

Climate Vulnerability and Health in Informal Settlements: Preliminary Findings from a Mixed-Methods Study Across Colombian Cities

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Introduction

- Residents of informal settlements bear the highest climate-related health risks while remaining largely absent from environmental epidemiology research.
- In Colombia, ~23% of urban dwellers live in informal housing, outside the reach of public health surveillance and climate adaptation programs.
- These communities face compounding, intersecting hazards (extreme heat, flooding, landslides, failing infrastructure) in self-built homes that offer little thermal or structural protection.
- Equity-centered, mixed-methods research is needed to understand lived experience across diverse climates and build the evidence base for targeted interventions.

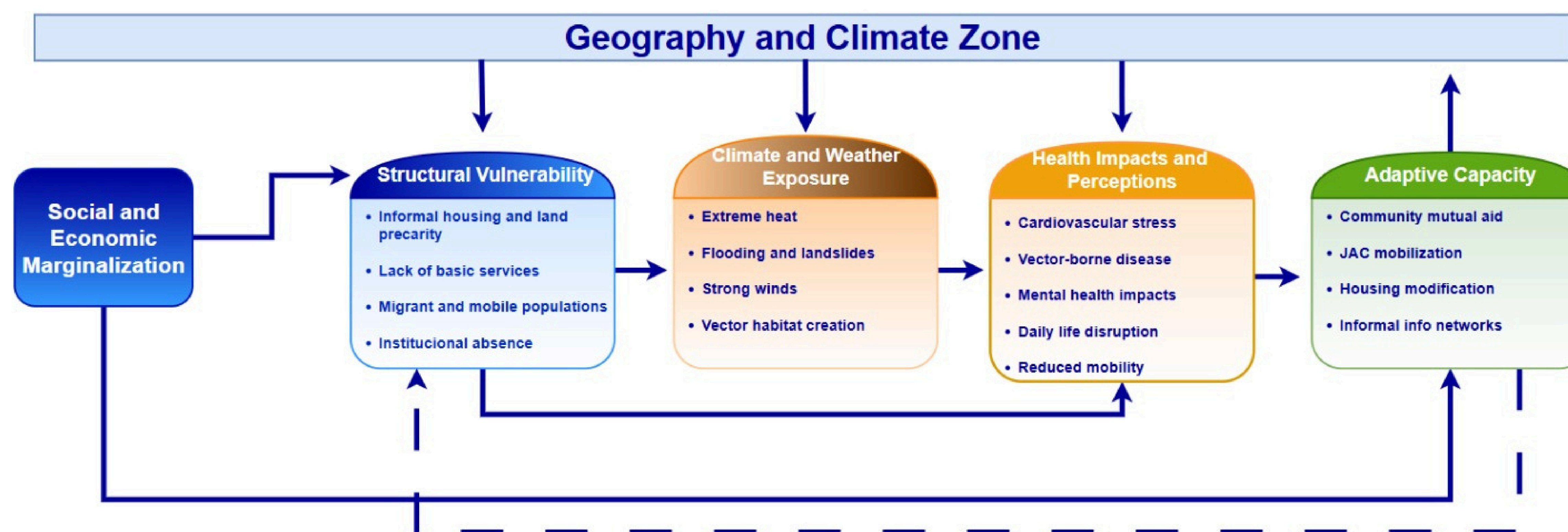
Methods

- Pilot mixed-methods study across two climatically distinct Colombian cities: Bucaramanga (subtropical mid-elevation) and Barranquilla (tropical coastal).
- Qualitative phase: Key informant interviews (n=3-5/city) with community leaders, Junta de Acción Comunal (JAC) representatives, municipal health workers, and NGO and health sector practitioners.
- Quantitative phase: Structured household surveys (n≈30–50/city) on weather exposure, self-reported health symptoms, and adaptive behaviors. Co-designed with Universidad Industrial de Santander and Universidad del Norte partners for cultural appropriateness and local relevance.
- Initial site visits were conducted to build relationships with partners and community leaders and to identify priorities, informing study design and survey development.

Preliminary Results: Key Informant Interviews

- Bucaramanga: Landslides, heat, and dengue/Zika/chikungunya dominate; intermittent rainfall and necessary water storage amplify vector risk on hillside terrain, while unstable slopes, precarious housing, and limited drainage infrastructure increase exposure to landslides and climate health risks.
- Barranquilla: Chronic flooding, extreme heat, and seasonal winds characterize communities built on former swampland. Increasing exposure to cold fronts, combined with limited road infrastructure and institutional neglect, further amplifies structural vulnerability.
- Housing as a health hazard: Zinc, wood, and plastic homes trap heat and offer no structural protection. Housing linked to respiratory illness, skin conditions, hypertensive crises, and heat-related mental distress. Children and older adults cited as most vulnerable at both sites
- Institutional absence: No fumigation, vector control, or emergency plans reach these communities. Mutual aid led by Community Action Boards (Juntas de Acción Comunal) and informal networks are the primary response and information systems.

Conceptual Framework: Climate-Health Pathways in Informal Urban Settlements



Flat, low-lying informal settlement in Barranquilla — wooden homes, unpaved roads, and limited drainage infrastructure increase flooding and heat exposure risk.



Dense hillside settlement in Bucaramanga — multi-story self-built homes reflect generational vertical expansion, while steep terrain creates persistent landslide risk.

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In informal settlements, the housing itself can be a health hazard.

Community mutual aid is the real emergency response system.

Dengue, flooding, landslides, heat-driven anxiety, isolated elders, missed school days. Vulnerability doesn't arrive alone; it compounds.