Social Epidemiologist Investigates Disease and Aging over the Lifecourse

The work of Maria Glymour could be compared to probing some of the greatest mysteries that exist in public health research and elsewhere.

Among them?

Why do Americans have significantly worse health in middle age versus their counterparts in European nations?

How have the social changes of the last few decades affected women?

And what are the key causes of the higher incidences of stroke for those who live in a select group of Southeastern states known among public health researchers as the “stroke belt”?

For the last three and a half years, Glymour, an assistant professor of Society, Human Development, and Health at Harvard’s School of Public Health, has collaborated with Harvard Center for Population and Development Studies (HCPDS) on several of her key research interests which look at social determinants of health in aging.

Prior to being named to the faculty in 2008, she spent her post-doctorate work in the Robert Wood Johnson Foundation Health and Society Scholars (RWJF HSS) program at Columbia University and now serves as a core faculty member in the same program at Harvard. Glymour received her S.D. and S.M. from the Harvard School of Public Health in 2004.

With HCPDS Executive Director Lisa Berkman, Adjunct Professor and former Pop Center Bell Fellow Mauricio Avendaño, and Associate Professor of Epidemiology Eric Tchetgen Tchetgen among her collaborators, Glymour’s research is focused on how social factors experienced across the lifecourse, from infancy to adulthood, influence cognitive function, dementia, stroke, and other health outcomes in old age.

“One of the things we are looking at was prompted by the finding that Americans have significantly worse health in middle age than their European counterparts,” said Glymour, noting that this finding was not simply a matter of socioeconomic differences as one might expect. “Even wealthy Americans were doing worse than wealthy Europeans, and this generated a great deal of speculation.”

Glymour is probing deeper into how the social changes of the last few decades have specifically affected American women, noting that increasing numbers of women entering the workforce did not necessarily equate with the addition of proper supports to alleviate other traditional duties.

“We do not have great access to child care or strong policies for family leave in the U.S., and this really takes a toll on women,” said Glymour. “Having social support relieves some of the consequences…. We want to see how these consequences in these women’s lives affect their old age, because whatever happens in your body over your life, you carry into old age. The hypothesis is that the...
Aging Societies: Why We Care, continued from page 1

in most instances. For a populous country such as China, the number of aging adults is almost equally matched by those working by a 2-to-1 margin, whereas a generation ago the ratio of working to aging adults was closer to 60 to 1.

These changes will have significant impacts on each and every society, and we will need to completely rethink how we define dependency as a matter of public policy with greater numbers of elderly and lower incidences of fertility and child births. Population growth will continue, yet these seismic demographic shifts will lead to necessary changes in the structure of our societies.

For the Pop Center, the depth and breadth of our work in this area addresses a host of the issues related to this rapidly changing landscape, including the concerns of rising inequality; fragile families and communities; new urban areas struggling to keep up with increasing populations; environmental consequences; social exclusion and “dis-integration”; and increased conflicts.

Our ties, both past and present, keep this focus ever present. In October, we were fortunate to welcome back former Visiting Fellow Dr. Babatunde Osotimehin, executive director of the United Nations Population Fund, to talk with us about his work which is focused on health and equal opportunities for men, women, and children. As you’ll see in the full article (found on page 3), Dr. Osotimehin noted that the problems stemming from population growth are actually issues of consumption, distribution, and equity, not necessarily intrinsic to the number of people alone.

Our associate director, David Canning, is deputy director of the Program on the Global Demography of Aging (PGDA) at Harvard, funded by the National Institute of Aging. The PGDA spearheads interdisciplinary research related to global aging and health. Canning’s own work explores demographic change and change in age structure on aggregate economic activity, and the effect of changes in longevity on economic behavior. In one of his most recent projects, Canning and his collaborators, David Bloom, Jocelyn Finlay, and Gunther Fink, analyzed the effect of low fertility on income per capita with a particular focus on Europe and found that old-age dependency will have serious long-term repercussions. Current PGDA fellow, Mark McGovern, is examining how childhood social factors affect adult health. Read about his recent work on page 4.

