COVID-19:
Basics of Contact Tracing

**ROCKY MOUNTAIN TRIBAL LEADERS COUNCIL/
EPIDEMIOLOGY CENTER**

Lani Paulson, MSPR, MS Health Data Analyst
Christopher Piccione, MPH, Lead Epidemiologist
Dyani Bingham, TEC-PHI Project Manager

June 16, 2020

Learning Objectives

- Describe what contact tracing is and how it stops transmission of SARS-CoV-2
- Define a case of COVID-19 and a contact
- Explain the meaning and purpose of isolation and quarantine
- Calculate how long a case should isolate and how long a contact should quarantine
- Describe the connection between the infectious period and isolation and quarantine
- Identify high-risk settings for transmission that require extra action

Importance of Case Investigation and Contact Tracing

- **Case investigation** involves working with a patient that has been diagnosed or is suspected as probable
  - Index case
  - Person Under Investigation (PUI)
  - Confirmed case
  - Probable case
- **Contact tracing** involves identifying people who may have been infected by the patient
  - Contacts vs. the General Public
- These are core disease control measures that have been used in public health for decades
  - Prevents further transmission of a disease

Case investigation and contact tracing are fundamental activities that involve working with a patient (symptomatic and asymptomatic) who has been diagnosed with an infectious disease to identify and provide support to people (contacts) who may have been infected through exposure to the patient. This process prevents further transmission of disease by separating people who have (or may have) an infectious disease from people who do not. It is a core disease control measure that has been employed by public health agency personnel for decades. Case investigation and contact tracing are most effective when part of a multifaceted response to an outbreak.

COVID-19 Contact Definition

- **Contact:** A person who was within 6ft of a case for about 15 minutes during the *2 days before illness onset*, or anytime during the case's isolation period
  - Contacts that a case can name, not the general public (except for large gatherings such as a conference)
  - Need to identify all contacts

- Types of contact include:
  - Physical
  - Close contact
  - Proximate

We are looking for contacts that a case can name, not the public

o In order to stop transmission, we need to identify ALL of a case's contacts

Proximate contact: more than 6 feet but in the same room for an extended period

What if they can't remember where they had been or who they were in contact with?

Considerations for COVID-19

- Case investigation and contact tracing needs to happen quickly, and activities may need to be prioritized
  - Vulnerable populations/persons
  - Congregate settings/workplaces/confined spaces
  - Healthcare and long-term care facilities
- Protocols may need to be updated as we learn more about COVID-19
  - Window period
  - Case investigations of probable cases
- Remote communication should be prioritized
- Need for significant levels of social support

Key Considerations for COVID-19 • Since COVID-19 can be spread before symptoms occur or when no symptoms are present, case investigation and contact tracing activities must be swift and thorough. • The complete clinical picture of COVID-19 is not fully known. As scientists learn more, updates may be made to recommendations for testing priorities and the window period (when the patient was infectious and not under isolation) in which contacts should be elicited. • Remote communications for the purposes of case investigation and contact tracing should be prioritized; in-person communication may be considered only after remote options have been exhausted. • Given the potentially large number of cases and contacts, jurisdictions may need to prioritize case investigation and contact tracing activities. Prioritization should be based on vulnerability, congregate settings/workplaces and healthcare facilities, including long-term care facilities and confined spaces (prisons).

• Significant social support may be necessary to allow clients with probable and confirmed COVID-19 diagnoses to safely self-isolate and close contacts to safely self-quarantine.

Goals of Contact Notification

- Inform the contact they have been exposed to COVID-19
- Assess the contact's medical condition and other risk factors
- Gather information for continued monitoring and support
- Develop trust and a professional, but warm/empathic rapport

A successful notification of exposure allows for an exchange of information with the person (contact) exposed to COVID-19 and offers an opportunity to answer questions and provide referrals for testing, medical evaluation and other necessary support services. The goals of this interaction are to inform the person that they may have been exposed to COVID-19, assess their medical condition and other risk factors, and gather information for continued monitoring and support. Developing trust and a warm, empathetic rapport, while maintaining a professional relationship, is key to providing effective support and collecting accurate information to inform the next steps in the contact tracing investigation.

Steps of Contact Tracing

The success of contact tracing to interrupt disease transmission hinges on the timeliness of case identification.

If we can limit the contact between people who are infected and others, we can limit opportunities for the virus to spread.

