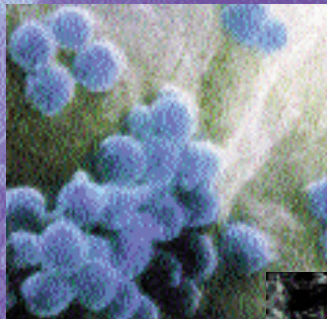


# Center for AIDS Research

AIDS-Related  
Research,  
Treatment,  
Outreach and  
Educational  
Programs



New York University  
School of Medicine



New York University  
School of Medicine

New York University

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*On the cover:* William Borkowsky, M.D.,  
Professor of Pediatrics, attends to a  
patient in the Pediatrics Infectious  
Diseases Family Clinic; newly made  
human immunodeficiency viruses  
(stained blue) emerging from an  
infected white blood cell.

Center For AIDS Research  
NYU School of Medicine

## AT THE FOREFRONT IN THE FIGHT AGAINST AIDS

FOR THE FIRST TIME SINCE THE DAWN of the AIDS epidemic in the United States, there is hope. The number of AIDS-related deaths in this country is finally declining, a trend that is expected to continue. With the advent of combination therapy — a “cocktail” of anti-viral drugs that can suppress replication of the human immunodeficiency virus — doctors and patients alike are beginning to view AIDS as a manageable chronic disease.

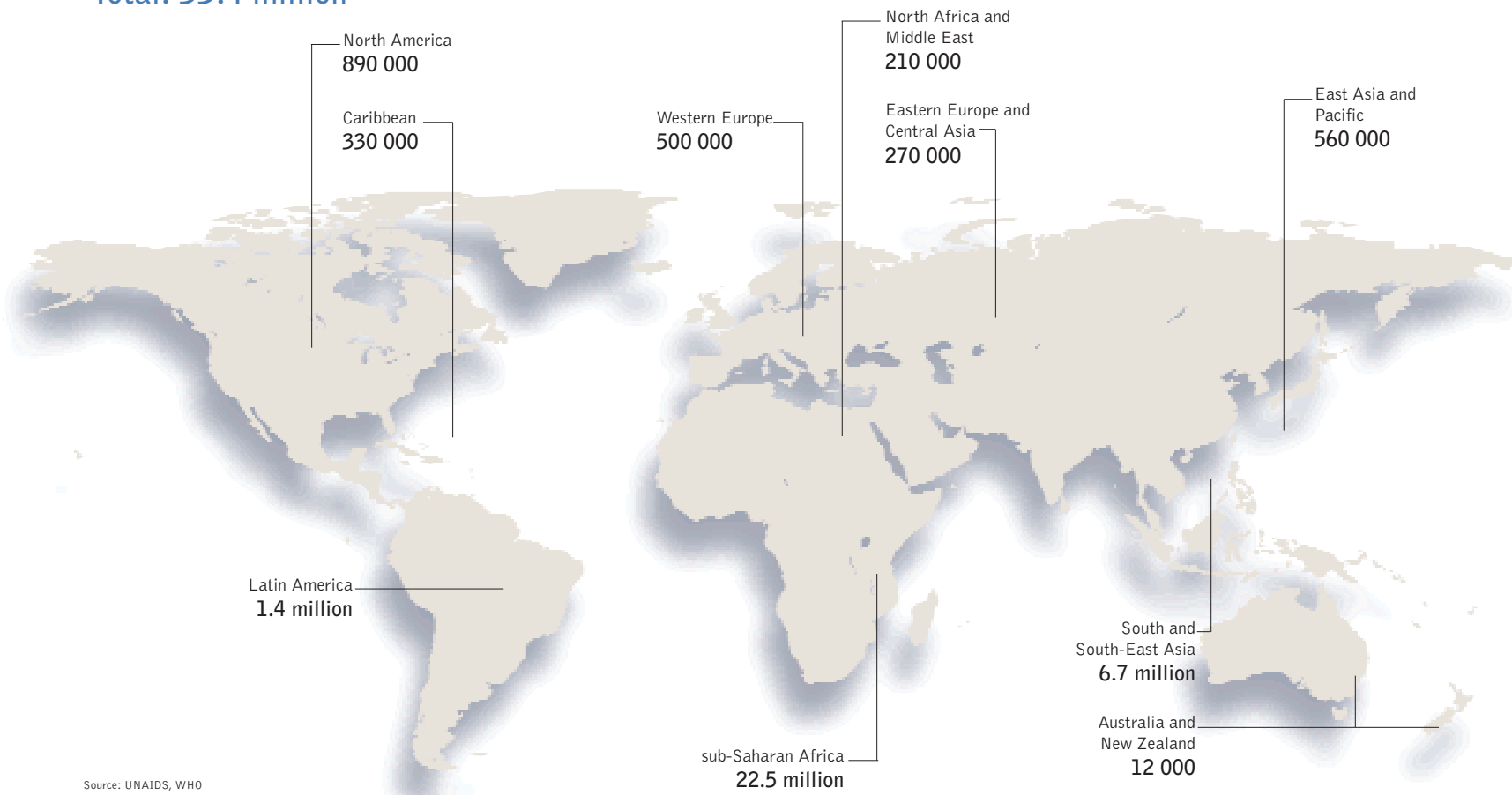
But the epidemic is far from over. Combination therapy is expensive — costing up to \$15,000 a year — and thus it is not available to all. Moreover, some patients suffer substantial side effects, while others cannot manage the rigorous pill-taking schedule. Dangerous drug-resistant strains of HIV can arise when patients do not meticulously follow their daily regimen. Also, the drugs have no effect on 15 to 20 percent of people with HIV, perhaps even more.

Moreover, HIV infection is escalating among certain groups, particularly minorities exposed through heterosexual sex and injection drug use. Approximately 40,000 new cases of AIDS are reported each year in the United States. Overseas, the situation is particularly bleak. AIDS is now the fourth leading cause of death in the world and the most deadly infectious disease. An estimated 35 million people are infected around the globe, the majority of them in developing countries where even basic health care is a luxury and expensive drug therapy is simply not an option. The World Health Organization has estimated that 16,000 new HIV infections occur every day, or almost six million a year.

As Daniel Zingale, Executive Director of the AIDS Action Council, has said, “AIDS is not over, but if we act like it is, it may never be.”

