



# Research Update

## Fall 2021

A semi-annual look at select DLH research activities.

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# Jeanine Christian

## President, Public Health & Scientific Research



Thank you for reading the Fall 2021 edition of the PHSR Research Update, a semi-annual look at select research activities from across our Public Health & Scientific Research operating unit. As always, I am struck by the breadth of expertise and depth of knowledge that our researchers demonstrate in their work. The research highlighted in this report illustrates a steadfast commitment to improving public health.

As we observe Breast Cancer Awareness Month this October, I reflect on our company's longstanding support for the National Institute of Environmental Health Sciences' 'Sister Study' – a 50,000 participant longitudinal cohort examining the causes of breast cancer. Nearly 20 years into its existence, the Sister Study continues to track the health of women in the cohort, and the research that emerges – some of which is featured in the pages that follow – brings us closer to answers. It is a privilege to be involved in work that touches so many of us personally.

The research that follows branches beyond breast cancer, to numerous other forms of cancer, bacterial diseases such as tuberculosis, obesity, mental health, and so much more. When confronted with the most challenging public health questions of our time, our researchers collaborate with partners to build towards answers. I am truly proud to be a part of this team. Sincerely,

Jeanine Christian

President

Public Health & Scientific Research

Unless another funding source is named, the research activities described below were funded wholly or in part by the federal government.

## Recent Publications

### **A Comparison of Several Survey-Based Algorithms to Ascertain Type 1 Diabetes Among U.S. Adults With Self-Reported Diabetes**

DLH epidemiologist Sarah Casagrande is among the authors of an [article](#) in *BMJ Open Diabetes Research & Care* (December 2020) about a study that compared the percentage and characteristics of US adults classified as having type 1 diabetes as defined by several algorithms. Seven algorithms classified type 1 diabetes using various combinations of self-reported diabetes type, age of diagnosis, current and continuous insulin use, and use of oral hypoglycemic in 6,331 respondents aged  $\geq 18$  years who reported a physician diagnosis of diabetes. The article concluded that estimates of type 1 diabetes using commonly used algorithms in survey data result in varying degrees of prevalence, characteristic distributions, and potential misclassification. Other authors of the article include researchers from the National Institute of Diabetes and Digestive and Kidney Diseases, the Centers for Disease Control and Prevention, and the National Center for Health Statistics.

### **National Trends in Neuromodulation for Urinary Incontinence Among Insured Adult Women and Men, 2004-2013: The Urologic Diseases in America Project**

DLH researchers Julia Ward and Lydia Feinstein are among the authors of an [article](#) in *Urology* (Epub December 6, 2020; print April 2021) that examined US trends in neuromodulation for urinary incontinence treatment. Study analyses were conducted overall and stratified by age, race/ethnicity, and geographic region, and nearly all neuromodulation procedures occurred in outpatient settings. The article authors concluded that, from 2004 to 2013, sacral neuromodulation procedures remained relatively uncommon but increased consistently. Posterior tibial nerve stimulation experienced growth starting in 2011. Neuromodulation has a growing role in urinary incontinence treatment, and ongoing trends will be important to examine. Other authors of the article include researchers from the Virginia Mason Medical Center, the National Institute of Diabetes and Digestive and Kidney Diseases, and the Johns Hopkins Brady Urological Institute.

### **Oral Deoxynivalenol Toxicity in Harlan Sprague Dawley (Hsd:Sprague Dawley® SD®) Rat Dams and Their Offspring**

DLH researcher Laura Betz was a coauthor of an [article](#) in *Food and Chemical Toxicology* (Epub December 31, 2020; print February 2021) that looked at widespread human exposure to deoxynivalenol (DON), a fungal mycotoxin found globally in many grain-based foods and animal feed. Acute exposures to high levels of DON are associated with gastrointestinal effects and emesis in humans and some animals, but the effects of low-dose exposures throughout the lifetime, a more likely exposure scenario in humans, are understudied. Therefore, this study was designed to identify doses of DON that could be used to evaluate long-term toxicity following perinatal exposure. In summary, doses of DON up to 3 mg/kg/day did not affect maternal survival or body weight. Doses of 3 mg/kg/day resulted in slight toxicity manifested as decreased body weight in the offspring; the no-observed-effect level was 1 mg/kg/day. Other authors of the article include researchers from the National Institute of Environmental Health Sciences.

