

The influence of hydrometeorological variables on childhood diarrheal disease: A Planetary Health approach

Diarrheal disease is a **leading cause of death in children under 5** years of age globally. Diarrhea can also cause **undernutrition, adverse growth outcomes, and slowed neurological development**, resulting in lifelong consequences. **Climate change impacts**, such as heavy precipitation, flooding and drought, **threaten decades of progress** achieved in reducing diarrheal disease burden. Impacts depend on the specific pathogen which causes disease, but **pathogen-specific research on this topic is scarce**.



Objective: To determine how hydrometeorological variables influence the incidence of medically-attended diarrheal disease and its determinants among children under five in Akuse, Ghana.

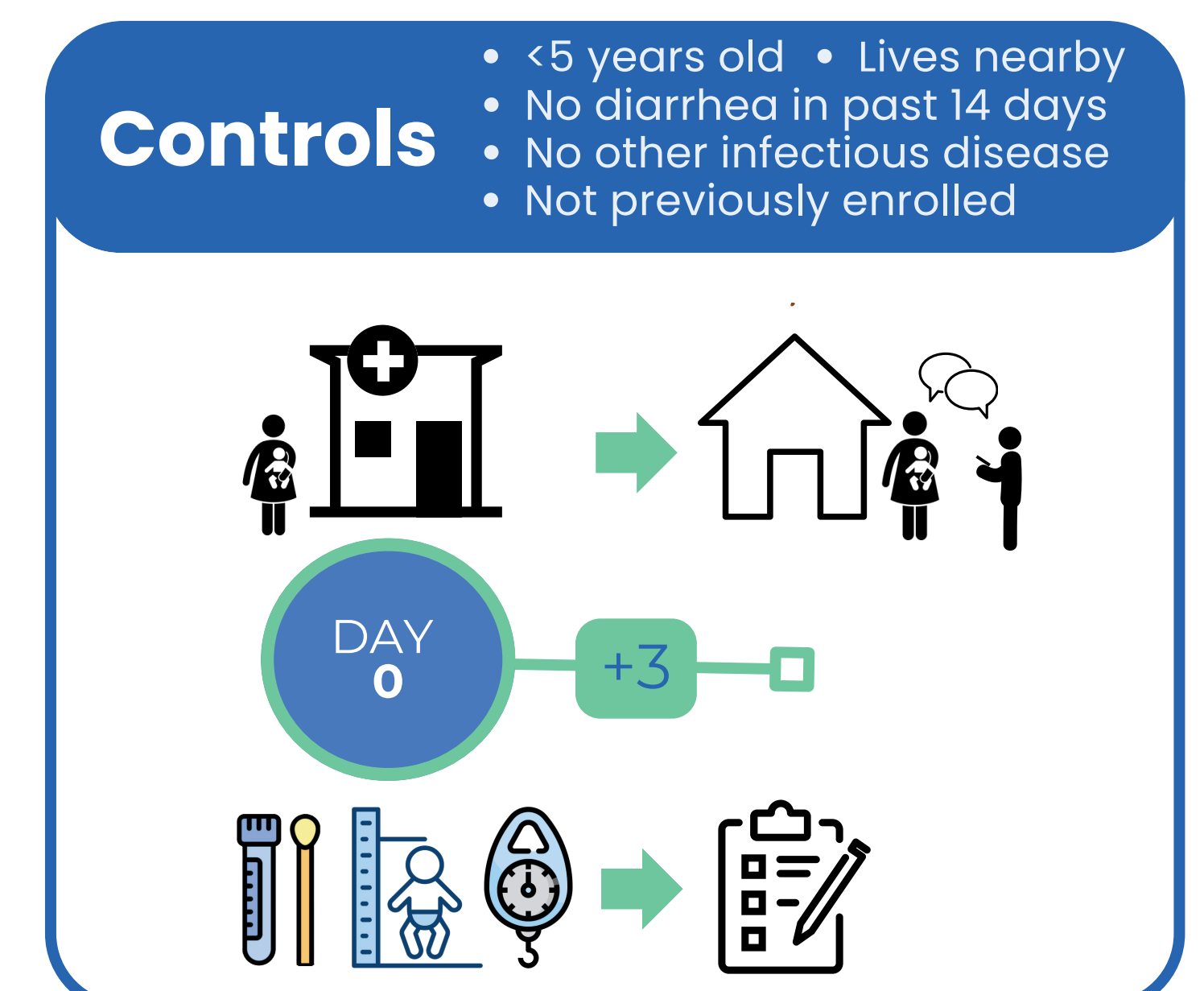
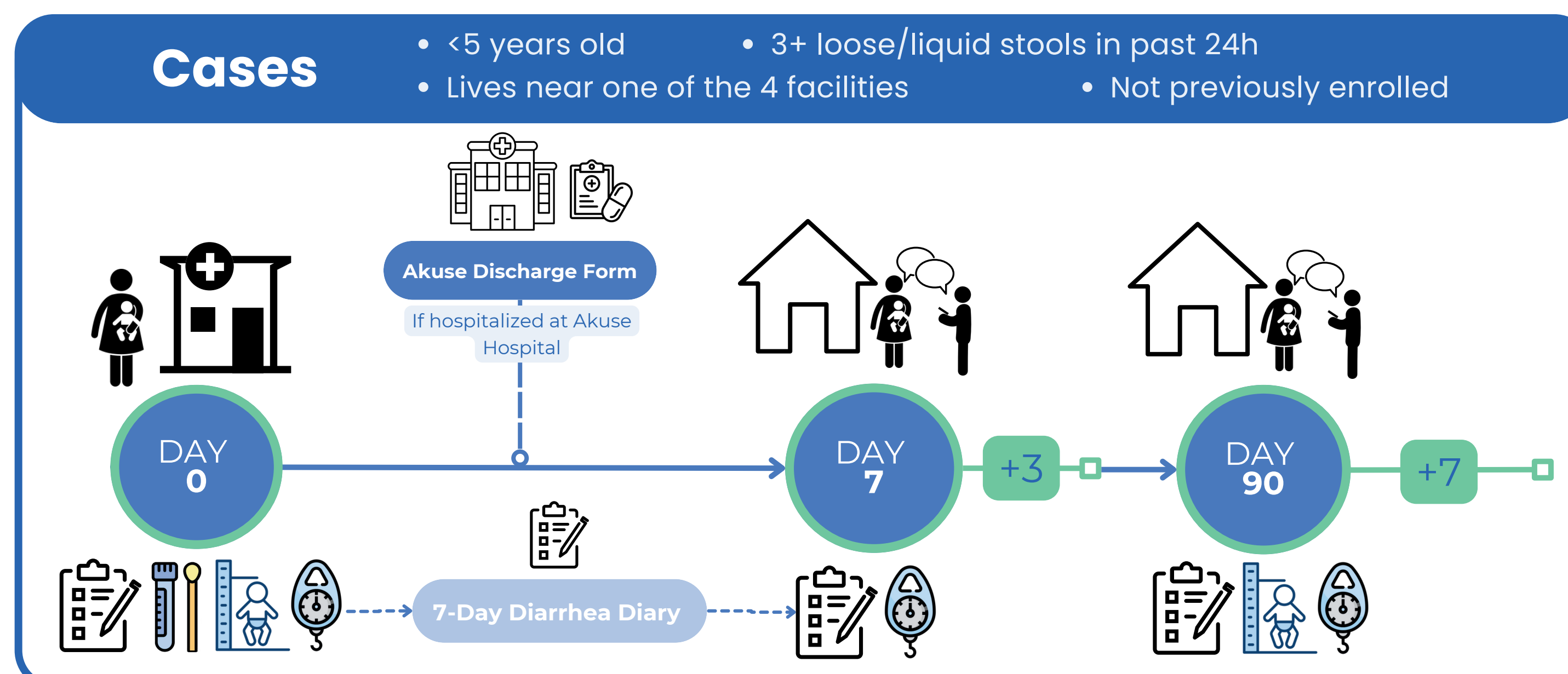


