WELCOME to the

Science & Practices to Keep Workers Safe and Businesses Productive

as the COVID-19 Pandemic Changes

ECHO

Session will start in less than 15 minutes
SARS-CoV-2

An overview of the virology and epidemiology of the virus causing COVID-19
Conflict of Interest Disclosure Statement

No Conflicts of Interest
Aims

• Basics of virology and SARS-CoV-2
• Coronavirus disease
• Epidemiology
Virus

- Organism at the edge of life
- Genetic information wrapped in protein and fat
- Needs living cells to replicate
- Can jump species
- Few treatments
Coronavirus

- 7 known types affect humans
  - 4 cause common cold
  - 3 cause severe illness (MERS, SARS)

- **SARS-CoV-2** = Severe Acute Respiratory Syndrome Coronavirus 2

- **COVID-19** = Coronavirus disease 19
SARS-CoV-2

- Droplets
  - Cough, sneeze
  - Talk, sing
- Indirect contact
  - Copper 4h
  - Cardboard 24h
  - Plastic, steel 72h
- Aerosol (artificial)
  - 3h

COVID-19

- Incubation median 4 days, maximum 14 days (good evidence)
- Most infectious 2d before to 7d after symptoms (moderate evidence)
- Probably 50% asymptomatic (moderate evidence)
- Spectrum of symptomatic disease (good evidence)
  - 80% mild disease
  - 20% hospitalized
    - 5% intensive care
COVID-19 symptoms

• Fever (83–99%)
• Cough (59–82%)
• Fatigue (44–70%)
• Loss of appetite (40–84%)
• Shortness of breath (31–40%)
• Muscle aches (11–35%)
The older, the sicker
But it’s not just about the virus!
What about mortality?

• Difficult to determine in an ongoing pandemic
  • Testing strategy
    • Who, when, where, how many
  • Duration of illness
  • Population differences
    • Age, co-morbidites
    • Health system capacity

• Differences *unlikely* due to mutations in the virus
### Coronavirus: case fatality rates by age

Case fatality rate (CFR) is calculated by dividing the total number of confirmed deaths due to COVID-19 by the number of confirmed cases.

Two of the main limitations to keep in mind when interpreting the CFR:
1. Many cases within the population were unconfirmed due to a lack of testing.
2. Some individuals, who are infected (and eventually die from the disease), but are still alive at time of recording.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>South Korea</th>
<th>Spain</th>
<th>China</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9 years</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>10-19 years</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>20-29 years</td>
<td>0.2%</td>
<td>0.2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>30-39 years</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>40-49 years</td>
<td>0.2%</td>
<td>0.2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>50-59 years</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>60-69 years</td>
<td>2.1%</td>
<td>1.1%</td>
<td>1.6%</td>
<td>2.3%</td>
</tr>
<tr>
<td>70-79 years</td>
<td>6.0%</td>
<td>1.6%</td>
<td>3.2%</td>
<td>4.1%</td>
</tr>
<tr>
<td>80+ years</td>
<td>12.9%</td>
<td>7.6%</td>
<td>11.1%</td>
<td>11.4%</td>
</tr>
</tbody>
</table>

Note: Case fatality rates are based on confirmed cases and deaths from COVID-19 as of 1 April 2020 (China), 31 March 2020 (Spain), 31 March 2020 (South Korea), and 27 March 2020 (Italy).

Data sources: World Health Organization; Our World in Data; John Hopkins University; US CDC; Ministry of Health, Korea; Korean Centers for Disease Control and Prevention (KCDC).

Project ECHO: Research and data to make progress against the world’s largest problems.

Case fatality rate of the ongoing COVID-19 pandemic

The Case Fatality Rate (CFR) is the ratio between confirmed deaths and confirmed cases. During an outbreak of a pandemic the CFR is a poor measure of the mortality risk of the disease. We explain this in detail at OurWorldInData.org/Coronavirus.

Source: European CDC – Situation Update Worldwide – Last updated 20th April, 11:30 (London time)  OurWorldInData.org/coronavirus  CC BY
Note: Only countries with more than 100 confirmed cases are included.
How infectious is CoV?

