JOHNS HOPKINS
BLOOMBERG SCHOOL
of PUBLIC HEALTH

Basics of Contact Tracing and Transmission Prevention for COVID-19

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Senior Housing Meeting

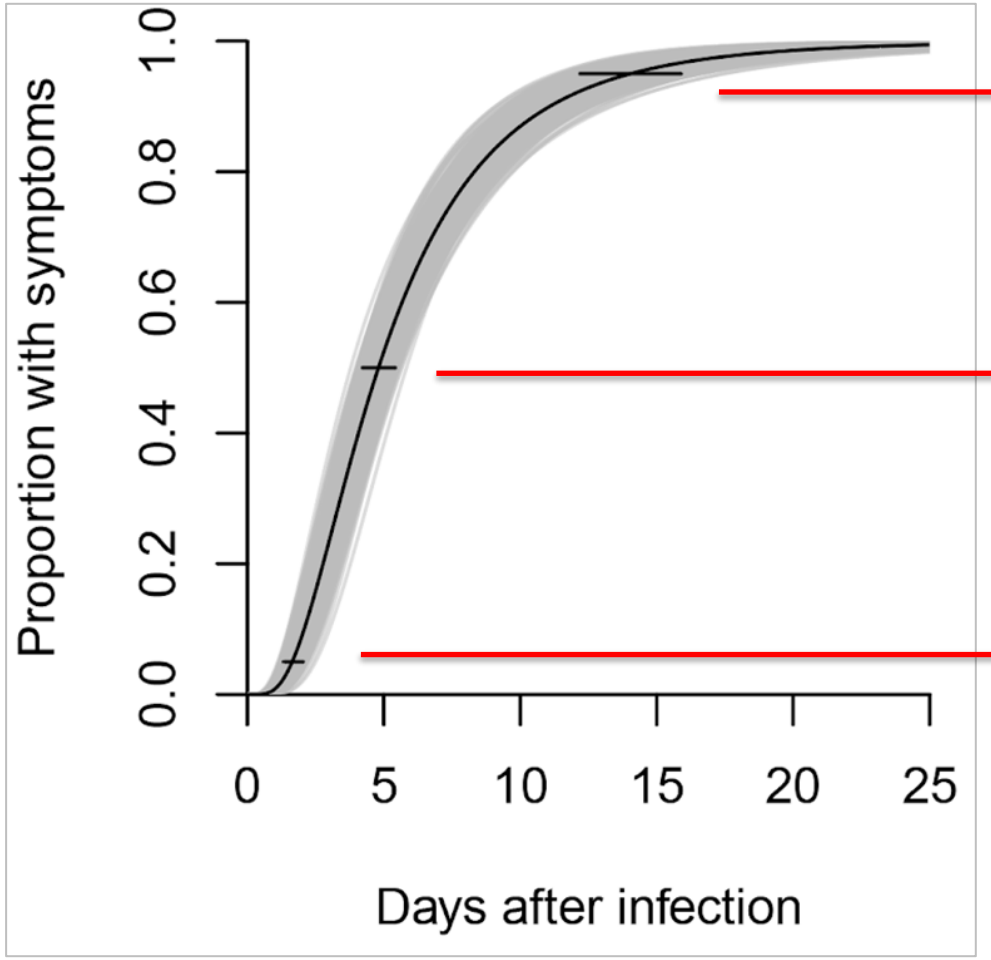
11 January 2021

Three objectives

- Timeline of SARS-CoV-2 infection and transmission
- Principles of risk reduction for transmission
- Contact tracing to reduce risk

SARS-CoV-2 incubation period

- Time from when someone is ***infected*** until the symptoms ***develop***
- SARS-CoV-2 incubation period ranges from 2 – 14 days
- 50% of people will become ill 5 days after they are infected



Bi et al, Epidemiology and Transmission of COVID-19 in Shenzhen China: Analysis of 391 cases and 1,286 of their close contacts. MedRxiv, 2020

Infectious Period

- The **infectious period** is the time at which someone infected with SARS-CoV-2 can transmit the virus to other people.

