Sleep Cycle

Research collaboration

Cambridge

March 13th, 2025

Sleep Cycle

UNIVERSITY OF CAMBRIDGE

Harnessing Live Cough Data to Visualize Global Trends

Dr. Mikael Kågebäck CTO & Head of Science

Cough Radar™ by Sleep Cycle®

Sleep Cycle
The World’s No. 1 Sleep Tracker

- **Sleep Tracker**
- **Advanced Sound analysis**
- **Population Insights**

Dr. Mikael Kågebäck CTO & Head of Science

A Global
Sensor Network for Health

Dr. Mikael Kågebäck CTO & Head of Science

Cough Radar™ by Sleep Cycle®

PRIVACY PRESERVING

Privacy By Design

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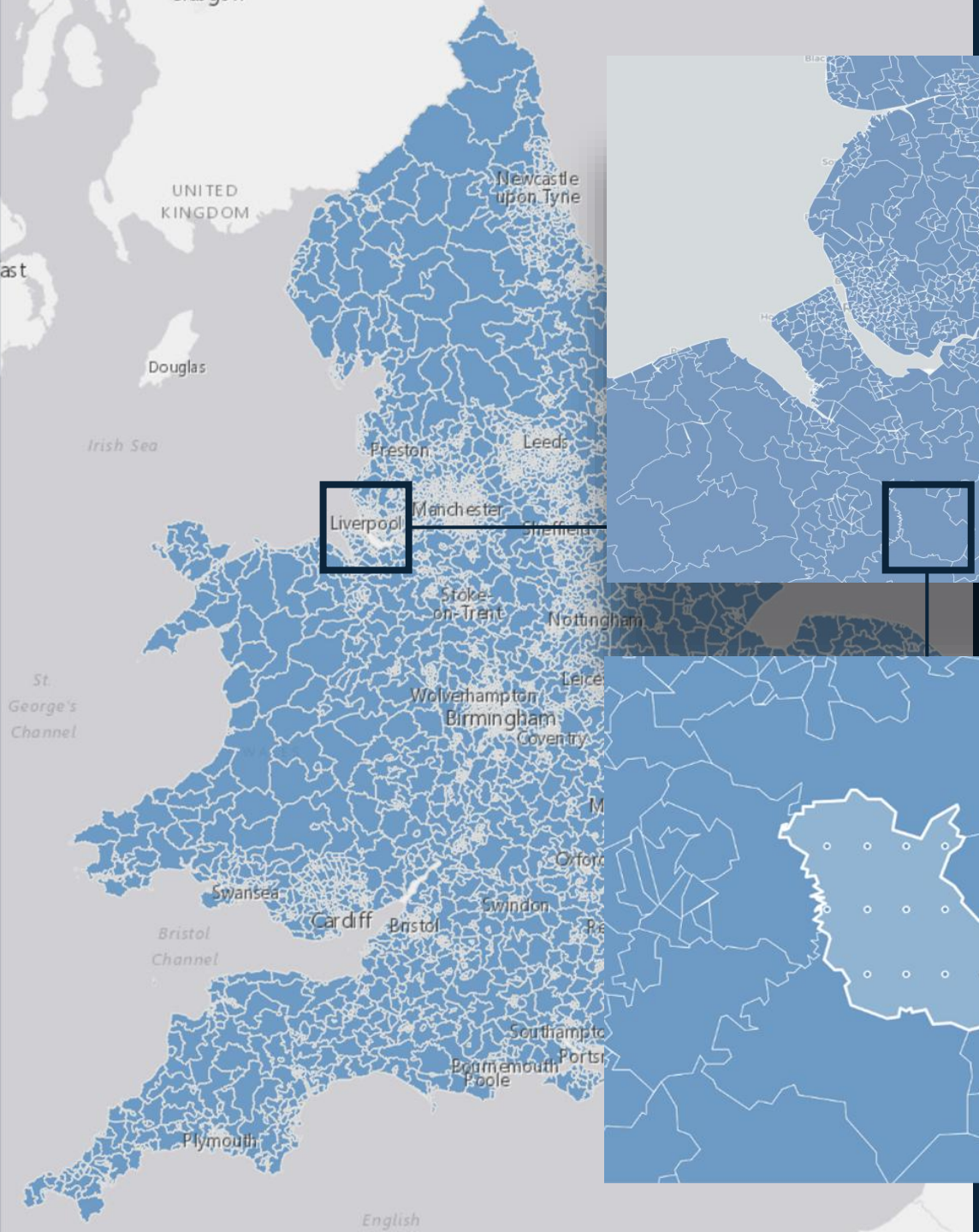
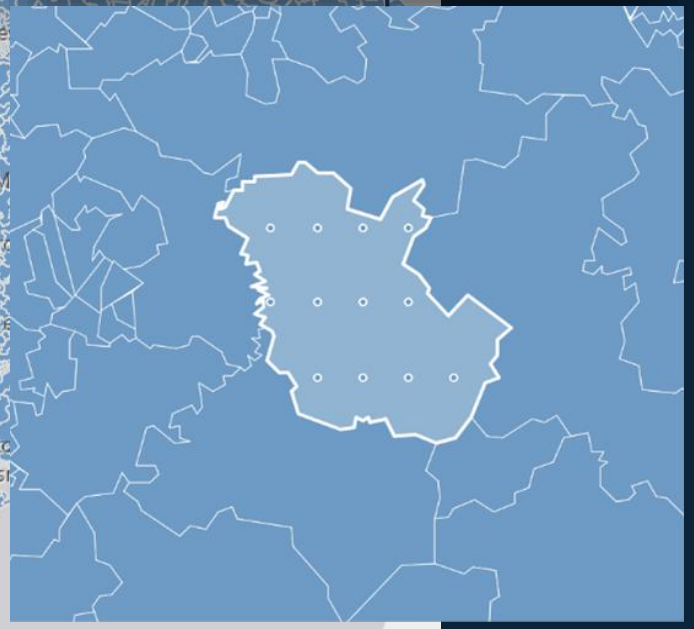
Cough Radar visualize global coughing trends

