



Considerations for a Long-Term Strategy to Contain COVID-19

These recommendations for a strategy to contain COVID-19 are being put forward by Michigan Local Health Departments (LHDs) that are part of the group advising the Michigan Department of Health and Human Services (MDHHS) on this matter. We are doing this in an urgent effort to stimulate discussion within the group and among other concerned Michiganders.

MDHHS has framed their proposed strategy around three interconnected concepts designed to break the cycle of transmission: 1. Testing, 2. Contact Tracing, and 3. Isolation and Quarantine. The components of this system are: test kits and laboratories; the Michigan Disease Surveillance System (MDSS) and Outbreak Management System (OMS); and isolation and quarantine places and procedures developed by LHDs and emergency operation centers (EOCs). This system is operated by thousands of health care and public health professionals. The approach is sound in theory.

However, LHDs have two concerns. The first is that there is likely more COVID-19 disease in our communities than the official case counts reveal to us. If this is true, efforts to reduce the number of COVID-19 illnesses using existing methodologies will likely stall, and we will face continuing morbidity and mortality. If that happens, economic recovery will not occur.

Our second concern is that there has been insufficient consideration given to weaknesses in our current efforts to control the disease. For example, we know that pre- and asymptomatic people transmit the disease; we know existing tests for SARS-COV2 return false negative results at an uncomfortable rate; we know many confirmed and probable cases are never reported for contact tracing; and if we are successful in finding more cases the public health system will need to house and support many more people in isolation and/or quarantine. We are anxious to be part of the solution to COVID-19 and only want to ensure that we all are being as sober and pragmatic as we must be to succeed.

In this brief paper we put forward a number of recommendations about testing, tracing and isolation and quarantine which are detailed at the end. These are tentative and should be debated and improved upon by all concerned. Our major finding, which flows from the limitations of testing, tracing and isolation mentioned in the paragraph above, is that the foundation of Michigan's strategy must continue to be social distancing supported by an active, integrated approach to surveillance.

Testing

Promptly identifying new cases of COVID-19 so they can be isolated and their contacts traced is seen as the bedrock of any effort to vanquish this illness. However, characteristics of the disease make it likely that a strategy based on test results will not capture enough cases. In the argument below, we conclude that testing must be supplemented by use of the expanded case definition of COVID-19 that does not require confirmatory testing, to activate contact tracing and access to isolation and quarantine.



Furthermore, it must be recognized that even with broader case identification, anyone could be contagious, and continuation of social distancing will be required.

We know that testing in Michigan is insufficient. The World Health Organization (WHO), comparing countries that had reduced levels of COVID-19 with those who did not, concluded that testing is widespread enough to catch sufficient cases when 10 percent or fewer came back positive (Here is a link to the WHO briefing <https://www.pscp.tv/w/1OyJAYoodRnJb>). Some days Michigan has had as few as 15 percent of tests returned positive, but the trend on average is still for nearly 30% to be positive. If these numbers cannot be significantly changed then we must re-think our strategy.

Even with increased testing we will miss many infected people. Studies have found that 25 percent to over 50 percent of COVID cases may be the result of pre- or asymptomatic transmission. In addition, some reports have suggested that people are most infectious just before symptoms develop. These results are well summarized in a report in Nature Medicine (<https://doi.org/10.1038/s41591-020-0869-5>). This article stated, "For a reproductive number of 2.5, contact tracing and isolation alone are less likely to be successful if more than 30% of transmission occurred before symptom onset, unless >90% of the contacts can be traced." Credible estimates of r_0 for COVID-19 are at or are just below that level.

Estimates of the percentage of time a SARS-COV2 PCR test in a person with the illness yields a false negative result range from 15 to 30 percent. An article in Healthline summarized the work (<https://www.healthline.com/health-news/false-negatives-covid19-tests-symptoms-assume-you-have-illness>). It is thought that the test itself is reliable, but faulty collection techniques are mostly to blame. Regardless, the result is a dilemma, we test to determine how to treat a patient, and whether they should be classified as a case in MDSS, but if we are doing what we should be, we treat them like a case no matter the result.

We do not feel these limitations can be fully overcome. Therefore, we believe alternative methods must be used to identify cases aggressively, to activate contact tracing and move people to isolation. For example, consideration could be given to asking employers to report cases in which employees fail workplace screening. Home test kits, if permitted and in use, could contain instructions for reporting to public health. In addition, the new case definition of a probable case which does not require confirmatory testing should be used in health care settings and all such cases reported to public health and/or entered into MDSS. The intention of all this would be to fill the gaps that PCR testing alone leaves.

Tracing

Once a case is identified, it is urgent to quickly contact the people they have interacted with to determine whether they are a case, and if so, quarantine them. Unfortunately, this is where many efforts to battle communicable disease fail. In the argument below we conclude that vigorous efforts



must be made to improve contact tracing, and again, that this must be supplemented with continued social distancing for an indefinite time into the future.

Although it is staggering to think about, studies soberly conclude that in many counties when the first wave of COVID-19 was recognized there were many times more cases than official case counts indicated (Infection Control and Epidemiology <https://doi.org/10.1017/ice.2020.116>). We now know that people died of COVID-19 in the United States three weeks before the first official case was announced. And while serology remains controversial, preliminary results support the contention that many people have had COVID-19 without knowing it. If this is true, then to prevent a second wave our case identification and contact tracing procedures will have to operate much better than they did the first time.

Even today, when we are deep into the outbreak, and even when it is confirmed that a person has COVID-19, the result is too often not reported to public health or put into MDSS. There are a dizzying array of lapses, some of them already mentioned, from laboratories that do not report results, to providers that fail to do so, and now the appearance of home testing unconnected to any disease surveillance process.

