

Special considerations for people with pre-existing medical conditions, multiple diagnoses, or other factors

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Background and Rationale

- COVID-19 continues spreading rapidly across the US and affecting individuals across the lifecycle
- An estimated 85% of individuals with known COVID-19 do not require hospitalization
 - A large proportion of those experience a time-limited illness and recover rapidly
 - Some proportion of those infected, while not requiring hospitalization, do experience symptoms and complications for an extended period of time
- Learning more about these COVID-19 “long-haulers” as the pandemic continues
- ***How do pre-existing conditions influence the likelihood of experiencing long-term complications of COVID-19?***



Agenda

- Association of pre-existing conditions with COVID-19 severity
- Sociodemographic characteristics of adults with the pre-existing conditions
- Appropriate targeting of resources for prevention and long-term management

Association of COVID-19 with Pre-Existing Conditions

- Consistent worldwide evidence demonstrates that pre-existing conditions lead to severe outcomes from COVID-19
 - Cardiovascular diseases (disease of the heart and vascular system)
 - Diabetes
 - Hypertension (high blood pressure)
 - Obesity
 - Chronic Kidney Disease under
 - Moderate to severe asthma or other chronic lower respiratory disease
 - Immunocompromised (sickle cell disease, cancer treatment, poorly controlled HIV or AIDS)
- Weaker, but still compelling evidence for additional chronic diseases that are more common among older adults, the mentally and physically disabled

Risk for Hospitalization among People with Chronic Conditions

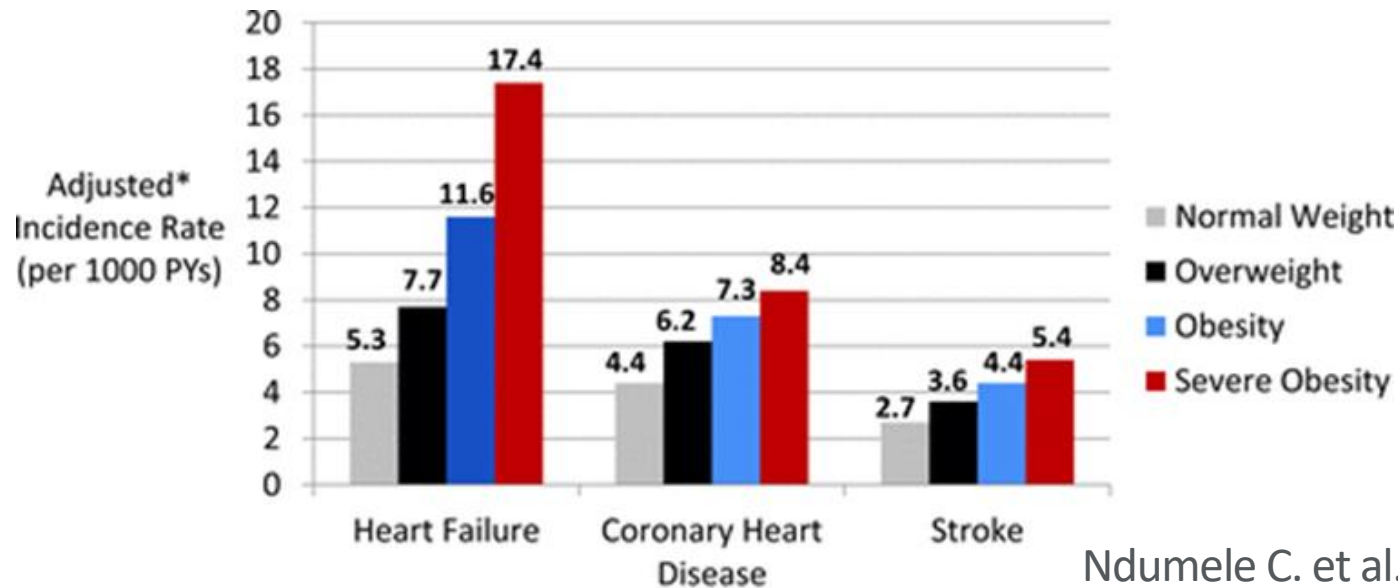
- Having more than 1 of these chronic conditions is related to even worse outcomes
- Notably, many of these conditions cluster together
- Obesity is a strong correlate of the vascular and lung diseases associated with severe COVID-19

RISK FOR HOSPITALIZATION IF YOU HAVE ANY OF THESE CONDITIONS AND GET COVID-19 COMPARED TO PEOPLE WITHOUT THE CONDITION(S).



