

Unraveling Disparities

disparities



UNC researchers uncover perplexing questions about how race and ethnicity affect health, and develop new tools to help tackle health disparities

BY KATHLEEN KEARNS

Hearth disease, cancer and cerebrovascular diseases (including stroke) are the three leading causes of death in the United States. All three are more common among African-Americans and Hispanics than whites, according to the Centers for Disease Control and Prevention (CDC). African-Americans also have the highest mortality rate of any race and ethnic group for all cancers combined and for most major cancers.

Health disparities like these pose a critical public health challenge. Uncovering why different racial and ethnic groups have different rates of disease and different disease outcomes is the first step toward developing methods of prevention and treatment that will both erase these disparities and improve health for everyone.

To meet this challenge, UNC School of Public Health researchers have for many years conducted a broad range of projects to investigate and overcome specific health disparities, including the top five killers reported by the CDC, as well as obesity, reproductive health

and violence-related injuries and deaths.

“Disparities are profoundly important in terms of longevity, healthcare costs and quality of life,” says Dr. Jay Kaufman, associate professor of epidemiology at the UNC School of Public Health and a fellow at the Carolina Population Center. “The risk of preterm birth among African-Americans in North Carolina is double that of whites. It’s our natural role to respond to exactly that kind of situation and to ask, what’s the underlying cause of this disparity? Whatever it is for African-Americans is at play for the majority population as well.”

Researchers at the School who investigate health disparities are driven by a desire to better understand what causes disease and death and by a fundamental belief in fairness. Most of all, they want to discover answers that will lead to better health for people of all races.



“It is always important to be inclusive, to study everyone,” says Dr. Robert Millikan, associate professor of epidemiology in the UNC School of Public Health, member of the UNC Lineberger Comprehensive Cancer Center and director of the North Carolina Center for Genomics and Public Health. “To date, observational studies and certainly clinical trials have neglected breast cancer in younger African-American women. This failure on our part to adequately address breast cancer in the entire U.S. population has resulted in marked health disparities and missed opportunities for finding cures.”

UNC School of Public Health researchers are sensitive to the importance of differentiating between disparities that are fundamentally genetic and those influenced by social, cultural or economic characteristics that could be altered. Identifying those patterns, however, can be a complex undertaking.

Theresa Cruz, a doctoral student in epidemiology at the School who studies the relationship between acculturation and violent death among Hispanic youth in the United States, points out that rates of violence among young Hispanic immigrants are clearly not rooted in biology. “There’s no inherent risk in being Hispanic,” she ►►

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PHOTO BY LINDA KASTLEMAN

says, “or the rates of violent death among Hispanics in the United States would be similar to those in Latin American countries.”

Her research explores how the process of adapting, or “acculturating,” to American culture affects rates of physical assault and suicidal behavior among young Hispanics. Using National Longitudinal Survey of Adolescent Health data, she is looking at sociocultural factors that may explain why violence rates shift as Hispanics acculturate.

“In the long run, we want to be able to prevent these deaths, so we look at patterns, analyze them and open up avenues for prevention,” she says. “For me, that’s the whole point of public health: to find patterns and prevent deaths.”

Awareness of the importance of non-biological factors has prompted researchers at the School to develop better methods for understanding health disparities. Kaufman, for instance, is investigating differences in pregnancy outcome by carefully defining racial and ethnic subgroups. By analyzing Puerto Rican immigrants separately from American-born residents with Puerto Rican ancestry, for example, he can take into account neighborhood, social, economic and other factors. His colleague, Dr. Amy Herring, associate professor of biostatistics at the School, has developed innovative statistical methods for this project that help describe the complex joint effects that socioeconomic indicators have in various racial subgroups.

Dr. Gerardo Heiss, a UNC epidemiology professor who studies heart disease and stroke, notes that the interdisciplinary make-up of his research group allows them to consider whether some racial differences in their findings may in fact have more to do with socioeconomic or cultural attributes than with race. “It’s a matter of stepping outside of biology,” he says. Because UNC faculty are collaborative and work in teams, they are better positioned to find answers to important questions.

