

Jenna Elizabeth Forsyth

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I am an environmental health researcher at Stanford University focused on reducing exposure to environmental toxins. I am a problem solver at heart and have spent 15 years addressing global environmental problems, particularly contaminants in air, water, soil, and food, with an emphasis on lead exposure. Recently, I have led studies to understand and reduce lead exposure from adulterated spices and polluting industries.

EDUCATION

Stanford University, Stanford, CA

- PhD, Environment and Resources, June 2019
- Dissertation: “Root causes of lead exposure in rural Bangladesh”
- Co-founder of the International Community Health and Development Group (2016-present)
- Independently raised nearly \$100,000 to complete dissertation research
- Primary author on successful grants totaling more than \$1,000,000 in 3 years

University of Washington, Seattle, WA

- Master of Science in Environmental Engineering (M.S.E.)
- Graduate Certificate in Global Health
- NSF Graduate Research Fellow, 3.96 GPA

Carleton College, Northfield, MN

- B.A. degree (Biology) and Certificate of Advanced Study in French
- *Summa cum laude*, 3.9 GPA; Carleton Scholar; Dean’s List

RESEARCH EXPERIENCE AND GRANTS

Received more than \$1,124,816 in funding as primary author and \$5,050,000 in funding as co-author on grants.

\$776,543 (primary author)

Effectiveness of nation-wide lead-tainted turmeric reduction intervention in reducing lead exposure among pregnant women and children 2021-2025

- Funder: Givewell, Open Philanthropy, Pure Earth
- Assessing lead exposure among 500 pregnant women and 900 children in multiple districts of Bangladesh in 2022 and comparing exposure with individuals of similar ages from 2012-2015. I will use multiple exposure assessment techniques, and measure blood and toe nails to improve methods.
- Partners: International Centre for Diarrhoeal Disease Research, Bangladesh

\$348,273 (primary author)

Identifying the most significant contributors to child lead exposure in Dhaka, Bangladesh 2021-2024

- Funder: Thrasher Research Fund
- I designed the study and am overseeing data collection and analysis for a source attribution study of 500 randomly selected children in Dhaka, Bangladesh. This is the first representative sample of children to assess child lead exposure in an urban site. The findings will inform intervention to reduce exposure from key lead sources.
- Partners: International Centre for Diarrhoeal Disease Research, Bangladesh

\$1,800,000 (co-author)

Improving health, intelligence, and economic growth by reducing lead exposure 2018-2026

- Funder: Stanford King Center on Global Development
- I am managing the research agenda and implementation of lead exposure-reduction initiatives related to child lead exposure assessments and interventions related to turmeric and batteries as sources of exposure

in South Asia. Intervention related to turmeric reduced the prevalence of lead-tainted turmeric by more than 98% within 1 year.

- **Partners:** International Centre for Diarrhoeal Disease Research, Bangladesh, Pure Earth, Aga Khan University Pakistan

\$200,000 (co-author)

Heavy metal pollution and maternal health in Bangladesh

2021-2023

- **Funder:** Stanford University Environmental Ventures Project
- Assessing the relationship between stillbirths and environmental exposure to heavy metals.
- **Partners:** International Centre for Diarrhoeal Disease Research, Bangladesh

\$2,500,000 (co-author)

RINew: Research on Integration of Nutrition Early Childhood Development WASH

2016-2020

- **Funder:** Bill and Melinda Gates Foundation
- Student co-investigator integrating a lead exposure reduction module into a household-based intervention to improve child development in rural Bangladesh.
- **Partners:** International Centre for Diarrhoeal Disease Research, Bangladesh, University of California, Berkeley, University of California, Davis

\$550,000 (co-author)

Optimizing windows to improve ventilation in Dhaka slums

2016-2019

- **Funders:** Unorthodox Philanthropy (\$500,000) and Stanford's Center for Innovation in Global Health (\$50,000)
- Student co-investigator with Professor Steve Luby assessing ventilation in urban slums and developing structural interventions to improve ventilation.
- **Partners:** International Centre for Diarrhoeal Disease Research, Bangladesh, Johns Hopkins University, University at Buffalo