Cough Radar™ by Sleep Cycle®

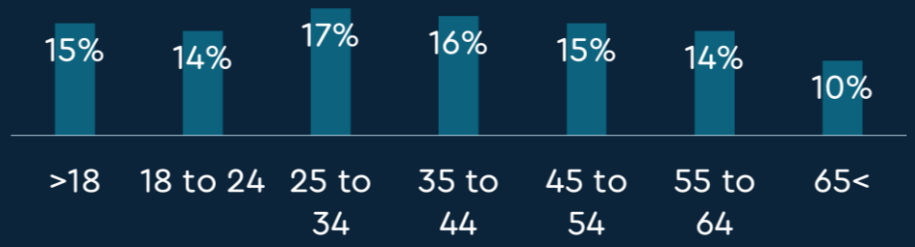




WIDE COVERAGE

Covering 80% of The UK Population

Even age group distribution



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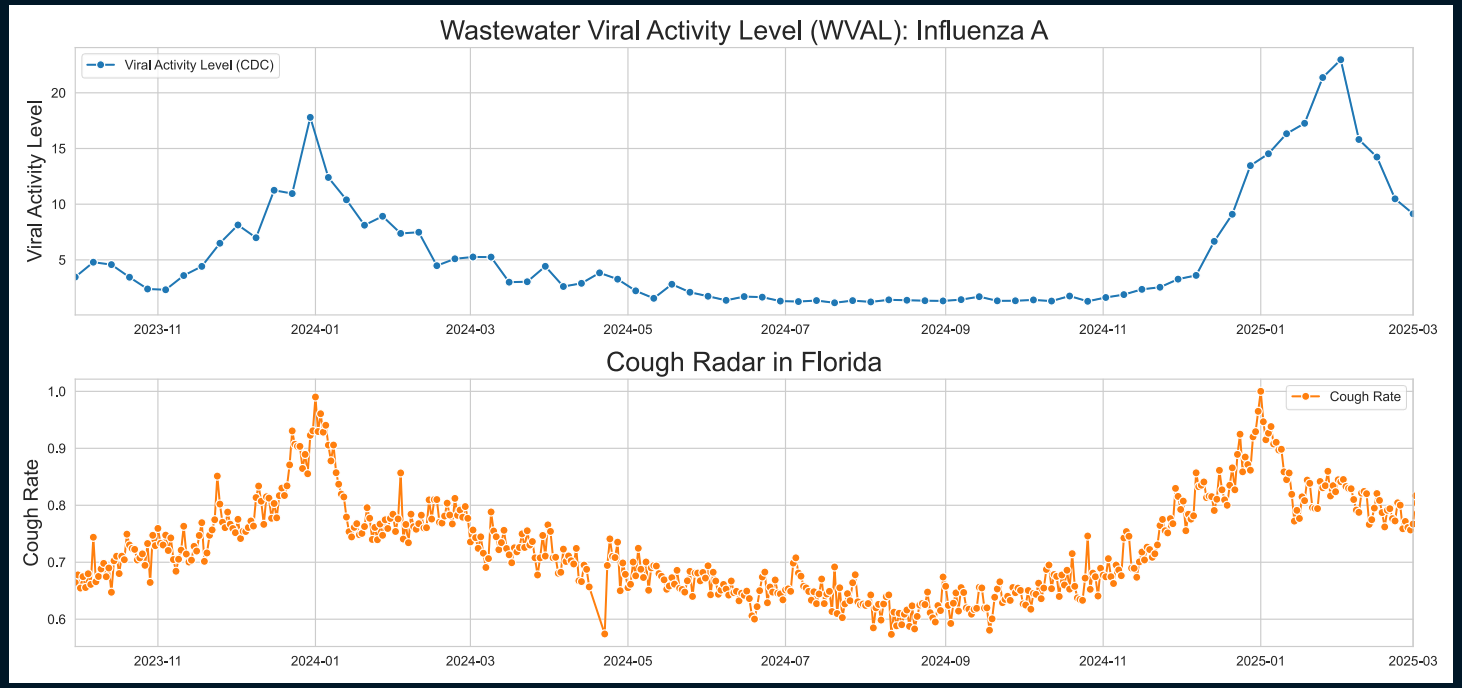
Correlation with wastewater viral activity (Influenza A) indicates good sensitivity

