COVID-19 Science and Medicine Updates

Compiled by University of Maine faculty and students

Maine Updates – April 17, 2020
From Maine CDC:
https://www.maine.gov/dhhs/mecdc/infectious-disease/epi/airborne/coronavirus.shtml

Data updated at April 16 at 11:45AM:
Confirmed Cases: 796
Recovered: 333
Hospitalized: 130
Deaths: 27
Negative test results, updated April 15 (now published weekly): 14,076

Maine/Penobscot County Data - Online Dashboard Links

Desktop version:

https://arcg.is/1Knarr

Mobile version:

https://arcg.is/5qGGr

News from Maine:

Governor Mills Unveils Actions to Protect Housing for Maine People Amidst COVID-19 Pandemic

https://www.maine.gov/governor/mills/news/governor-mills-unveils-actions-protect-housing-maine-people-amidst-covid-19-pandemic-2020-04

Governor Mills Extends State of Civil Emergency As Maine Continues to Combat COVID-19

Order is extended another 30 days, through May 15, 2020.

https://www.maine.gov/governor/mills/news/governor-mills-extends-state-civil-emergency-maine-continues-combat-covid-19-2020-04-14

UMaine Health Connection Chat Series
Sponsored by UMaine Center on Aging, and UMaine Medicine
Wednesdays from 11am – 12 Noon; Beginning April 15, 2020
LIVE, practical information and tips for staying healthy for Maine's 60+ citizens and other high risk residents during COVID-19.
Chats are held by Zoom (internet) or by telephone. No cost to attend.
THOSE JOINING BY PHONE CAN SEND IN QUESTIONS TO OUR SPEAKERS AHEAD OF TIME.
To register e-mail Kelley.morris@maine.edu
Each session will include a resource person from the University of Maine Center on Aging and Eastern Area Agency on Aging. Sessions will be recorded and be made available at: https://mainecenteronaging.umaine.edu/stayhealthy

UMaine Cooperative Extension – Food/Seafood pick-up and delivery options around the state
https://extension.umaine.edu/agriculture/farm-product-and-pickup-directory/

Other COVID-19 News:

Update on Mask decontamination from National Institutes of Health (NIH):

"NIH researchers find that N95 respirators can be decontaminated & maintain functional integrity for up to three uses. These findings are not yet peer-reviewed but are being shared to help those responding to the outbreak. The scientists found that ethanol spray damaged the integrity of the respirator's fit and seal after two decontamination sessions and therefore do not recommend it for decontaminating N95 respirators. UV and heat-treated respirators began showing fit and seal problems after three decontaminations—suggesting these respirators potentially could be re-used twice. The VHP-treated masks experienced no failures, suggesting they potentially could be re-used three times. Vaporized hydrogen peroxide was the most effective decontamination method, because no virus could be detected after only a 10-minute treatment. UV and dry heat were acceptable decontamination procedures as long as the methods are applied for at least 60 minutes. The authors urge anyone decontaminating an N95 respirator to check the fit and seal over the face before each re-use." https://bit.ly/2xz5jRL

How is COVID-19 spread from person-to-person?

- COVID-19 is spread primarily by direct contact with an infected individual or through droplets created by coughing or sneezing[1]. Droplet transmission can occur when a person is in close contact (within 1 meter) with another person experiencing respiratory symptoms (i.e. coughing, sneezing). This person is at risk of having his/her mouth, nose, or eyes exposed to potentially infectious respiratory droplets. This is different from airborne transmission[2]. In airborne transmission, microbes need to be present in very small droplets (droplet nuclei), can remain in the air for long periods of time, and can be transmitted further than 1m away from the infected individual[2]. This is NOT the case with COVID-19*. Transmission may also occur via contact with surfaces in the immediate environment[2].
  Sources: Rothan et al. 2020. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *Journal of Autoimmunity*.[1]

https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations[2]