PEER-REVIEWED PUBLICATIONS

Total citations: 475; H-index: 10

1. **Forsyth, JE**, Baker M, Nurunnahar S, Islam S, Saiful Islam M, Plambeck E, Winch PJ, Mistree D, Luby SP, Rahman M. Food safety policy enforcement and associated actions reduce turmeric lead chromate adulteration across Bangladesh. *Environ Res.* 2023 Sept 1; 232:1-11.
2. Lopez, AM, Nicolini CM, Aeppli M, Luby SP, Fendorf S, **Forsyth, J.E.** Assessing Analytical Methods for the Rapid Detection of Lead Adulteration in the Global Spice Market. *Environ Sci Technol.* 2022, Nov 7.
3. Brown MJ, Patel P, Nash E, Dikid T, Blanton C, **Forsyth JE**, Fontaine R, Sharma P, Keith J, Babu B, Vaisakh TP, Azarudeen MJ, Riram B, Shrivastava A. Prevalence of elevated blood lead levels and risk factors among children living in Patna, Bihar, India 2020. *PLOS Glob Public Health.* 2022 Oct 5;2(10):e0000743.
4. Shaffer RM, **Forsyth JE**, Ferraro G, Till C, Carlson LM, Hester K, Haddock A, Strawbridge J, Lanfear CC, Hu H, Kirrane E. Lead exposure and antisocial behavior: A systematic review protocol. *Environ Int.* 2022 Oct 1;168:107438.
5. **Forsyth JE**, Kempinsky A, Pitchik HO, Alberts CJ, Mutuku FM, Kibe L, Ardoin NM, LaBeaud AD. Larval source reduction with a purpose: Designing and evaluating a household- and school-based intervention in coastal Kenya. *PLoS Negl Trop Dis.* 2022 Apr 1;16(4):e0010199.
6. Pitchik HO, Tofail F, Akter F, Sultana J, Shoab A, Huda TMN, **Forsyth JE**, Kaushal N, Jahir T, Yeasmin F, Khan R, Das JB, Khobair Hossain Md, Hasan MdR, Rahman M, Winch PJ, Luby SP, Fernald LCH. Effects of the COVID-19 pandemic on caregiver mental health and the child caregiving environment in a low-resource, rural context. *Child Dev.* 2021;92(5):e764-80.
7. Jahir T, Pitchik HO, Rahman M, Sultana J, Shoab AKM, Nurul Huda TM, Byrd KA, Islam MS, Yeasmin F, Baker M, Yeasmin D, Nurunnahar S, Luby SP, Winch PJ, **Forsyth JE**. Making the invisible visible: Developing and evaluating an intervention to raise awareness and reduce lead exposure among children and their caregivers in rural Bangladesh. *Environ Res.* 2021 Aug 1;199:111292.
8. Chowdhury KIA, Nurunnahar S, Kabir ML, Islam MT, Baker M, Islam MS, Rahman M, Hasan MA, Sikder A, Kwong LH, Binkhorst GK, Nash E, Keith J, McCartor A, Luby SP, **Forsyth JE**. Child lead exposure near abandoned lead acid battery recycling sites in a residential community in Bangladesh: Risk factors and the impact of soil remediation on blood lead levels. *Environ Res.* 2021 Mar 1;194:110689.

9. Pitchik HO, Tofail F, Rahman M, Akter F, Sultana J, Shoab AK, Huda TMN, Jahir T, Amin MR, Hossain MK, Das JB, Chung EO, Byrd KA, Yeasmin F, Kwong LH, **Forsyth JE**, Mridha MK, Winch PJ, Luby SP, Fernald LC. A holistic approach to promoting early child development: a cluster randomised trial of a group-based, multicomponent intervention in rural Bangladesh. *BMJ Glob Health*. 2021 Mar 1;6(3):e004307.
10. **Forsyth JE**, Mutuku FM, Kibe L, Mwashee L, Bongo J, Egemba C, Ardoin NM, LaBeaud AD. Source reduction with a purpose: Mosquito ecology and community perspectives offer insights for improving household mosquito management in coastal Kenya. *PLoS Negl Trop Dis*. 2020 May 11;14(5):e0008239.
11. Krystosik A, Njoroge G, Odhiambo L, **Forsyth JE**, Mutuku F, LaBeaud AD. Solid Wastes Provide Breeding Sites, Burrows, and Food for Biological Disease Vectors, and Urban Zoonotic Reservoirs: A Call to Action for Solutions-Based Research. *Front Public Health*. 2020;7.
12. **Forsyth JE**, Nurunnahar S, Islam SS, Baker M, Yeasmin D, Islam MS, Rahman M, Fendorf S, Ardoin NM, Winch PJ, Luby SP. Turmeric means “yellow” in Bengali: Lead chromate pigments added to turmeric threaten public health across Bangladesh. *Environ Res*. 2019 Dec 1;179:108722.
13. **Forsyth JE**, Weaver KL, Maher K, Islam MS, Raqib R, Rahman M, Fendorf S, Luby SP. Sources of Blood Lead Exposure in Rural Bangladesh. *Environ Sci Technol*. 2019 Sep 17; 19: 11429–11436.
14. **Forsyth JE**, Saiful Islam M, Parvez SM, Raqib R, Sajjadur Rahman M, Marie Muehe E, Fendorf S, Luby SP. Prevalence of elevated blood lead levels among pregnant women and sources of lead exposure in rural Bangladesh: A case control study. *Environ Res*. 2018 Oct 1;166:1–9.
15. Dickerson-Lange SE, Lutz JA, Gersonde R, Martin KA, **Forsyth JE**, Lundquist JD. Observations of distributed snow depth and snow duration within diverse forest structures in a maritime mountain watershed. *Water Resour Res*. 2015;51(11):9353–66.
16. **Forsyth JE**, Zhou P, Mao Q, Asato SS, Meschke JS, Dodd MC. Enhanced inactivation of *Bacillus subtilis* spores during solar photolysis of free available chlorine. *Environ Sci Technol*. 2013;47(22):12976–84.