In this 2-year case-control study, we will collect...

- ✓ **Rectal swabs**
- ✓ **Anthropometric data** (weight, height, mid-upper arm circumference (MUAC))
- ✓ Data about **symptoms** and **healthcare**
- ✓ **Diarrhea risk factor data** during household visits
- ✓ **Water samples** throughout the study area and test concentrations of diarrheal pathogens
- ✓ **Weather** data during the two years using weather stations
- ✓ Anthropological data about **local beliefs** regarding climate change, water, diarrheal disease risk and adaptation.

Strengths

- Integrating **weather, water, animal, and diarrhea** data
- **Pathogen-specific** diarrhea outcomes
- Detecting **seasonal/temporal changes** in diarrhea risk factors
- Focus on **climate-WaSH interaction**, including adaptation options



What are we trying to find out?

Burden & Impact

- What is the **incidence** of diarrhea attributable to specific pathogens?
 - How **severe** are the diarrheal episodes?
 - How often do children suffer **adverse growth outcomes**?
- How many **disability-adjusted life years (DALYs)** does diarrhea cause?
- What are the **costs** of a diarrheal episode?

Risk factors

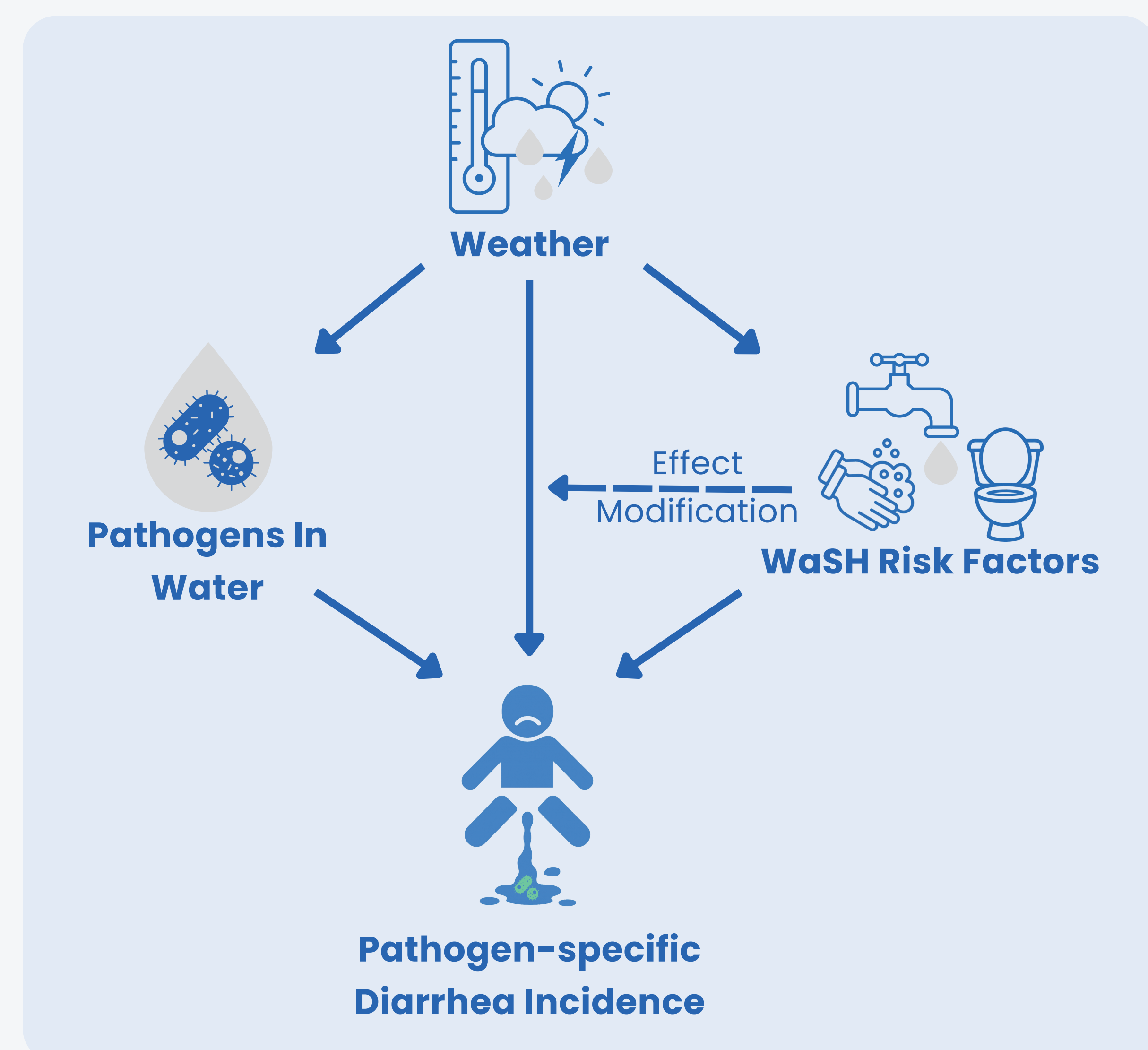
- What are the most important **risk factors** for diarrheal disease in this area in children <5? (Adjusted Odds Ratios)
- Are **pathogen concentrations in water** associated with diarrhea in children <5?

Influence of weather

- Is weather associated with...
 - Pathogen-specific diarrheal incidence in children <5
 - Pathogen concentrations in water
 - Water-, Sanitation, and Hygiene-related Risk Factors

Adaptation Potential

- **Do WaSH Risk Factors modify the effect of weather** on diarrhea?



Impact

Climate-Diarrhea Impacts

Understand the links between climate, water quality, and pathogen-specific diarrheal disease in children <5.

Project Future Risk

Improve modelled projections of future pathogen-specific diarrheal risk in children <5 in LMICs.

Simulate Interventions

Results from this study will be used as input for an Agent-Based Model to simulate the effect of various interventions.

Protect children against diarrhea

Help decision-makers implement solutions to mitigate the impact of climate change on diarrhea in young children.

