Israeli firm monitors sewers in fight against coronavirus

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Technicians from Israeli firm Kando extract sewage samples from a manhole near the beach, in the southern coastal Israeli city of Ashkelon

An Israeli company is monitoring coronavirus traces in a coastal city's sewers and hopes to deploy its technology more widely to provide early warning of future concentrations of the respiratory disease.

Ari Goldfarb saw a unique opportunity to test the limits of underground technology developed by his firm when coronavirus patients were moved into a hotel in Ashkelon taken over by the government.

"When this COVID-19 pandemic came, it was clear to us that we can use this system, or this knowledge, to give a better insight" into the virus, he told AFP.

Fixated by wastewater since seeing raw sewage streaming into the sea while surfing as a teenager, Goldfarb founded the firm Kando initially to pinpoint industrial waste in the city's labyrinthine municipal sewage system.

Eight years on, the company's network of sensors, autosamplers and controllers placed under manholes in Ashkelon are tracing coronavirus.

In May, Kando partnered with scientists and mathematicians in Israel, Europe and the United States to embark on a month-long pilot to determine the accuracy of their technology.

The findings, said Goldfarb, conformed with the health ministry's data showing the breadth and the near-exact location of confirmed virus carriers, including the hotel used by patients.

"We're the only one who can tell where the outbreak is and how big the outbreak is in the city," said Goldfarb.

Sewage has also been tested in cities like Melbourne, Paris, Tokyo, Amsterdam, Valencia and the US state of Massachusetts—although mostly on a small scale and without precision.

Kando's manhole sensors can measure the flow of wastewater and how far it has travelled, using algorithms to determine the best moment to

automatically collect samples.

They are then analysed at a number of laboratories, with the findings instructing the firm on the direction to follow within the sewage system's pipes to reach the source of the virus, Goldfarb said.

Scientists around the world have already detected COVID-19 in patients' stools within sewage systems, but can only provide a general reading of the presence of the virus in a community.

Kando's technology can go further, according to Goldfarb, by giving a more precise location of an outbreak, potentially helping authorities control diseases.

Israel, with a population of around nine million, has confirmed over 19,100 coronavirus cases and 302 deaths from the respiratory disease.

Israeli researcher Karin Yaniv working at Ben Gurion university's biotechnology engineering department in the southern Israeli city of Beersheba

Its relaxation of stay-at-home orders and reopening of schools have led to a rise in cases in the past few weeks, raising fears of a second wave of infections.

With many coronavirus cases being asymptomatic, broad wastewater checks could pin down the virus before it spreads widely.

The technology can detect the virus "in the sewage (of) asymptomatic people, so we know about a new outbreak before it really happens", said Goldfarb.

Kando's technology already proved successful in helping authorities contain a 2013 polio outbreak in the southern town of Hura, he said.

Potential economic benefits

Some of the samples are tested at Ben Gurion University in the southern Israeli city of Beersheba, where researcher Karin Yaniv inserted a tray of samples gleaned from sewage into a machine.

The adjacent computer screen lit up with lines indicating the presence of COVID-19 in the samples.

Although Yaniv saw "challenges going through the raw sewage", due to the amount of other materials, she was convinced it is the best way to forestall a virus outbreak.

It is also more practical than trying to test the entire population regularly and, once the technology is in place, it can be used to detect other diseases.

"If you have a platform to detect viruses, specifically corona, we can use the same platform for other viruses," said Yaniv, a PhD researcher at the university's biotechnology engineering department.

After the Ashkelon pilot, a number of Israeli municipalities have expressed interest in the technology, but authorities have not commissioned Kando to roll out the project more widely.

As well as the health benefits, Goldfarb is hopeful his firm could prevent a repeat of the sweeping economic shutdown which was imposed to stop the spread of coronavirus.

"Decision-makers can take decisions based on data and they can close

specific areas," he said.

That means "people will not lose their jobs, that means that people will have a better future... (and) the next outbreak will be managed much better."

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