

# Digitalizing Care in the Outback

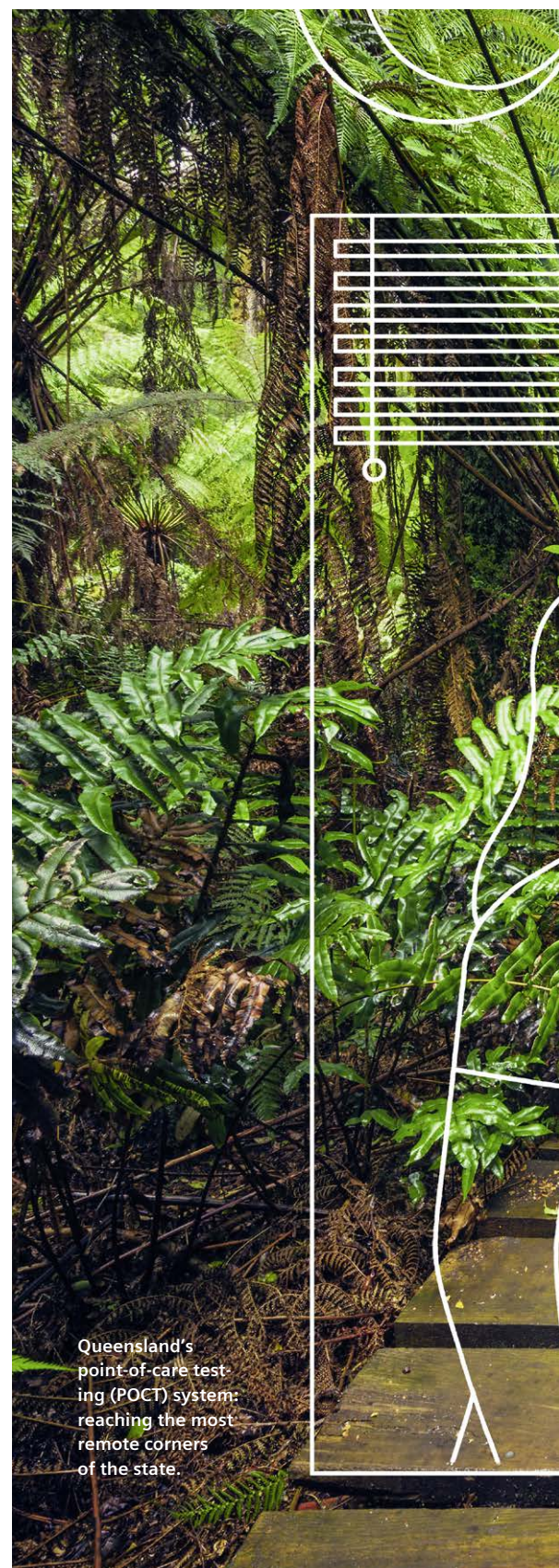
Few nations are as developed as Australia when it comes to providing medical testing services to remote communities. But while point-of-care testing for diabetes and urinary diseases among rural and remote Aboriginal communities has long been available nationally, centrally digitalized and managed systems are more recent developments.

Text: Garry Barker | Photos: George Clerk/Getty Images, Andrea Robinson/Getty Images | Illustrations: Patricia Tarczynski