The aging of the world’s population will create complex and challenging problems, ones that will affect each and every one of us. This is why the topic will continue to be a primary focus of our work, and why we will continue to keep you up-to-date on the Pop Center’s role in all of these emerging areas of study in the future.

—Lisa Berkman

### Aging Populations: Three Important Demographic Trends

- **At the world level**, the number of older persons is expected to exceed the number of children for the first time in history by 2045.
- **In 2000**, the population aged 60 years or older numbered 600 million, triple the number present in 1950. In 2009, the number of older persons had surpassed 700 million. By 2050, 2 billion older persons are projected to be alive, implying that their number will once again triple over a span of 50 years.
- **The pace of population aging is faster in developing countries** and at lower socioeconomic levels than in developed countries. Hence, developing countries will have less time to adjust to the consequences of population aging.

The consequences? **Economically**, population aging will impact economic growth, savings, investment, consumption, labor markets, pensions, taxation and intergenerational transfers. **Socially**, population aging will affect family composition and living arrangements, housing demand, migration trends, epidemiology and healthcare needs. **Politically**, population aging will shape voting patterns and political representation.

*2009 United Nations World Population Ageing Report*
Seven Billion and Climbing

As population grows, educating girls, engaging youth are top needs

With the world’s population passing an estimated 7 billion this fall, the executive director of the United Nations Population Fund (UNFPA) said in a Harvard Pop Center presentation that it is critically important to step up efforts to educate girls and engage young people.

Babatunde Osotimehin, who was named UNFPA executive director in January 2011, said that problems stemming from population growth are actually issues of consumption, distribution, and equity, not necessarily intrinsic to the number of people alone. He spoke at the Pop Center on October 12, 2011.

Though the population reportedly surpassed 7 billion this fall, Osotimehin said that all of those people, if standing shoulder to shoulder, could fit within the confines of Los Angeles. If an effort is made to ensure that a young man raised in fast-growing Tanzania gets a good education, understands the importance of the environment, and lives sustainably, that may create a different global future than if that same man were raised to want everything that someone in a developed nation like Denmark has, which would multiply humankind’s environmental footprint enormously.

Osotimehin, a Pop Center senior fellow in 1996 and 1997, described a world that will be transformed in the next few decades. By midcentury, the global population is expected to hit 9 billion, with 70 percent living in cities. The list of megacities, with populations over 10 million, is expected to grow rapidly, straining infrastructure and swelling slums.

Though the world’s present growth rate has slowed from 20 years ago, the sheer number of humans having babies ensures that the population will continue to climb. The fastest-growing countries are in Africa and Asia. In those nations, young people are making up larger percentages of the population, yet Osotimehin said that national resources aren’t targeted to their needs proportionately. In Kenya, for example, 85 percent of the population is under 35, yet the nation doesn’t spend near 85 percent of its budget on their needs.

Young people are critical to these countries’ future, he said, and nations should pay attention to them, particularly through education, to ensure they are engaged and participate in society.

“We have to ask ourselves how to engage with young people and make them equal partners in the future of the country,” Osotimehin said.

One segment of the population that is particularly important is young women and girls, Osotimehin said. In many of the fastest-growing nations, girls have few choices. They’re poorly educated, are married off while teenagers to begin a life of childbearing, and don’t participate fully in the economy.

Ensuring that those girls get a secondary education, he said, will not only delay their childbearing years but will give them a greater chance of participating more fully in society.

Gender-based violence is another pressing issue, Osotimehin said, and is widely underreported. He told of a visit to a refugee camp on the Kenya-Somalia border in which he interviewed groups of boys and girls separated. The boys were educated, had access to the Internet, and, though they worried about their futures, weren’t in particular danger. The girls he interviewed, however, stayed mainly silent, with one girl doing the talking. Many had suffered sexual attacks, and fear kept all but two of the 20 from attending school.

“It comes down to the status of women in our country. What do women mean to us?” Osotimehin said.

While much of his talk focused on the growing population of young people, he also said the world has to pay attention to its elderly. The world’s population growth has been boosted as much by lengthening life expectancy as by the increase in young people, he said. Nations have to ensure they have ways to care for their elderly. China’s population is rapidly aging, for example, but the migration of large numbers of people to the cities has broken the traditional extended family structure through which the old received care.

