data driven decisions

by

Precision Health
Surveillance Initiative

Introduction

Precision Health Platform (PHP) is dedicated to generating early warnings for disease outbreaks to transform the lives of the most vulnerable communities in the Global South. PHP has built on its success with wastewater monitoring during COVID-19 waves to harness the transformative potential of both 'cold' and 'warm' data- technology-driven and community-centered.

With more diseases of pandemic potential looming, PHP piloted:

1. **Geospatial mapping** to prioritize areas that are especially vulnerable to climate-related disease outbreaks.
2. **Community-based surveillance** that monitored symptoms for a population of ~10000 with a sample size of 704 *(99% confidence interval & 5% margin of error)* for 9 weeks.
3. **Event-based surveillance**, scanning diverse data sources -media platforms online to capture local reports of disease emergence.

PHP is helmed by Swasti, a global health equity CSO, which houses its secretariat

01 Objective

Develop an integrated disease surveillance system that achieves health equity.

02 Methodology

1. Geospatial mapping (GIS-based):

The platform mapped risks related to flooding for a district in Karnataka - looking at aggregated indicators like topographic wetness, rainfall, slope, and elevation. The mapping was conducted using the Analytical Hierarchy Process - a decision-making process to assign relative importance across indicators and objectives and check for consistency in subjective judgments about priorities.

2. Community-based surveillance:

The platform collected data of over 700 individuals in Karnataka with the help of a questionnaire deployed through the community engagement leaders teams. Data on health concerns, symptoms, and perceptions of people on disease risks was captured. Information on weather, pre-existing conditions, demographics, and other critical factors to correlate emerging data were also collected and findings were triangulated with primary health centers.

3. Event-Based Surveillance (EBS):

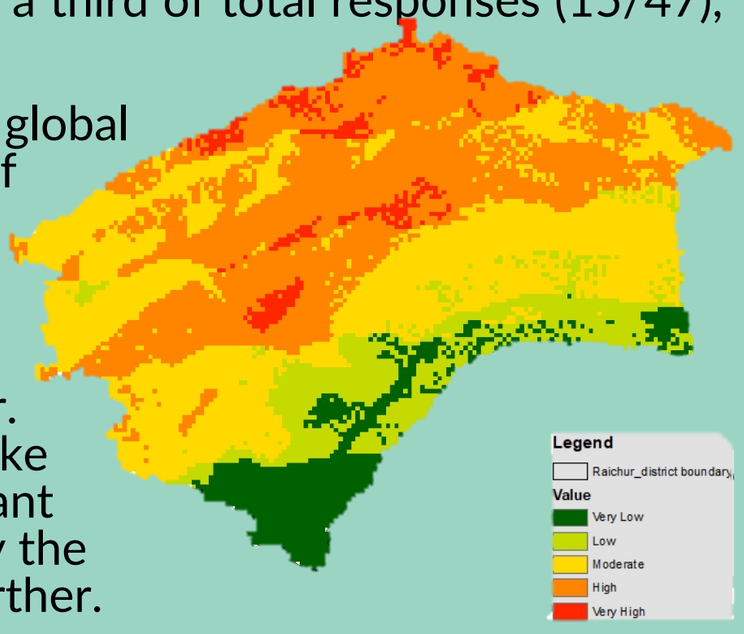
During the monsoon season the platform used state-of-the-art Machine Learning models, enabling the identification of critical media articles related to climate and health events of concern. The data wad refined with Named Entity Recognition (NER) and Zero-Shot Classification models to provide insights into the nature and severity of climate-health events.

03 Results

In partnership with Mapsolve.ai, the platform was able to develop maps that show the relative vulnerabilities of different spaces over time. This helps in decisions such as which regions warrant deeper engagement and resource allocation. The platform plans to layer other socioeconomic indicators along with the topographical ones around 'sensitivity' that have been considered so far, and create more such maps for different districts.

Through community-based surveillance, concerns beyond major diseases and correlate general conditions of wellbeing with weather conditions were highlighted. For example, almost 200/700 respondents reported headaches, and when reporting severe weather conditions, this group accounted for a third of total responses (15/47), the highest single category.

Through EBS, we received real time, global and local updates, and noted cases of COVID-19 vector borne diseases (dengue, malaria), adenovirus that causes conjunctivitis, and zoonotic diseases like African Swine Flu and Crimean-Congo Haemorrhagic Fever. Chronic gastrointestinal conditions like fatty liver also emerged. Few irrelevant data sources were also thrown up by the model, which needs to be refined further.



04 Recommendations based on lessons learnt

- Focus on serving communities without official health data collection (remote, underserved areas) but that have good community worker and facilitator networks to amplify the benefits of community-based surveillance over longer periods. **Investments to fund frontline and community health workers are essential in this regard.**
- Incorporate data sources beyond media /press including national or multilateral alert systems for disease emergence and **triangulate with community-based intelligence and other geospatial risk indicators to prioritize resource allocation.**
- Connect intelligence from early warning systems to **robust risk communications and community engagement plans to ensure that vulnerable communities truly benefit from disease surveillance.**

05 Conclusion

Through the agile use of data analytics & community networks on the ground, Civil Society Organizations have a significant role to play in disease monitoring in the Global South, and bring much needed health equity perspectives in global health security.

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THE HEALTH CATALYST