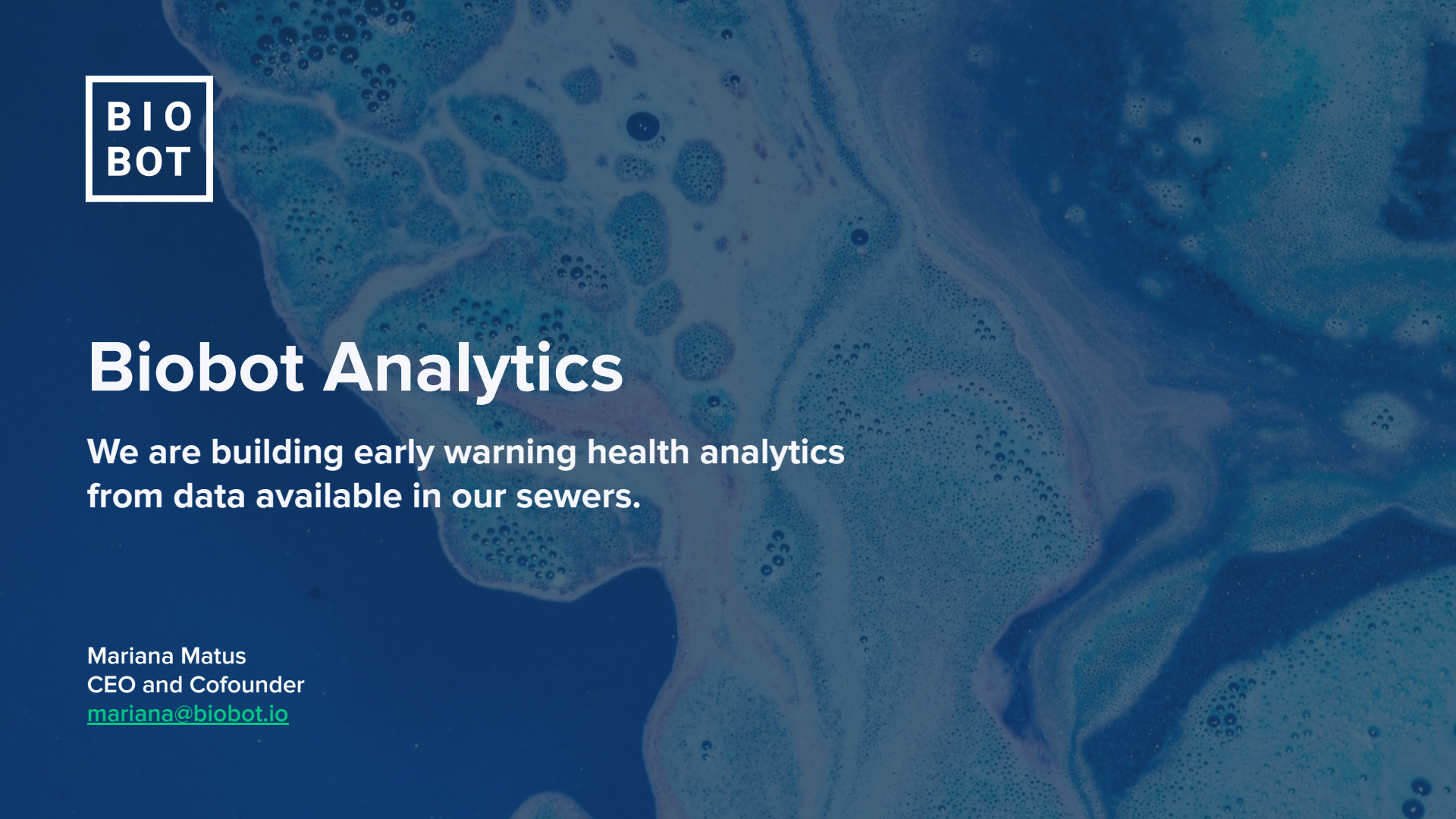


Biobot Analytics

We are building early warning health analytics from data available in our sewers.

