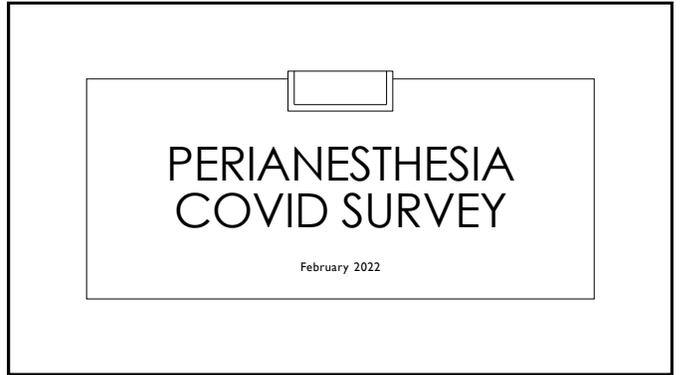
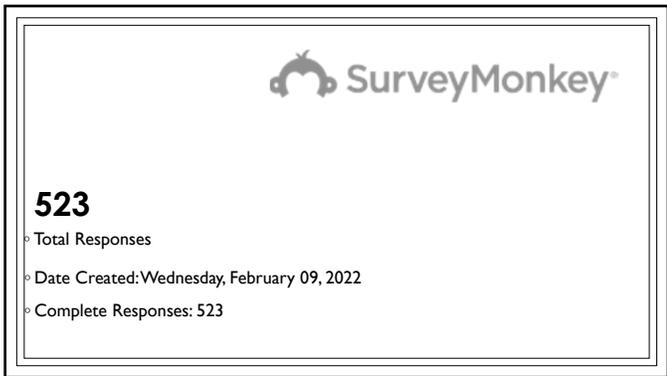


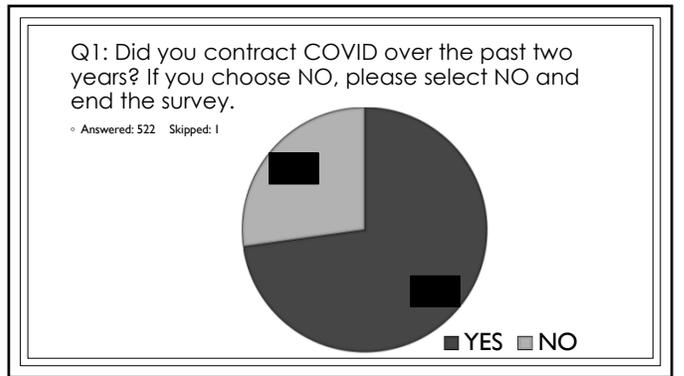
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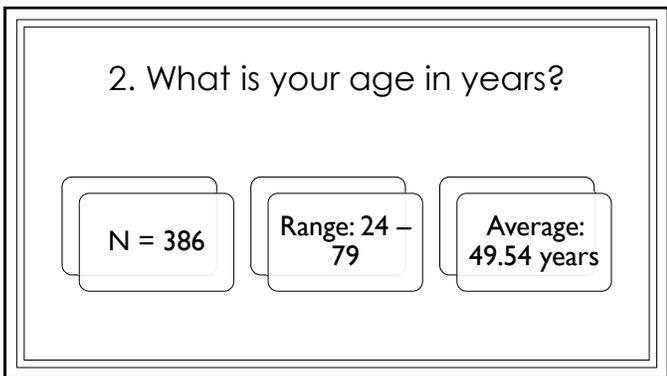
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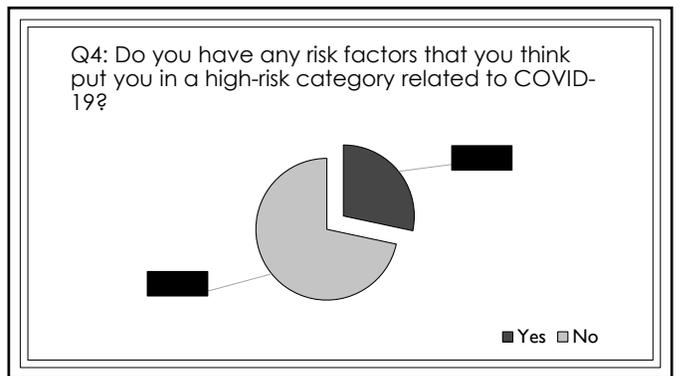
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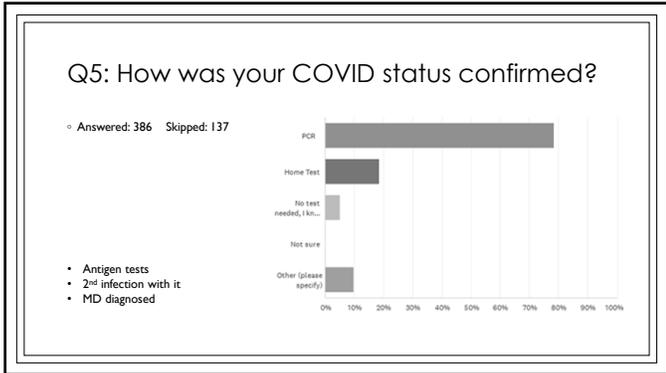
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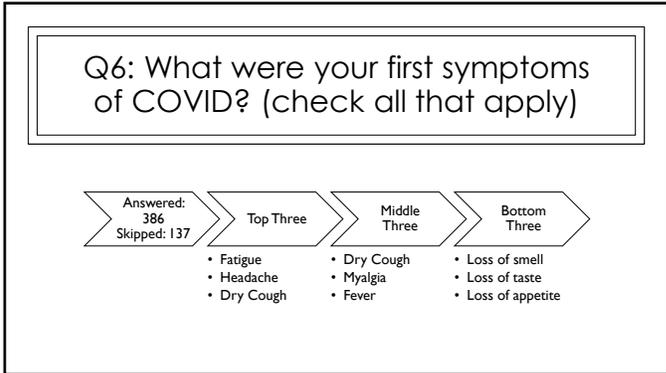
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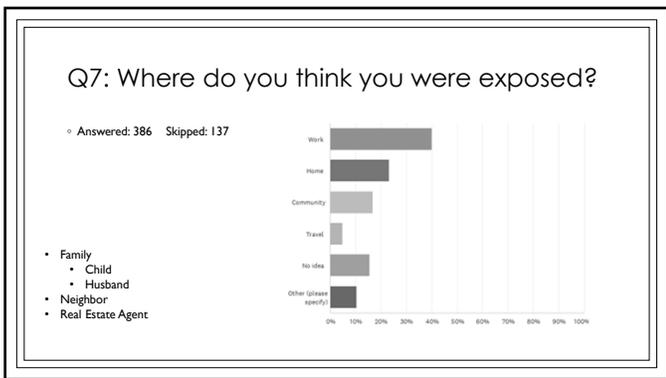
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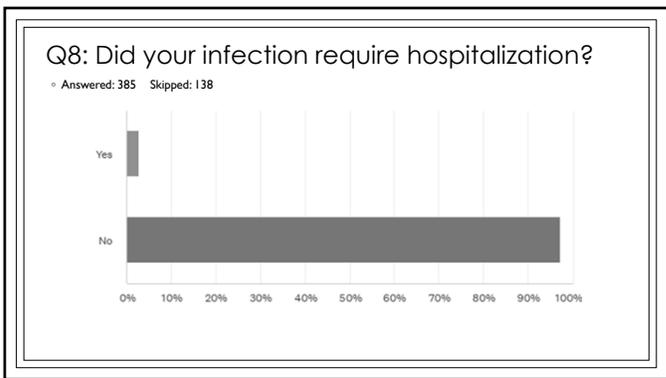
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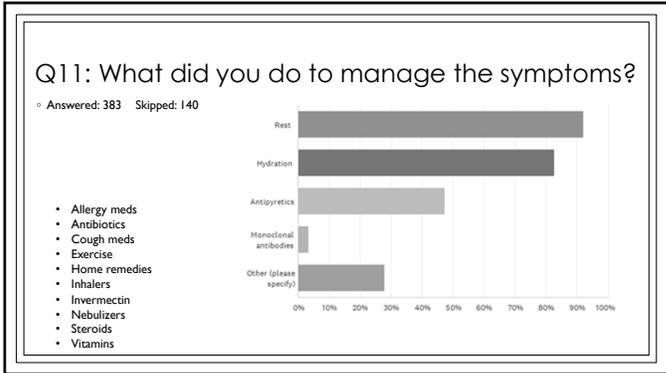


