



THE UNIVERSITY of EDINBURGH
Global Academy of
Agriculture and Food Systems



Pesticide exposure and child growth in low- and middle-income countries: a systematic review

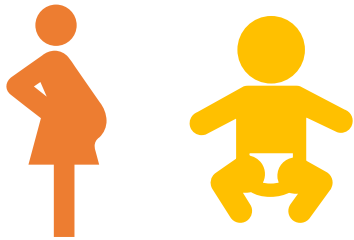
Lily Bliznashka, Aditi Roy, Lindsay M Jaacks

Background

- Pesticides are widely used in agricultural and residential settings globally
- Evidence from high-income countries shows that prenatal exposure to organochlorines is associated with adverse birth outcomes, but prenatal exposure to organophosphates is not (Longnecker et al. 2001, Ouidir et al. 2020, Reiss et al. 2015, de Araujo et al. 2016)
- Less consistent evidence on prenatal exposure to organochlorines and organophosphates and birth weight and length (Pinos et al. 2021, Stratakis et al. 2022, Govarts et al. 2012, Wolff et al. 2007, Khoshhali et al. 2021, Rauch et al. 2012)
- Limited evidence on the effects of pesticides on child growth in low- and middle-income countries (LMICs)

Objective

- To systematically review and synthesize the evidence on the associations between pesticide exposure and child growth in children <5 years of age in LMICs



PESTICIDE EXPOSURE



CHILD GROWTH

Methods

A thick yellow horizontal bar spans the width of the slide, with a vertical yellow bar extending downwards from its right end.

- Searched 10 electronic databases from inception through November 2021 with no language restriction
- Two independent researchers screened studies using Covidence, extracted data, and assessed certainty of the evidence

Methods: inclusion criteria

- Conducted in a LMIC
- Assessed children <5 years of age
- Evaluated self-reported or measured prenatal (at any time during pregnancy) or postnatal exposure to pesticides
- Measured at least one anthropometric measure of child linear or ponderal growth, and/or one of six birth outcomes

