



Social Determinants of Health and Obesity in WV, Training our Next Generation of Physicians

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Learning Objectives

- 1 Define social determinates of health and health disparities
- 2 Identify health disparities in West Virginia
- 3 Know how health disparities affect health and weight
- 4 Knowledge on options to implement changes to patient approach based on health disparities



Social Determinates of Health: They are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life.¹

Health disparities: Preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations.²



1. "Social Determinants of Health." *World Health Organization*, World Health Organization, https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1.
2. "Health Disparities." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 24 Nov. 2020, <https://www.cdc.gov/healthyyouth/disparities/index.htm>.



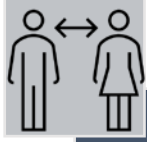
Economic Stability

- Employment
- Income
- Expenses
- Debt
- Medical Bills
- Support



Neighborhood and Built Environment

- Housing
- Transportation
- Safety
- Parks
- Playground
- Walkability



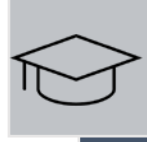
Social and Community Context

- Social Integration
- Support Systems
- Community Engagement
- Discrimination
- Food Access



Health Care and Quality

- Health Coverage
- Provider Availability
- Cultural Competency
- Quality of Care



Education Access and Quality

- Literacy
- Childhood Education
- Vocational Training
- Higher Education

Clinical Vignette:

Blake Brookhaven is a 12-year-old male who presents with his grandma with concerns about him having extra weight. Blake lives with his mom, about 1 mile from his grandma. He is in 7th grade. He states that he doesn't really like vegetables and he sometimes eats fruit. He enjoys screens and tends to spend his evenings on screens. His grandma thinks he sleeps well. Does well with school. He tends to skip breakfast and eats school lunch. He tends to drink chocolate milk at school and at home he drinks coke regularly. He lives in Brookhaven, WV.

PMHx: Reflux

Medications: None

Exam: Vitals: Weight 212% of the 95th %ile (Obesity Class 3).

Blood pressure 120/76, Pulse 89, RR: 14

Acanthosis nigricans noted on posterior cervical region and also in his antecubital fossa.

Heart: RRR no M/R/G

Lungs: CTAB

Abdomen: Enlarged liver noted.

Labs: CBC – nml, AST 60 (H), ALT 75 (H). Hgb A1C - 6.8 (H)



Clinical Vignette:

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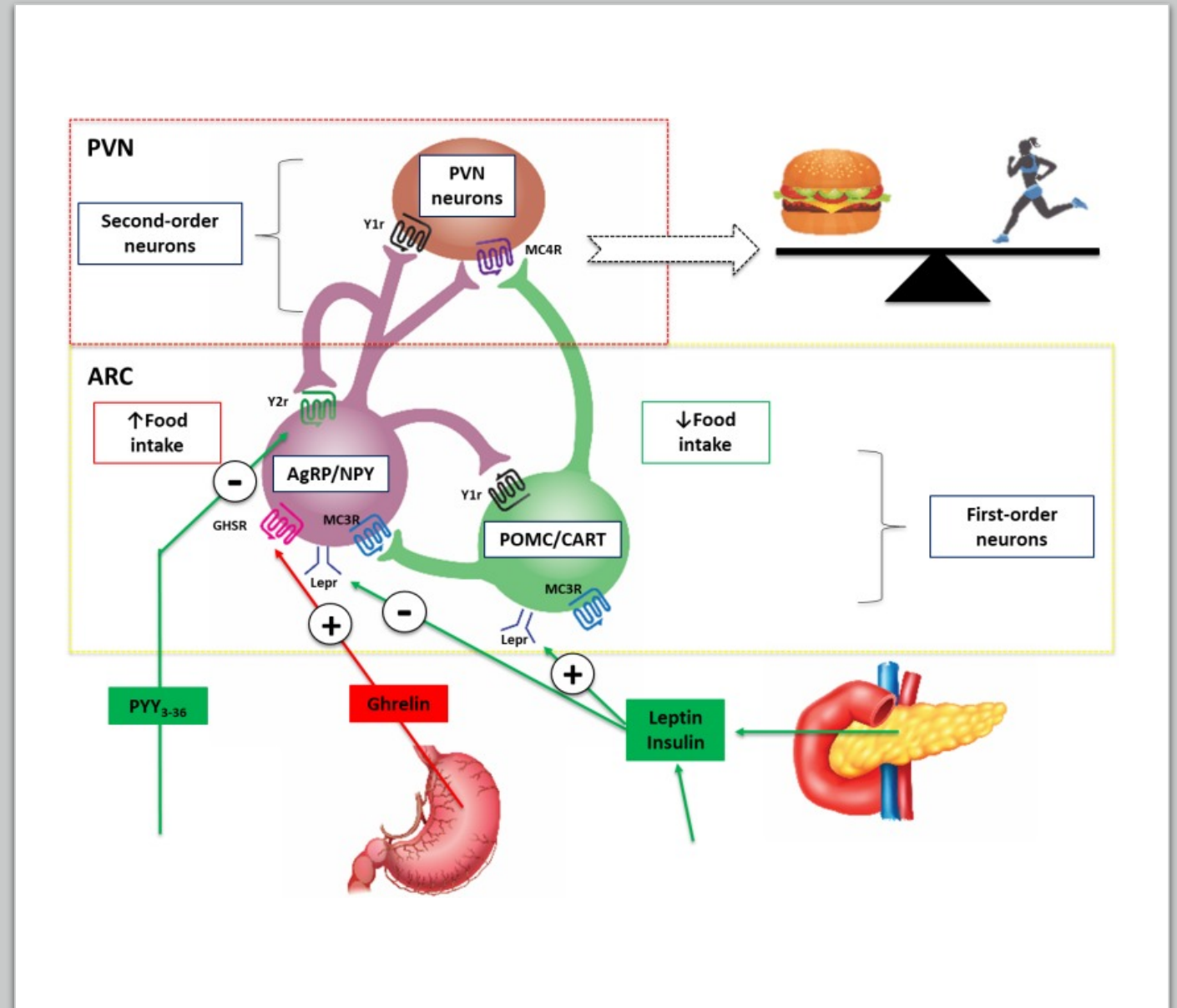
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Labs: CBC – nml, AST 60, ALT 45. Hgb A1C - 6.8



