

COVID-19 Update Dr Mark Cunningham-Hill Medical Director NEBGH



Testing Questions

- Does the person have COVID-19?
- Are they infectious?
- Will they become infectious?
- Are they immune?





RT-PCR

These have been the 'Gold Standard' for testing

Sensitive and specific

- Up to 30% false negatives in first few days
- Potential false positives during recovery
- Technical and technique issues
- Problems with PCR testing in USA today:
 - Insufficient tests and test reagents and pipettes
 - Cost and lack of easy access discourages testing
 - Testing is unpleasant
 - Turn around is slow (1+ weeks)







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Scaling Up Testing

- High throughput next-generation screening:
 - Ginkgo Bioworks, Boston:
 - Process tens of thousands of individual saliva tests at once.
 - 50,000 tests per day September 2020 and 100,000 per day by end 2020
 - Helix OpCo, San Mateo, California
 - Standardized kits in bulk for the collection of nasal swabs to collect tens of thousands of samples – results 24-48 hour
 - 50,000 samples a day by end of Sep and 100,000 per day by end 2020
 - Fluidigm, South San Francisco, California
 - Capacity to process thousands of SARS-CoV-2 PCR tests per day with a primary focus on saliva samples.
 - With many existing Fluidigm instruments in clinical and research labs, scale up and deployment can provide tens to hundreds of thousands of new tests per day in fall 2020



Pooled Testing



Antigen Testing

- Point of care
- Need proprietary reader
- Quick results in 10-15 minutes
- Cheaper (around \$25)
- Accuracy
 - Positive Predictive Agreement (PPA) 96.7%
 - Negative Predictive Agreement (PPA) 100%
- Test systems:
 - BD Veritor
 - Quidel Sofia SARS Antigen test



Paper and CRISPR Tests

Paper Tests

- Cheap \$1-\$10 (TBD)
- Rapid results in 15 minutes
- Self use/self read
- Nasal or saliva
- Examples:
 - e25Bio lateral flow immunochromatographic

assay



CRISPR

- Cheap <\$15 (TBD)
- Rapid results in 15 minutes
- Self use/self read
- Nasal or saliva
- Examples:
 - <u>Sherlock INSPECTR™</u>
 - Sherlock SHERLOCK™





Potential Issues

Sensitivity and specificity much lower than RT-PCR tests

- Sensitivity 40-70% (probably >50%)
- Specificity 90%
- Will the FDA approve?
- While sensitivity may be low tests may pick up people who are highly contagious



Testing and Contagiousness





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Deployment

- India has deployed a \$1 paper test that is 50% sensitive¹
 - 25-35% of tests using these new tests
- High false negative rate is an issue when used as a single diagnostic test – potential strength if used on a regular basis e.g. 3x/week or daily. Example:









75% recycled but on average air replaced by fresh air every 3 minutes 20 seconds



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Filtration

Subway cars use filters that are rated MERV-7 and are replaced every 36 days



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Particle Spread



14.7 seconds





Questions

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