



Cambridge
Public Health
Department

Cambridge COVID-19-19 Expert Advisory Panel

Thursday, January 7, 2021

Meeting convened at 1:02 pm

ATTENDEES:

Panel Members

Bill Hanage
Jill Crittenden
Louann Bruno-Murtha
Chris Kreis

CPHD/City staff:

Claude Jacob
Sam Lipson
Nancy Rihan-Porter
Sammi Chung
Lee Gianetti
Dan Riviello

1) Clinical, case, and wastewater data update

Clinical update

As of yesterday (1/6/21) MA had the most reported positive cases and deaths since the beginning of the pandemic. Most likely as a consequence of holiday gatherings the MA case numbers have been spiking since last Friday. Hospitalization is also growing across the state and bed capacity is getting extremely tight in Eastern MA. As of today med/surg bed and ICU bed availability is extremely limited at Cambridge and Everett hospitals. Hospitals will have no space for patients if the situation continuously worsening in the next two weeks. One of the important differences between the first wave of COVID patients in April and May and this surge is that there are a lot more non-COVID patients now, many seriously ill requiring hospitalization. 50% of CHA capacity is now taken by non-COVID patients, including bacteremia, substance abuse, diabetes-related treatments, and foot infection. Wait times for care are longer than we would like. Among those 50% (non-COVID patients), 75% are in critical care.

MDPH (MA Dept of Public Health) has been monitoring hospital capacity and has set up two field hospitals with a third coming soon. A few limitations in utilizing these field hospital beds include poor patient accessibility, limited staffing, and inconvenient or insufficient placement of restrooms (reported from the Lowell field hospital). These field hospitals have more beds than staff to support them, so it will be a challenge as they are utilized more. While bed capacity is being tracked pretty carefully, the staffing necessary

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to operate safely is not reflected in these hospitalization status reports. The next challenge facing the healthcare sector is that the entire country is looking for traveling nurses. CHA has some traveling nurses and is getting more. but even this will not be enough to staff all the surgery beds.

Case data update

MA, like most states, has seen a surge of COVID cases since Thanksgiving. Thankfully, although we're in a tough spot in our region, we haven't seen the curve continue to rise since that time. We are bumping up and down at a high rate of infections, but this appears to have stabilized.

As for the case data, the second wave of the pandemic in Cambridge has followed a similar pattern and timeline as statewide case data, except that Cambridge daily case numbers are **similar** to those seen in March, April, and May 2020, while the overall MA cases are occurring at **over twice** the rates seen during the first wave. Overall, Massachusetts did comparatively well in preventing exponential growth during the second surge, except for the small period of time after Thanksgiving. This could change over the next few weeks. Somewhat stable case numbers in December suggest that the safety measures imposed on or observed by MA residents has helped to keep the transmission rate (R^t) of around 1, so the case numbers did not grow rapidly, though they are certainly elevated. Though the household mixing behavior changed during the holidays, the transmission rate could return to an elevated base level once people return to normal patterns of activity. Introduction of new variants (e.g. UK variant) might change this pattern, but the data hasn't shown this trend yet.

Wastewater surveillance data update

The Cambridge and MWRA regional (Boston North) wastewater data appears to have reach a high level over the past couple of weeks and seems to be headed back down. Obviously this can change without warning. The Boston South data from MWRA are rising, so there is not agreement in the trends within the region yet. Though it's not clear how reliably wastewater data will predict case numbers, any upward trend is concerning due to the extremely limited hospital capacity now being managed. As the EAP has discussed already, the sewage data alone should not be used to drive changes in policy without looking at case and hospitalization data and trends. One of the limitations to the Cambridge data is likely to be the fact that daytime samples will capture both Cambridge residents and Cambridge workers and students (non-Cambridge residents). EAP will look at the correlation between the wastewater data and subsequent infections when we meet next on 1/21.

2) UK Variant (B.1.1.7) and other variants

Viral variants have defined characteristics based upon a large number of mutations built up over time. Mutations are not variants. Mutations occur frequently and most do not always cause changes in the infectivity or transmissibility of a virus. The pattern of mutations and the interactions between them can produce characteristics with consequences to ease of

transmission, severity of disease, or ability to evade vaccine-derived immunity. The “UK variant” (known as B.1.1.7) probably evolved within an immunocompromised patient with chronic infection over a long period of time. It was first identified in late August and subsequently emerged as a dominant strain, overtaking less transmissible variants. Since the middle of September, it has been accumulating lots of mutations and evolving at a far higher rate than the common form of the virus. This is described as a period of accelerated evolution in an “unknown compartment”. The South Africa variant, known as B.1.351 appears in a different “compartment”. Currently, there are two COVID variants with distinctive properties. B.1.1.7 (UK variant) appears to be more transmissible than the standard SARS-CoV-2 strain. B.1.351 also might be found to be more transmissible, but it remains unclear. The fact that two variants with high transmissibility emerged from 85 million infections shows they do not happen very often, but are worth taking seriously when they do occur. However, it is believed among scientists studying SARS-CoV-2 that the chance of a new more lethal variant (similar to MERS-CoV) emerging is relatively low.

In November in Southeast UK (around Kent) COVID safety restrictions were being strictly enforced but they observed that the infection rate grew from 10% to 70% and then plateaued. This coincided with the appearance of the B.1.1.7 (UK) variant and showed that this variant is able to transmit more even when strict lockdown measures are imposed. Ever since then, there’s consistent evidence indicates that B.1.1.7 (UK) is at least 50% more transmissible. Israel has placed stronger restrictions as a result of the spread of B.1.1.7 (UK) despite the fact that they have been touted as recently as last week as a high-performer with their rapid deployment of the COVID vaccine to a large number of people.

