

# Herbal Medicine

in the



## COVID-19 Pandemic

Materia Medica and Therapeutics

Andrew Bentley

Herbal Medicine  
In the COVID-19 pandemic:  
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# Introduction

Sometime in the fall of the Year 2019, or perhaps a little before then, a new virus entered the human population. It was a Coronavirus, a common type of virus whose spike proteins give it the appearance of a crown when viewed under an electron microscope (hence the name Corona). Much speculation and some research has surrounded the exact time, place and manner of the virus' entering its first human host. What is known without speculation is that a cluster of human cases began to emerge in the city of Wuhan, the capital of Hubei province, China.

In the first week of December 2019 a handful of patients had reported to hospitals in Wuhan with symptoms of a viral illness<sup>1</sup>. By the 8th of December, 41 patients had presented with similar pneumonia-like symptoms, which would later turn out to be cases of the new virus. Chatter on social media platforms in the city over the coming weeks included increasing mentions of shortness of breath and of SARS, a pandemic illness which had broken out near the end of 2002 and had strikingly similar symptoms. Thousands of miles away in Canada, an AI designed to track increases of such mentions on social media warned its clients that a new viral outbreak might be happening<sup>2</sup>. On the 31st of December, public health authorities in China informed the World Health Organization that they were dealing with a cluster of unexplained cases of pneumonia, many of which were linked to a market in the city of 11 million people. It was not certain at the time whether the virus was transmitted from human-to-human or only acquired by individuals working with meat or livestock that might have been a reservoir for the virus.

On New Year's Day, the market involved was shut down. Rumors spread that SARS had re-emerged, and multiple people were arrested by the Chinese government for spreading such rumors. On the 7th of January, Chinese authorities announced that they had isolated the virus which was causing the illness and that it was a novel Coronavirus<sup>3</sup>, similar to but distinct from the one that had caused the SARS epidemic of 2002 to 2003. At this time it was being referred to as 2019-nCoV, for novel coronavirus. Neighboring countries, especially those who had had cases of SARS, were already preparing for the possibility of the virus coming to their populations ( in fact many had been preparing, in small and large ways, since the SARS epidemic 17 years earlier). By the middle of January, the genome of the virus had been shared widely-- first unofficially by the scientists involved<sup>4</sup>, and then officially by the government<sup>5</sup>.

Around the same time, the first case was confirmed outside of China. Thermal scanners in Bangkok International Airport detected a fever in a woman, a Chinese citizen, who was taken to the hospital for quarantine and testing<sup>6</sup>. It was determined

that she did have the novel coronavirus, and this was announced by public health authorities in Thailand on the 13th of January, who also stated that they were contact tracing and testing 182 people who came in contact with this traveler. While this was the first case that was detected outside of China, it was certainly not the first case to make its way outside of China undetected.

By the end of January, cases had been confirmed in Thailand, Japan, UK, Russia, Sweden, Spain, USA and Canada, and were, we now know, occurring elsewhere as well. On January 30th the World Health Organization declared the outbreak a global Health Emergency. The same day, the United States Center for Disease Control confirmed the first case of person-to-person transmission within the United States, and stated that it was likely that in the coming days and weeks there would be more cases. The following day the Department of Health and Human Services declared coronavirus a public health emergency in the US, and the CDC issued a mandatory 14-day quarantine for the 195 American nationals who had been evacuated from Hubei Province-- the first such mandatory quarantine order in half a century<sup>1</sup>.

In the weeks that followed, there was an exponential increase in the number of cases and deaths caused by the novel Coronavirus, which by this time had been officially named Sars-Cov-2. It spread throughout the world, shattered economies, put regular life on hold, ended many lives, and permanently impacted many, many others. As of the time of this writing, in mid-December 2020, the virus has been responsible for over one and a half million known deaths worldwide, and tens of millions of cases of illness<sup>7</sup>.

Many years prior to the emergence of COVID-19, the human world received a sort of warning shot from the world of coronaviruses. SARS — severe acute respiratory syndrome— was a disease caused by a coronavirus that had made the evolutionary jump from infecting bats to infecting humans. This event took place in the fall of 2002, and by the summer of 2003 the virus had infected at least 8,098 people and caused 774 deaths, that we know of<sup>8</sup>. On a case by case basis, it was far deadlier than COVID-19. However, it was a far less competent virus in the human body; it was not as contagious, not as readily capable of infecting humans<sup>9</sup>. Because of this, and the fact that its dramatic lethality attracted early attention, it was contained before it could spread nearly so widely. A large portion of those who contracted it were healthcare workers, and it never gained a strong foothold in the general population<sup>8</sup>. It was, however, disruptive enough to cause a worldwide shortage of personal protective equipment, and to make public health authorities, especially in countries affected by it, begin thinking about the potential for future pandemics. In fact it was as clear a warning as there ever could have

been that the coronaviruses in bats were genetically very close to being able to be competent pathogens in the human body. From that point forward, the prospect of an outbreak of a viral illness like the one we have now was not a matter of if, but a matter of when.

In some of the countries where there were both cases of SARS and a subsequent preparation for future pandemics, the present pandemic has been much less severe. Taiwan and Japan in particular serve as examples, but also Vietnam, which is a relatively low-resource country<sup>7</sup>. The available evidence would suggest that preparation is more important than wealth when it comes to dealing with a prospective outbreak of disease. This is worth noting, not least because there is no reason why the present deadly coronavirus outbreak, which was not the first one, should be the last one.

Since the novel coronavirus now known as Sars-Cov-2 first appeared in China in late 2019, it has spread throughout the world, causing millions of cases of illness and well over 1 million deaths. It has also created widespread disruption in the global economy and the affairs of humankind in general. This is largely owing to two factors: one is that it is fairly contagious. It's easily spread from person to person without the need for any sort of intermediary such as polluted water or an animal carrier. The second reason, which may seem counterintuitive at first, is the fact that its case mortality rate is relatively low. In the vast majority of cases, COVID-19 (as the disease caused by the virus is now known) is a mild, self-limiting condition. In a minority of cases, it becomes very serious and in somewhere around 3% of cases that come to medical attention, it causes death<sup>10</sup>. This fairly low case fatality rate is a feature of the pandemic that it shares with many of history's most devastating outbreaks, simply because, in a disease that is spread from person to person directly, killing off the host too quickly or too consistently makes it hard for the virus to make its way through the population<sup>11</sup>. If everyone who has a virus becomes gravely ill and therefore less likely to go to work, go to other social gatherings, and spread the pathogen to other members of the community, the outbreak is less likely to grow exponentially. Consequently, more people have died from COVID-19 than have died from (for instance) Ebola hemorrhagic fever in the entire known history of that illness, despite Ebola being much deadlier to any given infected individual<sup>12</sup>.

Because many cases of COVID-19 are fairly mild, the vast majority of them are self-managed at home by the people suffering from the condition or those who live with them. Throughout the world, herbalists and traditional healers have been working to help with this process, since the initial outbreak of the disease<sup>13, 14</sup>. In my own practice I have worked with a large number of people experiencing illness, and a far larger number of people who are not experiencing illness but wanted to take every available precaution in case they were exposed to the pathogen. In addition to this, I have done a large amount of communicating both with individuals and through virtual presentations to groups of people information about the virus pandemic and remedies that could be useful in situations that might arise from them. Communication with colleagues, as well as their published works, shows that this pattern has been common for many of them.

Due to the unfortunate prevalence of wishful and/or malicious misinformation, and the widespread mistrust of public health experts, communication and education of the public has been more of a focus than it has needed to be with previous outbreaks and pandemics<sup>15</sup>.

Until just over a year ago, no one had ever seen a case of covid-19<sup>1</sup>. As such, it does not have the long specific traditions of treatment with herbs that many illnesses have. However, since the very beginning in Wuhan, China, herbalists have been treating people who have this condition based on knowledge that has been accumulated through many generations of study and practice<sup>14</sup>. While it is possible that some of the bioactive compounds in some of the herbal remedies directly interfere with the virus's ability to replicate<sup>16, 17</sup>-- in effect killing it-- this is not what herbalists tend to be relying on. Instead, the usual approach is to support the structures and functions of the body through the processes, the clinical patterns, that arise because of the virus. We may know that in a petri dish (or other operationally appropriate glassware), the usnic acid in usnea, or the rosmarinic acid in lemon balm, or the polyphenols in elderberry, are disruptive to viruses. We do not know with any real certainty that the same thing happens within the context of a human body. We do, however, know from long experience what to expect from these remedies in the cases of fevers, in the cases of inflammation and so forth.

The intention of this volume is to provide herbalists and others with an accessible and practical guide to understanding the virus and its clinical presentation; controlling spread of the virus through natural and hygienic measures; and using herbs for supporting structures and functions of the body in a way that helps people to heal through covid-19. Rather than promoting a single, possibly oversimplified and perhaps

inaccessible protocol, the intention is to discuss strategies and therapeutic goals with a variety of possible remedies to help achieve those goals. Accordingly, there is a section about the physiology of the virus and its epidemiology, a section outlining the different distinct stages of the illness and therapeutic strategies for working with people in those different stages; followed by a section on Materia Medica, featuring some of the herbs that I have found to be helpful in the course of this year. It should be noted, as regards the materia medica, that most if not all of the herbs described here have substitutes, other herbs with similar mechanisms of action and similar constituents, that could be used for them in the event that the described herb is not available or cannot safely and sustainably be acquired in the necessary quantities.

This work has intentionally been kept to a limited size and written in what I hope is an accessible and not overly academic style. Much of what we know about herbs we know from tradition and experience, and as covid-19 is an emerging and rapidly evolving Public Health situation, the understanding of relevant Materia Medica and Therapeutics is also incomplete and evolving.

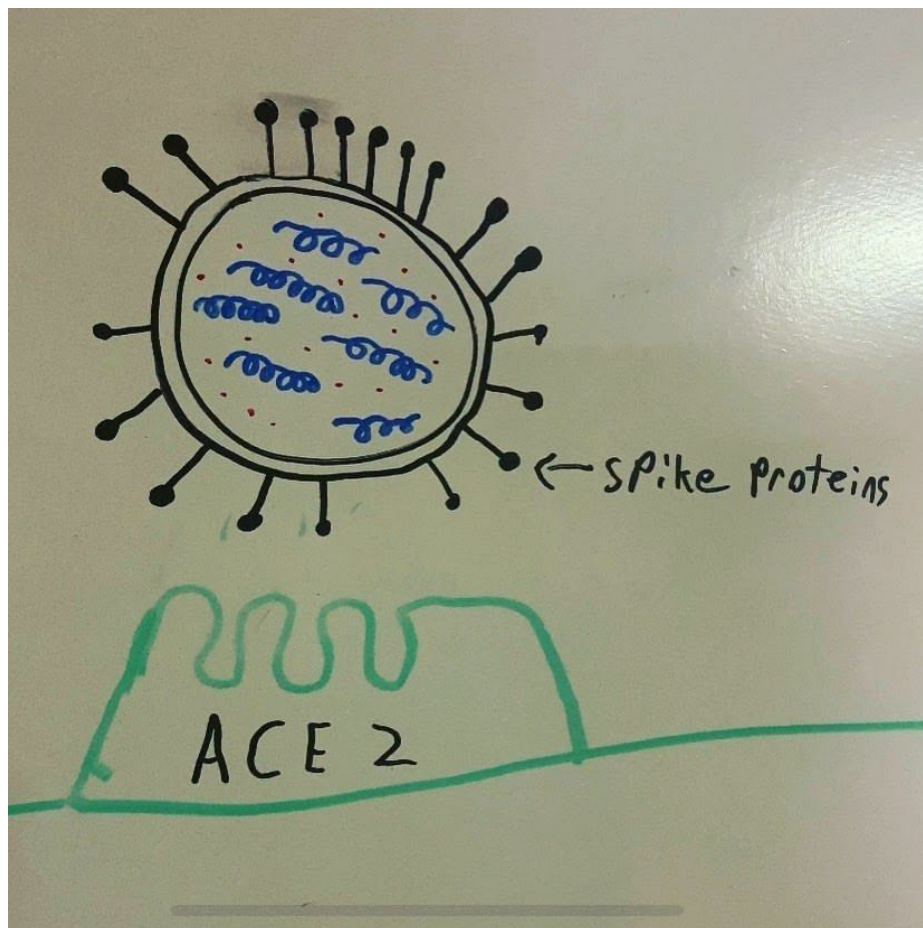
# About the Virus

The causative agent of covid-19 is the virus Sars-Cov-2, a member of the family of viruses known as coronavirus. Some other coronaviruses cause varieties of the common cold, as well as Middle East Respiratory Syndrome (MERS) or severe acute respiratory syndrome (SARS). In some early publications, it was referred to by the name ncov19, or 2019 novel coronavirus. After further research had revealed that it was very similar to the coronavirus which caused the SARS outbreak, the International Committee on Taxonomy of Viruses (ICTV) gave it the official name SARS-COV-2<sup>8</sup>. At the same time, the World Health Organization announced the official name COVID-19 for the disease caused by the virus<sup>9</sup>. (In some WHO public health publications the virus is referred to simply as the virus that causes COVID-19 or the COVID-19 virus, to avoid confusion with the virus that causes SARS). These names were created based on previously existing guidelines, to avoid naming any particular person, group of people, region or animal in the names of new diseases. This was intended to "minimize unnecessary negative impact on trade, travel, tourism, or animal welfare, and avoid causing offence to any cultural, social, national, regional, professional, or ethnic group."

Like other coronaviruses, Sars-Cov-2 consists of a protein envelope, called a capsid, on the surface of which are protruding structures called spike proteins. The name Coronavirus is derived from the fact that, when viewed through an electron microscope, this round capsid with protruding spikes has a spiked-circle appearance reminiscent of a crown ("corona" in Latin). Inside the capsid is the genetic material of the virus, RNA, and enzymes which aid in the reproduction of the virus<sup>20</sup>.

As is the case with other viruses, Sars-Cov-2 must reproduce within the cells of the host organism. To this end, the spike proteins interlace with and chemically bind to a protein called angiotensin-converting-enzyme 2, or ACE2, which is found on the surface of cells that line the respiratory tract, as well as some other cells in the body<sup>21</sup>. In the normal course of human physiology this protein binds to another substance called Angiotensin II (which raises blood pressure), and facilitates its conversion into a related hormone called angiotensin (1,7) (which lowers blood pressure, among other functions).

ACE2 also binds to and interacts with a variety of structurally similar proteins, facilitating their transport from the outside of the cell to the inside, somewhat like a locked door that opens when the key is inserted. The virus has essentially developed a lock pick, allowing it access to the interior of the cell. Once it binds to the ACE2 on the cell's surface, both the virus and the enzyme are taken into the cell, where the virus makes multiple copies of itself using the raw material from the cell. This then results in the cell being damaged or destroyed, and the multiple new viral particles (virions) being released.



This destruction of the cells and altering of the proteins that compose them results in immune responses by the body which are designed to make the environment less hospitable to the virus, and to try to isolate and remove it from the body. Among the more outwardly apparent signs of these complex responses are fever, inflammation, and coughing<sup>20, 21</sup>.

As a general rule, the act of coughing is intended to expel things that irritate the respiratory tract. In the case of pathogens, however, it may remove them from the



respiratory tract, but in so doing, it introduces them into the environment, where they may be breathed in by other hosts. In addition to coughing, the virus can be introduced into the environment through talking and breathing. It is carried through the air not as single viral particles but in droplets (which are large enough that they readily settle out of the air, usually traveling only a few feet) or aerosols, (which are small enough that they do not readily settle out of the air, and may be carried for some distance on air currents). It is generally believed that droplets are the primary vehicle for transmission of this virus and the aerosol transmission may be an important secondary source of infection. Early on in the pandemic, there was a lot of concern that transmission might occur by contaminated surfaces, objects which had been splattered with droplets for instance; but as time has gone on it does not appear that this is a common route of infection<sup>22</sup>.

