The American Holistic Nurses Association (AHNA) supports the Center for Disease Control (CDC) and the World Health Organization (WHO) in acknowledging the immediate global public health risk of the COVID-19.

This update is current to time of release. Previous updated information is reduced weekly to keep the report as concise as possible. For a comprehensive appraisal, please review subsequent weekly updates (since Feb 2020) at: https://www.ahna.org/Home/Resources/Coronavirus-COVID-19

Clinical Updates

The Quest for Immunity
Development of treatments and vaccinations is dependent upon interfering with, and / or harnessing, complex processes within the immune system. SARS-CoV-2 is an immunologists dream, or nightmare, depending upon perspective. While the virus thrives, it creates chaos of what is normally a harmonized dance between inflammation and healing. COVID-19 over-exhausts the system, and through it emerges vast opportunity for research, the obvious downside is the sheer fatality achieved by stealth in asymptomatic persons, and rapid exponential replication besting investigation.

To win in a war, strategic leaders devise clever interference and utilize an adversaries weaknesses. These plans require time and reconnaissance of organizational structure, and ultimately an unlimited support to the mission.

An overactive immune system 'fighting' a viral enemy is nothing less than a microscopic battleground. It cannot be won through political threats of withholding funds, angry fist shaking, or rebellious protests. This battle is of global scale: in laboratories with sufficient economic funding each rallying for small victories in any form. If one is unwilling or unsupportive of a singular method to achieve this goal, it is irrelevant. The argument should not be how to accomplish, so much as it is a united front to support every opportunity to win. Many small battles win the war. This is not a threat that can be rationalized with, bribed, cajoled into submission. It needs multiple strategies to accomplish one goal.

A brief pathophysiology of the immune system response to SARS-CoV-2:
The S protein is the envelope spike glycoprotein that binds to cellular receptor, ACE2. F. Wu, S. Zhao, B. Yu, et al. A new coronavirus associated with human respiratory disease in
China. Nature (2020). The virus then enters the cell through direct membrane fusion of itself and the plasma membrane of the cell, Belouzard, S., Chu, VC, Whittaker, GR., et al, Activation of the SARS coronavirus spike protein via sequential proteolytic cleavage at two distinct sites, Proc. Natl. Acad. Sci. U.S.A., (2009). More recently, a critical proteolytic cleavage event was discovered at SARS-CoV S protein at position (S2) which mediated the membrane fusion and viral infectivity. To survive within the war zone of the human immune system, COVID-19 defense is highly evolved. Its predecessors, MERS and SARS developed double membraned vesicles. It is theorized they partially replicate within the vesicles to avoid host detection of a pathogen; yielding a delayed immune response until viral replication is well underway. The virus RNA genome releases, producing 2 polyproteins and structural proteins of intricate complexity. The ERGIC (endoplasmic retifilum-Golgi intermediate compartment is germinated by the viral particles. Finally vesicles containing the particles fuse with the plasma membrane to release the virus. once this happens, the antigen is visible to the immune system [see Antigen presentation in diagram from Li, X., Geng, M., Peng, Y., Meng, L., & Lu, S. (2020). Molecular immune pathogenesis and diagnosis of COVID-19. Journal of Pharmaceutical Analysis, 10(2), 102-108] via Antigen Presentation Cells (APCs).

Recognition of pathogen-associated molecular patterns results in cytolytic immune response, mainly type I interferons (IFN) and natural killer cells. Adaptive immunity also plays an important part in viral clearance via activated cytotoxic T cells that destroy virus-infected cells and antibody-producing B cells that target virus-specific antigens. Patients with severe COVID-19 have substantially lower lymphocyte counts and higher plasma concentrations of a number of inflammatory cytokines such as IL-6 and tumor necrosis factor (TNF).