Dr. Emil Carlsson

RESEARCH SCIENTIST

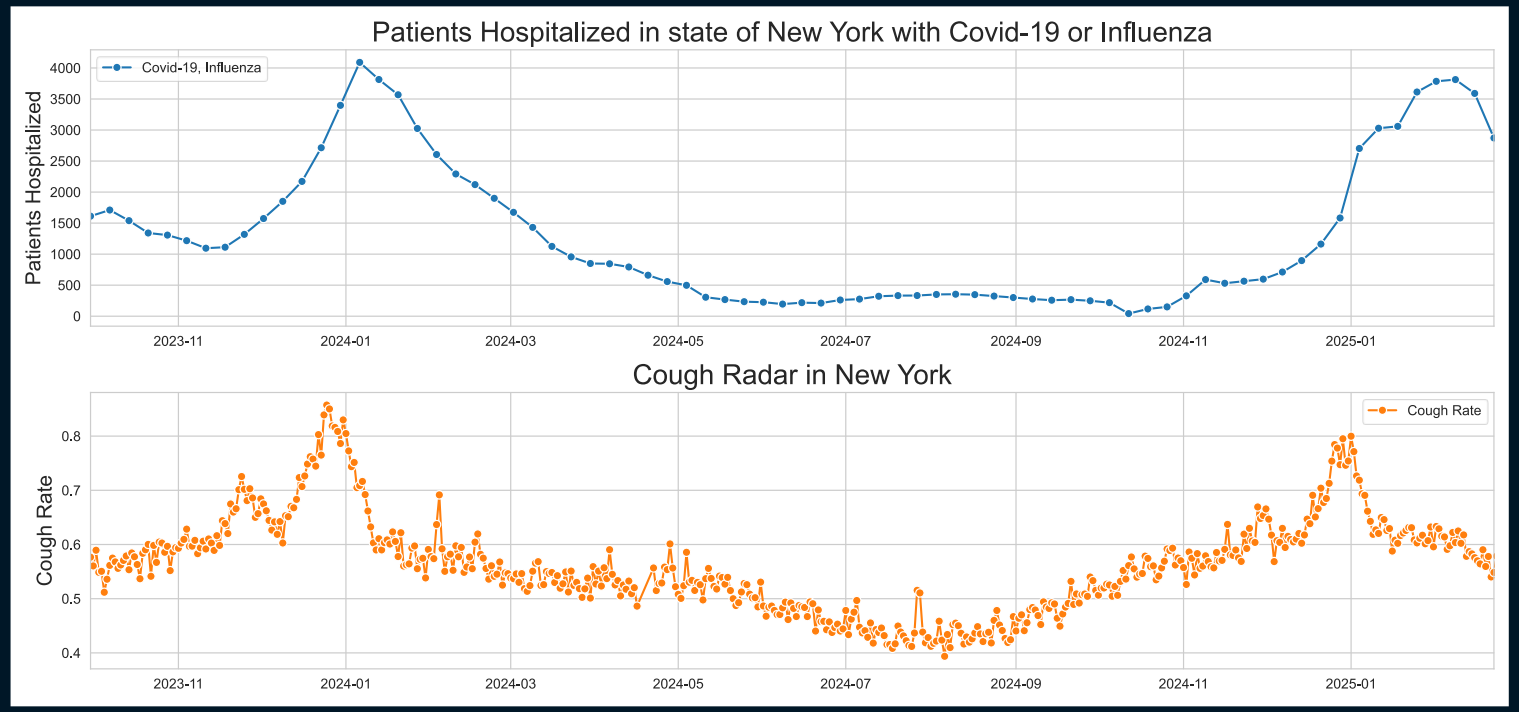
- CDC data on viral activity of Influenza A in wastewater.
- Correlation :
  - Florida: 0.82
  - Avg across states: 0.54 ± 0.17
- Good sensitivity but less specific
  - Clearly seen in Feb 2025



Dr. Mikael Kågebäck CTO & Head of Science

Strong correlation with hospitalization rates **two weeks in advance**

- Analysis based on CDC data
  - Hospitalized patients per US state.