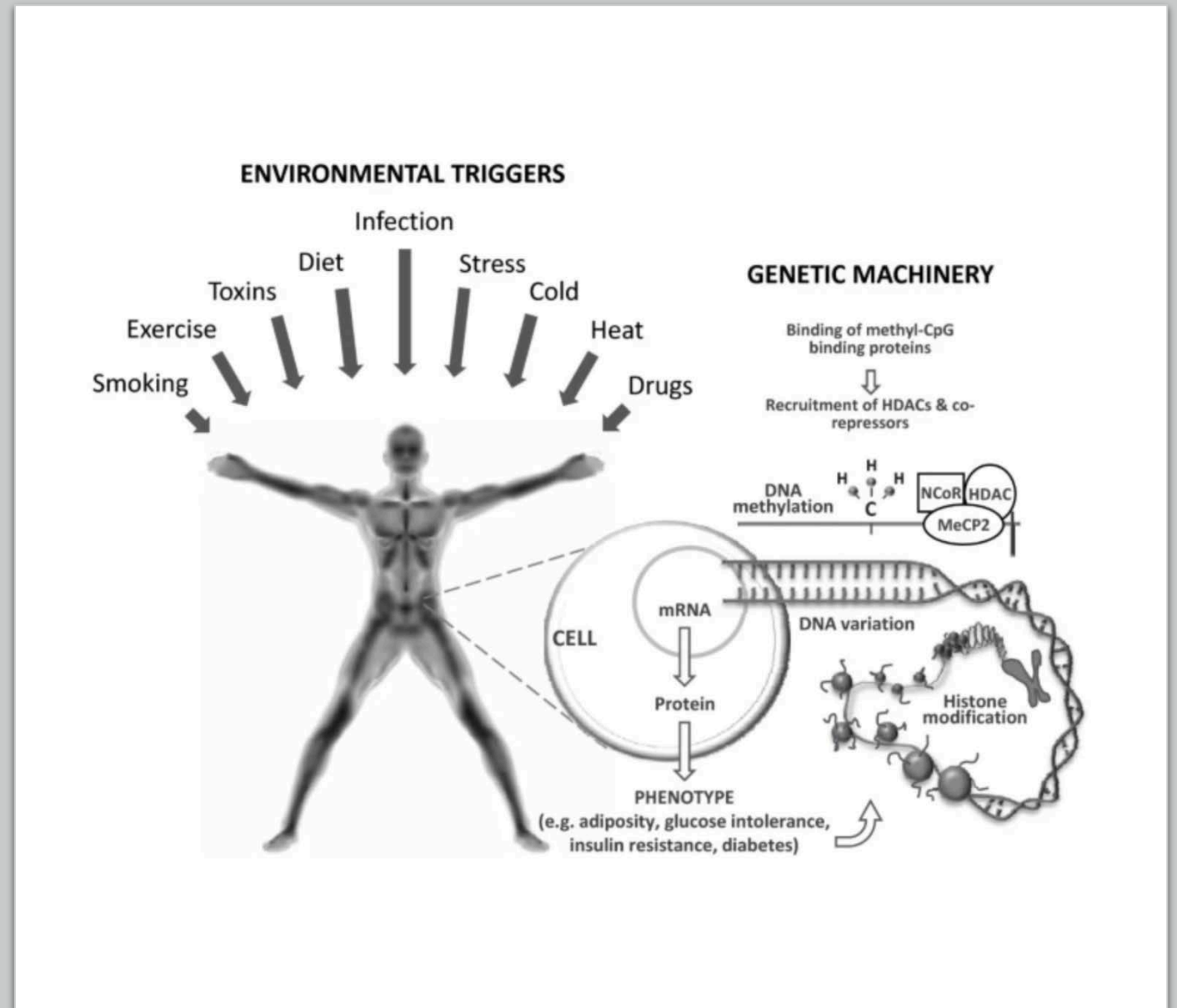
Obesity: The Chronic Disease

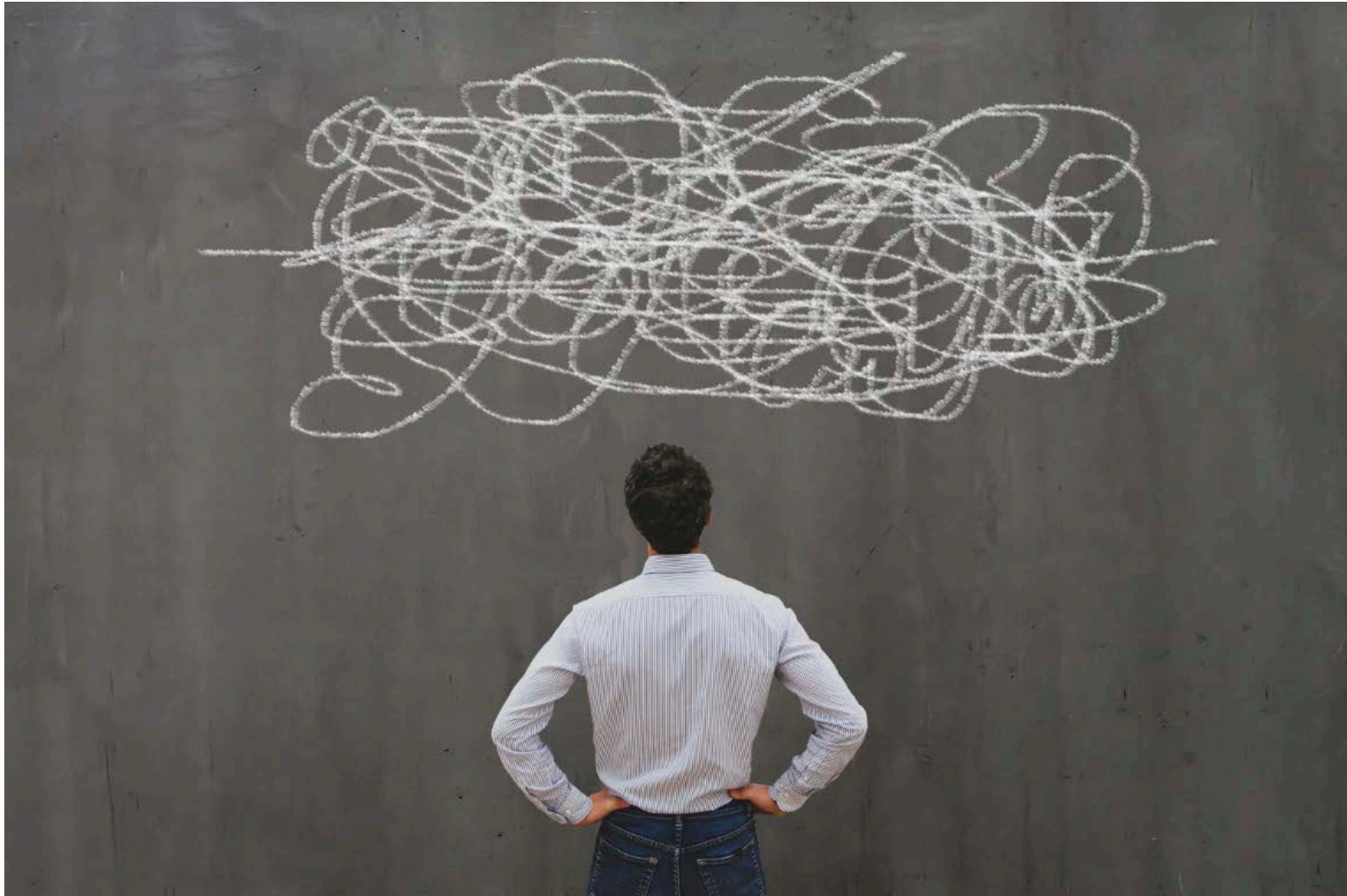
Chronic, relapsing, multi-factorial, neurobehavioral disease, wherein an increase in body fat promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical, and psychosocial health consequences.



Epigenetics in Obesity

- Epigenetics refers to the study of heritable changes in gene function that do not involve changes to the underlying DNA sequence.
- Epigenetic changes can be influenced by a variety of factors, including environmental factors such as diet and exposure to toxins, as well as certain medical conditions.

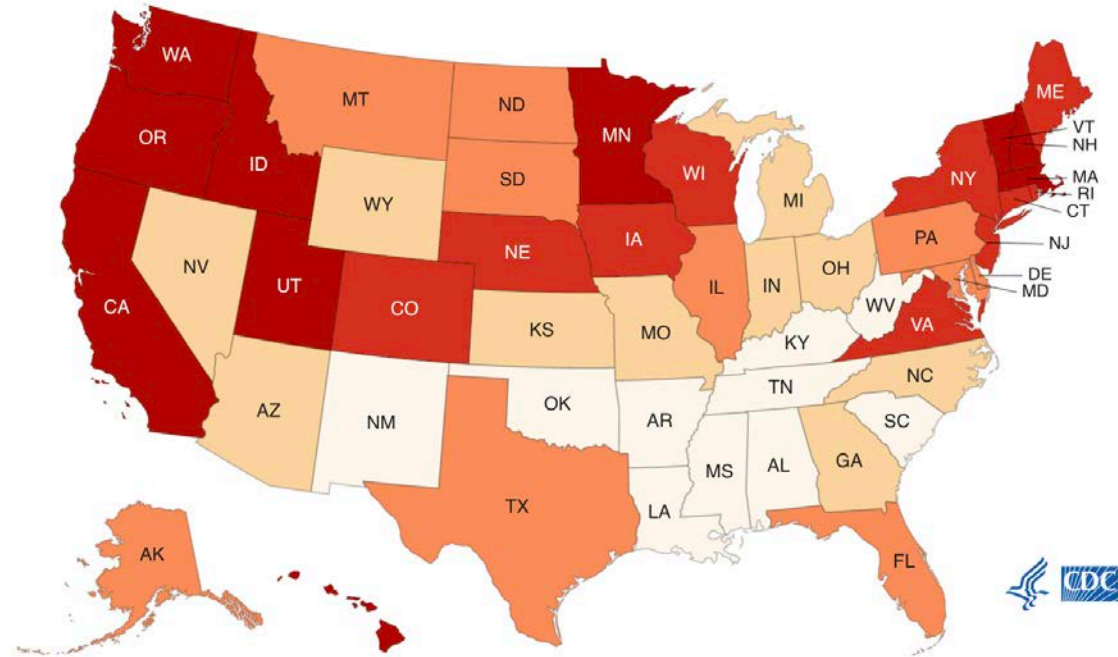




“Obesity isn’t rocket science, it’s much more complicated.” - Dr. George Bray

Health and WV:

WV Life expectancy: 72.8 yo
US Life expectancy: 79.1 yo
Japan Life expectancy: 85 yo



