
Responding in the Case of an Epidemic or Pandemic

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SARS-CoV-2, the virus that causes COVID-19, has been making its way around the world in past weeks and months. The effects of this disease will almost certainly be felt by every community. Countries where the infection is already well-established have found it difficult to manage. Coping with a pandemic like this is particularly challenging in places with high population densities, lack of infrastructure, malnutrition, and incidence of other infections that leave people's immune systems more vulnerable. Here are a few suggestions for ways to respond well in your community to the presence of a highly contagious disease.

Be informed

Find reputable sources of information. What are the symptoms of the disease, how does it spread, what are the best ways to slow its spread, and what effective treatment options are there? In the midst of an epidemic or pandemic, myths quickly circulate around these questions. It can be difficult to wade through the information and misinformation that spreads during a pandemic, particularly when little is known about the disease. Focusing your attention on reliable information can help protect your mental health while enabling you to take responsible action. The "Further Reading" section of this article contains sources of information that you may find helpful.

Avoid exposure

Avoiding exposure—and helping others to do so as well—is the best way to respond in a situation where a contagious disease is spreading. Practices to avoid exposure and subsequent infection are discussed below.

Implement basic health precautions

Common public health precautions to avoid exposure to infectious diseases include the following:

- wash hands often and well with soap and water
- avoid touching your face
- sneeze or cough into the bend of your elbow
- stay home when you are sick
- keep a safe distance from people, especially in public areas
- depending on the situation, health authorities may encourage people to wear masks in public and when taking care of sick individuals

Disinfect surfaces

Disease-causing agents (e.g., certain bacteria, viruses, and fungi) often live for a time in the environment, outside the body. Household bleach, rubbing alcohol (containing at least 70% alcohol), and hydrogen peroxide are all useful against any pathogens living on surfaces within the home (Figure 1). Penny Rambacher of Miracles in Action suggests setting up a low-cost disinfection station in your home, near the entrance. She shared some details for making and using the station, summarized here:

- Fill an adequately-sized container with 30 ml (2 Tbsp) of bleach and 1 L (1 qt) of water. [Ed: According to the Centers for Disease Control and Prevention (2019), 20 ml (4 tsp) of bleach is sufficient for 1 L (1 qt) of water.]
- Disinfect your home by dipping a cloth rag into the solution, wringing it out, and using it to wipe down surfaces (e.g., doorknobs and handles). Return the rag to the container after each use.
- Prevent the solution from breaking down and losing effectiveness by keeping a lid on the container. [Ed: Bleach breaks down in sunlight, so keep the container covered or in a dark room (WHO, 2014).]
- Replace the solution periodically to maintain its potency. [Ed: It is recommended that dilute bleach solutions be replaced daily (WHO, 2014).]

Note that for a bleach solution to be effective, surfaces must first be cleaned to remove dirt/organic matter. Contact with organic matter quickly reduces bleach's effectiveness. Also be sure to observe the following safety precautions. Use bleach



Figure 1. Cleaning agents for a household disinfection station. *Source:* Penny Rambacher.

in a ventilated area. Do not ingest bleach or get it in your eyes or on your clothes. Wear gloves, since bleach is a skin irritant. Also, do not mix bleach with other chemicals.

Wash your hands often with soap and water!

This is one of the most important things you can do to minimize the spread of an infectious disease. Health authorities recommend washing hands for 20 seconds using soap and water. Handwashing is a challenge in areas where water is scarce. The very simple tippy tap technology can help; see the article later in this issue by Elliott Toevs.

Sometimes a lack of water is not the only impediment to handwashing. After reading about the tippy tap, Dr. Tom Post shared, “I think that the tippy tap looks very useful for places like the mountain environments of Laos. [But] our long-standing challenge there has been that people don't have access to soap.... And it has been difficult to convince people to make their own soap.”

I asked Dr. Post what he would do if he found himself with no access to soap, and with a rapidly spreading virus in the community. He responded:

I would try participatory learning activities—which we have done in Laos...I would try modeling and discussion after. However, here is where [we have] had a struggle. [Some staff] are reluctant to model handwashing with soap and also to try to change the common pot style of eating. It would need some very good facilitation—and we have worked to train our Lao staff in dialogue education (<http://edn.link/wzcfwn>), too.

Communicate with your community

Communicate information about the disease with all members of a community, especially marginalized and vulnerable people. Photos and text-free diagrams/videos are good ways to communicate with those unable to read. Use appropriate media options for your area. These can include radio and messaging via mobile phone applications.