### **An Investigation of Systemic Exposure to Bisphenol AF during Critical Periods of Development in the Rat**

DLH health researchers Laura Betz and Sandra McBride are among the authors of an [article](#) in *Toxicology and Applied Pharmacology* (Epub December 15, 2020; print January 15, 2021) about the National Toxicology Program's (NTP) evaluation of the potential toxicity of bisphenol AF (BPAF) in rodent models. The data demonstrate considerable gestational and lactational transfer of parent aglycone from the mother to offspring.

Since the ontogeny of conjugating enzymes in humans is similar to that of rodents, the data from rodent BPAF studies may be useful in predicting human risk from exposure to BPAF. Other authors of the article include researchers from RTI International and the National Institute of Environmental Health Sciences.

### **Multiple, Objectively Measured Sleep Dimensions Including Hypoxic Burden and Chronic Kidney Disease: Findings from the Multi-Ethnic Study of Atherosclerosis**

DLH research scientists W. Braxton Jackson II and John McGrath were among the authors who published an [article](#) in *Thorax* (Epub December 4, 2020; print July 2021) that looked at how poor sleep may contribute to chronic kidney disease (CKD) through several pathways, including hypoxia-induced systemic and intraglomerular pressure, inflammation, oxidative stress, and endothelial dysfunction. Sleep apnea-associated hypoxia and very short sleep, likely representing independent biological mechanisms, were associated with a higher moderate-to-severe CKD prevalence, which highlights the potential role for novel interventions. Other authors of the article include researchers from the National Institute of Environmental Health Sciences, the National Institute on Minority Health and Health Disparities, the Division of Sleep Medicine at Harvard Medical School, and the Division of Sleep and Circadian Disorders at Brigham and Women's Hospital.

### **Employment After Breast Cancer Diagnosis and Treatment Among Women in the Sister and the Two Sister Studies**

DLH researcher Elizabeth Hodgson is among the authors of an [article](#) in the *Journal of Occupational Rehabilitation* (published online January 2, 2021; print scheduled for September 2021) that looked at how women undergoing diagnosis and treatment for breast cancer may face challenges in employment. The impact of demographic, clinical, workplace, and psychosocial characteristics on loss of employment after a breast cancer diagnosis and treatment were investigated, as well as changes in work status and work environment for cancer survivors who sustain employment. The researchers analyzed responses from a survey of breast cancer survivors from the Sister Study and the Two Sister Study cohorts who reported being employed at the time of their breast cancer diagnosis and who reported employment status (lost vs. sustained employment) at the time of survey administration. Older age, peripheral neuropathy, lack of sick leave, late stage at diagnosis, a recurrence or a new cancer, problems with memory or attention, and poor general health were significantly associated with lost employment. The long-term effects of breast cancer treatment and workplace provisions for leave and accommodation may have a substantial effect on women's ability to sustain employment. Findings from the study highlighted challenges reported by cancer survivors that may inform clinical and occupational interventions to support survivors' return to work. Other authors of the article include researchers from the Centers for Disease Control and Prevention and the National Institute of Environmental Health Sciences.

### **Use of Informal Support as a Predictor of Home- and Community-Based Services Utilization**

DLH researcher Kristen Robinson is among the authors of an [article](#) published in *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences* (January 2021) that analyzed how home- and community-based services (HCBS) help older adults remain living safely in their homes by delaying or preventing the need for institutionalization. For extremely vulnerable older adults who reported difficulties with any instrumental or basic activities of daily living, use of HCBS was not strongly associated with access to informal caregivers. However, for this same population of extremely vulnerable older adults, those who lived alone have roughly three times the odds of using any HCBS compared to those who do not live alone. Among already vulnerable older adults, this study revealed that living alone is an important enabling factor of the Andersen Behavioral Model as applied in HCBS research. Other authors of the article are researchers from RTI International and New Editions Consulting.

