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Identifying the Presence and Spread of COVID-19: Screening, Testing, and Contact Tracing

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Objectives

- **Screening**

Identify symptoms used for screening patients prior to COVID-19 tests.

- **Testing**

Describe available testing options.

Discuss new testing strategies.

- **Contact Tracing**

Categorize benefits and concerns associated with contact tracing.

Screening

Screening Symptomatic Patients

- **Some testing facilities are only testing symptomatic patients**

May miss up to 40% of COVID-19+ patients

- **Patients with the following symptoms are recommended for testing:**

New loss of taste or smell

Cough

Repeated shaking with chills (rigors)

Nausea or vomiting

Diarrhea

Fever

Difficulty breathing

Muscle pain

New onset fatigue

Headache

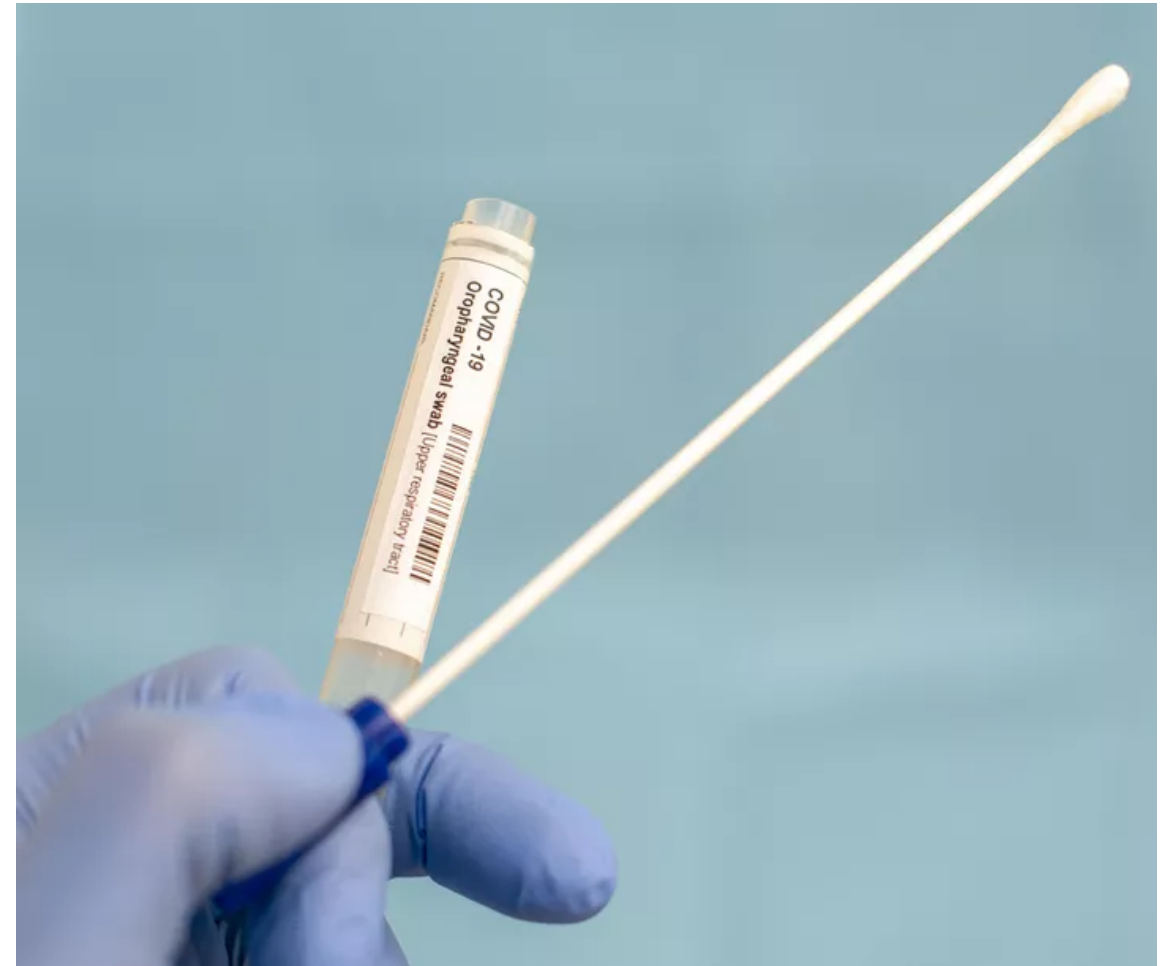
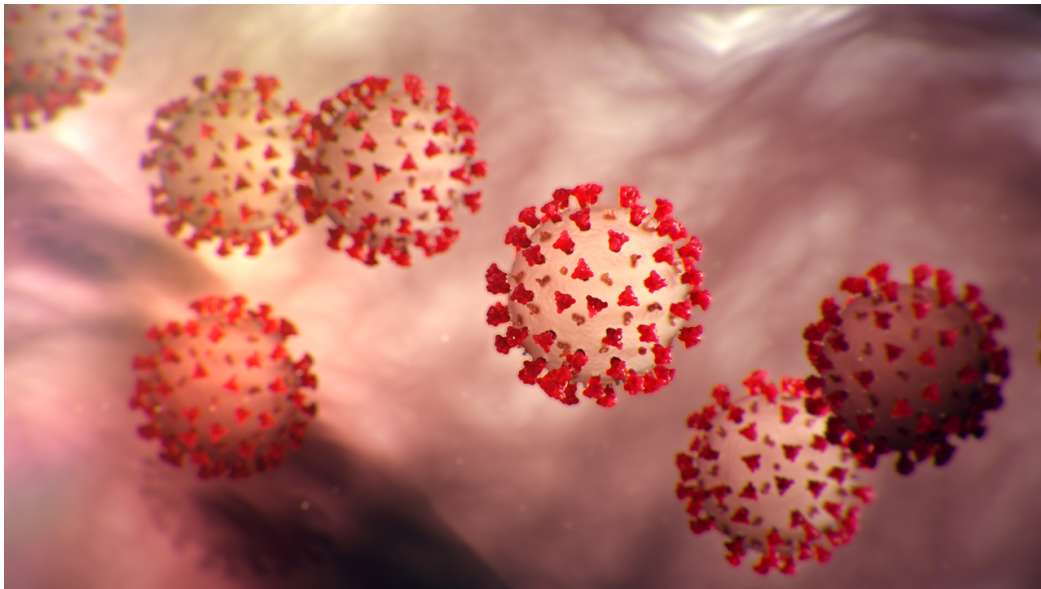
- **People who have had close contact with someone with confirmed COVID-19 should also be tested**

