Research Update

Fall - Winter 2021

A semi-annual look at select DLH research activities.

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Jeanine Christian

President, Public Health & Scientific Research

Thank you for your interest in the Fall-Winter 2021 edition of the DLH Research Update, a semi-annual look at select research activities from across our company's Public Health & Scientific Research operating unit. I am continually impressed by the curiosity and depth of expertise that our researchers display. In the pages that follow, you will see numerous examples of the passion that members of the DLH team bring to their scientific missions.

In delving into the research on display this edition, I was struck by the breadth of the populations touched by our team's work. Our research spans the young and the elderly, crosses race and gender barriers, and encompasses broad swaths of the socioeconomic spectrum. Through our expansive network of clinical research partners across the globe, we cross borders and continents. From investigational therapeutic discoveries, to infectious disease, exposure effects, and more, the work DLH researchers carry out truly does affect the lives of millions. Taking a moment to reflect on that is inspiring.

I am proud as always to be a member of the DLH team. My tremendous thanks and gratitude to the authors listed herein, and to the hundreds of other members of our world-class workforce and partner organizations who helped make this vital research a reality.

Sincerely,

Jeanine Christian
President
Public Health & Scientific Research

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Recent Publications

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 among the authors of an article published in *Social Psychiatry and Psychiatric Epidemiology* (Epub: April 2021; Print: July 2021). 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 diagnosis of clinical depression after age 30 among 47,055 women in the Sister Study was examined. A total of 8036 (17.1%) women were diagnosed with clinical depression over a mean follow-up of 24.0 (± 9.9) years. Those reporting being poor (versus well-off) or not having enough food to eat in childhood had a 1.28 and 1.30 times higher rate of depression diagnosis, respectively, with consistent associations observed across birth year groups. An inverse association between low household education level and incident depression was observed at baseline (i.e., age 30) becoming positive over time in the total sample but only among women born between 1935-1954 in analyses stratified by 10-year birth group. Findings suggest 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 include researchers from the National Institute of Environmental Health Sciences and the Joseph J. Zilber School of Public Health at the University of Wisconsin-Milwaukee.*

Corticosteroid Discontinuation, Complete Clinical Response and Remission in Juvenile Dermatomyositis

DLH research scientist William Warren-Hicks was among the authors of an article published in *Rheumatology* (Print: May 2021). A North American registry of juvenile dermatomyositis (JDM) patients was examined for frequency of and factors associated with corticosteroid discontinuation, complete clinical response, and remission. The probability of achieving final corticosteroid discontinuation, complete clinical response, and remission in 307 JDM patients was evaluated. JDM patients achieve favorable outcomes, including corticosteroid discontinuation, complete clinical response, and remission, although timelines for these may be several years based on time-dependent analyses. These outcomes are inter-related and strong predictors of each other. Selected clinical features and myositis autoantibodies are additionally associated with these outcomes. *Other authors include researchers from the National Institute of Environmental Health Sciences and the National Institute of Arthritis and Musculoskeletal and Skin Diseases.*

Suspected Immune-Related Adverse Events with an Anti-PD-1 Inhibitor in Otherwise Healthy People With HIV

DLH clinical trials specialist Chanelle Wimbish was among the authors of an article published in *the Journal of Acquired Immune Deficiency Syndromes* (Online: May 2021; Print: August 2021). Strategies to reverse HIV-specific immune exhaustion and target latently infected cells must be tested. These may require more targeted programmed death-1 blockade than that obtained with systemic administration of antibodies, coupled with a better understanding of risks for immune-mediated adverse events, to pursue studies of immune checkpoint inhibitors in otherwise healthy, virologically suppressed people with HIV (PWH). This study underscores the potential challenges of translating successful immunotherapeutic interventions from the high morbidity/mortality cancer field to otherwise healthy virologically suppressed PWH. *Other authors of the article include researchers from the Division of Infectious Diseases at the University of North Carolina at Chapel Hill, Center for Biostatistics and AIDS Research at the Harvard T. H. Chan School of Public Health, Division of Endocrinology, Diabetes and Metabolism at the Johns Hopkins University School of Medicine, and the HIV*

Research Branch/Division of AIDS at the National Institute of Allergy and Infectious Diseases.