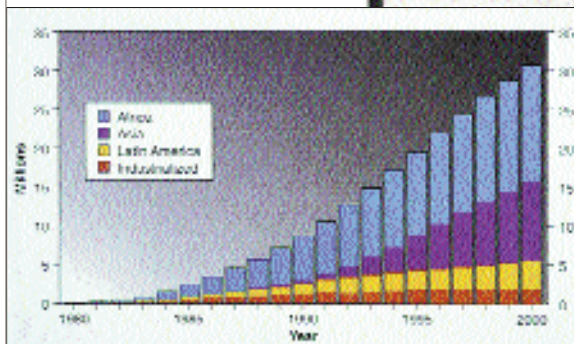
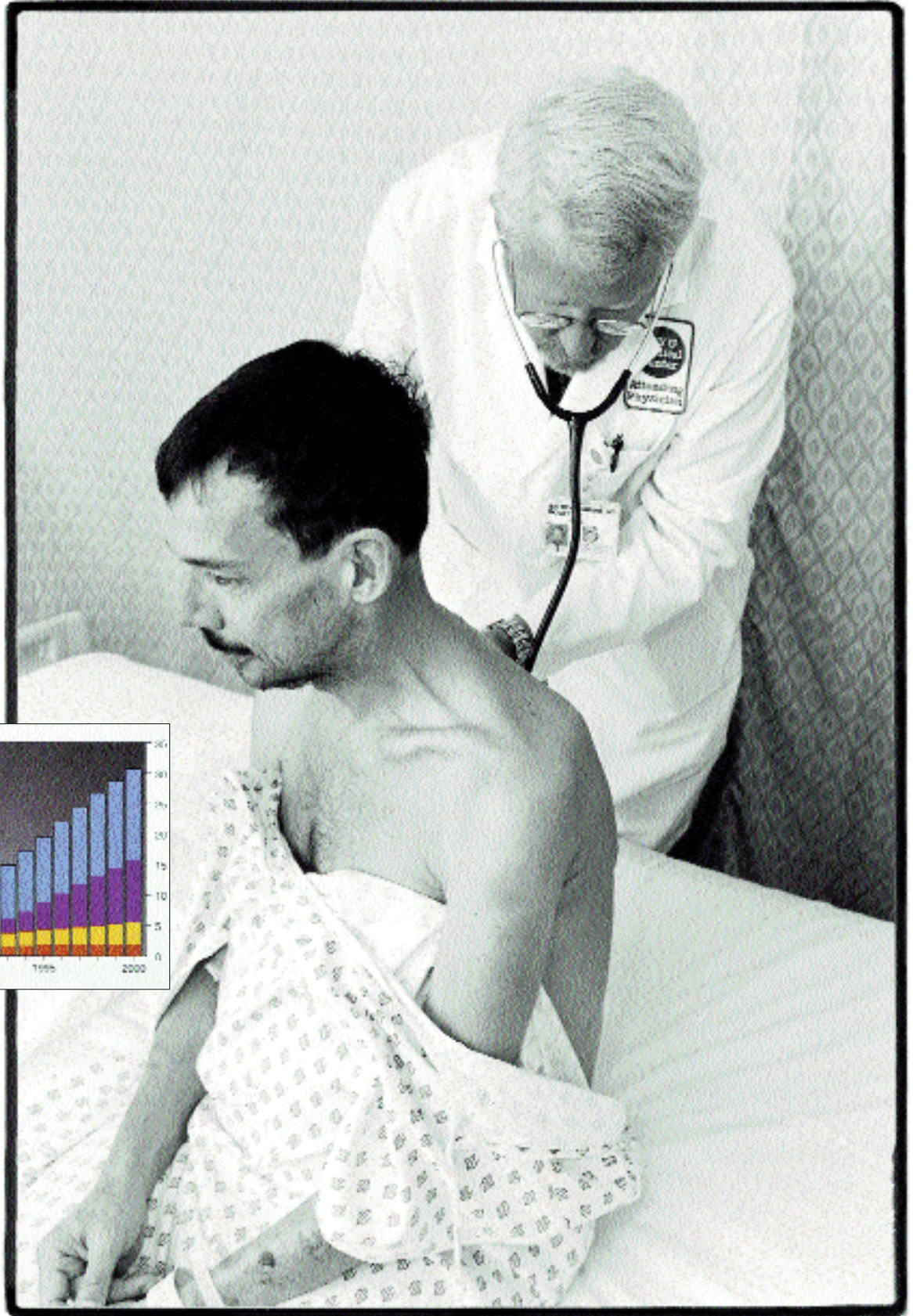
### Adults and children estimated to be living with HIV/AIDS as of 1998

**Total: 33.4 million**



# AN EPIDEMIC EMERGES

Jeffrey Greene, M.D.,  
Clinical Associate  
Professor of Medicine,  
conducting rounds at  
NYU's Tisch Hospital.  
In the early 1980s, Dr.  
Greene was one of the  
first doctors to recog-  
nize that a new infec-  
tious disease, eventually  
called AIDS, was  
spreading in New York  
City. Cases of AIDS  
continue to soar around  
the globe, with the large  
majority in Africa and  
Asia (inset).



## ... AND NYU RESPONDS

CLINICIANS AND RESEARCHERS AT NEW YORK UNIVERSITY MEDICAL CENTER have been closely involved with AIDS since the first signs of the epidemic. In 1980, patients with unusual opportunistic infections such as Kaposi's sarcoma and *Pneumocystis carinii* pneumonia began to be seen at Bellevue Hospital, a primary NYU teaching hospital. Ordinarily, these infections were found only in immunocompromised patients, mainly those receiving chemotherapy or undergoing transplants. Now, however, they were appearing in otherwise healthy young men.

An early clue to this epidemiologic puzzle was that the infections were appearing exclusively in men who have sex with men and in injection drug users, implicating an infectious agent transmitted in a manner similar to hepatitis B.

Sensing that they were witnessing the emergence of a new disease, a handful of NYU researchers and their laboratory colleagues began to investigate, delving into the epidemiology and immunology behind these unusual cases. Their early reports and publications would play a vital role in alerting the medical community, the government, and society at large to the growing epidemic.

Equally important, a group of NYU clinicians opened their practices to the infected members of the gay community, which was hardest hit by the epidemic. Many other health-care workers, fearing infection themselves, turned away anyone who might have the "gay plague." In less than a decade, NYU would build one of the nation's most comprehensive clinical programs for people with AIDS.

NYU doctors and scientists would amass an impressive list of "firsts," setting the standard for clinical care and research in this fledgling specialty. For example, researchers at NYU were the first to identify Kaposi's sarcoma as a manifestation of AIDS and the first to notify the Centers for Disease Control and Prevention (CDC) about the prevalence of this cancer among young gay men. NYU scientists were also the first to determine that AIDS is characterized by an immune deficiency. Early in the epidemic, investigators here made the alarming discovery that one-third of seemingly healthy homosexual men in New York City had immunologic abnormalities — the first indication that large numbers might be affected and that there is an early, asymptomatic phase of the syndrome.

Blood samples from these early patients were sent to Robert Gallo, M.D., then chief of virology at the National Cancer Institute. These were among the first specimens he examined in his studies that eventually led to the identification of HIV as the causative agent in AIDS. In 1984, NYU researchers were the first to receive FDA permission to test ganciclovir for the treatment of cytomegalovirus (CMV) infection. By this point, NYU had treated about 1,000 patients with CMV, one-sixth of the national caseload. The drug proved to be highly effective and was approved by the FDA in 1989. Later, NYU researchers would lead a national study proving that Bactrim (a medication containing trimethoprim and sulfamethoxazole) is more effective than aerosolized pentamidine in preventing recurrences of *Pneumocystis carinii* pneumonia (PCP), a leading cause of death in people with AIDS.

More recently, NYU spearheaded a multicenter trial demonstrating for the first time that three-drug combination therapy, including a potent protease inhibitor, can suppress HIV replication below detectable levels in the blood. This study revolutionized the treatment of HIV infection. Researchers at NYU also devised a diagnostic urine test for HIV. A simpler and less expensive alternative to blood tests, the urine test should broaden the acceptance and availability of HIV testing worldwide, especially in developing countries.

NYU pediatricians also have played a major role in AIDS since the early days of the epidemic. They were the first to describe the correlation between maternal viral burden and HIV transmission. Pediatricians here also described the nature of specific immune responses in HIV-infected children. Discoveries at NYU have led to changes in immunization practices and in guidelines for PCP prophylaxis for children with HIV. Today, NYU's pediatric clinical services and outreach programs are among the most comprehensive in the nation.

