

Implications of the California Wildfires for Health, Communities, and Preparedness

A Workshop

June 4-5, 2019

Betty Irene Moore School of Nursing at UC Davis Betty Irene Moore Hall 2570 48th Street, Room 1000 Sacramento, CA 95817

Meeting Briefing Materials

Hosted by:

Forum on Medical and Public Health Preparedness for Disasters and Emergencies

Roundtable on Environmental Health Services, Research, and Medicine

Roundtable on Population Heath Improvement

Roundtable on Promotion of Health Equity



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Betty Irene Moore Hall
2570 48th Street, Room 1000
Sacramento, CA 95817

June 4, 2019 Day 1

8:00 AM REGISTRATION

Opening Comments and Welcome

8:30 AM Kenneth W. Kizer, M.D., M.P.H.

Founding Director, Institute for Population Health Improvement, UC Davis Health Distinguished Professor, School of Medicine and Betty Irene Moore School of Nursing, University of California, Davis

Workshop Planning Committee Chair

David Lubarsky, M.D., M.B.A.

Vice Chancellor of Human Health Sciences and Chief Executive Officer, UC Davis Health

Deborah Ward, Ph.D., RN, FAAN

Dignity Health Dean's Chair for Nursing Leadership, Interim Dean, and Clinical Professor, Betty Irene Moore School of Nursing, University of California, Davis

Session I California Wildfires: Past and Future

9:00 AM *Moderator*: **Kenneth W. Kizer, M.D., M.P.H.**

Founding Director, Institute for Population Health Improvement, UC Davis Health

Distinguished Professor, School of Medicine and Betty Irene Moore School of Nursing, University of California, Davis Workshop Planning Committee Chair

Speakers:

Benjamin Houlton, Ph.D.

Professor and Chancellor's Fellow, Department of Land, Air and Water Resources, University of California, Davis

Director, John Muir Institute of the Environment, University of California, Davis

• Liane Jollon, RN, M.A.

Executive Director, San Juan Basin Public Health, Durango, Colorado

• Howard Backer, M.D., M.P.H., FACEP

Director, California Emergency Medical Services Authority

Session II Populations Impacted by Wildfires

10:00 AM

Moderator: Winston Wong, M.D., M.S.

Medical Director, Community Health and Director, Disparities Improvement and Quality Initiatives, Kaiser Permanente

Speakers:

• Oscar Chavez

Assistant Director of Human Services, County of Sonoma, California

Don Hankins, Ph.D.

Professor, Geography and Planning Department, California State University, Chico

• Genevieve Flores-Haro, M.P.A.

Associate Director, Mixteco/Indigena Community Organizing Project

• Andy Miller, M.D.

Health Officer, Butte County Public Health Department, Oroville, California

11:30 AM

LUNCH (Boxed lunches available free of charge for meeting attendees) Screening of Waking Up to Wildfires documentary

Session III Effects of Wildfires on the Natural Environment

1:00 PM

Moderator: Wayne Cascio, M.D., FACC, FAHA

Director, National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency

U.S. Environmental Protection Ag

Speaker:

• Andrew J. Whelton, Ph.D.

Associate Professor of Civil, Environmental, and Ecological Engineering, Purdue University (*Remote*)

Session IV Human Health Effects of Wildfires

2:00 PM

Moderator: Wayne Jonas, M.D.

Executive Director, Samueli Integrative Health Programs

Practicing Family Physician

Speakers:

• Colleen Reid, Ph.D., M.P.H.

Assistant Professor, Department of Geography, University of Colorado Boulder

• Lisa Miller, Ph.D.

Professor, Department of Anatomy, Physiology, and Cell Biology, School of Veterinary Medicine, University of California, Davis

Associate Director of Research, California National Primate Research Center

• Heather Riden, M.A.

Manager, Western Center for Agricultural Health and Safety, University of California, Davis

Kathleen Navarro, Ph.D., M.P.H.

Forest Planning Specialist, U.S. Forest Service

3:15 PM *BREAK*

3:30 PM Human Health Effects of Wildfires (Session IV Continued)

Moderator: Wayne Jonas, M.D.

Executive Director, Samueli Integrative Health Programs

Practicing Family Physician

Speakers:

• Irva Hertz-Picciotto, Ph.D.

Director, Environmental Health Sciences Center, University of California, Davis Professor, Department of Public Health Sciences, School of Medicine, University of California, Davis

• Lauren Thie, M.S.P.H.

Environmental Program Consultant, North Carolina Department of Health and Human Services

Ana Rappold, Ph.D.

Statistician, National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency

Session V Challenges and Limitations of Wildfire Smoke Exposure Research

4:45 PM *Moderator:* Michelle Bell, Ph.D., M.S., M.S.E.

Mary E. Pinchot Professor of Environmental Health, Yale University School of Forestry and Environmental Studies

Speakers:

• Colleen Reid, Ph.D., M.P.H.

Assistant Professor, Department of Geography, University of Colorado Boulder

• Ana Rappold, Ph.D.

Statistician, National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency

• Irva Hertz-Picciotto, Ph.D.

Director, Environmental Health Sciences Center, University of California, Davis Professor, Department of Public Health Sciences, School of Medicine, University of California, Davis

5:30 PM *ADJOURN*

June 5, 2019 Day 2

8:00 AM REGISTRATION

Call to Order and Opening Comments

8:30 AM Kenneth W. Kizer, M.D., M.P.H.

Founding Director, Institute for Population Health Improvement, UC Davis Health Distinguished Professor, School of Medicine and Betty Irene Moore School of Nursing, University of California, Davis

Workshop Planning Committee Chair

Session VI The Trials of Recovery

9:00 AM *Moderator:* David Eisenman, M.D., M.S.H.S.

Director, Center for Public Health and Disasters, Fielding School of Public Health, University of California, Los Angeles

Professor-in-Residence, David Geffen School of Medicine and Fielding School of Public Health, University of California, Los Angeles

Speakers:

Byron Mason, M.A.

Deputy Director, Office of Human Services, Emergency Preparedness, and Response, Administration for Children and Families (*Remote*)

• Annie Schmidt

Strategic Advisor, Washington State Fire Adapted Communities Learning Network

• Megan Kurtz, M.A.

Camp Fire Campus–Community Liaison, Office of the President and Faculty, College of Communication and Education, California State University, Chico

10:45 AM *BREAK*

Session VII Enhancing Operational Response

11:00 AM *Moderator:* Suzet McKinney, Dr.P.H., M.P.H.

Chief Executive Officer and Director, Illinois Medical District

Speakers:

John R. Balmes, M.D.

Professor, School of Medicine, University of California, San Francisco Professor, Environmental Health Sciences Division, School of Public Health, University of California, Berkley

Director, UC Berkeley-UCSF Joint Medical Program

Physician Member, California Air Resources Board

• Merritt D. Schreiber, Ph.D.

Professor, Department of Pediatrics, David Geffen School of Medicine and Los Angeles Biomedical Research Institute at Harbor–UCLA Medical Center, University of California, Los Angeles

• Tina Palmieri, M.D., FACS, FCCM

Director and Professor, Firefighters Burn Institute Regional Burn Center, UC Davis Health

Assistant Chief of Burn Surgery, Shriners Hospitals for Children–Northern California

• Stella Fogleman, R.N., M.S.N./M.P.H., CNS

Director, Emergency Preparedness and Response Division, Los Angeles County Department of Public Health (*Remote*)

12:30 PM LUNCH (Boxed lunches available free of charge for meeting attendees)

Session VIII Work Upfront: The Impact of Mitigation and Preparedness

1:30 PM *Moderator:* **Kenneth W. Kizer, M.D., M.P.H.**

Founding Director, Institute for Population Health Improvement, UC Davis Health

Distinguished Professor, School of Medicine and Betty Irene Moore School of Nursing, University of California, Davis Workshop Planning Committee Chair

Speakers:

• Nicole Errett, Ph.D., M.S.P.H.

Lecturer, Department of Environmental and Occupational Health, University of Washington School of Public Health

• Dave Shew, B.Arch.

Wildfire Field Representative, National Fire Protection Association Consultant, Wildfire Defense Works, LLC

• Michelle Medley-Daniel

Director, Fire Adapted Communities Network Deputy Director, The Watershed Research and Training Center

Session IX Further Reflections on What We Learned

3:00 PM *Moderator:* **Kenneth W. Kizer, M.D., M.P.H.**

Founding Director, Institute for Population Health Improvement, UC Davis Health

Distinguished Professor, School of Medicine and Betty Irene Moore School of Nursing, University of California, Davis Workshop Planning Committee Chair

Speakers:

• Wayne Jonas, M.D.

Executive Director, Samueli Integrative Health Programs Practicing Family Physician

• David Eisenman, M.D., M.S.H.S.