### **Inhaled High Molecular Weight Hyaluronan Ameliorates Respiratory Failure in Acute COPD Exacerbation: A Pilot Study**

DLH researcher scientist John McGrath and data manager Audrey Brown are among the authors of an [article](#) published in *Respiratory Research* (Epub February 1, 2021) that looked at how acute exacerbations of chronic obstructive pulmonary disease (AECOPD) carry significant morbidity and mortality. High molecular weight hyaluronan (HMW-HA) is a glycosaminoglycan sugar, which is a physiological constituent of the lung extracellular matrix and has notable anti-inflammatory and hydrating properties. The researchers hypothesized that inhaled HMW-HA will improve outcomes in AECOPD. In vitro testing showed that HMW-HA significantly improved mucociliary transport in air-liquid interface cultures of primary bronchial cells from COPD patients and healthy primary cells exposed to cigarette smoke extract. Inhaled HMW-HA shortens the duration of respiratory failure and need for non-invasive ventilation in patients with AECOPD. Other authors of the article include researchers from the National Institute of Environmental Health Sciences, the Gregory Fleming James Cystic Fibrosis Research Center at the University of Alabama, and the Harvard-MIT Division of Health Sciences and Technology.

### **Transient Elastography-Assessed Steatosis and Fibrosis Are Associated with Body Composition in the United States**

DLH epidemiologist Constance Ruhl co-authored an [article](#) in *Clinical Gastroenterology and Hepatology* (Online ahead of print February 2021) that examined transient elastography-assessed hepatic steatosis (liver fat) and fibrosis (liver scarring) distributions and relationships with body composition in a representative United States population sample. Study participants underwent anthropometry and dual-energy x-ray absorptiometry (DXA). In the United States population, increased anthropometric and DXA body composition measures were associated with higher hepatic steatosis and fibrosis biomarkers. The co-author of this article is a researcher from the National Institute of Diabetes and Digestive and Kidney Diseases.

### **Drug Susceptibility Patterns of Mycobacterium Tuberculosis from Adults with Multidrug-Resistant Tuberculosis and Implications for a Household Contact Preventive Therapy Trial**

DLH clinical trials specialist Linda Naini is among the authors of an [article](#) published in *BMC Infectious Diseases* (February 2021) that studied drug susceptibility testing patterns of Mycobacterium tuberculosis (MTB) from participants with rifampicin-resistant tuberculosis (RR-TB) or multidrug-resistant TB (MDR-TB; or resistant to rifampicin [RIF] and isoniazid [INH]) and how they guide preventive therapy for their household contacts. Three hundred eight adults with reported RR/MDR-TB were enrolled from 16 participating sites in 8 countries. Their median age was 36 years, and 36% were HIV-infected. RR-TB was detected in all routine specimens but only 75% had documented MDR-TB, illustrating the need for expanded drug susceptibility testing beyond Xpert MTB/RIF to target preventive therapy for household contacts. Other authors of the article include researchers from the Desmond Tutu TB Centre/Stellenbosch University (Cape Town, South Africa), Harvard T.H. Chan School of Public Health, Centers for Disease Control and Prevention, and the Division of AIDS/National Institute of Allergy and Infectious Diseases.

### **Association of Male Sex and Obesity With Residual Plasma Human Immunodeficiency Virus 1 Viremia in Persons on Long-Term Antiretroviral Therapy**

DLH health analyst Evelyn Hogg was one of several authors who published an [article](#) in *Journal of Infectious Diseases* (print: February 2021). Although adipose tissue has been proposed to harbor part of the human immunodeficiency virus 1 (HIV-1) reservoir, the influence of host characteristics, including sex and body mass index (BMI), on measures of HIV-1 persistence during antiretroviral therapy (ART) are incompletely understood. The researchers found that men were more likely than women to have detectable plasma HIV-1 RNA by single-copy assay, and the proportion of participants with detectable residual viremia increased in a stepwise



fashion by BMI category. Sex and obesity are independently associated with residual viremia in people on long-term ART. Other authors of the article include researchers from the Harvard T.H. Chan School of Public Health and the Office of the Global AIDS Coordinator at the Department of State.