Consider communication to address cultural customs or traditions that may need to change to slow the spread of a disease. Mike Fennema, who works with World Renew in Laos, encourages people to think carefully about helpful and harmful aspects of culture in this regard, adding that this should happen “ideally within a group of people from a wide variety of different cultures to enable better reflection.” He related a few examples as follows:

In Laos, a big danger is connected with the tradition of eating from a communal soup bowl. One big bowl [is] placed in the center of the table, [and] everyone uses their own spoon to take out one spoon full at a time. I suspect (I did not do any research on this) that it is a situation perfect for passing on the virus to the entire family...[It can be difficult to recognize] these aspects. My Lao staff were doing a pretty good job of following the advice to clean hands more often, use a mask, etc. However, when I raised this issue a while back, they sheepishly admitted that they had not thought about changing this habit (they are now).

One of the other challenges we face is the use of the communal hand towel. Even at the office, with an attempt to keep them clean, since so many people use [the towels], they quickly get dirty... We tested several water sources at the office (e.g. filtered, from a tap) as well as swabs of the toilet and a swab from the communal towel. The towel had higher numbers of bacterial colonies than the swab from the squatting toilet bowl. The towels were washed much more frequently after that. I assume that in [each culture] there are various traditions that are helpful (e.g., handshaking is not so common in Laos) and some that are hurtful in regards to spreading [disease].

Strengthen immunity

Attempting to avoid exposure is one way to fight against this virus. Another is to do what you can to strengthen your immune system. Ideally, people would follow the steps below before facing exposure to a virus like the one that causes COVID-19. However, these suggestions remain important.

Eat nutritious plants

Green leafy vegetables are an excellent source of many vitamins and minerals that strengthen the immune system. Some vitamins and minerals that are especially important for the immune system include Vitamins A, D, and C; zinc; and selenium (see *EDN 126* (<http://edn.link/fremth>) for more information about selenium).

Vegetables and fruits contain high amounts of antioxidants, which are molecules that protect your body from free radicals (that are produced when your body breaks down food, or when you are exposed to toxins). Many vitamins are antioxidants (including vitamins A, C, and E), and so is selenium and various other molecules.

World Renew has worked with many organizations in East Africa to introduce grain amaranth (*EDN 91* (<http://edn.link/d6yrr7>)). It seems to have a unique effect on the immune system. For example, people living with HIV (the virus that causes AIDS) who ate grain amaranth have experienced a remarkable increase in their CD4 count (<https://worldrenew.net/blog/healthy-and-living-positively-thanks-grain-amaranth>), which is one indication of how well their immune system is functioning. Grain amaranth contains a high amount of protein, especially the amino acid lysine, which is not present in most grains. It also contains important vitamins and minerals, including zinc. For best digestion and assimilation of nutrients, pop grain amaranth or grind it into flour before eating it.

Much of our immune function depends on the health of the microorganisms in our intestines, collectively known as the gut microbiome (Belkaid and Hand, 2014). To support your gut microbiome, eat foods that feed and add beneficial bacteria. Plants that feed beneficial microbes contain non-digestible fiber; these include leafy greens, onions (*Allium cepa*), garlic (*Allium sativum*), and bananas (*Musa* spp.). Foods that add beneficial bacteria include sauerkraut, kimchi, dairy products with live cultures, and many others.

Grow nutritious plants

If a large percentage of a population becomes ill, or if a government mandates that people stay home to reduce the spread of a disease, food supply systems can be disrupted.

The “From Our Seed Bank” section of this issue contains suggestions for crops that grow quickly and produce food soon after planting. Also plant longer-term crops that continue to provide food after the fast-growing plants decline. Perennial greens are especially beneficial, because they require little work to maintain and can yield fresh greens for a long time. Even if a perennial plant goes dormant for a season, the established root system allows rapid growth to resume once conditions are favorable. Like other leafy green vegetables, they provide vitamins and minerals that are important for strengthening a person’s immune system. For perennial green leafy vegetables, we recommend moringa (*Moringa oleifera*), chaya (*Cnidoscolus aconitifolius*), and katuk (*Sauropus androgynus*). (TN 91 (<http://edn.link/undercrops>))

If you grow most of your own food but become sick, you may lack energy to tend crops. Root crops produce an abundance of food and calories. Some of these include cassava (*Manihot esculenta*), sweet potato (*Ipomoea batatas*), and yam (*Dioscorea* spp.) (TN 81 (<http://edn.link/rootcrops>)).