Within 6 feet for at least 15 minutes

Testing

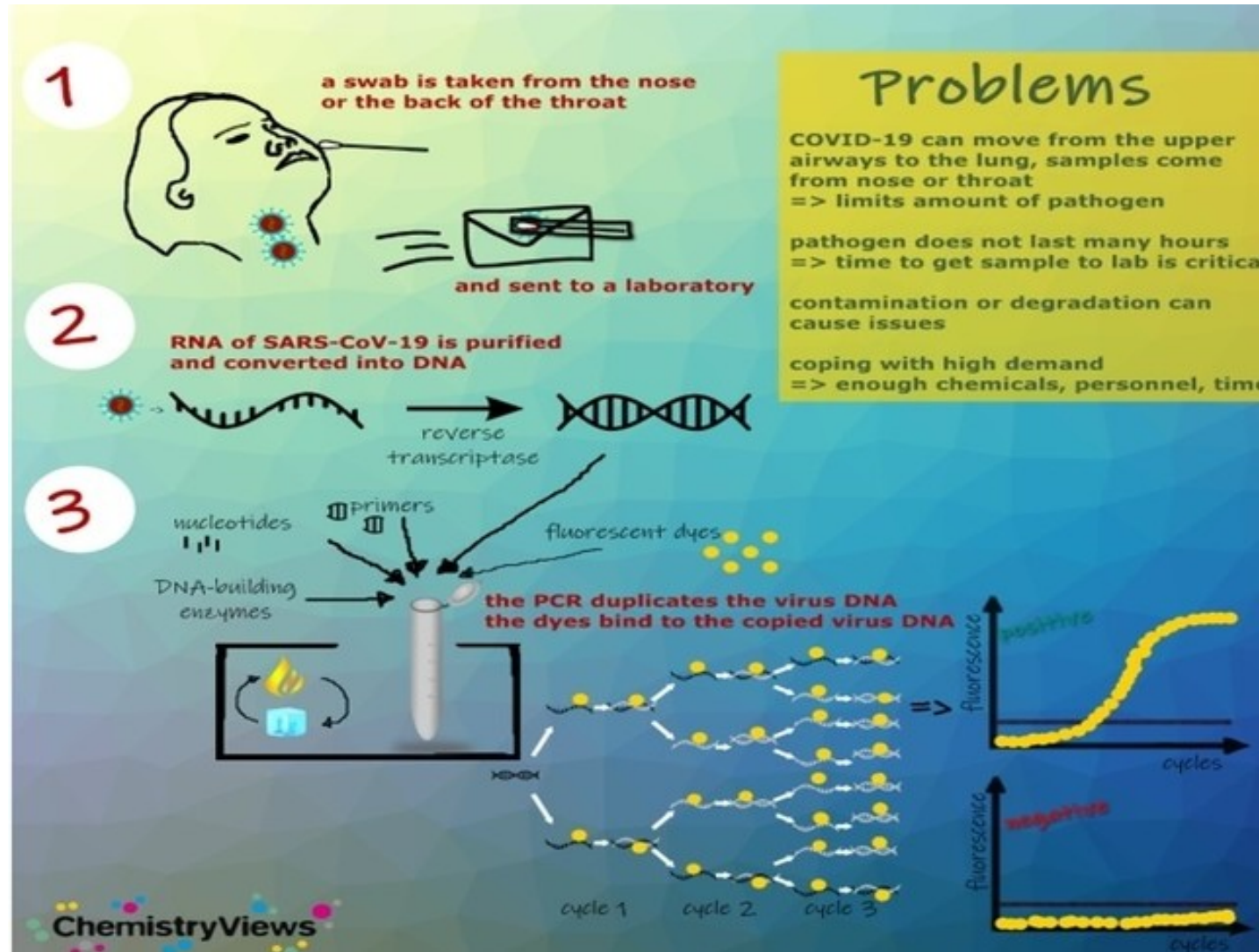
Available Testing Options-Diagnostic Tests

