Obesity Medicine & Stroke

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INTRODUCTION

- Bachelors of Science: Duke University
- Masters of Public Health: George Washington
- Medical School: Wake Forest
- Iredell Country, NC Emergency Medical Services
- Family Medicine Residency: Northwestern
- Obesity Medicine Fellowship: Atrium Health

***Bariatrician**: A physician who specializes in helping patients to achieve and maintain healthy weights though lifestyle counselling, pharmacotherapy, and surgical intervention*

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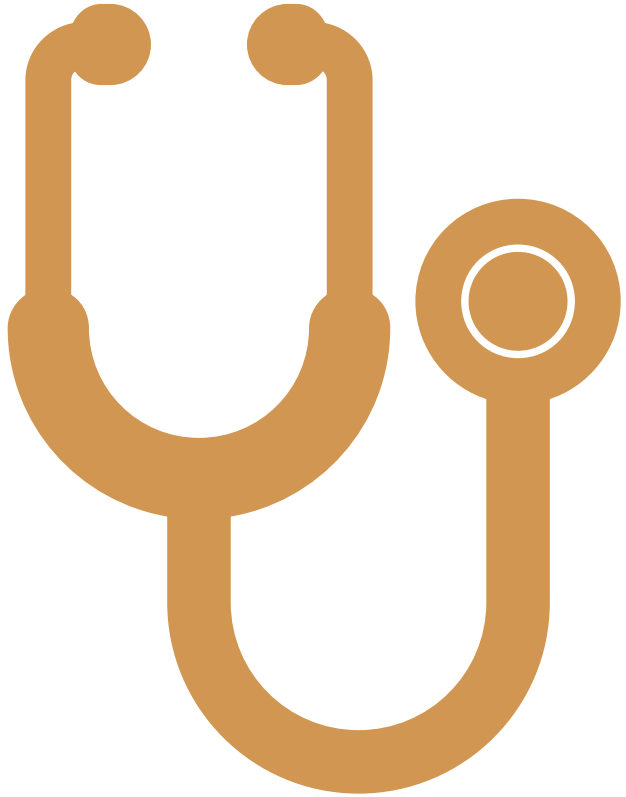
FINANCIAL DISCLOSURES

- None to report

OVERVIEW

- Defining Obesity
- Stats & Epi
- Causes & Effects of Obesity
- ***Obesity in relation to stroke***
- **Simulation: Stroke Patient**
  - EMS → ED → Imaging
  - Thrombectomy/Surgery → Inpatient care
  - Outpatient care → PT/OT



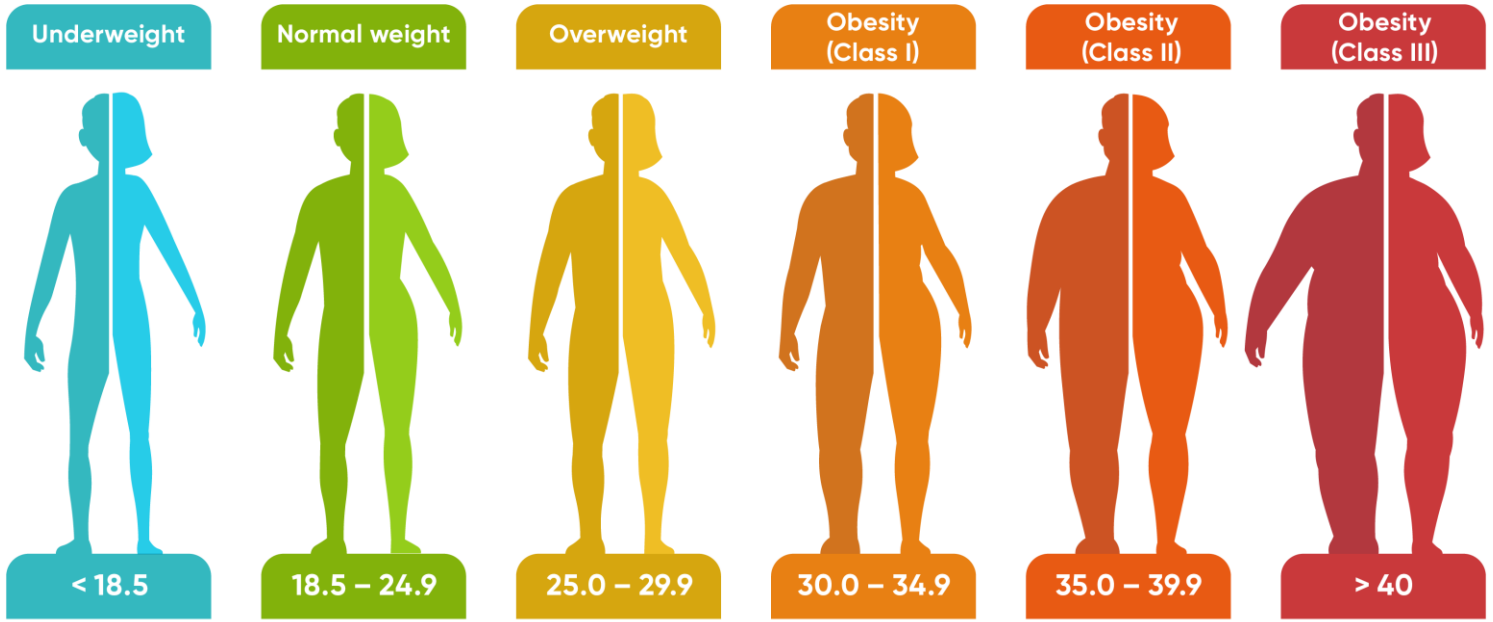
DEFINING OBESITY

Abnormal or excessive fat accumulation that presents a risk to health

DEFINING OBESITY

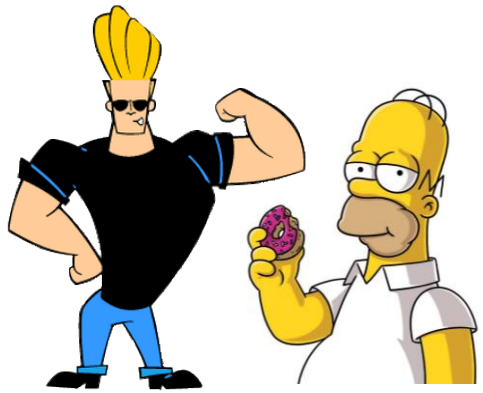
- **Body Mass Index (BMI)**
- Waist circumference
- **Waist to hip ratio**
- Body fat percentage

