Understanding and Addressing the Global Spread of COVID-19
A Clinician’s Guide

A CME-certified Activity

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Learning Objectives

This program is designed to address ACGME and NAM competencies, including delivering patient-centered care and practicing evidence-based medicine.

At the conclusion of this activity, participants should be able to:

• Describe the current global status of the COVID-19
• Form evidence-based strategies for prevention of COVID-19 transmission
• Recognize the signs and symptoms of COVID-19 and perform appropriate diagnostic studies
• Develop plans to manage patients with COVID-19
Coronaviruses
Coronaviruses Known Prior to 2019

• OC43, 229E, NL63, HKU1
  – 10%-30% of all winter upper-respiratory viral illnesses
  – Less likely than other respiratory viruses to cause outbreaks in LTC

• SARS, MERS
SARS Outbreak 2002-2003

Genotypic Relationships

SARS Epidemic: Guangdong Province

Why Was SARS Eradicable?

• All disease (or all that results in transmission) was symptomatic
  – Most transmission occurred during severe illness
  – This concentrates transmission/infection in hospitals

• Combination of:
  – Long enough incubation period (median 4-5 days)
  – Low infectiousness at onset of symptoms (unusual before 4 days)
  – Severity of illness during infectious period

• Spread is not (or not often) airborne over long distances
MERS Transmission

- Circulation within camel population
- Potential virus source in bats
- Zoonotic transmission
- Community transmission
- Healthcare-associated transmission
- Household transmission
COVID-19 Outbreak

A novel coronavirus was officially announced as the causative pathogen of the outbreak by China CDC. China CDC Level 2 emergency response activated.

Emergency monitoring, case investigation, close contact management, and market investigation initiated, technical protocols for Wuhan released; NHC notified WHO and relevant countries and regions; gene sequencing completed by China CDC.

Huanan Seafood Wholesale Market closed.

Outbreak announced by WHC; NHC and China CDC involved in investigation and response.

Case-finding activated.

Pneumonia cases linked to the Huanan Seafood Wholesale Market.

Reagent probes and primers shared with the public by China CDC.

Strict exit screening measures activated in Wuhan, people with body temperature ≤37.3°C were restricted from leaving.

First confirmed case reported in another province in China (in a person who had traveled from Wuhan); China CDC issued test reagent to all provinces in China.

NCIP incorporated as a notifiable disease in the Infectious Disease Law and Health and Quarantine Law in China.
COVID-19

Transmission Of the SARS-CoV-2 Virus Outside Mainland China

- Families in households: China, Hong Kong, US, Canada, etc.
- Non-family clusters in China: hospitals, schools, shopping malls
- Non-family transmission outside Chinese mainland
  - Co-workers (Singapore, Germany)
  - Family dinners (HK)
  - Tour guides/bus and taxi drivers/shop workers (Japan, Singapore)
  - Hotel meetings (Singapore)
  - Cruise-ship passengers (Japan, ??including quarantine officer)
  - Non-family household contact (servant, Singapore)
  - Religious groups (Singapore)
  - A few unlinked cases in Hong Kong and Singapore
COVID-19

- Incubation period: 4 days (range 2-10 days)
- Clinical presentation/course of illness:
  - Starts with fever/feeling unwell
    - 60%-75% dry cough
    - 50%-70% fatigue or myalgias
    - Later onset of shortness of breath
  - 4-5 days to medical care, 7-8 days to hospital admission
  - At admission: lymphopenia, elevated LDH, bilateral ground-glass opacities on CT chest
- Case fatality in hospitalized patients 6%-14%
- 7%-30% of infections have been in HCWs
- 0%-15% nosocomial in patients

Major Unanswered Questions

- What is the case fatality rate (CFR)?
  - Multiple biases in CFR early on during outbreaks
  - Confidence limits on estimates wide: <0.1%-4%
  - For comparison: 1918/19 pandemic 3%-5%; seasonal influenza 0.1%
- Is it possible to control transmission with public-health measures?
  - Draconian measures in mainland China failing (so far);
  - Singapore/Thailand/Hong Kong pending
  - Transmission early in illness and from mildly symptomatic people makes control MUCH more difficult
- What is the risk of transmission in healthcare? What preventive measures are needed?
- Is there an animal reservoir from which this can be reintroduced?
Preventing and Managing COVID-19
Key Principles of Effective Response