- Correlation between current cough rates and hospitalizations **in two weeks**
  - New York: 0.82
  - Avg. across states : 0.74 ± 0.07
    - Baseline: Google flu trends: 0.53
- Google flu trends use search traffic
- Cough radar directly monitor the biological phenomena of coughing
  - Sensitivity 92,1 %, Specificity 99.9%



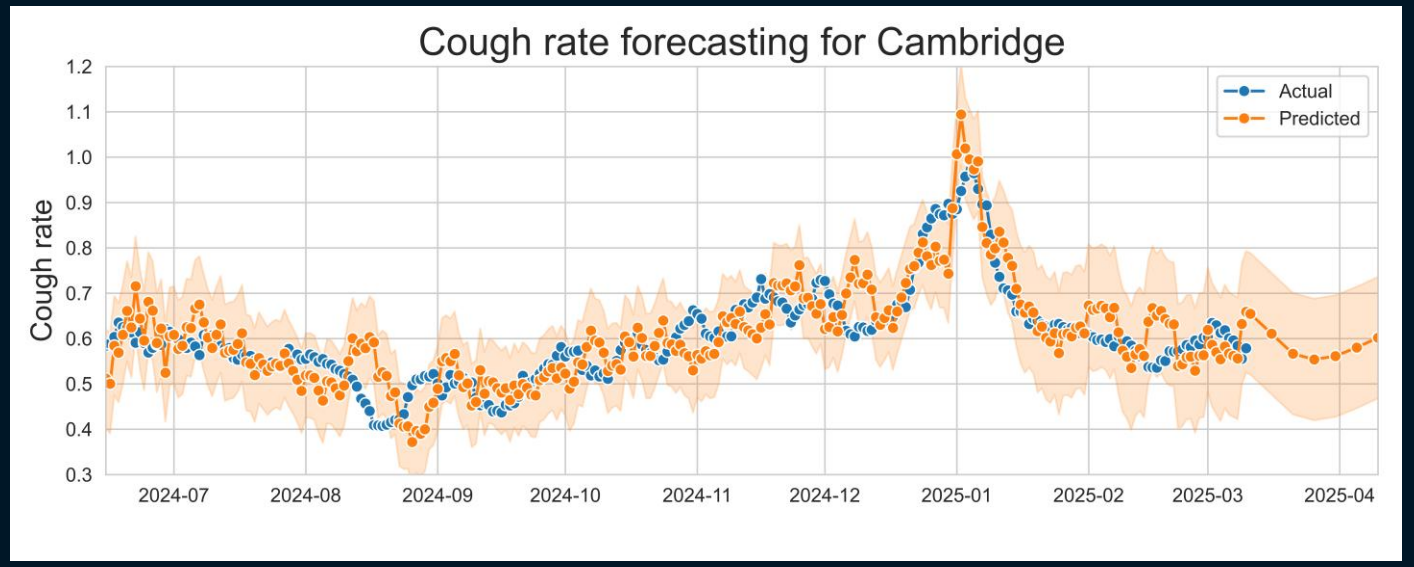
Dr. Mikael Kågebäck CTO & Head of Science, **Dr. Emil Carlsson** Research Scientist

