



Why do men of African descent have unfavorable prostate cancer risk and outcomes? A review of prostate cancer research in Philadelphia and Dakar.

A Quarterly Newsletter

Vol. 3, No. 4 — Fall 2008

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Prostate Cancer Research in Philadelphia and Dakar

Tim Rebbeck, PhD, is Professor of Epidemiology, University of Pennsylvania School of Medicine; CCEB Senior Scholar; Director, Center for Genetics and Complex Traits; Director, Center for Population Health and Health Disparities; and Cancer Epidemiology and Risk Reduction Program Leader, Abramson Cancer Center.

Prostate cancer represents a major public health problem for men of African descent. African American men suffer from the highest incidence and mortality from prostate cancer in the world. There is wide variability in the prevalence, incidence, and

mortality associated with prostate cancer in the US. Several studies have estimated the prevalence of pre-neoplastic lesions (e.g., high grade prostatic intraepithelial neoplasia, or HGPIN) and prostate cancer in men of different races. Figure 1 compares the ratio of prevalence, incidence, and mortality figures between African Americans and European Americans. The results of these studies have yielded remarkable insights into the occurrence of prostate cancer across ages and ethnicities that provided different information about prostate cancer than was available from registry or biopsy-based studies. For example, prostate cancers can be detected in very young men in their 20s in all populations. The disparity in most prostate cancer traits occurs at relatively young ages. For example, the greatest disparity in clinically

diagnosed cancer occurs in men in their 40s. The disparity in prevalence of latent prostate tumors between African Americans and European Americans may not be as great as the differences in clinical prevalence or mortality associated with diagnosed disease.

Despite the high prevalence of prostate cancer among African American men, and the historical relationship of African American and African men, few studies have been able to examine the commonalities and differences between these groups that may explain high prostate cancer rates in African Americans. The limited available data suggest that prostate cancer is one of the most prevalent

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Faculty Profile:



Warren Bilker, PhD, Professor of Biostatistics, Senior Scholar, CCEB

Warren Bilker, PhD, collaborates on research in diverse fields

Warren Bilker was born and raised in the Melrose Park Gardens section of Philadelphia. He stayed in Philadelphia after attending Northeast High School and earned both his BS and MS degrees at Temple University in 1981 and 1984, respectively. Although Warren admits he was not really a huge fan of math in high school, he had a change of heart and changed his major from biology to mathematics during his sophomore year of college. After completing a few statistics courses, he chose to concentrate on applied mathematics and decided that he would pursue a master's degree in statistics. Upon completion of his studies at Temple University, Warren moved 100 miles south to attend the Johns Hopkins School of Hygiene and Public Health (now called the Bloomberg School of Public Health). In 1992 he graduated from Johns Hopkins with a PhD in biostatistics. Dr. Bilker remained at Johns Hopkins after accepting a position as both Instructor in the Health Policy & Management department and Hospital Biostatistician at Johns Hopkins Hospital and stayed there for less than a year before returning to Philadelphia.

Dr. Bilker came to the University of Pennsylvania in 1992, prior to the initiation of the CCEB and the Department of Biostatistics and Epidemiology, so his first three years were spent as a Lecturer and then an Assistant Professor in the Department of Medicine. In 1995, he joined the CCEB and is the longest serving biostatistician in the department. In 2007, Dr. Bilker was promoted to Professor of Biostatistics in the Department of Biostatistics and Epidemiology and the Department of Psychiatry. He was involved in many facets of the development and implementation of the PhD and MS degrees in biostatistics. From 1993 to 2006 Dr. Bilker taught Introductory Biostatistics in the MSCE program. Currently, he teaches Statistical Computing to second- and third-year biostatistics doctoral students.

In early 2008 Dr. Bilker received the Dean's Award for Excellence in Basic Science Teaching. This award was established to recognize teaching excellence and commitment to medical education in the basic sciences. The recipients are selected on the advice of a committee composed of faculty and students.