Methods: exclusion criteria

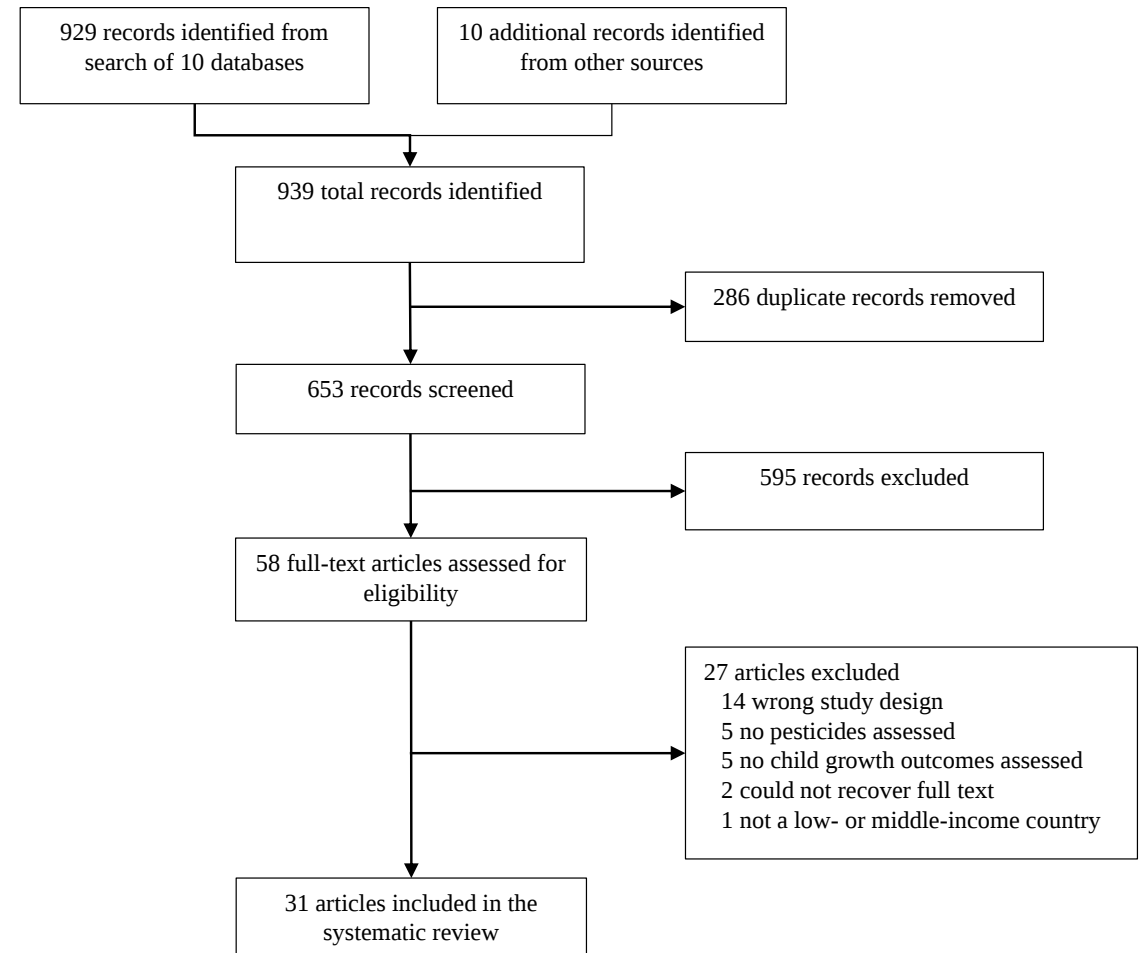
- Conducted in a high-income country
- Assessed children >5 years of age
- Animal studies, case-control studies, simulation studies, case reports, case studies, opinions, editorials, commentaries, letters, conference abstracts, ecological studies, reviews, and systematic reviews
- Focusing solely on insecticide-treated bednets for malaria prevention

