A Primer on Covid-19

The disease
Placing the disease in context
Information backing up present public health measures
Practical tips – beyond standard messages

To be updated periodically
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3/19/2020
University of Arizona
COVID-19

- About a quarter of common colds are caused by Coronaviruses.
- Our bodies form antibodies to foreign invaders, such as bacteria or viruses.
- If we have antibodies from a previous exposure, then we can rapidly ramp up the production of those antibodies if we are infected by that same virus at a later date.
- COVID-19 is a severe respiratory illness caused by the virus named SARS-CoV2. It is a novel virus, which means that no one in the world has antibodies to it because no one has ever been infected by it before.
Facts about the disease

What we know at the moment
Subject to updates as the science progresses

To see real time updates on how many cases by country:
https://www.worldometers.info/coronavirus/
Also https://ourworldindata.org/coronavirus
https://www.visualcapitalist.com/infection-trajectory-flattening-the-covid19-curve/?fbclid=IwAR04x5skmSuFwUQMH2ngqORjMXslpGAedP2LQn3TcIWI87EUvPGa1jdP7oJc#7s8d6f87
Arizona:
From an ER doctor friend
Symptoms vary and mimic other common diseases until severe: Here is what we know from China

The symptoms of coronavirus disease [COVID-19]

Reported from China in the period up to February 22, 2020

- Fever: 87.9%
- Dry cough: 67.7%
- Fatigue: 38.1%
- Sputum production: 33.4%
- Shortness of breath: 18.6%
- Muscle pain or joint pain: 15.8%
- Sore throat: 13.9%
- Headache: 12.6%
- Chills: 11.4%
- Nausea or vomiting: 6.5%
- Nasal congestion: 4.8%
- Diarrhoea: 2.7%

Many of the most common symptoms are shared with those of the flu or cold. So it is also good to know which common symptoms of the flu or the common cold are not symptoms of COVID-19. COVID-19 infection seems to rarely cause a runny nose.

What are the symptoms and how does it affect my body?

Access information listed below (provide good summaries) in addition to CDC and WHO websites:

- **Mild moderate severe symptoms:**

- Here’s what coronavirus does to the body:

- **CDC:** [https://www.youtube.com/watch?v=I-Yd__XIWIg&feature=share&fbclid=IwAR1g8OJPslsSmPGdzaEa6G8CIRjitLQgUcVujZkzdPfPE8PQ9502QTro4](https://www.youtube.com/watch?v=I-Yd__XIWIg&feature=share&fbclid=IwAR1g8OJPslsSmPGdzaEa6G8CIRjitLQgUcVujZkzdPfPE8PQ9502QTro4) (good knowledge and recommended practice summary)****
Severity: distribution

COVID-19 #Coronavirus Data Pack

The Majority of Infections are Mild
Seriousness of symptoms

- MILD: 80.9%
- SEVERE: 13.8%
- CRITICAL: 4.7%

The Bulk of People Recover
Of total worldwide confirmed cases...

- Currently Ill: 40%
- Recovered: 56.6%
- Critical: 3.5%

Study of 44,657 confirmed cases in Mainland China
Sources: China Centre for Disease Control & Prevention, Statista

Source: Johns Hopkins University
Who is affected most severely?
Mortality data
- Those > 65
- Those with chronic illness like heart disease, diabetes, lung disease
- Smokers

Note: Covid-19 infections are 10 times greater than the “flu” even in the least affected group of individuals > 10 and < 40)

Flu vs COVID-19 death rate, by age

Source: Centers for Disease Control and Prevention (CDC), Chinese Center for Disease Control and Prevention
Those Aged 60+ are Most At Risk

% infectees who die

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This data comes from the first wave of infections in Wuhan, China, where lung health is poor and smoking rates are high, and coronavirus attacks the lungs.