Forecasting coughing: Baseline shows potential

- **Task**:
  - Predict cough rates 7 days into the future.

- **Model**:
  - Linear autoregressive model forecasting based on simultaneous cough rates across multiple areas.
  - 95% prediction interval

- **Results in Cambridge:**
  - MSE: 0.015
  - MAPE: 0.10
  - Higher uncertainty in Feb-Mars



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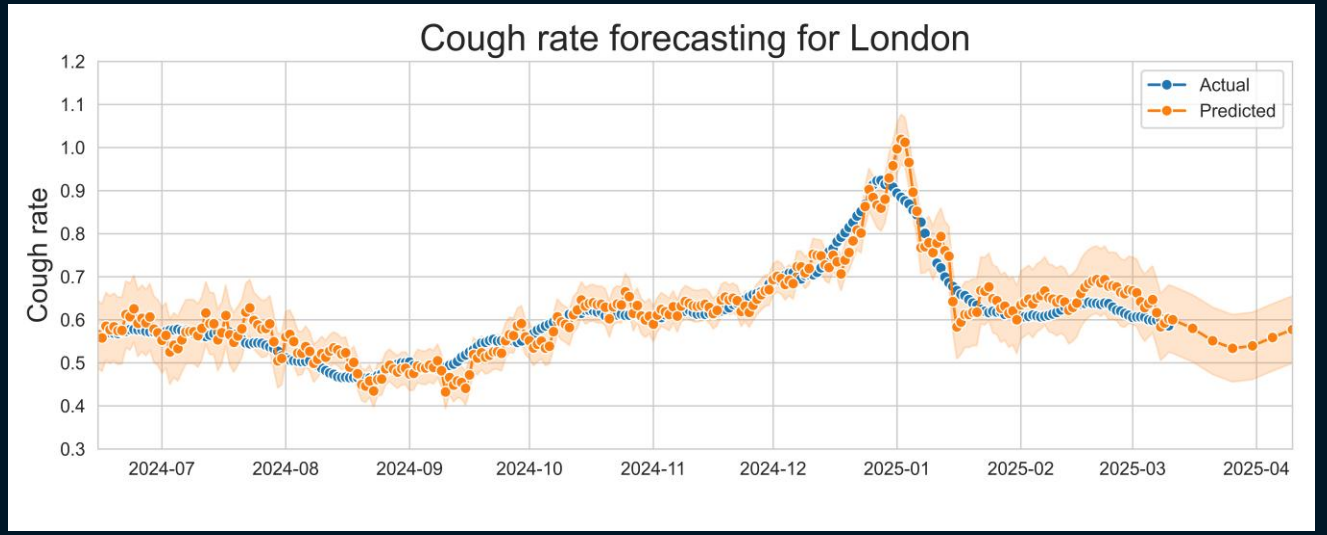
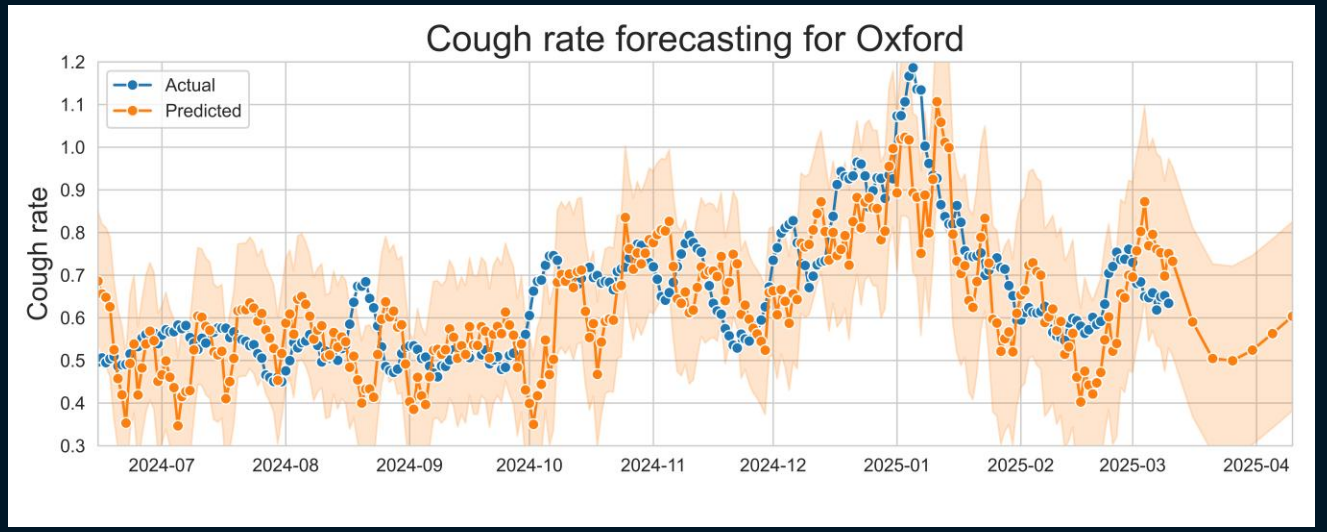
Forecasting coughing: Baseline shows potential but size matters





