SARS-CoV-2 and COVID-19
Challenges in Containment and Management

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For APPNA membership and all healthcare workers  April 2020
Disclosures

• I have no disclosures related to this talk
Objectives

• Brief history of coronaviruses
• Epidemiology of the current outbreak
• Myths vs. Facts
• Treatment
• Diagnosis
• Prevention
Brief history

- Betacoronaviruses frequently infect animals
- Seven species known to infect humans
  - SARS-CoV, MERS-CoV and SARS-CoV-2 can cause severe disease
  - HKU1, NL63, OC43 and 229E are associated with mild symptoms
- SARS
  - November 2002 through July 2003
  - 8,098 people worldwide became sick with severe acute respiratory syndrome
  - 774 died
  - By late July 2003, no new cases were being reported, and WHO declared the global outbreak to be over.
- MERS CoV
  - By November 2019, 8,494 cases reported
  - 858 deaths
  - Sporadic cases still occurring
SARS-CoV2

- SARS-CoV-2 is the seventh coronavirus known to infect humans
- Has a receptor binding domain (RBD) with high affinity for ACE2 receptors from humans, ferrets, cats and other species
- Genetic data irrefutably show that SARS-CoV-2 is not derived from any previously used virus backbone

SARS-CoV-2: causative organism
COVID-19: disease name caused by SARS-CoV-2

## How did SARS-CoV-2 enter human population?

<table>
<thead>
<tr>
<th>STEP 1: Natural selection in an animal host before zoonotic transfer</th>
<th>STEP 2: Natural selection in humans following zoonotic transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Many early cases linked to an animal market</td>
<td>• Possible that a progenitor of SARS-CoV-2 jumped into humans acquiring adaptations during early undetected human-to-human transmission</td>
</tr>
<tr>
<td>• Similarity with bat SARS-CoV, but spike in RBD is divergent suggesting it may not bind efficiently to human ACE2</td>
<td>• At some point, the cluster became large enough to trigger surveillance and alarm</td>
</tr>
<tr>
<td>• Similarity with coronaviruses in illegally imported Malayan pangolins, with very similar RBD</td>
<td>• Gene sequencing data suggests species jump occurred in late Nov/early Dec 2019</td>
</tr>
<tr>
<td>• However, neither the bat betacoronaviruses nor the pangolin betacoronaviruses have polybasic cleavage sites, which suggests natural selection and not a man-made virus</td>
<td></td>
</tr>
</tbody>
</table>

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 NHC; NHC and China CDC involved in investigation and response.

Case-finding activated.

Pneumonia cases linked to the Huanan Seafood Wholesale Market.

Nov. 27-30
Dec. 1-3
Jan. 4-6
Jan. 7-9
Jan. 10-12
Jan. 13-15
Jan. 16-18
Jan. 19-21
Jan. 22-24
Jan. 25-27
Jan. 28-30

Link to Huanan market
Not link to Huanan market

- First confirmed case from Wuhan reported outside China (in Thailand)
- China CDC emergency response level upgraded to Level 1 (the highest level); national technical protocols for 2019-nCoV released by NHC
- 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
- Reagent probes and primers shared with the public by China CDC

Situation report

As of 31 March 2020, 7:30 AM EST

802,369 cases
38,990 deaths
Global situation – March 31, 2020

- **Total Cases**
  - Linear Scale
  - Jan 22 to Mar 27

- **Total Deaths**
  - Linear Scale
  - Jan 22 to Mar 22

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Global situation – March 31, 2020

Mostly China

Rest of the world

Poor global response
Daily new cases – 30 March 2020

USA

Italy

Spain

Pakistan
Proportion died and ICU beds/100,000 population

Data compiled March 23, 2020
Let’s bust some myths first
Myth vs. Fact

• TRUE or FALSE?

COVID-19 is like the regular flu

FALSE

• COVID-19 is more infectious than the regular influenza virus and more lethal. However, while more infectious than other recent novel coronavirus viruses (SARS and MERS CoV), it is less lethal than both.
Myth vs. Fact

• TRUE or FALSE?