- For people will COVID-19 disease
  - 2 days before the start of signs and symptoms of disease
  - End of infectious period defined as:
    - At least 10 days after onset of illness, symptoms must be improving **and** no fever within the past 3 days

- Persons who are **asymptomatic can also be infectious**
  - Infectious period more difficult to define

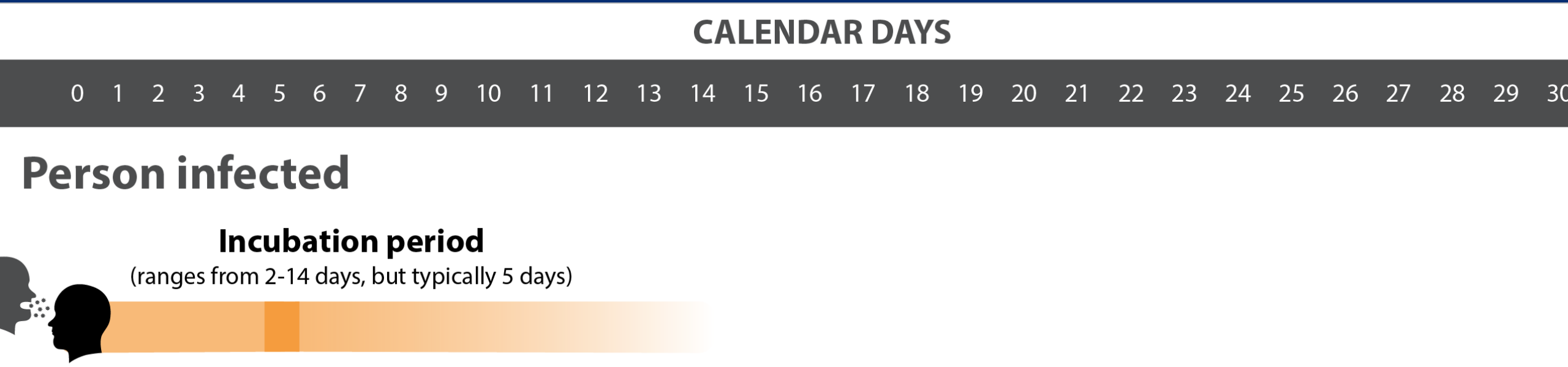
Which types of contact can lead to infection?

- Definition of potentially infectious contact:
  - *Physical*
  - *Close* (within 6 feet for at least 15 minutes)
  - *Proximate* (at more than 6 feet but in an enclosed area for at least 1 hour)
- Risk of transmission is determined by:
  - *Amount of infectious virus* (dose)
  - *Opportunities to transmit* (how many susceptible contacts do they have?)
  - *Intensity of contact* (proximity, duration)

- Closest contacts are at highest risk for infection
  - Household members
  - People who spend significant time together (meals, travel, workspaces)
- ***Not all contacts are at equal risk for infection***

CDC = US Centers for Disease Control and Prevention.

Timeline of infection – symptoms and infectiousness



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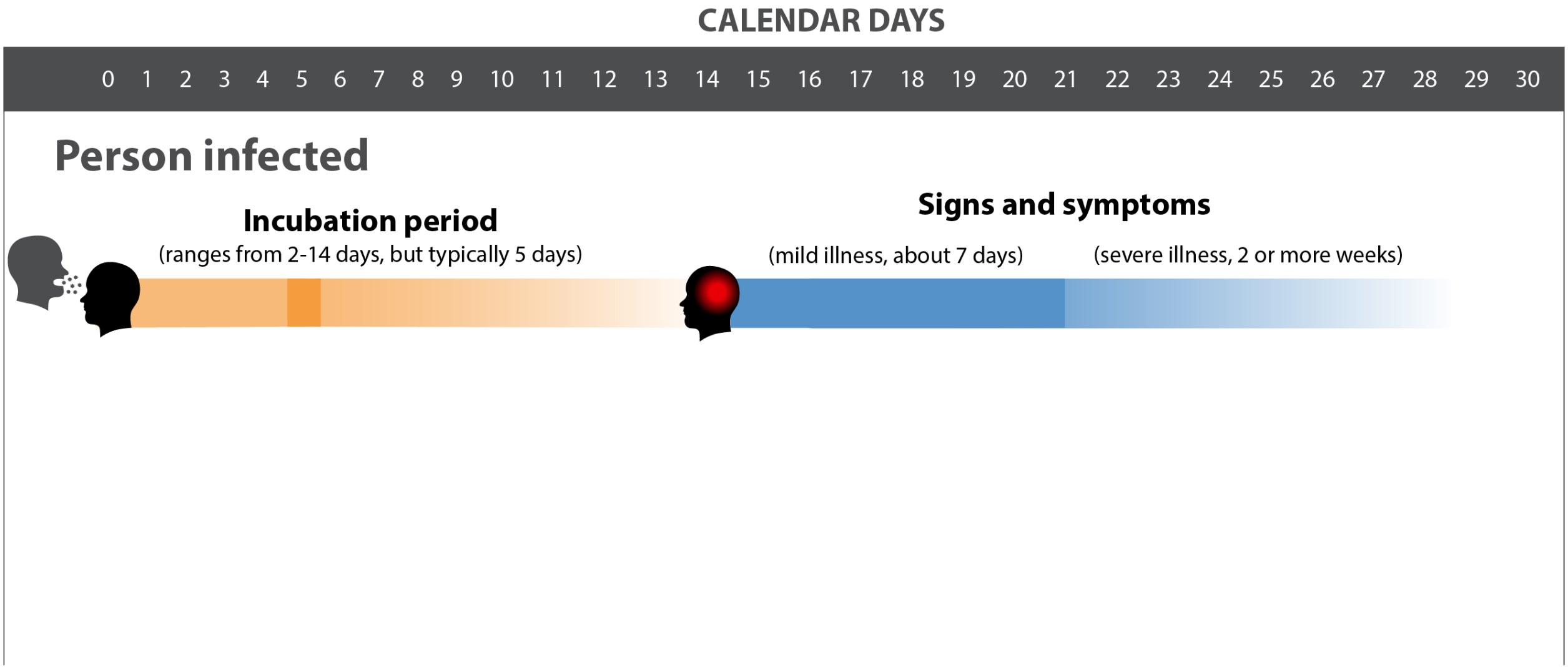

