

The 2010 and 2021 Haitian Earthquakes: Case Study

Introduction

On January 12, 2010, a 7.0-magnitude earthquake struck Haiti, destroying vital infrastructure while leading to higher death rates and illness numbers. This disaster revealed serious vulnerabilities in Haiti's infrastructure, healthcare, and governance systems. The lessons learned in 2010 had a significant impact on Haiti's preparedness for the 7.2-magnitude earthquake event on August 14, 2021, presenting another test of resilience and response capability.¹

Facts of the case

The 2010 earthquake in Haiti left 1.5 million people displaced and without homes, killed between 220,000 and 300,000 people, injured 300,000, and cost an estimated \$7.8 billion dollars.² The larger earthquake in 2021 killed about 2,200 people, injured 12,000 more, and displaced about 650,000.³ This clear difference shows the progress made in disaster readiness in Haiti, but it also highlights ongoing weaknesses.

Epidemiological aspects of the event

The collapsed infrastructure, limited census data, and inadequately maintained mortality registries and surveillance systems caused a delay in the 2010 data collection. Therefore, retrospective surveys, inpatient data, and NGO reports were enlisted as the primary sources of epidemiological information, posing risks to data reliability and validity.⁴ Additionally, a cholera outbreak, brought on by UN forces after the 2010 incident, killed about 10,000 Haitians and infected over 820,000 between 2010 and 2019. This secondary outbreak demonstrated that higher mortality rates were caused by political neglect, poor water and sanitation infrastructure, and earthquake-related injuries.⁵⁻⁶

By 2021, epidemiological surveillance had broadened to encompass worldwide coordination, community-based surveillance, and a more targeted application of electronic health data. Within a few days, updated mortality and morbidity estimates were available, ensuring a more targeted response.⁵

Management of the event

The 2010 response to Haiti's earthquake revealed a surge in international humanitarian efforts; however, poor coordination, overcrowded airports, and weak national governance impeded these attempts. Due to the disregard for early warnings and the years-long denial of accountability, the cholera pandemic further illustrated negligence.⁶

The emergency response system of Pan American Health Organization (PAHO), local hospitals, and regional governments achieved better deployment speed for field hospitals and surgical teams by 2021.³ Transportation routes impacted by the natural disaster were not as important due to the pre-positioned goods in the southern peninsula. Following the accident, significant epidemics were avoided because of enhancements made to disease surveillance by the Haitian

Ministry of Health, PAHO, and other partners.³ Inadequate housing structures failed to withstand collapse, critical transportation linkages remained fragile, and political instability brought on by President Jovenel Moïse's murder a month earlier hampered central coordination, all of which contributed to Haiti's ongoing structural deficiencies.⁴

Communications of the event

Haiti's damaged infrastructure resulted in communication failures, prompting the use of improvised solutions, including SMS-based warnings and crisis mapping.⁷⁻⁸ The lack of equal communication access throughout rural and mountainous areas requires funding for emergency communication systems that span the entire nation.

Summary

The 2010 earthquake revealed significant vulnerabilities in Haiti's readiness and response capacity, even though the 2021 event demonstrated some upward movement in resilience.¹⁻⁴ Improvements, including better national coordination, more rapid surveillance, and a decline in mortality despite a stronger earthquake, were examples of incremental gains.^{3,5} However, structural and systemic barriers continue to impede comprehensive disaster management.^{4,8} To further reduce morbidity and mortality, Haiti can prioritize infrastructure resilience by:

- Addressing the lack of equal communication access throughout rural and mountainous areas requires funding for emergency communication systems that span the entire nation.³ Equally important is the establishment of nationwide, redundant communication networks that ensure prompt cooperation during emergencies.⁵
- Ensuring water, sanitation, and hygiene (WASH) systems are effective and in place, especially as it relates to recurrent crises, such as the cholera epidemic.
- Expanding the surge capacity of the national health system is also essential to minimizing dependence on foreign responders.⁴
- Institutionalizing disaster preparedness planning by integrating epidemiological surveillance with response mechanisms would provide a more structured and data-driven approach to managing emergencies.⁴
- The persistent political instability in Haiti must be addressed immediately if its issues are to be resolved. Unstable governance systems have been shown to endanger lengthy recovery efforts and cause delays in relief distribution.⁶⁻⁷ It is clear from the Haitian disaster that, in addition to international aid, national preparation funding is necessary to achieve true catastrophe resilience. The current rate of development will not prevent future disasters from causing serious harm unless there is a sustained commitment.^{1,4}

References

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