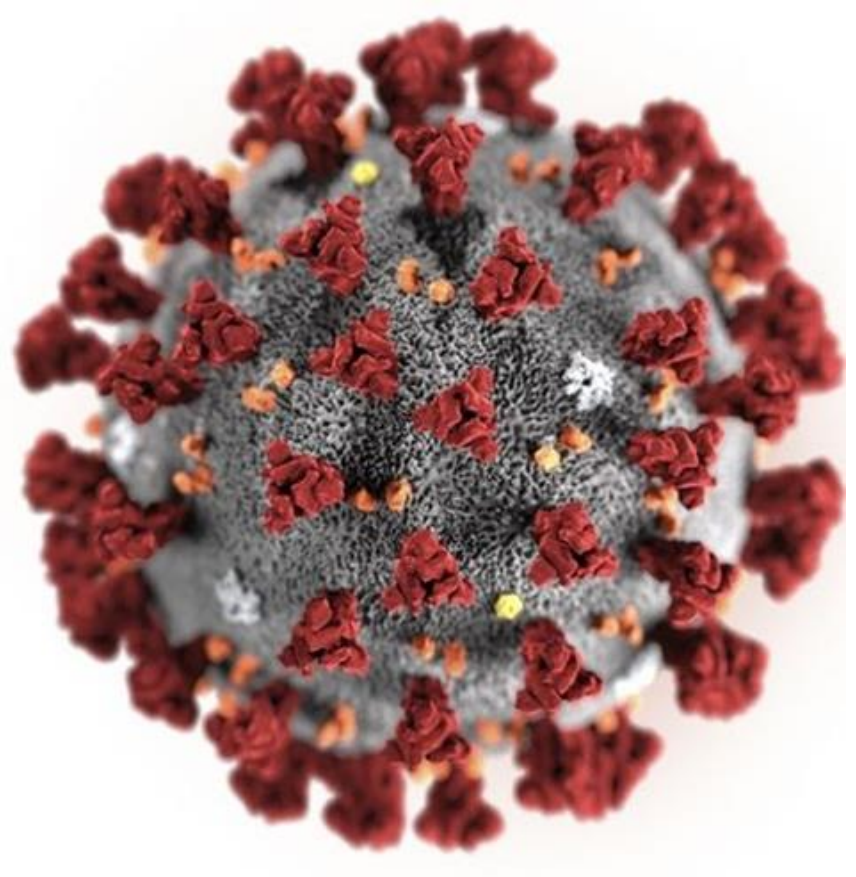


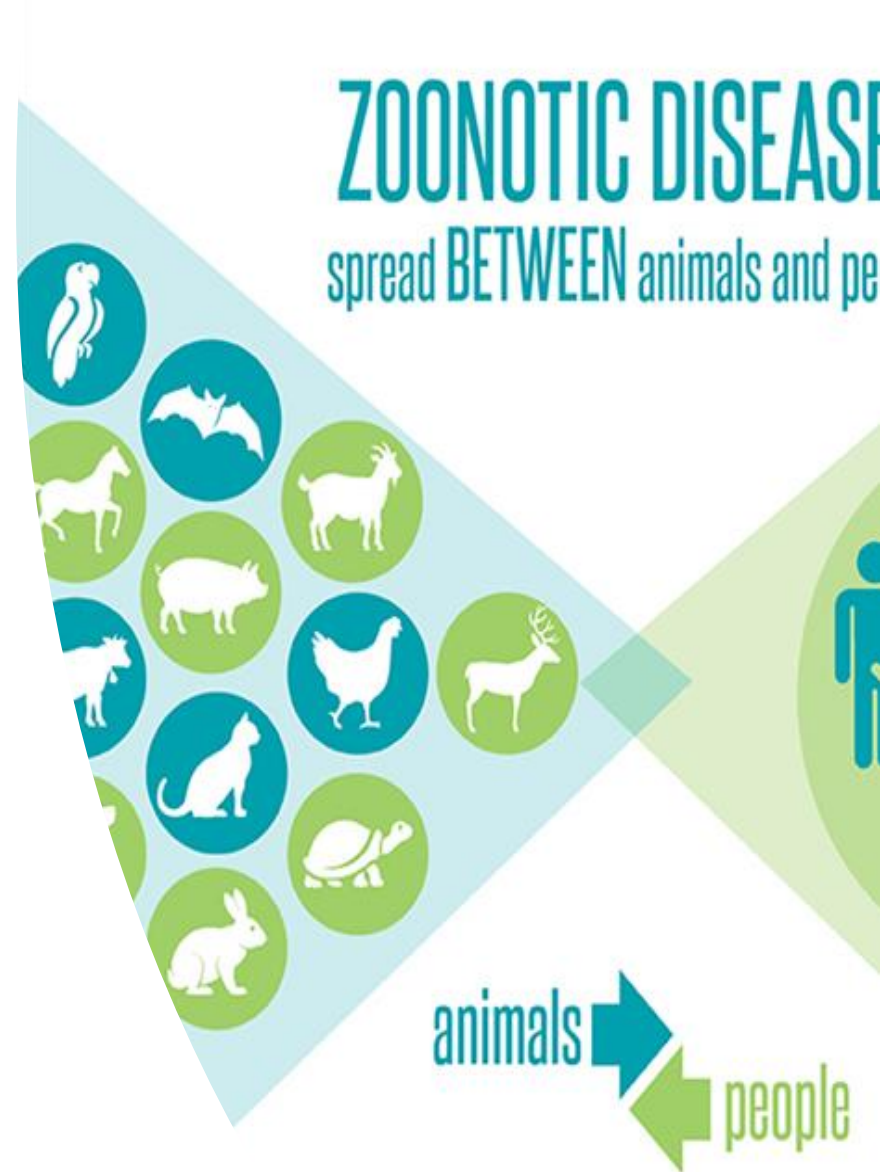
What Are Coronaviruses?