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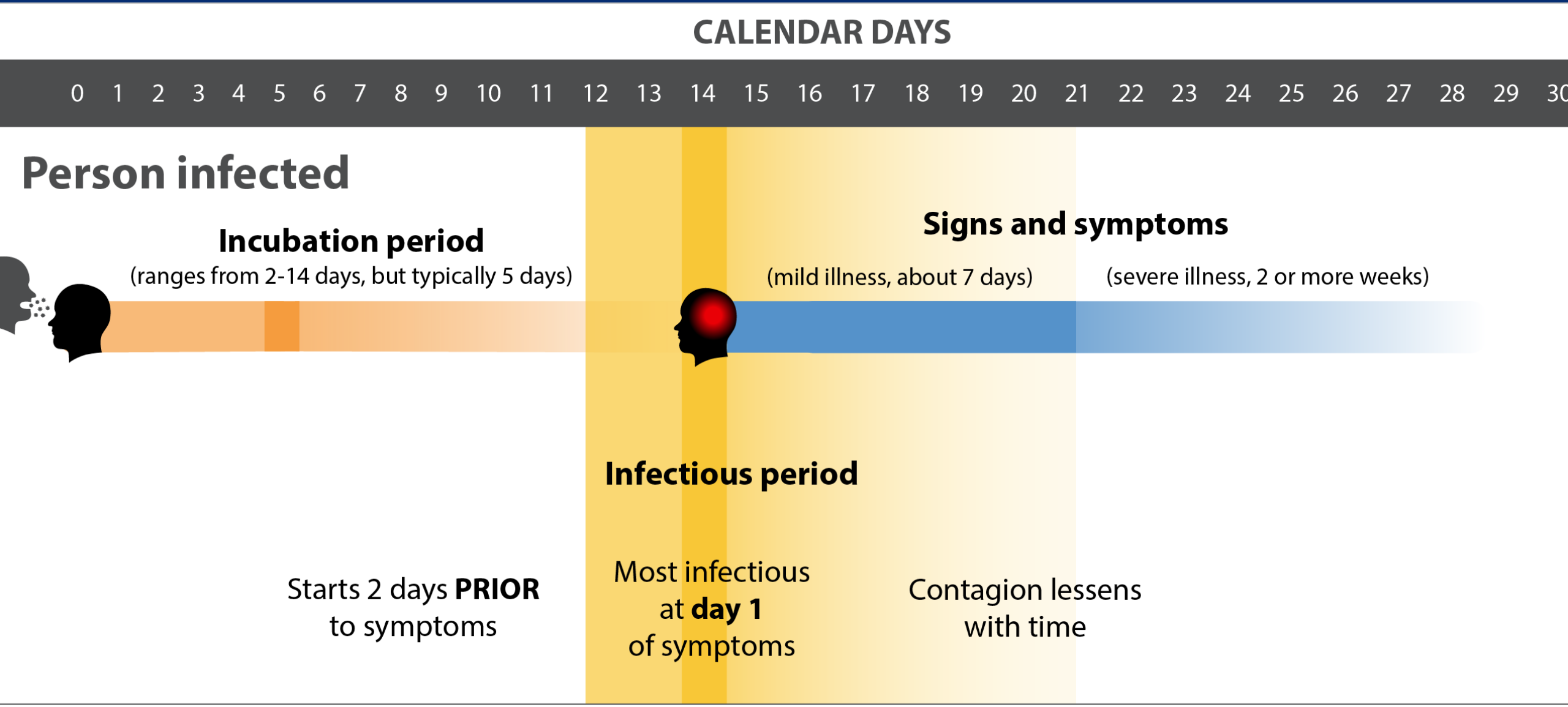