Methods: data analysis

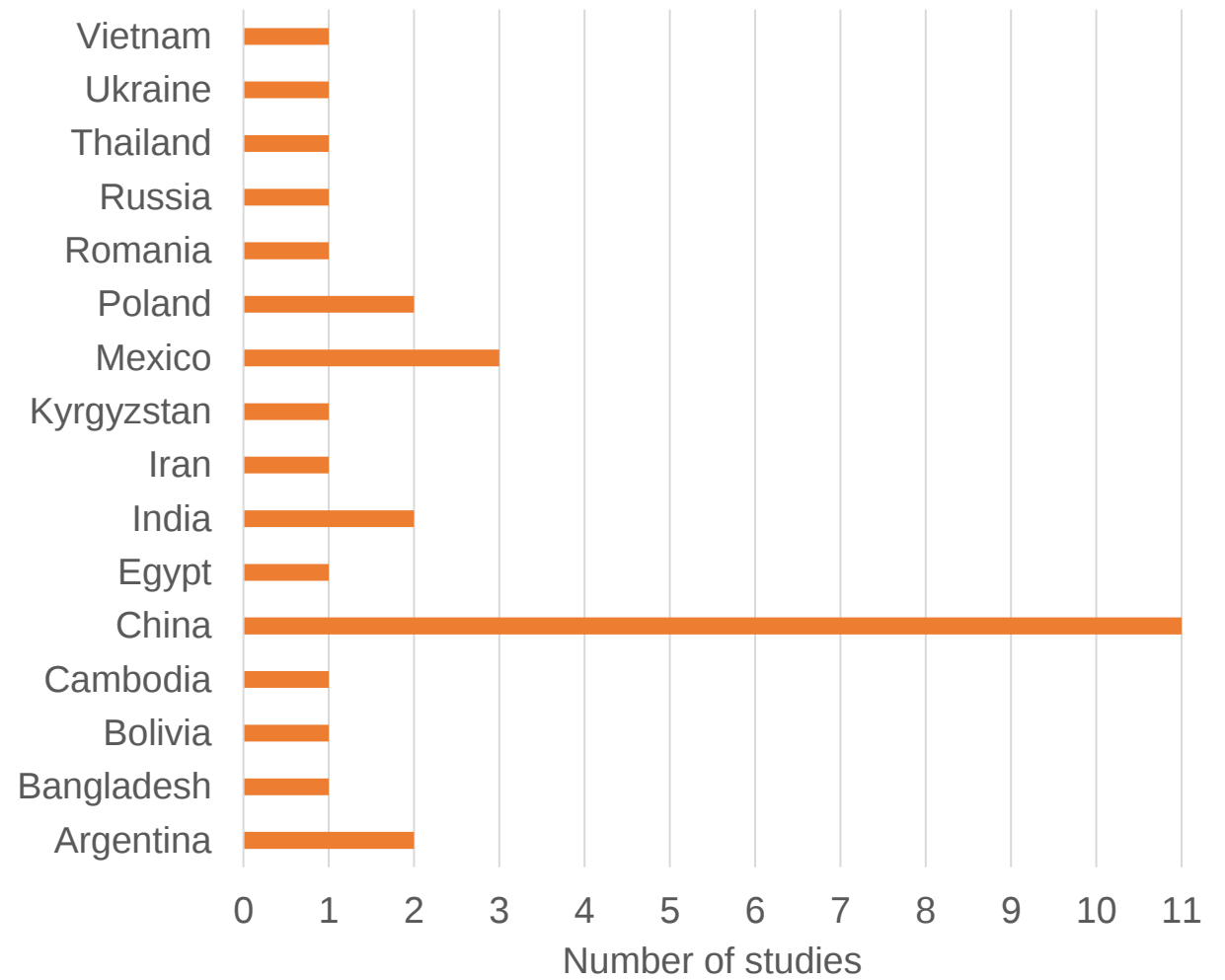
- Data summarized narratively by outcome and pesticide type
- Summarized evidence on adjusted outcomes
- Summarized author-reported effect measures
- Meta-analysis not conducted due to heterogeneity
- Risk of bias and quality of the evidence assessed using GRADE