The examples that follow illustrate the wide range of approaches that researchers at the School are taking to address health disparities and improve public health. ■

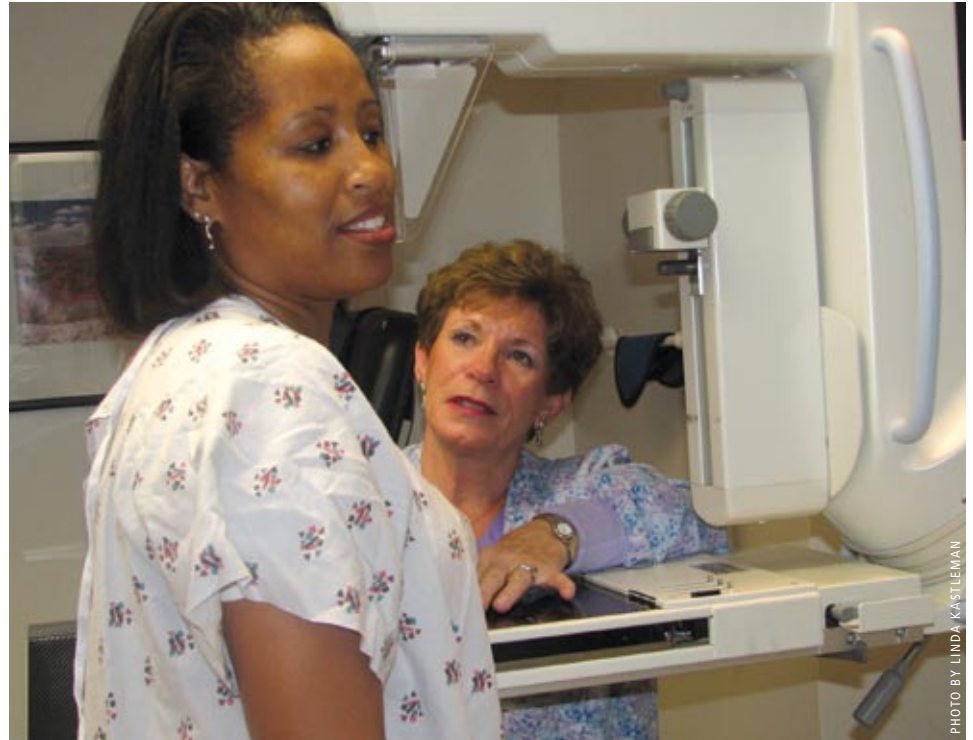


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A Breakthrough in Breast Cancer: The Carolina Breast Cancer Study

For many years, breast cancer in younger African-American women has been a significant, understudied public health problem. These young women get breast cancer more often than both white women and older Black women, and their prognosis tends to be worse. Yet, the situation had not been addressed.

Dr. Robert Millikan, associate professor of epidemiology at the UNC School of Public Health, member of the UNC Lineberger Comprehensive Cancer Center and director of the North Carolina Center for Genomics and Public Health, and his colleagues recently made a discovery that adds important information to this complex puzzle. In the June 7, 2006 issue of the *Journal of the American Medical Association*, the authors reported that young Black women were more than twice as likely as older Black women or white women to get basal-like breast tumors, a type of breast cancer with a poor prognosis.

“We found a higher frequency of a type of breast cancer that does not respond to traditional forms of treatment,” Millikan says. “And we found a lower frequency of the types of breast cancer that do respond. The basal-like form of cancer is harder to treat because it lacks targets for the agents commonly used to treat breast cancer. We need clinical trials to identify new treatment approaches. Since basal-like breast cancer is found in all

women, all women will benefit from this new knowledge. It is important, however, that clinical trials now focus on younger African-American women because they are the ones who are suffering the most.”

