

PITT  
**iiii PUBLIC HEALTH**

*the fight against*  
**premature mortality**  
*in the Pittsburgh region*

**SOUNDING**  
*the*  
**BATTLE**  
**CRY**

**THE DEVIL**  
*in the*  
**DIESEL**

**RESEARCH**  
*and*  
**SCHOOL**  
**HIGHLIGHTS**

*and*  
*more*  
...

*“We are not here to simply advocate for better health—we are here to provide evidence-based research to make better health a reality for all the citizens of our region.”*

**Donald S. Burke**, dean,  
Graduate School of Public Health

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**Pitt Public Health Magazine**

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*In March,*

it was my honor to deliver my inaugural lecture as Distinguished University Professor of Health Science and Policy. The lecture was titled “Systems Thinking in Public Health—and Everything Else.” Many thanks to all of you in the standing-room-only crowd who turned out to hear what was, in part, my scientific biography. In the first half of my career, I had been fully immersed in traditional research—experimental, clinical, and fieldwork—always with an eye on applications such as vaccines and diagnostics. Then about 15 years ago, I had a personal epiphany that modeling and simulation was a powerful tool to provide deep insights about complex dynamical phenomena like epidemics. Since then I have become something of an expert in framing problems in computationally tractable ways, and it’s been a joy to use this “systems thinking”, or “computational thinking,” framework as a way to communicate with my colleagues about complex public health dynamics.

Even before I became dean in 2006, I was impressed with the tradition of systems thinking in Pittsburgh. I was particularly influenced by the work of two Pittsburghers, the late Herb Simon of Carnegie Mellon University (CMU) and Pitt’s Nick Rescher, vice chair of the Center for the Philosophy of Science. Work already being done here on modeling and simulation at Pitt, plus the opportunity to collaborate with CMU and the Pittsburgh Supercomputing Center, convinced me that Pitt Public Health could become a powerhouse of public health computation. So I seized the opportunity and launched a program. The centerpiece is our unique Public Health Dynamics Lab, which houses hardcore computationalists smack in the midst of a school of public health: experts in computer science, statistical physics, game theory, and machine learning.

The core idea behind systems thinking is that all decisions about complex problems are based on models. Most models are mental models, in our head: implicit, indistinctly bounded, and imprecise. In contrast, computational models are explicit; defined; and, with assumptions, made clear. Computational modeling serves as a complement to mental modeling, to improve and clarify thinking.

In essence, computation helps us to represent, analyze, and visualize complex systems. It is a nearly magical way to convey and understand patterns. In my lecture, I reviewed a few of our exciting new projects. In our Framework for Replication of Epidemic Dynamics (FRED), we have developed real-time accurate modeling for epidemics anywhere in the United States. Want to know how SARS might spread in Boise, Idaho? Punch in a request, and within minutes you get back a report, complete with a video of the geospatial spread in Boise. We have also created a “big data” online repository of all the weekly reports of infectious diseases from every city and every state in the United States, dating back to 1888. Want to know about scarlet fever in Philadelphia in the 1930s? Enter the request, and get the epidemic curves and data, as well as links to the 80-year-old primary source documents. Very cool. You’ll hear more about this promising work soon.

Being a Distinguished University Professor is intellectually liberating: It provides me with opportunities to engage with scholars across the campus. We’re now using modeling approaches to extend our collaborations with scholars all across the University. Our legal experts in public health have developed a Web-based tool called the Legal Network Analyzer, which allows policy makers to instantaneously call up, visualize, and probe the

*“We intend to make modeling and simulation a regular day-to-day tool for decision support by public health officials.”*

complex network of laws and regulations that apply to emergency response and preparedness. With the Department of Philosophy, we have collaborated on a series of fascinating conferences on the epistemology of modeling and simulation, examining how science is changing. And we have worked with behavioral scientists to add social elements and individual decision making to our disease transmission model.

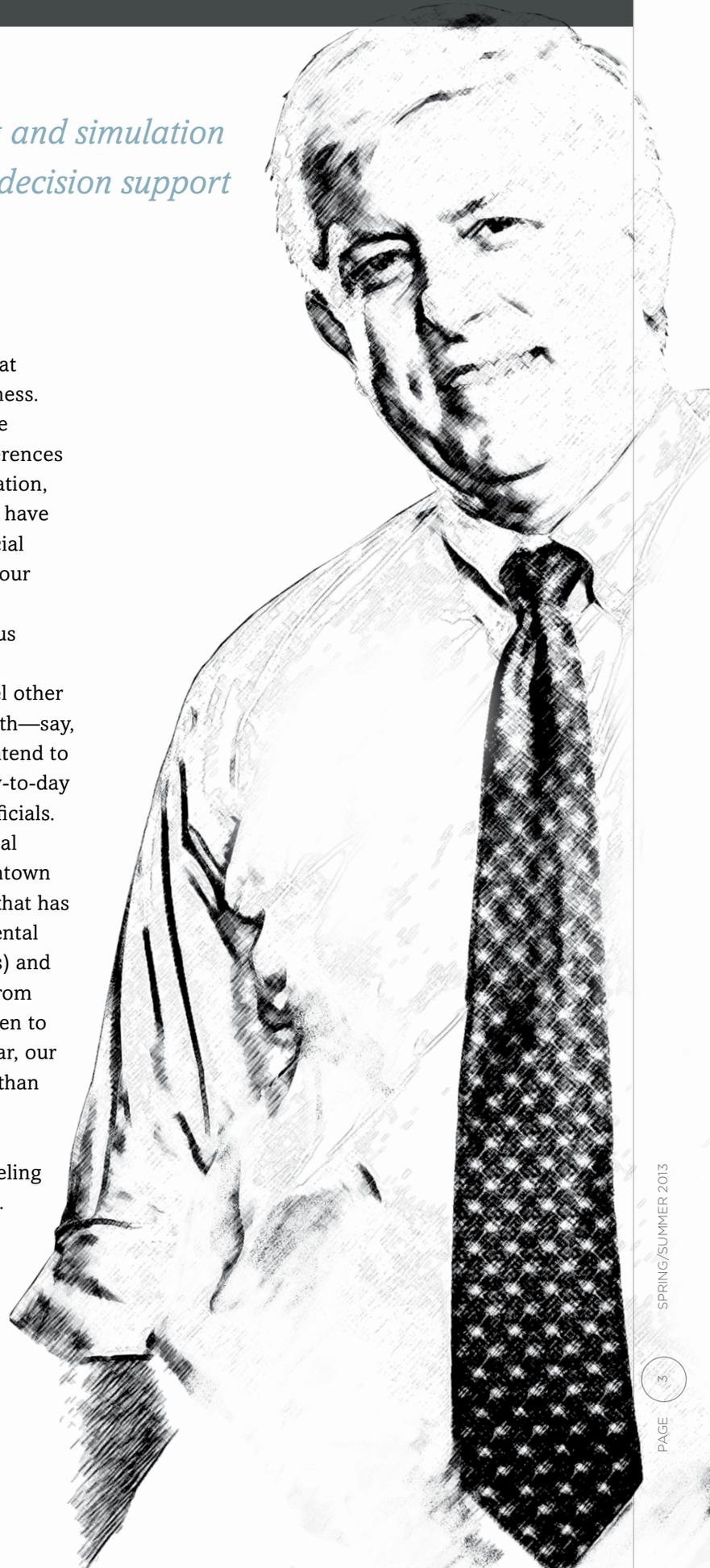
We are already at the forefront of infectious disease modeling. Now, Pitt Public Health is poised to move on to computationally model other important dynamics problems in public health—say, models for crime, obesity, or smoking. We intend to make modeling and simulation a regular day-to-day tool for decision support by public health officials.

In this issue, we report on two real-life local issues engaging our faculty: a study of downtown diesel emissions (the fine-particle pollution that has kept the region from meeting the Environmental Protection Agency’s Clean Air Act standards) and premature mortality in Allegheny County. From infant mortality to violence among young men to heart disease, our communities—in particular, our African American community—fares worse than those of our peer cities.

We need 21st-century tools to solve these problems. I believe that computational modeling has real promise to help achieve these goals. I invite you to view my Distinguished University Professor lecture at [www.publichealth.pitt.edu/lecturearchive](http://www.publichealth.pitt.edu/lecturearchive).

*Donald S. Burke*

**Donald S. Burke**, dean



# Research and School Highlights



To learn more about the achievements, news, and research of Pitt Public Health, go to [www.publichealth.pitt.edu/news](http://www.publichealth.pitt.edu/news)



**Anil Ojha**  
assistant professor

## Enzyme Discovery May Lead to Better Tests for Tuberculosis

Pitt Public Health researchers have identified an enzyme that will trigger the rapid breakdown of several mycobacteria species, including the bacteria known to cause tuberculosis (TB). This discovery could lead to better tests for the disease.

TB is one of the most deadly bacterial infections, spread through the air from one person to another

and killing more than 2 million people worldwide annually. Doctors see 9 million new cases of TB every year, mostly in Africa and Southeast Asian countries, although small outbreaks of the disease have been reported in urban areas of the United States.

“It’s a huge public health burden,” said Anil Ojha, assistant professor in the Department of Infectious

Diseases and Microbiology, and senior author of the study. “Clearly, controlling the infection is heavily dependent upon an effective diagnosis.”

The current bacterial culture test for TB infections is highly accurate but time-consuming, taking up to several weeks. “That may create a race against time for a patient who has acute tuberculosis infection,” said Ojha. “That’s why our process is so important. It can obtain results that are both rapid and accurate.”

The World Health Organization (WHO) currently recommends a diagnostic technique called nucleic acid-based amplification (NAA); however, this process faces difficulty in breaking open, or lysing, bacteria to access nucleic acids. Mycobacteria are shaped by a thick envelope of fats and sugars and are resistant to most of the chemicals conventionally used to lyse bacteria.

Pitt Public Health researchers found that exposure

to an esterase, an enzyme that targets fatty acids on the surface of the mycobacterial envelope, led to rapid lysis of the bacilli. Researchers also demonstrated that this quick lysis of Mycobacterium TB improved its detection at lower density.

“Discovery of enzyme-based mycobacteria lysis has the potential to increase the sensitivity of NAA,” said Ojha.

The results of the study, funded by the National Institutes of Health (NIH), were published in the January edition of the *Journal of Biological Chemistry*.

