Children's Environmental Health Network

Written Testimony before the
U.S. House of Representatives, Committee on Homeland Security
Subcommittee on Emergency Preparedness, Response, and Recovery

Hearing Entitled "Assessing the Homeland Security Impacts of a Changing Climate"

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April 9, 2019

Good afternoon Chairman Payne, Ranking Member King, and Distinguished Members of the subcommittee. It is an honor to appear before you today at this important hearing to discuss Homeland Security impacts related to climate change. I am Kristie Trousdale Deputy Director of the Children's Environmental Health Network (CEHN).

CEHN is a national nonpartisan nonprofit organization with the mission of protecting the developing child from environmental health hazards and promoting a healthy environment. We raise awareness of how natural and built environments affect children's health; support and stimulate preventive research; advocate for strong, child protective policy; and provide education and training to multiple audiences on children's environmental health and actionable steps to reduce children's exposures to environmental hazards. CEHN has been the national leading voice of children's environmental health for over 27 years and leads or advises many of the critical national conversations on children's environmental health issues, including service to the National Institutes of Health and U.S. Centers for Disease Control and Prevention.

Our children are our most valuable resources. They represent the future stability and security of our nation. Yet approximately 75 percent of young Americans between 17 and 24 would not qualify for military service, with nearly one-third ineligible due to health problems other than obesity, such as asthma, mental health issues, or Attention Deficit Hyperactivity Disorder.[1] One in four students in the U.S. students has a chronic condition, one in five has learning and attention problems, and the number of children receiving Social Security Income for disability is almost seven times larger than it was 30 years ago.[2,3,4]

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[1] Ready, Willing, and Unable to Serve. Mission: Readiness. Retrieved April 4, 2019 from http://cdn.missionreadiness.org/MR-Ready-Willing-Unable.pdf.
[2] Centers for Disease Control and Prevention. Managing Chronic Health Conditions in Schools. Retrieved April 4, 2019 from https://www.cdc.gov/healthyschools/chronicconditions.htm.
[3] National Center for Learning Disabilities. The State of Learning Disabilities: Understanding the 1 in 5. Retrieved April 4, 2019 from https://www.ncld.org/the-state-of-learning-disabilities-understanding-the-1-in-5.
[4] National Public Radio. Unfit for Work: The startling rise of disability in America. Retrieved April 4, 2019 from http://apps.npr.org/unfit-for-work/.

This is not just a problem for our country's military and defense needs. Over the past three decades there has been an unsettling rise in the number of Americans who are unfit for work. Currently over 13 million Americans receive a disability check from the government, and most of them are unable to work.[5] This represents a looming national security and stability crisis. Many of the childhood chronic diseases and developmental disabilities that have been increasing significantly over the past 40 years are environmentally mediated, and many are already increasing and intensifying due to our changing climate. Children from communities of lower income and communities of color face greater exposures to pollution and environmental hazards and suffer disproportionately from the resulting health effects.[6,7]

Over 88% of global disease associated with climate change impacts children—especially the youngest and most vulnerable children.[8] However, their unique needs continue to be under-prioritized in conversations and actions around mitigation, preparedness, response. I urge that the subcommittee use its role to ensure that children's health and development are placed at the center of decision-making for policies within its jurisdiction related to climate change.

There is solid consensus in the scientific community that children are more vulnerable than adults to environmental hazards because of their unique physiological and behavioral traits. A child's patterns of exposure differ than that of an adult. For example, many harmful air pollutants are emitted or exist low to the ground, within a young child's breathing zone, such as motor vehicle exhaust, mercury vapor, radon, and pesticides.[9] Infants and toddlers also crawl and play on the ground and explore the world orally which exposes them, via ingestion, to more hazards.[9] Proportionately, children eat more, drink more, and breathe more than adults, and their skin surface area to volume ratio is greater as well, increasing risk for dermal absorption of harmful compounds.[9] Their bodies also differ in how they absorb, detoxify, and excrete substances.

Additionally, children are more vulnerable to harm from these exposures because their bodies are still developing. There are critical windows of development for organs and organ systems, during which, if disrupted by a harmful exposure or experience, adverse and lasting effects can occur.[9] Early exposures have the potential for not only immediate harmful effects on children's health and development, but can set up the system for developing disease later in life as well.[9] Indeed, children have many years of life ahead of them within which to develop symptoms of diseases with long latency periods that may have been triggered by early exposures, such as cancer or

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[5] Social Security Administration. Monthly Statistical Snapshot. Retrieved April 4, 2019 from https://www.ssa.gov/policy/docs/quickfacts/stat_snapshot/.

