



Dear Friends:

I hope this note finds you well and calm during these uncertain times. I'd like to share with you all some helpful information about the new coronavirus officially known as **SARS2-COVID-19** virus and strategies to help combat it. To paraphrase a common saying, you may not be interested in the virus, but this virus is interested in you, both medically and economically.

This comes to you from an interested and intellectually curious physician. Although not a specialist, I believe that as a Super Generalist, I'm uniquely qualified to try to help tie together these many loose threads. Furthermore, before going down a path of an academic internist/general practitioner I had thought about pursuing a career track of critical care and infectious disease, having had significant exposure to both in my training program.

## **CORONAVIRUS**

The family of coronaviruses is common and usually benign. For example, the 2 most common coronaviruses, first discovered in 1960 and 1967, are responsible for about 25% of all cases of the common cold which peaks in the winter and spring in temperate areas. These viruses recur yearly as antibodies fall regularly, thus people are re-infected easily and are common across the population including children.

In 2002/2003 a new coronavirus named **SARS** (Severe Acute Respiratory Syndrome) was discovered having originated in China. Although it was eventually found to not be easily spread, it probably did have some super-spreaders (think of the original Typhoid Mary or children in daycare). It spread globally with a total of 8000 cases and it killed 1/10 (10%) of the people infected. This previously unrecognized coronavirus did become a pandemic and caused severe respiratory infections including ARDS (Acute Respiratory Distress Syndrome) which created dangerous fluid levels in the lungs, in 25% of patients. It was eventually well contained by following policies of isolating suspected patients and screening all passengers traveling by air from affected countries for signs of infections. However, it circled the world and caused about \$40 Billion dollars in losses. Fortunately, SARS went away but all the work put into fighting this severe infection was put on the shelves.

In 2011, another novel coronavirus named **MERS** (Middle East Respiratory Syndrome) was discovered in Saudi Arabia. Like SARS, it was also associated with severe respiratory infections, but this virus had a fatality rate of 35%. Although MERS is still around today, it is not spread between humans very easily, thus it is able to be contained.

The looming pandemic of viral infection we see with COVID-19 is not new to the United States. The etymology of the word "pandemic" comes from the Greek words *pân* meaning "all" and *dêmos* meaning "people" (of course I had to point out important Greek word origins). To note, a pandemic, which is an outbreak of infectious disease that sickens large numbers of people worldwide contrasts with an epidemic, which is isolated to a single region or country.

In 2009 a powerful H1N1 (influenza A) flu infected 1 billion people within six months. There were 61 million cases in the U.S. with 12,000 deaths. Although these numbers were lower than those of the seasonal flu it was a major threat, as 38% suffered from ARDS and the median age of deaths was about 40 years old. In fact, it has been estimated that approximately 60% of Americans developed antibodies to the H1N1, thus most of our population was unknowingly exposed to this virus. Although many may have forgotten or not been aware, I remember vividly the story of a mother needing to quarantine her child at home with a separate bathroom and had to aggressively use Personal Protective Equipment (PPE) like gloves and masks to keep her and the rest of the family uninfected.

According to the CDC, a pandemic flu virus infection is thought to happen when new (novel) influenza A viruses emerge which can infect people easily and spread from person to person in an efficient and sustained way. Prior pandemic flu seasons were in 1918, 1957, 1968, and the previously mentioned 2009 infection. The United States is **NOT** currently experiencing an influenza pandemic. However, to make matters both confusing and worse the current flu season is on track to be one of the worst in years. According to Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases (NIAID), in his comments from January 2020, the 2019/2020 flu season is on track to be as severe as the 2017/2018 flu season, which was the deadliest in at least a decade. At this point in the season (early March), CDC estimates indicate that there have been 32 million influenza illnesses, 310,000 hospitalizations, and 18,000 flu-related deaths.

## **COVID-19**

It is with all this background that we then can turn our attention to the current **SARS coronavirus 2 (COVID-19)** virus. According to Dr. Amesh Adalja of Johns Hopkins

University, in mid to late December 2019 a particularly lethal but unexplained series of pneumonia viruses were found in the Hubei province of China, specifically in its capital of Wuhan. He goes on to further explain that human to human spread thus probably began in November, probably leading to spread outside of China from an early beginning and that when you give a new virus a head start it is not easily containable. The World Health Organization (WHO) first learned of the 2019/2020 coronavirus outbreak on December 31, 2019. China took significant action to contain the current outbreak, quarantining over 50 million people. When by the end of January 2020 two new hospitals were built within 12 days in Wuhan; clearly something new, different, and dangerous was amiss with the COVID-19 virus.