Collaborators on this study include Yong Yang, Alexandra Bhatti, Danxia Ke, and Peijun Zhang, University of Pittsburgh; Mercedes Gonzalez-Juarrero and Anne Lenaerts, Colorado State University; Laurent Kremer, University of Montpellier; and Yann Guerardel, French National Center for Scientific Research. ●

## Many Stressors Associated With Fracking Due to Perceived Lack of Transparency and Trust

Pennsylvania residents living near unconventional natural gas developments using hydraulic fracturing, known by the slang term “fracking,” attribute several dozen health concerns and stressors to the Marcellus Shale developments in their area, according to a long-term analysis by Pitt Public Health researchers.

Reported health impacts persist and increase over time, even after the initial drilling activity subsides, they noted. The

study, which was published in the May issue of the *International Journal of*

*Occupational and Environmental Health*, did not include clinical examinations of the participants’ physical health or any environmental tests. Researchers surveyed those who believe their health has been affected by hydraulic fracturing activities for self-reported symptoms and stressors. The most commonly cited concern was stress, which 76 percent of participants said they’d experienced. Among the leading causes of stress reported by the participants were feelings of being taken advantage of, having their

concerns and complaints ignored, and being denied information or misled.

“Many of these stressors can be addressed immediately by the gas drilling industry and by government,” said senior author Bernard Goldstein, emeritus professor and former dean of Pitt Public Health.

“Scientific literature shows that if people do not trust companies doing work in their communities, or believe that the government is misleading them,

there is a heightened perception of risk,” said Goldstein, also a member of the National Academies’ committees to

*“Many of these stressors can be addressed immediately by the gas drilling industry and by government”*

investigate shale gas drilling in the United States and Canada. “Community disruption and psychosocial stress have been well documented as a result of environmental issues like oil spills and superfund sites. A strong response by the Pennsylvania Department of Health to address concerns about health impacts of hydrofracturing could reduce observed stress and resulting symptoms.”

From May through October 2010, members of Pitt Public Health’s Center for Healthy Environments and



**Kyle Ferrar** doctoral student in environmental and occupational health

Communities conducted in-depth interviews of 33 people concerned about fracking in their communities. Three-quarters of the residents resided in five of the seven most heavily drilled counties in Pennsylvania.

Follow-up interviews were conducted from January through April 2012 and included 20 of the initial 33 participants. The remainder could not be reached or declined to participate.

“Our study shows that perceptions of health may be affected by fracking regardless of whether this health impact is due to direct exposure to chemical and physical agents resulting from drilling or to the psychosocial stressors of living near drilling activity,” said lead author Kyle Ferrar, a doctoral student at Pitt Public Health. “Comprehensive epidemiological studies of all potential adverse

consequences of fracking need to be performed, and they should include a close look at psychosocial symptoms, including stress, which cause very real health complications.”

Participants reported 59 unique health issues that they attributed to Marcellus Shale development. In addition to stress, these perceived health issues included rashes, headaches, shortness of breath, nausea, and sore throats.

“Exposure-based epidemiological studies are needed to address identified health impacts and those that may develop as fracking continues,” said Ferrar.

Additional coauthors include Jill Kriesky, Charles Christen, Lynne Marshall, Samantha Malone, Ravi Sharma, and Drew Michanowicz, all of Pitt Public Health. ●

## Finding a New Way of Detecting HIV

A first-of-its-kind collaboration between Pitt Public Health, the Center for Vaccine Research (CVR), and Drug Discovery Institute (DDI) received a \$1 million, three-year grant to develop a novel test to detect HIV in the earliest stages of the disease.

“The earlier you know about an infection, the quicker you can treat it,” said Pitt Public Health Dean and CVR Director Donald S. Burke, also the UPMC-Jonas Salk Chair of Global Health and principal investigator on the project. “Immediately starting antiretroviral drugs greatly reduces the chance of the disease progressing to full-blown AIDS and reduces person-to-person transmissibility of the virus. The test will also enable extensive epidemiological studies in developing countries, allowing health agencies to effectively target their precious resources.”

Currently available tests rely on a few proteins made only by the HIV virus itself to detect anti-HIV antibodies in the blood. In new infections, these antibodies are typically at low levels, so it often takes months before a person tests positive for HIV and sometimes years before development of symptoms. The Pitt test is taking a new approach. Instead of looking only at proteins made by the virus, this research will examine a novel class of HIV biomarkers in patient blood samples. This approach utilizes synthetic molecules that resemble proteins and can be produced in millions of different variations. This larger diversity of biomarker targets increases the ability to detect new HIV infections, as well as distinguish between recent and established infections.

Such a test would allow public health workers to determine if a Third World country’s HIV infections are a recent development and how fast the virus is spreading, and physicians could factor in duration of infection to better tailor anti-HIV regimens.

Pitt coinvestigators on this project include George Tseng, of Pitt Public Health; Ronald Montelaro and Ernesto Marques, of CVR; and Lansing Taylor and Mark Schurdak, of DDI. Thomas Kodadek, at the Scripps Research Institute in Jupiter, Fla., is a key collaborator. ●

**Lisa Bodnar** associate professor of epidemiology

## Peace Corps Masters International Students Prepare for Service

Pitt Public Health students Marilyn Blasingame and Lucas Blazejewski are following in the footsteps of returning Peace Corps volunteer Sarah Sisaye. Both are enrolled in the school’s Peace Corps Master’s International program. Blazejewski is preparing for service in Kenya and Blasingame will be working in Mongolia. Former Peace Corps volunteers Russell Morgan (MSHYG ’70) and Ken Jaros (SOCWRK ’70) visited campus in April to give some advice and wish them well. Morgan and Jaros have also made an investment in the program by sponsoring the students for the year. We look forward to hearing about the students’ adventures over the next two years. ●



*Read Marilyn Blasingame’s blog while she is in Mongolia*  
[mablasingame.blogspot.com](http://mablasingame.blogspot.com)

## Bodnar Receives 2013 Distinguished Research Award

Lisa Bodnar, associate professor of epidemiology, received a 2013 Chancellor’s Distinguished Research Award in the Junior Scholar category for her research in addressing the role of maternal nutrition in adverse pregnancy outcomes. This prestigious award is given to University of Pittsburgh faculty members who are selected from a competitive nomination pool. ●



## Mortality Higher in Appalachian Coal Mining Counties Compared to Non-Coal Mining Areas

PENNSYLVANIA

OHIO

WEST VIRGINIA

VIRGINIA

KENTUCKY

West Virginia counties with coal mining activity have higher total mortality rates than their non-coal mining Appalachian counterparts, a Pitt Public Health analysis revealed.

“We’ve known for several years that adverse health outcomes occur at higher rates in Appalachia,” said Jeanine Buchanich, deputy director of epidemiology for Pitt Public Health’s Center for Occupational Biostatistics and Epidemiology. “For the first time, we’ve compared Appalachian coal mining counties to non-mining counties matched by median family income and found higher rates of cancer, respiratory disease, diabetes, and heart disease in the mining counties.”

The findings are reported in the Appalachian Research Initiative for Environmental Science (ARIES) Research Bulletin. Buchanich presented them in April at the Environmental Considerations in Energy Production symposium in Charleston, W.Va., and they were concurrently published in the peer-reviewed symposium proceedings published by the Society for Mining, Metallurgy, and Exploration, Inc.

Buchanich and her colleagues matched 31 West Virginia coal mining counties to non-coal mining counties with comparable family incomes that were still within Appalachia. Some of the non-coal mining matches were outside West Virginia. The study looked at data on mortality rates related to cancer from 1950 to 2007 and non-cancer deaths from 1960 to 2007.

The data for 2005–07 shows that men in coal mining

counties had a death rate of 1,200.1 per 100,000, compared to 1,086 per 100,000 in non-coal mining counties. For women, the rate was 825.2 per 100,000 for mining counties, compared to 767.2 per 100,000 in non-coal mining counties.

For all types of cancer from 2005–07, the death rate for men was 266.3 per 100,000 in mining counties, compared to 252 per 100,000 in non-mining counties. For women, it was 180.6 cancer deaths per 100,000 in mining counties and 167.7 per 100,000 in non-mining counties.

“It is interesting that there were higher rates of non-malignant respiratory disease mortality among men, but not women, in coal mining counties,” said Buchanich. “This is indicative of occupational, not environmental, exposures and could reflect lung diseases, such as pneumoconiosis, that are found among people who work in mines.”

There were 19 more non-malignant respiratory disease deaths per 100,000 men in mining counties compared to non-mining counties.

Despite the higher overall mortality and cancer death rates in the mining counties, the non-mining counties had higher rates of kidney cancer deaths and stroke.

“The categories where we found excesses in mortality rates in the coal mining counties are arguably heavily influenced by personal behaviors and risk factors, such as smoking, which can cause increased rates of heart disease, diabetes, and lung cancer,” said Buchanich. “More studies will be needed to understand the complex interactions of environmental factors, personal behaviors, and other risks to determine the extent coal mining plays in elevating mortality rates.”

Collaborators on this research include Evelyn Talbott, Ada Youk, Andrew Potter, and Lynne Marshall, all of Pitt Public Health. ●

## Pitt Malaria Researcher Focuses on Parasitic Biology in Quest for New Malaria Drugs

For most of us, mosquitos are simply a summertime annoyance—a tiny pest that we swat away without a second thought. Not so in many developing counties, where one bite can mean months of misery—or death.

Inside her laboratory at Pitt Public Health, Alice Tarun studies the genes of the Plasmodium vivax (P. vivax) bacteria, one of the two parasites that cause the most common forms of human malaria. They are microscopic targets, but Tarun hopes they will someday lead to a major breakthrough in malaria treatment, one of the biggest global health threats today.

“The public health impact of malaria is second only to tuberculosis,” says Tarun, an assistant professor of microbiology and infectious diseases. “If you look at the statistics, it’s just crazy.”

According to the World Health Organization, malaria is endemic to 90 countries, causing an estimated

660,000 deaths a year, mostly in sub-Sahara African countries. Ninety percent of the victims are children under the age of five or pregnant women.