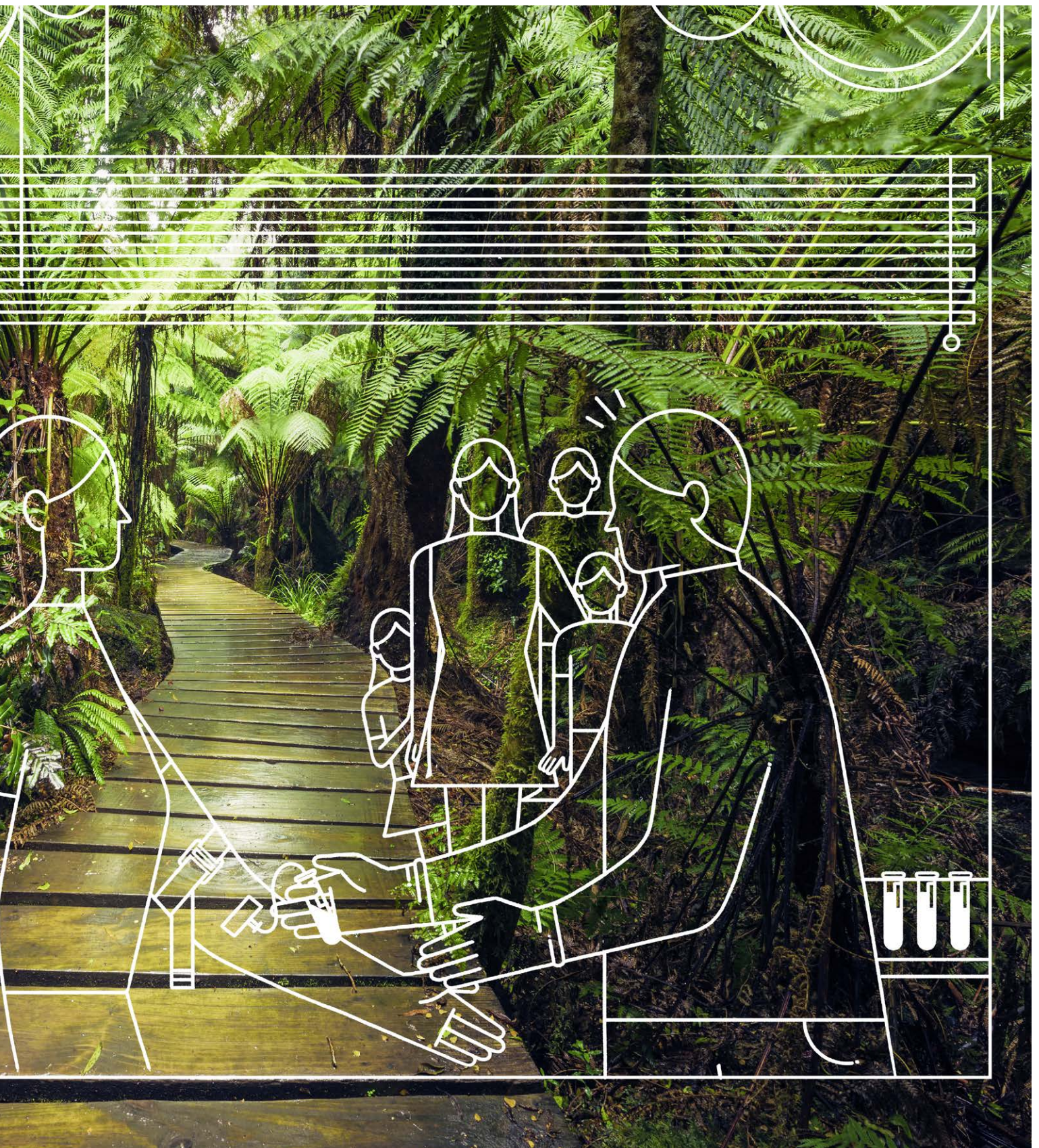
**I**magine a pathology clinic bigger than Texas, covering 1,730,648 square kilometers (668,207 square miles) with 10,000 trained analyzer operators serving two million potential patients living in areas varying from modern cities to the humid depths of tropical rain forests and barren baking deserts where temperatures rise through 50 degrees Celsius (122°F). Such is the scope and spread of the Australian state of Queensland's point-of-care testing (POCT) system, run by the Health Department – all interconnected by a web of fiber optic cable, microwave radio, and satellite transmissions, and managed by an expert team of three based in the Royal Brisbane Hospital.

## Geographical challenges...

The system, led by Point-of-Care Coordinator Cameron Martin, handled 440,000 tests in 2018, with the load expected to be even greater this year. The vast areas of Queensland and the needs of small communities hundreds of kilometers from the bigger coastal towns and cities









present special challenges. "We have rain forest and desert, and each has its unique diseases and disorders," Martin explained. The service has analyzers at work as far away as Birdsville, 1,600 kilometers (994 miles) west of the state capital Brisbane and one of the most remote places in Australia. It's so hot in summer you can fry an egg on an asphalt roadway in seconds. "50 plus degrees Celsius in the shade is too hot for accuracy from the analyzers but we have air-conditioning in the medical centers," Martin said. "Each indigenous community up in Cape York, on Queensland's northern-most tip, has a health center and we have at least one analyzer in all of them," he said. "The service covers the whole state, all the way up to the Papua New Guinea border and the Torres Strait Islands."