Case Investigation → Contact Elicitation → Contact Notification → Contact Monitoring → End of Quarantine
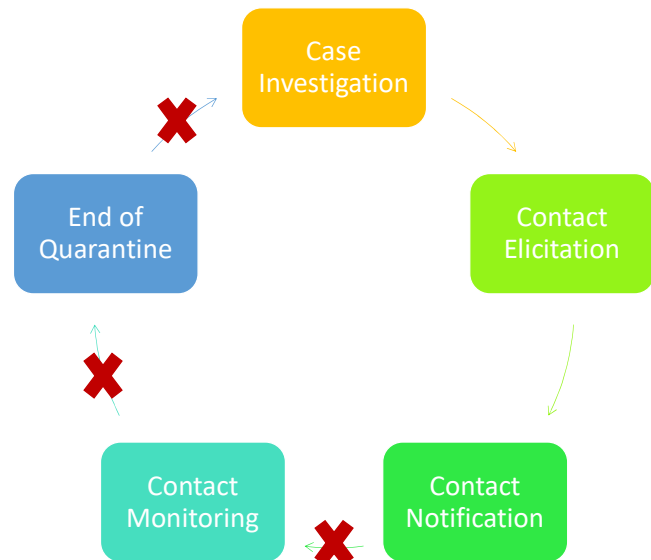
1. **Case Investigation**: Case Investigator* contacts the COVID-19 confirmed case-patient to document symptoms and underlying health conditions, confirm patient was notified of positive test result, and provide isolation guidance.
2. **Contact Elicitation**: Contacts are elicited from case-patients through interview. All close contacts are entered into a tracing tool by the Case Investigator and assigned to a Contact Tracer* for outreach.
3. **Contact Notification**: Contact Tracers perform initial outreach via phone, digital attempt (e.g., email, SMS) or in-person field visit to contacts who were in close contact with someone with COVID-19. Contact Tracer recommends testing and facilitates testing when needed and provides quarantine guidance.
4. **Contact Monitoring:** If needed, Contact Tracer facilitates provisioning of basic resources necessary for the contact to safely and successfully quarantine.
5. **End of Quarantine:** Contact submits final daily assessment and quarantine period ends. The contact receives general guidance on how to stay safe.

Timeline of Infection: Infectious Period

CALENDAR DAYS

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Person infected

Incubation period
(ranges from 2-14 days, but typically 5 days)

Signs and symptoms
(mild illness, about 10 days)   (severe illness, 2 or more weeks)

Infectious period

Starts 2 days **PRIOR** to symptoms

Most infectious at **day 1** of symptoms
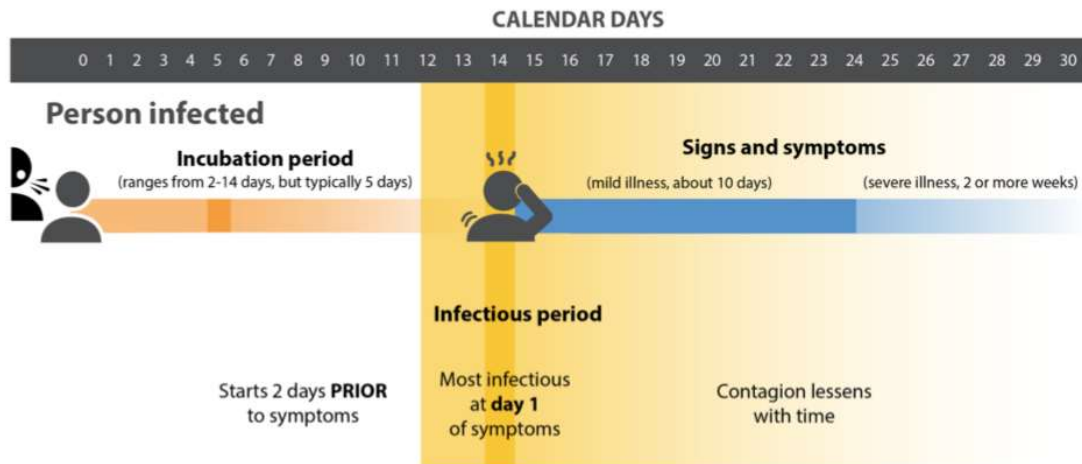
Contagion lessens with time

Image source: Center for Teaching and Learning, Johns Hopkins Bloomberg School of Public Health.