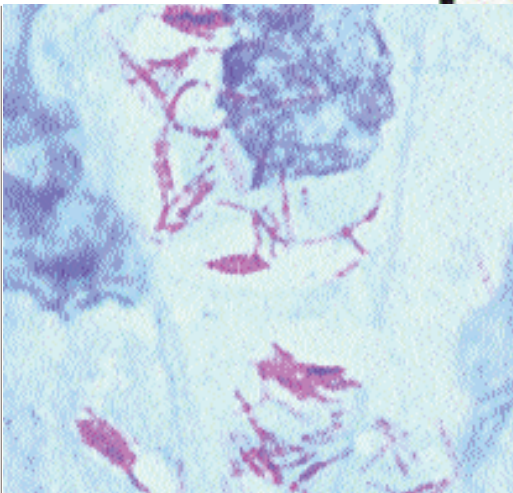
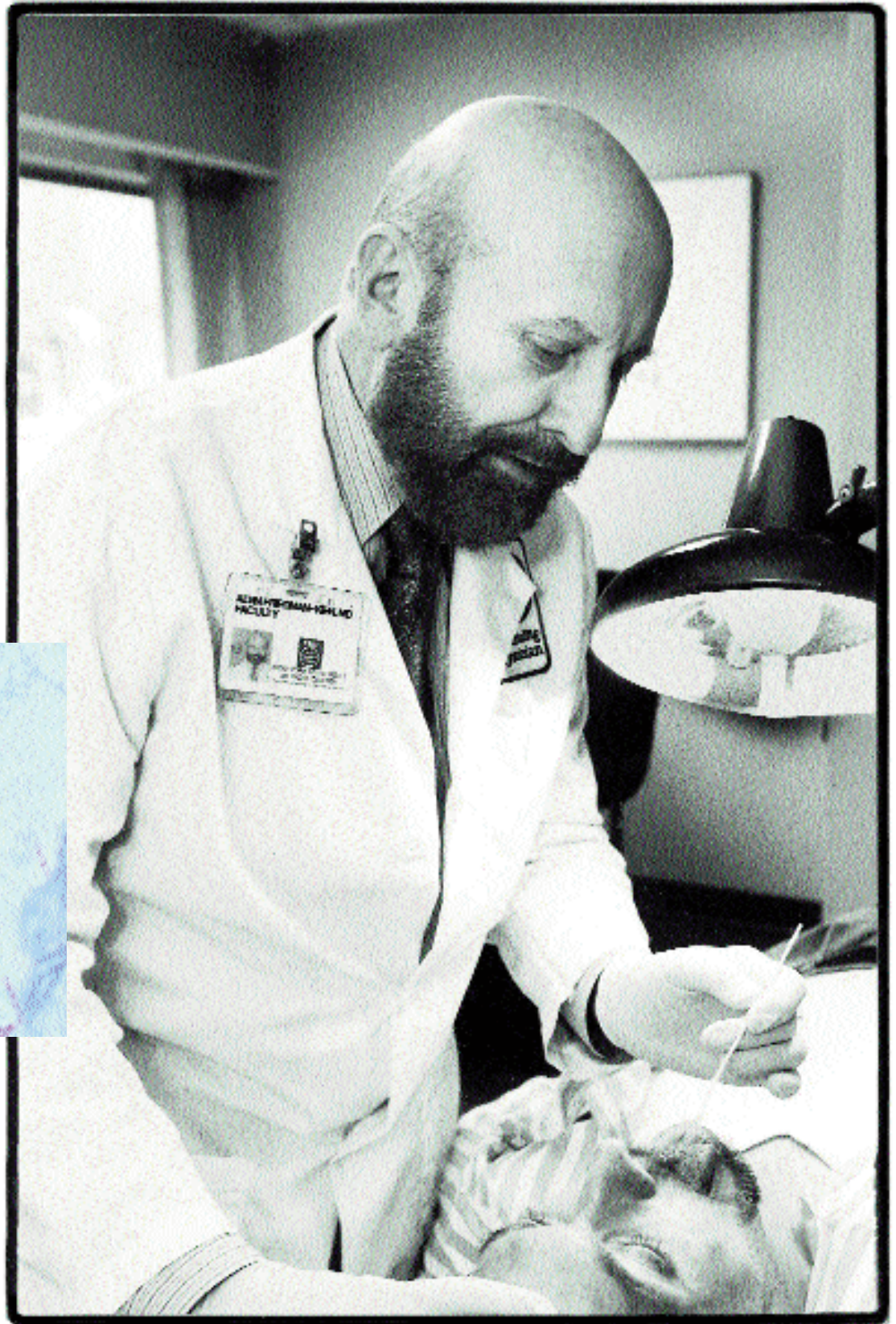


Philip Mannino, Alan Bennington, David Olsen, and Damian White (clockwise from top right) are the youngest participants in a clinical trial of AIDS VAX B/B, a vaccine now being tested at NYU Medical Center.

“Our generation was born into the age of HIV. We volunteered for the AIDS VAX trial because we needed to do something constructive. We don't want to lose our friends to this disease.”

-- Alan Bennington

# THE NYU CENTER FOR



A pioneer in the treatment of HIV-associated diseases, Alvin Friedman-Kien, M.D., Professor of Dermatology and Microbiology, treating a patient with Kaposi's sarcoma. Lung cells infected with the bacterium causing tuberculosis (stained magenta), a common infection seen in AIDS patients (inset).

# AIDS RESEARCH (CFAR)

IN THE MID 1980s, THE NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASE (NIAID), a division of the National Institutes of Health (NIH), established the first of 13 Centers for AIDS Research (CFARs). The CFARs, based at research institutions and universities, were designed to promote the development of scientific knowledge about AIDS, with the ultimate goal of improving the diagnosis, treatment and prevention of the disease.

CFAR awards provide investigators with shared core laboratory facilities, biostatistical consultation, and patient resources. The program encourages a multidisciplinary approach, involving a wide spectrum of basic and clinical research — a framework that promotes the quick translation of basic research findings into clinical therapies. CFAR is unique in that it supports established investigators as well as young scientists and those new to HIV research.

Two CFARs were established in New York City, including one in Manhattan at NYU Medical Center. NYU's CFAR began in 1989 under the leadership of H. Sherwood Lawrence, M.D., Jeffrey Bergstein Professor of Medicine, the discoverer of transfer factor, a small molecule capable of transferring antigen-specific immunologic memory of the donor to a recipient. The current director of NYU's CFAR is Fred T. Valentine, M.D., Professor of Medicine, who is also principal investigator of the Adult AIDS Clinical Trials Unit and an expert on the immunology of HIV disease.

CFAR brings together investigators throughout the NYU Medical Center campus, incorporating AIDS specialists and programs at Bellevue Hospital Center, the Department of Veterans Affairs New York Harbor Health Care System, and the Public Health Research Institute. Although CFAR's primary focus is research, it also supports a wide range of state-of-the-art clinical services for AIDS patients and their families, as well as a variety of educational and community outreach programs.

## Basic Research

CFAR is organized into five programs, defined by the strengths and expertise of NYU faculty. These programs include Developmental Therapeutics; Epidemiology, Transmission and Prevention; HIV-Associated Diseases; Vaccine Development; and Viral Pathogenesis. Four advanced-technology cores complement and enhance CFAR's interdisciplinary research: the Clinical Support Core, Flow Cytometry Core, Immunology Core, and Virology Core. In addition, CFAR investigators have access to other shared core services in the School of Medicine.

**Developmental Therapeutics** The Developmental Therapeutics Program focuses on developing and evaluating new drugs and treatment strategies to combat HIV disease and on providing insights into the pathogenesis of HIV disease in vivo, using therapeutic interventions that suppress HIV replication or initiate anti-HIV immune responses. The program, led by Dr. Valentine, includes studies of the Adult and Pediatric AIDS Clinical Trials Units (see below) as well as selected industry-sponsored trials. Researchers in this program also collaborate with basic science investigators and biostatisticians in CFAR to develop new treatment protocols.

**Epidemiology, Transmission, and Prevention** The Epidemiology, Transmission, and Prevention Program investigates pathways of HIV transmission: needle-borne transmission among injection drug users, sexual transmission among men and women, and transmission from mother to infant.

The program is headed by Michael Marmor, Ph.D., Professor of Environmental Medicine and Medicine. In recent work, Dr. Marmor and his colleagues in NYU's Infectious Disease Division



In just five years, from 1988 to 1992, Troy Masters watched as his best friends died of AIDS, while he somehow managed to remain free of HIV. In memory of his friends who passed away, he became one of the first volunteers for an historic clinical trial of a vaccine called AIDSVAX B/B. It is the first preventive HIV vaccine to be tested in a large-scale clinical trial. NYU Medical Center is one of the chief clinical testing sites.

"It is such an important trial," says Mr. Masters, who is the publisher of *Lesbian & Gay New York*, a biweekly newspaper. "So far the entire emphasis of the AIDS crisis has been about treatment. AIDS always has been viewed scientifically, and even culturally, as inevitable. Well, it isn't. I'm participating in this vaccine trial for all my friends who died of AIDS, and for all my new friends who are HIV-negative."

have demonstrated that needle exchange programs in New York City are lowering the transmission of HIV among injection drug users. They have also shown that methadone programs in conjunction with regular HIV counseling can change high-risk behaviors and lower the incidence of HIV infection.

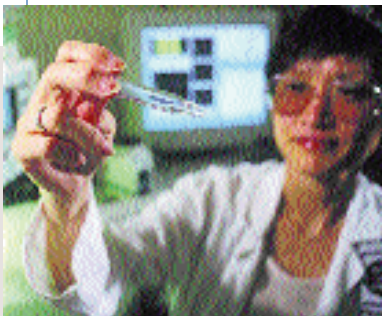
Dr. Marmor's group is now studying the epidemiology of tuberculosis in New York City and has been notably successful in designing and conducting HIV vaccine trials in high-risk groups. For two years the group has been using a Mobile Research Unit to access particularly hard-to-reach populations, who are tested for HIV, recruited for epidemiologic studies, and referred for treatment and counseling.