Results

Study selection

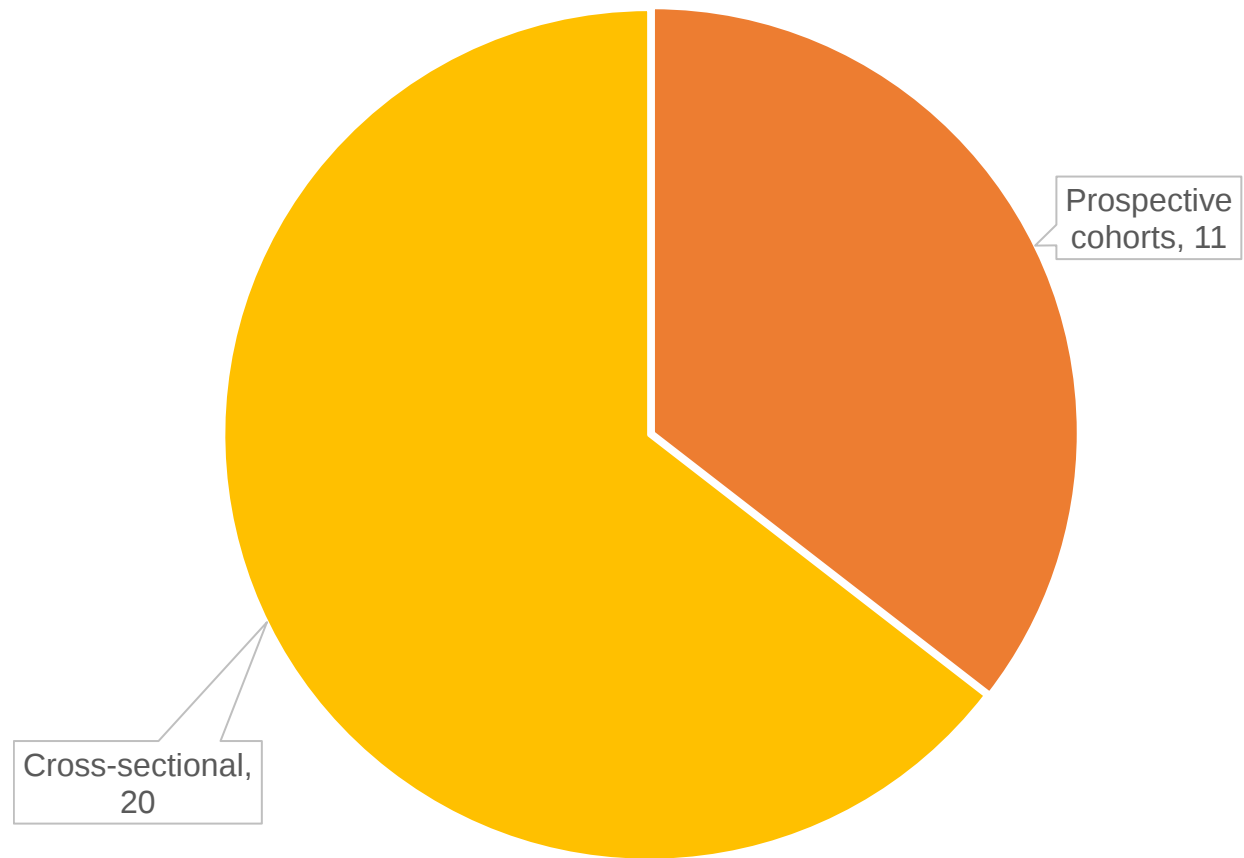


Study locations