Especially Those with Existing Conditions

% with other serious ailments who die

- Cardiovascular disease: 10.5%
- Diabetes: 7.3%
- Chronic respiratory disease: 6.3%
- Abnormally high blood pressure: 6%
- Cancer: 5.6%
- No existing conditions: 0.9%

Study of 44,672 confirmed cases in Mainland China, sources: China Centre for Disease Control & Prevention, Statistics.
Demographics in part explain huge differences in mortality in countries like Italy and S. Korea

- The population of Italy differs from much of the world. According to a UN report in 2015, 28.6% of the Italian population was 60 years old or older. By comparison, in South Korea, 18.5% of the population is at least 60 years of age, ranking 53rd globally.
- In Italy, 90% of the more than 1,000 deaths occurred in those 70 or older.
- By contrast, the outbreak in South Korea has occurred among much younger people. There, only 20% of cases have been diagnosed in those 60 years old and up. The largest affected group is those in their 20s, who account for almost 30% of all cases.
- Yes, we have to consider testing as well so as to catch mild cases in need of self quarantine. In South Korea, the rate of testing has been quite high (3,692 tests per million people as of March 8), Italy 826 people per million.


The median age in the country is 47.3, compared with 38.3 in the United States, the Times reported.
How does it spread?

- This virus is spread in large droplets by coughing and sneezing.
- You are **at risk** if a person coughing is very close to you as droplets descend to surfaces; that is why it’s best to remain 6 feet from others.
- All the surfaces where droplets land are infectious **for 24 hours to a week** depending on what the surface is made out of:
  - A recent study finds that the virus can survive on hard surfaces such as plastic and stainless steel for up to 72 hours and on cardboard for up to 24 hours.

How does it spread?
Protect your nose and mouth

- The virus infects you through your nose or mouth via your hands or an infected cough or sneeze onto or into your nose or mouth
- This virus only has cell receptors for lung cells (it only infects your lungs)
- Is it possible that the virus may remain in the air in aerosol form for some time? **Yes**, for some hours, but only under particular conditions (i.e., in a hospital). **This is less a worry than the surfaces you touch**
- It is unlikely you will be infected by breathing the air unless your unprotected face is directly coughed or sneezed upon
- **Protection**: The primary point of contact appears to be the virus on surfaces
Asymptomatic & mildly symptomatic in relation to disease transmission

- It appears that a Massachusetts coronavirus cluster with at least 82 cases was started by people who were not yet showing symptoms.
- Several studies have shown that people without symptoms are causing substantial amounts of infection.
- For example, between 48% and 66% of the 91 people in the Singapore cluster contracted the infection from someone who was pre-symptomatic.
- Of the 135 people in the Tianjin cluster, between 62% and 77% contracted the infection from someone who was pre-symptomatic.
- In the U.S., gov’t officials have emphasized that asymptomatic transmission can happen, but that it is not a significant factor in the spread of the virus.
- They also emphasize that among young people, social distancing is crucial to flattening the curve of infection and keeping elders safe—which is an indirect nod to the importance of social distance for all.

**Hence the importance of social distancing**

- The > 60 group must distance themselves to youth. Someone you know, even your grandchild may be asymptomatic.
- Engage in safe forms of social interaction with loved ones such as sociality through social media and the phone.

https://www.medrxiv.org/content/10.1101/2020.03.05.20031815v1

Asymptomatic cases were found on the Diamond Princess cruise ship: 322 of 621 people tested positive but showed no symptoms.

**See also**: New data suggests that for some asymptomatic cases might be contagious for up to 24 days:
Incubation period

- 5.1 days appears to be the median amount of time but the range is much larger
- Existing data suggests that about 97.5 percent of people who develop symptoms of COVID-19 infection will do so within 11.5 days of exposure.
- The researchers estimate that for every 10,000 individuals quarantined for 14 days, only about 101 would develop symptoms after being released from quarantine.**
- Chinese health officials who previously estimated that the incubation period for the virus ranged from one to 14 days, now suggest it could be as long as 24 days.***

**https://www.medicalnewstoday.com/articles/sars-cov-2-study-confirms-previous-incubation-period-estimates


*** https://www.sciencealert.com/researchers-confirmed-patients-can-transmit-the-coronavirus-without-showing-symptoms?fbclid=IwAR2DWhIb7KLShVvP3tb-KyrybIEZbnNO_mbdtz_rr-D9SFlzQH5ruJ_PEE
How many people will a sick person infect? Estimates for Covid-19 will no doubt be subject to revision over time.
Re-infection? We do not know, but so far it is rare