- A large family of respiratory (and less commonly, gastrointestinal) viruses that can infect both people and animals, including cats, chickens, mice, cattle and other ruminants and bats.
- Common coronaviruses are a known cause of upper and lower respiratory infection with more severe illness in young children <2 years



Novel coronaviruses

- Rarely, animal coronaviruses can develop mutations that allow them to infect humans exposed to infected animals, and then spread among people
 - MERS-CoV - causes respiratory infection in dromedaries that can be transmitted to humans
 - SARS-CoV- bats a likely reservoir → palm civet as an intermediary
 - SARS-CoV-2 (COVID-19)- likely transferred from small mammals
- All betacoronaviruses and have original origin in bats



How is Coronavirus Spread?

- Spread through respiratory droplets among close contacts
- Close contact = within 6 feet of an infected person for a prolonged period of time.
- Also spread by direct contact with infectious secretions or contaminated surfaces.
- Infectious secretions = sputum, serum, blood or respiratory droplets.
- Incubation period 2-14 days (average 5 days) after contact with someone who has the infection



Transmissibility

- Each infected person could spread coronavirus to 1.5 - 3.5 people without effective containment measures.
- Highest risk may be among very close (i.e. household) contacts
 - Attack rate 0.45% among all close contacts of infected returning travelers vs 10% among household contacts
- Duration of contagious period unknown but viral shedding appears to be highest soon after symptom onset
- Virus has been detected in stool samples but role in transmission unclear



Asymptomatic Transmission?

- Reports of cases among persons who report no known contact with a confirmed case or travel to an affected area:
 - Family member visited by asymptomatic children from Wuhan City
 - German businessman developed COVID-19 after exposure to a traveler from Shanghai who was reportedly asymptomatic during their meeting
 - SARS-CoV2 DNA has been detected in exposed persons with no or very mild symptoms
 - Detection of SARS-CoV2 in infected persons during convalescent phase
- Unclear how much potential asymptomatic transmission is contributing to spread
- Detection via PCR does not necessarily denote active virus
- Asymptomatic or mild symptoms?

