



Doctoral Dissertation Defense Announcement

**“Preventing childhood lead poisoning: Risk factors and points of intervention”**



**Joanna S. Balza**

Candidate for Doctor of Philosophy  
Public & Community Health  
School of Graduate Studies  
Medical College of Wisconsin

**Committee in Charge:**

Kathryn E. Flynn, PhD (Mentor)  
Rachel Cusatis, PhD  
Aprill Dawson, PhD, MPH  
Caitlin Kaeppler, MD  
David Nelson, PhD

**Date:** Wednesday April 10<sup>th</sup>, 2024

**Time:** 12:00 PM (CST)

**Defense Location:** Medical College of Wisconsin, HUB, room A6520/A6628

**Zoom:** <https://mcw-edu.zoom.us/j/97748707107?pwd=citaNVNOUk82V2MzMjJkQkE0Wm45QT09>

**Meeting ID:** 977 4870 7107 **Passcode:** 2LF11EgB

**Graduate Studies:**

Introduction to Epidemiology  
Infectious Disease Epidemiology  
Community Health Improvement I  
Community Health Improvement II  
Community Health Improvement III  
Community Health Improvement IV  
Intro to Statistical Analysis  
Regression Analysis- Stata  
Global Environmental Health  
Health and Forced Migration  
Global Health Consulting & Research  
Qualitative and Mixed Methods  
Qualitative Data Analysis  
Survey Research Methods  
Ethics & Integrity in Science  
Research Ethics Discussion Series  
Reading and Research  
Seminar  
Doctoral Dissertation Credits

## **Dissertation**

“Preventing childhood lead poisoning: Risk factors and points of intervention”

### **Abstract**

Exposure to lead is a health hazard, especially to children. Its health impacts include developmental delay, decreased intelligence quotient, learning difficulties, and more. Disparities exist in which populations are most impacted by lead poisoning. Children of color, low socioeconomic status, those living in rental housing, and refugees are among groups at greater risk. This mixed-methods study examined three factors related to lead poisoning: the experiences and perspectives of refugee resettlement workers related to lead poisoning, the impact of residing in a home served by a lead lateral water line, and the experiences and perspectives of landlords related to lead hazards in rental properties.

First, in-depth qualitative interviews with resettlement workers or other stakeholders in the refugee resettlement process were conducted to understand factors that may put refugee children at increased risk for lead exposure post-resettlement in the United States. This analysis found that a lack of affordable or safe housing, public misperceptions related to refugees, lack of awareness about lead are barriers to refugee families securing lead safe housing.

Second, childhood blood lead data from the Wisconsin Department of Health Services and lead lateral data from the city of Milwaukee Department of Water Works were used to examine the impact on residing in a home served by lead lateral water pipes on lead levels in children under one year of age. This analysis found that after adjusting for age, sex, race/ethnicity, Medicaid status, poverty by zip code, season of testing and age of primary residence, children in Milwaukee under 1 year of age whose listed primary residence was served by a lead lateral line were at greater risk for elevated blood lead levels  $> 3.5 \mu\text{g}/\text{dL}$  (OR 1.60, 95% CI 1.04-2.46,  $p$  0.031) and at greater risk for blood lead levels  $>5 \mu\text{g}/\text{dL}$  (OR 2.26, 95% CI 1.23-4.16,  $p$  0.008) than children whose primary residence was not served by a lead lateral line.

Third, surveys were used to collect data on landlords' perceptions of lead in rental properties, and data collected through one-on-one interviews were used to generate hypotheses for potential landlord-facing interventions. This study found that lack of knowledge, lack of funding, and some policy loopholes were barriers to landlords providing lead-safe housing.

Despite significant gains in lead poisoning prevention over the last several decades, children remain vulnerable to the deleterious effects of lead exposure. This study found that awareness and education related to lead exposure are needed—for families of infants residing in homes with lead lateral lines, for resettlement workers securing housing for newly arriving families, and for

landlords renting properties with potential lead hazards. Policy that requires testing for and explicit disclosure of lead hazards in rental properties, and other thoughtful policy and funding initiatives to promote safe housing and remediation for lead hazards in homes could be useful in lead poisoning prevention.

