



Preventing the spread of infectious diseases

Dr. Mike Cohen (right) greets UNAIDS executive director Michel Sidibé outside the World Bank in New York City.

Identifying proper treatments for eradicating infectious diseases is often “the easy part.” The hurdle is to deliver effective prevention protocols to affected populations. UNC public health researchers are overcoming this challenge with some of the world’s most contagious viruses.

Malaria

Malaria causes almost a million deaths per year. Around 30 percent of adults in the Democratic Republic of the Congo are infected with malaria, according to epidemiology professor Dr. Steve Meshnick. Meshnick has worked closely with UNC geography professor Dr. Michael Emch to map the disease and

identify factors responsible for its geographic spread. Read more about Meshnick’s work at www.sph.unc.edu/cph/tropical_disease.

SARS

Airborne viruses are also dangerous. A National Institutes of Health (NIH)-funded team led by epidemiology professor Dr.



Dr. Steve Meshnick



Dr. Ralph Baric

Ralph Baric investigates why SARS infection is more lethal among individuals over age 50. Using a mouse model, the team tests how new vaccine platforms induce robust protective immunity in older adults. Furthering their work, Baric and a team from UNC and Vanderbilt University have reconstructed synthetically the bat variant of the SARS



PHOTO PROVIDED BY MICHEL SIDIBE

Breakthrough of the Year

A UNC-led team has identified a protocol that prevents the transmission of HIV, the AIDS-causing virus—a feat once considered an impossible dream.

In a National Institute of Allergy and Infectious Diseases-funded study of 2,000 couples, epidemiology professor Dr. Myron Cohen and colleagues found starting antiretroviral therapy in infected partners with relatively healthy immune systems reduced HIV transmission by 96 percent. The one identified transmission likely occurred close to the time of study enrollment.

The findings were lauded as *Science* magazine’s “Breakthrough of the Year” in December 2011 (<http://tinyurl.com/cohen-breakthrough>).

“As researchers in labs, we can discover pills to improve individual health, but it’s different to develop a strategy that touches public health,” Cohen says. “This work is an unbelievable example of bench to bedside to public health.”



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In April, Cohen’s research won top honor in the Clinical Research Forum’s inaugural Top 10 Clinical Research Achievement Awards. The forum is a non-profit organization dedicated to providing national leadership in clinical research and is comprised of the nation’s most prestigious academic medical centers and health systems.

Read more at <http://tinyurl.com/UNC-spotlight>.

—Whitney L.J. Howell

Myron Cohen, MD, is J. Herbert Bate Distinguished Professor in UNC’s medical school, professor of epidemiology in the public health school and director of the UNC Institute for Global Health and Infectious Diseases.

coronavirus that caused the SARS epidemic of 2003. “By reconstructing the synthetic bat SARS virus, we have a model that will allow us to design better vaccines and drugs that will treat any strain of this virus that infects humans,” Baric says.

HIV prevention in Africa

Africa’s HIV statistics fueled Dr. Frieda Behets’ interest in reducing mother-to-child transmission of the virus.

In the Democratic Republic of the Congo (DRC), Behets’ PEPFAR*-funded team trains HIV-positive mothers as lay counselors. The counselors teach pregnant women who have HIV how to use treatments that prevent virus transmission to their infants. It is significant, Behets says, that the number of HIV-positive

women contacting the community lay counselors is increasing. Her research shows that pregnant women with HIV are twice as likely overall not to return to clinics, where they could receive antenatal treatment, delivery support and postnatal care. Those who interact with lay counselors are more likely to utilize the clinics. Behets’ team helps train an interdisciplinary group that works in 44 maternities and two treatment centers in Kinshasa, DRC.

Dr. Suzanne Maman also studies whether prenatal and postnatal counseling with the same nurse prevents mother-to-infant transmission or new infections. In a five-year, 1,500-woman study in South Africa, Maman’s team examines how counseling may have affected infant

feeding, contraception use and HIV testing.

Dr. Audrey Pettifor studies whether giving South African adolescent girls and their families a monthly cash transfer equivalent to \$10 per month, conditional on school attendance, prevents HIV infection. The 2,900-girl randomized controlled trial will follow young women and their parents/guardians over three years to look at the impact of the program on HIV incidence.