Additionally, and significantly, it appears that the dosage of virus which is introduced into a person's body may play a very significant role in whether they become infected and how severe their symptoms are<sup>23</sup>. Breathing in droplets from an infected person or infected people all day appears more likely to produce a serious case of illness than casual or passing exposure. This is especially relevant for people who may be living with a sick person or health care workers who would be taking care of infected people. It is also significant for people who work in close proximity to co-workers, especially in areas where they would be breathing the same air over and over. A person who came to work in that situation while infected with the virus would be more likely to pass it on to their coworkers and in a more severe form, than if they were outdoors or working at a larger distance from one another. It is also believed<sup>24</sup> that indoor air quality including air circulation and filtration may play a role and how the virus is spread from one person to another inside a building.

When a person has been exposed to covid-19 and it begins the process of reproducing in their body, the immune system begins responding more or less immediately. As mentioned before, this response may include some non-specific actions such as an increase in body temperature (a fever), which would be similar for many pathogens; It can also include some responses that are very specific to the individual virus-- the production of antibodies which specifically target this pathogen<sup>20</sup>. Because antibodies can be detected in the system for months or maybe even years afterwards, and because exposure to the virus is the only way that these antibodies form, they can be used to determine who has been exposed to the virus in the past. It should be noted that it is possible to be exposed and not develop antibodies; and that just because an antibody test does not find antibodies does not necessarily mean that there aren't any. So we could say that an antibody test is a very specific test, in that only

past exposure is likely to produce a positive result; but it is not always a very sensitive test, because history of exposure does not guarantee a positive result, especially after months have passed<sup>25</sup>.

Because many people have tested positive for antibodies without any history of the illness, or tested positive for the virus without ever developing symptoms, we know that many people are completely or very nearly asymptomatic throughout the course of their infection. The virus enters their body, their immune system mounts a successful defense, and they develop immunity to future exposure to the virus ( for some period of time, which has not yet been determined) without ever having become sick. Cases like this may not come to medical attention, and therefore remain difficult to count, but it's quite possible that this is what happens in the majority of cases<sup>20</sup>.

In people who do develop symptoms, they may show up as much as a couple weeks after the initial exposure, but often they show up in around four days. Early symptoms might include a low-grade fever, chills, a cough (typically non-productive) and fatigue. Some individuals lose their sense of taste and smell, and diarrhea is fairly common in children, less so in adults. Headaches, muscle aches, and a general sense of malaise are also very common, even in mild cases<sup>20</sup>. Viral load-- the quantity of viral particles present-- appears to be highest at right around the time that symptoms begin. This very likely means that pre-symptomatic or early symptomatic people are the most able to pass this illness on to other members of the community<sup>26</sup>.

In more severe cases, which probably account for about one in five infections, other symptoms which may develop include shortness of breath and difficulty breathing. Those cases which become more severe are often associated with situations in which the person might have inhaled a larger quantity of viral particles. For example, individuals who work in close quarters with an infected person or who take care of sick people in a healthcare setting are likely to be exposed at a larger dose, and develop a more severe case as a result. Other factors that are associated with higher risk include advanced age, diabetes, or a history of chronic heart, respiratory, or kidney disease<sup>27</sup>.

In cases that do become severe, this usually (but not always) happens 8 to 12 days after the onset of the first symptoms<sup>20</sup>. After an early mild illness which may even appear to be resolving, there is often a turning point it comes somewhere around the 10th day. This change is characterized by shortness of breath and difficulty breathing, sometimes accumulation of fluid in the lungs which may be audible as crackling or gurgling. Taking a deep breath often causes pain, a sensation of tightness in the chest and coughing. Inflammation and fluid in the lungs may result in decreased oxygenation of the blood, and in the most severe cases respiratory failure can lead to death.

In cases that do not become very severe, improvement in symptoms might begin around this same time. In both severe cases and less severe cases, there are sometimes a set of symptoms and presentations which can occur after the acute phase

of the virus has passed. At this stage, there may not be any virus left in the body; if there is it may not be readily detectable or transmissible. Even so, symptoms such as fatigue and lack of mental clarity may persist or emerge anew<sup>28</sup>. Other non-specific symptoms may also emerge and persist, including muscle and joint pain, changes to heart function, and shortness of breath. It is not completely understood exactly what is happening in this situation but it may involve the renin-angiotensin-aldosterone system (RAAS)<sup>21</sup>.

Angiotensin converting enzyme 2, the protein on the surface of mucosal cells, to which the SARS-CoV-2 virus binds, is located on cells within the respiratory mucosa, but also in many other types of cells throughout the body. The respiratory mucosa is a convenient entry point, because it is one of the only internal organs that comes into frequent contact with the air. It is one of the easier ways for a virus to enter the human body. But the same protein, which is involved in signaling and acts as a receptor molecule for signaling molecules that are sent throughout the body, can be found in cells lining the blood vessels, the digestive system, cells of the genitourinary tract-- In short a very wide range of places throughout the body. And once it has entered the body, the virus can enter into, replicate inside of, and damage any cell that has this protein on its surface.

The role of ACE2, in the normal course of the human body's functioning, is that it is part of a system of signaling substances called the renin-angiotensin-aldosterone system. Renin (produced by the kidneys), angiotensin (a plasma protein whose precursor is produced by the liver), and aldosterone (produced mainly in the adrenal cortex) are three interacting proteins that act as hormones throughout the body; in other words, as chemical messengers and regulators that are created in one part of the body and change the function of cells somewhere else in the body.

In very broad terms, this regulatory system controls the blood pressure; influences retention and secretion of electrolytes; regulates the production of some other hormones; stimulates the adrenal glands and sympathetic nervous system; and affects the functioning of the heart. It is one way that the respiratory system, circulatory system, kidneys, liver, and endocrine system communicate with each other.

One might suspect the virus interacting with a key component of the system might have an effect on the whole system. And in practice this is more or less what we observe-- especially in postacute Covid, but also even in mild cases of the illness. Circulatory changes and changes in blood pressure, extreme fatigue sometimes alternating with an impending sense of doom or panic, and even lasting metabolic and endocrine changes are all possible secondary effects of COVID-19<sup>20, 21</sup>.

All of this is important to realize, partly because it illustrates that covid-19 risk is not just a matter of surviving. Many people who survive and, as mentioned, some that weren't even very sick, have lasting and life-changing aftereffects.

When considering any contagious illness, two of the numbers that we might talk about are what is called *incidence* and *prevalence*. Incidence is the number of people who contract an illness during any given time— usually a year, but it could also be a day or a week. Prevalence is how many people have the condition at any one particular time. Prevalence could be thought of as a reservoir of infection, in effect, when considering a contagious illness. Prevalence is the number of people that are out there who might pass it on to a susceptible member of the population. With a short-lived illness like COVID-19 the incidence in a given year is going to be higher than the prevalence, since not everyone who contracts it during the year will still have it at the end of the year. While incidence is useful for keeping track of the overall impact that an outbreak has had, prevalence is useful for thinking about risk. Because the more prevalent an illness is, that is to say the more people in the population who have it, the more sources there are for an uninfected individual to potentially become infected. So all other things being equal— which of course they never quite are— the risk to any given individual rises as the prevalence rises.

The basic reproductive number of an infection is an estimate of the number of people that any infected person would go on to infect in turn. For a very contagious illness this might be several people; for a less contagious illness it would often be a number smaller than one, meaning that on average, each person who has it passes it on to fewer than one other person. With epidemics and outbreaks, it is generally understood or believed that there is a certain tipping point as far the reproductive number goes, beyond which the outbreak will grow rather than shrink; and a certain tipping point below which the numbers of people who have the infection will dwindle until there aren't any more. Real life does not always work the way mathematical estimates suggest, so sometimes what really happens is that the number dwindles to a very small number and perhaps remains a very small number rather than disappearing entirely. So for instance, if the reproductive number were 2, that would mean that the original person who has the infection passes it on to two people; they each pass it on to two more; who each pass it onto two more and so forth. This leads to an exponential growth in numbers. Unchecked, this process will continue until all individuals in a population have been infected and either died or developed immunity. By contrast if the reproductive number

is one half for every two present cases there would only be one new case, and as cases resolved faster than they were replaced by new cases, there would eventually be an exponential decrease in the number of cases.

Fortunately, the reproductive number of any given infection is not a thing that is set in stone. It's something that is very much susceptible to change based on changes in various factors and conditions. These factors and conditions can include the presence of immunity in the population, certainly, but also the difficulty that the infection might have in getting from person to person. There are both incidental and intentional factors involved in that process. One natural variable might be population density. If people lived very far apart, the infection would have a hard time getting from one person to the next if they didn't see each other often. This might be the case in a farming community, for example, where people mostly worked on their own farms and only occasionally ventured to other places. Contrast this with a crowded city where 1000 people might live or work in the same building, and many many thousands might live within one square mile.

A more intentional infection control scenario might be a strategy where people wore masks, avoided gathering in groups, and so on. Under such circumstances the reproductive number might be much lower; and when the reproductive number is lower than one, each person is infecting on average less than one person in turn. In other words, some people are infecting one person and some people are infecting no people, so then the prevalence of the infection decreases. At one time 10 people in a certain population might have it, and then by the time they recovered, if only half of them had infected another person, then only five people would have it. And if that process continued then only two or three people would have it and so forth until eventually only one person had it or perhaps no people had it.

The goal of nearly any preventive measure with a contagious illness is to decrease the average number of people the pathogen is being passed onto from each existing case, until it has crossed this tipping point and begun to decline. This is the goal of the hygienic measures, the social distancing, the masking; and the same thing would be the goal of any vaccine program. The unfortunate part is that this requires a collective will of the populace, which can sometimes be hard to muster<sup>29</sup>. This is especially true in situations where civic unrest makes some or all of the population very distrustful of the government, and by extension the public health authorities; and in situations where economic necessity compels people to take actions (such as continuing to work or conduct business when it is not safe to do so) that are contrary to the interest of public health. It can also be affected by regular old poor decision-making, often rooted in a sense of entitlement or exceptionalism.

In Lexington, Kentucky, where I live and practice, there is a legend from the days of the cholera pandemic in the 1830s (a version of which was recounted in print by local author James Lane Allen)<sup>30</sup>. In those days, cholera was spreading throughout the country but had not yet come to Lexington. It was a disease transmitted through contamination of food or drinking water with fecal matter or sewage (though not everyone knew or believed this) and may have been perceived as being a disease that disproportionately affected poor people, tending to be much worse in less well-off communities.

The wealthy people of Lexington decided to have a celebration in demonstration of their gratitude for how little their own lives had been affected by this pandemic that they were reading about in the papers and hearing rumors about as it had devastating effects in other cities.

So the date was set, and plans were made for a lavish celebration. People came from all over the countryside, and in addition to the guests, there were many workers brought in to procure and prepare and serve the food, play the music, and clean up the messes. All in all, it was the event of the season. And much to the surprise of the people hosting the event, but not to anyone reading this, cholera came as an uninvited guest. Within a matter of days, it had become widespread throughout the city, affecting rich and poor alike, partygoers and laborers and people who were unconnected to the original event. This quickly became one of the largest mass casualty events in the history of the city.

This is what is known as a super spreader event— an occurrence in which the right situations make it possible for an infection to be transmitted to a far larger number of people than its basic reproductive number. Exactly what those conditions are vary from one infection to another, but larger gatherings of people are almost always more likely to cause spread than smaller groups or people in isolation.

With COVID-19 which, unlike cholera, can be inhaled in the form of droplets or aerosols<sup>26</sup>, gathering indoors where people are breathing the same air could be expected to be (and indeed appears to be) a major risk factor. Most known super spreading events have been indoor events, such as church services, weddings and family gatherings; in which people were unmasked, breathing the same air together in an enclosed space, and quite frequently talking, singing or cheering-- vocalizing a lot. Some super spreader events were outdoor events but may have also included significant time spent indoors. For example the Sturgis motorcycle rally was a well publicized super spreader event that was mostly an outdoor event<sup>32</sup>, but attendees may have also spent time in close proximity to one another in bars, hotels and other places.

Just as it is possible for there to be a set of conditions where the pathogen spreads much more readily than it would in average conditions, it is also possible (though more difficult) to create a set of conditions in which the pathogen spreads much less than it normally would. This is a primary goal of basic preventative measures. Not merely to delay the spread of infection, although that can also be helpful, but ideally to push the reproductive number below the tipping point so that, rather than an ever expanding outbreak, the measures create a scenario in which the outbreak dwindles to the point of manageability or even insignificance.

Super spreader events appear to play a larger role in transmission of COVID-19 than in most other pandemic diseases. Part of this is likely due to the fact that it is a respiratory illness. A disease like AIDS, which is transmitted sexually, or a disease like cholera (previously mentioned) which is transmitted through the fecal-oral route, is not as easily spread from one individual to many others. Any of them can be, given the right circumstances, but for COVID-19 those circumstances are as simple as being in the same room together for a while.

In one large study conducted in India<sup>31</sup>, which collected data on more than half a million individuals who had been exposed to the virus, most infected people did not pass the virus on to anyone. 5% of the individuals were responsible for 80% of transmission. Socioeconomic factors driving the behavior of individuals play a role in when and if infected people come in contact with other people, and so it is possible that these findings might be more extreme or less in other cultural and economic contexts.

The fact that over 70% of the individuals did not transmit the illness to anyone else is most likely a result of stringent isolation and social distancing measures in place in the states where the study was conducted. Likewise, the ability to be a super spreader is probably related to the roles in society that those individuals have. For example working in a job where they come in contact with many other people or being a student in a school situation where they are in contact with a very large number of other individuals.

# Practices for working with COVID-19

Your first responsibility when working with a person who has or is suspected to have COVID-19 is to avoid catching it yourself. While many people may instinctually disregard personal safety to help others, in this case it could be the difference between making a meaningful contribution to someone's recovery, and becoming an agent of further sickness in your community. The possibility of becoming infected and passing the virus on, possibly to more vulnerable people, is something everyone should take seriously. If your goal and your work is to improve the health of your community, this is even more of a solemn duty.

Fortunately, today's technology can make avoiding direct contact with a sick person easier than it has been in the past<sup>33</sup>. For instance it is possible to do a telehealth consult or even a phone consultation with a person who is sick, may be sick, or believes that they have been exposed; and then deliver medicine to them without physically coming into the same space as them breathing the same air as them and risking becoming infected. Some strategies, based on those used in my practice during the pandemic include:

1. A phone call, text, or direct message in which a person asked for a specific remedy, which was then prepared and either picked up from the clinic or dropped off at their home, with no contact.
2. A system or systems for no-contact delivery of remedies. This can include remedies being delivered by mail, dropped off by the practitioner at the home of the person who needs them, or picked up on behalf of the person who needs them from the clinic or other suitable location.



3. A video consult or, where this is not possible because one party does not have the technology for it, a phone consultation in which assessment is made of an individual's state either for the first time or as a follow up, taking note of at a minimum: A description given to you by them of their overall symptoms; A sense of time frame including when any individual symptoms appeared for the first time or whether it has gotten better or worse since the last time that you talked to them; A thorough history including any allergies, any existing medical conditions, any medications that they are taking; measurements taken by the patient if it all possible including their temperature, pulse rate and blood pressure. (If the individual does not have in their possession instruments for measuring these values, they can be acquired fairly cheaply in most places and could be delivered to them as described above).
  
4. Preparing a kit that includes remedies appropriate for all the members of a household (a household which might include sick people as well as people who were exposed but not sick); as well as other supplies that might be useful, such as a thermometer and pulse oximeter, for self-assessment.