Director, Center for Public Health and Disasters, Fielding School of Public Health, University of California, Los Angeles

Professor-in-Residence, David Geffen School of Medicine and Fielding School of Public Health, University of California, Los Angeles

• Julie Baldwin, Ph.D.

Regents' Professor, Department of Health Sciences and Director, Center for Health Equity Research, Northern Arizona University

• Colleen M. Ryan, M.D., FACS

Professor, Department of Surgery, Harvard Medical School Staff Surgeon, Sumner M. Redstone Burn Center, Massachusetts General Hospital

Staff Surgeon, Shriners Hospitals for Children-Boston

• Winston Wong, M.D., M.S.

Medical Director, Community Health and Director, Disparities Improvement and Quality Initiatives, Kaiser Permanente

• Michelle Bell, Ph.D., M.S., M.S.E.

Mary E. Pinchot Professor of Environmental Health, Yale University School of Forestry and Environmental Studies

Closing Remarks

3:45 PM Kenneth W. Kizer, M.D., M.P.H.

Founding Director, Institute for Population Health Improvement, UC Davis Health Distinguished Professor, School of Medicine and Betty Irene Moore School of Nursing, University of California, Davis

Workshop Planning Committee Chair

4:00 PM ADJOURN

The National Academies of SCIENCES • ENGINEERING • MEDICINE

A Workshop on the Implications of the California Wildfires for Health, Communities, and Preparedness

The Western United States, particularly California, is experiencing an increase in the number and intensity of wildfires. According to the Sacramento Bee, large scale wildfires destroyed or damaged more than 10,000 structures in 2017, a higher total than the previous nine years combined. In November 2018, the Camp Fire killed at least 85 people and destroyed more than 18,000 structures, becoming California's deadliest and most destructive wildfire on record.

Wildfires and other, similar disasters are particularly difficult for vulnerable communities. They experience worse health outcomes, have fewer resources to respond and rebuild, and receive less assistance from state, local, and federal agencies. Disaster-related trauma adds to the health burden of people who experience a dangerous wildfires.

The National Academies of Sciences, Engineering, and Medicine will convene an ad hoc planning committee to plan a two day public workshop on the implications of the California Wildfires for health, communities, and preparedness, featuring invited speakers and discussants, to be held in California. The workshop will be hosted by four activities in the Health and Medicine Division – the Roundtable on the Promotion of Health Equity, the Forum on Medical and Public Health Preparedness for Disasters and Emergencies, the Roundtable on Population Health Improvement, and the Roundtable on Environmental Health Science, Research, and Medicine.

The workshop will be held on June 4-5 2019 in Sacrament, CA. Planning committee members include Kenneth W. Kizer, M.D., M.P.H., (Chair); Julie Baldwin, Ph.D.; Michelle Bell, Ph.D., M.S., M.S.E; Wayne E. Cascio, M.D., FACC, FAHA; David Eisenman, M.D., M.S.H.S.; Richard J. Jackson M.D., M.P.H., Hon. AIA, Hon. ASLA; Wayne B. Jonas, M.D.; Suzet M. McKinney, Dr.P.H., M.P.H.; and Winston Wong, M.D.

The planning committee will be responsible for the final agenda. However, the workshop's objectives will include:

- 1) Assist in the identification of the current scale and probability of subsequent wildfires in high risk regions in the West, including but not exclusively in the state of California
- 2) Describe and define potential disproportionate deleterious outcomes on vulnerable populations in the geographic areas identified
- 3) Explore the residual and chronic health consequences resulting from wild fires, including respiratory and cardiovascular disease caused by released atmospheric particulate matter, housing displacement, and post traumatic psychological distress
- 4) Identify challenges resulting from the increased scale and population of the urban-wildland interface, and explore opportunities to increase community and individual preparedness in the face of the wildfire threat
- 5) Suggest opportunities for improved institutional and government actions and steps to mitigate the adverse and disproportionate impact of wildfires on vulnerable populations, including community preparedness, resilience and capacity building before, during, and after wildfires.

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Implications of the California Wildfires for Health, Communities, and Preparedness:

A Workshop
June 4–5, 2019

Speaker and Planning Committee Biosketches

Speakers:

John R. Balmes, M.D., received his medical degree from Mount Sinai School of Medicine in 1976. After internal medicine training at Mount Sinai and pulmonary subspecialty, occupational medicine, and research training at Yale, he joined the faculty of University of Southern California in 1982. He joined the faculty at University of California, San Francisco in 1986 and is currently Professor and Division Chief of Occupational and Environmental Medicine at San Francisco General Hospital (SFGH). His major academic activities include his research laboratory, several collaborative epidemiological research projects, various advisory and editorial committees, and direction of the clinical occupational/environmental medicine division at SFGH. Dr. Balmes' laboratory, the Human Exposure Laboratory (HEL), has been studying the respiratory health effects of various air pollutants for the past 27 years. Recently, the HEL has been focusing on the airway inflammatory effects of ozone, secondhand tobacco smoke, and wood smoke. The HEL was the first group to demonstrate a) histological evidence of ozoneinduced airway injury and inflammation in human subjects, b) that asthmatic subjects have greater inflammatory responses to ozone than normal subjects, c) that ozone-induced inflammatory responses in normal subjects attenuate with short-term exposures on consecutive days in the lung, and d) that asthmatic subjects recruit macrophages to the airways with consecutive day exposures. The lab is currently studying the impact of a genetic polymorphism of the antioxidant enzyme, Glutathione-S-transferase M1, on the susceptibility of asthmatic subjects to ozone. The lab is is also studying the relationship of acute airway inflammatory responses to acute cardiovascular responses after both ozone and secondhand tobacco smoke. Dr. Balmes collaborates on several epidemiological projects that are run out of the UC Berkeley School of Public Health where he is a Professor of Environmental Health Sciences. One such project is called the Children's Health and Air Pollution Study (CHAPS). The overall specific goal of CHAPS is to assess the impact of air pollution on the health of children living in the San Joaquin Valley, including adverse effects on immune function that may increase the risk of asthma onset and exacerbation. A second project involves study of the effects of biomass smoke exposure on chronic respiratory health of children and adult women in rural Guatemala. A third line of research involves the effects of arsenic in drinking water on lung health in both Bangladesh and Chile. Yet another project involves the effect of chronic exposure to hydrogen sulfide on lung function in Rotorua, NZ.

Howard Backer, M.D., M.P.H., FACEP, is the Director of the California Emergency Medical Services Authority (EMSA) where he leads the department in establishing and enforcing standards for EMS personnel, coordinating with local EMS systems, overseeing the development of statewide care systems, and preparing for and responding to disasters. Dr. Backer previously served for ten years at the California Department of Public Health (CDPH) where he held a variety of assignments including Chief of the Immunization Branch and Interim Director and

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Interim State Health Officer. From 2008 to 2011, Backer was Associate Secretary for Emergency Preparedness at the California Health and Human Services Agency where he worked closely with EMSA, CDPH, the Department of Social Services and other CHHS departments on plans to coordinate public health and medical disaster response as well as mass care and shelter issues. In that capacity, he served as consultant to the Ukrainian Ministry of Emergencies and was part of a delegation to Chile following the devastating 2010 earthquake there. He will continue to coordinate the development of Emergency Function 8 (Public Health and Medical) for the California State Emergency Plan. Prior to government service, Dr. Backer practiced emergency medicine full-time for 25 years in rural, urban, and suburban settings. He received a Doctor of Medicine from the University of California at San Francisco, a Master of Public Health from the University of California at Berkeley, a Bachelor of Science from the University of Michigan, and is board certified in Emergency Medicine, Preventive Medicine, and Public Health. He continues to work clinical hours in Urgent Care at the UC Berkeley Student Health Center.

Oscar Chavez is the Assistant Director of Human Services for the County of Sonoma. Prior to joining the county, Mr. Chavez served as Executive Director of the Community Action Partnership of Sonoma County, one of the largest community benefit organizations in Northern California. While living in Bakersfield, CA, he was Director of Business Support Services and Director of Engagement and Public Relations for a large community-based organization. In his current capacity, Mr. Chavez oversees the County's Upstream Investments Initiative—a policy framework designed to strengthen our community's ability to implement evidence-informed practices and shift funding toward prevention. He is also responsible for the Human Services Department's planning, research and evaluation functions, as well as community and client engagement. Mr. Chavez serves as board president of Latino Service Providers; chair of Sonoma County Community Development Commission; board member of Community Foundation Sonoma County; board co-chair of California Stewardship Network, a statewide effort to promote regional collaboration and stewardship; and as a steering committee member of Rise Together, a nine-county Bay Area initiative committed to ending poverty. In 2018, Mr. Chavez served as steering committee co-chair for the California Economic Summit, as statewide event that brought together a broad and diverse network of business, equity, environmental, and civic organizations to craft strategies to improve upward mobility, build more housing, create a strong workforce, and strengthen the state's water sustainability. In 2016, Mr. Chavez was honored by Hispanics in Philanthropy, a network of nonprofits, corporations, foundations, and individuals dedicated to addressing poverty issues, identifying solutions, and mobilizing Latinx communities in the U.S. and Latin America. In 2012, he received the Sonoma County Jefferson Award and the North Bay Business Journal Non-Profit Leadership Award. In 2008, he was named one of the North Bay's "40 Under 40" leaders by the North Bay Business Journal. Mr. Chavez lives in Windsor with his wife, Christine, and their four children.