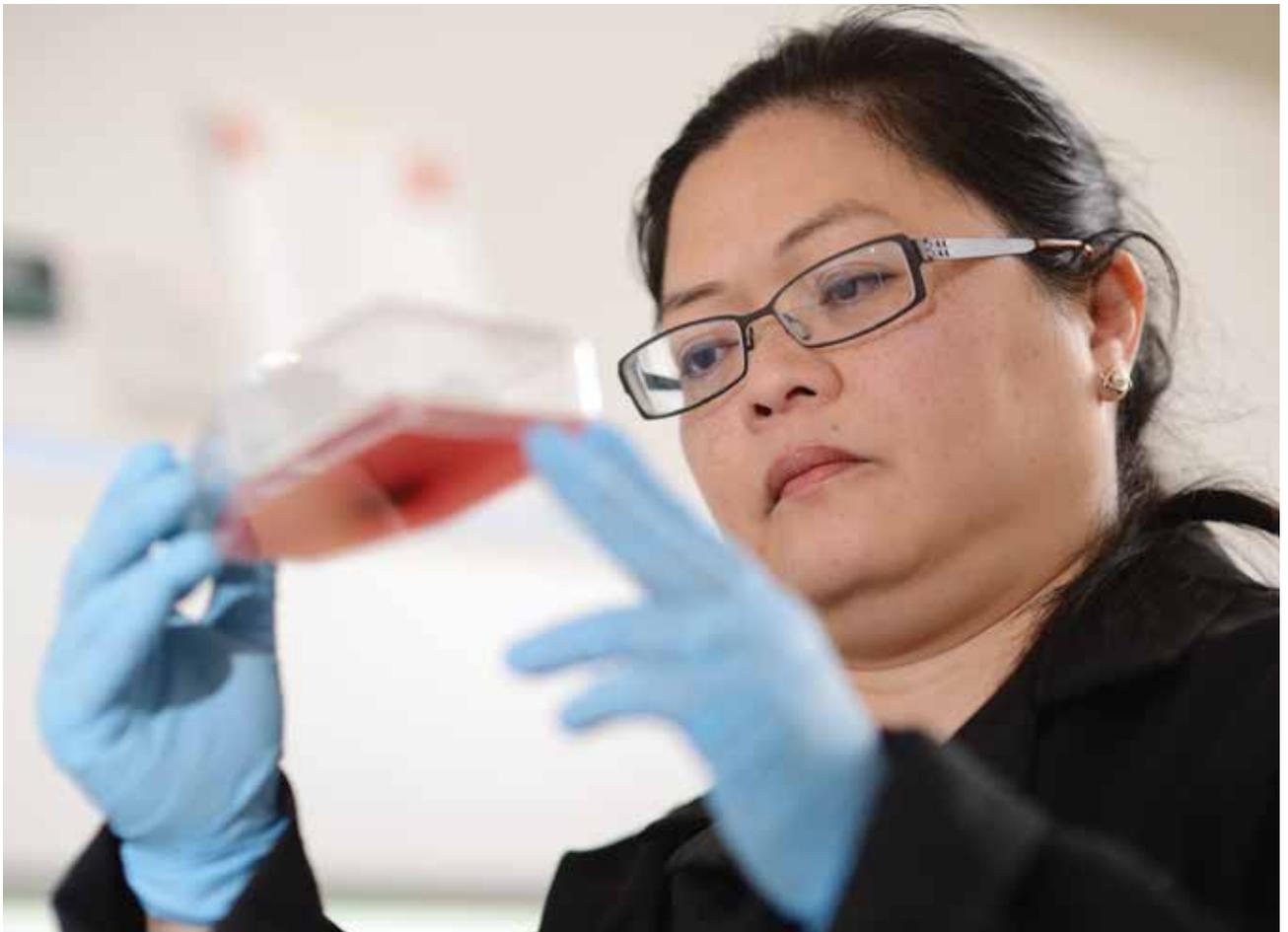
Malaria spreads when a person is bitten by an infected mosquito. That mosquito deposits parasites into the bloodstream, which travel to the liver and amplify. The parasites invade and feed off of red blood cells, ultimately bursting out of the cells, at which time an infected person begins to feel the symptoms of the disease—cycles of fatigue, chills, and fever.

The parasite has a complicated life cycle that alternates between mosquitoes and infected humans. Infectious disease researchers often study one phase of development or infection in the quest for new drug targets.

Tarun’s current research focuses on the liver and sexual stages of the P. vivax parasite.

“When the parasite is dividing in the blood, some

Alice Tarun assistant professor of infectious diseases and microbiology



parasites will form the gametes, or the sexual stage. They can't complete their development until a mosquito picks them up by biting an infected human," says Tarun. "This is really an area where there is not a lot of research."

According to Tarun, many of the available malaria drugs don't kill parasites during their sexual stage. A patient can be sick with malaria and receive treatment, yet they are still able to transmit the parasite because gametocytes are still circulating within their system.

"We are trying to see if there are genes and proteins

that are essential for gametocyte development," she said. "Then we mutate those genes to determine their importance."

Tarun says this approach could ultimately lead to the development of drugs that could target and kill the gametocyte, which she describes as "remarkably resilient."

"If we can stop the parasite in the liver, then we can prevent the disease, and prevent transmission," said Tarun. "I think attacking malaria on multiple fronts is really the best strategy." ●

## Dean's Day

Congratulations to the 2013 Dean's Day winners and participants! Now in its 15th year, Dean's Day is a competitive student research competition that drew more than 80 participants this year. ●



Visit our Facebook page and tag yourself!  
[www.facebook.com/PittPublicHealth](http://www.facebook.com/PittPublicHealth)



2013 Dean's Day winners and faculty with Dean Donald Burke (front row, center)

## Kagan Named Fellow by the American Association for the Advancement of Science

Valerian Kagan, professor and vice chair in the Department of Environmental and Occupational Health, was named fellow of the American Association for the Advancement of Science (AAAS) for his distinguished contributions to the fields of free radical biology, medicine, and programmed cell death. Kagan is one of four Pitt faculty members to be given the prestigious recognition for 2012.

Kagan's research is focused on molecular mechanisms of oxidative stress, antioxidants, tissue and cell acute and chronic injury, and molecular and nanotoxicology. He is one of the pioneers of a new field of research surrounding oxidative lipidomics—the study of lipids and their oxidation. He has had more than 500 peer-reviewed papers published on these subjects.

Kagan is also the director of Pitt's Center for Free Radical and Antioxidant Health, as well a professor of pharmacology and chemical biology, radiation oncology, and chemistry at Pitt. In addition, he

holds appointments as a foreign professor at the Karolinska Institutet in Stockholm, Sweden; Taipei Medical University in Taiwan; and, in Moscow, Russian State Medical University and Lomonosov Moscow State University.

Kagan serves as an executive editor of *Antioxidants & Redox Signaling* and an associate editor of *Chemistry and Physics of Lipids*. He is a member of the editorial boards of *Biochimica et Biophysica Acta*, *Biomembranes*, and *Nanomedicine: Nanotechnology, Biology and Medicine*.

Kagan graduated from Lomonosov Moscow State University with degrees in biochemistry and biophysics. He earned a PhD in biochemistry and biophysics from Moscow State University in 1972, and, in 1981, he was awarded a Doctor of Science degree from the former USSR Academy of Sciences.

Joining the 2012 class of fellows from Pitt are Bruce Freeman, School of Medicine; Peyman Givi, Swanson School of Engineering; and Allan Sampson, Kenneth P. Dietrich School of Arts and Sciences. ●

**Valerian Kagan** vice chair in the Department of Environmental and Occupational Health



## Pitt Public Health Pioneers Formal Collaboration with University of Stellenbosch

Jean Nachege is the first faculty member at Pitt Public Health to hold a dual position with Pitt and the University of Stellenbosch in South Africa. Dean Burke's commitment to expanding the school's global reach and the University's reputation as a biomedical powerhouse, specifically Pitt Public Health's infectious disease research, prompted this collaborative international relationship.

Nachege, associate professor of epidemiology, will teach a new course titled Global Control of HIV/AIDS and Tuberculosis.

"Professor Jean Nachege is an international leader in the treatment of HIV and AIDS in resource-constrained settings. His studies have influenced treatment guidelines issued by the World Health Organization, especially on how to avoid drug resistance and improve outcomes. He is an outstanding public health scientist, a brilliant lecturer, and a globally respected policy expert. We are fortunate to have recruited Jean to join our Pitt Public Health faculty," said Burke.

*"He is an outstanding public health scientist, a brilliant lecturer, and a globally respected policy expert."* **Don Burke**

Nachege's work focuses on improving the outcome of implementing HIV education and training. He notes that moving from science to implementation is a challenge, and that community-based intervention programs are necessary for success. A native of the Democratic Republic of the Congo, he fled Africa with his family to Belgium after high school

for safety. He received his BS in biomedical sciences cum laude in Namur, Belgium,

before completing his MD, also cum laude, at the Catholic University of Louvain Medical School in Brussels. During his residency he focused on infectious diseases, concentrating on diagnosis and management of infections in immune-compromised patients, mainly with HIV/AIDS. Nachege also holds an MPH from Johns Hopkins Bloomberg School of Public Health. Nachege is the first native-born Black African faculty member to be appointed to the Stellenbosch health sciences faculty. ●



**Jean Nachege**  
associate professor of epidemiology

## Even Limited Physical Activity is Linked to Lower Rates of Depression in Bariatric Surgery Patients

Adults undergoing bariatric surgery who are more physically active are less likely to have depressive symptoms and to have recently received medication or counseling for depression or anxiety than their less-active counterparts, according to new research led by Pitt Public Health.

“Typically, clinical professionals manage their patients’ depression and anxiety with counseling and/or antidepressant or anti-anxiety medication,” said Wendy C. King, epidemiologist at Pitt Public Health and lead author of the research, which is reported in the February 2013 issue of the *Journal of Psychosomatic Research*. “Recent research has focused on physical activity as an alternative or adjunct treatment.”

Adults with severe obesity are nearly twice as likely to have a major depressive disorder (13.3 percent) or anxiety disorder (19.6 percent) when compared to the general population (7.2 and 10.2 percent, respectively). King noted the importance of treating these conditions prior to surgery, as preoperative depression and anxiety increase the risk of these conditions occurring after surgery and have been shown to have a negative impact on long-term surgically induced weight loss.

As part of the Longitudinal Assessment of Bariatric Surgery-2, an observational study designed to assess the risks and benefits of bariatric surgery, King and her colleagues assessed participants’ physical activity for a week prior to undergoing bariatric surgery using a small electronic device worn above the ankle. Participants also completed surveys to assess mental health functioning, depressive symptoms, and treatment for psychiatric and emotional problems, including depression and anxiety.

A total of 850 adults who were seeking bariatric surgery between 2006 and 2009 from one of 10 different hospitals throughout the United States were included in the study.

Approximately one-third of participants reported depressive symptoms, while two in five reported taking medication or receiving counseling for depression or anxiety. “Those who reported treatment were more likely to report impaired mental health functioning and depressive symptoms, highlighting the need for better treatment modalities,” said King.

The association between physical activity and these

outcomes was strongest when only moderate-intensity physical activity was considered. However, the number of steps a person walked each day, no matter the pace, also was related.



A small electronic device worn above the ankle assessed participants’ physical activity for a week prior to undergoing bariatric surgery.

