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Introduction to Environmental Health and Policy

November 29, 2021

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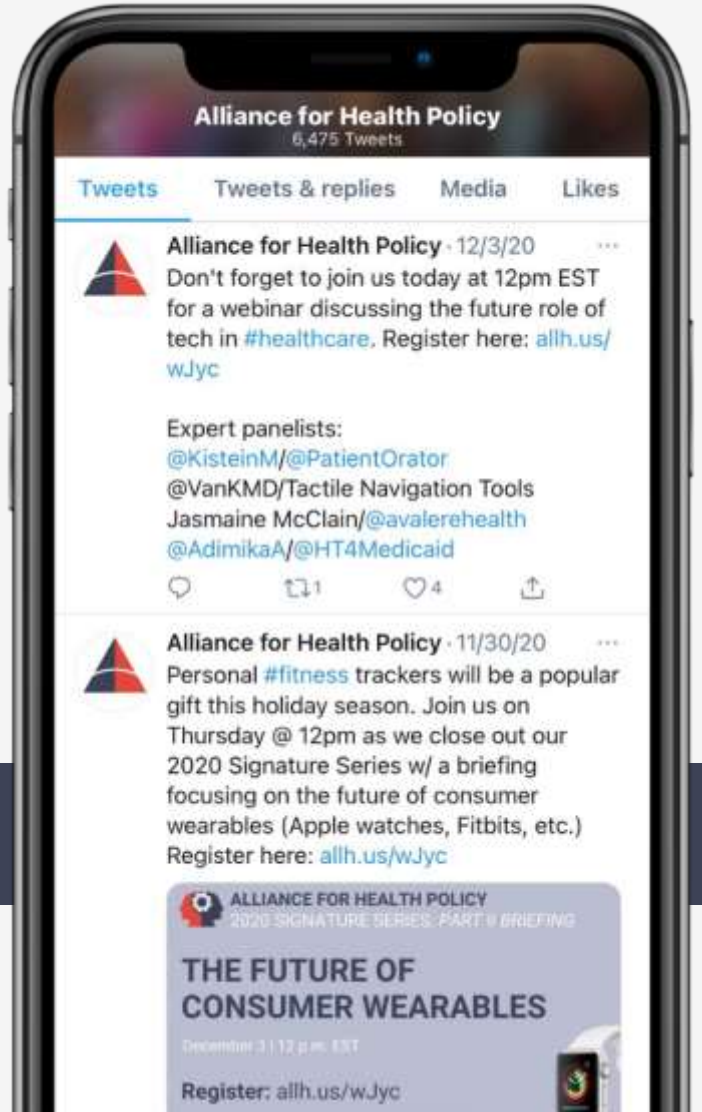

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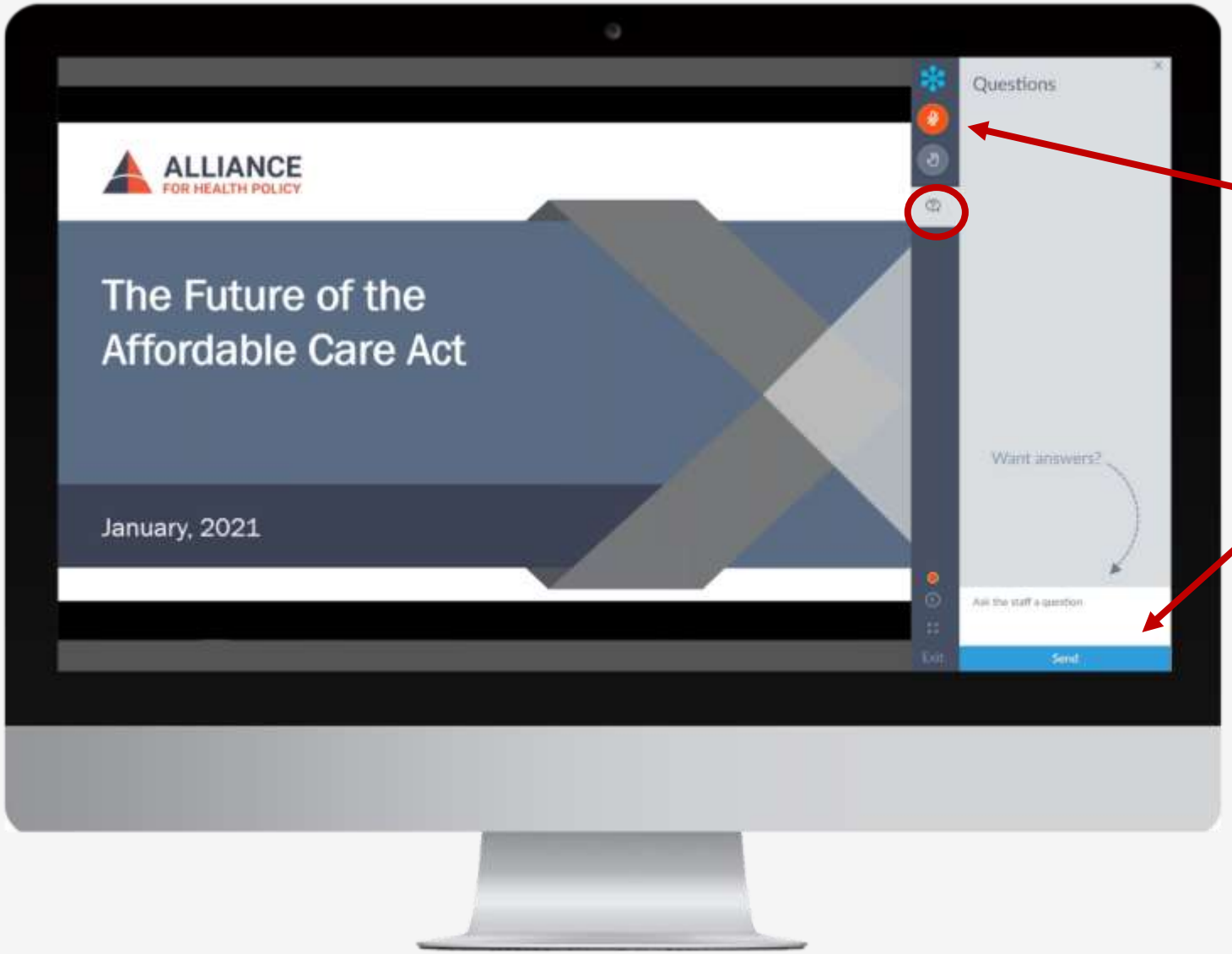


To mute yourself, click the microphone icon. The icon will appear orange when muted.

To ask a question, click the ? icon and enter your question in the chat box below.

@NIHCMfoundation

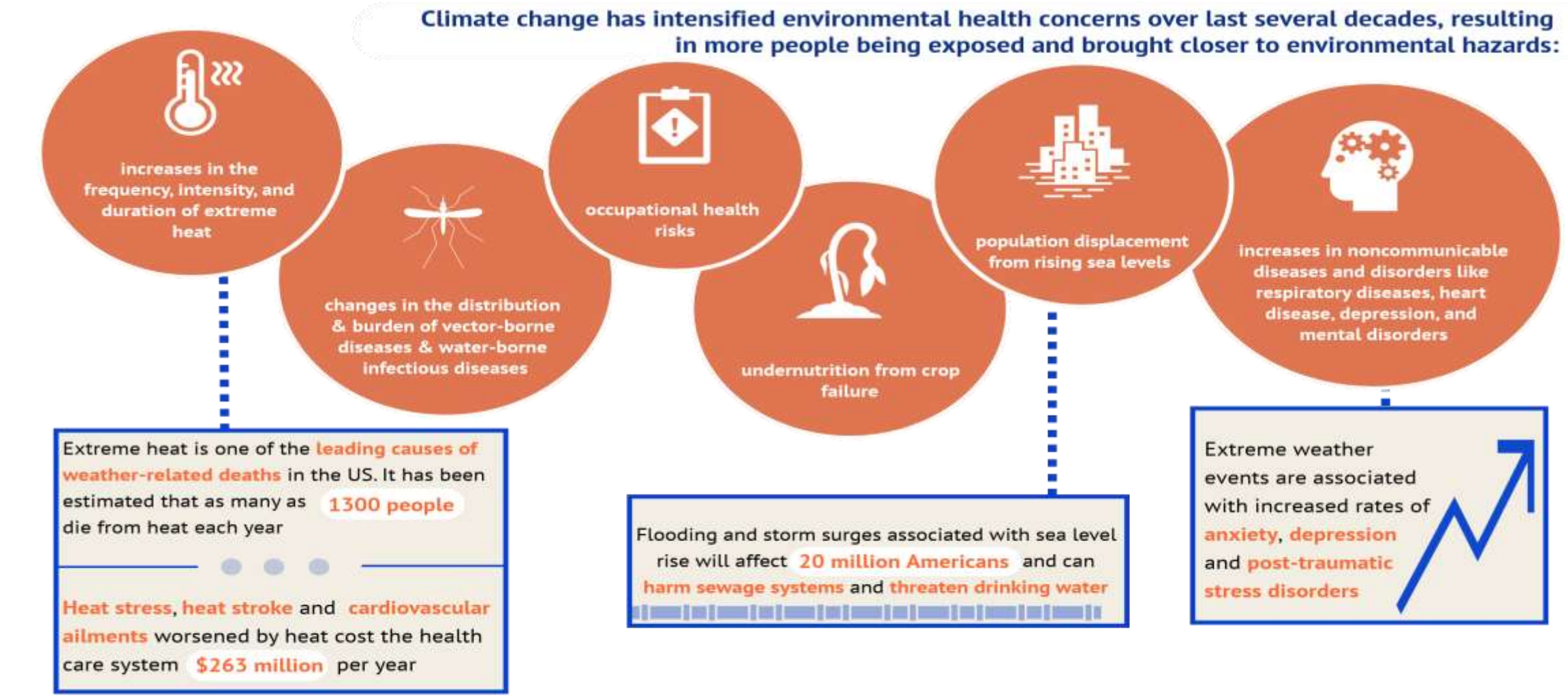
Kathryn Santoro, M.A.

