



Community and Public Health

“Wicked” Environmental Public Health Problems

Wayne Cascio, MD, FACC

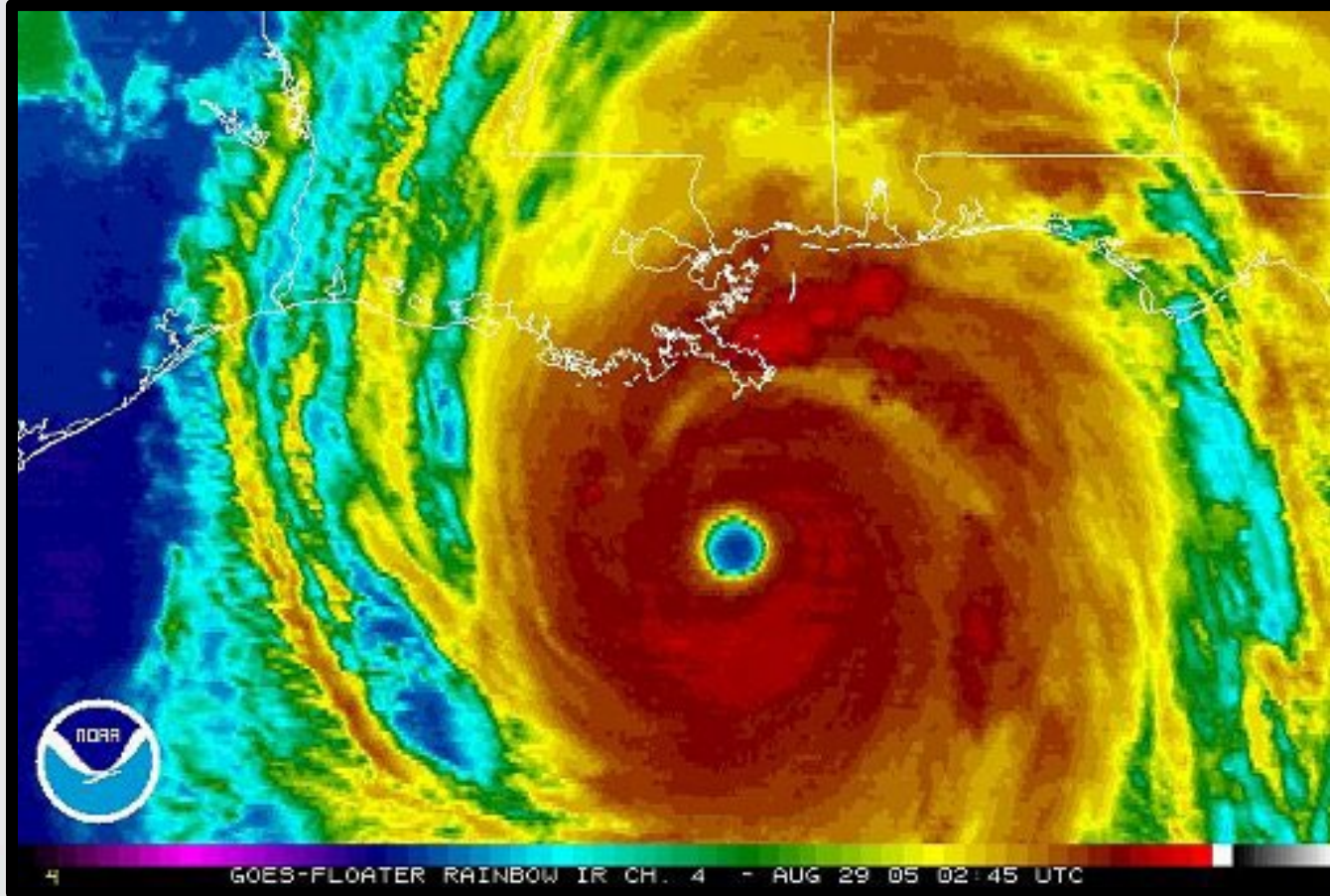
Director, Center for Public Health and Environmental Assessment

Office of Research & Development, US EPA

Research Triangle Park, NC



Hurricane Katrina: An Environmental Catastrophe Lessons Learned by Public Health & Communities



Hurricane Katrina, 02:45Z, August 29, 2005 – About 105 miles south of the mouth of the Mississippi River and about 170 miles south-southeast of New Orleans Louisiana. NOAA

Opportunities to Integrate Data to Address Challenges Faced during Katrina

- **Challenges to Collecting Medical Information about Persons from the Affected Regions**
- **Public Health Needs Better Planning and a Mixture of Communication Technologies**
- **Public Health Should Lead the Effort to Define Special Needs Populations**
- **Nursing Homes Faced Difficulties in Evacuating & Finding Alternative Facilities to Host Patients**
- **Finding Transportation and Shelter for Community-Based Special Needs Populations Was Challenging**



RENCI-ECU: Weather Events and Health Impacts At-Risk Populations in Coastal North Carolina

Problem:

Develop an emergency management registry for the medically fragile defined by physicians

