RISING TO THE CHALLENGE

Rising to the Challenge: The Campaign for Johns Hopkins will raise unprecedented levels of support to attract, sustain, and empower the students and faculty of Johns Hopkins, who through their work improve the lives of millions around the world. Together with our philanthropic partners we will:

ADVANCE DISCOVERY AND CREATIVITY through support of our exceptional faculty. Their innovative work drives the development of new knowledge, new forms of expression, and new ways to save lives and improve health across our core disciplines in science and technology, the humanities and arts, and public health and medicine.

ENRICH THE STUDENT EXPERIENCE by investing in scholarships and fellowships, inspirational spaces for collaborative learning and social opportunities, and new programs that will enhance student-faculty interactions, ensure diversity on campus, link learning in the classroom to life after graduation, and strengthen connections between our students and our communities.

SOLVE GLOBAL PROBLEMS AS ONE UNIVERSITY by creating new cross-disciplinary solutions in crucial areas such as sustaining global water resources, revitalizing America’s cities, advancing the health of individuals and populations, and understanding how we learn and teach.

With your help, the Bloomberg School will play a key role in the success of the campaign.
JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH

DEPARTMENT AT A GLANCE

Chair: David Celentano, MHS ’75, ScD ’77

History: Founded in 1916 as the world’s oldest academic department of epidemiology in the world’s first independent graduate school of public health, consistently ranked #1 by U.S. News & World Report.

Size and scope: World’s largest department of epidemiology, with 90+ full-time faculty and 180+ students. Master’s and doctoral degrees in all major fields of epidemiology including infectious diseases, cancer, cardiovascular, clinical, aging, genetic, environmental/occupational diseases, and the development of new epidemiologic methods.

Centers: Center for Drug Safety and Effectiveness; George W. Comstock Center for Public Health Research and Prevention; Johns Hopkins Center for Clinical Trials; Johns Hopkins Fogarty AIDS International Training and Research Program; Outpatient General Clinical Research Center; StatEpi Coordinating Center; US Cochrane Center; Welch Center for Prevention, Epidemiology and Clinical Research

DEPARTMENTAL PROFILE

The medical drama is a staple of American culture. Audiences love to watch heroic doctors battle dread diseases and bring their patients back from the brink of death. But disease will never be conquered one case at a time. Public health aims instead to stop the battle from ever beginning. Its fundamental disciplines of epidemiology and biostatistics enable public health researchers to survey the forest of human disease. Epidemiologists use laboratory methods, statistical analysis, and field investigations to unlock the modes of transmission and the most effective means of prevention. Populations are our patients, communities are our bedsides.

In 1916, Johns Hopkins University established the world’s first graduate school of public health, which married the best of biomedical inquiry with the population-based approach of public health. The early direction of the School and the discipline of epidemiology were profoundly shaped by Wade Hampton Frost, founding chair of the Department of Epidemiology and the School’s third dean. Frost framed epidemiology as an analytical science rooted in biology, medicine, and statistics. His protégés included Carroll E. Palmer, “Dean of the world’s tuberculosis epidemiologists” and director of the TB research programs for the U.S. Public Health Service and World Health Organization, and Alexander Langmuir, MPH ’40, founder of the Centers for Disease Control’s Epidemiological Intelligence Service, a national epidemiological training and surveillance system to monitor emerging disease outbreaks and bio-terrorism threats.

In 1942, Kenneth Maxcy, DrPH ’21, established the Department’s polio lab where David Bodian, Howard Howe, and Isabel Morgan “did more to unravel the mysteries of polio than any other group,” according to polio historian David Oshinsky. Building on the Department of Epidemiology’s commanding knowledge of viral diseases, the Division of Infectious Diseases helped establish the modern standard for neurovirulence testing in monkeys, which remains the only accepted method to assess the safety of live virus vaccines against neurotropic viruses before approving trials in humans. The Department’s solid foundation in virology and vaccine development underpins the current programs in clinical and infectious disease epidemiology, which maintain close collaborative relationships with the clinical departments of the Johns Hopkins School of Medicine and the Johns Hopkins Hospital.

