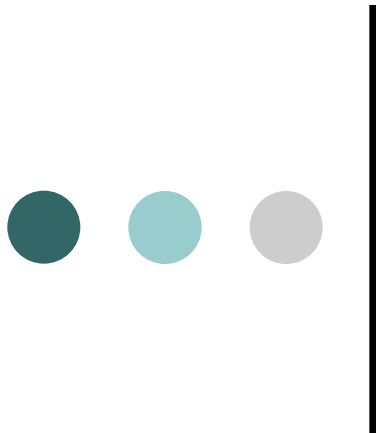


US EPA ARCHIVE DOCUMENT



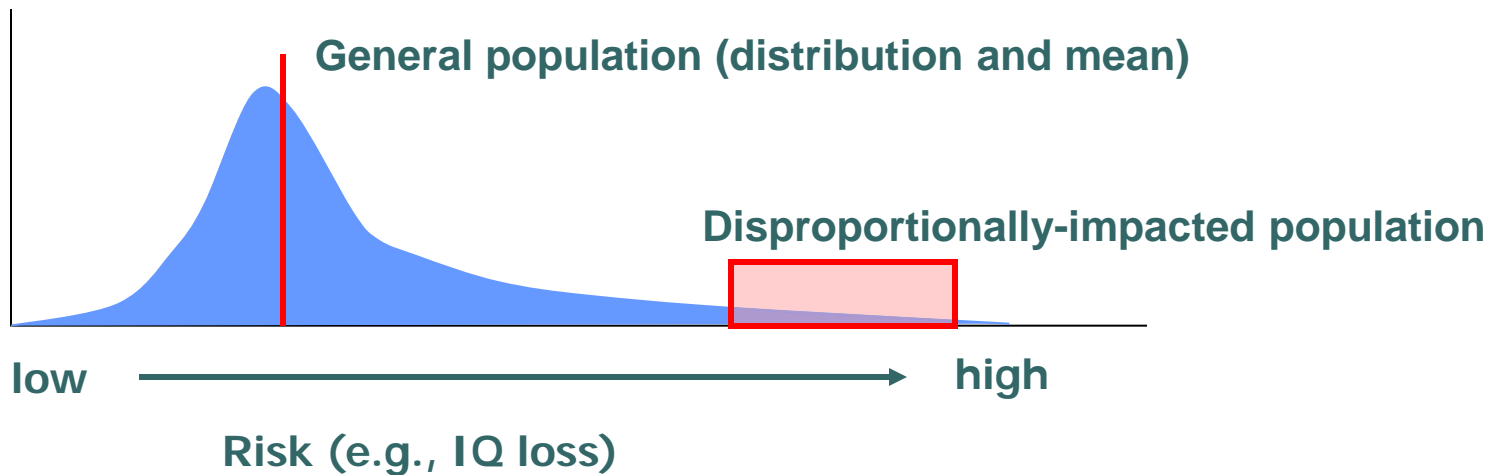
# Challenges in Assessing Risk for Disproportionately- Impacted Populations in the Regulatory Context (the examples of lead and mercury)

Dr. Zachary Pekar

Office of Air Quality Planning and Standards  
(OAQPS), US EPA

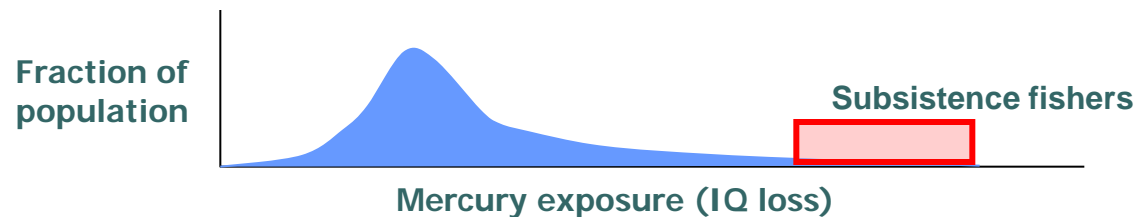
# Introduction – Disproportionate Risk (an illustration)