He also addressed other issues, cautioning that environmental priorities should not push aside societal ones. He said developing nations need to show a commitment to helping their own people and not just rely on donor aid, which today provides 90 percent of AIDS treatment and which, if withdrawn, could spell disaster.

“That is unsustainable,” he said.

Osotimehin said that academics can help by providing data that defines problems and points out solutions.

“What you can do for us as a community is to provide evidence,” Osotimehin said. “Whether on youth, on aging, on reproductive health, we need evidence.”

—Alvin Powell
Harvard Gazette
Reprinted with permission
Study Compares Early Life Conditions and Adult Health in Ireland

A substantial body of research in epidemiology, demography, and economics has established that our health is influenced not only by current behavior and circumstance, but also by cumulative experience since birth (and even before). Although we know that substantial inequalities exist in both child and adult health, causally linking these two facts is difficult.

Poor childhood health can be associated with many other factors that may influence adult health. In some cases it is possible to measure the variables which could be the real underlying cause of these relationships (i.e., parental education is likely to affect both adult and child outcomes). If we find that children with poor health are likely to suffer disadvantages when they grow older, we then need to ensure that this is not simply because they were born to parents who had less education. And if we have data that includes this information, the effects of parental socioeconomic status are easy to account for statistically, and we can rule out this alternative explanation. It may be the case, however, that it is not possible to measure something specific to children who suffered a health disadvantage, at least not in a satisfactory way with survey data. In a study with Liam Delaney at the University of Stirling, Scotland, and James Smith at the RAND Corporation, we were able to bypass this challenge by examining historical data —“a natural experiment”—which only affected early life health.

During the first half of the 20th century, the number of infant deaths was high in Ireland compared to most other European nations. In urban areas with high density and overcrowding, the mortality rate was around 50 percent higher than in rural areas preceding 1947. Ireland instituted comprehensive interventions via the 1947 Health Act and subsequently the national infant mortality rate halved within a decade. Convergence between urban and rural rates began to occur. Evidence suggests that the public health interventions that improved sanitation, clean water, and overcrowding in Irish cities were the main factors in these changes.

Our interest was in examining how these early childhood conditions affected adult health. We used current Irish census data to tie individuals back to the historical conditions in which they were born by combing information on place of birth with a database we compiled of local infant mortality rates.

Government interventions mainly affected those in urban areas so cohorts in rural areas could be considered a natural control group. As an external change driven by government action, we are able to argue that this reduction in the infant mortality rate only reflected changes in an individual’s early health environment. Using this “natural experiment” allows us to solve the problem discussed above as we are able to rule out all other potential explanations connecting childhood health to adult outcomes, even those we cannot measure.

Comparing the affected Irish cohorts gives us an accurate view of the effects of initial health. Our analysis shows that the improvement in national early life conditions in the 1940s (a fall of around 35 points in the infant death rate), was associated with an approximate 12–18 percent decrease in the probability of disability (as defined by the presence of a long-term chronic illness, intellectual disability, or a condition that substantially limited basic activities) for those cohorts. Additionally, we find that those who benefited most from the improving early-life conditions were at the lower end of the education distribution. A conclusion from this analysis is that in addition to the immediate benefits, public health interventions can have important long-lasting effects by improving the health of the adults who were affected as children.

Recently I have been pursuing a related research project related to low birth weight, which can be linked to increased risk of infant death, increased cost of care, and a range of later life outcomes. Despite general improvements in initial health in developed countries, there remains a good deal of inequality in birth weight. Lower income households are more likely to have children of lower birth weight. If birth weight has an independent effect on later outcomes, then addressing these disparities in initial health could be an important means of improving the life chances of disadvantaged children.

