Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Editorial

How much Covid?

In public health surveillance, case definition occupies a place of primacy. Some of this may be attributed to Alexander Langmuir, who was head of the Epidemic Intelligence Service at CDC for many years and who used the case definition as a foundational basis for the workup of an epidemic. It has remained a cornerstone of CDC's approach to surveillance.

But rigid adherence to an *a priori* definition can be constricting and misleading. The lessons of HIV demonstrate that a narrow definition, enlarged by engrafting new conditions that form part of the definition, leads to a Rube Goldberg contraption that is nearly unworkable. Definition change, simplification, and broadening have brought us to the current thinking: if you have a positive test, you have HIV disease and should be treated immediately.

At a much faster pace, we are going down the same road with Covid-19, but the path is clearer. As we learn more about the disease, and as the technology for diagnosis advances, the broad spectrum of clinical illness and sequelae is emerging. The current surveillance definition from CDC is a positive PCR test, but it is clear that a person with a compatible clinical picture and a positive rapid antigen is a case, and should be counted as a case. In fact, a person with the clinical syndrome should be counted. A person who is asymptomatic but has some biomarker evidence should be counted. The CDC deals with this issue by making modeling estimates of the actual burden [1]. A number of other modeling attempts [2,3] have tried to assess how much disease there really is, usually with broad confidence (or credible) limits, but these lack empirical validation. As recently suggested, we may be losing track [4].

Those promoting the current surveillance definition might correctly claim that we want to be sure that what we are counting is the real thing. But it would be a small step and a large eye-opener to cast the net as broadly as possible early on, and make adjustment for the basis of a reported case later on. As an example, we could simply ask that the report of a case be accompanied by one of four items: clinical, antigen, antibody, PCR. (In the surveillance world, such simplicity would never survive, but the idea might.) "Clinical" means that the case was diagnosed by presentation alone. "Antigen" would refer to a positive rapid antigen test; "antibody" to serological diagnosis after infection; and "PCR" to the gold standard test for diagnosis. Given the real-time dislocations in availability of medical care and testing, rapid reporting by any means possible would provide a much better sense of what we are really dealing with. The increasing use of the nonlaboratory rapid tests, and their adoption as a mechanism for keeping children in school, means that there is a substantial amount of diagnosis that may be ignored.

CDC is by its nature a conservative (small c) organization, which serves it well in many situations. But it has been recently suggested that we are demanding a good bit of flexibility on the part of the citizenry, but see less flexibility from government agencies. (The short history of the rapid antigen test is a case in point.) FDA is responding with more rapid EUAs, and CDC might respond as well with a more expansive view of COVID-19 surveillance.

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