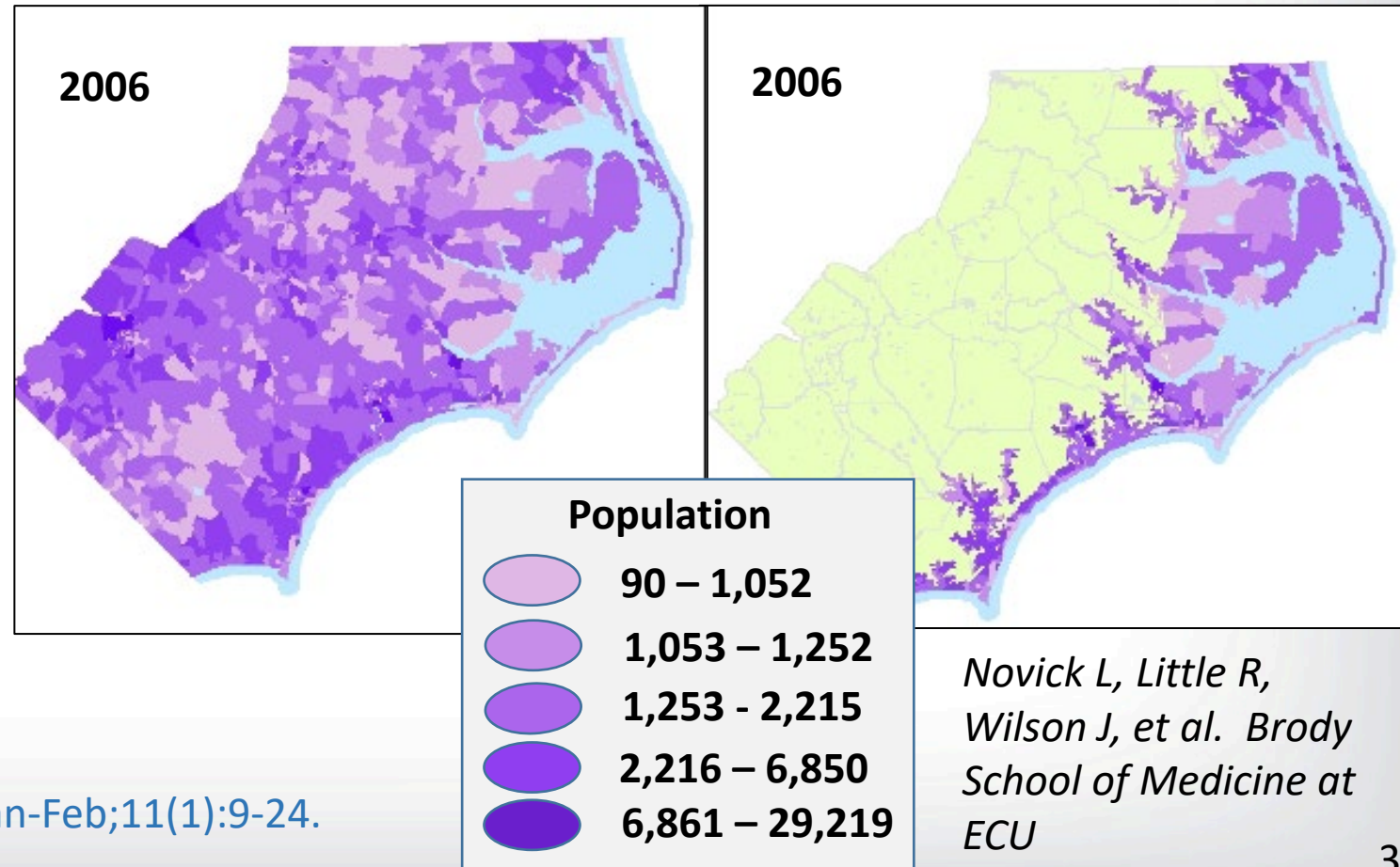
Identify the Vulnerable:

- Medically Fragile: determination based on literature review
- Ages 65+ and 75+ years
- Other groups (poverty, race, etc.), social vulnerability index

Event Example:

- A slow-moving hurricane: category 4/5

Eastern North Carolina Counties:
Medically Fragile Block Group Populations Affected by Storm Surge
Generated by a Slow-Moving Cat. 4 or 5 Hurricane





Contemporary Public Health Problems “Wicked Problems”

[Rittel HW and Webber MM]¹ “... used **wicked** to characterize a problem that is illusive or difficult to pin down and influenced by a constellation of complex social and political factors, some of which change during the process of solving the problem. They point out that with **wicked** problems, the nature of the problem is likely to be viewed differently depending on the perspectives and biases of those with a stake in the problem.”

Kreuter MW, De Rosa C, Howze EH, Baldwin GT.
Understanding Wicked Problems: A Key to Advancing Environmental
Health Promotion. *Health Education & Behavior*. 31 (4): 441-454, 2004

¹ Rittle HW, Webber MM.
Dilemmas in a general theory of planning
Policy Sciences 4 (1973), 155-169.