*Conditions include asthma, obesity, diabetes, chronic kidney disease, severe obesity, coronary artery disease, history of stroke and COPD.


Obesity is the Shared Characteristic among Pre-existing Conditions associated with Severe COVID-19



Ndumele C. et al. JAHA 2016

*At mean levels of age, sex, race, smoking status, alcohol use, education level, occupation and physical activity

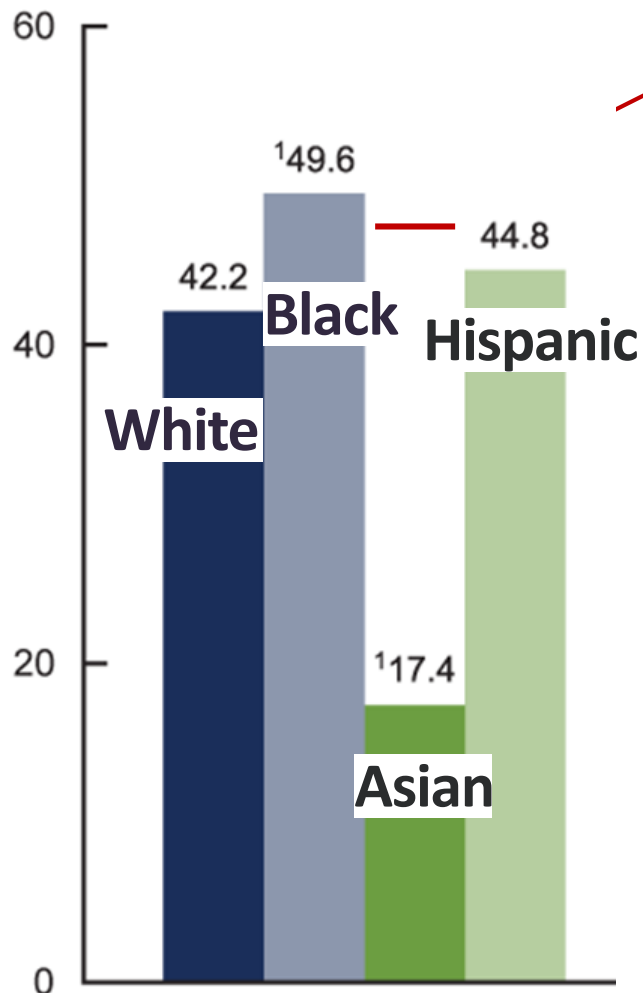
- Over 90% of adults with type 2 diabetes are overweight or obese
- 40% of new onset hypertension is attributed to obesity
- 57% of adults with severe asthma are obese
- While obesity is associated with better survival in kidney disease, obesity is a risk factor for developing CKD and its primary risk factors (diabetes and hypertension)



Who is likely to have these pre-existing conditions and how might that contribute to long-term disease?