[6] Southeast Pediatric Environmental Health Specialty Unit. Monograph. Break the Cycle of Environmental Health Disparities in Vulnerable Children. Retrieved April 4, 2019 from https://www.researchgate.net/publication/51970363_Break_the_Cycle_of_environmental_health_disparities_in_vulnerable_children.

[7] Children's Environmental Health Network. Children and health disparities. Retrieved April 4, 2019 from https://cehn.org/wp-content/uploads/2015/11/EJ-Factsheet_2018_FINAL.pdf.

[8] Zhang Y, Bi P, Hiller JE. Climate change and disability-adjusted life years. J Environ Health. 2007; 70:32–36.

[9] Bearer, CF. Environmental health hazards: How children are different from adults. Future Child. 1995; 5(2):11-26.

Parkinson's disease. Older children have agency, and more and more young people are speaking out on their own behalf and mobilizing action with regard to climate change's impacts on their generation. However, the youngest of children are not aware of environmental risks and climate change, and they lack the knowledge, mobility, funds, and power to address them. Children are dependent on adults to protect them, and it is our moral imperative to do so.

Climate change is increasing the frequency and severity of droughts, wildfires, and extreme heat events. It is increasing the severity of superstorms and flooding and affecting the incidence and geographic distribution of infectious diseases. These effects intensify existing environmental health risks to children.[10] In addition, children are more likely to live in high-risk areas such as floodplains, and they are more likely to live in poverty.[11] Pediatricians in the U.S. report that they are already seeing the serious effects of climate change on children's health.[12] Thus, mitigation of climate change via significant reductions in greenhouse gas emissions is of utmost importance in child health protection.

In addition, children remain an afterthought in preparedness, response, and recovery measures during natural disasters. In 2010, the National Commission on Children and Disasters released an assessment of the gaps in federal planning that lead to risks to children in times of disasters. The Commission developed 81 recommendations and sub-recommendations to prioritize the health and safety of children in preparedness, response, and recovery measures.[13] However, as of 2015, 79% of these recommendations remained unfulfilled.[14]

The following climate change-related environmental effects are among those of concern regarding children.

Heat-related illness

Children and pregnant women are among those most at risk from extreme heat events and the frequency and intensity of these events are projected to increase in the coming decades due to climate change. Studies have associated low birth weight, premature birth, and certain congenital heart defects with maternal exposure to extreme heat during critical windows of development.[15,16,17] Young children are also less able than adults to regulate their body

[10] Stanberry LR, Thomson MC, James W (2018) Prioritizing the needs of children in a changing climate. PLoS Med 15(7): e1002627. https://doi.org/10.1371/journal.pmed.1002627.

[11] Fothergill, A. (2017, July 27). Children, Youth, and Disaster. Oxford Research Encyclopedia of Natural Hazard Science. Ed. Retrieved 31 Mar. 2019, from http://oxfordre.com/naturalhazardscience/view/10.1093/acrefore/9780199389407.001.0001/acrefore-9780199389407-e-23.

[12] The Medical Society Consortium on Climate and Health. Accessed on April 1, 2019 at https://medsocietiesforclimatehealth.org/about/.

[13] National Commission on Children and Disasters. 2010 Report to the President and Congress. Retrieved April 2, 2019 from https://archive.ahrq.gov/prep/nccdreport/nccdreport.pdf.

[14] 2015 National Report Card on Protecting Children in Disasters. Save the Children. Retrieved April 2, 2019 from https://www.savethechildren.org/content/dam/usa/reports/emergency-prep/disaster-report-2015.pdf.

