SARS-CoV-2
(the virus that causes COVID-19)
Update from DoS MED

25 Feb 2020

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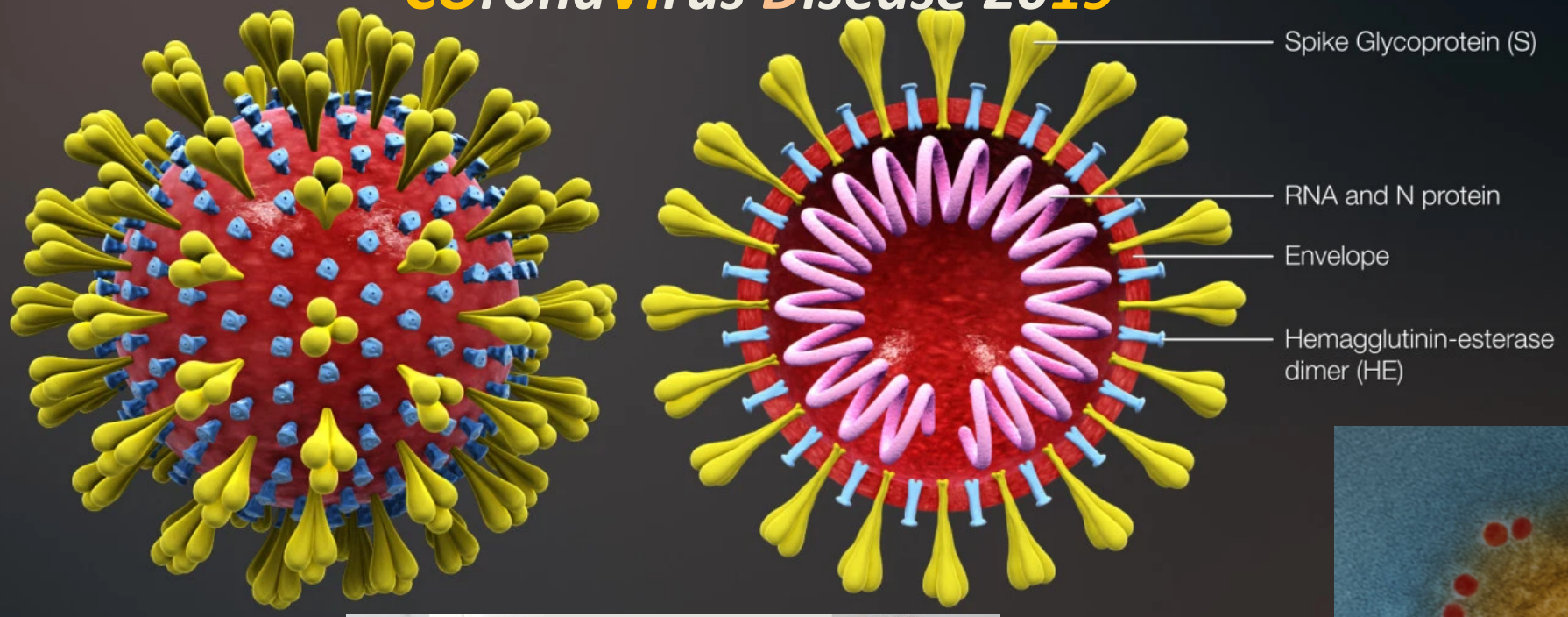
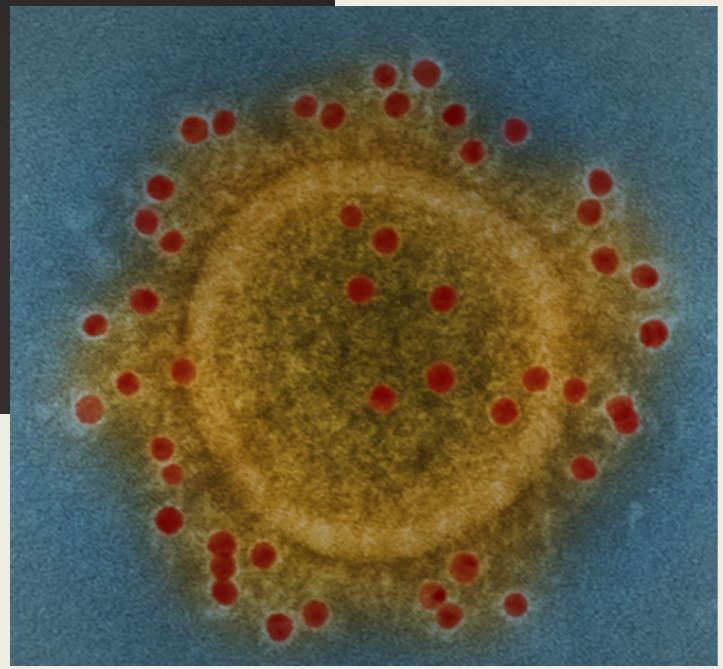
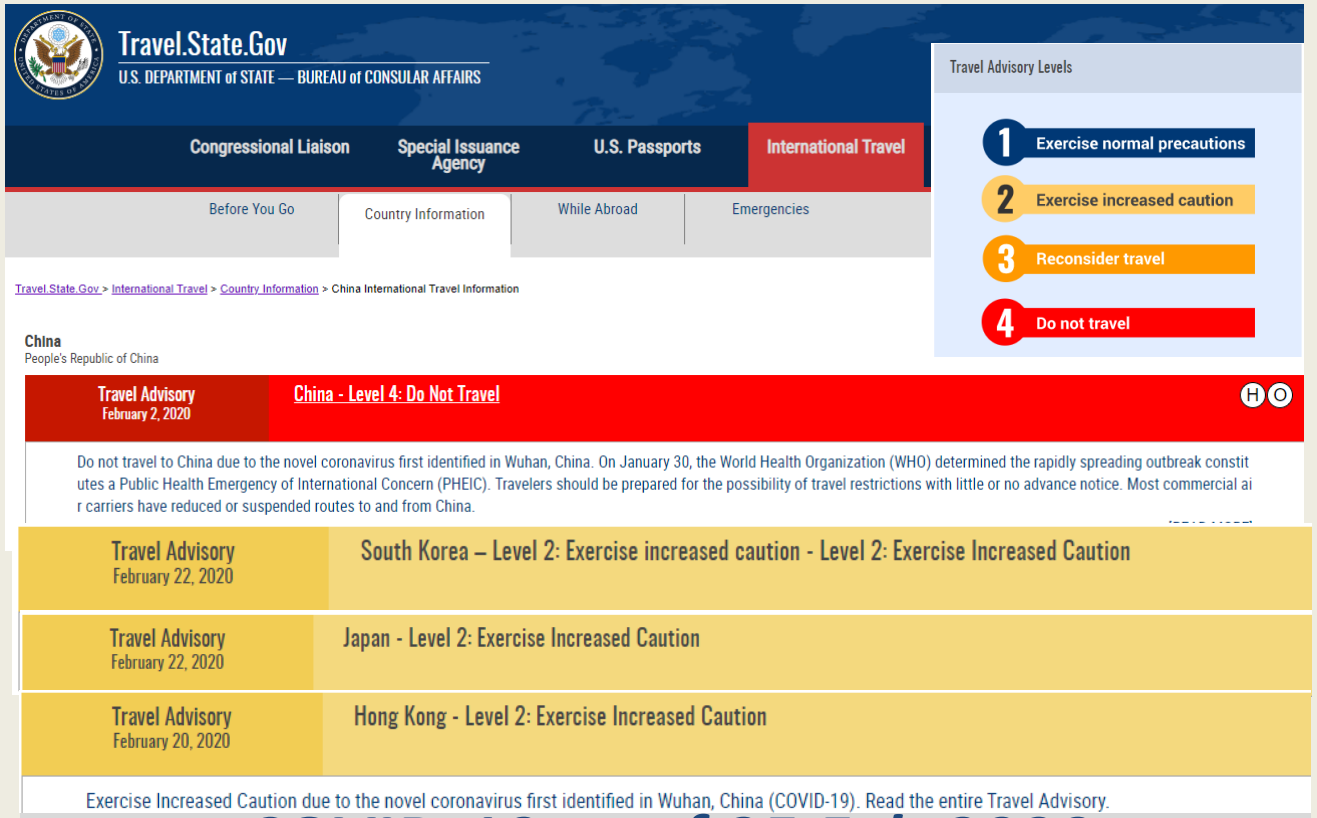
Tropical Medicine – Infectious Diseases

