

As coronavirus testing expands, new personal privacy issues arise

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"The virus poses another privacy issue ... We think that this is better recast as 'molecular privacy' — the privacy of the molecules found on a person. Like the novel coronavirus, many other microbes and molecules in or on our bodies are temporary; nevertheless, they can be unique to us or reveal details about us for a moment," the authors write. (Jane Ades / NHGRI)

The coronavirus pandemic has brought several key privacy dilemmas to the forefront. A most obvious one relates to determining whether an individual has virus particles on their person, either in a symptomatic or asymptomatic form of the disease, and then tracing their contacts.

But the larger issue of the privacy of an individual's molecules is now come to the fore, and especially as coronavirus testing and tracing increases, we must make clear which components of us will remain private and why.

Contact tracing, especially via smartphones, has proven to be a powerful solution for combating the virus in many countries. However, it can be very invasive from privacy perspective. In fact, both political parties have recently introduced bills in the U.S. Senate to protect the collected data from misuse.

We tend to think that the privacy issues related to contact tracing can be fit under the umbrella of "digital privacy," which has to do with bits of personal information stored on computers, often in the cloud — for instance, credit card numbers or email messages. And so far, proposals concerning contact tracing have often involved the usual digital-privacy suspects, such as Apple and Google.

But the virus poses another privacy issue, which is quite different. We think that this is better recast as "molecular privacy" — the privacy of the molecules found on a person. Like the novel coronavirus, many other microbes and molecules in or on our bodies are temporary; nevertheless, they can be unique to us or reveal details about us for a moment.

One aspect of molecular privacy is finding contagious pathogens like the novel coronavirus, which is essential from a public health perspective. But the metabolites and microbes on us can tell us more about our health. A case in point is the French company Enterome, which recently developed a test for Crohn's disease based on analyzing the gut microbiome (the collection of

microbes on an individual), eliminating the need for a colonoscopy.

The molecules found on a person can provide more than health information — they can even tell us about who the person has shaken hands with, whether they have recently been to a specific region of the world, or even about the characteristics of their home neighborhood. A trivial example is finding alcohol on the breath to determine if someone recently drank liquor. More dramatically, leaked chemicals such as trichlorobenzene from the Bhopal disaster in 1984 were found in the milk of nursing women in 2002, an indication of their location years earlier.

This leaked information is even more apparent for microbes, as modern sequencing technologies make it increasingly easy to probe the microbiome. With a small, portable machine, one can determine an individual's microbiome from a used coffee cup. In fact, in 2019, the startup Phylagen launched a platform to trace shoes through the supply chain by sequencing their microbiome content. Potentially, you could use this to determine if their manufacture involved locations with slavery or child labor.

The privacy implications of interrogating the microbiome are potentially far-reaching. In particular, is it OK for the state to assert legal access to the molecules on someone for the greater good? This makes sense for the novel coronavirus or even alcohol on a driver's breath. But we need to think about if such monitoring could be re-purposed for reasons other than the public good. Should we protect people from this type of assaying, whether it is done overtly or covertly?

Most importantly, if a person is assayed for the molecules in or on their body, how will the resulting information be protected? Unlike the privacy of an individual's DNA, which is firmly covered by existing law, molecular privacy occupies a gray zone. It is not clear whether the existing body of U.S. law

recognizes it.

These issues must be addressed when privacy regulations are re-written to combat COVID-19.

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