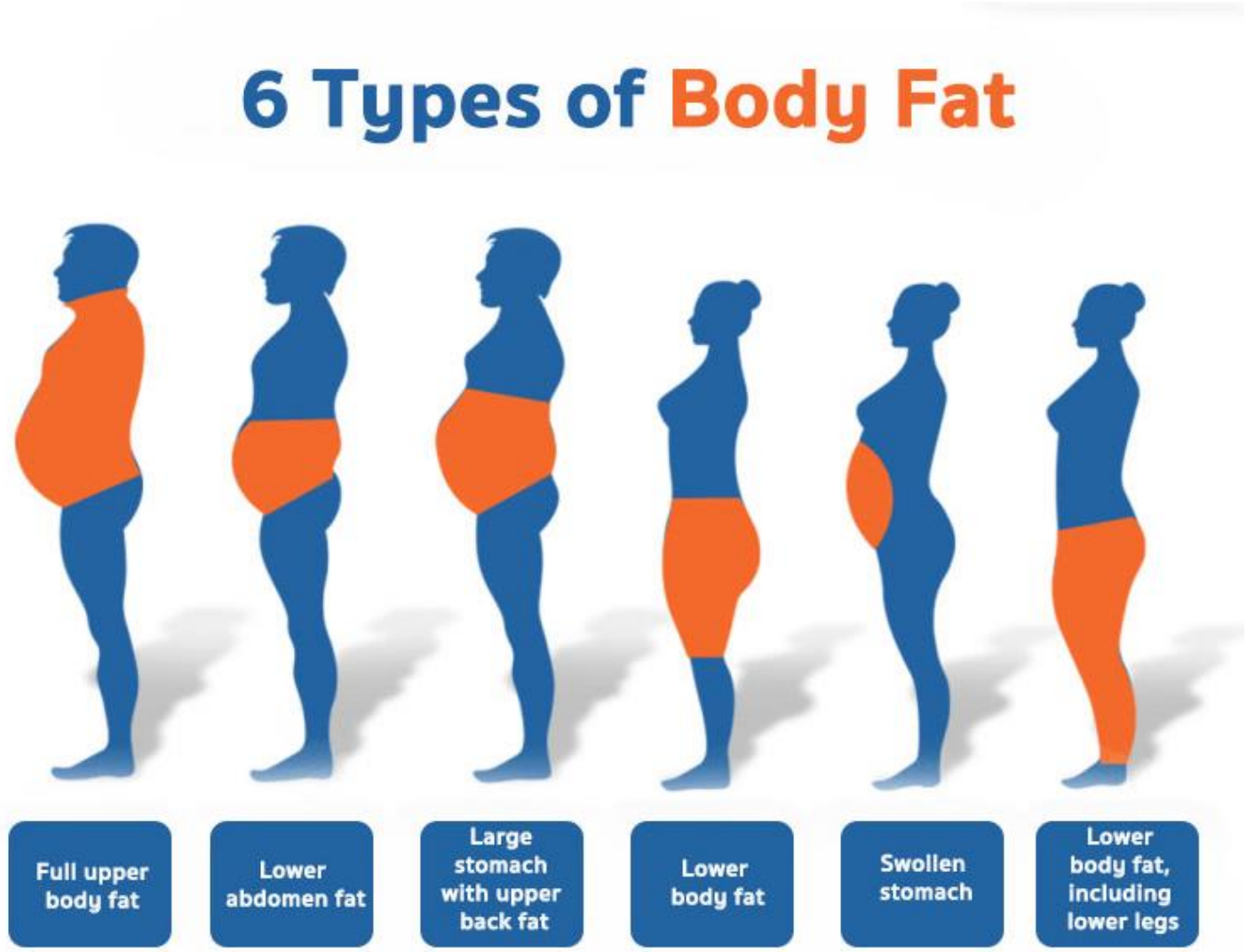
$$BMI = Weight\ (kg)/height\ (m)^2$$



WEIGHT DISTRIBUTION

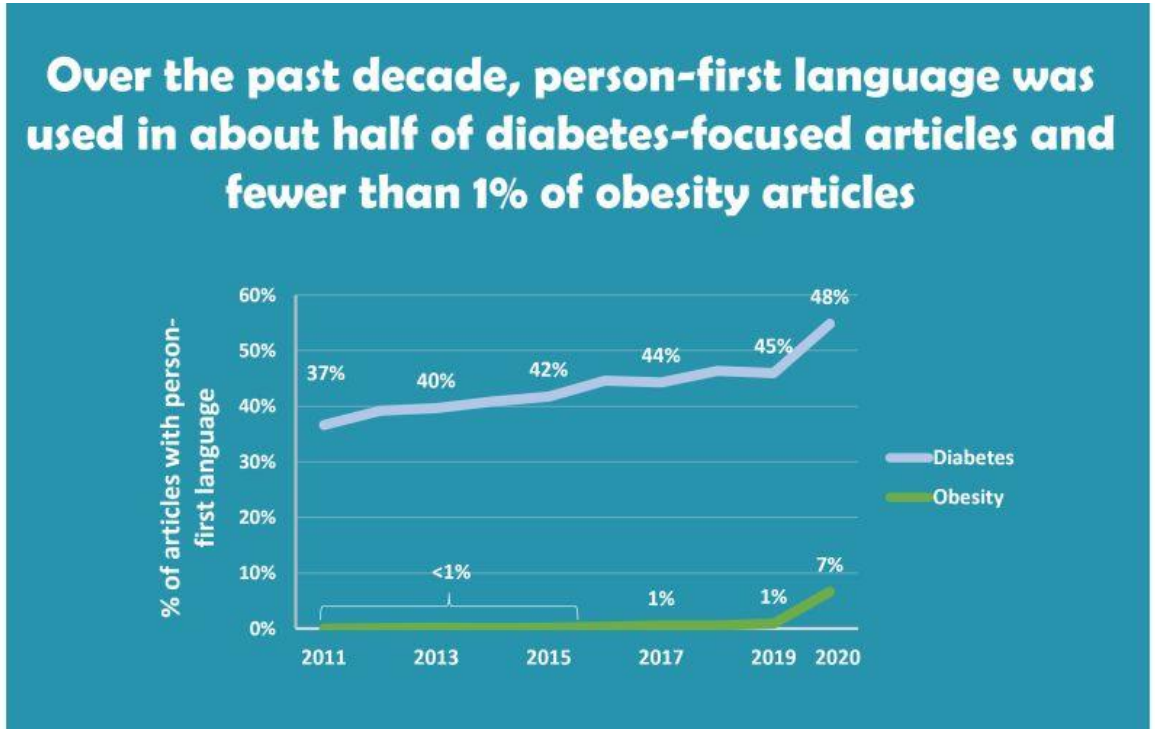
Abdominal adiposity is most likely to lead to metabolic syndrome





Help fight weight bias in medicine!

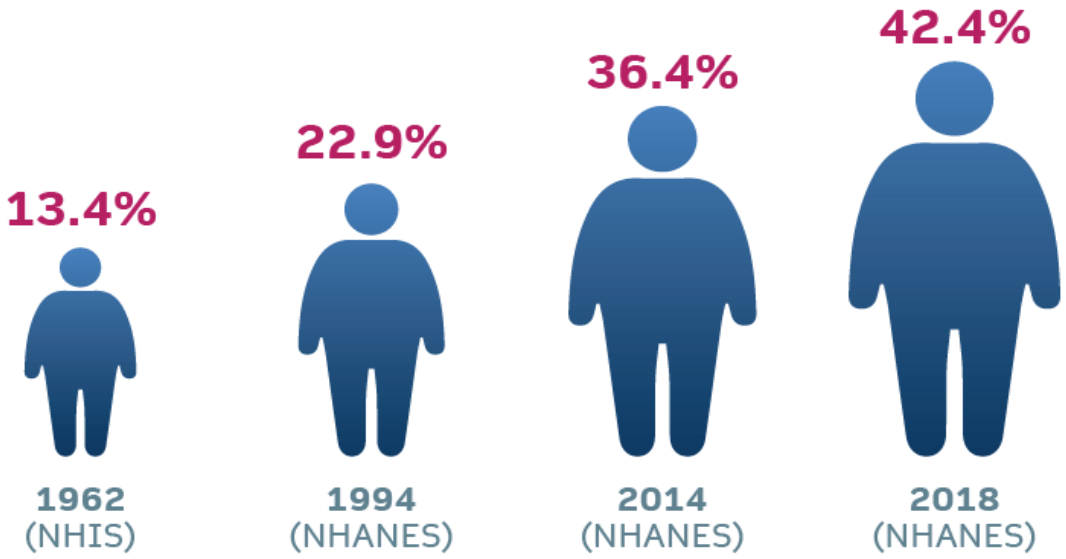
- **Use people-first language**
- Weight ≠ Health
- Weight bias can lead to healthcare disparities
- Be a part of the solution



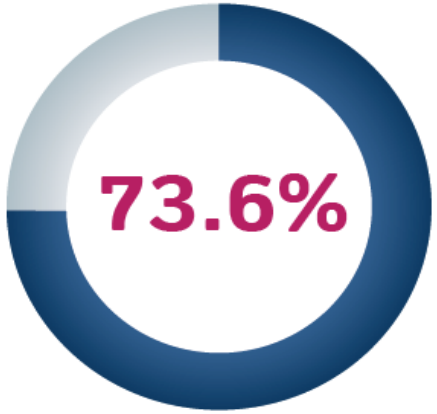
POPULATION STATISTICS: USA

Majority of Americans are Overweight or Have Obesity

Percentage of American Adults with BMI>30
(Percentage of Americans Who Have Obesity)[1]



