Report to the Boards of Health

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Central Michigan District Health Department, Wednesday, February 26, 2020
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Coronaviruses

Coronaviruses are common viruses. There are some species that infect humans and are the second most common cause of "the common cold" after rhinoviruses. Certain coronaviruses may also cause diarrhea in infants and children. Infections can occur at any time, but are most common during the winter and spring months. Several other species of coronaviruses cause infections in animals, including bats, pigs, dogs, rabbits, mice, rats, civet cats, chicken, turkeys, camels, and cats.

Rarely, animal coronaviruses change enough so that they can infect people. The virus may also change so that it can spread from person to person. The new virus is then referred to as a novel coronaviruses. People likely has little to no immunity to the novel, or new, virus because they have never been exposed to it before. This is one reason it tends to spread quickly and may cause more serious illness than other strains of coronavirus. Examples of novel coronaviruses are SARS-CoV (severe adult respiratory syndrome coronavirus), MERS-CoV (Middle East respiratory syndrome coronavirus) and, most recently SARS-CoV-2 (previously referred to as novel coronavirus 2019 or 2019-nCoV). The illness caused by SARS-CoV-2 is called COVID-19.

Coronaviruses

Order: Nidovirales
Family: Coronaviridae
Four Genera: alpha, beta, delta, gamma

- Coronaviruses are enveloped, nonsegmented, single-stranded, RNA viruses
- Named after their crown-like surface projections seen on electron microscopy due to the large surface spike proteins (corona means crown in Latin)
- Viruses are host specific; can infect humans and variety of animals

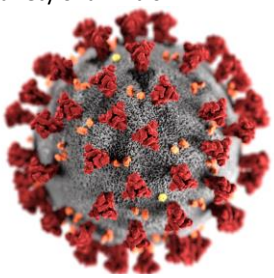


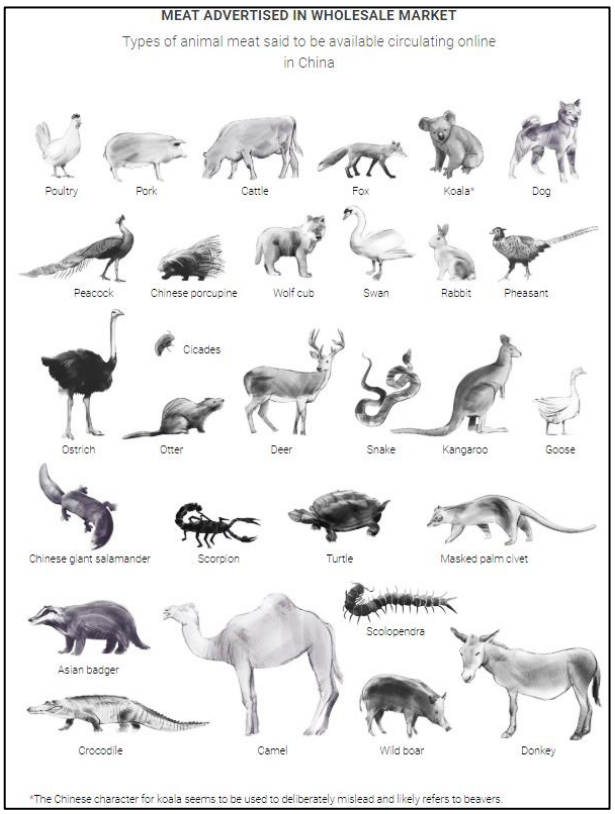
Table 1. Human Coronaviruses

Genus	Species	Acronym	Host	Associated Diseases
Alphacoronavirus	Human CoV-229E	HCoV-229E	Human	Respiratory tract infection (*"common cold")*
	Human CoV-NL63	HCoV-NL63	Human	Respiratory tract infection (*"common cold")*
Betacoronavirus				
Subgroup A	Human CoV-OC43[a]	HCoV-OC43	Human	Respiratory tract infection (*"common cold")*
	Human CoV-HKU1	HCoV-HKU1	Human	Respiratory tract infection (*"common cold")* and possibly gastroenteritis
Subgroup B	SARS-CoV	SARS-CoV	Human	Respiratory tract infection
	SARS-CoV-2	SARS-CoV-2	Human	Respiratory tract infection (COVID-19)
Subgroup C	MERS CoV	MERS CoV	Human	Respiratory tract infection
Subgroup D	No human CoV identified	--	--	--
Deltacoronavirus	No human CoV identified	--	--	--
Gammacoronavirus	No human CoV identified	--	--	--