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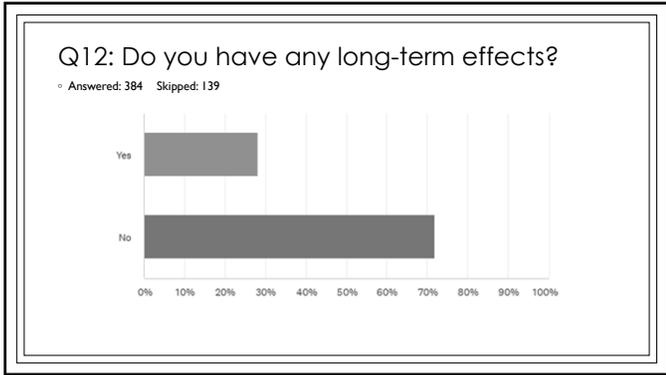
IF YOU REQUIRED HOSPITALIZATION, FOR HOW LONG?

Range: 1 night – 14 days

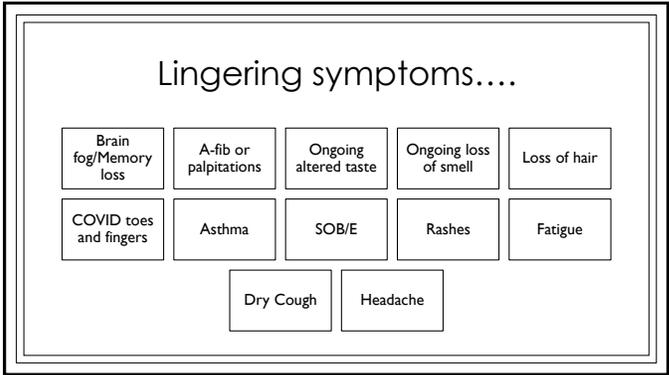
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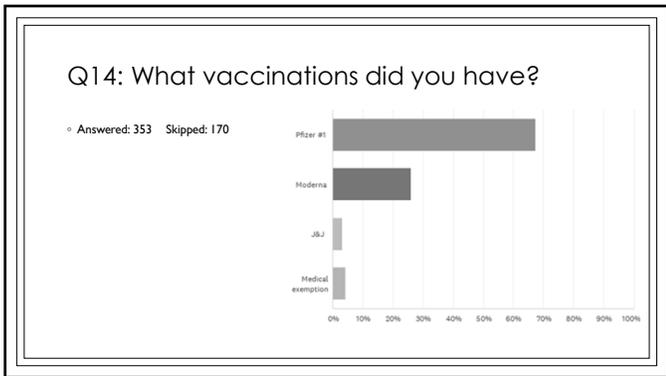
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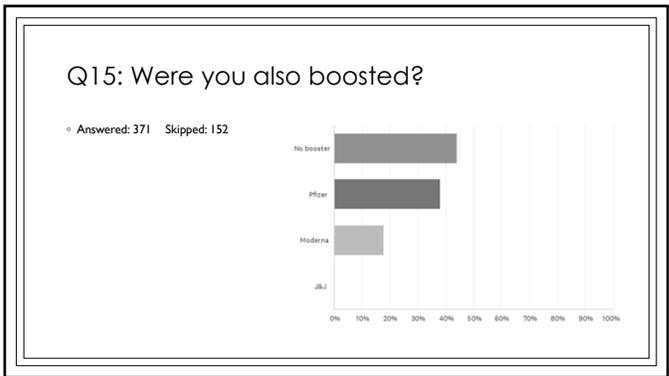
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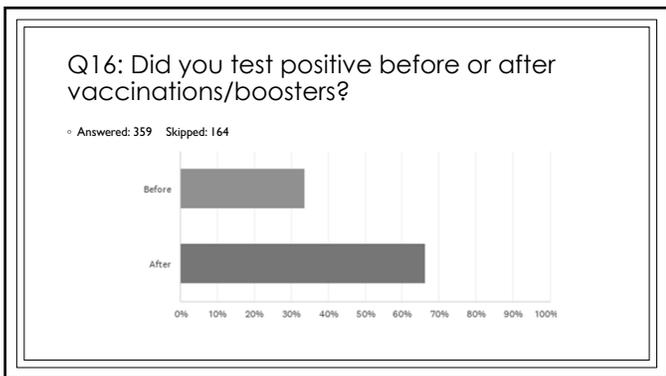
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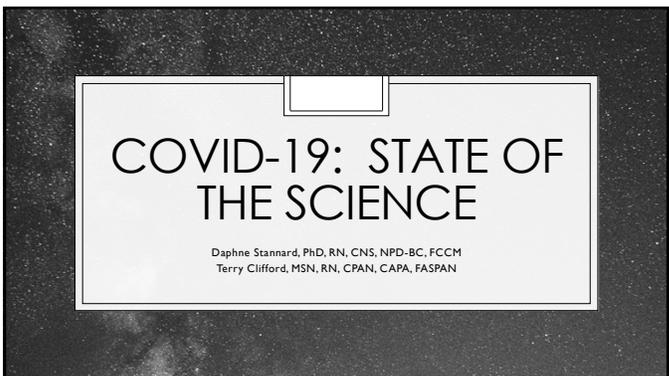
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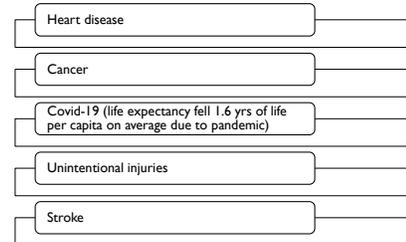
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## Learner Objectives

