

Understanding Pesticide Mortality and Poisoning in Brazilian Children: Informing Policy and Enhancing Communication on Childhood Exposures

Rafael Buralli ^{1*}; Alexis J. Handal ^{2*}; Alex Palomino ^{1**}; Beatriz Ferreira ^{1**}; Alyssa Brown ^{2**}; John Kubale ³; Sarah Burgard ⁴

¹School of Public Health, University of São Paulo, Brazil; ²School of Public Health, University of Michigan; ³ICPSR, Institute for Social Research, University of Michigan; ⁴Sociology – LSA, University of Michigan

*CGHE Seed Grant Co-PIs **Student trainees



Introduction

- Brazil is a major pesticide consumer globally; children bear a disproportionate burden of poisonings and mortality.
- Despite mandatory reporting, pesticide cases are underreported and underutilized for surveillance and prevention.
- **Aim:** Analyze pesticide mortality and poisoning among children 0–14 in São Paulo state to quantify burden, identify inequities, co-create policy and communication strategies to strengthen health surveillance.

Methods

- **Study design:** Ecological study using publicly available secondary data (2015–2024) on pesticide-related mortality and poisonings among children 0–14 in São Paulo state, including sociodemographic and pesticide exposure indicators
- **Data analysis:** Estimation of frequencies, incidence rates, temporal trends, and years of life lost (YLL), with stratified analyses to examine sociodemographic inequities and exposure patterns
- **Policy and communication:** Engagement with key stakeholders to translate findings into communication materials to strengthen prevention and surveillance
- **Current phase:** Data compilation and cleaning, exploratory analyses, analytic alignment, and stakeholder mapping (engagement forthcoming)
- **Project timeline:** 9/2025 - 8/2026

Expected Results

- **Estimated burden of pesticide-related mortality and poisonings** among children in São Paulo, including temporal trends
- **Identification of high-burden groups and key exposure patterns**, to inform equity-focused surveillance and prevention.
- **Evidence-based communication products** (policy briefs, infographics, technical reports) tailored to policymakers and health professionals needs, **co-created with key stakeholders** (health providers, public health organizations, youth groups, unions, farmers)
- **Strengthened integration of epidemiological data into surveillance and decision-making**, contributing to improved prevention strategies and child health protection.