“Another goal of this study was to determine physical activity thresholds that best differentiated mental health status,” said King. “We were surprised that the thresholds were really low.” Just one hour of moderate-intensity physical activity a week—or eight minutes a day—was associated with 92 percent lower odds of treatment for depression or anxiety among adults with severe obesity. Similarly, just 4,750 steps a day—less than half the 10,000 steps recommended for a healthy adult—reduced odds of depression or anxiety treatment by 81 percent.

“It could be that, in this population, important mental health benefits can be gained by simply not being sedentary,” said King.

Because this was an observational, cross-sectional study—meaning patients’ regular physical activity behavior and depressive symptoms were measured at the same time—it could not prove that a patient’s physical activity influenced mental health status.

“Results of the study are provocative, but we would need further research to verify that physical activity was responsible for lower levels of depressive symptoms in this patient population,” said study coauthor Melissa A. Kalarchian, associate professor at Western Psychiatric Institute and Clinic of UPMC. “Nonetheless, physical activity is a key component of behavioral weight management, and it is encouraging



**Wendy C. King**

research assistant professor  
of epidemiology

to consider that it may have a favorable impact on mental health as well.”

Additional collaborators on this research include Kristine J. Steffen and James E. Mitchell, both of the Neuropsychiatric Research Institute; Bruce M. Wolfe,

Oregon Health & Science University; and Katherine A. Elder, Pacific University.

This research was funded through a cooperative agreement by the National Institute of Diabetes and Digestive and Kidney Diseases. ●

## **Pitt Faculty Lend Expertise to Institute of Medicine for Report that Could Influence How Medicare Pays Providers**

Adjusting Medicare payments to clinicians and hospitals on the basis of geographic regions would not give providers the right incentive to improve the efficiency of care, according to an interim report issued by the Institute of Medicine (IOM).

The IOM committee is engaged in an ongoing, congressionally mandated study of regional variations in health care spending and the use and benefits of adopting a geographic value index. A value index would raise payment rates in low-cost regions where the quality of care and health benefits are high and decrease payments in high-cost areas where the quality

and benefits are low relative to their spending.

“Extensive analysis by our subcontractors, review of the literature, and interpretation by the committee revealed that if we want to provide high-quality care at lower cost, we need to provide incentives to those who make decisions—that is the doctors, hospitals, and health care systems—rather than broadly at the geographic area,” said Sally Morton, chair of the Department of Biostatistics and member of the IOM Committee on Geographic Variation in Health Care Spending and Promotion of High-Value Care.

Medicare spending varies greatly across the

country, even after adjusting for regional price differences. Studies indicate that regions where Medicare spends more do not consistently report better health outcomes or greater patient satisfaction. However, committee members noted that using a geographically based value index to set reimbursements could reward low-performing providers in high-performing regions and penalize high-performing providers in low-performing regions.

“The effectiveness of payment reforms in reducing overutilization while maintaining access to high-quality care depends on the effectiveness of targeting. We found that there was substantial local variation in health care utilization and spending within broad regions,” said Yuting Zhang, associate professor of health economics and the author of a subcontractor report for the IOM.

“Our analysis suggests that reimbursement policy at the regional level may be too crudely targeted to promote the best use of health care resources,” said Zhang, who was the lead author for a related study published last November in the *New England Journal of Medicine*. The IOM committee commissioned this study and another study, also led by Zhang, on the variation of medication adherence in heart failure, which was published in *JAMA Internal Medicine* in March 2013.

The IOM committee expects to release its final report this summer, which will include further analysis and conclusions. ●

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## Helping Hospitals Address Community Health Needs

Effective promotion of public health through the Affordable Care Act is the goal of a first-of-its-kind webinar series created by the Pennsylvania Public Health Training Center, a program of Pitt’s Center for Public Health Practice, to help hospitals and health systems comply with the law.

“Most hospitals are primarily concerned about having the right services in place to address individual patient needs and have been understandably cautious about venturing into the broad unreimbursable field of public health and, specifically, community health,” said George Huber, associate dean for public policy at Pitt Public Health. Huber, a board member of the Hospital and Health Care Association of Pennsylvania,

conceived the initiative and facilitated the underlying collaboration for the project.

“However, improving community health has historically been a focus of most American hospitals,” he said. “Public health experts are here to help hospital leadership achieve this goal while meeting Affordable Care Act requirements and maximizing benefits to hospitals and the communities they serve.”

Under the Affordable Care Act, nonprofit hospitals and health systems must complete a Community Health Needs Assessment. They must collect data, engage their community, build a strategic plan to address identified community health needs, implement interventions to improve community health, and analyze their results every three years.

The Pitt Public Health team has been working with the largest health system in Pennsylvania to ensure it’s Community Health Needs Assessment incorporates the latest in public health research and best practices. The team is helping the system wade through the wealth of existing information and data on community health, such as birth rates and mortality, which can aid in performing its assessment, as well as how to identify and engage the diverse communities the health system serves.

The availability of the webinars was presented at the Association of Schools of Public Health conference in October; the Hospital & Healthsystem Association of Pennsylvania and the American Hospital Association have made the webinars available to their membership. While the webinar series targets Pennsylvania hospitals, the model and incorporation of public health expertise can easily be adapted for other states or national distribution.

Presented in an interview format moderated by Huber, the webinars feature the Pitt Public Health expertise of Steven Albert, professor and chair; Jessica Burke, assistant professor; Donna Doebler, visiting assistant professor; and Beth Nolan, assistant professor, all of the Department of Behavioral and Community Health Sciences, and professor Edmund Ricci, director of the Institute for Evaluation Science in Community Health. ●



To view the public health webinars, visit  
[www.cphp.pitt.edu/communityhealth](http://www.cphp.pitt.edu/communityhealth)

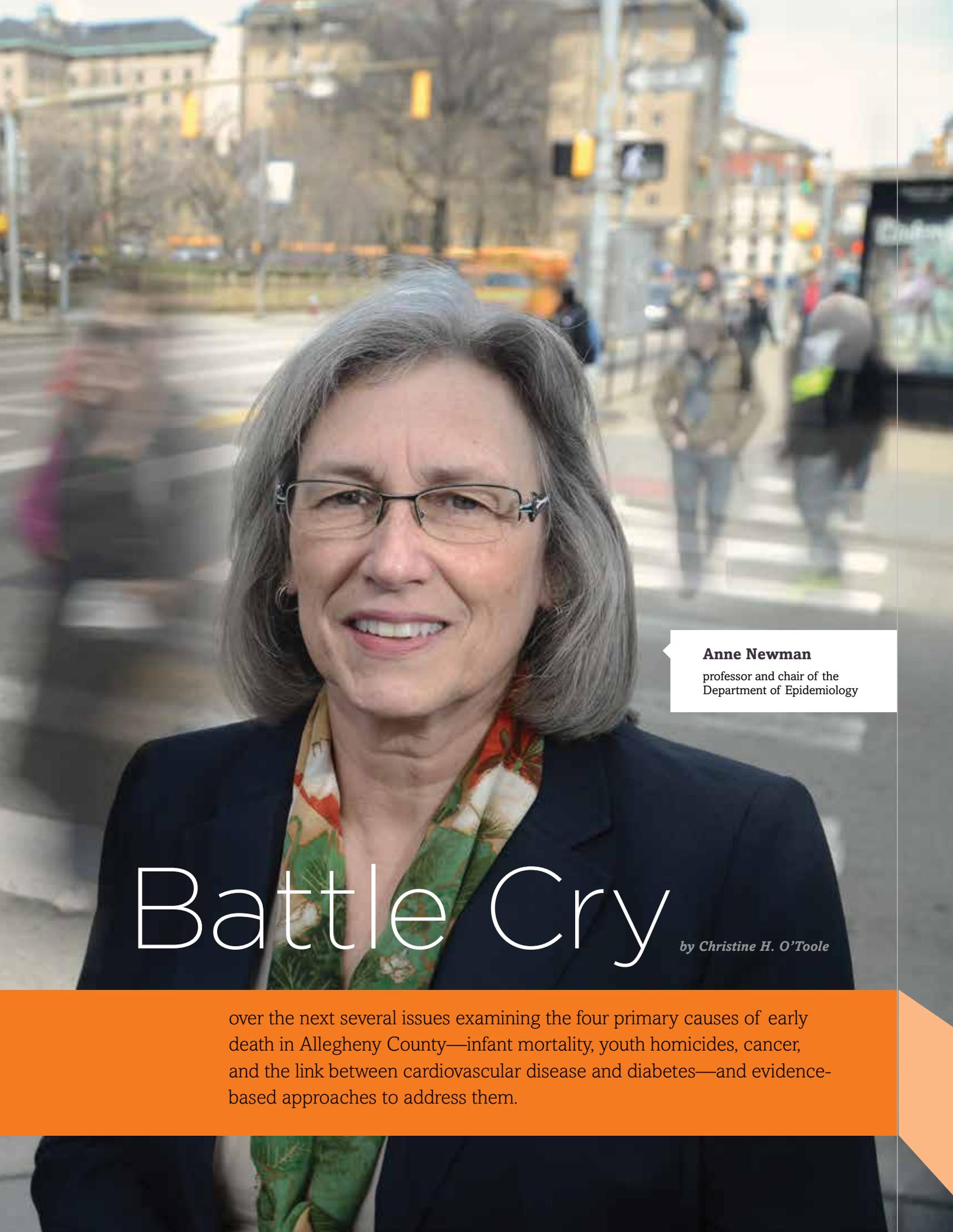
A portrait of Jeanine Buchanich, a woman with shoulder-length brown hair, smiling. She is wearing a dark blazer over a teal top and a colorful beaded necklace. The background is a blurred city street with buildings and a red double-decker bus.

**Jeanine Buchanich**

deputy director of Center for  
Occupational Biostatistics and  
Epidemiology,  
research assistant professor  
of biostatistics

# Sounding the

With a broad range of expertise, Pitt Public Health researchers have enlisted in the fight against premature mortality in the Pittsburgh region. Beginning with this report on an inaugural community conference last December, we will publish a series of in-depth articles



**Anne Newman**

professor and chair of the  
Department of Epidemiology

# Battle Cry

*by Christine H. O'Toole*

over the next several issues examining the four primary causes of early death in Allegheny County—infant mortality, youth homicides, cancer, and the link between cardiovascular disease and diabetes—and evidence-based approaches to address them.

***A unique conference launches a concerted effort to address preventable deaths in our region.***

On December 3, local health professionals streamed into the University Club, heading for a scholarly conference that would serve notice that Pitt Public Health is gearing up to address public health issues in its own backyard.