1. Utilize the “Identify-Isolate-Inform” framework in your planning
2. Ensure staff are properly trained in donning and doffing of the required personal protective equipment (PPE)
3. Develop and use checklists and flowcharts
4. Communicate well with your staff and patients
5. Anticipate surge
Identify-Isolate-Inform

- Can be used in planning for all High Consequence Infectious Diseases (HCIDs)
- Protects staff, patients, and the facility
- Works best when used as part of everyday operations

Identify - Isolate - Inform

**Identify**
- Utilize signage
- Develop triage questionnaires
- Use electronic prompts in the EHR

**Isolate**
- Immediately pass a mask to the patient
- Wear PPE
- Use an Airborne Infection Isolation (AII) room if available
- Use a closed-door room if not
- Use a secluded space if not

**Inform**
- Ensure staff know whom to call for suspect cases
- Consider creation of “biothreats” coverage
- Know how/when to contact Public Health

Koenig KL et al. *West J Emerg Med.* 2020;21. Available at: [https://escholarship.org/uc/item/0ch1h302](https://escholarship.org/uc/item/0ch1h302).
Identify

**ATTENTION PATIENTS**

If you have any of the following symptoms:
- Cough
- Fever

Please use hand sanitizer and put on a mask.

Have you traveled outside of the United States in the last 30 days? Please Tell the Nurse.

**AVISO A PACIENTES**

Si tiene cualquiera de los siguientes síntomas:
- Tos
- Fiebre

Utilice un desinfectante de manos y póngase una mascarilla.

Avísé a la enfermera si usted viajó fuera de los EE.UU. en los últimos 30 días.

**病人須注意**

如果你有任何以下症狀：
- 咳嗽
- 髒

請使用洗手液及戴上口罩。

請告訴護士您過去30天有沒有去美國以外旅行？

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**Flowchart to Identify and Assess 2019 Novel Coronavirus**

For the evaluation of patients who may be ill with or who may have been exposed to 2019 Novel Coronavirus (2019-nCoV)

**A.** Identify

- If in the past 14 days since first onset of symptoms a history of either
  - Travel to China
  - Close contact with a person known to have 2019-nCoV illness*

**B.** AND the person has

- Fever or symptoms of lower respiratory illness (e.g., cough or shortness of breath)

  if both exposure and illness are present

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1. **Isolate**
   - Place facemask on patient
   - Isolate the patient in a private room or a separate area
   - Wear appropriate personal protective equipment (PPE)

2. **Assess clinical status**
   - **EXAM**
     - Is fever present?
     - Measured? _____°C/°F
     - Subjective? cough? Shortness of breath?
   - Is respiratory illness present?

3. **Inform**
   - Contact health department to report at-risk patients and their clinical status
   - Assess need to collect specimens to test for 2019-nCoV
   - Decide disposition

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**If discharged to home**

**Instruct patient**

- As needed depending on severity of illness and health department consultation
  - Home care guidance
  - Home isolation guidance

**Advise patient**

- If the patient develops new or worsening fever or respiratory illness
  - Call clinic to determine if reevaluation is needed
  - If reevaluation is needed call ahead and wear facemask

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*Disclaimer: Children under laboratory confirmation of 2019-nCoV may not be possible for travelers or persons caring for patients in other countries. For more information on the definition for close contact see CDC’s Interim Guidelines for Healthcare Professionals: https://www.cdc.gov/mmwr/volumes/68/wr/p0394.htm#unv_xref
# Guide to Patient Evaluation

## Criteria to Guide Evaluation of Patients Under Investigation (PUI) for 2019–nCoV

Patients in the United States who meet the following criteria should be evaluated as a PUI for 2019-nCoV.