### **Natural Hazards and Mental Health Among US Gulf Coast Residents**

DLH data manager Mark Bodkin and research scientist W. Braxton Jackson II were among several authors who published an [article](#) in *Journal of Exposure Science & Environmental Epidemiology* (Online ahead of print: February 18, 2021) that looked at how individuals affected by disasters are at risk for adverse mental health sequelae. Individuals living in the US Gulf Coast have experienced many recent major disasters, but few studies have explored the cumulative burden of experiencing multiple disasters on mental health. The objective of this study was to evaluate the relationship between disaster burden and mental health. Total count of loss events was positively associated with perceived stress and was inversely associated with PTSD. Total duration of exposure was also associated with stress but not with other outcomes. Other authors of the article include researchers from the University of Miami Miller School of Medicine, National Institute of Environmental Health Sciences, and the Center for Emergency Management and Homeland Security at Arizona State University.

### **Prevalence of Urinary Incontinence among a Nationally Representative Sample of Women, 2005-2016: Findings from the Urologic Diseases in America Project**

DLH researchers Lydia Feinstein, Julia Ward, and Erline Martinez-Miller are among the authors of an [article](#) published in the *Journal of Urology* (Epub February 2021; print June 2021). Urinary incontinence is frequently underreported and underdiagnosed in the clinical setting. The study demonstrated a high prevalence of urinary incontinence among a nationally representative population of women in the United States, with many reporting that urinary incontinence affected their daily activities. Other authors of the article include researchers from the Virginia Mason Medical Center, the National Institute of Diabetes and Digestive and Kidney Diseases, and the Johns Hopkins University School of Medicine.

### **Participant Perspectives and Experiences Entering an Intensively Monitored Antiretroviral Pause: Results from the AIDS Clinical Trials Group A5345 Biomarker Study**

DLH health analyst Evelyn Hogg was one of several authors who published an [article](#) in *AIDS Research and Human Retroviruses* (Epub February 2021; print June 2021). The AIDS Clinical Trials Group (ACTG) A5345 study included an intensively monitored antiretroviral pause (IMAP), during which a cohort of participants temporarily stopped antiretroviral treatment. Researchers surveyed participant perceptions and understanding of A5345 using a cross-sectional sociobehavioral questionnaire. Participants completed the baseline questionnaire either before or after initiating the study's IMAP, and questionnaire responses were linked to existing demographic data. Perceived societal-level benefits of participating in the A5345 study included furthering HIV cure-related research and helping the HIV community. Perceived personal-level benefits included the opportunity to learn about their own body's response to IMAP and receipt of financial compensation. The majority of respondents reported risks from participation, for example, viral load becoming detectable. A5345 participants perceived both societal- and personal-level benefits of study participation. Other authors of the article include researchers from the UNC Gillings School of Global Public Health, AIDS Clinical Trials Group (ACTG) Community Scientific Sub-Committee, and NIH Division of AIDS.

### **Genital Powder Use and Risk of Uterine Cancer: A Pooled Analysis of Prospective Studies**

DLH senior research scientist and epidemiologist Aimee D'Aloisio was one of several authors who published an [article](#) in *International Journal of Cancer* (Epub February 1, 2021; print June 1, 2021). When powder is applied to the genital area, it has the potential to reach internal reproductive organs and promote carcinogenesis by irritating and inflaming exposed tissues. Although many studies have considered the association between genital

powder use and ovarian cancer risk, the relationship between genital powder use and uterine cancer is less well-studied. Data were pooled from four large, prospective cohorts (the Nurses' Health Study, the Nurses' Health Study II, the Sister Study, and the Women's Health Initiative-Observational Study). Over a mean 14.5 years of follow-up, 3272 invasive uterine cancers were diagnosed; however, there was no overall association between ever genital powder use and uterine cancer, with little difference observed for frequent ( $\geq 1$  times/week) vs never use. Long-term use ( $>20$  years) was associated with a small, but not statistically significant, increase in risk, compared to never use. The results of this large, pooled analysis do not support a relationship between the use of genital powder and uterine cancer, although the positive associations observed for long-term use may merit further consideration. Other authors of the article include researchers from the H. Lee Moffitt Cancer Center and Research Institute, National Cancer Institute, Harvard T.H. Chan School of Public Health, Fred Hutchinson Cancer Research Center, and the National Institute of Environmental Health Sciences.