Timeline of Infection: Infected Contact

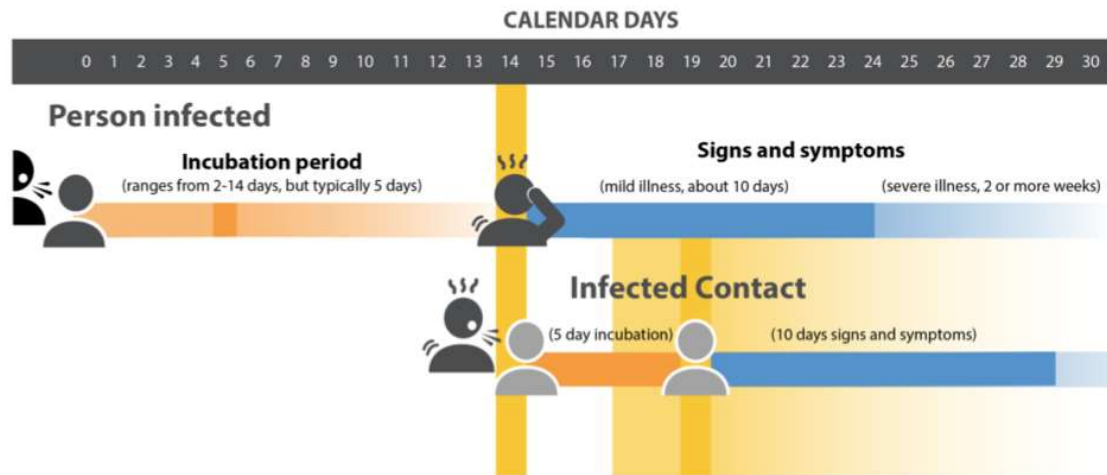
Image source: Center for Teaching and Learning, Johns Hopkins Bloomberg School of Public Health.

Timeline of Infection: Window of Opportunity

CALENDAR DAYS

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Person infected

Incubation period
(ranges from 2-14 days, but typically 5 days)

Signs and symptoms

(mild illness, about 10 days)   (severe illness, 2 or more weeks)

Infected Contact

(5 day incubation)   (10 days signs and symptoms)

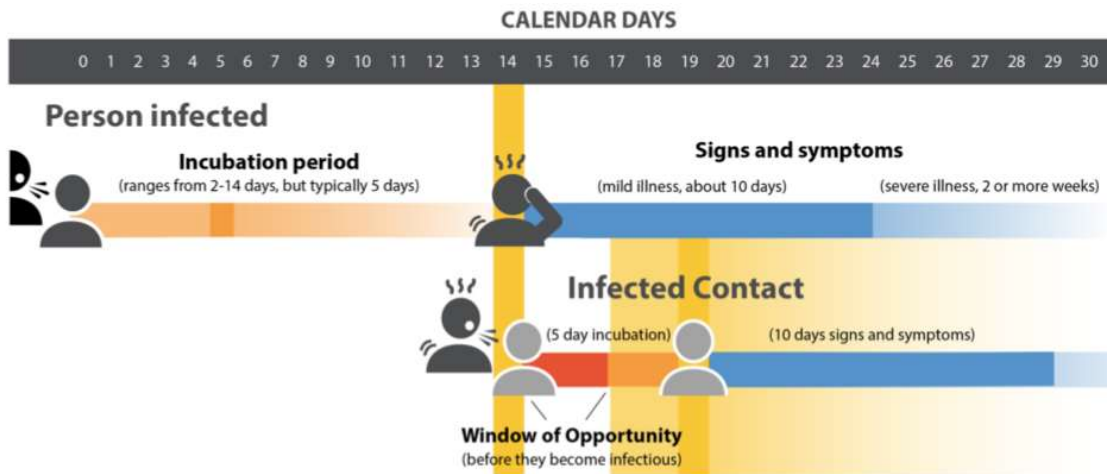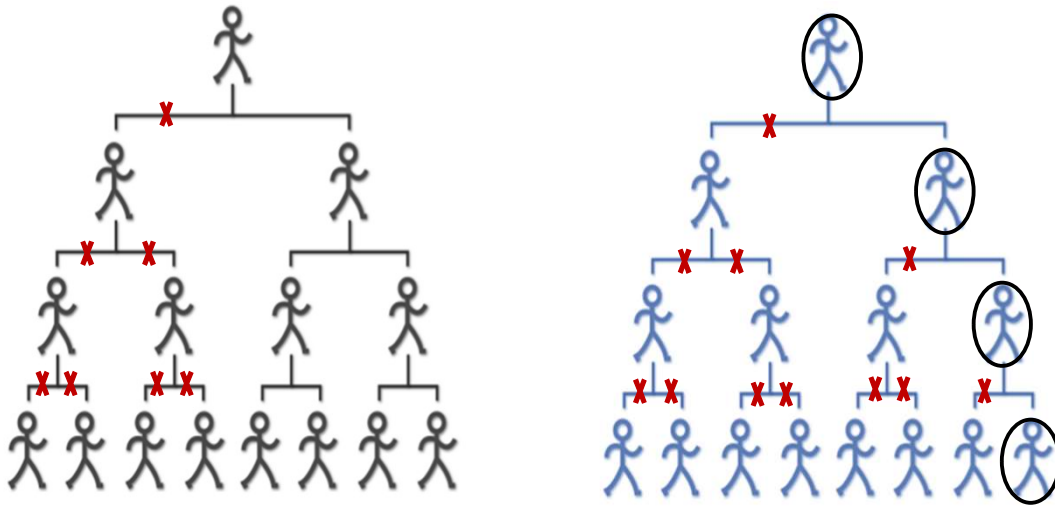**Window of Opportunity**
(before they become infectious)