Director of Programming

National Institute for Health Care Management (NIHCM) Foundation

What are the impacts of a changing environment on human health?

NIHCM FOUNDATION



Researchers expect that the health impacts of climate change and the resulting environmental health challenges will be distributed unevenly and preexisting health inequality will be made worse

Full citation and full infographic available at www.nihcm.org

Panelists

Lynn Goldman, M.D., M.S., MPH
Michael and Lori Milken Dean
George Washington University Milken Institute School of Public Health

@GWpublichealth

Richard Jackson, M.D., MPH
Professor Emeritus
UCLA Fielding School of Public Health

@DickJackson23

Keshia M. Pollack Porter, Ph.D., MPH
Vice Dean for Faculty,
Bloomberg Centennial Professor
John Hopkins Bloomberg School of Public Health

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Moderator

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Director of Programming
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JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

Environmental Health Briefing: Introduction to Environmental Health and Policy

Keshia M. Pollack Porter, PhD, MPH
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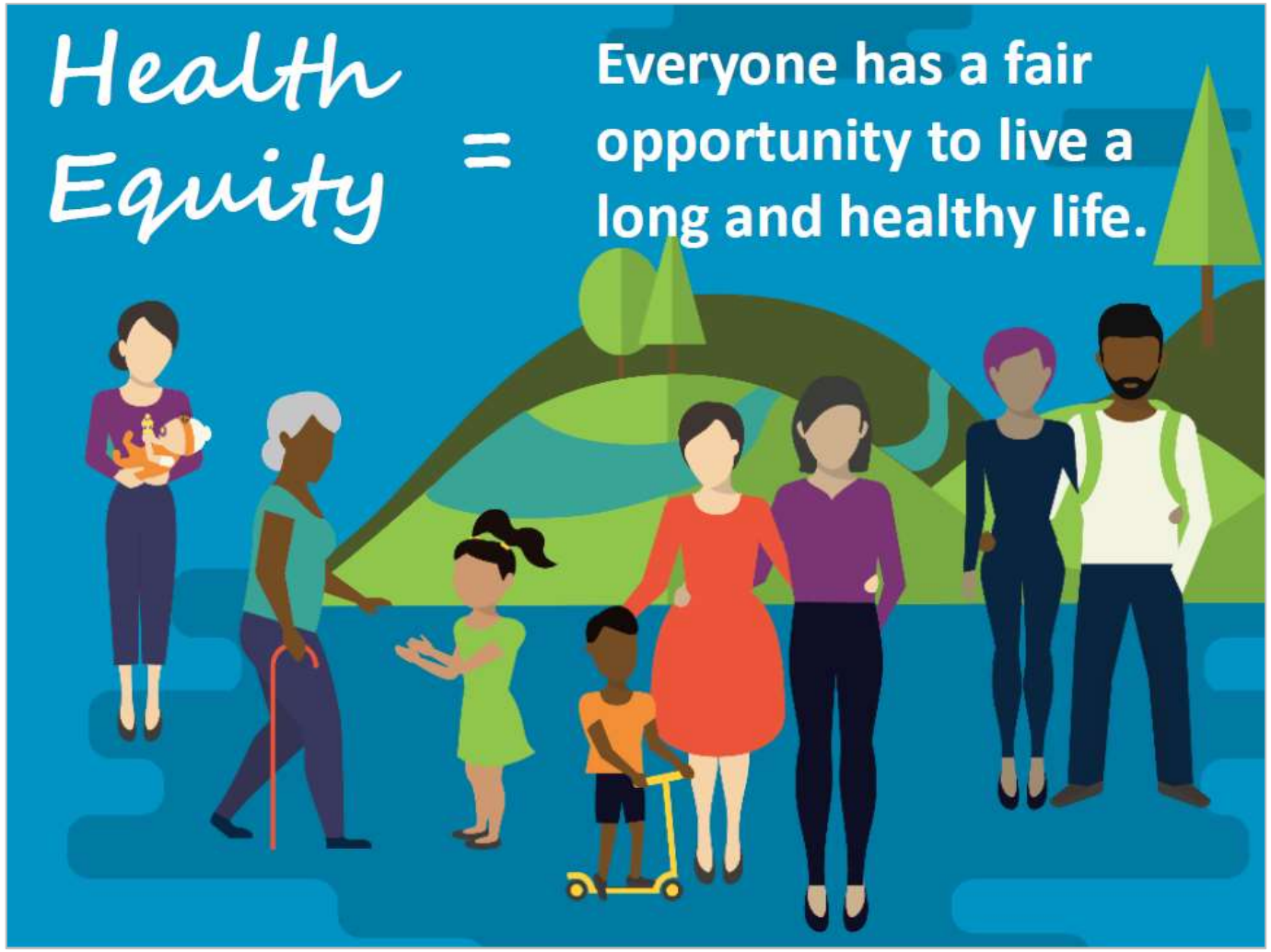
Multisector Influences on Health

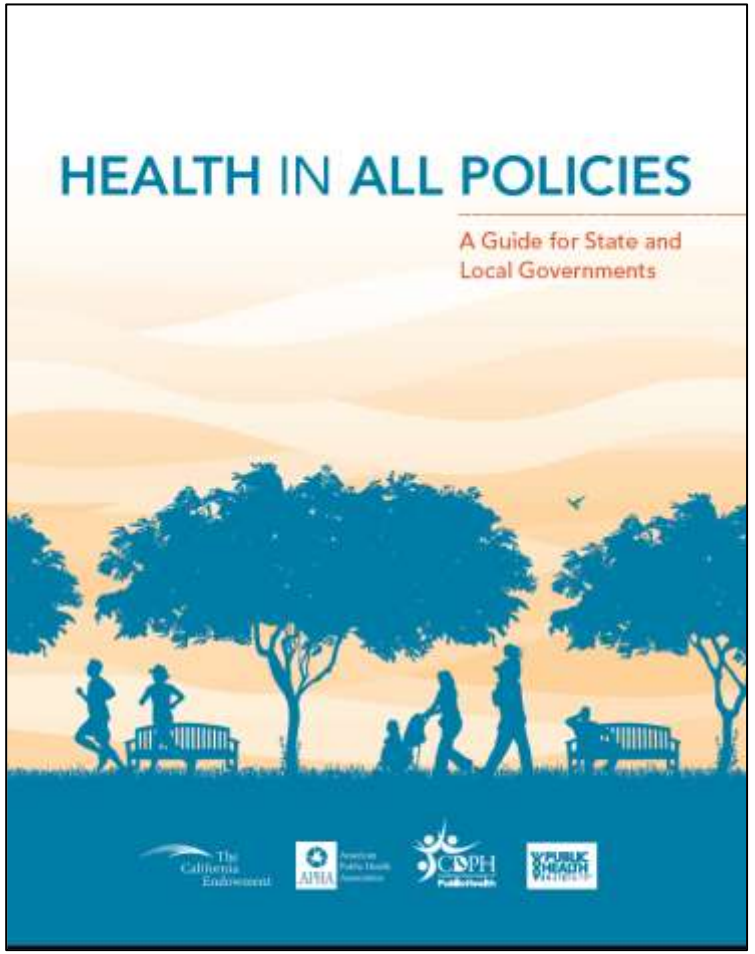
What is Health Equity?



https://www.rwjf.org/content/rwjf/en/library/research/2017/05/what-is-health-equity-.html;
https://images.app.goo.gl/TjfqKjasw21GTQNYA

Health in All Policies (HiAP)

- HiAP is a collaborative approach that involves multiple sections and systematically takes into account the health implication of decisions to improve population health and well-being and health equity
- Data driven approach
- Systems level change
- Seeks synergies and involves collaboration



Rudolph, L., Caplan, J., Ben-Moshe, K., & Dillon, L. (2013). Health in All Policies: A Guide for State and Local Governments. Washington, DC and Oakland, CA: American Public Health Association and Public Health Institute

Tools and Tactics to Achieve HiAP

- Creating cross-sector government structures
- Integrating health into planning processes including zoning updates and General Plans
- Integrating health language into request for proposals (RFPs)
- Developing health-related grant scoring criteria
- Using Health Impact Assessment (HIA) and related tools (e.g., health notes)