Life Expectancy at Birth



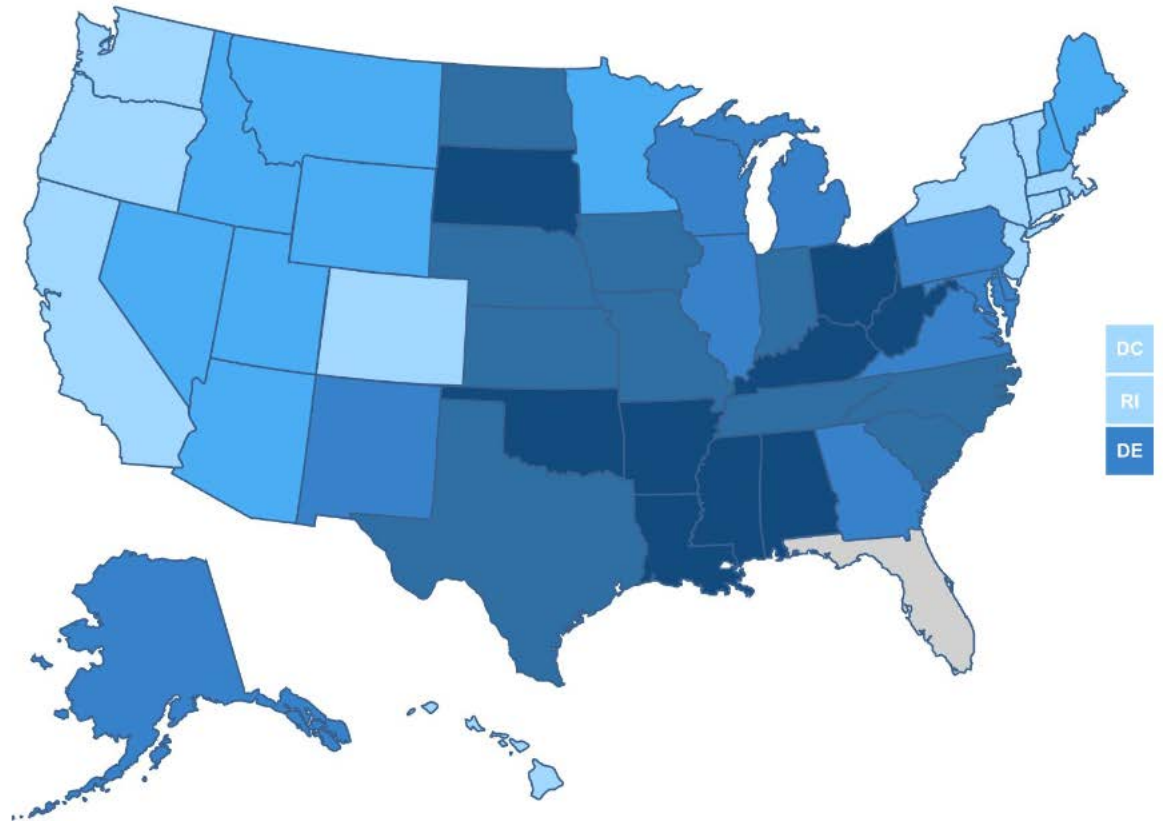
SOURCE: National Center for Health Statistics, National Vital Statistics System, 2020 data.



Obesity and WV:

West Virginia: 40.6%

United States: 33.9%

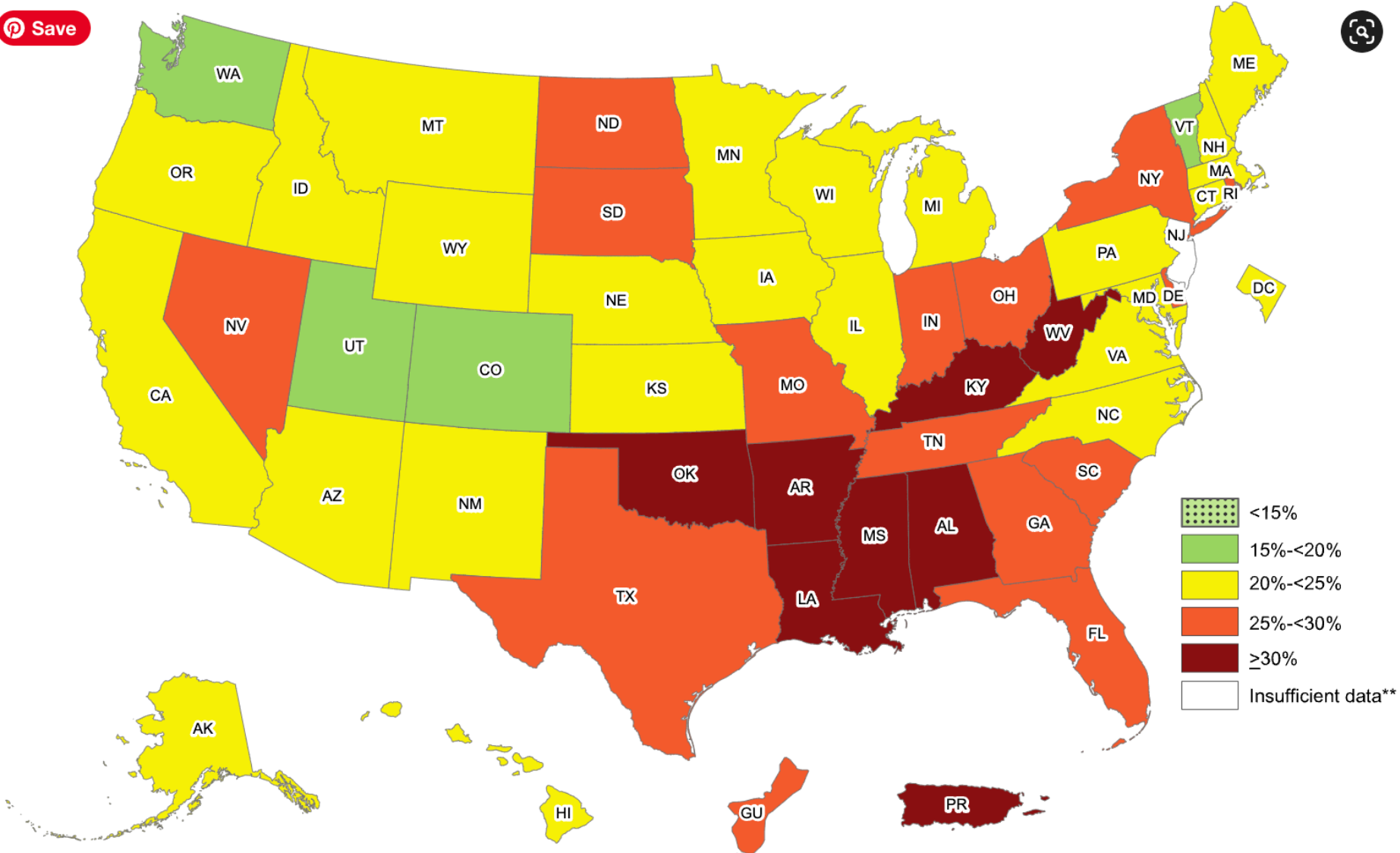


Source: CDC, Behavioral Risk Factor Surveillance System, 2021 Data



Prevalence of Self-Reported Physical Inactivity* Among US Adults by State and Territory, BRFSS, 2017–2020

Save



Source: [Behavioral Risk Factor Surveillance System](#)

