COVID-19 Testing for School Reopening and Town-wide Safety

Presentation to the Brookline COVID-19 Task Force

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Why test school kids and staff for COVID-19?

- Identify individuals with COVID-19→isolate/quarantine to avoid transmission
  - Symptomatic individuals
  - Asymptomatic individuals
- Exclude COVID-19 in symptomatic individual → earlier return to school
- Monitoring number of cases to guide schooling decisions about modifications to procedures, closures of classrooms, etc.
- Testing will have highest impact if results can be generated and used quickly.

Arguments for a centralized COVID testing strategy for the Brookline community

- Access to expedited COVID-19 testing for all symptomatic school children and staff will allow for real-time assessment of risk and facilitate rapid response to reduce transmission **and keep schools open**
  - **Harms of remote learning are real and well-documented**
- Currently, many school children and staff do NOT have access to rapid COVID-19 testing
- Existing COVID-19 testing infrastructure in MA cannot provide the rapid turnaround time (≤24h) that our district needs to detect infection and react to prevent further transmission within a school
- COVID-19 testing in MA relies upon a network of independent testing centers with varied capacity, limited comfort with children, and range of results turnaround time (from ≤24h to 7D).
- **Without a coordinated effort and dedicated funds, our district will be unable to expeditiously test school children and staff, potentially leading to disease spread and increased disparities**
- **This testing effort could be designed to serve the entire town of Brookline**

Background: what test?

- Reference test method: molecular testing (rRT-PCR) to detect SARS-CoV-2
  - Performed under FDA Emergency Use Authorization[1] (EUA)
  - Most testing in central laboratory setting (hospital or reference lab)
  - Testing capacity/supplies have been an issue throughout, but capacity has ramped up throughout state
  - Labs with unused capacity exist in Boston (TBD), and perhaps elsewhere in state
  - Point-of-care (POC) testing overall unavailable
    - POC molecular platforms exist but are $$ and supplies limited even for major hospitals
    - Low-cost field-ready POC tests with high sensitivity/specificity do not yet exist
- Test turn-around time (TAT)
  - **Must include time for sample collection, transport, testing, and results return**

https://www.fda.gov/medical-devices/emergency-situations-medical-devices/emergency-use-authorizations#covid19ivd

Background: what sample?

- Sample type: Nasopharyngeal (NP) flocked swab still preferred by FDA, but anterior nasal (AN) swab is accepted alternative (and CDC has no preference)[1,2]
  - **AN swab can be self-collected by adult/easily collected by clinician**; NP swab requires trained professional[1,2] and many sites are not comfortable testing children
  - NP swab is more specialized than AN swab
  - Both swab types have high sensitivity in newly symptomatic COVID (high viral load)
  - Variable yield in asymptomatic cases and late in illness
  - University serial testing programs planning to use AN swab

(1) https://www.fda.gov/medical-devices/emergency-situations-medical-devices/faqs-testing-sars-cov-2#whatif
(2) https://www.cdc.gov/coronavirus/2019-nCoV/lab/guidelines-clinical-specimens.html

Background: who should be tested?

- Patients with COVID have a wide range of possible presentations, ranging from asymptomatic to severely ill[1]
- Children have milder disease overall[1]
- Symptomatic adults and children have similar range of viral loads in the NP[2]
- Asymptomatic/pre-symptomatic adults have range of viral loads, including very high viral loads[3,4]
  - ??Range of viral loads in asymptomatic children—TBD
- Asymptomatic adults can transmit SARS-CoV-2[4]
- Kids (at least young kids) appear to have lower infection/transmission rates[4,5,6,7]

1. https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html
2. https://www.medrxiv.org/content/10.1101/2020.06.08.20125484v1
3. https://www.nejm.org/doi/10.1056/NEJMoa2008457
4. https://www.acpjournals.org/doi/10.7326/M20-3012
5. https://www.nature.com/articles/s41591-020-0962-9
6. Sommers et al, presentation to Brookline Expert Advisory Panel 7-2-20
https://www.brookline.k12.ma.us/cms/lib/MA01907509/Centricity/Domain/62/Panel%204%20Evidence%20-%20Reopening%20Schools%20COVID%207-2-20.pdf
7. https://wwwnc.cdc.gov/eid/article/26/10/20-1315_article