Dr. Bilker's collaborative clinical research focuses on neuropsychiatry, brain imaging, schizophrenia, pharmacoepidemiology, and infectious diseases. His primary methodological research interests are in the areas of pharmacoepidemiology, survival analysis, psychiatric methods, and correlated data. He is the principal investigator of the biostatistics and data core of the Schizophrenia Center in the Department of Psychiatry, which focuses on the study of the relationship between brain imaging findings and the clinical course of schizophrenia. One particular study that Dr. Bilker found fascinating was a brain imaging study using functional MRI for lie detection, which was funded by the Department of Defense shortly after the terrorist attacks in the US on September 11, 2001.

Dr. Bilker serves as a biostatistician on numerous research grants at Penn, collaborating across departments from Dermatology to Infectious Disease to Psychiatry on a diverse range of projects including survival analysis, pharmacoepidemiology, patient safety, health information technology, and brain imaging. Outside of the university, Dr. Bilker has visited research teams in Japan, Germany, and Israel to collaborate on brain imaging projects. In Japan, he worked with a group on impaired neuroanatomical development in infants with congenital heart disease. He is a participating faculty member for the International Research Training Group (IRTG) in Schizophrenia and Autism, which is funded by the German Research Council. Through this PhD program, candidates collaborate with partner scientists at the University of Pennsylvania who are involved in joint projects, and jointly supervise students' dissertations. Dr. Bilker also collaborates with Dr. Henry Silver and his group in Israel on cognition in the elderly with schizophrenia.

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Faculty Profile:

Mary Leonard, MD, MSCE, conducts research on children and adults with kidney disease and outcomes related to bone health and nutrition

Mary Leonard was born and raised in the “Emerald City” Seattle, WA. While growing up, her love for animals and burgeoning interest in science and medicine led to volunteering in a veterinary hospital, which she ultimately decided was not the best fit. From the Great Northwest to Northwestern University, Mary moved on to Evanston, IL for her undergraduate education. She entered college knowing that she would be a pre-med major and sought out work-study jobs in the hospital setting, performing basic science research and drawing blood. Mary earned a BA in chemistry in 1984.

She then moved on to Stanford University for medical school. The program there was very research-oriented and if one was able to get into a research lab, one could obtain a significant tuition break. In this environment, it was not unusual for students to spend 5 years obtaining a medical degree. Mary conducted clinical research in neonatology during her pre-clinical training and earned her MD in 1989.

Dr. Leonard then moved on to a residency in pediatrics at The Children’s Hospital of Philadelphia. In 1992, she began a fellowship in pediatric nephrology there that lasted until 1995. During this period, while reading an article about the need to train physicians to take basic science research to the bedside, Dr. Leonard had an epiphany about pursuing epidemiology. She

did some subsequent digging around and learned about the MSCE program offered by the CCEB and an opening in a pediatric nutrition training grant at CHOP. She pursued both, aware that she didn’t want to end her involvement with nephrology; she just recognized that this provided a good opportunity to study the effects of kidney disease on growth and development in children.



Mary Leonard, MD, MSCE, Assistant Professor of Pediatrics and Epidemiology, CCEB Senior Scholar

Back then, only a few CHOP fellows had entered the MSCE program and some at CHOP did not fully recognize the value of the program. Dr. Leonard became one of the first at CHOP to be tenure-track while completing the MSCE degree. Notably, CHOP is anything but resistant now about their fellows enrolling in the MSCE program. Dr. Leonard loved the collaborative, supportive environment of the master’s program, from which she graduated in 1998. She completed her research fellowship in pediatric nutrition in 1997.

Later that year, Dr. Leonard was named Assistant Professor of Pediatrics, University of Pennsylvania SOM, and in 1998, she became an Assistant Professor of Epi-

demiology, University of Pennsylvania SOM, CCEB Senior Scholar, University of Pennsylvania SOM. From 2001 to 2003, Dr. Leonard directed CHOP’s pediatric nephrology fellowship. In 2006, she was promoted to Associate Professor of Pediatrics and Associate Professor of Epidemiology, University of Pennsylvania SOM. Dr. Leonard became the Director of Research in the Division of Nephrology at CHOP in 2007. She is also an attending physician in the Nephrology Service at CHOP.

