

# research highlights

## Review of Pathogens' Route from Animals to Humans Suggests Need for Global Early Warning System

COULD THE HIV PANDEMIC HAVE BEEN PREVENTED? Dr. Nathan Wolfe, professor of epidemiology at the UCLA School of Public Health, says yes, and he's working to prevent the next one.

Writing in the May 17 edition of the journal *Nature*, Wolfe and UCLA colleagues Dr. Jared Diamond and Dr. Claire Panosian Dunavan identified five evolutionary stages in a pathogen's journey from exclusive transmission among animals to exclusive transmission among humans. They also re-examined the origins and characteristics of 25 of the most important diseases in human history.

The extensive review provides evidence supporting the development of the first global monitoring system for tracking the transmission of disease from animals to humans. Such a system would help scientists catalog the diversity of microbial agents, characterize animal pathogens that might threaten humans in the future, and perhaps detect and control emergence of a disease in humans before it can spread (for more on the school's efforts in this area, see the cover story on page 6).

Wolfe and his colleagues began by identifying five intermediate stages through which a pathogen exclusively infecting animals must travel before exclusively infecting humans. The research team found no inevitable progression of microbes from Stage 1 to Stage 5 and noted that many microbes remain stuck at a specific stage. The journey is arduous, and pathogens rarely climb through all five stages:

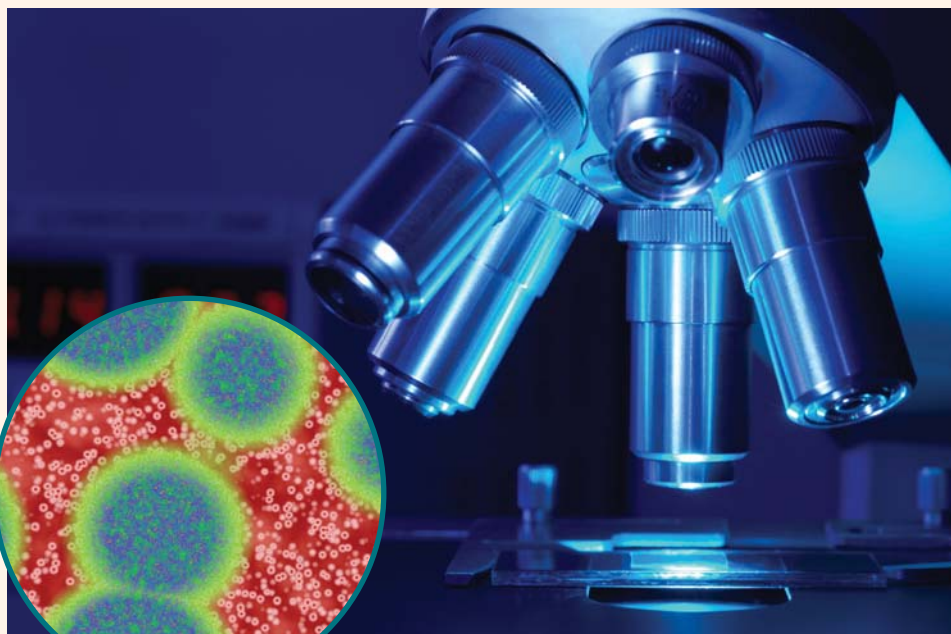
**Stage 1.** Agent only in animals: A microbe that is present in animals but not detected in humans under natural conditions. Examples include most malarial plasmodia.

**Stage 2.** Primary infection: Animal pathogens that are transmitted from animals to humans as a primary infection but not transmitted among humans. Examples include anthrax, rabies and West Nile virus.

**Stage 3.** Limited outbreak: Animal pathogens that undergo only a few cycles of secondary transmission among humans so that occasional human outbreaks triggered by a primary infection soon die out. Examples include the Ebola, Marburg and monkeypox viruses.

**Stage 4.** Long outbreak: A disease that exists in animals and has a natural cycle of infecting humans by primary transmission from the animal host but that also undergoes long sequences of secondary transmission between humans without involvement of animals. Examples include Chagas disease, yellow fever, dengue fever, influenza A, cholera, typhus and West African sleeping sickness.