Albuminuria as a Predictor of Mortality from Chronic Lower Respiratory Disease and from Influenza and Pneumonia

DLH researcher/SAS programmer Jesse Wilkerson and DLH research scientist Lydia Feinstein were among the authors of a short article published in the *Annals of the American Thoracic Society* (Online ahead of print May 2021; print December 21, 2021; available on PMC [PMCID: PMC8641818] March 30, 2022). The article reports on albuminuria, a marker of renal impairment, and its association with respiratory disease-related deaths. The study used data from the National Health and Nutrition Examination Survey and spot urine samples evaluated for albumin and creatinine levels. Findings suggested albuminuria is associated with mortality from chronic lower respiratory disease and from influenza and pneumonia, independent of diabetes or chronic kidney disease. *Other authors of the article include researchers from the National Institute of Environmental Health Sciences, University of Cincinnati College of Medicine, and the University of Iowa.*

The Association Between Douching, Genital Talc Use, and the Risk of Prevalent and Incident Cervical Cancer

DLH senior research scientist and epidemiologist Aimee D'Aloisio was among the authors of an article published in *Scientific Reports* (Print: July 2021). While human papillomavirus is the primary cause of cervical cancer, other factors may influence susceptibility and response to the virus. Candidates include douching and talcum powder applied in the genital area. Douching at ages 10-13 was positively associated with pre-baseline cervical cancer, though the association was not statistically significant. An association between adolescent talc use and pre-baseline cervical cancer was not observed. Douching in the year before enrollment was positively associated with incident cervical cancer. The association between recent genital talc use and incident cervical cancer was positive, but not statistically significant. The observed positive association between douching and incident cervical cancer is consistent with previous retrospective case-control studies. In the first study to examine genital talc use and cervical cancer, evidence of an association was not seen. *Other authors include researchers from the National Institute of Environmental Health Sciences.*

Antiretroviral Hair Levels, Self-Reported Adherence, and Virologic Failure in Second-Line Regimen Patients in Resource-Limited Settings

DLH researcher Evelyn Hogg was one of several authors who published an article in *AIDS* (London, England) (Print: July 2021) that evaluated associations between antiretroviral hair concentrations as an objective, cumulative adherence metric, with self-reported adherence and virologic outcomes. Protease inhibitor hair concentrations showed stronger associations with subsequent virologic outcomes than self-reported adherence in this cohort. Hair adherence measures could identify individuals at risk of second-line treatment failure in need of interventions. *Other authors of the article include researchers from the Division of AIDS/National Institute of Allergy and Infectious Diseases, Harvard T.H. Chan School of Public Health, as well as HIV researchers from Thailand, Brazil, South Africa, Malawi, India, and Australia.*

The Association Between Blood Metals and Hypertension in the GuLF Study

DLH researcher W. Braxton Jackson II was among the authors of an article published in *Environmental Research* (Epub: July 2021; Print: November 2021). Both essential and non-essential metals come from natural and anthropogenic sources. Metals can bioaccumulate in humans and may impact human health, including hypertension. Blood metal (cadmium, lead, mercury, manganese, and selenium) concentrations were measured at baseline for a sample of participants in the Gulf Long-Term Follow-up (GuLF) Study. The GuLF Study is a prospective cohort study focused on potential health effects following the 2010 Deepwater Horizon oil spill. Overall cross-sectional associations between blood cadmium, lead, mercury, selenium levels and hypertension or blood pressure were not found. However, some evidence was found suggesting that manganese might be

positively associated with risk of hypertension. Associations varied somewhat by race and BMI. *Other authors of the article included researchers from the University of North Carolina's Gillings School of Global Public Health and the National Institute of Environmental Health Sciences.*

Exploring the Motivations of Research Participants Who Chose Not to Learn Medically Actionable Secondary Genetic Findings About Themselves