SARS-CoV-2 the virus that causes COVID-19

COronaVIrus Disease 2019







COVID-19 as of 25 Feb 2020

80,150

Worldwide cases

2,699

Worldwide deaths

DoS and CDC Travel recs

Novel Coronavirus in China

- **Warning - Level 3, Avoid Nonessential Travel**
- Alert - Level 2, Practice Enhanced Precautions
- Watch - Level 1, Practice Usual Precautions

Coronavirus in South Korea

- **Warning - Level 3, Avoid Nonessential Travel**
- Alert - Level 2, Practice Enhanced Precautions
- Watch - Level 1, Practice Usual Precautions

Coronavirus in Japan

- Warning - Level 3, Avoid Nonessential Travel
- **Alert - Level 2, Practice Enhanced Precautions**
- Watch - Level 1, Practice Usual Precautions

Coronavirus in Italy

- Warning - Level 3, Avoid Nonessential Travel
- **Alert - Level 2, Practice Enhanced Precautions**
- Watch - Level 1, Practice Usual Precautions

Coronavirus in Iran

- Warning - Level 3, Avoid Nonessential Travel
- **Alert - Level 2, Practice Enhanced Precautions**
- Watch - Level 1, Practice Usual Precautions

Coronavirus in Hong Kong

- Warning - Level 3, Avoid Nonessential Travel
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- **Watch - Level 1, Practice Usual Precautions**

CDC estimates that so far for just *this US flu season*:

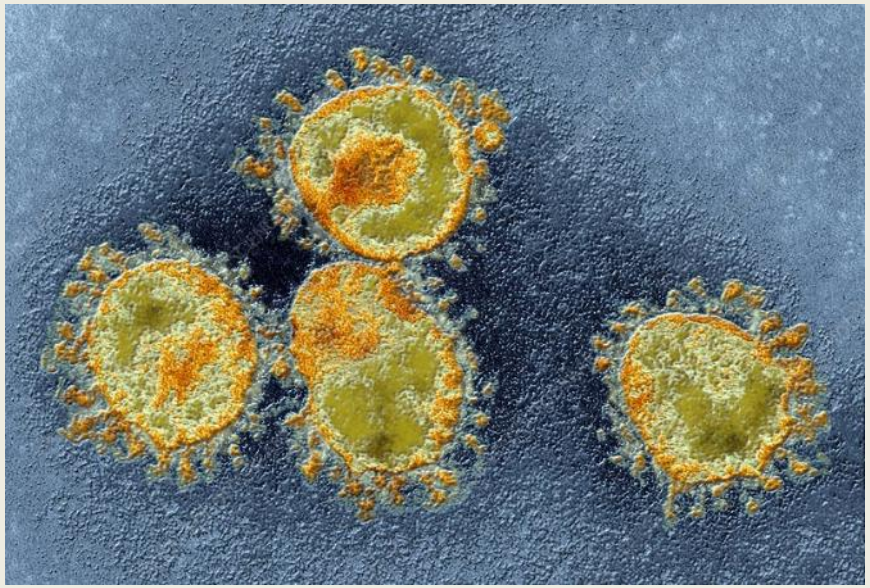
- **there have been at least 29 million flu illnesses**
- **280,000 hospitalizations**
- **>16,000 deaths from flu including 105 pediatric deaths**
- **5.9% of those sick enough to hospitalize die**
- **Typical years ~1 in 10000 of all flu cases die – CFR 0.01%**

https://www.cdc.gov/flu/weekly/index.htm

Human Coronavirus Types

Common human coronaviruses (colds).

1. ***229E*** **(alpha coronavirus)**
2. ***NL63*** **(alpha coronavirus)**
3. ***OC43*** **(beta coronavirus)**
4. ***HKU1*** **(beta coronavirus)**



Other human coronaviruses (the bad ones):

5. ***MERS-CoV*** **(*Middle East Respiratory Syndrome*)**
   - **2494 cases/858 deaths mainly Arabian peninsula**
   - **34% case fatality rate**
   - **Exported cases caused outbreak in S Korea**

6. ***SARS-CoV*** **(*Severe Acute Respiratory Syndrome*)**
   - **8098 cases/774 deaths**
   - **9.5% case fatality rate**
   - **No cases since 2004**

7. ***SARS-CoV-2 (causes COVID-19)***
   - **~2% case fatality rate to date but still being determined**

COVID-19

Background

- 36 countries outside China have reported 2491 cases
  - 1800 outside of China + 691 on *Diamond Princess*
  - 36 patients outside of China have died
- Case fatality rate continues to drop to under 2%
  - CFR in Wuhan 4.9%, in Hubei Province 3.1% and in other provinces 0.16%
  - In the first month of pandemic H1N1 in 2009 the initial CFR was 10%
    - After serologic assays focused on all those who were infected CFR was <0.1%
- All ages can be infected
  - In China: 80% of deaths in >60yo
    - 97% of deaths were in Hubei Province
    - 75% pre-existing conditions (asthma, DM or heart disease)
  - 71% of cases outside China are male
  - 17,000 Chinese cases 82% mild, 15% "severe" and 3% are "critical"

Excellent site for updated data: https://www.worldometers.info/coronavirus/ accessed 23 Feb2020

COVID-19

What are the symptoms?