**Stage 5.** Exclusive human agent: A pathogen exclusive to humans that involves either an ancestral pathogen present in a common ancestor of chimps and humans or involves a more recent pathogen that evolved into a specialized human pathogen. Examples include HIV, measles, mumps, rubella, smallpox and syphilis.



The review illustrates large gaps in the understanding of the origins of even established major infectious diseases.



The authors contend that the current health system is powered by outdated logic, outmoded organization, and misaligned finance strategies.

## “Patchwork” Child Health System Warrants Overhaul

THE U.S. CHILD HEALTH CARE SYSTEM is a “patchwork of disconnected programs, policies and funding” that lacks “clear accountability of performance goals” and is in need of a major overhaul, according to a team of UCLA School of Public Health professors headed by Dr. Neal Halfon, director of the school’s Center for Healthier Children, Families and Communities.

In their report, which appeared in the journal *Health Affairs*, Halfon and his co-authors argue that even as Congress, the nation’s governors and the Bush administration debate federal spending on the State Children’s Health Insurance Program, which covers low-income uninsured children whose families earn too much to qualify for Medicaid, leaders are not tackling more fundamental challenges facing the nation’s child health system.

They contend that the current system is failing to produce the kinds of health outcomes that it could and should because it is powered by outdated logic, outmoded organization, and inadequate and misaligned finance strategies that were designed to be responsive to epidemiology and health goals more relevant to the early part of the 20th century.

“An increasing body of science now tells us that the scaffolding for our adult physical, cognitive and socioeconomic health is built in the early years of life,” says Halfon, who prepared the report with Drs. Helen DuPlessis and Moira Inkelas. “We know now that many health problems have their origins during childhood and simply compound over time.”

Obesity rates among the nation’s children have doubled in the last 20 years, Halfon said, and the prevalence of diagnosable mental health and behavioral problems in youth has climbed to more than 20 percent, creating the prospect that the current generation of children could be less healthy than their parents.

## Vitamin E Supplements Don’t Reduce Type 2 Diabetes

IN THE MOST COMPREHENSIVE STUDY to date of the impact of vitamin E supplements in preventing type 2 diabetes in healthy women, a multi-center research team headed by Dr. Simin Liu, professor of epidemiology in the UCLA School of Public Health and professor of medicine in the David Geffen School of Medicine at UCLA, found that the supplements had no effect on the risk of developing the disease.

Using data from the federal Women’s Health Study, Liu and colleagues conducted the first randomized, double-blinded controlled trial to examine the efficacy of vitamin E supplementation on the incidence of type 2 diabetes among middle-aged and elderly U.S. women. They found that 10 years of vitamin E supplementation (600 IU on alternative days) had no benefit in preventing the disease.

“While there is a longstanding interest in the diabetes community regarding the promising yet unproven role of antioxidants in the prevention of diabetes and diabetic complications, direct evidence linking antioxidants to the incidence of type 2 diabetes is very limited,” says Liu, whose group reported the findings in the journal *Diabetes*.

Basic research has long supported the pivotal role of vitamin E in antioxidant functions, and most observational studies have associated increased vitamin E intake with a decreased risk of type 2 diabetes in initially healthy people. But evidence from randomized studies that vitamin E supplementation is beneficial in the primary prevention of type 2 diabetes has been lacking. The results from the Women’s Health Study are similar to previous findings, reported by Liu and colleagues in the *Journal of the American Medical Association* in 1999, that supplementation with the antioxidant beta-carotene did not affect the incidence of type 2 diabetes among healthy U.S. men in the Physicians’ Health Study.

“Our latest findings settle the issue on the role of vitamin E supplements alone for diabetes prevention, although the efficacy of other potent antioxidants

for the prevention of type 2 diabetes remains to be determined by large-scale clinical trials,” says Liu. “For prevention of chronic diseases, these findings indicate the need to shift our focus from the single nutrient-based approach to antioxidant-rich foods such as whole-grains, nuts and fruit and vegetables.”

## Lower Thresholds for Treating Cardiovascular Risk Factors: Worth the Cost?

CHANGING PRACTICE GUIDELINES for treatable chronic disease have lowered the thresholds to the point where under the most recent proposals, 97 percent of the U.S. adult population older than 50 qualifies for a diagnosis of at least one of three common risk factors for cardiovascular disease and stroke: high systolic blood pressure, high serum cholesterol, and impaired fasting glucose, according to an analysis by Drs. Robert Kaplan and Michael Ong in UCLA’s School of Public Health and David Geffen School of Medicine.