<table>
<thead>
<tr>
<th>Clinical Features</th>
<th>&amp;</th>
<th>Epidemiologic Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever(^1) or signs/symptoms of lower respiratory illness (e.g., cough or shortness of breath)</td>
<td>AND</td>
<td>Any person, including health care workers, who has had close contact(^2) with a laboratory-confirmed(^3)(^4) 2019-nCoV patient within 14 days of symptom onset</td>
</tr>
<tr>
<td>Fever(^3) and signs/symptoms of a lower respiratory illness (e.g., cough or shortness of breath)</td>
<td>AND</td>
<td>A history of travel from Hubei Province, China(^5) within 14 days of symptom onset</td>
</tr>
<tr>
<td>Fever(^2) and signs/symptoms of a lower respiratory illness (e.g., cough or shortness of breath) requiring hospitalization(^6)</td>
<td>AND</td>
<td>A history of travel from mainland China(^5) within 14 days of symptom onset</td>
</tr>
</tbody>
</table>

The criteria are intended to serve as guidance for evaluation. Patients should be evaluated and discussed with public health departments on a case-by-case basis if their clinical presentation or exposure history is equivocal (e.g., uncertain travel or exposure).

Available at: cdc.gov/coronavirus/2019-nCoV/hcp/clinical-criteria.html.
Ambulatory Best Practice Advisory

Very Important (2)

Novel Coronavirus Isolation Warning

Consider the possibility of Novel 2019 Coronavirus (2019-nCoV) and/or Avian Influenza given recent travel to China if the patient has fever and/or respiratory symptoms.

- Ask the patient to wear a surgical mask
- Room the patient immediately in a negative pressure room. If none available, put the patient in a standard room, keep the door closed, and ask the patient to keep on the medical mask.
- Institute Strict Isolation precautions (Airborne + Contact + Eye Protection)

See the CDC website for latest information about Novel 2019 Coronavirus and Avian Influenza, or the Partners site for 2019-nCoV and Avian Influenza.

Acknowledgment Reason

No Fever or Cough  Will Notify Provider  Administrative Review
In-patient Best Practice Advisory

Consider the possibility of Novel 2019 Coronavirus (2019-nCoV) and/or Avian Influenza given recent travel to China.

- Ask the patient to wear a surgical mask
- Room the patient immediately in a negative pressure room. If none available, put the patient in a standard room, keep the door closed, and ask the patient to keep on the medical mask.
- Institute Strict Isolation precautions (Airborne + Contact + Eye Protection)

See the CDC website for latest information about Novel 2019 Coronavirus and Avian Influenza, or the Partners site for 2019-nCoV and Avian Influenza.
Use of Personal Protective Equipment (PPE)

- The recommended PPE for COVID-19 is:
  - Eye covering
  - Gown
  - Gloves
  - N95 or PAPR

- While many staff use these items on a daily basis, most do not know how to truly don or doff them properly.
# How to Use PPE

## DOFFING CHECKLIST

**DISPOSABLE GOWN AND N-95 RESPIRATOR**

Except for Respirator, remove PPE at doorway or in anteroom if present. Remove PPE in the following sequence. Avoid touching face.

<table>
<thead>
<tr>
<th>#</th>
<th>Step</th>
<th>Location</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remove gown &amp; gloves first - in a single step. Roll gown into itself, peeling off gloves at the same time. Hold gown away from your body and discard*.</td>
<td>Doorway (inside or outside patient room - with door closed) or Anteroom</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Remove and discard* face shield or goggles</td>
<td>Doorway (inside or outside patient room - with door closed) or Anteroom</td>
<td>Avoid touching front of face shield. Remove by grasping sides or back of strap then pull forward over head. Avoid touching front of goggles. Remove by grasping sides and pull away from your face</td>
</tr>
<tr>
<td>3</td>
<td>Remove and discard* N-95 Respirator</td>
<td>Outside room</td>
<td>Do NOT touch front of mask. Pull bottom strap first then top strap over head - without touching respirator. Discard in trash</td>
</tr>
<tr>
<td>4</td>
<td>Perform Hand Hygiene</td>
<td>Outside room</td>
<td>Alcohol-based hand rub (ABHR) or wash with soap and water (if indicated), dry, then disinfect with ABHR.</td>
</tr>
</tbody>
</table>

*Discard all PPE in regular waste*
Training for Use of PPE

- Target PPE training for staff most likely to encounter PUIs
- Consider just-in-time trainers for higher risk situations
Using Tools to Support the Response

• Information has been, and will be, changing frequently
• Most clinical staff cannot stay current with all of the recommendations
• Use *electronic* flowsheets and checklists to help with decision-making
• Consider developing an online “outbreaks of concern” list
Using Tools to Support the Response

Assessing Patient Risk of High Consequence Infectious Diseases for Frontline Providers

These questions can be used during your history-taking for a patient with a suspected high-consequence infectious disease such as 2019 Novel Coronavirus (Wuhan), Avian flu, and Middle East Respiratory Virus (MERS). These details will provide helpful information when discussing the case internal Infectious Disease personnel and the State Epidemiologist, if required. Gathering this information should not delay isolation of the patient. Consider using personal protective equipment consisting of airborne + contact + eye protection.