Mariana Matus
CEO and Cofounder
mariana@biobot.io

Biobot is a spin-off from MIT

Newsha Ghaeli

PRESIDENT & COFOUNDER

Background:

Architecture & Engineering

MIT Research Fellowship on smart city technologies

senseable city lab.

Mariana Matus, PhD

CEO & COFOUNDER

Background:

Computational Biology & Microbiology

MIT PhD dissertation on wastewater epidemiology

alm lab MIT

Core Technical Teams

Molecular Biology &
Analytical Chemistry

Computational Biology &
Data Science

Public Health &
Epidemiology

Data Visualization &
Software Engineering

Board of Advisors

John Brownstein, PhD
Public Health Advisor

Chief Innovation Officer,
Boston Children's Hospital
Professor, Harvard Medical School

Andrew Weber
Government Affairs Advisor

Former Asst. Secretary of Defense for Nuclear,
Chemical & Biological Defense Programs,
2009-2014

Scientific Advisory Board

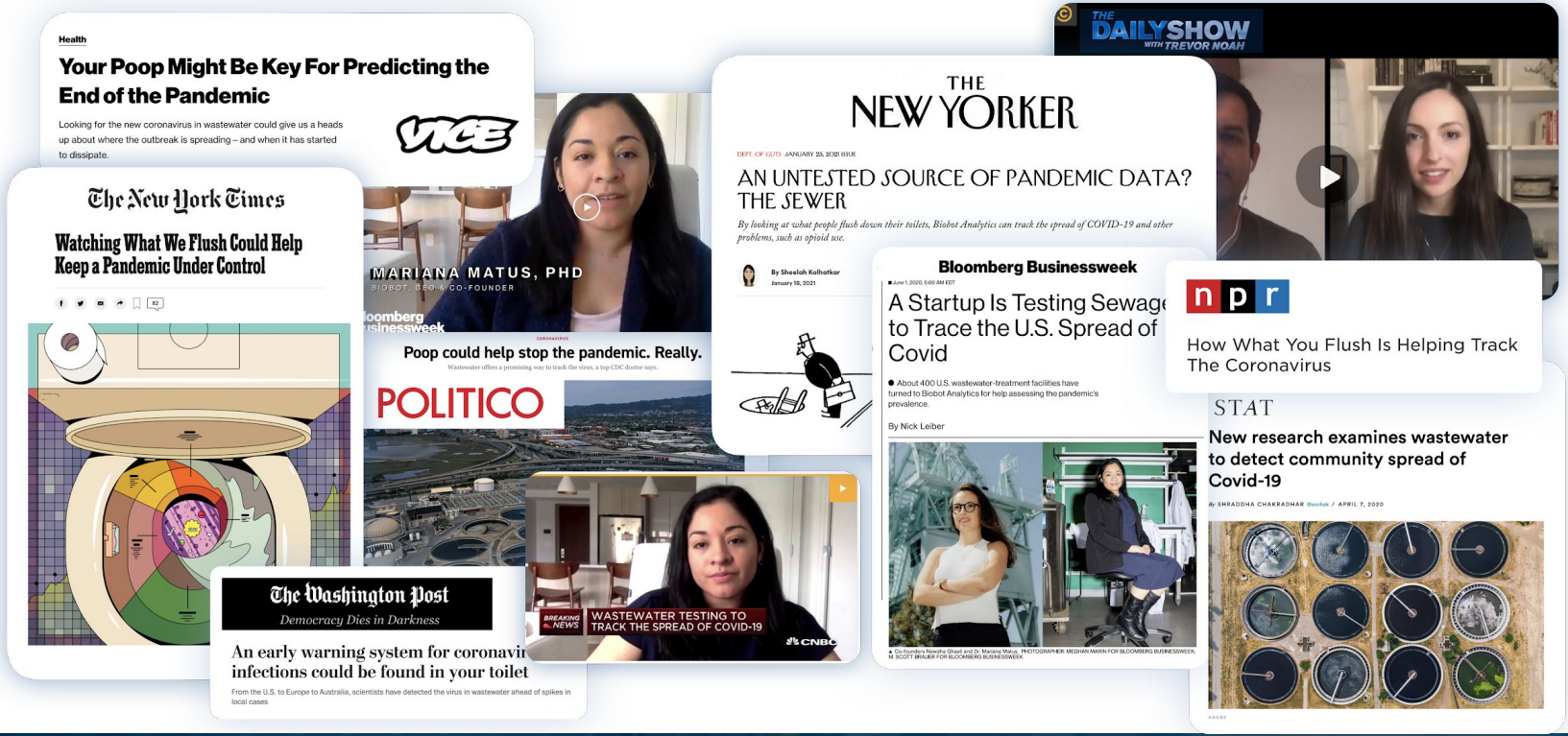
Eric Alm, PhD
Professor of Biological Engineering, MIT