Examples: Environmental Health in All Policies

- Housing policy
- Food policy
- Water policy
- Transportation policy

https://www.astho.org/Programs/HiAP/Environmental-HiAP/

@GWpublichealth

Lynn Goldman, M.D., M.S., MPH

Michael and Lori Milken Dean
George Washington University Milken
Institute School of Public Health

Environmental Health Policy

Health

- **In 1945, the World Health Organization (WHO) defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."**

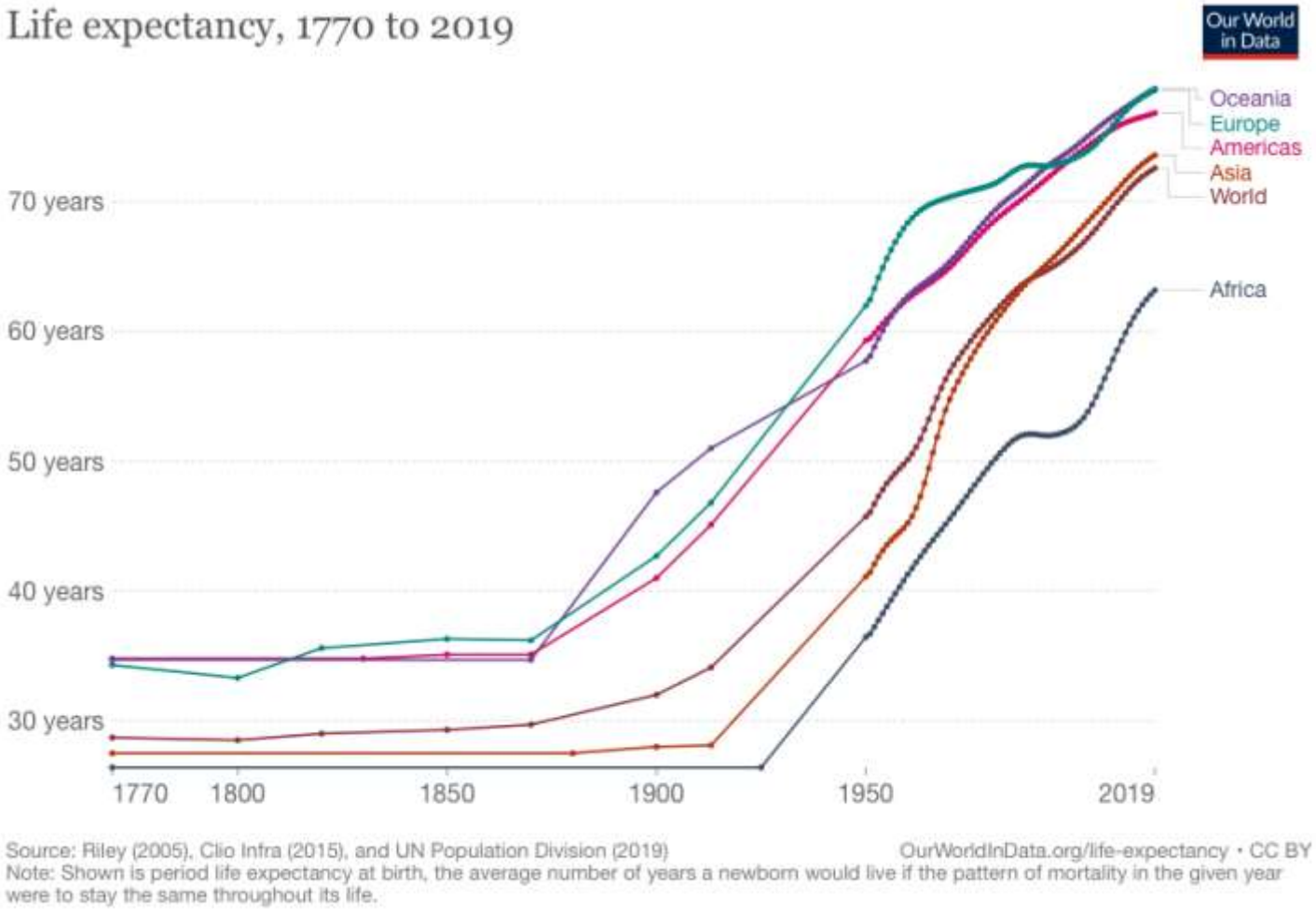
Goals of Environmental Health

- Establish and maintain a healthy livable environment for humans and other species
- Promote an environment that improves well-being and a high quality of mental health
- Allow the environment to be sustainable for the future, YET, allow a setting for population growth, manufacturing, and agriculture today to thrive

Components of Environmental Health

- Natural environment
- Built environment
- Social environment

Environmental protection prolongs life



Reasons for long-term gains in life expectancy

- Sanitation – thereby reducing death by infectious and other diseases expecially infant mortality
- Food – more nutritious and safer food
- Clean air – reduction in air pollution
- Maternal and infant care
- Immunizations
- Antibiotics
- Many other interventions including health care

Some Principles in Environmental Policy

- Prevention as the tool of first resort (or cleanup as a tool of last resort)
- Environmental justice
- Children's health and intergenerational equity
- Ecosystem/community protection
- Considerations of cost, cost effectiveness and who pays (Polluter pays)

Environmental Health Policy Operates at Multiple Levels

- Global – e.g., climate pollution, persistent pollutants
- National – e.g., air pollution, chemicals, pesticides, water, waste
- State & Local
- Nongovernmental – e.g., ESG (Environmental, Social and Governance) policies
- Individual – e.g., household energy use, recycling, consumer choice

@DickJackson23

Richard J. Jackson, M.D., MPH

Professor Emeritus

UCLA Fielding School of Public Health

Alliance for Health Policy

Lead's Lessons For Environmental Public Health Policy

Richard J Jackson MD MPH

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UCLA Fielding School of Public Health

Lecturer, UC Berkeley SPH

November 29,2021

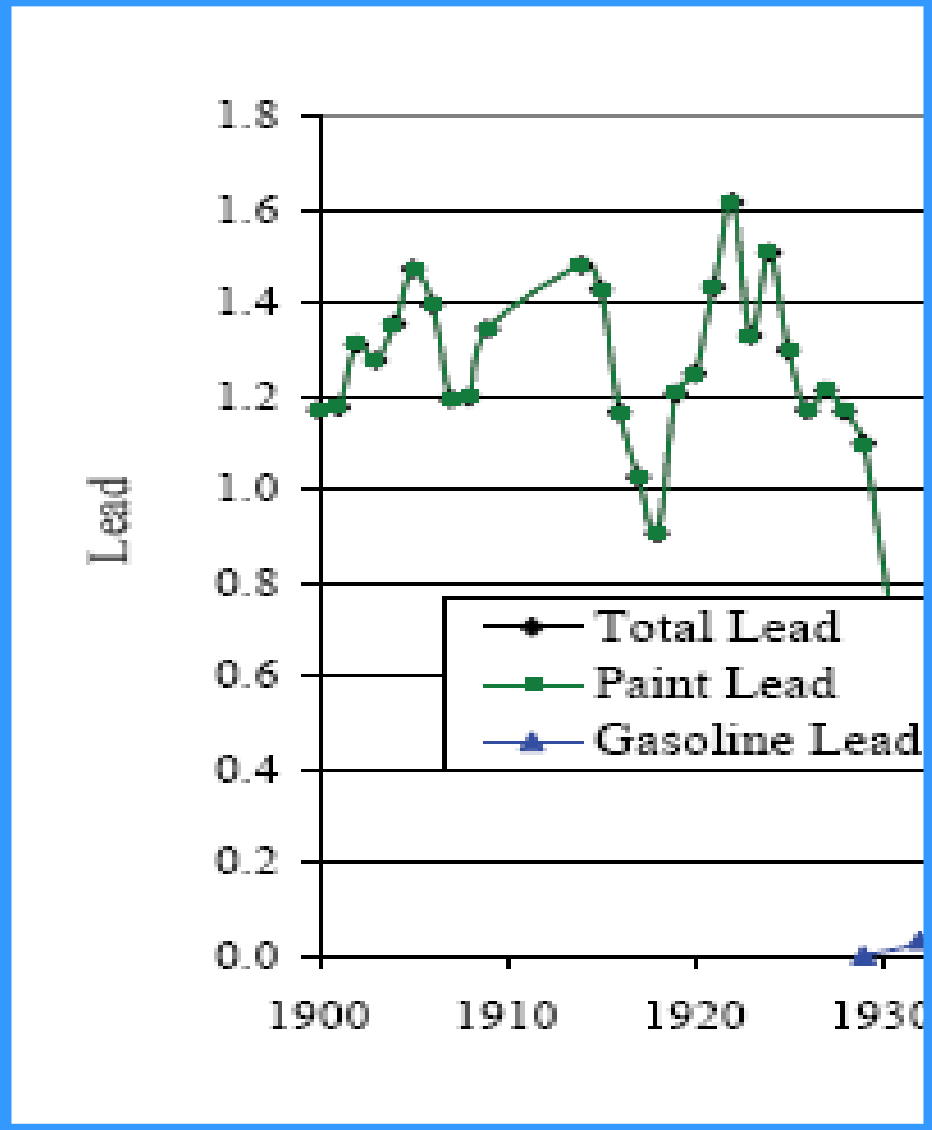
Institute of Medicine

The purpose of public health is to fulfill society's interest in assuring the conditions in which people can be healthy