Contemporary “Wicked” Public Health Problems The COVID-19 Pandemic, and PFAS Contamination

LONG COVID



Centers for Disease Control and Prevention

MONITORING COVID VARIANTS

WHAT are PFAS (per- and polyfluoroalkyl substances)



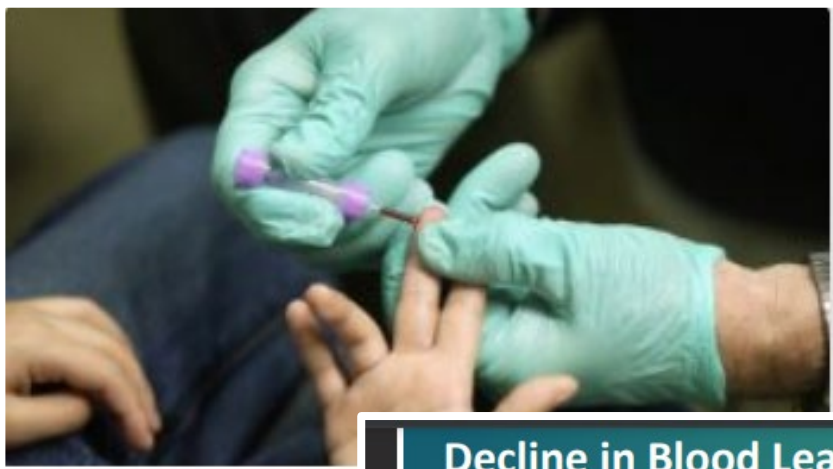
U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
Agency for Toxic Substances and Disease Registry

EPA is proposing the first-ever national standard to **limit PFAS in drinking water**





Contemporary “Wicked” Public Health Problems Lead



National Lead Poisoning Prevention Week



October 23-29, 2022

Decline in Blood Lead Testing in Young Children Following the Onset of the COVID-19 Pandemic



EPA STRATEGY TO REDUCE LEAD EXPOSURE AND DISPARITIES IN U.S. COMMUNITIES

www.epa.gov

OCTOBER 2022

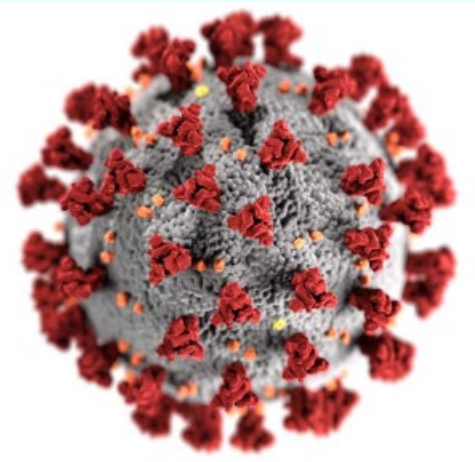


EPA's LSLR Research

Joseph Egan, PhD
 Director of Joseph Courtney, PhD
 National Lead Poisoning Prevention Program

Lead Exposure and Prevention Advisory Committee (LEPAC)

October 30, 2020



cdc.gov/coronavirus



Contemporary “Wicked” Public Health Problems Climate Change and Extreme Weather Events





Contemporary “Wicked” Public Health Problems Drought and Heat

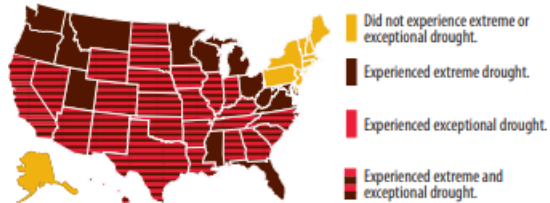
DROUGHT AND PUBLIC HEALTH IN THE U.S.

Why drought matters

When drought affects a community, its devastating consequences can include decreased food production, decreased water quantity and quality, and increased risk to human health. These effects can be far-reaching, complex, and costly.



States that experienced extreme or exceptional drought, 2005–2015



- ▶ Droughts are one of the most costly climate-related events. From 1980–2014, there were 22 droughts in the United States that each cost over \$1 billion.
- ▶ Droughts continue to impact the United States:
 - In 2012, the most geographically extensive drought to affect the U.S. since the 1930s covered over 50% of the country and cost \$31 billion.
 - For the state of California alone, the current western drought has cost thus far over \$4.9 billion and has contributed to the loss of more than 21,000 jobs.