- **Reports of patients testing positive for the coronavirus a second time have come out of China, Japan and South Korea.**
- But some health officials argue with these conclusions, saying they may be the result of relapses or errors in testing.
- **Animal studies (rhesus macaques) have not documented cases of reinfection.**
- Dr. Anthony Fauci, thinks it’s likely that someone who gets infected once is actually immune.
- However, much remains unknown about the virus.
- Reports of re-infection have health experts worried that the illness could remain dormant after an apparent recovery.
- “Once you have the infection, it could remain dormant with minimal symptoms,” Philip Tierno Jr., professor of microbiology and pathology at New York University, told Reuters. “And then you can get an exacerbation if it finds its way into the lungs.”

**
https://www.biorxiv.org/content/10.1101/2020.03.13.990226v1?fbclid=IwAR3toap3HNstl8YTEn-GR9zp05zYSwcUT_RRj_oCUSEG-AnGFF73MxIkxpo
How fast does this virus escalate?

Depends on steps taken during trajectory of illness
Exponential spread: For every six days that we delay engaging in social distancing, the number of infections double

Official line:
• Every person with the COVID-19 virus infects approximately two to four people.
• The infection rate doubles every six days (there is a range depending on what policies/programs different countries are implementing).
• That means that if 50,000 people have the virus today, then in 6 days, 100,000 people will have it.
• In another 12 days it’s 400,000 and less than two weeks later it’s over a million people.
• We have 330 million people in the US. The experts expect that 40-70% of people will be infected.

Exponential growth: get educated https://www.youtube.com/watch?v=Kas0tlxDvrg
Fatality rate (log scale)

New coronavirus
Most estimates put the fatality rate below 3%, and the number of transmissions between 2 and 4.

Note: Average case-fatality rates and transmission numbers are shown. Estimates of case-fatality rates can vary, and numbers for the new coronavirus are preliminary estimates.
Exponential spread

Total number of confirmed U.S. coronavirus cases at each
Tuesday: January to March 10
Jan. 14 — 0
Jan. 21 — 1
Jan. 28 — 5
Feb. 4 — 11
Feb. 11 — 14
Feb. 18 — 25
Feb. 25 — 59
Mar. 3 — 125
Mar. 10 — 1,004
Exponential Spread, USA

New coronavirus cases announced in the U.S. each day

Source: C.D.C., state and local health agencies, hospitals.
Total confirmed cases of COVID-19

The starting point for each country is the day that country had reached 100 confirmed cases. This allows us to compare the trajectory of confirmed cases between countries. Because of limited testing the number of confirmed cases is lower than the number of total cases.

Source: WHO COVID-2019 Situation Reports
OurWorldInData.org/coronavirus • CC BY
Where are we in the disease trajectory?

Based on the trajectory of other types of pandemic influenza
When will Covid-19 peak in the USA? Depends on our actions Now.

It left unmitigated, some epidemiologist-modelers anticipate a peak sometime mid summer with different peaks for different states.

* The figure is but one estimate ...it may well change. **

1. Daily new cases begin to decline after the peak. Hospital load will still increase for another 10-15 days.

2. Epidemic peak: new cases begin to decrease compared to daily cases with an outcome. Maximum hospital load.

3. New cases trend towards zero. Small high hospital load.
Herd immunity

And the Covid-19 infection curve that everyone is talking about
Herd immunity is key to control in an epidemic like this

- Herd immunity (also known as community immunity) is defined by the CDC as “a situation in which a sufficient proportion of a population is immune to an infectious disease (through vaccination and/or prior illness) to make its spread from person to person unlikely.”

- The theory behind herd immunity is that when someone gets vaccinated, it’s not only that person who is protected from infection—they can’t transmit the disease to other people.