The antibody profile component of IgM, begins development in week 3 of infection, and discontinues by week 12. The second is IgG theorized to have a protective mechanism. SARS-CoV-2 specific IgG antibodies primarily are S-specific and N-specific antibodies; protective qualities have an 'unknown' duration. This lends to the questionability of "how long the immune response will last". A study published in the Journal of Immunology revealed six years after SARS-CoV-1 infection, specific T-cell memory responses to the SARS-CoV S peptide library could still be identified in 14 of 23 recovered SARS patients. When discussing the longevity of antibody protection, Dr. Paul Auwaerter of Johns Hopkins, stated, "in other similar coronavirus infections this has been short-lived" unlike in Measles or other agents we vaccinate against. The comparison is made of a COVID-19 vaccination being similar to the influenza vaccine; it may protect some from infection, it also may decrease the severity in others. It is unlikely a 'one time dose' will be sufficient.

The time frame of vaccine development is simple; ascertaining the virus' weaknesses requires time consuming and elaborate design.
Clinical Research

MONOCLONAL ANTIBODIES
Antibody Binding to SARS-CoV-2: researchers isolated four previously unknown antibodies in blood from a recovered COVID-19 patient. Two, named B38 and H4, displayed binding capabilities to the introduced RBD. They theorize the paired antibodies may prohibit SARS-CoV-2 synthesis in human cells. The team, led by Yan Wu, Capital Medical University, Beijing, replicated each monoclonal antibody successfully. Antibodies were injected into SARS-CoV-2 positive mice, resulting in a 30% reduction of viral genetic material in the host lungs after a single injection. This class of therapeutics can be developed, tested according to standards, and approved more quickly than chemical small molecule compounds.


A synchrotron was used to map, at near-atomic resolution, the way in which the B38 antibody locks onto its viral target. This structural information helps to clarify the precise biochemistry of the complex interaction between SARS-CoV-2 and the antibody, providing a much-needed guide for the rational design of targeted drugs and vaccines.

A second study released in the scientific journal, Nature, was submitted by an international research team. Antibodies, S309 identified in SARS 2003, effectively neutralized SARS-CoV-2 by targeting the spike protein of the virus. NIH grantees David Veesler, University of Washington, Seattle, and Davide Corti, Humabs Biomed, a subsidiary of Vir Biotechnology, have indicated that S309 is being developed toward clinical trials. This study is part of the Accelerating COVID-19 Therapeutic Interventions and Vaccines (ACTIV) partnership united public and private efforts to advance treatment and research for COVID-19.


IMMUNOMODULATION
SARS-CoV-2 poses deliberation of hyper-inflammation versus viral replication. Effective anti-viral immunity is required for the clearance of pathogens (including the inflammatory response), hyper-activation / cytokine storm leads to tissue damage and multiple organ failure. There are two sides of immunomodulation therapy and selection is circumstantially dependent upon symptoms and timing; early intervention is a dynamic factor in successful immunomodulation therapy precluding cytokine storm. Behrens EM, Koretzky GA, Review: Cytokine storm syndrome: looking toward the precision medicine era. Arthritis Rheumatol. 2017; 69: 1135-1143. Research studies using Mesenchymal stem cells (MSCs) in other forms of inflammatory disease have been successful due to their anti-inflammatory properties.

In a review of literature, Zong, J. Tang, J, Ye, C., The immunology of COVID-19: is immune modulation an option for treatment, The Lancet Rheumatology, 20 May 2020, (online) discusses the benefits and contraindications of theorized repurposed immunomodulatory therapies, “Due to the hyperactive nature of the immune system several disease-modifying anti-rheumatic drugs (DMARDs), such as tocilizumab (interleukin [IL]-6 receptor inhibitor), baricitinib (Janus kinase [JAK] inhibitor), anakinra (IL-1 receptor antagonist), and the antimalarial drug hydroxychloroquine (or chloroquine), have been proposed as potential treatments for COVID-19, the immunological aspects of the SARS-CoV-2 virus infection and the potential implication of
DMARDs in the treatment of patients with COVID-19.

The pharmacokinetics of oral medications in crucially ill patients merits consideration; hepatic dysfunction, renal failure, or if administered parenterally due to gastrointestinal failure, absorption rate must be accounted for to avoid toxicity (HCL) White NJ, Watt G Bergqvist Y, Njelesani EK, Parenteral chloroquine for treating falciparum malaria. J Infect Dis. 1987; 155: 192-201.