Gardening around the home is an excellent way to alleviate anxiety while producing a portion of your own food, or food to share with those in need. ECHO has information about various types of gardens, including keyhole gardens (EDN 131 (<https://www.echocommunity.org/en/resources/825acc09-8402-4b59-9fb9-58c611efdd6c>)), rooftop gardens (TN 31 (<http://edn.link/m6d4qd>)), and wicking bed gardens (TN 95 (<http://edn.link/6twx93>), with more information in the “ECHO’s From Our Network” section of this EDN issue). Where space is limited, plants can be grown in containers, sacks, and tires. Gardening initiatives are most impactful when supported with seed sources and teaching on nutrition and hygiene (World Vegetable Center (https://avrdc.org/download/publications/medium-term_and_strategic_plans/strategy/eb0270.pdf), 2016).

Plan for the future

Like most disasters, a pandemic is unexpected. But steps can be taken ahead of time to increase a community's resilience in case of a disaster. *EDN 122* (<http://edn.link/rtxmr3>) contains an article about preparing for and responding to a disaster; though geared toward natural disasters, some of the content applies to pandemics. For example, promote root and tuber crops, which can often remain in the ground for a long time and can be used as emergency foods. Plants trees like coconut palms (*Cocos nucifera*), which are also important sources of food. Get to know local authorities, and work to build trust and local capacity in your community.

Conclusion

Disease outbreaks are extremely challenging to cope with. Yet, we can take practical actions to lessen their impacts. While certainly not exhaustive, we hope that this article inspires creative, agricultural solutions to problems associated with pandemics such as COVID-19.

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Further reading (information on COVID-19)

General information from health authorities

Centers for Disease Control and Prevention (<https://www.cdc.gov/coronavirus/2019-ncov/index.html>) (CDC): a wealth of public safety information on how to protect yourself from COVID-19 and what to do when sick.

World Health Organization (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>) (WHO): includes a coronavirus disease dashboard (<https://who.sprinklr.com/>) where you can view an updated map and table listing reported cases of COVID-19 by country. WHO also has a dashboard specifically for Africa (<https://www.afro.who.int/health-topics/coronavirus-covid-19>).

Johns Hopkins Medicine (<https://www.hopkinsmedicine.org/coronavirus/>): provides answers to frequently asked questions and informational tools similar to those from the CDC and WHO.

Disinfecting surfaces

US Environmental Protection Agency: list of products suitable for use against SARS-CoV-2.

Paper showing that SARS-CoV-2 lives on surfaces for four hours to four days depending on the type of surface: N van Doremalen, et al. 2020. Aerosol and surface stability of HCoV-19 (SARS-CoV-2) compared to SARS-CoV-1 (<https://www.nejm.org/doi/full/10.1056/nejmc2004973>). *The New England Journal of Medicine*.

Disinfecting fresh fruits and vegetables (in case you are concerned about produce touched by human hands):

A WHO doc entitled Surface decontamination of fruits and vegetables eaten raw (<https://www.who.int/foodsafety/publications/food-decontamination/en/>).

Recommended concentrations of chlorine for disinfecting various types of produce: Wash water chlorine disinfection: best practices to ensure on-farm food safety (https://www.lsu.edu/agriculture/plant/extension/hcpl-publications/8_Pub.3448-WashWaterChlorineDisinfection.pdf), a fact sheet by the Louisiana State University AgCenter.

A tool for calculating the amount of water and bleach you need to achieve a desired concentration of chlorine: Chlorine Dilution Calculator (<https://www.publichealthontario.ca/en/health-topics/environmental-occupational-health/water-quality/chlorine-dilution-calculator>) by Public Health Ontario.

Gardening options

The World Vegetable Center (AVRDC) offers ideas/production guides and videos.

Communicating with your community

An example of a video without words: Stanford Medicine (https://www.youtube.com/watch?v=rAj38E7vrS8&fbclid=IwAR2JkF1d4YeECH4KUPE-G0HexkNNgJKMwXqdNmigj-J5WA4ySt_rkVlg-U4).

A video on handwashing in multiple languages: How to wash your hands (<http://edn.link/na66rr>), by SAWBO (Scientific Animation without Borders).

A collection of resources on the ECHOcommunity (<http://edn.link/fd29h9>) website contains links to information on digital communication platforms.