Potentially suspect case if:

- Fever
- Symptoms of lower respiratory illness
  - Cough
  - Shortness of breath
- Travel in China, especially Hubei Province in the last 14 days

Or

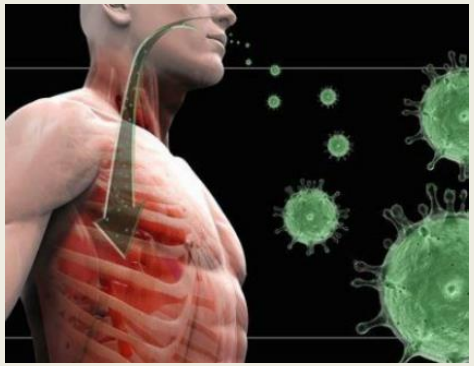
Close (≤6 feet) contact with an ill laboratory confirmed COVID patient

Other symptoms seen in some but are not in the diagnostic criteria include body aches, sore throat, runny nose and diarrhea

Incubation period:

- Range 2-14 days, most cases occur in 2-7 days and 5.2 days is mean
- Symptoms >14 days after potential exposure look for other etiologies
  - Health Unit assessment for influenza and other causes

Clinical Presentation for COVID-19
Remains to be fully determined



- It appears that >80% of cases are mild (? % No symptoms)
- Very few cases in children <15 yo and no deaths in children <10 yo
- What proportion of infections have symptoms vs none is one of the greatest unknowns
  - the case fatality rate and number of cases infected by each case can only be determined with this information
  - Will require large blood test surveys to be performed, probably in Hubei province
- How long are patients infected?
  - Not known but presumed as symptoms resolve that shedding stops
  - There may be some who shed virus even as they appear recovered?
  - Shedding may occur in stool?

Preventing and Treating COVID-19
No current antivirals or vaccines approved

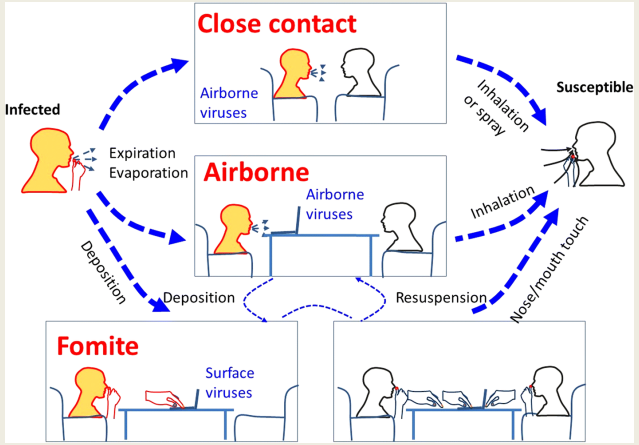
- **Some drugs have worked in the laboratory on CoV and are being used in China.**
  - **Immune serum from recovered patients is also being tested**
  - **Other antiviral drugs are ineffective**

- **Vaccines developed for SARS and MERS are excellent candidates**
  - **Possibly the SARS vaccine should be considered for use very shortly**
  - **NIAID plans human trials to start on vaccines within three months**

How is this new coronavirus spread?
What can we do to prevent it?

- **Person-to-person, appears similar to other coronaviruses and influenza**
  - **mainly via *respiratory droplets* produced when an infected person coughs**
  - **droplets can land in the mouths, noses, or eyes of people who are nearby or possibly be inhaled into the lungs.**
  - **Currently, the extent to which touching a surface or object that has the virus on it and then touching your mouth, nose, or possibly eyes, contributes to transmission is unclear.**

- **We know that some people do shed COVID-19 in their feces but how much, if any, role this plays in spreading the infection remains unknown**
  - **The unknown aspect of this makes hand washing and surface cleaning more important than it is with influenza**



SARS-CoV-2 transmission from objects?