Clinical presentation

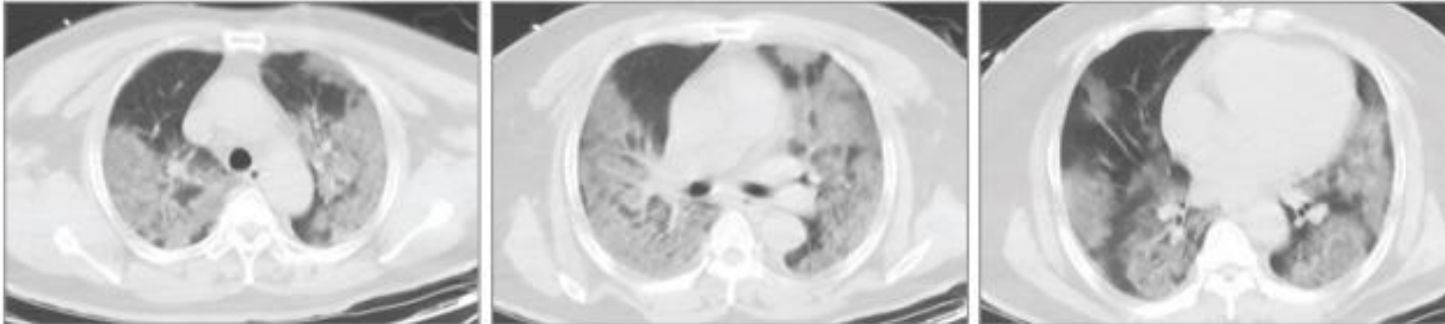
- Wide clinical spectrum of disease
- Limited initial data
 - Mostly adult case series
- Predominantly affecting male, older patients with comorbid conditions
- Young children may be less likely to experience severe disease
- Prodromal fever and fatigue may precede respiratory symptoms
- Possible presentation with predominant GI symptoms
- Multifocal pneumonia on imaging with ground glass opacities

Signs and symptoms	
Fever	136 (98.6)
Fatigue	96 (69.6)
Dry cough	82 (59.4)
Anorexia	55 (39.9)
Myalgia	48 (34.8)
Dyspnea	43 (31.2)
Expectoration	37 (26.8)
Pharyngalgia	24 (17.4)
Diarrhea	14 (10.1)
Nausea	14 (10.1)
Dizziness	13 (9.4)
Headache	9 (6.5)
Vomiting	5 (3.6)
Abdominal pain	3 (2.2)

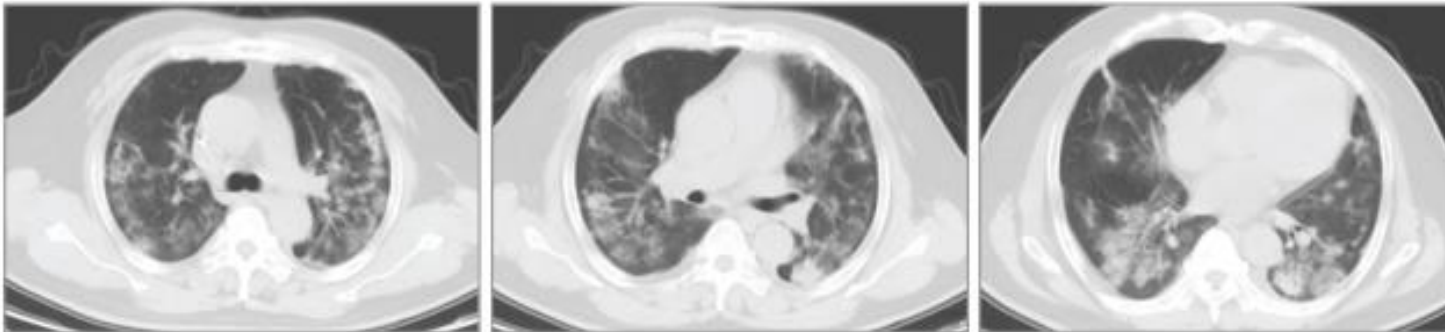
ARDS ~8 days after onset

Figure 1. Chest Computed Tomographic Images of a 52-Year-Old Patient Infected With 2019 Novel Coronavirus (2019-nCoV)

A Computed tomography images on day 5 after symptom onset



B Computed tomography images after treatment on day 19 after symptom onset



A, Chest computed tomographic images obtained on January 7, 2020, show ground glass opacity in both lungs on day 5 after symptom onset. B, Images taken on January 21, 2020, show the absorption of bilateral ground glass