VACCINE CANDIDATES
Vaccinology research on COVID-19 is expanding quickly, however, "the overall menu of vaccines over the years that have been developed and then came to market to be proven efficacious and safe, it's estimated that only about 16% of vaccine candidates actually reach market. This is marginally higher than drugs entering clinical phases of investigation, so this is a high-risk kind of enterprise, and by no means guaranteed. A lot about this virus has surprised us..." Dr. Paul Auwaerter, Johns Hopkins.

"The global COVID-19 pandemic has made the development of a vaccine a top biomedical priority, but very little is currently known about protective immunity to the SARS-CoV-2 virus," Dan H. Barouch, MD, PhD, Director of the Center for Virology and Vaccine Research at Beth Israel Deaconess Medical Center (BIDMC). "In two studies, rhesus macaques were protected by prototype vaccines against SARS-CoV-2 infection and that SARS-CoV-2 infection protected against re-exposure". Nine rhesus macaques were inoculated (endotracheal and intranasal) with SARS-CoV-2. Viral load was assessed via RT-PCR 'in multiple anatomic compartments'. High levels were observed in bronchoalveolar lavage (BAL) and nasal swabs (NS); Viral RNA peaked on 2 and resolution on day 10-14 in BAL and day 21-28 via NS. Following initial viral clearance, animals were 'rechallenged' with COVID-19 and viral loads were reduced in subsequent BAL and NS when compared to the primary infection. https://www.bidmc.org/

The following paraphrase of Dr. Auwaerter, Johns Hopkins School of Medicine, describing the various vaccination candidates in progress: One prep uses a weakened viral vector (similar to the measles virus) inserts a spike protein into the weakened virus. It is administered, replicates, and it also manufactures the spike protein without causing serious viral infection, then the individual develops antibodies. This method created the approved Ebola vaccine, which has proved successful.

Another approach is non-replicating viral vectors, to which "the virus does not reproduce within the body, although it does encode information such that the genes themselves will be slurped up and integrated into cells, or at least manufacture proteins that develop an antibody response." Nature, 4/2020. Often adenovirus is utilized in gene therapy, but to date, no infectious disease vaccine has incorporated this technique. DNA molecules, plasmids, are constructed with the spike protein. An injection gun inserts the material. Expectantly the plasmid is received by cells, transcribed into proteins and an immune response occurs. CanSino biologics, uses the adenovirus vector. Another option, a retroviral vector, lentivirus, by the Shenzhen Genoimmune Medical Institute uses the constructed virus with the protein injected. This may generate slightly different immunity, including T cells and dendritic cells.

"The Sinovac vaccine is an old-fashioned approach. The virus is simply grown up, it goes under in an activation protocol much like influenza virus; grown in eggs and activated, then injected to develop immune responses, hopefully without disturbing the protein structures too much to get appropriate responses. That is also in progress right now. The Moderna ( in the news) is novel... messager RNA containing the spike protein is injected, taken up by cells, and synthesized similarly to the manner in which the virus would be, but without the whole viral apparatus. Research published recently on recovered SARS-CoV-2 individuals found certain epitope pools (similar to antibodies, but for T-cells) and specific to this virus; most patients develop CD4, helper cells, and CD8 cells in recovery. These T-cell responses also had very strong responses to two other proteins; M, N, and others termed open reading frames," Auwaerter.
The theory is a successful vaccine could include neutralizing antibodies and other proteins—inciting superior response.

mRNA vaccine: Moderna offers limited information, the press release commented 46 patients received a low dose or a higher dose of the mRNA and developed antibody responses, but only eight developed neutralizing antibodies. “These are tests where you need to be in a BSL 3 lab, testing the antibodies to see if they actually help neutralize the virus from killing cells and tissue culture; the gold standard for antibodies, and necessary against a viral infection. This is a new vaccine approach in humans and does not include safety data yet, as well as whom the volunteers were. Were they young? Were they old? Were the responses uniform? Interestingly, they [Moderna] are jumping ahead, passing through phase 2 to phase 3 and moving to trial this in over 30,000 people. That’s quite a large number... to prove safety, a large number of patients are required. This phase 3 trial is supposed to start in July.”