As a pediatric nephrologist and epidemiologist, Dr. Leonard devotes the bulk of her research to studies of children and adults with kidney disease and outcomes related to bone health and nutrition. She recently completed a longitudinal study of glucocorticoid-induced osteoporosis, and a longitudinal study of the structural impact of renal osteodystrophy and the differential effects of impaired cortical and trabecular bone mineral accretion among children with kidney disease. Importantly, she now mentors multiple MSCE students and graduates as they conduct studies of bone health in pediatric rheumatology, gastroenterology, nephrology, oncology, and endocrinology.

More recently, she has expanded her research program to focus on novel imaging techniques to better capture the effects of chronic kidney disease on bone micro-

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From the Director:



Brian L. Strom, MD, MPH

I am happy to share this issue of our Newsletter, which aims to keep you informed of CCEB activities and services. In each issue, we identify one of the educational programs or services led by CCEB faculty, present a feature article covering a topic of general interest, include articles about members of our faculty, and highlight newsworthy events within the last couple of months.

In this issue, we include an article about the MS and PhD degree programs in biostatistics, which are designed for those interested in biostatistical theory and methods. As one of the few biostatistics programs housed within a school of medicine, training is highly practical and emphasizes the integral role of statistical thinking in medical science.

Our feature article is about research being conducted by Drs. Timothy Rebbeck and Charnita Zeigler-Johnson, in collaboration with African colleagues Drs. Serigne M. Gueye and Mohamed Jalloh, focusing on the occurrence of prostate cancer among men of African descent.

Two members of our faculty are highlighted in this issue: Warren Bilker and Mary Leonard. Warren Bilker, PhD, is Professor of Biostatistics and Senior Scholar in the CCEB. Mary Leonard, MD, MSCE is Associate Professor of Pediatrics, Nephrology Division, Associate Professor of Epidemiology (secondary), and Senior Scholar in the CCEB. Dr. Bilker's methodologic research interests are in the areas of pharmacoepidemiology, survival analysis, psychiatric methods, and correlated data. His primary research interests are in schizophrenia and the analysis of pharmacoepidemiology data using large databases. Dr. Leonard's primary interests are in studies of children with kidney disease and outcomes related to growth, bone health, and nutrition.

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(Bilker, continued from page 2)

Domestically, Dr. Bilker is a member of a number of Data Safety and Monitoring Boards that examine a wide range of research. At Thomas Jefferson University in Philadelphia he is involved in an Advancing Caregiver Training Project and at Columbia University in New York a Social Anxiety Treatment Study. He has also served on multiple monitoring boards for industry studies. In addition, Dr. Bilker is a member of the National Institute of Mental Health Standing Review Committee: Interventions Committee for Schizophrenia Spectrum Disorders, Personality Disorders and Disorders of Late Life. Recently, he served on an

FDA Advisory Panel for Dermatology and Ophthalmology.

While he's not at work, Dr. Bilker spends his time with his wife (who was a fellow biostatistics student at Hopkins) and his two daughters at their home in Abington, PA. His older daughter is currently a student at her dad's alma mater, Temple University, majoring in theater production. His younger daughter attends high school and is a musical theater performer both in her school and in the community. Dr. Bilker enjoys watching his daughters' theater performances, playing squash and softball, jogging, and riding roller coasters with his daughters.

The CCEB Newsletter is published by the Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania School of Medicine, for the dissemination of information and as a reference for its constituents. The CCEB Newsletter is published periodically free of charge, and distributed to the Medical Center community. If you are interested in receiving hyperlinks to the newsletter, please contact us at the address below.

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(Prostate cancer risk, continued from page 1)

malignancies in native Africans, and may be increasing in incidence.

The PROGRÈS and SCORE Studies

With this background in mind, Drs. Timothy Rebbeck and Charnita Zeigler-Johnson in Philadelphia and Drs. Serigne M. Gueye and Mohamed Jalloh in Dakar, along with numerous colleagues in both locations, have developed studies of prostate cancer risks and outcomes in European American, African American and West African men. These studies, known as SCORE (Study of Clinical Outcomes, Risk, and Ethnicity) in Philadelphia and PROGRÈS (Prostate Génétique Recherche Sénégal) in Dakar, are designed to identify and compare factors that influence prostate cancer etiology and outcomes in these two locations. These studies have developed the infrastructure and resources needed to understand the