- *Airborne transmission may be possible in specific circumstances where aerosols may be created. These specific circumstances include, but are not limited to, medical procedures such as endotracheal intubation, administration of nebulized treatment, disconnecting a patient from a ventilator. For this reason, as precaution, the World Health Organization (WHO) recommends airborne precautions be taken only in these situations where aerosols might be created. In non-aerosol environments, WHO recommends droplet and contact precautions for people caring for COVID-19 patients. https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations
- Two individual laboratories in China have isolated 2019-nCov from stool samples of infected patients, indicating a potential fecal-oral transmission. This has not yet been validated by other studies, so it is too soon to say that COVID-19 can be transmitted via the fecal-oral route.
  Source: https://www.gastrojournal.org/article/S0016-5085(20)30281-X/pdf
- The estimated R_0 of COVID-19 is 2.2, which means that on average, each patient spreads the infection to 2.2 other people.
  Source: Li Q, Guan X, Wu P, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. N Engl J Med 2020; doi:10.1056/NEJMoa2001316.
- Unfortunately, the onset and duration of when COVID-19 can be shed, in addition to the period of infectiousness, are not yet known. We know that COVID-19 can be shed via respiratory tract and bronchoalveolar lavage fluid, but we do not yet know if other non-respiratory body fluids from an infected person can contain infectious, viable COVID-19, including vomit, urine, breast milk, or semen.
  https://www.cdc.gov/coronavirus/2019-ncov/hcp/faq.html#Transmission
- It is still unknown how long a recovered patient will remain immune to COVID-19.
  https://www.cdc.gov/coronavirus/2019-ncov/hcp/faq.html#Transmission

How long is COVID-19 stable on surfaces?

- Stable vs alive: Viruses are not living particles, so they are never actually alive. The proper term is stable. In the case of COVID-19, the viral particle (virion) contains a lipid envelope on its outer surface. When this envelope is intact, the virion is stable. Since viruses rely on a host to continue spread and replication, this envelope will eventually degrade in the absence of a host. We want to know how long a COVID-19 virion is stable and capable of causing infection on surfaces.
- The amount of time that COVID-19 can remain stable on surfaces depends on the type of surface. One study published in The New England Journal of Medicine demonstrated that viable COVID-19 was detected on plastic and stainless steel for up to 72 hours (3 days) after application of virus to these products. The same study found that COVID-19 is viable on cardboard for up to 24 hours post-application. Interestingly, these authors also found that no viable COVID-19 was detected on copper at 4 hours post-application. It should be noted that the timeframe for virus stability on surfaces can be impacted by temperature, humidity, and other environmental conditions.

  Source: van Doremalen N, Morris D, Bushmaker T et al. Aerosol and Surface Stability of SARS-CoV-2 as compared with SARS-CoV-1. New Engl J Med 2020 doi: 10.1056/NEJMc2004973

Face mask guidance:

- The CDC recommends wearing cloth face coverings in public where other social distancing measures are hard to maintain. Good examples of this include grocery stores and pharmacies. Wearing these masks will help to slow the spread of COVID-19 by preventing people who are unknowingly infected from transmitting it to others. Masks

worn by the public are meant to protect other surrounding individuals, rather than the people wearing the masks themselves. https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/coronavirus-disease-2019-covid-19-frequently-asked-questions

- Specifications for home-made face masks:
  - Snug fit against sides of face
  - Must cover **mouth and nose**
  - Secure with ear loops or ties around the back of head
  - Include multiple layers of fabric
  - Should still be able to breath easily when wearing the mask
  - Be able to launder and machine dry without compromising the mask https://www.cdc.gov/coronavirus/2019-ncov/downloads/DIY-cloth-face-covering-instructions.pdf
- Cloth face masks should be washed regularly. https://www.cdc.gov/coronavirus/2019-ncov/downloads/DIY-cloth-face-covering-instructions.pdf
- When removing face masks, individuals should take care not to touch eyes, nose, and mouth and should immediately wash their hands upon removal of the mask. https://www.cdc.gov/coronavirus/2019-ncov/downloads/DIY-cloth-face-covering-instructions.pdf
- Surgical masks and N-95 respirators are not recommended for public use. We are experiencing great shortages of these supplies and must reserve them for medical workers who need them most (i.e. healthcare workers and medical first responders). https://www.cdc.gov/coronavirus/2019-ncov/downloads/DIY-cloth-face-covering-instructions.pdf
- Good instructions/diagrams for making face masks can also be found at https://www.cdc.gov/coronavirus/2019-ncov/downloads/DIY-cloth-face-covering-instructions.pdf
- Good video on how to make a quick cloth facemask out of common items: https://www.youtube.com/watch?time_continue=45&v=tPx1yqvJgf4&feature=emb_title

