

The Threat of Avian Flu

Bird flu has received much attention lately, primarily because of fears that an avian influenza strain could result in pandemic influenza in humans. First detected in 1997, avian influenza A, also known as H5N1, is an influenza virus subtype that occurs primarily in birds. This particular strain of bird flu is highly contagious and is often deadly for poultry. To learn more about the threat H5N1 poses to humans, Highlights spoke to Tomás Aragón, M.D., Dr.P.H., executive director, Center for Infectious Disease Preparedness, and assistant adjunct professor, Division of Epidemiology.



Tomás Aragón

Since we've known about this bird flu, or H5N1, for almost ten years, why are we hearing so much about it now?

When we first started seeing avian influenza in humans, in Hong Kong in 1997, this was completely new. Public health authorities successfully eliminated that strain by culling millions of poultry. No one saw any more avian influenza in humans until late 2003 and early 2004. And even though the recent cases were H5N1, it was a new strain. Scientists became concerned because human cases of avian influenza started occurring in a number of different countries—but still transmitted from poultry to humans. A major concern is if the influenza virus mutates sufficiently so that it is transmissible human to human. This can also happen if a human is co-infected with both avian and human influenza viruses and they reassort into a transmissible form. In either event, you might now have a new virus with a high mortality rate that is transmissible person to person. As bird flu spreads throughout the world and continues to affect poultry, and humans continue to interact with diseased poultry, there are more opportunities for this event to occur. Right now domestic poultry are having a pandemic, and we don't want to experience what they are experiencing.

With all the recent natural disasters around the world, it's hard to put the possibility of a pan-

demio into perspective. Is this a threat that we should be focusing on and making a priority?

Yes, absolutely. The influenza pandemic of 1918 killed an estimated two percent of people who were infected. While that doesn't sound high, a two-percent infection rate means that a large number of people get sick, many are hospitalized, and some of them die, and the burden of all those sick people in a short period of time is catastrophic. In 1918 this happened over a period of a few months and came in two waves. Can you imagine that in your urban area you might have hundreds of people dying every day? In 1918, many people died from acute viral pneumonia, and the people with the highest mortality rate were younger people—between ages 20 and 35.

Do we know why that age group was hardest hit?

One hypothesis is that maybe the older folks had been exposed to similar influenza strains when they were very young, so they had residual immunity, while the younger folks were more susceptible. We don't know the true mechanisms—all we know is that young people died, and they died quickly.

Is there anything that individuals can do right now to protect themselves?

As with any potential disaster, there's a natural tendency for people to avoid preparing for the "unthinkable." First, people should prepare for a general disaster, with emergency supplies and so on. Second, people can support efforts to restore and build public health infrastructure. A strong public health infrastructure is going to make a big difference in an infectious disease emergency. It's going to be critical to implement control measures. Finally, people should definitely get vaccinated for seasonal influenza.


But will the seasonal influenza vaccines protect against avian flu?

Probably not, but they certainly won't hurt, and in 1918, the people who seemed to be spared were the older people that may have been exposed to a similar strain of influenza when they were young. It's possible that you may actually have some residual immunity that could protect you from mortality or severe disease.

What are the problems with making a vaccine for H5N1?

Well, even though we are monitoring this highly pathogenic H5N1, we don't really know if it is going to be the one that causes a human pandemic. Also, H5N1 is deadly in poultry, and it destroys eggs. Normally when scientists make flu vaccines, they use eggs. So researchers are developing cell culture methods for a vaccine.

One of the issues that we face with global epidemics is that people and governments aren't always forthcoming about the scale of a crisis or the number of people infected for fear that there will be economic repercussions in loss of tourism or food exports. We saw this with SARS. Is there any evidence that this might be also happening with bird flu?

