# Covid-19: Avoid panic, stay informed

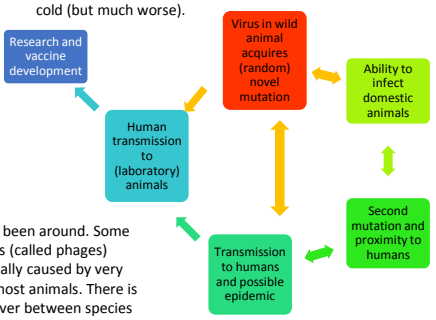
**Overall health**
Exercise
Diet
Decrease stress

**Information**
Understand news
Separate fact from fiction

**Concerned but not fearful**
Normal activities
Increased hygiene
Cough etiquette

## What are viruses?

Viruses are packaged genetic material, which upon entering an appropriate cell integrate into the genome or replicate to produce many copies of itself, which enter additional cells and continues the cycle. Corona virus are a subset of viruses, composed of RNA and require special proteins to integrate. These viruses enter our cells through specialized proteins found on cells in our lungs and give us symptoms similar to those of a cold (but much worse).




## Why are there so many viral diseases currently?

Viruses are not "new" or "novel" and have been around ever since host organisms have been around. Some of the oldest organisms on Earth (single-celled bacteria) are victims of virus-like particles (called phages) demonstrating how prevalent these infectious particles are. Current outbreaks are typically caused by very small molecular changes (mutations) that allow viruses to infect previously unavailable host animals. There is currently no evidence that any virus is "designed" as a biological weapon and crossing over between species is a random event.

| Virus | Symptoms | Origin | Vector for humans | Case fatality | $R_0$ |
|---|---|---|---|---|---|
| 2003-SARS | Fatigue, coughing, shortness of breath, pneumonia, kidney failure | Bats | Civet cat | 9.60% | 2.40 |
| Middle East respiratory syndrome | Fatigue, coughing, shortness of breath, pneumonia, kidney failure | Bats | Camels | 34.40% | 0.50 |
| Covid-19 | Fatigue, coughing, shortness of breath, pneumonia, kidney failure | Bats(?) | Exotic animals (?) | 7.02% | ~4.9 |

*Transmission rates, disease progression and fatality (4 May 2020).*

## Symptoms of coronavirus infection

- Fatigue
- Coughing
- Fever
- Diarrhea
- Shortness of breath
- Pneumonia
- Kidney failure

## How contagious are corona-viruses?

It depends on transmission method

- Human to human transmission is more frequent and easier
  - SARS and Covid-19 are transmitted this way
  - Make sure to follow hygiene protocols
    - Cough etiquette
    - Wash hands and face frequently
- Animal to human transmission less likely, but possible
  - MERS is transmitted this way
  - If working with animals, follow hygiene protocols

## How do viruses make us sick?

- Immune system recognition of virus causes inflammation
  - Occasionally self-harm can occur
  - Especially likely in vulnerable populations
- Development of secondary infections
  - Virus or bacteria take advantage of temporary immune suppression

## What can I do about an outbreak?

**Asymptomatic**
- Work towards a healthier life-style (Exercise and diet)
- Maintain social distance
- Be hygienic
  - Wash hands and face frequently
  - Cover face and mouth
- Stay informed
  - Two resources: WHO and Johns Hopkins

**Symptoms of a cold**
- Stay at home, rest and stay hydrated
- Monitor fever and cough
  - If fever is continuous and cannot be controlled with OTC medications after a day
  - or cough results in shortness of breath
    - Contact physician or hospital

**Symptoms of pneumonia and/or shortness of breath and possible exposure**
- Contact physician
- Contact relatives and friends that may have been infected
  - Ask them to remain at home and follow the steps above

https://www.cdc.gov/disasters/disease/respiratoryic.html

SARS MERS Covid-19

Populations at increased risk of infection and complications

Individuals with:
Hypertension
Diabetes
Cardiovascular disease
Transplants
Immune compromised

Older individuals (over 65 years old)
Adults with COPD
Adults with weak immune systems

## What do all the numbers mean?

- **Number of infections**
  - Individuals confirmed by a health professional. Available tests are nucleic acid (while actively infected) or IgG (after infection). Typically shown as "infected per 100,000".
- **Case fatality (sometimes reported as mortality)**
  - Number of people that have died from *confirmed* disease
  - Includes people that die from secondary infections and complications
  - Misrepresentative because it does not consider deaths from cases not confirmed
- **Recovered**
  - Confirmed individuals no longer showing any symptoms
- **Basic reproduction number ($R_0$ [R naught])*** [Here is a great article for $R_0$]
  - **Expected** cases developed from one case in a population that has not been exposed
  - The SARS-CoV2 virus (COVID19) has an estimated $R_0$ 3.9-5.9 making it about as contagious as a common cold ($R_0$=6.0), but much deadlier
  - Also used to estimate how many people would have to become immune (by vaccine or by already having had the disease) to protect the entire population. For COVID-19 this number is between 60-80% of the population.
- **Using these number to model the spread of disease & help identify vulnerable populations and plan resource deployment**

## What are current treatments?

- Isolation, rest and proper hydration
- Control/reduce fever
  - Acetaminophen
- Respiratory intervention
  - Ventilators
- Being researched as treatment (not available)
  - Antivirals
  - Chloroquine
  - Anti-inflammatory drugs
- ANTIBIOTICS ARE NOT EFFECTIVE AGAINST VIRUSES
  - In patients that may develop secondary infections antibiotics may be recommended

Resources:


- https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/
- https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6
- Liu et al., (2020). https://doi.org/10.1101/2020.01.25.919787
- Huang et al., (2020). https://doi.org/10.1016/S0140-6736(20)30183-5
- https://www.who.int/csr/sars/country/table2004_04_21/en/
- https://www.who.int/emergencies/mers-cov/en
- https://www.theatlantic.com/science/archive/2020/01/how-fast-and-far-will-new-coronavirus-spread/605632/


***Covid-19 is an unknown respiratory virus. We are still learning about it. Stay informed using the links above.**