Drilling into data is a hallmark of the school's scholarship, applied with equal rigor to subjects as diverse as environmental pollution in Asia or safe sex practices in Africa. The conference, titled Health Across the Lifespan: Allegheny County 2012, was focused on analysis of premature mortality much closer to home.

Cosponsored by the University of Pittsburgh Graduate School of Public Health, the Allegheny County Health Department, the Pennsylvania Department of Health, the Pennsylvania Public Health Training Center, and the Center for Aging and Population Health Prevention Research Center, the conference invited community leaders seeking research-based answers to a sobering question.

*“We are not here to simply advocate for better health—we are here to provide evidence-based research to make better health a reality for all the citizens of our region.”*

**Don Burke**

Pittsburgh is proud to be designated as among the most livable cities in the United States. But in some areas, like health, we still have a long way to go. Despite offering the most sophisticated tertiary care facilities and translational research in the world, Pittsburgh and its surrounding communities have higher rates of overall premature mortality than comparable cities in the United States. The conference began with a striking comparison. According to one report, Allegheny County ranks last among 34 U.S. peer counties in use of preventive services and 31 of 34 for access to primary care. Across a variety of measurements, local residents are more likely to die young. What are the causes, and how can epidemiological research address them?

“When we define premature mortality as death before age 65, about 6,800 years are being lost for every 100,000 persons in Allegheny County, with huge variability,” notes Anne Newman, chair of the Department of Epidemiology, who chaired the conference planning committee. As she sees it, the

conference was an important first step toward a community answer.

To Dean Donald Burke, the meeting served as a battle cry. “These are the issues that must be addressed, and we’re here to talk about what we as academics can do to help. We are not here to simply advocate for better health—we are here to provide evidence-based research to make better health a reality for all the citizens of our region.”

Support from the Centers for Disease Control and Prevention Research Centers fueled the work, according to Newman. “Our theme is healthy aging, and our mission is to understand the needs of the community,” she explains. “But we can’t address healthy aging if we don’t first address premature mortality.”

A planning committee spent the fall analyzing data, pulling findings from previous local and national research and the Pennsylvania Bureau of Vital Statistics and correlating it with census reports and Allegheny County mortality rates.

One important source of comparative information came from Pitt Public Health’s own mortality data. According to Jeanine Buchanich, deputy director of the Center for Occupational Biostatistics and Epidemiology, the school now has more comprehensive mortality data for the United States than even the federal government. The United States does not have county level data prior to 1968. Pitt’s repository contains age-race-sex-specific annual data by county from 1950–2009 for cancer causes of death and 1960–2009 for non-cancer causes of death, including total mortality.

When mapped across the county, the results were sobering: a “red zone” of mortality that often correlated to poor communities, including Monongahela Valley river towns, and with disproportionate impact on African Americans. When compared with other locations for infant mortality, homicides, cancer, diabetes, cardiovascular disease, and disability, local rates were alarmingly high.

“We have pockets of mortality in Allegheny County that are worse than Pakistan or Bangladesh,” notes Newman.

Representatives from the Pitt School of Medicine, along with the Allegheny County Health Department, social service agencies, insurers, and research organizations, shared her concern.

“People appreciated being invited to the University. They really want to know how we can help, so it was energizing,” says Newman.

Presenters summarized data, and participants ended the day in group discussion of five pressing issues.

## Infant Mortality

Births occurring before 37 weeks of gestation are considered pre-term and are a public health issue worldwide. But preterm births in Allegheny County are of particular concern, remaining stubbornly above the national average: Rates of preterm birth are higher in Allegheny County than in the nation, the state, or Philadelphia County, a much larger metropolitan area.

Infant mortality locally is also higher than the national average. In 2012, rates for White infants stood at 5.8 per 1,000 live births. African American rates, by contrast, stand at 15.1 per thousand. The racial disparity is similar to the 1.5 fold excess noted across the state and country.

With White infant mortality lower than the state and national averages, the Maternal Child Health Working Group honed in on African American infant mortality. Because maternal health during pregnancy is so

closely tied to infants' outcomes, the group also looked at two other variables: obesity and vitamin D levels.

Analysis of Pennsylvania data showed that from 2003 to 2010, 19.8 percent of White and 28.9 percent of African American women in Allegheny County began pregnancy at a body mass index of 30 or higher, which is considered obesity. Vitamin D deficiency may also play a role in maternal and infant health. Both in Allegheny County and nationwide, studies are being done to determine its association with preterm birth and preeclampsia, and it is more prevalent in African American women than in Whites. Pitt Public Health researchers Lisa Bodnar and Alison Gernand have found that nationally, mothers with low blood levels of vitamin D in the first 26 weeks of pregnancy were more likely to deliver babies that weighed 46 grams less than their peers. They studied infants delivered full term, but babies born even at full term yet small-for-gestational age are associated with poor outcomes and are a higher risk of death.



**Alison Gernand**

postdoctoral associate in the  
Department of Epidemiology

Both weight and vitamins are tied to access to good nutrition, which links in turn to environmental issues. Some mothers may live in neighborhoods not well served by grocery stores or have limited access to public transportation.

Newman says the current protocols for maternity care may need to be changed to create better outcomes. “For individuals with high-risk pregnancies, each pregnancy is seen as an isolated event,” she notes. “If we can treat the first pregnancy as a sentinel event and keep patients engaged over time, we may do better. Agencies haven’t been able to crack that problem—they’re not set up for the long haul.”

Already under way at Pitt Public Health is the Academic-Community Partnership to Address Maternal and Child Health in Allegheny County project, which includes an Interdisciplinary Advisory Board (IAB) comprising University and health department staffers.

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## Youth Homicides

Local media headlines scream another important public health story: For young men in their prime, homicide is the leading cause of death in Allegheny County. From 1999 to 2010, data from the National Center for Health Statistics shows the sobering results. Locally, 91.3 of every 100,000 teens aged 15–19 was murdered. Among those 20–24, the homicide rate was even higher: 143.3 per 100,000. Worse, rates among African Americans in both age groups were 38 fold and 45 fold respectively higher than Whites. Zooming in more closely, city homicide rates for young Black men are 60 times the citywide average and 50 times the national average.

Violent crime is decreasing across the country, but not in Allegheny County. That puts the region on the wrong side of U.S. trends. As Newman acknowledges, risk factors for violent behavior are already well known; violent behavior is an extreme manifestation of conduct disorders and delinquency in youth. Interventions for youngsters—such as preschool attendance—may hold promise for changing outcomes in young adults.

“We see a reinforcement of existing research,” notes Newman. Key among those findings is the work of Pitt School of Medicine professor Rolf Loeber. In the

Pittsburgh Youth Study and the Pittsburgh Girls Study, his team has conducted 20 years of comprehensive research on the causes of juvenile delinquency in local children as young as seven.

Other metro areas have grappled with the complexities of sharing data across bureaucratic boundaries, with some success. Working group participants cited data sharing in the National Violent Death Reporting System, which integrates information from medical examiners, police, and hospital emergency departments. A local commitment to pooling these agencies’ data could provide further insight into homicides.

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## Cancer

The good news: Cancer mortality in the region is declining. (The bad news: Forty-four percent of cancer deaths here in 2012 were tobacco related.) And while rates of both breast and colon cancer have been declining, conference participants honed in on the role of lifestyle in cancer risk and prevention.

Obesity and inactivity are known risk factors. In breast cancer, the second-highest killer of local women, obesity is associated with a 25 percent higher rate of breast cancer, and inactivity is associated with a 33 percent higher risk. Here again, African American women have a significantly higher rate of breast cancer at a younger age. Their mortality rates are about 50 percent higher, particularly in those aged 55–59.

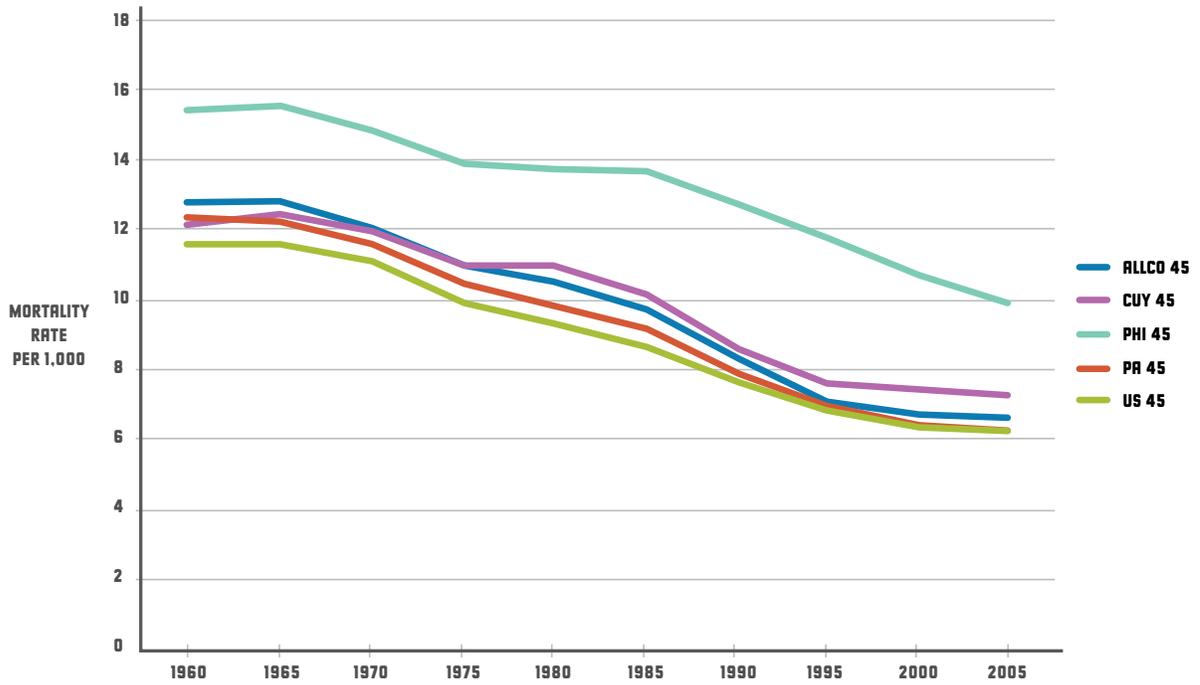
Changing behaviors, then, could make a significant dent in cancer rates. Here, working group members again voiced the need for data sharing. While information from the state Behavioral Risk Factor Surveillance System (BRFSS) is readily available, access to other potentially useful data from cost-containment and medical assistance records is constrained by privacy regulations.