- By the end of this presentation, learners will be able to:
  - Discuss the latest science in relation to the SARS-CoV-2 virus
  - Describe the impact Covid-19 has had on the healthcare sector
  - Discuss research-based coping strategies to help deal with the emotional burden associated with the pandemic

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## Leading Causes of Death in the US (2020)



Ahmad & Anderson, 2021

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## Covid-19 Emergence

- Covid-19 is an acronym for Corona (Co) Virus (Vi) Disease (D) and the year that the novel virus was detected in humans, 2019
- Caused by a coronavirus (SARS-CoV-2)
- Before 2019, there were only six known coronaviruses that could infect humans, including the viruses responsible for SARS and MERS
- Prior to those outbreaks, coronaviruses were thought to cause variations of the common cold, with mild, self-limiting respiratory symptoms.
- It is believed that Covid-19 started in a zoonotic reservoir, probably in bats or pangolins before infecting humans
- Person-to-person spread was detected early on in Wuhan, Hubei Province in China
- Now all continents have ongoing community spread of this virus
- Officially designated as a pandemic by the World Health Organization (WHO) on March 11, 2020



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## Covid-19 Risk Factors

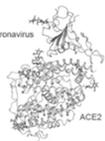
- Based upon available information, those at higher risk for severe illness include:
  - People aged 65 years and older
  - People with certain underlying medical conditions:
    - Obesity
    - Diabetes
    - Heart conditions: HTN, Heart Failure
    - Pulmonary conditions: COPD, history of smoking, asthma, OSA
    - Immunocompromised states
  - BIPOC

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## Mechanism of Disease

Lock & Key

Novel Coronavirus



- Like SARS-CoV, SARS-CoV-2 uses the angiotensin-converting enzyme 2 (ACE-2) receptor to infect host cells, including:
  - Airway epithelium & parenchyma cells
  - Vascular endothelial cells
  - Kidney & small intestine cells
  - Neuronal dissemination
  - Placenta
- Higher ACE-2 expression levels are found in people with advanced age, obesity, diabetes, and heart conditions

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## Pediatrics vs Adults



- Children with special healthcare needs, including genetic, neurologic, or metabolic conditions, or those with congenital heart disease, can be at increased risk for severe illness from Covid-19
- Similar to adults, children with obesity, diabetes, asthma, chronic lung disease, sickle cell disease, or immunosuppression can also be at increased risk
- About 466 children under the age of 5 have died of Covid-19 in the US
  - Ages 5-11, 308 deaths
- Children under the age of 18 represent about 8.5% of the reported cases
- The circulating viral strain determines, to some extent, which populations are more at risk for severe disease
  - With the earlier strains, adults over 50 were hospitalized at 5x the rate of younger kids and adults 65+ were hospitalized at a rate 20x higher
  - During the surge of the Omicron variant, Covid-19 associated hospitalization rates among children and adolescents were 4x as high as rates during the Delta period

CDC, stats as of 3.1.22

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## Covid-19 Transmission



- The scale of an outbreak depends on how quickly and easily a virus is transmitted
- This is called the basic reproduction number or  $R_0$
- It is an estimate of how many healthy people one contagious person will infect
- While the science is still evolving, it is believed that the original strains of Covid-19 had an  $R_0$  of 2-5
- The  $R_0$  for the Delta variant is between 6-7
- This makes Covid-19 more contagious than seasonal flu ( $R_0$  1.3) or SARS ( $R_0$  3.0), but the Delta variant is still less contagious than chickenpox ( $R_0$  9-10) or measles ( $R_0$  12-18)

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## Covid-19 Transmission Con't

- Transmission is based on:
  - **Airborne:** can hang in the air for as long as 2 hours
  - Droplet
  - Contact: fragments have been found on surfaces that have not been disinfected for up to 72 hours
- As the virus spreads through the population, the number of people left to infect decreases
- This is the basis of **herd immunity**
- It is expected that Covid-19 will eventually become **endemic**, meaning that a disease has a constant presence in a population, with sporadic and seasonal outbreaks
  - Not ideal, though, if Covid-19 + Influenza = Flurona (early reports of the combined disease states)
- The growth rate of an epi/pandemic in progress is described by its effective reproduction number or  $R_E$
- Once  $R_E$  falls below 1, the virus will stop spreading (**elimination**)
- **Eradication** is very difficult to achieve with infectious disease

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## Transmission Con't



- While the primary route of transmission is inhaled virus through the mouth or nose, because of contact transmission, the virus can also be transmitted by rubbing the eyes, mouth, and nose
- The SARS-CoV-2 virus has been found in patients':
  - Sputum (most accurate for lab dx, followed by nasal swabs)
  - Saliva
  - Feces
  - Tears
  - Blood
  - Inner ear hair cells (causes hearing loss)
  - CSF (crosses blood brain barrier; found in patients with neuropsychiatric symptoms and acute disseminated encephalomyelitis [ADEM])
  - Semen
  - Placenta
  - Donated solid organ
- It is estimated that up to 50% of infections originate from Covid-19 positive people who are asymptomatic

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## Covid-19 Signs & Symptoms

