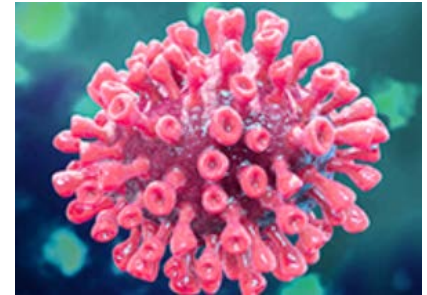




COVID - 19
Update March 24, 2020

Meg Durbin, MD
Chief Medical Officer



Overview of the current Coronavirus pandemic

What is it?

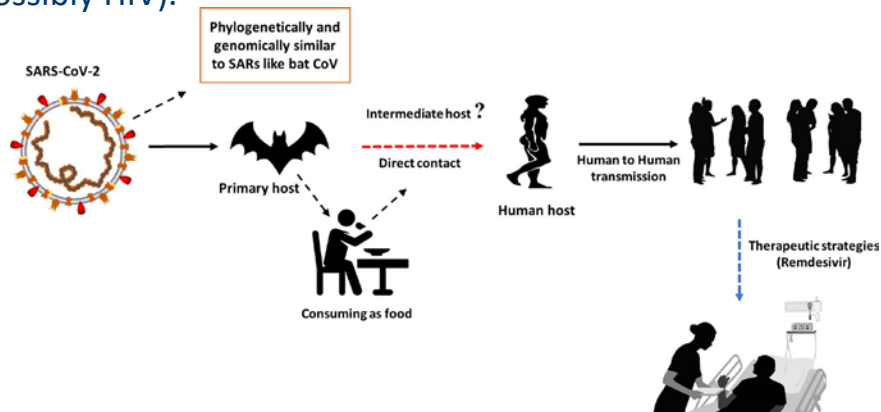
The disease, COVID -19 is caused by a virus (SARS –CoV-2) in a large family of viruses called coronaviruses. Coronaviruses especially cause respiratory symptoms ranging from common cold to pneumonia or respiratory failure.

Where did it SARS-CoV-2 come from?

COVID-19 was first identified in Wuhan province of China in December 2019.

Current thesis: the virus leaped from bats to humans, perhaps in markets where wild species are sold as pets or meat. Other coronaviruses have also leaped from other species to humans (SARS – South Asian Respiratory Syndrome, MERS – Middle Eastern Respiratory Syndrome, possibly HIV).

Bats harbor many viruses that don't make them sick but can make humans sick. When viruses from bats infect humans, they can cause massive immune responses that can be counterproductive (e.g. filling the lungs with inflammatory cells and fluid).



Overview of the current Coronavirus pandemic

Why is it this virus more concerning than other respiratory viruses?

SARS-CoV-2 preferentially adheres to cells in the lower respiratory tract, causing more serious symptoms than other related viruses.

How lethal is COVID-19? We don't really know....

Early mortality rate reported for COVID-19 is higher (3 – 4%) than for other coronavirus infections or from influenza (0.1-0.2%).

However, the complete number of infected people with few or no symptoms is unknown.

Infection and mortality rate reports will change as we test more people.

Exposure Rate \neq Infection Rate \neq Illness Rate \neq Mortality Rate

xx deaths / yy infected = mortality rate

Epidemic, Pandemic, and/or Global Health Emergency

Definitions not precise

Epidemic:

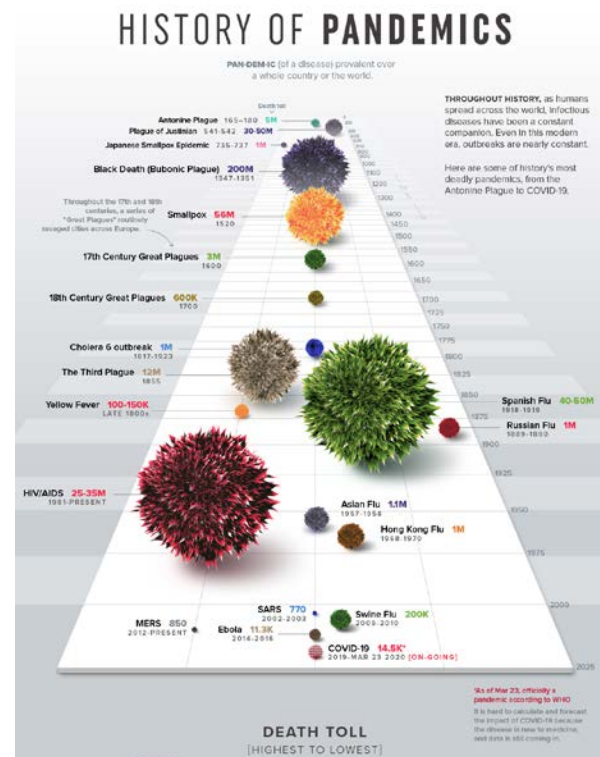
Refers to a sudden increase in the number of cases of a disease above what is normally expected; an outbreak of a disease that occurs over a wide geographic area and affects an exceptionally high proportion of the population