Erik Goldman of Holistic Primary Care has written an excellent and detailed article from early February 2020 that I'd like to quote at some length to provide perspective and background. Despite being written for health care providers, I believe the more information we know the better, especially with our audience of talented and intellectually curious citizen scientists.

Late in January, *The Lancet* published [the world's first detailed case analysis](#) - an in-depth look at 99 PCR-confirmed cases of infection with 2019-nCoV from Wuhan, the outbreak's epicenter. Eleven of these 99 were fatal. The journal is making all of its [current and future content on coronavirus free and open-access](#). The case series report by Nanshan Chen and colleagues at the Tuberculosis & Respiratory Department, Wuhan Jinyintan Hospital, sheds some light, as do studies of earlier coronavirus outbreaks like SARS and MERS.

**Symptoms & Lab Findings:** Chen and colleagues report that fever (83%), cough (82%), and shortness of breath (31%) were the most common symptoms among their 99 patients. Other symptoms included muscle ache (11%), confusion (9%), headache (8%), sore throat (5%), rhinorrhea (4%), chest pain (2%), diarrhea (2%), nausea and vomiting (1%).

Radiographically, 75% of patients had bilateral pneumonia, and 14% showed "multiple mottling and ground-glass opacity." One had pneumothorax.

They report that 43 patients had abnormal liver function tests, particularly elevated ALT and AST levels. Thirty-eight had high neutrophil counts, and 35 had abnormally low lymphocyte numbers. In the 73 patients tested, nearly all had elevated C-reactive protein levels.

Chen's team tested for nine other common respiratory pathogens associated with pneumonia. Aside from coronavirus, they found no other viruses. One patient was infected with *Acinetobacter baumannii*, *Klebsiella pneumoniae*,

and *Aspergillus flavus*. Three had *Candida albicans*, and one had *Candida glabrata*.

**Patient Characteristics:** The average age of the infected individuals was 55.5 years, with a range of 21-82 years. Two thirds (67) were male.

Notably, half of the infected patients had prior and longstanding chronic conditions, including cardiovascular and cerebrovascular diseases (40%), endocrine disorders (13%), and gastrointestinal diseases (13%). Twelve had diabetes.

The first two deaths in this case-cohort were men in their 60s, who had long histories of smoking.

The high prevalence of preexistent chronic disease observed in this cohort is similar to what investigators reported during the MERS-CoV epidemic.

“Our results suggest that 2019-nCoV is more likely to infect older adult males with chronic comorbidities as a result of the weaker immune functions of these patients.” Chen and colleagues cite age, obesity, and presence of one or more chronic disorders as factors associated with increased risk of death from COVID-19.

**Treatment:** There are no specific antiviral drugs or vaccines known to be effective against coronaviruses in humans. Nonetheless, the Jinyintan clinicians treated 75 of the 99 patients with oseltamivir (75 mg every 12 h, orally), ganciclovir (0.25 g every 12 h, intravenously), and lopinavir and ritonavir tablets (500 mg twice daily, orally). The treatment duration ranged from 3 to 14 days (median 3 days). Chen and colleagues have not disclosed estimates of the efficacy of these treatments.

Though only 5 of the 99 patients had other non-viral co-infections, the clinical team opted to treat 70 of them with antibiotics (25 received a single drug, 45 got a combination of antibiotics). They drew from a wide range of drugs: cephalosporins, quinolones, carbapenems, and others.

At the time of the *Lancet* publication, 31 of the 99 patients had been discharged, 11 had died, and 57 were still hospitalized.

Based on what we know currently, most people (approximately 80%) will have no symptoms to only mild similarities to a cold while some may get fatigue, dry cough, or fever. However, this is NOT your mother's cold or flu. With its quick spread from a single city to the entire country of China in 30 days, its rapid global spread, an exponential increase in case rates, significant complication rates (at least 20% of cases including 15% pneumonia and up to 5% needing intensive care treatment), the potential high case fatality rate, and its ability to spread via respiratory and contact surfaces before any symptoms appear; this 3<sup>rd</sup> coronavirus is not only already a pandemic but worthy of attention and caution.