While measures like these are not necessarily what any of us are used to, and take a certain amount of adjustment, they are not necessarily a great impediment to doing one's best work. Just as new problems evolve, we as practitioners and healers must evolve new strategies for coping with them.

# General measures for prevention

**Primary strategies: reduce personal risk; reduce transmission in community.**

"First do no harm" is a phrase that has come to be associated with the healing professions. Sometimes mistakenly believed to be part of the Hippocratic oath (which contains a similar sentiment, but in the form of a vow rather than an admonition), it actually stems instead from another Hippocratic text, *Epidemics*<sup>34</sup>. The author is discussing a widespread outbreak of a previously unfamiliar disease, and advises the reader to make a habit of two things: to help, or at least do no harm. This can be and often is interpreted as a warning against treating more than is necessary, but at the same time it is also a statement of the precautionary principle. Put simply, it is better to take the course of action that is less risky, than to take the course of action that is more risky or whose risk is not well understood, though might otherwise have been preferable.

Early on in the pandemic, social distancing and wearing masks while in public, were being recommended on the precautionary principle<sup>35</sup>. There was physiological plausibility to suggest that these measures might decrease the transmission of the virus. There was not, at that time, so much clear, measured evidence that quantified that decrease in risk, or even conclusively demonstrated that the risk was decreased. Now such data exists, having been gathered during the intervening time<sup>36, 37</sup>. The suspicions and expectations have been confirmed not only that masks are effective as source containment, reducing (not eliminating) the likelihood that an infected person will pass on the virus, but also effective as protection for the wearer, reducing (not eliminating) their chance of becoming infected if they come into contact with another infected person.

Tragically, the delay in protective measures becoming widespread as well as the shortage of personal protective equipment that occurred, here in the United States and

in many other places that did not choose to stockpile them effectively after the SARS epidemic, meant that the chance for containing the outbreak was missed. Sustained and widespread transmission within the community-- not just in a limited geographical area or in a limited occupational setting such as healthcare-- led to an exponential increase in cases, and therefore a large reservoir of transmissible virus within the population.

The basic preventive measures of hand-washing, social distancing, and masking are, at this point, probably well known to just about everyone. Unfortunately, there remains considerable confusion about their exact applications, purposes and usefulness. One of the more surprising things about this pandemic in my own experience has been how difficult it has been to convince some people of the usefulness of these measures. Educating the community on these basic hygienic measures, as well as the concept of risk reduction in general, has constituted a large part of my work during this pandemic. The purpose of this section is to discuss some of these measures and how we know what we know about them as well as to provide useful information for reassuring people about the safety and effectiveness of these hygienic practices.

Masks in particular have been a contentious topic here in the United States<sup>38</sup> as well as in some other countries. While the usefulness of masks as an infection control measure has long been understood or assumed in a healthcare setting, the practice of wearing them in public for the general population has never been socially acceptable in this country, and has even had some anti-social connotations in the past. Complaints that masks were for bank robbers or other criminals who didn't want their faces to be seen have been frequently brought up by individuals who did not like the idea of masking as a preventative measure. Masking was unfamiliar to many people, and uncomfortable physically and socially, which led to the proliferation of many incorrect ideas that large numbers of people were all too happy to accept as fact. For instance:

*Masks restrict access to oxygen from the air.*

*Masks are ineffective because the holes in them are larger than viruses.*

*Masks must be useless, since people have gotten sick while wearing them.*

*Wearing a mask is a sign of being controlled by the government.*

*If masks worked, there would be no need for additional measures.*

*The disruption and inconvenience are not worth the reduction in risk, since most infected people survive.*

Understanding that people have these concerns, and being able to compassionately address them, can help contribute to a better community-wide public health environment. Because an herbalist is often a trusted source of information and unlikely to be seen as an "establishment" figure, they are in a relatively strong position to offer a differing viewpoint and have it be well received. This should be done without offering ridicule or judgement, and with sympathy for their concerns (provided of course that they are sincere concerns; avoid wasting much time on people who just want to argue). For example, one might say:

*Masks are definitely uncomfortable. It can feel like you're suffocating, but as long as you are able to take a full breath, your lungs can get plenty of oxygen.*

*The holes in masks are larger than viruses, but they are smaller than most of the droplets the viruses are in. You're right that some viruses would still get through, but the more you breathe in the more likely you are to get sick. Wearing a mask will help reduce your risk of getting the virus, and if you unknowingly have it, will reduce your risk of giving the virus to someone else.*

*Some people do get sick even though they are wearing masks. They aren't perfect protection, but they do lower the chances of getting sick, or unknowingly passing the virus on to someone else.*

*Up until now, the government hasn't really wanted people to cover their faces. This has been a big adjustment for everyone, but masks are a pretty useful hygienic measure.*

*It's all about reducing risk, not eliminating it completely. The masks improve your chances some, the social distancing improves your chances some, and staying home whenever possible improves your chances some.*

*That's really a value judgement. Your risk as an individual might be fairly low, but when you apply a small percentage of fatalities to a population of hundreds of millions, you end up with a pretty big number. It seems likely that hundreds of thousands of extra deaths would end up being disruptive, in addition to being tragic.*

This last point, in particular, has to do with the difficulty most people have in thinking about risk. Someone might hear that there is a 3% (or some other number) chance of death, and feel like this means that the virus is not especially dangerous. But as mentioned previously, covid-19 has killed far more people than ebola (for instance) or

its close relative SARS, in spite of having a much lower case fatality rate, because it has affected so many more people<sup>7,10</sup>.

A similar misunderstanding of risk occurs when people say "We already took this risk yesterday, might as well take it again today", when in fact each incidence of risk taking adds to the total risk, and the goal should be to keep the total risk down. So the fact that a family attended a large gathering on Tuesday (for instance) is an extra reason why they shouldn't attend another one on Thursday, rather than a reason why they 'might as well.'<sup>39</sup>

Helping people to conceive of total risk as a matter of layering of smaller risks, and prevention as a layering of total prevention, might help lead to better decision making in the community as a whole. In terms of the practices of social distancing, everything is about decreasing the total risk. Most interactions are relatively low-risk when taken as a single interaction. Standing six feet away from another person (or 1.5 m or whatever other distance is recommended), only works to a significant degree if it is performed consistently by a large number of people. Any single instance of standing next to another person, or going into a shop without a properly-worn mask, for instance, carries with it a very small risk. But if such an action is repeated thousands of times by millions of people, all those small risks add up to an absolutely certain calamity.

Quarantining oneself after traveling or a high risk exposure is another individual action whose impact on risk might be small or large, but if made into a consistent practice throughout the community can close the door to one type of transmission event. The virus can only move when people move it and since, as mentioned previously, we have reason to believe that a relatively small number of people are responsible for the majority of transmission<sup>31</sup>, isolating oneself from contact with others for a period of 10 days to two weeks after traveling or after a known exposure to an infected person (even if you test negative afterwards, since false negatives are very common), helps to ensure that you are not one of those people. By contrast, if you were unknowingly infected and introduced the virus into a population where it was not previously spreading, you could originate many new cases which could in turn originate more cases.

Depending on your role in the community and what sort of platform you have for reaching out to people who may listen to you, your strategies around communication may differ significantly. In my own practice, I began communicating with people about the virus and these measures through some free classes. The first of these was in early February of 2020, before there were any cases in our area, and was held in person. Since then, I have done a number of live streamed and other online presentations, reaching out to both people in my immediate community and elsewhere on social media. I would strongly recommend, for any herbalist who has a sizable online following

and the means to do so, to regularly offer updates and question and answer sessions of this sort, in order to keep your community informed and engaged.

Even if your platform as an herbalist is mostly limited to family and others close to you (which is and always has been the case for many herbalists), it can be good to talk to them and make a plan. Come to a set of agreements about how you are going to minimize your own risks to yourselves and your potential impact in the community; and about services and remedies you can provide them.

# Special Measures for Prevention

## **Primary strategy: support immune function**

The efficacy of a preventative intervention is very difficult to be sure of. In the best case scenario, nothing happens, making it difficult to determine whether nothing happened as a result of the intervention, or whether the same nothing would have happened in the absence of the intervention. Even when it is possible to conduct rigorous and well-funded research involving large numbers of participants, uncertainty may persist. That being the case, the remedies and nutrients described here are somewhat speculative in nature, and based on plausibility from what is known of their constituents and mechanisms of action, as well as their history of use for similar conditions, rather than there being an extensive body of evidence directly pertaining to their use for Covid-19. As a group, the herbs and nutrients described here are well-tolerated and suggested on the precautionary principle, that it is generally better to take a precaution than to take a risk.

## **Nutrients**

There are a few nutrients for which there is at least some evidence that a deficiency makes COVID-19 more dangerous. One of these is Vitamin D<sup>40, 41</sup>. Vitamin D is synthesized by the human body in the presence of sunlight, and also consumed in the diet as a fat soluble vitamin found primarily in animal products. Sources include fish (especially fatty fish like salmon and trout), eggs, and products that have been fortified with vitamin D (including some milk, soy almond and rice milk, and orange juice). Vitamin D3 is also widely available and generally inexpensive as a dietary supplement. Observational studies suggest that vitamin D was deficient in many, if not most, people who died from COVID-19. It is of course possible that the vitamin D deficiency was due

to old age or poor health at baseline which risk factors themselves; but given the strength of the correlation and the fact that vitamin D supplementation is very accessible and safe, supplementation would be a reasonable precaution to take. Even if we later find out that it was in fact not helpful, little will have been lost.

Zinc is another nutrient for which there is at least some evidence that deficiency in the diet could put a person at greater risk for a severe case of COVID-19<sup>42</sup>. Researchers in Spain found that patients who were admitted to the hospital with COVID-19 who had lower blood levels of zinc were more likely to experience inflammation and more severe disease<sup>43</sup>. Among those who died, the average blood level of zinc was much lower than that among those with moderate presentations of the disease. This is essentially consistent with previous research in how zinc affects the course of other cold and flu-like illnesses

Vitamin C is another nutrient commonly found in fruits and green vegetables, which is widely thought of as being supportive to the immune system, in which it plays a role<sup>44, 45</sup>. To date I have seen no information that specifically indicates that supplemental vitamin C would be especially helpful to most people during the COVID-19 pandemic, although that may change as new information emerges. It is possible that most people get plenty of it in their diet, as long as they're eating a varied diet that includes some fruits and vegetables. Supplementation may be helpful for people who have a marginal diet since it is involved in a wide variety of metabolic functions, and plays a role in regulating inflammation as an antioxidant. In the rest of the population, it is generally an inexpensive, familiar, and well-tolerated supplement, and could be included in a treatment plan or not as the individual wishes.

## **Herbs**

While no herbs have been conclusively proven to prevent or decrease the incidence of COVID-19, there are a number of them whose history of use for supporting healthy immune function, and known pharmacology or mechanism of action, make them reasonable choices for attempting to lower risk. Most of the herbs in this section have traditionally been used to prevent similar illnesses; and also have been the subject of some clinical research demonstrating these effects, and/or natural products research elucidating potential mechanisms of action through which these results might be achieved.



Perhaps the best-known botanical for stimulating the immune system is echinacea. While clinical trials have mostly been small and have had varying designs and results, they and the history of use of echinacea together provide a suggestion that good quality echinacea is sometimes effective when taken before or at the time of exposure to an illness in reducing the frequency and severity of symptomatic infection<sup>46</sup>. The main drawback to echinacea as an immune stimulating remedy during a pandemic is the fact that its effects are possibly short-lived, meaning that it could make sense to take it for a week or two here or there, but that taking it for a year would mostly be a waste of plant matter.

Medicinal mushrooms such as reishi, shiitake, and maitake, are also very popular supplements for supporting the function of the immune system<sup>47, 48</sup>. It is conceivable that these might be beneficial in the prison pandemic although, of course, there has been no rigorous evaluation of their effect in the situation. As these substances are generally very well tolerated, taking them as a precautionary measure should be complication-free for most people, should they choose to do so.

Usnea is a medicinal lichen which I have tended to use year after year as immune support during flu season during the course of this pandemic, I have also made extensive use of it for myself and for hundreds of patients. Usnea contains usnic acid, an antiinflammatory which, at least in vitro, has antiviral properties against RNA viruses, preventing their ability to replicate. It is also an antiinflammatory, and additionally contains expectorant compounds which help to break up or prevent congestion in the respiratory system<sup>49</sup>. Like medicinal mushrooms, usnea also contains alpha and beta glucans, which are polysaccharides that modulate the immune response<sup>47</sup>. In short, usnea nourishes the immune system, protects the respiratory system, And it may make the body a less hospitable environment for the virus.

Another herb that I have frequently used in the prevention stage of an epidemic--both the present one and others that came before it-- is lemon balm. Lemon balm's main actions come in handy during the early stages of illness and will be discussed under that heading as well as in the section on lemon balm in the *Materia Medica*. As a pre-exposure measure, lemon balm may make the body a less hospitable place for viruses both by stimulating host defense and perhaps due to its content of rosmarinic acid, which is an antiviral compound<sup>16</sup>, and other similar organic acids.

Elderberry is another popular remedy that is widely used to protect the body against the effect of viruses. Most of its history of use and Clinical Research into its efficacy has focused on people who are already symptomatic<sup>50, 51</sup>. However, since its mechanism of

action would be the same whether the virus were already present previous to taking it or became present while it was already in the system, and since it is generally very well tolerated, being essentially a food, taking it as a precautionary measure is not unreasonable.

A compound tincture consisting of usnea, elderberry, and lemon balm, is something I have often used in the past when viral outbreaks were occurring in the community, such as during flu season. During the present viral outbreak, I have used it myself for immune support, and provided thousands of doses to other people in my community and elsewhere.

***Sample intervention plan for this stage:***

*Compound tincture of Usnea (2 parts), Elderberry (1 part) , and Lemon Balm (1 part), 5ml (1 tsp) per day.*

*Vitamin D3, 20,000 IU per day*

*Eating a reasonably balanced and varied diet, and being physically active*

*Practicing social distancing, wearing a mask or respirator in public, frequent handwashing, and avoiding prolonged indoor exposure to people who are not household members.*

While these are reasonable precautions for anyone who is able to take them, individual circumstances, needs, and abilities may require variance from them.

# Managing Mild Cases and Early Stages

**Primary strategies: reduce inflammation, support immune function**

**Secondary strategies: relieve coughing, promote comfort**

For most people that get COVID-19, there is a pre-symptomatic phase after they have been exposed, in which the virus is detectable in their body, but before any clinically significant symptoms develop<sup>20</sup>. And for a significant number of them, during this phase the body mounts an entirely successful immune response and no significant symptoms ever develop. However in some people, either because they were exposed to a larger quantity of the virus, or because of nutrition, genetics, or just dumb luck, symptoms progress into those of a mild respiratory illness-- what might sometimes be described as an influenza-like illness. And this can involve any or all of: coughing, fever, fatigue, diarrhea (especially but not exclusively in children), loss of sense of smell and taste, and emotional changes<sup>20</sup>.

Especially during the early part of this process, the strategy from the last section of nurturing the immune system should be continued. The immune system is mounting response and every effort should be made to give it what it needs. This means plenty of rest, extra fluids, and the same sort of immune supporting herbs previously described.

Measures to keep the person comfortable will depend mostly on the presenting symptoms. For many patients this especially includes a persistent, non-productive cough. Headache or muscle aches often feature prominently as well. Because these features tend to interfere with a person's ability to sleep they themselves are barriers to healing and might contribute to a worsening condition if they prevent the person from taking self-care measures that would give them the best chance of getting better. Symptomatic treatment in this situation is actually a preventative measure that opens the way to a greater chance of a better outcome.

Cherry Bark (syrup or tincture) has proven itself to be helpful in this situation as a cough suppressant. I seldom use cough suppressants in the normal course of my practice, but since the cough, at this stage, tends to be non-productive, expectorants

are not necessarily helpful. There is nothing to cough up, so provoking coughing or trying to loosen phlegm is not an effective strategy. The cough suppressant allows the person a break from coughing which helps with the possibility that they might be able to get some sleep, and makes them more comfortable during their waking hours.