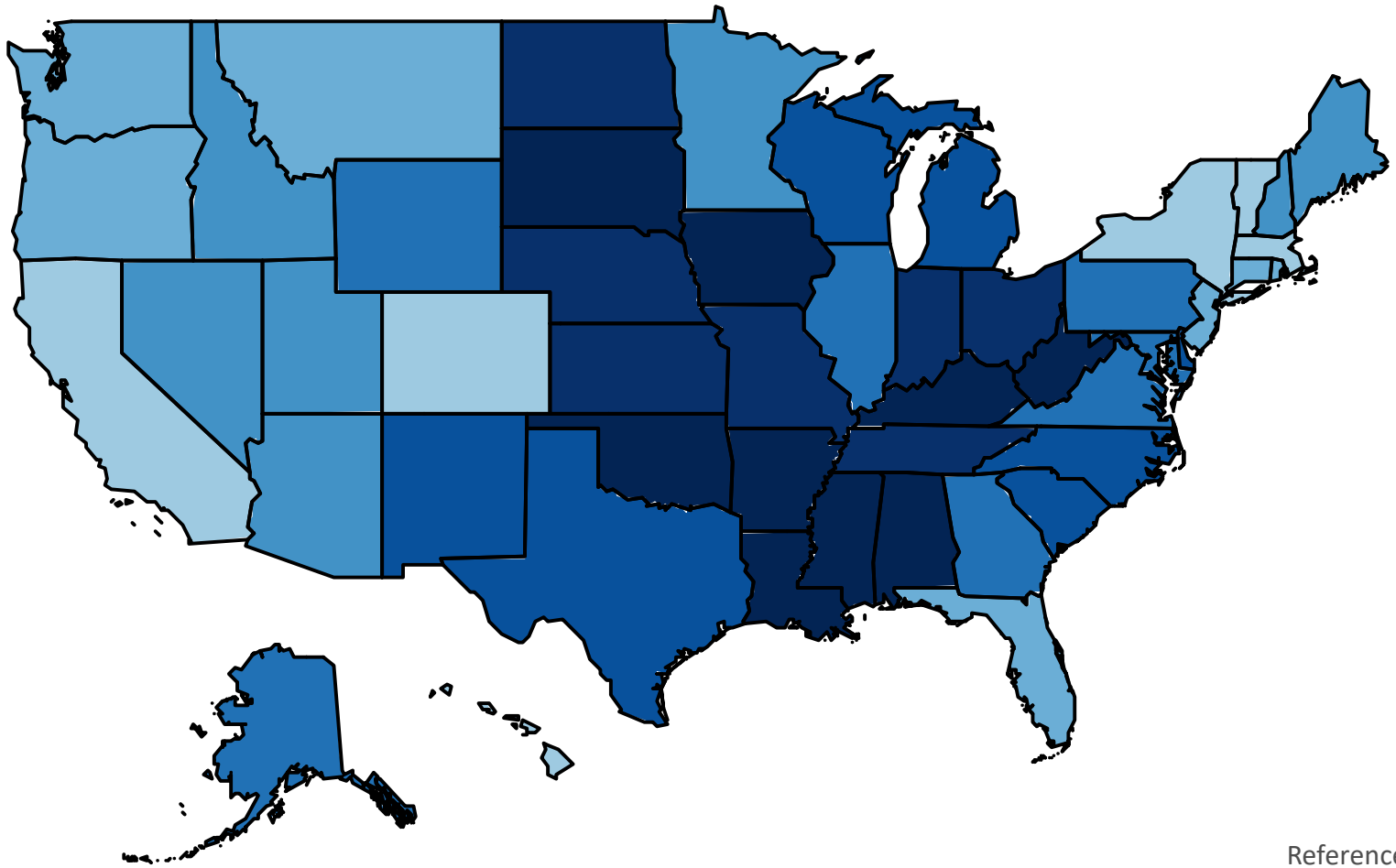
Percentage of Americans Over Age 20
Who Are Overweight or Have Obesity[2]



References: **1.** https://www.cdc.gov/nchs/about/factsheets/factsheet_nhanes.htm. **2.** https://www.cdc.gov/nchs/fastats/obesity-overweight.htm

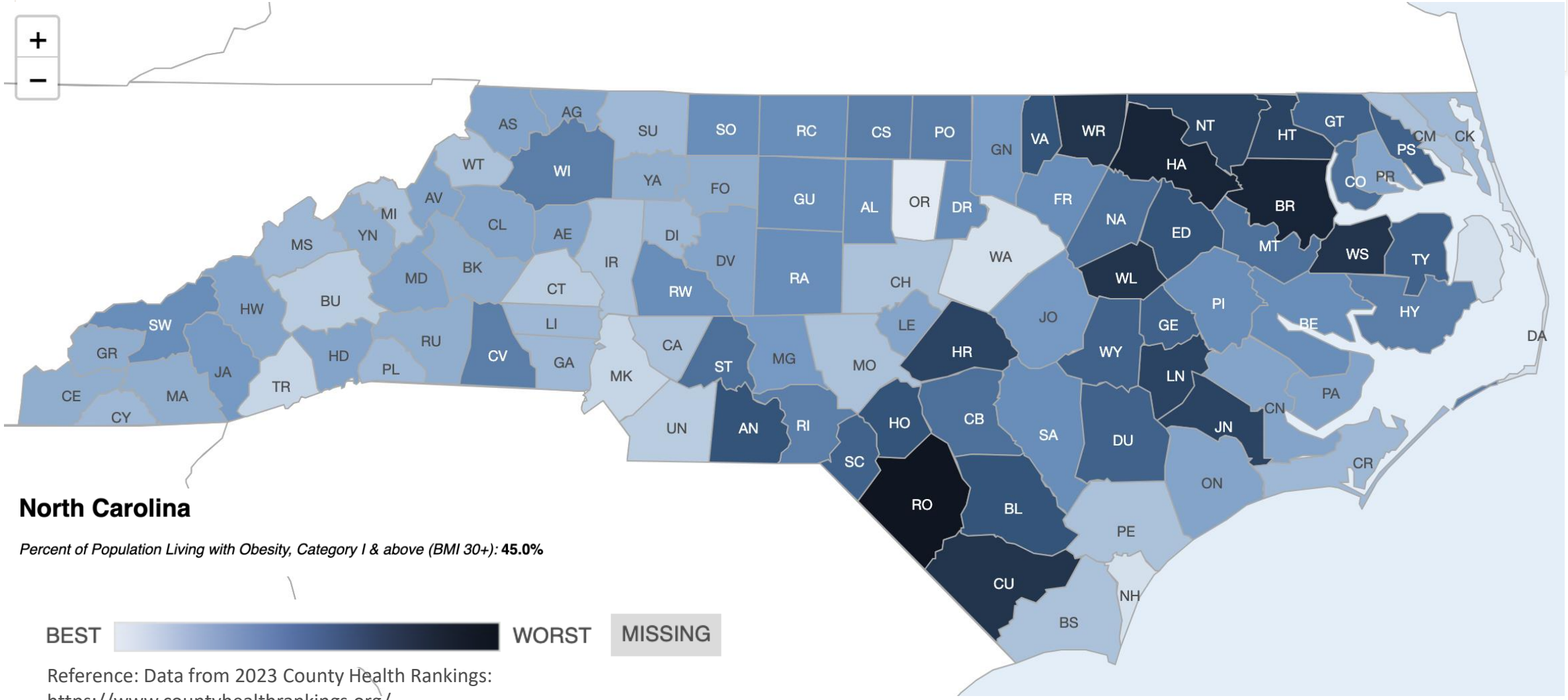
Percent of Population Living with Obesity

Both sexes, All races, All areas, All education levels, All ages, 2019-2021, Age-adjusted (2000 Std. Pop.)