It is helpful to quote Bill Gates' recent article from the respected medical journal NEJM (February 28, 2020):

Now we also face an immediate crisis. In the past week, COVID-19 has started behaving a lot like the **once-in-a-century pathogen** we've been worried about. I hope it's not that bad, but we should assume it will be until we know otherwise.

There are two reasons that COVID-19 is such a threat:

**First**, it can kill healthy adults in addition to elderly people with existing health problems. The data so far suggest that the virus has a case fatality risk around 1%; this rate would make it many times more severe than typical seasonal influenza, putting it somewhere between the 1957 influenza pandemic (0.6%) and the 1918 influenza pandemic (2%).

**Second**, COVID-19 is transmitted quite efficiently. The average infected person spreads the disease to two or three others — an exponential rate of increase. There is also strong evidence that it can be transmitted by people who are just mildly ill or even presymptomatic. That means COVID-19 will be much harder to contain than the Middle East Respiratory Syndrome (MERS) or Severe Acute Respiratory Syndrome (SARS), which were spread much less efficiently and only by symptomatic people. In fact, COVID-19 has already caused 10 times as many cases as SARS in a quarter of the time.

The former FDA commissioner Dr. Scott Gottlieb has spoken effectively about the problem; from his March 8, 2020 interview on *Face the Nation*.

“Well, we have an epidemic underway here in the United States. There's a very large outbreak in Seattle. That's the one we know about, probably one in Santa Clara or maybe other parts of the country, other cities. **And so, we're past the point of containment. We have to implement broad mitigation strategies.**”

**The next two weeks are really going to change the complexion in this country. We'll get through this, but it's going to be a hard period. We're looking at two months probably of difficulty.** To give you a basis of comparison, two weeks ago, Italy had nine cases. Ninety-five percent of all their cases have been diagnosed in the last 10 days. For South Korea, 85 percent of all their cases have been diagnosed in the last 10 days. We're entering that period right now of rapid acceleration. And the sooner we can implement tough mitigation steps in places we have outbreaks like Seattle, the lower the scope of the epidemic here.”

“Well, I think no state and no city wants to be the first to basically shut down their economy. But that's what's going to need to happen. States and cities are going to have to act in the interest of the national interest right now to prevent a broader epidemic. Close businesses, close large gatherings, close theaters, cancel events. I think we need to think about how do we provide assistance to the people of these cities who are going to be hit by hardship, as well as the localities themselves to try to give them an incentive to do this.”

From Dr. Gottlieb’s twitter of March 8, 2020, in commenting on his above appearance:

“We’re losing a narrow window of opportunity to avert a broader epidemic in the U.S. We must adopt strong mitigation steps now in areas of community spread. Feds, states, mayors, public health experts must work together to develop a systematic approach on when tough mitigation strategies should be triggered. We should work from a similar playbook that advances national interest, reduces the scope of infection, and protects lives.”

Dr. Deborah Birx, M.D., virologist, retired Army colonel, and top medical coordinator of COVID-19 response for the U.S. government says of this infection:

“It spreads like the flu. It reacts a lot like the flu in the way it spreads and the way we prevent it.”

**According to Erik Goldman,**

“At this point, there are more questions about COVID-19 than answers: What is the velocity of spread? Will the case-fatality rate increase or decrease over time? Is it seasonal? Are current antiviral drugs effective? Are there especially vulnerable subpopulations? Do simple interventions- paper surgical masks, frequent hand-washing, chemical hand sanitizers- provide meaningful protection?”