Nicole Errett, Ph.D, M.S.P.H., is a Lecturer in the Department of Environmental and Occupational Health at the University of Washington School of Public Health. Her research interests and expertise are in the use of public policy to enhance health outcomes during and after disaster. Dr. Errett co-founded and co-directs the ColLABorative on Extreme Event Resilience (CEER), a network of public health researchers, practitioners and community scientists who collaborate to address real world challenges that impact our communities' resilience to disasters and the acute impacts of climate change. Her commitment to community relevant, translatable

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research is grounded in nearly a decade of practical experience in public health and healthcare emergency preparedness and management. She previously served as the Special Assistant to the Assistant Secretary of Preparedness and Response at the U.S. Department of Health and Human Services, the Policy and Legislative Director at the Baltimore City Mayor's Office of Emergency Management, and the Evaluation and Assessment Manager at the Northwest Healthcare Response Network. Dr. Errett holds a Ph.D. in Health and Public Policy, an MSPH in Health Policy, and a BA in Public Health Studies from the Johns Hopkins University in Baltimore, MD. She completed post-doctoral training in coastal community resilience at the University of British Columbia's School of Community and Regional Planning in Vancouver, BC. Dr. Errett is a Robert Wood Johnson Foundation New Connections Scholar and a 2018 National Academies Gulf Research Program Early-Career Research Fellow.

Genevieve Flores-Haro, M.P.A., serves as the Associate Director for the Mixteco/Indigena Community Organizing Project, a nonprofit serving Ventura County's indigenous immigrant community. In this capacity, she oversees grant writing, donor development and special events. In addition to supporting the organization's policy priorities, she also supervises programs specific to health advocacy, mental health and domestic violence, including two multi-year mixed methods research studies. Ms. Flores-Haro received her Bachelor's degree in Psychology and her Master's in Public Administration from the University of Southern California. She currently sits on the Board of Directors for Ventura County's local LGBT organization Diversity Collective, and is a Member-At-Large for the Ventura County Women's Political Council. In 2017 she was awarded the Ventura County Democratic Party's Chris Lanier Community Activist Award. Her interests include community building, playing guitar and traveling. She and her wife Sade live in Oxnard with their dog Nena.

Stella Fogleman, RN, M.S.N./M.P.H., CNS, has been working for the Los Angeles County Department of Public Health for nearly 18 years. She is the Director of the Emergency Preparedness and Response Division (EPRD), and leads readiness activities to prepare for emerging threats and natural disasters as well as acts of biological, radiological, and chemical terrorism. EPRD encompasses several important areas, including threat assessment, policy and planning, community resilience, emergency operations, and finance and administration. Ms. Fogleman began her professional career as a pediatric staff nurse at Miller Children's Hospital in Long Beach, then went to L.A. County as a district public health nurse at the Hollywood-Wilshire Health Center. From there, she was promoted to assistant program specialist at the Toxics Epidemiology Program, where she worked with an interdisciplinary team to assess patterns of disease related to toxic agent exposures throughout L.A. County. Prior to her current role, Ms. Fogleman was the Director of EPRD's Community Resilience Unit, aimed at increasing community preparedness and resilience among LA County populations. She received her B.S.N., M.S.N, and M.P.H. at Cal State University, Long Beach, where she also received her certification as a Clinical Nurse Specialist in Community Health.

Don Hankins, Ph.D., is a Professor of Geography and Planning at California State University, Chico. He has a B.S. in Wildlife, Fish, and Conservation Biology and a Ph.D. in Geography from the University of California, Davis. His interests and expertise is in the following areas: pyrogeography, ecohydrology, landscape ecology, intervention ecology, conservation, environmental policy and Indigenous stewardship. Dr. Hankins has been involved in various

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aspects of environmental planning, stewardship, conservation, and regulation for a variety of organizations and agencies including federal and tribal governments. Drawing from his academic and cultural knowledge, he is particularly interested in Indigenous traditional knowledge and policy and their application as a keystone process to aid in conservation and stewardship. He has published several articles specific to Indigenous prescribed fire and the social dynamics of colonization on cultural burning. Amongst other projects, his current research includes longitudinal studies of fire effects on biodiversity, cultural resources and hydrology and overall environmental resiliency in riparian forests, oak woodlands, and meadows in California and Eucalypt and tea tree woodlands in the Cape York Peninsula, Australia. These projects involve working with local Indigenous communities in the respective areas in order to achieve a broader framework of collaborative stewardship and learning. Dr. Hankins has also been active in policy related to Indigenous stewardship particularly as related to fire and water management.

Benjamin Houlton, Ph.D., studied chemistry (B.S.) and environmental engineering (M.S.) before receiving his doctorate in ecology and evolutionary biology from Princeton University in 2005. He then spent two years working as a postdoctoral scholar at Stanford University and the Carnegie Institution for Science, Department of Global Ecology, where he also forged collaborations with CSIRO's Division of Marine and Atmospheric Research in Australia. Currently, a Professor of Global Environmental Studies at the University of California, Davis, Dr. Houlton holds the distinction of Chancellor's Fellow and was recently appointed Director of the John Muir Institute of the Environment. Dr. Houlton's research interests include ecosystem processes, climate change and the growing risks of human alterations to the global carbon, nitrogen, phosphorus cycles for enhanced energy and food production. At the John Muir Institute of the Environment, he catalyzes research discovery across more than 300 faculty-experts from all of UC Davis's colleges and professional schools with the goal of devising innovative solutions to the environmental sustainability challenges of the 21st century. Most recently, Dr. Houlton has been spear-heading the new "OneClimate" initiative, which envisions a interdisciplinary, team-based approach to reduce greenhouse gas pollution and help people and ecosystems adapt to an uncertain climate future. Dr. Houlton's research has appeared in leading scientific journals such as Science, Nature, Nature Climate Change, and the Proceedings of the National Academy of Sciences and been covered by news media including Newsweek, New York Times, Scientific American, The Christian Science Monitor, Discovery News, MSNBC/Today, and BBC's The Naked Scientists. He has appeared as a guest on NPR's Morning Edition, MSNBC's All In with Chris Hayes, and local TV and radio shows.

Irva Hertz-Picciotto, Ph.D., is Director of the NIH-funded UC Davis Environmental Health Sciences (EHS) Center; and Professor in the Department of Public Health Sciences, School of Medicine, UC Davis. She is an internationally renowned environmental epidemiologist with over 300 scientific publications addressing environmental exposures, including metals, pesticides, air pollutants and endocrine disruptors, their interactions with nutrition, social factors and genetics, and their influences on pregnancy, the newborn, and child development. Over the last 15 years, she has built a comprehensive research program on the environmental causes for autism, which has produced seminal papers on the links with pesticides, traffic-related air pollution, low periconceptional folic acid intake, and untreated fever during pregnancy. The EHS Center that she directs fosters collaborations across disciplines as diverse as molecular biology, public health, pulmonology, engineering, chemistry and sociology to identify key drivers of

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environmentally induced disease and disability, and partners with government agencies and community organizations to develop interventions that can reduce the harmful exposures and improve health. Dr. Hertz-Picciotto has held appointments on numerous state and national advisory panels to organizations such as the U.S. Environmental Protection Agency, NIH National Toxicology Program, California Air Resources Board, and California Proposition 65 Carcinogen Identification Committee. She chaired three National Academy of Sciences, Engineering, and Medicine Panels, mentored 75 pre- and post-doctoral trainees, taught epidemiologic methods on four continents, and in 2011, received the Goldsmith Lifetime Achievement Award by the International Society for Environmental Epidemiology. Recently she co-founded Project TENDR (Targeting Environment and Neuro-Developmental Risks), a collaborative effort of scientists, clinicians, policy-makers and advocates that aims to decrease the incidence of neurodevelopmental disorders by reducing neurotoxicant exposures that contribute to them.