In addition, the group functions as a site for the National Institutes of Health HIV Network for Prevention Studies (HIVNET). Established in 1993, HIVNET is a multi-site network that develops and conducts population studies of vaccine and non-vaccine strategies to prevent the spread of HIV. National and local HIVNET Community Advisory Boards, made up of study participants and community leaders, collaborate to ensure that HIVNET studies are conducted ethically and with sensitivity to community needs.

**HIV-Associated Diseases** Tuberculosis, Kaposi's sarcoma, *Pneumocystis carinii* pneumonia, cytomegalovirus, and other infections that affect people with AIDS are the focus of the HIV-Associated Diseases Program. It is directed by William Rom, M.D., Professor of Medicine and a leading authority in the field of tuberculosis. Dr. Rom and his colleagues at NYU are known for demonstrating that TB infection in HIV-positive individuals increases the production of HIV in the lungs.

The HIV-Associated Diseases program also includes research conducted by the NYU unit of the NIH-funded AIDS Related Malignancy Consortium, led by Alvin Friedman-Kien, M.D., Professor of Dermatology and Microbiology. A pioneer in the field, Dr. Friedman-Kien has developed a diag-

Doris Tse, Ph.D., Research Assistant Professor of Pathology and Director of the Flow Cytometry Core.



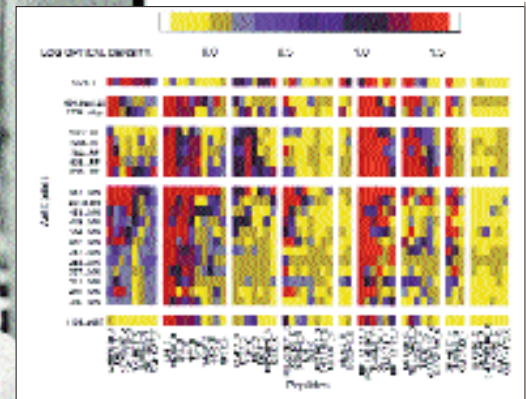
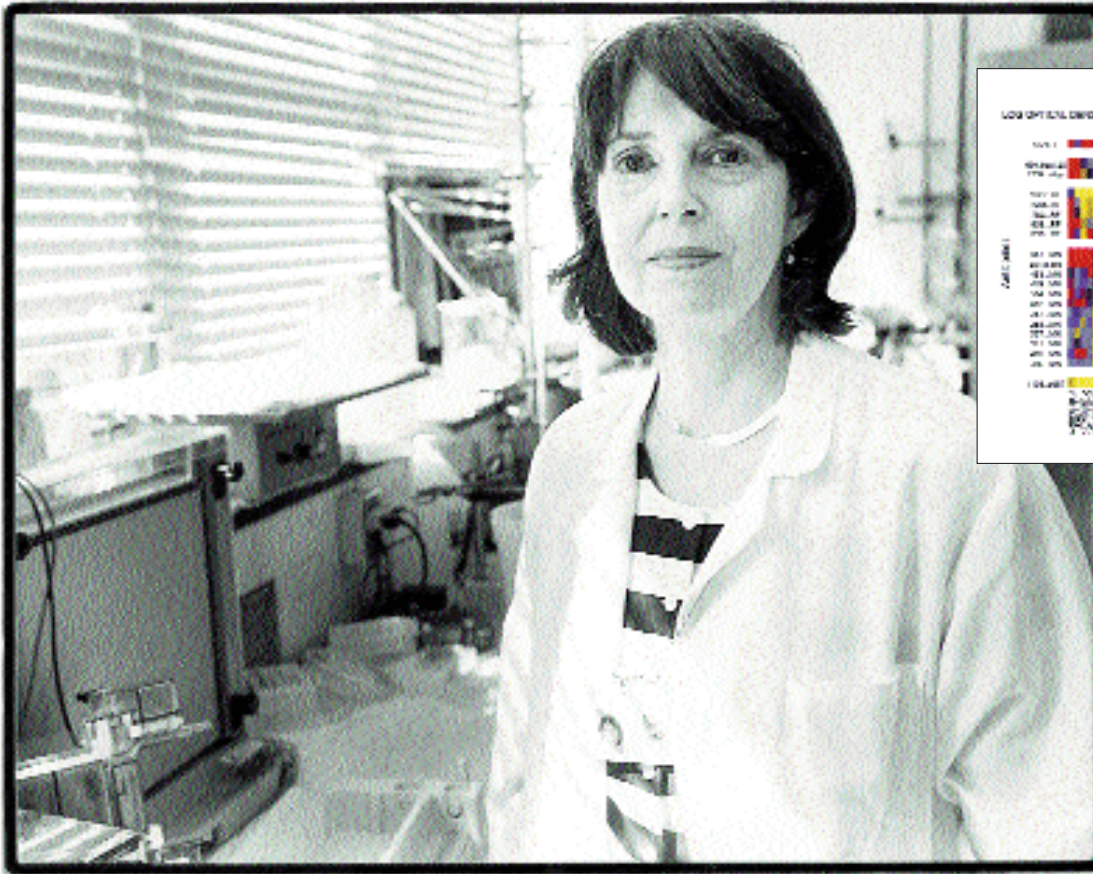
The CFAR supports four core laboratories that provide data analysis, specimens, immunologic and virologic assays, monoclonal antibodies, and biostatistical consultation services to investigators at NYU Medical Center.

#### ► Clinical Support Core

The Clinical Support Core provides a variety of services to encourage the rapid conduct of patient-based research. Specific services provided to CFAR investigators are: epidemiological and biostatistical consultation; processing and storage of biological samples from HIV-infected patients and uninfected controls; and cataloging and distributing information on specimens stored either in the CFAR core facilities or in the laboratories of CFAR investigators.

The core is led by Dr. Marmor and Keith Krasinski, M.D., Professor of Pediatrics and Environmental Medicine.

## SHARED CORE RESEARCH SERVICES



Results from a new assay (inset) developed by Susan Zolla-Pazner, Ph.D., Professor of Pathology. Using this highly sensitive assay, Dr. Zolla-Pazner demonstrated that some AIDS vaccines can induce antibodies that neutralize strains of HIV obtained directly from patients.

#### ► Flow Cytometry Core

Under the direction of Doris Tse, Ph.D., Research Assistant Professor of Pathology, the Flow Cytometry Core provides technical expertise and extensive instrumentation for the detection, identification, enumeration, sorting and cloning of cells based upon the quantitation of molecules expressed inside of cells or on their surface.