In the late1960s Childhood Lead Poisoning was an ***Insurmountable*** Challenge

- Lead was everywhere
- Only Blood Leads over 60 mcg/dl were thought to be Toxic
- Average Blood Lead in the US was about 22 mcg/dl
- Large Eastern cities ~10 Lead Poisoning Deaths per year
- Many Children In Hospitals for Treatment

Lead Paint
Especially on Windows and friction surfaces

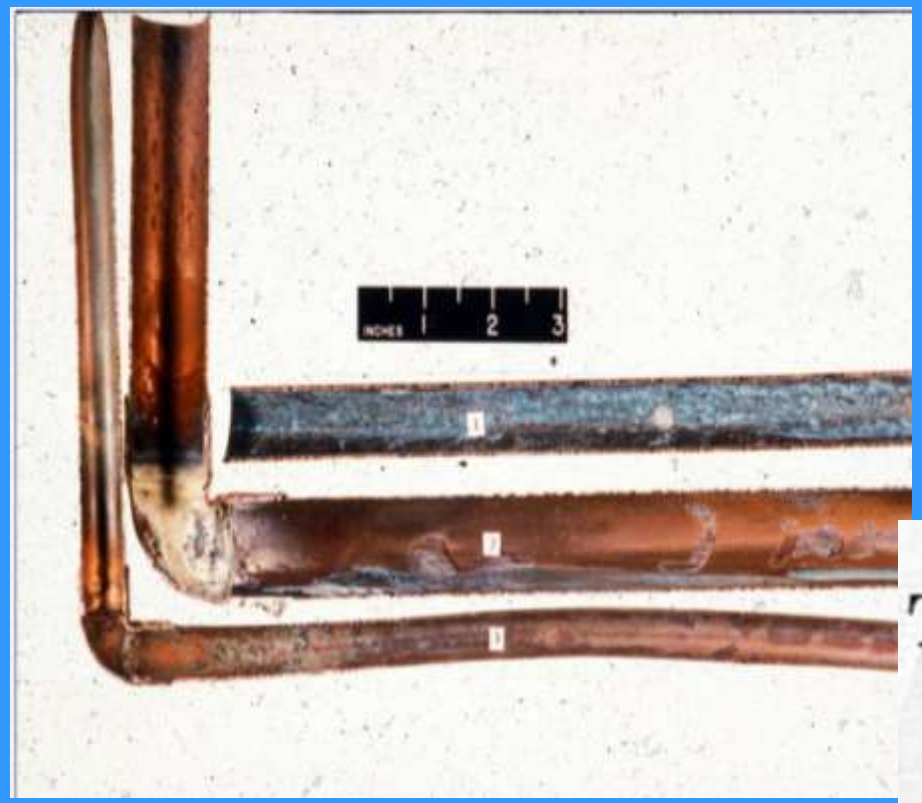


Lead in Paint US 1900-1930

2 pounds of lead per person per year 1900-1930

Lead as kilotons of lead per 1 million population.

Sources. U.S. Geological Survey and U.S. Department of the Interior: 1904-1929; Mineral Resources of the U.S.; 1933-1980, Minerals Yearbook; 2001; U.S. Consumption of Lead in Manufacture of Gasoline Additives, 1941-1986.


INCHES 1 2 3


The Drop of Solder...
MILK
EVAPORATED
that puts a Cow in your Kitchen Cupboard

"Cater to the Children": The Role of The Lead Industry in a Public Health Tragedy, 1900–1955

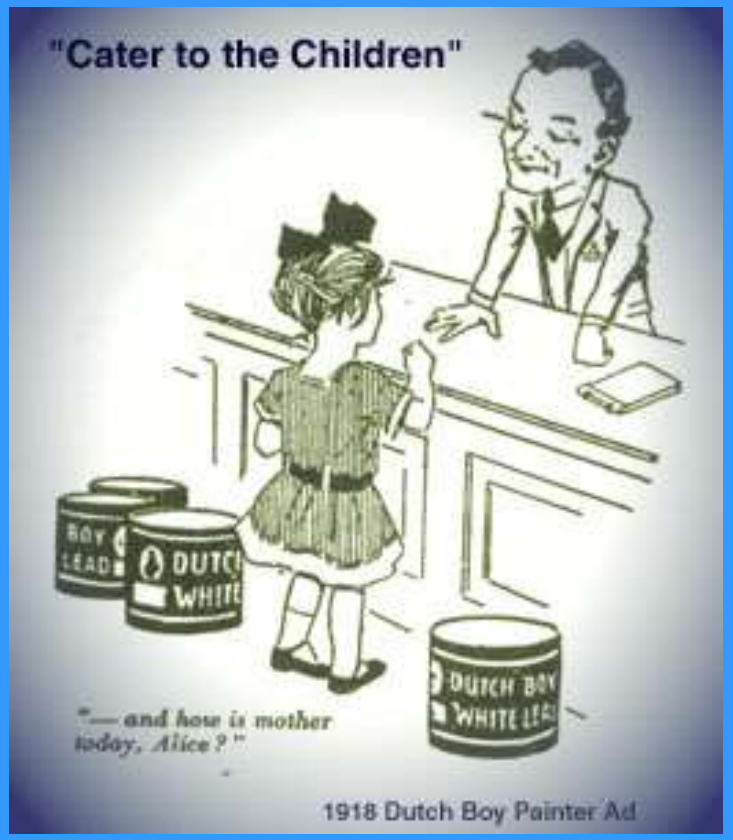
Gerald Markowitz, PhD, and David Rosner, PhD, MSPH

According to the Centers for Disease Control and Prevention, it is estimated that 1 of every 20 children in the United States suffers from subclinical lead poisoning,[1] and a recent article in *Science* argues that "paint appears to be the major source of childhood lead poisoning in the United States."[2] Yet it is only during the past 15 years that the history of this tragic situation has been addressed in any detail,[3–7] primarily through the documentation of childhood
health and me
the 20th centu
influence of th
lar and profes
lead paint pro

own economic interests ahead of the welfare of the nation's children.

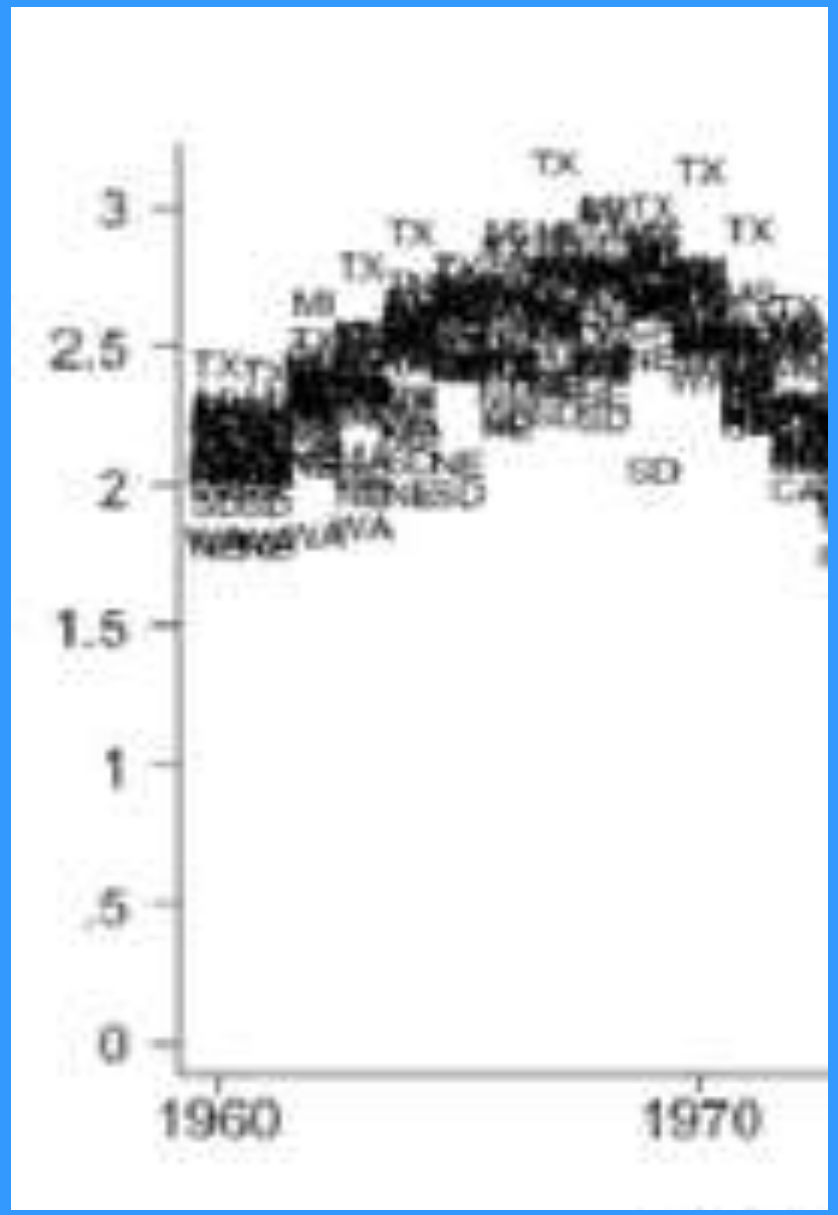
Medical Knowledge of the Dangers of Lead-Based Paint

Historians have shown that knowledge of the dangers of lead poisoning to workers and children can be traced back into the 19th cen-



Addition of tetraethyl lead at ~2.5 grams per gallon began in the 1930s.