Bill Hanage, PhD
Professor of Epidemiology,
Harvard School of Public Health

Timothy Erickson, MD
Emergency Medicine Physician, Brigham & Women's Hospital; Division Chief of Medical Toxicology, Harvard Medical School, Faculty, Harvard Humanitarian Initiative

Peter Chai, MD
Professor of Emergency Medicine,
Harvard Medical School

Biobot's Covid-19 WBE work in the news



FAST COMPANY

Biotech innovation award: #3 behind Pfizer and Moderna

Mariana Matus, cofounder and CEO of Biobot Analytics [Photo: Tony Luong]

1. PFIZER-BIONTECH

For being first to market with an effective COVID-19 vaccine

1. MODERNA

For making a COVID-19 vaccine that can travel

3. BIOBOT ANALYTICS

For using sewage to detect the next surge

4. OXFORD UNIVERSITY-ASTRAZENECA

For finding a different path to a COVID-19 vaccine

Our wastewater epidemiology platform enables early warning health analytics to combat pandemics.

Predictive

Wastewater data is a leading indicator for new infectious disease cases.

Inclusive

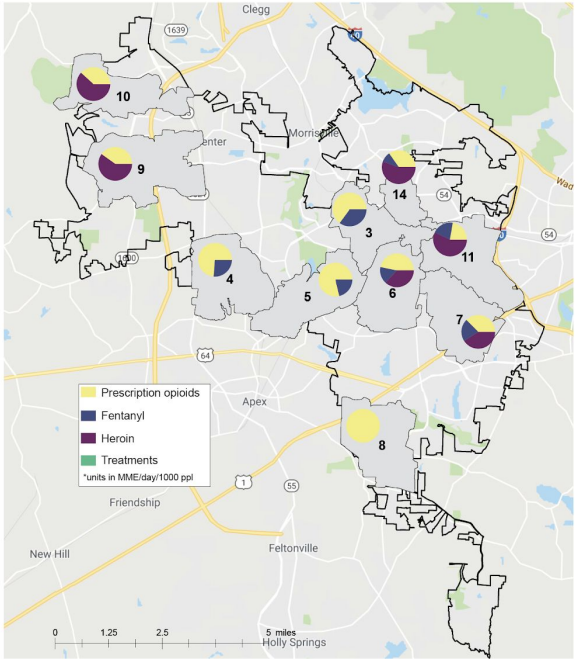
Everyone has a voice in the sewer. Our data includes everyone, not just people who access clinical care.

Versatile

Wastewater is a rich source of health data, including Covid19, influenza, opioids, diet, stress, and others.

We started by addressing the opioid epidemic

Neighborhood-level data on opioid use, overdose & treatment



Site ID	Population	Median age	Median HH income	Demographic breakdown [%]	Hispanic	Total MME
03	6,557	36			10%	
04	7,896	36			5%	
05	8,368	38			5%	
06	10,853	42			15%	
07	6,622	47			5%	
08	5,306	44			3%	
09	9,332	34			4%	
10	5,503	46			4%	
11	7,408	35			25%	
14	4,490	34			13%	

0 $100k $200k

% white
% asian
% natives
% black
% other

0 500 1000 1500

Pr. opioids
Fentanyl
Heroin
Treatments

Bloomberg Philanthropies

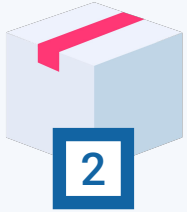
MAYORS CHALLENGE

Rapid response to Covid-19

How it works

Ordering

- Customers order sample kits
- Biobot's fulfillment partner overnight ships kits directly to the customer site