During the 1960s and 1970s, Abraham Lilienfeld, MPH ’49, the father of chronic disease epidemiology, published some of the earliest and most far-reaching epidemiological studies of cerebral palsy, Down syndrome, heart disease, stroke, and most major forms of cancer, especially the association of cigarette smoking with lung cancer. This era was also the golden age of grants from the National Institutes of Health (NIH) to support the Department’s epidemiological research and training programs.

A second wave of research on the health effects of smoking focused on secondhand smoke and established it as a major public health hazard for non-smokers. Jonathan Samet
George Comstock, DRPH ’56, taught the ever-popular Epidemiology of Tuberculosis course for more than 40 years.

From the Frost era to the present, the Department of Epidemiology’s signature strength has been the longitudinal cohort study, which has yielded insights of astonishing quality and quantity for preventing and treating disease in human populations. Ever since Frost established the first U.S. community-based longitudinal investigation in 1932, the Epidemiology faculty has excelled at conducting large-scale, highly sophisticated, ingeniously designed studies that extend over several decades. George Comstock’s landmark community studies of cancer, heart disease, and stroke, in progress since 1962, have provided longitudinal data for over 50,000 persons and led to the publication of hundreds of scientific papers. These studies have informed our knowledge about cancer, cardiovascular disease, and common neurological conditions, including migraine headache in adolescents and young adults.

Since the early 1980s, faculty in the Department of Epidemiology have formed dozens of large HIV/AIDS cohort studies in the U.S., one with more...
Seventy-five percent of U.S. public health workers have no formal public health training, and the need is even greater overseas. Hopkins-Epi X is “feeding the world” with essential epidemiological knowledge.

**OPPORTUNITIES TO SUPPORT EPIDEMIOLOGY**

While the Department of Epidemiology continues to reap new teaching and research opportunities from an enviable portfolio of long-running studies, it must grow and change to ensure its next century of leadership rivals its last. NIH currently provides more than 80 percent of funding for the Department, but funding guidelines can constrain innovation by penalizing projects with long timelines or unorthodox approaches. Large reductions in the NIH grant programs for occupational and environmental health have created a “huge hole” in the Department, according to Celentano. Epidemiology must diversify its funding base in order to continue to train first-class epidemiologists and to forge ahead in new areas of epidemiological inquiry. Building the Department’s endowment will generate a greater share of stable income and reduce reliance on grant money.

Epidemiology is seeking private support for two core groups of faculty who have shown great potential for innovative research. The *Center for Public Health and Human Rights* requires stable operating funding and support for affiliated faculty and students. By
establishing the *Johns Hopkins Wade Hampton Frost Institute for Cohort Studies*, the Department could serve as a bridge for high-return cohort studies such as the Johns Hopkins Precursors Study, the Persistent Oral Papillomavirus Study (POPS), and the Comstock Center’s ongoing community studies of heart disease, cancer, and stroke. Private donors are critical for the Institute since the NIH no longer supports long-range cohort studies, in light of their expense, duration, and complexity. Yet cohort studies constitute the very backbone of our Department and are marvelously rich sources of epidemiological data and insights that have produced some of the most important advances in the health status of populations.

More reliable core support for faculty and students is essential to maintain high-quality teaching in Epidemiology, which benefits the entire school. Constant pressure to fund their own salaries drains away faculty time and energy for students or for just pursuing a novel idea with creative potential. The Department is in constant danger of losing its most promising junior and mid-level faculty to other institutions, and two new endowed professorships would greatly aid retention of a promising assistant professor and a distinguished senior professor. The priority subject areas for these professorships are in Epidemiology of Aging and Epidemiology of the Environment. To remain competitive in recruiting the most promising students to lead the next generation of epidemiologists, the Department must establish new doctoral scholarships, providing five years of tuition plus a stipend. This is particularly important when recruiting students whose home countries cannot afford to send them to Johns Hopkins for graduate study.

NIH training programs are oriented toward preparation for academic research careers, yet only one-third of the Department’s students enter academia, and that proportion is likely to shrink further in the future. Therefore, the faculty has committed to adjusting its teaching to equip more graduates for non-academic jobs as practicing epidemiologists.