Image source: Center for Teaching and Learning, Johns Hopkins Bloomberg School of Public Health.

Window Period/Window of Opportunity: period that someone was infectious and not under isolation. This timeframe is about 3 days.

In the image on the left, 7 out of 15 individuals do not become infected from the index case.

In the image on the right, only 4 out of the 15 individuals become infected.

Tips for Locating Cases and Contacts

- State DMV records
- Online people search engines
- Health department records
- Social media/mobile apps
- Following up with the index case
- Jail and other correctional facility records
- Property tax records

- Frequent shopper cards
- Online white pages
- Google maps
- Employment records

When the locating information provided for a patient or close contact is insufficient, case investigation and contact tracing may come to an abrupt halt. The following list includes additional resources that may be used to obtain missing locating information and keep the investigation moving forward.

State DMV records

Online people search engines (may incur additional costs)

Health department records

Social media/mobile apps

Following up with the index case to ask for additional locating information on a contact

Jail and other correctional facility records

Property tax records

Frequent shopper cards

Women Infants and Children Program, Food Stamps and other social services records

Online white pages

Google maps

Employment records

Services to Support Isolation and Quarantine

- Basic resources
  - Masks or face coverings, thermometers, hand sanitizer, gloves, etc.
- Ability to self-isolate or self-quarantine
  - Do they live alone, with others, or in a communal environment?
- Financial support
  - Compensate for lost wages
- Additional wraparound services
  - Food, laundry, pharmacy services, etc.
- Alternative caregiving services

Services to support people in isolation and quarantine. **Support for contacts in quarantine and cases in isolation can improve people's safety, comfort, and adherence to isolation and quarantine guidance. For many contacts, provision of basic resources, such as daily check-in phone calls, health education materials, masks or face coverings, thermometers, hand sanitizers and gloves, may be enough. For others, "wraparound services" (including food, laundry, pharmacy services, garbage removal services) may be necessary. Financial supports may be needed to help those in quarantine and isolation meet basic needs and to compensate for lost wages. When people who care for children, older adults or other dependents are put in isolation or quarantine, the people they care for could be left in untenable situations. Alternative caregiving services should be provided in these situations.**

Calculating Isolation and Quarantine Time Frames

How Long Should a **Case** Self-Isolate?

- ▶ Let's assume that you call the case on May 10
- ▶ They tell you that they became ill on May 9
- ▶ You know that they were infectious for about 2 days before they became ill, and will be for at least 10 days after their onset
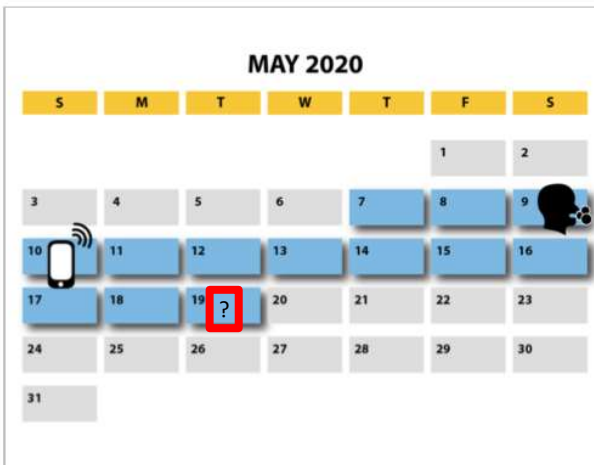
Image source: Center for Teaching and Learning, Johns Hopkins Bloomberg School of Public Health.

