



# Long COVID-19 Effects and Recovery: Information for Indian Country

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# Land Acknowledgement



Today, the University of North Dakota rests on the ancestral lands of the Pembina and Red Lake Bands of Ojibwe and the Dakota Oyate - presently existing as composite parts of the Red Lake, Turtle Mountain, White Earth Bands, and the Dakota Tribes of Minnesota and North Dakota. We acknowledge the people who resided here for generations and recognize that the spirit of the Ojibwe and Oyate people permeates this land. As a university community, we will continue to build upon our relations with the First Nations of the State of North Dakota - the Mandan, Hidatsa, and Arikara Nation, Sisseton-Wahpeton Oyate Nation, Spirit Lake Nation, Standing Rock Sioux Tribe, and Turtle Mountain Band of Chippewa Indians.



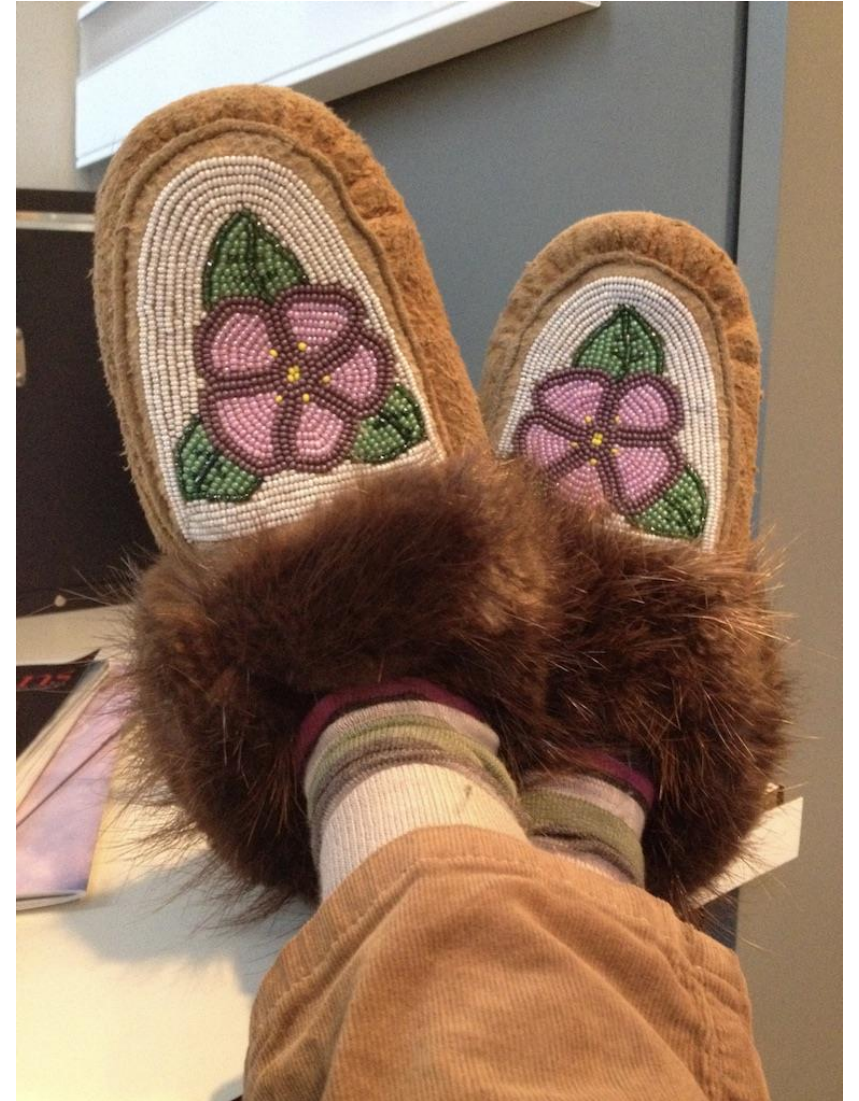
# Objectives

- Talk Story
- Describe the symptoms and conditions associated with post-COVID conditions
- Aware of clinical assessments and tests available to patients
- Aware of traditional and other remedies for chronic viruses



# Sharing Story

- Traditional modality for teaching/learning
  - I became a physician due to a virus
  - Epstein-barr virus, Mono “The Kissing Disease”
  - They can be debilitating and recurrent
- Overview of COVID in Indian Country
- COVID is a novel virus
- We are learning how viruses work and how they work together
- Research takes time to translate into practice



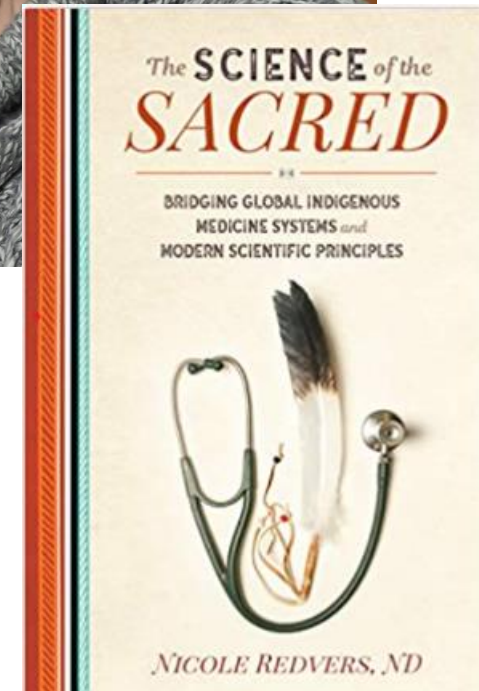
# Introduction

- Family and Integrative Physician, extra and intramural research experience T0-T4, NIDCD
- Trained since Pre-K in Traditional Healing
- Apprenticeships in Global Healing Traditions
- Realized the limits to direct services, goal of expediting and improving care and care options delivered
- Building upon strengths and resources
  - Expand upon existing partnerships
  - Create novel partnerships and excellent science



# Dr. Redvers and COVID success

- Community driven remote learning, contact tracing
- US Govt allowed AI/AN to distribute vaccines
- AN Health Board coordinated with state, much tribal leadership with distribution (with community partners)
- Highest first dose and vaccination rates
- Highest rates of hospitalization and deaths
- Mortality 2.5 x rate 3.5 x infection, 4 x hospitalization rate
- Misinformation and lack of trust in gen pop- we had culturally appropriate messaging
- Urban Indian Health Institute: We have to protect our elders, warrior up, collective approach
- Foxworth, Raymond, **Nicole Redvers**, Marcos A. Moreno, Victor A. Lopez-Carmen, Gabriel R. Sanchez, and James M. Shultz. "Covid-19 Vaccination in American Indians and Alaska Natives — Lessons from Effective Community Responses." *New England Journal of Medicine* 385, no. 26 (December 23, 2021): 2403–6. <https://doi.org/10.1056/NEJMp2113296>.