Some contributors to life expectancy

1

Poverty

2

Lack of access to healthcare

3

Obesity and other chronic diseases

4

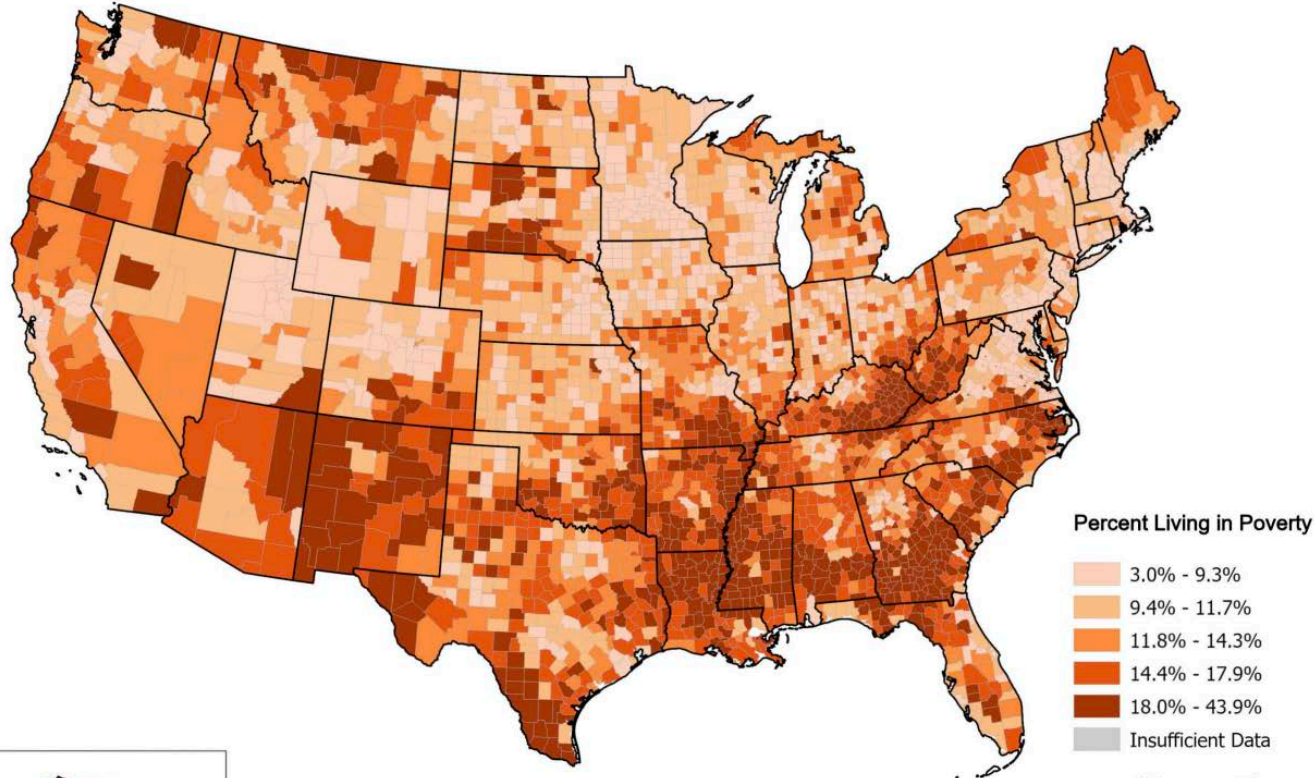
Disability

5

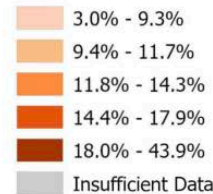
Healthy food access

Poverty

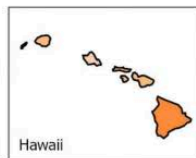
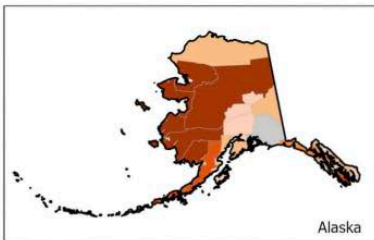
Percent of Population Living in Poverty,
2020 by County



Percent Living in Poverty



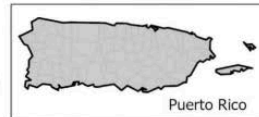
Data source and methodology found at:
www.cdc.gov/dhbsp/maps/atlas/statistical-methods



Guam

Northern
Mariana
Islands

American
Samoa



The 2020 Census found that about 278,734, or 16.8 percent, of West Virginians were living below the federal poverty threshold of \$26,500 for a family of four.

National poverty rate was 11.4 percent.

Rank: 46th overall

1

Poverty

1. Inadequate housing
2. Limited access to healthcare and preventive services.
3. Higher exposure to environmental toxins and pollutants.
4. Increased stress and mental health issues.
5. Higher rates of chronic diseases such as obesity, diabetes, and heart disease.
6. Higher rates of infectious diseases.
7. Higher infant and maternal mortality rates.
8. Reduced life expectancy.
9. Lack of access to education and job opportunities, which can lead to a cycle of poverty and poor health.

Poverty



Figure from Taylor L. Housing and health: an overview of the literature. Health Affairs Health Policy Brief. 2018 Jun 7;10.

Those with housing cost burden¹

- Less likely to have a usual source of medical care
- More likely to postpone needed treatment than those who access more-affordable housing.
- Face difficulty purchasing food
- More likely to lack a sufficient supply of food
- More likely to go without prescribed medications.

1. Testa A, Jackson DB. Food insecurity, food deserts, and waist-to-height ratio: variation by sex and race/ethnicity. *Journal of community health*. 2019 Jun 15;44:444-50.

How does rural and poverty affect housing?²

- Fewer employment opportunities.
- More difficulty accessing services.
- More likely to have structural problems.
- Less likely to have home ownership (22% versus 81% in WV)

2. Latimer M, Woldoff RA. Good country living? Exploring four housing outcomes among poor Appalachians. *Sociological Forum* 2010 Jun (Vol. 25, No. 2, pp. 315-333). Oxford, UK: Blackwell Publishing Ltd.

“Persons living in mountaintop mining areas experience persistently elevated poverty and mortality rates.”³

3. Hendryx M. Poverty and mortality disparities in central Appalachia: mountaintop mining and environmental justice. *Journal of Health Disparities Research and Practice*. 2010;4(3):6.

Poverty



Living in a food desert had a positive association with WHtR among both males and females.¹

1. Testa A, Jackson DB. Food insecurity, food deserts, and waist-to-height ratio: variation by sex and race/ethnicity. *Journal of community health*. 2019 Jun 15;44:444-50.

Quality of dietary intake appeared to be associated with the availability of grocery stores, higher levels of physical activity appeared to be most consistently associated with greater walkability, and lower weight status was associated with greater diversity in land-use mix.²

2. Dixon BN, Ugwoaba UA, Brockmann AN, Ross KM. Associations between the built environment and dietary intake, physical activity, and obesity: A scoping review of reviews. *Obesity Reviews*. 2021 Apr;22(4):e13171.

“...the rural food desert had significantly higher per-serving costs among the most nutritious food items...”³

3. Hardin-Fanning F, Rayens MK. Food cost disparities in rural communities. *Health promotion practice*. 2015 May;16(3):383-91.

Poverty

Those living in poverty are less likely to have access to clean drinking water.¹

Specific to WV:

- Coal mining/energy extraction
- Agriculture
- Contaminated well-water

1. VanDerslice, J. 2011. Drinking water infrastructure and environmental disparities: Evidence and methodological considerations. *American Journal of Public Health* 101: S109-S114.



1

Poverty

“A questionnaire survey was conducted in order to assess residents' perceptions of water quality for drinking and recreational purposes in a mid-sized city in northcentral West Virginia...Results show that 37% of respondents primarily use bottled water and that 58% use a household filter when drinking from the tap.”¹

1. Levêque JG, Burns RC. Predicting water filter and bottled water use in Appalachia: a community-scale case study. *Journal of Water and Health*. 2017 Jun;15(3):451-61.

“...Non-white racial/ethnic groups who disagreed that their local tap water was safe to drink were more likely to report low intake of plain water...”²