Aches and pains including headache can similarly be dealt with through symptomatic treatment. Salicylate containing herbs such as Willow, Violet, Sweet Birch, Poplar bud, or meadowsweet (or a host of others) can help to relieve the sensation of pain and some of the inflammation that is involved with it. If there is enough fever to make the person uncomfortable, they will also reduce the fever. However, these herbs do have a mild anticoagulant component to their effect, and should not be used in anyone who has bruising bleeding or extravasation present, which is occasionally a feature of this illness. And because of the possibility that this feature might develop later in the course of things and the salicylate containing herbs would already be in the system at that time, it is appropriate to consider other herbs for these purposes as well, such as larger doses of elderberry or mulberry for fever and other antiinflammatories such as turmeric or ginger for body aches.

Calming herbs that might help relax muscle tension are also useful at this stage. Lemon balm would be a mild example of this, as would lobelia. And both of them have other relevant effects-- on the body's immune response in the case of lemon balm, and on the respiratory system in the case of lobelia.

Thyme leaf tea is a remedy that has a history of use for promoting respiratory health and keeping mild respiratory problems from becoming worse<sup>52</sup>. Taking it during the early stages of a viral respiratory infection will sometimes make the difference between a simple recovery and a case of pneumonia developing. While specific data have not been gathered on the effect of thyme in the early stages of COVID-19, it is generally recognized as safe and can reasonably be taken as a precaution. A large jar of a strong infusion can be prepared in advance and kept in the refrigerator for up to a week and taken 1 oz of thyme every 4 hours during the waking parts of the day.

Bee balm, though less readily available than thyme, is also excellent for these uses and appears from my observation to work better in individuals with pre-existing lung damage, such as long term smokers and people with COPD. It may also be gentler and more effective in children and elderly people. Because thyme is more abundant, I have been using it as a first line remedy for this purpose but in cases where it has caused excessive coughing I have used bee balm as a substitute and generally had excellent results.

**Sample intervention plan for this stage:**

*(Not to be considered a blueprint or universally applicable protocol; needs and indications will vary by individual)*

*Compound tincture of Usnea (2 parts), Elderberry (1 part) , and Lemon Balm (1 part), 5ml (1 tsp) 3 times per day.*

*Vitamin D3, 20,000 IU per day*

*Eating a reasonably balanced and varied diet if appetite is present (copious fluids in any case), and being moderately and cautiously physically active if desired, with copious time for rest.*

*Self-quarantining until 10 days to 2 weeks after symptoms abate, or until after two consecutive negative tests.*

*Licorice tincture, 5 ml/day*

*Thyme leaf tincture, at least 1 tsp (5 ml.) 2x/day, or 2-3 cups of tea. Sage, bee balm, or rosemary may be substituted.*

*Antiinflammatory herbs, such as Ginger or Turmeric tincture, 2 tsp (10 ml) 3x/day, and/or Butterfly weed tincture, 2 tsp (10ml.) 2x/day and/or Wild Yam or Trillium, 2tsp (10ml.) 2x/day*

***If shortness of breath is present:***

*Lobelia tincture, 1-3 ml. As needed (and as tolerated)*

*And/or Bitter orange, 2-5 ml. As needed, up to 4x/day*

*And/or Black or green tea, 1 cup tea or 5 ml tincture as needed*

***If dry cough is present:***

*Wild cherry bark, 1 tsp. of syrup as needed, up to 6x per day*

*If fever and body aches are present:*

*1 cup of Yarrow or Boneset tea, or other bitter and aromatic diaphoretic herbs, 2x/day*

*Or*

*1 tbs(15 ml) violet syrup, 2x/day, or 5 ml. willow or meadowsweet tincture, 2x/day*

***If anxiety and insomnia are present:***

*1-3 tsp (5-15 ml.)/1x per day of passionflower, motherwort, or skullcap tinctures, plus 1 ml. as needed. Timing may depend on when symptoms are most prevalent or weather anxiety or insomnia are more pronounced. An initial teaspoon may be taken in the morning to help with anxiety throughout the day and a second may be taken an hour or so before bedtime to promote sleep with individual milliliter doses being taken throughout the day as needed.*

# Managing Escalating Symptoms

**Primary strategies: Reduce inflammation, support respiratory function**

**Secondary strategies: Support other affected systems**

In cases where symptoms begin to worsen, especially in terms of worse oxygen saturation (if that is being monitored) or shortness of breath, more coughing or difficulty breathing, or more chest pain when inhaling fully, my clinical strategy has tended to consist of decreasing inflammation, addressing the buildup of fluid in the chest, and increasing oxygenation of the blood. In this situation it is also critical to monitor and evaluate the individual with consideration towards whether they might need to be hospitalized. It should be borne in mind that the condition of a person with shortness of breath can become very serious and even deadly, very quickly.

The reduction of inflammation can be accomplished through the use of anti-inflammatory herbs, of which there are multiple different classes; and demulcent herbs which reduce irritation and soothe the lungs. The managing of the buildup of fluid in the chest is accomplished through aromatic and resinous expectorants as well as drying decongestants. Promotion of oxygenation of the blood is achieved through breathing, with which breathing exercises can be helpful, and the use of specific herbs that help to open the airways.

While the final decision as to whether to transfer to hospital care is always up to the sick person themselves (or a family member, etc. if they are not capable of making their own decisions), it is helpful for an herbalist to be able to provide sound advice on the matter, as they will probably listen to you. This decision will depend not only on the individual symptoms but on their social support situation and whether or not hospital care is available and accessible to them<sup>53</sup>.

There are a number of physiological and social measures that must be considered when assessing whether an individual is an appropriate candidate for home care as opposed to hospital care. At a certain point it becomes unsafe or impractical for a person to try and remain in their home, if they are not able to perform the tasks necessary to promote and maintain their own health, or need more help than is available at home. At the same time hospital care may be inaccessible or unavailable, particularly in the situation where a surge of illness has resulted in facilities being overwhelmed or devices and medicines being unavailable. As an herbalist this is not something that you can decide for anyone, but it is definitely something on which you can provide information to help them make their decision.

One such factor is the respiratory rate. In a normal healthy person respiratory rate typically be between 9 and 18 breaths per minute while at rest if this is greatly elevated it suggests that oxygen saturation is not being achieved and the person is breathing fast to try and compensate for the fact that not enough oxygen is being absorbed into the bloodstream with each breath. Very slow breathing fewer than 9 breaths per minute might indicate that breathing is an effort but the person is having a hard time drawing a full breath perhaps due to fatigue or due to obstruction of the airways.

If oxygen saturation is being measured with a pulse oximeter, a normal reading would be anything above 96 if it is lower than this especially if it is lower than 93 this indicates that the person is in danger of not having enough oxygen to sustain vital functions. A decline in this number while at rest or while doing anything that makes the individual breathe harder indicates that the respiratory system is not functioning sufficiently which is a dangerous situation.

Heart rate and blood pressure, frequently measured together, can become out of range in either direction with COVID-19.

In addition to the physiological assessment it is important to consider the person's social situation when evaluating whether or not they can safely care for themselves at home. If the person is without stable housing, either being homeless, having no fixed abode or living in a situation in which they might be compelled to leave, then this is much more difficult. Living alone creates a greater degree of vulnerability compared to living with someone else who might be able to help. This is especially true in the case of people of advanced age, or who have physical, emotional, or intellectual disabilities that might make caring for themselves harder.



All of that being considered, the decision of when and whether to seek inpatient care will be influenced by its accessibility. At the time of this writing (Dec 2020), many hospital systems here in the USA are operating at or near capacity, meaning that if things get much worse, some very sick people could be turned away, and the standards of care for those who are admitted may be lower than usual.

Concerning the first point in the strategy, that of reducing inflammation, there are a number of herbs that are useful. Among the least complicated are antiinflammatory herbs such as turmeric and ginger, which may reduce the production of fluid by mast cells in the respiratory system and reduce inflammation of the airways. Many of the cooling aromatic expectorants which will be discussed shortly also have anti-inflammatory properties.

Salicylate containing herbs such as willow and violet are not as directly effective on the respiratory system, although they may be helpful to the circulatory system both in terms of reducing inflammation and preventing clotting. Evidence is emerging to suggest that damage to the heart and circulatory system is a significant lasting effect of COVID-19, so where possible and otherwise appropriate it may be a good idea to include some herb of this sort in a person's treatment. And as previously mentioned in the section on mild symptoms, they can be helpful for aches and fever, making the individual more comfortable. At the same time it is important to note that extravasation bruising and bleeding can be made worse by these herbs, especially at higher doses.

Anti-inflammatory herbs that work through their content of steroids, such as wild yam and butterfly weed, do not tend to have this side effect, nor do tumeric and ginger to anti-inflammatory herbs that are neither salicylate containing nor steroidal.

Lobelia has been the primary herb that I have used for shortness of breath, although some stimulating herbs that have an opening effect on the airways such as green or black tea and bitter orange are also helpful at this stage. Both lobelia and the stimulants may cause a reduction of appetite and, at higher doses, some nausea.

Sometimes at this stage there can be a significant accumulation of wetness in the chest, fluid and phlegm. Thyme is still the first-line herb that I have been using in this situation, but when it is insufficient, sometimes adding a resinous expectorant like white pine is helpful.

**Sample intervention plan for this stage:**

*(Not to be considered a blueprint or universally applicable protocol; needs and indications will vary by individual)*

*Usnea tincture, 5ml 3x/day.*

*Vitamin D3, 20,000 IU per day*

*Rest and copious fluids. Eat as desired/if desired.*

*Self-quarantining until 10 days to 2 weeks after symptoms abate, or until after two consecutive negative tests.*

*Licorice tincture, 5 ml 2x/day*

*Thyme leaf tincture, at least 2 tsp (10ml.) 2x/day, or 4 cups of tea. Sage, bee balm, or rosemary may be substituted.*

*Non-steroidal, non-salicylate antiinflammatory herbs, such as Ginger or Turmeric tincture, 6 tsp (30 ml) 3x/day,*

*And steroidal antiinflammatory herb(s) such as Butterfly weed tincture, 2 tsp (10ml.) 2x/day*

*and/or wild yam or trillium, 2tsp (10ml.) 2x/day*

*Lungwort lichen is also appropriate to use for this purpose at this stage, if available.*

**If shortness of breath is present:**

*Lobelia tincture, 1-3 ml. As needed (and as tolerated)*

*And/or bitter orange, 2-5 ml. As needed, up to 4x/day*

*With 0.5-2 ml. cayenne*

*And black or green tea, 2 cups tea or 10-15 ml tincture as needed*

***If cough is present:***

*Stronger expectorant herbs (in addition to the thyme,, sage,, etc.) may be used if a productive or wet cough is present. Pine or eryngo tincture, 2.5 ml, 3x/day would be an example of this. A pure cough suppressant such as cherry bark should not be used at this stage as it may have a suppressive effect on respiration.*

***If fever and body aches are present:***

*1 cup of yarrow or boneset tea, or other bitter and aromatic diaphoretic herbs, 2x/day*

***If insomnia is present:***

*1-1.5 tsp (5-7.5 ml.)/1x per day of passionflower, motherwort, or skullcap tinctures. Usually less sedative herbs are needed at this stage because the body is more tired. Lower doses are also indicated because it is more important for the adrenergic response to help keep respiration functioning as well as possible.*

# Therapeutics for Recovery and Sequelae

**Primary strategies: Reduce inflammation, Support affected systems toward recovery.**

**Secondary strategy: Support and regulate immune function.**

A significant number of people who are affected by COVID-19-- perhaps as many as one in three-- have lasting symptoms after the acute stage and presumably after all of the virus has been cleared from the body<sup>54</sup>. This is referred to as the Post Acute stage, and is sometimes informally called "long covid", and those experiencing it, "long haulers". Because the ACE2 protein into which the virus binds is found on the cells of many different types of tissues, and because the Renin-angiotensin-aldosterone system which it regulates is involved in many different functions of the body, symptoms can vary widely<sup>21</sup>. Among the most common are persistent shortness of breath, a lack of mental Clarity sometimes described as "brain fog", Rapid or irregular heartbeat, the irregularities of the digestive system joint and muscle pain, fatigue, and mental health changes. Sometimes these persistent symptoms occur even in individuals who were not severely ill<sup>5 5</sup>.

There is no compelling reason to think that all of these persistent symptoms are caused by the same physiological process. However, lasting inflammation is likely to be a factor (causative or otherwise) in most of them<sup>5 6</sup>. Changes to the nervous system and possibly also the endocrine system<sup>21</sup> seem to be involved as well. Some individuals showed scar tissue in their hearts<sup>5 5</sup>. These may be a result of damage done directly by the virus; or they may be a result of ongoing inflammation and immune response; or they may be a result of damage caused by a malfunctioning nervous system which is making the heart overwork itself; or some combination of these factors.

One primary strategy in this stage would be a reduction of inflammation. As mentioned previously there are a number of different classes of herbs that can be used for this, including those providing antioxidants; salicylate containing herbs; herbs that inhibit the inflammatory response via leukotrienes; herbs containing steroidal compounds; and others. While reducing inflammation in the acute stage of the disease is more focused on the lungs and airways, in this stage the goal is to reduce inflammation throughout the body. Herbs which contain salicylates, such as violets, meadowsweet, and Willow, are helpful in small doses at this stage. Ginger and turmeric, which are non-steroidal anti-inflammatories without salicylates, falling into the leukotriene inhibiting category mentioned, can be taken in relatively larger doses. Both of these categories of antiinflammatories tend to be blood-moving. While the salicylates inhibit clotting the ginger and tumeric help to dilate the blood vessels all of this works together to promote better flow of oxygen and nutrients throughout the body in addition to reducing inflammation, which can facilitate healing.

The stronger steroidal anti-inflammatory herbs such as asclepius and trillium, which can be rescuing in the acute phase, are usually not necessary in the recovery phase except where there are comorbidities (such as emphysema, or fibrosis) that have been exacerbated during the acute stage. Generally speaking, after an acute infectious illness the immune system is cleaning up the debris on a cellular level, as well as producing substances involved in immunity. At the same time some of the body's immune resources have been depleted through their interaction with the virus. Suppressing the immune system, as steroids can do, might make the clean up process move more slowly and might make the already weary immune system more susceptible to other infections that it might come in contact with.

Also at this time, it is important to nourish and support the various systems of the body that have been affected by the virus. This differs greatly from one individual to the next. It might involve the nervous system, the endocrine system, and the circulatory system. Additionally the digestive system and particularly the appetite is sometimes affected. Many of the problems that might arise with these systems can be dealt with essentially in the same way that similar problems would be dealt with in a person who has not had COVID-19. Others are more unique to this particular situation. The following are some frequently occurring issues, as noted in my own practice and elsewhere, and some of the herbs that could help support those systems.

### **Nervous system**

The nervous system is affected by COVID-19 on more than one level. It is semi directly affected by the virus through its changes to the renin-angiotensin-aldosterone system,

and its impact on electrolyte balances. Less directly, the nervous system is affected by the changes to the endocrine system, and by the psychological stress of illness. In practice it's not always possible to tell these categories of effects apart.