### **...and seasonal trials**

Distance and remoteness, the great Australian challenges, have been conquered by the system but there are seasonal trials: fierce cyclones and flooding, recently unprecedented and disastrous around Cairns in the state's north. "It is not often that we have a problem with that," Martin said, "but if we have to get resources to areas suffering damage we have the State Emergency Service's helicopters and boats to help." In the far north it is normal that the only way to reach some communities in the wet season is by air.

"Our connection to even quite remote medical centers is by fiber optic cable with microwave radio and a bit of satellite when the medical center is really remote. Queensland Health did a great job of re-cabling the state a few years ago from copper to fiber. They did it for a telemedicine program that includes online training, which works very well, and we piggybacked on that," he said.

### **Training and accountability**

When trainees complete their course, Martin's control center is sent the details of their identity and their training which then goes into the middleware system, the Siemens Healthineers POCcelerator Data Management System. "Operators who are not completing their tests correctly receive three warnings through the email system, derived from reports from POCcelerator, and if they ignore them they find their enrolment is shortened and they are forced to repeat the training program. It's a fantastic tool because we're managing operators by exception rather than

blindly targeting everyone. We can push the details out to the individual analyzer as needed and ensure that only people who have been trained are doing the tests," Martin said. "If there are any issues, we can always track back to the source of the test, the analyzer, and its user to check which operators are current and which are not. We always know who did the test."

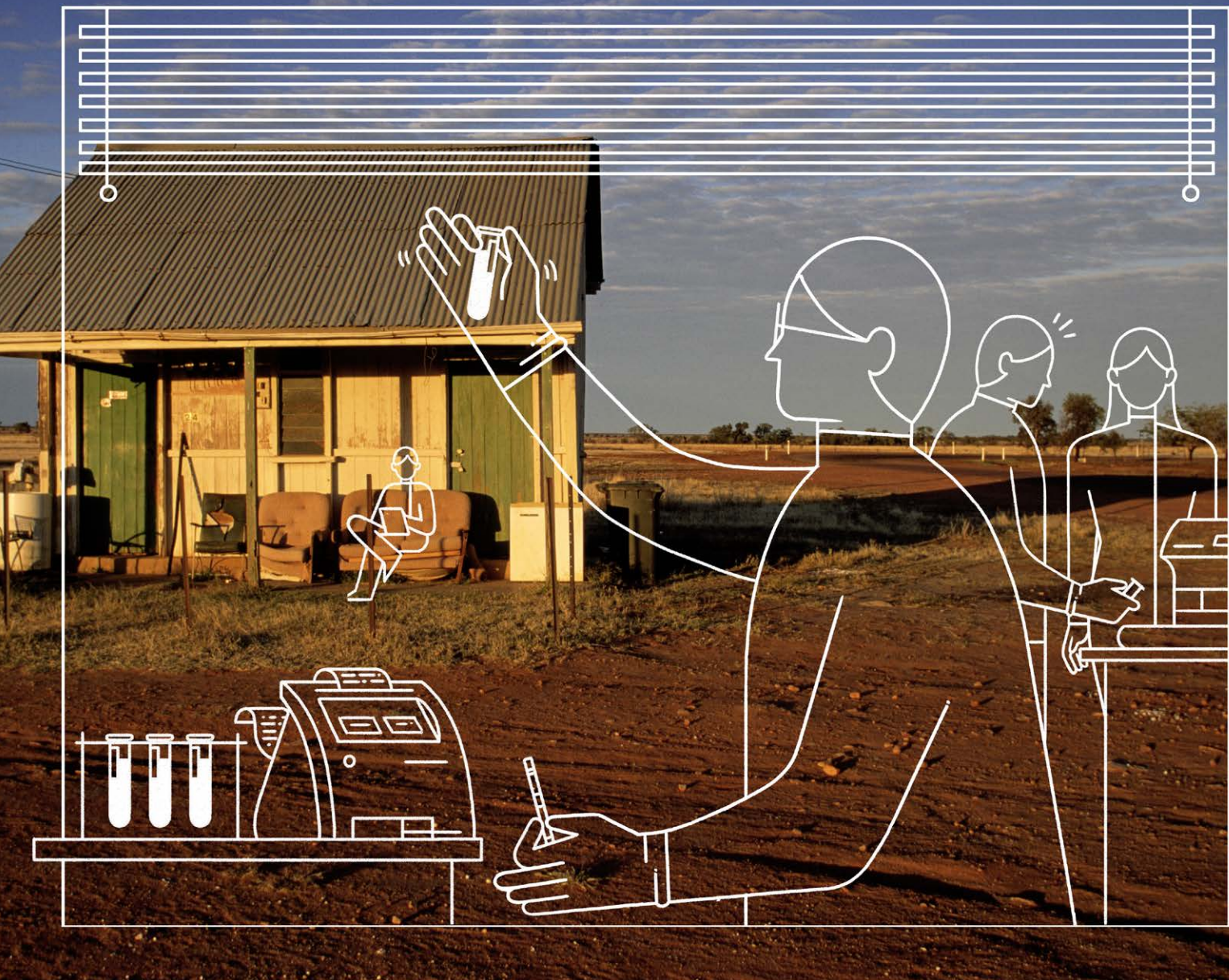
Recruitment, training, and registration of the huge and constantly changing cohort of analyzer users is an ongoing effort due to the transient nature of people working in the Outback. This also means track must be kept of analyzers and other equipment which might be lost or misplaced.