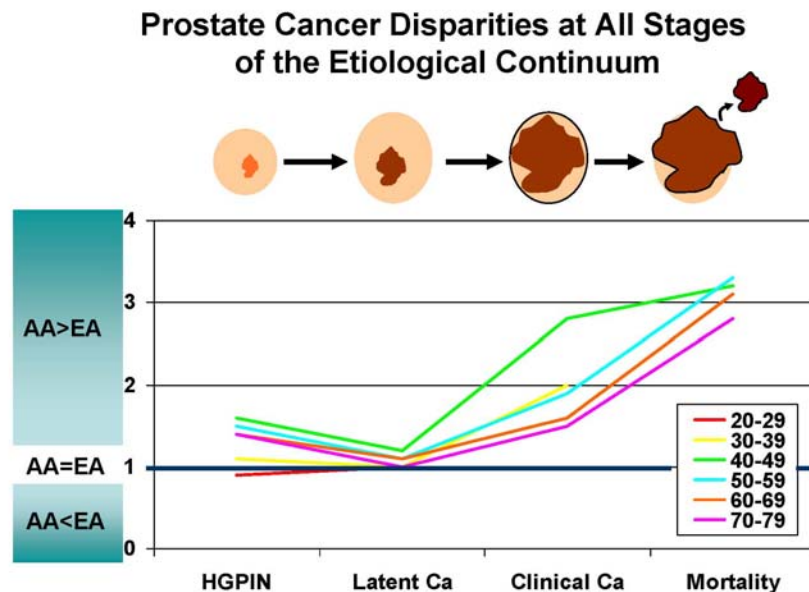
Charnita Zeigler-Johnson and Timothy Rebbeck outside the Hôpital General de Grand Yoff in Dakar

occurrence, etiology, histopathology, and biomarker correlates of prostate cancer in men of African descent. These collaborative studies have developed parallel molecular laboratory infrastructures, dietary assessments, pathology, and biobanking resources in Philadelphia and Dakar. In addition to risk factors of the individual, the studies have also begun to evaluate the role of community and neighborhood factors to better understand the context in which prostate cancers are diagnosed and treated.

Finally, this team has entered into ancillary collaborations with researchers to undertake an autopsy prevalence study of prostate tumors in Senegalese men. In a recent development, a worldwide consortium has formed to study prostate cancer in men of African descent. This consortium, known as MADCaP (Men of African Descent and Carcinoma of the Prostate), will undertake systematic gene discovery and translational studies in populations of

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Figure 1: Ratio of prevalence (of High-Grade Prostatic Intraepithelial Neoplasia, HGPIN), latent prostate cancer prevalence (as estimated from autopsy studies), incidence (from SEER data), and mortality (from SEER data) comparing African Americans and European Americans, by decade of age. Values above the horizontal blue line (ratio=1) suggest that rates are higher in African Americans than European Americans; values below the horizontal blue line (ratio=1) suggest that rates are lower in African Americans than European Americans.



Faculty News and Notes

Several CCEB faculty have appeared in the news recently. A brief summary dating from late Sept. follows in alphabetical order.

Kurt Barnhart, MD, MSCE, Associate Professor of Obstetrics and Gynecology, University of Pennsylvania SOM, Associate Professor of Epidemiology, CCEB Senior Scholar, and Director of Clinical Research for the Department of Obstetrics and Gynecology, was interviewed by [CBS3 TV's Eyewitness News](#) on the 17th of November. In response to questions about a new study from the Center for Disease Control and Prevention (CDC) that cites a two- to four-fold increased risk of developing birth defects in babies conceived with assisted reproductive technology (ART) as opposed to naturally conceived children, Dr. Barnhart stressed that the overall risk associated with ART is still relatively low (about 1 – 3%). The text of the interview can be read at the above link.

§

Sean Hennessy, PharmD, PhD, Assistant Professor of Epidemiology and Pharmacology, University of Pennsylvania SOM, CCEB Senior Scholar, and Director of the Ambulatory Drug Use & Effects Program, was quoted on the 10th of October in an article by the Associated Press in which he questioned the rationale for the FDA setting 4 years old as the age limit for recommending cough and cold remedies even though several pediatricians had requested banning such medications for anyone under the age of six. Dr. Hennessy suggested that there is a lack of evidence to show that these drugs are even effective for children under 12 years old. The AP story was disseminated online through [MSNBC](#) as well as other media outlets.