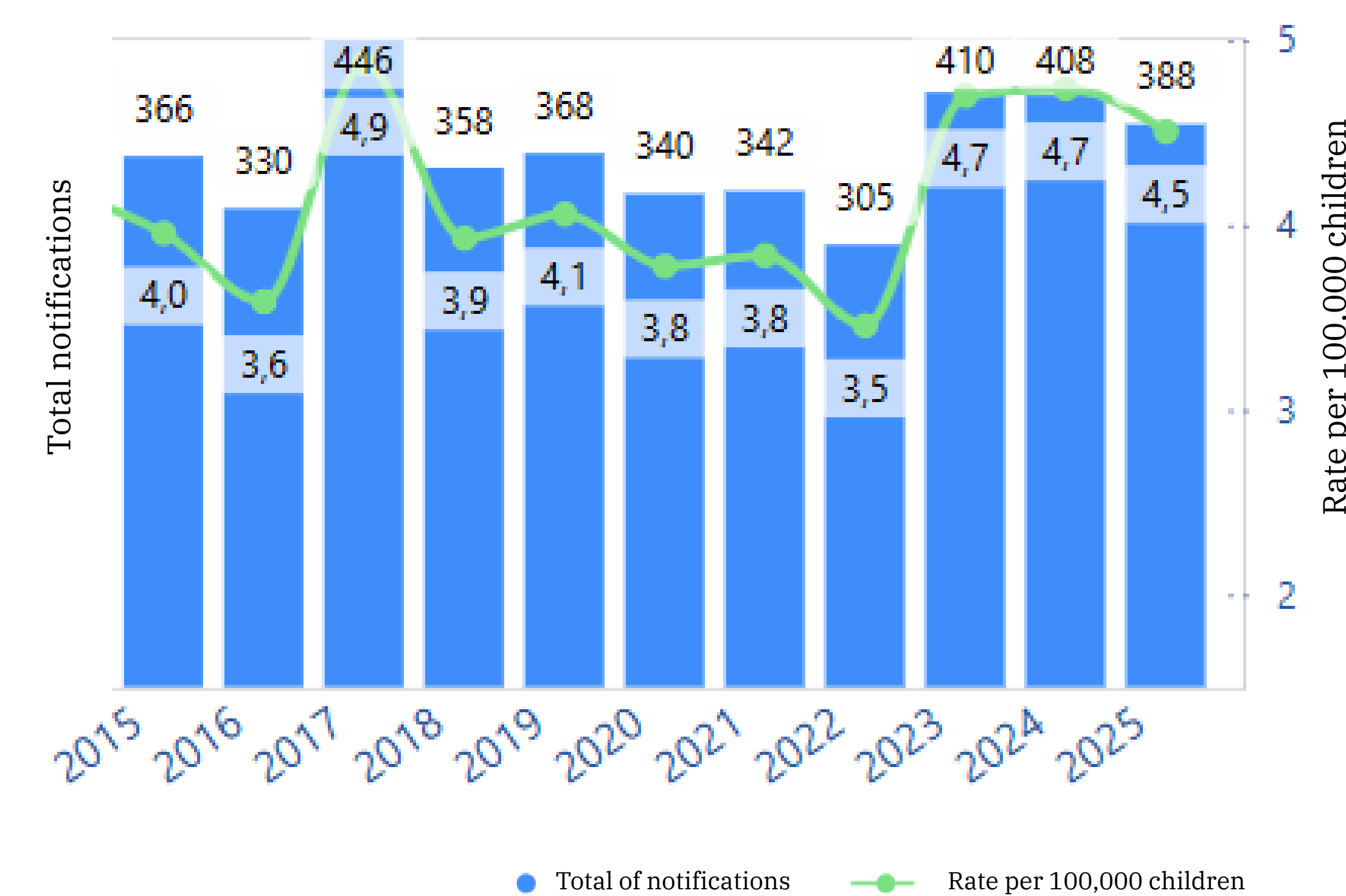
Preliminary Findings

- The rate of notifications ranged from 3.5-4.9 per 100,000 children between 2015-2024 (Fig 1), however there was marked heterogeneity across municipalities with higher crude rates in small agricultural towns.
- Most municipalities show few poisoning notifications (total monthly median = 31); with a substantial share of notifications concentrated in a few cities.
- Accidental poisonings more frequent among younger boys (1–4y), non-accidental cases predominated among adolescents (10–14y), especially girls.



Source: Buralli, 2015. **Caption:** children playing in a tomato field while their parents are working handling pesticides.

FIGURE 1: Pesticide poisoning notifications among children 0-14y and crude rates (per 100,000 children), per year, São Paulo state, Brazil, 2015–2024.



Source: Dashboard VSPEA, Ministry of Health, 2026.

References:

Buralli R, Nazli SN, Cordoba L, Quiros-Alcala L, Hyland C, Muñoz-Quezada MT, Fariás P, Handal AJ. Children's environmental and occupational exposures to pesticides in low- and middle-income countries rural areas - an elephant in the room. *Sci Total Environ.* 2025 Aug 15;990:179887. doi: 10.1016/j.scitotenv.2025.179887. BRASIL. Ministry of Health. Secretary for Health Surveillance and Environment. Dashboard VSPEA - Program for Health Surveillance of Populations Exposed to Pesticides.

Surveillance data exist, but their use for prevention remains limited.

Transforming routine health records into actionable child health protection is urgent.

Co-creating equitable surveillance strategies with stakeholders is key to protecting vulnerable children.



CENTER FOR GLOBAL HEALTH EQUITY
UNIVERSITY OF MICHIGAN