I am young and otherwise healthy. I have nothing to fear

FALSE

• While COVID-19 is more likely to cause serious illness and death in the elderly and those with chronic medical conditions, there have been plenty of severe cases and even deaths in the younger population. Also, young persons play a role in transmission of infection.
Myth vs. Fact

• TRUE or FALSE?

A vaccine to cure COVID-19 is available

FALSE

• Vaccine trials have started and first group of patients have been enrolled. However, a safe, effective and viable vaccine is probably at least 12-18 months away.
Myth vs. Fact

• TRUE or FALSE?

You can protect yourself by swallowing or gargling with bleach, taking acetic acid or steroids, or using essential oils, salt water, ethanol or other substances

FALSE

• There is no truth to such remedies being touted on social media. While some of these remedies may help with general wellness, others may be quite harmful. Do not forward or share such posts on social media. Always verify your sources and rely on highly reliable sources such as CDC and WHO.
Myth vs. Fact

• TRUE or FALSE?

The new coronavirus was deliberately created or released by people

FALSE

• There is no truth to this. In fact recent a recent paper in a major medical journal has debunked that myth.
Myth vs. Fact

• TRUE or FALSE?

Ordering or buying products shipped from China will make a person sick

FALSE

• There is no evidence of any transmission through trade or trade goods. In fact, with the infection rates dramatically reduced in China with exponential increase in cases in many other developed countries, this does not make sense.
Myth vs. Fact

• TRUE or FALSE?

A face mask will protect you from COVID-19.

FALSE

• For proper protection, a professional fitted N-95 mask is required. CDC and WHO do not recommend regular face masks for all persons. However, those with symptoms of a respiratory infection should wear a surgical mask to prevent spreading the infection.
How does the virus spread?
## Viability of SARS-CoV-2 on various surfaces

<table>
<thead>
<tr>
<th>Surface</th>
<th>Viability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>Upto 4 hours</td>
</tr>
<tr>
<td>Cardboard</td>
<td>Upto 24 hours</td>
</tr>
<tr>
<td>Plastic</td>
<td>2 to 3 days</td>
</tr>
<tr>
<td>Stainless steel</td>
<td>2 to 3 days</td>
</tr>
<tr>
<td>Aerosols</td>
<td>Upto 3 hours</td>
</tr>
</tbody>
</table>
Presumed asymptomatic carrier transmission

Patient 1 traveled from Wuhan to Anyang

Timeline events:
- Contact with patient 1
- Asymptomatic period
- Symptomatic period
- Onset of symptoms
- Negative PCR result
- Positive PCR result

JAMA. Published online February 21, 2020. doi:10.1001/jama.2020.2565
## Risk factors for healthcare workers

<table>
<thead>
<tr>
<th>Factor</th>
<th>Relative risk (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosed family member</td>
<td>2.76 (2.02 – 3.77)</td>
</tr>
<tr>
<td>Suspected family member</td>
<td>1.30 (0.31 – 5.35)</td>
</tr>
<tr>
<td>Diagnosed patient</td>
<td>0.36 (0.22 – 0.59)</td>
</tr>
<tr>
<td>Suspected patient</td>
<td>0.49 (0.27 – 0.89)</td>
</tr>
<tr>
<td>Suboptimal hand hygiene before patient contact</td>
<td>3.10 (1.43 – 6.73)</td>
</tr>
<tr>
<td>Improper PPE</td>
<td>2.82 (1.11 – 7.18)</td>
</tr>
</tbody>
</table>
How does it present?
### Clinical characteristics