PUBLICATIONS IN REVIEW

Forsyth, JE, Akhalaia K, Jintcharadze M, Nash E, Sharov P, Temnikova A, Elmera C. Reductions in spice lead levels in the Republic of Georgia. *Environ Res*. In Review.

PRESENTATIONS

Forsyth, J.E. *Updates on progress to reduce lead exposure in South Asia.*

- Invited lecture at Columbia University, New York, NY, October 2022

Forsyth, J.E. *Lead chromate adulteration of spices.*

- Invited speaker for the U.S. Centers for Disease Control and Prevention Childhood Lead Poisoning Prevention Program Representatives, March 2021

Forsyth, J.E. *Lead-tainted turmeric: problems and solutions.*

- Invited panelist at the International Symposium on Spices and Aromatic Crops, India, February 2021

Forsyth, J.E., Luby, S.P., and Islam S. *Hidden Dangers and Perverse Incentives in the Global Spice Trade: The Case of Bangladesh.*

- Invited oral presentation as part of a panel on food safety at the American Society of Tropical Medicine and Hygiene, Baltimore, MD, November 2017

TEACHING AND MENTORING

Practical Approaches to Global Health Research, Stanford University (co-Instructor with Professor Steve Luby) – 2021

Research Approaches for Environmental Problem Solving, Stanford University (co-Instructor with Professor Nicole Ardoin) – 2018

Students - Mentored two post-doctoral fellows, one pre-doctoral fellow, nine graduate students, nine undergraduates, and three high school students (14 women, 16 under-represented minorities):

- Assessing sources of lead exposure in rural Bangladesh (1 female)
- Developing improved measurement techniques for lead in spices (3 females, 1 male)
- Assessing the policy framework for reducing exposure to lead acid batteries (5 females, 1 male)

- Assessing the prevalence of elevated blood lead levels and sources of child lead exposure in urban Bangladesh (1 female, 1 male)
- Characterizing sources of lead exposure in South Asia (4 females, 1 male)
- Development of ventilation measurement techniques and ventilation strategies (1 male, 1 female)

AWARDS AND HONORS

- Stanford Center on Global Poverty and Development Student Fellowship (2017), \$15,000 award
- Woods Institute Mel Lane Grant (2017), \$1,000 award
- Stanford Center for Innovations in Global Health award (2016), \$50,000
- Community Engagement Grant (2016), \$2,800 award
- Haas Global Public Service Fellow (2016-2017), \$3,000 award
- Freeman Spogli International Studies Fellow (2016), \$5,500 award
- Center for African Studies Travel Fellowship (2016), \$5,000 award
- Center for South Asian Studies Travel Fellowship (2015-2016), \$1,000 award
- MWH/AEESP Master's Thesis Award, 1st Place Winner (2013), \$1,000 award
- Reed Elsevier Environmental Challenge 2nd Place Winner (2011), \$25,000 award
- Outstanding Graduate Female Engineer Award from the Society of Women Engineers (2011)
- NSF Graduate Research Fellowship \$30,000 per annum (2009-2012)

PROFESSIONAL EXPERIENCE

R&D Specialist, Consultant, Cascade Designs, Inc. 2011-2014

- Researched and developed water and waste treatment technologies funded by the U.S. government and the Bill and Melinda Gates Foundation
- Led k-12 and university educational outreach programs about safe water and disaster preparation

Consultant, Intern, PATH 2010-2013

Technology Solutions Global Programs | Water, Sanitation, & Air Quality Group

- Managed project improving water quality across 60 schools in Kenya
- Received the 2011 2nd Place Reed Elsevier Environmental Challenge Award (\$25,000)
- Developed skills in monitoring and evaluation, formative and summative impact assessments, user experience research using survey, in-depth interview, and focus-group discussion methods

Contributing Scientist, Neonatal Feeding Technology Development 2010-2015

- Collaborated with an interdisciplinary team of epidemiologists, engineers, and product developers to prototype and test a feeding tool for infants who are unable to breastfeed, known as the Neonatal Intuitive Feeding Technology (NIFTY™); featured on [Fast Company](#)

SERVICE

Contributing member, International Lead Working Group 2021-Present

- Contributing to develop a strategy to reduce lead exposure globally with key government stakeholders, non-profit organizations, and policy think tanks. Organized by the Center for Global Development

Co-founder, Bangladesh Lead Working Group 2020-2021

- Brought together researchers and practitioners from over 10 different organizations to coordinate and collaborate on work related to lead exposure in Bangladesh

Member, Strategic Planning Committee for Interdisciplinary Graduate Studies, Stanford 2017

- Co-developed a 5-year plan for interdisciplinary environmental science education at Stanford

Co-founder, International Community-based Health and Development Group, Stanford 2016-2018

- Developed group for students interested in global health and development issues
- Applied for and received \$3,000 from Stanford SPICE: Student Projects for Intellectual Community Enhancement to facilitate group operations and bring in guest speakers