[15] S. Ha, D. Liu, Y. Zhu, S.S. Kim, S. Sherman, P. Mendola. Ambient temperature and early delivery of singleton pregnancies. Environ. Health Perspect., 125 (2017), pp. 453-459.

temperature, they tend to dehydrate more quickly, and they are more likely to be physically active outdoors. Student athletes, especially youth football players and long-distance runners, are at risk from exertional heat stroke.[18] Over 9,000 U.S. high school athletes are treated for heat illness each year, and in the past two decades, deaths of football players due to heat stroke nearly doubled.[19, 20]

Air quality

Approximately 10% of children aged 5-19 in the U.S. suffer from asthma.[21] According to the Centers for Disease Control and Prevention, 1 in 6 children with asthma ends up in the emergency department and about 1 in 20 is hospitalized each year.[22] Asthma is the leading cause of school absenteeism, accounting for millions of missed school days each year.[23] The warmer temperatures brought about by climate change lead to increased concentrations of smog/ground level ozone, a major contributor to asthma exacerbation that is also known to decrease lung functioning in young children and at elevated levels to lead to the development of asthma in children who play outdoor sports.[24]

Allergic response to pollen is also one of the most common causes of asthma exacerbations in children, and warming temperatures extend the length of pollen-producing plants' growing season and the duration of the allergy season. In addition, increased levels of atmospheric carbon dioxide results in increased production of pollen from plants such as ragweed, and increased potency of the pollen produced.

Inhalation of particulate matter also exacerbates asthma and children's other respiratory illnesses. This particle pollution can also affect unborn children by increasing the risk for premature births and for lower birth weights. Particulate matter is a mixture of solid particles and liquid droplets found in the air. The particles exist in many different sizes and can contain hundreds of different

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[16] Ha S, et al. Ambient temperature and early delivery of singleton pregnancies. Environ Health Perspect. 2017;125(3):453. doi: 10.1289/EHP97.

[17] Zhang, W., et al. Projected Changes in Maternal Heat Exposure During Early Pregnancy and the Associated Congenital Heart Defect Burden in the United States. Journal of the American Heart Association. 2019; 8:(3).

[18] Beasley, M. Athletes and heat stroke: Prevention and treatment. Boston Children's Hospital Notes. Retrieved April 1, 2019 from https://notes.childrenshospital.org/protecting-athletes-heat-exertional-heat-stroke-prevention-sports-medicine-specialist/.

[19] Kerr, ZY, et al. Epidemiology of exertional heat illness among U.S. high school athletes. Am J Prev Med. 2013 Jan;44(1):8-14.

[20] Annual Survey of Football Injury Research: 1931 - 2017. National Center for Catastrophic Sport Injury Research. Retrieved April 4, 2019 at https://nccsir.unc.edu/files/2013/10/Annual-Football-2017-Fatalities-FINAL.pdf.

[21] Centers for Disease Control and Prevention. National Current Asthma* Prevalence (2016) Retrieved April 1, 2019 from https://www.cdc.gov/asthma/most_recent_data.htm.

[22] Centers for Disease Control and Prevention. Vital Signs: Asthma in Children — United States, 2001–2016. Retrieved April 1, 2019 from https://www.cdc.gov/mmwr/volumes/67/wr/mm6705e1.htm?s_cid=mm6705e1_e.

[23] Hsu, J., Qin, X., Beavers, S. F., & Mirabelli, M. C. (2016). Asthma-Related School Absenteeism, Morbidity, and Modifiable Factors. American journal of preventive medicine, 51(1), 23–32. doi:10.1016/j.amepre.2015.12.012.

[24] McConnell, R., Berhane, K., Gilliland, F., London, S.J., Islam, T., Gauderman, W.J. et al. Asthma in exercising children exposed to ozone: a cohort study. Lancet. 2002; 359: 386–391.

chemicals. Those particles that are under 10 micrometers in diameter (PM10), and especially those under 2.5 micrometers (PM2.5) in diameter, can lodge deep within our lungs and pose the greatest health risks. Over 10,000 tons of PM2.5 were released during the burning of the northern California wildfires in 2017.[25] In the fall of 2018 California school closures due to wildfires kept over one million children at home.[26] The frequency and intensity of wildfires is projected to increase in the coming decades.

Infectious diseases

Increasing temperatures and weather disasters cause increased food and water-borne illnesses, especially due to flooding, structural damage, and power loss. For example, there were increased cases of leptospirosis, a relatively rare bacterial infection in humans, in Puerto Rico post Hurricane Maria, due to contaminated water.[27] Because children's immune systems are still developing, they can have more pronounced responses to infections.[28] Severe disasters can also hamper adequate health care service, amplifying the spread of infectious diseases such as tuberculosis or influenza.