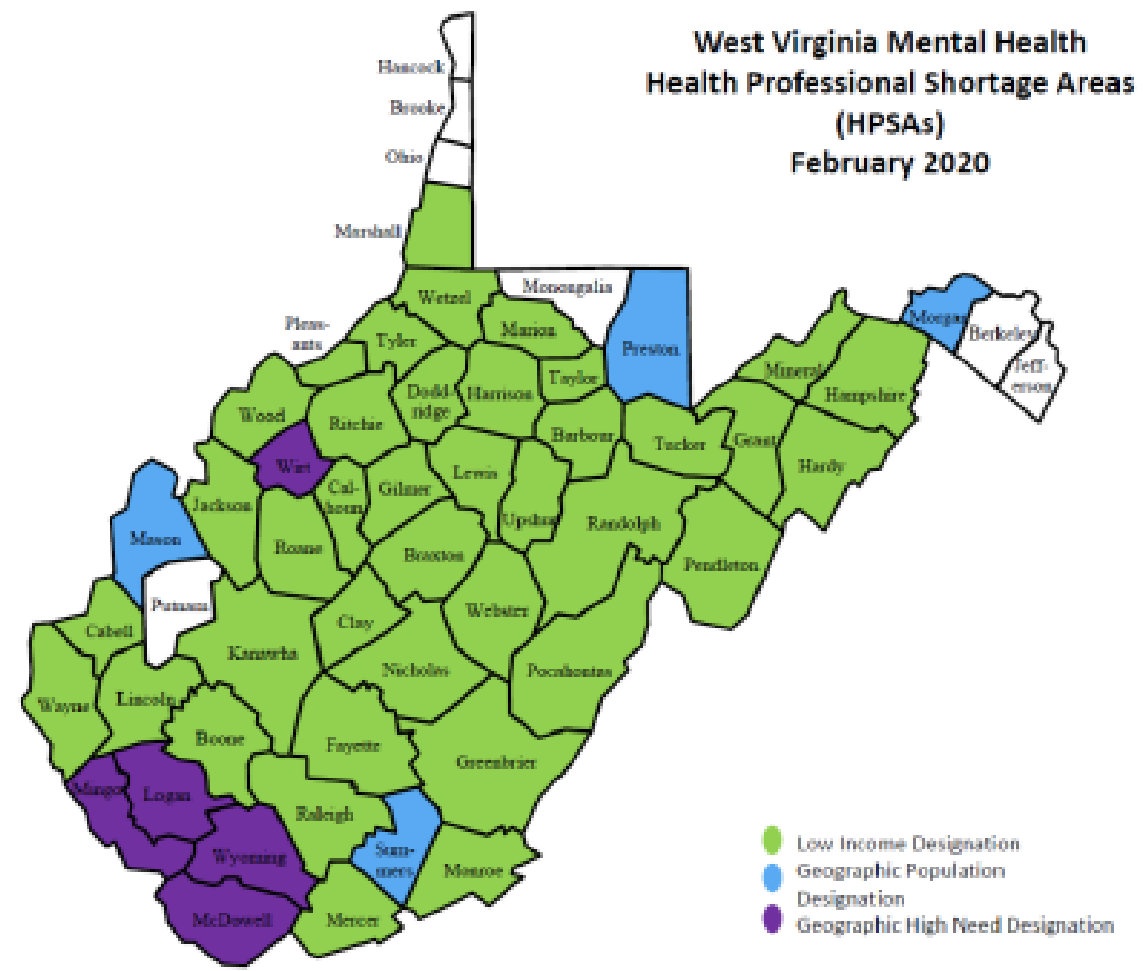
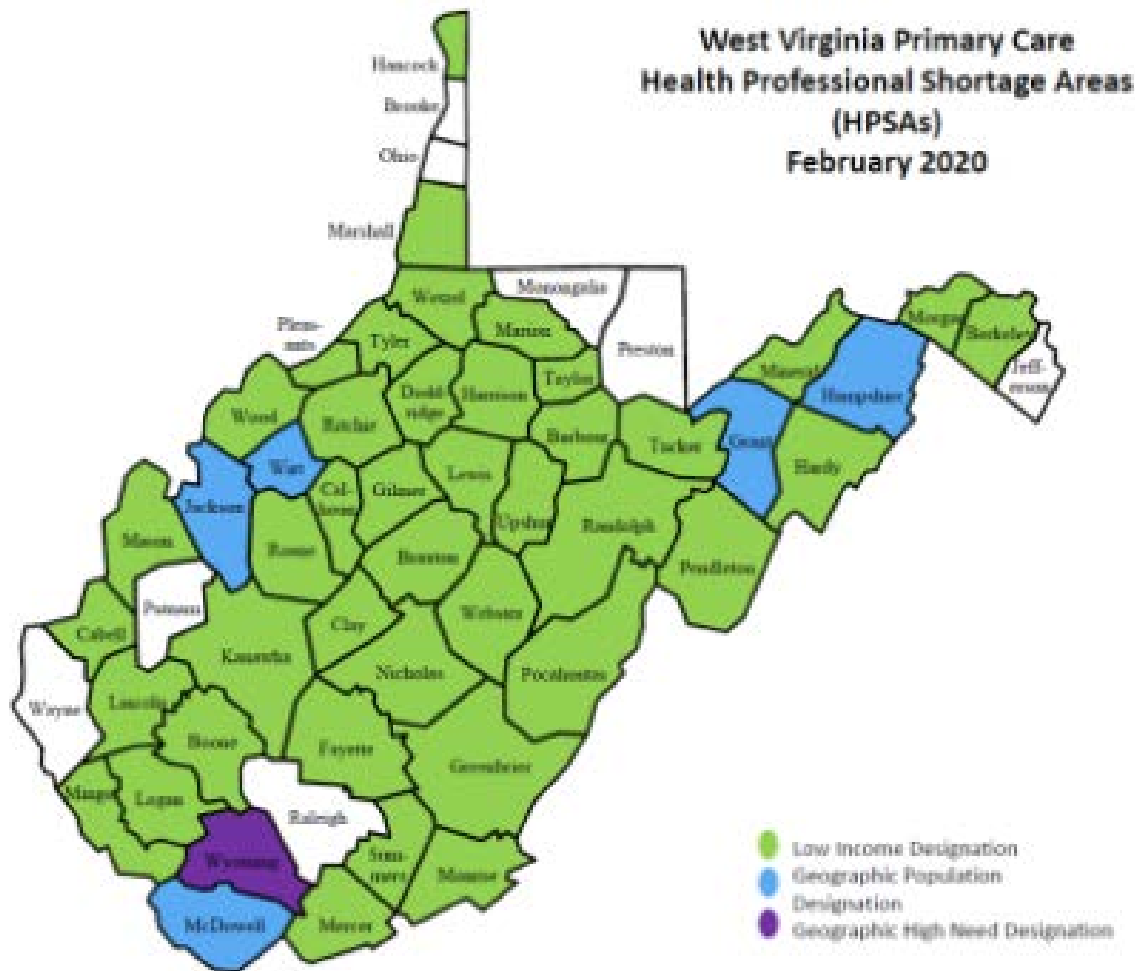
2. Onufrak SJ, Park S, Sharkey JR, Sherry B. The relationship of perceptions of tap water safety with intake of sugar-sweetened beverages and plain water among US adults. *Public health nutrition*. 2014 Jan;17(1):179-85.

“Water Filter Use was associated with higher tap water intake and lower SSB intake among U.S. adults.”³

3. Park S, Onufrak SJ, Craddock AL, Hecht C, Patel A, Chevinsky JR, Blanck HM. Factors Related to Water Filter Use for Drinking Tap Water at Home and Its Association With Consuming Plain Water and Sugar-Sweetened Beverages Among US Adults. *American Journal of Health Promotion*. 2022 Jun;36(5):813-22.