## Joanna S. Balza, RN

Curriculum Vitae

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### EDUCATION

|  |                           |
|--|---------------------------|
| <b>Medical College of Wisconsin</b><br>PhD in Public & Community Health<br>Milwaukee, WI<br>Mentor: Kathryn E. Flynn, PhD<br>Dissertation title: <i>Preventing childhood lead poisoning: Risk factors and points of intervention</i> | <b>2024 (Anticipated)</b> |
| <b>The Johns Hopkins School of Nursing</b><br>Bachelor of Science, Nursing<br>Baltimore, MD  | <b>2012</b>               |
| <b>Wisconsin Lutheran College</b><br>Bachelor of Arts, Spanish<br>Milwaukee, WI  | <b>2005</b>               |
| <b>Universidad de Guadalajara</b><br>Study Abroad<br>Guadalajara, Jalisco, Mexico  | <b>2003</b>               |

### CERTIFICATIONS/HONORS

|  |             |
|--|-------------|
| Certified Medical/Surgical Nurse (CMSRN)             | <b>2015</b> |
| Registered Nurse (RN)                                | <b>2012</b> |
| National Honors Society of Nursing (Sigma Theta Tau) | <b>2012</b> |

### PROFESSIONAL SOCIETIES

|  |                  |
|--|------------------|
| <b>American Public Health Association (APHA)</b><br>Student Member | <b>2022-2024</b> |
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### AWARDS

|   |             |
|---|-------------|
| <b>Student Graduate Association Travel Award</b><br>Medical College of Wisconsin            | <b>2022</b> |
| <b>Student Graduate Association Travel Award</b><br>Medical College of Wisconsin            | <b>2023</b> |
| <b>Department of Medicine Health Endowment Travel Award</b><br>Medical College of Wisconsin | <b>2023</b> |

### LEADERSHIP AND COMMITTEE POSITIONS

|  |             |
|--|-------------|
| <b>Admissions Committee</b><br>Public and Community Health PhD Program<br>Medical College of Wisconsin | <b>2024</b> |
|--|-------------|

## **TEACHING EXPERIENCE**

**Mind over Matter (MOM): Healthy bladder, health bowels**  
Program Facilitator

**2023-2024**

## **RESEARCH EXPERIENCE**

**Research Assistant**

**2019-Present**

Department of Medicine, Medical College of Wisconsin  
Milwaukee, WI

Works under several primary investigators on a variety of projects including studies funded by the National Institute of Health. Experience in: in-depth interviewing, cognitive interviewing, qualitative coding, systematic reviews, coordination with Institutional Review boards, survey management through REDCap, and manuscript preparation.

## **PROFESSIONAL EXPERIENCE**

**Registered Nurse II**

**Jan 2018 – Aug 2019**

Stanford Hospital  
Palo Alto, CA

Provided direct patient care on an Adaptable Care Unit (provided both medical/surgical and ICU care).

**Registered Nurse Level IV**

**Nov 2012 – Dec 2017**

Froedtert Hospital  
Milwaukee, WI

Provided direct patient care on internal medicine/telemetry unit, served as a nurse preceptor and shift coordinator. Full time November 2012 to January 2015, part time/per diem until December 2017. House-wide chair of the nursing quality & safety committee.

**Public Health Nurse**

**June 2015 – Sept 2016**

City of Milwaukee Health Department  
Milwaukee, WI

Home visiting nurse in the Empowering Families of Milwaukee program, provided in-home nursing, health education, support, and referrals for pregnant women and infants.

**Bilingual Recruiter/Branch Manager**

**May 2005 – June 2008**

Parallel Employment Group  
Milwaukee, WI

Hired as a Bilingual (English/Spanish) Recruitment and Placement Specialist, promoted to Branch Manager, trained in OSHA practices and certified in employment law by the American Staffing Association.