Pandemic: refers to an **epidemic** that has spread over several countries or continents, usually affecting a large number of people.

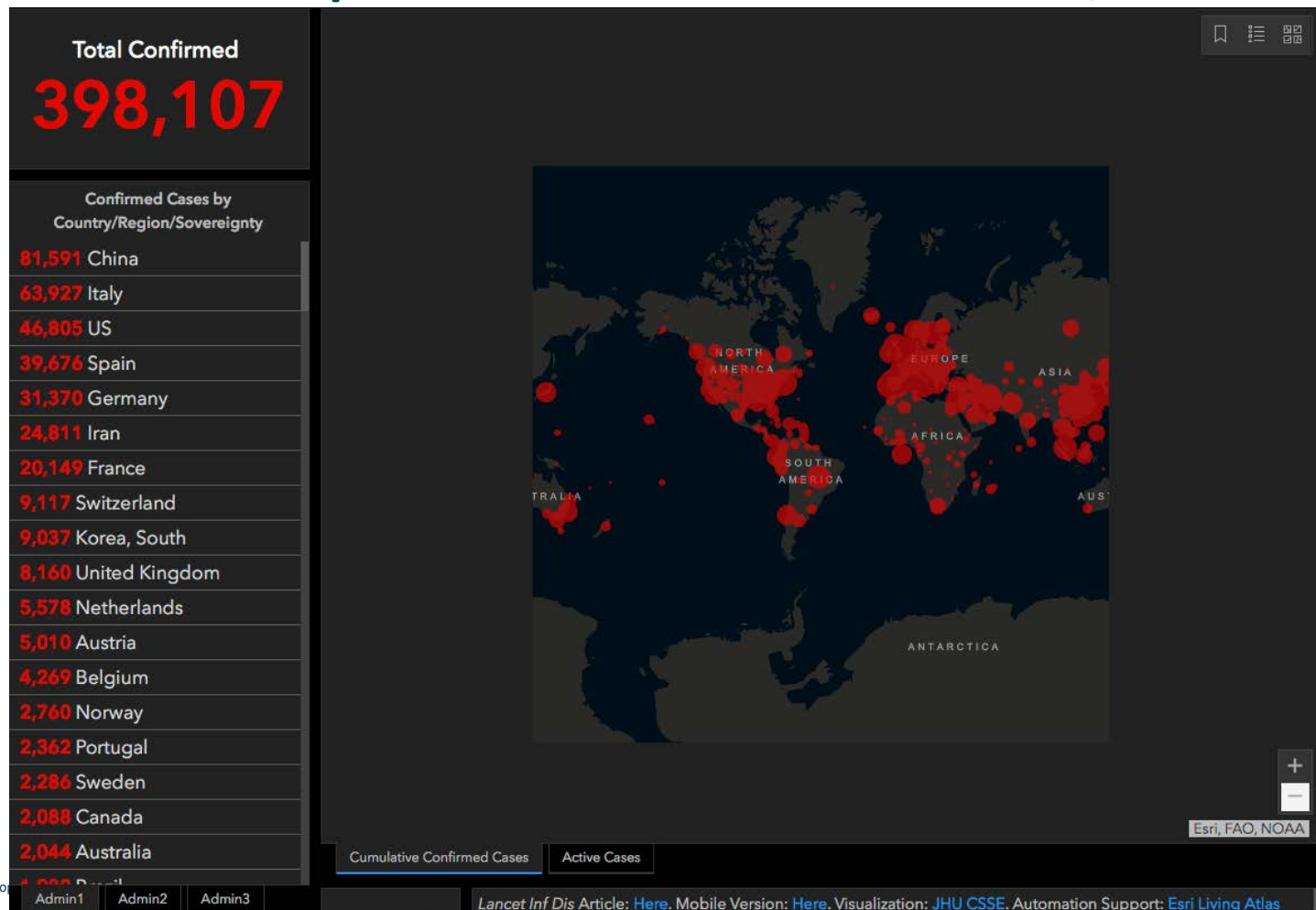
- HIV/AIDS: 1982 - present
- Influenza (various strains) 1918, 1956-58, 1968
- Cholera 1852-60
- Black Death (Bubonic Plague) 1346-53

