

Actionable Impact Brief

1. Executive Summary

This project studies how countries cluster based on various vulnerability factors such as healthcare access, demographic composition, mobility, urbanization and how these clusters correspond to pandemic outcomes.

The project reveals that vulnerability is not only an issue of economic development, but also social structure, mobility, and population age.

High-income and globally connected countries had the highest pandemic excess mortality, due to older populations, intense mobility, and early exposure (Figure 1). Low-income countries showed lower mortality, but remain structurally fragile due to weaker healthcare systems and limited resources for effective vaccination programs (Figure 2).

These insights show the need to rethink global strategies to respond to health crises considering not only economic categories.

This project proposes actionable pathways for health preparedness, aid prioritization, and urban planning. Its methods cluster-based typology and combined exposure indicators can scale to climate, migration, or other global crises.

2. Implications for Policymakers

2.1 For high-mobility countries with older population:

- Prioritize targeted protection for vulnerable groups, such as the elderly and people with chronic diseases;
- Develop strategies to minimize secondary damage (economic and mental health);
- Share resources during health crises with low- and middle- income countries.

2.2 For low- and middle-mobility countries with younger or mixed population:

- Invest in healthcare and disease surveillance infrastructure;
- Cooperate with high-income countries to improve vaccine logistics, data collection and transparency about epidemic spread.

2.3 For both:

- Reassess global travel dependence and coordinate early warning;

2.4 Findings and implications for international organizations:

- Urbanization and mobility increase pandemic risk therefore health crises strategies must focus on global connectivity;
- Aging demographics increase mortality risk, requiring healthcare and vaccination prioritization, and relatable planning;
- Use proposed structural vulnerability assessment instead of economy-based grouping when allocating aid.

3. Visualizations

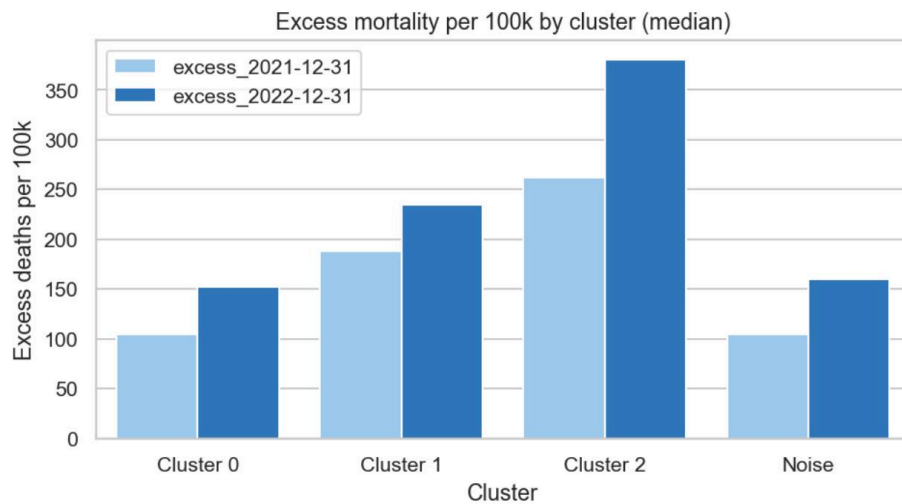


Figure 1: Excess mortality during 2021-2022 pandemic; Cluster 2: high-income, high-mobility countries with aging, mostly urban population, Cluster 0: low-income, low-mobility countries with young population, Cluster 1: medium countries

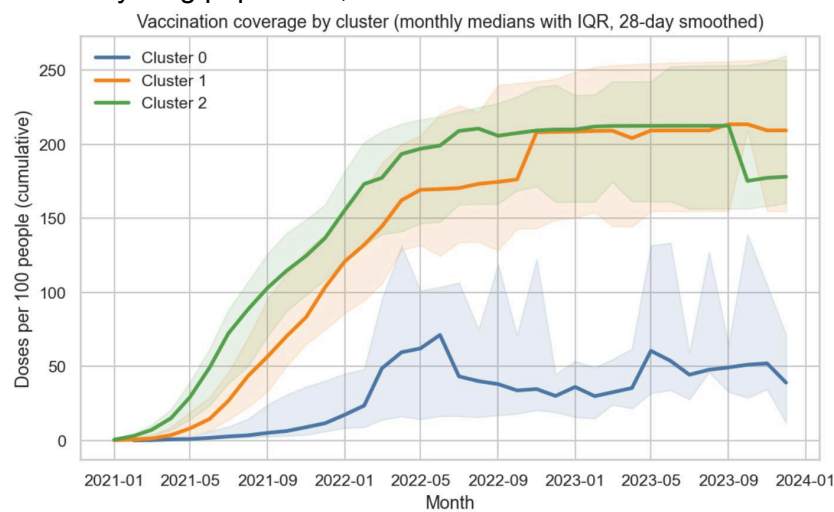


Figure 2: Vaccination coverage; Same clusters; Low-income countries lag significantly behind.