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The pitfalls of mass hospital healthcare worker testing for COVID-19

Dominik Mertz MD, MSc[1], Gerald A Evans MD[2], Susy Hota MD, MSc[3]
on behalf of the Ontario Infection Prevention and Control Community of Practice (see list)

[1]Hamilton Health Sciences Centre & McMaster University, Hamilton, Ontario;
[2]Kingston Health Sciences Centre & Queen's University, Kingston, Ontario;
[3]University Health Network & University of Toronto, Toronto, Ontario

Corresponding author:
Susy Hota, Infection Prevention and Control, University Health Network, 8 PMB Room 102, Toronto General Hospital, 200 Elizabeth Street, Toronto, Ontario M5G 2C4. Susy.Hota@uhn.ca

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On May 29, 2020, Ontario released an ambitious plan, "Protecting Ontarians through Enhanced Testing," [1] for COVID-19. The approach included testing asymptomatic individuals who are at risk for infection due to suspected exposure or at-risk occupations and targeted testing campaigns for high-risk populations. Shortly thereafter, several Ontario hospitals were requested to conduct comprehensive health care worker (HCW) asymptomatic testing for COVID-19. While on the surface, broad testing of HCWs for COVID-19 seems to have merit, a deeper look raises questions regarding the rationale, effectiveness, and potential harms of this endeavour.

To understand the rationale for targeting hospital HCWs for mass, asymptomatic testing, we must first ask what question we seek to answer by carrying out this testing. If the goal is to derive an estimate of community prevalence of COVID-19, hospital HCWs may or may not be representative of the general public. As a result, are we asserting that HCWs are at extremely high risk for acquiring COVID-19 despite personal protective equipment (PPE) use and are therefore driving community transmission? Studies to date have not suggested a significantly higher incidence of COVID-19 infection in acute hospital HCWs compared to the community, outside of outbreak settings [2–4].

Indiscriminate testing of asymptomatic HCWs is challenging to interpret. When asymptomatic persons test positive for COVID-19, we identify four groups with differing levels of infectious risk. In descending order, they are [1] those who are pre-symptomatic, [2] those who have a completely asymptomatic course of infection, [3] those who are recovering from infection, and [4] those with a false-positive test result. While pre-symptomatic individuals are likely as infectious as symptomatic individuals, this group will be a small minority of the true positive cases given that our current polymerase chain reaction (PCR) assays only detect SARS-CoV-2 virus two to four days before individuals become symptomatic [5]. Furthermore, it remains unclear to what extent pre-symptomatic and truly asymptomatic infections contribute to COVID-19 transmission [6,7], particularly in Ontario hospitals, where enhanced infection prevention and control measures, such as universal masking, physical distancing, liberal use of eye protection, diligent hand hygiene, and augmented environmental cleaning are in place.

Current data suggests that most individuals who are more than eight days past symptom onset are no longer infectious despite positive PCR results [8,9]. As a result, their identification is unlikely to prevent transmission. Unfortunately, there is no accurate, rapid way to distinguish these cases from the other groups.

In the setting of mass, asymptomatic testing of hospital HCWs, false-positives would likely be responsible for the largest number of positive tests with the current low prevalence of COVID-19 in Ontario [10,11]. As an example, if one assumes a specificity of 99.9% for most SARS-CoV-2 PCR assays and a lower than 0.1% prevalence of COVID-19 care workers to identify 1 true positive while having 1.25 false-positive results. In other words: the positive predictive value of SARS-CoV-2 testing in groups 1–3 (of the four groups identified earlier) is only 44.5%.

Significant harm may arise from identifying recovered non-infectious HCWs with viral RNA persistence and HCWs with false-positive tests, which, as outlined above, may constitute a significant majority of positive tests on asymptomatic mass testing initiatives. Sending these individuals and their close contacts home to self-isolate could unnecessarily deplete the pool of available health care workers. Also, if more than one

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positive HCW was identified from the same clinical unit, an institutional outbreak would be declared and the unit would then be closed to admissions, affecting the hospital's flow and capacity. False-positive results can also cause unnecessary anxiety and stigmatization and may discourage HCWs from coming forward for testing in the future when symptomatic. Furthermore, implementing a broad testing initiative without a clear rationale can send a worrisome message to HCWs. Paramount to every hospital's pandemic response has been a prioritization of staff safety. If hospitals require all HCWs to be tested, HCWs may perceive this as reflecting a change in confidence in the personal protective measures, which could undermine the trust between hospital leadership and frontline staff, potentially leading to work refusals and union grievances.

Of similar concern is an inability to put the results of mass testing in context. Without reliable local community prevalence data to present alongside hospital HCW testing results, it would be difficult to gauge the risk of COVID-19 acquisition in HCWs at the workplace. Individuals will draw their own conclusions, assuming that disparities between proportions of positive health care workers from one hospital to another represent differences in hospital safety or performance.

Lastly, despite the ever-increasing capacity of COVID-19 testing in Ontario, mass testing can temporarily exceed current laboratory capacity, resulting in prolongation of the turnaround time for the highest priority testing: symptomatic individuals and those involved in outbreak investigations, where swift action is required.

Our group of Ontario Infection Prevention and Control (IPAC) medical leads and microbiologists believe that the return on investment for asymptomatic hospital HCW testing is low and that the risks are potentially substantial. As a result, we express concerns with diverting acute care hospital resources toward this particular testing strategy and instead suggest the resources be deployed to other pandemic response activities, such as investing in additional human resources, renovations to support safer care environments, and other newly identified needs during the COVID-19 pandemic.

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- Manal Tadros, SickKids
- Nisha Thampi, Children's Hospital of Eastern Ontario
- Yvonne Yau, SickKids
- Alon Vaisman, University Health Network

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