I would say that SARS was good in that it taught us lessons, especially with the early experience in mainland China, that withholding information can impede efforts to control the spread of a serious infectious disease. Right now, the lack of information is caused primarily by lack of surveillance infrastructure. There are many countries that don't have the public health infrastructure to identify cases, trace and monitor contacts, conduct laboratory testing, and cull infected poultry. Like SARS, detecting and responding to pandemic influenza will require international collaboration, cooperation, and coordination. 



Fauna Doyle participates in the Annual Fund phonathon.

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Dean's Message

The Terror Without, the Terror Within

I recently had the privilege of hearing Dr. Richard Carmona, U.S. surgeon general, speaking at the UCSF–UC Berkeley Global Health Dinner Series. In his remarks, Dr.

Carmona spoke about the pandemic flu infection as the “terror without” and obesity-related chronic illness as the “terror within” our country. His remarks remind me of the breadth of disease prevention and health promotion that encompasses public health. Our School is actively working on both “terrors.” In this issue Dr. Tomás Aragón, director of our Center for Infectious Disease Preparedness, discusses the current avian flu threat. The center’s activities, however, extend beyond the current flu threat by training first line responders throughout Northern California and Nevada in a wide range of preparedness activities. The center’s activities are a prime example of Berkeley’s “from publication to public action” approach to public health.

Martyn Smith’s research on food additives brings to mind the wide range of issues involved with food-related threats to health—the “terror within.” In the past year, the School developed a joint partnership with the College of Natural Resources to cosponsor the University’s Center for Weight and Health. This Center is a leader in California and throughout the nation in helping to develop, implement, and evaluate interventions to promote healthy eating and physical activity.

The threat to our health both from without and within is also exacerbated by the scourge of poverty within our country and across the globe. The School is involved in two major campus-wide initiatives—creation of a Global Poverty Institute and the Berkeley Diversity Research Initiative—to address this challenge. The Global Poverty Initiative will bring together faculty and students throughout the Berkeley campus to work “on the ground” in developing countries over sustained periods of time. The Berkeley Diversity Research Initiative will bring new faculty to campus to address broad issues of multicultural inclusiveness and reductions of inequalities and disparities that exist across nearly all sectors of American life.

You will learn more about these and related developments in future issues of *Highlights* and the School’s *Public Health* magazine. In the meantime, I thank you for your continued support of this special School as we address the major challenges to our health from without and within.

Sincerely,

Stephen M. Shortell, Ph.D., M.P.H.

*Dean, School of Public Health
Blue Cross of California Distinguished Professor of Health Policy & Management
Professor of Organization Behavior*

News and Notes



School Welcomes Prospective Students at Conference

1 Prospective students learned about public health degrees, career opportunities in the field, and the application process, at the “26th Annual Public Health Conference for Prospective Students,” held October 29, 2005. The event was sponsored by the Graduate Recruitment and Diversity Services (GRADS) Program. Pictured: GRADS advisers (left to right) **Michelle Boontanom**, **Stephanie Boarden**, **Arnab Mukherjea**, and **Carina Vance**.

Wellpoint Executive Delivers Regents' Lecture

2 **Leonard D. Schaeffer**, former chairman and CEO of Wellpoint, Inc., delivered the Regents' Lecture on November 1, 2005, in Warren Hall. The title of his presentation was “Reshaping the Future of Health Care.”

Gates Foundation's Klausner Discusses Challenges in Global Health

3 **Richard D. Klausner, M.D.**, who served as executive director of the Bill & Melinda Gates Foundation's Global Health Program from 2002 to 2005,

presented the Edward E. Penhoet Annual Lecture on October 11, 2005. Klausner discussed “Grand challenges in global health: the unfinished work of science, medicine, and globalization.” Pictured (left to right): Klausner, former dean **Edward E. Penhoet, Ph.D.**, and **Dean Stephen M. Shortell, Ph.D., M.P.H.**