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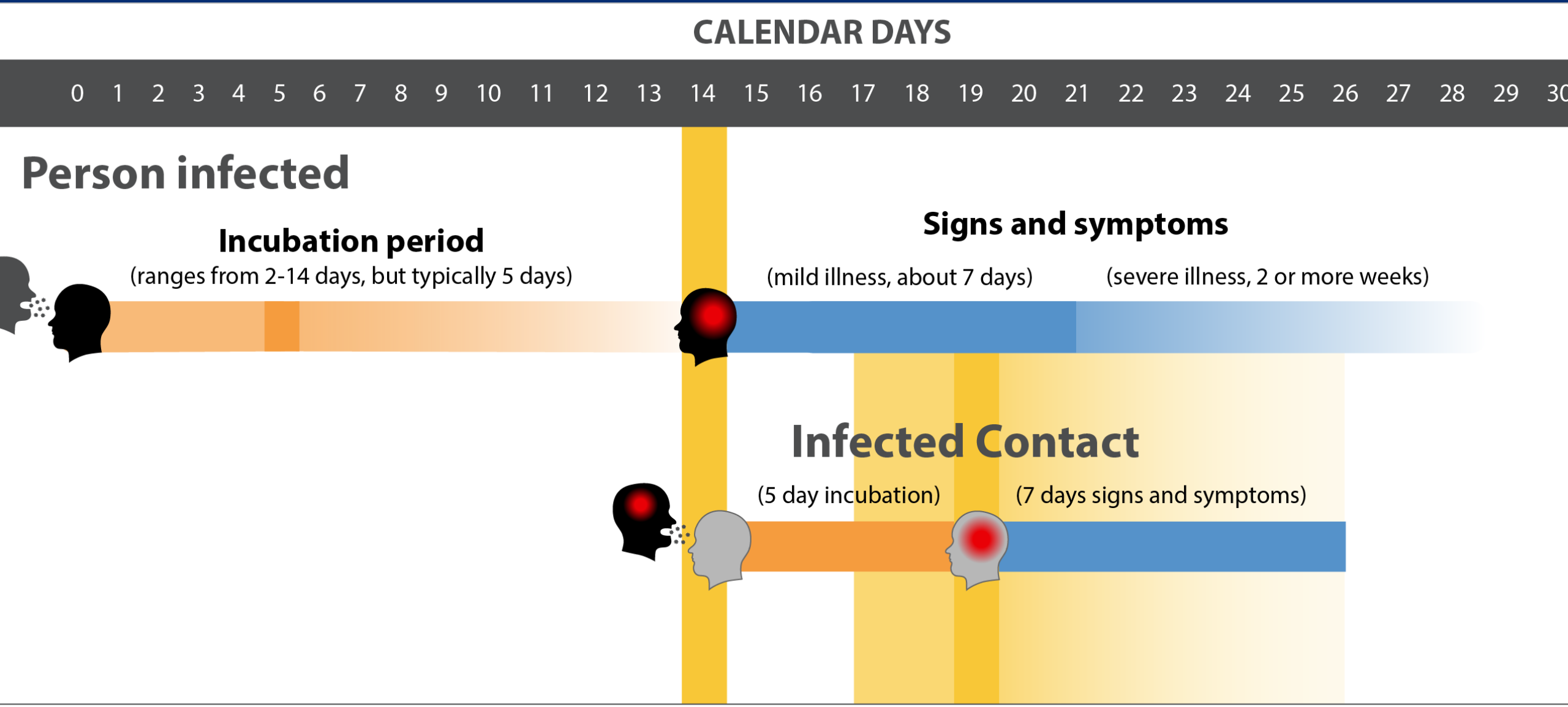