(12 gallons of gasoline had one ounce of lead)

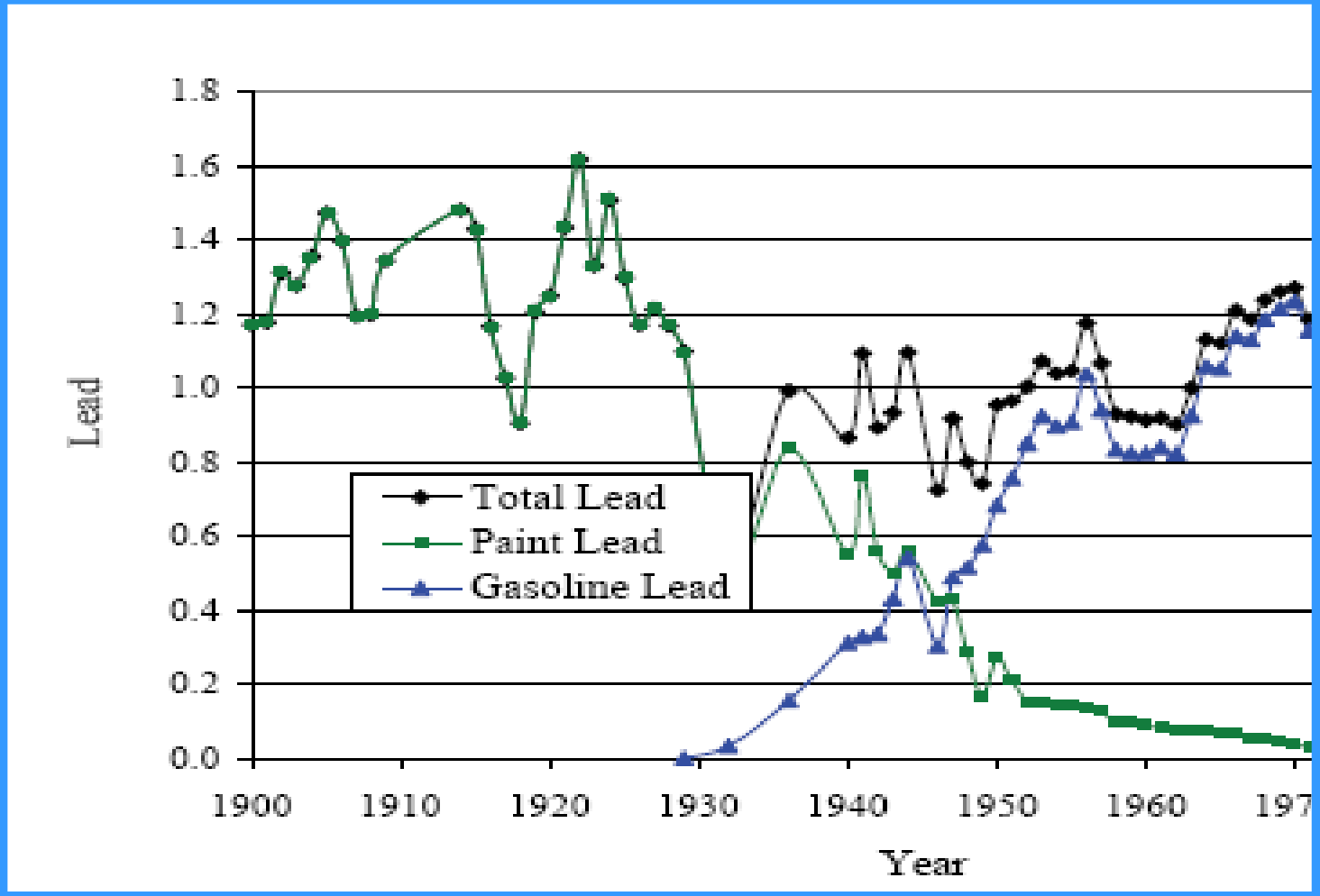


kilotons per million persons
per year by state”

US Gasoline Lead Exposure 1960-1974

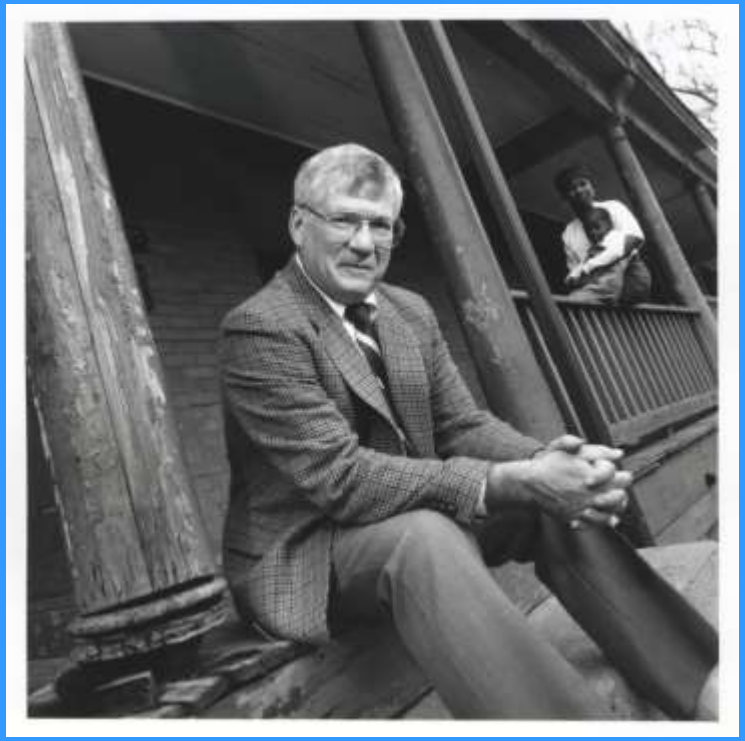
e.g. Each year
Texas Used
Six pounds of Lead
in Gasoline
per Texan

Lead in Paint & Gasoline – US 1900-1970



Lead as kilotons of lead per 1 million population.

Sources. U.S. Geological Survey and U.S. Department of the Interior: 1904-1929; Mineral Resources of the U.S.; 1933-1980, Minerals Yearbook; 2001; U.S. Consumption of Lead in Manufacture of Gasoline Additives, 1941-1986.



Herbert L Needleman MD FAAP
1927 - 2017

Children who had survived lead poisoning were not “fine”