Liane Jollon, RN, M.A., earned her nursing degree in Durango, Colorado and joined San Juan Basin Public Health (SJBPH) as a clinic nurse in 2010, subsequently serving as a clinic manager and Health Services Division director. She was named the Executive Director of SJBPH in August 2013. Liane completed a Master of Arts in Security Studies from the Center for Homeland Defense and Security at the Naval Postgraduate School where she is focused on equity in the emergency management field. A native New Yorker with a B.A. in history and sociology from Columbia University, Ms. Jollon worked in local and statewide non-profits in Colorado for over 15 years prior to joining the field of public health. Her experiences ranged from delivering direct services to board positions and leadership roles. Many of these roles were focused on health of children and families including housing, violence prevention, economic development, and access to healthcare. In addition to local public health, Ms. Jollon's recent roles include serving as a board member for organizations including federally qualified health centers and community mental health, the Denver Foundation's Colorado Health Access Fund, Colorado Association of Local Public Health Officials, and Colorado Department of Public Health and Environment's Cancer, Cardiovascular and Pulmonary Disease Grants Program. Ms. Jollon was also named a member of the Aspen Institute's inaugural class of the Colorado Children and Families Health and Human Services Fellowship.

Megan Kurtz, M.A., joins the Civic Engagement team for the Spring 2019 semester as a partnership between OCE & the Office of the President at California State University, Chico. Ms. Kurtz is the Camp Fire–Campus Liasion. She worked in the TRIO Program in Student Affairs for eleven years and is currently faculty in Recreation, Hospitality, and Parks Management.

David Lubarsky, M.D., M.B.A., is the vice chancellor of human health sciences and chief executive officer for UC Davis Health, a nationally ranked leader in health care education, research and patient care. He oversees UC Davis Health's academic, research and clinical programs, including the School of Medicine, the Betty Irene Moore School of Nursing, the 1,000-member physician practice group, and UC Davis Medical Center, a 625-bed acute-care hospital. With roughly 14,000 employees, nearly 1,000 students, an annual operating budget of \$3 billion, approximately \$300 million in extramural research funding, and around one million outpatient visits each year, UC Davis Health is a major contributor to the health and economy of

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the Sacramento region and is a center of biomedical discoveries that help advance health around the world. Before joining UC Davis, Dr. Lubarsky served for six years as the chief medical officer and systems integration officer at the University of Miami Health System (UHealth). Previous transformational roles held by Dr. Lubarsky include serving as the first CEO of the UHealth Physician Practice, where he prioritized superior patient care and health education, optimal financial performance, and research as a core academic mission. He drove the largest annual growth (17% clinic visits, 26% procedures) in the history of the university, and positioned the \$2 billion University of Miami hospital system for risk assumption. As senior associate dean for safety, quality and risk prevention from 2007 to 2011, Dr. Lubarsky drove system malpractice costs down by 80%, saving \$100 million annually. Committed to academics as well as leadership, he served from 2001 to 2018 as the Emanuel M. Papper Professor and Chairman of the Department of Anesthesiology, Perioperative Medicine and Pain Management at the University of Miami's Miller School of Medicine, reinvigorating the largest anesthesia training program in the world, with 132 interns, residents and fellows, and 60 student nurse anesthetists. In addition to covering a dozen OR suites and more than 100,000 anesthetics annually, the department ran a heralded Center for Patient Safety dedicated to reducing patient harm through simulation and team training, which was hailed as one of the finest academic anesthesia training programs in the nation. Dr. Lubarsky also was a professor at the University of Miami's School of Business, serving in both health sector policy and management and the Department of Management, teaching population health, behavioral economics, physician behaviors, patient safety, negotiations and incentive plans. From 1988 to 2001, Dr. Lubarsky was a tenured professor and vice chair of anesthesiology at Duke University, and adjunct professor at Duke's Fugua School of Business from 1999 to 2002. With more than 100 peer-reviewed publications and hundreds of invited lectures, Dr. Lubarsky is noted for his contributions to health care economics, informatics and OR management, having published several articles defined as landmark contributions. Dr. Lubarsky earned his Bachelor of Arts in history (1980) and medical degree (1984) at Washington University in St. Louis. He graduated in the first class of the university's Scholars Program in Medicine. He completed an anesthesia residency and a fellowship in cardiovascular anesthesia and clinical research at New York University Medical Center. He received his M.B.A. (1999) from the Fugua School of Business at Duke University and was honored as a Fuqua Scholar, graduating at the top of his class

Byron R. Mason, M.A., is the Deputy Director of the Administration for Children and Families' (ACF) Office of Human Services Emergency Preparedness and Response (OHSEPR), which is responsible for leading disaster human services preparedness, response and recovery planning, and operations for the Department of Health and Human Services (HHS). In this role, Mr. Mason is currently leading field operations to provide disaster case management services to disaster survivors in Butte County in response to the 2018 Camp Fire in Paradise, California. Prior to joining ACF, Mr. Mason was a member of HHS' Division of Recovery where he served as the health and social services recovery field coordinator for federal interagency coordination and disaster recovery operations following Hurricanes Irma, Lane, Matthew, Michael, and Sandy, as well as Typhoon Dolphin and tornadoes in Kentucky, Mississippi, and Oklahoma. Mr. Mason has also served as HHS' recovery coordinator in response to the Flint Water Crisis. In 2018, Mr. Mason led the Human Services Branch to support the disaster human services recovery needs of Puerto Rico following Hurricane Maria. Prior to joining HHS, Mr. Mason worked in FEMA's Public Assistance Directorate's Regulations and Policy Branch and staffed the National

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Response Coordination Center as the Infrastructure Support Branch Director during the 2007 California Wildfires, in advance of Hurricane Dolly, and following the 2009 tsunami in American Samoa. Mr. Mason led recovery field operations following the 2008 Cedar Rapids, Iowa flooding; and Hurricanes Gustav and Ike in Louisiana and Texas. In addition to leading field operations, he led the development of debris management policies, guidance, training and exercises. Prior to joining the federal government, Mr. Mason worked at the National Academy of Sciences. Mr. Mason earned a B.A. in Anthropology at the University of Florida and a M.A. at the George Washington University.

Andy Miller, M.D., was raised in Chico, California, and attended California State University, Chico, where he graduated in Instructional Technology and Computer Science in 1989. He worked as a computer consultant in Chicago and Seattle and as the director of a medical software company in San Francisco. He received his Doctor of Medicine degree from the University of California, San Diego, in 1999 and graduated from the University of California, Davis residency program in Redding in 2002. He is Board Certified in Family Practice and has been a Fellow in the American Academy of Family Physicians since 2002. Dr. Miller spent 12 years as UC Davis volunteer faculty teaching family practice residents in both the inpatient and outpatient settings. Dr. Miller returned to Chico as a Family Practice Physician with Northern Valley Indian Health (NVIH) beginning in 2002. He served as Medical Director for NVIH from 2008 until his departure in October of 2016 to take the position of Butte County Public Health Officer.

Lisa Miller, Ph.D., is a professor in the Department of Anatomy, Physiology, and Cell Biology at the University of California, Davis School of Veterinary Medicine. She is also the associate director of the California National Primate Research Center. Dr. Miller's research program is focused on investigating the impact of environmental exposures (air pollution, allergens, microbes) on pulmonary and immune system development during the first year of life. She uses both cell culture approaches and animal models to address questions related to mucosal immune mechanisms in pediatric populations, with an emphasis on understanding the etiology of childhood asthma and susceptibility to infectious disease.

Michelle Medley-Daniel is Deputy Director of the Watershed Research and Training Center and Director of the Fire Adapted Communities Network. A Hayfork-local, she is proud to be contributing to the vitality of her hometown through her work at the Watershed Center. She also works as the Co-Director of the Fire Adapted Communities Network. In this role, she works alongside partners at The Nature Conservancy to direct the operations of a national network of communities learning to live better with wildfire. In particular, Ms. Medley-Daniel's focus is on working with State and regional efforts to launch network-based approaches to wildfire resilience. She has a background in studio art and English, and has over ten years of experience coordinating networks and providing communications and development services to non-profits.

Kathleen Navarro, Ph.D., M.P.H., is a forest planning specialist in the U.S. Forest Service and is qualified as a wildland firefighter. She has evaluated wildfire smoke exposure (particulate matter, carbon monoxide, and polycyclic aromatic hydrocarbons) for the public and wildland firefighters through direct monitoring at wildfires. Currently, she is using field collected smoke exposure measurements to estimate risk of lung cancer and cardiovascular mortality for wildland firefighters. Dr. Navarro completed her Ph.D. in the Environmental Health Sciences at the UC

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Berkeley School of Public Health, where she also completed her M.P.H. degree in 2011. Her dissertation combined traditional methods of exposure assessment with new approaches to evaluate exposures in ambient community and occupational settings to air contaminants commonly emitted from wildfires. She has a Bachelor of Science degree in Environmental Toxicology from UC Davis.

