Cambridge Public Health Department

Minutes
Cambridge COVID-19 Expert Advisory Panel
2 pm, Tuesday May 26th, 2020

1. **Mem Dr. trial opening– crowd control? Masks? Any improvements needed?**
   - Claude: Mem drive was closed to cars from 11am-7pm on Sunday. People were wearing masks and there was plenty of athletic activity but it was not crowded. May have been less crowded due to absence of students. Sunday May 31 will also be part of pilot. Saturdays may be looked at as well for the future.
   - Jill queried interest at Broad for measuring virus+ rate among outdoor exercise cohort.
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2. **Discussion with Eric and Katia from Biobot**
   Many local universities and colleges have announced opening for the fall- can we get biobot, and direct communications set up with their med. depts. in place now to help minimize resulting transmission in our community? What about long term care facilities?
   - Covering 10% of US with sampling. Most extensive sampling is at Deer Island covering greater Boston sewage.
   - Trend data from sewage is consistent with dynamic of outbreak observed up to this point. However it would suggest larger number of cases than what has been reported to date. This appears to be explained in part by a discrepancy in clinical literature regarding the amount of fecal shedding that actually occurs in COVID infection.
   - Overall Biobot samples correlate more with new cases than with cumulative cases. And they correlate with new cases that are diagnosed clinically about one week after the sewage sample is taken. (One week is an average…range is about 4 days to 2 weeks)
   - Shedding patterns: In individuals there is initially a high level of viral shedding that levels off quickly. Bolus of shedding lasts 2-4 days very early in infection. This is different from initial clinical literature which initially showed a flat curve of shedding that lasted weeks or months. This low level shedding does occur but it is accompanied by the large bolus.
   - Biobot started to see shedding March 2nd when there were only two cases. Suggests that Biobot was detecting cases in advance of clinical testing data.
   - How prominent was signal on March 2nd? Is it an indicator that could be used? Early in the outbreak the system was very sensitive because the background noise was zero. Now that is not true. Majority of shedding they are seeing now can't be explained by people who were infected a couple weeks ago—it represents newer cases. At some point the number of new cases will be lower and the sensitivity will be higher. Until number of new cases is very low again, surveillance won't be as sensitive as early march unless they go to smaller catchment areas.
   - Most of what they are seeing is new cases, so could have ability to make estimates of R0.
   - The smaller the catchment, the larger the signal for new cases. So, you increase sensitivity.
   - Catchments are smaller the further up they go into sewage network. If they could get sample collection and processing with PCR within 24 hours, then could give an early warning that people need to be tested. Another application would be measuring effectiveness of different public health interventions in different catchments.
   - Thus far have only done small catchments but have not done building-level testing. Houston has 35 treatment plants which is helping them getting better handle on

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thresholds. Talking to MIT about it would work to monitor dorms when students come back. Also talking to larger companies.
- Challenge to sampling very small catchment is getting homogenous sample (easy at treatment plant, harder for single building). Would involve plumber and cutting into effluent and putting it through macerating pump and allowing sufficient time between samplings. Only need 15ml of sewage to get data and currently pumps collect 1L over 3-4 hours. Would need adjusted sampling system or a device that identifies mass passing through and collects sample. There are some commercial pumps available, Biobot has been making some. Ideal equipment has two pumps – first is strong and pulls water from 15ft depth and second samples from that.
- Boston neighborhood samples are homogenous enough to overcome sampling issues. Don't require plumber. Challenge is that it requires more modeling. Using GIS maps and census data to run simulations and determine how often you need to turn pump on and off.
- Building sampling is theoretical at this point. Most likely the signal is from fecal matter (not tooth brushing) because normalized against plant virus that is also present in fecal matter and also +strand RNA.
- Could potentially work with Cambridge on a pilot either with Eric's academic lab or with Biobot company.
- Does fecal testing result in higher rate of positivity than NP swab? Stool swab may be better way of figuring this out. Children do definitely get it and probably transmit less than adults. Model from China shows closing schools decreased R0 by 0.3. Reopening schools in Denmark may have increased R0 by .3. Schools shouldn't make decisions until looking at data that gives better idea.
- Another challenge with building level monitoring is that place of work is not always where people stool.
- Testing air filters?
- Claude: would be useful to see overlay of sewage data on hotspot map.
- Sam: would be valuable to have a few sentinel indicator sites for Cambridge that could be used as evidence for taking earlier action than what's recommended at the state level