The lower thresholds are substantially expanding the market for health care, which has the potential to place strains on the health care system far beyond any marginal benefits that may come from the earlier, more aggressive treatment of the population, argue Kaplan and Ong, whose findings – based on data from the Framingham Heart Study and National Health and Nutrition Examination Survey – were published in the *Annual Review of Public Health*.

“Conditions that were previously thought of as normal are now being defined as targets for treatment,” Kaplan says. “Some would say this is a good thing, because more people are going to be getting the new medications, which are widely believed not to harm people. But even if there turn out to be no unforeseen long-term side effects to the drugs, there is one immediate side effect that is not well understood: These lower thresholds are forcing the costs of medical care to go up, which leads to more employers not providing health insurance and a higher uninsured rate.”

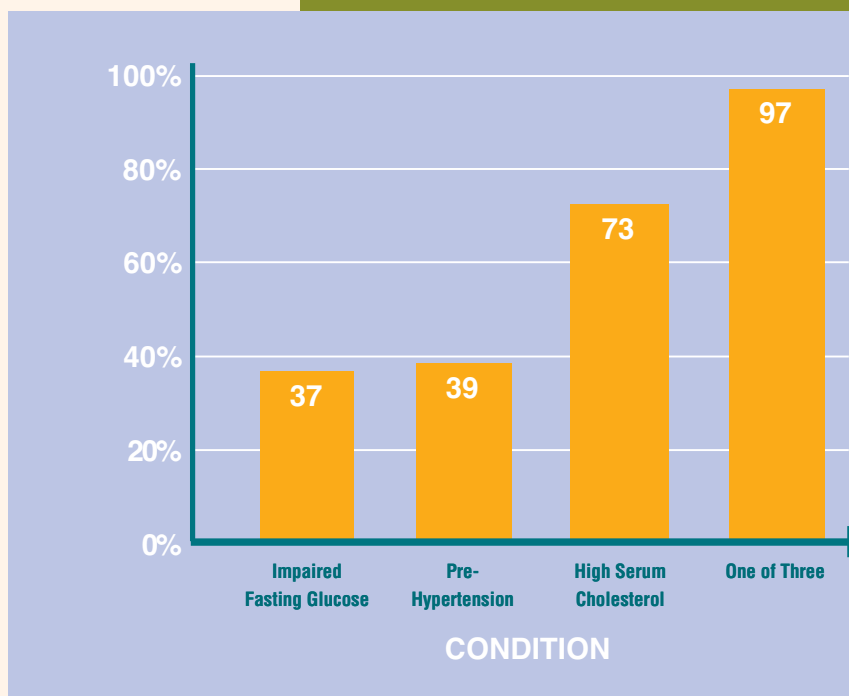
Because the benefits to reducing serum cholesterol, glucose and blood pressure levels are substantially greater for those who are well beyond the treatment threshold, the gains for individuals who are newly qualifying for treatment are extremely small, Kaplan says. “These people may experience a tiny benefit from being treated more aggressively,” he explains. “But we’re spending a lot of resources and producing relatively little in terms of health benefit.”

## Emergency Risk Communications Critical to Successful Disaster Response

THE FAST PACE AND UBIQUITOUS NATURE of modern news-media dissemination means that health departments cannot afford to wait for an emergency or disaster to occur before formulating a risk communication plan; rather, they must have disaster communication teams, plans, materials and even websites in place ahead of time to ensure that they have the wherewithal to quickly and appropriately communicate risks as events unfold.

That’s one of many points put forward by Dr. Deborah Glik, professor in the UCLA School of Public Health and faculty member in the UCLA Center for Public Health and Disasters, based in the school. Writing in the *Annual Review of*

**Percent of U.S. Population Older than 50 with Disease or Pre-Disease Under Latest Proposed Guidelines**



*Public Health*, Glik outlined basic principles that characterize the rapidly developing field of emergency risk communication practice, which draws on environmental risk communication, disaster management, health education, and public relations for guidance.

“Risk communication with the media and the public during emergencies is now a basic skill set public health professionals need to master,” Glik contends. “The 9/11 terrorist attacks, reinforced by large-scale disasters such as SARS, Hurricane Katrina, and foodborne outbreaks, as well as the potential global flu pandemic, have made it clear that public health professionals must play a communications role prior to, during and after emergencies that threaten population health.”