The service has more than 190 sites each with at least one analyzer at the moment and in total more than 300 analyzers of various types and from a variety of manufacturers – with the number continuing to grow. More and better tests are becoming available all the time along with updates to analyzers and new devices and the service maintains a close eye on those developments, Martin said. "We work with 35 Pathology Queensland labs, all up the east coast and a number dotting the interior in larger places such as Mount Isa and Longreach. Lab scientists are a close-knit group," he said, "and we all know one another."

### **Informed decisions on site**

Testing and retrieval of the results is far faster than the traditional way of transporting a blood sample to a pathology lab and waiting for the result to be returned to the doctor. "We can get the result from a test, usually done with a finger-prick and an analyzer, in two to ten minutes, depending on the test," he said. "Then, not only do we know the result but we know who the patient was, where they were, and who did the test. Staff at the test site also have the result and they are connected to the statewide pathology system so the doctors on site can make the decision to treat their patient on the spot or evacuate them to a larger facility, either by road or by the Flying Doctor Service."

According to Martin, the system gives remote medical staff the tools to make more informed decisions on who stays and who goes. "That means we are making the best use of the transport services we have and also making the best decision for patients."



## A growing variety of exams

Remote area medical centers in Australia deal with a wide variety of problems ranging from diseases such as the endemic diabetes suffered mainly by Aboriginal people to heart attacks and most of the maladies encountered in big city practices, but with the added difficulties imposed by their remoteness.

The point-of-care analyzers deal with the testing and diagnosis end of the medical equation. "We can test for chest pains, and check whether patients are having a heart attack," Martin said. "Chest pain is a biggie on our list. It's not the most common test we do, but you certainly need to know as soon as possible if it is really a heart

attack or just a muscle strain or indigestion. We can also test for renal problems and we have other analyzers that can look for sepsis." He even expects that at some point in the future a device could be developed to test for the squamous cells of skin cancer, of which Australia with its intense sunlight has the world's highest rate.

"Electrolytes and urea are common screens. Blood gases (oxygen and carbon dioxide) make up a big part of our screening because they can be suggestive of various disorders. And it's not just acute diagnostic stuff. These analyzers can do INR tests, monitoring people on blood thinners so they don't get overdoses. It's particularly common up in Cape York where a lot of people

Distance and remoteness: Two challenges the Australian health-care system faces.