Privacy-Protecting COVID-19 Exposure Notification Via Cluster Events Without Proximity Detection

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Workshop on Challenges for Digital Proximity Detection in Pandemics
NIST (via Cyberspace)
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Some Problems Motivating This Design

- COVID Testing can be: Expensive And Slow
  - Many new infections before exposed knows to quarantine
Positive: Tested yesterday. Results not in.
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- Exposure Notification depends on participation in proximity detection (bluetooth)
  1. Any nonparticipant is never detected/notified/notify-others
  2. Any not-detected participant is never det/notif/notif-others
Proximity Detection Participant

Tested Positive
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- False reporting individual can create havoc
  - Johnny has a chem test tomorrow. Reporting a positive result (anonymously) he can close school.
Some Things Leveraged By This Design

- **Point-of-care tests dist. through HHS/DoD and WHO**
  - Cost about $5, Results in about 15 min
  - 99.7 Million tests allocated in U.S. as of a week ago
  - Sensitivity 97.1%, Specificity 98.5%

- **COVID-19 propagates in clusters**
  - Vast majority of infected never infect anyone else
  - Most distribution happens when multiple tested-positive individual are copresent with others
  - “In an overdispersed regime, identifying transmission events (someone infected someone else) is more important than identifying infected individuals.” -Tufekci
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6. System clusters pairs from all reporting phones into events with multiple tested-pos individuals are present
   - Indiv. false reports: must actually be at event and cross reporting threshold
   - Clustering may use ancillary info
Example: Reportable Cluster ancillary criteria

- Busy city street corner: 4
- Crowded poorly-ventilated barbershop: 2
- Unknown location: 3
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7. System pushes events to participant phones/publishes on webpage
8. Participants (and nonpart) locally compare pushed events to local individual history
Questions?

- Work is described in a paper under journal review
- Full disclosure: just a high-level design and discussion
  - No design detail
  - Not implemented
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