DLH researcher Jamie Glover was among the authors of an article published in *Genetics in Medicine* (Epub: July 2021; Print: December 2021). Proposals to return medically actionable secondary genetic findings (SFs) in the clinical and research settings have generated controversy regarding whether to solicit individuals' preferences about their "right not to know" genetic information. This study contributes to the debate by surveying research participants who have actively decided whether to accept or refuse SFs. Participants were drawn from a large National Institutes of Health (NIH) environmental health study. This study demonstrates the need for a more robust informed consent process when soliciting research participants' preferences about receiving SFs. The authors also suggested that their data support implementing a default practice of returning SFs without actively soliciting preferences. *Other authors of the article included researchers from the National Institute of Environmental Health Sciences, the Department of Bioethics at the National Human Genome Research Institute, and Harvard University.*

Experiences with Everyday and Major Forms of Racial/Ethnic Discrimination and Type 2 Diabetes Risk Among White, Black, and Hispanic/Latina Women: Findings from the Sister Study

DLH senior epidemiologist Julia Ward was one of several authors of an article published in the *American Journal of Epidemiology* (Online ahead of print: July 2021; Print December 2021). Racial/ethnic discrimination may contribute to type 2 diabetes mellitus (T2DM) risk, but few studies have prospectively examined this relationship among racially/ethnically diverse populations. Prospective data from 33,833 eligible Sister Study participants enrolled from 2003 to 2009 were analyzed. In a follow-up questionnaire (2008-2012), participants reported lifetime experiences of everyday and major forms of racial/ethnic discrimination. Self-reported physician diagnoses of T2DM were ascertained until September 2017. Over an average of 7 years of follow-up, there were 1,167 incident cases of T2DM. Non-Hispanic-Black women most frequently reported everyday and major racial/ethnic discrimination (vs. Non-Hispanic-White and Hispanic/Latina). While everyday discrimination was not associated, experiencing major discrimination was marginally associated with higher T2DM risk overall after adjustment for sociodemographic characteristics and body mass index. Associations were similar across racial/ethnic groups; however, racial/ethnic discrimination was more frequently reported among racial/ethnic minority women. Anti-discrimination efforts may help mitigate racial/ethnic disparities in T2DM risk. *Other authors of the article include researchers from the National Institute of Environmental Health Sciences, Department of Epidemiology at the University of North Carolina at Chapel Hill, Department of Epidemiology and Biostatistics at the University of Maryland in College Park, National Institute on Minority Health and Health Disparities, the Harvard T.H. Chan School of Public Health, and the Department of African and African American Studies at Harvard University.*

Intergenerational Educational Mobility and Type 2 Diabetes in the Sacramento Area Latino Study on Aging

DLH senior epidemiologist Julia Ward was among the authors of an article published in the *Annals of Epidemiology* (Epub: July 2021; Print: January 2022). United States (US) Latinos have the lowest educational attainment of any US racial/ethnic group, which may contribute to their disparate burden of type 2 diabetes. The association between intergenerational educational mobility and type 2 diabetes among US Latino adults was examined. Data from the Niños Lifestyle and Diabetes Study (2013-2014) and the Sacramento Area Latino Study on Aging (1998-1999) were used to link 616 adult Latino children to their parents. Findings from a predominantly Mexican-heritage community suggest that higher education across generations may buffer individuals from

glycemic dysregulation. As such, higher education may be a promising public health target to address the rising burden of type 2 diabetes in the US. *Other authors of the article include researchers from the Carolina Population Center and the Gillings School of Global Public at the University of North Carolina at Chapel Hill, the Department of Biobehavioral Health at Pennsylvania State University, and the Mailman School of Public Health at Columbia University.*

Cognitive Function Among Older Adults With Diabetes and Prediabetes, NHANES 2011-2014