# Studies

- **Patients with a COVID-19 hospitalization were at significantly increased risk for future mortality.** In a time when nearly all COVID-19 hospitalizations are preventable this study points to an important and under-investigated sequela of COVID-19 and the corresponding need for prevention.
- **Patients with a severe COVID-19 episode were at greater risk for future hospitalizations.**
- Mainous AG 3rd, Rooks BJ, Orlando FA. Risk of New Hospitalization Post-COVID-19 Infection for Non-COVID-19 Conditions. *J Am Board Fam Med*. 2021 Sep-Oct;34(5):907-913. doi: 10.3122/jabfm.2021.05.210170. PMID: 34535516.
- Mainous AG 3rd, Rooks BJ, Wu V, Orlando FA. COVID-19 Post-acute Sequelae Among Adults: 12 Month Mortality Risk. *Front Med (Lausanne)*. 2021 Dec 1;8:778434. doi: 10.3389/fmed.2021.778434. PMID: 34926521; PMCID: PMC8671141.



# Vaccines and Long Haul

- Vaccines reduce the risk of long COVID by lowering the chance of infx
- W/breakthrough infection, studies suggest that vaccination might only halve the risk of long COVID — or have no effect on it at all.
- Understanding the prevalence of long COVID among vaccinated people has urgent public-health implications
- Further inquiry will help us understand the causes lingering COVID-19
- Antonelli, M. *et al. Lancet Infect. Dis.* [https://doi.org/10.1016/S1473-3099\(21\)00460-6](https://doi.org/10.1016/S1473-3099(21)00460-6) (2021).
- Taquet, M., Dercon, Q. & Harrison, P. J. Preprint at medRxiv <https://doi.org/10.1101/2021.10.26.21265508> (2021).





# PBRN Overview

- **Practice-Based Research Network**
  - **UND American Indian Collaborative Research Network (AICoRN)**
  - Network of clinicians and organizations that aim to rapidly translate discoveries from research into medical practice and improve the quality, safety and effectiveness of health care
  - Include Indigenous voice in research priorities and participation/representation in clinical trials
  - Started in 70s, became official in 1989
  - Agency for Healthcare Research Quality, DHHS
  - Ultimately it takes too long to translate science into practice



Recording

## NIH's Commitment to Ending Structural Racism

➤ NIH is committed to instituting new ways to support diversity, equity, and inclusion, and identifying and dismantling any policies and practices that may harm our workforce and science.

➤ NIH established the **UNITE** initiative to address structural racism in biomedical research with the goal of ending racial inequity.

➤ Primary goals of the initiative are:

- U** Understanding stakeholder experiences through listening and learning
- N** New research on health disparities, minority health, and health equities
- I** Improving the NIH culture and structure for equity, inclusion and excellence
- T** Transparency, communication, and accountability with our internal and external stakeholders
- E** Extramural research ecosystem: changing policy, culture and structure to promote workforce diversity



[nih.gov/ending-structural-racism](https://nih.gov/ending-structural-racism)