Information from a new Irish cohort study has just been released, which so far has followed children until age 9. Using these data I can determine whether their infant health is related to their outcomes at this age. I find that lower birth weight is associated with lower scores in English and math, more hospital stays and diminished health (as reported by the mother). It is possible that children of low birth weight receive fewer investments from their parents, meaning that birth weight itself may not actually be driving these results. For example, if children with poorer initial health go to lower quality schools then this could explain these findings. When I examine this in the data, however, I find that these alternative mechanisms cannot explain the observed relationship between birth weight and later outcomes.

Following future waves of the cohort study, we aim to see whether the effects of those initial differences in early life conditions either narrow or widen as time goes on.

—Mark McGovern, Fellow, Program on the Global Demography of Aging, Harvard School of Public Health
Datasets on Aging and Lifecourse Available at Pop Center

The Research Core at the HCPDS hosts a range of data sets that can be applied to the study of a healthy lifecourse. The Health and Retirement Study (HRS) was launched in 1992 and is a longitudinal panel study of Americans aged 50 and older. Published by the University of Michigan, researchers at the Pop Center access these data through a shared repository in an effort to explore health and welfare issues of aging. For the highly confidential HRS data, researchers make use of the Andelot Data Enclave housed in the Bow Street building. In addition to the HRS, there are panel studies on aging conducted in other countries throughout Europe and Australia, and the one for India (Longitudinal Aging Study in India, LADIS) is housed jointly by HSPH and the HCPDS.

The HCPDS has started working on projects using the World Health Organization’s Study on Global AGing and Adult Health (SAGE). A team of researchers have started exploring the data, and it would be an opportune time for new collaborations in these early stages. Relatedly the HCPDS is also working closely with a number of INDEPTH sites. These sites run regular community censuses, and on top of these build randomized controlled trials or prevalence surveys to explore detailed issues of aging in Africa and South Asia.

Finally the Demographic and Health Surveys (DHS) is located in a shared repository for researchers to access at the HCPDS. Those inclined to studying lifecourse issues, and not aging in particular, may find these data sets to be a rich source.

Researchers interested in working with any of these data sets can contact Jocelyn Finlay (jfinlay@hsph.harvard.edu), director of the Research Core, who will help you with data use agreements, access, and collaborative opportunities.

Maria Glymour, continued from page 1

experience happened differently for women in Europe, that they have more formal or informal supports.”

Part of the original study showed “big life expectancy gains” for everyone in recent decades, yet not as much for American women. Given the significant changes in life experience of this group over the past 50 years, Glymour said they are using several longitudinal studies as core data sources to determine why American women are contracting more disease in their lifetimes and dying earlier.

Glymour’s other recent work has focused on understanding the social and geographic patterning of stroke and stroke recovery. In particular, she is looking at the longstanding pattern of excess stroke incidence and mortality suffered by residents of southern states.

“We are examining whether this might be attributable to early life exposure, rather than adult place of residence,” said Glymour. “By studying stroke, I hope to improve understanding of factors that influence neurologic risk and resilience and how these conditions are shaped by social inequalities from childhood through adulthood. In particular, the intersection of stroke and dementia is an inadequately understood area.”

Glymour, who is working with a team on the REGARDS Study of regional and racial differences in stroke, said there is something about living in these “stroke belt” states—which include North Carolina, South Carolina, Georgia, Tennessee, Alabama, Mississippi, Arkansas, and Louisiana—in early life which increases stroke risk. But precisely what is harmful is not yet known. Despite many hypotheses, so far there isn’t much evidence to support any of them.

“I was certain it was about socioeconomic, but we couldn’t explain the pattern with our usual measures of education or poverty,” she said. “Now that we know there is some connection to early life, we can focus on conditions relating to childhood.”

Along with Tchetgen Tchetgen, Glymour has also collaborated on a pilot study on health and retirement funded by the Robert Wood Johnson Foundation that has focused on the neighborhood effects on older adult cardiovascular disease and disability, as well as research on social and cardiovascular risk factors for memory loss in old age.