- Incubation Period
    - Covid-19 ranges from 2-5 days depending on the strain
    - Omicron has a shorter incubation period (3 days)
  - If symptomatic, most begin to show symptoms 3-5 days after infection
  - Most common clinical manifestations include\*:
    - Cough (#1)
    - Fever
    - Anosmia (loss of sense of smell) & ageusia (loss of sense of taste)
    - Fatigue (#2)
    - Sore throat
    - Headache
    - GI symptoms
    - Congestion (#3)
    - Runny nose (#4)
- Red = signs/symptoms associated with the Omicron variant  
\*The particular strain may present with different signs/symptoms

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What Starts As A Respiratory Disease  
Can Very Quickly Switch In Some  
People And Become An Immunologic  
Disease Affecting Nearly Every Organ  
In The Body

## Major Categories of Lung Disease

- **Obstructive**
  - COPD
  - Asthma
  - OSA
- **Restrictive**
  - Pneumothorax
  - Pleural effusion
- **Vascular**
  - Pulmonary edema
  - Pulmonary embolus
- **Infectious**
  - Pneumonia
  - Tuberculosis
- **Inflammatory**
  - ARDS
- **Infectious & Inflammatory**
  - SARS-CoV-2 in the acute phase, but if severe, can cause long-term obstructive or restrictive lung disease

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## Pathophysiology of Covid-19

- Covid-19 is classified as an infectious inflammatory disease
- Can unleash a devastating series of host events in the lungs prior to death
  - Runaway inflammation
  - Rampant tissue destruction that the lungs cannot repair
- Post-mortem findings in recent studies found that lungs were filled with macrophages
  - While some macrophages are helpful to fight disease, the excessive amount produced a cycle of severe inflammation that further damaged the lung tissue
  - The macrophages also produced high levels of IL-1B, which is a cytokine
  - The unchecked inflammation also impaired the regenerative cells from repairing the damage, causing rapid lung scarring (pulmonary fibrosis)



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## Pathophysiology of Covid-19 Con't

- The Covid-19 virus binds to ACE-2 receptors, activating the innate and adaptive immune systems, resulting in the release of pro-inflammatory cytokines
- Cytokines are a broad and loose category of small proteins that are important in cell signaling
- Massive inflammation and systemic vasodilation caused by cytokines that are released with a large and severe viral load
  - A high viral load will cause a bigger immune system response--all of which makes all symptoms worse
- Cytokine Release Syndrome is characterized by a hyperinflammatory state that resembles sepsis
- While many systems are involved, a 3-pronged cascade occurs:
  - Inflammation
  - Suppression of the immune system
  - Activation of the coagulation cascade

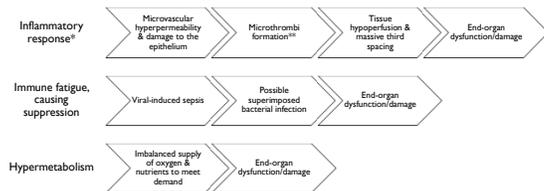
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## The Cytokine Storm Turns the Body Against Itself

- A vicious, self-activating cycle occurs and previously protective mechanisms contribute to:
  - Maldistribution of volume
  - Altered immune function
  - Imbalance of oxygen supply and demand

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## Homeostatic Mechanisms Gone Awry



- \*In pedes, this multisystem inflammatory syndrome (MIS-C) can look like Kawasaki disease
- \*\*There may be distinct phenotypes, with hypothermic patients more likely to develop coagulopathies with Covid-19 (Bhavani et al., 2022)

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## This is Not a Benign Disease

- While the CDC estimates that <1% of those infected will die in the US, approximately 88% of those hospitalized with Covid-19 develop Long Covid, reporting at least one symptom 60 days after onset
  - Autoantibodies may cause Long Covid
- Majority of patients with Long Covid experience one or more of the Long Covid symptoms with the initial infection
  - Dysautonomia: miscommunication between the ANS & the rest of the body, involving heartrate, breathing, sleep, and digestion issues
  - Excessive fatigue
  - Memory issues, foggy cognition, and psychosis, with elevated PRO levels found in CSF indicating inflammation
  - Chronic loss of sense of taste and smell
  - Anxiety & depression
- Some patients with Long Covid have reported improved signs and symptoms after receiving the vaccine and vaccinated people are less likely to develop Long Covid



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## Diagnosis

- History & Physical with review of symptoms
- CXR shows bilateral infiltrates, much like ARDS
- Presumptive diagnosis based on travel history, symptoms, or exposure to another with Covid-19 or Persons Under Investigation (PUJ)
- Covid-19 test result, although there have been testing irregularities and inconsistencies
  - **Molecular test** (i.e., RT-PCR test): detects virus genetic material
    - Some combo tests on the market: detect Covid-19 & influenza
  - **Antigen test**: detects specific proteins from the virus
    - FDA issued Class I recall for Ellume at home test due to high false positive rates (11.20.21) & several tests have produced false-negative results with Omicron
  - **Antibody tests**: might tell you if you had a past infection
  - New breath-based test (still needs more research)

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## Fatality Rates

- Fatality rates vary between 0.0% [Iceland, New Zealand, Bhutan]-18.1% [Yemen], and are dependent on many factors:
  - Type of patient (e.g., age, co-morbidities, BMI, and number of involved organ systems)
  - Location of patient (including the level of wealth/industrialization and amount of healthcare strain at the time of hospitalization)
  - Circulating Covid-19 strain(s)
  - The US fatality rate is 1.2%
    - Johns Hopkins Coronavirus Resource Center, stats as of 3.1.22
- Unvaccinated people have 20x greater risk of dying from Covid-19 than those who are "up to date" with their vaccinations (CDC)