Fraction of population

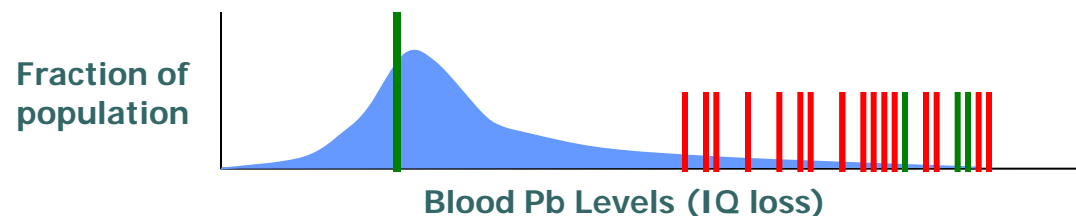


# Two case studies

- Two case study examples:
  - **Mercury** (maternal fish consumption) – challenge is in modeling exposure and risk for high-end individuals with ***complicated (dietary) behavior***

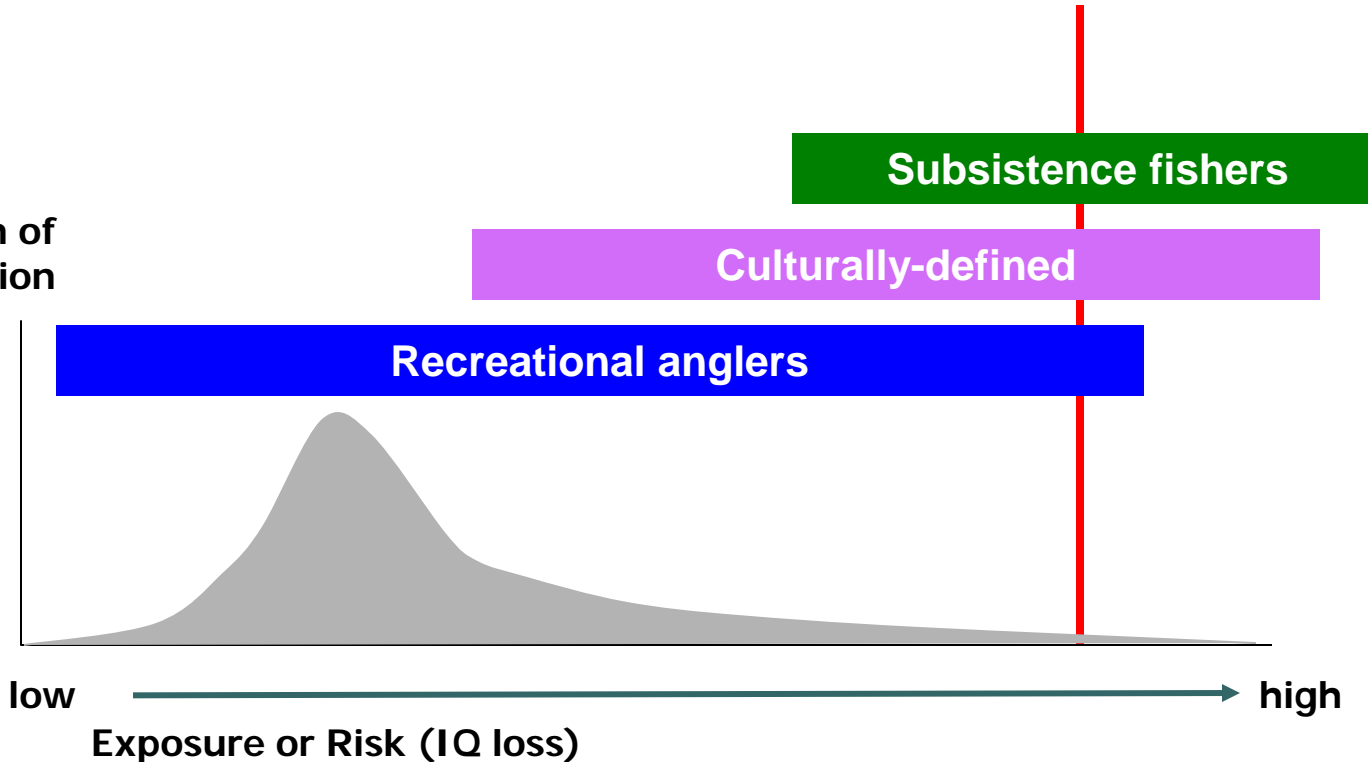


- **Lead** (child dust/soil ingestion and inhalation) – challenge is focusing on the ***appropriate subset*** of children in the overall population