“We have investigated whether residents of socioeconomically disadvantaged neighborhoods have worse health in several domains, including self-reported health, disability, and depression,” said Tchetgen Tchetgen. “Most previous studies have used a cross-sectional design. Our contribution has been to try to assess whether these results can be replicated in longitudinal designs which is an important goal for research on the health effects of neighborhoods. This is because demonstrating that neighborhood disadvantage predicts the onset of poor health provides stronger and more definitive evidence that the associations may be causal, rather than due to a variety of selection processes such as people in poor health moving to disadvantaged neighborhoods.” Initial results indicate the cross-sectional findings held up for some outcomes, such as subjective health assessments, but not others, such as disability. The research team is continuing to look at incident heart disease, stroke, and diabetes.

With the two major categories of dementia identified as Alzheimer’s and vascular dementia, which is related to stroke, Glymour is hopeful that this work could lead to better understanding on the importance of prevention.

“It is very easy to think of diseases of old age, but we need to think of the investments we make to keep people healthier in their later lives,” said Glymour. “We should understand the context of what makes people healthy.”
# Upcoming Winter/Spring 2012 Seminars

**POP CENTER SEMINARS**

Pop Center, 9 Bow Street, Cambridge, 4:30 – 6:00 PM

These sessions are open to everyone: faculty, research scientists, postdoctoral fellows and students. Advance readings are available at our website www.hsph.harvard.edu/cpds.

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| February 6 | **Studies of Leader Functioning, Work Environment and Employee Health in a Swedish Context**  
Töres Theorell, Professor Emeritus of Psychosocial Environmental Medicine, Occupational Medicine, Karolinska Institutet |
| February 13| **Measuring and Visualizing Accessibility in Urban Areas: Revealing Invisible Spatial Structures in Public Health**  
Kirk Goldsberry, Visiting Scholar, Harvard Center for Geographical Analysis and Assistant Professor of Geography,  
Michigan State University |
| February 27| **What's Wrong with the Narrative on NCDs in Low and Middle Income Countries?**  
SV Subramanian, Professor of Population Health and Geography, Harvard School of Public Health |
| March 5    | **Title TBD**  
Abhijit Banerjee, Ford Foundation International Professor of Economics, MIT |
| March 19   | **A Global Perspective on Physiological Change with Age**  
Eileen Crimmins, AARP Chair in Gerontology, and Director of Training, Multidisciplinary Research Training in Gerontology, USC |
| March 26   | **Title TBD**  
Dyann Wirth, Richard Pearson Strong Professor of Infectious Diseases, and Chair, Department of Immunology and Infectious Diseases, Harvard School of Public Health |
| April 2    | **Living Forward, Understanding Backward: Transforming Public Health in the 21st Century**  
David Butler-Jones, Chief Public Health Officer, Public Health Agency of Canada  
*Note location: Room K262, Knafel Building, 1737 Cambridge Street, Cambridge*  
Co-sponsored by the Weatherhead Center for International Affairs Canada Program |
| April 9    | **Hypothetical Lifestyle Interventions to Prevent Type 2 Diabetes: Analysis of Prospective Data Using Parametric G-formula**  
Goodarz Danaei, Assistant Professor of Global Health, Harvard School of Public Health |
| April 17   | **FEATURED SEMINAR**  
**Going Solo: The Extraordinary Rise and Surprising Appeal of Living Alone**  
Eric Klinenberg, Professor of Sociology, Public Policy and Media, Culture, and Communications at New York University |
| April 23   | **Educational Attainment and Widening Mortality Disparities in the United State**  
Robert Hummer, Centennial Commission Professor of Liberal Arts #1, University of Texas at Austin |
| April 30   | **The Evolutionary Significance of Human Social Networks**  
Nicholas Christakis, Professor of Medical Sociology and Professor of Medicine, Harvard Medical School; and Professor of Sociology, Harvard Faculty of Arts and Sciences |

*Co-sponsored by the Program on the Global Demography of Aging*
ROBERT WOOD JOHNSON FOUNDATION HEALTH AND SOCIETY SCHOLARS SEMINARS
Pop Center, 9 Bow Street, Cambridge, 4:00 – 5:30 PM

These Thursday sessions are open to faculty, research scientists, and postdoctoral fellows. Advance readings are available at our website www.hsph.harvard.edu/cpds.