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## Treatment

- FDA approved Remdesivir (antiviral) for Covid-19 adult pts requiring hospitalization; not as effective with some strains
  - Shortens LOS by approx. 4 days
  - WHO does not recommend the therapy (Nov 2020)
- IV monoclonal therapy with FDA approval: REGEN-COV (casirivimab & imdevimab; treat mild to moderate Covid-19 in adults who are not hospitalized; SQ use prevented symptomatic Covid-19 and asymptomatic Covid-19 in previously uninfected household contacts of infected pts; reduced duration of symptomatic ds and duration of high viral load in some strains)
  - Costs 100x more than vaccine
- IV monoclonal antibody therapy with FDA EUA: Bamlanivimab (treat mild to moderate Covid-19 in adults and children; ameliorates some symptoms and reduces the risk of hospitalization and death by 87%, depending on the strain), Sotrovimab (85% efficacy), and Bebtelovimab (reduces viral load after 5 days of use)
- Oral Covid-19 anti-viral medications with FDA EUA: Molnupiravir (30% efficacy; can cause birth defects) and Paxlovid (nirmatrelvir & ritonavir; 88% efficacy; not suitable for those with liver or kidney ds)
  - Must have a positive Covid-19 test, get a Rx, find a pharmacy that carries the drug, and must be started within first 5 days of symptom onset to produce a benefit
- IM pre-exposure prophylaxis for severely immunocompromised individuals: Evusheld (tocigevimab & cilgavimab)
- Inpatient therapy:
  - Dexamethasone (glucocorticoid) has a mortality benefit and a reduction in use of mechanical ventilation in adult critically ill patients
  - Baricitinib (Janus kinase inhibitor with FDA EUA): Improvement in reducing recovery time and accelerating improvement in clinical status vs Remdesivir alone
  - Tocilizumab or Sarilumab infusions (drugs to treat rheumatoid arthritis with FDA EUA) in REM-CAP study showed 8.5% improvement in surviving critical illness and reducing ICU stays 3-10 days earlier
  - PO drug to treat rheumatoid arthritis: Tofacitinib (with FDA EUA)

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## Treatment Con't

- **More studies needed:**
  - Mesenchymal stem cell infusion
  - Lambda-interferon infusion
  - Antiviral drugs: Favipiravir, Arbidol,
  - Anti-inflammatory drugs: Colchicine & Selinexor
  - Neutralizing antibodies (from convalescent human plasma of Covid-19 survivors)
  - Methotrexate to improve immune response to vaccine or reduce Long Covid
  - Nonalcoholic steatohepatitis drug: Axcella for Long Covid
- **No Benefit shown for:**
  - Azithromycin or Doxycycline
  - Hydroxychloroquine
  - Lopinavir-ritonavir
  - ASA
  - Anticoagulants: REM-CAP study was paused due to increased risk seen with full doses of anticoagulants; ACTION study showed increased risk of bleeding complications without benefit
  - Anti-parasite drug Ivermectin

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## Treatment Con't

- Supportive treatment includes:
  - High-flow O<sub>2</sub> via nasal cannula
  - Anticoagulation therapy
  - Conservative fluid strategies
    - Use of vasopressors to maintain MAP
  - Periodic prone positioning
  - Lung-protective ventilation—intubate only if absolutely necessary
    - Smaller tidal volumes to prevent volutrauma
    - Smaller amounts of PEEP to prevent barotrauma
  - Extracorporeal Membrane Oxygenation (ECMO) for refractory hypoxemia
  - End-organ supportive therapies (e.g., dialysis for Acute Kidney Injury etc.)



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## Containment as a Mitigation Strategy

Since this is a novel virus and humans lack any herd immunity, it is estimated that 60-75% of us will get infected with Covid-19, perhaps over several waves\*

The healthcare infrastructure cannot care for all of us getting ill at one time, so we need mitigation measures to flatten the epidemiological curve

The primary methods of containment at this time include:

Use of face mask	Hand hygiene	Physical distancing	Quarantine when ill	Vaccine!
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PLUS, global containment, as the pandemic will not be over anywhere until it is over everywhere!

\*Approximately, 40% of US population has had at least one Covid-19 infection; 65% in US have rec'd 2 shots and 38% have rec'd a booster

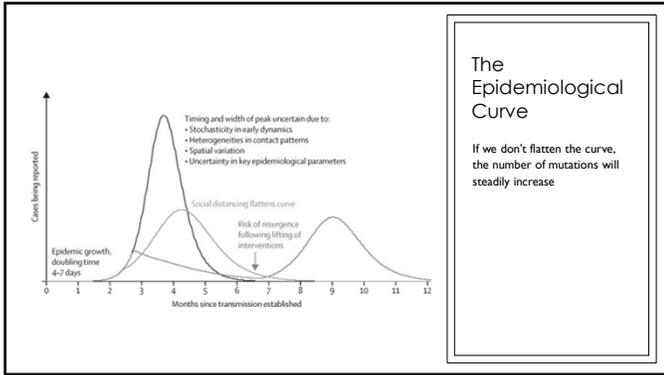
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## Ebola News Centro

- We Didn't See It Coming  
We Knew It Was Coming  
It Was Coming
- Close The Borders  
Close The Bridal Store  
It's In Texas*
- In A Bowling Ball  
It Could Be Anywhere  
Will You Know When You Have It?*
- It Is Already Too Late.*

◦ Yasmin, Seema. (2021). *If God is a Virus: Poems*. Haymarket Books.

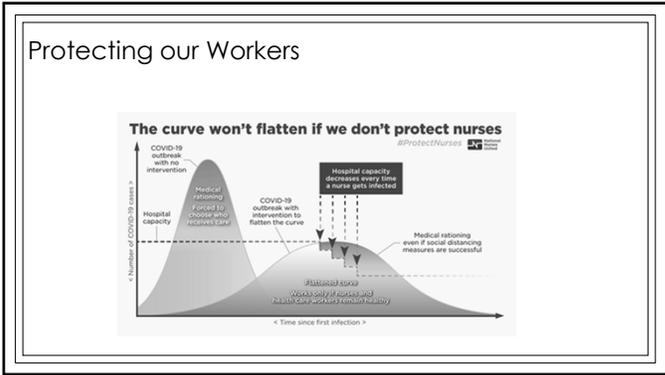
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**The Epidemiological Curve**

If we don't flatten the curve, the number of mutations will steadily increase

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**Face Masks**

- The Covid-19 virus measures 0.12 micron
  - N95s are intended to filter out 95% of particles ranging from <1 micron to > 100 microns
  - The pores in fabrics are around 3.5-6 microns
- N95s and surgical masks protect the wearer
- Cloth masks worn by the public protect others—this is a concept known as source control and it is estimated that cloth masks can block 60-80% of fine droplets and particles
- Double masking (surgical or N95 with a cloth mask) helps the wearer and others!
- Additionally, face shields should be worn in areas with poor ventilation or during procedures with high risk of aerosolization

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**New CDC Guidance**

Low	Medium	High
<ul style="list-style-type: none"> <li>• Stay <u>up to date</u> with COVID-19 vaccines</li> <li>• <u>Get tested</u> if you have symptoms</li> </ul>	<ul style="list-style-type: none"> <li>• If you are <u>at high risk for severe illness</u>, talk to your healthcare provider about whether you need to wear a mask and take other precautions</li> <li>• Stay <u>up to date</u> with COVID-19 vaccines</li> <li>• <u>Get tested</u> if you have symptoms</li> </ul>	<ul style="list-style-type: none"> <li>• Wear a <u>mask</u> indoors in public</li> <li>• Stay <u>up to date</u> with COVID-19 vaccines</li> <li>• <u>Get tested</u> if you have symptoms</li> <li>• Additional precautions may be needed for people <u>at high risk for severe illness</u></li> </ul>

People may choose to mask at any time. People with symptoms, a positive test, or exposure to someone with COVID-19 should wear a mask.