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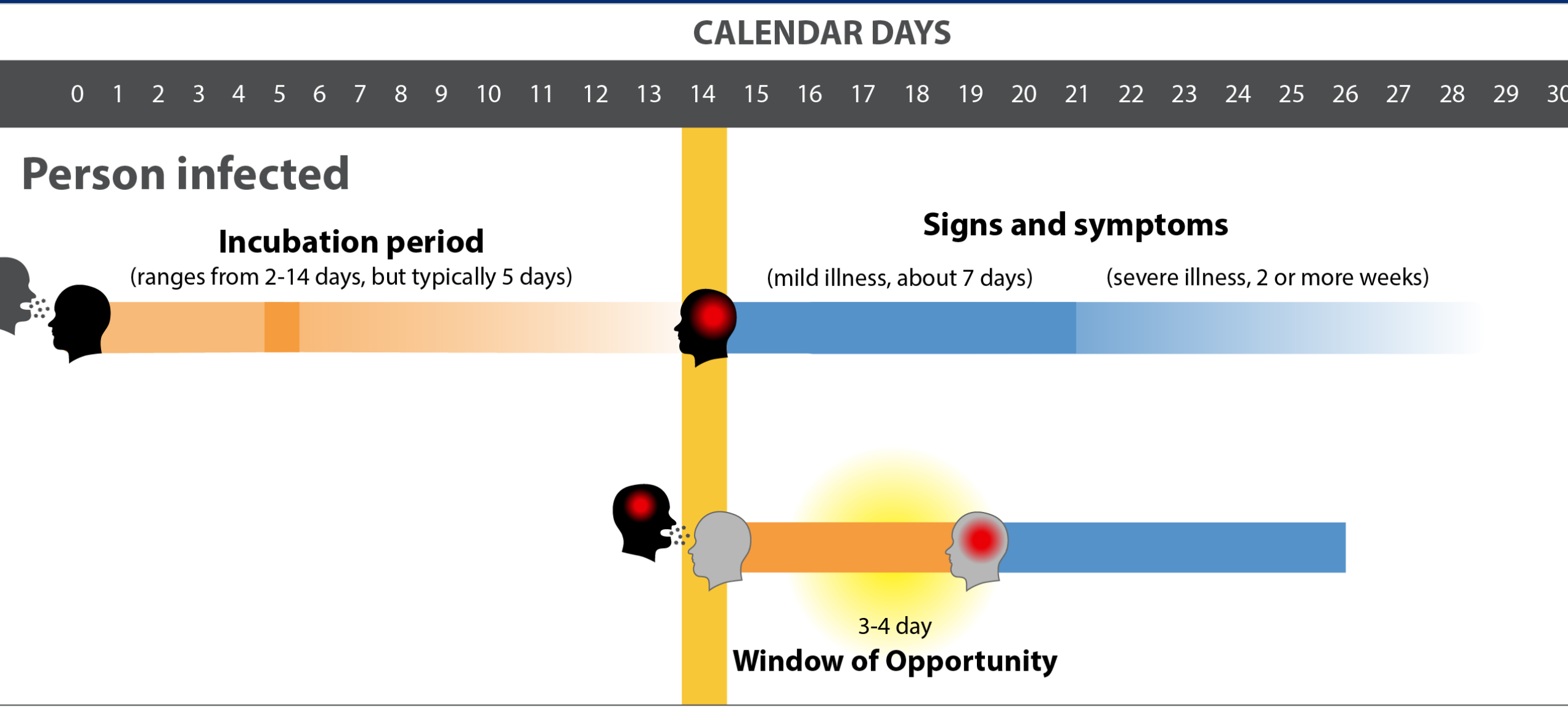


Two kinds of tests

- Diagnostic tests: identify virus in the body
  - PCR (polymerase chain reaction) tests, also called molecular tests
    - Best for diagnosing cases
  - Antigen tests, are ‘rapid tests’
    - Best for quickly identifying someone shedding a lot of virus
  - Sign that the virus is reproducing in your cells

- Antibody tests: identify antibodies to the virus, usually in blood
  - Antibodies are made by your immune system to fight off viruses or bacteria
  - Some antibodies (IgG) begin to develop when you are sick and can be identified after you recover

- Remember that no tests are perfect!

Age strongly associated with risk of death from SARS-CoV-2

- Systematic review of 27 studies
- Infection fatality ratio vs case fatality ratio
- Infection fatality ratio varies dramatically by age
  - Children and young adults – very low (<0.01%)
  - Age 55 – 0.4%
  - Age 65 – 1.4%
  - Age 75 – 4.6%
  - Age 85 – 15%

Levin et al, European Journal of Epidemiology. Dec 2020

Public Health Prevention for COVID-19

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

1. **Limit contacts with others**

2. **Remove infectious people from the environment**

Principles of risk reduction

- “Keep people safe” → “Reduce risk to our community”

1. Reduce the number and intensity of contacts people have
2. Reduce the risk of transmission during contacts that cannot be avoided
3. Identify those who are most likely to be infectious and reduce contact with them