#### ► Immunology Core

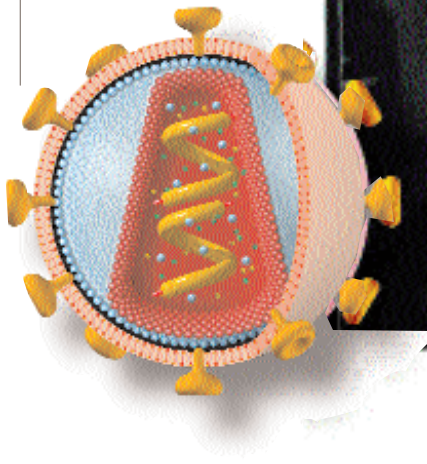
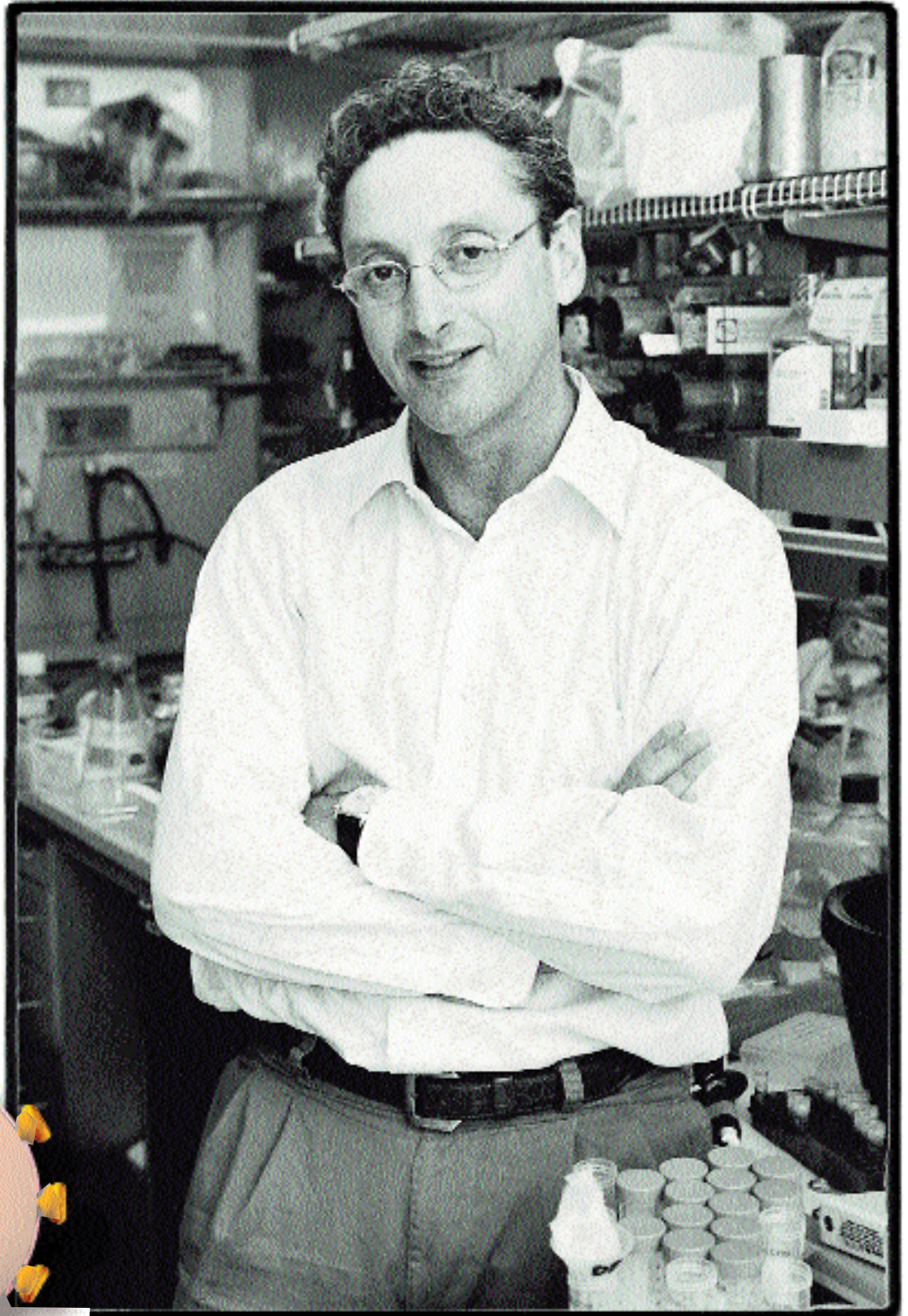
The Immunology Core, led by Dr. Susan Zolla-Pazner, offers a variety of laboratory assays to CFAR members and other AIDS researchers inside and outside the NYU Medical Center community. These services include ELISA and Western blot tests for HIV-1 antibodies; mea-

surements of the ability of antisera to neutralize HIV, using a new technique developed by CFAR investigators; immunochemical and functional analyses of monoclonal antibodies; and production of human and murine (mouse) monoclonal antibodies.

#### ► Virology Core

The Virology Core provides a variety of services to researchers, including isolating HIV from clinical samples; quantifying infectious HIV in clinical samples; phenotyping HIV-1 isolates; sequencing the HIV genome to identify mutations; testing antiviral agents; and quantifying HIV RNA levels. William Borkowsky, M.D., Professor of Pediatrics, is director.

Dan Littman, M.D.,  
Ph.D., Helen L. and  
Martin S. Kimmel  
Professor of  
Molecular  
Immunology and  
Professor of  
Pathology and a  
Howard Hughes  
Medical Institute  
Investigator, discov-  
ered the second  
receptor to which



nostic test for HHV8 — a newly discovered herpes virus that is thought to cause Kaposi's sarcoma — which will help doctors determine the prevalence of this infection. The team is currently studying the relationship of HHV8 to the pathogenesis of Kaposi's and is conducting clinical trials of antiviral drugs for patients with this form of cancer.

Douglas Dieterich, M.D., Clinical Associate Professor of Medicine and a renowned expert on cytomegalovirus (CMV) gastrointestinal disease, recently compiled CMV treatment guidelines for the International AIDS Society. He is now evaluating new drugs for the treatment of viral hepatitis, an infection common to patients with HIV.

**Vaccine Development** The Vaccine Development program is concerned with identifying and characterizing immune responses against HIV that may be associated with protection against infection or that may control infection in individuals already carrying the virus.

The program is directed by Susan Zolla-Pazner, Ph.D., Professor of Pathology, who is internationally recognized for her expertise in the immunology of HIV. She also serves as scientific director of the Research Center for AIDS and HIV Infection at the Department of Veterans Affairs New York Harbor Health Care System.

NYU's vaccine development team recently developed a new assay to measure the presence of neutralizing antibodies. The previous test was insufficiently sensitive, and its use caused scientists to underestimate the ability of some experimental vaccines to induce a desired antibody response. Using this new test, Dr. Zolla-Pazner's group showed that some AIDS vaccines can induce antibodies that neutralize strains of HIV obtained directly from patients. Previously, researchers had only been able to demonstrate that the vaccines induced antibodies that inactivated test-tube-grown viruses. These results are rejuvenating the vaccine effort and moving AIDS vaccines closer to clinical trials.

Abraham Pinter, Ph.D., Professor of Microbiology and Senior Scientist at NYU's Public Health Research Institute, is studying "miniproteins" on gp120, a critical glycoprotein found on HIV's outer coat that the virus uses to bind to and infect white blood cells. Although gp120 has been difficult to target, Dr. Pinter has managed to induce antibody responses against this region in lab animals, an important step toward developing an HIV vaccine based on these immunogenic miniproteins.

In a related approach, Hanna Kelker, Ph.D., Research Assistant Professor of Medicine, has devised a strategy for inducing novel antibody and cell-mediated immune responses against folded regions of the HIV outer protein, "conserved" regions that do not mutate because they are essential for viral function.

Another key figure in vaccine development is Dan R. Littman, M.D., Ph.D., Helen L. and Martin S. Kimmel Professor of Molecular Immunology and Professor of Pathology, Associate Director of CFAR for basic sciences, and a Howard Hughes Investigator. He is also a member of the AIDS Vaccine Committee of NIH, a group assembled at the behest of President Clinton. Dr. Littman discovered the second receptor to which HIV must bind when it infects cells.