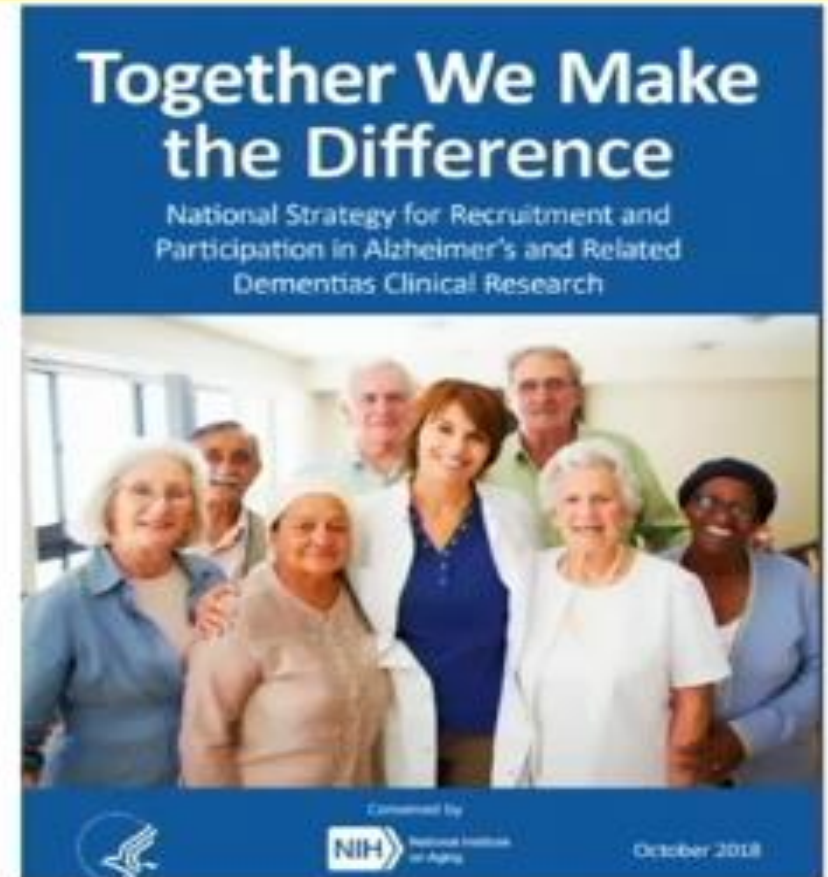
# National Institutes of Health Goals

**Goal 1:** Increase Awareness and Engagement

**Goal 2:** Build and Improve Research Infrastructure

**Goal 3:** Engage Local Communities and Support Participants

**Goal 4:** Develop an Applied Science of Recruitment



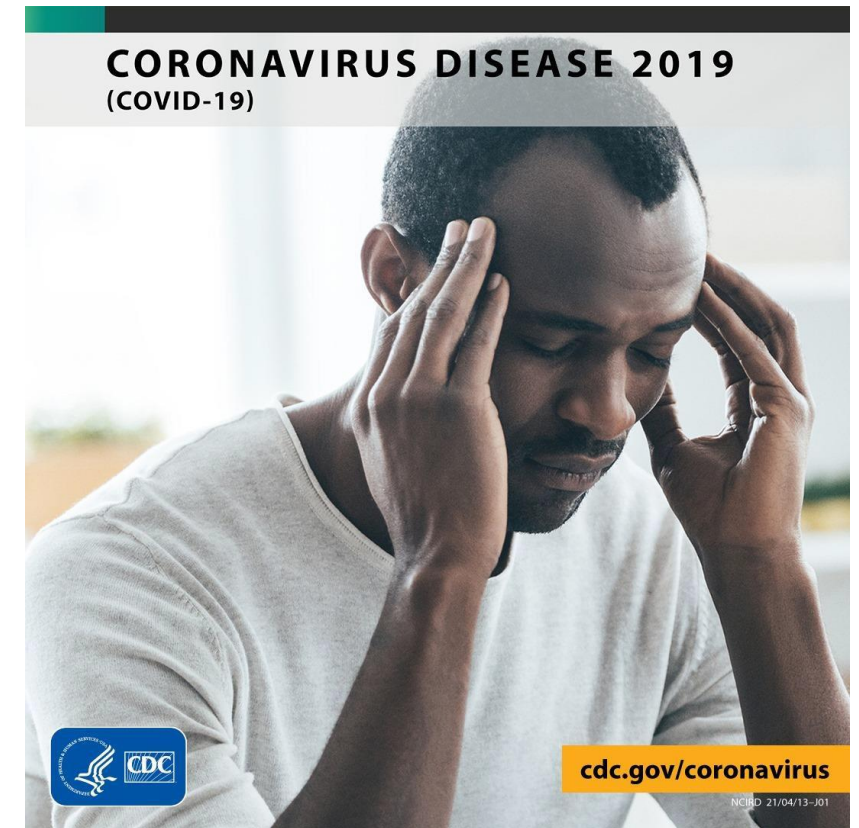
# Precaution

- If you are a patient, please refer your question to your healthcare provider.



# Definition

- “**Post-COVID conditions**” is an umbrella term for the wide range of physical and mental health consequences experienced by some patients that are present four or more weeks after SARS- CoV-2 infection, including by patients who had initial mild or asymptomatic acute infection.
- Post Acute Sequela of Covid
- Long Haul Covid



# Post-COVID conditions are heterogenous

- Several patterns have been identified
  - Persistent symptoms
  - New-onset late sequelae
  - Evolution of symptoms/conditions
- Attributable to different underlying pathophysiologic processes
  - Genetics of COVID and individuals
- Presentation could be complicated by a number of factors
- May share similarities with other post-viral conditions



# Long Haul COVID

- Frequency varies widely in the literature
  - Up to 30% of infected (hard to tell with asymptomatic)
- Could also affect children and adolescents
- Challenges estimating prevalence in subgroups that could be at higher risk



# Listen to and validate patients' experiences and partner with patients to identify achievable health goals

- Most post-COVID conditions can be diagnosed and managed by primary care
- **Post-COVID conditions are associated with a spectrum of physical, social, and psychological consequences**
- Consider referral to multidisciplinary post-COVID care centers
- Many post-COVID conditions may be diagnosed based on history and physical exam
  - Potential harms could arise from excessive testing
- Consider conservative diagnostic approach in the first 4 to 12 weeks
- Symptoms persisting beyond three months should prompt further evaluation



## Common Post-COVID Symptoms




- Dyspnea or increased respiratory effort
- Fatigue
- Post-exertional malaise
- “Brain fog,” cognitive impairment
- Cough
- Chest pain
- Headache
- Palpitations and/or tachycardia
- Arthralgia
- Myalgia
- Paresthesia
- Abdominal pain
- Diarrhea
- Insomnia and other sleep difficulties
- Fever
- Lightheadedness
- Impaired daily function and mobility
- Pain
- Rash (e.g., urticaria)
- Mood changes
- Anosmia or dysgeusia
- Menstrual cycle irregularities

Body System	Conditions (subject to change and not mutually exclusive)
<b>Cardiovascular</b>	Myocarditis, heart failure, pericarditis, orthostatic intolerance (e.g., postural orthostatic tachycardia syndrome [POTS])
<b>Pulmonary</b>	Interstitial lung disease, reactive airway disease
<b>Renal</b>	Chronic kidney disease
<b>Dermatologic</b>	Alopecia
<b>Rheumatologic</b>	Reactive arthritis, fibromyalgia, connective tissue disease
<b>Endocrine</b>	Diabetes mellitus, hypothyroidism
<b>Neurologic</b>	Transient ischemic attack/stroke, olfactory and gustatory dysfunction, sleep dysregulation, altered cognition, memory impairment, headache, weakness, neuropathy
<b>Psychiatric</b>	Depression, anxiety, post-traumatic stress disorder (PTSD), psychosis
<b>Hematologic</b>	Pulmonary embolism, arterial thrombosis, venous thromboembolism, other hypercoagulability
<b>Urologic</b>	Incontinence, sexual dysfunction
<b>Other</b>	Weight loss, dysautonomia, allergies and mast cell activation syndrome, reactivation of other viruses, pain syndromes, hearing loss, vertigo, and progression of comorbid conditions

# A thorough physical examination should be completed

- Evaluate ambulatory pulse-oximetry with respiratory symptoms, fatigue, malaise
- Orthostatic vital signs with postural symptoms, dizziness, fatigue, cognitive impairment, malaise

A drop in systolic BP of  $\geq 20$  mm Hg, or in diastolic BP  $\geq 10$  mm Hg, or experiencing lightheadedness or dizziness is considered abnormal

POSITION	TIME	BP	ASSOCIATED SYMPTOMS
Lying Down 	5 Mins.	BP ____ / ____ HR _____	
Standing 	1 Min.	BP ____ / ____ HR _____	
Standing 	3 Mins.	BP ____ / ____ HR _____	

**Basic diagnostic tests to consider ≥4 weeks after SARS-CoV-2 infection (or sooner if clinically indicated)**

<u>Category</u>	<u>Laboratory tests</u>
Blood count, electrolytes, and renal Function	Complete blood count with possible iron studies to follow, basic metabolic panel, urinalysis
Liver function	Liver function tests or complete metabolic panel
Inflammatory markers	C-reactive protein, erythrocyte sedimentation rate, ferritin
Thyroid function	TSH and free T4
Vitamin deficiencies	Vitamin D, vitamin B12

**Specialized diagnostic tests\* to consider ≥12 weeks after SARS-CoV-2 infection (or sooner if clinically indicated)**

<u>Category</u>	<u>Laboratory tests</u>
Rheumatological conditions	Antinuclear antibody, rheumatoid factor, anti-cyclic citrullinated peptide, anti-cardiolipin, and creatine phosphokinase
Coagulation disorders	D-dimer, fibrinogen
Myocardial injury	Troponin
Differentiate symptoms of cardiac versus pulmonary origin	B-type natriuretic peptide