Reference:
https://obesitymap.norc.org./obesityrates

OBESITY IN NORTH CAROLINA

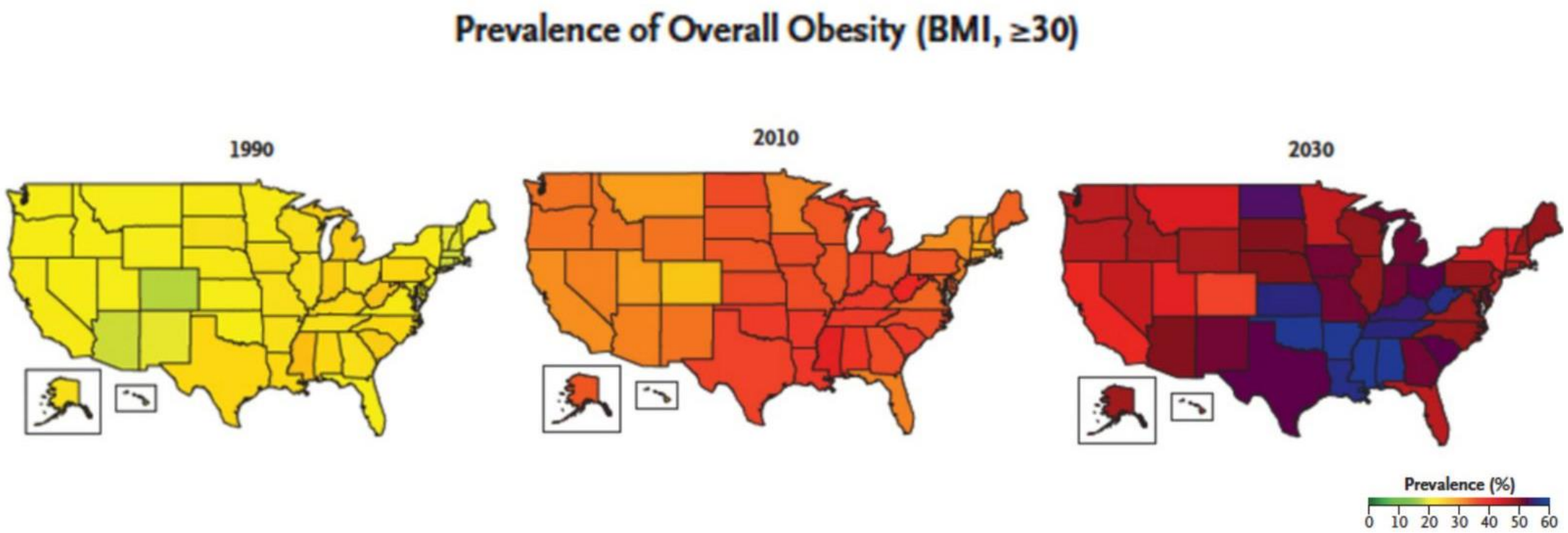


North Carolina

Percent of Population Living with Obesity, Category I & above (BMI 30+): **45.0%**

BEST WORST MISSING

Reference: Data from 2023 County Health Rankings: https://www.countyhealthrankings.org/

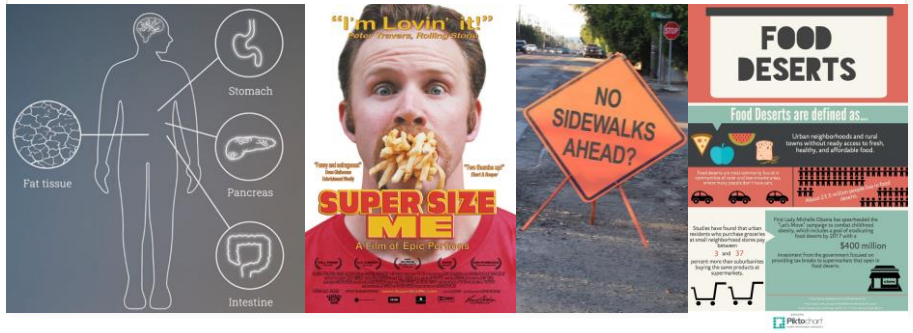


EPIDEMIOLOGY

OBESITY: CAUSES

- Internal causes
- External causes

Remember, while some factors are within a patient's control, other factors are not



OBESITY: EFFECTS

Deranged endocrine and Immune Responses

Sick Fat Disease (SFD) (Adiposopathy)

Endocrine/metabolic:

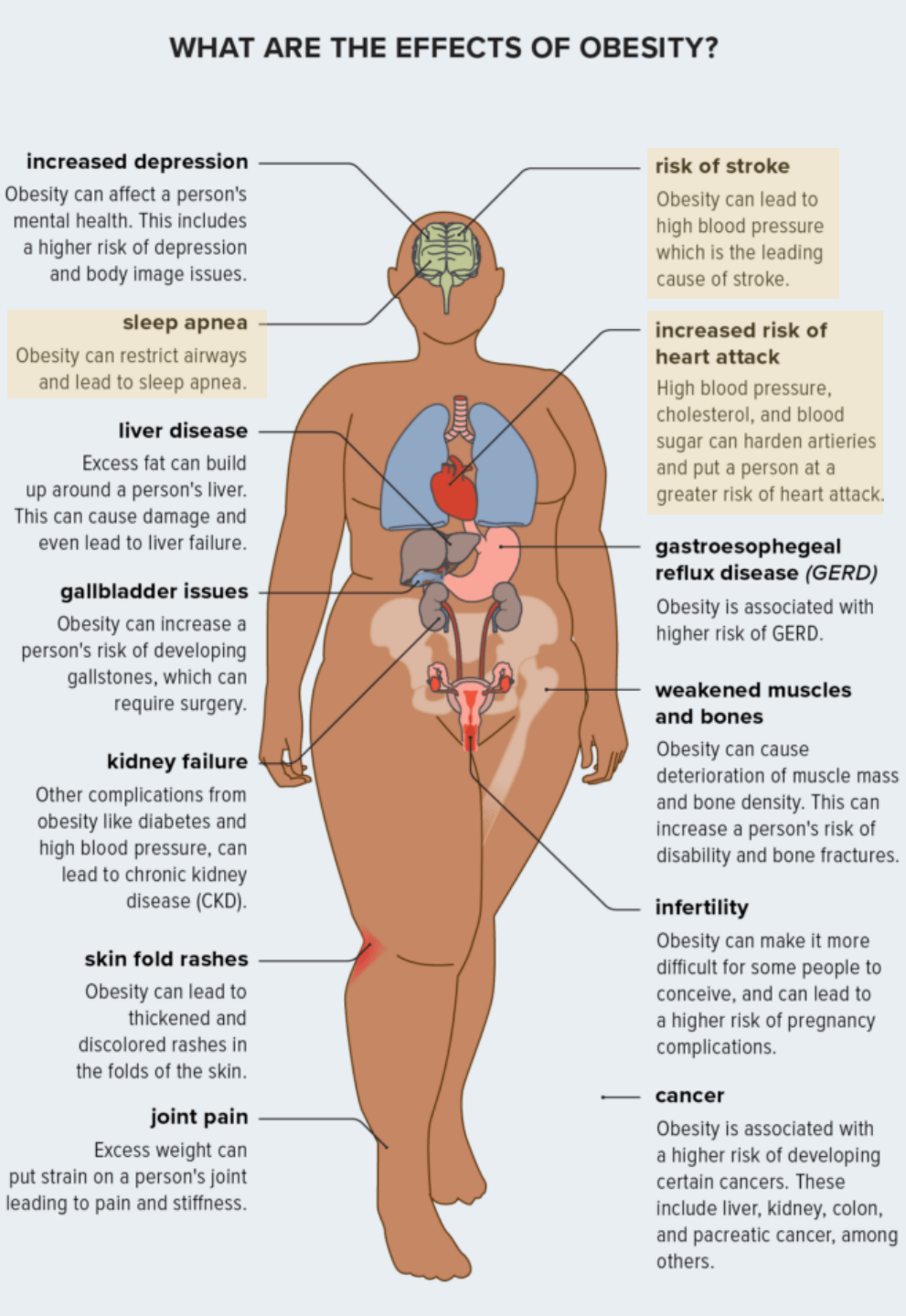
- Elevated blood glucose
- Elevated blood pressure
- Dyslipidemia
- Other metabolic diseases

Abnormal and Pathologic Physical Forces

Fat Mass Disease (FMD)