Altered patterns of rainfall can cause the expansion of breeding grounds and range, and increased populations for mosquitos, ticks and other disease vectors for illnesses such as Lyme disease, dengue, and Zika. Children tend to spend more time outdoors than adults, and in the U.S., young boys are among those most at risk from contracting Lyme disease. [29] Puerto Rico, which is hardest hit by the Zika virus in the U.S., has seen an increase in the *Aedes* mosquito breeding grounds since Hurricane Maria, and research indicates that the number of pregnant women with Zika is now near that of levels in 2016 during the height of the problem.[30] Children born to women infected with the virus are at risk of developing congenital Zika syndrome, which includes symptoms such as microcephaly, brain damage, and other birth defects.

Injuries and death from extreme weather events

Young children are also among those most at risk from physical injuries and death resulting from wildfires and severe storms. Settings where children spend their time, such as school and child care facilities, may be structurally unsound, or be otherwise unprepared for disasters. Young children's mobility issues place them at higher risk, as some need to be carried and others guided

[25] Week of wildfires polluting air as much as year of cars. CNN. Retrieved from https://www.cnn.com/2017/10/13/health/california-fires-air-pollution-trnd/index.html.

[26] Calmatters. School closures from California wildfires this week have kept more than a million kids home. Retrieved April 4, 2019 from https://calmatters.org/articles/school-closures-california-wildfires-1-million-students/.

[27] Henry J Kaiser Family Foundation. Public Health in Puerto Rico after Hurricane Maria. Retrieved April 1, 2019 from https://www.kff.org/other/issue-brief/public-health-in-puerto-rico-after-hurricane-maria/.

[28] American Academy of Pediatrics. Outbreaks, Epidemics, and Other Infectious Disease Emergencies. Retrieved April 1, 2019 from https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Children-and-Disasters/Documents/MIDCCSoutbreaks.pdf.

[29] Centers for Disease Control and Prevention. Lyme Disease Charts and Figures: Historical Data. Retrieved March 31, 2019 from https://www.cdc.gov/lyme/stats/graphs.html.

[30] PBS. What's the truth about Zika virus in post-hurricane Puerto Rico? Retrieved April 2, 2019 from https://www.pbs.org/newshour/show/whats-the-truth-about-zika-virus-in-post-hurricane-puerto-rico.

via handholding. Children are among the most likely to drown in floods,[31] and floodwaters can pose electrical hazards, mix with and spread sewage and toxic chemicals, hide unsafe conditions such as broken glass, and pose risks of hypothermia. Compounding these risks is the fact that access to medical care is jeopardized in extreme weather events, due to power loss or facility damage. Children who are injured, or those with chronic health conditions or special needs may not be able to receive critical medical attention.

Food security

As of 2016, over 13 million children in the U.S. face hunger. Disasters exacerbate food insecurity for the poor, as exemplified in under-resourced communities in South Florida after Hurricane Irma. Families faced food spoilage and unpaid time off, and most grocery stores only accepted cash and could not process Supplemental Nutrition Assistance Program debit-like cards due to power outages.[32] In Puerto Rico, 19.7% of families had difficulties securing meals for their children daily after Hurricane Maria.[33]

Many families rely on the free or reduced breakfasts and lunches offered through schools to help ensure their children are fed. However, approximately 8.5 million children were unable to attend school, some of them for weeks, due to Hurricanes Harvey and Irma.[34] After Hurricane Maria, students aged 5-17 in Puerto Rico missed an average of 78 days of school, and those children in preschool missed 92 days of early learning and care in their programs.[33]

Extreme heat, drought, floods, and rising sea levels threaten agricultural yield, fisheries and meat production, as well, thus affecting food prices and access for children and pregnant women in poverty across the globe.[35] In addition to a diminishing supply of food, the quality of food is also at risk. Rising atmospheric carbon dioxide, while producing bigger crops, reduces the nutritional value of food crops. Staple crops, including rice, legumes, and wheat show a loss of protein and micronutrients, including essential elements such as iron and zinc, which are critical to children's health.[36] Children already at risk for malnutrition will face increased food insecurity and resultant health and development problems.

Access to safe drinking water

Flooding, structural damage, and power loss can lead to failed drinking water systems and thus contaminated drinking water. Post Hurricane Harvey, 166 water systems were under boil-water

[31] The World Health Organization. Drowning. Retrieved April 1, 2019 from https://www.who.int/news-room/fact-sheets/detail/drowning.

[32] WLRN. After Hurricane Irma, Food Insecurity In Miami-Dade's Poorest Communities. Retrieved April 2, 2019 from https://www.wlrn.org/post/after-hurricane-irma-food-insecurity-miami-dades-poorest-communities.