This fundamental, potentially revolutionary breakthrough resulted from analysis of the large amount of data collected for the Carolina Breast Cancer Study, a population-based, case-control study involving UNC faculty from the Lineberger Comprehensive Cancer Center, the School of Public Health and the School of Medicine. Millikan has led the project since 1999. Researchers involved in the study, which has led to more than 60 papers published thus far, collected data on 4,000 women—half of them African-American—from 24 North Carolina counties between 1993 and 2001.

“The general findings are that breast cancer is not one disease but many diseases,” Millikan says. He and his colleagues used the new tools of molecular biology—including diagnostic tools developed in large part by Dr. Charles Perou, assistant professor of genetics, pathology & laboratory medicine in the UNC School of Medicine—to differentiate tumors according to how the cells grow and use molecular signals to form tumors. They also have learned that genetic, ▶▶

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UNC researchers have found that young Black women are more than twice as likely as older Black women or white women to get basal-like breast tumors. Researchers are now working to uncover the reasons for this disparity.



environmental and social risk factors interact to cause breast cancer, and they continue to mine the rich Carolina Breast Cancer Study data source to determine exactly how.

“We are studying stage-at-diagnosis, treatment, type of breast cancer, socio-economic status, rural versus urban residence and other factors that may influence breast cancer prognosis,” he explains. Because younger African-American women have a higher frequency of basal-like breast cancer than older African-American women, he points out, broad environmental factors must play a role. “Our unpublished data suggest that a lower frequency of breast-feeding, combined with a larger number of children, as well as higher levels of overweight, may contribute to the increased risk of basal-like breast cancer in younger African-American women,” he says.

The team now is studying the possible role of low-level radiation, smoking, diet and other environmental exposures in breast cancer development. “We are studying genes that influence DNA repair and other responses of the body to these environmental exposures,” Millikan says. “And we are studying how lifestyle variables such as jobs and where one lives, and social factors such as social support and socio-economic status influence breast cancer progression.”

Once their findings are validated in other populations, they can be translated into better care and access to clinical trials for all women with breast cancer, Millikan says. “African-American women—like all breast cancer patients—need the best possible diagnostic workups and access to the latest clinical trials,” he says. “Epidemiologists need to pay particular attention to minority women because they have been underserved.” The results of the study probably could not have occurred without teams that included epidemiologists, geneticists and oncologists. Together, they not only examined data but determined how the lives of individual women were being affected. ■

Margarite Lathe contributed to this report.

Evaluating Multiple Risks: African-Americans and Head and Neck Cancer

If you're a smoker with a certain genetic constitution, are you more susceptible to head and neck cancers, because you're less able to metabolize compounds and repair damage from tobacco smoke?

That was one of the questions that UNC epidemiology professor Dr. Andrew Olshan wondered about when beginning his investigations into whether interacting genetic and environmental factors can increase one's risk of head and neck cancers.

In a large, population-based study of oral, pharyngeal and laryngeal cancers funded by the National Cancer Institute, Olshan now is looking to answer that question and others. Using the same gene-environment approach his colleagues have taken with breast and colon cancers, Olshan hopes to tease out the different causes of head and neck cancers. His study is the largest in the United States relating to head and neck cancers.

To date, Olshan has collected data in 46 central and eastern North Carolina counties by recruiting 1,385 patients with newly-diagnosed cases of oral, pharyngeal and laryngeal cancers and an equal number of cancer-free controls. Nurse interviewers have spoken with patients in their homes—taking histories of smoking, drinking and diet habits and obtaining blood samples from which DNA will be extracted to look for genetic mutations called polymorphisms.

“Cancer and many other diseases tend to run through families,” Olshan explains. “One genetic susceptibility factor is an inherited gene mutation that is very rare in the general population, but if you have it, your risk of disease is very high. We're interested in another kind of genetic mutation that is much more common in the general population but carries a lower risk of cancer.”





Dr. Andrew Olshan

With cancer and some other diseases, this second type of mutation, a polymorphism, is thought to depend on environmental exposures. It interacts with such things as cigarette smoke, alcohol or elements in the work environment. Olshan hopes his study will zero in on polymorphisms involved in the metabolism and repair of genetic damage from cancer-causing compounds in tobacco and alcohol.