Global Health Emergency declaration by WHO (3 criteria):

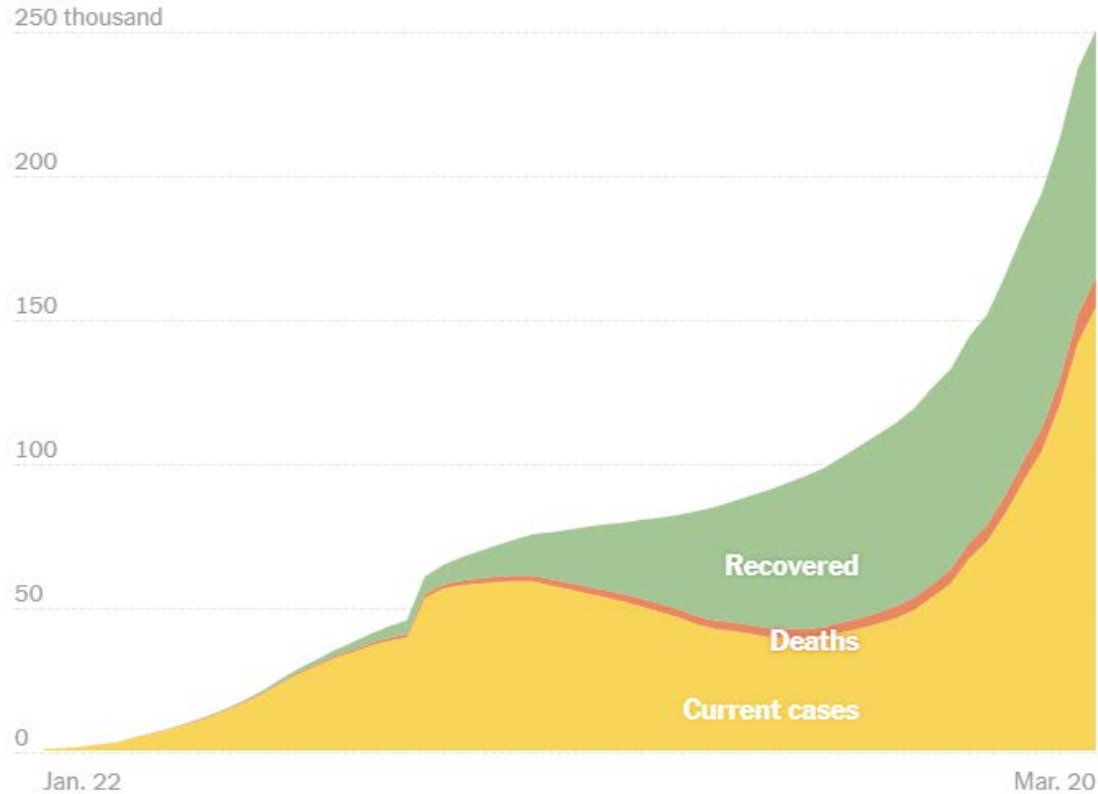
- extraordinary event
- constitute[s] a public health risk to other States through international spread of disease
- potentially require[s] a coordinated international response