## What We Probably Currently Know About COVID-19

Based on the good work of Chris Martenson, but definitive numbers hard to nail down:

- Regional outbreak with Global shockwaves
- Common symptoms are often similar to common cold or flu - based on 55,000 cases of confirmed COVID 19 cases in China include:
  - Fever 87.9 %
  - Dry cough 67%
  - Fatigue 38%
  - Sputum 33%
  - Shortness of Breath 18.6%
- Wide range of case outcomes with very high serious complication rates:
  - 80% - mild
  - 15% - severe
  - 5% - critical
- High Case Fatality Rate thus far - approximately 1-2+ % but with a wide range (it has been difficult to get accurate numbers):
  - Italy 4.25%
  - South Korea 0.7%
- More importantly, need to look at fatality rates among different segments:
  - 8% - patients aged 70-79
  - 15% - patients aged > 80
  - 50% - in critical cases
- NOT the flu - much more deadly than the flu (0.1%) - approximately 10 to 20x.
- Spreads asymptotically.
- Very high R0 - way over 2-3 (the average infected person spreads it at least 2 to 3 others).
- Long incubation period - perhaps > 21 days.
- Spreads via droplets on surfaces and aerosols.
- No vaccine in the immediate future.
- Smoking makes it worse.
- Testing has resulted in false negative result errors.
- Highest risk in the elderly and those with chronic medical problems.
- Wide range of people have gotten ill, including and increasing in those > 50 and even some in their 30s and 40s.
- Kids are spared but they participate in spreading the disease.
- Men likelier than women - approximately 5:3 ratio.
- Significant respiratory problems can occur, but also, many organs can be involved including cardiac, neurological, and GI systems.

- Anyone can be infected, regardless of travel history.
- It is already in our community.
- “Fatality and mortality globally will track with per capita availability of ventilators and ICU beds. There will be a huge inequity with those most vulnerable.” -Dr. Gabriel Leung, family doctor, epidemiologist, and dean of University of Hong Kong medical school (HKU)

**“We need to stay calm, be sensible, and don’t panic.”** -Dr. Gabriel Leung

## **TREATMENT STRATEGIES (also known as Non-Pharmaceutical Interventions)**

From the Virginia Department of Health:

**How can I protect myself and my family?** - What has been called Hygiene 3.0:

- Wash your hands often with soap and water for at least 20 seconds. Use an alcohol-based hand sanitizer only if soap and water are not available.
- Avoid touching your eyes, nose, and mouth as much as possible.
- Cover your mouth and nose with a tissue or sleeve (not hands) when coughing or sneezing.
- Clean and disinfect frequently touched objects and surfaces.
- Stay home when you are sick.
- Avoid contact with sick people as much as possible.
- Avoid non-essential travel.

The CDC also adds:

- Practice respiratory hygiene by coughing or sneezing into a bent elbow or tissue and then immediately disposing of the tissue.
- Maintain social distance (a minimum of 1 meter) from individuals with respiratory symptoms.
- Wear a medical mask if you have respiratory symptoms and perform hygiene after disposing of the mask.

## **Personal Protective Equipment (PPE)**

The above recommendation by the CDC is an important one but also filled with challenges. PPEs include gloves, medical masks, goggles or face shields, gowns, aprons, and specialized masks or respirators (N95 and N99). The protective equipment used by hospitals and care facilities has now reached the community, often creating supply issues.

From the CDC, “The current global stockpile of PPE is insufficient, particularly for medical masks and respirators; the supply of gowns and goggles is soon expected to be insufficient also. Surging global demand- driven not only by the number of COVID-19 cases but also by misinformation, panic buying and stockpiling- will result in further shortages of PPE globally. The capacity to expand PPE production is limited, and the current demand for respirators and masks cannot be met, especially if the widespread, inappropriate use of PPE continues.”

Generally speaking, the use of a basic surgical mask is thought best to be used if you have respiratory symptoms to protect those around you since it may capture large respiratory droplets whereas the more advanced N95 masks are best to be used to protect you if those around you, including an infected patient, has the potential of an infection that transmits through the air. Clearly there is value in these masks for many of us in the community, especially if we are helping those who are sick in our family or supporting others in our local areas. How to best keep the supply up to have enough first for healthcare workers is the key strategic and logistical question that hasn't been fully answered. There is no doubt that much of the care for the ill will be done at home. In the interim, it is vital that we do not hoard these PPEs.

Speaking of homecare, I think it is important to stress that paradoxically most of the medical specialists and those of us practicing in the healthcare community are now stressing that patients who may be sick to not initially go to doctors' offices or urgent care centers and emergency rooms. This makes sense since most people will have only minor symptoms, probably not be very sick, and risk infecting others or possibly worse, such as picking up the COVID-19 or even flu viruses from such centers.