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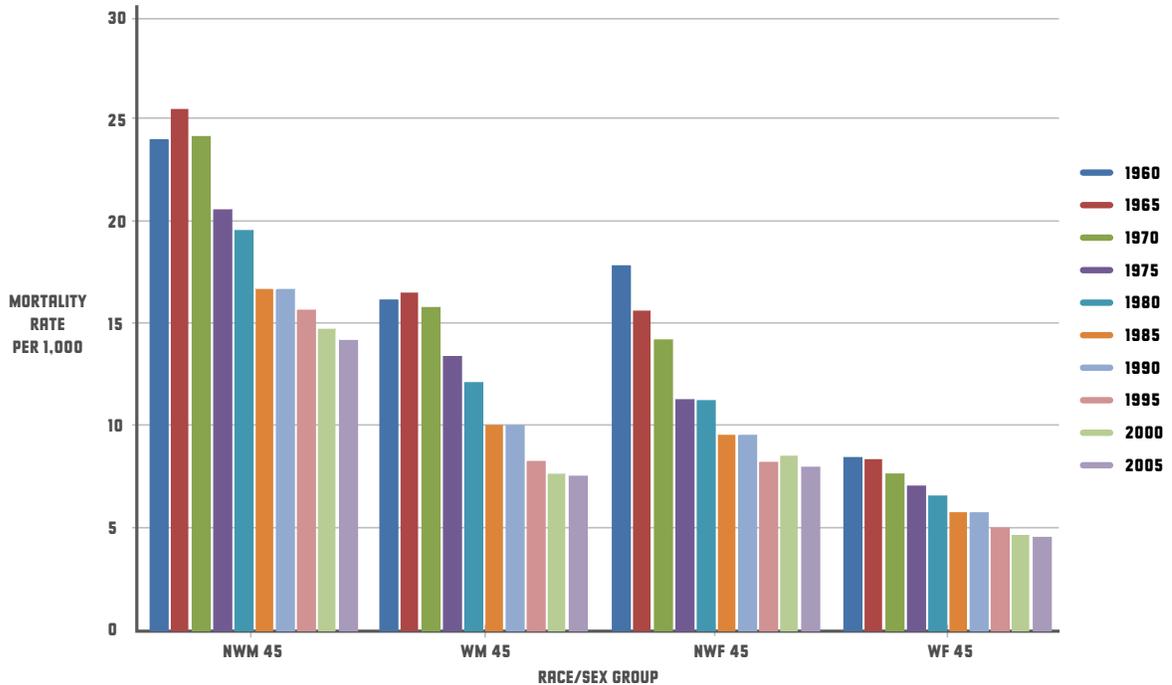
## Cardiovascular Disease and Diabetes

Already identified as the primary cause of heart attack and stroke, cardiovascular disease is now strongly linked to diabetes. As the working group reviewed Allegheny County deaths from stroke, heart

**ALLEGHENY COUNTY, PENNSYLVANIA, AND UNITED STATES  
FIVE-YEAR, TIME-PERIOD SPECIFIC MORTALITY RATES FOR 45-64 YEAR OLDS,  
1960-2009, ALL CAUSE MORTALITY**



**ALLEGHENY COUNTY, RACE/SEX SPECIFIC  
MORTALITY RATES FOR 45-64 YEAR OLDS  
OVER TIME, 1960-2009, ALL CAUSE MORTALITY**



disease, and diabetes mellitus among those 45–65, local rates were consistently higher than those of Cuyahoga County (Cleveland, Ohio), Philadelphia, Pennsylvania, and the United States.

Two local University of Pittsburgh studies showed the challenges in attacking these complex killers.

The 2010 Heart SCORE (Strategies Concentrating on Risk Evaluation) studies involving nearly 2,000 participants ages 45–75 showed extremely low levels of heart health; in fact, only a single participant demonstrated ideal levels of weight, blood pressure, fasting blood sugar and cholesterol, nutrition, and exercise.

Steven Reis, the University's associate vice chancellor for clinical research and the senior SCORE investigator, reported the results in the journal *Circulation*. "We have a great challenge ahead of us to attain the American Heart Association's aim of a 20 percent improvement in cardiovascular health rates by 2020," he noted.

In a second analysis of local information, obtained through the 40-city Women's Health Initiative, Pitt researchers found that Pittsburgh subjects had the fifth-highest age-adjusted total mortality of the 40 clinics. The incidence was about 30 percent higher than the average and driven predominantly by smoking, hypertension, and diabetes. The results suggest those risk factors are potentially preventable and treatable.

Nutrition, exercise, smoking cessation, and long-term adherence to proven therapies can reduce both heart disease and diabetes. To educate the entire community on those solutions is a huge public health task. Participants noted, however, that the Allegheny County Health Department has no direct services for chronic disease prevention; the provision of preventive services currently takes place primarily in the primary care doctor's office. Meanwhile, Pitt Public Health has established a Diabetes Prevention Support Center to help guide translation efforts in the community.

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## Aging and Disability

Because cardiovascular disease and stroke often disable the aging, the prevalence of these events has a deep impact in Allegheny County. Well known as one of the oldest counties in the nation, Allegheny County has a high need for services that support this cohort. A final working group analyzed measures to keep them healthier longer.

The high level of cardiovascular disease in the region strongly influences disability rates. Panelists noted that controlling cardiovascular risk factors—blood pressure, high cholesterol, and smoking—can have a major impact in preventive disability. Combined with other standard prevention techniques—cancer screening, immunizations for flu and pneumonia, prevention of osteoporosis fractures, and activity to preserve mobility—these actions offer the potential for healthy aging. The group noted that sustaining social activity and preventing depression are important mental health measures for this age group.

Steven M. Albert, chair of the Department of Behavioral and Community Health Sciences, presented the parallels that exist in the aging services and public health services, suggesting that use of services could be used as an indicator of health status. Prevention services are already offered through the senior services programs, and could be expanded. However, the data divide continues to exist. Information is not yet shared between social service and health service agencies. Work through the Area Agencies on Aging might offer a solution.

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## The Gap Between Health Care and Public Health

As she readied a paper on the proceedings, Professor Newman noted that the gulf between public health and medical practice remains. "An important issue that was recognized by all the conference working groups is that our health care systems are still not responsible for populations, just individuals," she says. "There's still a gap between health care and public health. We don't see these problems in Europe, where health care providers are responsible for a given area. That may explain their better health outcomes. The Affordable Care Act gives us an opportunity to think about changes in the deployment of health care, to track and design ways to improve."

Overall, Newman believes that the best outcome of Health Across the Life Span was consensus on improving Allegheny County's most difficult health issues. "The response was what I had hoped—an affirmation that we have problems worthy of our attention." ●

The

Devil

in the

Diesel

*by Christine H. O'Toole*

Mounted 10 feet above the green lawn of Point State Park in downtown Pittsburgh, a plain gray vinyl box stands sentinel. Over the next two years, it will patiently inhale about four liters of downtown air each minute—a bit less than the human dog walkers, Frisbee players, and cyclists below. It will remember those breaths, recording continuous data on time and weather, and—most important—collecting evidence of dangerous diesel emissions generated by vehicles, rail engines, and river barges that pass by.

But the high-tech sampler, installed in January to capture both particulate and aerosol pollutants, doesn't stand alone. In the region's first attempt to comprehensively map the sources of downtown diesel pollution, its findings will be combined with that of 39 other monitors saturating the downtown core. The high-tech effort will yield highly detailed winter and summer data on one of the region's most daunting health risks.

The microscopic particulates in diesel fuel are a potent carcinogen: One ton of diesel particulate matter (DPM) poses the same health risk as 60 tons of benzene. Diesel particulates carry heavy metals and other toxins deep into the lungs. Mapping fumes is essential to understanding air quality in the Pittsburgh region, as it strives to attain federal clean air standards.

The investigation by Jane Clougherty, assistant professor of environmental and occupational health, puts Pitt Public Health expertise to work in a groundbreaking project for the Allegheny County Health Department (ACHD), the agency responsible for monitoring the county's air quality. Pittsburgh is only the second U.S. city, after New York, to use the breakthrough approach and equipment. The results will not only identify what kinds of pollutants are emitted by diesel engines, but also where and when concentrations are found.



**Leah Cambal, Brett Tunno, and Lauren Chubb,** graduate students in environmental and occupational health, install an air pollution monitor.

The sampler findings will be paired with another powerful tool: a geographic information system (GIS), which combines hundreds of layers of digital data to create instant in-depth maps. GIS helps to generate answers to virtually any public health research question that begins with “where.” In this application, GIS will allow University and ACHD staffers to minutely map mobile pollution. Whether it’s the amount of diesel emissions at a 50-meter area at Point State Park during an August rush hour or the average amount of diesel exhaust generated by river barges in a year, the system will yield the first comprehensive look at the impact of diesel pollution downtown.

“The big problem with mobile source emissions is that we don’t have monitors on cars, so we have only broad estimates of what’s going on,” explains Jim Thompson, director of air quality monitoring for the health department. In contrast, “we know how much [pollution] is coming from a steel plant, so we can plan where controls should go.” Thompson saw a conference presentation on Clougherty’s work on the New York City Community Air Survey using the new monitors. “I knew right away we needed it here,” he says. “With the monitoring project, we will be able to identify significant sources. And with that data in hand, we can inform good policy decisions.”

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## A Long-Term Legacy

Diesel exhaust has been classified by the U.S. Environmental Protection Agency (EPA) as a potential human carcinogen since 2002. Humans routinely exposed to diesel fumes, such as bus drivers and truckers, show the hazards: Those exposed to high levels of diesel exhaust over many years consistently demonstrate a 20 to 50 percent increase in the risk of lung cancer or mortality, and local estimates based on 2005 data estimate that diesel exhaust alone causes 64 deaths in the region annually. Burned diesel has also been linked to heart attacks and adult diabetes.

Diesel traffic accounts for only six percent of the vehicle miles traveled within the region. But diesel engines emit more than half of the most dangerous particulates: those measuring 2.5 microns or less. These penetrate deep into the respiratory system.

Thompson notes that controlling diesel emissions has been a high priority for ACHD, which has spent \$4 million on voluntary retrofit programs.

With no existing state or local regulations to control emissions, the department has led voluntary programs that have reduced diesel emissions from school buses, trash trucks, and other vehicles by at least 90 percent, or a total of almost 400 tons a year. Allegheny County has also enacted anti-idling regulations that prevent trucks, buses, off-road vehicles, and construction equipment from running parked vehicles more than five minutes per hour. A city clean construction vehicle bill was passed in 2011, but has not yet been implemented.