One of the most obvious effects on the nervous system are the changes in sleep and wakefulness. Many people experience insomnia and or extreme fatigue and daytime sleepiness while recovering from COVID-19. Part of this may just be the body's need to sleep and recover after the tiring acute phase of the illness; but some of it appears to be disordered patterns of sleep, wherein a person will have a hard time falling asleep at night and then be tired during the day. Alternately, they may sleep a lot and still be tired during the day, indicating that the sleep is perhaps not as restorative as it should be. If the sleep disturbances are caused by physical symptoms, such as coughing, pain, or shortness of breath, then the obvious strategy is to treat those symptoms. If there is no obvious outward cause for the lack of sleep, or if it is caused by anxiety, there are some nervine herbs that are helpful in that situation. Passionflower is one that I have used often (in addition to lemon balm, a calming herb I am frequently already giving to people for other purposes). Passionflower is a producer of good quality sleep, and tends to relieve the mind of racing thoughts. Other suitable herbs for this purpose include lavender and skullcap, and motherwort, which is discussed further in the section on the cardiovascular system.

Another frequent neurological complaint in postacute Covid people, is a lack of mental clarity or difficulty remembering things, sometimes described as "brain fog." This differs in its presentation from one person to another, in terms of severity but especially in terms of whether it is consistently present or intermittently present. Sometimes addressing sleep will make brain fog better without any other interventions, and in any case better sleep is a necessary condition for better mental clarity. When it is not a sufficient one, there are a few herbs that I tend to turn to.

Licorice, which will be discussed more in the section on the endocrine system, is one of these herbs.

Another one is Rosemary. Rosemary is for remembrance, and is also soothing to the respiratory system. It can therefore be a good herb to use if there is shortness of breath as well as brain fog— both of which are frequently present in postacute Covid.

Lion's mane mushroom is another remedy which I have found especially helpful for brain fog previous to the emergence of Covid. I have used it in many other conditions that had brain fog as a result as a sequel of an infectious illness such as Lyme disease and Epstein-Barr based on that experience for my own practice as well as that of other herbalist begin using it for people with postacute Covid and brain fog and found that it was usually very helpful when taking in doses of 1/2 to 1 teaspoon per day.

## Endocrine system

The endocrine system shares with the nervous system the responsibility of sending messages from one part of the body to another, and establishing feedback loops that regulate functions of the body such as metabolism and excretion of waste. COVID-19 directly impacts some of the organs of the endocrine system by attacking the cells located within them, and less directly affects other part of parts of the system by increasing inflammation throughout the body, by altering the renin-angiotensin-aldosterone system, and by creating physiological and psychological stressors that the endocrine system must respond to.

As previously mentioned, the primary route of entry for the SARS-Cov-2 virus into the cells of the human body is by way of the protein angiotensin converting enzyme 2, or ACE2<sup>20</sup>. This is an enzyme which plays a role in the endocrine system, specifically as part of the renin angiotensin aldosterone system, upon which it has a regulatory effect.

While it is expressed in the cells of the lungs and respiratory mucosa where the virus first comes in contact with it, ACE2 can also be found on many other types of cells of the body, including in some of the organs which we more typically think of as endocrine organs— like the pancreas and gonads. Prior to the outbreak of SARS in 2002, which also uses this protein as a point of entry into the cell, people didn't really know much about the ACE2 enzyme. Since then, we have learned that it has expression in a wide variety of tissues and tends to have, on the whole, a down regulating effect on the renin-angiotensin-aldosterone system<sup>21</sup>. Its disruption probably contributes to hypertension dysregulation of blood sugar tending towards hyperglycemia. Chronic fatigue and possibly a decrease in fertility in men.

Clinically it has been noted that mortality is slightly higher in men than women. While there are many factors that could be contributing to this, one intriguing possibility is that it might have to do with an androgenic enzyme facilitating the binding of the virus to the receptor site<sup>20, 21</sup>. Obesity, hypertension, and diabetes, all of which have significant effects on and influences from the functioning of the endocrine system, are also associated with higher morbidity and mortality. It is not possible to say for certain,

but is at least physiologically plausible and consistent with the available data to suspect that these correlations are directly related to the virus's effects on the endocrine system.

The Hypothalamus-pituitary-adrenal axis— a set of endocrine structures and functions which regulate responses to stress and help control energy usage and inflammation— may be notably affected, creating a situation similar to what is seen in other post-viral situations, as with some cases of Epstein-Barr infection<sup>5 7</sup>. This could include chronic fatigue, and inflammation throughout the body.

In terms of therapeutics for the endocrine system in postacute covid, strategies will necessarily vary depending on presenting symptoms. Many of the herbs that I have found success with are what have often been termed alteratives or adaptogens. American ginseng, for instance, is an herb that is widely used (and has been widely used for a very long time) to improve stamina and energy, and produce a general sense of wellbeing. Although many different substances work together to produce ginseng's effect on the body, among the most unique and best-known of these are the ginsenosides: a class of steroidal saponosides which work by being analogous to substances from the endocrine system, which the body's tissues are designed to receive and respond to. In the past I have often used ginseng for people who were trying to regain some sense of strength and energy after a long or intense illness. So when they started seeing people who had been through the acute phase of COVID-19 and had fatigue and lack of stamina it was one of the first herbs that I tried. Unsurprisingly, it did what it usually does, and made people feel better.

Another herb that has seen extensive use in my practice for supporting the endocrine system after the acute phase of COVID-19 is licorice. Licorice root interacts with the same renin-angiotensin-aldosterone system as the virus<sup>5 8</sup>, and seemingly helps to push it back into its proper balance when it has been dysregulated. Taking licorice daily for two weeks is generally safe and well tolerated (using it for too long may raise blood pressure in some people due to excretion of potassium, also a function of the renin-angiotensin-aldosterone effects).

Other tonic herbs for the endocrine system such as codonopsis and the aralias, would very likely produce the same sorts of adaptogenic changes that they usually do. In all cases these adaptogen should be used along with anti-inflammatory herbs, since inflammation puts a strain on the endocrine system by requiring it to use resources to produce anti-inflammatory steroids to keep it in check. Similarly a diet that is varied and rich in antioxidants as well as good fats and cholesterol will help to give the endocrine system what it needs for proper functioning.



## **Cardiovascular system**

The vascular endothelium—the lining of the blood vessels— is one of the main targets of the virus, the cells being equipped with the ACE2 protein<sup>5 6</sup>. The virus enters these cells, alters the proteins within them to make more virions, and leads to their being either destroyed as the new viral particles emerge from them, or recognized by the immune system as no longer consisting of human proteins and therefore destroyed by the immune response. In the heart of the great vessels of the heart this can lead to inflammation scarring and altered performance in the tiny blood vessels the capillaries this can lead to complete destruction and the leaking of blood into surrounding tissues.

In this situation, one of the most important things to do is to give the body the nutrients that it needs in order to rebuild. A diet supplying adequate protein and calories is essential. Blood-building herbs and blood vessel supporting herbs are also helpful at this stage. Nettle is a remedy that I like for both giving the body what it needs to make blood cells and the tissue of blood vessels. Cayenne is also helpful in promoting capillary perfusion and circulation in the extremities which can be diminished in this situation.

## **Digestive system**

As with the respiratory system and the vasculature many cells in the digestive system contain the ACE2 protein which is the docking site for the virus<sup>21</sup>. During the acute phase inflammation in the cells can cause Inflammation which may manifest clinically as diarrhea or as pain just below the xiphoid process. Sometimes, especially in older people, this inflammation can manifest as constipation rather than diarrhea.

The symptoms may persist after the acute phase, especially in people who are already given to inflammation of the digestive tract. This can result in a lasting dysmotility which may include constipation and/or diarrhea, sometimes accompanied by painful cramping. Licorice can be helpful for this situation if taken in doses of around 1/2 to 1 teaspoon per day for 2 weeks. Ginger, either in tincture or tea, can also be helpful and can be used as often and for as long as is wished (or as is needed to get the job done).

## **Immune system**

Viral infections tend to produce an immune response. Much of the bad feeling that people have when they feel sick is caused by the immune system working, rather than directly by the pathogen itself. After a viral infection sometimes the immune system is depleted having used up all of its resources in cleaning up the wreckage that the virus causes at other times the immune system has entered a heightened state of alert and may begin to have inappropriate reactions to things that would normally be innocuous, such as human connective tissue whose proteins may be slightly different than what the immune system expects.

In the postacute phase, it is important to nourish and modulate the immune system. This does not mean stimulating the immune system the way that one might do as a preventative measure or early on in the course of an illness. Nor does it necessarily mean suppressing the immune system the way that might be done with steroidal anti-inflammatories at the crisis point of an illness or inflammatory response. For the most part, this is accomplished through good diet and restorative rest. Medicinal mushrooms are also seemingly helpful with this process. While common examples like reishi, shiitake, and maitake are quite safe and appropriate, lion's mane and usnea have been the ones I have used most frequently since they are also indicated for other reasons such as the anti-inflammatory properties of usnea and the nervous system supporting properties of lion's mane.

### ***Sample intervention plan for a more complicated postacute stage:***

*(Not to be considered a blueprint or universally applicable protocol; needs and indications will vary by individual)*

*Compound tincture of Usnea (2 parts), Elderberry (1 part) , and Lemon Balm (1 part), 5ml (1 tsp) 3 times per day.*

*Vitamin D3, 20,000 IU per day*

*Eating a reasonably balanced and varied diet if appetite is present (copious fluids in any case).*

*Plenty of rest. Gradually and incrementally increasing daily physical activity; doing too much on a good day can lead to exhaustion and more bad days.*

*Self-quarantining until 10 days to 2 weeks after symptoms abate, or until after two consecutive negative tests.*

*Licorice tincture, 5-15 ml/day*

*Thyme leaf tincture, at least 1 tsp (5 ml.) per day, or a cup of tea. sage, bee balm, or rosemary may be substituted.*

*Antiinflammatory herbs, such as ginger or turmeric tincture, 2 tsp (10 ml) 3x/day, and/or butterfly weed tincture, 2 tsp (10ml.) 2x/day*

*Heart-supporting herbs, such as hawthorn leaf and flower tincture, 1 tsp (5 ml.) Per day*

***If cough is present:***

*Carraigín, 5g in hot water, or 2tsp (10ml) of tincture*

***If body aches are present:***

*1 cup of yarrow or boneset tea, or other bitter and aromatic diaphoretic herbs*

***If anxiety and insomnia are present:***

*1-3 tsp (5-15 ml.)/1x per day of passionflower, motherwort, or skullcap tinctures, plus 1 ml. as needed. Timing may depend on when symptoms are most prevalent or weather anxiety or insomnia are more pronounced. An initial teaspoon may be taken in the morning to help with anxiety throughout the day and a second may be taken an hour or so before bedtime to promote sleep with individual milliliter doses being taken throughout the day as needed*

***If fatigue is persistent in spite of adequate sleep:***

*Ginseng, 1-5 ml. per morning*

*And/or Green tea, 1 cup as needed*

***If lack of mental clarity and difficulties with memory persist in spite of adequate sleep:***

*Lion's mane tincture, 5 ml. per day*

*Rosemary tincture, 5ml. per day*

*(Herbs for fatigue listed above are also likely to be helpful)*

***Sample intervention plan for a less complicated postacute stage:***

*(Not to be considered a blueprint or universally applicable protocol; needs and indications will vary by individual)*

*Vitamin D3, 20,000 IU per day*

*Eating a reasonably balanced and varied diet if appetite is present (copious fluids in any case).*

*Plenty of rest. Gradually and incrementally increasing daily physical activity; doing too much on a good day can lead to exhaustion and more bad days.*

*Self-quarantining until 10 days to 2 weeks after symptoms abate, or until after two consecutive negative tests.*

***Compound tincture for nerve, endocrine, and immune system:***

*Equal parts tincture of usnea, licorice, lion's mane, skullcap, 5 ml/day*

***Compound tincture for cardiovascular and respiratory system:***

*Equal parts tincture of thyme, carraigín, hawthorn; ¼ part cayenne, 5 ml/day*

***Compound tincture for inflammation:***

*Equal parts tincture of turmeric, butterfly weed, marshmallow*

# Materia Medica

The following are descriptions of some of the plants that I have found to be useful during the course of the present pandemic. While their use in this capacity is largely based on personal experience and observation, all of them have traditional uses that make them relevant in terms of supporting various structures and functions in the body. None of them are to be understood as cures or prevention for COVID-19. Nor should they be understood as primarily something that "fights" the virus, a martial or pugilistic metaphor that, while common in the culture of the English-speaking world, has little real relevance to what is happening physiologically. Some of them just might interfere with the quasi-biotic functions of the virus, although it has not been conclusively demonstrated that any of them do so in the context of the human body. Rather, everything that is here is here because it works with the structures and functions already present in the human body to produce a desirable effect of some sort or another.

I feel that it is also important to note that some of these herbs are what I use because they grow where I live. One of the greatest strengths of herbal medicine and the reason that it is still the world's most widely used form of healthcare is its accessibility. Not all of the herbs that are abundant here are abundant everywhere, and so it might be inappropriate or impossible for the whole world to be supplied with them. But there are, in almost every case, other herbs with similar actions and indications that would be more readily available in other places. Especially during a time such as this,

when there is a great amount of disruption to the economy and supply lines, I would encourage every herbalist to develop familiarity and competence with the plants that grow where they live. This helps to prevent unsustainable exploitation of plant populations and to keep herbal medicine accessible to those who need it.

## Bee Balm

*Monarda fistulosa* L.



Bee balm is both a diaphoretic and an aromatic expectorant. It helps to break up congestion and prevent the accumulation of fluid in the lungs. It is soothing to the Airways and protective against secondary infection, being an antiseptic similar to thyme.

In the present pandemic I have found bee balm to be more helpful than time in old people and those with a very dry constitution. It is also particularly helpful in people who have a history of smoking for many years who have very reactive airways, or who have chronic obstruction of the airways.

Monarda contains large amounts of rosmarinic acid<sup>1 6</sup>, which may make the virus less able to infect cells of the respiratory system, and aromatic compounds such as thymol, which are cooling and decongesting<sup>5 9</sup>.

## Bitter orange

*Poncirus trifoliata* (L.) Raf.

*Citrus aurantium*



The unripe fruits of trifoliate orange, as well as some other varieties of Orange, act as a wonderful decongestant and remedy for shortness of breath. Among the many phytochemical compounds that make this herb do what it does, is the ephedrine group alkaloid synephrine. This is a very powerful remedy for keeping the airways clear of phlegm. It is also one that must be used with care because it does have a stimulant



effect, and can raise the blood pressure and heart rate. At doses in its therapeutic range, it also tends to decrease the appetite, which may not be ideal for someone who is trying to recover from an illness. On the whole, my inclination has been to use other herbs with similar actions (such as tea) first, and to use this and other strong stimulant respiratory herbs as a second line, and for as short a time as can be managed.

In addition to the synephrine, these fruits also contain citrus flavonoids such as hesperidin and rutin, antioxidants which have a protective and antiinflammatory effect; and essential oils and aromatic acids, which may help to soothe the respiratory mucosa.

## Boneset

*Eupatorium perfoliatum* L.



Boneset is a bitter herb that has been widely used to induce sweating and break fevers in febrile illnesses. Writing nearly two hundred years ago, Rafinesque said " no other tonic of equal activity can be exhibited in fevers with less danger of increasing excitement or producing congestion"<sup>61</sup>. Typically, drinking boneset tea or taking a tincture of boneset in some hot water, will induce a sweat that relieves the body of excess heat and produces some relief from the body aches and general malaise of

illnesses involving fevers. In the case of COVID-19 the fever is usually mild if it's present at all, but bonest seems to still produce the same result as far as having some temporary relief from body aches and malaise.

# Butterfly Weed

*Asclepias tuberosa* L.



Butterfly weed is native to meadows and grasslands of North America, especially the Eastern and Southern United States and Eastern Canada. It is a member of the milkweed genus and family but unlike other milkweeds it does not contain the milky sap (latex) for which they are named. Its Latin genus name, *Asclepias*, comes from the name of a greek demigod of healing, son of Apollo and legendary ancestor of the physician Hippocrates. Its other common name, pleurisy root, refers to its history of use in the treatment of pleurisy, inflammation of the membranes between the lungs and the chest wall. It is also traditionally used as an expectorant and diaphoretic. The root (prepared as a decoction or tincture) is the primary part used, and is bitter, aromatic, and slightly demulcent.