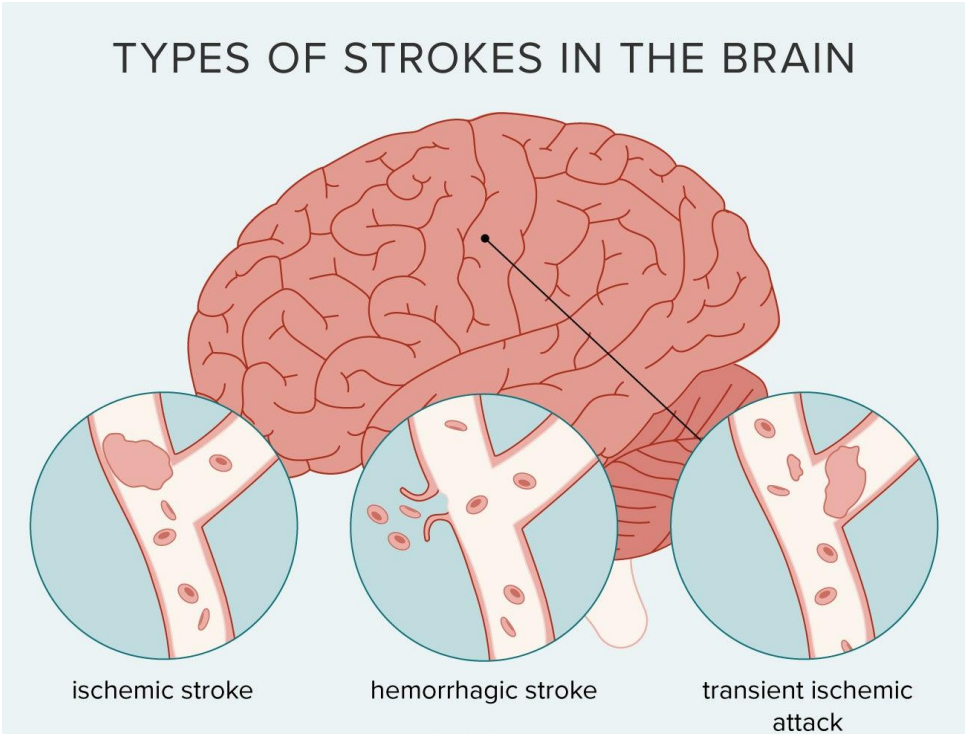
Biomechanical/structural:

- Stress on weight-bearing joints
- Immobility
- Tissue compression (i.e., sleep apnea, gastrointestinal reflux, high blood pressure, etc.)
- Tissue friction (i.e., intertrigo, etc.)



OBESITY & STROKE RISK

- Ischemic strokes = 87%
- Hemorrhagic strokes = 13%



QUICK LITERATURE REVIEW

- Over 60 published studies, between 1983 and 2023, have examined the association between obesity and cerebrovascular disease.
- **For every 1 unit increase in BMI (≈7 pounds), risk of ischemic stroke increases by ≈5%**

Prevention Conference VII

Obesity, a Worldwide Epidemic Related to Heart Disease and Stroke: Executive Summary

Robert H. Eckel, David A. York, Stephan Rössner, Van Hubbard, Ian Caterson, Sachiko T. St. Jeor, Laura L. Hayman, Rebecca M. Mullis and Steven N. Blair

Originally published 2 Nov 2004 | https://doi.org/10.1161/01.CIR.0000140086.88453.9A | Circulation. 2004;110:2968–2975

Excess Body Weight and Incidence of Stroke

Meta-Analysis of Prospective Studies With 2 Million Participants

Pasquale Strazzullo, Lanfranco D'Elia, Giulia Cairella, Francesca Garbagnati, Francesco P. Cappuccio and Luca Scalfi

Originally published 18 Mar 2010 | https://doi.org/10.1161/STROKEAHA.109.576967 | Stroke. 2010;41:e418–e426

J Neurol Sci. 2017 Dec 15:383:1-4. doi: 10.1016/j.jns.2017.10.012. Epub 2017 Oct 13.

The effect of metabolic syndrome and obesity on outcomes of acute ischemic stroke patients treated with systemic thrombolysis

Demet Funda Bas [1], Atilla Ozcan Ozdemir [2]

Neuropsychiatr Dis Treat. 2020; 16: 2045–2052.
Published online 2020 Sep 7. doi: 10.2147/NDT.S264300
PMCID: PMC7494389
PMID: 32982243

Metabolic Syndrome Predicts Poor Outcome in Acute Ischemic Stroke Patients After Endovascular Thrombectomy

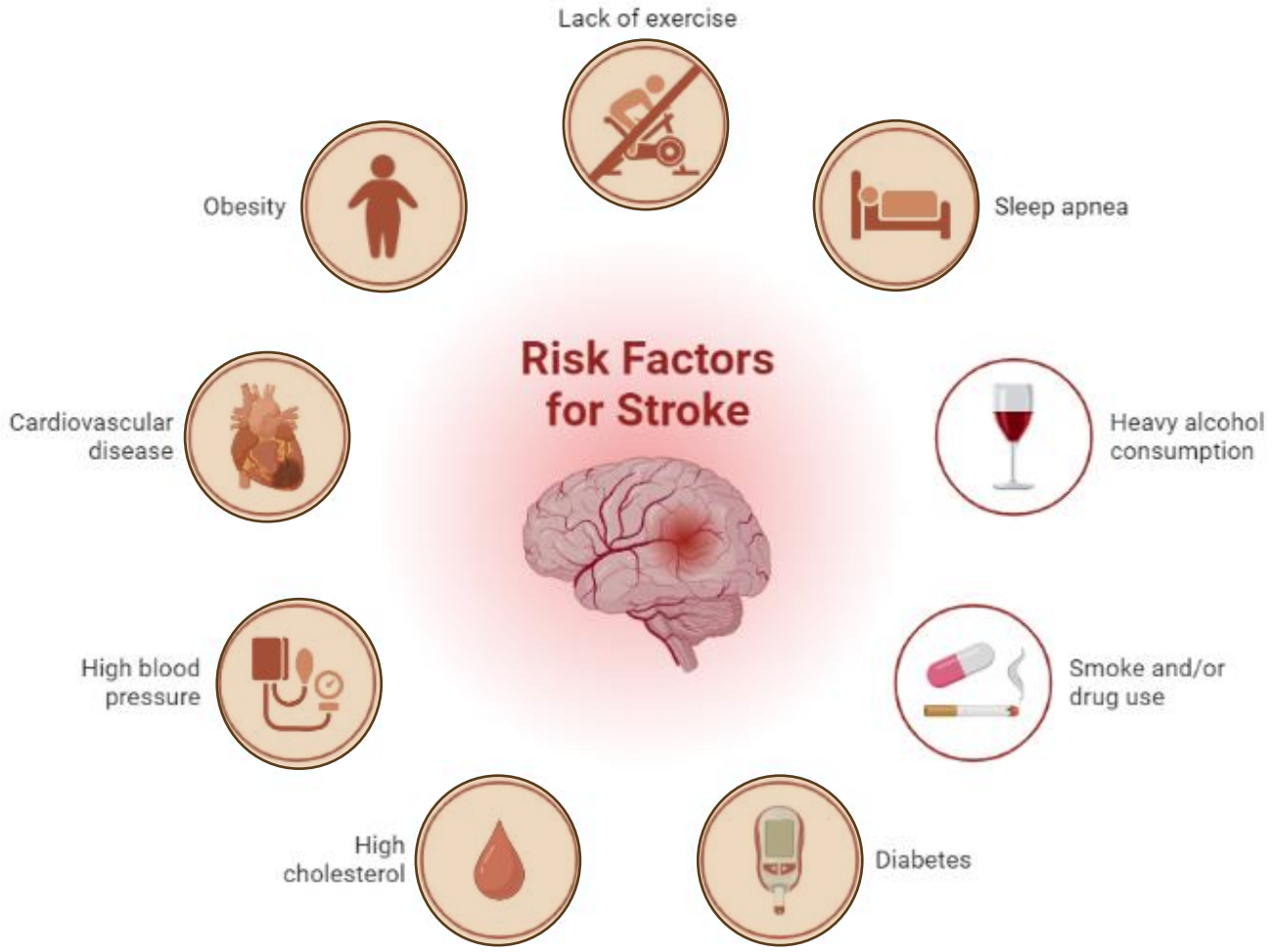
Zhonglun Chen,[1] Mouxiao Su,[1] Zhaokun Li,[1] Hongcai Du,[1] Shanshan Zhang,[1] Mingjun Pu,[1] and Yun Zhang[1]

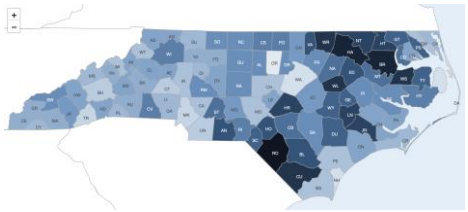
RISK FACTORS FOR STROKE

ASCVD (Atherosclerotic Cardiovascular Disease) 2013 Risk Calculator from AHA/ACC ☆

Determines 10-year risk of heart disease or stroke.