HEAT-RELATED ILLNESSES

WHAT TO LOOK FOR

WHAT TO DO

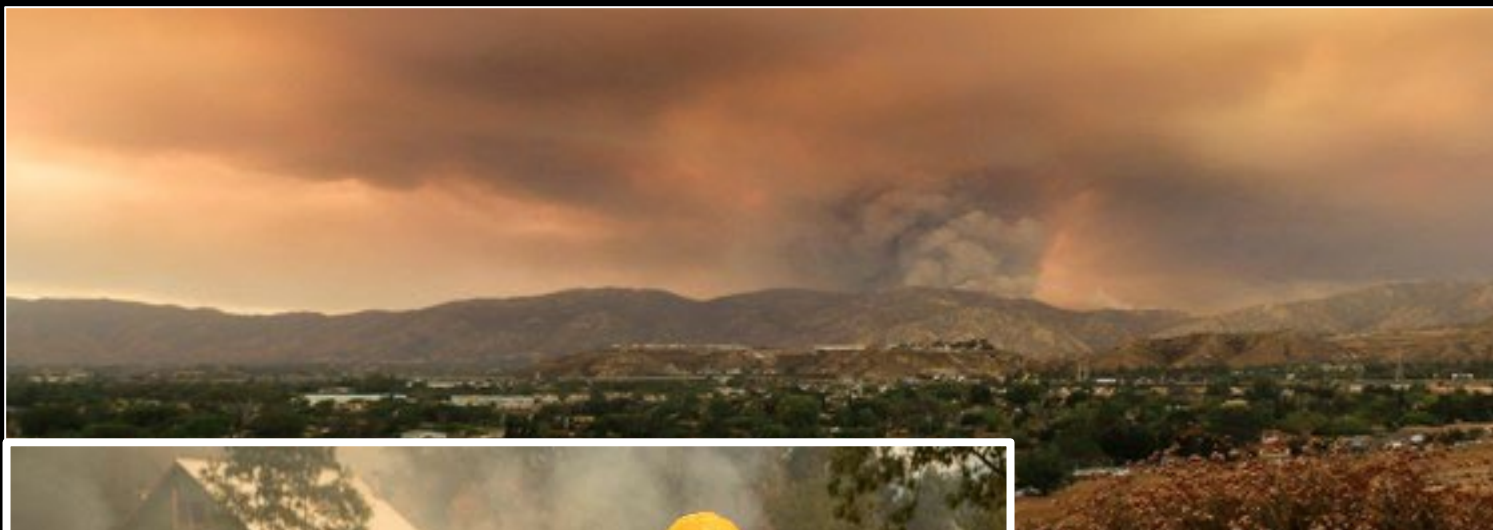
HEAT STROKE

- | | |
|---|--|
| <ul style="list-style-type: none"> • High body temperature (103°F or higher) • Hot, red, dry, or damp skin • Fast, strong pulse • Headache • Dizziness • Nausea • Confusion • Losing consci | <ul style="list-style-type: none"> • Call 911 right away-heat stroke is a medical emergency • Move the person to a cooler place • Help lower the person’s temperature with cool cloths or a cool bath • Do not give the person anything to drink |
|---|--|





Contemporary “Wicked” Public Health Problems Wildfire and Prescribed Fire



Health Effects
of
WILDLAND FIRES

What are Health Effects of wildland smoke?

The Health Effects are...

- Irritated eyes, sinus, and
- Increase cough
- Difficulty Breathe
- Tiredness
- Head aches
- Asthma Attacks
- Chest pain
- premature death
- Burns
- wheezing
- stroke
- more visits to hospital

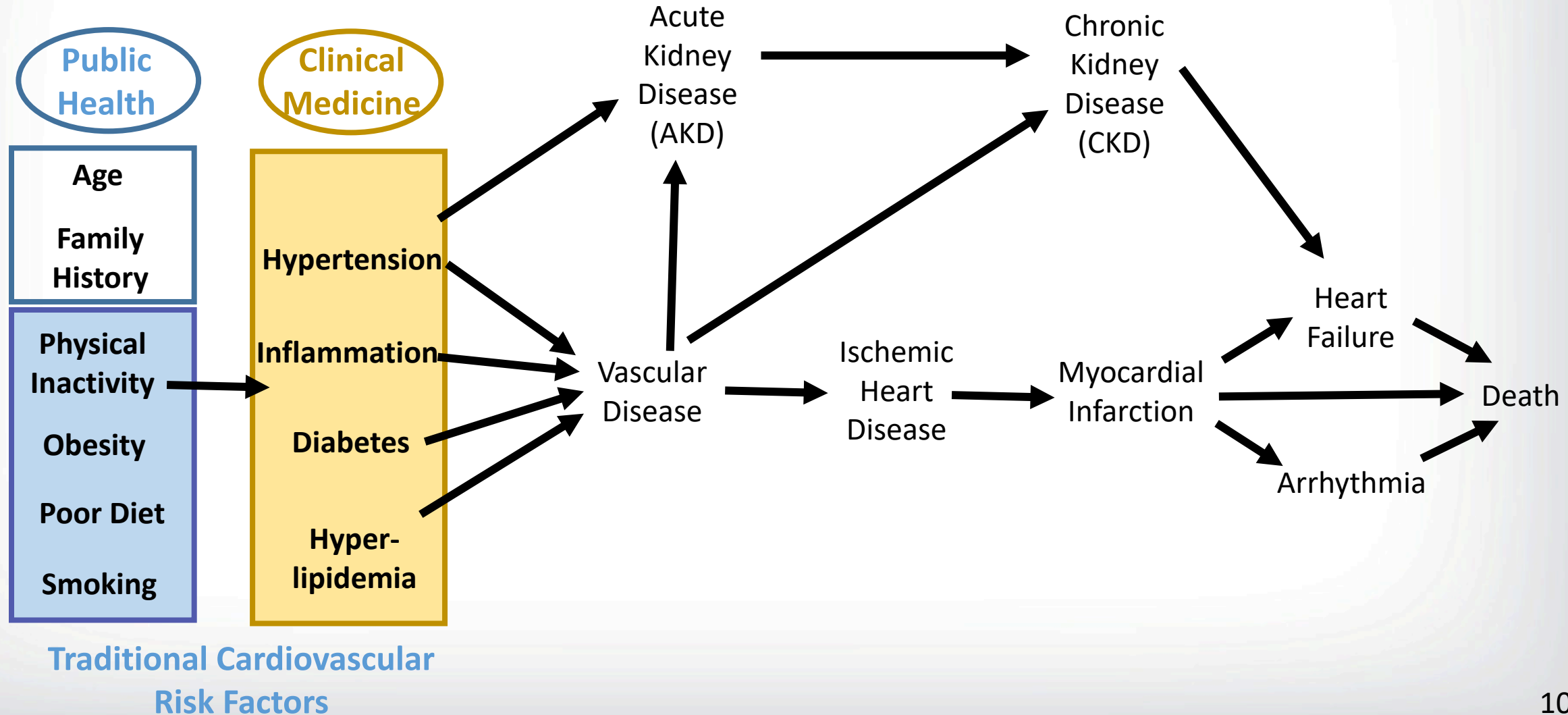
By: Sydney E. Codrington
3rd Grade: McFadyen