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever at admission</td>
<td>44%</td>
</tr>
<tr>
<td>Fever during hospitalization</td>
<td>89%</td>
</tr>
<tr>
<td>Cough</td>
<td>68%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>38%</td>
</tr>
<tr>
<td>Sputum production</td>
<td>34%</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>19%</td>
</tr>
<tr>
<td>Myalgias/arthritis</td>
<td>15%</td>
</tr>
<tr>
<td>Sore throat</td>
<td>14%</td>
</tr>
<tr>
<td>Headache</td>
<td>14%</td>
</tr>
<tr>
<td>Chills</td>
<td>12%</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>5%</td>
</tr>
<tr>
<td>Nasal congestion</td>
<td>5%</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>4%</td>
</tr>
</tbody>
</table>
Clinical features of patients with pneumonia

<table>
<thead>
<tr>
<th>Initial common symptoms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>188 (93.5)</td>
</tr>
<tr>
<td>Cough</td>
<td>163 (81.1)</td>
</tr>
<tr>
<td>Productive cough</td>
<td>83 (41.3)</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>80 (39.8)</td>
</tr>
<tr>
<td>Fatigue or myalgia</td>
<td>65 (32.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chest imaging, infiltrate^a</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral</td>
<td>10 (5.0)</td>
</tr>
<tr>
<td>Bilateral</td>
<td>191 (95.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comorbidities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>39 (19.4)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>22 (10.9)</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>8 (4.0)</td>
</tr>
<tr>
<td>Liver disease</td>
<td>7 (3.5)</td>
</tr>
<tr>
<td>Nervous system disease</td>
<td>7 (3.5)</td>
</tr>
<tr>
<td>Chronic lung disease</td>
<td>5 (2.5)</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>2 (1.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical outcomes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ARDS</td>
<td>84 (41.8)</td>
</tr>
<tr>
<td>ICU admission</td>
<td>53 (26.4)</td>
</tr>
<tr>
<td>Death</td>
<td>44 (21.9)</td>
</tr>
</tbody>
</table>
## Risk of ARDS and death

<table>
<thead>
<tr>
<th>Patient characteristics and findings</th>
<th>ARDS</th>
<th>Death</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR (95% CI)</td>
<td>P value</td>
</tr>
<tr>
<td><strong>Clinical characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (≥65 vs &lt;65), y</td>
<td>3.26 (2.08-5.11)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Gender (male vs female)</td>
<td>1.47 (0.92-2.36)</td>
<td>.11</td>
</tr>
<tr>
<td>Highest patient temperature (≥39 °C vs &lt;39 °C)</td>
<td>1.77 (1.11-2.84)</td>
<td>.02</td>
</tr>
<tr>
<td><strong>Comorbidities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension (yes vs no)</td>
<td>1.82 (1.13-2.95)</td>
<td>.01</td>
</tr>
<tr>
<td>Diabetes (yes vs no)</td>
<td>2.34 (1.35-4.05)</td>
<td>.002</td>
</tr>
<tr>
<td><strong>Infection-related indices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hs-CRP, mg/L (&gt;5 vs ≤5)</td>
<td>4.81 (1.52-15.27)</td>
<td>.008</td>
</tr>
<tr>
<td>IL-6, pg/L</td>
<td>1.02 (1.00-1.05)</td>
<td>.09</td>
</tr>
<tr>
<td>ESR, mm/h</td>
<td>1.01 (1.00-1.02)</td>
<td>.19</td>
</tr>
<tr>
<td>Serum ferritin, ng/mL (&gt;300 vs ≤300)</td>
<td>3.53 (1.52-8.16)</td>
<td>.003</td>
</tr>
<tr>
<td><strong>Coagulation function</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PT, s</td>
<td>1.56 (1.32-1.83)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>APTT, s</td>
<td>0.97 (0.94-1.01)</td>
<td>.13</td>
</tr>
<tr>
<td>D-dimer, μg/mL</td>
<td>1.03 (1.01-1.04)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Risk factors for more severe disease

- Older age
- Comorbidities
  - Diabetes
  - Hypertension
  - Chronic kidney disease
  - Chronic lung disease
  - Chronic liver disease
- Reduced immunity
Case fatality rate