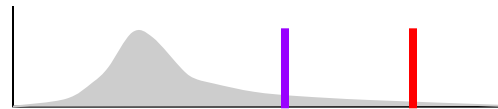
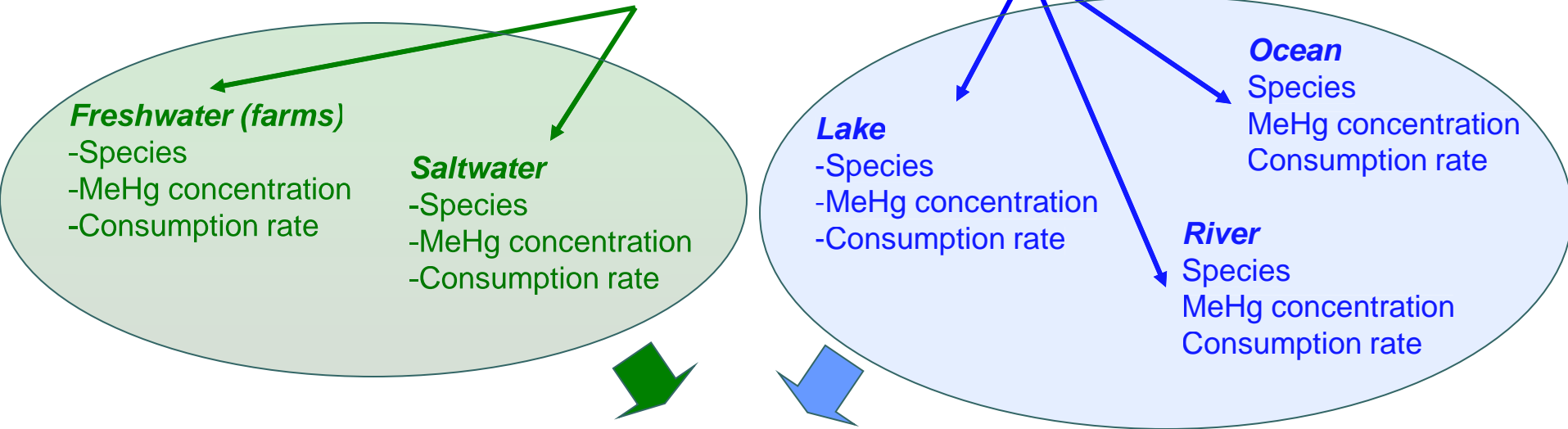
# MeHg (fish): Different groups experiencing high-end exposure/risk