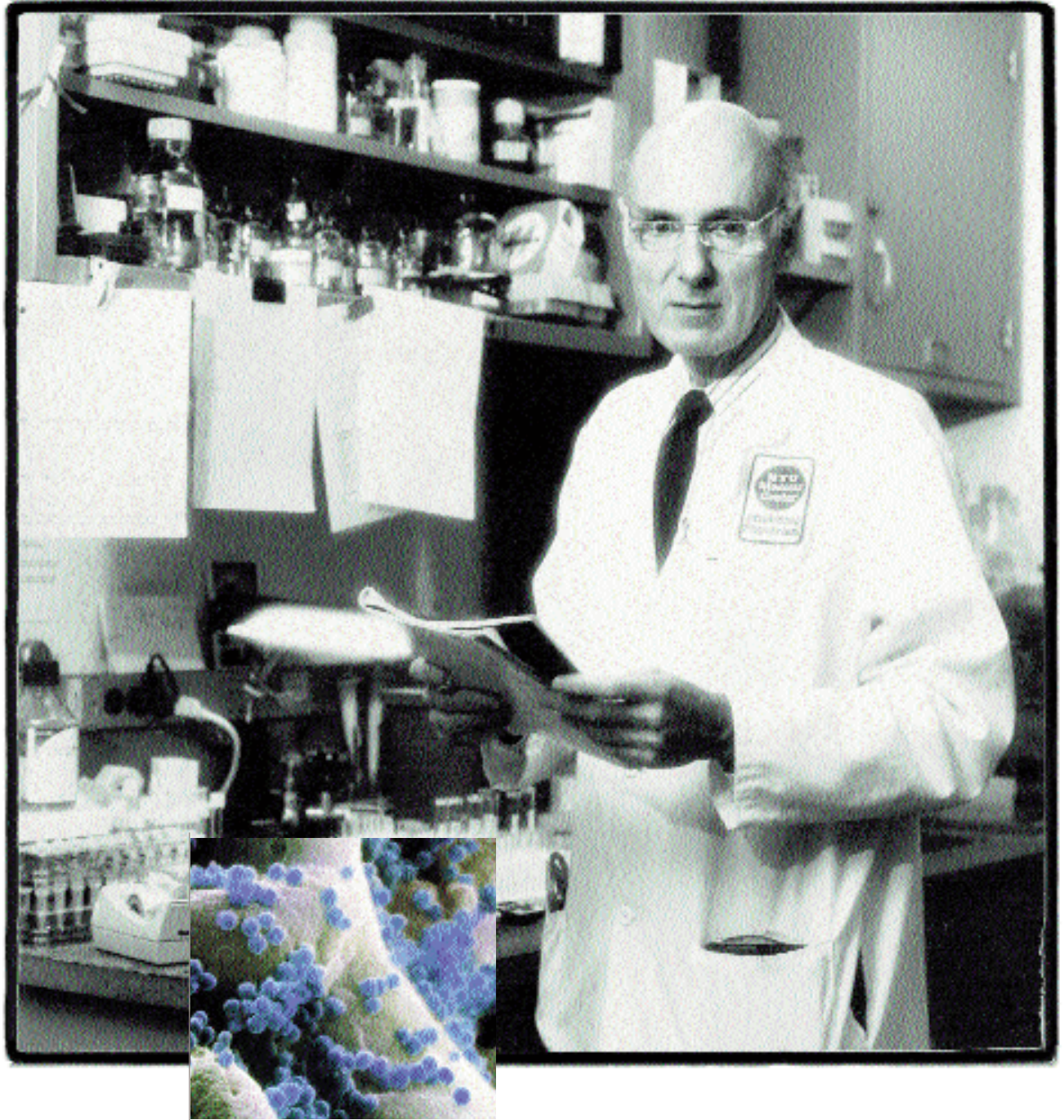
**Viral Pathogenesis Program** The Viral Pathogenesis program conducts studies to determine viral and host cellular factors that govern the pathways of HIV infection, both in vitro and in vivo. (The program is directed by Dr. Littman. He also heads the Molecular Pathogenesis program of the Skirball Institute of Biomolecular Medicine at the School of Medicine.



As one of the first policemen in the New York City Police Department to become infected with HIV through heterosexual sex, **Stephen P. Yurcik** has been on the front line of efforts to educate fellow officers about AIDS. Mr. Yurcik founded "Positive Police," a support group for officers with HIV, and he counsels officers about the medical, emotional and legal issues surrounding the disease.

Mr. Yurcik retired in 1996, after serving on foot patrol and as a plain-clothes officer in one of the City's largest precincts. He now lectures in local high schools about HIV/AIDS, and hopes to establish a scholarship fund for children whose parents have died of the disease. Mr. Yurcik is the father of two girls. His wife died of AIDS in 1992.

Mr. Yurcik came to NYU's CFAR in 1998, enrolling in a clinical trial with hopes of finding medications that can quell his disease. "The research has to be done, and it is only through the trials that we learn what works and what does not," he says.



Fred Valentine, M.D., Director of CFAR and principal investigator of the Adult AIDS Clinical Trials Unit, is a leading authority on the immunology of HIV disease. Newly made human immunodeficiency viruses (stained blue) emerging from an infected white blood cell (inset).

Dr. Littman's laboratory is currently investigating the molecular events underlying T-lymphocyte differentiation and activation and the mechanisms HIV employs to enter target cells and cause systemic depletion of helper T cells. In the last year or so, the laboratory has discovered a number of co-receptors for HIV on T cells and macrophages. The new receptors are potential targets for blocking the HIV life-cycle at its earliest stage, when it enters cells of the immune system.

Dr. Pinter and his colleagues are studying envelope proteins of retroviruses. These are critical components in viral infection and function as a major target of the immune response to HIV infection.

Charles Gonzalez, M.D., Assistant Professor of Medicine, and Dr. Valentine are investigating mechanisms by which HIV infection results in the death of uninfected lymphocytes by the process of apoptosis, or programmed cell death.

## Clinical Trials

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**AIDS Clinical Trials Group** In 1986, the National Institute of Allergy and Infectious Disease (NIAID), established a program to foster collaborative clinical trials of experimental therapies in persons infected with HIV. NYU was one of the first such groups in the nation, called AIDS Clinical Trials Units (ACTUs). There are now 28 adult and 23 pediatric ACTUs. These units and their affiliated institutions, the NIAID Division of AIDS, and a center for data management and analysis make up a consortium called the AIDS Clinical Trials Group (ACTG).

The NYU ACTU is one of the most productive in the nation, enrolling 150 to 200 patients per year in adult and pediatric clinical trials, supported by both NIH and pharmaceutical companies. NYU is the only site in New York with separately funded adult and pediatric trials units. Data from the units have supported the licensing of several drugs.

**Adult ACTU** The Adult ACTU, which is led by Dr. Valentine, focuses on therapies for HIV infection as well as for opportunistic infections and cancers associated with AIDS. The unit is staffed and managed by a multidisciplinary group of physicians and research nurses, mainly from infectious diseases and immunology disciplines.

The majority of patients enrolled in studies at the ACTU are ambulatory. These patients are seen in a special outpatient AIDS research clinic at Bellevue Hospital established by NIH. This clinic is designed to eliminate waiting time and permit physicians and nurses to spend as much time as needed with each patient. Inpatients are also enrolled in clinical trials; they are hospitalized in the General Clinical Research Center (see below) for intensive pharmacokinetic studies.

NYU researchers recently conducted the first study showing that combination therapy with a protease inhibitor, 3TC, and AZT is able to decrease HIV replication to undetectable levels in 85 percent of patients. The effect persisted in two-thirds of study subjects for as long as three years. This therapy, to date the most significant advance in AIDS treatment, has transformed HIV into a manageable, long-term disease for many patients, and has provided hope that new drugs with greater efficacy and fewer side effects will be developed.

Several clinical trials are in progress, including studies of new antiviral agents in patients who do not respond to initial combination therapy. In other projects, investigators are testing multi-drug regimens with easier-to-follow dosing schedules. Clinical investigators and immunologists also are evaluating whether antiviral drugs, given to patients with acute primary infection, have any effect on long-term prognosis and permit the immune system to control HIV infection.

NYU researchers are playing a leading role in developing therapeutic HIV vaccines that can rev up the immune system in patients well along in their infections.



Vietnam veteran **Don MacIver** had given up hope of ever finding an AIDS treatment when he became seriously ill with pneumonia in 1995. Fortunately, the next year he was able to enroll in a clinical trial of a new combination therapy at NYU's AIDS Clinical Trials Unit (ACTU). The therapy, which combined a protease inhibitor called Crixivan with two other drugs, AZT and 3TC, saved his life. Today, after more than three years of continuous therapy, his viral load is undetectable and his T-cell count, a measure of the strength of his immune system, has rebounded to normal levels.

"When my health improved after I started taking the combination therapy, I realized that I had a future," he says. Looking ahead, Mr. MacIver has started a computer consulting company. He also serves as vice chairman of the ACTU Community Advisory Board.

In addition, NYU researchers are playing a leading role in developing "therapeutic" HIV vaccines that can rev up the immune system in patients well along in their infections. In preliminary studies, patients with HIV were given standard combination therapy. When their blood showed no signs of the virus, they were immunized with an inactivated form of HIV. These immunizations stimulated "missing" types of immune responses against HIV that the infection itself had not induced. The immune responses were as large as those seen in rare HIV-infected individuals whose immune systems do control the virus. These observations suggest that it may be possible to wean some patients from combination therapy. This would be a major advance because many people have trouble adhering to the rigorous drug regimen, the drugs are costly, and long-term use can cause troubling side effects. Further clinical trials are being developed.