## **INTERNATIONAL PROFESSIONAL EXPERIENCE**

**Nursing Activities Manager**

**Dec 2017-June 2018**

Médecins San Frontières (Doctors without Borders)  
Aburoc, Upper Nile, South Sudan

Stationed at an inpatient hospital and clinic providing acute care, maternity, outpatient services and mobile clinics. Responsible for supervision of pharmacy and nursing activities.

**Registered Nurse****March 2017 – May 2017**

SP Emergency Field Hospital

*Bartella, Iraq*

Provided direct care to pediatric and adult war-trauma patients at an emergency field hospital outside Mosul. Served as ward charge nurse.

**Ebola Response Nurse****Jan 2015 – April 2015**

Partners in Health

*Port Loko & Freetown, Sierra Leone*

Triaged and provided direct care for Ebola patients at Maforki Ebola Treatment Unit in Port Loko, Sierra Leone, in collaboration with healthcare workers from Sierra Leone, United States, and Cuba. Provided maternal/infant nursing care at the Ebola Holding Center at Princess Christian Maternity Hospital in Freetown.

**VOLUNTEER EXPERIENCE****Planning committee****July 2023 – Nov 2023**

'Our City of Nations' conference on refugee issues

*Milwaukee, WI***Resettlement volunteer****Oct 2018 - Aug 2019**

International Rescue Committee

*San Jose, CA***Registered Nurse****Sept 2017**

World Medical Mission

*Cox's Bazar, Bangladesh*

Provided direct care to pediatric and adult trauma patients during the Rohingya refugee crisis.

**Registered Nurse****March 2016**

Syrian American Medical Society (SAMS)

*Al Zaatari, Jordan*

Provided nursing support at SAMS hospital emergency ward in Al Zaatari refugee camp.

**Peace Corps Volunteer****July 2008 – August 2010**

United States Peace Corps

*Mpumalanga, South Africa*

Underwent training in the Ndebele language, community needs assessments, community health, and educational theory. Collaborated with local nurses to hold community HIV/AIDS awareness and testing events, led after school HIV/life skills group with local counterparts, and worked closely with schools to acquire resources such as safe latrines and library books.

**PUBLICATIONS**

1. **Balza, J.**, Bikomeye, J.C., Flynn, K.E. (2024). Effectiveness of educational interventions for the prevention of lead poisoning in children: a systematic review. *Reviews on environmental health*. Online prior to print. <https://doi.org/10.1515/reveh-2023-0108>

2. Cusatis, R., Johnson, C., Schoyer, K. D., Tsaih, S. W., **Balza, J.**, Sandlow, J., & Flynn, K. E. (2023). Decision regret among couples experiencing infertility: a mixed methods longitudinal cohort study. *Reproductive health*, 20(1), 165. <https://doi.org/10.1186/s12978-023-01699-5>