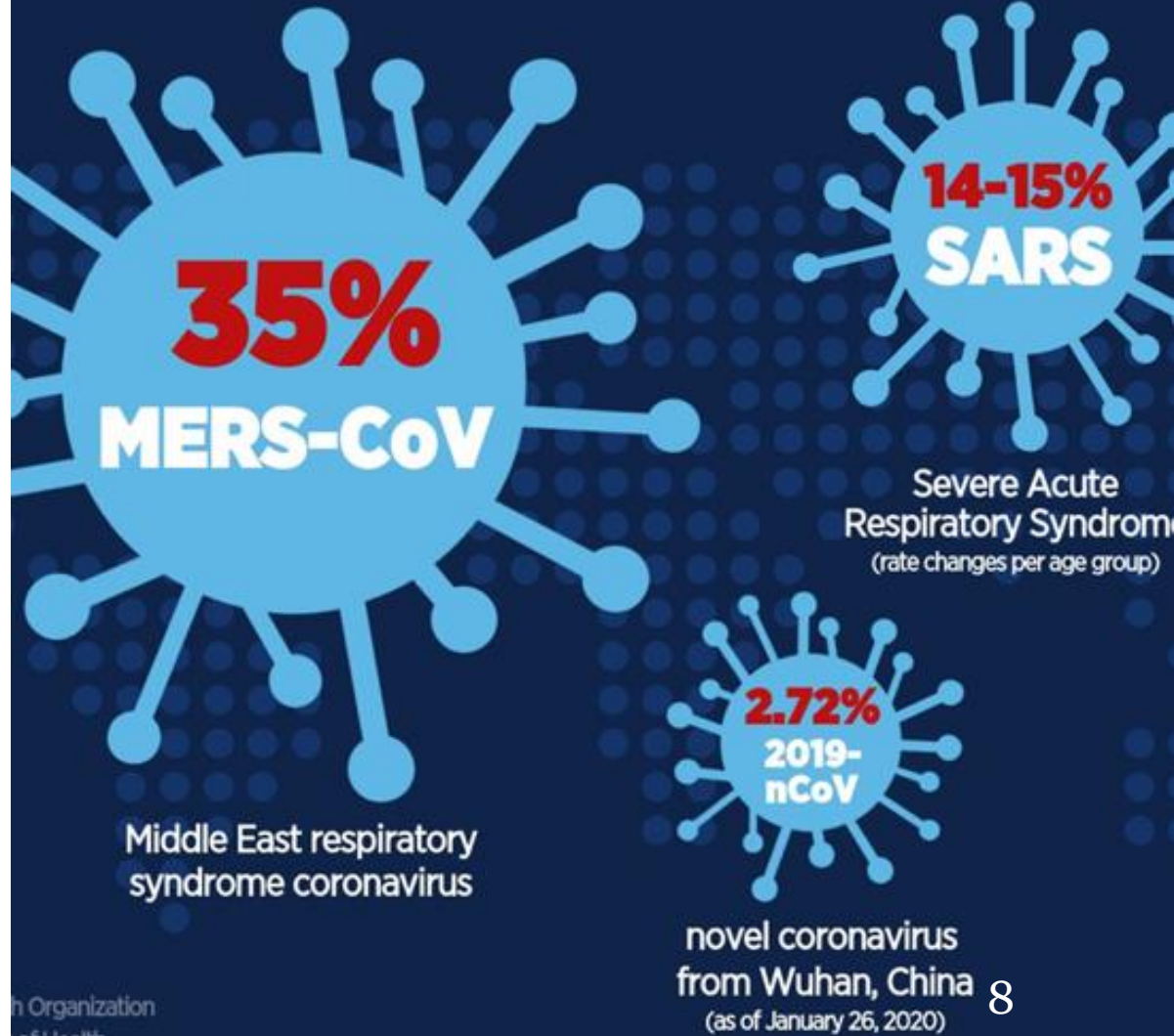
opacity after the treatment of extracorporeal membrane oxygenation from January 7 to 12 in the intensive care unit.

(1) Wang D, Hu B, Hu C, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China. *JAMA*. Published online February 07, 2020.

Outcomes

- 20% of diagnosed cases “severe”
- Complications: ARDS, cardiac injury, septic shock, liver dysfunction, acute kidney injury
- 2.0-2.3% case fatality rate in initial case series
 - 60-69 years: 3.6%
 - 70-79 years: 8%
 - ≥ 80 years: 14.8%
 - Healthy: 0.9%

FATALITY RATES of severe human coronaviruses



Comparison of Recent Infections: Pathogenicity and Transmissibility

Table 1. Pathogenicity and Transmissibility Characteristics of Recently Emerged Viruses in Relation to Outbreak Containment.