Sociodemographic Patterns in Obesity

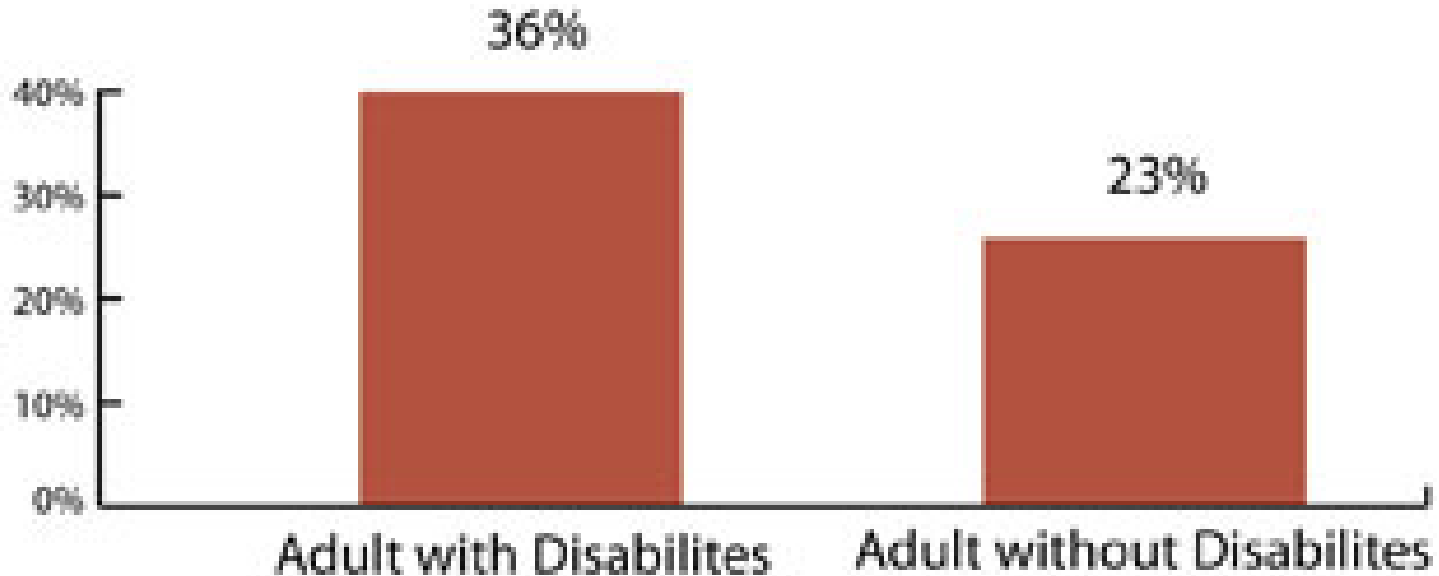
NHANES 2017-18



Native Americans / Alaskan Natives have obesity rates of 48%

- The prevalence of other correlates of severe COVID follow similar patterns by race/ethnicity
- On average, Black, Hispanic, Native American/AN have fewer socioeconomic resources
- **The demographic most likely to have pre-existing conditions are more likely to have severe COVID-19**

Prevalence of Obesity Among Adults by Disability/Functional Status



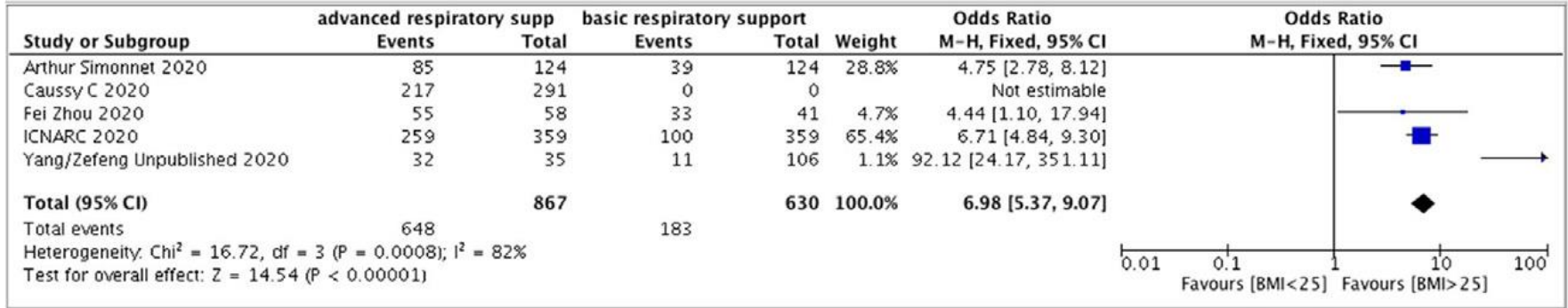
- Obesity rates for adults with disabilities are 58% higher than for adults without disabilities