- **Two categories of COVID-19 tests**
 - Molecular tests
 - Antigen tests



Molecular Tests

- **Most accurate of two diagnostic test types**
- **Administered mostly through nasal/throat swabs**
 - Detects viral genetic material (RNA)
- **Highly manual process**
 - RT-PCR: involves hands-on time with each testing sample
 - Can take a while to get results
- **Over 100 companies have been authorized by the FDA for distribution**
 - Provider-administered swab tests
 - At home testing kit (fully autonomous kits are not yet authorized by the FDA)



Available Testing Options-Diagnostic Tests

- **Antigen Test**

Nasal/throat swab

Faster: Results in an hour or less

Cheaper: Much less labor intensive

Higher chance of false negative results



Date EUA Issued	Manufacturer	Diagnostic (Letter of Authorization)	Technology	Authorized Setting(s) ¹	Authorization Documents ²
08/26/2020	Abbott Diagnostics Scarborough, Inc.	BinaxNOW COVID-19 Ag Card	Antigen	H, M, W	HCP, Patients, IFU
08/18/2020	LumiraDx UK Ltd.	LumiraDx SARS-CoV-2 Ag Test	Antigen	H, M, W	HCP, Patients, IFU
07/02/2020	Becton, Dickinson and Company (BD)	BD Veritor System for Rapid Detection of SARS-CoV-2	Antigen	H, M, W	HCP, Patients, IFU
05/08/2020	Quidel Corporation	Sofia SARS Antigen FIA	Antigen	H, M, W	HCP, Patients, IFU

Antibody Tests

- **Finger stick or blood draw¹**
Detects antibodies specific for the virus¹

- **Results given same day or up to 3 days later¹**

- **Does NOT diagnose active infection¹**

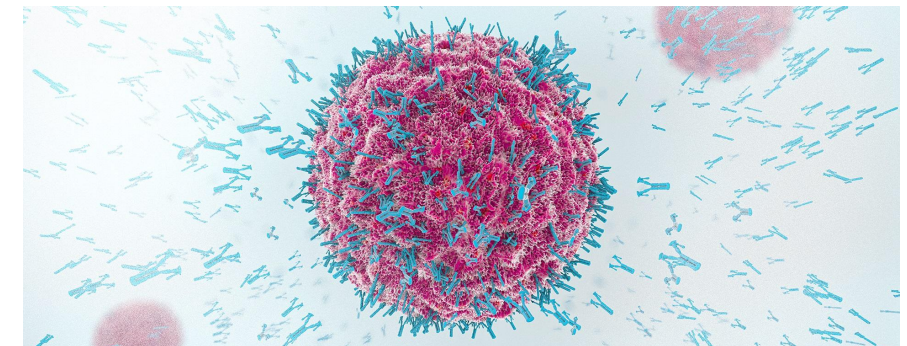
Test could also detect cross-reactive antibodies from other coronaviruses¹