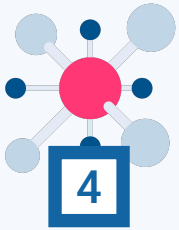


Shipping Kit

- Customers collect composite wastewater samples and ships them in Biobot provided transportation kits
- Customers input site/ day specific metadata into Biobot's customer web portal for each sample

Lab Analysis

- Current: qPCR analysis for Covid-19 and variants.
- Upcoming: sequencing for C19 variants & metabolomics for opioids and other high-priority drugs.



Data Analysis

- Testing results flow through Biobot's automated computational data analysis pipelines where they are ingested, QC'ed and validated

Reporting

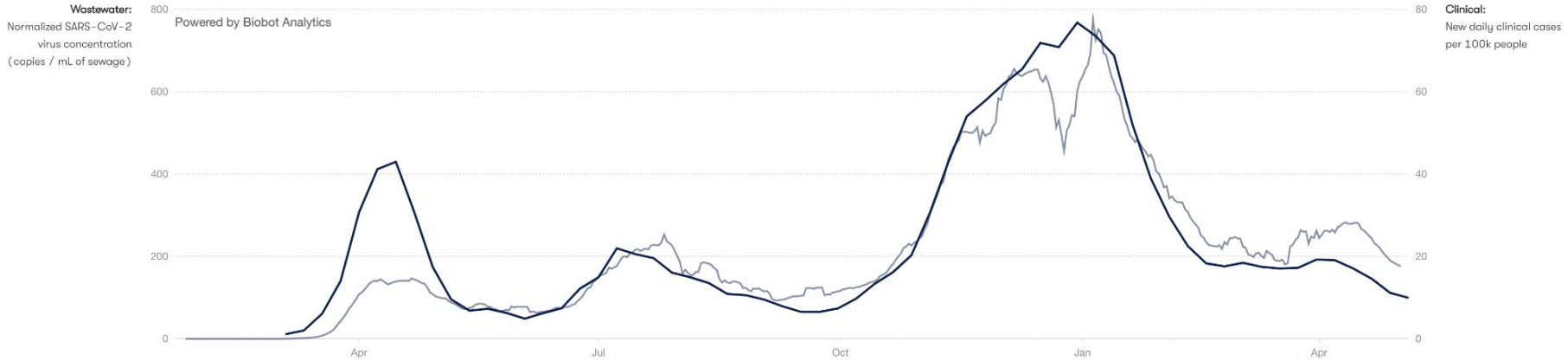
- Summary data analysis, findings and visualizations are packaged as reports and sent directly to customers or uploaded to a dashboard

Nationwide Wastewater Monitoring Network

Explore the data!
www.biobot.io/data

Regions Selected:
Nationwide

NATIONWIDE	NORTHEAST	SOUTH	MIDWEST	WEST	COUNTIES
Wastewater	Wastewater	Wastewater	Wastewater	Wastewater	Wastewater
Clinical	Clinical	Clinical	Clinical	Clinical	Clinical



46 states + provinces

500 communities

8000+ samples tested

13% of U.S. population

HHS Covid-19 wastewater monitoring program

- No-cost program for 320 communities.
- Testing started June 7th, 2021, and will continue for 10 weeks.
- We are generating SARS2 qPCR concentrations + Genomic sequencing data to study variants.
- qPCR data will be reported through HHS Protect and CDC NWSS.
- Sequencing data will be uploaded to NCBI.

Want to hear more or get involved? Email support@biobot.io

50 states **320** communities **100M** people tested **6,000** samples tested

Data analysis & insights are our core value proposition

Independent confirmation of clinical data trends

Wastewater data can be analyzed side-by-side with clinical data to get independent confirmation of trends.

