COVID-19 Conversations

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COVID19Conversations.org
#COVID19Conversations
COVID-19

SHIELD

Target TEST Tell

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Target

Modeling to guide test frequency and scheduling

TEST

Direct saliva → PCR test for SARS-CoV-2 that is fast and scalable

Tell

Digital exposure notifications + manual contact-tracing
Modeling for SHIELD at UIUC with 2x/week testing, masks, classes >50 online, & manual contact tracing

If we do nothing...
30,000 infections

If we do SHIELD
- 700 total infections
- Manageable by public health
- Initial “bump” when students arrive is crushed by SHIELD mitigations
- Outcome: safer environment
- Students educated in person, local economy stays open

Detailed modeling of 45,000 students working and socializing, transmitting SARS-CoV-2 via proximity and aerosol

Ahmed Elbanna, Nigel Goldenfeld, Sergei Maslov, Alexei Tkachenko, Zach J. Weiner, Tong Wang, George N. Wong, Hantao Zhang
SHIELD works by multi-layer approach

Estimate for how many students will be infected over the whole semester (including 200 initial imports)
Test – why saliva?

**Logistical considerations:**
- Avoids swab and VTM (supply chain limiting)
- Easy and rapid self collection
- No/less need for health-care workers
- Much easier on patient
- Compatible with frequent repeat testing

**Scientific/medical considerations:**
- Saliva likely provides a more relevant indication of infectiousness
- Early report of excellent sensitivity in saliva

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**Graphical Data:**

- Bar chart showing infectiousness removed over time with different collection methods.
- Scatter plot comparing nasopharyngeal swab and saliva for SARS-CoV-2 detection limits.

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medRxiv 2020.06.22.20136309
medRxiv 2020.04.16.20067835
Cost, Time, and/or Supply chain bottlenecks

Test – addressing bottlenecks

**Standard method:**

- NP swab
- Viral Transport Medium
- RNA purification kit
- RT-qPCR

**Saliva (FDA EUA approval April 2020):**

- Saliva collection
- RNA purification kit
- RT-qPCR

**UIUC testing vision (Paul Hergenrother):**

- Saliva collection
- RT-qPCR
1. Heat at 95°C for 30 min

2. Add TBE/Tween buffer

Results in 3-6 h

Saliva-Based Molecular Testing for SARS-CoV-2 that Bypasses RNA Extraction

Diana Ranoa, Robin Holland, Fadi G Alnaji, Kelsie Green, Leyi Wang, Christopher Brooke, Martin Burke, Tim Fan, Paul J Hergenrother

doi: https://doi.org/10.1101/2020.06.18.159434

Bridged to FDA EUA 8-18-2020
https://www.biorxiv.org/content/10.1101/2020.06.18.159434v1

Complementary method from team at Yale (FDA EUA approved 8-15-2020)
https://www.medrxiv.org/content/10.1101/2020.08.03.20167791v1
TEST: Transformation of VetMed Diagnostics Lab into human COVID-19 testing facility

Tim Fan
and
Paul Hergenrother

Seven more big cats test positive for coronavirus at Bronx Zoo

A Malayan tiger at the Bronx Zoo, photographed in 2017. Five of the zoo’s tigers and three of its lions have tested positive for the virus that causes COVID-19.
Logistics of testing 20,000 students/faculty/staff a day

40 testing lines on campus (20+ locations)
Large tents, allowing for distancing
Easy scan-in system (scan I-card, label printed and affixed to tube)
Samples brought to the vet diagnostic facility every hour
Have run >300,000 tests on students/faculty/staff July-September with this process, typically results within hours not days
Safer in ILLINOIS

Join the fight against COVID-19
Track and manage your health to help keep our Illinois community safe

How it works
Testing and limiting exposure are key to slowing the spread of COVID-19.

You can use this app to:
- Provide any COVID-19 symptoms you experience
- Automatically receive or enter test results from your healthcare provider
- Allow your phone to send exposure notifications to you about the people you’ve come in contact with during the last 14 days
Tell

William C Sullivan
Faculty/Staff
Champaign, Illinois

Building Access
GRANTED

William C Sullivan
Faculty/Staff
Champaign, Illinois

Building Access
DENIED
Results

304,740

0.44%

Case positivity is unique new cases/total number of test results.

Unique New Cases

Unique New Cases are the first time an individual is detected COVID-19 positive by the SHIELD active test.

Total Number of Daily Tests
Results

304,740

0.44%

Unsafe undergraduate parties
Results

- Essential activities only for undergraduates, prioritized testing, and SHIELD Team 30

Total Test Results: 304,740

Past 7-Day Case Positivity Rate: 0.44%

Case positivity is the unique new case/total number of test results.
Key Takeaways

• Fast/frequent testing can help mitigate the spread of COVID-19 in a large university community

• Testing is not a silver bullet; it should be integrated into a holistic approach that includes epidemiological modeling, contact tracing, masks, social distancing, and community engagement.

• I-COVID direct saliva→PCR test enables fast/frequent testing on scale

• Prioritized testing can maximize impact

• Mechanisms to help people that test positive get safely isolated quickly, and to support/enforce isolation and quarantine are important