Infectivity on Surfaces

Fomites = nonliving objects that can transmit infection

- **Survivability of coronaviruses is variable**
  - **Ideal conditions, 4^{o}C and 20% humidity, some live for 28 days on steel surface**
  - **SARS/MERS variable on surfaces 24 -72 hours**
  - **Porous materials such as fabric and papers tend to hold onto viruses so they are less risky**

- **Risk of infection is very low from items shipped at room temperatures over several days.**
  - **Amazon packages, diplomatic pouch, documents at the consular window are all unlikely to have any risk as porous items are very poor fomites**

Infection Control

Measures to take in your workspace to decrease infectious risks

- Wipe down daily "high-touch" surfaces, such as counters, tabletops, doorknobs, bathroom fixtures, toilets, phones, keyboards, tables, etc.
  - Can use disinfectant on a sponge or rag or use disposable saniwipes

- Use a diluted bleach solution or a household disinfectant with a label that says "EPA-approved."
  - To make a bleach solution, add 60 mL (2 oz) of bleach to 4 L of water.

- Alcohol-based hand disinfectants and common hospital personal disinfectants are all effective against COVID-19
  - Reuse frequently, especially before touching your face or eyes

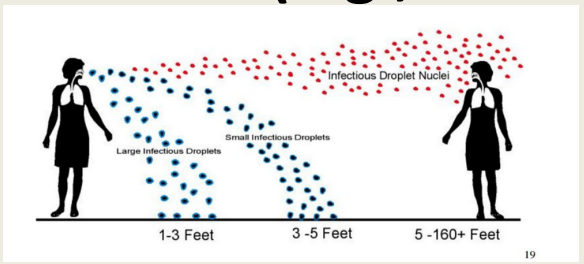
What is my risk when I'm at work and interacting with the local population?

The definition of a close contact?

The CDC defines a close contact is defined as:

- **being within ~6 feet (2 meters) of a COVID case for a prolonged period**
  - **while caring for, living with, visiting, or sharing a health care waiting area or room with a COVID case**

    OR
- **having direct contact with infectious secretions of a COVID case (e.g., being coughed on)**



Considerations when assessing close contact:

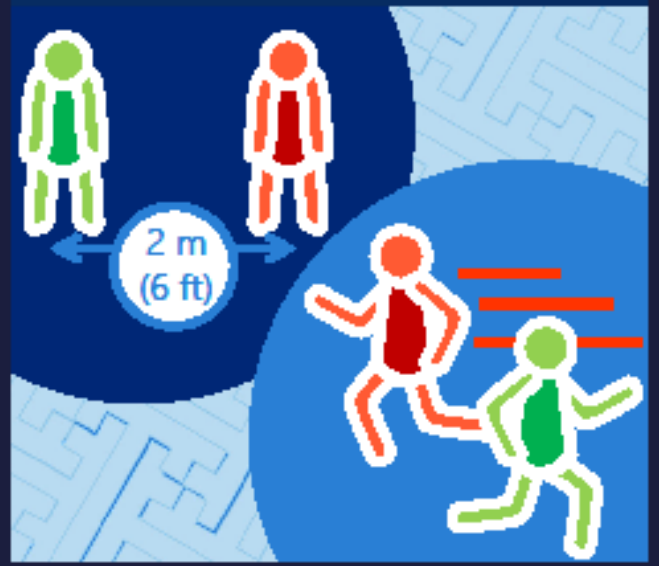
- *duration of exposure (e.g., longer exposure time likely increases exposure risk)*
- *clinical symptoms of the person with COVID (e.g., coughing likely increases exposure risk as does exposure to a severely ill patient).*
- *Special consideration should be given to those exposed in health care settings.*

What determines whether I or someone I know should be considered a "close contact"?

Remain Vigilant

Brief Contact

Interactions at a 2 meter (6 ft) distance or brief encounters, such as walking by a person, are low risk and do not constitute close contact