He also aims to understand why African-Americans are more likely than whites to develop head and neck cancers and almost twice as likely to die from them. “We want to know what might explain that,” he says. “Not genetic factors so much as patterns of smoking and drinking, cigarette brands, socioeconomic factors, access to health care, and so on.”

With funding from the UNCLineberger Comprehensive Cancer Center, Olshan is also looking at the cancer patients in his study for clues about what might predict survival. He plans to analyze tumor sections and data on comorbid conditions, such as heart disease and diabetes, exposure factors, disparities in access to health care and other medical and treatment information. He’s also collecting information on survivors’ quality of life.

“Head and neck cancers can have very disfiguring and debilitating treatment,” Olshan says. “Treatment can affect swallowing, breathing and one’s ability to speak—so there are big quality of life issues.” Presently, nothing in the scientific literature explores African-American head and neck cancer survivors’ quality of life, Olshan notes. He hopes additional funding will allow him to research this issue too. Support for studies of survivors is often difficult to obtain. ■

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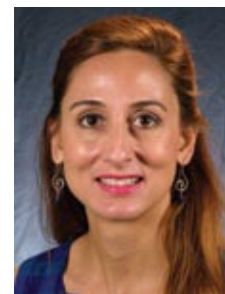


UNC researchers are developing interventions to help women maintain a healthy weight throughout their childbearing years. Their work involves exploring barriers and motivations affecting what women eat and how much they exercise during pregnancy and the postpartum period.

Gaining Understanding about Weight During Pregnancy & Postpartum

Dr. Anna Maria Siega-Riz, associate professor of epidemiology and nutrition at the UNC School of Public Health, seeks to understand what behaviors are associated with weight gain and weight loss during pregnancy and the postpartum period. Her goal is to develop interventions to help women maintain a healthy weight throughout their childbearing years. In so doing, both the mothers and their children will be healthier.

Although her work doesn't focus specifically on racial and cultural differences, Siega-Riz has nevertheless found that some health behaviors vary by race. "White women are more



Dr. Anna Maria Siega-Riz

likely to breast-feed than African-American women and for longer," she says. "And African-American women tend to retain more weight gained during pregnancy than white women."

Her colleague, Dr. Peggy Bentley, professor of nutrition and associate dean for global health at the School, is also seeing differences in infant feeding characteristics in her research: African-American mothers are more likely to introduce cereal earlier than white mothers.

Siega-Riz' project is part of a larger collaboration, the Pregnancy, Infection and Nutrition Study, in which researchers in the UNC Schools of Public Health and

Medicine are investigating the causes of preterm birth, growth of the fetus and pregnancy complications like gestational diabetes. She has used focus groups that include people of different races and weights to find out what barriers and motivations affect what women eat and how much they exercise during pregnancy and the postpartum period. “There were probably more differences by BMI (body mass index) than by cultural preference, except for the Hispanic group,” she notes. Immigrant Hispanic women reported that once they moved to the United States, they found it difficult to eat fresh foods and be physically active because the environment doesn’t support either.

“The high-BMI women, both Caucasian and African-American, found the environment important,” she says. “These women were low-income, they lived in environments that were very heavily populated by fast foods, and that influenced what they ate. They worked all day, and when they came home, they went for something quick and easy.” Her focus groups also challenged the perception that African-Americans are more accepting of being heavy, she says. “We saw the same comments among white high-BMI women,” she adds.

In talking about her research, Siega-Riz notes that in dividing, or “stratifying,” by race in any given study, researchers are not necessarily looking for biological or genetic differences. “As a reproductive epidemiologist, when I stratify by race, I’m really trying to find cultural differences, such as eating behaviors or physical activity patterns, that may help explain the differences in health outcomes,” she says, “but this always depends on the research question at hand.”