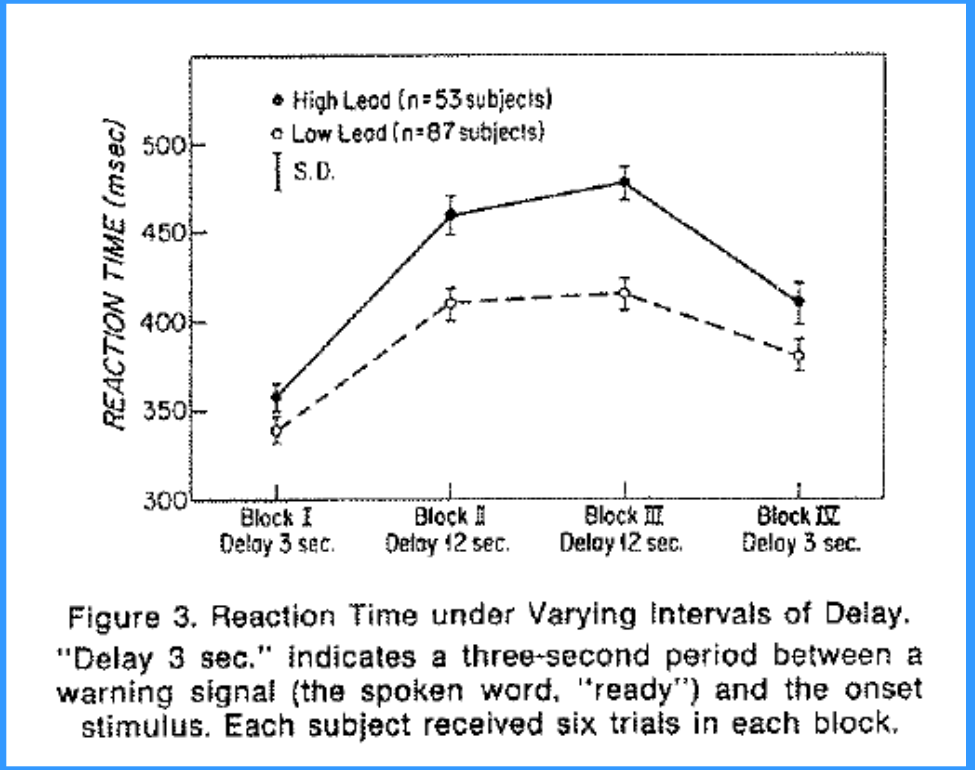


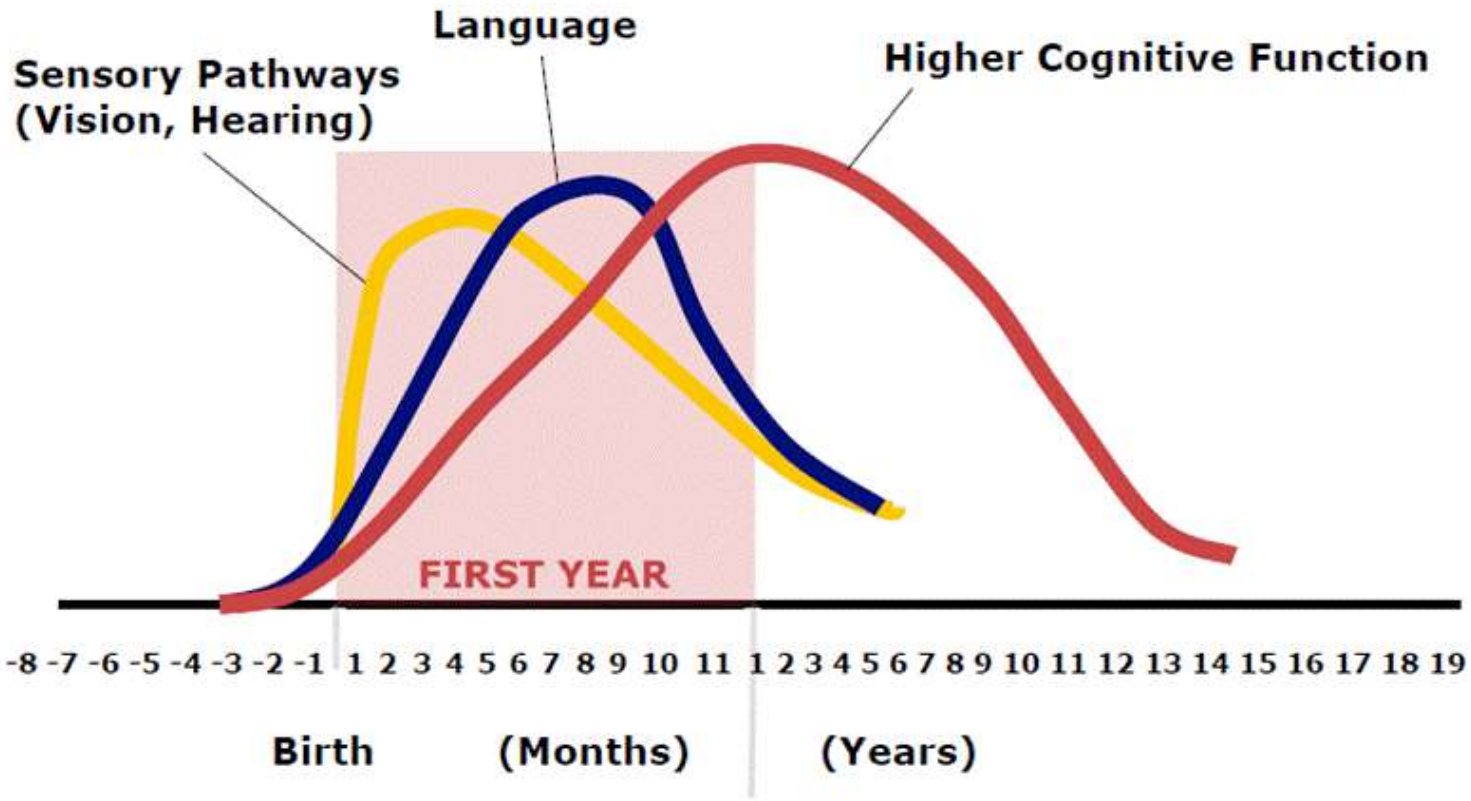
Figure 3. Reaction Time under Varying Intervals of Delay. "Delay 3 sec." indicates a three-second period between a warning signal (the spoken word, "ready") and the onset stimulus. Each subject received six trials in each block.

Center on the Developing Child
HARVARD UNIVERSITY

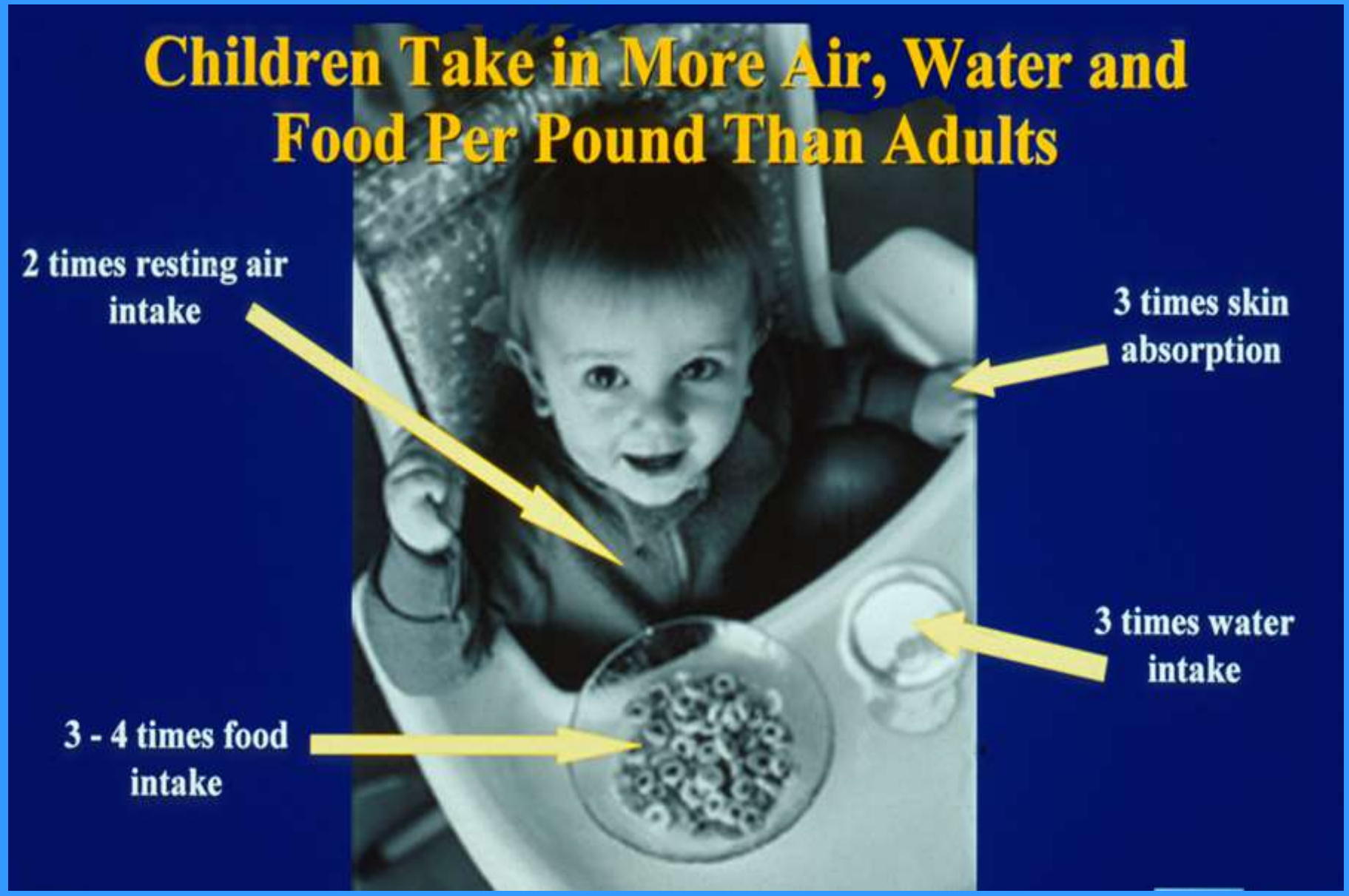
Human Brain Development

Synapse Formation Dependent on Early Experiences

(700 per second in the early years)



Source: C. Nelson (2000)



"Children Are Not Little Adults"

The New England
Journal of Medicine

Volume 300 MARCH 29, 1979 Number 13

DEFICITS IN PSYCHOLOGIC AND CLASSROOM PERFORMANCE OF CHILDREN WITH ELEVATED DENTINE LEAD LEVELS

HERBERT L. NEEDLEMAN, M.D., CHARLES GUNNOE, ED.D., ALAN LEVITON, M.D., ROBERT REED, PH.D., HENRY PERESIE, PH.D., CORNELIUS MAHER, PH.D., AND PETER BARRETT, B.S.

Abstract To measure the neuropsychologic effects of unidentified childhood exposure to lead, the performance of 58 children with high and 100 with low dentine lead levels was compared. Children with high lead levels scored significantly less well on the Wechsler Intelligence Scale for Children (Revised) than those with low lead levels. This difference was also apparent on verbal subtests, on three other measures of auditory or speech processing and on a measure of attention. Analysis of variance showed that none of these differences could be explained by any of the 39 other variables studied.