- $R_0$ pronounced R naught
- Basic reproduction number
- The average number of people one infected person will infect
The power of social distancing

Scientists measure the intensity of an infectious disease by its reproduction number ($R_0$).

$R_0$, the average number of people a sick person will infect. For COVID-19, this has been estimated at 2.5.

To illustrate the potential of social distancing, the following assumptions are made:

- There is a direct linear correlation between social exposure and $R_0$.
- The median incubation period of COVID-19 is approximately five days—after this period, a person will experience symptoms and self-quarantine.
A Step-by-Step Plan to Reopen California

How to manage Covid-19 as we emerge from sheltering in place, by two California doctors

By Rajiv Bhatia, MD, MPH and Jeffrey Klausner MD, MPH

Managing the Curve

Under-response
Healthcare system is unable to manage rate of COVID-19 infections.

Balanced response
COVID-19 infection is managed with least restrictive economic and social limitations.

Over-response
Universal social distancing is over applied with longterm consequences on population health and well-being.

Photo: Josh Edelson/Getty Images
# Core State Preparedness Responsibilities

<table>
<thead>
<tr>
<th>TESTING &amp; CONTACT TRACING</th>
<th>HEALTHCARE SYSTEM CAPACITY</th>
<th>PLANS</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔️ Ability to quickly set up safe and efficient screening and testing sites for symptomatic individuals and trace contacts of COVID+ results</td>
<td>✔️ Ability to quickly and independently supply sufficient Personal Protective Equipment and critical medical equipment to handle dramatic surge in need</td>
<td>✔️ Protect the health and safety of workers in critical industries</td>
</tr>
<tr>
<td>✔️ Ability to test Syndromic/ILI-indicated persons for COVID and trace contacts of COVID+ results</td>
<td>✔️ Ability to surge ICU capacity</td>
<td>✔️ Protect the health and safety of those living and working in high-risk facilities (e.g., senior care facilities)</td>
</tr>
<tr>
<td>✔️ Ensure sentinel surveillance sites are screening for asymptomatic cases and contacts for COVID+ results are traced (sites operate at locations that serve older individuals, lower-income Americans, racial minorities, and Native Americans)</td>
<td></td>
<td>✔️ Protect employees and users of mass transit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✔️ Advise citizens regarding protocols for social distancing and face coverings</td>
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<td></td>
<td></td>
<td>✔️ Monitor conditions and immediately take steps to limit and mitigate any rebounds or outbreaks by restarting a phase or returning to an earlier phase, depending on severity</td>
</tr>
</tbody>
</table>
Testing is complicated

• Active disease
  • Need PPE
  • Sensitivity depends on collection
    • Deep or superficial nasal swab
    • Home collection
  • Validity in asymptomatic unclear

• Past disease
  • Tests not well validated
  • Not sure if indicated immunity
Develop and implement appropriate policies, in accordance with Federal, State, and local regulations and guidance, and informed by industry best practices, regarding:

- Social distancing and protective equipment
- Temperature checks
- Sanitation
- Use and disinfection of common and high-traffic areas
- Business travel

Monitor workforce for indicative symptoms. Do not allow symptomatic people to physically return to work until cleared by a medical provider.

Develop and implement policies and procedures for workforce contact tracing following employee COVID+ test.
Estimating occupational risk

**HIGH RISK JOB**
- Dental Hygienists

**Contact With Others**

**Physical Proximity**

**Exposure to Disease**

Dental Hygienists have one of the riskiest non-hospital jobs during a pandemic, scoring close to 100 in all three categories.

**MEDIUM RISK JOB**
- Bus Driver (Transit)

**Contact With Others**

**Physical Proximity**

**Exposure to Disease**

Bus drivers have a lower score on physical proximity and exposure to disease, but their constant contact with the general public puts them at risk.

**LOW RISK JOB**
- Economists

**Contact With Others**

**Physical Proximity**

**Exposure to Disease**

Economists have one of the safest jobs during a pandemic, scoring a perfect zero in two categories.

Thank you

Creating a superhero in this time means that she has to stand for justice in the real world

Edgardo Miranda-Rodriguez
Creator of La Borinqueña