[33] The Youth Development Institute of Puerto Rico .The impact of Hurricane Maria on children in Puerto Rico. Retrieved April 2, 2019 from https://drive.google.com/file/d/0B_GGLGhvE3QueDJYWTJNTThCTFE5YkExbnllQ3VOcEtKeWFF/view.

[34] USA Today. Hurricanes Harvey and Irma kept 1 in 6 students in the USA out of school. Retrieved April 2, 2019 from https://www.usatoday.com/story/news/2017/09/15/hurricanes-drove-millions-students-school/668156001/.

[35] Columbia University. How Climate Change Will Alter Our Food. Retrieved April 2, 2019 from https://blogs.ei.columbia.edu/2018/07/25/climate-change-food-agriculture/.

[36] Meyers, SS., et al. Increasing CO2 threatens human nutrition. Nature. 2014; 510: 139–142.

orders and another 50 water systems were shut down completely.[37] One week after Hurricane Maria 55% of Puerto Ricans lacked clean drinking water,[38] and one month after the disaster approximately 1 million were without reliable drinking water.[39] Heavy storms and flooding can also contaminate private wells.

Mental health

Children exposed to Hurricane Katrina were five times as likely as pre-Katrina cohorts to have serious emotional issues, such as post-traumatic stress disorder, anxiety and depression.[40] According to the Youth Development Institute of Puerto Rico, a reported 44% of children struggled with emotional and behavioral problems after Hurricane Maria, with 23% specifying struggles with anxiety.[33] In addition to immediate fears of safety in a crisis situation, children may experience a loss of home and belongings, may have to leave their neighborhood, and may be separated from family, caretakers, communities, and friends. Disasters may also destroy community resources that are integral to their sound development, such as schools, hospitals, and places of worship. Mental health implications are concerning especially for those children who are already at higher risk, such as those living in under-resourced areas.

Important settings outside the home

Approximately 65 million children attend schools and child care in the U.S., yet many schools and child care programs in the U.S. do not comprehensively evaluate nor address matters pertaining to children's environmental health.[41,42] There is no federal oversight for the protection of children's environmental health in these learning and care settings, despite the legal mandate that children spend a significant portion of their time in school facilities. Many schools and child care facilities in this country are old, in poor condition, and/or are located on or near hazards sites, and already present environmental health risks which can be exacerbated in disasters.[43,44] In addition, many schools and child care programs are unprepared to safely manage these crises.

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[37] U.S. Environmental Protection Agency. Status of Water Systems in Areas Affected by Harvey. News Release. Retrieved March 31, 2019 from https://www.epa.gov/newsreleases/status-water-systems-areas-affected-harvey.

[38] U.S. Department of Defense. DoD Accelerates Hurricane Relief, Response Efforts in Puerto Rico. DoD News. Retrieved March 31, 2019 from https://dod.defense.gov/News/Article/Article/1330501/dod-accelerates-hurricane-relief-response-efforts-in-puerto-rico/.

[39] Sutter, JC. CNN. About 1 million Americans without running water. 3 million without power. This is life one month after Hurricane Maria. Retrieved March 31, 2019 from https://www.cnn.com/2017/10/18/health/puerto-rico-one-month-without-water/index.html.

[40] Abramson, D. M., Park, Y. S., Stehling-Ariza, T., & Redlener, I. (2010). Children as bellwethers of recovery: Dysfunctional systems and the effects of parents, households, and neighborhoods on serious emotional disturbance in children after Hurricane Katrina. Disaster Medicine and Public Health Preparedness, 4(S1), S17–S27.

[41] Paulson, J. & Barnett, C. Who's in Charge of Children's Environmental Health at School? New Solutions. 2016; 20 (1): 3-23.

[42] Seltenrich, N. Environmental exposures in the context of child care. Environ Health Perspect. 2013 May; 121(5): a160–a165.

[43] American Society of Civil Engineers. 2017 Infrastructure Report Card: Schools. Retrieved April 4, 2019 from https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Schools-Final.pdf.

[44] Center for Effective Government. Living in the shadow of danger: Poverty, race, and unequal chemical facility hazards. Retrieved April 4, 2019 from https://www.foreffectivegov.org/sites/default/files/shadow-of-danger-highrespdf.pdf.