Behavioral Risk Factor Surveillance System

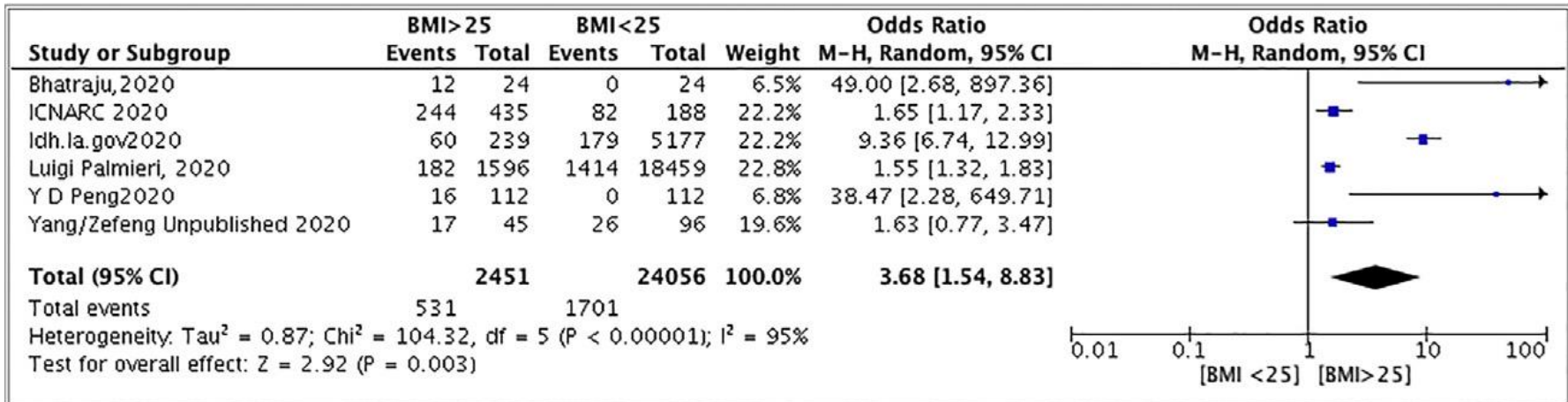
Pathways by which Obesity Leads to More Severe COVID-19

- Obesity makes it more difficult to manage COVID-19
 - Moving patients to the prone position can reduce the need for ventilation and improve outcomes with ventilation
 - Difficult to move obese patients prone and uncomfortable for patients
- Obesity is an inflammatory condition
 - Obesity interferes with the innate immune response to influenza virus and could do the same with SARS-CoV2
 - Pre-existing inflammation may cause the hyperactive immune response that occurs when some people are exposed to the SARS-CoV2 infection
 - The organs damaged by the inflammatory response from SARS-CoV2 may already have been compromised by obesity and its complications (diabetes, hypertension)


Obesity and Mortality from COVID-19: Meta Analysis



Patients with BMI>25 are 7 times more likely to need advanced respiratory support than those with normal weight BMI



Patients with BMI>25 are 3.7x more likely to die from COVID-19 than those who are normal weight



How do pre-existing conditions contribute to long-term symptoms or disability from COVID-19?

COVID-19's damaging effects on the body

Growing evidence suggests that the coronavirus, mostly known to cause respiratory illness, can also affect many of the body's primary organs.

Heart

Doctors have reported inflammation to the heart and damage to the muscle. Some patients have died from severe heart attacks.

Blood vessels

Blood clotting in major arteries and veins has been reported. Clots can break off and damage multiple organs by stopping blood flow.

Kidneys

Many COVID-19 patients suffer serious kidney damage and require dialysis.