Investigation into the chemistry of butterfly weed have found that it contains flavonoids such as kaempferol that are likely contributors to its diaphoretic and expectorant properties. It also contains some steroidal compounds-- cardenolide and pregnane glycosides, and the related compound tuberogenin<sup>62</sup>-- which are structurally related to some of the body's own powerful antiinflammatory molecules, and which likely contribute to its long-observed ability to decrease respiratory inflammation. Additionally, like many roots, it contains some polysaccharides that are demulcent and may contribute to a soothing effect.



# Carraigín

*Chondrus crispus* Stackh.



Often called "sea moss" or "Irish moss", carraigín is a purple algae, a seaweed rather than an actual moss. It is the source of carrageenan, a group of sulfur containing carbohydrates widely used as a food additive for texture. Traditionally prepared as a broth, sea moss is very demulcent and slightly expectorant. It helps to soothe the lungs and thin the secretions of the respiratory mucosa. It tends to make coughing more productive and less painful. I refrain from using this remedy when a great amount of inflammation or shortness of breath is present, and choose other demulcents instead. However, when there is a productive or wet cough it can be very helpful, or when there is a mild but persistent sense of irritation or provocation of coughing on drawing a full

breath. All in all, it has been one of the more common herbs I have used during the pandemic, especially for people who were in the "long haul" stage of recovery.

Because carragín is essentially a food, it can be used in fairly large doses without much complication (Like other foods high in soluble fiber, it does have a stool softening effect at large doses). My preferred way of preparing it is to add 5 or 10 G of chopped up seaweed to 250 to 500 milliliters of boiling water, and then allow this to cool to a drinkable temperature. This tends to have an almost immediately soothing effect on the throat and lungs, sometimes followed by a productive cough that helps with the expectoration of phlegm. For people who find the texture disagreeable or are not really capable of preparing the hot water preparation, it is possible to encapsulate carragín. However, it is usually only necessary to use this remedy for a few days, and most people can tolerate a remedy with an unfamiliar texture for that long.

Note that the color of unprocessed carragín is purple. Much of what is sold here in the United States has a beige or slightly yellowish color. This is from being blanched in the Sun after harvesting, a process which breaks down some of the antioxidant compounds in the seaweed. These are not the main substances responsible for its soothing effect, but they do play a role.

# Catnip

*Nepeta cataria* L.



Photo: Robyn Klein

Catnip is best known for the excitatory effect that it has on house cats. However it also has a long history as an herbal remedy-- especially as a calming remedy, but also for fevers and congestion. Like lemon balm, catnip is a mild diaphoretic that is also mildly sedating. During the acute phase it would likely be an adequate substitute for lemon balm if the former were not available. In the postacute phase, it can be helpful as a support to the nervous system, promoting more restful sleep and an enhanced sense of calm during the waking hours.

# Cayenne

*Capsicum annuum* L.



Cayenne is a well-known spice. It is also one of a handful of herbs that is extremely powerful, producing dramatic (sometimes even painful) results in anyone who consumes it, and also very safe, being one of the more common ingredients in the world's cuisines. What notable feature of cayenne is that it does tend to thin the secretions of the respiratory mucosa so if someone has thick phlegm, which is sometimes a feature of COVID-19 as it becomes more severe, then cayenne accompanied with adequate hydration will help to facilitate the coughing up of that fluid and preventing it from becoming viscous and obstructive.



Dosage should be based on tolerance of the spiciness. ½ ml. is a dose that will usually provoke the desired results without being too intense for most people. In my practice I have often been combining it with lobelia, in tincture form, in the proportion of one part cayenne tincture to 5 Parts lobelia tincture. This is a combination that was popularized by Samuel Thompson in the early 19th century, and has been a popular American folk remedy ever since, for helping to induce sweating and move various fluids throughout the body.

# Cherry Bark

*Prunus serotina* Ehrh. *et species*



Wild Cherry (*Prunus serotina*) bark is used as a cough suppressant, which is not a mechanism of action that I tend towards using frequently in my practice (It's usually safer and more effective to stop what is causing the coughing), but when it is called for it's pretty good at what it does. The usual compound is a syrup, since that form of the medicine is soothing to the throat which might be raw from coughing, and because it masks the bitterness of the cherry bark. Too much cherry bark might actually cause shortness of breath, so it is important to keep track of how much is being consumed, and if necessary to alternate its use with something else (for instance a soothing demulcent herb).

*Cherry Bark Syrup (simple)*

*1 part (e.g. 1 liter, one quart) water*

*1 part (e.g. 1 kg, 2 pounds) sugar or honey*

*1/2 part (e.g. 200 g, 1/2 lb) cherry bark*

*Combine the water and cherry bark. Bring to a boil, reduce heat, and allow to simmer for 20 minutes. Cover and allow to stand for several hours or overnight, cooling completely. Strain plant material from liquid. Return liquid to medium heat, then stir while slowly adding sugar or honey, allowing it to dissolve completely. Keep refrigerated if possible or (if not possible) store in loosely corked bottles, as some subsequent fermentation can occur.*

Cherry bark syrup can be taken in doses of 15-30 ml (1-2 tablespoons) for adults and adult sized adolescents, and in proportionately smaller doses for smaller children.

# Echinacea

*Echinacea angustifolia* DC., *E. purpurea* (L.) Moench



For a few decades, echinacea has been one of the best selling herbs on the market. Supplements made from echinacea, including the root and the above-ground parts, are generally labeled as being supportive to the immune system. Echinacea's pharmacology is not very clearly elucidated, and its history of use comes from Great Plains cultures that do not have an explicit concept of the immune system (though it has been traditionally held to protect the body from envenomation and sometimes illness). The numerous small to medium-sized clinical trials that have been conducted with echinacea have given mixed results as far as its ability to shorten the duration and severity of illness<sup>46</sup>. On the whole echinacea should be avoided by anyone with autoimmunity and should be used with caution by people who tends to have a lot of allergic reactions ( I can find no evidence for, nor see any reason to suspect, the often-repeated idea that people with ragweed allergies are particularly more likely to be

allergic to echinacea; they both belong to a very large plant family also includes many food plants such as sunflowers and lettuce).

It is possible that echinacea, when taken for a week or two, might temporarily decrease the likelihood of contracting an illness by increasing immune activity<sup>46</sup>. It is not an herb that I have been using during the pandemic but it is one that a number of people that I have worked with and spoken to had chosen to use on their own. At least a few of them had known exposure to covid-19 without developing the illness but as this is something that can happen with or without echinacea (or other interventions), it is hard to draw any sort of firm conclusion from it.



# Elderberry

*Sambucus spp.*



Since ancient times, elderberries have been used to reduce the severity and duration of febrile illnesses. In modern times, there have been a number of clinical trials demonstrating these effects to varying degrees for various elderberry products, as well as research into the chemistry of elderberry. What has been found on the whole is that Elderberry does tend to have a modest effect in terms of reducing the duration and severity of febrile illnesses and upper respiratory complaints<sup>5 0</sup>. Most research has focused on influenza-like illness, for which there is good evidence of its efficacy.

Unripe elderberries can cause digestive upset, as can many other unripe fruits. This is sometimes presumed, in the case of elderberries, to be a result of the cyanogenic glycosides that are found in the unripe seeds. These substances, mainly one called sambunigrin, are found to a greater or lesser extent in the seeds of ripe berries when

they're uncooked, and other above-ground parts of the elder plant. They are very similar to substances found in wild cherry bark that give it its efficacy. Because elderberry products can be and often are consumed in much larger doses than wild cherry bark, it is recommended for the purposes discussed here that all elderberry should be cooked in the process of making it into medicine. This of course is only a concern if you are starting from the ripe berries themselves-- any commercially purchased elderberry products will already have been cooked in the processing

The most commonly used and most widely researched kind of elderberry is *Sambucus nigra* L., the Eurasian species of elderberry. In North America, *Sambucus canadensis* L. is also very widely used, being the most common type of elderberry in most of the regions east of the Rocky Mountains.. It is for all practical purposes medicinally interchangeable with *Sambucus nigra*. In Western North America, along much of the Pacific coast and in adjacent areas, the Western blue elderberry, *Sambucus cerulea* Raf. is the predominant species of elderberry. It is widely used by herbalists in that part of the country and appears to be medicinally interchangeable as well. In fact, some authorities treat both North American species as being subspecies of *Sambucus nigra*. Other species, such as the red elderberry (*Sambucus racemosa* L.) may or may not have comparable properties for the purposes described here. When I speak of my own experience, it is with both *S. nigra* and *S. canadensis*.

When someone has taken Elderberry during the course of a fever it is common for the fever to go up a degree or so before it goes down. Often within an hour this process has happened and the fever has gone down a couple of degrees from its starting point. In cases of COVID-19, if there is a fever it is usually very slight; so lowering the fever is not one of the primary goals of using elderberry. Even so it is an accessible biological indicator that something is being modulated within the immune system. The exact pharmacology of elderberry is not fully elucidated. We know what it does, and what to expect when using it, more from empirical experience and from some clinical trials to validate that experience and quantify it, rather than from the point of view of understanding its physiology and trying to construct actions based on that physiology the way that people would do for a new drug. However, there is some preclinical research some in vitro studies for instance that show that elderberry might be a cytokine modulator in the human body. Cytokines are signaling molecules that mobilize cells with an immune function by modulating their effect. Elderberry might work to increase or alter the body's immune response. Early on in the course of the pandemic, this observation led to a rumor that elderberry was likely to create a situation known as a cytokine storm, in which the body produces large amounts of cytokines and creates a very destructive immune response. This has not been an observed outcome; in the hundreds of people I have given elderberry to so far, the results have been very much in line with what herbalists are used to seeing when using elderberry to treat similar

conditions, which is a modest shortening of the duration of symptoms, and some reduction of the symptoms.

Like many other berries and small soft fruits, elderberry contains an abundance of polyphenols, antioxidant compounds which may reduce inflammation and, according to some in vitro research, may also make it more difficult for viruses to enter cells of the body.

### *Elderberry wine*

*4 part (e.g. liters) of elderberries*

*½ part (e.g. liter) of water*

*1 packet of champagne yeast OR dregs from previous brewing*

*In a large pot, combine berries and water. Bring to a boil, stirring continuously and crushing berries with a large spoon. Reduce heat and allow to simmer for 20 minutes. Remove from heat and allow to cool completely. Strain the berries through a screen or cheesecloth,, and press out any remaining liquid. Place the liquid in a jug or carboy with a stopper fitted with an airlock. If an airlock is not available, an improvised flutter valve may be made from a sterile powderless glove with one fingertip cut off, tightly banded to the neck of the jug. In either case, the purpose is to allow the release of gasses produced during fermentation, without letting in air (which will turn the preparation to vinegar), insects, or other contaminants.*

Elderberry wine is one of the traditional ways of keeping elderberries. It is essentially elderberry juice that has been fermented. Medicinally it contains most of the same substances, such as polyphenols, that the juice contains and not many that the juice doesn't contain. The main difference is that the sugar in the juice has been converted to alcohol in the wine, rendering it shelf stable.

### *Elderberry syrup*

*4 part (e.g. liters) of elderberries*

*½ part (e.g. liter) of water*



*½ part sugar or honey*

*In a large pot, combine berries and water. Bring to a boil, stirring continuously and crushing berries with a large spoon. Reduce heat and allow to simmer for 20 minutes. Remove from heat and allow to cool completely. Drain the berries through a screen or cheesecloth, and press out any remaining liquid. Return to medium heat, slowly adding the honey or sugar and stirring until it is dissolved. Simmer until a spoonful has a syrupy taste and consistency when allowed to cool. Can in jars or else decant into clean containers and refrigerate for longer shelf life.*

Elderberry syrup is typically more concentrated than wine (perhaps twice as concentrated), and is more palatable to some. In particular, children and elders may find it less overpowering, and anyone who intentionally avoids alcohol must prefer it.

# ERYNGO

*Eryngium yuccifolium* Michx.



Eryngo is a mild resinous expectorant in the celery family. It is included here as a representative of that class, which also includes herbs like osha, lomatium, asafoetida and lovage, that may be more familiar to herbalists that live where they grow. It is warming, drying, and helps to break up congestion if there is any. I have used it in cases where there was thick phlegm and a wet semi-productive cough, which has been

the case in a relatively small number of the people that I have seen. In those cases, as well as in cases from other times that have a similar clinical presentation, it generally gives relief without complication. Because it is important not to overstimulate the lungs which may already be irritated, it is good to start with 1 ml or so of the tincture and work up from there if necessary.

# Forsythia

*Forsythia spp.*



The seed capsules of forsythia, especially the Weeping Forsythia *Forsythia suspensa*, are known in Chinese as Lián Qiáo, and are traditionally used to remedy a clinical pattern known as external wind Heat, which may include fever, cough, sore throat, and headache<sup>6 4</sup>. In recent generations it has been part of an extremely popular remedy for colds and flu-like illnesses called Yin Qiao, in combination with honeysuckle flowers. Having been written about in the Shen Nong Ben Cao Jing, an early Chinese Materia Medica, it has a very long provenance as a remedy (many centuries). Similarly, having been used in Wuhan from the early stages of the pandemic, it has one of the longest histories of use for individuals suffering from Covid-19 (several months)<sup>6 5</sup>.

The traditional way of taking this remedy is as a powder, combined with the powder of honeysuckle flowers. It is most appropriate in the early stages of the condition when the clinical pattern described above tends to prevail.



# GINGER

*Zingiber officinale* Roscoe



Ginger is a very well known, and very well tolerated, anti-inflammatory, decongestant, and promoter of peripheral circulation. It is widely commercially available both as a fresh or dried herb and in medicinal preparations like teas and tinctures.

Besides the spicy taste, one of the first things that people notice about Ginger when they consume it is that it tends to cause the sinuses to start draining. More specifically, it is altering the functioning of the mucosa in such a way that its secretions are thinner and more fluid. It is possible that this would help to remove viral particles or other pathogens from the respiratory mucosa.

In both the acute and post-acute phases, the anti-inflammatory effects of ginger can be soothing and improve comfort as well as potentially facilitating better breathing, having some direct bearing on respiratory inflammation<sup>6 6</sup>.

# Ginseng

*Panax quinquefolius* L.

*Panax ginseng* C.A. Mey.



Ginseng is a popular tonic that has been used in a wide variety of different situations to improve the feeling of well-being and energy<sup>6 7</sup>. Commercially available ginseng supplements are usually cultivated. Wild American ginseng (*P. quinquefolius*) is very selective in its habitat and vulnerable to overharvesting, so wildcrafted products must be used with extreme care as to ethical sourcing and avoiding overuse. Ginseng is not typically used while fever is present, and should be avoided during pregnancy. It may also adversely affect blood pressure.

Ginseng is commercially available in a wide variety of preparations including tablets, granules, tinctures and extracts, and teas. Because of the age and growing conditions

of the plant, as well as the handling and processing of the products made from the plant, the potency of available products can vary widely.

The most well-researched substances in ginseng are ginsenosides, molecules with a steroidal nucleus and an attached sugar<sup>6 8</sup>. In addition to having the mild steroidal effect that might give symptomatic relief, they may also modulate the function of the endocrine system, which is largely responsible for processing the body's energy and regulating metabolism.

I have found ginseng to be useful in the recovery phase, in particular for people who are experiencing fatigue and a feeling of depletion. Ginseng increases the appetite, increases energy and alertness, and decreases lingering inflammation. 3-5 ml. of ginseng tincture in the morning Taken for 2-4 weeks, appears to be a valuable intervention, especially in older individuals with a loss of appetite and energy.