Age This calculator only applies to individuals 40-75 years of age.	Norm: 20 - 79	years
Diabetes	**No**	Yes
Sex	Female	Male
Smoker	**No**	Yes
Total cholesterol	Norm: 150 - 200	mg/dL ⇆
HDL cholesterol	Norm: 0 - 60	mg/dL ⇆
Systolic blood pressure	Norm: 100 - 120	mm Hg
Treatment for hypertension	**No**	Yes





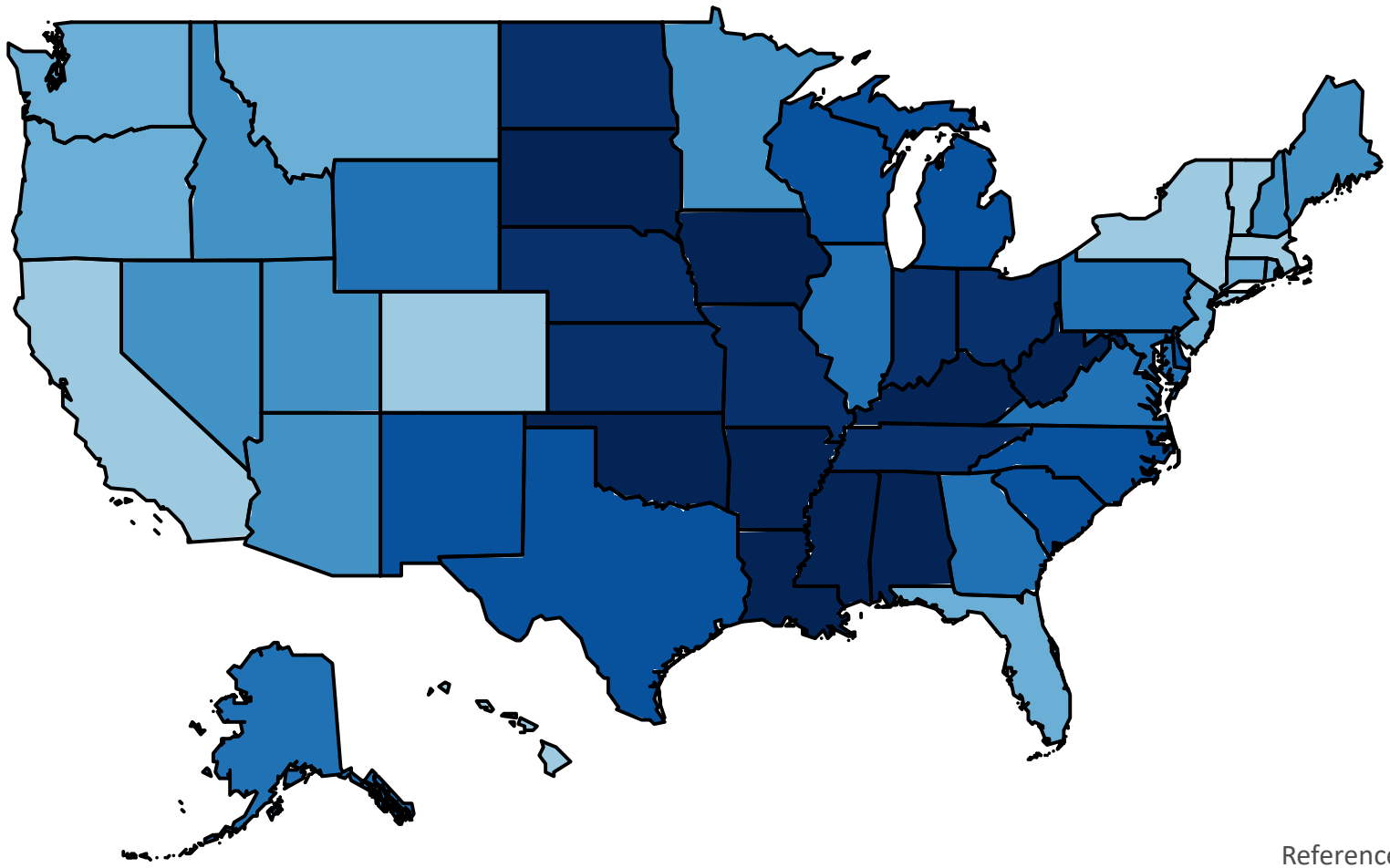
	Both sexes, All races, All areas, All education levels, All ages, 2021, Age-adjusted (2000 Std. Pop.)	
	North Carolina	United States
Percent of Population Living with Obesity, Category I & above (BMI 30+)	45.0%	42.7%
Percent of Population Living with Obesity, Category II & above (BMI 35+)	23.0%	21.0%
Percent of Population Living with Obesity, Category III (BMI 40+)	10.4%	9.4%
Percent of Population who have Cardiovascular Disease	8.4%	7.5%
Percent of Population who have had a Heart attack	3.9%	3.6%
Percent of Population who have had a Stroke	3.5%	2.9%
Percent of Population who have Angina/Coronary Heart Disease	4.0%	3.4%
Percent of Population who have Diabetes (any onset)	10.9%	10.0%
Percent of Population who have Hypertension	31.8%	30.0%
Percent of Population who have Dyslipidemia	30.3%	29.4%

RISK FACTORS FOR STROKE

- North Carolina is part of the nation's "Stroke Belt."
- Eastern NC is in the "buckle" of the Stroke Belt, where stroke mortality is 40% higher than national average & hospital readmission rates are the highest in NC.
- (Tobacco use is likely a secondary independent risk factor)

Percent of Population Living with Obesity

Both sexes, All races, All areas, All education levels, All ages, 2019-2021, Age-adjusted (2000 Std. Pop.)



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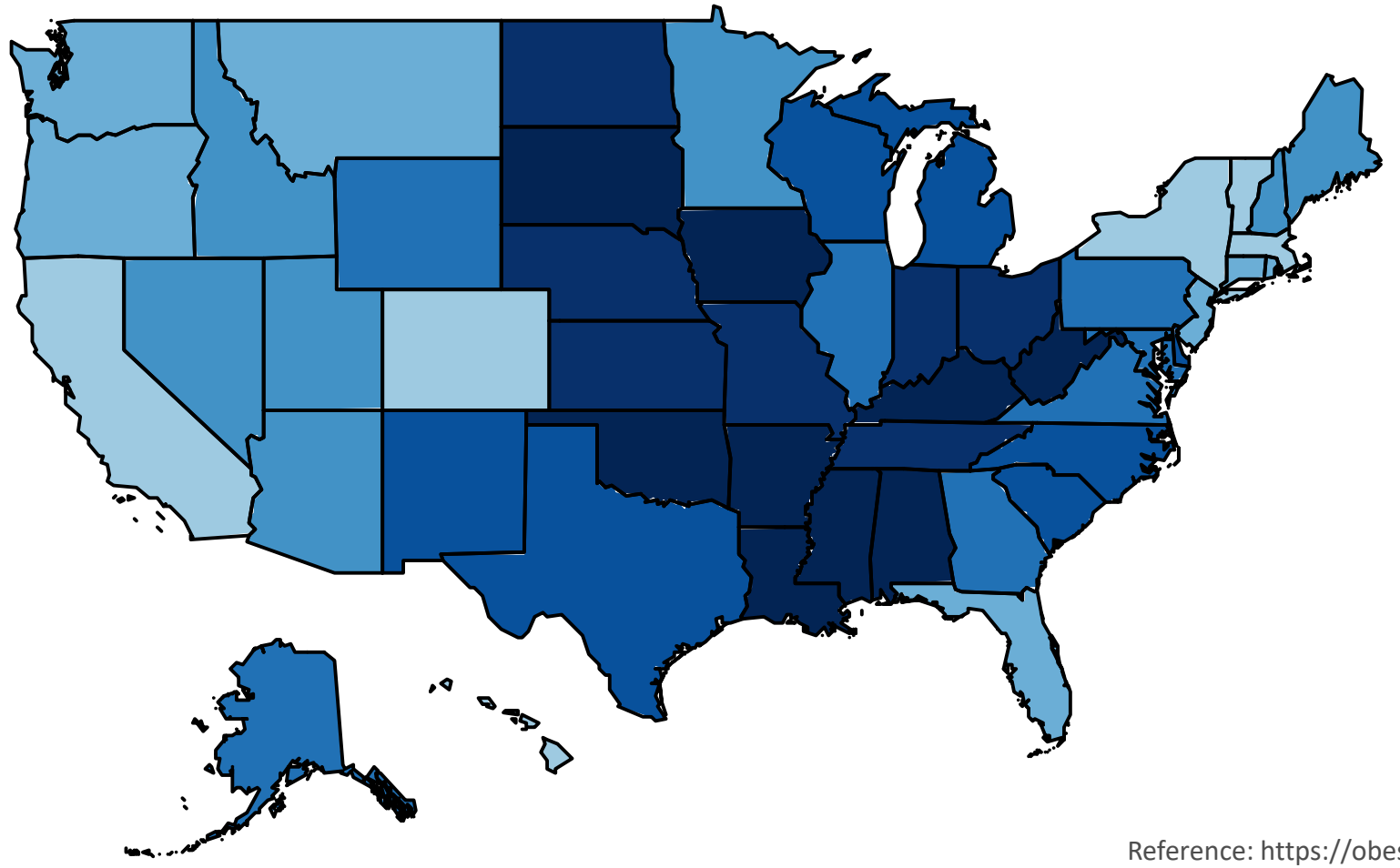
Percent of Population Living with Obesity