The transition to ultra-low-sulfur diesel fuel and the debut of low-emission engine standards in 2007 has also reduced particulates. But because old diesel equipment can chug on for decades, the particulate problem persists.

“Post 2007, diesel vehicles are 90 percent cleaner,” notes Thompson. “Over time, the number of problem vehicles will be reduced. But there’s a large legacy issue. The average age of diesel vehicles is going up because of the poor economy. Companies upgrading their fleets sell used vehicles to others, which is why we need retrofit programs for small business. We’re looking at more than 30 years to solve the problem.”

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## Placing Monitors

Clougherty’s office offers an expansive riverfront view that spans the busy Parkway East interstate, steel mills, a CSX rail line, and barges puffing down the Monongahela River.

“The first time my research analyst, Jessie Carr, came in, she said, ‘You’ve got all your point and non-point pollution sources, right in front of you,’” she laughs. At rush hour, the skyline outside Clougherty’s window illustrates the confluence of hills, rivers, and densely interwoven traffic that complicates the downtown pollution problem.

Temperature inversions that trap pollutants under a layer of warm air often occur in cities surrounded by mountains, like Pittsburgh. In fact, the nation’s worst air quality tragedy occurred a few miles upstream from Clougherty’s office in the mill town of Donora. In 1948, an inversion trapped industrial pollution at ground level in the river town for four days, killing 17 people outright and sickening thousands.

“Air pollution and diesel emissions vary tremendously. Topography plays a key role. We are working with complex terrain and wind patterns,” she notes. As her team planned the locations for the diesel monitors through downtown and the South Side, they borrowed datasets from county agencies to plot points that could capture different types of elevation, roadways, and traffic. As Clougherty clicks through digital maps at her desk, she explains the variations among the resulting patterns.

“This is heavy truck traffic, showing the number of 18-wheelers each day. You see that the truck routes ring around downtown. And on this one, you clearly see where bus routes run, and the number of trips each day. The buses tend to run through downtown, rather than around it—a very different pattern. On this one, you see the active railways that run downtown, and the proximity to rivers, where the barges are. There’s very good spatial contrast between gasoline and diesel sources. That’s convenient because they will influence different monitors. Next, we characterize according to high and low activity on each of those three categories and come up with eight classes, with an equal number of sites in each class.”

Once placed, the sophisticated monitors contribute high-quality features. “We have unique instrumentation,” says Clougherty. “The pumps and

batteries are much better calibrated, so we have a much cleaner-cut point in the size fractionalization of the 2.5 particulates” caught in the devices’ quartz filters. “Most importantly, we can time them precisely—we have everything synchronized. Because they are programmable, we can set each monitor to particular times of interest. During the first year, we’ll monitor the work week. Next year, we’ll go back to look at high exposure hours; that is, we’ll program our monitors to collect particles only during early morning and evening rush hours, when diesel activity is highest downtown. Or we could look at inversion-focused areas so we have that data.”

At the conclusion of the three-year, \$865,000 project, funded by the agency’s Clean Air Fund, ACHD will have a lode of data to meet a long-held goal. Allegheny County now meets all of the clean air standards of the EPA, except for fine particulates (PM<sub>2.5</sub>), the newest standard for ozone (eight-hour average), and the one-hour standard for oxides of sulfur (SO<sub>2</sub>).

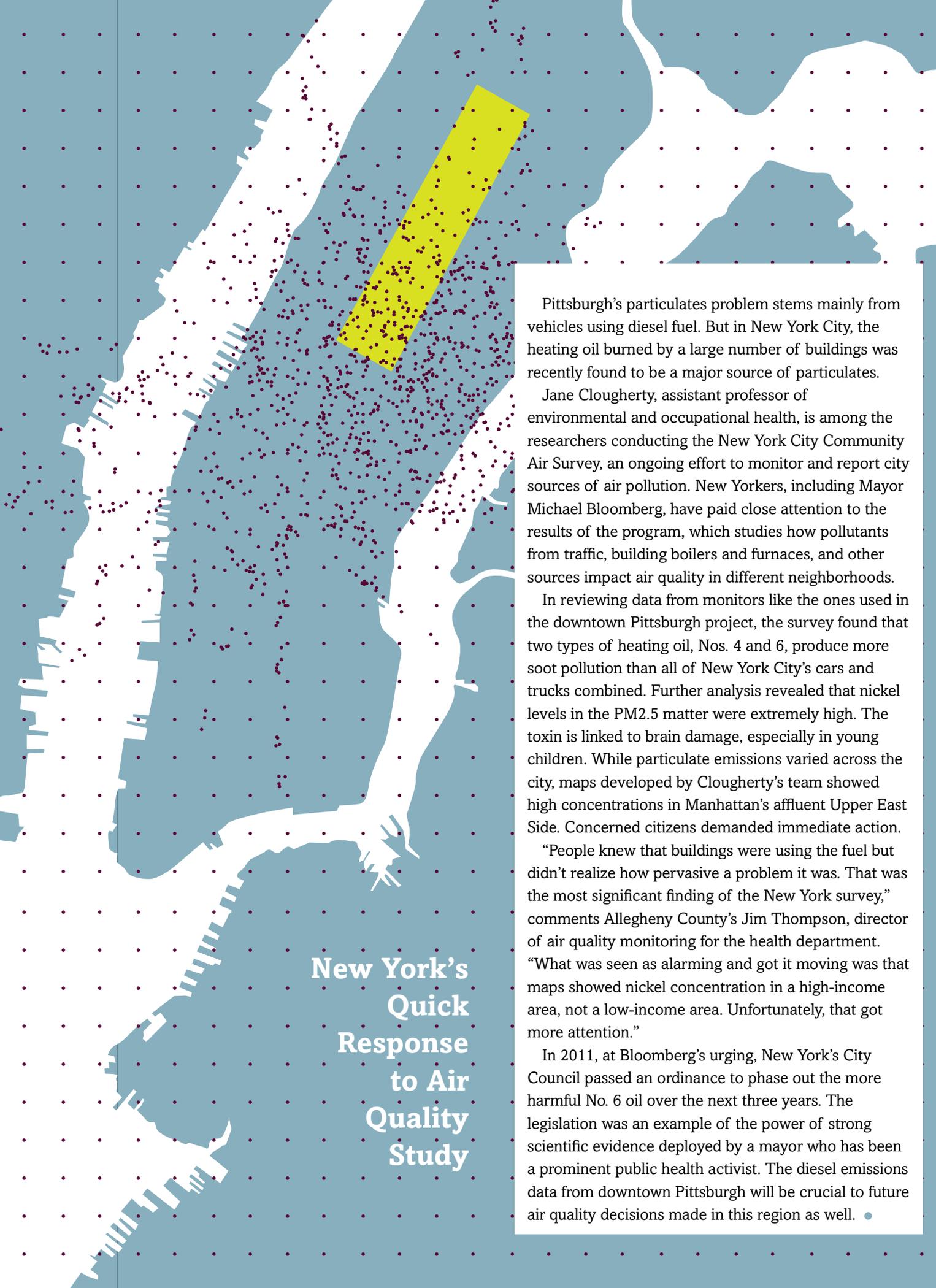
“With previous ACHD programs, we’ve taken a shotgun approach, attacking various areas of diesel emitters,” says the health department’s Thompson. “This study will better identify what is the exact problem, and what the sources are—trucks, construction equipment, or tugboats.” ●



**Jane Clougherty**

assistant professor of environmental and occupational health





## New York's Quick Response to Air Quality Study

Pittsburgh's particulates problem stems mainly from vehicles using diesel fuel. But in New York City, the heating oil burned by a large number of buildings was recently found to be a major source of particulates.

Jane Clougherty, assistant professor of environmental and occupational health, is among the researchers conducting the New York City Community Air Survey, an ongoing effort to monitor and report city sources of air pollution. New Yorkers, including Mayor Michael Bloomberg, have paid close attention to the results of the program, which studies how pollutants from traffic, building boilers and furnaces, and other sources impact air quality in different neighborhoods.

In reviewing data from monitors like the ones used in the downtown Pittsburgh project, the survey found that two types of heating oil, Nos. 4 and 6, produce more soot pollution than all of New York City's cars and trucks combined. Further analysis revealed that nickel levels in the PM2.5 matter were extremely high. The toxin is linked to brain damage, especially in young children. While particulate emissions varied across the city, maps developed by Clougherty's team showed high concentrations in Manhattan's affluent Upper East Side. Concerned citizens demanded immediate action.

"People knew that buildings were using the fuel but didn't realize how pervasive a problem it was. That was the most significant finding of the New York survey," comments Allegheny County's Jim Thompson, director of air quality monitoring for the health department. "What was seen as alarming and got it moving was that maps showed nickel concentration in a high-income area, not a low-income area. Unfortunately, that got more attention."

In 2011, at Bloomberg's urging, New York's City Council passed an ordinance to phase out the more harmful No. 6 oil over the next three years. The legislation was an example of the power of strong scientific evidence deployed by a mayor who has been a prominent public health activist. The diesel emissions data from downtown Pittsburgh will be crucial to future air quality decisions made in this region as well. ●

# Alumni

## 2013 Alumni Awards and Ceremony

Congratulations to the 2013 University of Pittsburgh Graduate School of Public Health alumni award recipients! Dean Donald Burke, along with members of the Pitt Public Health Board of Visitors, associate and assistant deans, chairs, faculty, and fellow alumni honored the awardees on March 28 at the University Club.



**Dean Burke** with the 2013 University of Pittsburgh Graduate School of Public Health alumni award recipients. (Unable to attend were William Holman, Gregory Homish, and Daniel Patterson.)

**Margaret McDonald** (PhD '93), associate vice chancellor for academic affairs, and **Steven Albert**, chair of the Department of Behavioral and Community Health Sciences, attend the ceremony to support the alumni awardees.



**Lauraine Duncan** and **Kristen de Paor**, director of development for Pitt Public Health, celebrate with the awardees. Duncan's family supports Pitt Public Health through the school's **Dr. Edgar and Lauraine Duncan Scholarship**, providing resource support for such items as books, fees, stipends, or travel, with priority given to disadvantaged students.



 *View more photos from the awards ceremony at [www.publichealth.pitt.edu/photogalleries](http://www.publichealth.pitt.edu/photogalleries)*

## Distinguished Alumni Awards



For Teaching and Dissemination:  
**Anita Caufield (MHA '84)**, president and executive producer, Forecast Technology Group, Inc.