The National Commission on Children and Disasters' 2010 Report to the President and Congress outlined recommendations specific to both settings, and the Federal Emergency Management Agency (FEMA) has developed a variety of tools as part of its Multi-hazard Emergency Planning for Schools toolkit. Yet as of 2015 18 states and the District of Columbia had not adopted minimum emergency planning standards at schools and child care.[14] While many schools and child care programs have developed emergency plans, many plans do not meet national guidelines and the implementation of plans are hampered due to funding, training, capacity, and communications issues. In some states, school and child care emergency plans are not mandated, and not all regulated child care providers and/or schools are subject to the relevant standards.

In addition, a great deal of focus centers around school or child care evacuation planning and family reunification, and there is often significant pressure to reopen schools as quickly as possible to provide education and other key community services as well as stability for children and their families after a disaster. Yet many health problems from disasters arise during the recovery period. Mandatory standards, protocols, and oversight for reopening schools and child care facilities safely are needed to prevent unnecessary harmful exposures to children, such as the serious mold and pest issues reported at Brewster Middle School at Camp Lejeune when it reopened after Hurricane Florence.[45]

Conclusion and Recommendations

Climate change makes children's environmental health issues more visible than ever. It is a threat multiplier and it exacerbates inequalities; children from communities of color and communities of lower income bear the brunt of climate change effects.

I urge the subcommittee to understand and recognize that:

- the environments where children live, learn, work, and play, have direct and significant impacts on their health;
- children, especially those from communities of color and communities of lower income, including children on tribal lands, are particularly vulnerable to environmental hazards;
- children are our future; and
- we have a moral obligation to protect children.

I ask that the subcommittee:

- consider children's health in all environmental decisions and policies; and
    - provide special consideration and prioritization of those children who are most vulnerable—those from communities of color, from communities of lower income.
    - Apply the pediatric environmental health lens to climate change legislation

[45] Military Parents Outraged After Mold Found in Base School Damaged by Florence. Military.com. Retrieved April 2, 2019 from https://www.military.com/daily-news/2018/09/25/military-parents-outraged-after-mold-found-base-school-damaged-florence.html.

        - Support continued measures to aggressively mitigate the changing climate.
        - Support measures to intentionally address children's unique risks and needs in preparedness, response, and recovery.
- support all federal, state, and tribal agencies and programs that protect children's health.
    - Ensure capacity, training, and funding needs—for improved coordination across agencies, sectors, and multiple levels of government in matters of preparedness, response, and recovery measures.

Your support is critically needed for key federal agencies such as the U.S. Environmental Protection Agency, especially the Office of Children's Health Protection, the Centers for Disease Control and Prevention, especially the National Center for Environmental Health, and the Agency for Toxic Substances and Disease Registry. These agencies conduct research, set guidelines, and develop surveillance and intervention programs to address children's environmental health issues. They also help to fund critical efforts such as the Children's Environmental Health and Disease Prevention Research Centers and the Pediatric Environmental Health Specialty Units--programs which have developed strong community ties.

I commend the subcommittee for holding this hearing today and for inviting CEHN to provide the children's health perspective to the conversation on climate change. Children, not profits, need to be placed at the center of decision-making to reduce the risk of disease or disability, and to assure that our children will have long, healthy and productive lives. This is our shared moral imperative. Protecting the health and development of our most precious resources will also safeguard the stability and security of our country for generations to come.

Thank you for the opportunity to testify on these critical issues and thank you for your leadership.

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Trousdale, Kristie A.

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE: Deputy Director

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Willamette University, Salem, OR	B.S.	05/1993	Sociology & Environmental Science
University of Maryland, College Park, MD	M.P.H.	05/2010	Environmental Health

A. Personal Statement

Currently I am **Deputy Director of** the Children's Environmental Health Network (CEHN), where I provide organizational leadership and development. I lead CEHN's Science Committee and the Network's science translation and education projects, communications and marketing, the organization of CEHN's research conferences, program training activities, and assist with fundraising and development efforts. I have over eight years of experience developing curriculum and other educational resources for CEHN's Eco-Healthy Child Care® program, and have served as Co-Editor of "Putting it into Practice" a pediatric environmental health training resource for health care faculty. My leadership in public health includes serving on the steering committees for the CDC-funded and APHA-facilitated Environmental Health Coalition and the Lead Service Line Replacement Collaborative. I also chair messaging and communication work groups for the Environmental Health Coalition and APHA's Children's Environmental Health Committee, as well as leading the development and engagement of a Community Advisory Board for the DC-area child care community. I have presented at state and national conferences on issues pertaining to environmental health in early learning and child care settings, the state of children's environmental health, and have been a recurring guest lecturer for public health and environmental science courses at American University. I have co-authored publications on epigenetics and pediatric environmental health, environmental hazards in school settings and child care facilities, perspective articles on children's environmental health, and environmental hazards in residential facilities for persons with developmental or intellectual disabilities. I received a B.S. in Sociology and Environmental Science from Willamette University and a MPH in Environmental Health from the University of Maryland.