Dr. Hennessy was also quoted in [The New York Times](#) on the 11th of December in an article about the vote of an FDA panel to ban the asthma drugs SerEVENT and Foradil. In citing problems associated with Advair and the nearly \$8 billion in revenue earned from the drug, Dr. Hennessy, a member of the FDA panel, called for GlaxoSmithKline, manufacturer of Advair, to initiate a large safety study of this asthma medication that, along with Symbicort, the FDA panel recommended for continued usage.

§

Joshua Metlay, MD, PhD, Associate Professor of Medicine, Division of General Internal Medicine, Associate Professor of Epidemiology, University of Pennsylvania SOM, CCEB Senior Scholar, was quoted in an article published by [UPI.com](#) on the 27th of October. As the lead author of “Patient reported receipt of medication instructions for warfarin is associated with reduced risk of serious bleeding events,” published in the October issue of the [Journal of General Internal Medicine](#), Dr. Metlay suggested that improving communication about medications increases drug adherence as well as the likelihood of earlier recognition of drug side effects. **Sean Hennessy, PharmD, PhD, A. Russell Localio, JD, PhD, Xiaoyan Han, MS, Wei Yang, MS, Abigail Cohen, PhD, Charles E. Leonard, PharmD, Kevin Haynes, PharmD, Stephen E. Kimmel, MD, MSCE, Harold I. Feldman, MD, MSCE, and Brian L. Strom, MD, MPH**, contributed to the article.

§

Jesse M. Pines, MD, MBA, MSCE, Assistant Professor of Emergency Medicine at HUP, Assistant Professor of Epidemiology, University of Pennsylvania SOM, CCEB Senior Scholar, Associate Director, Division of Emergency Care Policy and Research Senior Fellow, Leonard Davis Institute of Health Economics, and Fellow, Institute of Aging, University of Pennsylvania, was quoted on December 8th in [The New York Times](#) article, “Uninsured Put a Strain on Hospitals.” In a story that focused on the systemic burdens of widespread increases in the number of patients – uninsured as well as insured with minimal access to a regular doctor – visiting emergency rooms on an annual basis, Dr. Pines said, “Crowding is a national public health problem.”

§

Kathryn Schmitz, PhD, MPH, Assistant Professor of Epidemiology, University of Pennsylvania SOM, CCEB Senior Scholar, was quoted by the [Los Angeles Times](#) in the article “Cancer patients are making their bodies strong again,” published on the 20th of October. (Continued on page 8)

(Leonard, continued from page 3)

architecture and strength. She is currently collaborating with Dr. Felix Wehrli, a physicist in the Department of Radiology at Penn, to use high-resolution micro-MRI and CT scans to determine if the damage to bones in kidney patients is reversible following kidney transplant. She recently completed a pilot study to assess the effects of whole body vibration in dialysis patients. She and others had previously shown in animal models the effects of high-impact physical activity in which animals stood on a vibrating platform (low magnitude mechanical stimuli).

Of all of her many research projects, Dr. Leonard most enjoys an ongoing investigation where the children and their families actually are eager to enroll. In a randomized, placebo-controlled trial, 80 children with Crohn's disease are assigned to use the low magnitude mechanical stimuli device (which looks like a bathroom scale) and 80 are assigned to a placebo device. Both devices are hooked into a modem with an internal adherence monitor, and the treatments last for 10 minutes per day. Once weekly, the modem downloads the adherence data into the office of the study's psychologist, revealing how often the children get treatment. Families enjoy the study because it doesn't involve drugs, and the kids think it is cool that the device is slated to be used at the international space station.