In addition, while the dogged work of LHD disease control nurses is commendable, we know that they often struggle to contact a case. Days can pass despite their efforts before contact is made, and by that time their contacts have already interacted with many other people.

Our first recommendation with respect to tracing is that Michigan must fix the lapses in case reporting by labs and health care providers. Labs must be required to report and health care must be held accountable for doing so. Our second recommendation is that very tight standards must be set for case identification and contact tracing. LHD performance in meeting the standards must be measured in real time, not to be punitive, but in the spirit of quality improvement and with the knowledge that delays in tracing, no matter how unavoidable are a threat to the health of the public and need correcting. Finally, if we identify sufficient cases the resources required by LHDs to do the work will have to be expanded significantly. If we find the cases we need to, LHD communicable disease staffing needs could easily double or triple depending on location.

Isolation and Quarantine

The ideas for overcoming the challenges to isolation and quarantine in the preliminary sketch of MDHHS's strategy are good ones. We support them. Here we want to focus on a significant problem raised by the testing and tracing strategy. That is, a strategy that captures enough exposed people will identify a very large number of low income, vulnerable people who must be supported in their recovery. Responding to the needs of these people must necessarily require resources that have not been deployed to date.

Following MDHHS guidance, some LHDs and EOCs have created shelters for people impacted by COVID-19. Depending on location, there are a wide variety of people who may use such shelters, from people who were in a shelter (e.g. a shelter for victims of domestic violence) but lost access to it because of



COVID-19, to homeless people who test positive, to health care workers who face the risk of exposure and do not want to jeopardize their families. Following the logic of our argument so far, these are all very good reasons for sheltering people to avoid further transmission of the disease.

Additionally, a principal of epidemiology is that efforts to fight an outbreak should identify and focus on priority populations most likely to be affected. In the case of COVID-19—as the Michigan experience so starkly reveals—those populations are low income people, people of color and those with pre-existing conditions. This being the case, both MDHHS and LHDs have tried to prioritize testing among vulnerable groups like communities of color and the homeless. The experience of LHDs however, is that doing this quickly identifies large numbers of people who need to be sheltered. It may be that they are homeless, or cannot shelter at home without exposing other vulnerable people, etc. LHDs that have prioritized testing for the vulnerable have found their shelters filling up quickly. This has occurred without much increase in the availability of testing. When testing is expanded and when the new case definition is used aggressively to identify people who need to be isolated, this situation could become overwhelming.

This issue is important. Without the ability to shelter people, a testing and tracing strategy will stumble. Unless the third step of isolation is completed, the homeless will spread the disease, people will infect their family members, and health care workers will do the same. Here we have not made an effort to identify the number of people who might need to be sheltered, so the number I am about to quote should not become the target. But suffice it to say if a second wave had 50,000 new cases over a six-week period, and three percent of them needed to be sheltered for two weeks, then at the peak many more than 5,000 people might need to be sheltered.

Quickly Identify the Next Wave

In addition to the concepts of testing, tracing and isolating, we need to be able to recognize a resurgence of COVID-19 very early so that the asymptomatic do not spread it far before public health can respond. Accomplishing this will require the use of all the surveillance tools we have.

We have already mentioned the limitations of testing, nonetheless it can be one part of a comprehensive surveillance system. Another piece would be syndromic surveillance. Michigan has retrospectively run the syndromic surveillance system against a new definition of COVID-19. This revealed that on March 18, 2020 when Michigan only had 80 positive cases the syndromic surveillance definition had risen steeply and doubled over the baseline noise. Serology might also be part of surveillance. Consideration could also be given to a role for serology. While it is true that much remains to be known about serology, it is possible results could tell us that people are carrying the disease before we are seeing many cases in health care or getting positive PCR results.

Most fundamentally, surveillance for a resurgence of COVID-19 will require face-to-face observation in health care settings, schools, workplaces and even morgues and mortuaries. Shifting patterns of



attendance, unexpected deaths and the observations of people now sensitized to the disease may be the earliest warning we can get.

Conclusion

Among our conclusions is that there must be dramatic improvements in testing, tracing and isolation and quarantine. Our detailed conclusions about this are below. However, we feel that the limitations testing and tracing we have enumerated here mean it will never be completely sufficient. Our major conclusion is that these must just be thought of as complements to continued social distancing and very active, integrated surveillance. The public must be told this and must understand that “opening up” will not mean a “return to normal” until a vaccine or treatment is found. Whenever surveillance indicates there is a threat of a resurgence, social distancing may be deepened again. It is our hope that these strategies will get us through this with the maximum number of people alive and healthy.

Detailed Recommendations

1. Continue social distancing as the foundation of our strategy. The public must understand this.
2. Use an integrated surveillance system to watch for a resurgence
 - a. Testing
 - b. Syndromic surveillance
 - c. Serology
 - d. Direct observation
3. Testing
 - a. Increase the supply of tests
 - b. Increase lab capacity
 - c. All labs must report all results
 - d. Healthcare settings report all cases with or without confirmatory testing
 - e. Employers and individuals report symptoms
4. Tracing
 - a. Use the definition of a probable case to activate case investigation, contact tracing and isolation and quarantine
 - b. Set standards for the completion of case investigation and contact tracing
 - c. Identify failures to meet the standards
 - d. Significantly increase LHD assets for contact tracing
5. Isolation
 - a. Utilize the excellent strategies in MDHHS’s draft document
 - b. LHDs use quarantine powers
 - c. Expansion of isolation and quarantine facilities
 - d. Expanded staffing for the facilities