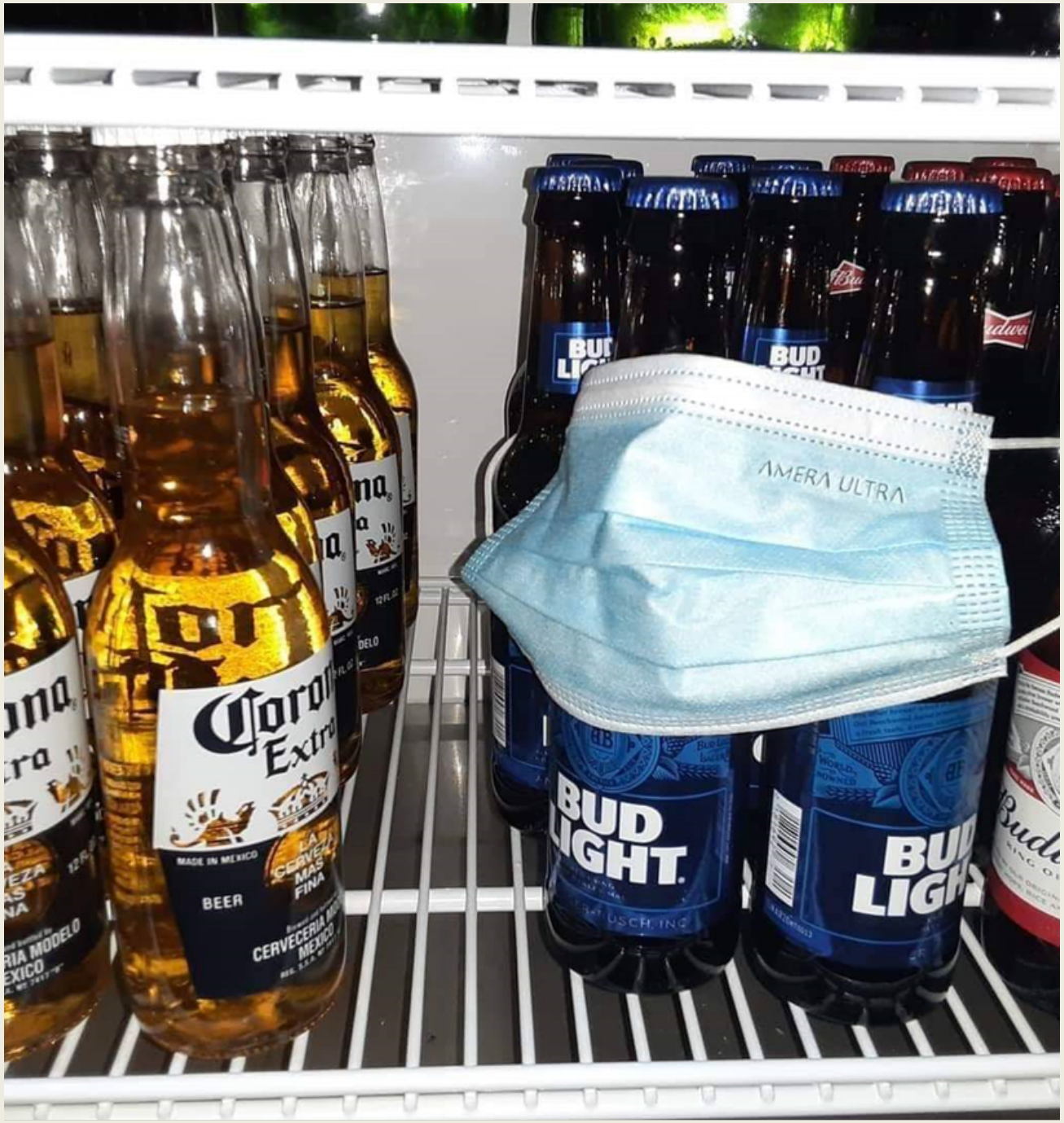
Consult Medical Unit

Proximal Contact

Being near a person who is infected with novel coronavirus for a LONG TIME

Direct Contact

Direct contact with infectious body fluids of a person who is infected with novel coronavirus, such as being coughed on



The Role for Masks

Which one should be masked, Bud Light or Corona?!

GLOBAL INFLUENZA PROGRAMME

Non-pharmaceutical public health measures for mitigating the risk and impact of epidemic and pandemic influenza

World Health Organization

Masks, hand hygiene, respiratory etiquette

What do studies reveal?

RECOMMENDATION:

Hand hygiene is recommended as part of general hygiene and infection prevention, including during periods of seasonal or pandemic influenza. Although RCTs have not found that hand hygiene is effective in reducing transmission of laboratory-confirmed influenza specifically, mechanistic studies have shown that hand hygiene can remove influenza virus from the hands, and hand hygiene has been shown to reduce the risk of respiratory infections in general.

Population: General public

When to apply: At all times

RECOMMENDATION:

Respiratory etiquette is recommended at all times during influenza epidemics and pandemics. Although there is no evidence that this is effective in reducing influenza transmission, there is mechanistic plausibility for the potential effectiveness of this measure.

Population: General public

When to apply: At all times

WHO. *Non-pharmaceutical public health measures for mitigating the risk and impact of epidemic and pandemic influenza*; 2019

OVERALL RESULT OF EVIDENCE ON FACE MASKS

1. **Ten large controlled studies reviewed** and there was no evidence that face [illegible] effective in reducing transmission of laboratory-confirmed influenza.