Dr. Leonard has lectured extensively throughout the US and internationally and has authored or co-authored several editorials, reviews and book chapters. In addition, she has been the primary author of articles published in peer-reviewed journals, including: the *American Journal of Clinical Nutrition*, *American Journal of Transplantation*, *Bone*, *Clinical Reviews in*

Bone and Mineral Metabolism, *Journal of the American Society of Nephrology*, *Journal of Bone and Mineral Research*, *Journal of Clinical Densitometry*, *Journal of Developmental Physiology*, *Journal of Pediatrics*, *Kidney International*, *New England Journal of Medicine*, *Pediatric Clinics of North America*, *Pediatric Infectious Disease Journal*, *Pediatric Nephrology*, and *Pediatrics*. Dr. Leonard is an associate editor for the *Journal of the American Society of Nephrology*, and an editorial board member of the *Clinical Journal of the American Society of Nephrology*, *Journal of Bone and Mineral Research*, and *Journal of Pediatrics*. She has also been an invited reviewer for the *American Journal of Nephrology*, *Bone*, *Journal of the American Society of Nephrology*, *Journal of Bone and Mineral Research*, *Journal of Clinical Densitometry*, *Journal of Clinical Endocrinology and Metabolism*, *Journal of Pediatrics*, *Kidney International*, *Nephrology Dialysis and Transplantation*, *New England Journal of Medicine*, *Pediatric Nephrology*, and *Peritoneal Dialysis International*.

Dr. Leonard lives with her husband Curt Langlotz, MD, PhD, a Professor of Radiology at HUP, University of Pennsylvania SOM, Professor of Epidemiology, University of Pennsylvania SOM, CCEB Senior Scholar, and their children in Moorestown, NJ. She is very active in her children's field trips and supporting their athletic endeavors (including gymnastics, soccer, basketball, tennis, and lacrosse for her daughter and soccer, basketball, tennis, and lacrosse for her son). In fact, Dr. Leonard is very thankful for the flexibility that allows her to attend such activities, more than she might have otherwise been able to share had she continued as a clinical pediatric nephrologist.

(Message from the Director, continued from page 4)

I also would like to take this opportunity to remind faculty, residents, and fellows of the availability of the clinical research courses being taught during the spring term. For the course schedule, please see: <http://www.cceb.upenn.edu/education/non-degree/coursescrtp.php>. For course descriptions of these and other courses offered throughout the year, please see: <http://www.cceb.upenn.edu/education/non-degree/courses.php#credit>. Registration for courses offered this spring can be requested through the following

registration portal: http://www.med.upenn.edu/apps/my/epi_course.

Finally, please check our website regularly to read announcements and other newsworthy events (<http://www.cceb.upenn.edu/>) and to find potential faculty collaborators (<http://www.cceb.med.upenn.edu/faculty/>).

I hope you have a safe and enjoyable holiday season.

Discussing the exercise routines of some cancer patients, Dr. Schmitz noted, “This is a population that is not unlike people who have cardiac disease – they have a damaged body system that can be helped by exercise.”

Notes

Katrina Armstrong, MD, MSCE, Associate Professor of Medicine, Division of General Internal Medicine, University of Pennsylvania SOM, Associate Professor of Epidemiology, and CCEB Senior Scholar, accepted the position of Chief of the [General Internal Medicine Division](#) in the Department of Medicine, effective December 1, 2008. Dr. Armstrong, who is also Associate Director of the Abramson Cancer Center and Co-Director of the Robert Wood Johnson Clinical Scholars Program, will succeed Solomon Katz Professor of General Medicine Sankey Williams, MD, in the post as head of the division.

§

Joseph Gallo, MD, MPH, Associate Professor of Family Practice and Community Medicine, University of Pennsylvania SOM, Associate Professor of Epidemiology, and CCEB Senior Scholar, received the Steve Bank Award for Mentoring on the 27th of October in San Diego, CA at the annual meeting of the American Public Health Association. Dr. Gallo was acknowledged for his demonstrated commitment to teaching and mentorship and, in particular, sharing his time and experience to those he mentors in order to help them attain their professional as well as personal goals.

§

Joshua Metlay, MD, PhD, was one of two School of Medicine recipients of the Christian R. and Mary F. Lindback Award for Distinguished Teaching, which was created with help from the Christian R. and Mary F. Lindback Foundation in 1961 to acknowledge highly rated teaching at the University of Pennsylvania as assessed by students. Dr. Metlay received this award in April, and was featured in the [University of Pennsylvania Almanac](#), which the *CCEB Newsletter* is acknowledging belatedly, with apologies.