Cardiovascular Morbidity and Mortality

A “Wicked” Global Public Health Problem

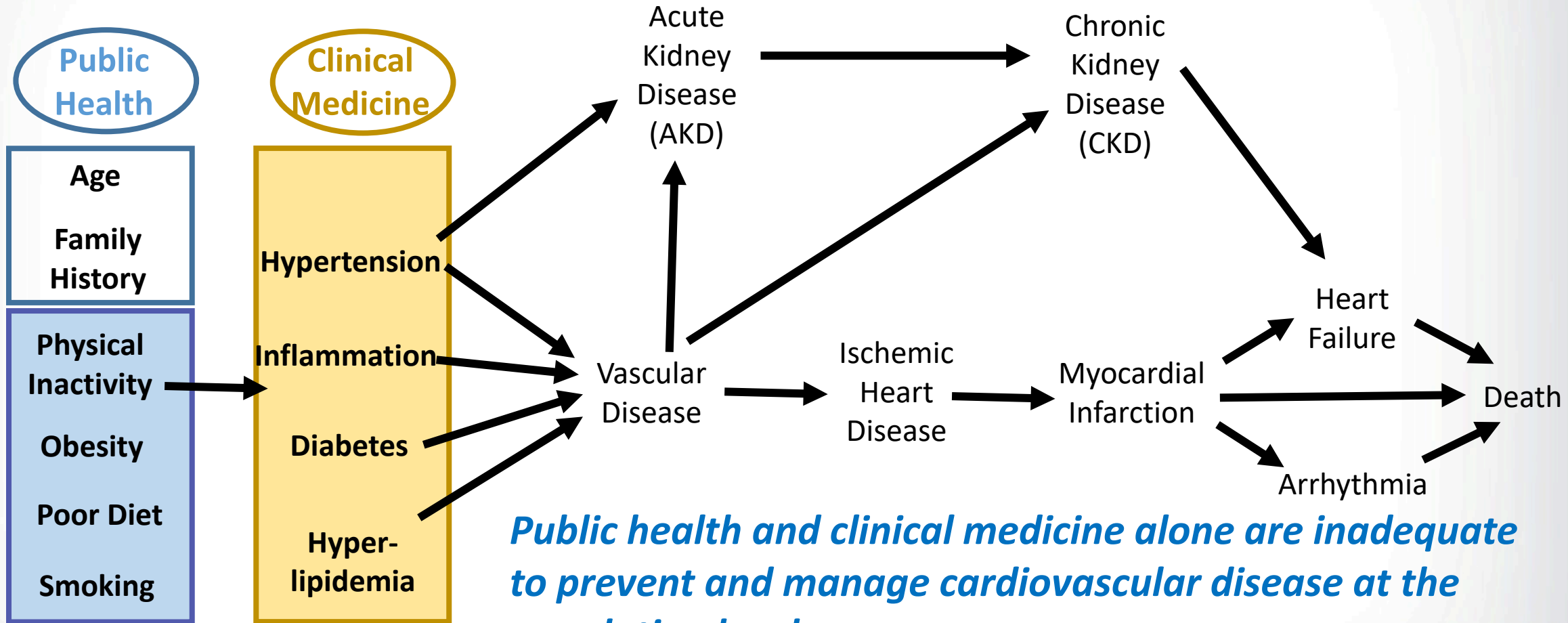
Cardiovascular Risk Factors and Cardiovascular Disease Prevention