Reference: https://obesitymap.norc.org./obesityrates-overlay-stroke

Patient Simulation

Stroke symptoms --> EMS call	Emergency department	Urgent imaging	Thrombectomy
Hospital admission	Outpatient follow up	PT/OT	Patient returns home

Meet Amy

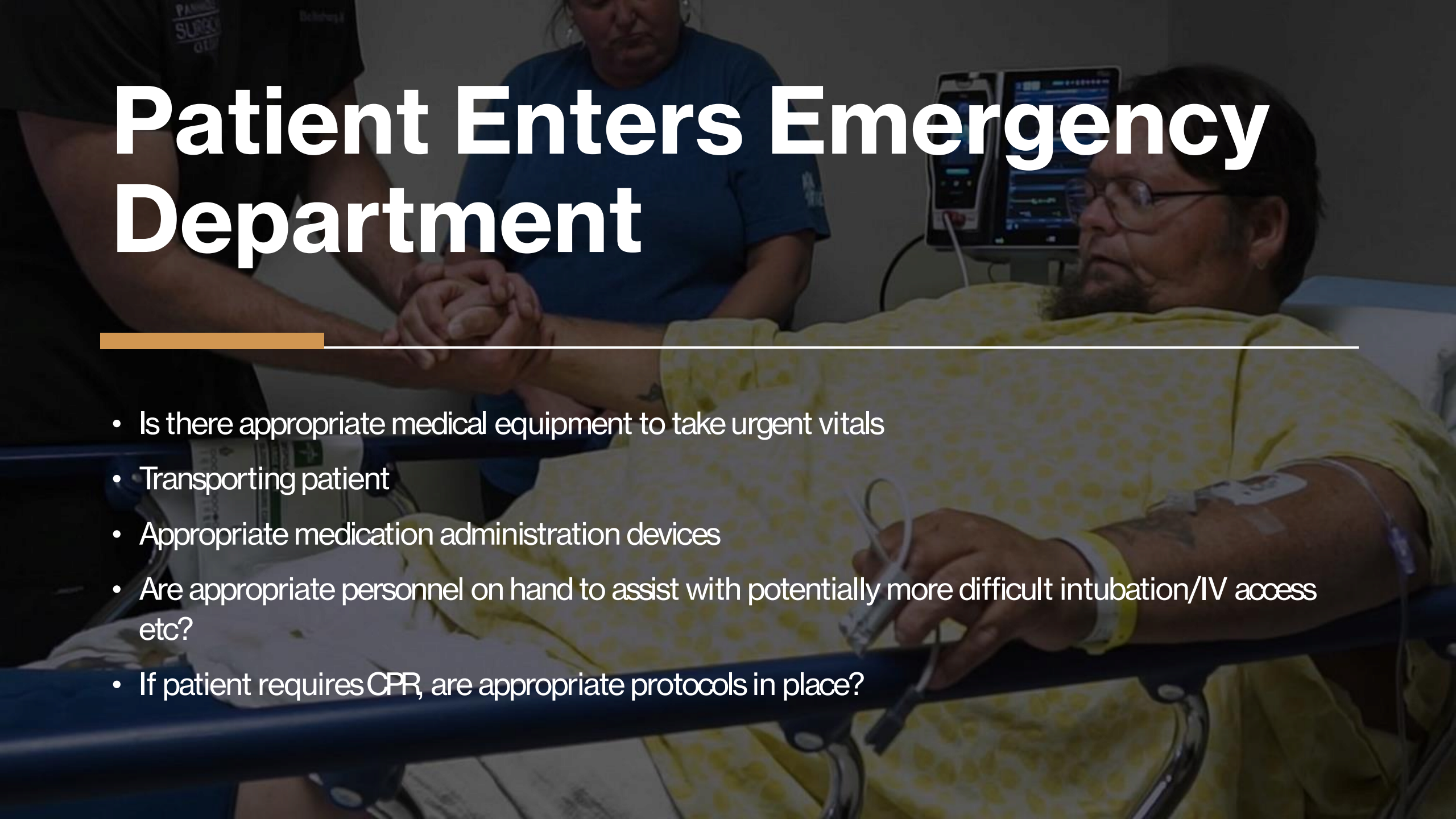
Amy is a 55-y.o. female with a BMI of 76 kg/m^2 (net weight 530 lbs). She has history of HTN, HLD, prediabetes (last Hba1c 6.2%), lipedema, and OSA on CPAP. Her medications include amlodipine, atorvastatin, and metformin. She used to smoke ½ ppd but quit around 15 years ago, and she only consumes alcohol on special occasions.

She lives at home with her husband and step-daughter in a 2nd story duplex in Wilkes county, NC. Her physical activity is somewhat limited due to lipedema and knee pain, but she can ambulate up and down stairs if she leans on the railings. She occasionally uses a cane for longer walks but is fully independent in her ADLs/IADLs.

She works as a secretary for a local lumber company, and mostly works from home. She tries to eat a low sodium and low carb diet due to her other health conditions, and she enjoys cooking for her family, but often struggles with obtaining fresh foods, as the nearest grocery is over 25 minutes away in here rural county. She enjoys singing and playing guitar in her free time and helps with the choir and instrumentals at her church.

EMS is called for patient with stroke-like symptoms

- Is appropriate information communicated on EMS call to bring appropriate personnel and equipment
- Consider stair and door access
- Are there any airlift protocols?
- Which hospital should patient be transported to
  - Is there a list of bariatric-accommodating regional hospitals?