Local prevalence and possible tools for tracking the B.1.1.7 (UK) variant

One of the PCR tests for the spike gene doesn’t have to amplify because the PCR prime is able to bind. In MA, labs (Broad, maybe State Lab) have been sequencing of SARS-CoV-2 for surveillance purposes, but no instances of the new variant have been reported yet. *Helix*, one of the genomic profiling labs, has recently released a preprint showing that deletion of H69 and V70 can be characterized by a dropout of the spike gene in standard PCR tests. As a result, it is possible to use this characteristic to detect the B.1.1.7 (UK) variant (and possibly others) with one of the PCR tests now used for the common form of the virus. *Helix* looked at a portion of their test results and found Massachusetts has the highest proportion of spike dropouts (1.8%, by the time the preprint released). The spike dropouts are not necessarily the variant. On the other hand, the B.1.1.7 (UK) variant might be fairly rare in Massachusetts at this moment, since no cases have been reported and they are looking for it. CDC and Yale researchers have also discovered variant “B.1.346”, which has the same mutation in the spike as B.1.1.7 (UK) but doesn’t seem to be more transmissible. So it’s murky. There is also reported to be a “Scottish” variant, but it hasn’t taken off so far (not dominating transmissions).

Further risks posed by variants

South Africa variant (B.1.351) has a specific mutation that has been found in experiments to diminish neutralization of the virus when introduced to a convalescent serum (recovered from a COVID patient who has acquired natural immunity). Such “immune escape” might result in a less protective immune response to a COVID vaccine. This is the

reason people are more concerned about the B.1.351 (SA) than B.1.1.7 (UK). Another concern is there hasn't been a similar campaign to identify B.1.351 (SA) in the UK or elsewhere, so we do not really know how widespread it may already be. In order to do early screening for these variants, the testing labs will need to use primers that are able to bind to those variants. For instance, UK uses TaqPath. There are opportunities to conduct *retrospective* PCR amplification, but this requires retention of sample sufficient to extract the RNA and this can be a logistic burden (no financial incentive for most testing labs to retain and store). Broad is also aware of all these possibilities. The scientific and medical community should continue communicating and advocating for more screening for important variant strains. Not all the available PCR test protocols are capable of detecting the spike dropouts, so this would require selection of PCR method capable of binding to region on the RNA associated with the variants of concern.

It's reasonable to suspect the vaccine might be less effective with the new variants, but it is probably still going to be somewhat effective. Based on modeling, B.1.1.7 (UK) appears to have less "immune escape" risk, which is another reason to promote vaccination. In order to get the critical vaccination threshold (herd immunity), we used to need to have at least 60% of people fully immune, so with the impact of new variants, we might need 75% now.

Few clinical sites offer the "neutralizing antibody cocktail" therapy. It has been controversial, since the data presented wasn't strong enough to show efficacy. Many hospitals, including CHA, don't have the staff capacity to do offer it safely in a clinic at the present time. It is not recommended by NIH. South African variants do show to escape this monoclonal antibody treatment, the "cocktail".

3) Communicating vaccine safety to different groups

The City of Cambridge website has an informational page with common concerns and myths related to the vaccine. The website guidance also indicates the people need to continue wearing a mask after vaccination to protect others. Topics that should be added to the City's vaccine page:

- 1) Explanation of the importance of taking both doses of the vaccine
- 2) Summary of what is understood about impact on fertility from the vaccine

Moderna has an in vivo trial looking at fertility and toxicity.

More than 50 % of the CHA staff has been vaccinated with the first dose and staff are starting to get the second dose this week. The team has started collecting data on staff who are hesitant about taking the vaccination (e.g. which disciplines, ethnicities, or other characteristics are more skeptical). Hopefully, CHA will have more data on people who have concerns about getting vaccinated soon. This will help in addressing these concerns.

4) KN-95 mask distribution (most important targets)

Cambridge Public Schools has order tens of thousands of flat masks to supply

their staff, teachers and students. These masks are flat surgical masks, which have been tested by the Lincoln Labs at MIT and shown to have a 90% filtration rate. CPS is preparing a one-pager to describe why surgical masks are better than cloth masks and have also begun training athletes on mask use during games, scrimmages and practice sessions. It seems likely that news about the UK and SA variants have made motivates people to embrace more safety measures, but it not at all clear how much people are really paying attention across the country. There have been some reports that B.1.1.7 (UK) is more transmissible among children, but it seems likely that this is a matter of opportunity (in-person instruction) rather than any positive selection for younger people. CPS mask distribution efforts could be an opportunity to encourage other City departments and non-municipal sectors to use higher grade masks for better protection. Also, the COVID case and wastewater hotspot maps could be used to target specific areas for mask distribution to frontline workers and residents. School is planning to translate this one-page mask use document. The City could partner on this material and use it in the community setting.

5) Schools Path to Zero framework adopted by School Committee

The school committee voted on 1/5 to adopt the Schools Path to Zero framework (see handout) for protection of students, teachers and families that was developed by researchers and epidemiologists at Harvard, BU and Brown. This would allow an increased density (more in-person attendance) for younger kids, more in-person instruction for high school students with a strict 6-ft distancing policy in place. The emphasis will be placed more on surveillance and closures in response to in-school transmission risk rather than overall community risk. They are working on making testing available for all 6-12 students. The fundamental message in this document is that schools closures only make sense when students have become a major route for virus to enter the household. In-school testing is the only way to monitor whether the situation has worsened. Tracing should include a more deliberate evaluation of the degree of adherence to masking and distancing practices and the likelihood that there was a transmission within the school building itself. There have been 6 in-school transmissions in CPS schools so far during this school year and it's still not clear how these occurred.

Adjourned 2:06 pm

Notes respectfully submitted by Sam Lipson on 1/10/21