- **A positive antibody test does not mean that a patient is immune from future infection**

Second infections (with a different strain) have been documented²

- **More informative for COVID-19 research¹**

Allows insight into the breadth of viral spread

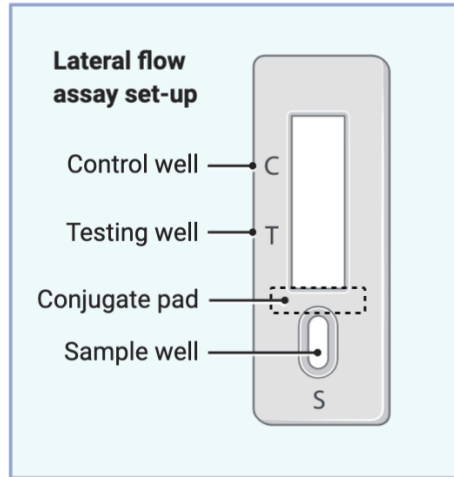


1. <https://time.com/5880255/covid-19-tests-types/>

2. <https://www.sciencemag.org/news/2020/08/some-people-can-get-pandemic-virus-twice-study-suggests-no-reason-panic>

Images: <https://www.drugtargetreview.com/news/61620/antibody-named-s309-from-sars-patient-shows-promise-against-covid-19/>

<https://www.roche.com/strongertogether/covid-19-antibodies-immunity.htm>



1 Sample loading

Add drop of serum (shown above in yellow) or blood in sample well (S).

2 Buffer loading

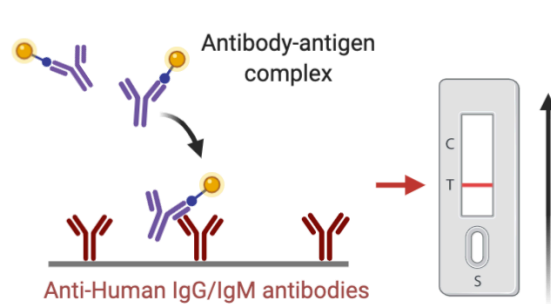
Add dilution phosphate saline buffer to sample well.

3 Sample incubation

Capillary action moves sample across lateral flow test.

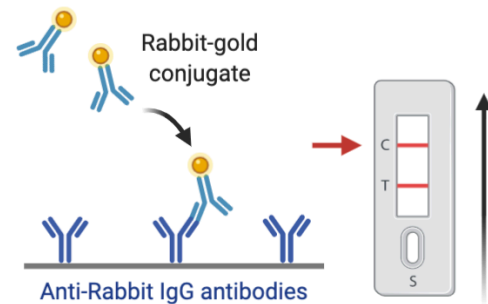
4 Antibody-antigen recognition

Antibodies with specificity for COVID-19 bind to gold COVID-19-antigen conjugates in conjugate pad.



5 COVID-19 antibody detection

Sample enters testing well (T) and COVID-19 antibody-antigen complex binds to immobilized anti-human IgG/IgM antibodies.



6 Control antibody detection

Rabbit antibody-gold conjugate binds to immobilized anti-rabbit IgG antibodies.