RECOMMENDATION:

Face masks worn by asymptomatic people are conditionally recommended in severe epidemics or pandemics, to reduce transmission in the community. Disposable, surgical masks are recommended to be worn at all times by symptomatic individuals when in contact with other individuals. Although there is no evidence that this is effective in reducing transmission, there is mechanistic plausibility for the potential effectiveness of this measure.

Population: Population with symptomatic individuals; and general public for protection

When to apply: At all times for symptomatic individuals (disposable surgical mask), and in severe epidemics or pandemics for public protection (face masks)

Ryu S, Gao H, Wong JY, et al. **Nonpharmaceutical measures for pandemic influenza in nonhealthcare settings—international travel-related measures**. *Emerg Infect Dis*. 2020; 26(5) doi: 10.3201/eid2605.190993.

Xiao J, Shiu EYC, Gao H, et al. **Nonpharmaceutical measures for pandemic influenza in nonhealthcare settings—personal protective and environmental measures**. *Emerg Infect Dis*. 2020; 26(5) doi: 10.3201/eid2605.190994.

Fong MW, Gao H, Wong JY, et al. **Nonpharmaceutical measures for pandemic influenza in nonhealthcare settings—social distancing measures**. *Emerg Infect Dis*. 2020;26(5). doi: 10.3201/eid2605.190995.

Interim Guidance for Businesses and Employers to Plan and Respond to 2019 Novel Coronavirus (2019-nCoV), February 2020

What should we be doing in our workspace?

- ***Actively encourage sick employees to stay home if they have respiratory illness and stay home until they have no fever >24 hours***
  - **Phone contact with Health Unit BEFORE returning to work**
- ***Separate sick employees until they can be sent home***
  - **Provide a mask and keep them apart from people until they can go home**
- ***Emphasize staying home when sick, respiratory etiquette and hand hygiene by all employees***
  - **Place posters, make sure hand sanitizer is readily available, bathroom sinks have soap**
- ***Perform routine environmental cleaning***
  - **Routinely clean frequently touched surfaces: workstations, countertops, door handles**
  - **Make disposable wipes available for employees to wipe surfaces as well**

https://www.cdc.gov/coronavirus/2019-ncov/guidance-business-response.html

What else to do?

Other items to consider with the threat of COVID-19

- **Have signs encouraging embassy/consulate visitors who have a respiratory illness to reschedule their appointment for when they are feeling better**
  - **Discuss with security: visibly ill people should be turned away before coming into the facility**

- **Get your flu shot!**
  - **This has been a big year for influenza in the US and in China as well much of the world.**
  - **COVID-19 vs influenza are clinically overlapping and hard to tell apart**
    - **Getting a case of flu means you may be considered as a possible case of COVID**

- **Make sure that hand sanitizer dispensers are available and filled in the public areas before they come to your window.**
  - **Having a sign requesting that everyone sanitize first is a good idea**
  - **Have a container next to you at your workstation and sanitize between applicants and before eating or touching your face or eyes**

Why aren’t we doing temperature screening at our facility?

- **Not a recommendation at this point from the WHO or CDC for routine work settings**

- **Not a very sensitive nor specific way to identify those with early COVID-19 infection:**
  - **Numerous other causes for fever are far more common especially in winter months**
  - **A significant number of COVID-19 infected people do NOT develop fever**

What else can you do to ensure your health?

- **Understand that even in a worst-case scenario you are infected with COVID-19:**
  - **Most young healthy people do not develop a serious illness, over 85% have no or mild illness**
  - **Most of those that do have a serious illness are older with complicating medical problems**
  - **Very few children have been ill (even if they may have been infected)**
- **The most effective way to prevent infection:**
  - **Avoiding sick people (or keeping >6 feet away)**
  - **Good hand washing**
  - **Not touching face or eyes – adjusting your face mask is a risk!**
- **Wearing masks in the community as recommended by Chinese authorities:**
  - **Demonstrates respect for the local public health recommendations even if it is not recommended by the WHO and US CDC**
  - **Should DEFINITELY be done if you have a respiratory illness**

COVID-19

What is the pathway for this outbreak?