Cardiovascular Morbidity and Mortality

A “Wicked” Global Public Health Problem



Traditional Cardiovascular Risk Factors

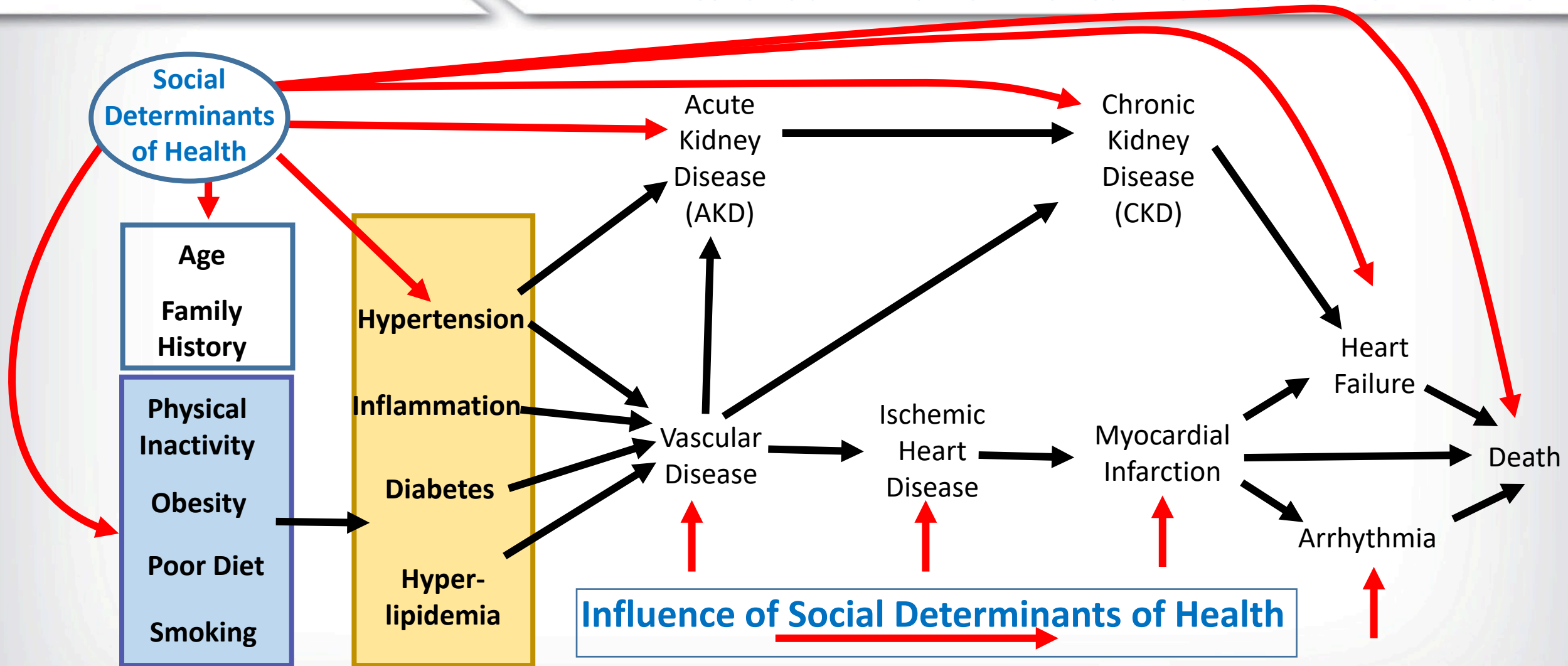
Public health and clinical medicine alone are inadequate to prevent and manage cardiovascular disease at the population level.