### **QT Effects of Bedaquiline, Delamanid, or Both in Patients with Rifampicin-Resistant Tuberculosis: A Phase 2, Open-Label, Randomised, Controlled Trial**

DLH clinical trials specialist **Laura Moran** was one of several researchers who published an [article](#) in *The Lancet: Infectious Diseases* (Epub February 2021; print July 2021) that looked at the effects of bedaquiline and delamanid for tuberculosis treatment. The authors aimed to characterize the effects of bedaquiline, delamanid, or both on the QTc interval, longitudinally over 6 months of multidrug treatment, among patients with multidrug-resistant or rifampicin-resistant tuberculosis taking multidrug background therapy. Combining bedaquiline and delamanid has a modest, no more than additive, effect on the QTc interval, and initial microbiology data are encouraging. This study provided supportive evidence for use of these agents together in patients with multidrug-resistant or rifampicin-resistant tuberculosis with normal baseline QTc values. Other authors of the article included researchers from the Johns Hopkins University School of Medicine, Division of AIDS (NIAID), University of Witwatersrand in Johannesburg, and the University of Cape Town.

### **The National Children's Study Archive Model: A 3-Tier Framework for Dissemination of Data and Specimens for General Use and Secondary Analysis**

DLH researchers **Linda Andrews** and **Lydia Rogers** are among the authors of an [article](#) in *Frontiers in Public Health* (eCollection March 2021) about the National Children's Study (NCS) Archive, which was created as a repository of samples, data, and information from the NCS Vanguard Study a longitudinal pregnancy and birth cohort evaluating approaches to study influence of environmental exposures on child health and development-to provide qualified researchers with access to NCS materials for use in secondary research. The National Children's Study Archive (NCSA) model is a 3-tiered access model designed to make the information and materials gathered during the NCS Vanguard Study available at a user-appropriate level, providing intuitive data exploration and visualization tools, an end-to-end data and sample request management system, and a restricted portal for participant-level data access. Other authors of the article included researchers from NIH's Office of the Director and the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

### **Resistance to Mycobacterium Tuberculosis Infection Among Household Contacts: A Multinational Study**

DLH clinical trials specialist **Linda Naini** was among the authors of an [article](#) published in *Clinical Infectious Diseases* (Online ahead of print March 2021) on a multinational study that aimed to estimate the proportion of household contacts resistant to Mycobacterium tuberculosis. Some contacts of patients with tuberculosis remain negative on tests for tuberculosis infection, despite prolonged exposure, suggesting they might be resistant to Mycobacterium tuberculosis infection. The authors found that at least 10% of household contacts can be classified as resistant to tuberculosis infection, depending on the definition used, including those with high exposure. Other authors of the article included researchers from Emory Rollins School of Public Health and School of Medicine, the National Institutes of Health, Harvard T.H. Chan School of Public Health, and clinical

research site investigators in Peru, India, and South Africa.

### **Breast Cancer-Related Employment Disruption and Financial Hardship in the Sister Study**

DLH researcher Elizabeth Hodgson is among the authors of an [article](#) in *JNCI Cancer Spectrum* (published online March 2021; eCollection June 2021) on a study that examined whether cancer-related employment disruption was associated with increased financial hardship in a national US study of women with breast cancer.

Employment disruption was defined as stopping work completely or working fewer hours after diagnosis. Financial hardship was defined as: 1) experiencing financial problems paying for cancer care, 2) borrowing money or incurring debt, or 3) filing for bankruptcy because of cancer. The researchers concluded that women experiencing employment disruptions after breast cancer may be more vulnerable to financial hardship. Findings highlighted the need to target risk factors for employment disruption, facilitate return to work or ongoing employment, and mitigate financial consequences after cancer. Other authors of the article include researchers from the UNC Gillings School of Global Public Health, Centers for Disease Control and Prevention, the National Institute of Environmental Health Sciences, and the Memorial Sloan Kettering Cancer Center.