Efficacy: some participants are potentially, exposed to demonstrate preventing infection compared to placebo. A disadvantage of phase 3 trials is to prove efficacy requires exposure to the virus, and, to demonstrate prevention, the placebo group must still test positive for illness.

The human challenge model is different. The ethics are debatable but it can significantly shorten research time frame via intentional exposure after an antibody response. This challenges the reality of adequate protection. The advantage is testing on a smaller sample size, assessing efficacy, and submit a larger sample size to phase 3. This concept is proposed but without global coordinated response, it is fragmented. Related: Audio Interview: Capitalizing on Immune Responses to Covid-19 - New England Journal of Medicine, & Coronavirus Q&A: Accelerating Therapies and Vaccines - JAMA

HYDROXYCHLOROQUINE/CHLOROQUINE
A retrospective analysis of 96,032 patients across 671 international hospitals, evaluated the result and effects of COVID-19 treatment utilizing HCQ and chloroquine alone, and with antimicrobials. Mandeep Mehra, Harvard Medical School professor and physician at Brigham and Women's Hospital, and colleagues at other institutions - included patients with a positive laboratory test for covid-19 who were hospitalized between Dec. 20, 2019, and April 14, 2020. Using a multinational registry analysis, a sample of 14,888 were included with a mean age of 54 years. 53 percent were male. Each subject was divided into one of 4 treatment groups-chloroquine or hydroxychloroquine, alone, or in combination with the macrolide azithromycin. 81,144 patients were included in the control group. Mehra, M, Desai, S, Ruschitzka, F., et al. Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis, The Lancet (5/2020) Exclusions included certain pre-existing conditions, prior remdesivir administration, current mechanical ventilation, and treatment initiation greater than 48 hours after diagnosis. Patients in all 4 treatment groups exhibited statistically significant increases in mortality as well as increased risk of ventricular arrhythmia:

- those given hydroxychloroquine showed 34 percent increase in risk of mortality and a 137% increased risk in heart arrhythmias
- the chloroquine group experienced 37 percent increased risk of death and 256% increase risk of serious heart arrhythmias
- the hydroxychloroquine & azithromycin group increased risk of death by 45% and a 411% increase in risk of serious heart arrhythmias
- chloroquine and azithromycin yielded a 37 percent increased risk of death and a 301% increased risk of serious heart arrhythmias

Mehra reflected upon the findings stating using the drugs without systematic testing was "unwise", and in an interview with the Washington Post, said, "I wish we had had this information at the outset, as there has potentially been harm to patients." Since May 1st, the National Institutes of Health announced a randomized, placebo-controlled clinical trial of hydroxychloroquine and azithromycin involving 2,000 adults dealing with their illness at home. The ethics of these required consideration of mounting evidence to potential harm.

Global Situation Report

JHCHS tracker reports 5,522,931 confirmed COVID-19 cases and 346,873 deaths globally, May 26 at 08:32 am CST:

United Kingdom contributed $3.8m to the WHO Regional Office for the Americas to support Antigua and Barbuda, Belize, Dominica, Grenada, Guyana, Jamaica, Saint Lucia, and Saint Vincent and the Grenadines.

South America: Brazil reported 18,508 new cases, its second highest daily incidence to date. Its daily incidence is second to only the United States. (Daily per capita incidence is over 25% greater than the US.) Per capita incidence in Peru and Chile is higher. Peru reported 140 new cases daily/million. Chile reported over 200.

Russia reported 8,894 new cases, its third consecutive day with fewer than 9,000 new cases. Reports from humanitarian and international organizations indicated Yemen official disease incidence and death reports are underestimated. The UN Office for the Coordination of Humanitarian Affairs (UNOCHA) stated Yemeni health system has "in effect collapsed." The Global Humanitarian Response Plan lists Yemen among 10 highest risk countries.