Lack of access to healthcare



Lack of access to healthcare

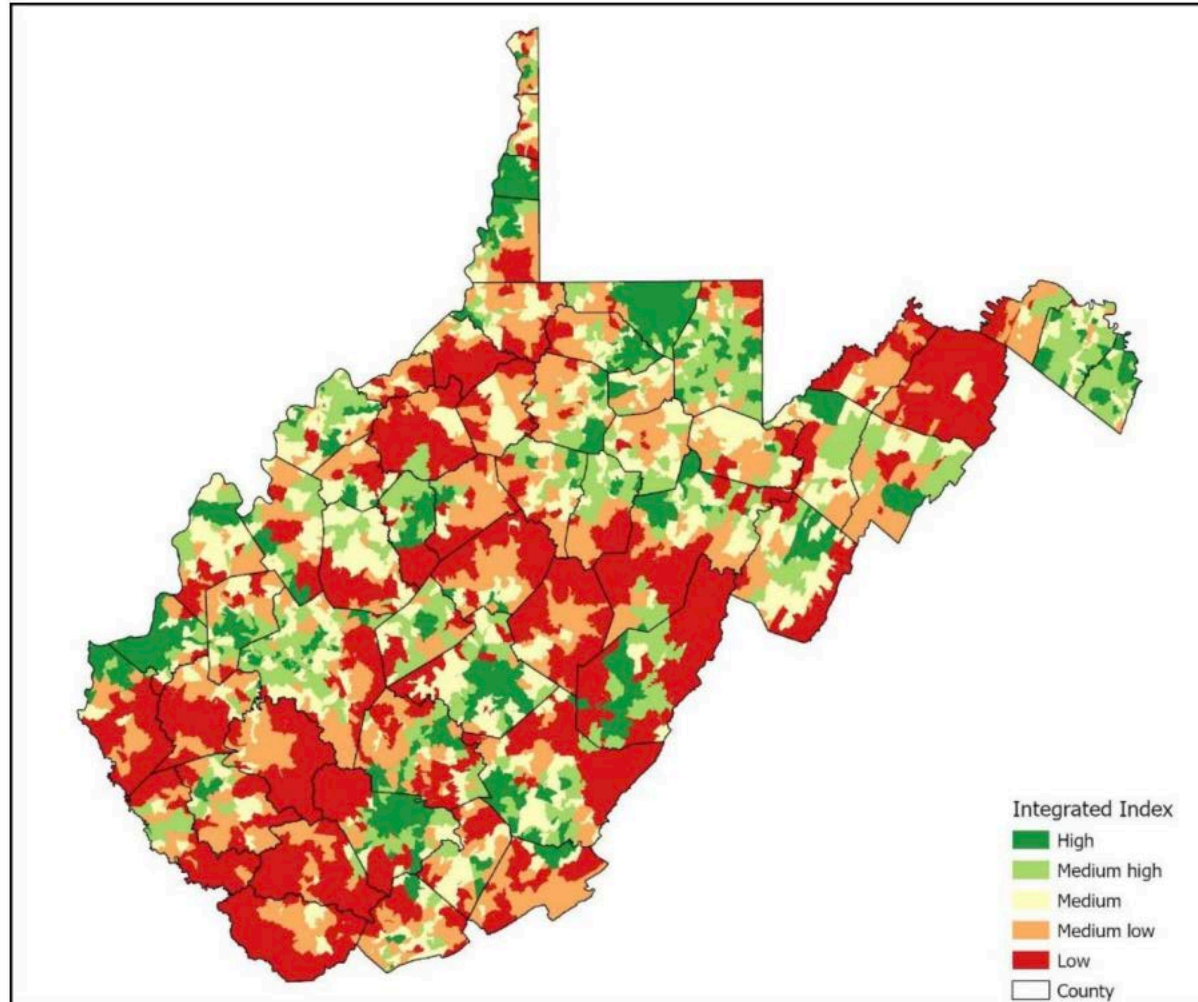


Fig. 6 Spatial distribution of population with low or medium low access

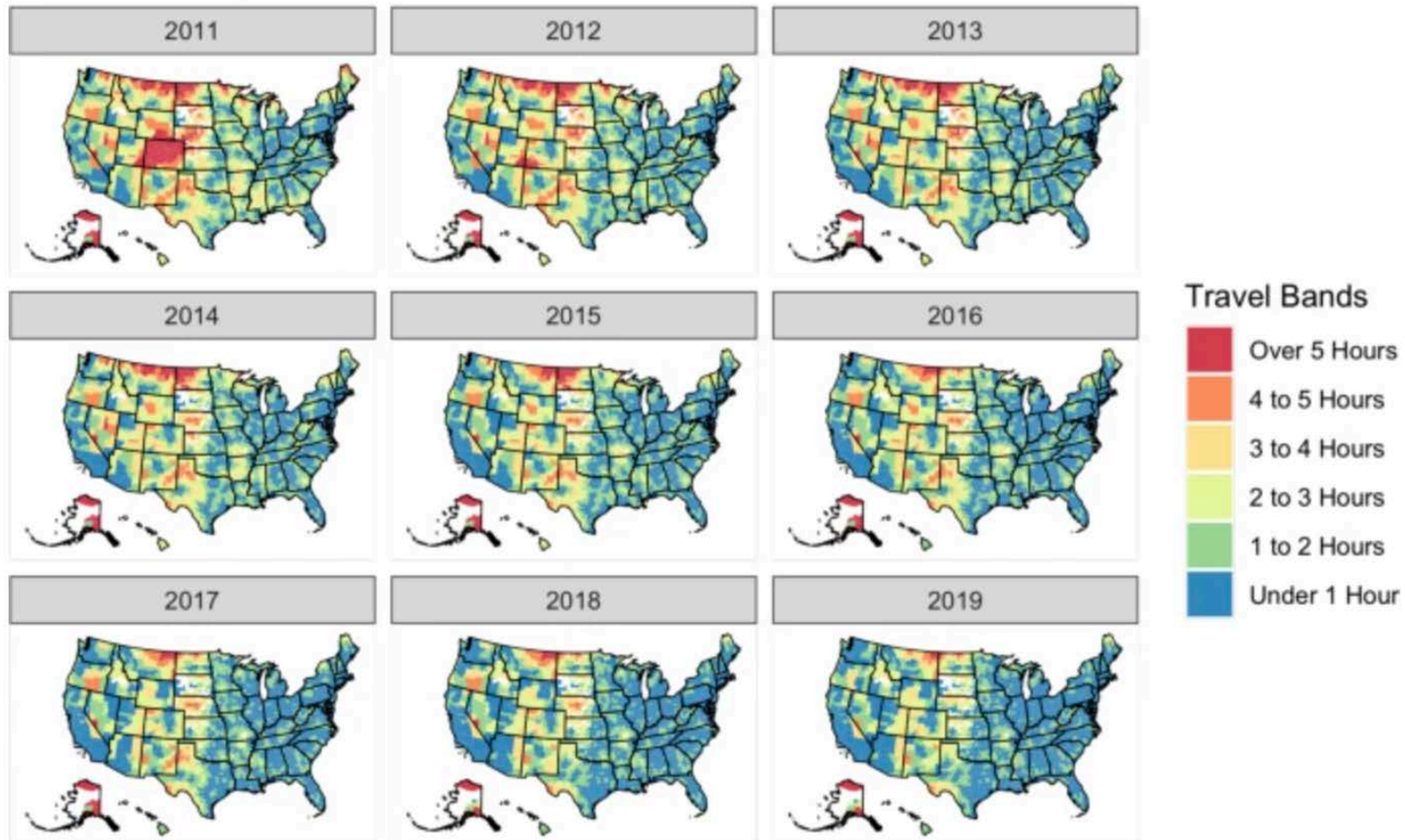
- Data on physicians, primary healthcare sites, and socio-economic variables were collected for the entire state of West Virginia.
- Sites used that were 1) available to everyone and 2) provided primary care.
- “As anticipated, healthcare services are less accessible with mountainous terrain and rural populations.”

Hong I, Wilson B, Gross T, Conley J, Powers T. Challenging terrains: socio-spatial analysis of Primary Health Care Access Disparities in West Virginia. *Applied Spatial Analysis and Policy*. 2022 Aug 10:1-21.

Lack of access to healthcare

Fig. 1: Longitudinal changes in county-level travel time to obesity medicine diplomates.

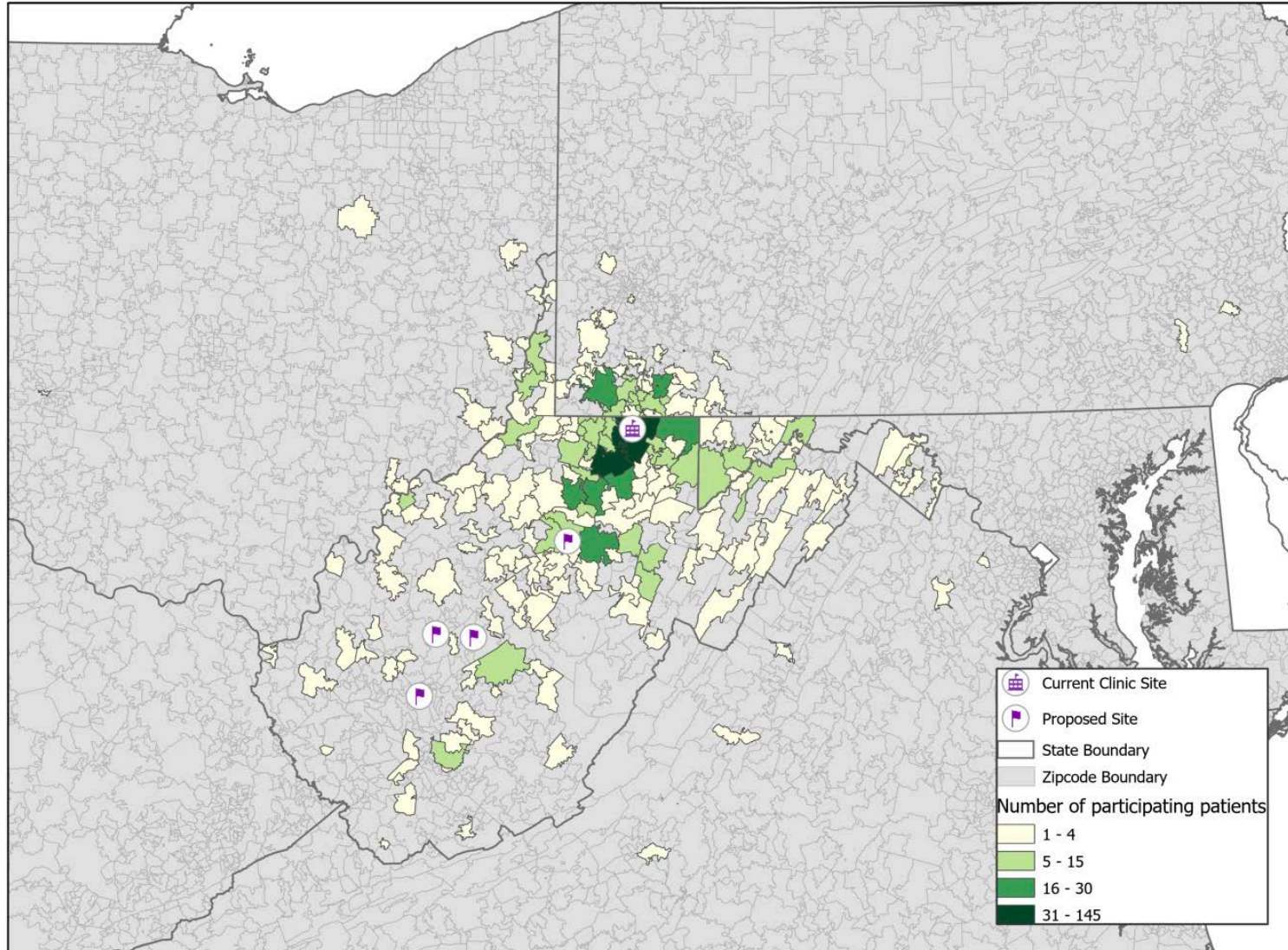
Median County-Level Travel Time to Obesity Medicine Specialists