# HAWTHORN

*Crataegus spp.*



Both the berries and the combination of leaf and flower of Hawthorne are traditionally used as a medicine for the heart<sup>6, 9, 70</sup>. Hawthorn contains cardiac glycosides<sup>6, 9</sup>, special steroids that act to alter the way the electrolytes potassium is transported-- and therefore the way electricity is conducted-- in the muscles of the heart. Hawthorn does this in such a way that it tends to slow and steady the heartbeat. In some other herbs, most famously digitalis, this effect is very strong, very pronounced and can upset the



natural balance of the heart's functioning. In hawthorn, which is orders of magnitude weaker, it is a very subtle effect.

Damage to and irregular functioning of the heart is one of the most troubling long-term effects of covid-19. In individuals who develop this situation, it tends to persist for months afterwards, and may even be permanent<sup>71</sup>. While Hawthorne is not likely to reverse gross physical damage to the tissue of the heart such as scarring it does appear to provide some aid in terms of improving healthy function of the heart. This is in keeping with our long clinical history of use of Hawthorne and while it is still very early to draw any conclusions about its long-term effects in people who have suffered from covid-19 it is at least a reasonable remedy to try, and one for which my experience so far makes me hopeful.

# Honeysuckle

*Lonicera spp.*



Honeysuckle flowers have a long history of use both in traditional Chinese medicine and elsewhere for fevers and body aches<sup>72</sup>. Traditional preparations include a tea made from the flowers or a powder made from the flowers and mixed with the powdered fruit of forsythia. The species pictured here is Amur honeysuckle, a large bush. As it is locally abundant and invasive, I have frequently used its flowers as medicine. The traditional species used in Chinese medicine is a vine, Japanese Honeysuckle (*Lonicera japonica*).

# Lavender

*Lavandula spp.*



Teas, tinctures, and other dietary supplements made from lavender-- NOT the essential oil, which is unsafe for internal use-- are gentle and familiar remedies that support the respiratory system and calm the nerves. Lavender is a member of the mint family, and like many other plants in the mint family it contains aromatic compounds that break up congestion and alter the condition of the respiratory mucosa. In the usual doses in which it is taken, lavender tends to be soothing and calming to these tissues.



# LEMON BALM

*Melissa officinalis* L.



Lemon balm is a member of the mint family whose fresh leaves have a lemony scent. It is a mild diaphoretic (it induces sweating) and is mildly calming. Unlike many other stronger diaphoretic herbs it does not have a very bitter taste. This makes it easier to take for people with a sensitive palate. There have been a number of in vitro studies which found that certain compounds from lemon balm can inhibit the reproduction of viruses, in particular Avian Influenza and herpes virus. This does not necessarily translate to it doing the same thing in the human body, however.

Although it is very mild both in terms of taste and action, my experience with people suffering from covid-19 is that they do tend to notice a difference in how they're feeling after taking a dose of lemon balm. Some people reported that, within the span of an hour to an hour and a half after taking a dose of lemon balm extract, they felt noticeably less ill, less fatigued and in less physical discomfort. Others reported being able to relax

and to sleep more peacefully, which is often not easy for sick people. This effect is usually short-lived, lasting perhaps 3 hours, but since lemon balm generally has no adverse effects other than drowsiness (which may itself be a welcome relief to many), it is possible to take it every couple hours if need be.

# LICORICE

*Glycyrrhiza glabra* L.

*G. uralensis* Fisch. ex DC.



Licorice has antiinflammatory and cough suppressant properties, though it has perhaps most commonly been used in western herbal medicine as a remedy for digestive complaints. In recent decades, it has sometimes been used with caution, because prolonged use has been found to raise blood pressure. It does this because the same molecule that gives it flavor, glycyrrhizin, interacts with the renin-angiotensin-aldosterone system in such a way that potassium is lost at a higher

rate<sup>5 8</sup>. In the course of this same interaction, a steroid made from the molecule prevents an enzyme from altering or breaking down a stronger steroid, cortisol. This has the net effect that steroid activity in the body is increased, reducing inflammation and modulating the function of the endocrine system (which steroids and other hormones are part of) and the nervous system (which potassium and other electrolytes play a role in). These subtle modulations of hormones and metabolism are commonly goals of the use of licorice in Traditional Chinese medicine<sup>7 3</sup>. Licorice affects the balance of the same renin-angiotensin-aldosterone system that Sars-Cov-2 interacts with when it attaches itself to the ACE 2 enzyme on the surface of cells in the respiratory tract and elsewhere<sup>5 8</sup>.

In clinical practice with people who had COVID-19, my impression has been that it is an especially useful herb after the climax of the illness. It aids in returning the body's functions to normal, and helps to decrease persistent inflammation.



# Lion's Mane

*Hericium erinaceus* Persoon



Lion's mane is an edible and medicinal mushroom. Like other mushrooms it contains Alpha and beta glucans polysaccharides which are absorbed through the small intestine and have a nursing beneficial effect on the immune system. More uniquely lion's mane is often used to support cognitive function and memory.

Preliminary studies suggest that lion's mane may help with the regeneration of nerve cells that have been damaged in addition to helping with cognitive function and memory.



Additionally, it may promote calm, and have a protective and anti-inflammatory effect for the nervous system. All of these effects, and the fact that it is generally very well tolerated to the extent that it is widely thought of as a food, make it an attractive candidate for inclusion in the treatment regimen of a person recovering from a nerve damaging viral illness like covid-19.

# LOBELIA

*Lobelia inflata* L., *L. siphilitica* L., various other species



Lobelia is helpful for shortness of breath. It is a fairly unique herb in terms of its mechanism of action and the alkaloid substances it contains, which may be beta-agonists, as nicotine is, but they have not been well-researched in modern times<sup>74</sup>.

In larger doses, lobelia will induce vomiting. This can be and has traditionally been used as a dramatic purge to remedy for shortness of breath and congestion; however, it is unpleasant and similar effects can be obtained with a lower dose that does not induce vomiting. One way to do this is to take a milliliter of the extract, wait an interval of one minute, and then take another; and continue this until a feeling of nausea develops.

This typically takes about 1-3 ml. to achieve, but varies greatly from person to person. Once the amount that produces this feeling has been found, decreasing the dose by about ½ ml. in subsequent doses will usually result in the maximum amount of benefit without causing nausea.

In addition to its effects on breathing lobelia is generally thought of as a calming herb, though it may be said that it does more to reduce anxiousness than to promote sleep.

In the traditional Appalachian Medicine of the community in which I was raised, lobelia was considered to be contraindicated during pregnancy. There is no clinical research to back up this assertion (nor would it be feasible to conduct any), and any clear physiological plausibility rests on the tenuous similarity between lobelia and tobacco, a plant which is known to cause birth defects. Even so, I avoid giving lobelia during pregnancy, on precautionary principle.

*Lobelia inflata* is the most widely used and traded species of lobelia, and probably the strongest medicinally. *L. siphilitica* is also easy to find in the wild, and while it is not as effective at as small a dose, it is also less emetic, which makes the use of a larger dose possible in most people.

# Lungwort

*Lobaria pulmonaria* L.



Lungwort lichen-- sometimes called tree lungwort-- is a large leaf shaped lichen that grows on mature trees in areas without much air pollution trees. Because of its selective habitat, slow growth, and tendency to produce relatively small amounts of itself where it does occur, it is not appropriate as a first-line treatment for anything. In terms of

therapeutics, it is antiinflammatory, owing to the presence of some steroid or compounds as well as some non steroidal lichen acids. It is also an expectorant and contains some bitter and resinous substances.

It's combined ability to relieve congestion and decrease inflammation in the lungs makes it a useful Herb in situations where symptoms have begun to worsen-- for instance increased shortness of breath. I have used it a handful of times in cases where this was the situation and where I had previously tried Trillium or butterfly weed without success. The details of one such scenario are shared as a case study.

*Individual is female, mid 50's, history of asthma and respiratory illnesses that turn into pneumonia, for which she has been hospitalized twice in the last five years. Uses daily inhaled steroid and albuterol rescue inhaler. This individual lives with someone that was a confirmed case of COVID-19, and developed symptoms. Testing was not widely available at this time (March 2020). This individual developed symptoms (fatigue then fever, then coughing and shortness of breath, feeling of inability to breathe in fully) after their cohabitant (who had been hospitalized by that time).*

*After the initial consultation with this individual, I suggested taking thyme leaf tea (2x a day), lemon balm and usnea tincture(5 ml. 3x a day), and boneset tea(2x/day), and delivered these remedies to them. The second day after beginning this, they reported that their respiratory symptoms had gotten more severe, they were using a lot more albuterol than usual, and were unable to sleep at all the previous night.*

*At this point we added *Sticta pulmonaria* tincture (5:1, 40% alcohol 5 ml 4x/day) to what they were already taking. The following day she reported feeling "a dramatic difference" in the severity of the respiratory symptoms and much better sleep. Two days after beginning the *Sticta* (friday march 27) she reported that she was continuing to improve and felt an increased ability to engage in simple tasks, like light housework for a short period of time.*

*This set of remedies was continued for ten days, by which time the only remaining symptom was moderate fatigue.*



# Marshmallow

*Althea officinalis* L.



Marsh mallow is a soothing herb. It contains demulcent mucilage and some gentle antiinflammatory compounds<sup>7 5</sup>. We have documented clinical history of use going back to Ancient Egyptian times, though of course it was used before people started writing things down. The root is the usual part used, though if supplies run short, the rest of the plant contains a similar profile of demulcent substances ( as do the related herbs hollyhock (*Alcea rosea*) okra (*Abelmoschus esculentus*), and neglected mallow (*Malva neglecta*)). These herbs-- especially prepared as an infusion-- can help to soothe the digestive system in cases where it is affected (mostly but not exclusively in children) as well as the chest and throat in people who have been coughing.

# Meadowsweet

*Filipendula ulmaria* (L.) Maxim., *et species.*



Meadowsweet is an anti-inflammatory herb. Like violet and willow, its action is partly due to the presence of salicylates. Like them it should not be used when extravasation or bleeding is present because it may worsen them by inhibiting the clotting of blood. It can however be useful for relieving pain and promoting comfort in very mild cases, or after the climax of the condition has passed. In particular it is soothing to stomach and intestinal pain which is experienced as an after-effect by a significant number of people.



# Motherwort

*Leonurus cardiaca* L.



Motherwort is a member of the mint family that is traditionally used both as a calming remedy for the nerves and as a remedy for the heart<sup>7 6</sup>. Like hawthorn (and like the toxic digitalis) it contains cardiac glycosides, which slow and regulate the beating of the heart. Because fear and anxiety are often experienced by people with covid-19, beginning in the early stages, and because motherwort is generally a very well tolerated herb with few contraindications, this herb can help to create a more tranquil state of mind for people experiencing this.



Taking 2-5 mL of motherwort tincture in the morning and 1 ml as needed throughout the day will usually make people feel calmer, and may have a protective effect on the tissue of the heart itself.

As with any potentially sedating herb, motherwort may cause drowsiness, and should not be used to the extent of causing drowsiness in situations where alertness is essential, such as driving.

# MULBERRY

*Morus spp.*



An alternative to elderberry which may be more abundant or accessible in some areas or at some times of year. Mulberry, like elderberry, contains polyphenols<sup>77</sup>, which may make it more difficult for viruses to enter cells. It likewise has a long history of use as a fever reducer, and can easily be made into a syrup.

*Mulberry pekmez*

*4 parts Mulberry (e.g. 4 liters)*

*1 part water*

*2 cc. of ash from Mulberry twig (optional). (This is meant to thicken the molasses. I cannot attest from my own experience as to how much difference it makes).*

*Mulberry pekmez is made by simply reducing mulberry juice until it becomes a molasses or syrup. Crush or puree the mulberries.*

*Add the water, and ash if you are using it, and let stand overnight to allow the sugars and other compounds from the fruit to dissipate in the liquid.*

*Strain and press out as much liquid as possible then reduce over a simmering heat until it is  $\frac{1}{4}$  to  $\frac{1}{2}$  the original volume of liquid.*

*Decant into a glass jar and allow to cool.*

The pekmez will thicken upon cooling. Give 1-3 tsp per day for children and 4-6 (or more) for adults.

Pekmez can also be made, and commonly is made, out of grape juice; while grapes do not have mulberry's history of use for reducing fevers, purple grape juice does contain significant amounts of polyphenols<sup>7 8</sup>, which might help to protect the body from viruses and the inflammation that results from them.

# Mullein

*Verbascum thapsus* L.



Mullein is often thought of as one of the primary lung herbs-- especially by people coming from a background of European or North American herbalism<sup>7 9</sup>. This is not incorrect, but it's not always applicable in this case. Mullein is stimulating to the lungs, and will provoke coughing. While this can be a useful thing in the case of chest congestion and or a productive cough, it should be avoided in a situation where there is a dry irritated cough that is not productive of anything, as it will just result in more coughing. In the present situation, this tends to mean that mullein is not indicated in the very early stages, but it may be later.



# Passionflower

*Passiflora incarnata* L.



Passion flower is a calming sleep promoting and nerve supporting herbal remedy. It is gentle enough that it is widely used for children, but it is very helpful in adults as well. Rather than having any direct bearing on covid-19 itself, passionflower is useful for relieving anxiety which often accompanies this illness. It is also a gentle way to promote sleep in people who are uncomfortable due to illness<sup>80, 81</sup>.

The nervous irritability that accompanies a long sickness, the muscle stiffness resulting from prolonged lying in bed and little physical activity, and the wakeful stimulation that can come from some therapeutic substances such as green tea and steroids, can all be obstacles to the process of sleeping, which is so vital for healing and recovery. Passion flower when taken at a moderate dose such as 5 ml, helps to neutralize those obstacles, and aids the body in achieving a state of true sleep.

Taken in a smaller dose such as one or two ml. during the day, passionflower can relieve tension and anxiety-- usually without causing extra drowsiness. This is especially helpful in the Post Acute stage because so many people are very stressed from what they've been through, but also very fatigued and struggling to stay awake throughout the day. In the short-term, this will allow passionflower to relieve the anxiety that contributes to wakefulness during the day, and promote better quality, healing sleep during the night, all while nourishing the nervous system towards better health.

As with any potentially sedating herb, passionflower may cause drowsiness, and should not be used to the extent of causing drowsiness in situations where alertness is essential, such as driving.

# Rosemary

*Salvia rosmarinus* Spenn., syn. *Rosmarinus officinalis* L.



Rosemary is another expectorant aromatic herb that has a cooling and protective effect for the respiratory system. It contains and is the source for the name of rosmarinic acid<sup>6</sup>, an antioxidant which may prevent viruses from binding to the tissue of the respiratory system. It also helps with preventing the buildup of phlegm, and makes the respiratory environment a less hospitable place for secondary pathogens.

In the postacute phase Rosemary is additionally helpful for promoting memory, which is sometimes affected.



# Garden Sage

*Salvia officinalis* L.



This is the original plant called “sage” in English. Its Latin name Salvia is derived from the word meaning “save”. Over the centuries (and changes from latin to french and then being adapted into english) the latin word has become the same as the English word for a wise person.

Sage has a wide range of infection fighting properties, and an affinity for the digestive and respiratory systems. Like other kitchen herbs, it contains enough



medicinal secondary phytochemicals to have a very strong scent and flavor, but is safe enough to be used in food.

The primary action of sage like that of thyme, is to be an aromatic expectorant, and to have a cooling effect on the lungs and respiratory system<sup>82</sup>. And like thyme and many other herbs, it contains rosmarinic acid and similar compounds which may help to make the lining of the respiratory system a less hospitable place for the virus<sup>16</sup>.

Like rosemary, sage may be used in the postacute phase to help improve memory and cognitive function.

# Skullcap

*Scutellaria lateriflora* L.