Outbreak detection for early intervention

On a background of little disease activity, wastewater can detect as few as 3 cases in a population of 1,500

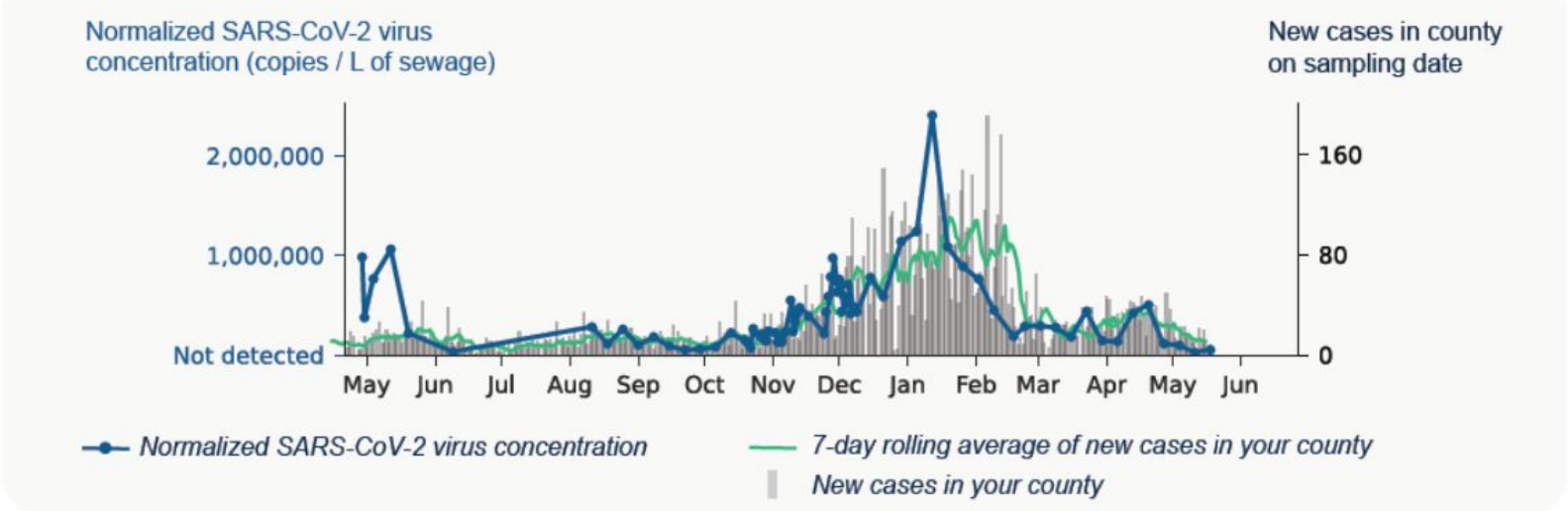
Ranking amongst nationwide database

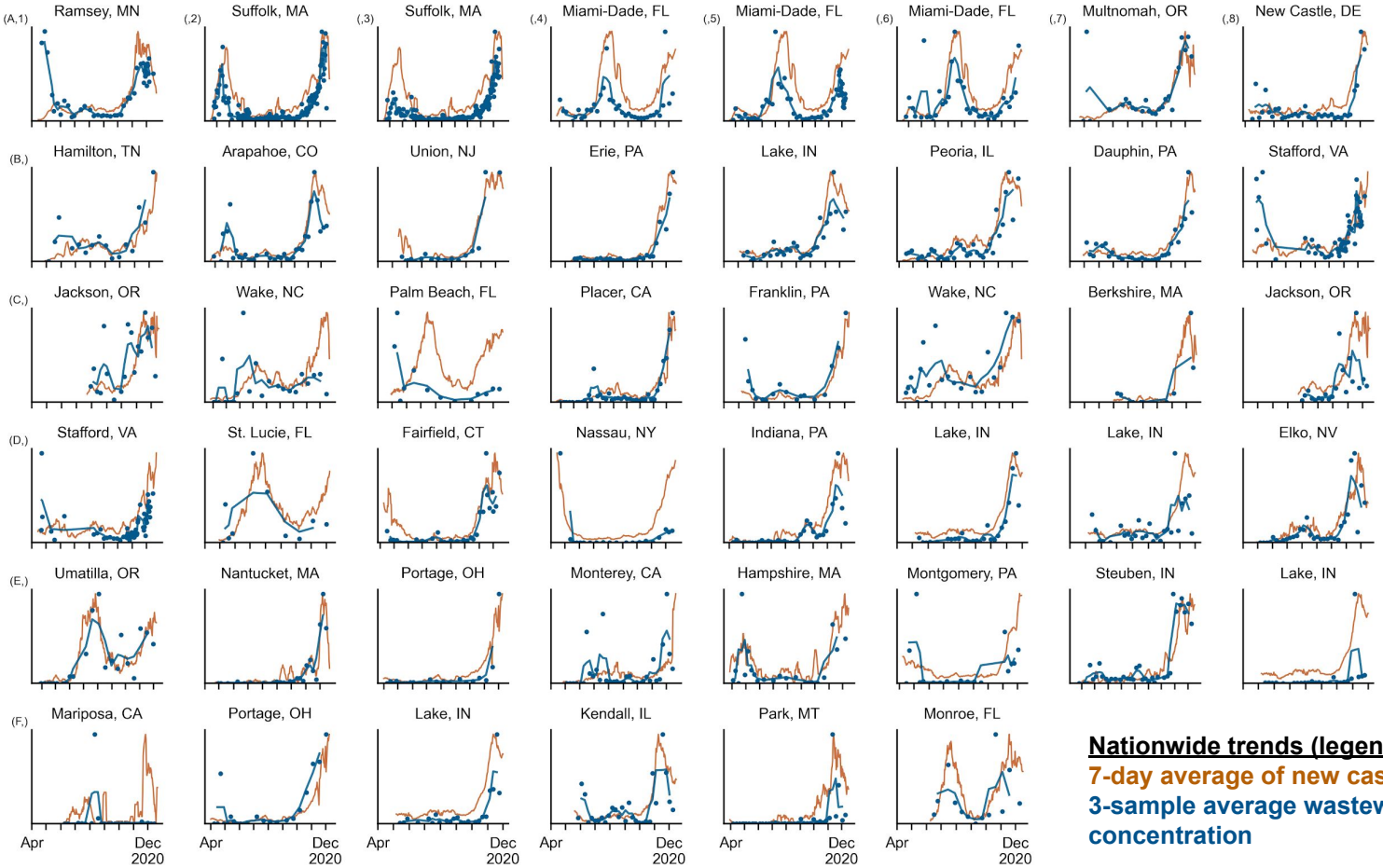
We contextualize if the level of infection is low or high, by comparing against our nationwide database of communities.

"SARS-CoV-2 titers in wastewater foreshadow dynamics and clinical presentation of new COVID-19 cases." Wu, F. et al., Preprint MedRxiv, 2020
"Applications of wastewater-based epidemiology as a leading indicator for COVID-19", Olesen, O. et al., Preprint arxiv, 2021

BIO BOT

Wastewater data serves as an independent confirmation of clinical data trends





Nationwide trends (legend)

7-day average of new cases

3-sample average wastewater concentration

Metric 1

Daily New Cases

Definition: Weighted average of new confirmed cases per day, per 100,000 people in Cambridge

Threshold: Fewer than 25 new cases per day, per 100,000 people (7-day average)

19.2 new cases per day (As of 11/15/2020)

Metric 2

Test Positivity Rate

Definition: Rate of positive COVID-19 tests in Cambridge

Threshold: Less than 5% of COVID-19 tests are positive

Published by the state weekly. Updates can be expected by the end of the week.