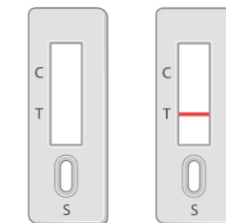
Positive



Negative



Invalid

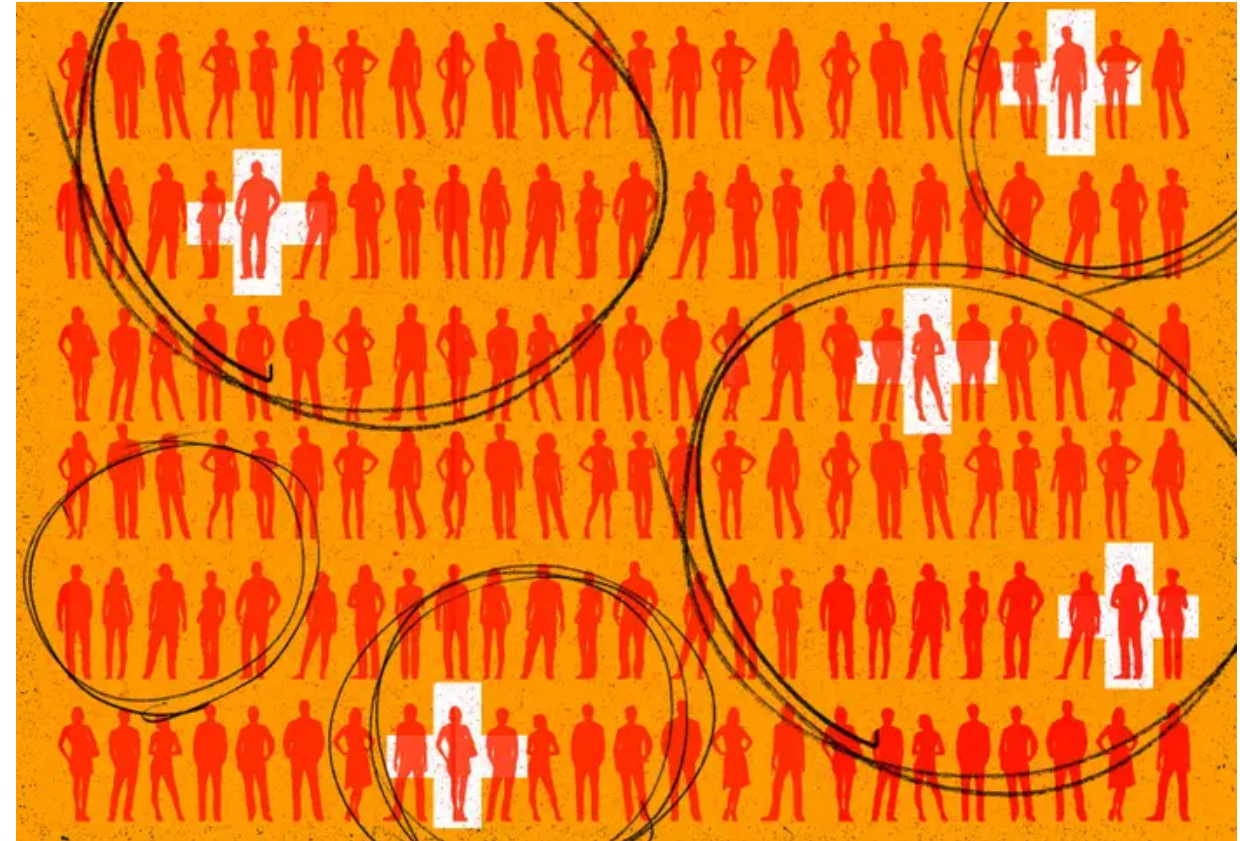


7 Interpreting results

Positive: one strip each in C well and T well
Negative: one strip in C well

New Testing Strategies-Pooled Testing

- **Combines samples during analysis**
Reduces reagent use and time until results
- **If a sample comes back negative:**
The entire pool is presumed negative
- **If a sample comes back positive:**
The pool of patients is retested individually to find the positive patient within the pool



New Testing Strategies-Saliva Tests

- **Sample collection is less invasive than the traditional nasal swab**

Patients can collect the sample at home.

- **Early research indicates that saliva tests are as accurate as the nasal swab tests**
- **Utilizes LAMP technology**

A PCR alternative where all reactions take place at 63C, which does not require as much specialized equipment.



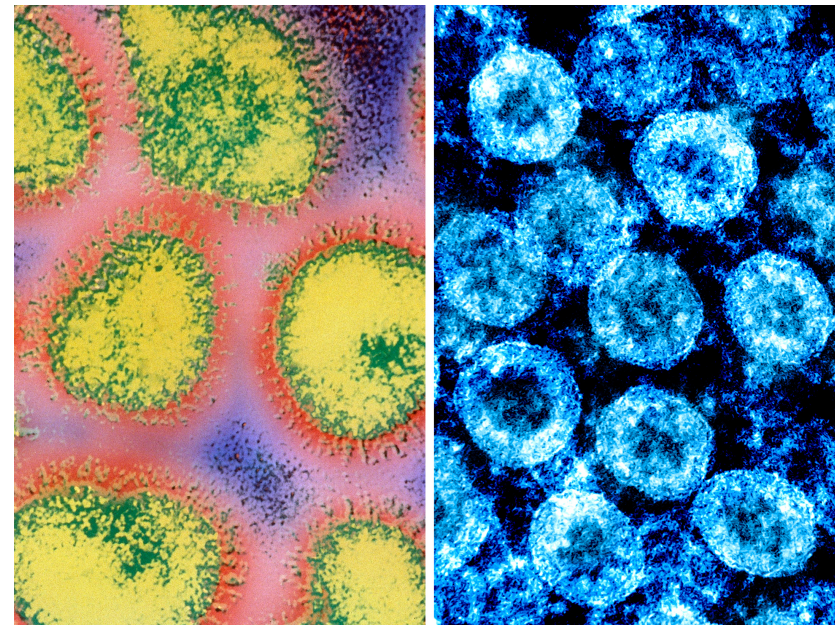
New Testing Strategies-Flu/COVID-19 test