Tina Palmieri, M.D., FACS, FCCM, is Assistant Chief of Burn Surgery at Shriners Hospital for Children-Northern California, and Director of the Firefighters Burn Institute Regional Burn Center, UC Davis Health. Dr. Palmieri treats patients with acute burn injury, inhalation injury and soft tissue disorders (toxic epidermal necrolysis, meningococcemia, traumatic tissue loss). The burn center treatment philosophy is a team approach: professionals from multiple disciplines (nursing, respiratory therapy, nutrition, occupational therapy, physical therapy, child life, psychologists and pharmacists) working together to assure that each patient obtains the best outcome possible. Dr. Palmieri's research focus is analysis of outcomes after burn injury, including both the immediate physical and long-term psychological effects of burn injury on patient quality of life. Dr. Palmieri is also Director of the burns data coordination center at UC Davis. She has received funding from the Department of Defense to study the impact of limiting blood transfusions on burn survival and infection rates. In addition, she studies how the body deals with acute burn stress (the hypothalamic-pituitary-adrenal response) after burn injury and the long-term psychosocial impact of burn injury in both children and the elderly. Dr. Palmieri is one of the leaders of the Burn Multicenter Trials Group, which brings burn centers together to share information and to perform meaningful outcomes research. Dr. Palmieri is nationally and internationally known by her participation on the American Burn Association Board of Trustees and International Association of Fire Fighters Burn Foundation Board of Medical Advisors.

Ana Rappold, Ph.D., is a statistician with the U.S. Environmental Protection Agency's National Health and Environmental Effects Research Laboratory. She is a scientific lead of the project aimed to integrate public health messaging with environmental models and understanding their effectiveness to reduce burden in populations. She has conducted a number of clinical and epidemiological research studies of health effects from air pollution and has authored a number of studies specific to smoke impacts on health.

Colleen Reid, Ph.D., M.P.H., is an assistant professor in the Department of Geography at the University of Colorado Boulder. Her research focuses on the health impacts of wildfire smoke exposure and how environmental and social exposures interact to influence health. Dr. Reid received her M.P.H. and Ph.D. in Environmental Health Sciences from the University of California, Berkeley and did her post-doctoral training at Harvard University as a Robert Wood Johnson Foundation Health and Society Scholar.

Heather Riden, M.A., is the manager of the Western Center for Agricultural Health and Safety at the University of California, Davis. She has over 15 years of experience in leadership roles advancing programs that advocate for the health of vulnerable populations. Currently, Ms. Riden's focus is on occupational health and the safety of the agricultural workforce.

Annie Schmidt is a strategic advisor for the Washington State Fire Adapted Communities Learning Network as well as the Public Affairs Officer for Chelan County Fire District 3 in

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Leavenworth, Washington. Ms. Schmidt has worked in the environmental field for the past 15 years (including five years as the Director of the Chumstick Wildfire Stewardship Coalition). She is the co-author of the National Forest Foundation publication "A Roadmap for Collaboration Before, During and After the NEPA Process" which has been distributed to Forest Service units and collaborative groups across the nation. Ms. Schmidt is passionate about sharing fire adapted communities concepts and particularly enjoys teaching the Wildland Urban Interface: Fire Adapted Communities course at the National Fire Academy in Emmittsburg, Maryland. Ms. Schmidt's other areas of interest include the integration of FAC principles into Incident Management Team operations, the development of business wildfire resilience, and post-fire recovery. Her recent work includes assisting with the development of the Washington State Fire Adapted Communities Learning Network.

Dave Shew, B.Arch., is a consultant at Wildfire Defense Works, LLC and a wildfire field representative with the National Fire Protection Association. Mr. Shew is recently retired from the California Department of Forestry and Fire Protection. He has expertise in land use planning, community wildfire preparedness, structural resiliency, vegetation treatment projects, and mapping and data analysis. He received his Bachelor of Architecture degree from the University of Cincinnati.

Merritt D. Schreiber, Ph.D., is a professor of clinical pediatrics at Harbor–UCLA Medical Center and the David Geffen School of Medicine at the University of California, Los Angeles. He is on staff in the Trauma Program at CHOC Children's Hospital. Dr. Schreiber is mental health module coordinator for the European Master of Disaster Medicine Program. Dr. Schreiber also serves as subject matter expert for the Department of Homeland Security Interagency Advisory Board on first responder issues in terrorism and disaster response and FBI Victim Services Division Children and Mass Violence working group. Dr. Schreiber's current work is focused on the development models of stepped continuum of mental health care health in mass casualty disasters, terrorism and injury trauma for both adults and children in a public health context, and enhancing disaster medical responder resilience to large and small events. Dr. Schreiber created the PsySTART Rapid Mental Health Triage and Incident Management System for rapid identification of at risk victims and emergency responders in mass casualty events. He is the originator of a novel community resilience–focused psychological first aid program called "listen, protect, and connect". He is also the developer of "anticipate, plan, and deter," a disaster responder resilience system. Dr. Schreiber developed the National Children's Disaster Mental Health Concept of Operations with the National Child Traumatic Stress Network's Terrorism Disaster Center for use by cities, counties, and states to prepare and respond to the needs of children. Previously, Dr. Schreiber was reserve Captain(O-6) in the USPHS. As a USPHS reserve officer, he was also activated to the emergency operations center for the Southeast Asian tsunami and Hurricane Katrina. Dr. Schreiber was deployed by the Department of Health and Human Services to the Sandy Hook school shooting and the Boston Marathon bombing. He also trained medical teams for the U.S. Public Health Service (USPHS) Ebola response to Africa. Dr. Schreiber is a member of the California Disaster Mental Health Coalition and chair of the Disaster Response Network for the California Psychological Association. He is a member of the California Department of Health, Emergency Preparedness Office Advisory Committee. He received the California Psychological Association Distinguished Humanitarian Contribution Award and a presidential citation from the American Psychological Association for his work in

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the aftermath of the 9/11 terrorist attacks. Dr. Schreiber received the Crisis Response Award, Outstanding Unit Citation and Special Commendation from the Surgeon General for his development of USPHS inaugural disaster response team training curricula.

Lauren Thie, M.S.P.H., is an environmental program consultant for the North Carolina Department of Health and Human Services and serves as Principal Investigator for the Climate and Health Program cooperative agreement with the Centers for Disease Control and Prevention. Ms. Thie earned her Masters of Science in Public Health from the University of North Carolina at Chapel Hill's Gillings School of Global Public Health.

Deborah Ward, Ph.D., RN, FAAN, is the Dignity Health Dean's Chair for Nursing Leadership, interim dean, and a clinical professor at the Betty Irene Moore School of Nursing at UC Davis. As the first faculty member recruited to the school in September 2008, Ward is a passionate advocate for the encouragement and advancement of her students, as well as facilitating profound improvements in health and health care. Prior to this role, Dr. Ward served in a number of leadership positions including two years as chair of the Nursing Science and Health-Care Graduate Group and as associate dean for academics for the School of Nursing from 2009 to 2015. She played a critical role in the development of the school's graduate degree programs, while she also worked diligently to connect the new school with the Davis campus as well as the larger communities it serves. In 2017, Chancellor Gary S. May appointed her as a representative of UC Davis Health on the steering committee of the university's strategic planning effort, "To Boldly Go." Dr. Ward received her doctorate in Health Policy from Boston University in 1988 and a Master of Science in Nursing from Yale University School of Nursing in 1977. She earned a Bachelor of Arts in Government from Oberlin College in 1968. Dr. Ward secured grant funding for a variety of research and educational projects and is widely published, both in the United States and overseas, including Health Affairs and Nursing Outlook. She has received numerous awards and honors, including the Rheba de Tornyay Excellence in Undergraduate Teaching Award and the Award for Excellence in Graduate Teaching from the University of Washington School of Nursing, where she was an associate professor. She received the Distinguished Alumna Award from the Yale University School of Nursing and is a Fellow of the American Academy of Nursing. In 2010, she received the UC Davis School of Medicine Dean's Award for Excellence in Teaching. Dr. Ward was most recently honored in 2018 with UC Davis' James H. Meyer Distinguished Achievement Award.

Andrew J. Whelton, Ph.D., M.S., is an associate professor of civil engineering and environmental and ecological engineering at Purdue University. Dr. Whelton is passionate about conducting research to investigate and solve problems that affect our natural and built environments with an expertise in polymer science, analytical chemistry, food science, and nanoengineering.

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Planning Committee:

Kenneth W. Kizer, M.D., M.P.H., (*Chair*) is the founding Director of the Institute for Population Health Improvement and a Distinguished Professor in the University of California, Davis, School of Medicine and the Betty Irene Moore School of Nursing. He is an internationally respected health care leader whose diverse professional experience includes senior executive positions in the public and private sectors, academia, and philanthropy. He is an elected member of the National Academy of Medicine and the National Academy of Public Administration.

Dr. Kizer's positions over the years have included: founding President and CEO, National Quality Forum; Chairman, CEO and President, Medsphere Systems Corporation; Under Secretary for Health, U.S. Department of Veterans Affairs and CEO of the nation's largest healthcare system; Director, California Department of Health Services; and Director, California Emergency Medical Services Authority, where he was the architect of the state's EMS system in the early 1980s. He has served on the U.S. Preventive Services Task Force and as Chairman of The California Wellness Foundation, as well as on the governing boards of a number of managed care and health IT companies, foundations, professional associations and non-profit organizations. He has been an advisor to numerous foreign countries on health-related matters.

