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Diarrheal disease and climate change

Floods, droughts, and extreme heat linked to climate change are disrupting clean water and sanitation systems and increasing the risk of water contamination and poor hygiene practices. Furthermore, changes in temperature and humidity create conditions that support the growth and spread of disease-causing germs. Climate change can also impact food supplies, leading to malnutrition and weakened immune systems, making children more susceptible to diarrheal diseases. In summary, climate change is playing a role in worsening the prevalence of diarrheal diseases among young children in low-income countries.

The findings presented in this factsheet are based on research by the Belmont Forum-funded project, Addressing extreme weather-related diarrheal disease risks in the Asia Pacific region (AWARD-APR). This project's overarching goal is to help communities across the Asia-Pacific region with tools to prevent and manage diarrheal disease in young children. This effort involves the development of an innovative early warning system for implementation across the entire region that uses information from long-term weather trends, enabling the prediction of conditions conducive to the proliferation of diarrheal diseases.

The purpose of this factsheet series is to showcase key findings from research on climate change and health from projects funded by the EU and Belmont Forum which are part of the ENBEL network. The series includes only findings from research produced by four EU-funded projects and one JPI Climate-funded project in the ENBEL network as well as from projects funded through the Belmont Forum Climate, Environment and Health Collaborative Research Action (CEH1).

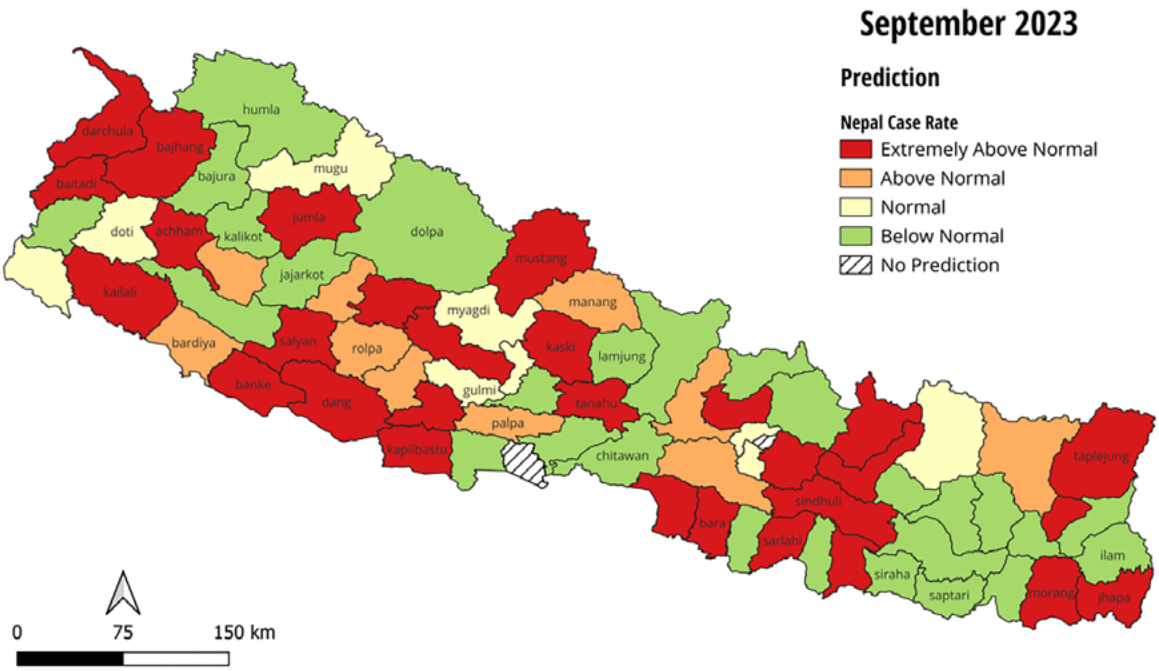
Key findings

- Diarrheal diseases have declined around the world due to oral hydration therapy, yet they remain a leading cause of death and illness among children in low-income countries in the Asia-Pacific region.
- Scientific consensus confirms an impending rise in the frequency, duration, and intensity of extreme weather events resulting in more cases of diarrhea among young children in the Asia-Pacific region.
- A comprehensive study in Nepal reported a direct link between elevated temperatures, increased rainfall, and a notable increase in reported cases of diarrhea among children under 5 years old.
- The risk of diarrhea among young children was higher in mountainous regions compared to hilly or lowland areas within Nepal.
- Monsoons and La Niña phases are identified as key factors that drive rainfall and extreme weather events such as flooding that result in the spread of diarrhea among young children.
- During the monsoon season, there was a 21% rise in diarrheal disease, while La Niña was associated with a 32% increase in diarrhea cases among children under 5 years old.

Implications of the research

- Conventional early warning systems reliant on basic weather forecasts are only able to offer a seven-to-ten day lead time which does not provide sufficient time for communities and public health authorities to adequately prepare and respond.
- The research underscores the potential to design an early warning system centered on weather events such as the El Niño and La Niña phases and monsoon dynamics given their longer-range predictability.
- Early warnings extended to four-to-twelve weeks empower public health entities, workers, and communities to proactively prepare, mitigating illness and fatalities among young children susceptible to diarrheal diseases.

Predicted diarrheal disease case rate, Nepal



Who is most at risk?

- Young children under five years of age, particularly in areas with poor water sanitation and hygiene, are the most vulnerable to diarrheal diseases.
- Diarrheal diseases are the second leading cause of death in children younger than 5 years of age worldwide, accounting for approximately 1.7 billion cases and over half a million deaths each year.

Conclusion

This research underscores that the increase in frequency, duration, and intensity of extreme weather events often results in more cases of diarrheal diseases among young children in Nepal, particularly in mountainous terrain. Key factors driving extreme weather events such as monsoons and La Niña periods are tied to a rise in diarrheal diseases. These research findings can be used to develop early warning systems with substantially extended lead times thus equipping public health workers to effectively stave off diarrhea outbreaks especially within communities struggling with poor water sanitation and hygiene.

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For more information

Please visit AWARD-APR's website (www.award-apr.org/newsletters-1)

Publications

- Adams, N, Dhimal, M, Mathews, S, Iyer, V, Murtugudde, R, Liang, XZ, et al. El Nino Southern Oscillation, monsoon anomaly, and childhood diarrheal disease morbidity in Nepal. (May 2022). PNAS Nexus, Volume 1, Issue 2, 1-7. https://doi.org/10.1093/pnas-nexus/pgac032.

- Dhimal, M, Bhandari, D, Karki, KB, Shrestha, SL, Khanal, M, Shrestha, RRP, et al. Effects of climatic factors on diarrheal disease among children below 5 years of age at national and subnational levels in Nepal: An ecological study. (2022). Journal of Environmental Research and Public Health 19 (10): 6138. DOI: 10.3390/ijerph19106138.

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