\* The specialized diagnostic tests should be ordered in the context of suggestive findings on history and physical examination

# More evidence is needed to support the utility of specific imaging tests for evaluation of post-COVID conditions

- Some imaging tests may have low yield
  - CT chest with normal chest x-rays and normal oxygen saturation
  - CT pulmonary angiogram without an elevated D-dimer and compatible symptoms
  - Brain MRI with brain fog
- More specialized imaging studies (e.g., cardiac MRI) might merit consultation with specialists



# Documentation of post-COVID conditions is critical for accurate public health surveillance

- The World Health Organization (WHO) has developed coding guidance for health care encounters related to post-COVID conditions:
  - **U09.9 Post COVID-19 condition, unspecified**
- Not currently available in the United States and is under review by the U.S. ICD-10 Coordination and Maintenance Committee
- In the meantime, CDC recommends:
  - **B94.8 Sequelae of other specified infectious and parasitic diseases**

# What can predispose us to viruses

- If underlying disease/imbalance exists
- Virus takes advantage of that
- Viruses can work together in complex ways we are beginning to understand
- Hyper response or lack of response are likely to manifest in illness
- Viruses get worse with
  - Less Sleep
  - Stress
  - Poor Nutrition
  - Nutrient deficiencies (C, A, D, Zinc etc)
  - Other conditions: DM2, HTN, Obesity
  - Autoimmune Conditions
  - Immune Modulating Medications (ie. Steroids or treatment RA)

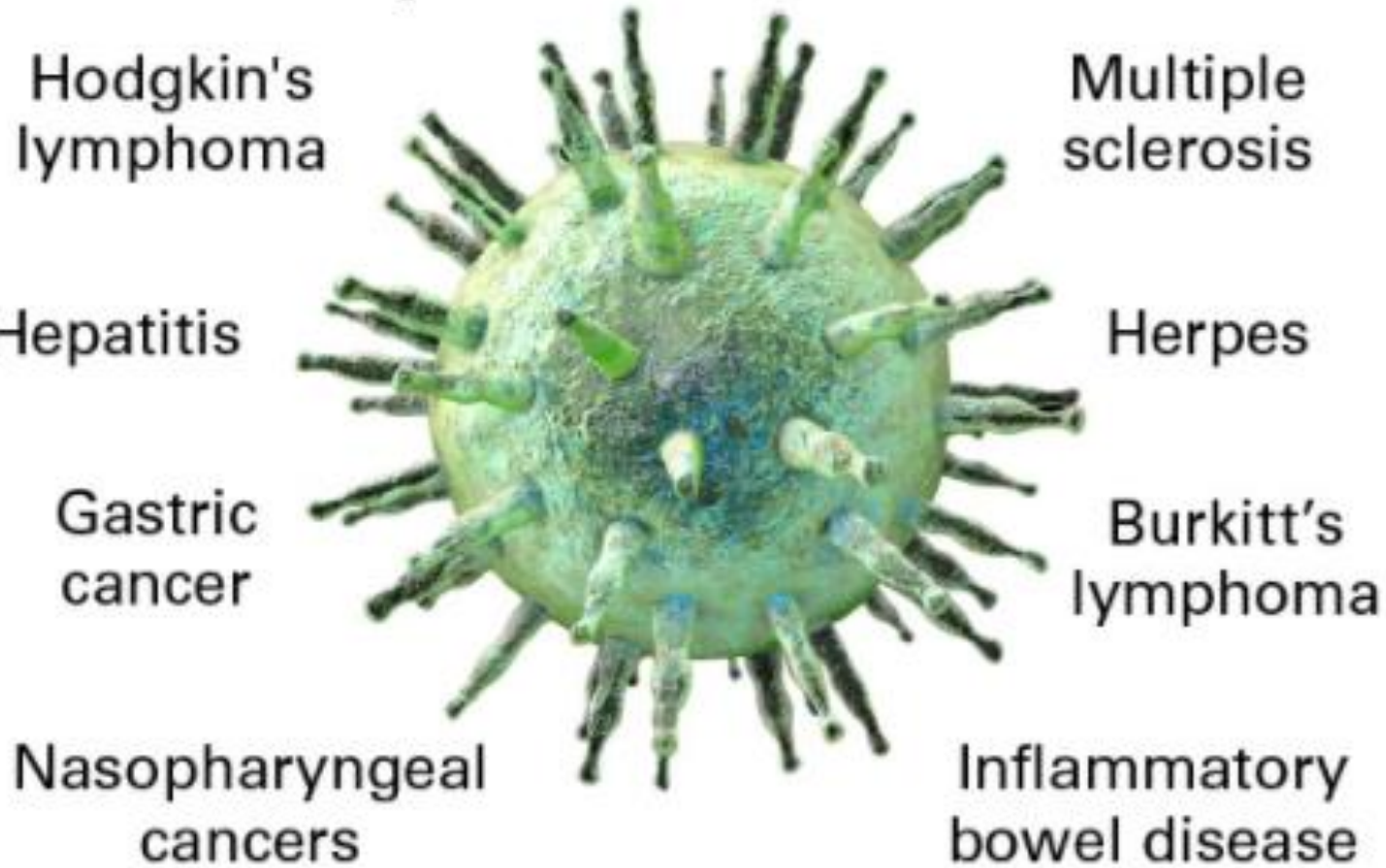
# Epstein-Barr Virus

- Type of herpes virus that can cause glandular fever, which shares many symptoms with long COVID.
- Stays in immune cells dormant, or reactivates
- B cells humoral or adaptive immunity (similar to COVID 19)
- At least 95% of adults have a “latent” or dormant EBV infection that causes no symptoms.





# Diseases associated with Epstein-Barr virus



# EBV Serologies

- 185 randomly selected patients recovered from COVID-19 and found that 30.3% had long term symptoms consistent with long COVID after initial recovery from SARS-CoV-2 infection. This included several patients with initially asymptomatic COVID-19 cases who later went on to develop long COVID symptoms.
- The researchers then found, in a subset of 68 COVID-19 patients randomly selected from those surveyed, that 66.7% of long COVID subjects versus 10% of controls were positive for EBV reactivation based on positive EBV early antigen-diffuse (EA-D) IgG or EBV viral capsid antigen (VCA) IgM titers. The difference was significant ( $p < 0.001$ , Fisher's exact test).
- Gold, J.E., *et al.* (2021) Investigation of Long COVID Prevalence and Its Relationship to Epstein-Barr Virus Reactivation. *Pathogens*. [doi.org/10.3390/pathogens10060763](https://doi.org/10.3390/pathogens10060763).