Also evaluated by a teachers' questionnaire was the classroom behavior of all children (2146 in number) whose teeth were analyzed. The frequency of nonadaptive classroom behavior increased in a dose-related fashion to dentine lead level. Lead exposure, at doses below those producing symptoms severe enough to be diagnosed clinically, appears to be associated with neuropsychologic deficits that may interfere with classroom performance. (N Engl J Med 300:689-695, 1979)

THE neurotoxic properties of lead at high dose are well known and not a subject of general con-

clinics, schools for the retarded or psychiatric clinics may not be representative of the population in

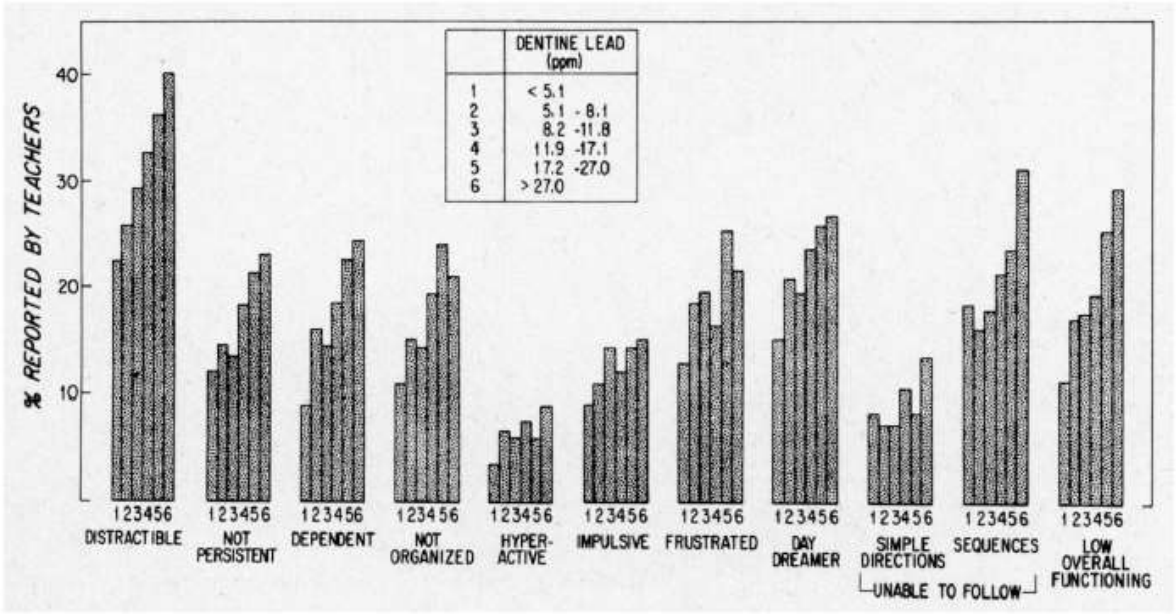
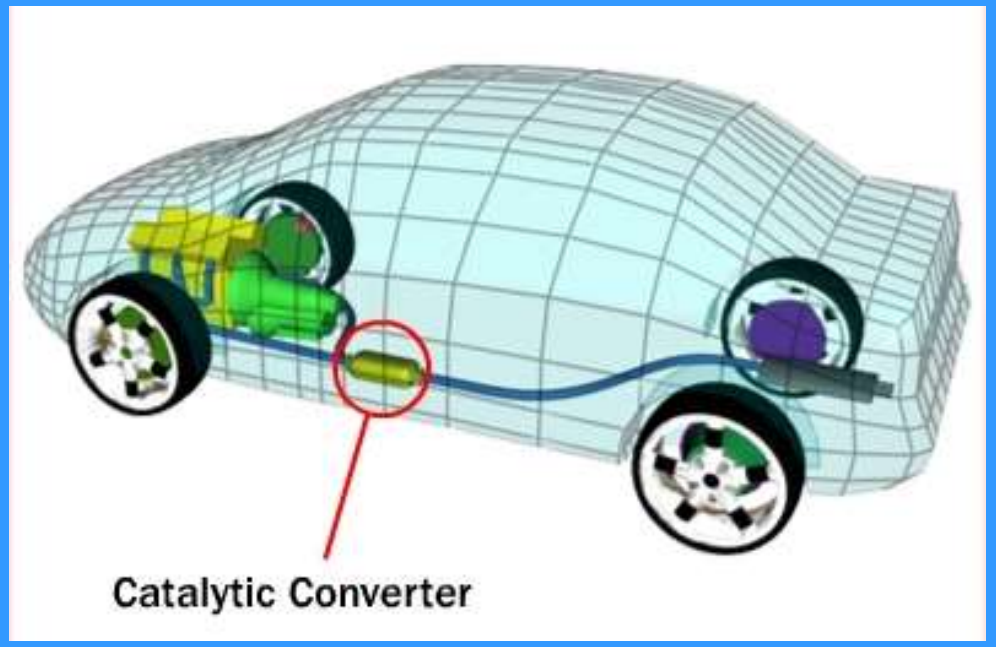


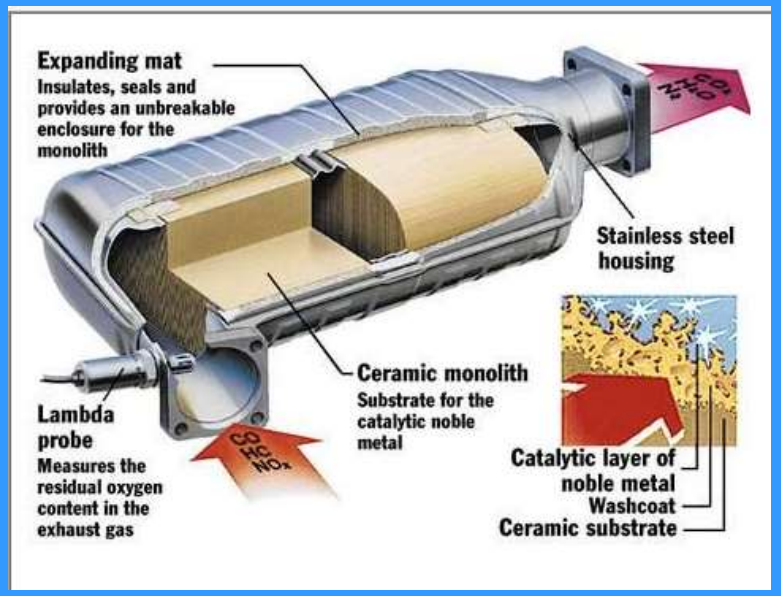
Figure 2. Distribution of Negative Ratings by Teachers on 11 Classroom Behaviors in Relation to Dentine Lead Concentration.

The group boundaries were chosen to obtain symmetrical cell sizes for the median (Groups 1 and 6 = 6.8 per cent, Groups 2 and 5 = 17.6 per cent, and Groups 3 and 4 = 25.6 per cent).