Fraction of population



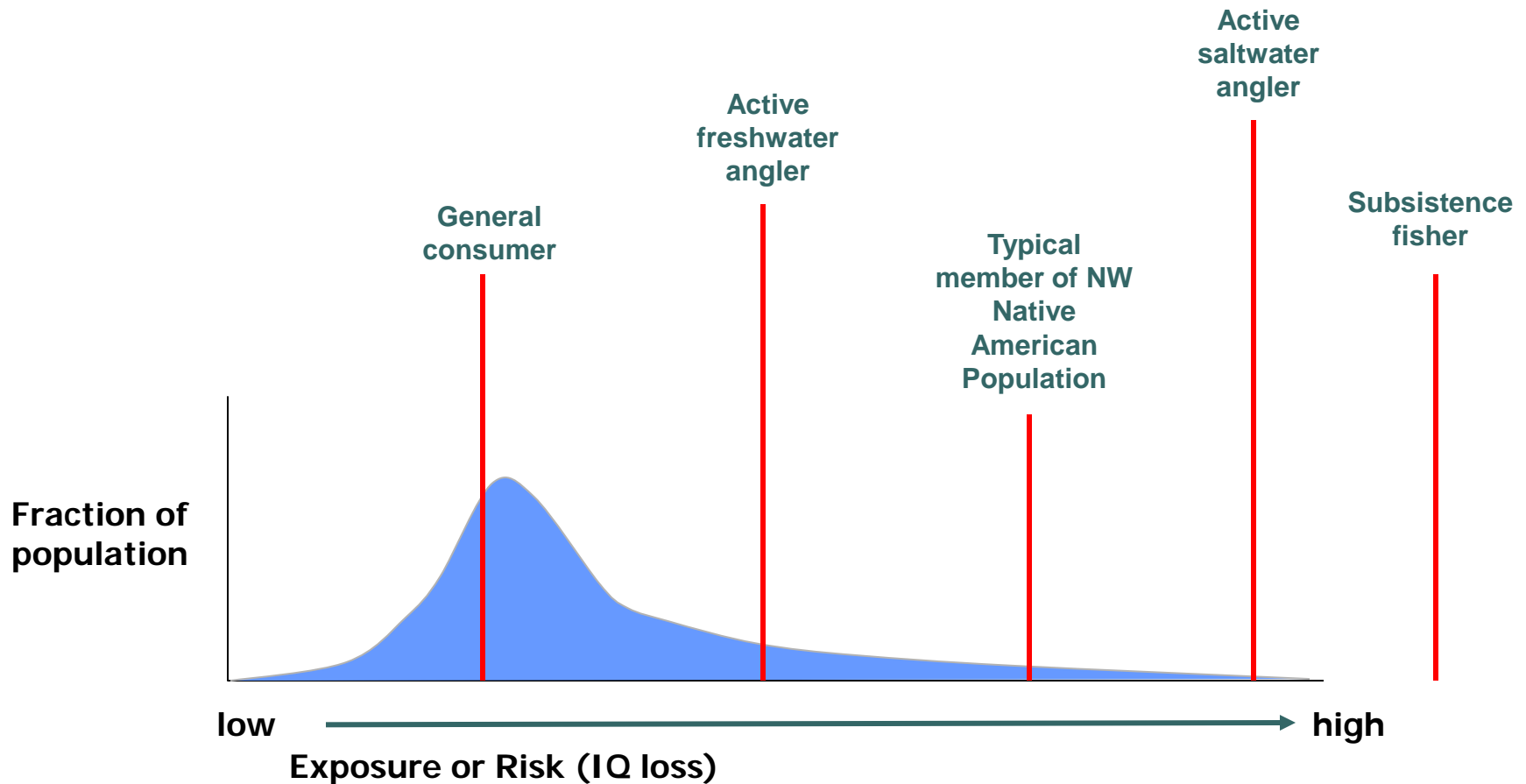
● ● ● | MeHg (fish): key risk-related attributes – *commercial and self-caught exposures*

