

Making global public health more proactive with Google Earth AI

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We're helping public health leaders overcome reporting lags, forecast disease outbreaks, and deliver care to vulnerable communities around the world by combining local health data with advanced geospatial models.

A community's health is deeply connected to its geography, which dictates climate patterns, physical infrastructure, and the ways people live and move. But public health teams frequently grapple with geographic blind spots — as well as fragmented data and reporting delays — whether they're tracking a fast-moving viral outbreak or projecting cardiovascular mortality. Equipping health leaders with advanced predictive tools can better protect at-risk communities, and help shift emergency response from reactive management to proactive prevention.

In new research papers co-authored with global health partners, we demonstrate how Google Earth AI can bridge critical gaps across diverse geographies, diseases, and areas of public health using autonomous predictions and population dynamics.

By combining environmental signals with satellite imagery, mobility data, and foundation models — such as AlphaEarth Foundations and our Population Dynamics Foundation Model (PDFM) — and pairing them with a prototype Geospatial Reasoning agent, we help communities uncover the complex connections between people and their environments.

This enables researchers and public health officials to complement existing health information, bridge reporting gaps, and address health challenges proactively.

Bringing agentic capabilities to the front lines

Acute health crises demand rapid, intuitive tools. To validate the power of Earth AI during active emergencies, several partners were given access to two research prototypes: the Geospatial Reasoning agent using Google Earth AI capabilities for conversational spatial mapping, and the planetary prediction engine for autonomous disease forecasting. Through plain-language conversations, public health teams can streamline complex manual data processing with timely insights and clear decision support.

During the ongoing Ebola outbreak in the Democratic Republic of Congo (DRC), our partners at the World Health Organization's Regional Office for Africa (WHO AFRO) Emergency Preparedness and Response Hub in Dakar and the Epidemic Modeling and Intelligence Unit (UMIE) at the DRC's National Institute of Biomedical Research (INRB) put these prototypes to work.

- **Uncovering transmission blind spots:** The WHO AFRO team used our Geospatial Reasoning agent prototype to map remote mining corridors where the exposure risk and human mobility are high. In minutes, the team pinpointed 48 exposed settlements and located more than 45,500 at-risk people — a process that normally would have taken weeks. This allowed local

responders to proactively deploy mobile laboratories and coordinate border surveillance.

- **Simulating outbreak trajectories:** Working alongside UMIE, we built predictive models that estimate the risk of Ebola spread into uninfected zones. By combining mobility flows with historical case trends and Earth AI models and datasets, these weekly insights give coordinators critical planning time before cases arrive.
- **Scaling health predictions:** Beyond fast-moving outbreaks, our research shows pairing Earth AI's capabilities with public health data can predict broader community health trends more accurately than manual analysis.

Pairing foundation models with local insights

PDFM combines aggregated search trends and mobility and environmental patterns into a dynamic, high-resolution picture of a community. Partners can integrate these insights directly into their own systems.

- **Boosting timely disease prediction (cardiovascular disease):** By integrating real-time population signals into chronic disease models, researchers at NYU Langone Health projected same-year cardiovascular mortality with similar — and in some cases improved — performance over conventional approaches. The faster these insights are generated, the faster they can be used to direct critical resources to vulnerable communities.
- **Tracking cross-border immunization (measles, mumps and rubella):** Researchers at Mount Sinai Health System and Boston Children's Hospital incorporated human behavioral patterns on either side of the U.S.-Canada border to gain a more accurate view of vaccination rates in U.S. counties and uncover insights that could be overlooked by traditional public health models.
- **Anticipating seasonal surges (dengue):** Many endemic diseases exhibit seasonal fluctuations tied to environmental and weather shifts. Combining PDFM with localized climate models allowed researchers at the University of Oxford and Tecnológico de Monterrey to more accurately forecast dengue fever outbreaks across Mexico. This can provide vital lead time to take early action, such as killing mosquito larvae.
- **Predicting waterborne disease hotspots (cholera):** In the DRC cholera evaluations with WHO AFRO, combining epidemiological records with PDFM improved the predictability of identifying outbreak-prone health zones up to eight weeks in advance. This could help frontline teams take proactive measures.

Supporting global access

Bringing planetary intelligence into public health workflows starts with getting these tools into the hands of researchers and practitioners. PDFM embeddings are commercially available in Preview as Population Dynamics Insights, a geospatial embeddings dataset from Google Maps Platform. Researchers can request no-cost access for select use cases.

Eligible organizations can apply for Google Earth credits through our GMP Public Programs.

To further support local public health infrastructure, Google.org has provided INRB with funding to help modernize local testing and disease surveillance.

By pairing planetary intelligence with local expertise, we're working alongside global health leaders to build proactive, data-driven tools to better protect communities everywhere.

<https://blog.google/innovation-and-ai/technology/health/google-earth-ai>