# EBV continued

- COVID-19 for evidence of EBV reactivation indicated by positive EBV EA-D IgG, EBV VCA IgM, or serum EBV DNA tests.
- If patients show signs of EBV reactivation, they can be treated early to reduce the intensity and duration of EBV replication, which may help inhibit the development of long COVID



# For most patients, the goal of medical management is to optimize function and quality of life

- Creating a comprehensive rehabilitation plan may be helpful for some patients
- Many post-COVID conditions can be improved through already established symptom management approaches
- Evidence indicates that holistic support for the patient throughout their illness course can be beneficial

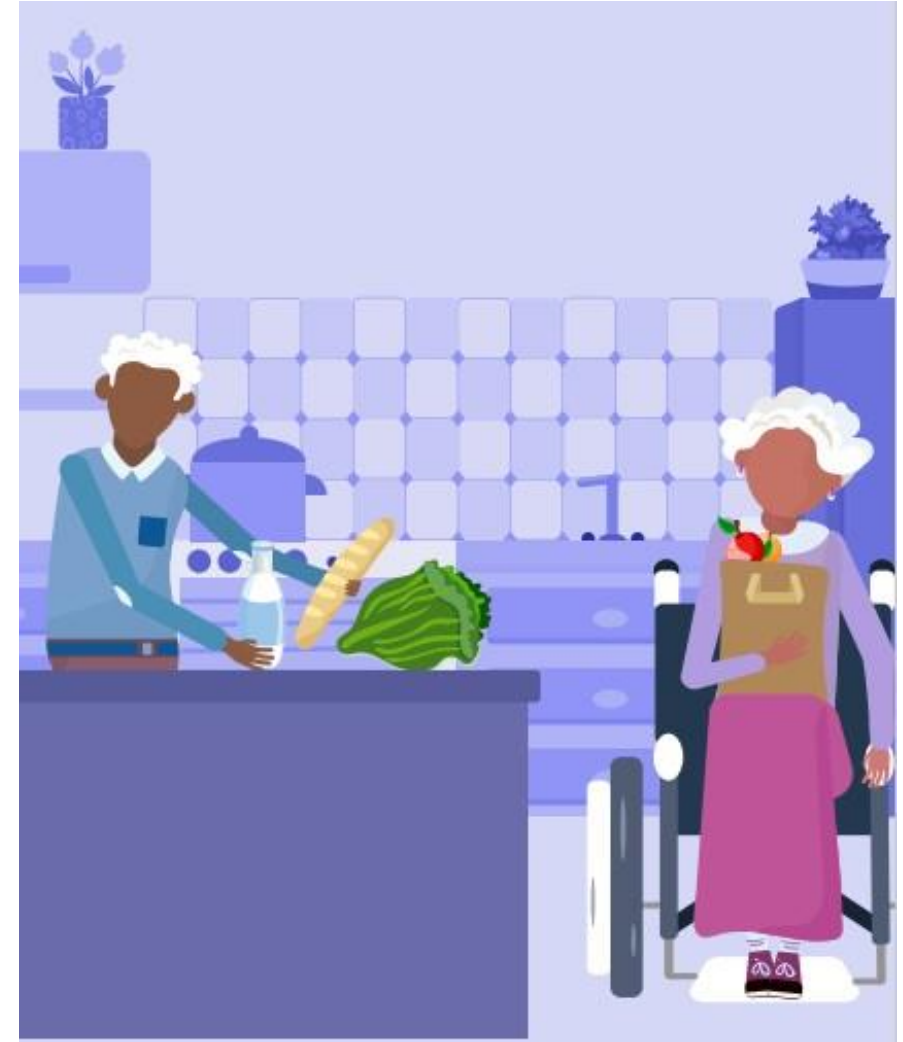


# How to Treat Viruses- Integrative Perspective

- Immune support from nutrition and also through supplements such as Vitamins C and D, Zinc, mushroom extracts and echinacea can improve the immune response to the virus.
- Adaptogens: current life stresses, herbs such as Ashwagandha, Reishi mushroom, Holy basil and Licorice root can be helpful to modulate the stress hormone response and speed up recovery.
- Natural anti-virals can include supplements such as Lauricidin, St. John's wort, Olive leaf extract, Lemon balm, L-Lysine, Echinacea and Licorice root

# Some patient groups may require special considerations

- Racial and ethnic minority populations
- People with disabilities
- People experiencing homelessness
- People in correctional facilities
- People with pre-existing substance use disorder
- People who live in rural areas
- People with other barriers to accessing health care



# Knowledge of post-COVID conditions is likely to change rapidly with ongoing research

- Research is underway to define the long-term phases of COVID-19
- CDC has partnered with NIH, aligning efforts within the federal government to support the post-acute sequelae of SARS-CoV-2 infection (PASC) initiative
- CDC will continue to work in collaboration with federal, state, local, academic, and community partners
- With extensive research underway, it is likely that evidence-based treatment practices will evolve over time

# RECOVER PASC STUDY

- "NIH deeply appreciates the contributions of patients who have not fully recovered from SARS-CoV-2 infection and who have offered their experiences and insights.... We now ask the patient, medical, and scientific communities to come together to help us understand the long-term effects of SARS-CoV-2 infection."
- ***Francis Collins, MD, PhD***  
*Director, National Institutes of Health*
- <https://recovercovid.org/>