	Virus	Case Fatality Rate (%)	Pandemic	Contained	Remarks
<u>December 2019</u> →	2019-nCoV	Unknown*	Unknown	No, efforts ongoing	
<u>2009 swine flu</u> →	pH1N1	0.02–0.4	Yes	No, postpandemic circulation and establishment in human population	
<u>2013 Bird flu</u> →	H7N9	39	No	No, eradication efforts in poultry reservoir ongoing	
<u>2003</u> →	NL63	Unknown	Unknown	No, endemic in human population	
<u>2002</u> →	SARS-CoV	9.5	Yes	Yes, eradicated from intermediate animal reservoir	58% of cases result from nosocomial transmission
<u>2012 & 2019</u> →	MERS-CoV	34.4	No	No, continuous circulation in animal reservoir and zoonotic spillover	70% of cases result from nosocomial transmission
<u>Since 1976, 26 outbreaks</u> →	Ebola virus (West Africa)	63	No	Yes	

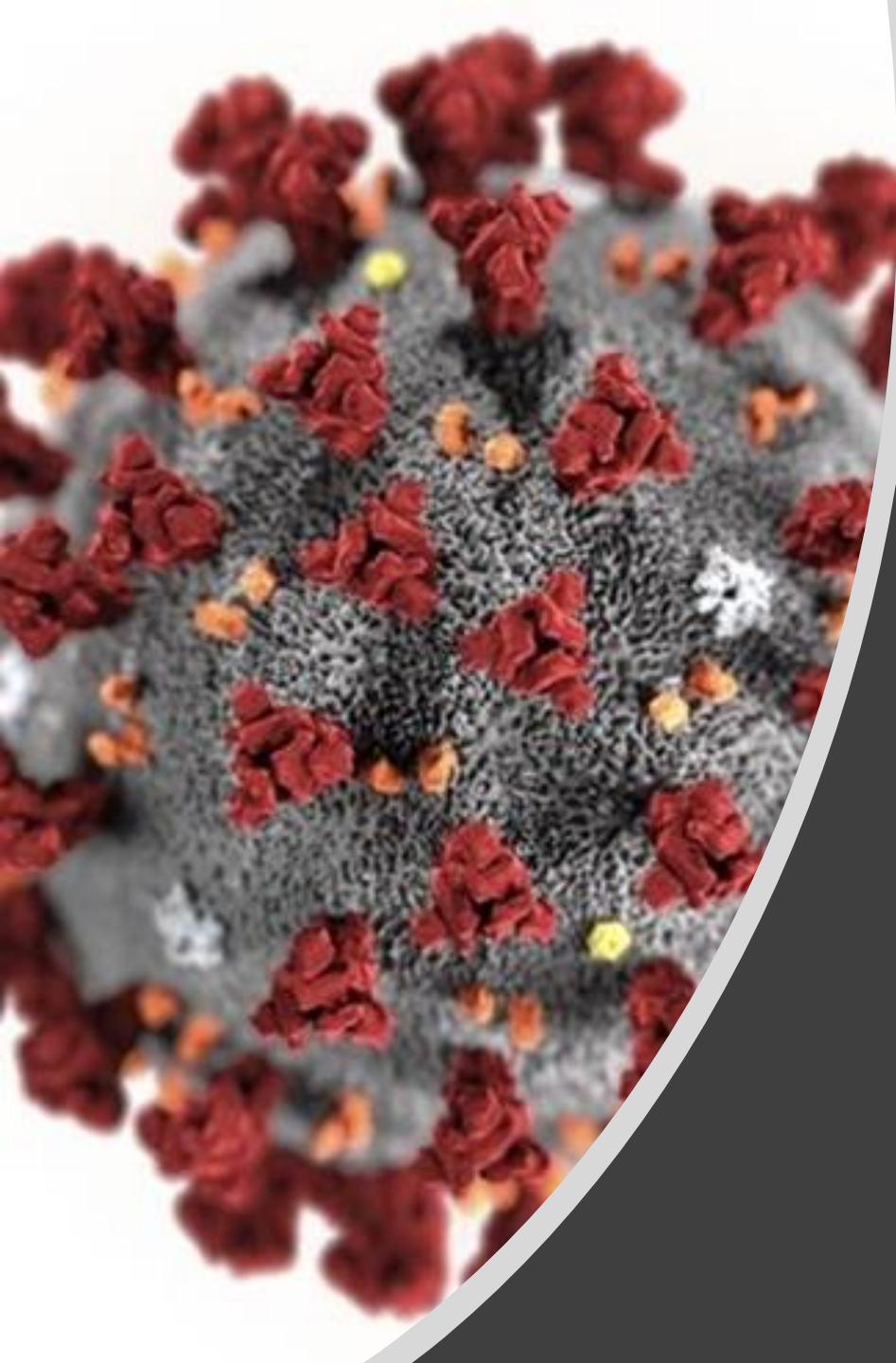
* Number will most likely continue to change until all infected persons recover.