B. Positions and Honors

2011-present Deputy Director, Children's Environmental Health Network, Washington, DC

C. Contributions to Science

There is a paucity of research on toxicant exposures to children in early learning and care environments. CEHN and colleagues from the University of Maryland School of Public Health conducted a pilot study of 14

DC-based child care programs, to assess the environmental health literacy and behaviors of the providers and to assess the indoor air quality of the facilities, specifically with respect to certain volatile organic compounds (VOCs) and particulate matter (PM) which are harmful to the health and development of youth. Quantifiable levels of VOCs and PM in the child care facilities were found, indicating the need for further, expanded research to characterize and identify sources of these exposures in order to effect appropriate mitigation strategies. I conducted child care facility walk-through assessments and interviews for this project**,** and contributed towards the publication of the findings.

Quirós-Alcalá L, Wilson S, Witherspoon N, Murray R, Perodin J, **Trousdale K**, Raspanti G, Sapkota, A. (2015). Volatile organic compounds and particulate matter in child care facilities in the District of Columbia: Results from a pilot study. *Environmental Research*, 146: 116-124.

CEHN's 2017 pediatric research conference, "2017 Children's Environmental Health Translational Research Conference: New Challenges" (#CEHN2017), drew approximately 150 participants who gathered in Arlington, VA for 2.5 days at the Key Bridge Marriott, enjoying stimulating keynote presentations, the latest research findings in the field, insightful discussions on advocacy and the translation of research to improved child health outcomes. The event hosted a diverse group of participants, including a mix of senior and junior level investigators and professionals as well as several international presenters from institutions in Taiwan, Thailand, the United Kingdom, and the Netherlands. Attendees represented diverse fields as well, including those from clinical backgrounds, advocacy organizations, child care, interior design, and a psychiatrist and filmmaker. Presentations included findings from the latest exposure and health outcome related research as well as findings from targeted intervention studies and updates on new investigations underway or exciting initiatives to protect children's health. Additional event highlights included a special evening preview of a film on climate change and children's mental health, and dedicated agenda time for discussions of the policy implications of the research presented. I led the Conference Advisory Committee in the planning and program development of the conference.

CEHN's 2012 pediatric research conference was titled: "The contribution of epigenetics in pediatric environmental health". I lead the Conference Planning Committee in organizing of the conference. The conference was held in San Francisco, CA and had an attendance of 170. The majority of the participants were researchers representing diverse institutions including medical schools, schools of public health, schools of nursing, and research centers. Proceedings included mini-symposia, keynote addresses, and posters. Translation of the science is an important part of CEHN's research conferences, and a portion of the agenda is devoted to the public health and policy implications of the latest findings. Thus the conference also drew participation from 17 representatives of non-profits and children's health advocates from organizations such as Autism Speaks, the Pesticide Action Network of North America (PANNA) and the W.K. Kellogg Foundation. A number of health practitioners and clinicians were also in attendance. In addition to showcasing cutting edge research in the emerging field of epigenetics and dedicating time to discussions on moving science into action, efforts were made to encourage young investigator participation, including reduced student and post-doctoral registration rates, encouragement of student abstract submission, and awards for top junior investigator abstracts. Three of these awards were presented for outstanding research in the areas of epigenetic effects of prenatal BPA exposure, DNA methylation and infant growth, and epigenetic regulation after environmental intervention. Environmental Health Perspectives published the conference abstracts: http://ehp.niehs.nih.gov/wp-content/uploads/2012/10/CEHN_Epigenetics2012_Abstracts.pdf

Witherspoon N, **Trousdale K**, Bearer CF, Miller RL**.** (2012). The Public Health and Policy Implications of Epigenetics and Pediatric Health Research. *Environmental Health Perspectives,* 120:a380–a381.

Not all publications listed

D. Research Support