Faculty Present Current Projects at Fall Research Symposium

The School's Fall Research Symposium, held on October 25, 2005, at Alumni House, included the following presentations: **William A. Satariano, Ph.D., M.P.H.**, “Health and Physical Activity among Older Spouses”; **Christine Skibola, Ph.D.**, “The Roles of Fucus Vesiculosus, a Brown Seaweed, in Sex Hormone Modulation”; **Steve Selvin, Ph.D.**, “To Err is Human...Three Case Studies”; **Darlene Francis, Ph.D.**, “Maternal Care in the Rat: A Model to Examine the Complex Interplay Between Our Genes and the Environment”; **Joan R. Bloom, Ph.D.**, “Cancer Risk, Risk Notification and Preventive Behavior”; and **Fenyong Liu, Ph.D.**, “Human Herpes Virus: from Infection to Therapy.”

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Spring Alumni Brunch

Hosted by the Public Health
Alumni Association
Sunday, April 23, 2006
10:30 a.m.–1 p.m.
Clark Kerr Campus
2601 Warring Street, Berkeley
Cost: \$25



Gather with colleagues for delicious food, invigorating camaraderie, and the opportunity to bolster your Alumni Association's efforts to support key areas of interest identified by alumni.

If you would like to contribute donations or volunteer to help with the **Silent Auction**, contact **Julie Brown**, (650) 571-6690.

For more information about the **Spring Alumni Brunch**, contact **Eileen Pearl**, (510) 643-6382.

Food additive inhibits longevity enzyme in yeast, increases cell toxicity

by Sarah Yang

A common additive found in food and cosmetics has been found to inhibit the activity of sirtuins, enzymes associated with lifespan control in yeast and other organisms, according to a new study led by researchers at the University of California, Berkeley.

The study, published December 16, 2005, in the online journal *Public Library of Science (PLoS) Genetics*, found that in lab tests, dihydrocoumarin (DHC), a compound found naturally in sweet clover and synthetically manufactured for use in foods and cosmetics, inhibited the activity of Sir2p and SIRT1, forms of sirtuin found in yeast and humans, respectively.

Increased sirtuin activity is known to increase longevity in yeast, roundworms and fruit flies. The opposite effect in yeast has also been shown when the sirtuin enzyme is either deleted or reduced—the lifespan decreases by as much as 30 percent.

"Although studies on sirtuins and longevity have not been done in humans, there is reason to suspect that sirtuins play a role in the aging process of human cells, so identifying sirtuin inhibitors becomes important," says **Marty Smith, Ph.D.**, professor of toxicology at UC Berkeley's School of Public Health and principal investigator of the study, which was funded by grants from the National Institute of Environmental Health Sciences and the National Institute of General Medical Sciences.

DHC is added as a flavoring agent to a wide variety of foods, including soft drinks, yogurt and muffins, and is used as a common fragrance in cosmetics, lotions and soaps. It can be found in concentrations as high as 100 parts per million in such foods as gelatins, puddings and frozen dairy products.

"It's still a long jump from test tube to person, but our findings may imply that humans are exposed to chemicals in the diet and environment that block an important enzyme involved in longevity," says Smith.

Notably, there are five forms of sirtuins found in yeast, and seven forms of sirtuin in humans. "There is good reason to think that DHC would inhibit at least some of the functions of some of the other forms of sirtuins," says **Jasper Rine, Ph.D.**, professor of genetics at UC Berkeley's Department of Molecular and Cell Biology and coauthor of the paper.

The UC Berkeley researchers collaborated with **Eric M. Verdin, M.D.**, associate director and senior investigator at the Gladstone Institute of Virology and Immunology, which is affiliated with UC San Francisco. Verdin, who is also a professor of medicine at UCSF, is an expert on mammalian sirtuin enzymes.

"It's important to note that the role of sirtuins in aging is conserved in distantly related organisms such as yeast, drosophila and the small roundworm, *C. elegans*," says Verdin. "So, it is not too much of a stretch to expect that sirtuins also control the aging process in mammals, including humans. In addition, sirtuins control many important cellular functions

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besides aging, and an agent that modulates sirtuins, such as DHC, could not only affect aging but also other critical functions, such as metabolism, neurodegeneration and cancer."