COVID-19 Cases Reported Worldwide as of Mar 24, 2020



How Many People have Recovered or Died from the Coronavirus



As of Mar 24

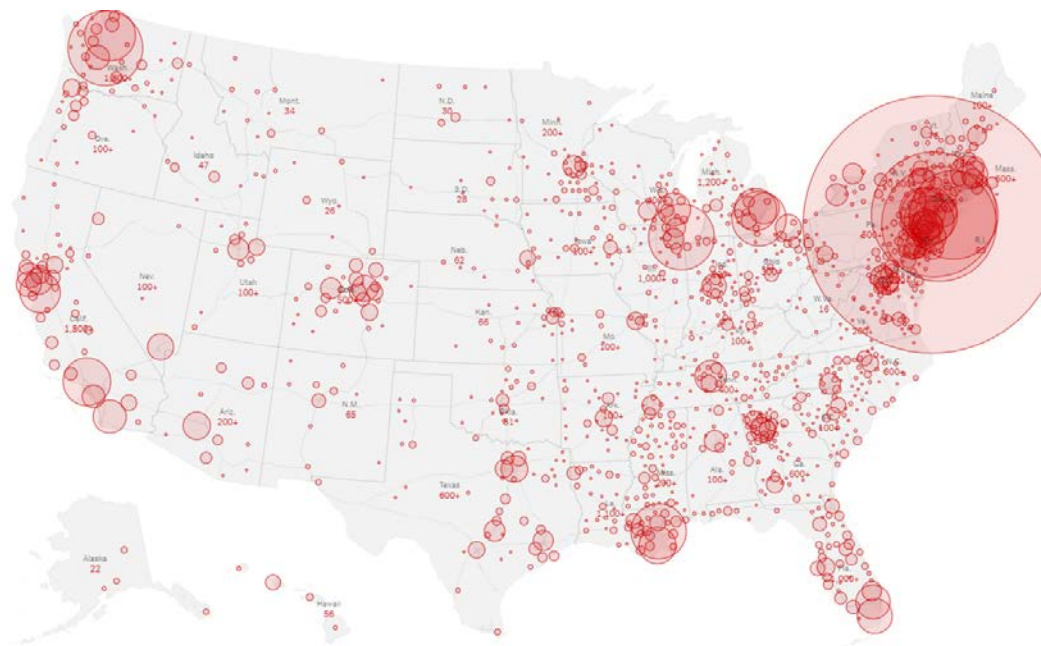
103,334
recovered

17,454
deaths

277,319
current

Source: Center for Systems Science and Engineering at Johns Hopkins University; Local governments.

US COVID-19 cases as of March 23, 2020



Note: The map shows the known locations of coronavirus cases by county. Circles are sized by the number of

| STATE | CASES | DEATHS |
|----------------|--------|--------|
| New York | 20,875 | 125 |
| New Jersey | 1,914 | 20 |
| California | 1,849 | 33 |
| Washington | 1,844 | 98 |
| Michigan | 1,232 | 15 |
| Louisiana | 1,172 | 34 |
| Illinois | 1,049 | 9 |
| Florida | 1,000 | 13 |
| Texas | 668 | 7 |
| Massachusetts | 646 | 5 |
| Georgia | 620 | 25 |
| Colorado | 591 | 5 |
| Pennsylvania | 512 | 3 |
| Tennessee | 441 | 1 |
| Wisconsin | 401 | 5 |
| Ohio | 351 | 3 |
| Connecticut | 327 | 8 |
| North Carolina | 303 | 0 |
| Maryland | 290 | 3 |
| Indiana | 259 | 7 |
| Mississippi | 249 | 1 |
| Minnesota | 235 | 1 |

COVID-19 Cases in California as of March 23, 2020

Coronavirus Tracker

The Chronicle is compiling an exhaustive list of every coronavirus case in California.

2,138 confirmed cases in California

39 confirmed deaths in California

858 confirmed cases in the Bay Area

By [CHRONICLE DIGITAL TEAM](#) | LAST UPDATED: March 23, 2020 3:32 p.m.

California cases are organized by reporting county. Cases are based on reports from the U.S. Centers for Disease Control and Prevention, the California Department of Public Health and county public health departments, plus exclusive Chronicle reporting. For more information on the data, please [read about our methodology](#).