While not all disasters can be anticipated, many can, and for the past six years public health agencies at the local, state, and national levels have developed messages, fact sheets, background information, templates for press statements and media advisories, video clips and disaster-preparedness education materials for possible crises, Glik notes.

Most important in emergency risk communications is to have timely, credible, articulate and compassionate spokespersons who can deliver clear, consistent, and culturally competent messages, Glik argues. Messages should provide specific information on exposure to the hazard or agent, symptoms, treatment, long- and short-term consequences, preventive and curative actions, and emergency response resources. Communications with the news media must be replicated on websites, blogs, podcasts, and video news releases, given that most people turn to the Internet as well as broadcast media during an emergency, Glik adds. For hard-to-reach or more isolated populations, health departments must be prepared to work with community partners to get vital information disseminated.

## New Method Enables Local-Level Health Estimates

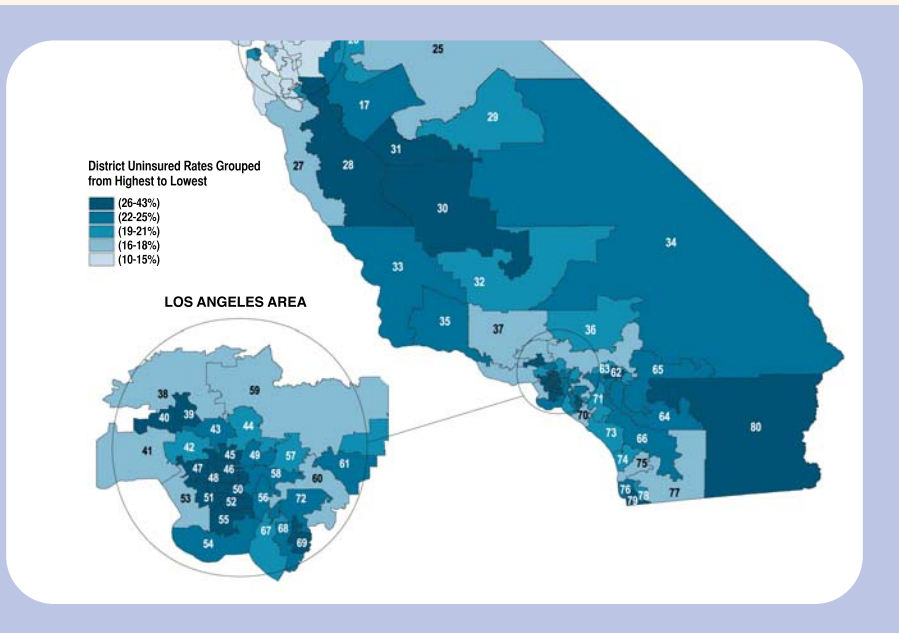
UCLA SCHOOL OF PUBLIC HEALTH researchers have refined statistical methods that enable them to take county and ZIP code-level data from the California Health Interview Survey, U.S. Census, and Current Population Survey to create “synthetic estimates” of the number of uninsured residents by California Assembly, Senate, and congressional districts.

The methodology produces results that state legislators, members of Congress, and groups seeking to influence policy have found useful, says Dr. Steven Wallace, associate director of the UCLA Center for Health Policy Research, based in the school.

“Data are of most interest to policy makers when they reflect the experiences of their district,” Wallace says. “But state and federal legislators’ district boundaries wander along unique and irregular paths that are designed for political purposes, not health planning purposes. Almost all health data are designed to provide estimates for areas where health planning and interventions occur – such as states, counties, and cities. So there is a fundamental mismatch between available health statistics and legislators’ needs.”

This mismatch is also felt by health advocates. “They go to Sacramento and repeatedly encounter representatives who ask, ‘But what is the situation in my district?’” Wallace says. After listening to the concerns of both legislators and health policy advocates, he and his colleagues at the UCLA Center for Health Policy Research decided to address the information gap. The center has published a series of policy briefs with results created by the new method, and reported the methodology in the *American Journal of Public Health*.

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With “synthetic estimates” done by the UCLA Center for Health Policy Research, state legislators and members of Congress can get uninsured rates and other health data for their district.