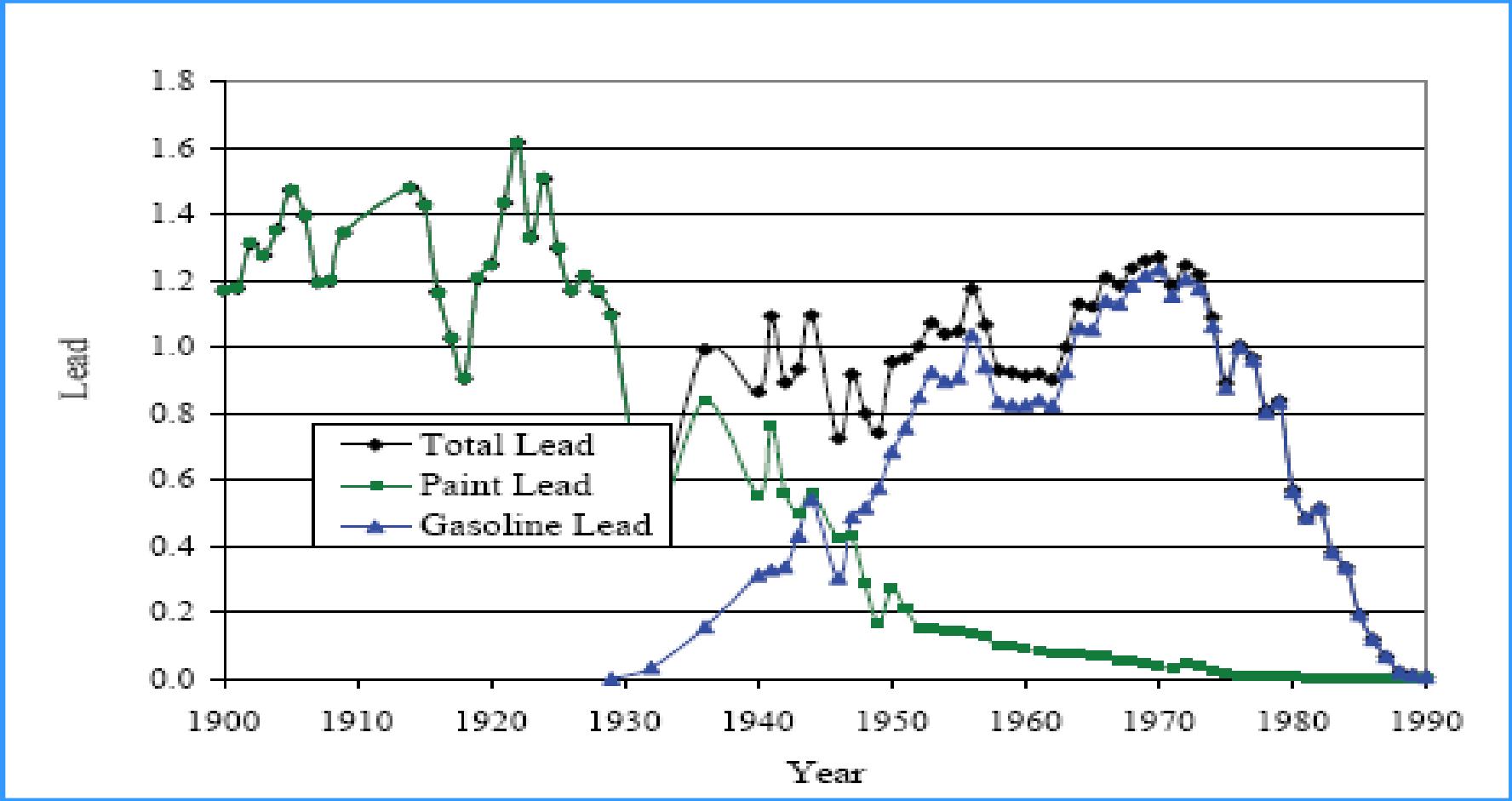
Downtown Los Angeles 1960s



Lead Ruins
Catalytic Convertors…
California Required
Unleaded Gasoline



Lead in Paint & Gasoline – US
1900-1990



Lead as kilotons of lead per 1 million population.

*Sources.*U.S. Geological Survey and U.S. Department of the Interior: 1904-1929; Mineral Resources of the U.S.; 1933-1980, Minerals Yearbook; 2001; U.S. Consumption of Lead in Manufacture of Gasoline Additives, 1941-1986.

Society Benefits from Preventing Lead Exposure

Source: Environ Health Perspect 110:563-569 (2002).

Reducing blood lead levels by 10 μg/dL raises IQ by 2.6 (1.9-3.2) points

Children's Health Articles

Economic Gains Resulting from the Reduction in Children's Exposure to Lead in the United States

Scott D. Grosse,[1] Thomas D. Matte,[1] Joel Schwartz,[2] and Richard J. Jackson[1]

[1]National Center for Environmental Health, Centers for Disease Control and Prevention, Atlanta, Georgia, USA; [2]School of Public Health, Harvard University, Cambridge, Massachusetts, USA

In this study we quantify economic benefits from projected improvements in worker productivity resulting from the reduction in children's exposure to lead in the United States since 1976. We calculated the decline in blood lead levels (BLLs) from 1976 to 1999 on the basis of nationally representative National Health and Nutrition Examination Survey (NHANES) data collected during 1976 through 1980, 1991 through 1994, and 1999. The decline in mean BLL in 1- to 5-year-old U.S. children from 1976–1980 to 1991–1994 was 12.3 μg/dL, and the estimated decline from 1976 to 1999 was 15.1 μg/dL. We assumed the change in cognitive ability resulting from declines in BLLs, on the basis of published meta-analyses, to be between 0.185 and 0.323 IQ points for each 1 μg/dL blood lead concentration. These calculations imply that, because of falling BLLs, U.S. preschool-aged children in the late 1990s had IQs that were, on average, 2.2–4.7 points higher than they would have been if they had the blood lead distribution observed among U.S. preschool-aged children in the late 1970s. We estimated that each IQ point raises worker productivity 1.76–2.38%. With discounted lifetime earnings of $725,300 for each 2-year-old in 2000 dollars, the estimated economic benefit for each year's cohort of 3.8 million 2-year-old children ranges from $110 billion to $319 billion. *Key words*: child, cognition disorders/chemically induced/prevention and control, environmental exposure/economics, environmental monitoring, intelligence, lead/adverse effects, blood lead. *Environ Health Perspect* 110:563–569 (2002). [Online 15 April 2002] http://ehpnet1.niehs.nih.gov/docs/2002/110p563-569grosse/abstract.html

IQ levels and of IQ on earnings. Then, for each component of the model underlying our benefit calculations, we briefly discuss the available evidence. Finally, we present the assumptions for our model and the results of our analysis. Both the conceptual model and specific methods relating to the impact of lead on cognitive ability and the economic valuation of cognitive ability are largely based on previously published work of one of the authors (6).

We represented the impact of lead in the environment on economic productivity by a simplified causal model (Figure 1). First, lead in the environment produces human exposure to lead, as quantified through BLLs. Second, BLLs influence impairment of cognitive ability among children, as measured in scores on intelligence tests conducted at school age. Third, cognitive

Economic Value of an IQ Point

$14,500

($12,700 - $17,200)

(in year 2000 dollars)

Environ Health Perspectives 110:563-569 (2002).

Economic Benefit of Preventing Lead Exposure in U.S. Cohort

Annual cohort of children reaching age 2:

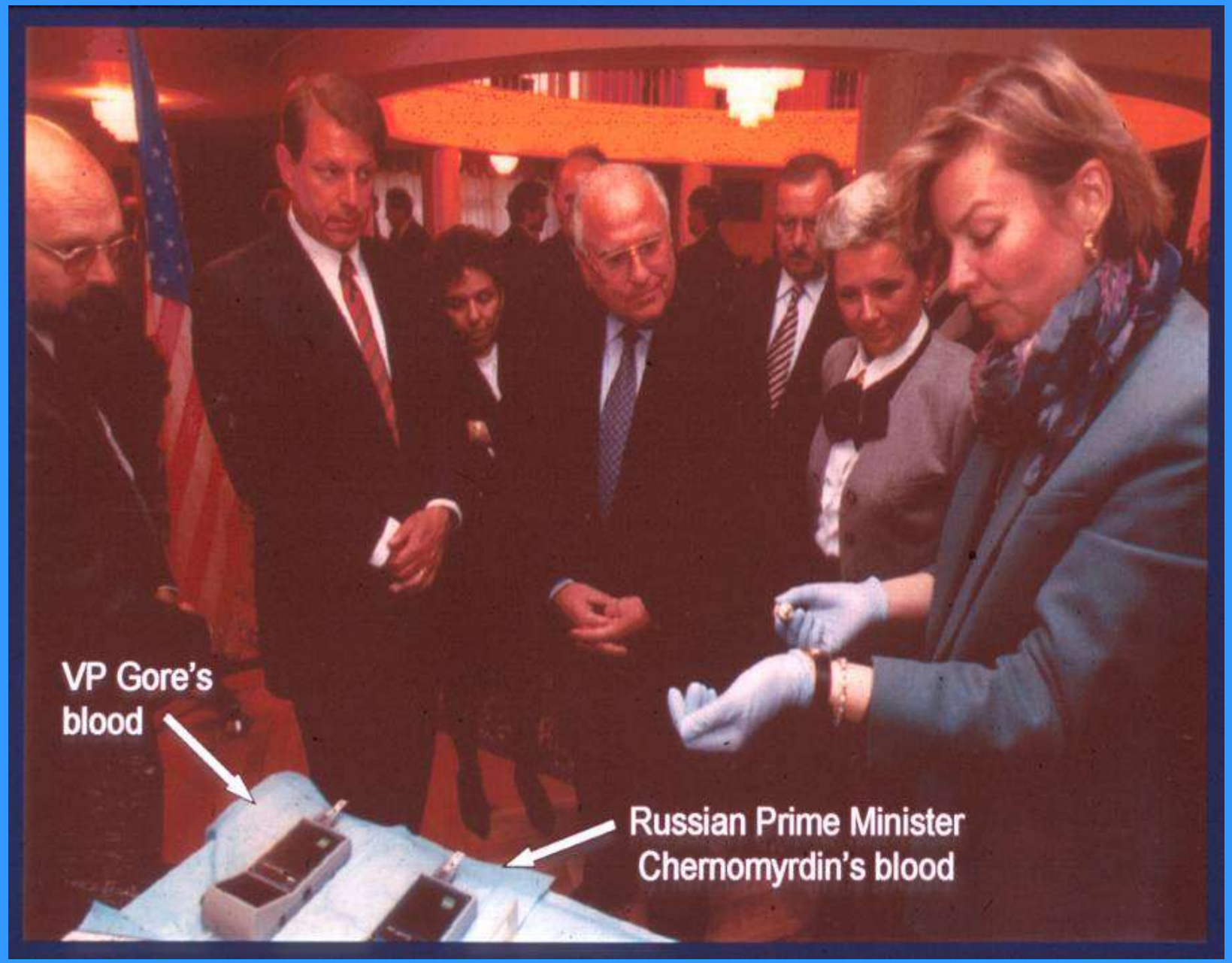
3.8 million

Estimated benefit per each year's cohort:

$213 billion

($110 - $318 billion)

Environmental Health Perspectives 110:563-569 (2002).



These data convinced governments to cease using leaded gasoline

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Please fill out the evaluation survey you will receive immediately after this presentation, or via email this afternoon!

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Upcoming Event

NOV
30

Policymaking to Support the Health of Native American People

12:00 pm – 1:00 pm ET

https://register.gotowebinar.com/register/7354711762322236429

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