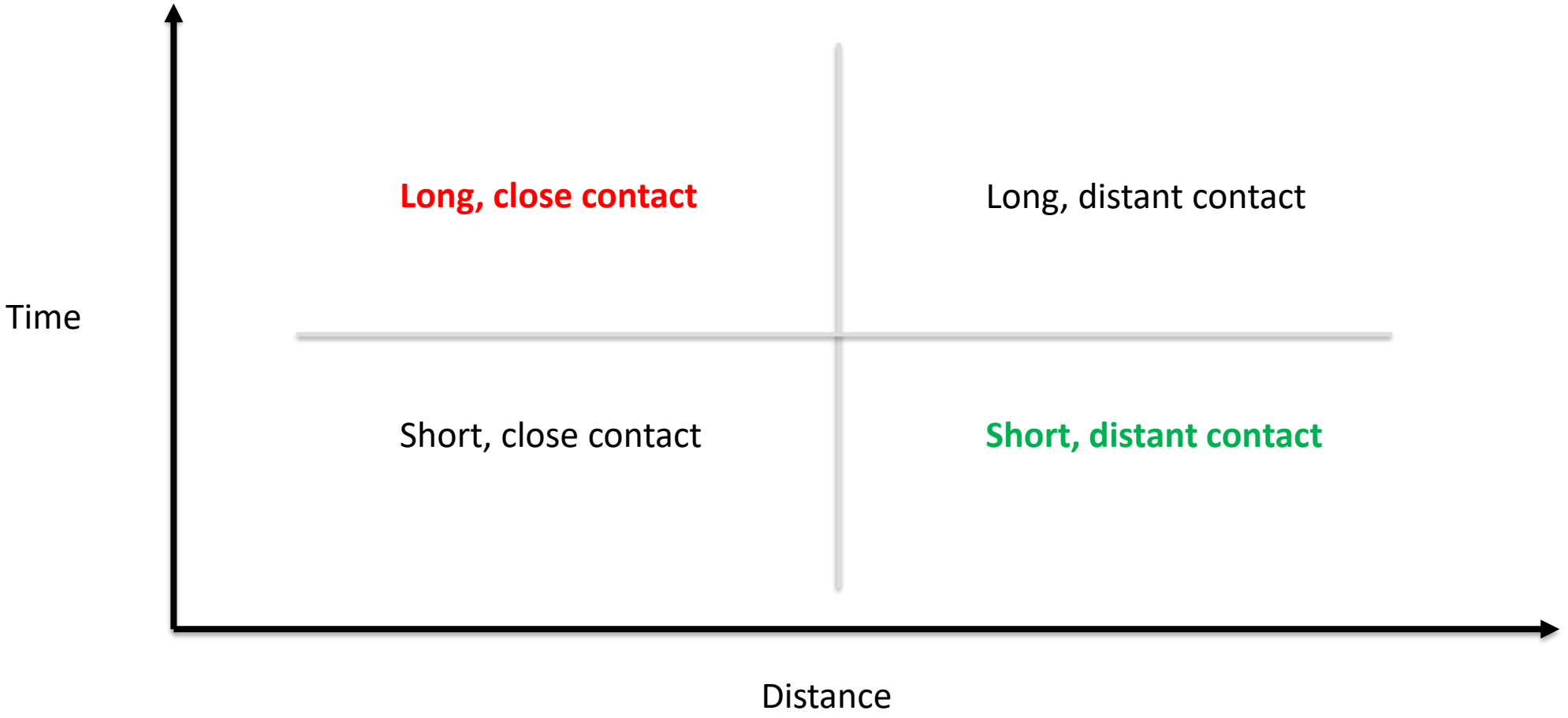
1. Reduce number and intensity of contacts

- Function of number of individuals, time of contact, and intensity of contact

- Thresholds for distance and time of contact are only guidelines
  - Transmission can happen at 6ft distance, <15 minutes of contact

- Some possible implementations:
  - Limits on number of people who can gather in one room, or elevator
  - Markings on the floor to help people keep their distance
  - Imposing ‘traffic flows’ to reduce contact as people move through the building

Risk reduction framework



2. Reduce risk of transmission for contacts you can’t avoid

- Outdoors vs indoors
  - Increased airflow reduces risk
  - Increasing airflow for indoor contacts that can’t be avoided

- Masking
  - Any cloth face covering can help
  - High filtration, medical grade masks are better

Contact tracing – identifying people who are/may become infectious

- Important to check-in with your local health department
  - Collaborative approach
  - No ability to help, but aware of activities
  - Use of materials for contact tracing purposes
- Typically facilitated by public health, but must be ‘done’ by individuals
- Many states have apps to facilitate notifications
  - Can be useful for your residents and staff

Cases and contacts

- Case
  - Someone who has COVID-19
  - Usually has a positive laboratory test
- Suspect or probable case
  - Someone exposed to a case who develops symptoms even if they have not had a test yet

- Contacts
  - Someone who had contact with a case while they were infectious
    - During their illness
    - 2 days before their illness began
  - 3 kinds of contact
    - Physical contact
    - Close contact: within 6 feet for 15+ minutes (10 or 30)
    - Proximate contact: more than 6 feet, but in the same room for an extended period