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**Hand Hygiene**

- The CDC recommends:
  - Frequent hand hygiene with soap and water for at least 20 seconds or use a hand sanitizer with at least **60%** alcohol to clean hands **BEFORE** and **AFTER**:
    - Touching your eyes, nose, or mouth
    - Touching your mask
    - Entering and leaving a public place
    - Touching an item or surface that may be frequently touched by other people

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**Physical Distancing**

- Because of droplet transmission, CDC recommends 6 feet distance from others
  - Based on respiratory physiology studies
  - But some studies show 17-30 foot spread

What is 6 feet (or 2 meters)?

- Two golden retrievers standing nose to tail
- A 5'9" man wearing a top hat lying down
- An average sedan
- A standard 3-seat sofa
- A dining room table
- The length of a full or twin mattress
- A 6-foot bathtub

What is 30 feet?

- SF Cable Car or 2 Toyota Prius Cars end to end



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## Quarantine When Ill

- Follow facility and CDC guidelines!
- But what about patients who need surgery?

ASA-APSF Recommended Wait Times for Elective Patients in the Covid Recovered	
Clinical Symptom Severity	Recommended Wait Time for Elective Surgery
Asymptomatic patient or patient with mild non-respiratory symptoms	4 weeks
Patient with mild respiratory symptoms who did not get hospitalized	6 weeks
Symptomatic patient who is diabetic, immunocompromised, or hospitalized	8-10 weeks
Patient who was admitted to an ICU due to Covid-19 infection	12 weeks

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**In a low-transmission environment, lethal strains die out and mild strains predominate**

- The converse is also true: In hotspots, rates of mutation increase and tend to be more lethal (more hosts to infect)

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**CDC: Variants Of Interest, Concern, High Consequence**

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## Variants of Concern

Scientific Name	Country Where First Identified	WHO Label
B.1.1.7	UK	Alpha
B.1.351	S. Africa (with E484K mutation*)	Beta
P.1	Brazil	Gamma
B.1.617.2	India	Delta
B.1.427/429	US	Epsilon
P.2	Brazil	Zeta
B.1.525	Multiple Countries	Eta
P.3	Philippines	Theta
B.1.526	US	Iota
B.1.617.1	India	Kappa
C.37	Peru	Lambda
B.1.621	Colombia/Ecuador	Mu
B.1.529	S. Africa	Nu
BA.2	1 <sup>st</sup> cases reported in Denmark, India, UK	Omicron
B.1.640.2	France	...

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**This is not unexpected...**

- The highest risk for the establishment of a vaccine-resistant viral strain is when a large fraction of the population has already been vaccinated but the transmission is not controlled.
- Transmission must be controlled to prevent the emergence of strains that escape vaccine immunity
- The Omicron variant has 30 mutations in the spike protein, the surface protein that recognizes the ACE2 receptor and 15 of those are in the receptor binding domain, meaning that this variant will have higher affinity for the ACE2 receptor
- At least 8 of the mutations on the Omicron spike protein are known to impair antibody recognition, causing greater levels of immune escape (breakthrough infection)

\* Simonsen & Shaffer, 2022

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## Vaccines Con't

- All of this makes finding a one-time effective vaccine difficult
  - It will likely be necessary to have annual vaccinations, like for influenza
- There are three vaccines with either full FDA approval or Emergency Use Authorization available in the US
  - Pfizer
  - Moderna
  - Johnson & Johnson
- According to Regulatory Affairs Professionals Society, there are 25 Covid-19 vaccines currently authorized for use around the globe
- There are 91 still in late stage trials and in the pipeline

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## Vaccine Facts

- There are 4 main types of Covid-19 vaccines:
  - mRNA vaccine** (Pfizer, Moderna): uses mRNA that instructs cells to make a piece of the coronavirus spike protein, so that it will be recognized rapidly if the body is infected post-vaccination
  - Vector vaccine** (J & J, AstraZeneca): uses adenoviruses to carry the genetic instructions to make the spike protein
  - Protein Subunit vaccine** (Novavax): uses little pieces of the coronavirus to stimulate the immune system to recognize and respond rapidly if the body is infected post-vaccination
    - Demonstrated 89.3% efficacy against Covid-19 with alpha & beta variants
  - Whole Killed vaccines**: this is how older vaccines were produced and it takes much longer to make because batches of the coronavirus must first be grown and then killed using a chemical or heat and then made into a vaccine
- None of the vaccines contain fetal tissue, however Pfizer and Moderna used HEK293 cells to test their vaccines
  - The cells in question, called HEK293, are clones of kidney cells from a single fetus from the 1970s. They did not come directly from the fetal tissue
  - New fetal tissue is not being harvested for any Covid-19 research
- Immunity from SARS-CoV-2 infection appears to last 8 months and vaccines provide at least 6 months of immunity—perhaps longer—but the data are still being collected!
- To date, post-marketing surveillance shows the vaccines are incredibly safe!