| | Total cases | Deaths | New cases | 7 | 19+ |
|----------------|-------------|--------|---|---|-----|
| Alameda County | 122 | 1 | 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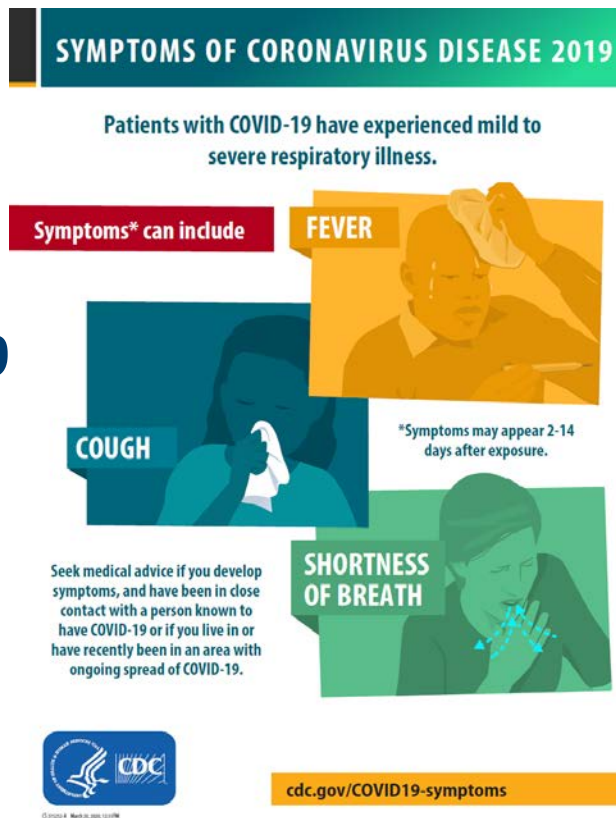
SOURCES: U.S. Centers for Disease Control and Prevention, the California Department of Public Health and county public health departments, exclusive Chronicle reporting

What are the common symptoms of COVID-19

Fever, fatigue and dry cough. These are symptoms common to many other viral or bacterial infections, including influenza.

What are less common Symptoms of COVID-19

Aches/pains, stuffy or runny nose, sore throat, diarrhea.



How does SARS –CoV-2 spread?

By absorbing virus particles through mucus membranes (eyes, nose, mouth, lungs). These particles are found in droplets of saliva, tears, mucus.

Droplets are shared during coughing, sneezing or exhaling or by touching one's eyes, nose or mouth after contact with droplets on surfaces.

How long does it take for COVID-19 symptoms to occur after exposure (incubation period)?

1 – 14 days



How long can the SARS – CoV-2 virus survive?

... on surfaces?

It depends on the surface....

- Plastic & steel: 72 hours
- Copper: 4 hours
- Cardboard: 24 hours

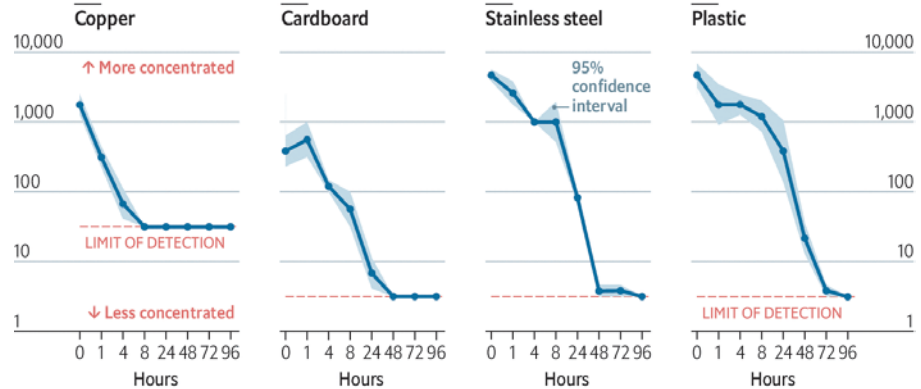
... in air?

Small droplets stay suspended in air for 30 minutes before drifting down to surfaces.

But aerosolized droplets don't linger long before dropping and they aren't generally found in high enough concentration to infect others - if you keep distance.

Can't touch this

Concentration of viable SARS-Cov-2 virus in a sample, TCID₅₀* per litre of air, log scale



Source: "Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1"
by Doremalen, Bushmaker & Morris, *New England Journal of Medicine*

The Economist

*Tissue-culture infectious dose

What kills SARS –CoV-2 on surfaces?

Substances that break the fatty envelope surrounding the virus, including ...

Soap, detergent, bleach, ethanol:

Routine household cleaners and wipes with at least 60% ethanol (Purell® is 70% ethanol).

What about alcoholic beverages? Legal alcoholic beverages don't have sufficient alcohol concentration (vodka is 40% alcohol = 80 proof).