Diplomate geographic access and availability have improved over time, yet there is still not a high enough supply to serve the potential patient demand.

Pollack CC, Onega T, Emond JA, Vosoughi S, O'Malley AJ, McClure AC, Rothstein RI, Gilbert-Diamond D. A national evaluation of geographic accessibility and provider availability of obesity medicine diplomates in the United States between 2011 and 2019. *International Journal of Obesity*. 2022 Mar;46(3):669-75.

Lack of access to healthcare

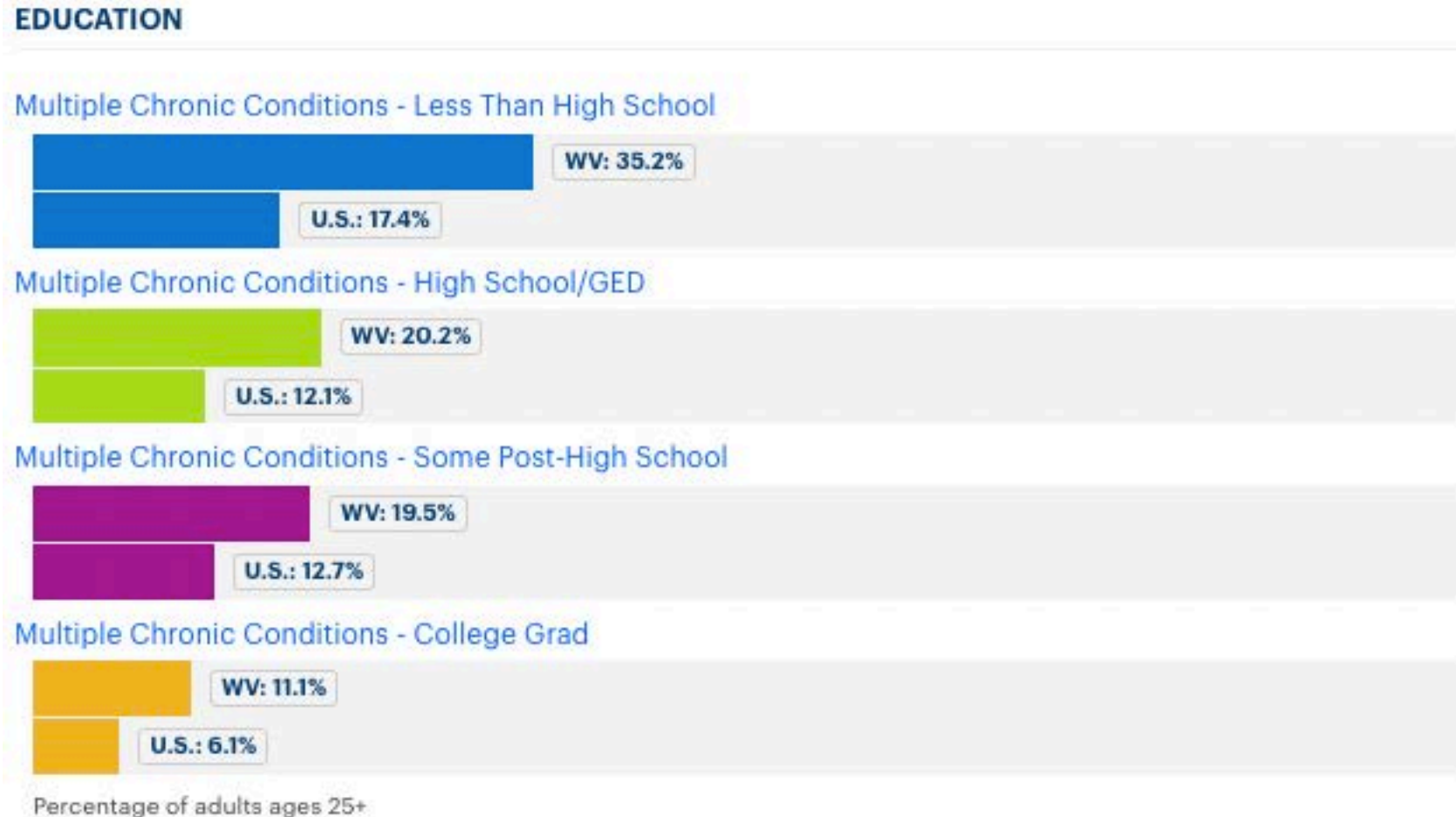


Distance patients travelled for Medical Weight Management

Average patient miles travelled to WVU: 39 miles/54 minutes

Maps created by Courtney Pilkerton
MD PhD

Obesity and other chronic diseases



Percentage of adults who had three or more of the following chronic health conditions: arthritis, asthma, chronic kidney disease, chronic obstructive pulmonary disease, cardiovascular disease (heart disease, heart attack or stroke), cancer (excluding skin), depression and diabetes. Data from CDC, Behavioral Risk Factor Surveillance System, 2021 data

"Ahr." America's Health Rankings, <https://www.americashealthrankings.org/explore/annual/measure/CHC/state/WV>. Accessed 1/31/23

Obesity and other chronic diseases



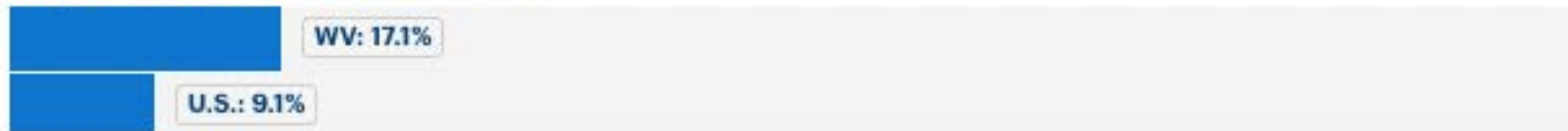
Percentage of adults who had three or more of the following chronic health conditions: arthritis, asthma, chronic kidney disease, chronic obstructive pulmonary disease, cardiovascular disease (heart disease, heart attack or stroke), cancer (excluding skin), depression and diabetes. Data from CDC, Behavioral Risk Factor Surveillance System, 2021 data

"Ahr." America's Health Rankings, <https://www.americashealthrankings.org/explore/annual/measure/CHC/state/WV>. Accessed 1/31/23