We at Pappas Health are uniquely situated to be of help in this manner. From the beginning, we have promoted the use of HIPPA-compliant telemedicine/video conferencing in addition to extended phone calls to meet the needs of our patients. As the CDC recommends, “Consider using telemedicine to evaluate suspected cases of COVID-19 disease, thus minimizing the need for these individuals to go to healthcare facilities for evaluation.” So please don't hesitate to call us or set up a telemedicine evaluation or change your existing appointment to a phone call or video conference.

## **Other Important Treatment Options**

- Decontaminate when getting home from the outside - change clothes and wash up aggressively before interacting with others at home.
- Declutter your living space - time to practice spring cleaning.
- Regular cleaning of surfaces (such as with Clorox wipes) and filters.
- Get outdoors - practicing social distancing when possible (2 to 3 arm lengths).
- Viruses need low temp and low humidity, work on increasing the temp and humidity.
- Intergenerational lifestyle probably facilitating the spread of the virus (Italy is a good example) - be careful with family gatherings with the elderly or those at risk.
- Use social distancing measures to reduce contact in the community and workplace to the greatest extent possible.
- Voluntary home isolation or quarantine if you have vague symptoms and are in an area with confirmed cases - like ours here in the DMV area.
- **Home treatment of all but the critically ill (this will be the standard soon).**

## **Lifestyle Can Be an Important Tool**

From the Goldman article in Holistic Primary Care,

Beyond the calls for new vaccines, public health officials worldwide have paid little attention to the matter of individual immune system strength, overall health status, or ways to strengthen these through nutrition, herbal medicine, and other non-invasive interventions.

That seems like a glaring oversight, given that half the Jinyintan Hospital cases were in people with preexisting chronic conditions that are strongly associated with lifestyle factors, and that having a chronic disease is associated with a higher risk of death when infected with coronavirus.

As many of you know, it is my belief that we can do much to help strengthen our personal system and make us more resilient and flexible to cope with this mostly unknown problem and uncertain future. Our thoughts and actions both can have profound effects on our ability to heal and flourish in these potentially challenging times. If the virus is the seed, we are the soil and there is much we can do help strengthen our immune systems and make ourselves a place that is unwelcome to the virus and to other infections.

Many cultures have found the spring a time of renewal and rebirth and practice habits. As per Jane Collingwood:

Spring is the season of new growth, and the signs of change are all around us. Flowers smatter parks and lawns, the days are longer, brighter and warmer, and our emotions are lifted by the extra light and raised temperature.

Springtime is seen as a time of growth, renewal, of new life being born, and of the cycle of life once again starting. It is also seen more generally as the start of better times. At this time of year, we begin to feel less sluggish and become more open to inviting changes- both big and small- into our lives.

The symbolism of spring is one most people can appreciate. In all cultural traditions the world over, it is a time of rebirth and new beginnings. Whether we reference the antics of numerous fertility gods of rural communities, the Green Man festivities of pagan cultures or the Christian resurrection of Easter, springtime itself has never been a season to go unmarked.

According to psychiatrist Dr. Abigail Brenner:

Although we still have a little way to go to really enjoy the warmth and light that spring brings, we can begin to think about what we can do to renew ourselves and to better balance our lives. What better time than spring to re-group and re-prioritize, and even re-invent ourselves and the lives we find ourselves living. Here are some spring “rituals” to help you get started:

- Declutter your living space
- Clean out mental and emotional clutter
- Start a new practice or discipline
- Begin something new, for example, assess your health status
- Spend time outdoors
- Simplify your life

I believe this is an ideal time to engage in spiritual practices that are common in all cultures whether they are seen in Christianity, monotheistic faiths, other religious communities, modern non-believers practicing stoic principles, or the many nice “virtuous pagans” we all know.

As a Greek brought up in a community of Eastern Orthodox Christians emphasizing more ancient practices and rituals, I saw that there were many seeds and points of contact with a variety of faiths and religious practices- “Bride of the East and mistress of

the West". Timeless principles that all of us can benefit from was demonstrated in a quote by the Orthodox Patriarch Bartholomew when he recently stated, "We offer hymns of thanks to the God of love as once again we enter Holy and Great Lent, the arena of ascetic struggle, fasting and abstinence, of vigilance and spiritual awareness, of guarding our senses and prayer, of humility and self-knowledge."