Note: Everclear® is a highly concentrated grain alcohol not meant to be drunk straight; it ranges from 151 – 190 proof (76 – 95% alcohol) and is illegal to buy in California and 12 other states. *Cleaning with Everclear® would kill coronavirus, but drinking it straight would kill you!*

Who seems to be most at risk of COVID-19 complications?

- Travelers to hotspot countries

- Elderly

Those with underlying medical conditions: smokers, diabetes not well controlled, immunocompromised, lung disease, heart disease

- But... young adults are not without risk. So... Millennials – be careful!
Not especially high risk for children, pregnant women

However, this is based on incomplete data, since we don't know the true incidence (how many people without symptoms who are infected but haven't been tested).

How to protect yourself from exposure to COVID-19

- Wash hands w/ soap & water frequently for 20 seconds (sing the “Happy Birthday” song twice)
- Use hand rub with at least 60% alcohol concentration.
- Avoid touching eyes, nose and mouth.
- Cover your cough w/ your elbow. If you use tissue, dispose of it right away.
- Clean surfaces frequently with soap and water.
- Avoid large gatherings.
- Don’t touch people unnecessarily.
- Use a mask if you are feeling ill and are coughing or sneezing, or if you are caring for someone suspected or known to have COVID-19.
- Avoid travel/cruises.
- Stay home.
- Stay 6 feet away from others outside your household.



Social distancing lessons from the past: A tale of two cities – Philadelphia & St. Louis

Consequences of different policies during the 1918 Influenza pandemic



Philadelphia: 72 hours after a major parade held to raise money for war bonds, all 31 hospitals were full and 2,600 people died within 1 week.