Likely scenarios:

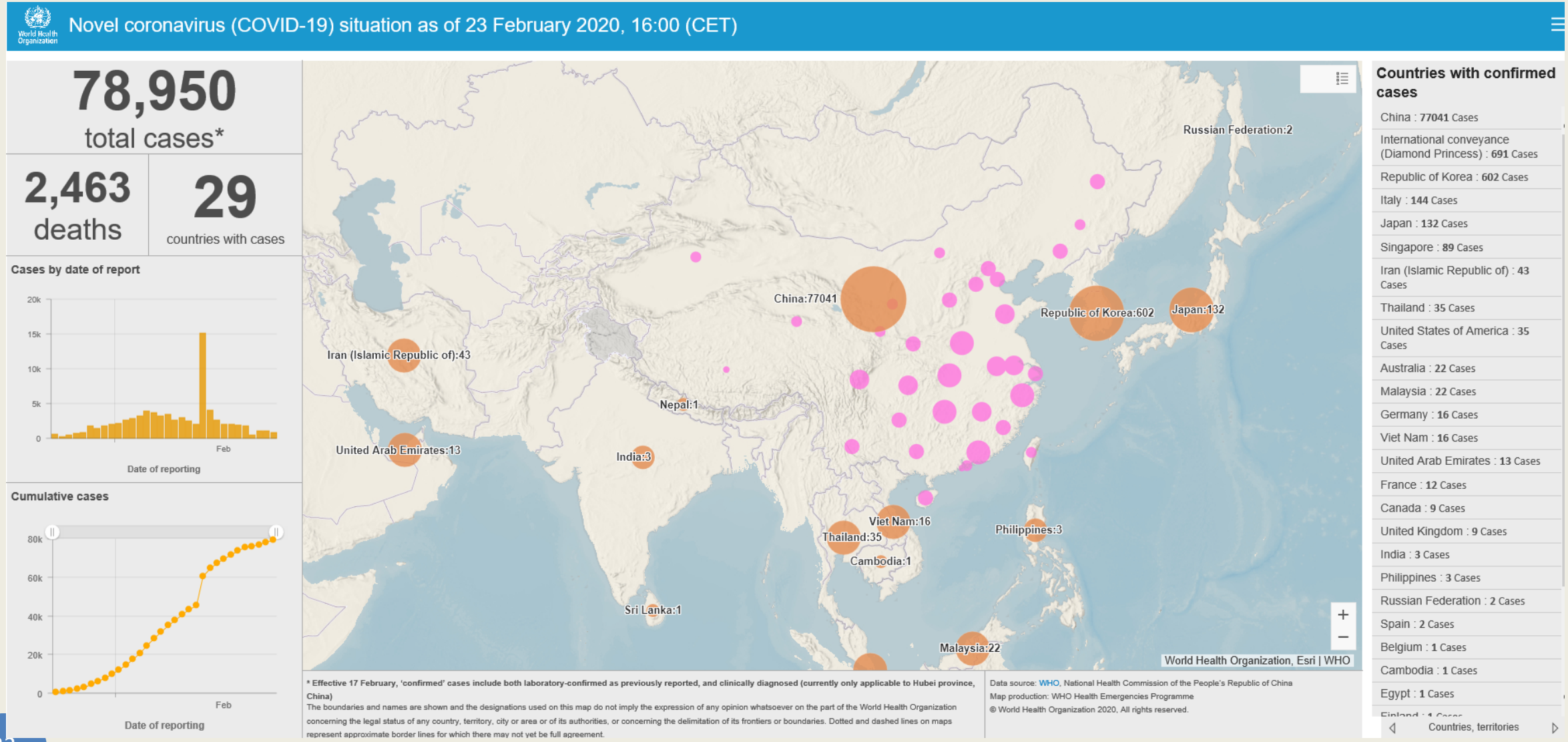
1. **COVID-19 is contained in China and small incursions elsewhere are contained and don't spread. The virus goes away.**
   - **This is what was done with SARS and no cases have been seen in 15 years**
   - **COVID-19, although less virulent, appears more readily transmitted and has already infected considerably more patients. May be impossible to contain at this point**

2. **COVID-19 spreads rapidly, infects nearly all susceptibles and then essentially burns itself out**
   - **This could mean worldwide infections and significant morbidity and mortality**
   - **Containment efforts may slow spread and allow for development of vaccines and antivirals**

3. **COVID-19 joins the other 4 common coronaviruses that infect humans and become one more cause of viral respiratory infections**

Tracking the outbreak

Use trusted reliable sources at the WHO, CDC and Travax



http://who.maps.arcgis.com/apps/opsdashboard/index.html#/c88e37cfc43b4ed3baf977d77e4a0667

Thanks for your attention