DLH epidemiologist Sarah Casagrande was among the authors of an article published in *Diabetes Research and Clinical Practice* (Epub: July 2021; Print: August 2021) that looked at the association between diabetes status, glycemia, and cognitive function among a national U.S. sample of older adults in the 2011-2014 National Health and Nutrition Examinations Surveys. Among 1,552 adults age ≥60 years, linear regressions were used to determine the association between diabetes status (diabetes, prediabetes, normoglycemia) and cognitive function. Overall, diabetes was associated with mild cognitive dysfunction. Among all adults, cognition function scores decreased with increasing HbA1c for all assessments but remained significant in the fully adjusted model for the Animal Fluency and Digit Symbol Substitution Test. The findings suggest that dysglycemia, as measured by HbA1c, was associated with poorer executive function and processing speed. *Other authors of the article included researchers from the National Institute of Diabetes and Digestive and Kidney Diseases.*

Reproductive Hormone Concentrations and Associated Anatomical Responses: Does Soy Formula Affect Minipuberty in Boys?

DLH researcher Kerry James was among the authors of an article published in the *Journal of Clinical Endocrinology and Metabolism* (Print: August 2021). Soy formula feeding is common in infancy and is a source of high exposure to phytoestrogens, documented to influence vaginal cytology in female infants. Its influence on minipuberty in males has not been established. The researchers assessed the association between infant feeding practice and longitudinally measured reproductive hormones and hormone-responsive tissues in infant boys. They concluded that reproductive hormone concentrations and anatomical responses followed similar trajectories in soy and cow milk formula-fed infant boys. Findings suggested that these measures of early male reproductive development do not respond to phytoestrogen exposure during infancy. *Other authors of the article include researchers from the National Institute of Environmental Health Sciences, the Clinical Standardization Programs of the CDC, and the Children's Hospital of Philadelphia.*

Incidence of Chronic Respiratory Conditions Among Oil Spill Responders: Five Years of Follow-up in the Deepwater Horizon Oil Spill Coast Guard Cohort Study

DLH researcher Kate Christenbury was among the authors of an article published in *Environment Research* (Epub: August 2021; Print: January 2022). Over 10 years after the Deepwater Horizon (DWH) oil spill, understanding of long-term respiratory health risks associated with oil spill response exposures is limited. A prospective analysis was conducted in a cohort of U.S. Coast Guard personnel with universal military healthcare. For all active duty cohort members in the DWH Oil Spill Coast Guard Cohort Study, medical encounter data was obtained from October 1, 2007, to September 30, 2015. Among active duty Coast Guard personnel, oil spill clean-up exposures were associated with moderately increased risk for longer-term respiratory conditions. *Other authors included researchers from the Department of Preventive Medicine and Biostatistics at Uniformed Services University of the Health Sciences, Department of Epidemiology at the University of North Carolina's Gillings School of Global Public Health, and the Directorate of Health, Safety, and Work Life at United States Coast Guard Headquarters.*

Spirometry Quality Predictors in a Large Multistate Prospective Study

DLH researchers W. Braxton Jackson II, Steven Ramsey, and Matthew Curry were among the authors of an

article published in *Respiratory Medicine* (Epub: September 2021; Print: November 2021). The Gulf Long-Term Follow-up (GuLF) Study is a prospective cohort study of health effects associated with oil spill response and clean-up following the 2010 Deepwater Horizon Disaster. As part of the study, spirometry testing of lung function was carried out in home visits across multiple states. Few studies have described factors associated with spirometry test failure in field-based settings. The authors' objective was to identify what factors, if any, predicted test failure among GuLF Study participants who completed spirometry testing in a non-traditional setting. Field-based studies involving spirometry should identify and account for participant factors that may influence test failure. Coaching that is tailored to those less likely to have experience with spirometry may help reduce test failure rates. *Other authors of the article include researchers from the National Institute of Environmental Health Sciences.*

Early-Life Farm Exposure and Ovarian Reserve in a U.S. Cohort of Women

DLH senior statistician Gregg Dinse and senior research scientist and epidemiologist Aimee D'Aloisio were among the authors of an article published in *Epidemiology* (Print: September 2021) that examined whether lower concentrations of the ovarian reserve biomarker anti-Müllerian hormone (AMH) in adulthood were associated with prenatal farm exposure, as well as childhood farm exposure, using enrollment data from the Sister Study, a large U.S. cohort of women. Prenatal and childhood farm exposure data were collected by questionnaire and telephone interview. Prenatal exposure to maternal residence or work on a farm was associated with lower AMH concentrations. Associations between childhood farm residence exposures and AMH were null or weak, except childhood contact with pesticide-treated livestock or buildings. The article concluded that replication of the prenatal farm exposure and lower adult AMH association raises concern that aspects of prenatal farm exposure may result in reduced adult ovarian reserve. *Other authors include researchers from the College of Human Medicine at Michigan State University, the University of North Carolina Gillings School of Global Public Health, and the National Institute of Environmental Health Sciences.*