Timothy Rebbeck, PhD, Professor of Epidemiology, University of Pennsylvania SOM, Cancer Epidemiology and Risk Reduction Program Leader, Abramson Cancer Center, Director, Center for Genetics and Complex Traits, Director, Center for Population Health and Health Disparities, and CCEB Senior Scholar, received the Potamkin Award at the PA Breast Cancer Coalition Annual Conference on the 8th of October. Dr. Rebbeck was acknowledged for his research on the breast cancer genes BRCA1 and BRCA2 as well as non-BRCA cancers.

Dr. Rebbeck was also recently appointed as Editor-in-Chief of *Cancer Epidemiology, Biomarkers & Prevention*, published by the [American Association for Cancer Research](#).

§

Kathryn Schmitz, PhD, MPH, is the 2008 recipient of the Marjorie A. Bowman New Investigator Research Award, which was established in 2006 to annually recognize a junior faculty member for research that has shed light on a fundamental clinical problem or enhanced health care organization and delivery. Dr. Schmitz has been acknowledged for publishing in 2005 the first ever meta-analysis on the effects of exercise on various outcomes in cancer survivors. She has continued to focus on improving the health of cancer survivors and, in the process, committed to expanding the awareness among oncologists of the importance of exercise for cancer patients and survivors.

§

Thomas Ten Have, PhD, MPH, Professor of Biostatistics, University of Pennsylvania SOM, CCEB Senior Scholar, is the 2008 recipient of the Samuel Martin Health Evaluation Sciences Research Award, which was established in 1996 in memory of Samuel P. Martin, III, MD, former professor of medicine, executive director of the Leonard Davis Institute of Health Economics, and chair of the Health Care Systems Unit of the Wharton School. The award recognizes a faculty member of the School of Medicine for a body of work, particularly in health services research, conducted primarily at Penn during the last five years.

CCEB's Clinical Research Services: Graduate Training Programs in Biostatistics

The CCEB serves as an interdisciplinary resource for clinical research throughout the School of Medicine and offers a range of services, primarily to faculty, residents, fellows, and research staff within the University of Pennsylvania Health System, but also to clinicians and scientists throughout the Delaware Valley with interests in such services. These services are identified and described as a regular feature of this newsletter.

The CCEB offers an array of research training programs designed for medical students, residents, fellows, graduate students, research staff, and faculty. These programs include MS and PhD degree programs in biostatistics, a Master of Science in Clinical Epidemiology degree program, a PhD degree program in epidemiology, and a clinical research certificate program for those interested in careers in collaborative and research support roles. This article describes the MS and PhD degree programs in biostatistics.

The MS and PhD degree programs in biostatistics, developed and conducted in collaboration with the Statistics Department in the Wharton School, are designed for those interested in biostatistical theory and methods, especially as applied to problems in biomedical sciences. The MS program is intended for those who seek careers as statistical practitioners, whereas the PhD program is intended for those who seek careers as independent statistical scientists. As one of the few biostatistics programs housed within a school of medicine, training is highly practical and emphasizes the integral role of statistical thinking in medical science.

The MS degree requires two years of full-time study, including the successful completion of a written examination and the preparation of a master's thesis. Required courses include probability; mathematical statistics; and statistical methods including categorical data analysis, linear models, multivariate methods, survival analysis, and applied data analysis. The MS program may also be completed on a part-time basis.

The PhD program includes the courses required for the MS degree program plus at least one additional semester of advanced courses, two courses outside of statistics (the minor sequence), and several units of independent study. PhD students must also pass written and oral examinations and complete a doctoral dissertation. Well-prepared college graduates can typically complete the program in four to five years of full-time study. Part-time students are also welcome.