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Cough Radar™ by Sleep Cycle®

RIGHT NOW IN LONDON

Live Disease Monitoring

Peak : 1.05/h

Now : 0,69/h

Elevated coughing levels

Dr. Mikael Kågebäck CTO & Head of Science

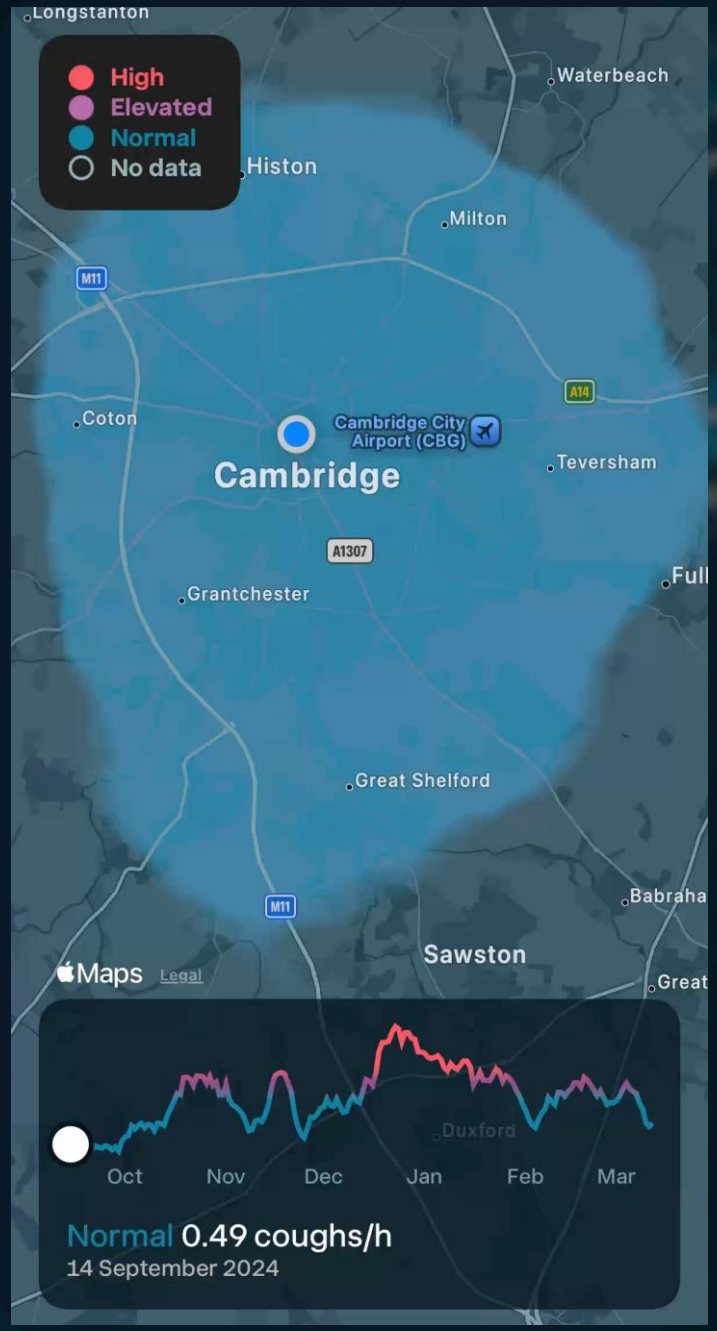
Right now in Cambridge

Live Disease Monitoring

Peak : 0.95/h

Now : 0,58/h

High coughing levels



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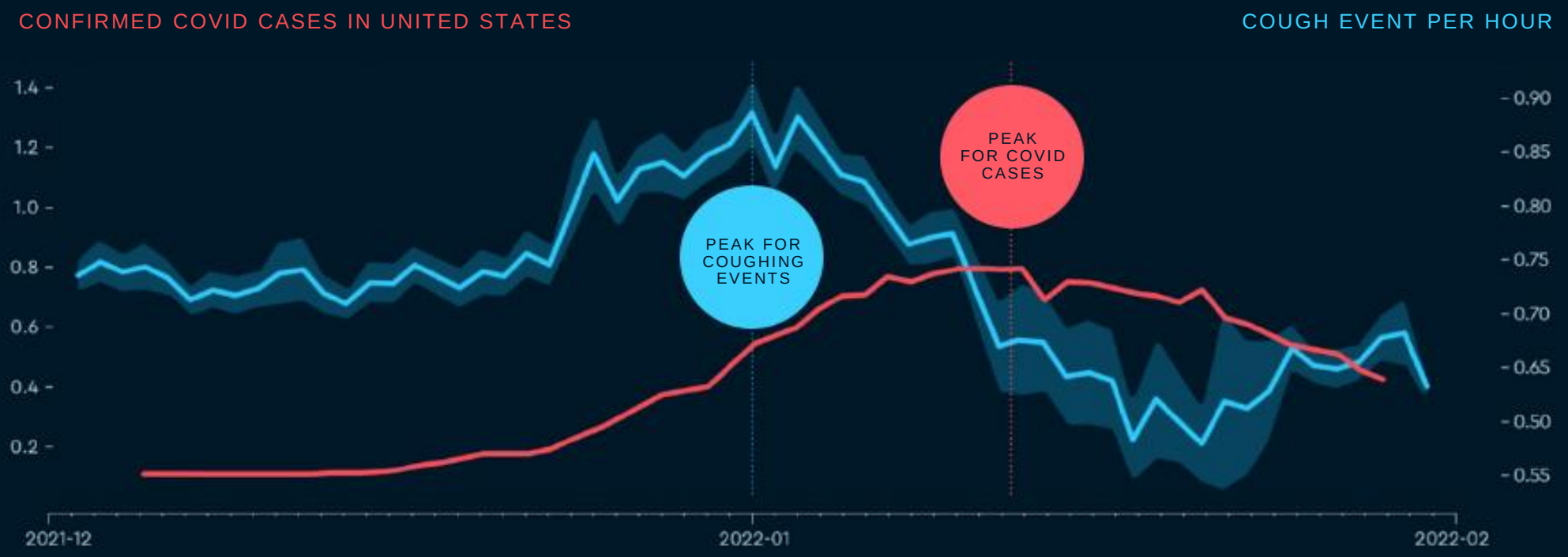
Potential future directions