India had its highest daily incidence to date; over 6,000 cases. Tamil Nadu, the location of one of the largest markets reported 743 new cases. Cyclone Amphan created 96 casualties and complications in social distancing among evacuees. In a previous update, AHNA featured one of the largest refugee settlements in Cox's Bazar, Bangladesh, as a vulnerable population. Housing nearly 1 million Rohingya refugees: 28 newly arrived Rohingya refugees were quarantined on the nearby island of Bhasan Char to prevent spread among the settlement.

Indonesian public health officials promoting distancing measures, were challenged during the Eid-al Fitr holiday; markets, public spaces, and airports are crowded, disregarding physical distancing guidance. Government mandated plantation workers shelter in place due to the risk of transmission. Indonesian President Joko Widodo has kept some large-scale restrictions in place resumed public transportation and airline flights. The end of July marks the 'return to normal' goal for the country despite a tornado devastating the island of Sumatra, requiring the evacuation of local residents.

Singapore reported 614 new cases, including 610 in migrant dorms; 92.5% of Singapore cases are in migrant dormitories.

South Africa is currently reporting the highest cumulative COVID-19 incidence (19,137 cases) and highest daily incidence in Africa.

Travel Bubbles proposed between and within partner countries (potentially states or cities) would increase tourism economy. Travelers arriving from other locations would be subject to restrictions, potentially including quarantine. Without a vaccine, any growth of travel and social interaction boosts SARS-CoV-2 transmission; 'bubbles' should be limited to countries with similar levels of transmission and areas with the ability to control spreading and seeding.

United States of America

The number of known coronavirus cases in the United States continues to grow quickly. The map pictured depicts deaths per 10 million in a state population. Those with darkest red or burgundy are highest in fatalities.
Scientists Baffled by Decision to Stop a Pioneering Coronavirus Testing Project
(Nature) The Seattle research team that first uncovered COVID-19 spreading in US communities was directed by the FDA to stop testing. The SCAN project was the first of surveillance projects to undertaken in the United States of America. The program processed 20,000 tests during the past 10 weeks and helped to reveal communities in Seattle most affected; the city was integrating this data into its contact tracing. Though the stop may be a 'pause', medical and public health professionals legitimately cite, interruption devalues public-health initiatives. Diagnostic testing needs to be available outside of healthcare settings in order to reach more individuals and identify hotspots early in the infectious process.

The Centers for Disease Control and Prevention has acknowledged mixing the results of PCR-which detects active infection- and serology studies, used to detect antibodies of previous infection, may misconstrue results. Combining the counts reduces the number of positive results, lowering the overall positivity rate; a rate utilized by the WHO to identify which countries are performing enough tests to accurately assess their pandemic response and mitigation. Jennifer Nuzzo, an epidemiologist at the Johns Hopkins Center for Health Security, expressed concern that adding the two types of tests together could result in the appearance of greater testing capacity than what is being conducted, and, the test results are for two different infectious populations. Serology tests result in a delay of real time information. State health departments, such as Virginia, have been compiling results of both types of testing prior to reporting to the CDC; after receiving appropriate guidance Virginia immediately began disseminating results in separate categories. (NPR)

REOPENING
"Opening recklessly is easy. Opening safely takes more work...but as other countries have shown, it can be done.”- Andy Slavitt

The New York Times continues to track state-level COVID-19 incidence, with a focus on state policies regarding social distancing. This tracker differentiates between states that have relaxed social distancing measures statewide and those that have done so on a regional basis. IHME offers continuous entourage estimates of infection / fatality rate based upon current physical distancing practices, testing capacity, and state health department data: https://covid19.healthdata.org/united-states-of-america.