**MeHg intake** = **commercially-sourced consumption** + **self-caught consumption**

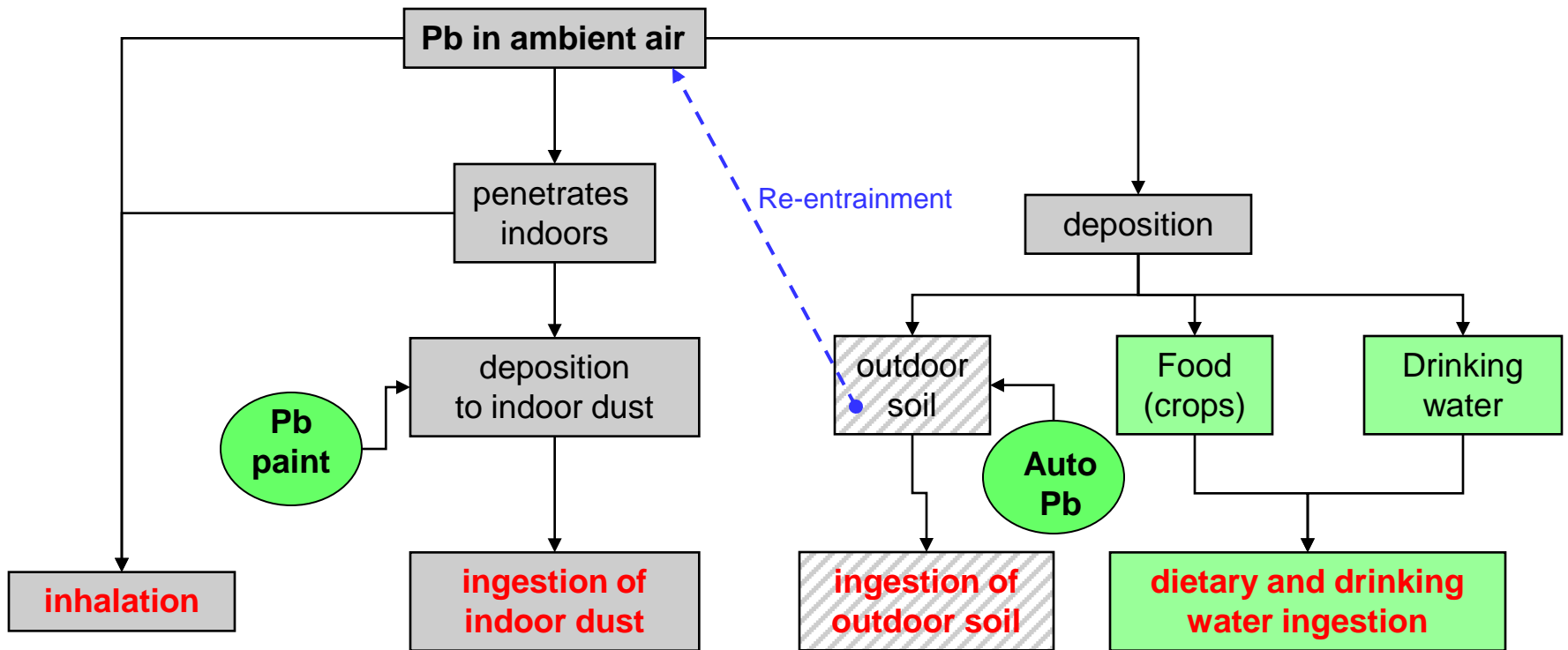


**Additional critical issue is correlation between exposure factors and source of Hg considered (EGU – local impacts)**

# MeHg (fish): Role of deterministic scenarios in performance assessment of probabilistic simulation

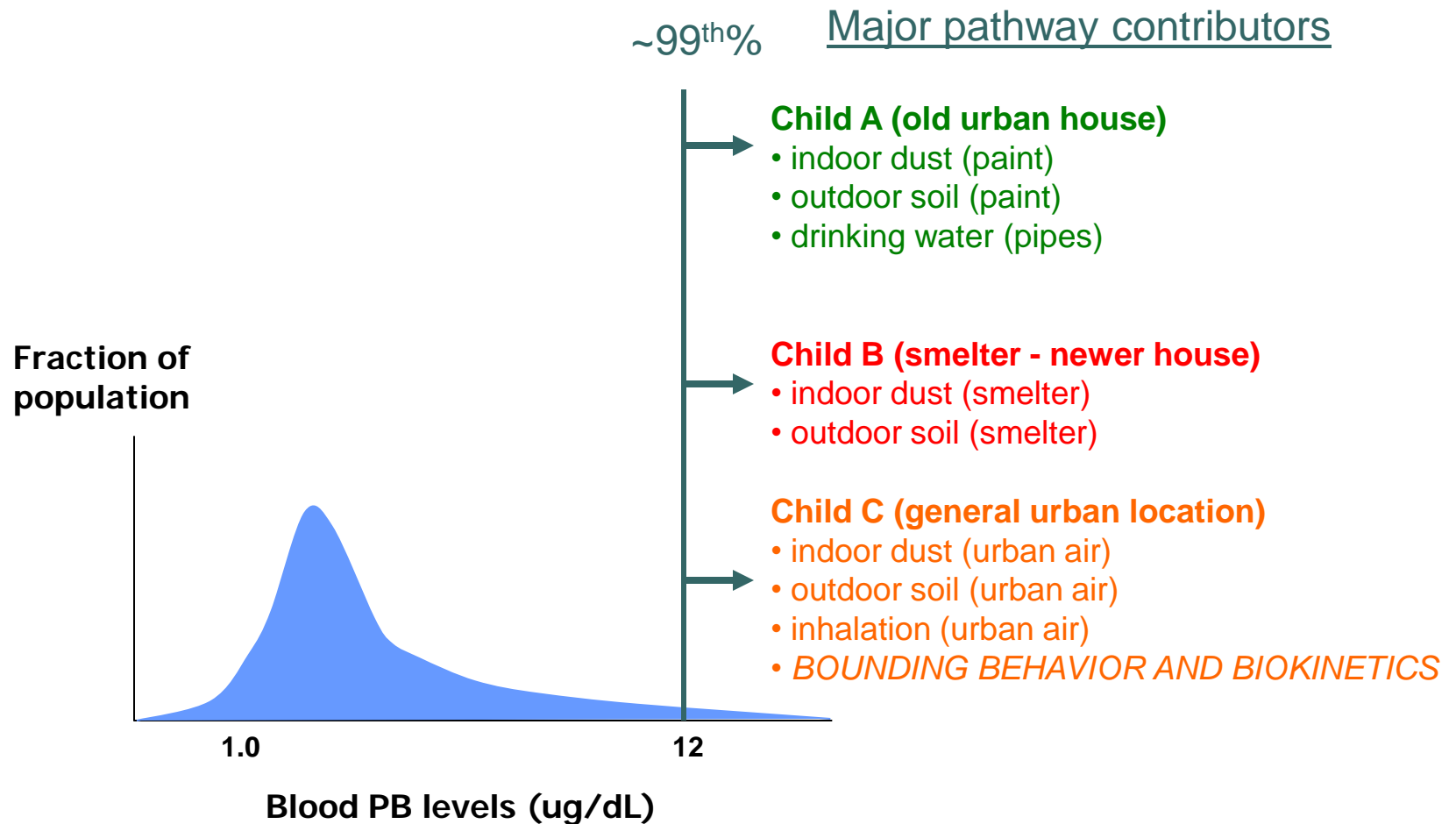


