Unsung heroes; The workers behind Alberta's COVID-19 testing

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Any typical work day, Caroline Mekodom is in a laboratory or hospital ensuring medical testing equipment is running smoothly - but she never sees patients or many of the people who rely on her to know if they have COVID-19.

"Each time I leave my house and go to work I know I'm helping people."

Mekodom is a certified engineering technologist (CET) who has worked to maintain and fix biomedical equipment for the past 10 years, specializing in hundreds of different genetic screening instruments, including some of the equipment that supplies the province with key information during the pandemic: Alberta's rapidly-changing COVID-19 statistics. Dr. Graham Tipples, medical scientific director at the provincial lab for public health Alberta Precision Laboratories (APL), said the real heroes are the people who developed tests, those who worked to scale up their capacity, and staff like lab techs working in shifts to keep the laboratories going 24 hours a day, seven days a week. Throughout the province, there are over 5,000 laboratory professionals who work in the provincial lab system, although not all are deployed to COVID-19 testing.

"They're working so, so hard behind the scenes, doing everything they can to give high-quality, timely and relevant test results for Albertans," said Tipples.

Once a sample is taken at an assessment centre, usually with a special kind of deep nose swab or a throat swab, it's put into a tube with liquid that stabilizes the sample. It goes to testing labs, where tracking data like location and date are entered into the lab's information system.

Tubes are taken in racks into the lab, where they go through several steps to determine if COVID-19 genetic information - RNA, the viral equivalent of human DNA - can be detected, Tipples explained.

One part of the lab extracts that RNA, which is then used as a kind of template for the next step. This is where the "reagent," comes into play. It's a special chemical that's essential to extracting that material, and it can't be cooked up in the lab.

Like yeast during the height of the lockdown bread-baking frenzy, reagents have been in hot demand.

"That massive demand globally makes it really really challenging," said Tipples.

In another step in the testing process, special molecules called primers bind to specific COVID-19 genetic material, matching up like a puzzle piece.

An enzyme recognizes where the primer binds to the RNA structure, generating another copy of the virus'genetic code. And then another. "It's basically an exponential amplification of that target," said Tipples.

A probe with a fluorescent molecule binds to its target and generates a signal.

"As it goes through these cycles, you will go from undetectable levels to now we've got detectable a sig-nal that is picked up by a machine."

After about an hour or hour and a half, you get your results.

The machine and the results need to be verified, and then the information system fires out the result to APL's public health partners, including public health tracing teams and Health Link.

Even more behind the scenes, technologists like Mekodom are playing an essential role in keeping all the medical equipment running smoothly.

Fixing and maintaining a machine can take her up to two days, or a major repair up to a week. Some machines are bigger than her, and some can fit on a tabletop.

The biomedical tech field is growing, partly because the expansion in health technology like equipment for radiation therapy, or MRIs and ventilators, said Barry Cavanaugh, CEO, Association of Science and Engineering Technology Professionals of Alberta (ASET).

Among the association's approximately 16,000 members, 9,272 are CETs like Mekodom.

"They don't often get noticed or praised for it, but they're as involved as other health-care professionals," said Cavanaugh. lijohnson@postmedia.com