5

Short answer:
      Ideally, as long as they are infectious
Long answer: Until they fully recover
      By the time they are likely diagnosed, they will already be sick
      Must monitor their symptoms
      Are no longer infectious after they recover
      = At least 10 days and once all symptoms are resolved

      You know that they were infectious for about 2 days before they became ill, and will be for at least 10 days after their onset May 9 + 10 days = May 19

      The case will need ongoing follow-up to really know when they can stop isolating from others ▶ Need to know when symptoms resolve (without medication)

15

Identifying Contacts in a Case's Infectious Period

- ▶ Let's assume they do fully recover by May 19

- ▶ Now that you know their infectious period, you can help them identify their contacts

- ▶ You call them on May 10
  - ▶ You will ask about contacts they had from May 7 through May 10

MAY 2020

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Image source: Center for Teaching and Learning, Johns Hopkins Bloomberg School of Public Health.

8

A case doesn't need to be fully recovered if they have self-isolated to prevent the spread of COVID-19

How Long Should a Contact Stay in Quarantine?

- Short answer:
  - Ideally, as long as they could be infectious

- Longer answer:
  - 14 days following the last contact with someone who is infectious
  - The last contact may have been days ago – these days can be counted towards the 14
  - Contact may be ongoing

Almost everyone who is infected will develop illness within 14 days
**If they have developed symptoms, should be considered a case

How Long Should a **Contact** Stay in Quarantine?

► Let's assume you make a call to a contact on May 13

► Based on the call, you understand that their last contact with the case was on May 10

► So, they should receive instructions to quarantine for 14 days since that last exposure

MAY 2020

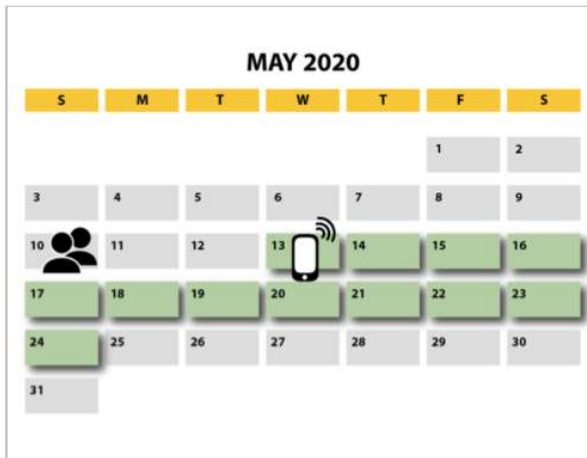| S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Image source: Center for Teaching and Learning, Johns Hopkins Bloomberg School of Public Health.

12

So, they should receive instructions to quarantine for 14 days since that last exposure
May 10 + 14 days = May 24

Cases that Live with Contacts

▶ The contact must quarantine themselves immediately, and for 14 days following the recovery of the case
   ▶ So, quarantine will be longer than 14 days for some contacts

▶ Let's assume we call the case on May 13, and the person they live with became ill on May 9

▶ Let's also assume that the case will be fully recovered by May 19 (10 days)

▶ Therefore, 14 days after their last infectious contact would be June 2

MAY 2020

Image source: Center for Teaching and Learning, Johns Hopkins Bloomberg School of Public Health.