Isolation vs. Quarantine

- **Isolation**
  - Restricts movement and contact of *sick or infectious people*
  - For duration of infectiousness
    - 2 days before onset
    - At least 10 days after onset of illness; symptoms must be improving ***and*** no fever within the past 24 hours
    - *From diagnosis until recovery*

- **Quarantine**
  - Restricts movement and contact of *healthy people* who have been exposed
    - Important because infectious not the same as symptomatic
  - For 14 days since the last contact with the person who is infected
  - *From diagnosis of the case through 14 days after last contact (can be 10 days)*
    - *A negative test is not enough*

Steps to investigate cases and trace their contacts

Introduce

Introduce yourself to the case and get their basic information

Inquire

Figure out the case's likely infectious period

Identify contacts

Ask the case about contacts during their infectious period

Isolate

Provide isolation instructions to the case, identify challenges, and provide support

Initiate contact tracing

Call case's contacts to inform about their exposure, ask about symptoms, and give quarantine instructions

Implement regular check ins

Check in with the case and their contacts until their isolation or quarantine ends

Fitting the Steps Together

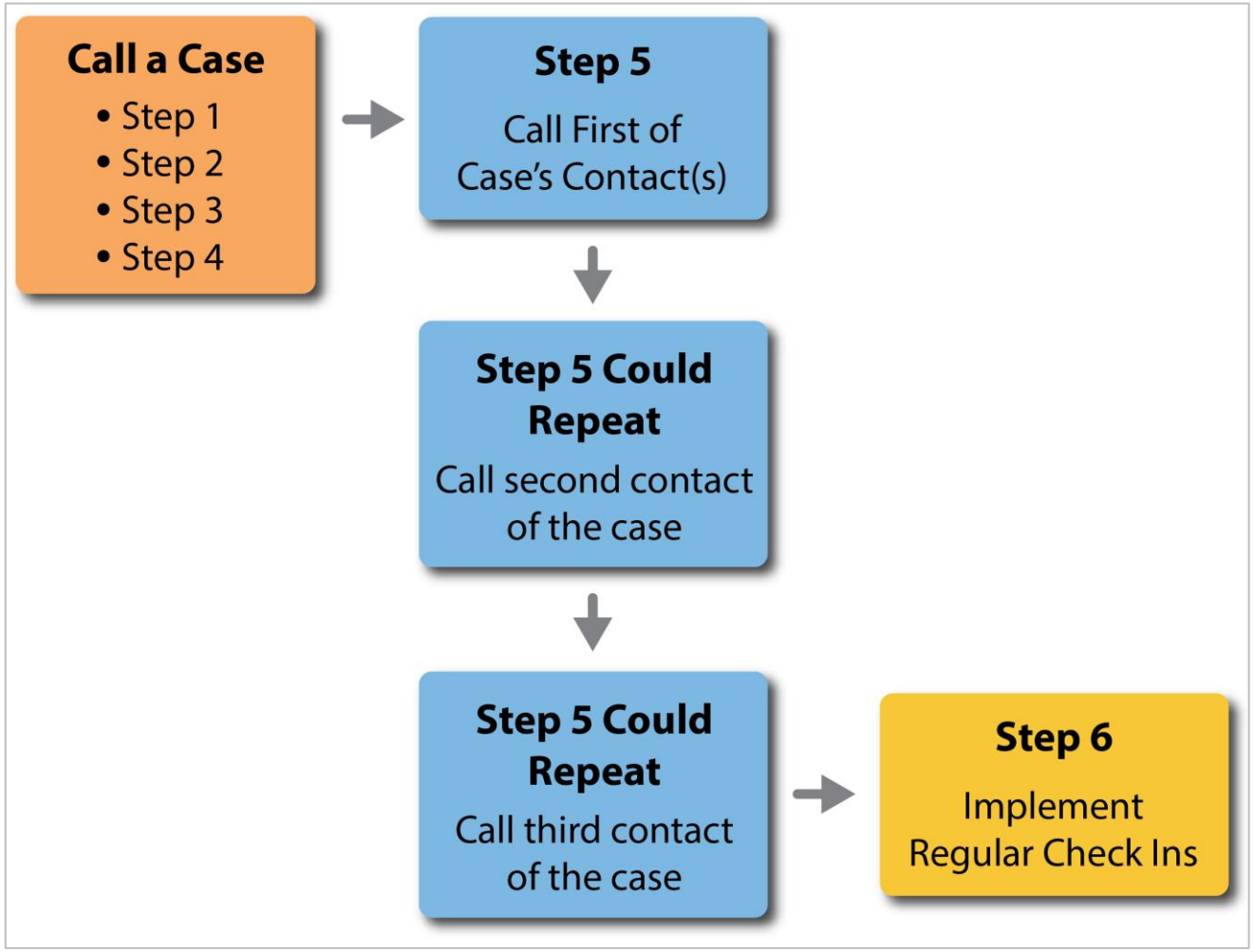
Steps 1-4: Calling the Case

- Step 1: Introductions
- Step 2: Inquire about infectious period
- Step 3: Identify contacts
- Step 4: Instruct on how to isolate