0.32% (As of 11/12/2020)

Metric 3

Wastewater Monitoring

Definition: The level of COVID-19 found in sewage wastewater in MWRA

Threshold: COVID-19 in wastewater detected at less than 100 copies viral genomes/mL

255.5 (As of 11/10/2020)

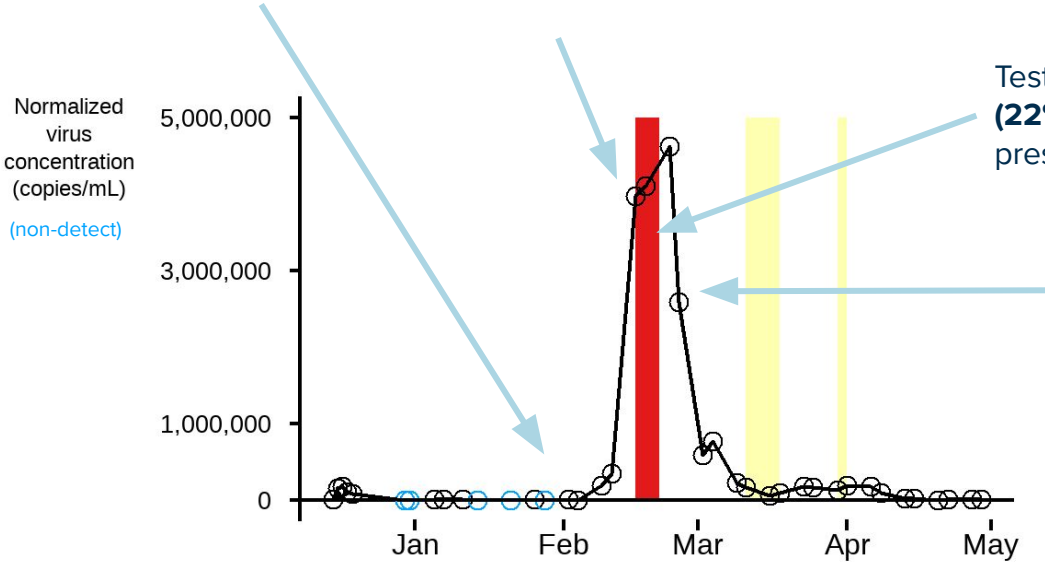
"It's amazing how many residents wait for these numbers and have come to trust these more than [clinical] testing"

— Wastewater treatment plant director in the State of Massachusetts

Outbreak detection on a background of little disease activity

Late Jan/early Feb 2021: Low levels of virus in wastewater

Feb 18: There are no known infections among patients, but **wastewater virus spikes**. Community responds by testing all patients.



Testing reveals that **13 of 60 patients (22%) are infected**. Most are likely presymptomatic.

Further infections are prevented.

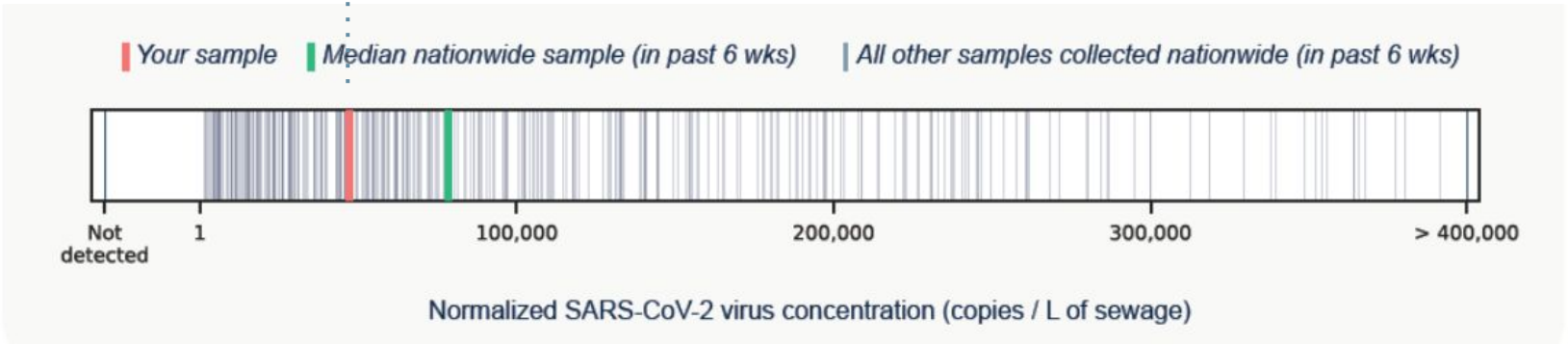
Fraction of people known to be infected:
>15% 0-5%