# RECOVER contd.

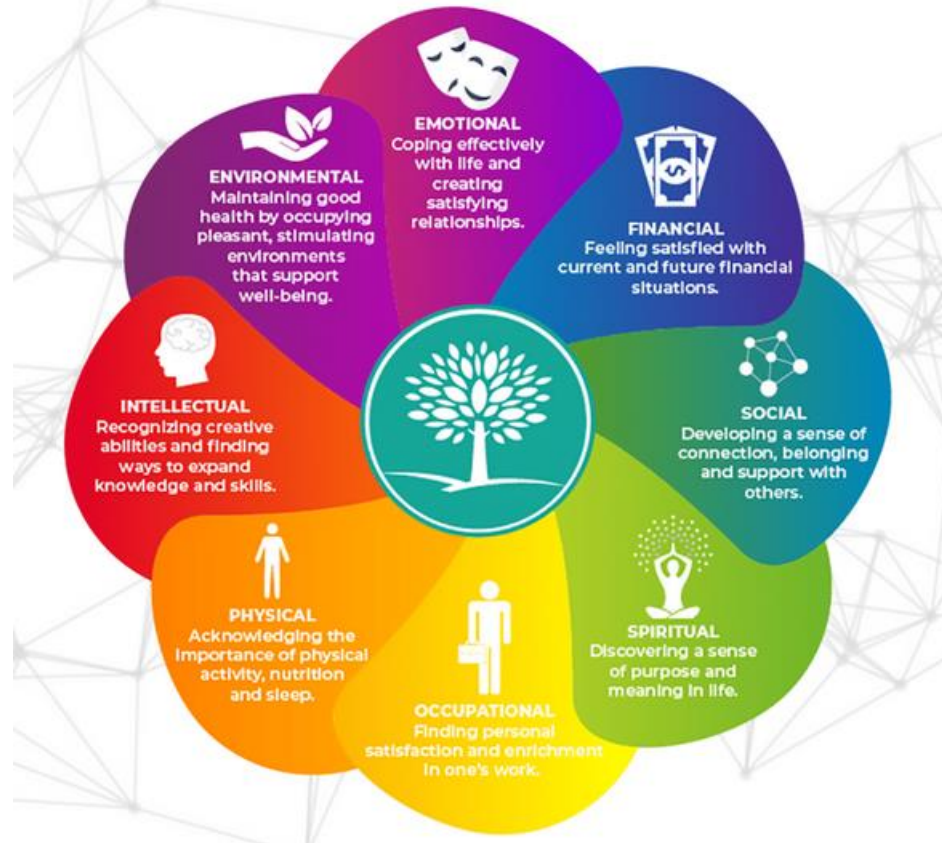
NIH RECOVER: A Multi-site Observational Study of Post-Acute Sequelae of SARS-CoV-2 Infection in Adults

- Understanding the Long-term Impact of COVID-19 in Adults
- Sanford Sioux Falls, SD
- Dr. Warne and UND President Armacost



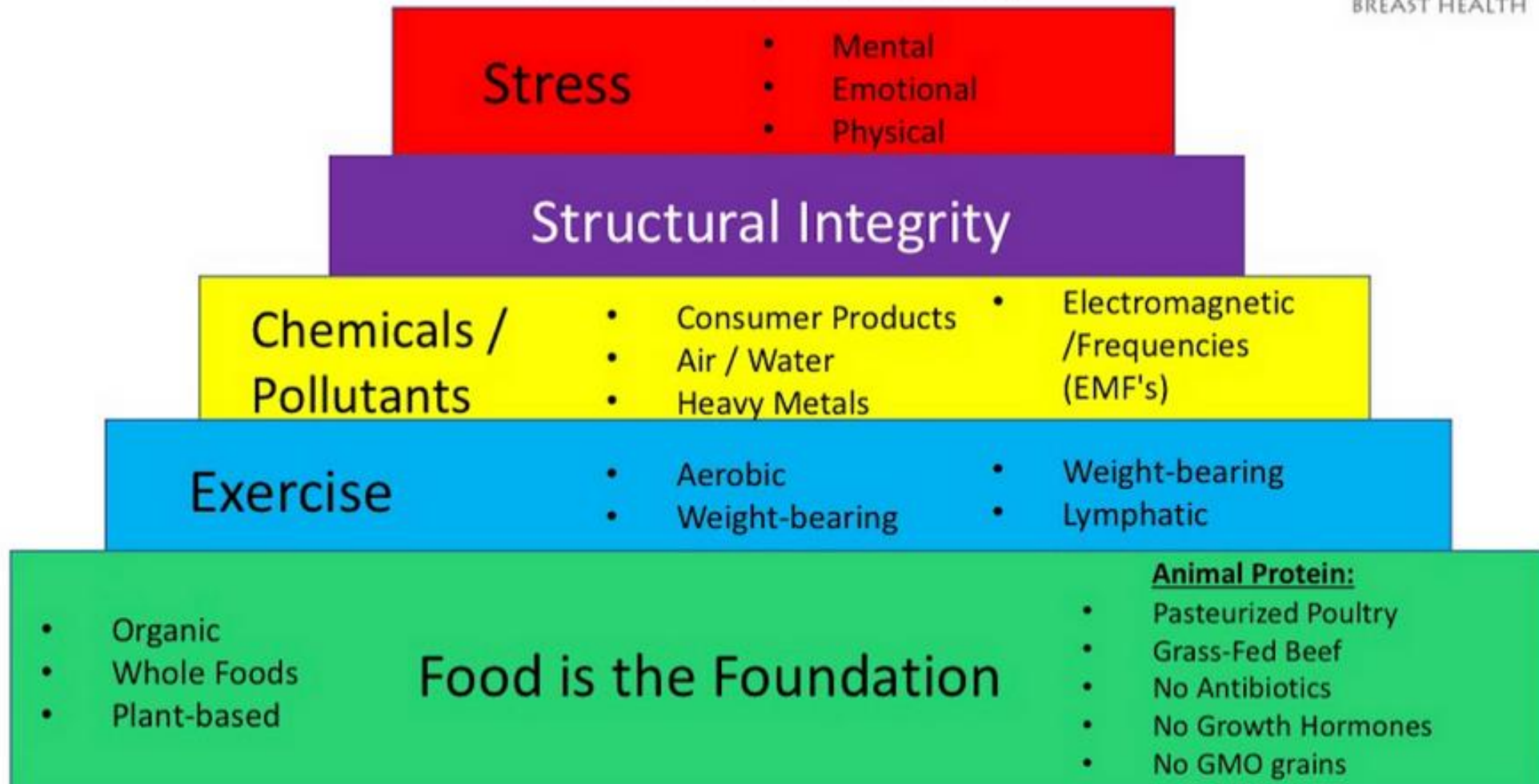
# Overview of Practical Treatments

## 8 DIMENSIONS OF WELLNESS



# The 5 Pillars to Take Charge of Your Breast Health

90-95% of Breast Cancer Diagnoses are related to the  
**Environment = How we are living!**





- Supplements
  - Vit D
- Teas: Yarrow, Artemesia
- Herbs: Yarrow, Artemesia
- Protein: eggs
- Mushroom: Chaga
- Fish
- Nuts and Seeds
- Beans
- Vegetables
- Berries