A fact proven with the annual influenza epidemics, viruses love enclosed and crowded spaces. Dr. Erin Bromage, a Comparative Immunologist and Professor of Biology (specializing in Immunology) at the University of Massachusetts Dartmouth, compared SARS-CoV-2 to a fire, in simplicity this applies. As individuals reconvene from isolation, the human hosts gather together becoming fuel for viral consumption. Movement and travel of infected individuals fans the flames. Though the economic health of the nation is uncertain, without provisions for safety and identification of rapid seeding and spreading, it is certain the economy will not have opportunity to recover. Unemployment will teeter-totter, health-insurance inaccessible via 90 day employer wait lists, will become indefinite, and the void of a "strategic plan" in testing is certain to boil over into vaccination distribution- if/when one is prepared to safely allocate.
Despite CDC guidelines, called 'gating' criteria, few states have sustained decline in new infections yet most have reopened. Nearly every state is undertesting compared to recommendations. A panel of 21 health experts and bipartisan political leaders network to develop a strategy for America to #OpenSafely. People are still dying at an alarming rate, and that will continue unless we follow the path like the one outlined by Dr. Deborah Birx at the White House: a steady, gated reopening that avoids accelerated growth in cases, hospitalizations and deaths. Healthcare workers can help by asking decision-makers at all levels to #OpenSafely by opening up our communities as deliberately as necessary and as quickly as can be safely accomplished.

Per the Center for Disease Control this entails, "The principal objectives of COVID-19 surveillance are to monitor the spread and intensity of the pandemic, to enable contact tracing to slow transmission, and to identify disease clusters requiring special intervention. Secondary objectives include understanding the severity and spectrum of disease, identifying risk factors for and methods of preventing infection, and producing data essential for forecasting. In addition to tracking the disease itself, monitoring of healthcare capacity and essential supplies through the National Healthcare Safety Network (NHSN) is critical to ensure adequacy of care".

Related webinar: How to get Reopening Right- Johns Hopkins Public Health

CONTACT TRACING
Researchers from Imperial College London-including its WHO Collaborating Centre for Infectious Disease Modelling-MRC Centre for Global Infectious Disease Analytics, and the University of Oxford published a detailed report on their modelling efforts regarding the effects of statewide social distancing measures on population mobility and the time-varying reproductive number (Rt) in the United States. Results are presented on both a state and regional basis. The researchers found that statewide emergency declarations and social distancing orders had varying effects on different types of population movement, including public transit use and residential mobility. "For each state, we estimate the time-varying reproduction number (the average number of secondary infections caused by an infected person), the number of individuals that have been infected and the number of individuals that are currently infectious. We use changes in mobility as a proxy for the impact that NPIs and other behaviour changes have on the rate of transmission of SARS-CoV-2. We project the impact of future increases in mobility, assuming that the relationship between mobility and disease transmission remains constant. We do not address the potential effect of additional behavioral changes or interventions, such as increased mask-wearing or testing and
Trends in Rt associated with population density and the timing of the onset of state COVID-19 outbreaks were observed in areas of high population density and earlier community spread. The report outlined transmission projections based on population mobility models as states relax social distancing measures. As expected, increases in public mobility resulted in increased transmission, potentially including subsequent epidemic waves that far exceed the incidence reported thus far.

**Fomite Transmission**
Research specific to fomite transmission published last week cited "the virus does not spread easily" via fomites (particulate surface contamination). Practically speaking, the changes should have little effect on current recommended protective measures, such as improved hygiene (hand washing) and disinfection practices. Continuance of package disinfection prior to opening purchases or, specifically food decontamination (washing of produce) should not change based upon the new data.

**Research on Mask Wearing**
An online meta-analysis, Chou, R. Tracy, D. Buckley, D. et al., Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers: A Living Rapid Review Annals of Internal Medicine (5/2020) publication of Oregon Health & Science University (OHSU), funded by WHO, confirmed stock surgical masks reduce infection transmission of healthcare workers coronaviruses in clinical settings. The results indicates that wearing a mask while indoors potentially reduces coronavirus transmission rates by as much as 80%. A second study completed in Hong Kong, Universal Masking is Urgent in the COVID-19 Pandemic: SEIR and Agent Based Models, Empirical Validation, Policy Recommendations reflected surgical masks could reduce the rate of airborne COVID-19 transmission by up to 75%. "The findings implied to the world and the public is that the effectiveness of mask-wearing is huge," said Dr. Yuen Kwok-yung, a leading microbiologist from Hong Kong University who helped discover the SARS virus back in 2003.