Background: insurance coverage and test access

- COVID testing ordered by a physician is covered by insurance without copay or prior authorization
  - Uninsured: MassHealth will cover, but enrollment within 90D would be needed
- Testing of asymptomatic people must conform to CDC guidelines to meet insurers' medical necessity criteria for reimbursement
  - Recent contact with someone known or suspected to have COVID-19
  - For purposes of early ID in "special settings"
  - By public health officials to track spread of virus
  - In practice, this means any testing ordered by a provider will likely qualify
- **Not all testing sites around the state will test children (BCH has created a list of sites that will)**
- **Each PCP office has set up their own plan for testing (reference lab vs hospital vs referral elsewhere)**
  - **Test access and TAT are highly variable for the kids, parents, and teachers in each school system—and for town employees**
  - **TAT can range from <24h to 7 days or more**

Guiding principles and testing scenarios

- **If a child/teacher develops new or worsening symptoms c/w COVID[1,2] (checklist to be provided to parents and school nurses), at a minimum, they should stay home from school. Ideally, TEST, to allow quarantine, contact tracing, and return to school.**
  - **TBD**: What about mild symptoms? (e.g. headache only, GI symptoms only)
  - **TBD**: How long should they stay home?[2,3]
    - **Test positive vs test negative vs no testing**
- **The same approach could apply to town employees/community members**
- **Three testing scenarios:**
  - **1. Leave testing up to each individual/family**
  - **2. Centralized program to rapidly test all with symptoms (and contacts)**
  - **3. Centralized program to test everyone (or only staff) serially (includes asymptomatic people)**

1. https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html
2. DESE guidelines, 7-17-20
3. e.g. https://www.coronavirus.in.gov/files/20_Student%20Guidance%20for%20Return%20to%20School.pdf?fbclid=IwAR0PnmOjz2MYkBBAKXW5IMhQTkdwQTumiFKTrw3J0YOK8oXYLf0giTviko0

Testing scenario 1: each individual gets tested in system of choice (= status quo)

e.g. School child or staff in Brookline with symptoms consistent with COVID-19:

→calls PCP or local testing site

→scheduled for testing (0-1D)

→sample obtained

→testing results return to MA DPH/*Local HD (MAVEN) + ordering provider (**1-7D**)

→For Brookline residents with positive results, Brookline HD initiates contact tracing, including notification of school nurse and individual (0-1D)

→For non-Brookline residents, local HD manages positive result (??D)

→Provider returns results to individual (0-1D)→ individual can choose to notify HD/school (1-2D)

*Brookline HD only follows results for Brookline residents, and is focused on POSITIVE results

Testing scenario 1: each individual gets tested in system of choice (continued)

- The Brookline HD→school notification process already appears to be fast, BUT:
  - Other jurisdictions have their own processes
  - Not all teachers/families in MA have PCPs
  - Could provide list of walk-in testing centers, but similar time constraints apply
  - Positive results for teachers and students who live outside of their school district will go to their hometown DH (and PCP)
  - Negative results (for return to school) will have to be reported to school nurse by individuals
- Time from symptoms to actionable positive result available to school could be **2-11D**→delays in notification and quarantine→**increased risk of spread within school community**.
- **Same issues apply to town employees**
- **Need improvements to process to reduce delays**

Testing scenario 2: centralized program for all **symptomatic** individuals (students, staff, and ideally town employees) with **RAPID TAT**

- **Goals:**
  - **Identify cases quickly, allowing rapid quarantine and contact tracing**
  - **Exclude COVID-19 quickly, allowing faster return to school/work**
- **To make program more useful than scenario #1:**
  - TAT of **actionable results** needs to be as fast as possible, and ideally ≤24h
  - Need designated testing site(s) providing same-day appointments
  - **Results need to rapidly reach staff member/family, AND those responsible for making quarantine decisions for their school** (HD, school nurses) **or workplace**
  - 7D/week

Centralized town-wide testing program--concept

- Student/staff (or town employee) with new/worsening Sx c/w COVID (per provided list): call **Centralized Testing Site** (CTS) for appt
- CTS accessible to entire school district/town
- All school staff/students (or town employees) could come to CTS even if they live elsewhere (just like healthcare workers)
- Would not do any sample collection at individual schools; anyone who gets sick at school should leave the school as quickly as possible. Teachers/students could go to the CTS before heading home
- **Results returned rapidly both to patient AND to Brookline DH**
  - **→school nurse, to allow quarantine plan implementation/decision about return to school**
  - **→employee supervisor, to allow similar decisions**
- CTS ideally would bill insurance; need consistent ordering provider
- Would need to route non-resident teacher/student/employee results to Brookline DH, to expedite
- Families/staff could have option to do testing elsewhere (testing scenario #1)

How could we do centralized testing in Brookline?