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## Vaccine Effectiveness

- |  |   |   |
|--|---|---|
| <p><b>Pfizer**</b></p> <ul style="list-style-type: none"> <li>Efficacy: 95%; Effectiveness: Fades from 91% 2 months after the third shot to 70%</li> <li>Effectiveness in 12-17 yo drops to 23% after 2 months</li> <li>Age: 5 years and older</li> <li>EUA for 5-11 (12% effectiveness)                             <ul style="list-style-type: none"> <li>Get 1/3 the dose</li> </ul> </li> <li>Shots: 2 shots 21 days apart (28 days for mod-severe immunocompromised 5-11 yo)</li> <li>Booster shot 5 months after 2<sup>nd</sup> dose (new language: up to date)</li> <li>Storage: Must be kept frozen at 100° F below zero</li> <li>Evolving science re: dose, timing, and need for 4<sup>th</sup> shot</li> </ul> | <p><b>Moderna**</b></p> <ul style="list-style-type: none"> <li>Efficacy: 94.5%; Effectiveness (1 study): 80% after one dose and 90% after 2 doses. Concern about waning immunity (&gt;6 months after vaccination series) and protection against variants (Mayo Clinic study showed 76% effectiveness against delta)</li> <li>Age: 18 years and older</li> <li>Shots: 2 shots 28 days apart</li> <li>Storage: Can be stored above freezing</li> <li>Booster shot 6 months after 2<sup>nd</sup> dose</li> </ul> | <p><b>Johnson &amp; Johnson</b></p> <ul style="list-style-type: none"> <li>Efficacy: 66%</li> <li>Age: 18 years and older</li> <li>Shots: 1 dose</li> <li>Storage: Can be stored in a refrigerator</li> <li>Booster shot 2 months after 1<sup>st</sup> dose (EUA)</li> <li>Make up only 8% of the vaccinated people in the US</li> <li>Recent clinical trial showed effectiveness in reducing the risk of hospitalization from Omicron increased to 85% with 2<sup>nd</sup> shot</li> </ul> |
|--|---|---|

\*\*Efficacy refers to how the vaccines performed in controlled settings, such as clinical trials. Effectiveness refers to how well the vaccines perform in real life.

\*\*Pediatric trials underway for younger children (2-4 years and 6 months to 2 years)

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## Clinical Trials

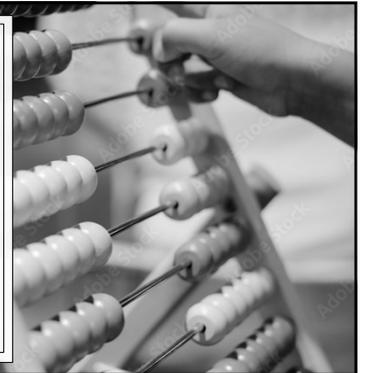
- Phase 0 Preclinical Testing: If & how the treatment works**
  - Often in animals
  - First in human study to help researchers find out if a treatment does what it is supposed to do
  - Not a required part of testing a new drug
  - Typically, small trial with <15 subjects and the drug is given for a short time and with a small dose
- Phase I Safety Trial: Is the treatment safe?**
  - Find the highest dose that can be given to humans without serious side effects
- Phase II Clinical Trial: Does the treatment work?**
  - Does it work for the intended purpose?
- Phase III Efficacy Trial: Is it better than placebo or gold standard?**
  - Comparing safety & effectiveness of the new treatment against the current standard treatment
- Phase IV Clinical Trial: Post-Marketing Surveillance**
  - To look at the longitudinal effects of the treatment

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## Assessing Risk

- The Activity**
  - Is it indoors? If yes, is there adequate ventilation?
  - Will you be there for more than 1 hr?
  - Will the activity be high intensity or involve shouting?
- The Crowd**
  - Will there be more than 10 people there?
  - Will you be around many people you don't know?
  - Are some people unvaccinated?
  - Are some people ignoring health guidelines?
- Your Health**
  - Do you have underlying health risks for Covid-19?
  - Will you struggle to afford your expenses if you stop working & isolate?
  - Do you lack access to sick leave, testing, and essential supplies?
- Your Circle**
  - Are there kids in your circle?
  - Are any adults in your circle unvaccinated?
  - Is anyone in your circle at high risk for Covid-19?
- The Location**
  - Are you going somewhere that has adequate infrastructure (e.g. clinics, hospitals)?

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## The Economic Impact on Hospitals

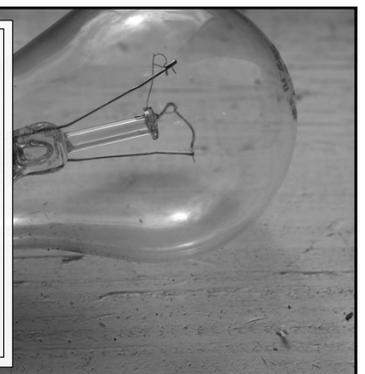
- It's all in the loss column
  - 35% of hospitals are projected to end 2021 with negative operating margins
  - 30% increase in drug expenses compared to 2019
    - AHA, 2021
  - The summer surge cost the US health system \$5.7 billion from June-August due to hospitalizations of unvaccinated adults (Kaiser Family Foundation analysis)
    - Unvaccinated adult Covid-19 hospitalizations cost \$13.8 billion worldwide from June-Nov 2021 (KHE 2022)
  - Pre-pandemic, hospitals typically spent \$7/pt/day on PPE
    - In the Spring 2020, hospitals were spending \$2040/pt/day on PPE
    - Though costs are declining, the demand and use is high and is estimated that hospitals spent > \$3 billion for PPE since the pandemic started



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## Covid-19 Disinformation

- Recent survey found that 80% US adults either believe or aren't sure about 1 of 8 pandemic or vaccine falsehoods
  - Kaiser Family Foundation survey, 11.8.21 (n=1,519)
- 38% heard & believe the false statement that the US gov't is exaggerating number of Covid-19 deaths; 22% aren't sure
- 17% heard & believe pregnant women shouldn't get the vaccine; 22% aren't sure
- 18% said they've heard & believe the US gov't is intentionally hiding deaths r/t Covid-19 vaccine; 17% aren't sure
- 8% heard & believe vaccines cause infertility; 23% aren't sure
- 14% heard & believe ivermectin is a safe & effective Covid-19 treatment
- 14% heard & believe that vaccines can cause Covid-19; 10% aren't sure



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## Global Outbreaks Likely to Increase

- Unfortunately, as the human population grows and encroaches upon "wild" areas, the risk of zoonotic infections being transmitted to humans increases
  - Spillover
  - Likewise, spillback is on the increase, which is when humans infect nonhuman animals
- Additionally, other trends are potent drivers of this change:
  - Globalization
  - Urbanization
  - Agricultural intensification & lack of diversification
  - Consumerism of exotic/rare foods & plants
  - Consolidation and contraction of the healthcare sector, leading to fewer hospital beds overall
  - Increased human consumption of animal proteins, leading to deforestation and destruction of buffer zones between wildlife areas and inhabited human areas
  - Climate change

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## Knowledge is Power!

**Spread the Knowledge, Not the Virus!**

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## ASPAN Response

**COVID-19**  
Toolkit for the Perianesthesia Nurse

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## Emergency Preparedness – Key Points

More questions than answers.....