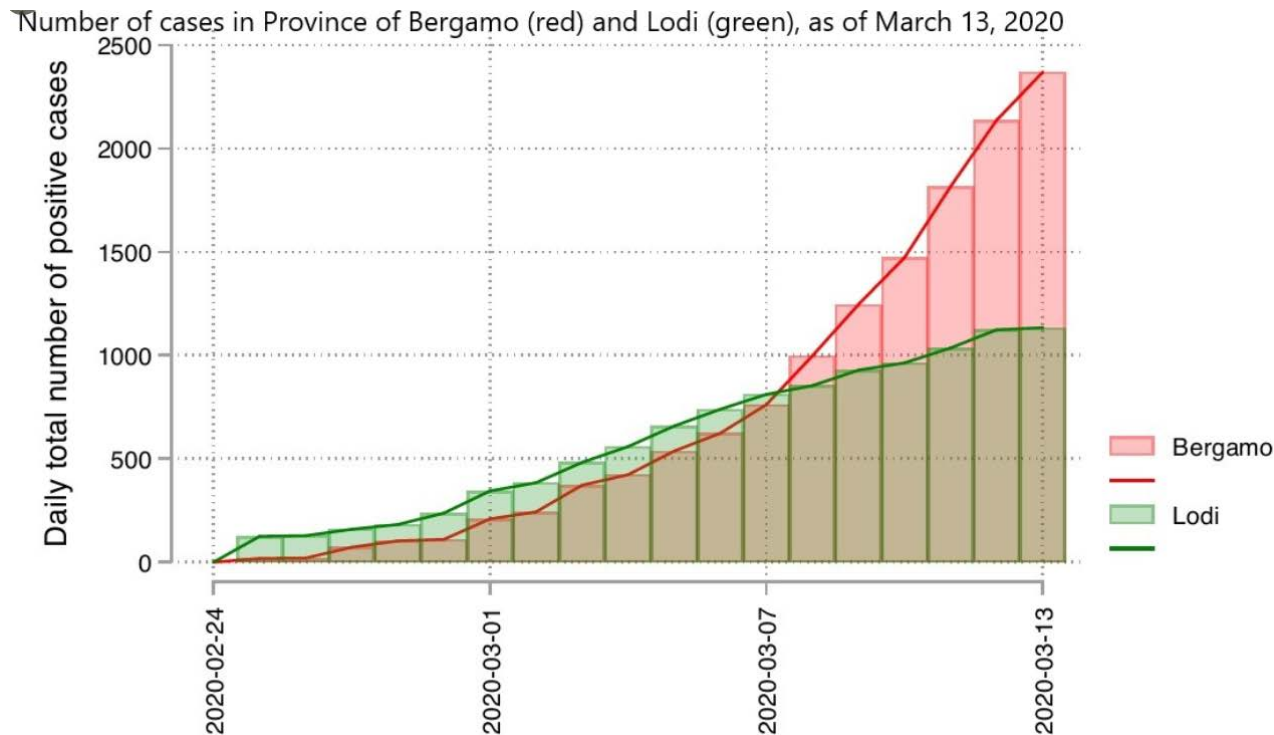


St Louis: When influenza in military barracks spread to civilians, the health commissioner quickly closed schools, theaters and pool halls and banned all public gatherings. **Peak death rate was 8 times lower than in Philadelphia.**

Lessons from now: Racconto di due province in Italia

COVID-19 cases as of 13 March 2020:

Lodi (strict quarantine) vs. Bergamo (no strict quarantine)



If you have been exposed to COVID-19 but have no symptoms

- Self quarantine at home for 14 days.
- Follow respiratory hygiene.
- Don't share utensils, kitchen ware.
- Wipe down surfaces frequently with alcohol-based cleaners.
- Isolate yourself in a room with fresh air circulating.
- Wear a mask when out in public or near others.

If you have been exposed to COVID-19 & have mild symptoms

- If you need medical advice for mild symptoms, call your doctor's office or use a virtual visit.

QUARANTINE IF EXPOSED

Separates people and restricts their movement if they were exposed to a contagious disease to see if they become sick.



- For people who are not sick, but may have been exposed (in close contact with someone) who is sick.
- You must stay away from others for 14 days to see if you get sick.



14 DAYS

What to do if you have COVID-19 confirmed or suspected:

<https://www.cdc.gov/coronavirus/2019-ncov/downloads/sick-with-2019-nCoV-fact-sheet.pdf>

- Stay home for at least 24 hours after cough, shortness of breath and fever abate.
- Follow "respiratory" hygiene: Cover your cough w/ your inner elbow, wear masks when near others or outside.
- Don't share utensils, kitchen ware.
- Wipe down surfaces frequently with alcohol based cleaners, detergents or soaps.
- For fever, take acetaminophen, ibuprofen, naproxen and stay hydrated.
- Isolate yourself in a room with fresh air circulating.
- Avoid touching or close contact with pets, although there's no evidence of transmission of SARS-CoV-2 between humans and typical household pets, livestock or wild animals in the US.
- If you need medical advice for mild symptoms, call your doctor's office or use a virtual visit.

What to do if you have COVID-19 with more than mild symptoms?

If you have more severe symptoms e.g. shortness of breath but don't need emergency care,

Call before going to your physician's office, local urgent care center or emergency department, to get instructions and to prepare the staff for your safe arrival.

If you have quite severe symptoms (greater difficulty breathing), call 911.



Who currently qualifies for SARS-CoV-2 testing?

Symptoms: fever, lower respiratory illness (shortness of breath, dry cough) that require more than self care at home

AND higher risk (Age > 60 years old, immunocompromise (cancer, transplant, on immunosuppressive meds, HIV), pregnancy, chronic lung disease, cirrhosis, cardiovascular disease, end stage renal disease, diabetes, hypertension)

AND no other confirmed cause of such symptoms: other viruses (influenza), bacteria (pneumococcus), microbes (mycoplasma)

AND risk of SARS-CoV-2 exposure: close contacts with confirmed COVID-19 or travel to hotspot country within 14 days

These recommendations are adapted from UCSF as of March 19, 2020. They will likely change as testing becomes more widely available.

SARS CoV-2 tests – Different types

1. Particles of genetic material (RNA) from the virus

secreted from nose, throat or lower respiratory tract – indicate active infection and ability to infect others

2. Antibodies against the virus

detected in the blood, a sign of immune response induced by infection.

More about antibodies:

Antibodies indicate prior infection. Different types of antibodies are produced early (IgM) & later (IgG) after infection, so can roughly indicate timing of infection.

We don't know if people can shed virus (and be contagious) at the same time they have antibodies.

We don't know if antibodies protect against subsequent infection.

SARS CoV-2 tests

Who is doing tests?

CDC: Initially samples all done by CDC. Now state public health departments and commercial labs can develop and employ tests without 1st getting FDA approval.