[a]This species has been abolished according to the International Committee on Taxonomy of Viruses. It is now considered part of the species betacoronavirus
CoV, coronavirus; HCoV, human coronavirus; MERS, Middle East respiratory syndrome; SARS, Severe acute respiratory syndrome.
Adapted from: Long, S. S., Prober, C. G., & Fischer, M. (2017). Principles and practice of pediatric infectious diseases E-Book. Elsevier Health Sciences

The original animal source of SARS-CoV, MERS-CoV, and SARS-CoV-2 is believed to be a bat. In SARS-CoV, it is believed the coronavirus evolved from a horseshoe bat, then passed to civet cats and other animals common to wild animal markets in China before passing to humans. MERS-CoV appears to have passed from bats to camels and then to humans. The intermediate host, or animal host between bats and humans, for SARS-CoV-2 is still being debated. Bats can carry many species of coronavirus and may not show any signs of illness.

Areas where animals and humans are close together allow opportunities for viruses to change and infect humans. This is an example of a zoonosis, or zoonotic disease, which is an infectious disease that spreads from a non-human animal to humans. It is suspected that SARS-CoV-2 started at Wuhan's Huanan Wholesale Seafood Market, a large seafood and animal market in Wuhan, China. This is a similar situation that was suspected as the source of SARS-CoV. In an effort to control SARS-CoV, China issued a temporary ban on wildlife trade in 2003, at the height of that epidemic, but lifted it after 6 months. On January 26, 2020, China again banned wild animal trade until the COVID-19 crisis is over. There is increasing pressure to make this ban permanent, however this would likely be opposed by business organizations and could lead to unregulated black market sales. Prior to the ban, the Chinese government allowed 54 wild species to be bred on farms and sold as food, while many other species are poached illegally, some close to extinction.



While the SARS-CoV-2 is a serious public health situation, only those in direct contact with someone ill seem to be at risk. Coronaviruses, including SARS-CoV-2, are spread by droplets created by coughing or sneezing. This is the same way influenza is spread. SARS-CoV-2 appears to be as contagious as influenza and rhinovirus, the most common cause of colds (see Table 2, the R_0 value). Coronaviruses live on objects outside of the body for a short time, between 2 to 12 hours. Currently there is no evidence to support transmission of SARS-CoV-2 through imported goods and there have not been any cases of SARS-CoV-2 in the United States associated with imported goods. There is no evidence to suggest that animals or animal products imported from China pose a risk for spreading SARS-CoV-2 in the United States.

Table 2. Case Fatality Rate and R_0 Value of Commonly Known Emerging Viruses

Virus	Case Fatality Rate (%)	R_0^
2019-nCoV	**3**	**1.4-5.5***
SARS-CoV	**10**	**2~5**
MERS-CoV	**40**	**<1**
Avian H7N9 (2013)	40	<1
H1N1 (2009)	0.03	1.2-1.6
H1N1 (1918)	3	1.4-3.8
Measles Virus	0.3	12-18

Rhinovirus	<0.01	6
Ebola Virus	70	2.3
HIV	80**	3.4
Small Pox Virus	17	5-7

* WHO: 1.4-2.5; S. Zhao, et al.: 3.3-5.5; J. Read, et al.: 3.6-4.0; M. Shen, et al.: 4.5-4.9

** Without therapy

^Definition of R_0: the average number of people who will catch a disease from one contagious person. It specifically applies to a population of people who were previously free of infection and have not been vaccinated.

Other Summaries of On-Going Outbreak:

As of 2/19/20 at 11am, there have been 75,284 cases of COVID-19 reported, with 2,014 deaths.

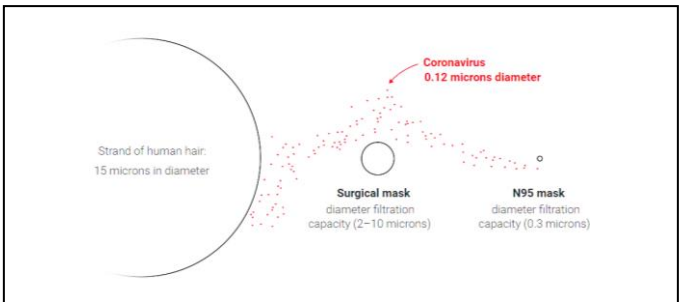
- 74,251 (98.6%) of the cases have been in Mainland China (including Hong Kong)
  - 2,008 deaths (99.7%)
- 61,682 (81.9%) in Hubei Provence, China
  - 1,921 deaths (95.4%)
- 1,033 (1.4%) spread over 29 other countries and one cruise ship
  - 6 deaths outside of China:
    - 2 Iran
    - 1 Philippines
    - 1 Taiwan
    - 1 France
    - 1 Japan