- **Multiplex assay (Flu SC2) testing for SARS-CoV2, Influenza A, and Influenza B simultaneously**

Utilizes the same PCR technology as the traditional nasal swab tests.

- **FDA granted emergency use authorization on July 2, 2020**

- **Distribution of the tests began in August**



Contact Tracing

Main Benefit

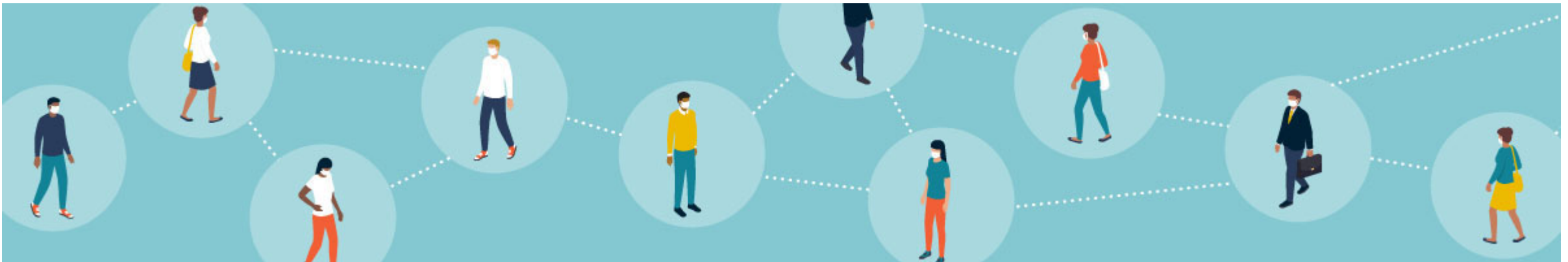
- **Identifies potential exposures**

Allows individuals to be better informed about potential exposure and seek testing

The health department will contact anyone who was in close contact (within 6 feet for more than 15 minutes) without sharing any names or identifying information

Individuals are contagious for at least 48 hours prior to symptom onset

- **Minimizes the spread of COVID-19**



Considerations

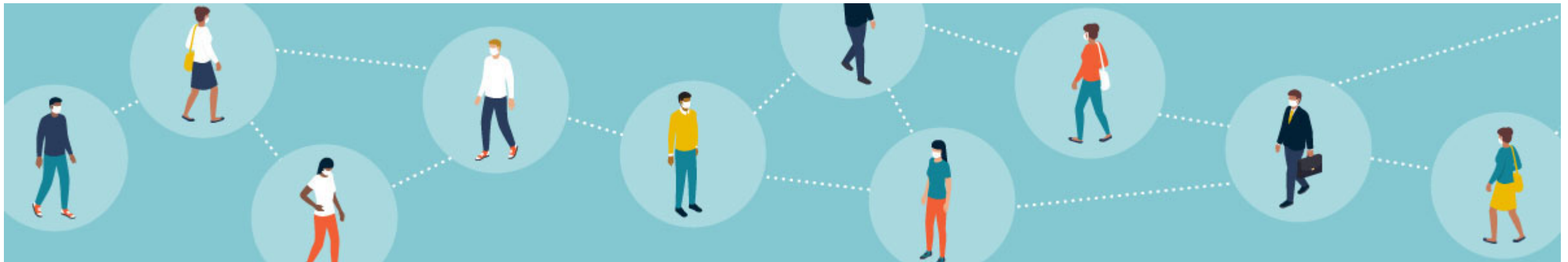
- **Personal health data potentially shared with employer, insurance, etc.**

All conversations with health departments are confidential

- **As more contact tracing moves to a digital format, there is heightened concern about information security.**

Digital tracking technology on smart phones (ie, tracking/monitoring apps), particularly Bluetooth-enabled devices, could be vulnerable to hacking

Contact tracers will never ask for information related to money, banking, or credit cards.



Questions?