Evaluating Newly Approved Drugs for Multidrug-Resistant Tuberculosis (endTB): Study Protocol for an Adaptive, Multi-Country Randomized Controlled Trial

DLH clinical trials specialist Osarenoma Okunbor was among the authors of an article published in *Trials* (Online: September 2021). Treatment of multidrug- and rifampin-resistant tuberculosis (MDR/RR-TB) is expensive, labor-intensive, and associated with substantial adverse events and poor outcomes. While most MDR/RR-TB patients do not receive treatment, many who do are treated for 18 months or more. A shorter all-oral regimen is currently recommended for only a subset of MDR/RR-TB. Its use is only conditionally recommended because of very low-quality evidence underpinning the recommendation. Novel combinations of newer and repurposed drugs bring hope in the fight against MDR/RR-TB, but their use has not been optimized in all-oral, shorter regimens. This has greatly limited their impact on the burden of disease. There is a dire need for high-quality evidence on the performance of new, shortened, injectable-sparing regimens for MDR-TB that can be adapted to individual patients and different settings. The lack of a safe and effective regimen that can be used in all patients is a major obstacle to delivering appropriate treatment to all patients with active MDR/RR-TB. Identifying multiple shorter, safe, and effective regimens has the potential to greatly reduce the burden of this deadly disease worldwide. *Other authors include researchers from the Department of Global Health and Social Medicine at Harvard Medical School, the University of San Francisco Center for Tuberculosis, the Division of Global Health Equity at Brigham and Women's Hospital, Dana-Farber Cancer Institute, as well as researchers from France, Belgium, Kazakhstan, Canada, South Africa, Pakistan, Peru, and India.*

Disparities in Multiple Sleep Characteristics Among Non-Hispanic White and Hispanic/Latino Adults by Birthplace and Language Preference: Cross-Sectional Results from the US National Health Interview Survey

DLH health researchers Erline E. Martinez-Miller, John McGrath, and W. Braxton Jackson II were among the

authors of an article in *BMJ Open* (Epub: September 2021) that investigated whether sleep disparities vary by birthplace among non-Hispanic White and Hispanic/Latino adults in the US, and investigated language preference as an effect modifier. Sleep disparities varied by birthplace, Hispanic/Latino heritage, and language preference, and each characteristic should be considered in sleep disparities research. *Other authors include researchers from the National Institute of Environmental Health Sciences, the Department of Population and Data Sciences at the University of Texas Southwestern Medical Center, the National Institute on Minority Health and Health Disparities, and the National Heart, Lung and Blood Institute.*

Poor Clinical Guideline Adherence and Inappropriate Testing for Incident Lower Urinary Tract Symptoms Associated with Benign Prostatic Hyperplasia

DLH health researchers Lydia Feinstein, Julia Ward, and Erline E. Martinez-Miller were among the authors of an article in *Prostate Cancer and Prostatic Diseases* (Online Ahead of Print: September 2021). The American Urological Association (AUA) makes recommendations for evaluation and testing for lower urinary tract symptoms associated with benign prostatic hyperplasia (LUTS/BPH) to help primary care providers and specialists identify LUTS/BPH and harmful related conditions including urinary retention and prostate or bladder cancer. Understanding of provider adherence to these guidelines is limited to single-site or non-representative settings. Although older men were at greater risk of LUTS/BPH than younger men, they were less likely to undergo testing at diagnosis. Recommended testing with urinalysis was poor despite higher prevalence of bladder cancer in older men and a standard recommendation for urinalysis since 1994. Providers should be more cognizant of AUA Guidelines when assessing LUTS/BPH patients. *Other authors include researchers from the Division of Urology at Albany Medical College, the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill, the National Institute of Diabetes and Digestive and Kidney Diseases, Johns Hopkins School of Medicine, the Center for Male Health at Loyola University Medical Center, and the Department of Population and Data Sciences at the University of Texas Southwestern Medical Center.*