All biostatistics degree students participate in a two-semester consulting experience. In the first semester (known as Consulting I), students attend a weekly seminar where potential scientific collaborators present their design and analysis problems. In the second semester (Consulting II), each student selects a project and, under the supervision of a faculty mentor, identifies the key statistical issues, researches potential statistical approaches, acquires and analyzes the relevant data, prepares a written report, and presents the project to the faculty in a short seminar. This project typically constitutes the master's thesis for students seeking an MS degree. *School of Medicine faculty interested in receiving biostatistical advice provided by an advanced biostatistics student through this consulting mechanism, with guidance provided by a member of the biostatistics faculty, should contact Jonas Ellenberg, PhD, Professor of Biostatistics (jellenbe@mail.med.upenn.edu).*

The CCEB supports doctoral students in biostatistics primarily through research assistantships funded by training and research grants and fellowships from the NIH and private industry. Graduate student research assistants are available to work on the projects that provide their support part time during the academic year (approximately 12 hours per week) and full time during the summer months. Typically, the student works under the joint supervision of the project's PI and its senior faculty biostatistician. *School of Medicine faculty serving as PIs of research grants requiring biostatistical support who are interested in employing biostatistics students should contact Daniel F. Heitjan, PhD, Director of Educational Programs in Biostatistics (dheitjan@mail.med.upenn.edu).*

Students graduating from the biostatistics program gain entry into a vibrant local and national job market. The strong theoretical and practical training that Penn provides prepares students to follow a range of attractive career paths including positions in private industry, academia, and government.

African descent. To date, the MADCaP consortium consists of 17 centers with over 4,000 prostate cancer cases and 5,000 controls of African descent.

Implications for Prostate Cancer Disparities

The PROGRÈS and SCORE studies are among the first to systematically evaluate prostate cancer in men of African descent in the US and Africa, to compare these rates to those in European American men, and to identify factors that explain these rates and their differences across populations. The ongoing development of studies and research infrastructure in West Africa should also provide important resources for future research on prostate cancer in other parts of the world and the study of other relevant diseases in Africa.

There are several implications from the PROGRÈS and SCORE research designs beyond an improved understanding of prostate cancer in men of African descent. First, high rates of prostate cancer have been theorized in African men, and are well documented in African American men. However, accurate prostate cancer rates in Africa are difficult to obtain since registries are generally unavailable, prostate cancer screening is rarely performed, and access to cancer treatment is limited there. Consequently, it is difficult to draw meaningful comparisons of prostate cancer rates with those in the US or other developed countries. Autopsy studies and well-designed epidemiological investigations that accurately identify prostate tumor prevalence and etiological correlates are therefore an important means of estimating and comparing prostate cancer rates



An exterior view of the Hôpital General de Grand Yoff in Dakar

across populations. Second, the parallel design of these studies makes it possible to compare tumor histopathology characteristics, risk factors, biomarkers, and clinical characteristics across populations. For example, if rates and histopathological characteristics are similar in African and African American men, despite differences in diet, lifestyle, and screening patterns, then we can begin to draw inferences about common risks in men of African descent. Differences in these age-specific patterns will allow us to begin to identify factors that may point to the origins of the high rates of prostate cancer in African American men. Finally, these studies will examine biomarkers that may be associated with prostate cancer risk and outcomes to better understand the baseline relationship of these markers with disease severity. Because prostate cancer screening is not widely available in Africa, the spectrum of disease observed in Africa is quite different than that typically seen in the US. Ultimately, this research may provide information about biomarkers that will lead to studies of improved prostate cancer screening and early detection in men of African descent.

These coordinated studies in African American and African men have the potential to elucidate the sources of prostate cancer progression and provide additional information about etiology, biomarkers, and screening to the groups of men at highest risk for advanced prostate cancer. This research will be directly relevant to the African American community as it is designed to be directly comparable with the ongoing prostate cancer studies in African American populations in the US.



Left to right, Professor Serigne Gueye, Elaine Spangler, and Timothy Rebbeck outside the PROGRÈS study office in Dakar

CCEB Holiday Party Photo Gallery



Left (l. to r.), Brian Strom, Dick Landis, and Janet Conway

Right (l. to r.), Judy Kinman, Harshvinder Bhullar, and Kevin Haynes



Top (l. to r.), Doug Wiebe and Theo Zaoutis



Bottom (l. to r.), Charlie Branas, Katie Schmitz, and John Farrar



Top (l. to r.), Darren Linkin, Ebb Lautenbach, and Jason Christie



Left (l. to r.), Josh Metlay and Brian Strom



Left (l. to r.), Anna Nagy, Chris Couples, and Harv Feldman

Right (l. to r.), Knashawn Morales, Scarlett Bellamy, Deidre Ashton, and Nancy Robinson