Skullcap (not to be confused with the deadly herb monkshood, though both are named after monastic headgear) is an herb that excels at supporting the nervous system. In the short term its effect is calming at low doses and sleep producing at slightly higher doses. It's among my personal favorite herbs for relieving anxiety and tension, which can occur throughout this or any other serious illness, and can be an impediment to the healing process. In Covid in particular, increased activity of the sympathetic nervous

system may be a direct result of damage from the virus and might contribute to this problem<sup>20</sup>.

Skullcap is occasionally useful for shortness of breath, in cases where that shortness of breath is made markedly worse by anxiety or stress.

In the postacute phase, using skullcap as a tonic for the nerves might help the functioning of the nervous system return to normal faster.

Dosage is variable depending on the individual, But generally speaking, one or 2 mL of the tincture will result in relaxation, and five or 10 mL will result in sleepiness.



# Sweet Annie

*Artemisia annua* L.



Sweet Annie or annual wormwood is a member of the large and varied genus *Artemisia*, which also includes tarragon and mugwort. While its traditional uses are similar to both of those, it has gained fame in recent years as the source of artemisinin, a chemical compound widely used as a malaria drug. During the covid-19 pandemic, it has gained considerable attention as the main ingredient in an herbal preparation that was promoted by the head of state of Madagascar. It is currently undergoing clinical trials to determine its efficacy for decreasing the duration and severity of covid-19.

While it remains uncertain what, if any, effect this remedy will have on the duration and severity of COVID-19, the fact remains that *Artemisia annua* products are being used for this purpose, and several countries in Africa and the Caribbean have taken deliveries of this remedy as part of their strategy for managing the pandemic.

Traditionally, this herb is used as a febrifuge and as a bitter to stimulate the function of the liver, as well as being used as an antiinfective. In traditional Chinese medicine, Qing Hao (as it is also called) is additionally used for after effects of febrile illness including joint pain and inflammation, and exhaustion<sup>83</sup>. Although its traditional uses-- and previous lab studies involving the similar SARS coronavirus-- make it a plausible remedy in the current situation, there is also concern that overuse of it might lead to increased resistance by malaria to its constituent artemisinin, which is a primary treatment for that disease.

# TEA

*Camellia sinensis* (L.) Kuntze



Green tea and black tea are two different preparations of the same plant. Considered as a whole, this plant is one of the most widely used and most well known therapeutic substances in the world. Tea consists of the leaves and flowers and buds of the tea plant, *Camellia sinensis*. Brewed as a hot beverage it is among the most widely



consumed drinks in the world. It is very familiar to most people, and frequently used to give relief from a wide variety of symptoms<sup>8 6</sup>.

Some people may be inclined to categorize tea as stimulant, and think of it primarily as a source of caffeine, a means of managing fatigue. While these things are true, they are far from the whole story. In addition to caffeine, tea contains several related compounds such as theobromine, theophylline, collectively these compounds are known as methylxanthines. Methylxanthines open up the Airways and increase respiratory drive in addition to having a stimulant effect, and altering metabolism in a way that produces more free energy. It is aided in this process by several different types of anti-inflammatory compounds and antioxidants which have beneficial effect on the respiratory system<sup>8 4</sup>

Tea contains decongestant, stimulant, antioxidant and anti-inflammatory, and immune modulating properties<sup>8 5</sup>. It can break up phlegm, reduce pain and fatigue, open the airways and decrease inflammation. Many people also find it comforting, and there's something to be said for that in the face of an unpleasant and perhaps frightening illness.

Although tea can be overstimulating and drying to some individuals, it tends to be a very well-tolerated remedy. As such, drinking a liter of tea per day, if it gives relief from symptoms and improves breathing, is not an unreasonable thing to do for a short to medium period of time.

# Thyme

*Thymus vulgaris* L.



Thyme is a member of the mint family known for its properties as an aromatic decongestant and expectorant. Its most researched biochemical constituent, thymol, was one of the earliest known antibacterial substances, and revolutionized the field of surgery and wound care during the 19th century<sup>8 7</sup>. In my own practice, and in my family's healing practice going at least as far back as the 17th century, thyme finds frequent use as a remedy in cases of respiratory infections<sup>8 8</sup>, often with the intention of preventing a simple inflammatory situation from turning into pneumonia.

In cases of people with covid-19, I have often given thyme tincture or concentrated tea as a remedy from the onset of the earliest symptoms, or as soon as possible



thereafter. While it is not really possible, in the absence of a well-matched control group, to quantify exactly how much effect this has had, relatively few cases have become severe compared to the national average, and I believe based on its history of use that the thyme preparations are part of the reason for this.

# Trillium

*Trillium spp.*



Trillium is a genus of showy woodland flowers whose roots are bitter and demulcent. It is a slow-growing plant, and depending on growing conditions, can take many years to grow from a seed into a mature, seed-bearing plant. Although it can be locally abundant and may be appropriate as a remedy for people who live where it lives, it is extremely vulnerable to overharvesting and should not be exploited on a commercial scale (note that wild yam and butterfly weed are herbs of commerce with significant overlap in how they work).

The roots of Trillium contain steroidal compounds that exact an antiinflammatory effect in the body. It has been one of the more successful herbs that I have used to

bring down inflammation in cases where the inflammation was worsening and the condition appeared to be turning from a mild one into a more severe one. In this scenario I have given a loading dose of 15 mL of the tincture three times daily for the first day followed by 5 ml three times daily on successive days, provided that the inflammation appeared to be coming under control.

# TURMERIC

*Curcuma longa* L.



Turmeric is easily one of the most widely used therapeutic substances in the world<sup>89, 90</sup>. Its documented history of use goes back at least as far as the Rig Veda, written in the second millennium BC. Dozens of clinical trials and preclinical Studies have expounded upon its anti-inflammatory properties<sup>89, 90, 91</sup>.

Because some of its anti-inflammatory properties seem to be related to the inhibition of leukotrienes<sup>92, 93</sup>, which play a significant role in inflammation of the respiratory system in some conditions, it seemed to me a likely candidate for decreasing inflammation in people with COVID-19. My clinical experience did not appear to demonstrate this well, at least not in the acute phase (ginger, a related plant, appears to work better). Turmeric has, however, seemed very beneficial in postacute / long COVID-19 situations, helping to reduce aches and pains during the recovery period, as well as improving respiratory symptoms.

As has been the case in other chronic inflammatory conditions featuring a loss of mental clarity or "brain fog," curcuma helps to restore clear thinking. This may also be a result of its ability to relieve leukotriene mediated inflammation, which can play a role in the occurrence of this altered functioning.



# USNEA

*Usnea spp.*



Usnea is a lichen-- a single organism consisting of fungal tissue and algal tissue working together. Lichens such as usnea contain some substances found in medicinal mushrooms like reishi or maitake; some substances found in algae like spirulina or chlorella; and some substances that are only found in lichens. Compared to flowering plants, lichens tend to contain a much higher percentage of secondary phytochemicals-- that is, the substances that are not part of the basic biological processes, but are there to serve some other adaptive function, and are usually responsible for an herb's

medicinal properties. Usnea has a variety of medicinal uses<sup>9 4</sup>,, being perhaps most well known for its immune supporting roles. It is strongly antiinfective, as well as containing starches that improve immune function<sup>9 5</sup>. A lesser-known use (from traditional medicine in the nordic countries) is as a pain reliever. It isn't sedating at all, and its analgesic compounds are very different from those in most plants.

Usnea has very broad spectrum immune supporting and antiinflammatory properties<sup>9 6</sup>. This makes it useful not only for trying to stave off infection from a particular outbreak, but also in terms of nurturing and replenishing the immune system when it might be exhausted from other things like stress. I usually take it on a daily basis when i am working with a lot of people with viral illnesses, such as during flu season, and of course during the present pandemic. It's never the only preventive measure that I use; rather it is part of a larger strategy that includes handwashing, hygiene, rest, good nutrition, and protective distance, and sometimes other immune-supporting remedies. Even so, I consider it to be one of my primary defenses against illness, and feel that it has served me very well in the decades that I have been using it.

The particular extract that i have been using is made by adding alcohol to the dry usnea, letting it get soaked up for a couple hours, and then adding boiling water and agitating it. The finished product is 5:1 (5 ml of liquid per gram of dry herbal material) and about 30% alcohol. After straining the liquid and squeezing/wringing out the solid part, there's very little left behind.

Usnea is something you shouldn't harvest unless you have a good understanding for the particular stand it is growing in and the ecology around it. In some habitats it is very abundant, and in others it is very scarce. It's selective in its habitat in some parts of its range, and can be slow growing. Many gatherers just gather it from windfallen branches, but that is also an important winter food for deer in some places, so even that is not without potential impact.



# VIOLETS

*Viola spp.*



There are many different species of violets. As a genus, they are spread very widely around the world mostly growing in temperate climates. They are not identical to one another medicinally-- for example, some have an aromatic sweet scent like wintergreen, and contain methylsalicylic acid, while others do not-- but they are similar enough that they can be spoken of as a class.

Violets are anti-inflammatory, cooling, soothing, and have a mild blood thinning effect. They are a very well tolerated remedy and are suitable for use in children and the elderly provided that the individual is not on any other blood thinning drugs (if they are then it is best to avoid violets and instead use herbs that do not contain salicylates). Violet syrup tea or tincture can be used to lower fevers, if fever is present, although it

should be borne in mind that doing so is not because of any danger posed by the fever but simply for the sake of comfort of the person taking the medicine. In most cases, a fever associated with COVID-19 is low-grade if present at all and is probably a beneficial rather than harmful thing, since the increased temperature has a protective effect on the body.

*Violet syrup:*

*2 cups (or 250 ml) water*

*2 cups sugar or honey*

*2 cups violet flowers (tightly packed)*

*Combine water and sugar or honey in a pot. Heat over a medium-high heat until the sugar dissolves and the mixture begins to boil. Reduce to a low heat.*

*Slowly add violets while stirring continuously. Continue stirring until all the flower petals are wilted and submerged. Cover and allow to steep on warm stove top for at least 10 minutes.*

*Allow to cool to a hot beverage temperature (approximately 130 ° F or 54 ° C) , then strain into a clean jar. Keep refrigerated for longer shelf life.*

As with other salicylate containing anti-inflammatory herbs, violets should not be used if there is bleeding, bruising, or if extravasation is present.

# White Pine

*Pinus strobus* L.



Pine is a genus consisting of many different species of coniferous plants. In my area, the white pine (*Pinus strobus* L.) is the most commonly used as medicine. All pines have fairly similar actions and chemical composition. They contain antioxidants and aromatic and resinous compounds<sup>9 7</sup>.

While there are some differences between the different species and parts of pine in terms of their flavor energetics and phytochemical constituents for the purpose of this volume they will be treated as a class. Pine-- either in the form of pine needle tea or a tincture made from the resin-- is an aromatic expectorant. It helps to break up congestion in the chest and ease irritation there as well.

The resinous compounds in pine are especially good at breaking up congestion and making the secretions in the respiratory tract more fluid rather than viscous and provoking productive coughing that will break them up and bring them out. Additionally the antioxidants that it contains are soothing and cooling to the respiratory tract, and can have the result of leading to less irritation and therefore less production of secretions in the first place. All of this makes it potentially useful in the management of chest congestion with a productive cough. While pine products are generally well tolerated and have a wide therapeutic margin, it should be noted that in some cases pine might be overstimulating to tissue of the respiratory system. It is not the most helpful remedy in the case of a non-productive cough, as it might just lead to more coughing.



# Wild Yam

*Dioscorea spp.*



In American herbal medicine and the US supplement industry, wild yam has been widely noticed (and has largely been pigeon-holed) as an herb for menopause<sup>9 8</sup>. This may be partly due to a mistaken belief that it contains progesterone or something like it, when in fact the plant steroids it contains are no closer to progesterone than those of many other plants. In any case, it is a vast abridgement of the plant's traditional indications, which include not only a variety of reproductive issues, but also pain and cramping in the abdomen; and rheumatic complaints (what we would now term autoimmunity), for which it was given the common name "rheumatism root". It is

anti-inflammatory and demulcent, a combination which works well to make it soothing to the organs of the body.

Dioscorea can be used to decrease inflammation in the lungs which is resulting from an immune response. Similar to *Trillium* or *Asclepias* in this regard, it is a reasonable remedy to try when shortness of breath or pain upon inhalation is present and especially if it is becoming more severe.

In the postacute phase, wild yam may help to increase appetite and decrease fatigue. Its actions appear to be partly attributable to polysaccharides and steroidal saponins that it contains<sup>9 9</sup>, which soothe and decrease inflammation while also increasing some aspects of metabolism.

It should be noted that wild yam is not closely related to the sweet potato, which is sometimes called yam in parts of the United States. It is closely related to Shan Yao, the Chinese wild yam, which has similar constituents and attributes<sup>10 0</sup>.



# Willow

*Salix spp.*



Willow bark is an herbal medicine that contains salicylates. As such it is a fever reducer and pain reliever<sup>101</sup>. When it is used in febrile illnesses like COVID-19, it should be used with a view towards keeping the person more comfortable. In other words, it is symptomatic relief and does not necessarily address the underlying cause of the symptoms.

Fever in COVID-19 tends to be very mild when it is noticeable at all. Body aches and headaches are present for some, and willow can be helpful for them. Decoction, vinegar

extract, or tincture are all usable forms in which to employ willow, though decoction requires preparation and might therefore be less convenient for the person using it.

As with other salicylate-containing antiinflammatories, willow should not be used if bleeding, bruising, or extravasation is present. The main use that I have put it to in the present situation is poor aches and pains during the recovery phase.

# Yarrow

*Achillea millefolium* L.



Yarrow is one of my favorite herbs. It has helped humanity through many mass-casualty incidents over the millenia, and can continue to do so today. Best known for its ability to help wounds heal, yarrow will also help a person sweat out a fever, or break up congestion, and even improve appetite and digestion with its bitterness<sup>1 02</sup>. Additionally, it grows quickly, is distributed widely, and is not very selective in its habitat. This means that it can be found throughout a significant part of the world, for much of the year, if someone is looking for it. It's accessibility and versatility has

contributed to it being a popular traditional medicine for many centuries. In spite of this, it is not particularly popular as a commercial product, so purchasable supplies may be more limited than for some herbs.

In the case of respiratory illnesses, yarrow's combination of febrifuge and expectorant properties are very useful, especially in individuals with mild to moderate symptoms. It works fine as a tincture, taken in doses of 5 ml. 1-3 times per day, but administering yarrow as a hot infusion has the added advantage of the warm liquid thinning respiratory secretions. However, as with other herbs, the fact that the tea needs to be prepared means that a tincture might be easier to use for some people--particularly if they are having shortness of breath and limited energy.

# Closing Thoughts

The COVID-19 pandemic will undoubtedly be remembered as one of the more difficult chapters in recent history. Alongside larger but more distant pandemics such as the 1918 flu epidemic and the black death of medieval Europe, it will also be a defining moment for the health of the human community. It has exposed many glaring deficits in the world's public health and primary care systems, and vulnerabilities in the way that nations and communities keep themselves safe from threats of this nature. At the same time, it has shown what people can do when they work together-- and what a great difference it can make whether they do or not.

The hope in writing this text has been to share some of what I have learned and make healing more accessible to a greater number of people. Herbal medicine has been and remains the world's most common form of healthcare, precisely because it is accessible and resilient, sustainable even in the absence of economic activity. The plants grow whether the people are seeking them out or not; and if we do seek them out, they are there for us. Part of our role as herbalists and caregivers is to be a connection between that awesome store of healing power of plants and the people who need them. In times like these, when the world needs all the help that it can get, I would encourage everyone to collaborate in the process of dealing with this immense and rapidly changing crisis. Learn what you can, and share what you know, because life is short and the skill of healing is more vast than the study of any one lifetime can encompass.

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