# Lead: key risk-related attributes – *multi-pathway*



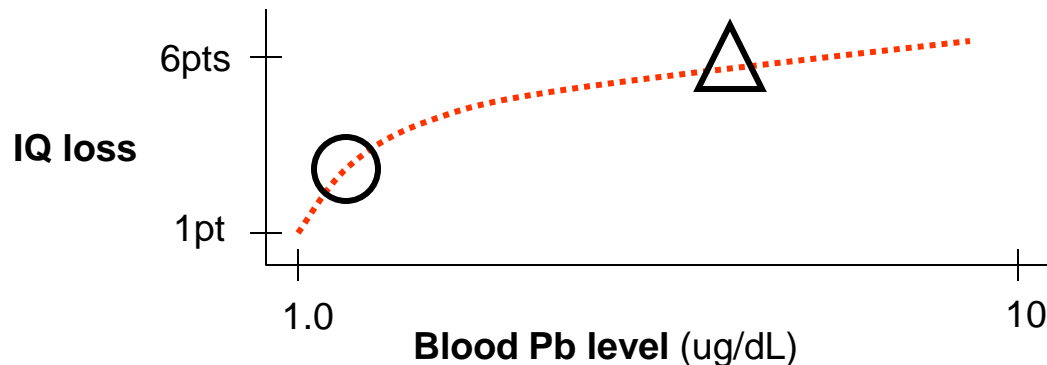


● ● ● | Lead: challenges – *Source contributions to children with higher BLLs*

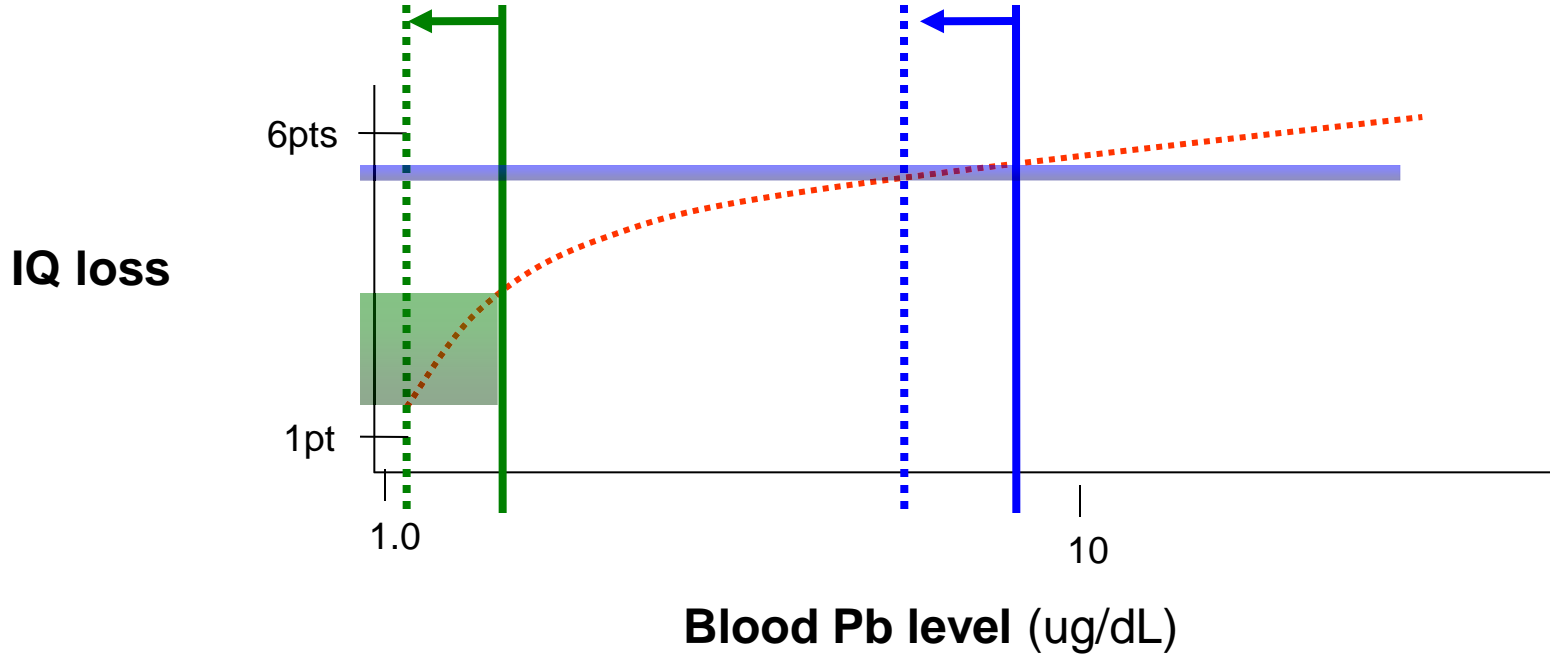


# Lead: key risk-related attributes – *non-linear CR function*

- *Non-linearity* in Pb exposure modeling and IQ concentration-response requires consideration of **total Pb exposure** (not