UPDATE ON COVID-19 TREATMENTS:

HYDROXYCHLOROQUINE:

- Hydroxychloroquine is an arthritis medication that can also be used to prevent or treat malaria. https://www.cdc.gov/malaria/resources/pdf/fsp/drugs/hydroxychloroquine.pdf
- Hydroxychloroquine can be safely prescribed to adults and children of all ages, as well as pregnant women and nursing mothers.
  - However, people with psoriasis should not take hydroxychloroquine
- As of now, there is limited and insufficient data on whether or not use of this drug is a viable antiviral therapy against SARS-CoV-2. https://www.bmj.com/content/369/bmj.m1432
  - There are currently at least 80 trials worldwide involving hydroxychloroquine and/or its closely related compound, chloroquine, against SARS-CoV-2.
  - A recent study conducted in 4 French hospitals, with 181 hospitalized COVID-19 patients with pneumonia suggest that hydroxychloroquine did not improve patient prognosis. https://www.medrxiv.org/content/10.1101/2020.04.10.20060699v1
- Though it is generally well tolerated, there are some potential side effects:
  - Stomach pain
  - Nausea
  - Vomiting
  - Headache
  - Itching
  - Cardiac Arrhythmia

    - Low blood sugar
    - Retinopathy (rare when taken in high doses for many years)

https://www.fda.gov/media/136537/download

- Despite this, many U.S. hospitals are using hydroxychloroquine as a therapy for hospitalized COVID-19 patients. https://www.nih.gov/news-events/news-releases/nih-clinical-trial-hydroxychloroquine-potential-therapy-covid-19-begins
- A NIH clinical trial of hydroxychloroquine as a therapy for COVID-19 began on April 2, 2020
    - It is being conducted by a network of institutions, the first participants enrolling at Vanderbilt University Medical Center in Nashville
    - It aims to involve roughly 500 adult patients who are currently hospitalized with COVID-19 or in an emergency department with anticipated hospitalization
    - It is estimated to end sometime in July 2021

https://www.nih.gov/news-events/news-releases/nih-clinical-trial-hydroxychloroquine-potential-therapy-covid-19-begins

REMDESIVIR is currently a promising antiviral drug in development for the treatment of SARS-CoV-2, the coronavirus that causes COVID-19.

Background on remdesivir:

- Remdesivir is an investigational antiviral drug produced by Gilead Sciences.
- Remdesivir is currently the focus of multiple clinical trials, including trials in the United States, for treatment of COVID-19.
- The European Medical Agency (EMA) has recommended remdesivir for "compassionate use" in COVID-19 patients, which allows physicians to treat seriously ill patients with an experimental drug when there is little hope left for the patient's survival.
- Remdesivir was originally developed for treatment of Ebola virus, yet has demonstrated strong inhibitory effects against coronaviruses in experiments performed in the laboratory using cells or using animal models. These results yield promise that remdesivir may also effectively inhibit coronavirus infection in humans.
- A recent publication in the New England Journal of Medicine (April 10, 2020) reports that compassionate-use remdesivir treatment resulted in clinical improvement in 68% of hospitalized COVID-19 patients across the United States, Europe, Canada, and Japan. These data are significant because they represent critically ill patients, and thus it is possible that the drug would perform even better in future trials with patients at earlier stages of COVID-19 disease.