17

Contacts Who Live With Cases May Need to Quarantine Longer: 14 Days After Their Last Infectious Contact

Factors that Increase Risk

Factors that Increase Risk for Infection and Severe Disease
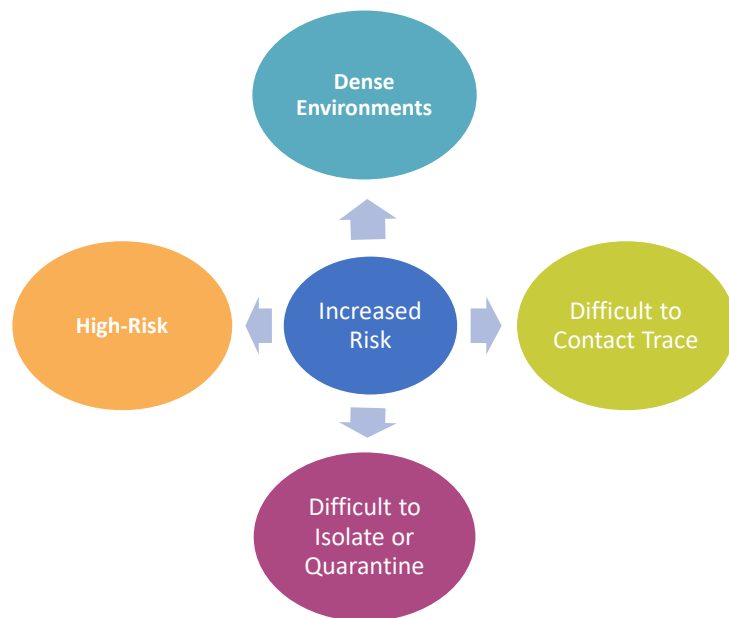
Populations at increased risk: ► Dense contact environment ► Difficult to contact trace and identify exposures ► Difficult to isolate or quarantine ► Higher risk of infection and severe disease or death

Dense Contact Environment: Examples

► Large crowds of people

► Close contact interaction
   ► Physical contact
   ► Within 6 feet for prolonged periods of time

► Can lead to a "super-spreading" event—an unusually high reproductive number

► **Examples**
   ► Conferences
   ► Mass transit
   ► Religious services
   ► Demonstrations
   ► Workplaces
   ► Bars
   ► Gyms
   ► Schools
   ► Sporting events
   ► Concerts

Difficult to Contact Trace: Example

- ► Close contacts may be unknown

- ► Recall of close contacts may not be reliable

- ► There may be too many contacts, and difficult to determine who is at highest risk for infection

- ► **Example: homeless shelter**
  - ► May not recall all contacts
  - ► Contacts may be spread out through multiple jurisdictions
  - ► Difficulty locating or testing exposed homeless contacts

Difficult to Isolate or Quarantine: Example

- ▶ Unable to distance from others
  - ▶ Design of house or facility
  - ▶ Developmental disabilities
  - ▶ Not enough resources
    - ● Masks, gloves, staff
  - ▶ Social pressures

- ▶ Unwilling to cooperate

- ▶ **Example: intermediate care facility**
  - ▶ A home with individuals with special needs
  - ▶ Residents may be unable to cooperate
    - ● May not understand the concepts of hygiene and social distancing
    - ● Difficult to remove those who need care from infected people
    - ● Harder to maintain resources (masks, gowns) for effective infection prevention

Higher Risk of Infection and Severe Disease or Death: Example

► May be more likely to get infected due to close contacts

► More likely to have underlying medical conditions (heart disease, respiratory conditions, poor immune system)

► May get exposed to the virus multiple times

► **Example: assisted living facility**
  ► Congregate living situation
  ► Most residents over 60 years of age
 ► Multiple levels of care, including skilled nursing facilities, which care for individuals with illness or injury

Contact Tracers need to be able to identify high-risk situations

► Collect the necessary information to assess risk accurately: ► Location and type of interactions ► Contact information for venue ► Names of close contacts ► Specifics on flight number, movie name, conference name, class name, facility name
► The identification might depend on noticing a pattern between multiple calls
► Notify case that there may be additional follow-up
► Immediately escalate to a supervisor

Contact Tracing Metrics

Possible Metrics

- Case Interviewing
  - Time to interview from symptom onset and diagnosis
  - Proportion of cases interviewed
  - Median number of contacts elicited
  - Proportion of cases with no contacts elicited

- Contact Notification
  - Proportion of contacts notified
  - Time from first potential exposure to notification
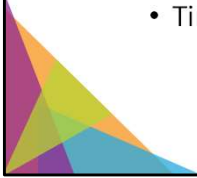
Possible Metrics, cont.

- Contact Follow-up
  - Daily proportion of contacts whose status is evaluated
  - Proportions of contacts with symptoms evaluated within 24 hours of onset of symptoms
  - Proportion of contacts who complete their full self-monitoring period

- Contact Tracing Efficacy
  - Percent of new COVID-19 cases arising among contacts during the self-monitoring period