just air-related) in order to representatively “place” a modeled child on the CR function curve

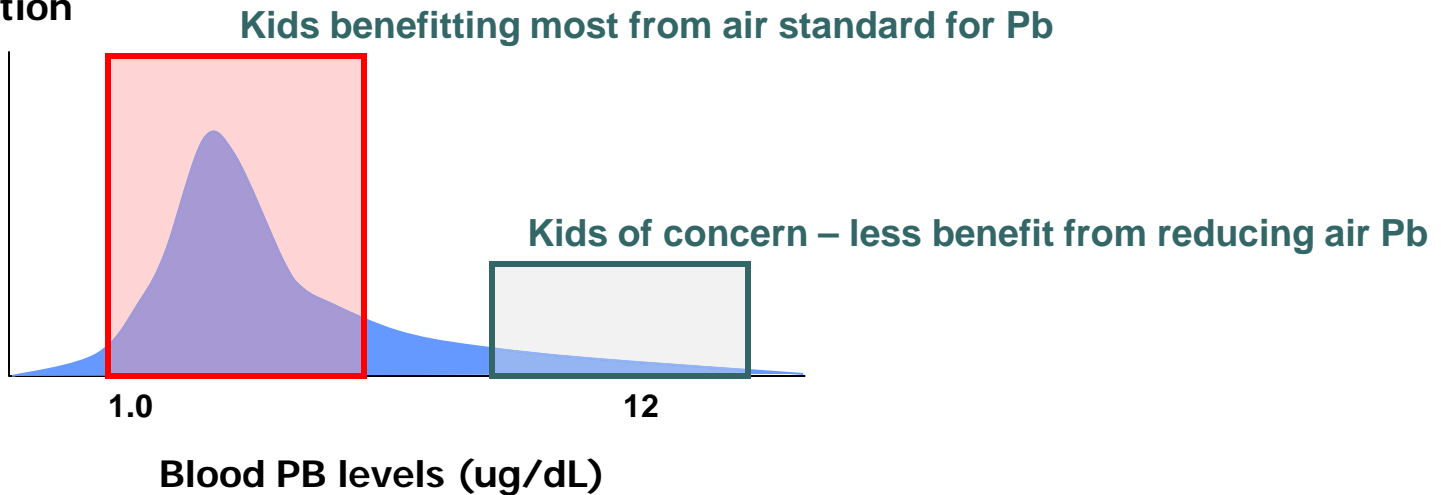


● ● ● | Lead: challenges – *public health significance (high vs low exposures)*



● ● ● | Lead: challenges – *Source contributions to children with higher BLLs*

Fraction of population



# Lead: challenges – *Probabilistic modeling of exposure and risk*