- CTS located centrally within Brookline (e.g. tent/garage site)
- AN swabs, to be collected at CTS
  - AN swabs/tubes available in CTS (in future, possibly pre-positioned at home/school)
  - Samples would not be collected at school (or at work)
- Workflow:
  - Samples collected at CTS
  - Patient information collected/order placed at CTS
  - **Samples go by courier (e.g 2x/day) from CTS to specific contracted laboratory (TBD); results returned in ≤24h to CTS**
  - **Results returned rapidly both to patient AND Brookline HD**
    - **→school nurse**
    - **→employee supervisor**
- CTS ideally would be able to bill insurance
  - If patient did not have insurance, Town would need to cover cost/assist

A centralized testing strategy needs a lab partner

- E.g. Broad Institute's Clinical Sequencing Research Platform (CRSP)
  - High-throughput CLIA-certified genomics lab in Cambridge, converted for COVID testing
  - Current capacity 35,000/day, goal 100,000/day or more
  - Cost per test currently $50 if samples delivered to Broad, but hoping to reduce to $25-35 by fall
  - Using AN swabs; good performance vs NP in internal studies
  - 7D/week testing
  - Developing a relationship with a partner that can help communities set up a CTS
    - Cambridge Innovation Center
  - **Goal TAT <u><</u>24h**
    - TAT= <u>time from sample arrival in lab to result report</u>

Public Q+A, 6/4/20, and informal followup 7/8/20-7/20/20; <u>all would need to be confirmed if Brookline interested in partnering.</u>

Broad/CRSP logistics, continued

- Sample collection
  - CRSP can provide AN swabs and tubes with labels
  - Local CTS could manage sample collection and courier samples to CRSP
- Ordering, resulting, and billing
  - Every test needs an MD order
    - Could identify MD to order for school district
    - Potential for standing “blanket” order
  - Two choices for ordering and results return
    - Set up a full website user interface (with CRSP assistance)
    - Upload of a manifest file and push results to a bucket/spreadsheet
  - CRSP will return results to ordering provider and MAVEN
  - ****CRSP does not manage insurance billing.**

Public Q+A, 6/4/20, and informal followup 7/8/20-7/20/20; all would need to be confirmed if Brookline interested in partnering.

Testing scenario 3: centralized program to test individuals **serially**

- **Goal: capture asymptomatic cases**
- E.g. all students and staff; testing regardless of Sx
- Alternative: staff only
- Testing **weekly** (testing less frequently could miss new infections and interim spread)
- N = LARGE (e.g. PSB: ~1800 staff, ~7500 students)
- *Insurance may not cover asymptomatic screening testing
- Pooling not yet available, but likely coming soon

Testing all students/staff serially will be expensive.

Testing staff (only) serially could be considered, especially to reduce anxiety

Would be important to avoid false sense of security; would still need to maintain infection control (masks, distancing, etc.)

Funds spent on this level of testing could be spent on infection control measures (note that healthcare workers are not currently being serially tested in this way, but some university students/staff and employees are.)

Additional considerations

- In addition to Broad CRSP, other high-throughput COVID-19 testing labs are coming on line in the near future
  - BU
  - Harvard
- Other towns/cities are implementing city-wide testing strategies, e.g.
  - Somerville
  - Cambridge
- This is an opportunity for Brookline to lead.

Summary

- Coordinated school-specific testing and contact tracing will allow us to monitor our community and react to prevent outbreak scenarios, maintaining the effective COVID-19 response to date in Brookline/MA
- Ideally, the same approach would be applied town-wide
- The key to real-time reaction is same-day testing access with rapid ($\leq$24 hours) TAT that will allow quarantine and contact tracing to happen before newly infected people spread the virus
- Unused testing capacity currently exists in MA.
- The town is well-situated to coordinate operations and information sharing in order to successfully provide access to testing for the community, maintaining low positivity rates and safe school/work environments
- **Without an effective plan for expeditious detection of COVID-19 in schools, teachers may be unwilling to return to the classroom**

Recommendations

- **The town should implement, fund, and monitor a comprehensive and coordinated infrastructure for testing school children and staff**
  - **Optimally, this infrastructure would serve the entire town**
- Plan should meet the following 3 requirements:
  - Same day testing access for symptomatic individuals
  - Clear process for ordering tests that does not require new patient registration or insurance authorization
  - Results turnaround time of $\leq$24 hours, with positive results reaching the relevant school (or workplace) efficiently regardless of the patient's home jurisdiction
- The goal should be to bill testing to insurance payers, greatly limiting cost to the town

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