Sirtuin enzymes are histone deacetylases, which modify the structure of chromatin, complex substances made up of DNA and protein. Histone deacetylases keep chromatin packed and tightly coiled in such a way that enzymes cannot activate the DNA, keeping the gene from being expressed. This type of gene "silencing" is considered epigenetic, which means that it effectively controls the expression of a gene without altering the actual DNA molecules.

Andrew Olaharski, Ph.D., UC Berkeley postdoctoral researcher in environmental health sciences and lead author of the paper, noted that toxicology testing routinely focuses on an agent's ability to cause DNA mutations, chromosome alterations, or cell death, but does not currently test for chemical-induced epigenetic changes. While epigenetic changes do not alter the DNA structure, they can impact gene expression that may lead to disease. "The identification that a common additive to foods and cosmetics may interfere with these epigenetic processes is simply one more piece of evidence supporting the important role environmental agents may play in human health," says Olaharski.

Other coauthors of the paper are **Brett Marshall, M.S.**, a research associate at the Gladstone Institute; **Joshua Babiarz**, a graduate student at UC Berkeley's Department of Molecular and Cell Biology; and **Luoping Zhang, Ph.D.**, a researcher at UC Berkeley's School of Public Health.

Highlights



Inside this issue:
**The Threat of
Avian Flu**

Event Calendar

Spring 2006

For the latest information about School of Public Health events, visit our web site: <http://sph.berkeley.edu>.

February 28 (Tuesday), 4–6 p.m.

Memorial Service for Professor Emeritus Henrik Blum

An event to celebrate the life of Dr. Henrik L. Blum, professor emeritus of health administration and planning, a pioneer in health care reform, who died January 3 at age 90.
Bancroft Hotel, 2680 Bancroft Way, Berkeley

March 14 (Tuesday), 4–6 p.m.

Dean's Colloquium: Sherman James

A lecture by Sherman A. James, Ph.D., the Susan Bennett King Professor of Public Policy Studies in the Terry Sanford Institute of Public Policy at Duke University.
Baldwin Auditorium, 22 Warren Hall, Berkeley campus

March 17 (Friday), 6:30 p.m.

10th Annual Public Health Heroes Awards Ceremony

A gala celebration recognizing individuals and organizations for their significant contributions and exceptional commitment to promoting and protecting human health. (See p. 3.) Information: <http://www.publichealthheroes.org>
The Exploratorium, San Francisco

April 8 (Saturday), 8 p.m.

Charter Gala

An evening of celebration, fine dining, music, and dancing, marking the 138th anniversary of the University of California.
Information: <http://alumni.berkeley.edu/chartergala>
Fort Mason Center, San Francisco

April 22 (Saturday), 9 a.m.–4 p.m.

Cal Day

Take in all that Berkeley has to offer at the campus's annual open house, offering a variety of free activities, lectures, sports, and demonstrations for people of all ages and inclinations. Information: <http://www.berkeley.edu/calday/>
UC Berkeley campus

April 23 (Sunday), 10:30 a.m.–1 p.m.

Spring Alumni Brunch and Silent Auction

Gather with colleagues for food, camaraderie, and an opportunity to support the work of the Public Health Alumni Association. (See p. 3.)
Clark Kerr Campus, 2601 Warring Street, Berkeley

April 25 (Tuesday), 4–6 p.m.

Dean's Colloquium: Marion Nestle

A lecture by Marion Nestle, Ph.D., M.P.H. '86, the Paulette Goddard Professor of Nutrition, Food Studies, and Public Health at New York University, and visiting professor at the School of Public Health.
Baldwin Auditorium, 22 Warren Hall, Berkeley campus



Inside this issue:
**New Findings About
Food Additives**



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