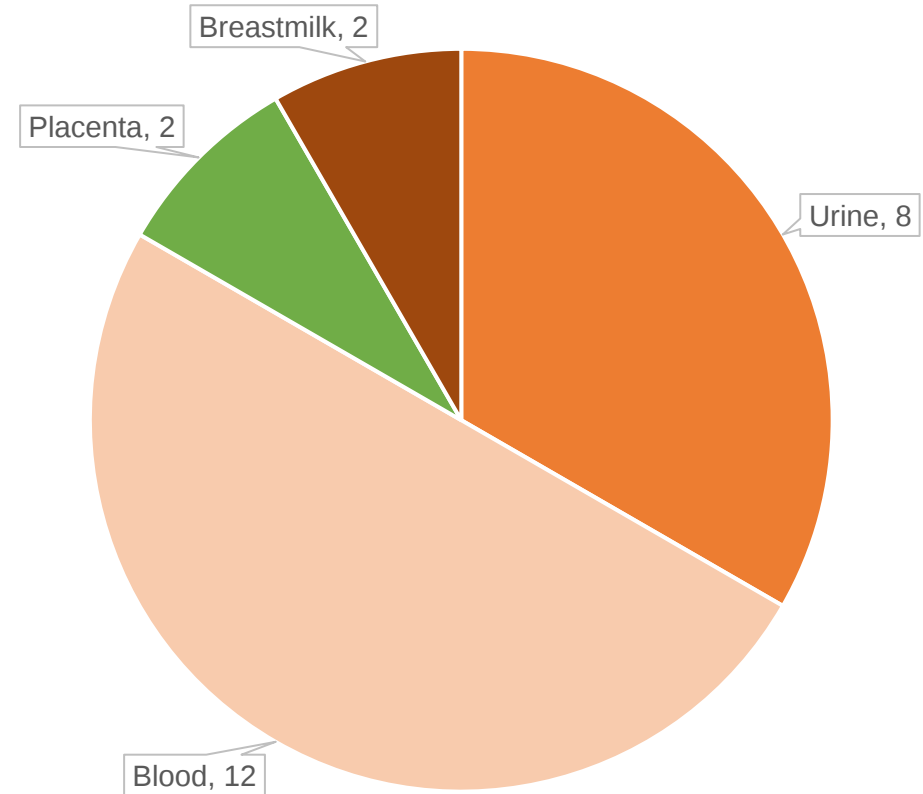
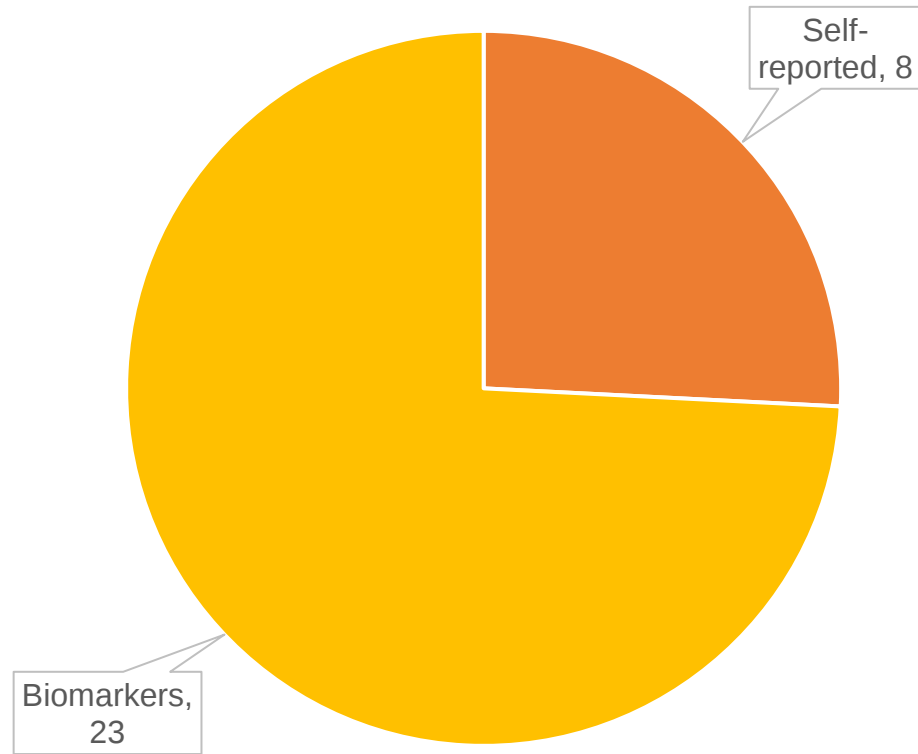