Practices I routinely engage in during the Lenten period and that would be helpful for all include:

- Ascetic discipline
- Fasting - could be caloric restriction, food restriction (for example meat), or time restriction like intermittent fasting
- Silence, simplicity, and solitude
- Sleep - deeper and longer
- Regular exercise
- Unplug from technology
- Engage in metaphysical and meaningful reading material
- Deep dive into higher principles - especially important now that our community will need the help of all of us

As Massimo Pigliucci explains in his great book *How To Be A Stoic*:

It's about practicing virtue and excellence and navigating the world to the best of our abilities, while being mindful of the moral dimension of all of our actions. The practice of Stoicism involves a dynamic combination of reflecting on theoretical precepts, reading inspirational texts, and engaging in meditation, mindfulness, and other spiritual exercises. This approach combines the ancient idea of virtue ethics, which focuses on character development and the pursuit of personal excellence.

One of the key tenets of Stoicism is that we ought to recognize, and take seriously, the difference between what we can and cannot master.

## **Natural Treatments**

From the Goldman article:

It is unlikely that herbal extracts and nutraceuticals hold drug-like "cures" for coronavirus. Four leading supplement industry trade organizations, the American

Herbal Products Association (AHPA), Council for Responsible Nutrition (CRN), Consumer Healthcare Products Association (CHPA), and the United Natural Products Alliance (UNPA) stressed that point in [a joint statement on February 11](#).

"While research supports the use of certain dietary supplements to maintain immune system health, we are not aware of clinical research that demonstrates using a dietary supplement specifically to prevent or to treat the novel coronavirus. Even if research is conducted and published on the topic, the law that regulates dietary supplements... prohibits marketers in the United States from promoting any dietary supplement product that makes disease prevention or treatment claims."

That said, there are several herbs that have shown *in vitro* antiviral activity against some forms of coronavirus. One that stands out is Oregano.

*In vitro* work done during the 2002-03 SARS epidemic show that carvacrol-rich oregano oil is both virustatic and virucidal against the coronavirus thought to cause SARS (see [Oregano Oil Proves Effective Against Coronavirus](#)).

Other studies have shown oregano oil- alone or in combination with other terpene-rich herbs- to inhibit the growth of H1N1, HSV, and other human viral pathogens ([Brochot A, et al. Microbiology Open. 2017](#). Toujani MM, et al. [Phytother Res. 2018](#). Sanchez C, et al. [Int J Food Microbiol. 2015](#)).

There has yet to be a human clinical trial of oregano oil to confirm or refute the observations from basic research. And as the joint industry position paper has stated, even if a company or agency were to sponsor such studies, the Dietary Supplements Health and Education Act (DSHEA) would prohibit supplement makers from advertising the data.

But given the dearth of conventional drug therapies for coronavirus infections, the possibility that this herb might be useful should not be categorically dismissed.

In his excellent 2013 book, [Herbal Antivirals](#), herbalist Stephen Harrod Buhner goes into great depth about the mechanisms by which viruses attach to and infect human cells, and the diverse plant substances that can inhibit viral attachment and proliferation.

Buhner points out that the virus that triggers SARS attaches to the Angiotensin-Converting Enzyme 2 (ACE-2) on the surfaces of the lung, lymph and splenic epithelium. Several herbs, including Licorice, Chinese Skullcap, Horse Chestnut,

Polygonum, Elder, and Cinnamon contain compounds that block coronavirus attachment to ACE-2.

He also notes that Kudzu, Skullcap, Angelica, Astragalus, and cordyceps mushrooms can down-regulate TGF- $\beta$ , IL-1 $\beta$ , and other cytokines involved in the inflammatory cytokine storm that characterizes SARS.

Buhner's book, rooted in traditional use and long personal experience, includes guidelines and recipes for the use of herbs to strengthen immunity to viral infections while down-regulating inflammation.

Here is a link to an article by Buhner describing his approach to viruses like the coronavirus. **Warning:** it goes deep into a lot of science but has many good principles. <https://www.stephenharrodbuhner.com/wp-content/uploads/2020/03/coronavirus.txt.pdf>

I have found the work of Buhner to be excellent, have experimented with many of these natural supplements, foods, and extracts for many years, and believe that many of these treatments have been very helpful in keeping me well during my many years of being exposed to infections throughout my medical career.