- China: 2.3%
- Korea: 1.0%
- Italy: 7.2%
  - Older demographic (23% > 65) and 37.6% of cases in Italy were in people > 70
  - Italian CFR uses death from any cause, not limited to “COVID-19-related deaths”
  - Stringent testing policy (only hospitalized, high risk patients), may have decreased denominator and therefore increased CFR

<table>
<thead>
<tr>
<th>Age, y</th>
<th>Deaths, No. (% of total)</th>
<th>Case-fatality rate, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10-19</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20-29</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>30-39</td>
<td>4 (0.25)</td>
<td>0.3</td>
</tr>
<tr>
<td>40-49</td>
<td>10 (0.62)</td>
<td>0.4</td>
</tr>
<tr>
<td>50-59</td>
<td>43 (2.65)</td>
<td>1.0</td>
</tr>
<tr>
<td>60-69</td>
<td>139 (8.55)</td>
<td>3.5</td>
</tr>
<tr>
<td>70-79</td>
<td>578 (35.57)</td>
<td>12.5</td>
</tr>
<tr>
<td>80-89</td>
<td>694 (42.71)</td>
<td>19.7</td>
</tr>
<tr>
<td>≥90</td>
<td>156 (9.6)</td>
<td>22.7</td>
</tr>
<tr>
<td>Not reported</td>
<td>1 (0.06)</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>1625 (100)</td>
<td>7.2</td>
</tr>
</tbody>
</table>

Authors: Edward Livingston, MD; Karen Bucher, MA, CMI
Sources: Adapted from the COVID-19 Task Force of the Department of Infectious Diseases and the IT Service Instituto Superiore di Sanità. https://www.sis.it/infographiche
Please cite as: JAMA. Published online March 17, 2020. doi:10.1001/jama.2020.3344
How to diagnose?
Diagnosis

• Nasopharyngeal swab
• Lower respiratory secretions
• Bronchoalveolar lavage fluid
• Also found in sputum and stool
• Serology (IgG, IgM)
• Radiographic (CXR or CT scan)

New assays being developed
• Antigen detection

Not recommended unless no other option due to high risk of infection
Real time RT-PCR

Rapid, point-of-care

To confirm presence and extent of pneumonia rather than etiologic diagnosis
## Detection in different types of clinical specimens

<table>
<thead>
<tr>
<th>Specimens and values</th>
<th>Bronchoalveolar lavage fluid (n = 15)</th>
<th>Fibrobronchoscope brush biopsy (n = 13)</th>
<th>Sputum (n = 104)</th>
<th>Nasal swabs (n = 8)</th>
<th>Pharyngeal swabs (n = 398)</th>
<th>Feces (n = 153)</th>
<th>Blood (n = 307)</th>
<th>Urine (n = 72)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive test result, No. (%)</td>
<td>14 (93)</td>
<td>6 (46)</td>
<td>75 (72)</td>
<td>5 (63)</td>
<td>126 (32)</td>
<td>44 (29)</td>
<td>3 (1)</td>
<td>0</td>
</tr>
<tr>
<td>Cycle threshold, mean (SD)</td>
<td>31.1 (3.0)</td>
<td>33.8 (3.9)</td>
<td>31.1 (5.2)</td>
<td>24.3 (8.6)</td>
<td>32.1 (4.2)</td>
<td>31.4 (5.1)</td>
<td>34.6 (0.7)</td>
<td>ND</td>
</tr>
<tr>
<td>Range</td>
<td>26.4-36.2</td>
<td>26.9-36.8</td>
<td>18.4-38.8</td>
<td>16.9-38.4</td>
<td>20.8-38.6</td>
<td>22.3-38.4</td>
<td>34.1-35.4</td>
<td></td>
</tr>
<tr>
<td>95% CI</td>
<td>28.9-33.2</td>
<td>29.8-37.9</td>
<td>29.3-33.0</td>
<td>13.7-35.0</td>
<td>31.2-33.1</td>
<td>29.4-33.5</td>
<td>0.0-36.4</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviation: ND, no data.
Viral load in upper and lower respiratory specimen

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How to treat?
Treatment principles

- On 30 March 2020, FDA issued an EUA (Emergency Use Authorization) to allow chloroquine and hydroxychloroquine for treatment of certain patients with COVID-19 infection. This does not include prophylaxis.