3. **Balza, J.S.**, Awoyinka, I., Kaeppler, C., Cusatis, R., Flynn, K.E. (2023). Lead poisoning in refugee children living in the United States: A systematic review of case studies, *Hygiene and environmental health advances*, Volume 6, <https://doi.org/10.1016/j.heha.2023.100057>.
4. Bikomeye, J.C., **Balza, J.S.**, Kwarteng, J.L., Beyer, A.M, & Beyer, K.M.M. (2022). The impact of greenspace or nature-based interventions on cardiovascular health or cancer related outcomes: A systematic review. *PLoS One*, 10.1371/journal.pone.0276517.
5. Cusatis, R., **Balza, J.**, Uttke, Z., Kode, V., Suelzer, E., Shaw, B. E., & Flynn, K. E. (2022). Patient-reported cognitive function among hematopoietic stem cell transplant and cellular therapy patients: a scoping review. *Quality of life research*. 10.1007/s11136-022-03258-0. Advance online publication. <https://doi.org/10.1007/s11136-022-03258-0>
6. **Balza, J.S.**, Bikomeye, J. C., Beyer, K. M. M., Rublee, C., & Flynn, K. E. (2022). Elevated blood lead levels of refugee children in the United States: a systematic review of recent literature (2011-2021). *Reviews on environmental health*, 10.1515/reveh-2022-0015. Advance online publication. <https://doi.org/10.1515/reveh-2022-0015>
7. **Balza J.** (2022). Hidden toxins: bathtubs as a potential source of lead exposure in children. *Journal of toxicology and environmental health. Part A*, 85(9), 376–380. <https://doi.org/10.1080/15287394.2021.2022053>
8. **Balza, J.**, Tsering, S., Dickson-Gomez, J., Hall, T., & Kaeppler, C. (2022). Understanding Barriers to Care for Refugee Patients: Lessons from Focus Groups. *Wisconsin medical journal: official publication of the State Medical Society of Wisconsin*, 121(2), 141–144.
9. **Balza, J.S.**, Cusatis, R., McDonnell, S.M., Basir, M.A., & Flynn, K.E. (2022). Effective questionnaire design: How to use cognitive interviews to refine questionnaire items. *Journal of neonatal-perinatal medicine*, 15(2), 345–349. <https://doi.org/10.3233/NPM-210848>
10. Bikomeye, J.C., **Balza, J.**, & Beyer, K.M. (2021). The Impact of Schoolyard Greening on Children's Physical Activity and Socioemotional Health: A Systematic Review of Experimental Studies. *International journal of environmental research and public health*, 18(2), 535. <https://doi.org/10.3390/ijerph18020535>

## **PUBLICATIONS UNDER REVIEW**

1. **Balza, J.**, Awoyinka, I., Cusatis, R., Dawson, A.Z., Nelson, D., Kaeppler, C., Flynn, K.E. Leveraging the perspectives and experiences of landlords and property managers for lead poisoning prevention. *Pediatrics*. Revise and resubmit, resubmission sent 12/30/2023.

## **PRESENTATIONS**

1. **Balza, J.**, Awoyinka, I., Cusatis, R., Dawson, A., Nelson, D., Kaeppler, C. & Flynn, K.E. (2023, November 12-15). Leveraging the perspectives and experiences of landlords and property managers for lead poisoning prevention [Poster]. American Public Health Association Annual Meeting, Atlanta, GA.
2. **Balza, J.**, Bikomeye, J., & Flynn, K.E. (2022, November 4-9). Effectiveness of Educational Interventions for Lead Poisoning Prevention: A Systematic Review [Poster]. American Public Health Association Annual Meeting, Boston, MA.



3. Nelson, D., Hamelin, K., Paradis, H., Mondragon, O., Hoium, C., Kellis, J., **Balza, J.**, Miller, T., & Meurer, J. (2022, November 4-9). Developing a cohesive lead messaging process for community and clinical practitioners to produce comprehensive communication regarding lead exposure among children [Poster]. American Public Health Association Annual Meeting, Boston, MA.
4. **Balza, J.**, Larson, K., Miller, T., Kellis, J. & Nelson, D. (2022, November 3). Perspectives and Wisdom from Parents of Children Impacted by Lead Poisoning [Poster]. Medical College of Wisconsin: Community Engagement Poster Session, Milwaukee, WI.
5. **Balza, J.**, Awoyinka, I., Kaepler, C., Cusatis, R., & Flynn, K.E. (2022, October 27). Lead poisoning in refugee children living in the United States: A systematic review of case studies [Poster]. The 32nd Annual School of Graduate Studies and Office of Postdoctoral Education Research Day, Medical College of Wisconsin, Milwaukee WI.

### **INVITED PRESENTATIONS**

1. **Balza, J.** (2023, August 16) Lead Poisoning in Refugee Populations. Presented to: Texas Department of Health and Human Services, Childhood Lead Poisoning Prevention, Quarterly Strategic Planning Committee meeting. (Virtual)
2. **Balza, J.** (2015, November 6) Ebola: Experiences in Sierra Leone. Presented to: Milwaukee Health Department, ECEH all-divisional meeting. Milwaukee, WI

### **JOURNAL REVIEWS**

Environmental health insights

**2023**