Still, Siega-Riz has learned that cultural differences aren’t always key. In fact, she has found these differences had less impact on pregnant women’s exercise habits than another factor: having a partner willing to be physically active with them at their level—such as having another pregnant woman with whom they could walk. ■

Perspectives on Heart Disease and Stroke: Atherosclerosis Risk in Communities

Rates of heart disease and stroke vary by race and ethnicity — and also by age, region, behavior, lifestyle and a number of other attributes. Unlocking the reasons would solve one of the conundrums facing researchers working on the Atherosclerosis Risk in Communities (ARIC) Study, a project coordinated by UNC School of Public Health Biostatistics Professor Dr. Lloyd Chambless. The study tracks variations in cardiovascular risk factors, medical care and disease rates by race, gender, location and date. Explaining the reasons for these differences would be a major step in developing better ways to prevent and beat heart disease and stroke.

For two decades, nine collaborating universities have followed nearly 16,000 men and women initially aged 45 to 64 from defined populations within four communities in Maryland, Minnesota, Mississippi and North Carolina. Each participant has received four physical exams so far, says UNC School of Public Health Epidemiology Professor Dr. Gerardo Heiss, a princi-



PHOTO BY LINDA KASTEMAN

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Dr. Lloyd Chambless

pal investigator for the study. “We contact them yearly by phone for information on their health status and visits to physicians,” he says. “We’re still in touch with 93 percent of the survivors of the original

cohort.” Researchers also gather data on the community-wide occurrence of heart disease and stroke among those aged 35 to 74 in each study area.

The massive amount of information from ARIC has yielded enormous insights, produced over 450 articles to date, and led to many presentations at national and international scientific conferences and meetings. Recently, the National Heart, Lung and Blood Institute extended the project’s funding through 2012.

Among the findings: ARIC investigators have found that individuals with “metabolic syndrome” have a higher degree of hardening of the arteries and a higher frequency of coronary heart disease than the general population. Metabolic syndrome represents a combination of blood chemistries, abdominal obesity and elevated blood pressure that is related to defects in the ability of insulin to work in the body, which can lead to a high risk for development of diabetes and cardiovascular disease.

ARIC investigators have reported that the extent and severity of gum disease is linked to hardening of the arteries, and recently have expanded on these results by measuring the antibodies to microbes that colonize the mouth and cause gum disease. The level of these antibodies also is related to hardening of the arteries, providing evidence of the role of infection and chronic inflammation in the processes that can lead to strokes and heart attacks. Also, investigators have found reduced kidney function (estimated from blood measurements) in ARIC participants with more extensive and severe periodontal disease.

Although not designed to distinguish race from other attributes, the study has turned up racial differences in both risk factors and disease rates.

Heiss cautions, however, that “it’s difficult to separate race from socio-economic status since a larger proportion of minority individuals in the study are less well off generally than the majority population.”

“Disentangling these attributes has to be done with a great deal of deliberation and trepidation,” Heiss says. “The literature is rife with statements about attributes by color of skin that may well be attributed to how we live, our level of education and the kind of neighborhood networks that make up our social support.”

“In many ways,” he says, “we’re trying to catch up from years of wasted effort



Dr. Gerardo Heiss

attributing to race things we didn’t bother to look into more deeply, possibly because so many with medical training lack the sociological and social-psychological skills to be aware of this and to formulate inquiries along these lines. So perhaps we’ve attributed to biology things that have deeper roots in society, culture and history rather than in one’s genes and blood pressure.”

The logical response to this insight, Heiss says, is a methodologically innovative interdisciplinary approach—one that the ARIC study teams are well equipped to undertake. “We’re fortunate to have a wide range of disciplines among our investigators,” he says. “We have sociologists, physicians, psychologists, basic scientists, chemists, mathematicians. That’s helped the study and many other studies comparably equipped to achieve critical mass in interdisciplinary thinking. The study questions become more inquisitive and better formulated. A multidisciplinary, wider-reaching perspective is probably what leads to innovation. At least, that’s what we hope for.” ■