- Treatment is otherwise largely supportive
First do no harm: what DOES NOT work
## Potential treatment regimens

<table>
<thead>
<tr>
<th>Possible role</th>
<th>No role (except specific other need)</th>
</tr>
</thead>
</table>
| • Chloroquine/azithromycin  
• Convalescent plasma/serum  
• Remdesivir  
• IL-6 receptor blockers (e.g. tocilizumab) | • Steroids  
• ACE-inhibitors  
• Oseltamivir |

**Unsure**

• Lopinavir/ritonavir  
• Interferon/ribavirin  
• NSAIDS  
• Vitamin C
Hydroxychloroquine + azithromycin

- Only 20 subjects in the active treatment arm
- No control group
- Varying disease severity
Hydroxychloroquine + azithromycin

**Clinical Classification**

- **Asymptomatic**: 5.0%
- **URTI**: 41.2%
- **LRTI**: 53.8%

**Severity (based on NEWS score)**

<table>
<thead>
<tr>
<th>Severity</th>
<th>At admission</th>
<th>At discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>92.0%</td>
<td>93.8%</td>
</tr>
<tr>
<td>Medium</td>
<td>5.3%</td>
<td>6.2%</td>
</tr>
<tr>
<td>High</td>
<td>2.7%</td>
<td>-</td>
</tr>
</tbody>
</table>

**Pneumonia on CT**

- **Not done**: 20.0%
- **No pneumonia**: 26.2%
- **Pneumonia present**: 53.8%

**Study Design**

- Aggressive course (O2 requirement; ICU admission)
- Contagiousness (PCR<34; culture negative)
- LOS in ID ward

**Gautret et al. Pre-publication non-peer reviewed draft**

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**Concerns**

- No control group
- Varying severity of disease
- Other treatments unclear
- No change in disease severity
- Even patients with pneumonia may have had mild disease
- Decreasing numbers tested from day 3 onwards

Gautret et al. Pre-publication non-peer reviewed draft  
Remdesivir, chloroquine, hydroxychloroquine

- Benefit observed in vitro
- Increased inhibition of virus
Lopinavir/ritonavir

Time to Clinical Improvement in the Intention-to-Treat Population

- Large enough study
- No benefit of Lopinavir/ritonavir observed

Lopinavir/ritonavir

Mean Change from Baseline in Viral RNA Load by qPCR on Throat Swabs.

- Large enough study
- No benefit of Lopinavir/ritonavir observed

Convalescent serum

- Only 5 subjects; No control group
- Also received other treatments (antivirals)
- Plasma transfusion done 10-22 after admission

Shen et al. JAMA. Published online March 27, 2020. doi:10.1001/jama.2020.4783
Tocilizumab