“The theory is that keeping girls in school will reduce their risk of HIV infection,” Pettifor says. “There are many ways that schooling may be protective for young women, but providing money to them also may be protective.” Although study results will not be available until 2015, Pettifor says cash transfers seem to be a promising

intervention. A study published in *The Lancet* on Feb. 15, for which she wrote a commentary (<http://tinyurl.com/lancet-commentary>), found cash transfers reduced HIV risk.

In a two-year, NIH-funded study, Maman's team implemented microfinance interventions in "camps" in Dar es Salaam, Tanzania, where 15- to 19-year-old males socialize. By giving 19 men \$100 loans each, researchers tested whether professional goals would deflect men from risk-taking behaviors. Although there were too few participants in this pilot study to determine impact upon behaviors, a positive outcome was that the majority of the men have repaid their loans.

Dr. Sharon Weir participates in the USAID-funded MEASURE Evaluation project based in UNC's Carolina Population

Center. She helps establish international guidelines to monitor and evaluate HIV programs for gay men, transgendered individuals, sex workers and intravenous-drug users.

"These groups suffer from stigma and inadequate access to prevention services," Weir says. "Guidelines give countries and providers tools to track coverage and identify gaps in information, counseling and treatment access."

HPV

Human papillomavirus (HPV) is the main cause of cervical cancer, which remains the leading cause of cancer death among women in many countries in Africa. HIV-positive women are at a notably higher risk, says Dr. Jennifer S. Smith. Using PEPFAR* funding, her team works in Kenya and South Africa

to increase cervical cancer screenings, particularly among HIV-positive and higher-risk women. Smith and Dr. Noel Brewer are leading programs to eradicate cervical cancer in North Carolina and in the U.S., too.

"HIV-positive women with a lower count of CD4 cells (a type of white blood cell) have a higher risk of high-grade cervical lesions that are more likely to lead to cancer," Smith says. "That's important when thinking about increasing screening for HIV-positive populations."

—Whitney L.J. Howell

* U.S. President's Emergency Plan for AIDS Relief (PEPFAR)

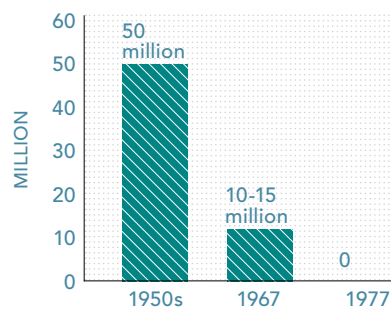
Researchers featured in this article include:

- Ralph Baric, PhD, professor of epidemiology
- Frieda Behets, PhD, professor of epidemiology
- Noel Brewer, PhD, associate professor of health behavior and health education
- Michael Emch, PhD, professor, geography; adjunct professor of epidemiology
- Suzanne Maman, PhD, associate professor of health behavior and health education
- Steven Meshnick, MD, PhD, professor of epidemiology
- Audrey Pettifor, PhD, assistant professor of epidemiology
- Jennifer Smith, PhD, research associate professor of epidemiology
- Sharon Weir, PhD, research assistant professor of epidemiology

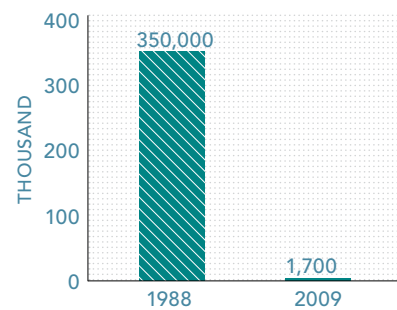
THE WORK STILL AHEAD

References: www.who.int and www.avert.org.

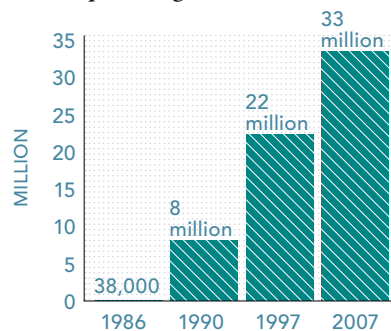
SMALLPOX
Worldwide, by year



POLIO
Cases in 125 endemic countries



HIV/AIDS
People living with HIV



OBESITY
Worldwide, by year