Clinical Management

- Supportive care and appropriate isolation
- Clinical trials in process for therapeutic agents
 - Remdesivir - has been given under compassionate use and is being investigated in trials
 - Lopinavir / ritonavir, chloroquine and ribavirin
 - Avoid use of corticosteroids, predominantly based on data from SARS and MERS

Clinical management of severe acute respiratory infection when novel coronavirus (2019-nCoV) infection is suspected

Interim guidance
28 January 2020



Case Identification, Containment and Mitigation

How Agencies Are Working to Prevent the Spread of COVID-19

- Travel screening
- Testing
- Quarantine
- Isolation
- Contact tracing
- Infection Prevention and Control in Healthcare Settings
- Social distancing



Acute Communicable Diseases Activities

- Outbreak detection
- Clinical consultation (i.e. post-exposure prophylaxis guidance)
- Laboratory coordination
 - Direct detection methods
 - Molecular subtyping
- Control measures for suspected/confirmed cases within and outside healthcare settings
- Response coordination with other PDPH partners and agencies (Office of Food Protection, Vector Control, Animal Care and Control)
- Educational outreach
 - In-services, Posters
 - Health advisories, Health Information Portal, HIP content
- Special projects and studies

Key
surveillance
activities:
COVID19

- Identification of potential cases
 - Compatible clinical presentation AND exposure risk
 - Diagnostic testing
- Prevent spread to others
 - Isolation of suspected / confirmed cases
 - Contact tracing
 - Quarantine of exposed persons to minimize likelihood that they can transmit the virus to others if symptoms develop

Identifying at risk persons

High Risk:

- Living with someone or providing care in the home for someone who has 2019nCoV without use of recommended precautions

Medium Risk:

- Close contact with a person with confirmed 2019nCoV but using recommended precautions
- Travel from affected areas (Level 3 travel alerts)

Low Risk:

- Being in the same indoor environment (a classroom) with someone who has symptoms but not a close contact

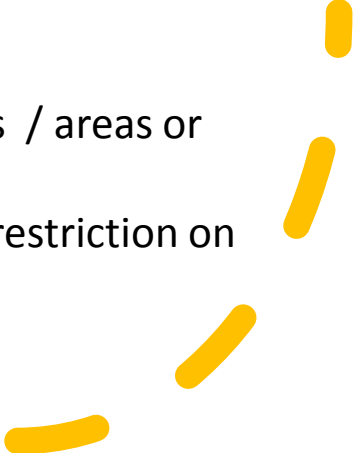


Affected Regions?

- Level 3: Widespread Sustained Ongoing Transmission- Avoid Nonessential travel
 - China
 - Iran
 - Italy
 - South Korea
- Level 2: Sustained Ongoing Transmission- Persons at higher risk for severe illness should postpone travel
 - Japan
- Level 1: Risk of Limited Community Transmission- Practice usual precautions
 - Hong Kong



Current Guidance: Monitoring At Risk Persons

- Close contacts of cases without appropriate PPE (high risk)
 - Quarantine with no public activities
 - Daily symptom monitoring
 - Returning travelers from affected countries (Level 3 Travel Alerts)
 - Passenger monitoring for travelers returning from China and Iran
 - Travelers returning from Italy and South Korea receive guidance to self-monitor for symptoms
 - All returning travelers from affected countries advised to limit activity (i.e. stay home from work or school) for 14 days
 - Returning travelers from other countries / areas or other low risk exposures
 - Self-monitor for symptoms with no restriction on activities
- 

Person Under Investigation Definition

Clinical Features	&	Epidemiologic Risk
Fever ¹ or signs/symptoms of lower respiratory illness (e.g. cough or shortness of breath)	AND	Any person, including health care workers ² , who has had close contact ³ with a laboratory-confirmed ⁴ COVID-19 patient within 14 days of symptom onset
Fever ¹ and signs/symptoms of a lower respiratory illness (e.g., cough or shortness of breath) requiring hospitalization	AND	A history of travel from affected geographic areas ⁵ (see below) within 14 days of symptom onset
Fever ¹ with severe acute lower respiratory illness (e.g., pneumonia, ARDS) requiring hospitalization ⁴ and without alternative explanatory diagnosis (e.g., influenza) ⁶	AND	No source of exposure has been identified

