Healthy and Sustainable Environments for Children: Turning Research into Practice

Sally Perreault Darney, Editor in Chief
Sally.Darney@nih.gov
www.ehponline.org

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Japanese Society of Public Health COI Declaration

• National Institute of Environmental Health Sciences, National Institutes of Health, U.S.A.
  Sally P. Darney

• The presenter has no conflict of interest with any corporate organizations relating to this presentation
How I became interested in children’s environmental health research

- 1970s, teaching biology at local college, and health education in a family planning clinic
- 1977-80, PhD biomedicine, thesis on sperm physiology and male infertility
- 1981-84, postdoctoral research at The Johns Hopkins University School of Public Health on sperm microinjection into hamster eggs

1984 - 2014, EPA’s Office of Research and Development – toxicology research

RESEARCH ABOUT:
- Reproductive toxicology, chemicals
- Sperm measures
- Reproductive health in men (air and water quality)
- Early pregnancy loss
- Children’s health research roadmap
Reproductive epidemiology: air pollution ~ male reproductive health

Coal mining and use in Czech Republic

Semen quality in young men

Research to practice

- Influenced Czech governmental actions to improve air quality by switching to gas for heating and closing some power plants
- Led to more research in Prague where air pollution from traffic and has become a concern (men and women)
- Demonstrated value of longitudinal semen studies and inclusion of sperm DNA and chromosome outcomes in other studies
- Contributed to design of EPA study of drinking water disinfection byproducts and male reproduction needed by US EPA
Since 2015, putting it all together!
Editor in Chief of EHP at National Institute of Environmental Health Sciences (NIEHS)

Vision:

EHP is recognized as the leading environmental health journal, publishing the highest quality and most important research, news and commentary in the field; and,

EHP makes new knowledge accessible and understandable by many diverse stakeholders

Research motivated by concern about real-world exposures

POCs in Breast Milk: PCBs, DDT, Dioxins

Pesticides in Foods
Estrogens in Soy Formula

Plasticizers in products: BPA, phthalates
Research and action are needed to:

• Fill gaps in the evidence base for medical diagnosis and treatment
• Provide reliable advice to pregnant women, parents, and youth
• Support both public health practices and environmental regulations that protect and promote children’s health
• Improve public trust of science
• Inform those who make the laws and public health policies

Importance of life-course exposures and lasting health impacts
Key challenges and trends in children’s environmental health research

- Larger and longer cohort studies such as JECS
  - Large databases to sustain over time
  - Data sharing and access while ensuring protection of human subjects
  - Biobanks: large inventories, Q.A., sustainability, access control
  - Publication plans involving many investigators and students

Consideration of multiple exposures AND multiple health outcomes across all life stages

* Exposures from parents: smoking and air pollution; chemicals from work; chemicals used at home; food choices
Emerging areas of interest

- **Microbiome**: formation after birth and stability across the life course +/- chemical exposures
- **Environmental vs. inherent** contributions to children’s health
- **Role of epigenetic reprogramming** (Developmental Origins of Disease)

Early-life environments and risk of chronic diseases in later life

- **Neurodegenerative**: Alzheimer’s disease; Parkinson’s disease
- **Obesity**: complex interactions of genetics, diet, exercise, inflammation, diabetes, etc.
- **Cardiovascular disease**: contribution from air pollution
- **Role of the “built environment”** in maternal and child health: access to healthy food, walkable communities, safe play places, “green schools”
Journals can foster children’s health knowledge transmission to all stakeholders:

- **Researchers**: By publishing original research articles to fill critical data and knowledge gaps (basic and applied)

- **Policy makers**: By publishing systematic reviews that weigh the evidence according to clear and objective criteria

- **Public**: By including articles on children’s health written for lay audiences; podcasts; video interviews; commentaries; links to other resources

- **All**: by using social media to “push” out content

Accessibility helps ensure knowledge transmission

- Online open access at [www.ehponline.org](http://www.ehponline.org)

- No publication fees or page charges (funded by NIEHS)

- Readers can sign up for notifications of new content

- Social media: Twitter and Facebook @EHPonline
Longstanding emphasis on children’s health

Birth Outcomes following Occupational Exposure to EDCs: A European Meta-Analysis

Abstracts of all relevant articles, grouped by:

• Disease outcomes
• Exposures
• Methodologies and populations
Authors: What YOU can do

• Follow widely accepted reporting guidelines to ensure transparency, reproducibility and rigor
  – ARRIVE for animal and experimental studies
  – STROBE for observational (human) studies
  – PRISMA for systematic reviews

• Make your data accessible and re-usable in online data access sites designed for data sharing (e.g. NIH genomics, Dryad)

• Volunteer to be on peer review boards and governmental or community advisory boards
Authors can also:

• Work with journal editors to
  – Write short summaries in “reader friendly” language
  – Develop graphical abstracts
  – Participate in webinars and podcasts

• Work with university public affairs staff
  – Press releases
  – Newsletters
  – Learn to talk with press

Press releases are powerful tools

“Prenatal Fluoride Exposure and Cognitive Outcomes in Children at 4 and 6–12 Years of Age in Mexico” (Bashash et al. EHP, 2017)

– First week after publication:
  • 10,026 web hits
  • 675 PDF downloads
New Study Confirms Fluoride Harms Fetal Brain; Lowers IQ

“The results of the first ever US government funded study of fluoride and IQ have just been published. A team of researchers found a statistically significant association between fluoride exposure in women during pregnancy and a lowering of IQ in their children, reports the Fluoride Action Network.”

Another example:


- First week after publication:
  - 1,430 web hits
  - 266 PDF downloads
Supporting “research to practice”

• Identify and engage “knowledge users” at the start
  – Community groups
  – Regulatory agencies (national and local)
  – Medical care providers (physicians, nurses, health care workers)

• Create an “outreach plan” from the start

NIEHS/EPA Children’s Environmental Health and Disease Prevention Research Centers Program

• 1998 – 2018 Report
• Summarizes research from 24 Centers
• Includes: Outcomes, Exposures, Community Outreach Efforts
Examples from NIESH/EPA Children’s Health Research Centers

**RESEARCH ON:**
- Farm workers bring pesticides home (U. Washington)
- “Integrated Pest Management” (IPM) approach (Columbia U.)
- Exposures common in schools (several)

**PRACTICE:**
- Workers taught to remove clothes and wash before contact with children
- IPM adopted by public housing authorities in NYC
- EPA developed “Tools for Schools”

Scientists, health care providers, and advocates can also:

- Speak at public meetings, webinars, and podcasts
- Write about your research (and that of others) for newspapers and your personal social networking avenues (blog about children’s health)
- Create or share existing online resources
Online resource

https://CEHN.org Children’s Environmental Health Network

Online resource

https://www.epa.gov/iaq-schools US EPA materials about indoor air quality (IAQ) and “Tools for Schools” kit

Creating Healthy Indoor Air Quality in Schools

Promote a healthy learning environment at your school to reduce absenteeism, improve test scores and enhance student and staff productivity.

Adopting IAQ Best Practices

Learning and Training

Indoor Air Quality Home Page

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School IAQ
Thank you!

Sally.Darney@NIH.gov

https://www.EHPonline.org