- Herd immunity protects people who cannot be vaccinated because their immune systems aren’t strong enough and are therefore the most vulnerable to serious illness.
An example of herd immunity via vaccination is the measles outbreak among preschool-age children in the United States

- In the late 1980s, the attack rate of measles decreased faster than an increase in the rate of vaccination coverage.
- Researchers who examined the association between incidence of measles and immunization coverage among preschool-age children concluded that immunization coverage of about 80% may be enough to stop sustained measles outbreaks in an urban community.
COVID-19 is different from measles as there is no vaccine: So the herd immunity situation is different

- There’s no vaccine for COVID-19 yet – there will probably not be one available to the public for a year
- The only option is recovery, which means letting the majority of people catch the virus at some point.
- **But not at the same time or the health system gets swamped**
- The curve everyone is taking about = spreading out rate of infection to reduce case load
# of cases

Without Protective Measures

Healthcare system capacity

With Protective Measures

Time since first case

Adapted from CDC / The Economist
LOWER AND DELAY THE EPIDEMIC PEAK

Proactive measures taken early in an epidemic reduce burden on the healthcare system and slow the spread of disease.
Why is testing so important?

- It is important to diagnose people quickly and to prevent spread of Covid-19 to the community through isolation of infected people.
- Effectiveness seen in South Korea
  - Used the WHO validated test and made a simple decision: Test as many people as possible even with minor suggestive symptoms and get results back quickly
  - Contact trace
  - Isolate
- If we only wait until one is very ill to administer a test—those with minor or no symptoms spread the disease
The only way of slowing down the number of cases & serious cases needing hospitalization in the USA at this time

Social distancing
Now
Not when there are many cases in your community
Chart 23: Model of Cumulative Cases of Coronavirus with Social Distancing Measures Taken One Day Apart

- No social distancing
- Social distancing one day later (n+21)
- Social distancing started on day n+20

Source: Tomasi Pueyo

Cumulative cases
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0

Number of days
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

+40%!
How do we know social distancing and (when warranted) quarantine works?

We know from both history and what other countries have done already.
There is a reason for canceling public gatherings. In a pandemic, don't be Philadelphia (held a parade in 1918 when cases started to come up, downplayed cases), be St. Louis (canceled gatherings). [https://www.pnas.org/content/104/18/7582](https://www.pnas.org/content/104/18/7582)

See also the story of Gunnison Colorado: [https://getpocket.com/explore/item/gunnison-colorado-the-town-that-dodged-the-1918-spanish-flu-pandemic?utm_source=pocket-newtab&fbclid=IwAR18il6dkpg_UgrZ8Q_hEUwDS_CdQzdW0hBPHUYchrQodDrmWs0D6AMYSg](https://getpocket.com/explore/item/gunnison-colorado-the-town-that-dodged-the-1918-spanish-flu-pandemic?utm_source=pocket-newtab&fbclid=IwAR18il6dkpg_UgrZ8Q_hEUwDS_CdQzdW0hBPHUYchrQodDrmWs0D6AMYSg)
Lessons learned from Asian countries doing the best to contain the disease

• What has worked the best:
  • Early travel restrictions
  • Aggressive testing and screening of contacts
  • Strict quarantine rules

• Which countries:
  • Taiwan, Hong Kong, Singapore

➢ What they have in place enabling them to do so
  • Universal healthcare
  • Clear management structures for the public health response
  • Proactive communication protocols to get the population on board
  • Experience with containing SARS

https://www.ft.com/content/e015e096-6532-11ea-a6cd-df28cc3c6a68
Hong Kong and Singapore have limited the spread of coronavirus; S Korea is slowing the rate of infection. Most western countries show a similar trajectory.
What to do

What not to do
Beyond obeying social distancing mandate
Wash your hands: learn how and with what

- Standard message: Wash your hands with soap thoroughly for 20 seconds and/or use a greater than 60% alcohol-based hand sanitizer
- **** Soap and water is more effective than hand sanitizers, baby
  wipes are not effective
  ➢ Use when no soap and water alternative
- Whenever you return home from ANY activity that involves locations where other people have been, wash your hands with soap

Clean surfaces you routinely touch – or are touched by others – often

- Counters, door knobs, steering wheel
- Cell phones, computers
- Use appropriate cleaning products (look up approved list cited in notes)★★★

★★★For example what cleaning products are effective for cleaning counters: https://www.americanchemistry.com/Novel-Coronavirus-Fighting-Products-List.pdf
Should we disinfect the air periodically? No

• Although COVID-19 is spread by the airborne route, air disinfection of cities and communities is not known to be effective for disease control and needs to be stopped.