- Disparities in Well-being, Health Outcomes, Longevity



Cardiovascular Morbidity and Mortality

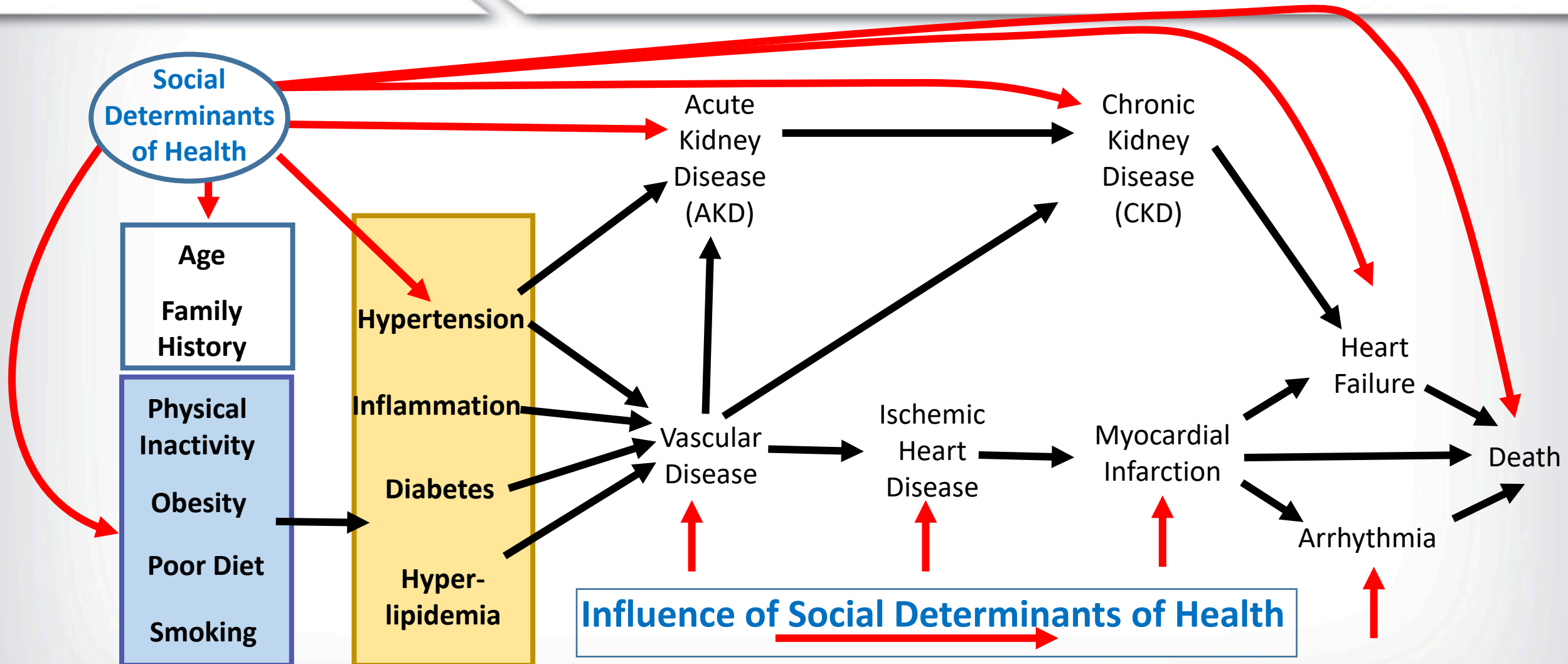
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Cardiovascular Morbidity and Mortality

A "Wicked" Environmental Public Health Problem



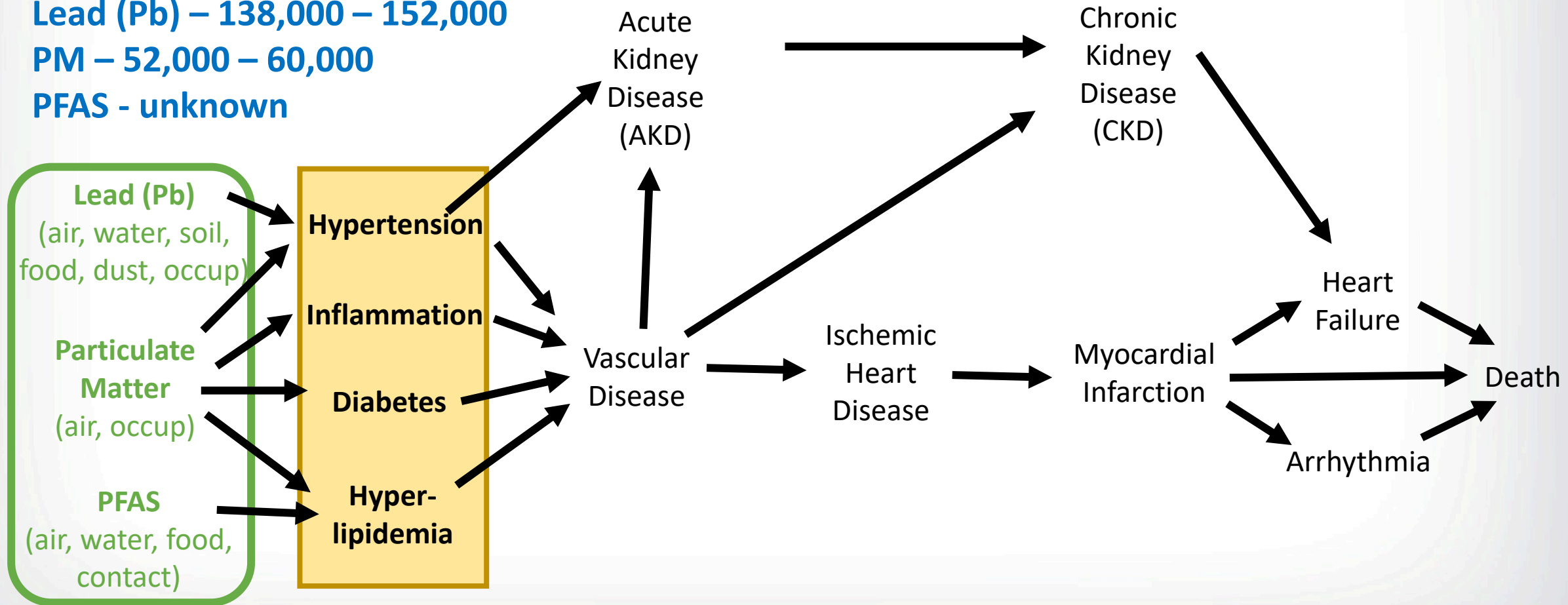
Community (Neighborhoods, Cities), Culture, Red-lining, Faith-based settings, Greenness, Governance, Legislation, Regulation, Policy, etc.