**Public Education**
D.A. Kirk, an author, self-proclaimed "germaphobe and OCD sufferer" writes to the public, "Some people would like to you believe that refusing to wear a mask is patriotic. If anything, refusing to wear a mask during a pandemic is the antithesis of patriotism. Patriots don't shy away from making very minor sacrifices to try and help preserve the health and well-being of their fellow countrymen during a crisis, nor do they complain about the trivial discomfort that wearing a mask produces; and they certainly don't go around threatening or assaulting workers at stores that require customers to wear masks. Patriots are better than that, stronger than that, and more selfless than that... others would like you to believe wearing a mask makes no difference whatsoever, but the evidence says they're almost certainly wrong."

Dr. Bromage, wrote an informal post to which the Viral education, has gone 'viral'. The description of transmission plainly explains the contagion differences in speech, a cough, a sneeze, and singing. "Infection could occur, through 1000 infectious viral particles you receive in one breath or from one eye-rub, or 100 viral particles inhaled with each breath over 10 breaths, or 10 viral particles with 100 breaths. Each of these situations can lead to an infection."

Speaking increases the release of respiratory droplets about 10 fold; ~200 virus particles per minute. Again, assuming every virus becomes inhaled it would take only 5 minutes of speaking face-to-face to receive enough virus to become infected. Coughing: a single cough releases about 3,000 droplets and travels 50 miles per hour. Most droplets are large, and fall quickly (gravity), but many do stay in the air and can travel across a room in a few seconds. Sneezing: A single sneeze releases about 30,000 droplets, with droplets traveling at up to 200 miles per hour. Most droplets are small and travel great distances- easily across a room. Toilet flushing: approach public bathrooms with caution, aerosolized particulates are everywhere.

**Risk of Infection**
"The principle is viral exposure over an extended period of time. Exposure to SARS-Cov-2 in the air over a prolonged period (hours) increases the risk for infection... Even if they were 50 feet away, a low dose of the virus in the air reaching them over a sustained period, was enough to cause infection and in some cases, death." Research has proven between 44 - 65% of community-acquired transmissions occur from asymptomatic or pre-symptomatic people.
The biggest outbreaks occurred in prisons, religious ceremonies, and workplaces. 
"Enclosed environments with poor air circulation and a high density of people, spells trouble"
Weddings, funerals, birthdays were 10% of early spreading events, as well as business conferences.

Though some of Dr. Bromage's advice will not be well-received, it does not make it any less applicable. Re-opening with seating arrangements in open air areas, picnics, and playgrounds would be ideal, others could potentially be labeled "Where NOT to Be":

**Restaurants:** "shoe-leather epidemiology demonstrated clearly the effect of a single asymptomatic carrier in a restaurant environment" An asymptomatic infected person enjoyed a 1-1.5 hour dinner with 9 friends releasing low-levels of virus into the air from their breathing. Approximately 50% of their table were diagnosed with COVID-19 within the week, 75% of the people on the adjacent downwind table became infected, along with another 2 of 7 people seated at an updraft table.

**Workplaces:** A single infected employee came to work with 216 employees. Over a week, 94 others became infected, with only 2 asymptomatic. While exact number of people infected by respiratory droplets/respiratory exposure versus fomite is unknown, being in an enclosed space, sharing the same air for a prolonged period of time, increased exposure and infection.

**Choir:** Steps to minimize transfer were observed: participants avoided physical contact, brought their own music, and socially distanced themselves during practice. Anyone experiencing symptoms remained home. A single asymptomatic carrier infected most of the people in attendance over 2 1/2 hours, in an enclosed rehearsal hall roughly the size of a volleyball court.
"Singing aerosolizes respiratory droplets extraordinarily well. Deep-breathing facilitated the droplets getting deep into the lungs. Two and half hours of exposure ensured that people were exposed to enough virus over a long enough period of time for infection to take place. Over a period of 4 days, 45 of the 60 choir members developed symptoms, 2 died. The youngest infected was 31, but they averaged 67 years old."

**Indoor sports:** A curling event with 72 attendees became another hotspot for transmission in close contact, an indoor environment, with heavy breathing for an extended period. 24 of the 72 were infected.