Another good resource is from an interesting- and recent- research article, *Nutraceuticals have the potential for boosting the type 1 interferon response to RNA viruses including influenza and coronavirus*, that covers many well-known supportive nutrients including elderberry, zinc, and NAC to name a few. <https://www.sciencedirect.com/science/article/pii/S0033062020300372?via%3Dihub>

There is some early evidence out of China that high doses Vitamin C may also be helpful. Richard Cheng M.D., Ph.D., Chinese Edition Editor of the Orthomolecular Medicine News Service states there are at least three clinical trials in China studying the effects of high-dose IV vitamin C for the treatment of COVID-19. He mentions the Shanghai Medical Association has released an expert consensus statement on the comprehensive treatment of COVID-19 where they endorse the use of high-dose IV vitamin C for the illness. It is unclear if oral vitamin C at high doses can provide the same benefit, and although it can contribute to more bowel movements, I have found it safe and usually helpful.

There is an interesting article out of the Philippines, wherein scientists are looking at coconut oil and its derivative lauric acid and monolaurin as a possible effect antiviral for COVID-19. According to Fabian M. Dayrit, Ph.D. and Mary T. Newport, M.D.:

Given the considerable scientific evidence for the antiviral activity of coconut oil, lauric acid and its derivatives and their general safety, and the absence of a cure

for nCoV-2019, we urge that clinical studies be conducted among patients who have been infected with nCoV-2019 (see below). This treatment is affordable and virtually risk-free, and the potential benefits are enormous.

On the other hand, given the safety and broad availability of virgin coconut oil (VCO), we recommend that VCO be considered as a general prophylactic against viral and microbial infection.

<http://ateneo.edu/ls/sose/sose/news/research/potential-coconut-oil-and-its-derivatives-effective-and-safe-antiviral>

Lastly, Dr. Alex Vasquez DC ND DO FACN, wrote in an informative article in 2014, “The recent international health crises due to viral infections has made one thing very clear: We need a new strategy to combat viral infections”. He goes on to explain in detail, based on his extensive work and research, a multicomponent antiviral strategy:

1. **Targeting the virus directly:** Targeting the virus directly has been the focus of medical practice and public health efforts through sanitation, vaccination, and – more recently – the use of disease-specific antiviral drugs. Several nutrients and botanicals are also very effective for directly targeting viral infections, and I will provide two examples here. The mineral [selenium](#) has a wide margin of safety and provides antiviral benefits through several mechanisms, two of which are blocking viral mutation and also blocking viral replication; anti-infectious clinical benefits are proven in humans with HIV/[AIDS](#).[\[5\]](#) The botanical medicine and common herbal tea licorice ([Glycyrrhiza glabra](#)) has demonstrated antiviral effectiveness in experimental studies and human clinical trials against several different pathogenic viruses, including [hepatitis B](#) virus (HBV), [hepatitis C](#) virus (HCV), herpes simplex virus (HSV), [influenza A](#) virus, human immunodeficiency virus (HIV-1), [severe acute respiratory syndrome](#) (SARS)-related coronavirus, respiratory syncytial virus, arboviruses, vaccinia virus, and vesicular stomatitis virus[\[6\]](#); this botanical has an excellent history of safety spanning several thousand years, with adverse/beneficial effects including a pseudoaldosterone effect (sodium retention and potassium depletion) and a testosterone-lowering effect, and mechanism of action including via direct virus binding, inhibition of viral replication, enhancement of immunity, inhibition of inflammation, and blocking the activity of specific enzymes. Antiviral nutrients and botanicals can be used alone, in combination, and alongside medications for additive and synergistic benefits.