- What are the immediate needs for the provision of care in this situation?
- Are there emergency policies, protocols, and guidelines in place to help transition to emergency care and provide guidance and protection for HCWs?
- What is the plan for flexing care locations to meet needs?
- What are the staffing needs for this event?
- How will the staff receive accelerated and just-in-time training to support dynamic patient care needs?
- How can support staff best be reallocated?
- What is the best communication channel for staff to stay current and what is the emergency communication plan?
- Will emotional support services be available to frontline staff?
- Is the supply chain adequate to meet supply needs?
- Is there a supply preservation and conservation plan?

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## Studies...one year later

- Sahebi, et. al. (Jan. 2021). The prevalence of anxiety and depression among healthcare workers during the COVID-19 pandemic: An umbrella review of meta-analyses. *Progress in Neuropsychopharmacology & Biological Psychiatry*, 207, 110247.
  - Findings: Anxiety and depression is high among healthcare workers
- Chirico, et. al. (June 2020). Protecting the mental health of healthcare workers during the COVID-19 emergency. *BJPSYCH International*, 18(1).
  - Findings: High level of fear and anxiety
- Chen, et. al. (2021). A large-scale survey on trauma, burnout, and posttraumatic growth among nurses during the COVID-19 pandemic. *International Journal of Mental Health Nursing*, 30, 102-116.
  - Findings: Higher stress than 'normal', emotional exhaustion, burnout

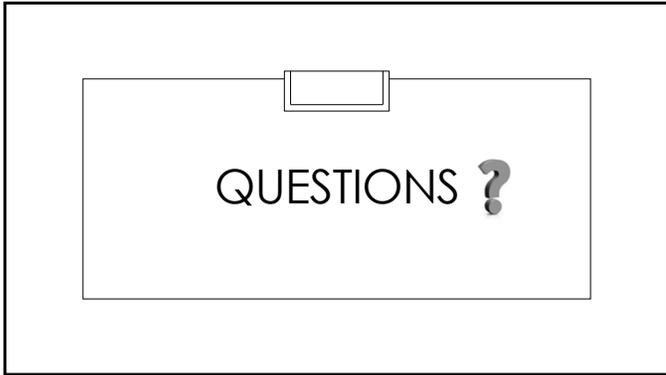
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## Caring for the Nurse: Self Care

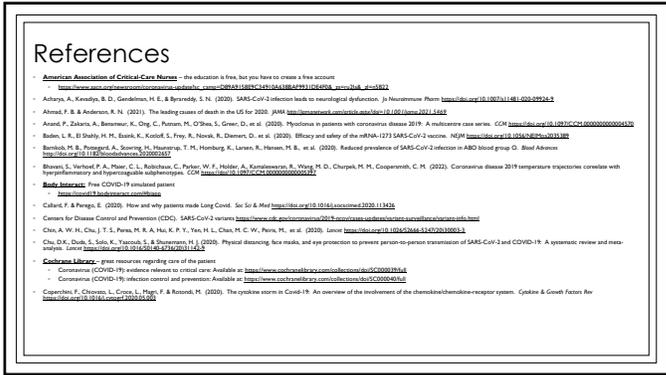
- Be active
- Practice mindfulness
- Stay in touch
- Find support
- Eat well
- Limit crappy news
- Listen to music
- Complete a small project
- Read
- Try a new skill
- SLEEP

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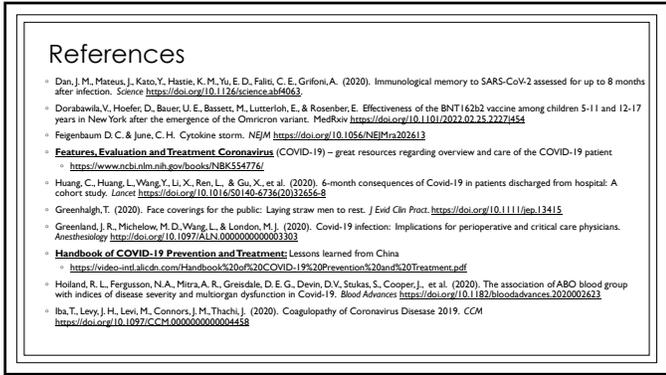




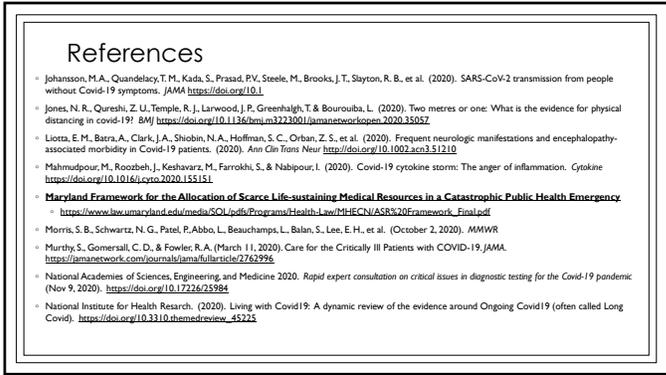
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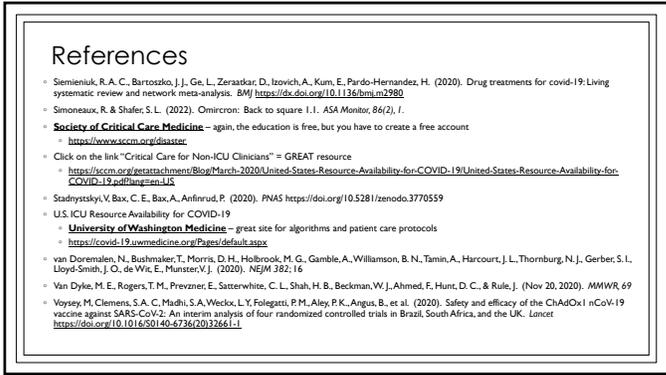
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## References

- Lastly, **YouTube** has some great mini clips and teaching videos for some very basic skills for critical care:
  - <https://youtu.be/z788tbu3VM> (Vasopressors Explained Clearly: Norepinephrine, epinephrine, vasopressin, dobutamine....)
  - [https://youtu.be/0qz7uq\\_HrhQ](https://youtu.be/0qz7uq_HrhQ) (How Coronavirus Kills)
  - [https://youtu.be/E\\_6T9R7WJg](https://youtu.be/E_6T9R7WJg) (Prone positioning)
  - <https://www.youtube.com/watch?v=YC4bn16KPa> (Intro to Hamilton G5 Ventilator – teaches how vents work)