Beginning in 2005, the Department of Epidemiology established a new Research and Professional course series with a grant from the Johns Hopkins Gateway Sciences Initiative. The Gateway courses are designed to assist departments in integrating their introductory courses under a common pedagogical framework. Epidemiology and Biostatistics faculty collaborate to enhance the sequencing, coordination, and presentation of quantitative methods in our Gateway series. This blended teaching/learning model incorporates active learning strategies and instructional technology enhancements. Finally, the Gateway initiative has prompted the Department to revitalize and modernize the laboratory experience by integrating common technology competencies.

Even in the U.S., 75 percent of public health workers have no formal public health training, and the need is even greater overseas. Three proposed projects would further advance our Gateway curriculum and address the need for accessible, high-quality public health training. *Hopkins-EpiX* would “feed the world” with essential epidemiological knowledge by making all con-
tent from our two Gateway sequences available entirely online via interfaces such as Open Courseware, iTunes, and Coursera. The **JHSPH Personalized Epidemiology Pedagogy Project (JHU-PEPP)** is an extension of the Gateway project that records all departmental (non-seminar) course lectures and trains faculty in transitioning classes to a blended and/or case-based learning environment. Finally, additional **Certificate Programs** such as Epidemiology for Public Health Managers would build on the existing program developed with the Pan American Health Organization, but would be tailored for directors of epidemiology units in the U.S.

**BIG DATA AND THE FUTURE OF EPIDEMIOLOGY**

The ability to analyze mass-scale data sets and merge multiple sources of data will be fundamental to solving the most important public health problems on the horizon. JHSPH’s expertise in big data is a pillar of the University’s unmatched reputation in the biostatistics and epidemiology communities. JHSPH biostatisticians and epidemiologists have enabled researchers from across the schools of Public Health and Medicine to develop new methods to extract meaning from massive, linked longitudinal data; to unravel the etiology of complex conditions; and to chart and analyze portentous changes in risk factors over time.

One of the potentially revolutionary sites of data monitoring is the human body itself. Physical activity is a modifiable risk factor for multiple chronic diseases, since higher levels of physical activity can counteract obesity, high blood pressure, and other precur-sors of disease. Accurately measuring and interpreting human activity has been challenging until recently. Now, heart rate and blood pressure monitors, step counters, and GPS locators are commonplace. These devices enable users to log food intake, physical activity, and vital signs wherever they are, using websites and mobile apps. The powerful combination of social media, wireless communication, and rapidly maturing wearable technology such as Fitbit® is creating an unprecedented opportunity for advancement in mass-scale epidemiological and clinical studies that measure activity and function.

A **Center for Physical Activity Measurement** would build on our commanding knowledge of big data and multi-site clinical trials. The Hopkins medical campus currently lacks a physical performance laboratory with state-of-the-art devices for measurement, calibration, and normalization of functional performance data. This new Center would constitute an invaluable cross-disciplinary platform for this important new field. A core group of big data specialists in Epidemiology and Biostatistics, along with University-wide resources in high performance computing, high-density data analysis, and visualization will provide the ideal knowledge base to reap the maximum scientific and health-promoting benefits of complex data from contemporary wearable devices. The Center would capitalize on the expertise of an established Hopkins faculty group, provide new research and teaching opportunities, and educate researchers in best practices for experimental design and analysis.

The Department of Epidemiology and the Bloomberg School have been at the forefront of building the science of public health, but we have only begun to address the continuing challenges of infectious and chronic disease in the United States, or the gaping health inequities among the 4.8 billion citizens in developing countries, especially the 2.7 billion who live on less than $2 USD per day. There is no better place to invest in research and training programs to transform global health.

### CAMPAIGN GOALS FOR EPIDEMIOLOGY

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<tr>
<th>Amount</th>
<th>Description</th>
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<tr>
<td>$100,000</td>
<td>Core operating funds for the Center for Public Health and Human Rights</td>
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<td>Curriculum development for Hopkins-EpiX and JHSPH Personalized Epidemiology Pedagogy Project</td>
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<td>New certificate program for U.S. public health managers</td>
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