**Pediatric ACTU** Clinical investigators in the Pediatric ACTU study ways to prevent perinatal transmission of HIV and to treat children already infected with HIV. Investigators in this unit also study interventions directed at AIDS-related immune system dysfunction and HIV-associated diseases. The unit is headed by William Borkowsky, M.D., Professor of Pediatrics.

Numerous clinical trials are in progress, including a study of oral ganciclovir for the treatment of asymptomatic CMV infection; an evaluation of the safety and toxicity of various combinations of drugs, including protease inhibitors, in HIV-infected or exposed infants; a study of the safety and immunogenicity of live attenuated varicella vaccine in HIV-infected children; and a trial of nevirapine for the prevention of maternal-fetal transmission in pregnant HIV-infected women who present in the third trimester of pregnancy.

**General Clinical Research Center** NYU's General Clinical Research Center (GCRC), established in 1960, was one of the first of 12 such centers established by NIH. Located at Bellevue Hospital Center, it facilitates multidisciplinary collaborations between basic and clinical scientists at the NYU School of Medicine and its Skirball Institute of Biomolecular Medicine. The GCRC supports more than 100 protocols a year in such HIV-related areas as maternal-fetal HIV transmission, AIDS therapies, and tuberculosis.

## Clinical Services

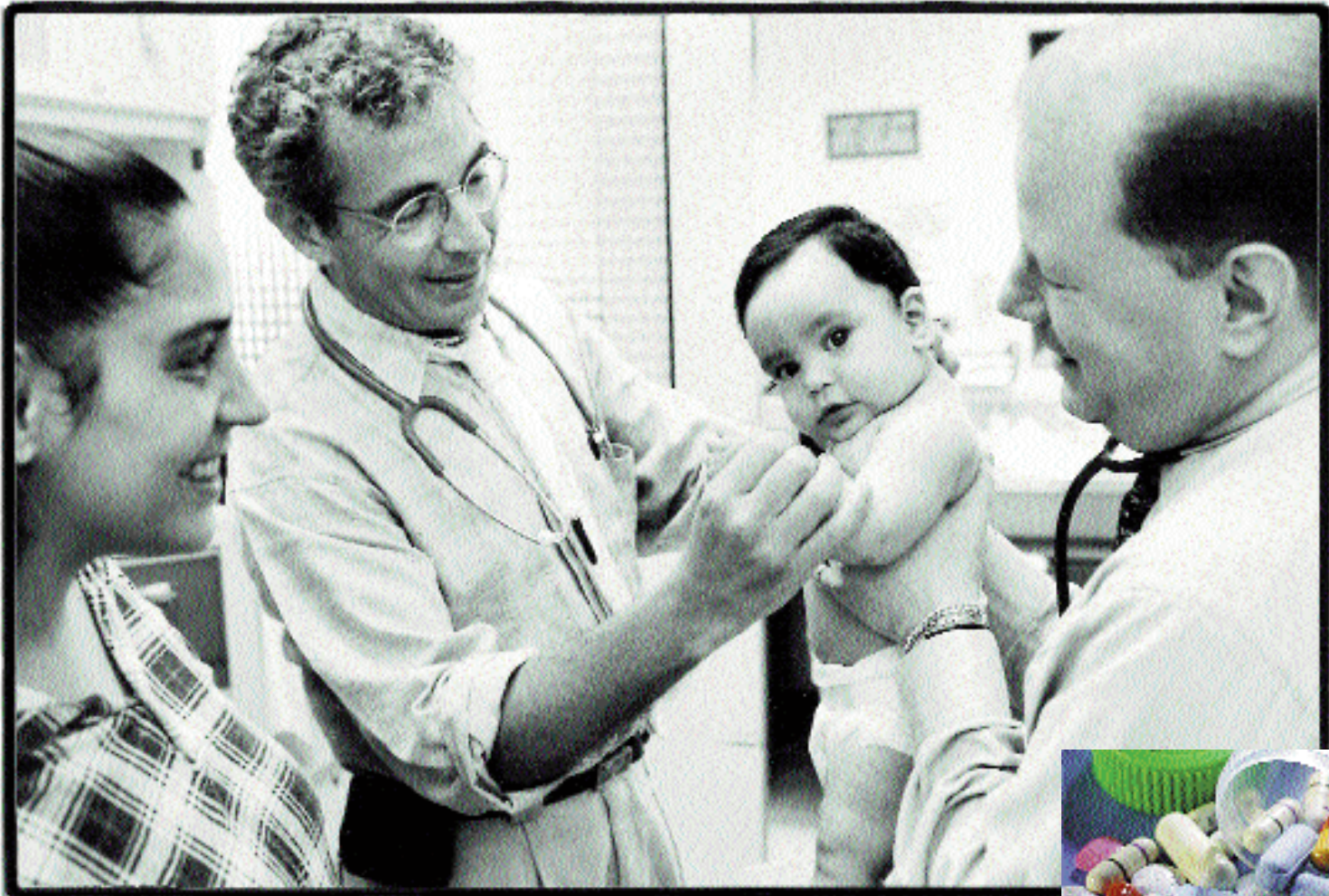
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NYU Medical Center has long been a major provider of services to HIV-infected persons. At the beginning of the AIDS epidemic, clinicians at NYU Medical Center and its affiliates were treating nearly 10 percent of all HIV/AIDS patients in the United States. Approximately 4,500 HIV-infected people are now treated annually by the clinical faculty of NYU Medical Center.

Today, most people with AIDS are treated in outpatient settings. In just three years, the average daily number of patients hospitalized at NYU with AIDS has declined by more than one half, from 200 to less than 100, thanks to advances in the treatment of HIV infection and in the prevention and management of opportunistic infections.

Among the AIDS-related clinical services at NYU Medical Center are:

- ▶ A specialized AIDS Inpatient Unit, located on the 17th floor of Bellevue Hospital.
- ▶ The Virology Clinic, a Bellevue Hospital outpatient facility, where approximately 1,000 HIV-infected individuals receive their care.



- ▶ The AIDS-Related Malignancy Consortium, located at Tisch Hospital, which focuses on care for people with Kaposi's sarcoma.
- ▶ The Pediatrics Infectious Diseases Family Clinic, a major provider of health-care services for mothers and children in lower Manhattan at risk for or infected with HIV. Located at Bellevue Hospital, the clinic follows more than 300 families, including 80 to 85 children who are HIV positive.
- ▶ The HIV/AIDS Adolescent Clinic, located at Bellevue, which provides free confidential HIV testing, pre- and post-test counseling, complete medical evaluations, comprehensive medical care, and referral to clinical trials for HIV-positive teens.
- ▶ The Pediatric Day Hospital, for children who require lengthy intravenous infusions but not hospitalization. The Day Hospital provides medical, nursing, psychological and social support services.
- ▶ The Lower New York Consortium for Families with HIV, which offers a variety of AIDS-related services, including family-based, comprehensive, case-managed primary care; comprehensive health services for women; community-based outreach and case management linkage; referral to clinical trials; and the Teen Outreach Prevention Service (TOPS) which provides HIV/AIDS education and prevention strategies as well as medical and social services for New York City youth.

William Borkowsky, M.D.,  
 Professor of Pediatrics  
 (second from left), and  
 William Hoover, M.D.,  
 Clinical Assistant Professor of  
 Pediatrics (far right), attend to  
 a mother and child in the  
 Pediatrics Infectious Diseases  
 Family Clinic. New HIV  
 medications (inset).

In just three years, the average daily number of patients hospitalized at NYU with AIDS has declined by more than one-half, thanks to advances in the treatment of HIV infection and in the prevention and management of opportunistic infections.

**Private Practices** Since the beginning of the epidemic, NYU physicians in private practice have played a significant role in the care of people infected with AIDS. Today, these clinicians are nationally recognized for their expertise in the management of this disease.

## Education and Outreach

CFAR investigators are also committed to educating both health-care providers and HIV-infected individuals with up-to-date information about the disease.