- There have been 15 cases in the United States, none in Michigan. They have been in Washington, California, Arizona, Texas, Wisconsin, Illinois, and Massachusetts.
- Five people have been evaluated for infection in Michigan, all have tested negative.
- The MDHHS Lab has received supplies to do testing for SARS-CoV-2. The lab has to complete a validation process, which confirms the test is working properly, before it will be available for use.
- On January 31, the US HHS declared a public health emergency for the United States.
- Also on January 31, the President of the United States issued a "Proclamation on Suspension of Entry as Immigrants and Nonimmigrants of Persons who Pose a Risk of Transmitting 2019 Novel Coronavirus" which became effective beginning 5 p.m., Sunday, February 2, 2020. This put the following into effect:
  - Foreign nationals who have visited China in the past 14 days may not enter the United States.
  - All American citizens and exempted persons ("travelers") coming from China will be directed to ("funneled to") one of 11 U.S. airports, one of which is Detroit Metro.
  - Travelers who have been in Hubei province (the site of nearly 75% of all infections) in the previous 14 days will have an additional health assessment (screened for fever, cough, or difficulty breathing).
    - If found to be symptomatic, travelers are transferred for further medical evaluation. (They will not be able to complete their itinerary.)
    - If found to be asymptomatic, travelers will be subject to a mandatory, observed 14-day quarantine at or near that location. (They will not be able to complete their itinerary.)
      - In Michigan, this is taking place in Detroit Receiving Hospital
  - Travelers who have been in other parts of mainland China (outside of Hubei Province; the site of nearly all other infections) in the previous 14 days will have an additional health assessment (screened for fever, cough, or difficulty breathing).
    - If symptomatic, travelers are transferred for medical evaluation. (They will not be able to complete their itinerary at that time.)
    - If asymptomatic, travelers are allowed to reach their final destination and, after arrival, will be monitored under self-quarantine for 14 days.

- **THE MONITORING OF THESE INDIVIDUALS IS ASSIGNED TO US AT THE LOCAL HEALTH DEPARTMENT. We are notified at least twice a day if we have a traveler to monitor.**

The best way to prevent infection is to avoid being exposed to the virus. Avoid all non-essential travel to China. As a reminder, CDC always recommends everyday preventive actions to help prevent the spread of respiratory viruses, including:

- Wash your hands often with soap and water for at least 20 seconds. If soap and water are not available, use an alcohol-based hand sanitizer.
- Avoid touching your eyes, nose, and mouth with unwashed hands.
- Avoid close contact with people who are sick.
- Stay home when you are sick.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Clean and disinfect frequently touched objects and surfaces.



Surgical Masks are designed to prevent large droplets from coughing and sneezing from passing from one person's mouth to another person or to a surface. They are not designed to keep out small particles like viruses.

There is no evidence that wearing a mask protects non-sick persons from getting sick.

If you are ill with an upper respiratory illness, note that many healthcare facilities use a test that swabs the nose or throat called a FilmArray Respiratory Panel to help diagnosis respiratory infection. One of the many germs these panels test are common human coronaviruses. This test does not assess for SARS-CoV-2 or other novel coronaviruses, rather the common coronaviruses that are normal causes of colds. If this test is positive for the coronavirus, and you have not been exposed to someone sick with SARS-CoV-2, you have a common form of coronavirus that regularly goes around.

Resources:

- CDC information and guidance: https://www.cdc.gov/coronavirus/2019-ncov/index.html
- MDHHS information and guidance: www.mi.gov/coronavirus (includes FAQ and public handout in English, Chinese, Spanish, Arabic)
- National Restaurant Association Coronavirus Info & Tips Poster: https://foodsafetyfocus.com/FoodSafetyFocus/media/Library/pdfs/Coronavirus_2019-nCoV_Info_TipsforRestaurants.pdf
- Coronavirus: Everything you need to know in a visual explainer https://multimedia.scmp.com/infographics/news/china/article/3047038/wuhan-virus/index.html
- Johns Hopkins Center for Health Security COVID-19 resources http://www.centerforhealthsecurity.org/resources/COVID-19/index.html
- COVID-19 Global Cases by Johns Hopkins CSSE (regularly updating map and counts of cases) https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6 or www.tinyurl.com/2019-ncovmap

Recommendations

1. While the risk for SARS-CoV-2 infection in Michigan remains low at this time, continue to practice everyday preventive actions to help prevent the spread of respiratory viruses.
2. Prior to any international travel, visit www.cdc.gov/travel for guidance regarding health advisories, precautions, and advice to ensure the safest travel possible.
3. Help prevent stigma and discrimination in the community, workplaces, schools, etc. Do not make determinations of a persons of risk of SARS-CoV-2 based on race or country of origin, and be sure to maintain confidentiality of people with confirmed coronavirus infection, or any other medical condition.

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