Brain

People with COVID-19 have had strokes and seizures. Some have reported confusion or delirium. Not directly involving the brain but a central nervous issue: Many patients have reported losing their sense of smell.

Lungs

The virus can cause pneumonia, in which the lungs become inflamed and fill with fluid. Patients may require ventilation. As the infection progresses, the virus can cause serious lung damage, which can be fatal.

Intestines

Roughly 20% of patients report diarrhea as an early symptom. The virus has been found in the lower intestinal tract of some patients.

Sources: Chronicle research, Getty Images

The Chronicle

- *Diabetes, hypertension and pre-existing cardiovascular disease are independent risk factors for these complications that could magnify the damage from COVID-19 and lead to persistent symptoms*

Heart Damage may be an Early Severe Side Effect of COVID-19

- Inflammation can damage the heart muscle (myocarditis) or the covering of the heart (pericarditis)
 - Can explain some of the longer-term symptoms reported such as shortness of breath, chest pain or racing heart rate
 - Prolonged damage to the heart muscle observed in previously healthy young adults following COVID-19 disease
 - Death of a young adult football player from cardiac damage after having recovered from COVID-19
- At only 8 months into our collective experience with the virus, it is not known how long inflammation in the heart persists following infection

Acute Respiratory Distress Syndrome (ARDS) and Long-Term Symptoms

- A relatively small percent (5%) of COVID-19 patients experience ARDS
- ARDS is managed in the ICU and requires therapies to maintain oxygenation
 - Mechanical ventilation
 - Extracorporeal membrane oxygenation (ECMO)
- ARDS-related ICU stays are associated with complications that persist beyond the length of the initial ICU stay
 - Muscle weakness
 - Depression
 - Cognitive decline
 - Poorer quality of life and physical functioning
 - PTSD

Characteristics associated with a Return to Baseline Health in Hospitalized and Non-Hospitalized COVID-19

- In a sample of 270 adults surveyed by the CDC,
 - 65% reported to a return to their usual state of health within 7 days
- Among the 35% who did not return to a usual state of health by 14-21 days, the following characteristics were more common
 - Age > 50 years old
 - 2+ chronic conditions
 - Participants with obesity and psychiatric conditions were 2.3 times less likely to return to normal
- No association of race with a prolonged return to normal



How do we target resources to manage long-term COVID?

Resource Allocation for Managing Long-Term COVID-19: Prevention

- Prevention remains the most important strategy to prevent what we can see is coming
 - Protecting populations who are most likely to experience severe COVID-19
- The sociodemographic characteristics of individuals most likely to contract COVID-19 are shared by those who have pre-existing conditions
 - Most often, these individuals are from racial and ethnic minority groups and have fewer socioeconomic resources
- **Recommendation**
 - Culturally competent prevention messaging coupled with practical supports (economic and equipment)
 - Advocacy for vaccination when it becomes available

Mange the Burden of Pre-Existing Conditions

- Early signs suggest that adults with more comorbid disease are likely to experience slower resolution of symptoms
 - Biologically plausible given synergistic effects of the pre-existing conditions on target organs that contribute to long-term symptoms
 - Socially plausible if populations with these conditions don't seek or receive timely guideline-driven care
- Continued emphasis on managing pre-existing conditions
 - In many cases, poorly controlled chronic disease is highlighted as the problem
- **Recommendation**
 - Manage the burden of COVID-19 on the healthcare system so that individuals can continue chronic disease management can continue
 - Where appropriate, use telehealth to maintain continuity of care for individuals with pre-existing conditions or disabilities that make access a challenge

Enhance Discovery by Supporting Longitudinal Studies of Survivors

- Many of the patterns of long-term complications that have emerged are similar to what is seen in other severe respiratory illnesses
- Administrative data sources (electronic medical records) can be used to track and study long-term outcomes among adults with varying baseline health status but have limitations
- **Recommendation**
 - Carefully designed longitudinal epidemiologic studies with systematic data collection at baseline and at regular follow-up are needed
 - Combination of health status and behaviors must be assessed



Thank you