• The widespread practice of spraying disinfectant and alcohol in the air and on roads has no value and may actually be harmful to our individual and community health microbiota.
To mask or not to mask

- **Wearing a mask will probably make little difference if you’re just walking around town or taking a bus**
  - If wearing a mask is the only way to keep from touching your nose and mouth in public they serve that purpose --- but they are not comfortable
  - They are symbolic—psychologically comforting— a form of harm reduction rendering a feeling you are doing all you can do
- If you are likely to be in close contact with someone infected, a mask cuts the chance of the disease being passed on.
- If you’re showing symptoms of coronavirus, or have been diagnosed, wearing a mask can also protect others.
- Masks are recommended for family members who need to care for someone who is ill – ideally both the patient and caretaker should have a mask.
- If you wear a mask, then you must know how to use it and dispose of it properly.***

https://time.com/5794729/coronavirus-face-masks/
But they wear masks in Asia and......

- **Civic responsibility**: Wearing a mask is not just for protecting yourself from getting infected, but also minimizing the chance of potential infection harboring in your body from spreading to people around you.
- In some Asian countries, this is a sign of health citizenship.
- **Note**: If you are asymptomatic and contagious, masks might reduce the spread of disease....at present this is being played down but in Asia there is an opinion that this slows down the spread of the virus in public.
  - Stay tuned...right now masks need to be reserved for health care providers out of necessity because of low supply.

Surgical vs N95 masks

- N95 masks are to protect YOU from the secretions of others, and the surgical mask is to protect others FROM you.
- Although surgical masks are in widespread use by the general population, there is no evidence that these masks prevent the acquisition of COVID-19, although they might slightly reduce the spread from an infected patient breathing in your face.
- A well-conducted, large, cluster randomized trial, undertaken largely in US primary care settings, did not identify a meaningful benefit from N95 respirators when compared to surgical masks for the prevention of influenza among staff.
- N95 masks are most needed by those in hospital settings and in short supply.

Masks are in short supply for health care workers

Do not stockpile and use only when sick
Conserve them so those who work in health care settings have adequate protection
Food or food packaging has not been identified as a risk factor for COVID-19 transmission

- Currently there is no evidence to support transmission of COVID-19 associated with food
- There is likely very low risk of spread from food products or packaging that are shipped over a period of days or weeks at ambient, refrigerated, or frozen temperatures.
- There is also no evidence to support transmission of COVID-19 associated with imported goods and there have not been any cases of COVID-19 in the United States associated with imported goods.
Suspect you may have Covid-19? Don’t self-medicate with Aleve for fever and body ache

- The taking of anti-inflammatories [ibuprofen, cortisone ... ] could be a factor in aggravating the infection. In case of fever, take paracetamol or Tylenol (acetaminophen). It will reduce the fever without counterattacking the inflammation.
- If you are already taking anti-inflammatory drugs, ask your doctor’s advice.

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30628-0/fulltext

Meds containing acetaminophen
Actifed®
Alka-Seltzer Plus LiquidGels®
Anacin®
Benadryl®
Cepacol®
Contac®
Coricidin®
Dayquil®
Do not engage in diagnosis by treatment

Do not take leftover antibiotics you have at home to see if your respiratory illness is bacterial or viral
Get a flu buddy and prepare your home

- Get a flu buddy (aka ‘pandemic pal’) and make back-up plans for care of children, pets, and those in need of special assistance
- Prepare a hot zone in your home just in case someone falls ill
- Stock up on essential foods and medicines etc.