Environmental Exposome and Cardiovascular Morbidity and Mortality

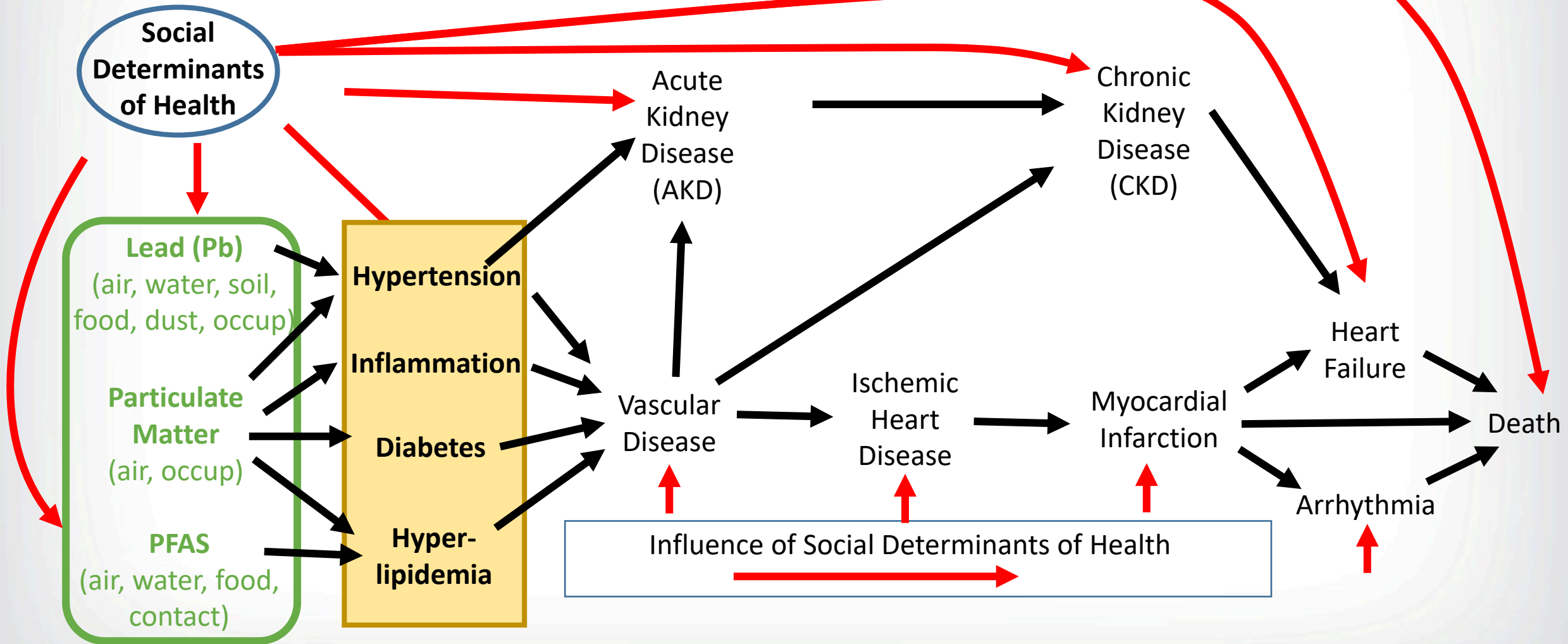
Annual Deaths in the U.S. Attributed to:

- Lead (Pb) – 138,000 – 152,000
- PM – 52,000 – 60,000
- PFAS - unknown





Environmental Exposome, SDOH, and Cardiovascular Morbidity and Mortality



- **Many environmental public health problems are “Wicked Problems”**
- **Environmental health hazards are modified by social determinants of health, and contribute to broader public health concerns where the causes and outcomes are multi-factorial, historical and with complex**
- **Solutions need community involvement and multi-sectoral stakeholder engagement**
- **Electronic Health record databases, satellite imaging, and non-targeted analysis are creating new opportunities to gain insight into the health effects of environmental hazards**

- **Need to develop approaches that integrate emerging analytical, imaging and personalized technologies to assess exposure and health responses**
- **Acquisition of data, the integration of multi-dimensional data, and the meaningful interpretation and communication will be keys to successful community-based decision-making and policy-making**
- **Need to effectively communicate evidence to motivate Individuals, public health and health care professionals to address risk reduction**
- **Randomized controlled trials are needed critically to evaluate the efficacy of personal action and population level policies to lower exposure, clinical risk and events and taking a multi-sectoral strategy to motivate action**

Thank you

Wayne E. Cascio, MD, FACC

Director, Center for Public Health and Environmental Assessment

Office of Research and Development

U.S. Environmental Protection Agency

Email: cascio.wayne@epa.gov

- No conflicts of interest
- The presentation represents the opinions of the speaker and does not necessarily represent the policies of the US EPA