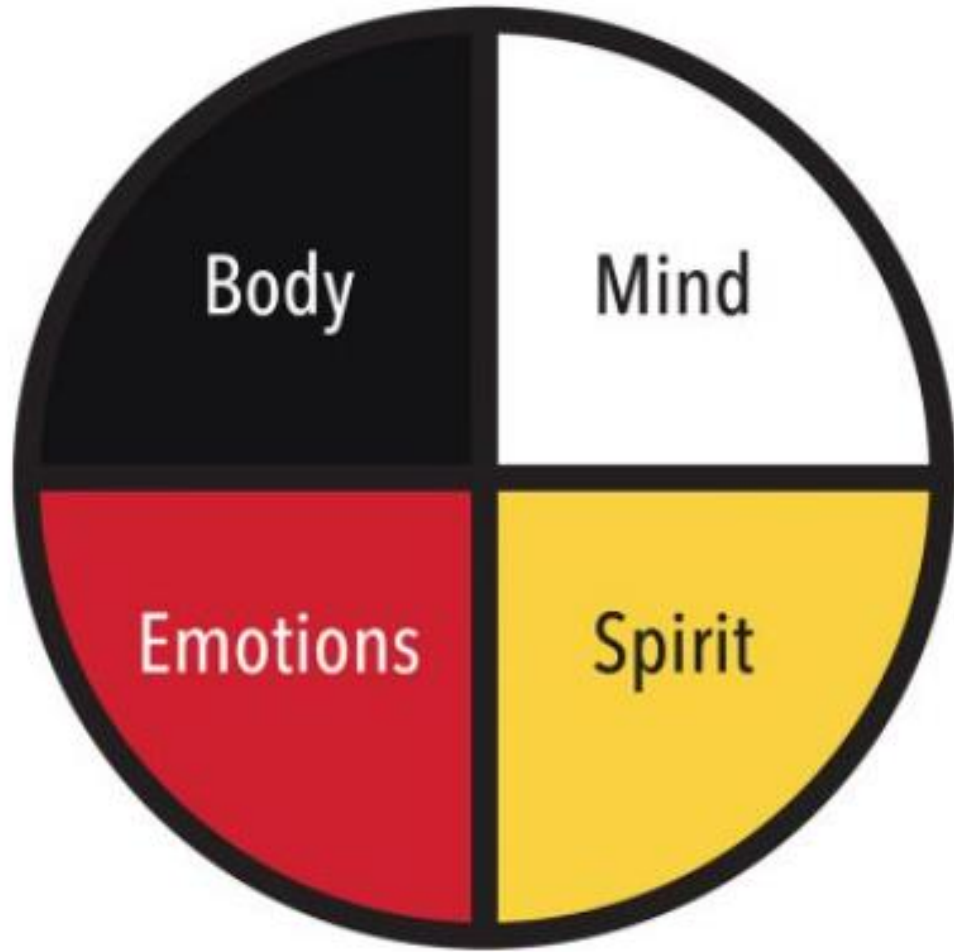
# Nutrition from the earth

- Optimal nutrition when fighting a virus includes sufficient protein, high-antioxidant foods (think colourful vegetables and fruits), foods rich in beta carotene (orange vegetables especially). Minimal grains and sugars can also be helpful to reduce immune system stress and improve nutrient density.

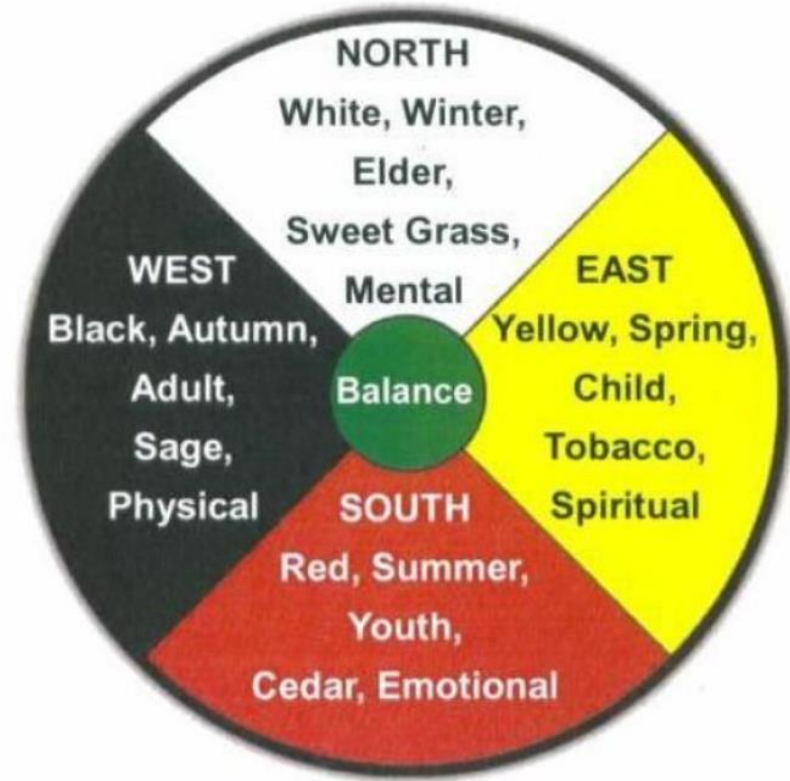


- Our wellness is related to environmental health
- Clean unpolluted air, water, land (relatives)
- We have traditional models for addressing balance
- Guidelines: Social distancing (vs physical distancing) and we need **SOCIAL CONNECTEDNESS, COMMUNITY AND BELONGING**





## Ojibwe Medicine Wheel



- The medicine wheel is manifested within the community as a “process (healing), a ceremony (sweats, sharing circles) and teachings (a code for living)” (McCabe, 2008, p. 34). The Indigenous people consider the community participation in ceremonies to be an important part of the healing process (McCabe, 2008). The medicine wheel assists community members to connect with each other, while also supporting balance and harmony across the four dimensions of mind, body, emotions, and spirit for the individual and the extended community (Clarke & Holtslander, 2010).
- Recent literature focuses on the use of the medicine wheel to recover from illness and regain health. The medicine wheel guides healthy change and can be **individualized** to the specific needs of the client or community, taking into account the context of culture, socioeconomic status, family situation, disease process, and other significant factors, culminating in balance, healing, and growth in all four aspects.
- Medicine LibreTexts. “10.7: The Medicine Wheel as a Change Model,” September 29, 2018.  
[https://med.libretexts.org/Bookshelves/Nursing/Book%3A\\_Leadership\\_and\\_Influencing\\_Change\\_in\\_Nursing\\_\(Wagner\)/10%3A\\_Common\\_Change\\_Theories\\_and\\_Application\\_to\\_Different\\_Nursing\\_Situations/10.07%3A\\_The\\_Medicine\\_Wheel\\_as\\_a\\_Change\\_Model](https://med.libretexts.org/Bookshelves/Nursing/Book%3A_Leadership_and_Influencing_Change_in_Nursing_(Wagner)/10%3A_Common_Change_Theories_and_Application_to_Different_Nursing_Situations/10.07%3A_The_Medicine_Wheel_as_a_Change_Model).