Mechanism of action of remdesivir:

- Just like the cells in our bodies contain DNA with a copy of our entire genome, viruses have genomes encased within the virion.
- The viral genome contains the "blueprints" for the production of new virions, and when cells become infected, the cell gets converted in a viral replication factory and those blueprints get copied to make new virions.
- Viruses with an RNA-based blueprint, like coronaviruses, encode for an enzyme, known as RNA-dependent RNA polymerase, which is required for the virus to make additional copies of the genome and ultimately make new virions.
- The antiviral drug remdesivir is a nucleotide analog that works by adding an incorrect base to the growing RNA chain and thus blocking that enzyme RNA polymerase. This inhibits the virus from making additional copies of the genome and making new virions.
- If virion production is limited in the cell, the spread of the virus in the host will be reduced, and infection can be halted.

- One of the reasons that an antiviral that specifically targets the viral polymerase is promising is because it should not have negative effects on the cell, but will shut down virus synthesis specifically.

Sources:

Agostini et al. mBio Mar 2018, 9 (2) e00221-18; https://mbio.asm.org/content/9/2/e00221-18

Gordon et al. Journal Biological Chemistry, *In press,* February 24, 2020. https://www.jbc.org/content/early/2020/02/24/jbc.AC120.013056

Wang et al. 2020. Cell Research, 30: 269–271. https://www.nature.com/articles/s41422-020-0282-0

https://www.the-scientist.com/news-opinion/remdesivir-works-great-against-coronaviruses-in-the-lab-67298

Grien et al. New England Journal of Medicine, 2020. DOI: 10.1056/NEJMoa2007016 https://www.nejm.org/doi/full/10.1056/NEJMoa2007016?query=featured_coronavirus

EVIDENCE-BASED GROCERY SHOPPING PROTOCOLS

What are recommended distancing practices that I should follow while in the store?

- It is recommended to stay at least 6 feet away from others while shopping, including when in line.

https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/essential-goods-services.html

Should we be concerned with COVID-19 on our grocery store purchases?

- COVID-19 is stable for up to 3 days on surfaces like doorknobs and other surfaces
  Source: https://www.webmd.com/lung/how-long-covid-19-lives-on-surfaces
- Not only are you around others who may be infected at the grocery store but you are handling items that likely were handled, coughed, or even sneezed on by someone else
- When you are in public you should assume that an infected individual has touched everything that you touch, including produce and packaged foods
  Source: https://www.healthline.com/health-news/worried-about-contaminated-groceries-how-to-be-safe#Cleaning-your-groceries-at-home

How should we decontaminate our groceries?

- At the very least you should wash your hands after putting away your groceries
- If you are at all concerned that your grocery items may have been contaminated you can:
  - Wipe down or wash packaged food items or cans or throw disposable packaging away (Use a disinfectant wipe or spray on packaging)
  - After you are finished putting away your groceries, wipe down any surfaces, tables, or countertops that were touched by grocery bags or items
  - If you are using cloth grocery bags you should wash them before reusing them
  - You can leave nonperishables in a garage or porch for 72 hours before putting them away in your house
  - For fruits and vegetables it is recommended to wash with soap and water for at least 20 seconds, make sure to rinse well before storage

  Source: https://www.healthline.com/health-news/worried-about-contaminated-groceries-how-to-be-safe#Cleaning-your-groceries-at-home

While I am at the grocery store I touch things other than grocery items including my phone, my wallet, and when I am checking out, what precautions should I be taking?

- Try to avoid touching your phone or keys while shopping. Place them in a pocket or bag until your hands are clean again
- Store hand sanitizer in your car or bag. After returning to your car, if you are able to, use hand sanitizer to thoroughly clean your hands, steering wheel, and stick shift
- Avoid touching your face until you get home and are able to wash your hands
- When you leave the store or when you get home you should disinfect your cell phone with a disinfectant wipe or alcohol if you handled it while out in public

- When you get home you may change your clothes/shower but it isn't critical unless you came into direct contact with someone who is sick
- After you get home wipe down your door knobs with a disinfectant wipe or other cleanser

  Source: https://www.goodmorningamerica.com/living/story/virus-researcher-makes-doesnt-bring-coronavirus-home-70016433

Should I wear a mask to the grocery store?