Acute and Longer-Term Cardiovascular Conditions in the Deepwater Horizon Oil Spill Coast Guard Cohort

DLH researcher Kate Christenbury was among the authors of an article published in *Environment International* (Epub: October 2021; Print: January 2022). The U.S. Coast Guard (USCG) led a clean-up response to the Deepwater Horizon (DWH) oil spill. Human studies evaluating acute and longer-term cardiovascular conditions associated with oil spill-related exposures are sparse. The authors aimed to investigate prevalent and incident cardiovascular symptoms/conditions in the DHW Oil Spill Coast Guard Cohort. In this large study of the DWH oil spill USCG responders, self-reported spill clean-up exposures were associated with acute and longer-term cardiovascular symptoms/conditions. *Other authors included researchers from the Uniformed Services University of the Health Sciences, the Department of Epidemiology at the University of North Carolina's Gillings School of Global Public Health, and the Directorate of Health, Safety, and Work Life at United States Coast Guard Headquarters.*

Estimation of Dermal Exposure to Oil Spill Response and Clean-up Workers after the Deepwater Horizon Disaster

DLH researcher Anna Jones was among the authors of an article published in *Annals of Work Exposures and Health* (Online Ahead of Print: October 2021). The GuLF STUDY is investigating health outcomes associated with oil spill-related chemical exposures among workers involved in the spill response and clean-up following the Deepwater Horizon disaster. Due to the lack of dermal exposure measurements, dermal exposures were estimated using a deterministic model, which was customized from a previously published model. Workers provided information on the frequency of contact with oil, tar, chemical dispersants applied to the oil spill and sea water, as well as the use of protective equipment, by job/activity/task. The model estimated dermal exposures to total hydrocarbons (THC), benzene, ethylbenzene, toluene, xylene, n-hexane (BTEX-H), polycyclic

aromatic hydrocarbons (PAHs), and dispersants in GuLF DREAM units (GDUs). Correlations of these substances to each other were high for most of the substances in oil but were lower for some of the substances in tar. These data were linked to the study participants to allow investigation of adverse health effects that may be related to dermal exposures. *Other authors include researchers from the National Institute of Environmental Health Sciences and the Gillings School of Global Public Health at the University of North Carolina.*

A Prospective Study of Multiple Sleep Dimensions and Hypertension Risk Among White, Black And Hispanic/Latina Women: Findings from the Sister Study

DLH senior epidemiologist Julia Ward was among the authors of an article published in the *Journal of Hypertension* (Print: November 2021). Poor sleep is associated with increased hypertension risk, but few studies have evaluated multiple sleep dimensions or investigated racial/ethnic disparities in this association among women. Multiple sleep dimensions (sleep duration, inconsistent weekly sleep patterns, sleep debt, frequent napping, and difficulty falling or staying asleep) and hypertension risk among women were investigated, and modification by age, race/ethnicity, and menopausal status were determined. Data were used from the Sister Study, a national cohort of 50,884 women who had sisters diagnosed with breast cancer in the United States enrolled in 2003-2009 and followed through September 2018. Screening for multiple sleep dimensions and prioritizing younger and premenopausal women may help identify individuals at high risk for hypertension. *Other authors included researchers from the National Institute of Environmental Health Sciences, Duke University School of Medicine, and the National Institute on Minority Health and Health Disparities.*