Step 5: Call Contact(s)

- Inform about exposure, ask about symptoms, instruct on quarantine

Step 6: Implement Regular Check Ins with the Case and Contact(s)



Step 1: Introduce yourself and the situation to the case

Identify your organization

- *"Hi this is Julie from the health department. Is this Swetha?"*

Confirm their identity and residence

- *"Nice to meet you Swetha. I need to discuss some sensitive information with you. Before we keep talking, can you please tell me your birthday and address?"*

Discuss the positive test

- *"I'm calling about your coronavirus test. Have you talked with your provider yet?"*

Describe the importance and benefits of the call

- *"I'm calling to see how you are and to help keep you, your family, and your community safe."*

Confirm that the call is confidential

- *"What we talk about is between you and me."*

Check in about length and safety of call

- *"This call should take about 20 minutes. Is now a good time? Are you in a safe space to talk?"*

During call, pause and assess need for medical care if:

- The person has trouble breathing, chest pain that doesn't go away, confusion, or trouble talking.

Step 2: Inquire about the infectious period

Ask questions to determine the infectious period

- If they had symptoms:
  - *What date did your symptoms start?*
  - *Did you feel like you had a fever?*
  - *Has your fever improved without medication?*
  - *How are you feeling now?*
- If they did not have symptoms:
  - *What date did you get tested?*

Use answers to:

- Calculate the period of time that the case may have spread SARS-CoV-2 to others (i.e., contacts)
- Figure out who was close to the case during that period of time

Step 3: Identify contact(s)

Ask questions to list the case's contacts

Anyone considered a contact of the case during their infectious period will be quarantined, which includes *but is not limited* to people who:

- Live with the case
- Were face-to-face within six feet of the case for 15+ minutes
- Had direct contact with the case (e.g., kissing) or with their secretions (e.g., used tissues)

Helpful questions

- *Do you have any caretakers or housemates?*
- *Would you be willing to look at your calendar (or phone or social media) to help jog your memory about what you did this past week?*
- *Where have you traveled?*

Step 4: Issue isolation instructions (four components)

Four components of isolation instructions

- Explain isolation in simple terms
- Ask questions to check that they understand completely and help them plan
- Identify challenges that may stop them from following your isolation instructions
- Offer resources to improve their chances of following your isolation instructions

Step 4: Description of four components of isolation instructions

Explain isolation simply

Isolation means that you should try to eliminate your contact with other people, except if you need to see a doctor. If you live with others, you might try and find a different place to stay. Or, you might use your own bedroom and bathroom. If you need to be around other people, you should wear a mask.

Check understanding and help make a plan

Do you have a safe place to stay?

Will you need food soon? If so, how could you get it?

Do you take any medications and will you need a refill soon?

Do you have a mask?

Identify challenges

What concerns do you have about your responsibilities and mental health? Examples include:

- Taking care of parents or kids
- The only employed person in their home
- In a domestic violence situation

Offer resources

- 211 (available in most but not all parts of the United States)
- Food banks
- Local social services
- Neighborhood and various community support groups

Step 5: Initiate contact tracing

- Inform them that they were in close contact with someone who has coronavirus
- Check if they have symptoms (e.g., fever)
- Provide instructions to quarantine, identify challenges, and offer resources to overcome those challenges
- Answer their questions
- Make a plan to follow up

FAQs from contacts

- What happens if I get sick?
- How do I get tested?
- Do I need a mask?
- Can you give me a letter for my job/landlord?

Step 6: Implement regular check ins

You may regularly check with cases and contacts to determine when they can end their isolation or quarantine

- Cases
  - Have their symptoms (if present) improved or worsened?
  - Have they had new contacts?
  - Offer support for continued isolation
- Contacts
  - Have they had any symptoms?
  - Offer support for continued quarantine

Resources

- Novel Coronavirus Research Compendium https://ncrc.jhsph.edu
- Free courses on Coursera
  - COVID-19 Contact Tracing
  - Measuring and Maximizing Impact of COVID-19 Contact Tracing
- Contact Tracing Evaluation and Strategic Support Application (ConTESSA) https://iddynamicsjhu.shinyapps.io/contessa/
- Maximizing and evaluating the impact of test-trace-isolate programs. https://medrxiv.org/cgi/content/short/2020.09.02.20186916v1