Affected Geographic Areas with Widespread or Sustained Community Transmission

Last updated February 26, 2020

- China
- Iran
- Italy
- Japan
- South Korea

Person Under Investigation Definition

Clinical Features	&	Epidemiologic Risk
Fever ¹ or signs/symptoms of lower respiratory illness (e.g., cough or shortness of breath)	AND	Any person working with health care workers ² , who has had contact ³ with a laboratory-confirmed patient within 14 days of symptom onset
Fever ¹ and signs/symptoms of lower respiratory illness (e.g., cough or shortness of breath) requiring hospitalization		Residence in affected geographic areas ⁵ within 14 days of symptom onset
Fever ¹ with severe acute lower respiratory illness (e.g., pneumonia, ARDS) requiring hospitalization and no alternative explanatory diagnosis (e.g., bacterial pneumonia)		Source of exposure has been identified
<h2>Affected Geographic Areas and Modes of Transmission</h2> <p><i>Last updated February 2020</i></p> <ul style="list-style-type: none"> • China • Iran • Italy • Japan • South Korea 		

New PUI Guidance (as of 3/4/2020)

- “Clinicians should use their judgment to determine if a patient has signs and symptoms compatible with COVID-19 and whether the patient should be tested. Decisions on which patients receive testing should be based on the local epidemiology of COVID-19, as well as the clinical course of illness.”
- High index of suspicion / high priority for testing
 - Exposure risk factors including close contact with a confirmed COVID-19 case OR travel to an affected area within 14 days
 - At risk for severe disease (older persons, chronic medical conditions)
 - Residence in a congregate setting
 - Acute respiratory illness requiring hospitalization with no apparent cause
- Prioritize testing for persons with high index of suspicion
- Also test for other respiratory viruses

What can healthcare providers do to prevent transmission in the community

- Provide safe and effective care to our patients
- Provide safe workplace for our colleagues



ATTENTION

IF YOU HAVE RECENTLY TRAVELED



**AND YOU ARE FEELING SICK WITH:
FEVER, COUGH, AND/OR TROUBLE BREATHING**



PLEASE TELL STAFF IMMEDIATELY

 Department of
Public Health
CITY OF PHILADELPHIA

Screening
for
influenza-
like illness
AND travel
upon entry
into clinical
settings

Post signs in highly
visible locations at all
entrances

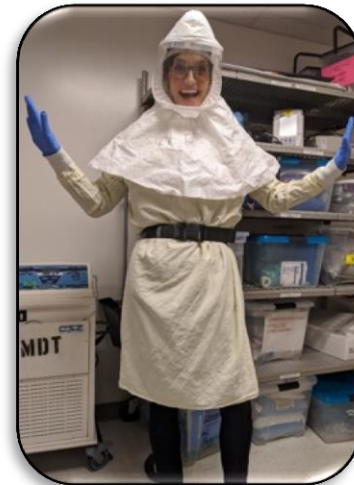
Provide surgical masks
and alcohol hand gel
adjacent to signs

Patients with
respiratory
symptoms should
put on mask and
perform hand
hygiene

Symptomatic patients
who report travel to an
affected area within 14
days OR contact with a
known COVID-19 case
should be escorted
promptly to a patient
room

CDC Recommended Management

- Appropriate isolation and PPE: contact, droplet, airborne
 - Gown, glove, N95 mask, eye protection, airborne isolation when available
 - New guidance!! Respirators OR facemasks can be used when evaluating patients BUT N95 masks still recommended for aerosol generating procedures
- Call health department to report suspected case
- Respiratory sample (nasopharyngeal and oropharyngeal) for nCoV PCR *and* other respiratory viruses



*testing is expanding to commercial laboratories

Preparing for increased patient volume



Inventory personal protection equipment supplies and review recommendations to preserve masks



Review emergency plans for alternative staffing and surge capacity plans



Explore capability to use phone triage or patient portals to encourage patients with mild illness to stay home



Telemedicine options

An Evolving Situation: Bookmark Coronavirus Resources

- Centers for Disease Control and Prevention
 - <https://www.cdc.gov/coronavirus/2019-ncov/index.html>
 - Philadelphia Department of Public Health
 - <https://hip.phila.gov/>
 - <https://www.phila.gov/the-latest/>
 - Pennsylvania Department of Health
 - <https://www.health.pa.gov/topics/disease/Pages/Coronavirus.aspx>
 - World Health Organization
 - <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
- 