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A covid-19 laboratory for Jersey—in a shipping container

Small mobile testing facilities could prove a useful tool in the pandemic response—and are being trialled in the UK, reports Chris Baraniuk

Chris Baraniuk *journalist*

The island of Jersey has a new tool in its covid-19 testing toolbox: a laboratory built inside a shipping container, which can process 2000 reverse transcription polymerase chain reaction (RT-PCR) tests every 24 hours. It was delivered to a car park behind Jersey's only airport in July.

Jersey, 23 km (14 miles) off the French coast, is a British crown dependency and self-governing member of the Channel Islands. To date, covid-19 diagnostic tests on the island have been processed using a mix of local facilities and laboratories in the UK; although PCR capacity is currently limited to 2000 a day,[1] the acquisition of more machines will help to expand this number by mid-September.[2] Two flights every day deliver swab samples to England for testing at a laboratory in Coventry, with results usually available within 30 hours.

"All we're responsible for is increasing that speed," says Tom Meany, co-founder of OpenCell, the London based biomedical start-up that designed and built the shipping container testing laboratory.

Testing travellers

When visitors arrive in Jersey by air or sea they can choose to be swabbed for covid-19 or to self-isolate for two weeks, unless they have travelled from regions the local government has deemed are at greater risk of exposure to covid-19. Many of these swabs, for arriving travellers, will be processed at the shipping container lab.

Ivan Muscat, consultant microbiologist and deputy medical officer of health for the Jersey government, says the facility could mean that negative test results are texted to travellers in as little as four hours after a sample is provided. It may take slightly longer to communicate positive results, as these will be reported to individuals directly by contact tracers.

"It seemed like the most efficient and rapid way of setting up a completely new system," says Muscat of the shipping container. "It was, if you like, an off-the-shelf complete laboratory, in contradistinction to building a laboratory yourself."

Compact and transportable

The design for OpenCell's compact, transportable covid-19 testing laboratory, of which several are now being built, was developed in partnership with King's College London and open source laboratory equipment firm Opentrons.[3] The 40 ft shipping containers can be transported by road, rail, air, or sea and, once deployed, require six members of staff working in shifts. They are equipped with robotic machines that can automatically handle samples and fluids—but, at their hearts, are a traditional PCR laboratory, albeit with a streamlined process. The laboratories have been designed to meet biosafety level two or higher.

Meany says that his firm is now manufacturing the shipping container laboratories to order for other clients, with one already to be delivered to Pakistan and another to an undisclosed location in the UK. While efforts to ramp up covid-19 testing capacity in the UK and elsewhere around the world have largely focused on established hospital laboratories and centralised facilities equipped to process many thousands of tests per day, small, mobile laboratories have also been used.

Take, for instance, the field laboratory first used in Africa during the Ebola outbreaks in 2014 and 2015, which was repurposed for covid-19 testing and shipped to Italy in June.[4] The following month, a mobile laboratory was installed in the grounds of the Bohol Medical Care Institute in the Philippines.[5] In both cases, the aim was to boost overall testing capacity and provide results quickly to people on site.

In these specific, niche contexts, mobile laboratories could prove useful, says Allan Wilson, president of the Institute of Biomedical Science in the UK. Some Scottish islands, for example, have had to rely in part on rapid molecular tests, which are easy to use but also expensive. "It really is pretty low volume; some of these you can only do one at a time," says Wilson.

Key proving ground

For the wider UK, however, testing capacity within the NHS and at the government's lighthouse laboratories has grown significantly since the early days of the pandemic, he notes, meaning that the usefulness of small, on site testing facilities would be limited. In the case of a significant local outbreak in an urban area, for example, Wilson thinks it would be more straightforward simply to courier a higher volume of swabs to the existing, larger laboratories for analysis rather than rely on a rapidly deployed mobile laboratory.

In Jersey, the shipping container may find its purpose. For now, Meany and his team are carrying out checks to ensure that tests can be processed accurately. To date, OpenCell has not published detailed validation data showing that the shipping container model is as reliable as other laboratory formats. But Jersey, Meany hopes, will be a key proving ground.

If successful, it could pave the way for similar projects to bring testing facilities much closer to the point of care in some special cases—although centralised facilities still look set to carry out the vast majority of covid-19 diagnostics around the world.

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