### **Quantile Regression Models for Survival Data with Missing Censoring Indicators**

DLH senior statistician Gregg Dinse was one of several authors who published an [article](#) in *Statistical Methods in Medical Research* (Epub April 2021; print May 2021). The quantile regression model has increasingly become a useful approach for analyzing survival data due to its easy interpretation and flexibility in exploring the dynamic relationship between a time-to-event outcome and the covariates. In this article, the authors considered the quantile regression model for survival data with missing censoring indicators. Based on the augmented inverse probability weighting technique, two weighted estimating equations were developed and corresponding easily implemented algorithms were suggested to solve the estimating equations. Other authors of the article include researchers from the Research Center of Applied Statistics and Big Data at Huaqiao University and the Academy of Statistics and Interdisciplinary Sciences at East China Normal University.

### **Objective and Subjective Childhood Socioeconomic Disadvantage and Incident Depression in Adulthood: A Longitudinal Analysis in the Sister Study**

DLH senior research scientist and epidemiologist Aimee D'Aloisio was one of several authors who published an [article](#) in *Social Psychiatry and Psychiatric Epidemiology* (Epub April 2021; print July 2021), which examined the association between objective (i.e., household education level) and subjective (i.e., rank of family income and report of not enough food to eat) socioeconomic disadvantage (SD) during childhood, and baseline diagnosis of clinical depression after age 30 among 47,055 women in the Sister Study. Those reporting being poor (versus well-off) or not having enough food to eat in childhood had a 1.28 times higher rate of depression diagnosis, respectively, with consistent associations observed across birth year groups. The researchers' findings suggested that subjective SD in childhood is a largely consistent predictor of depression onset among women in adulthood, whereas the effects of household education level in childhood may vary across women born into different birth cohorts, and for some, across the lifecourse. Other authors of the article include researchers from the University of Wisconsin-Milwaukee and the National Institute of Environmental Health Sciences.

### **Dietary Inflammatory Potential, Oxidative Balance Score, and Risk of Breast Cancer: Findings from the Sister Study**

DLH Sister Study Epidemiologist Elizabeth Hodgson was one of several authors who published an [article](#) in the *International Journal of Cancer* (Epub April 27, 2021; print scheduled for August 2021) that suggested diet, inflammation, and oxidative stress may be important in breast carcinogenesis, but evidence on the role of the inflammatory and pro-oxidative potential of dietary patterns is limited. Diets with increased inflammatory potential and reduced oxidative balance score (i.e., higher potential for oxidative stress) were positively



associated with overall and triple-negative breast cancer. Other authors of the article include researchers from the National Institute of Environmental Health Sciences, the University of North Carolina Gillings School of Global Public Health, Cancer Prevention and Control Program, University of South Carolina, and the Harvard T.H. Chan School of Public Health.

### **Patient Perspectives of Sickle Cell Management in the Emergency Department**

DLH research biostatistician Christian Douglas is among the authors of an [article](#) in *Critical Care Nursing Quarterly* (April-June 2021). Sickle cell disease (SCD) is a common genetic blood disorder predominantly affecting African Americans in the United States. The objective of this study was to use a multimethods approach to describe how patients with SCD in North Carolina perceive the care they receive in emergency departments (EDs). Fourteen participants completed an interview or 2 focus groups and 51 completed surveys. Sixty percent of participants with pain attack "very much" or "quite a bit" avoided going to the ED for care because of prior bad experiences and 50% of participants reported waiting 120 minutes or more in the ED for treatment of their sickle cell pain. Participants reported that stigma associated with provider perception of drug-seeking behavior is a persistent problem in the ED. Other authors of the article include researchers from the Duke University School of Nursing.

### **Longitudinal Investigation of Pubertal Milestones and Hormones as a Function of Body Fat in Girls**

DLH researchers John McGrath, Gary Larson, and Christian Douglas are among the authors of an [article](#) published in the *Journal of Clinical Endocrinology & Metabolism* (May 2021), investigating the effect of total body fat on reproductive hormones and on the maturation of estrogen-sensitive tissues during puberty in girls. Their analysis was conducted using mixed, multi-state, and Cox proportional hazards models. The data showed that, in late puberty, girls with higher total body fat demonstrate differences in standard hormonal and clinical markers of puberty. Although epidemiologic studies have demonstrated that overweight and obese girls pass some pubertal milestones earlier than normal-weight girls, this study is the first longitudinal study to specifically investigate the relationship between body weight and clinical and biochemical pubertal markers in girls. Other authors of the article include researchers from the National Cancer Institute, National Institute of Environmental Health Sciences, and the Centers for Disease Control and Prevention.