**Shortages and Solutions**
Repeated pleas from HealthCare workers have received slow progress in 'ramped up' production and distribution of PPE, and N-95 masks. Shortages requiring sterilization and reuse of 'single use' masks persist. Per previous disinfection research, VHP remains the 'gold standard' process resulting in the most repeated uses without break down to mask integrity. With controversial reuse becoming customary across the nation, the question of how to don/doff a 'reused' mask is one many trusted would never need asked.

Prior to sterilization procedures, healthcare workers should label the mask in a manner respective to the form of sterilization. (Pictured). Without indication of certain of decontamination, an inspection of the masks components and integrity. Use clean gloves to apply the sterilized mask and ensure a proper seal, if leaks occur or are questionable, the mask should be disposed of. 
"When in doubt, switch it out."
Advocacy

Prescribing Paid Sick Leave—An Important Tool for Primary Care During the Pandemic (JAMA Health Forum) Researchers in Israel found that 94% of people would comply with advice to self-quarantine when their earnings are guaranteed vs just 57% when this would mean the loss of wages. Congress has stepped in to help address this aspect of the pandemic by requiring many employers to provide paid sick leave for any person given medical advice to stay home related to COVID-19 as of April 1, 2020. This is where primary care clinicians may write the most important prescriptions of the pandemic.

Resources

RESILIENCE RESOURCES

Compassion Caravan

Listening Circles

NursesTogether#Support Conversations are Peer-to-peer phone calls. Conversations are available around the clock offering a safe space to openly share with colleagues.

Happy App “warm line” offers 24/7 access to a trained Support Giver; Nurses have access to their first call at no cost.

MoodFit App; enter program code ANF30

Headspace - Clinical healthcare professionals are currently receiving complimentary premium memberships.

Holliblu.com- Self-care resources to use before, during, and after your shift!


Tips for Managing Stress and Self-Care American Psychiatric Nurses Association

Volunteer to facilitate Nurses Together calls: https://www.signupgenius.com/org/nursestogether#

POPULATION SPECIFIC RESOURCES:

Publication of population specific guidance for COVID-19 is diverse and plentiful. AHNA is now unable to cover every specialty/topical update. We will continue to try to provide links to the most valuable recent research.

GERIATRICS

COVID-19 Guidance for Older Adults

IMMUNOCOMPROMISED

Management of Cancer Surgery Cases During the COVID-19 Pandemic: Considerations - Annals of Surgical Oncology & Oncology Nurses Society Guidance during the COVID-19 Pandemic

ORTHOPEDICS

COVID-19 - ESSKA guidelines and recommendations for resuming elective surgery - Journal of Experimental Orthopedics
General Guidelines in the Management of an Obstetrical Patient on the Labor and Delivery Unit during the COVID-19 Pandemic - American Journal of Perinatology

Society for Maternal-Fetal Medicine & NIH COVID-19 Treatment Guidelines: Special Considerations in Pregnancy and Post-Delivery


American Academy of Neurology COVID-19 resources
Movement Disorders Society Resources for the COVID-19 Pandemic & COVID-19 Resources for Epilepsy Clinicians

Safe Reintroduction of Cardiovascular Services during the COVID-19 Pandemic: Guidance from North American Societies
Framework on how to safely resume essential cardiovascular diagnostic and treatment care during the COVID-19 pandemic, from the AHA and 14 North American cardiovascular societies - American Heart Association

Virtual care: new models of caring for our patients and workforce - The Lancet Digital Health & HHS Awards $15 Million to Support Telehealth Providers During the COVID-19 Pandemic

Novel, High-Impact Studies Evaluating Health System and Healthcare Professional Responsiveness to COVID-19 (R01). This Funding Opportunity Announcement invites R01 grant applications for funding to support novel, high-impact studies evaluating the responsiveness of healthcare delivery systems, healthcare professionals, and the overall US healthcare system to the COVID-19 pandemic. Topics such as effects on quality, safety, and value of health system response to COVID-19; the role of primary care practices and professionals during the COVID-19 epidemic; understanding how the response to COVID-19 affected socially vulnerable populations; and digital healthcare including innovations and challenges in the rapid expansion of telehealth response to COVID-19. grants.gov

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