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| January 26 | Health Insurance Exchanges and the Affordable Care Act  
Katherine Swartz, Professor of Health Policy and Economics, Harvard School of Public Health |
| February 9  | Getting Eating Disorders Prevention on the Public Health Agenda: A Strategic Approach to Prevention Science, Pipelines, and Workforce Training  
Bryn Austin, Assistant Professor of Adolescent/Young Adult Medicine, Children's Hospital Boston |
| February 23 | The Online Advocate: A System's Approach to Improving Social Determinants of Health  
Eric Fleegler, Instructor in Pediatrics, Children's Hospital Boston |
| March 8 | Title TBD  
David Laibson, Goldman Professor of Economics, Harvard University |
| April 26 | Title TBD  
Peter Bearman, Cole Professor of the Social Sciences and Co-Director, RWJF Health & Society Scholars, Columbia University |
| April 26 | Title TBD  
Sheldon Cohen, Doherty Professor of Psychology, Carnegie Mellon University |

FEATURED SEMINAR

Join us on Tuesday, April 17, when the Pop Center welcomes Eric Klinenberg, professor of Sociology, Public Policy, and Media, Culture, and Communications at New York University. He will conduct a special lecture, “Going Solo: The Extraordinary Rise and Surprising Appeal of Living Alone,” also the name of his newly released book.

Dr. Klinenberg will discuss the dramatic rise of solo living and the seismic impact it’s having on our culture, business, and politics. Conventional wisdom tells us that living by oneself leads to loneliness and isolation, but, as Klinenberg will show, most solo dwellers are deeply engaged in social and civic life. In fact, compared with their married counterparts, they are more likely to eat out and exercise, go to art and music classes, attend public events and lectures, and volunteer. It is now more common for an American adult to live alone than in a nuclear family, and Klinenberg analyzes the challenges and opportunities for singletons at different stages of life: young professionals who pay higher rent for the freedom and privacy of their own apartments; singles in their thirties and forties who refuse to compromise their career or lifestyle for an unsatisfying partner; divorced men and women who no longer believe that marriage is a reliable source of happiness or stability; and the elderly, most of whom prefer living by themselves to living with friends or their children.

The presentation is co-sponsored by the Department of Sociology, Harvard, and the Radcliffe Institute for Advanced Study. It is open to everyone on April 17 from 4:30 to 6:00 pm here at the Harvard Center for Population and Development Studies, 9 Bow Street, in Cambridge.
The Harvard Pop Center was pleased to host the MacArthur Foundation Aging Society Network’s core members’ meeting on November 17, 2011. The Network collaborates on research projects that revolve around the core challenges and opportunities facing America as it becomes an aging society. Its principal goal is to promote policy changes relevant to education, work, retirement, civic engagement, and urban design. Core group members, including HCPDS Director Lisa Berkman, are drawn from a variety of relevant disciplines including epidemiology, psychology, gerontology and geriatrics, sociology, political science, and economics.

Highlights of the November meeting included an update on a PBS documentary being developed by Vital Pictures of Boston, MA, called “Coming of Age in Aging America.” The program, which will explore the social transformation of aging unfolding across the U.S. and elsewhere, will air nationally in late 2013. Filmmakers Christine Herbes-Sommers and Llew Smith briefed participants on the production schedule and the emerging public engagement campaign including the winter 2012 launch of a new companion website for the series, found at www.vitalpix.com.

A number of current research studies were discussed, including one by Hiram Beltran-Sanchez, a Pop Center postdoctoral fellow, on “Health Patterns in the Adult Mexican Population.” Beltran-Sanchez’s project finds there are increasing rates of health risk factors in the adult Mexican population such as obesity, as well as incidences of hypertension, high-risk waist circumference and cholesterol, particularly among young people and women. This all coincides with Mexico’s shifting demographic and epidemiologic transitions and overlapping recent changes in nutrition and income.

The MacArthur Network meets four to five times a year and produces an annual report as well as policy-related materials. For more information, visit their website at www.agingsocteenetwork.org.

Christine Herbes-Sommers, standing, updates MacArthur Network core members on the production of “Coming of Age in Aging America.”