**Food**



**Exercise**



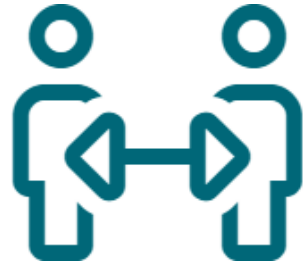
**Stress  
Management**



**Sleep**

People with post-COVID conditions should continue to follow CDC's COVID-19 prevention measures

**COVID-19 vaccination should be offered to all eligible people, regardless of their history of SARS-CoV-2 infection**



# Thank You!



- We are each on our own journey, and related to each other
- UND Department of Indigenous Health
- Association of American Indian Physicians

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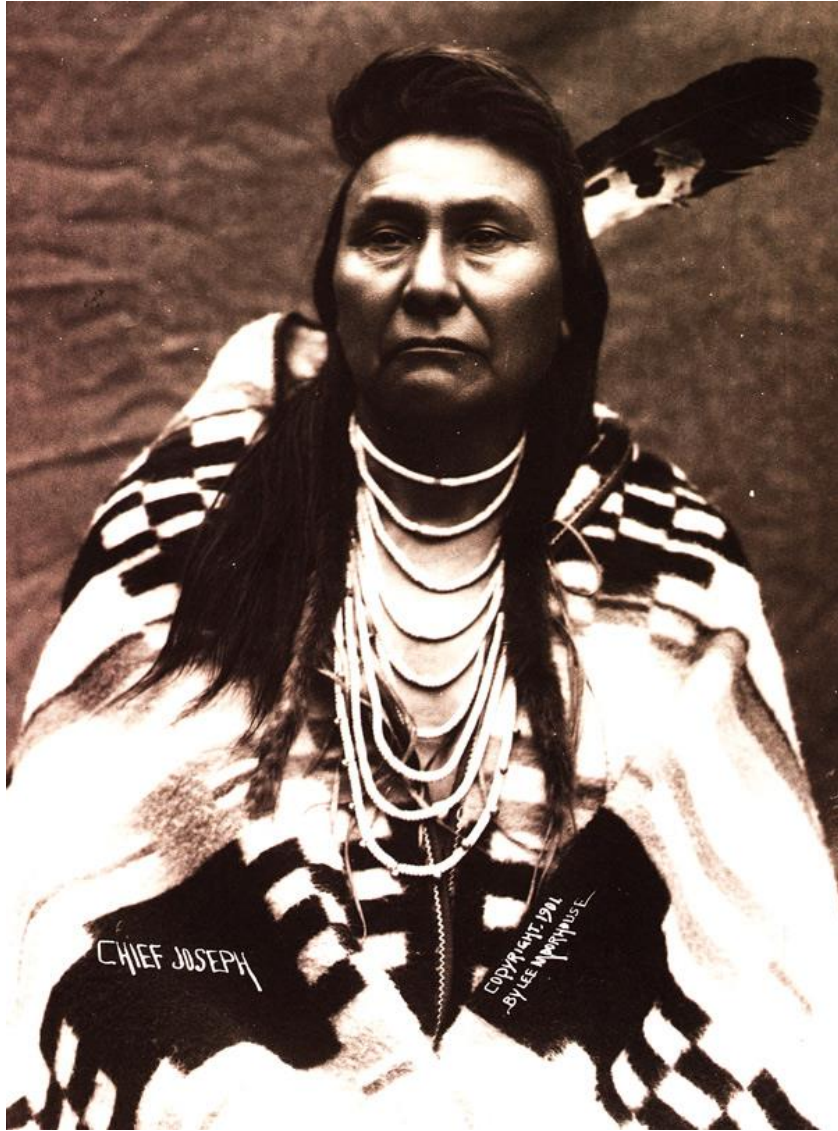
# Resources

- **CDC webpages on post-COVID:**

- [For the general public: https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects.html](https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects.html)
- [For clinicians: https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-conditions.html](https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-conditions.html)

- **NIH Workshop on Post-Acute Sequelae of COVID-19**

- Day 1: <https://videocast.nih.gov/watch=38878>
- Day 2: <https://videocast.nih.gov/watch=38879>



## Chief Joseph

Hinmuuttu-yalatlat (alternatively Hinmaton-Yalaktit or Hin-mah-too-yah-lat-kekt Nez Perce: Thunder rolling down the abyss

“Treat all men alike. Give them the same law. Give them an even chance to live and grow.”

- **Q1. Does the COVID-19 vaccine improve long COVID symptoms?**
- ***[Follow-up: Does the COVID-19 vaccination play a role in the prevention of long COVID?]***
  
- **Q2. Is it possible that long COVID will be considered a chronic disease?**
- 
- **Q3. How can loved ones support friends or family that are suffering from long COVID?**
- 
- **Q4. Is possible for someone who suffers from long COVID to get COVID-19 again?**
- 
- **Q5. Do symptoms of long COVID affect our organ systems, like lungs, kidneys, liver, heart, and brain?**
- 
- **Q6. Does long COVID affect children?**

- It suggests that excessive immune response, known as cytokine storm, may cause immunopathological damage in COVID-19 patients.
- We compared the expression levels of several cytokine genes in leukocytes between ICU and non-ICU COVID-19 patients, including *IL-6*, *IL-1β*, *TNF*, *CCL2*, *CXCL10*, *IFNG*, *IL7*. We found that these genes displayed significantly higher expression levels in non-ICU than in ICU patients
- A potential explanation for these different results could be the different sources of these cytokine. In addition, our findings suggest that weak immune responses are associated with worse prognosis in COVID-19 patients.
- It appears to conflict with previous indications that strong immune responses may cause severe COVID-19 outcomes. Nevertheless, the present and previous results together may indicate that both inadequate and excessive immune responses will lead to severe COVID-19 cases.
- Chen, Zuobing, Qiushi Feng, Tianfang Zhang, and Xiaosheng Wang. "Identification of COVID-19 Subtypes Based on Immunogenomic Profiling." *International Immunopharmacology* 96 (July 2021): 107615. <https://doi.org/10.1016/j.intimp.2021.107615>.