- Advanced forecasting model
- Resolve different types of coughing
- Use Cough Radar to study transmission routes.

An early warning system
Two weeks in advance

Cough events per hour is an **early indicator** of confirmed covid cases.



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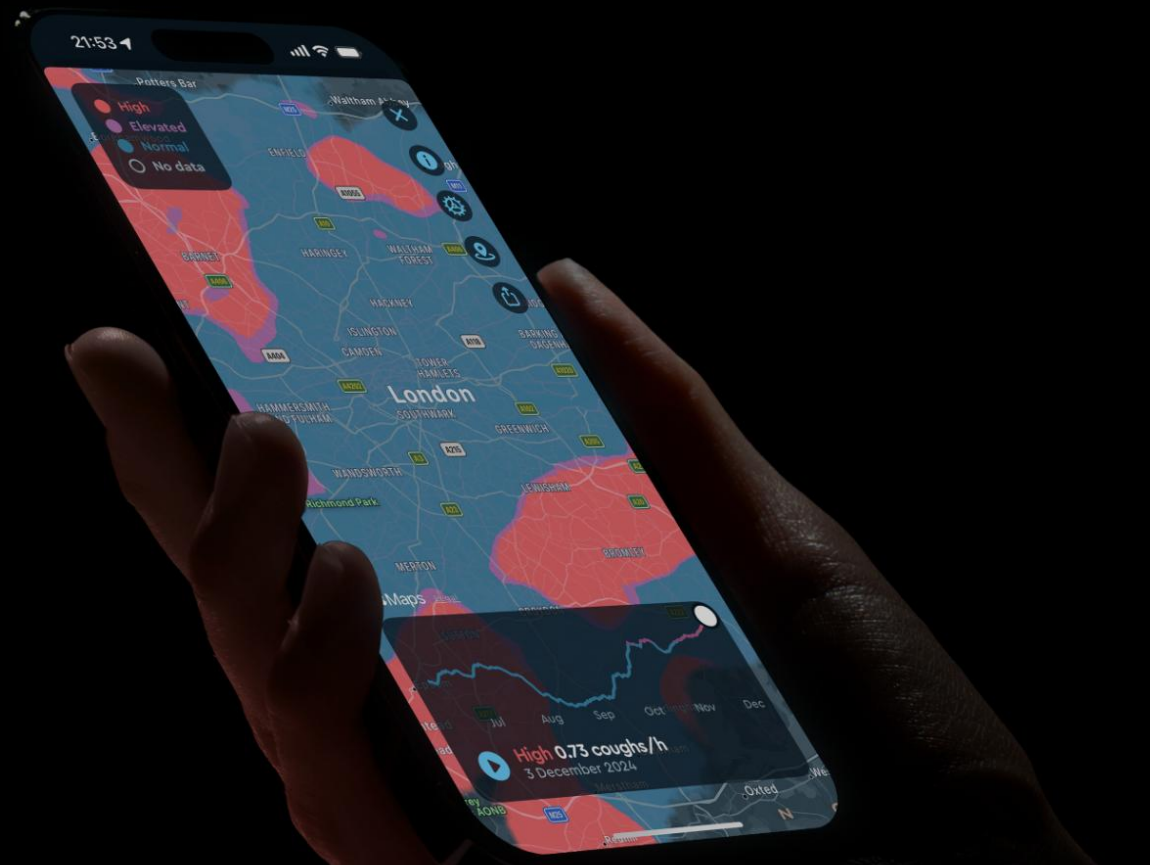
Get access
To Cough Radar



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