Dr. Kizer is an honors graduate of Stanford University and UCLA, the recipient of two honorary doctorates, and a fellow or distinguished fellow of 12 professional societies. He is board certified in six medical specialties and/or subspecialties, and has authored over 500 original articles, book chapters and other reports. He is a Fellow National of the international Explorer's Club, a founding member and architect of the international Wilderness Medical Society, a former Navy diving medical officer, and a recognized expert on aquatic sports and wilderness medicine. He also worked as a firefighter for two years early in his career.

His accomplishments have been recognized with dozens of awards, and he has been selected as one of the '100 Most Powerful People in Healthcare' by *Modern Healthcare* magazine on several occasions. His work has been featured in *Time*, *BusinessWeek*, *Fortune*, the *Wall Street Journal*, *New York Times* and numerous other magazines, newspapers, and national television shows.

Julie Baldwin, Ph.D., is the director of the Center for Health Equity Research and a Professor of Health Sciences at Northern Arizona University. From 1994-2004, Dr. Baldwin served as a tenured faculty member at Northern Arizona University, with a joint appointment in the Mel and Enid Zuckerman College of Public Health. She joined the faculty at the University of South Florida College of Public Health in the Department of Community and Family Health in 2005. She returned to Northern Arizona University in August 2015 to create the Center for Health Equity Research. Dr. Baldwin's research over the years has focused on both infectious and chronic disease prevention. Cross-cutting themes which have characterized her work include: utilizing community-based participatory research approaches, working with underserved and/or marginalized populations, and addressing health disparities by developing and implementing culturally competent public health interventions. As an enrolled member of the Cherokee Nation of Oklahoma, she has made a life-long commitment to serving diverse communities and to advocating for health promotion programs for children, adolescents and families. Dr. Baldwin earned her doctorate in Behavioral Sciences and Health Education in 1991 from the Johns Hopkins University School of Hygiene and Public Health.

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Michelle Bell, Ph.D., M.S., M.S.E., is the Mary E. Pinchot Professor of Environmental Health at the Yale University School of Forestry and Environmental Studies, with secondary appointments at the Yale School of Public Health, Environmental Health Sciences Division and the Yale School of Engineering and Applied Science, Environmental Engineering Program. Her research investigates how human health is affected by atmospheric systems, including air pollution and weather. Other research interests include the health impacts of climate change and environmental justice. Much of this work is based in epidemiology, biostatistics, and environmental engineering. The research is designed to be policy-relevant and contribute to well-informed decision-making to better protect human health and benefit society. She is the recipient of the Prince Albert II de Monaco / Institut Pasteur Award, the Rosenblith New Investigator Award, and the NIH Outstanding New Environmental Scientist (ONES) Award. Dr. Bell holds degrees from the Massachusetts Institute of Technology (B.S. in Environmental Engineering), Stanford University (M.S. in Environmental Engineering), and Johns Hopkins University (M.S.E. in Environmental Management and Economics and Ph.D. in Environmental Engineering).

Wayne E. Cascio, M.D., FACC, FAHA, is Director, National Health and Environmental Effects Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency (EPA). Over 24 years in academia at the University of North Carolina at Chapel Hill and East Carolina University, he engaged in clinical, research, teaching, and healthcare administrative activities. Prior to joining the EPA in 2011, Dr. Cascio worked to increase access to cardiovascular health care in underserved rural areas, and served on EPA's Clean Air Scientific Advisory Committee for Particulate Matter. While at the EPA, Dr. Cascio has helped focus research activities of the Office of Research and Development on public health relevant products. He has served as a leader in the Agency's research and public health guidance on the topic of wildfire smoke and health, and is a co-author of the 2016 Wildfire Smoke: Guide for Public Health Officials. He now serves as the EPA's liaison to NCER-ATSDR's Board of Scientific Counselors, and the National Academies of Sciences, Engineering, and Medicine's Roundtable on Environmental Health Sciences, Research, and Medicine. Dr. Cascio has authored or co-authored more than 180 journal articles and book chapters. He is a recipient of a 2013 EPA Gold Medal for Exceptional Service, a 2013 Office of Research and Development Impact Award, APHA's 2018 Homer N. Calver Award, and numerous Scientific and Technological Achievement Awards. Current research includes the study of the health effects of environmental pollutants informing risk assessment, risk-management decisions, and improvement of public health and quality of life through increased environmental health communication and literacy. Dr. Cascio earned a B.A. from Johns Hopkins University and an M.D. from the University of Maryland. He completed clinical training in internal medicine, and cardiovascular diseases at the University of North Carolina and post-doctoral training in electrophysiology at the Physiologisches Institut, Universität Bern, Switzerland. Dr. Cascio is a clinician-scientist and is board certified in internal medicine and cardiovascular diseases.

David Eisenman, M.D., M.S.H.S., is Professor-in-Residence at the David Geffen School of Medicine and the Fielding School of Public Health at the University of California, Los Angeles (UCLA), where he is the Director of the Center for Public Health and Disasters. Dr. Eisenman's training is in internal medicine, primary care, public health, and health services research. For over 15 years, Dr. Eisenman has been funded by the National Institutes of Health, National

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Science Foundation, National Institute of Justice, U.S. Forest Service, Centers for Disease Control and Prevention, Department of Homeland Security, the Assistant Secretary for Preparedness and Response, and Robert Wood Johnson Foundation. His research is focused on public health and disasters, climate change, refugee health, violence, and post-traumatic stress disorder. Recent studies investigated community resilience to disasters, the interactions of social factors and the built-environment on heatwave mortality and morbidity, the mortality associated with winter-time extreme heat in Los Angeles, organizational networks in disasters, behavioral responses to wireless emergency alerts, wildfires and mental health, improving treatment for post-traumatic stress disorder in public safety-net clinics, and evaluating programs for preventing violent extremism. He has authored over 100 peer-reviewed papers, chapters, and major reports related to disasters and emergencies. Dr. Eisenman has served on committees and expert panels for the National Academies of Sciences, Engineering, and Medicine; National Institute of Standards and Technology; National Institutes of Health; and national and international funding organizations. He was the Los Angeles County Department of Public Health Preparedness Science Officer for the Emergency Preparedness and Response Program from 2012 to 2016. Dr. Eisenman is also an Associate Natural Scientist at RAND, where he is a member of the Human Subjects Protection Committee. Dr. Eisenman is a credentialed physician for the Los Angeles County Emergency System for the Advance Registration of Volunteer Health Professionals Program. He holds a board certification in internal medicine and cares for patients at the UCLA Medical Center. Dr. Eisenman earned his B.A. from the University of Pennsylvania, his M.D. from the Albert Einstein College of Medicine and his M.S.H.S. from the Fielding School of Public Health at UCLA.

Richard J. Jackson, M.D., M.P.H., Hon. AIA, Hon. ASLA, was most recently Professor and Chair of Environmental Health Sciences at the Fielding School of Public Health at the University of California, Los Angeles. A pediatrician, he has served in many leadership positions in both environmental health and infectious disease with the California Health Department, including the highest as the State Health Officer. For nine years, Dr. Jackson was Director of the CDC's National Center for Environmental Health in Atlanta and received the Presidential Distinguished Service award. While in California, he helped establish the California Birth Defects Monitoring Program and state and national laws to reduce risks from pesticides, especially to farm workers and to children. While at CDC he established the national asthma epidemiology and control program, oversaw the childhood lead poisoning prevention program, and instituted the federal effort to "biomonitor" chemical levels in the US population. Dr. Jackson has received the Breast Cancer Fund's Hero Award, as well as Lifetime Achievement Awards from the Public Health Law Association, and the New Partners for Smart Growth. In October 2012, he received the John Heinz Award for Leadership in the Environment. Dr. Jackson lectures and speaks on many issues, particularly those related to built environment and health. He co-authored two Island Press Books: Urban Sprawl and Public Health in 2004 and Making Healthy Places in 2011. He is host of a 2012 public television series Designing Healthy Communities, which links to the J Wiley & Sons book by the same name published in October 2011. He has served on many environmental and health boards, as well as the Board of Directors of the American Institute of Architects. He is an elected honorary member of both the American Institute of Architects and the American Society of Landscape Architects. Dr. Jackson earned his M.D. from the University of California, San Francisco and his M.P.H. from the University of California, Berkeley. Dr. Jackson is a member of the National Academy of Medicine.