Studies published between 2003 and 2022

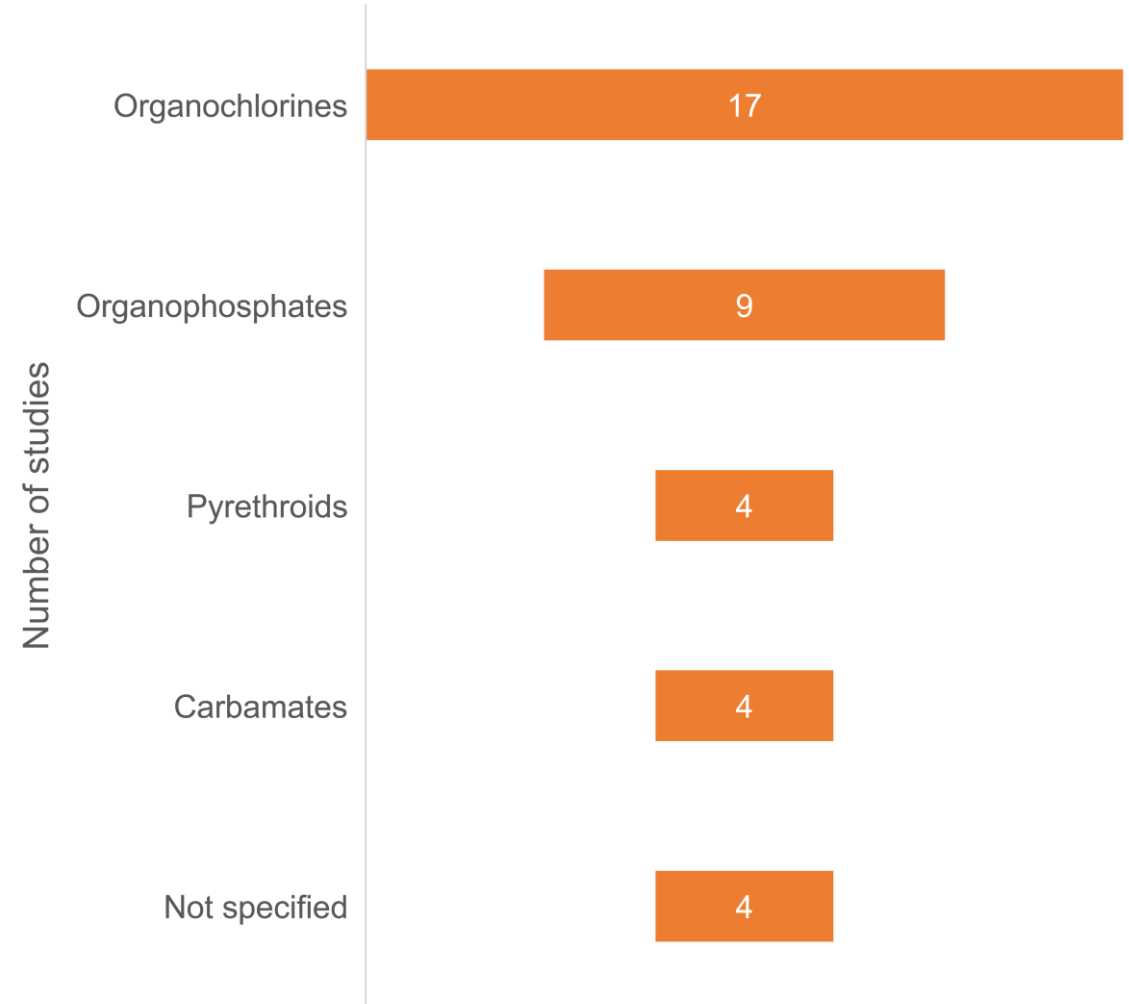
Study designs



Method of exposure assessment

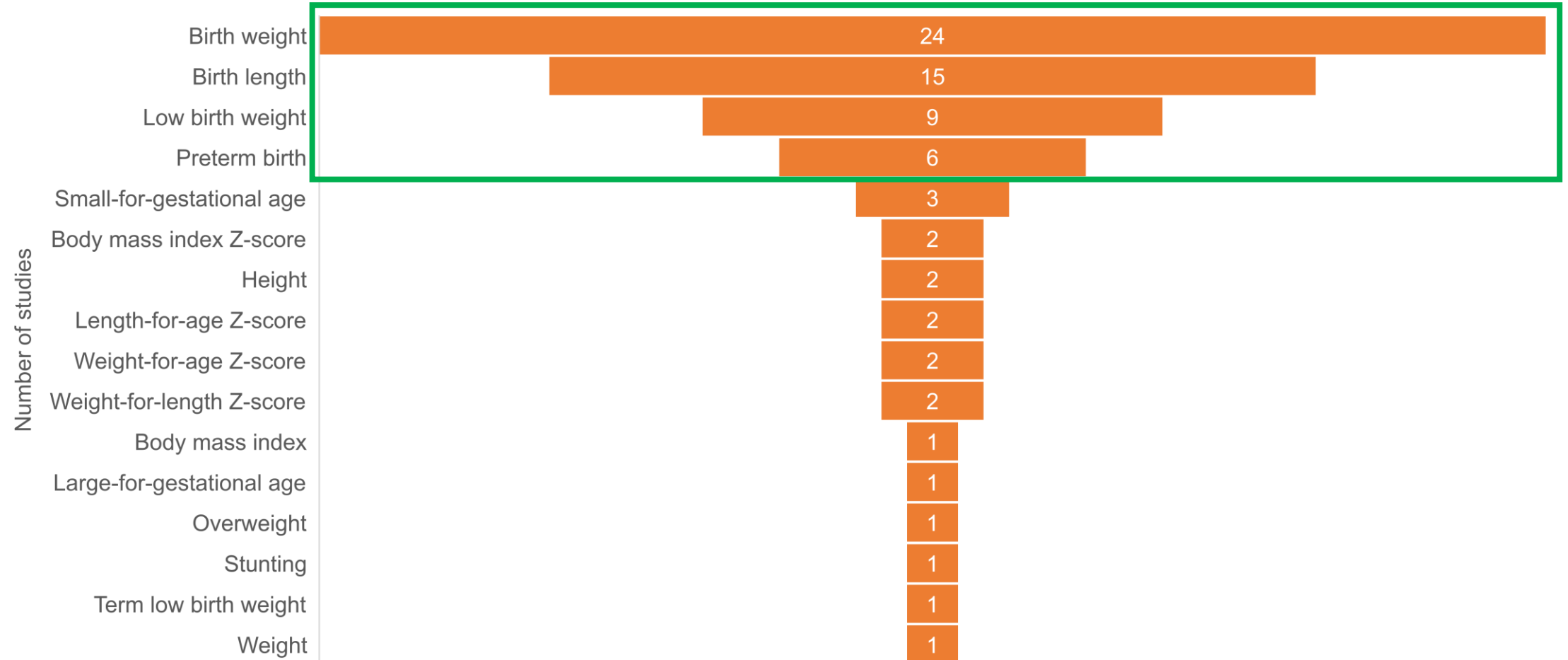


Types of pesticides assessed



All studies assessed prenatal exposure

Outcomes assessed



Key findings

- Mixed associations between prenatal pesticide exposure and birth weight and birth length



Exposure to:

- Organochlorines
- Organophosphates
- Pyrethroids
- Carbamates



Child growth:

- Birth weight
- Birth length
- Low birth weight
- Preterm birth

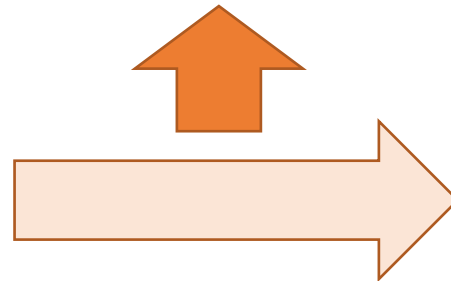
Key findings

- Prenatal exposure to some pesticide may be associated with low birth weight and preterm birth



Exposure to:

- Organophosphates
- Carbamates



Child growth:

- Low birth weight
- Preterm birth

Limitations

- Many studies at serious risk of bias; “very low” certainty of the evidence
- Limitations include:
 - Incomplete toxicology picture
 - Exposure assessed at a single time point during pregnancy
 - No studies in Sub-Saharan Africa, Central America, Caribbean, or Asia Pacific
 - Small sample sizes
 - Participants recruited at a single location
 - Subgroup analyses only by child sex
 - Causal impacts not examined

Conclusions

A thick yellow horizontal bar spans the width of the slide, with a vertical yellow bar on the right side.

- Mixed associations between prenatal pesticide exposure and child growth among children <5 years of age in LMICs
- More studies with complete toxicology of commonly used pesticides in LMICs assessing chronic and acute exposure in comparable populations of pregnant women and children are needed to better understand if, and how, pesticides may influence child growth

Thank you!

- Funding:
 - UKRI Medical Research Council
 - DBT/Wellcome Trust India Alliance Fellowship



/GlobalAgEd



@GlobalAgEd

#ANH2022