### **Urinary and Salivary Endocrine Measurements to Complement Tanner Staging in Studies of Pubertal Development**

DLH researchers Anna Jones and John McGrath were among the authors of an [article](#) in *PLOS ONE* (online May 13, 2021) that examined whether changes in endocrine levels can indicate the onset of pubertal development prior to changes in self-rated Tanner stage. Endocrine markers in urine and saliva may provide an objective, sensitive, and non-invasive method for assessing development. The article concluded that increasing concentrations of follicle-stimulating hormone in girls and DHEA and testosterone in boys over a 6-month period revealed the start of the pubertal process prior to changes in self-rated Tanner stage. Repeated, non-invasive endocrine measures may complement the more subjective assessment of physical markers in studies determining pubertal onset. Other authors of the article include researchers from the National Institute of Environmental Health Sciences, the National Institute for Occupational Safety & Health, and Emory University Schools of Public Health and Medicine.

### **Types and Spatial Contexts of Neighborhood Greenery Matter in Associations with Weight Status in Women Across 28 U.S. Communities**

DLH senior research scientist and epidemiologist Aimee D'Aloisio is among the authors of an [article](#) published in *Environmental Research* (Epub May 2021; expected print publication August 2021). Excess body weight is a risk factor for many chronic diseases, and studies have identified neighborhood greenery as supportive of healthy

weight. Few have considered plausible effect pathways for ecosystem services (e.g., heat mitigation, landscape aesthetics, and venues for physical activities) or potential variations by climate. This study examined associations between weight status and neighborhood greenery that capture ecosystem services most relevant to weight status among women in the Sister Study cohort residing in 28 U.S. communities. Associations between greenery and overweight/obesity varied by type and spatial context of greenery, and climate. The authors' findings add to a growing body of evidence that greenery design in urban planning can support public health. Other authors of the article include researchers from the U.S. Environmental Protection Agency and the National Institute of Environmental Health Sciences.

### **Institutional Review Board Preparedness for Disaster Research: A Practical Approach**

DLH project manager **Steven Ramsey** is among the authors of an [article](#) in *Current Environmental Health Reports* (Epub May 2021; print June 2021). Because disasters are becoming more common and challenge national and global resiliency and response efforts, government agencies have increased interest in disaster research to understand their environmental impact and health-related consequences. This article describes approaches for Institutional Review Board preparedness in reviewing disaster research. The growth of the disaster research field has brought more attention to potential ethical concerns of disaster research studies. Disaster survivors, responders, and those that assist in cleanup and remedial efforts may be left with significant unmet needs and long-term physical and emotional challenges as a result of their experiences. It is important for IRBs and investigators to collaboratively address how best to protect the welfare of individuals and communities affected by a disaster. A new approach is needed to systematically consider the various factors relevant to an assessment of human research protection issues following disasters. Other authors of the article include researchers from the National Institute of Environmental Health Sciences.

### **Relation of Repeated Exposures to Air Emissions from Swine Industrial Livestock Operations to Sleep Duration and Awakenings in Nearby Residential Communities**

DLH research scientist **Nathaniel MacNell** is the lead author of an [article](#) in *Sleep Health* (online ahead of print June 2021). Since waste from swine industrial livestock operations (ILOs) produces air pollutants associated with negative health outcomes among nearby residents, the impact of odorant emissions on sleep duration and awakenings was assessed in 16 residential communities (80 participants) in eastern North Carolina hosting swine ILOs. Among 80 participants, nightly (across a 12-hour period) swine odor was associated with lower nightly sleep duration compared to odor-free nights, and detection of nightly hydrogen sulfide was associated with an increased risk of awakening compared to nights with no detection of hydrogen sulfide. These results suggest that environmental odorants are important considerations for sleep health and highlight the importance of sleep as a potential mediator between environmental air pollution and health outcomes impacted by poor sleep. The other two authors of the article are researchers from the National Institute of Environmental Health Sciences and the Bloomberg School of Public Health at Johns Hopkins University.