Step 1. Timing is KEY. Use the timeline to add on the following dates.
- Date arrived in country (i.e., China)
- Date departed country (i.e., China)
- Date arrived in US
- Date of symptom onset

Today

Step 1a. For 2019-nCoV (Wuhan coronavirus), where in China have they traveled in the last month?

- Use map below (can ask the patient to write down cities of recent travel and/or point to the map)

Step 2. Clinical details:
- Brief past medical history and description of symptoms
- Have they taken any antipyretics?

Step 3. Exposure details are ESSential. While traveling, dates of any:
- Animal exposures- chickens (including farms/live markets), bats, camels, birds, snakes...any animal
- Healthcare exposures- hospitalizations or doctors visits (including as a visitor)
- Sick contacts- suspected or confirmed cases of 2019-nCoV, MERS, etc; or any other sick contacts

Step 4. Other Important details we will often need:
- Cell phone number so we can call the patient while in the room: ____________________________
- What they do for a job?
- Where they live and with whom ____________________________

Date updated: 1/27/2020
Using Tools to Support the Response

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**High Consequence Infectious Disease (HCID): Emergency Department (ED)**

**Current Infectious Disease Outbreaks of Concern**

Last Updated 08/01/2018

**How to use this document**

This document provides frontline clinicians with the tools to take a targeted travel history for patients who may be at risk for HCIDs. It is not intended to be exhaustive or replace a full travel history, but is focused on HCIDs circulating as of the date above.

**For questions or concerns regarding these diseases**

Contact the Biothreats Pager (Institutions SNEF, i.e. ID on call) available 24/7 at pager number XXX.

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**Country Traveling From** | **Surveillance Window** |
--- | --- |
Bahrain | 14 Days |
Berlin | 21 Days |
China | 10 Days |
Democratic Republic of Congo (DRC) | 21 Days |
--- | --- |
**Disease(s)** | **Case Definition and Guidance** |
MERS | CDC (insert document included) |
Lassa Fever | CDC, Lassa Fever, EVD Plan applies |
H7N9 H1N1 | CDC, H7N9 and CDC-MRNA |
Ebola | CDC, EVD Plan |
Meningitis | CDC, Acute Isolation Plan |

**Abbreviations:** MERS: Middle East Respiratory Syndrome
2019 Novel Coronavirus – TELEPHONE ONLY
Scheduler Screening and Clinician Process

Patient calls clinic:
(1) To schedule an appointment,
(2) In response to the travel Televox message regarding China, or
(3) For a general inquiry about an upcoming appointment.
2019 Novel Coronavirus – IN PERSON
Designated Clinical Staff Member Process

Screen shot from Massachusetts General Hospital.
Communications

• Anxiety is obviously high at this time
• Communicate regularly with staff and patients as the situation changes
• Consider developing internal websites to collect and organize all of the response resources and links
• Consider partnering with the media now to demonstrate readiness
• Monitor social-media threads for misinformation
Anticipating Surge

- Ambulatory surge
  - Identify space where a surge of patients seeking urgent care, diagnosis, and/or reassurance can be accommodated
  - Consider physical space, air handling, patient flow

- Inpatient surge
  - Identify all rooms throughout the facility
  - Consider whether hospital units can be made “negative” as a whole
  - Consider ICU space capabilities
Additional Considerations

• Testing
  – Testing kits are just being rolled out to state public-health labs
  – For the short term, testing will require public-health consent and resources

• Treatment
  – No known definitive treatments
  – Supportive care
  – Experimental therapeutics
    • Lopinavir/ritonavir – RCT underway in China right now
    • Plans for remdesivir
    • Lots of people looking on the shelf to see what can be used
Questions?

• Selected resources available at:
  – https://www.massgeneral.org/disaster-medicine/tools
Understanding and Addressing the Global Spread of the COVID-19 Infection

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Thank you for joining us today!

Please remember to complete the POST-TEST and EVALUATION.

Your participation will help shape future CME activities.