For Research:  
**Coleen Boyle (PhD '81)**, director, National Center on Birth Defects and Developmental Disabilities at the Centers for Disease Control and Prevention



For Practice:  
**William Holman (MHA '79)**, president and CEO, Baton Rouge General Medical Center and General Health System (Retired)

## The Margaret F. Gloninger Service Award



**Mary Patricia Nowalk (PhD '93)**, associate professor, University of Pittsburgh School of Medicine, Department of Family Medicine

## Delta Omega Initiates



**Charles Christen (DrPh '10)**, executive director, Pittsburgh AIDS Task Force



**Gregory Homish(PhD '03)**, assistant professor of community health and health behavior, and codirector, Community Health and Health Behavior Concentration, MPH Program, State University of New York at Buffalo



**Daniel Patterson (MS '12)**, national registered paramedic; assistant professor, University of Pittsburgh School of Medicine, Department of Emergency Medicine; and director for research, Center for Emergency Medicine of Western PA, Inc.

## About the Awards

**The Distinguished Alumni Awards** are the highest awards given to alumni by the Graduate School of Public Health. Recipients are Pitt Public Health alumni who have made a significant contribution to the field of public health, to the school, or to both.

**The Margaret F. Gloninger Service Award** was established in honor of the late Margaret Fitzgerald Gloninger (MSHyg '66), former faculty member in maternal and child health. This award is presented annually to an alumnus who has made a significant contribution to the school or to the community through volunteer service.

Recipients of the Distinguished Alumni Awards and Margaret F. Gloninger Service Award are chosen through a competitive nomination and selection process by a Pitt Public Health committee. The 2013 committee was chaired by Eleanor Feingold, associate dean for education, and consisted of the following members: Joan Anson, director of career services; William T. Green Jr. (MPH '01); Edward Gregg (PhD '96); James Pieffer (MHA '86); Joel Weissfeld (MPH '82); and John Zanardelli (MPH '79).

**Delta Omega** is the national honorary society for graduate studies in public health. The society was founded in 1924, when only a few graduate schools of public health existed in the United States, and now has chapters at 38 of the accredited schools providing advanced public health degrees. Membership in Delta Omega reflects the dedication of an individual to quality in the field of public health and to the protection and advancement of the health of all people. The Omicron Chapter of Delta Omega was established at the University of Pittsburgh Graduate School of Public Health in 1984.

# Profile: Debra Cen

by Christine H. O'Toole

A passion for science, business, and American culture has propelled Hui “Debra” Cen (ScDHy '91) to a sweet spot. Having sold one successful biotech start-up and handed off another, the Silicon Valley entrepreneur is now turning her attention to a high-tech way to promote the cultural strength of the United States and China to each other.

It's a natural progression for the 50-year-old Cen, who first flew from China to the United States to enroll in the Graduate School of Public Health in 1986, after completing undergraduate work at Xiamen University and spending two years in the master's program at Shanghai Institute of Biochemistry and Cell Biology at the Chinese Academy of Sciences. “I came to the U.S. when I was 23. I remember the plane ride,” she laughs. “Even then, my dream was to start a company, though I had no idea what kind. It was definitely in my mind.”

Cen's undergraduate experience had already put her on the path to a career-long interest in the molecular mechanism of diseases.

“One of my professors at Xiamen University was very influential. I remember him using the example of sickle cell anemia, explaining how it was caused by the mutation of amino acid in hemoglobin protein, and therefore caused whole blood cell to malfunction. I fell in love with modern biology in his classroom.”

Cen's business dream was deferred while she earned her ScD in infectious diseases and microbiology (IDM)—specifically molecular virology—at Pitt. After a stint at the National Institutes of Health researching cellular oncology, she moved to the University of California, San Francisco, working with signal transduction pioneer Lewis T. “Rusty” Williams. Along with 14 other members of his staff, she followed Williams to what was then Chiron Corporation. The Silicon Valley environment reawakened her dream to launch a company, and she and partner Li Shen launched SABiosciences, creating pathway-specific gene and protein array products. A decade later, the firm was acquired by QIAGEN for \$97 million.

“Entrepreneurship is so appealing because I feel I can instantly make decisions and influence the whole thing. In Silicon Valley, the whole culture is like that,” she says.

After returning briefly to her homeland in 2002, Cen became involved with Biotium, a fluorescent dye company, and later spun off a second start-up, LEAP Biosciences. The firm has developed several novel multiplex protein detection technologies, which she says LEAP is looking into licensing.

Describing herself as a “retired entrepreneur,” Cen now hopes to encourage a dialogue between Chinese and U.S. cultures, promoting recognition of the best elements of each.

“U.S. society offers transparency, free thinking, taking risks, meritocracy—all great things. The Chinese emphasize discipline, education, and personal responsibility.” She hopes to encourage other immigrants to contribute not just in the American workplace, but also in schools and the community.

Cen is an active donor to Pitt Public Health, which started her career with a full scholarship and student stipend. “Twenty-seven years ago, my parents couldn't have helped me very much—they could only buy my plane ticket to the U.S. Once I started at Pitt, I was the wealthiest person in my family. It changed my life, and I really appreciate that.” She fondly remembers Robert Yee, an IDM department chair and mentor. “When Dr. Yee retired, he started a fund for students from his savings. I was moved by his generosity. So when I was able, I made my first donation to the Dr. Yee fund.” Last year, Cen made a gift to the capital campaign that will support significant upgrades to the school's existing facilities. Taking advantage of the Elizabeth L. and John P. Surma matching gift\*, Cen has the opportunity to name a new classroom in the renovated building.

Overall, Cen is both grateful and pragmatic about her career. “I'm really thankful. I've been blessed with good luck—half good luck, and half hard work. If you don't work hard, you have no luck.” ●



To learn more about the Elizabeth L. and John P. Surma matching gift, visit [www.publichealth.pitt.edu/SurmaMatch](http://www.publichealth.pitt.edu/SurmaMatch)



# Pitt Public Health in the World

**a** Mirta Roses Periago, emeritus director of the Pan American Health Organization, spoke to the Class of 2013 at Pitt Public Health Convocation on April 28. She said, “[P]ublic health is at a crossroads, and during your professional lifespan, you will shape it. Your generation may be able to jump into longevity as a result of the social contract established since 1900 (Industrial Revolution-microbial world) and into the 21st century (digital revolution-nano world), or we may witness the first-ever shortening of life expectancy due to NCDs [non-communicable diseases], violence, and external causes.”



*Read the full transcript online at [www.publichealth.pitt.edu/convocationaddress2013](http://www.publichealth.pitt.edu/convocationaddress2013).*

**b** Seven African American-owned barbershops and hair salons participated in the Center for Health Equity’s annual Take a Health Professional to the People Day, a health promotion and disease prevention program in several Pittsburgh communities.

**c** Student volunteers from the school’s Association of Women in Public Health packed produce for local community members at the Greater Pittsburgh Community Food Bank. More than 20,000 pounds of food was prepped for 450 families.

**d** Natalie Bulger (MHA ’12), compliance manager at The Children’s Institute, and Mike Evans (MPH ’80), vice president of surgical program development at the Jefferson Regional Medical Center, at the Pitt Public Health reception attend the American College of Healthcare Executives 2013 Congress on Healthcare Leadership in Chicago, Ill., in March.

**e** David Hirsh (MPH ’72) and Ellen Dressler attend the Health Sciences alumni reception in Palm Beach, Fla., on February 13.

**f** Many thanks to Diane Peterson (MPH ’75) for hosting the Pitt Public Health Alumni Reception in Houston, Texas, on May 23. Pictured here are (left to right) Larry Mathis, Diane Peterson, Craig Peterson, Michael Walsh (MHA ’04), and Seema Mehta Walsh.

**g** Laila Jarjour (MPH ’93) and Alka Agarwal (MPH ’78) at the Houston Alumni Reception on May 23. The reception was hosted by Diane Peterson (MPH ’75). Interested in hosting an event? Contact Kristen de Paor at [kwd128@pitt.edu](mailto:kwd128@pitt.edu).

**h** The Pitt Public Health community enjoyed great company, incredible food, swirling silks, Peruvian serenades, and bagpipes at the annual Pitt Public Health International Dinner, which promotes and encourages globalism, diversity, and the inclusion of all cultures.

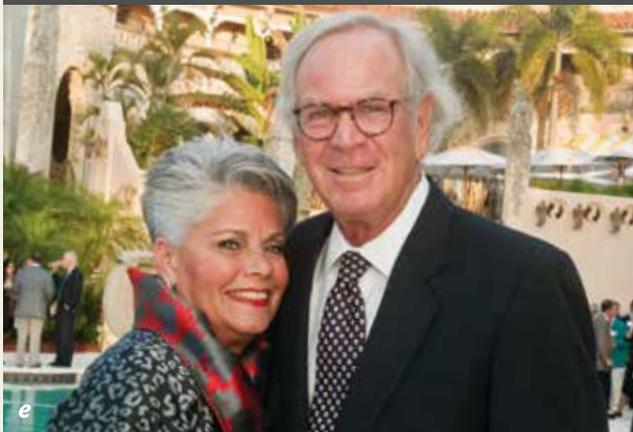
**i** Robert Henkel (MPH ’83), president and CEO of Ascension Health, returned to campus several times this past year as the Executive in Residence (EIR) for the Department of Health Policy and Management. The EIR program provides students with career counseling and leadership and professional development.

**j** Pink was the color as Pitt Public Health students recognized National Breast Cancer Awareness Month last fall. Recognizing that the mission of public health aligns with that of the Susan G. Komen for the Cure Foundation, students associated with the Association of Women in Public Health, the Minority Student Organization, and the Health Policy and Management Association collaborated to raise \$370.50 for the cause through volunteer bake sales, a Zumba fitness class, a “Pitt wears pink” day, literature distribution, and a special speaker who addressed breast cancer concerns. Featured here are (left to right) Jessica Ngan, Beatrice Lors, and Karalyn Smith.



## ***Have Something to Share?***

*Pitt Public Health in the World is a collection of photos of our faculty, staff, students, alumni, and friends involved in the world. **Have a photo you’d like to share?** Please send it to [sgill@pitt.edu](mailto:sgill@pitt.edu).*





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[gsphcomm@pitt.edu](mailto:gsphcomm@pitt.edu)

### *Mark your calendar!*

September 7, 2013  
Alumni Reception  
Los Angeles, CA

September 28, 2013  
Homecoming  
Pittsburgh, PA

November 4, 2013  
Alumni Reception at APHA Conference  
Boston, MA

mid-May 2014  
Pitt Public Health Alumni Reunion  
Pittsburgh, PA

Check our Web site for more event details soon:  
[www.publichealth.pitt.edu](http://www.publichealth.pitt.edu)