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Wayne B. Jonas, M.D., is a practicing family physician, an expert in integrative health and health care delivery, and a widely published scientific investigator. Dr. Jonas is the Executive Director of Samueli Integrative Health Programs, an effort supported by Henry and Susan Samueli to increase awareness of and access to integrative health. Additionally, Dr. Jonas is a retired Lieutenant Colonel in the Medical Corps of the United States Army. From 2001 to 2016, he was President and Chief Executive Officer of the Samueli Institute, a non-profit medical research organization supporting the scientific investigation of healing processes in the areas of stress, pain and resilience. Dr. Jonas was the Director of the Office of Alternative Medicine at the National Institutes of Health (NIH) from 1995 to 1999, and prior to that served as the Director of the Medical Research Fellowship at the Walter Reed Army Institute of Research. He is a Fellow of the American Academy of Family Physicians.

Dr. Jonas has led and participated in hundreds of research studies beginning with his time as Director of the National Institutes of Health Office of Alternative Medicine. While serving as CEO and President of the non-profit research organization Samueli Institute, his work set the bar for evidence-based research in the areas of pain, stress and human performance.

Dr. Jonas' new book, *How Healing Works*, was published in January 2018 by Ten Speed Press. His research has appeared in peer-reviewed journals such as *the Journal of the American Medical Association, Nature Medicine*, *the Journal of Family Practice*, *the Annals of Internal Medicine*, and *The Lancet*. Dr. Jonas received the 2015 Pioneer Award from the Integrative Healthcare Symposium, the 2007 America's Top Family Doctors Award, the 2003 Pioneer Award from the American Holistic Medical Association, the 2002 Physician Recognition Award of the American Medical Association, and the 2002 Meritorious Activity Prize from the International Society of Life Information Science in Chiba, Japan.

Suzet M. McKinney, Dr.P.H., M.P.H., is CEO/Executive Director of the Illinois Medical District, one of the largest urban medical districts in the United States. Dr. McKinney is the former Deputy Commissioner of the Bureau of Public Health Preparedness and Emergency Response at the Chicago Department of Public Health (CDPH), where she oversaw the emergency preparedness efforts for the Department and coordinated those efforts within the larger spectrum of the City of Chicago's Public Safety activities, in addition to overseeing the Department's Division of Women and Children's Health.

Dr. McKinney previously served as the Sr. Advisor for Public Health and Preparedness at the Tauri Group, where she provided strategic and analytical consulting services to the U.S. Department of Homeland Security's (DHS), BioWatch Program. Her work at DHS included providing creative, responsive and operationally based problem solving for public health, emergency management, and homeland security issues, specifically chemical and biological early detection systems and the implementation of those systems at the state and local levels.

Dr. McKinney serves on numerous boards, committees, and advisory boards, including the Board of Directors for Susan G. Komen Chicago, Thresholds, and the Fifth Third Bank Advisory Board. Dr. McKinney is Co-Chair of the National Academies of Sciences, Engineering, and Medicine (NASEM), Health and Medicine Division's Forum on Medical and Public Health Preparedness for Disasters and Emergencies and is a member of the NASEM Board on Health Sciences Policy. She also serves on the Science and Security Board for the Bulletin of the Atomic Scientists, the Board of Scientific Counselors for the U.S. Centers for

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Disease Control, Office of Public Health Preparedness and Response, as well as the Federal Emergency Management Agency's National Advisory Council. She has served as an Incident Commander for CDPH and was a member of Chicago's Incident Management Team. She has been responsible for leading multiple emergency response efforts, including Chicago's 2014-2015 Ebola response; the operational response to the 2009 H1N1 outbreak, which was successful in vaccinating nearly 100,000 residents over a six week timeframe; as well as CDPH's participation in the 2012 NATO Summit response and the 2010 Haiti Earthquake response.

Dr. McKinney has earned a reputation as an experienced, knowledgeable public health official with exceptional communication skills. She has served as an on-camera media expert on emergency issues including biological and chemical threats, natural disasters, pandemic influenza, and climate-related emergencies. A sought-after expert in her field, she has also provided support to the U.S. Department of Defense's Defense Threat Reduction Agency, lending subject matter expertise in biological terrorism preparedness to the country of Poland.

In academia, Dr. McKinney serves as an Instructor in the Division of Translational Policy and Leadership Development at Harvard University's T.H. Chan School of Public Health and as Adjunct Assistant Professor of Environmental and Occupational Health Sciences at the University of Illinois at Chicago School of Public Health. Additionally, she serves as a mentor for the Biomedical Sciences Careers Project, also at Harvard University. She is the co-author of the new text: *Public Health Emergency Preparedness: Practical Solutions for the Real World* (2018), and was named one of Chicago's Notable Women in Healthcare (2018).

Dr. McKinney holds her Doctorate degree from the University of Illinois at Chicago School of Public Health, with a focus on preparedness planning, leadership, and workforce development. She received her Bachelor of Arts in Biology from Brandeis University, where she was also a Howard Hughes Medical Institute Fellow. She received her Master of Public Health degree (Health Care Administration) and certificates in Managed Care and Health Care Administration from Benedictine University.

Winston Wong, M.D., M.S., is Medical Director of Community Health and Director of Disparities Improvement and Quality Initiatives at Kaiser Permanente. In this role, he is responsible for developing and cultivating partnerships with communities and agencies in advancing population management and evidence based medicine, with a particular emphasis on safety-net providers and the elimination of health disparities. His background includes leadership roles in community health, government, and health plan delivery. From 1993 to 2003, Dr. Wong was a Commissioned Officer of the U.S. Public Health Service, serving as both the Chief Medical Officer for the Health Resources and Services Administration, Region IX, and its Director of California Operations. He achieved the rank of Captain, and was awarded the Outstanding Service Medal from the U.S. Department of Health and Human Services. A boardcertified family practitioner, and bilingual in Cantonese and Toisanese dialects, Dr. Wong continues a small clinical practice at Asian Health Services, a federally qualified health center in Oakland, California, where he served previously as Medical Director. Dr. Wong has served on a number of state and national advisory groups addressing issues in cultural competence, health care access, and improving health care for vulnerable populations. Dr. Wong co-chaired the National Quality Forum's initiative for "Measuring and Reporting Cultural Competency" for health care organizations, and currently serves on the National Academies of Sciences, Engineering, and Medicine's Roundtable on Health Literacy, Board on Population Health and Public Health Practice, and Roundtable on the Promotion of Health Equity. He is also Chair of

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the National Council of Asian and Pacific Islander Physicians and Board member of Grantmakers in Health, as well as the California Endowment. Dr. Wong earned his medical degree from the University of California, San Francisco and his master's and undergraduate degrees at the University of California, Berkeley.

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Implications of the California Wildfires for Health, Communities, and Preparedness: A Workshop

June 4-5, 2019

Readings and Resources

* NOTE: These select readings and resources are intended to provide a sampling of the material available on topics covered during the workshop.

Session 1: California Wildfires: Past and Present

Ferrer, B. 2019. Climate change, wildfires, and how public health leaders can rise to the challenge. In *Health Affairs Blog*. https://www.healthaffairs.org/do/10.1377/hblog20190509.680050/full (accessed May 20, 2019).

Gorman, A., and A. B. Ibarra. 2018. In parts of California blanketed with wildfire smoke, breathing is "a chore". *NPR* (National Public Radio), August 10. https://www.npr.org/sections/health-shots/2018/08/10/637704465/in-parts-of-california-blanketed-with-wildfire-smoke-breathing-is-a-chore (accessed January 18, 2019).

Guarino, B., Z. Stone, and S. Morrar. 2018. California's deadliest wildfire is also a massive air-quality problem. *The Washington Post*, November 14. <a href="https://www.washingtonpost.com/nation/2018/11/15/californias-deadliest-wildfire-is-also-deadliest-wildfi

massive-air-quality-problem/?utm_term=.3853a1397607 (accessed January 18, 2019).

Liu, Y., S. Goodrick, and W. Heilman. 2014. Wildland fire emissions, carbon, and climate: Wildfire–climate interactions. *Forest Ecology and Management* 317:80–96.

Office of Environmental Health Hazard Assessment. 2019. 2018 indicators of climate change in California: Wildfires. https://oehha.ca.gov/epic/impacts-biological-systems/wildfires (accessed April 15, 2019).

Schoennagel, T., J. K. Balch, H. Brenkert-Smith, P. E. Dennison, B. J. Harvey, M. A. Krawchuk, N. Mietkiewicz, P. Morgan, M. A. Moritz, R. Rasker, M. G. Turner, and C. Whitlock. 2017. Adapt to more wildfire in western North American forests as climate changes. *Proceedings of the National Academy of Sciences* 114(18):4582–4590.

Sommers, W. T., R. A. Loehman, and C. C. Hardy. 2014. Wildland fire emissions, carbon, and climate: Science overview and knowledge needs. *Forest Ecology and Management* 317:1–8.