As members of the faculty of the NYU School of Medicine, CFAR investigators teach medical students, doctoral candidates, interns, residents, and postdoctoral fellows. In 1995, NIAID awarded NYU Medical Center its second five-year AIDS Training Grant for preparing young investigators in the multiple disciplines of HIV/AIDS-related research. AIDS specialists are also trained in the Department of Medicine's Fellowship Program in Infectious Diseases.

CFAR is also active in education nationally and internationally. Members are regularly invited to present lectures in the United States and abroad. In turn, CFAR sponsors seminars for its own researchers and clinicians, presented by HIV/AIDS experts from around the world.

AIDS research efforts in Poland have benefited immeasurably from NYU's CFAR. In recent years, CFAR trained 12 physicians from Poland in methods for performing clinical evaluations of antiretroviral drugs and in the management of various facets of HIV-disease. NYU also trained the director of the HIV laboratory at the Warsaw AIDS Institute. In addition, Philip Alcabes, Ph.D., an NYU CFAR epidemiologist, has worked in Poland on the epidemiology of transmission among intravenous drug users.

Community outreach is an important focus at CFAR. The staff of CFAR firmly believes that an

## RESEARCH AND TREATMENT MILESTONES

NYU physicians and researchers ...

- ▶ were the first to determine that AIDS is characterized by an immune deficiency
- ▶ were the first to identify Kaposi's sarcoma as a manifestation of AIDS, and the first to notify the Centers for Disease Control and Prevention about the prevalence of this cancer among young gay men
- ▶ discovered that up to one-third of seemingly healthy homosexual men in New York City had immunologic abnormalities — the first indication that large numbers might be affected and that there is an early, asymptomatic phase of the syndrome
- ▶ were the first to describe the correlation between maternal viral burden and HIV transmission
- ▶ were the first to describe the presence of low blood platelet counts in HIV disease and delineate the mechanisms by which this occurs

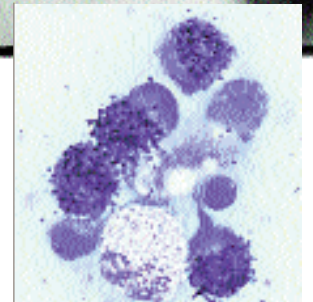
informed community will have a lower incidence of infection, that educated individuals will seek testing and medical help earlier in course of their disease, and that knowledgeable patients will be more likely to understand and adhere to treatments.

One example of CFAR's outreach efforts is a free public lecture series on emerging issues related to AIDS, featuring talks by prominent AIDS specialists from academia, government and industry. Topics have including combination therapy and summaries of national and international AIDS meetings. These full-day events, which are co-sponsored by the National AIDS Treatment Advocacy Project, attract a diverse audience, including patients, activists, and health-care providers, with attendance often exceeding 500.

Clinical investigators also have presented talks about HIV/AIDS to groups of infected individuals in community centers and clinics throughout Brooklyn and the Lower East Side.

The AIDS Clinical Trials Unit at NYU/Bellevue has the oldest and most active Community Advisory Board in the country. As a result, CFAR investigators enjoy an excellent working relationship with the community of infected individuals, which helps investigators assess the need for new therapies and the feasibility of performing new clinical trials.

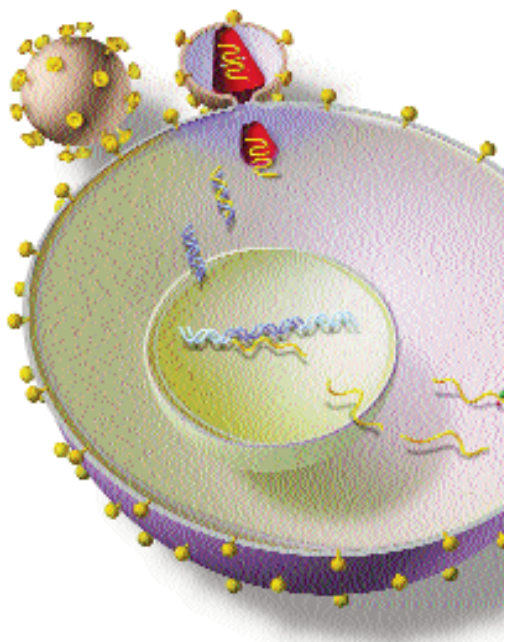
HIVNET's Community Advisory Board is involved in a variety of outreach activities. In recent years, HIVNET workers have helped spread the prevention message by distributing literature and networking with other agencies. In addition, HIVNET organized a special meeting for the community on women's issues related to AIDS. NYU's pediatricians conduct a number of outreach programs within the Lower New York Consortium for Families with HIV.



Alexander A. McMeeking, M.D., Clinical Assistant Professor of Medicine, one of many NYU physicians with a deep commitment to battling AIDS. Lymphocytes demonstrating a normal immune response to HIV (inset).

- ▶ were the first to receive FDA permission to test ganciclovir for the treatment of cytomegalovirus (CMV) infection
- ▶ discovered the second receptor to which HIV must bind when it infects T cells and macrophages
- ▶ devised a diagnostic urine test for HIV, a simpler and less expensive alternative to blood testing
- ▶ led a national study proving that Bactrim is better than aerosolized pentamidine in preventing recurrences of *Pneumocystis carinii* pneumonia, a leading cause of death in people with AIDS
- ▶ led a multicenter trial demonstrating for the first time that three-drug combination therapy, including a potent protease inhibitor, can suppress HIV replication below detectable levels in the blood

## THE FUTURE



NEW YORK UNIVERSITY SCHOOL OF MEDICINE'S CENTER FOR AIDS RESEARCH unites an impressive group of research, clinical, educational, and outreach programs, each among the best in the nation. Yet these efforts are not enough.

Treatment is improving, but it is very expensive, and thus beyond the reach of many, especially people with HIV who live in our inner cities and in the developing world. And, of course, there still is no cure. Meanwhile, tens of thousands of new cases are occurring every day around the world, and tens of millions of people are already infected. In other words, the epidemic is far from over.

However, it could be — with more support for activities like basic research into the molecular biology of HIV infection and vaccine design, clinical trials of promising medications and vaccines, training programs for researchers and clinicians, HIV-prevention campaigns, and community-outreach efforts.

From a global perspective, the number-one priority is a vaccine. “Therapies are not going to reach the vast majority of people infected with HIV,” says NYU scientist Dr. Dan Littman. “We need to prevent new cases from occurring. A vaccine may be the only way to contain the worldwide epidemic.”

Unfortunately, an effective vaccine is still not a reality, which points to the need for more basic research into the molecular biology and immunology of HIV, among other areas. “Without basic research, there will be no advances in the prevention or treatment of HIV,” adds Dr. Fred Valentine.

Next, there is a great need for inexpensive medications for combating HIV. Combination therapy is effective but costly, and essentially unattainable in developing countries, which bear the largest burden of the epidemic. In addition, the AIDS cocktails are not universally effective, and they often cause serious side effects. Thus, new medications must be developed and tested, an expensive process.

Education is critical. “We need to teach people how to prevent infection with HIV, with programs specifically tailored for each socioeconomic group,” says Dr. Valentine. “We know how to do this. We have the knowledge — but we haven't made a full effort in prevention and outreach.”

At NYU, there are many worthy projects in need of support. HIV-associated disease specialists, for example, are hoping to start more basic research into the immunology of tuberculosis and to conduct a clinical trial of interferon gamma in HIV patients who have contracted TB. Other researchers are ready to launch comparative drug studies, which pharmaceutical companies are reluctant to fund.

Monies are needed for “off-the-beaten-track” studies. “NIH tends to fund next-logical-step experiments,” explains Dr. Valentine. “By and large, these aren't the ones that lead to the big steps forward. This is a place where private funds could really help.”

And support is needed for young investigators, he adds. “There are a lot of bright, exceedingly dedicated people who leave academic research for lack of funding. We need to sustain the researchers of the future.”

According to Dr. Zolla-Pazner, “Private funds could be used to recruit investigators with novel ideas to establish pilot programs.”

Given the opportunity, Dr. Michael Marmor would launch a training program for minority epidemiologists. “HIV/AIDS is becoming more and more a disease of minorities, so there is a need for people who can go into these communities and gain their confidence, counteracting the tremendous distrust towards government and medical experimentation,” he explains.

This list goes on and on. With more funding, NYU's programs of research, clinical care, and outreach could go on and on, too.