Public Health Department Labs

Commercial Labs: LabCorp & Quest

Academic Medical Centers



Who is developing tests? Lots of groups!

Academic medical centers

Pharma: Cepheid - point of care test with TAT 45 minutes –
available by Mar 31

- Others: Abbott, Roche, Hologic, Thermo Fischer Scientific ...

Insurance Coverage and COVID-19 in California

Screening and test costs are covered with \$0

copay for people with:

- Commercial insurance
- MediCal
- Medicare Advantage
- FFS Medicare

Treatment costs are covered with \$0 copay
for people with MediCal



Vaccine development – 3 different modes of action

Stimulate the body to generate antibodies to attack the virus's spike protein. NIH & Moderna:

The spike protein is responsible for the virus burrowing into human cells. Injecting segments from just the spike protein's RNA into humans should stimulate the body to create protective antibodies. This should prevent the virus from entering human cells. This vaccine doesn't contain the full live virus, so it cannot cause COVID-19 infection.

Testing in healthy young volunteers at the KP Washington Health Research Institute.

Inject proteins designed to clamp onto the SARS-CoV-2 spike protein. Inovio Pharmaceutical:

These clamp proteins should keep the spike protein from burrowing into human cells. Testing at U Penn and Kansas City in April.

Directly infuse antibodies designed to attack coronaviruses. Regeneron Pharmaceuticals:

Temporary protection by adding direct immune response (not by boosting body's own immune response). Given to those who have been exposed to this virus until the body develops its own immune response, or as treatment for someone already infected whose immune system needs a boost.

Clinical trials

Meds being tested to slow or prevent viral replication:

- **Remdesivir:** (Gilead): Developed to treat Ebola (didn't work), but some promise in animal models for treating MERS. Randomized placebo controlled trial U Nebraska & China with hospitalized pts.
- **Favipiravir:** (Sihuan Pharmacuetical): anti viral med developed to treat influenza.
- **Ritonavir/lopinavir** (anti-HIV meds): but... initial results not encouraging in China.
- **Chloroquine and hydroxychloroquine:** anti malarial drugs that suppress growth of similar virus SARS-CoV in lab setting. Some studies show drop in detectable virus when used alone or combined with a common antibiotic, azithromycin. But... no proof yet that a drop in detectable virus corresponds to improved survival or faster recovery from COVID-19 illness.

Meds being tested to prevent organ damage from virus:

Losartan: A common blood pressure med that blocks a receptor on cells ("ACE 2") that binds the virus, thus may block virus entry into cells & minimize organ damage. But 1 study raised concern that the med might spur more ACE 2 receptors. U Minnesota is testing this now.

Emotional Support and Self Care

Do activities that reduce anxiety and stress.

Focus on what you can control

Exercise, relaxation techniques, go outside, keep routines to your day and delineate time for work and pleasure, enjoy entertainment (on-line, TV, radio, print), stay socially and spiritually connected at a safe distance, volunteer to help others if you can, titrate your intake of news and seek reliable sources (e.g. CDC, WHO, NY Times, academic medical centers).

Talk with your employers' HR department about benefits, time off, working from home, etc.

Seek professional help if needed:

- EAP programs
- Optum Emotional Support Help Line 1-866-342-6892 (free & available for anyone)
- Telepsych encounters through behavioral health provider networks through health plans
- Government resources:
 - Local public health departments
 - Substance Abuse and Mental Health Services Administration's Disaster Distress Helpline: 1-800-985-5990 or text TalkWithUs to 66746. (TTY 1-800-846-8517)
 - CDC resources: <https://www.cdc.gov/coronavirus/2019-ncov/prepare/managing-stress-anxiety.html>
 - Non profit agencies like NAMI (National Alliance on Mental Illness)

What we don't know yet -- but are learning more about daily

Whether prior infection with SARS-CoV-2 confers future immunity.

How long those with COVID-19 will shed virus and be contagious.

Whether vaccines in development will:

- prevent infection
- prevent symptoms in those with early infection

Whether medications will:

- reduce contagion of those infected with COVID-19
- reduce symptoms and speed recovery in those who are infected.

What we do know....

How to slow spread of the virus:

- Social distancing
- Quarantine
- Hygiene



Humans are resilient, smart, resourceful, generous, and committed to tackling the myriad challenges posed by COVID-19.

We are all in this together.