Young Kids and Covid-19

- Data from the epidemic in China: kids get infected at the same rate as the population average
- Kids are less likely to get severely sick than adults, but are just as contagious
- Parents and grandparents can get very sick from children
  - Limit contact with grandparents > 60 years of age especially if suffering from a chronic disease like diabetes or respiratory problems or if a smoker
- Play: Form a small playgroup and play outside. Adults should stand > 6 feet away from children other than their own
  - Don’t go into each other’s homes
  - Playgrounds: COVID19 virus can live on surfaces for hours or days in a laboratory environment, but there are no data that I am currently aware of regarding survival of the virus on playground equipment.

What if I suspect my child has Covid-19

• If you think symptoms are serious enough to see a doctor, call your doctor
• If your child has the virus, clinicians will provide supportive care to children with COVID-19
• No antiviral drugs have been approved for treatment

What else can I do if I feel I am “coming down with something”

- There are additional measures that may reduce the risk of infection and the severity of this disease:
- Care for your throat and engage in practices that supports the self-cleaning powers of the respiratory tract
- Like what --- gargling with salt water or antiviral mouthwash, steam inhalations...true for all types of influenza
- Zinc supplements may reduce the duration of the illness and are available in capsule, tablet, and lozenge form. One review of seven studies showed that zinc lozenges containing 80-92mg of zinc may reduce common cold duration by up to 33%. Zinc-containing nasal sprays should be avoided. ***


**https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5418896/
Personal Notes

- We need to get past fear-based messaging to community-based messaging and messaging that appeals to our sense of global as well as local health citizenship
- Covid-19 needs to be treated as a family and community disease — if it is the pandemic will be controlled faster — We learned this with Ebola. We need to provide those who need to self-quarantine with the resources to enable them to do so
- We need to get into the weeds with a ‘devil in the details’ approach to keeping ourselves safe
- **Above all else: stay put, cocoon**
- Social distancing does not mean social disconnection — this is a time for community building, not social isolation at the personal or country level. We are in this together.
This is a test of family and cultural values as well as political responsibility

• It is also a time for thinking about serious health care reform and the need for safety nets enabling public health recommendations to be implemented quickly by the average citizen = sustained economic support during the crises for all, especially the most vulnerable

• We must be prepared for periodic pandemic and reemerging disease threats. They are really not all that uncommon !!!!
Major Emerging and Re-emerging Infectious Disease Outbreaks, 2002-2020

Data Source: World Health Organization
SARS, severe acute respiratory syndrome; MERS, Middle East respiratory syndrome
Your responsibility as a university professor

- Aside from staying safe yourself, making sure your students are not compelled to be in spaces where they are going to be exposed
  - For example, university students without internet who may go to coffee shops to get online
  - Provisions for them to get internet to complete classes
- Educating youth about why their social distancing is so important to containing this disease and preventing the swamping of our health care system which is ill prepared for a large surge
  - Making this an ethical and citizenship issue
- Dispelling the impression that ‘youth will only get a mild case with flu-like symptoms which is no big deal’
  - Note: More young people are being admitted to hospital in Italy with coronavirus, as the outbreak continues....this follows a first wave of the elderly being hit hard


As an engaged anthropologist what can you do

Action items: here are a few examples

- **Social determinates of health**: Beyond looking at rates of disease by group, consider the ability of specific groups in specific home, community, and work environments to adhere to public health social distancing guidelines
  - Identify constraints and opportunities for reducing risk
  - What may be done to reduce risk of contagion that is feasible
  - What resources would make a big difference
  - Move the discussion from groups at risk and risky behaviors to environments of risk

- **Identify what information sticks and does not stick given all that is out there and changing on a day by day basis** — Participate in translational research efforts and identifying/supporting local spokespeople who are trusted and can act as filters of information

- **Remind everyone that the household is an important unit of analysis**: the families of both the ill and health care providers whose families themselves may be seen as dangerous to interact with and be indirectly stigmatized

- **Consider opportunities for social connection and support** for different types of people at this time of high risk contagion. so social distancing does not become social isolation over what is likely to be a several month social isolation trajectory
Concern: political partisanship may be our undoing if it undermines public health dictates
Bottom line:
Stay put, cocoon.
Check in on your family, friends, neighbors. Don’t just think of yourself.

Your grandparents were called to war. You're being called to sit on your couch. You can do this.