Ranking amongst nationwide database

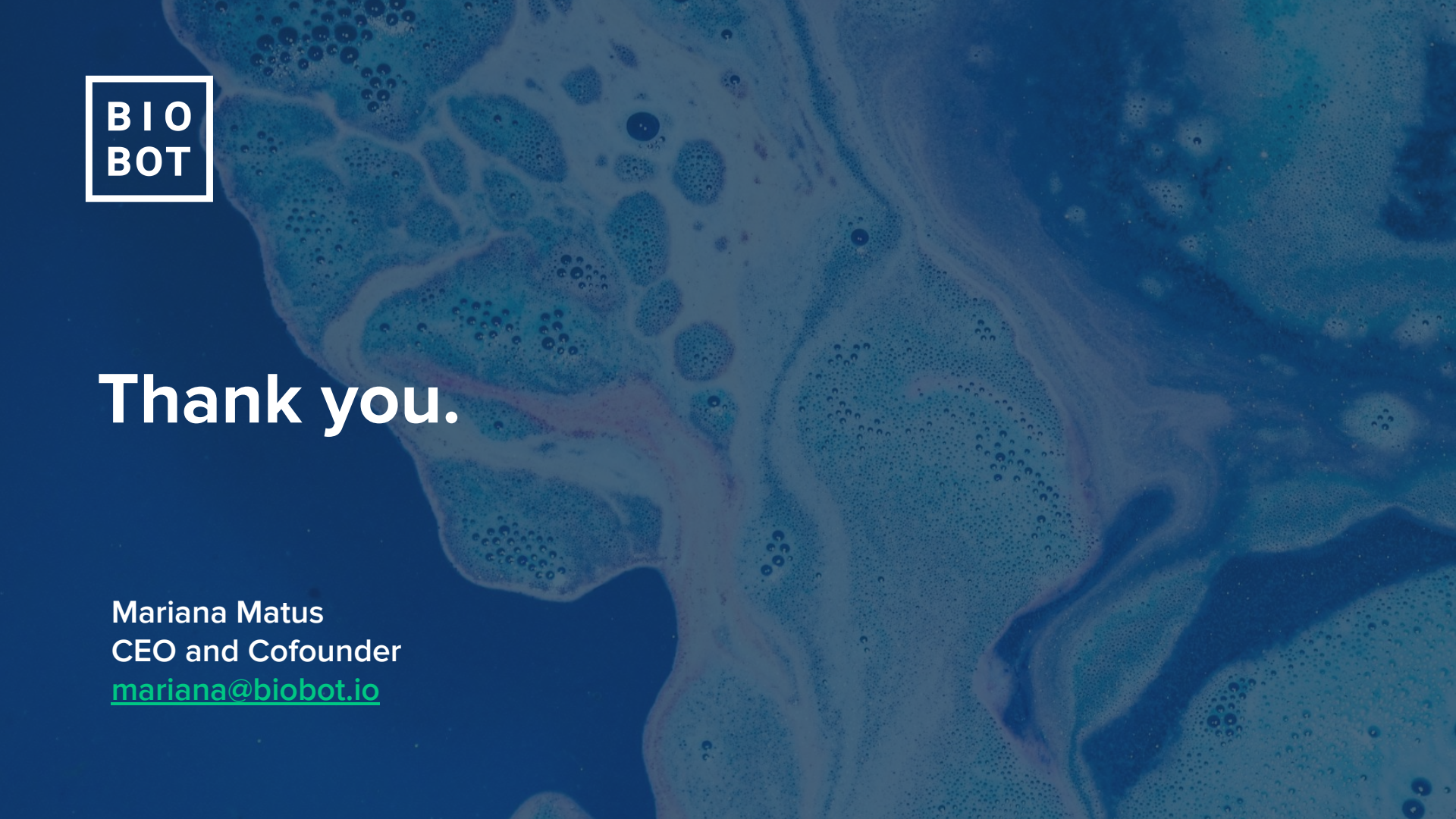
Your sample is in the

34th percentile

from all samples tested in the past 6 weeks



We can build dozens of applications with our platform



Thank you.

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