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# Treatment for severe ARDS

<table>
<thead>
<tr>
<th>Therapy</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-flow nasal oxygen</td>
<td>Might prevent or delay the need for intubation</td>
</tr>
<tr>
<td>Tidal volume</td>
<td>Use 6 mL/kg per predicted bodyweight (can reduce to 4 mL/kg per predicted bodyweight)</td>
</tr>
<tr>
<td>Plateau airway pressure</td>
<td>Maintain at &lt;30 cm H₂O if possible</td>
</tr>
<tr>
<td>Positive end-expiratory pressure</td>
<td>Consider moderate to high levels if needed</td>
</tr>
<tr>
<td>Recruitment manoeuvres</td>
<td>Little value</td>
</tr>
<tr>
<td>Neuromuscular blockade</td>
<td>For ventilator dyssynchrony, increased airway pressure, hypoaxemia</td>
</tr>
<tr>
<td>Prone positioning</td>
<td>For worsening hypoaxemia, PaO₂/FIO₂ &lt;100–150 mm Hg</td>
</tr>
<tr>
<td>Inhaled NO</td>
<td>Use 5–20 ppm</td>
</tr>
<tr>
<td>Fluid management</td>
<td>Aim for negative fluid balance of 0·5–1·0 L per day</td>
</tr>
<tr>
<td>Renal replacement therapy</td>
<td>For oliguric renal failure, acid-base management, negative fluid balance</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>For secondary bacterial infections</td>
</tr>
<tr>
<td>Glucocorticoids</td>
<td>Not recommended</td>
</tr>
<tr>
<td>Extracorporeal membrane oxygenation</td>
<td>Use EOLIA trial criteria³</td>
</tr>
</tbody>
</table>
Triage algorithm (one of many such available)

COVID-19 suspected as per case definition

Severe symptoms (requires hospitalization)
- Shortness of breath (RR ≥30 breaths/min)
- Oxygen saturation ≤93% on room air
- PaO2/FiO2 ≤30mmHg
- Chest imaging shows clear pneumonia
- Respiratory failure requiring mechanical ventilator
- Shock
- Other organ failure that requires ICU care
  - Collect nasopharyngeal/throat swab (full viral panel including COVID-19)
  - Admit to appropriate setting

Moderate symptoms
- Fever and respiratory symptoms with radiological findings consistent with pneumonia
  - Collect nasopharyngeal/throat swab (full viral panel including COVID-19)
  - Keep patient under airborne, droplet and contact isolation
  - Swab result?
    - Positive
      - Admit to appropriate setting
    - Negative
      - Home suitable for isolation?
        - Yes
          - Send home with verbal and written instructions
          - Quarantine
        - No
          - Observe for development or worsening of symptoms
          - Medical evaluation
          - Swab result?
            - Positive
              - Admit to appropriate setting
            - Negative
              - Continue home isolation for 14 days from the day of arrival/contact

No symptoms or mild symptoms
- No evidence of pneumonia on imaging
  - Symptomatic treatment
  - Home suitable for isolation?
    - Yes
      - Send home with verbal and written instructions
      - Quarantine
    - No
      - Observe for development or worsening of symptoms
      - Medical evaluation
      - Swab result?
        - Positive
          - Admit to appropriate setting
        - Negative
          - Continue home isolation for 14 days from the day of arrival/contact

Adeel A. Butt, MD, MS, FACP, FIDSA
How to prevent?
Prevention

Save the world

Prevent yourself from getting infected

Prevent transmitting it to others
Break the cycle of transmission

Social distancing
- No handshakes, hugs
- Work from home

Hygiene
- Frequent handwashing or sanitization
- Proper cough etiquette

Stay at home
- Work from home
- Restrict travel to critical travel

No mass gathering
- Avoid malls, restaurants, weddings, funerals, mosques

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Management of contacts

- Medical evaluation
- If contact with a confirmed case, then test and isolate
  - Distance <6 feet (some say 4 feet) for >15 minutes (some say 30 minutes)
- Further management based on meeting case definition and symptoms

- Contact of an asymptomatic contact
  - General preventive measures only
  - Strict quarantine not indicated
  - Stay at home, social distancing, hygienic principles
At the workplace (other than healthcare facilities)

- Work from home wherever and whenever possible
- Audio or videoconferencing for meetings
- Do not gather in large numbers
- No handshakes
- Close or avoid common areas (water cooler, cafeteria, etc.)
- Frequent hand hygiene
- Frequent and meticulous cleaning of common areas and surfaces
Summary

• Pandemic is on the upswing in most areas of the world
• However, good news is that China managed to stem it relatively quickly
• Public health measures do work

• Public has to take responsibility
• Governments must provide unified and clear advice and enforce public health measures
INNOVATIONS IN HEALTHCARE ADVOCACY, RESEARCH AND TRAINING

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