2. **Blocking viral replication:** Inhibition of viral replication is the therapeutic goal of many antiviral drugs, while several nutrients can also provide a similar effect. Because viruses are unable to self-replicate and must therefore rely on

host/human genetic and synthetic machinery for their replication, nutrients that modulate genetic expression can have therapeutic value here, namely via DNA methylation (generally causes genes to be "silenced") and blockade of the transcription factor NFkB (an inflammatory pathway used by viruses to promote viral replication). The few nutrients which promote DNA methylation and which also have proven clinical effectiveness against viral infections include [folic acid](#)<sup>[7]</sup> (now used clinically in the forms of folinic acid and methyl-folate), vitamin D3<sup>[8]</sup>, [betaine](#) and S-adenosyl-methionine.<sup>[9]</sup> Inhibition of the NFkB pathway for antiviral effectiveness is well-proven, with two examples being with NAC against influenza<sup>[10]</sup> and lipoic acid against viral hepatitis and HIV.<sup>[11]</sup>

**3. Supporting immune function:** The performance and regulation of the immune system is heavily dependent on optimal nutritional status, and without proper nutrition, the immune system is slanted simultaneously toward underactivity (deficiency-induced immunosuppression) and hyperactivity manifesting as inflammation and autoimmunity.<sup>[12]</sup> Nutritional deficiencies are very common in the general population and thereby contribute to epidemics of infectious and inflammatory diseases. Human clinical trials using nutrients alone or in combination to support immune function in general have shown outstanding safety and efficacy against infectious diseases, especially use of [glutamine](#), whey protein isolate, [vitamin A](#), vitamin D, [fish oil](#), and [zinc](#).<sup>[13]</sup> Nutritional supplementation has been shown in several instances to improve immunological response to vaccinations; for example, cystine and [theanine](#) were noted to increase seroconversion of influenza vaccination in elderly persons.<sup>[14]</sup>

**4. Supporting cellular and whole-body health:** Viral infections have numerous adverse effects on cellular and whole-body health. Intracellular consequences of viral infections include mitochondrial dysfunction<sup>[15]</sup> and endoplasmic reticulum stress<sup>[16]</sup>, manifesting clinically as prolonged inflammation, fatigue and – likely – in the case of herpes simplex infections, [Alzheimer's disease](#).<sup>[17]</sup> Among the more than 30 interventions to improve mitochondrial function and alleviate endoplasmic reticulum stress, we see that exercise, low-carbohydrate diets, [coenzyme Q-10](#), lipoic acid, and acetyl-L-carnitine are preeminent in their safety, effectiveness, and collateral benefits.<sup>[18]</sup> Osteopathic manipulative medicine, perhaps via promotion of improved respiration and lymphatic flow and distribution of chemokines, has also shown benefit in the nonpharmacologic amelioration of infectious disease.<sup>[19]</sup>

<https://www.greenmedinfo.com/blog/proof-panic-we-need-new-strategy-against-viral-infections>

**In summary, via the use of a structured antiviral strategy, pharmacologic and nonpharmacologic interventions can be applied with greater clinical and public**

**health effectiveness, thereby alleviating the clinical, social, financial, and political burdens of these infectious diseases.**

*I'll be providing a detailed list shortly of the specific products and their dosing which I have found to be helpful.*

## **Where Is Your Current Biochemistry Taking You?**

Knowing your current situation is also essential since I believe that the multiple biochemical imbalances from which many of us can suffer often predispose us to get sick. Thus, simply “not having” the known medical illnesses of the elderly who are at highest risk, in my opinion, is not enough, especially since we routinely find many of our patients frequently ill during this time of year without illnesses of diabetes, hypertension, cancer, or cardiovascular disease. As Jay Campbell has stated, “It goes without saying that those who are heavily inflamed are not doing themselves any favors, so make sure you know your inflammatory markers ASAP. Maintaining as minimal of an inflammatory physical state as possible will help your body respond to a coronavirus infection without possibly experiencing the cytokine storm” (the dangerous, very overactive immune response that has been thought to be the cause of illness and death of the young effected by COVID 19).

I am confident that we will all get through this together in one piece through being calm and relaxed but also vigilant and on high alert. We are here to partner with you to help you stay on top of the latest information and also help support you all to make sure there is no “ill-informed complacency”, to paraphrase a good point I recently heard.

We have found Twitter to be an especially valuable resource and encourage you, if interested, to follow me [@DrSamPappas](#) and also follow our [website](#) and join our mailing list where we will be sharing regular updates. Please feel free to share this and our contact information with anyone who you think may find this of value.

Yours in health,

Dr. Sam Pappas and the team at Pappas Health