Early-Life Exposures and Age at Thelarche in the Sister Study Cohort

DLH senior research scientist and epidemiologist Aimee D'Aloisio was among the authors of an article published in *Breast Cancer Research* (Print: December 2021). Early age at breast development (thelarche) has been associated with increased breast cancer risk. Average age at thelarche has declined over time, but there are few established risk factors for early thelarche. Associations were examined between pre- and postnatal exposures and age at thelarche in a US cohort of women born between 1928 and 1974. Associations between pre- and postnatal exposures and age at thelarche suggest that the early-life environment influences breast development and therefore may also affect breast cancer risk by altering the timing of pubertal breast development. *Other authors included researchers from the National Institute of Environmental Health Sciences.*

A Semimechanistic Model of the Bactericidal Activity of High-Dose Isoniazid Against Multidrug-Resistant Tuberculosis: Results from a Randomized Clinical Trial

DLH clinical trials specialist Laura Moran was among the authors of an article published in *American Journal of Respiratory and Critical Care Medicine* (Print: December 2021) that examined accumulating evidence that higher-than-standard doses of isoniazid are effective against low-to-intermediate-level isoniazid-resistant strains of Mycobacterium tuberculosis, but the optimal dose remains unknown. The objectives were to characterize the association between isoniazid pharmacokinetics (standard or high dose) and early bactericidal activity against M. tuberculosis (drug sensitive and inhA mutated) and N-acetyltransferase 2 status. Dosing of isoniazid based on N-acetyltransferase 2 acetylator status may help patients attain effective exposures against inhA-mutated isolates. *Other authors of the article included researchers from the National Institute of Allergy and Infectious Diseases, University of Cape Town, Johns Hopkins University School of Medicine, and the Harvard T.H. Chan School of Public Health.*

The North American Registry for Care and Research in Multiple Sclerosis (NARCRMS)

DLH researchers Sara McCurdy Murphy and Lisa Patton were among the authors of an article published in the International *Journal of MS Care* (Epub December 2021; Print: November-December 2021). Although many regional multiple sclerosis (MS) databases existed in the United States and Canada, there was no single

clinician-derived registry that examined this disease as a group across the North American continent. This distinction is important because information that results from such a database can potentially give perspectives about MS that cannot be derived from any single regional registry. A partnership was forged between the pharmaceutical industry and the Consortium of Multiple Sclerosis Centers (CMSC) to create a registry of patients with MS from Canada and the United States, including Puerto Rico. Case report forms were created to collect physician-derived information, and the Patient-Reported Outcomes Measurement Information System (PROMIS) was selected to capture patient-reported outcomes. As of November 2021, 927 of 1,000 patients have been enrolled. Completion of recruitment is expected by the end of 2021. Twenty-five centers are participating, with an expected total of 30, including five centers from Canada. Clinical status, health economic outcomes, magnetic resonance images, and, soon, biomarkers relevant to understanding relapses and progression are being collected. The short-term goal is to understand and better treat MS disease progression, and the long-term goal is its prevention. The North American Registry for Care and Research in Multiple Sclerosis (NARCRMS) is one of few clinician/patient-generated registries that examines MS across North America, including Puerto Rico. Information derived from the natural history studies should help physicians, the pharmaceutical industry, and regulatory bodies understand MS better and improve quality of life for patients with MS worldwide. *Other authors included researchers from the University of Miami, the Consortium of Multiple Sclerosis Centers, and the University of British Columbia.*

Longitudinal Associations Between Objective and Perceived Healthy Food Environment and Diet: The Multi-Ethnic Study of Atherosclerosis

DLH epidemiologist Joseph Engeda was among the authors of an article published in *Social Science & Medicine* (Epub November 2021; Print: January 2022). Research examining the influence of neighborhood healthy food environment on diet has been mostly cross-sectional and has lacked robust characterization of the food environment. Longitudinal associations between features of the local food environment and healthy diet were examined, and whether associations were modified by race/ethnicity. Data on 3,634 adults aged 45-84 followed for 10 years were obtained from the Multi-Ethnic Study of Atherosclerosis. Findings suggest that neighborhood-level food environment is associated with better diet quality, especially among racially/ethnically minoritized populations. *Other authors included researchers from the School of Public Health at the University of California at Berkeley, the Dornsife School of Public Health at Drexel University, and the National Center for Chronic Disease Prevention and Health Promotion at the Centers for Disease Control and Prevention.*