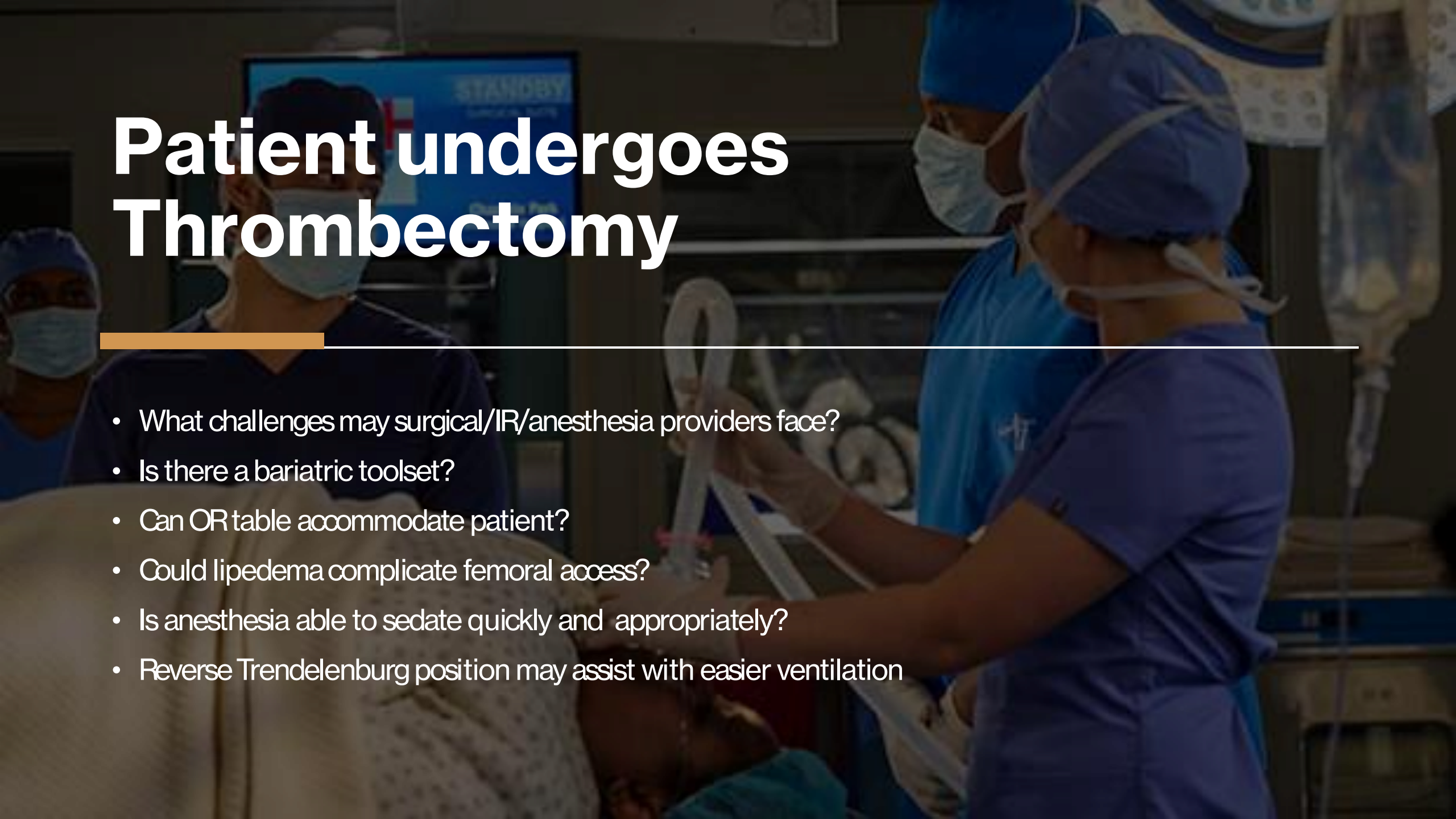


Patient Enters Emergency Department

- Is there appropriate medical equipment to take urgent vitals
- Transporting patient
- Appropriate medication administration devices
- Are appropriate personnel on hand to assist with potentially more difficult intubation/IV access etc?
- If patient requires CPR, are appropriate protocols in place?

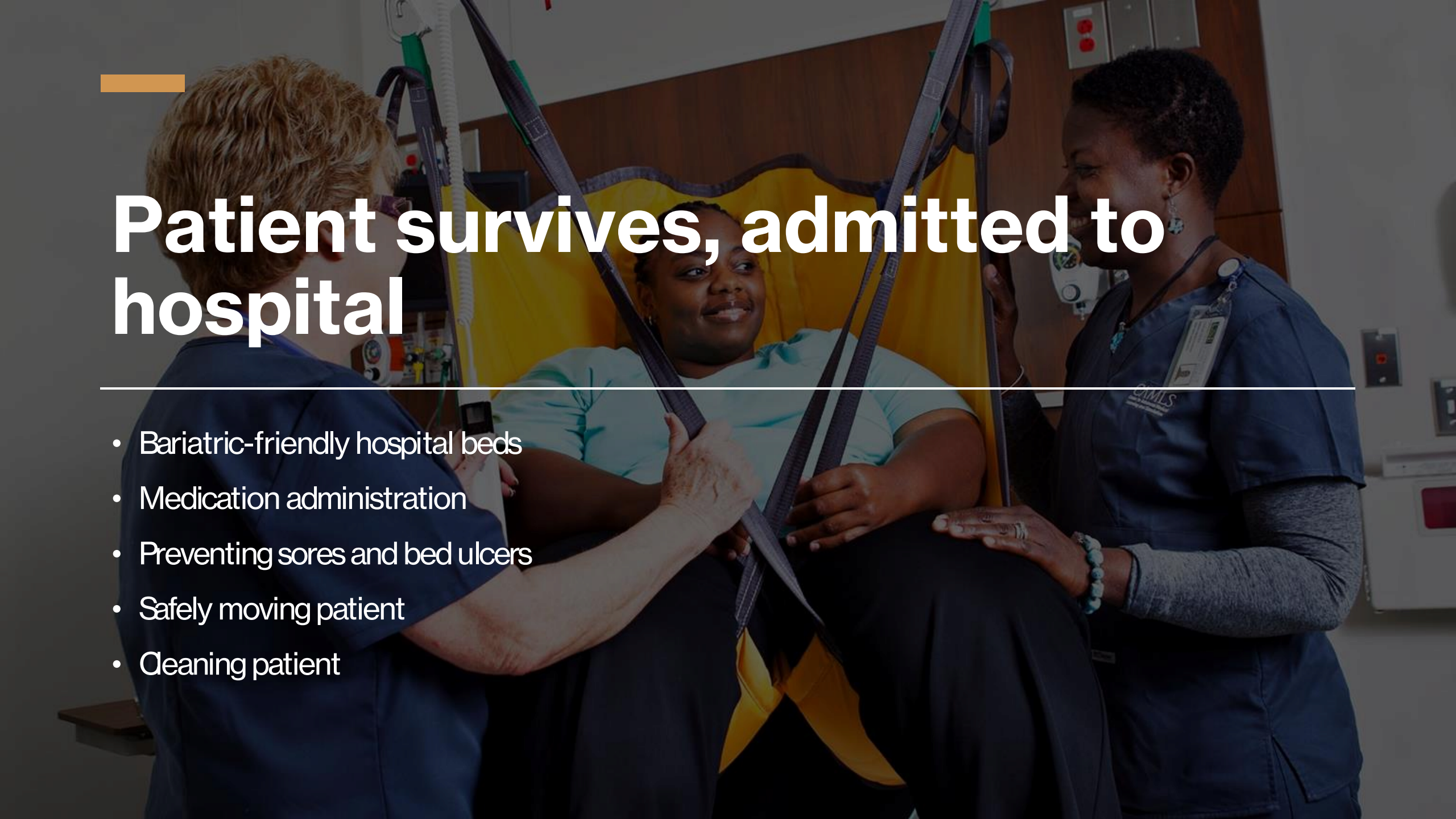
Patient needs urgent imaging

- Will patient be able to fit in CT/MRI scanner/ on
- Average CT scanner weight limit is 500 lbs, though some bariatric CT scanners may be able to accommodate up to 650 pounds
- Average bore size/ gantry aperature between 70-78 cm
- How may image quality be affected?



Patient undergoes Thrombectomy

- What challenges may surgical/IR/anesthesia providers face?
- Is there a bariatric toolset?
- Can OR table accommodate patient?
- Could lipedema complicate femoral access?
- Is anesthesia able to sedate quickly and appropriately?
- Reverse Trendelenburg position may assist with easier ventilation



Patient survives, admitted to hospital

- Bariatric-friendly hospital beds
- Medication administration
- Preventing sores and bed ulcers
- Safely moving patient
- Cleaning patient

Patient attends outpatient hospital follow-up

- Patient transportation
- Chairs and exam tables
- BP cuff
- Scale
- Physical exam/ neuro exam

Patient attends stroke rehab: PM&R/PT/OT

- Moving and assisting patient
- Functional rehabilitation
- Appropriate sized braces/bars/devices etc

Amy comes home!

- What challenges may Amy face once she returns home?
- What resources could able to provide her and her family?
- Will she need assistance with ADLs/IADLs?
- What DME may be appropriate?
- If she experiences another stroke, what could we change this time around?

CONCLUSIONS

- Weight bias causes healthcare disparities
  - Less likely to engage in preventative health services
  - Under/misdiagnosis
  - Structural barriers
    - medical equipment – BP cuff
    - OR tables
    - MRI/CT scanners
  - Surgery weight cut offs


Questions?
Thank you!