Session 2: Populations Impacted by Wildfires

California Department of Public Health. 2019. *Climate change and health equity: Issue brief.* Office of Health Equity.

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Davies, I. P., R. D. Haugo, J. C. Robertson, and P. S. Levin. 2018. The unequal vulnerability of communities of color to wildfire. *PLoS One* 13(11):e0205825.

Ibarra, A. B. 2018. Low-income Californians feel twice the burn from wildfires. *Kaiser Health News,* September 4. https://khn.org/news/low-income-californians-feel-twice-the-burn-from-wildfires/ (accessed January 18, 2019).

Paquette, D. 2018. During California's wildfires, farmworkers say they felt pressure to keep working or lose their jobs. *The Washington Post*, November 20.

https://www.washingtonpost.com/business/economy/during-california-wildfires-farm-workers-felt-pressured-to-keep-working-or-lose-their-jobs/2018/11/20/757f92a0-ec06-11e8-baac-2a674e91502b_story.html?utm_term=.1241e7968d4a_(accessed January 18, 2019).

Poudyal, N. C., C. Johnson-Gaither, S. Goodrick, J. M. Bowker, and J. Gan. 2012. Locating spatial variation in the association between wildland fire risk and social vulnerability across six southern states. *Environmental Management* 49(3):623–635.

Rappold, A. G., J. Reyes, G. Pouliot, W. E. Cascio, and D. Diaz-Sanchez. 2017. Community vulnerability to health impacts of wildland fire smoke exposure. *Environmental Science & Technology* 51(12):6674–6682.

Rasker, R., and K. Pohl. 2018. *Wildfire and vulnerable populations in Austin, Texas: Report and user guide.* Bozeman, MT: Headwater Economics.

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Session 3: Effects of Wildfires on the Natural Environment

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Forum on Medical and Public Health Preparedness for Disasters and Emergencies

Background

The Forum on Medical and Public Health Preparedness for Disasters and Emergencies convenes public and private sector leaders to improve the nation's preparedness for, response to and recovery from disasters, public health emergencies and emerging threats. The Forum fosters in-depth policy discussion and collaboration to identify barriers and explore solutions to ensure and sustain national security, promote recovery and enhance resilience.

The Forum is a self-governing body composed of members and other key stakeholders at the federal, state, and local levels representing government, non-government, and the private sectors. Its membership identifies meeting and workshop topics for exploration and discussion and creates strategic direction to advance the field of medical and public health preparedness.

Over the next year, the Forum membership will be focusing their attention on the following topic areas:

Global Health Security

Global health security focuses on ongoing efforts to accelerate progress toward a world safe and secure from emerging infectious diseases and other threats. The Forum will concentrate its discussion on strengthening the U.S. health care and public health systems capacity to detect, prevent, plan for, respond to, and recover from naturally-occurring outbreaks and intentional or accidental releases of dangerous pathogens.

Communication and Coordination

Ensuring timely communications and effective coordination within all levels of government and between government, the private sector, and the public during large-scale disasters and incidents is critical to ensuring the health and welfare of the nation. The Forum will center its attention on ways to improve situational awareness, threat intelligence sharing, risk communication, and collaboration among multisector disaster response networks including public, academic, private, governmental, and non-governmental organizations.

Personal and Community Resilience

Personal and community resilience is the sustained ability of an individual and a community to utilize available resources to respond to, withstand, and recover from adverse situations following a catastrophic event. The Forum will explore opportunities and barriers to enhancing the resilience of individuals and communities through disaster risk reduction; ensuring that health is included in post-disaster recovery planning efforts; work with nontraditional sectors, and exploring special considerations needed to strengthen community after a mass casualty incident.

Critical Infrastructure

Critical infrastructure protection focuses on ongoing efforts to secure the assets, systems, and networks, whether physical or virtual, vital to the security, public health, and safety of the nation. The Forum centers its discussion on the health care and public health sector and interdependent sector vulnerabilities, consequences of cascading and prolonged failures of infrastructure, threats from chemical, biological, radiological, nuclear, and high yield explosives, and the increasing threat and consequences of cyber-attack.

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THE ROUNDTABLE ON ENVIRONMENTAL HEALTH SCIENCES, RESEARCH, AND MEDICINE

The Roundtable on Environmental Health Sciences, Research, and Medicine was established in 1998 and provides a structured opportunity for regular and open communication among interested experts from a variety of government, academic, industry, and consumer groups in a neutral setting. Through meetings and workshops, the Roundtable facilitates discussion of key issues in environmental health sciences and decision making, identification of vulnerable populations to environmental hazards, and translation of environmental health research into public health practice. Workshop proceedings are published but do not contain conclusions and recommendations. By focusing on current and emerging issues that are being considered by decision makers, the Roundtable facilitates the discussion of the contribution of environmental health to complex societal problems.

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- The Interplay Between Environmental Chemical Exposures and Obesity: Workshop Summary
- Principles and Obstacles for Sharing Data from Environmental Health Research: Workshop Summary
- Identifying and Reducing Environmental Health Risks of Chemicals in Our Society: Workshop Summary
- Understanding the Connections Between Coastal Waters and Ocean Ecosystem Services and Human Health - Workshop Summary
- Sustainable Diets: Food for Healthy People and a Healthy Planet Workshop Summary
- Including Health in Global Frameworks for Development, Wealth, and Climate Change -Workshop Summary
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For more information, contact Roundtable Director, Kathleen Stratton (202.334.1723; kstratton@nas.edu).

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Health and Medicine Division

ROUNDTABLE ON POPULATION HEALTH IMPROVEMENT

The Roundtable on Population Health Improvement brings together multiple sectors and disciplines to broaden the national conversation about the factors that shape our health and to support cross-sector relationships and engagement to transform the conditions for health across US communities. By hosting workshops, spurring individually-authored papers, and organizing action collaboratives, the roundtable engages members and outside experts, practitioners, and stakeholders around models, best practices, and other evidence about actions that will contribute to building a strong, healthy, and productive society that cultivates human capital and equal opportunity. The roundtable has explored a range of connected issues including collaboration between the education and health sectors, partnerships between faith-based and health sector entities, the shifting definitions of value that are helping reorient investments in the health care and business sectors toward health and well-being, and the nature and needs of the population health workforce, broadly conceived.

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The Roundtable on the Promotion of Health Equity of the National Academies of Sciences, Engineering, and Medicine has a unique role as the conveners of the nation's experts in health disparities and health equity, with the goal of raising awareness and driving change. The Roundtable works to advance the visibility and understanding of the inequities in health and health care. The Roundtable promotes health equity and the elimination of health disparities by

- Advancing the visibility and understanding of the inequities in health and healthcare among racial and ethnic populations.
- Amplifying research, policy, and community-centered programs.
- Catalyzing the emergence of new leaders, partners and stakeholders.

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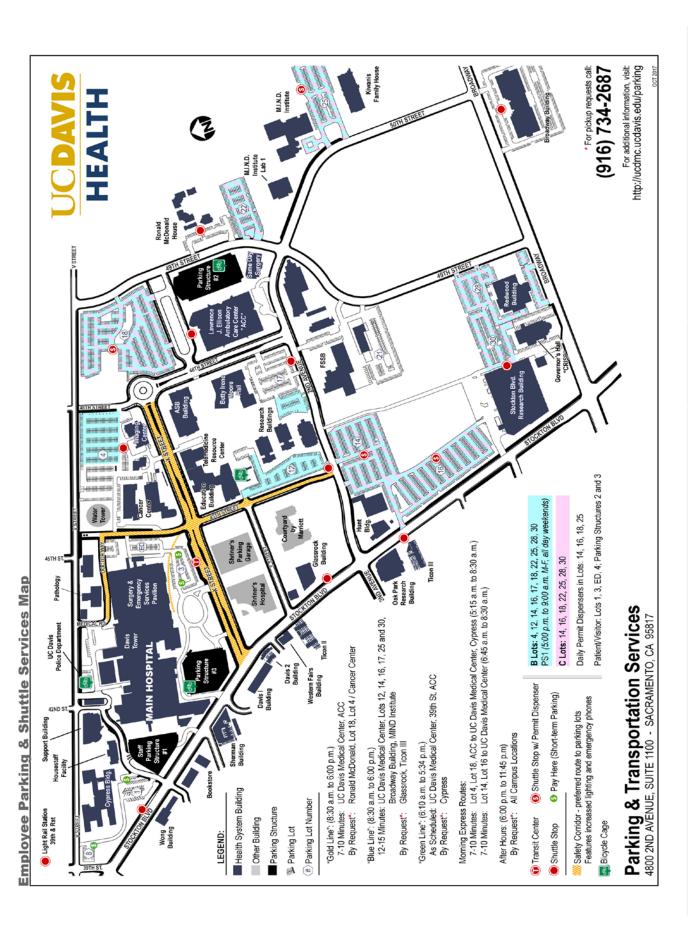
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