- Yes. The CDC recommends covering your nose and mouth with a cloth face covering or mask when required to be out in public.
  - There are instructions available on the CDC website on how to make adequate homemade cloth face coverings here:
    - https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html

  https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/essential-goods-services.html

https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/essential-goods-services.html

What is the best policy for wearing gloves in stores? Should we be doing this?

- The CDC does not recommend wearing gloves in stores.
- Recommended precautions while shopping include:
  - Disinfecting the shopping cart
  - Refraining from touching your eyes, nose, or mouth
  - Using touchless payment if possible (paying without touching money, a card, or keypad). If you must handle physical payment such as money, a card, or keypad, hand sanitizer with over 70% ethanol should be used right after paying.
- After shopping, the CDC recommends the use of hand sanitizer and washing hands with soap and water.
- However, if wearing gloves helps you feel less worried or stressed or reminds you to avoid touching your face, they could be worn. It would be recommended to remove gloves before touching the car, and washing the gloves or disposing of them as soon as possible.

  https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/essential-goods-services.html

What measures are grocery stores doing to protect us?

- Retail food stores and restaurants have been given guidelines by the FDA to increase customer and employee safety during the COVID-19 pandemic.
- Sanitization efforts have increased in ways such as requiring associates to frequently clean high-traffic and high-touch areas such as shopping carts and checkouts.
- Stores are limiting the total number of people in a store at once to help customers maintain social distancing.
- Floor decals make it easy to know how far you should stand from the person in front of you while waiting in line.
- Some grocery stores have dedicated shopping hours for individuals with higher health risk in regards to COVID-19. You should check individual store websites for their exact hours.

    - This includes senior citizens 60 and older and individuals with compromised immune systems, including pregnant women and caretakers of the immunocompromised.
- Ordering curbside pickup of groceries is also available at some stores so that you can limit your possible exposure.
    - If possible, use of curbside pickup and ordering online is recommended by the CDC.

https://www.fda.gov/food/food-safety-during-emergencies/food-safety-and-coronavirus-disease-2019-covid-19

https://www.hannaford.com/customer-service/htg-coronavirus-updates

https://corporate.walmart.com/important-store-info

What protective practices should we use when getting gas at the gas station?

- It is recommended to use gloves or disinfecting wipes on handles or buttons at the gas station before touching them.
- Hand sanitizer with at least 60% alcohol should be used after fueling, and when you're home or somewhere with soap and water hands should be washed for 20 seconds.

https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/essential-goods-services.html

What about my prescriptions? Can those be delivered?

- Depending on the pharmacy, yes. Some pharmacies, such as CVS and Walgreens are offering free delivery for prescriptions during the upcoming weeks to help avoid excessive trips to the store.
- Certain medications may require in-person pick up. In those cases consider using a drive thru.

https://www.walgreens.com/topic/pharmacy/prescription-delivery.jsp
https://www.cvs.com/content/delivery

RESOURCES AND RECOMMENDED READINGS:

UMaine's Fogler Library COVID-19 Lib Guide:
https://libguides.library.umaine.edu/coronavirus/maine

Calculate your Pandemic Footprint, based on your behaviors:
https://www.pandemic-footprint.com/

NIH is Enrolling for a New Study to Quantify Undetected Cases of Coronavirus
Blood samples from healthy volunteers are needed, learn more here:
https://www.niaid.nih.gov/news-events/nih-begins-study-quantify-undetected-cases-coronavirus-infection

Reputable Online Resources with COVID-19 Data:

IHME Health Data and Projections:
https://covid19.healthdata.org/united-states-of-america
https://covid19.healthdata.org/united-states-of-america/maine

Johns Hopkins
https://coronavirus.jhu.edu/map.html

Maine Small Business Resources during COVID
http://www.mainestreamfinance.org/covid-19-updates/small-business-updates-and-resources-during-covid-19-outbreak/

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