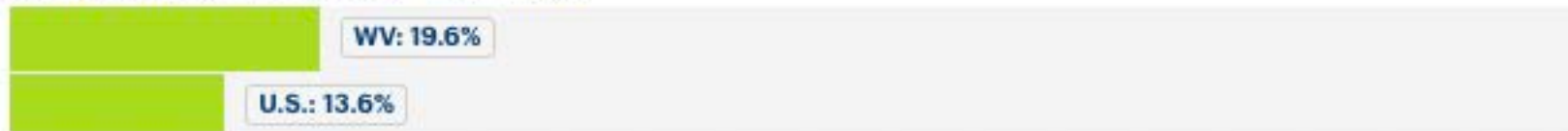
Obesity and other chronic diseases

METRO/NON-METRO

Multiple Chronic Conditions - Metro



Multiple Chronic Conditions - Non-Metro

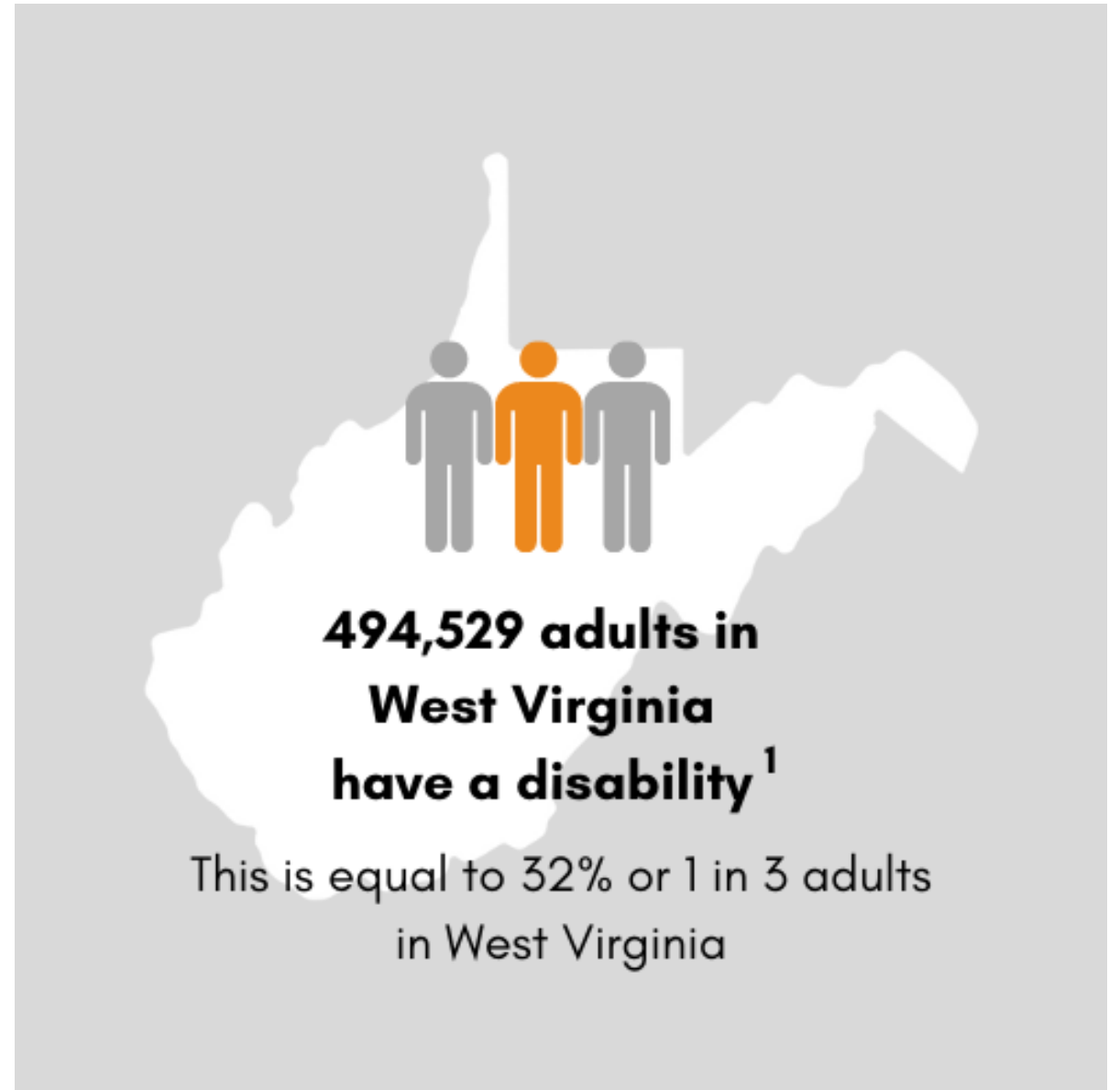


Percentage of adults

Percentage of adults who had three or more of the following chronic health conditions: arthritis, asthma, chronic kidney disease, chronic obstructive pulmonary disease, cardiovascular disease (heart disease, heart attack or stroke), cancer (excluding skin), depression and diabetes. Data from CDC, Behavioral Risk Factor Surveillance System, 2021 data

"Ahr." *America's Health Rankings*, <https://www.americashealthrankings.org/explore/annual/measure/CHC/state/WV>. Accessed 1/31/23

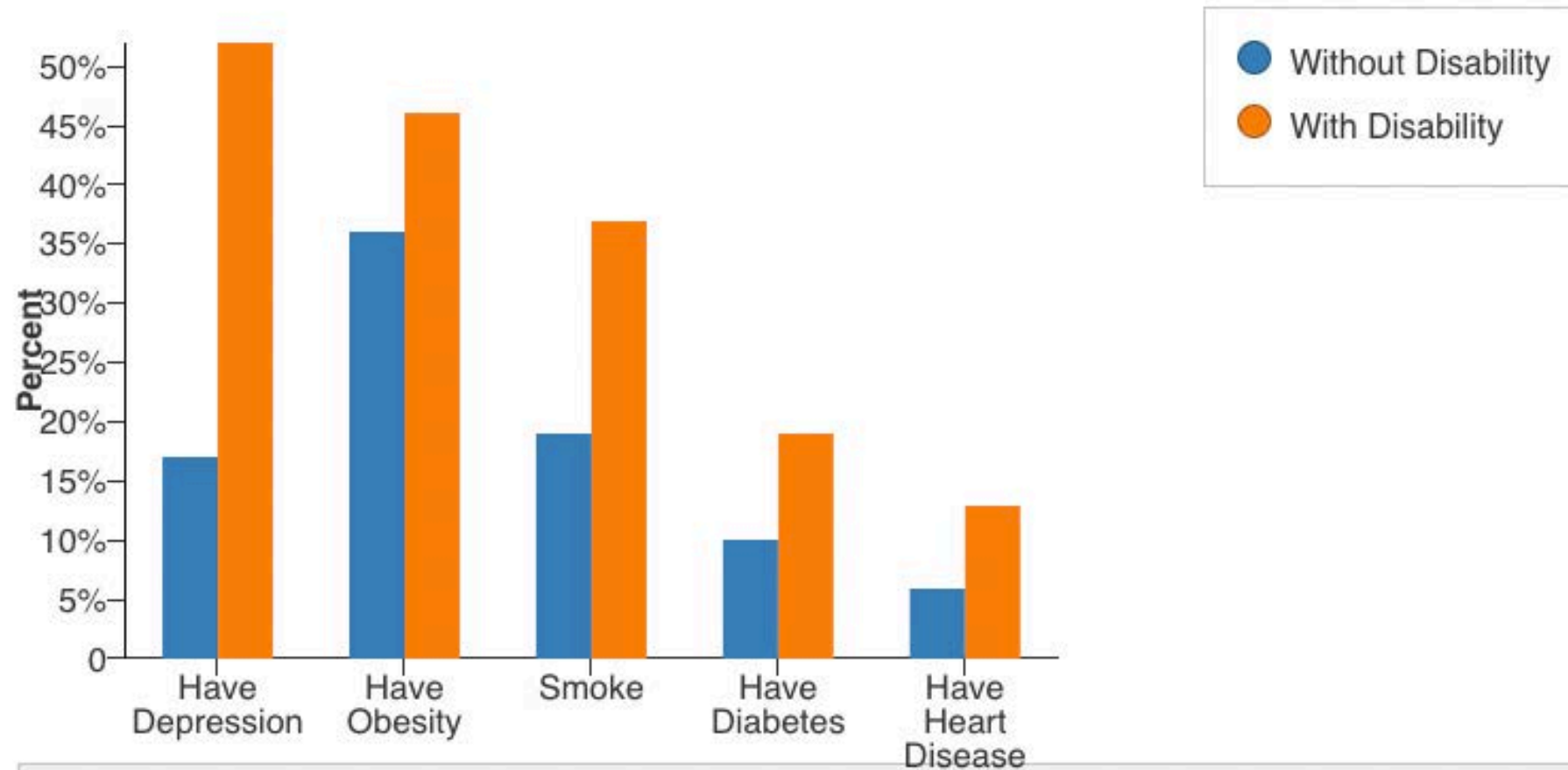
Disability



Data Source: 2020 Behavioral Risk Factor Surveillance System (BRFSS).

Disability

Adults with disabilities in West Virginia experience health disparities and are more likely to...¹



Data Source: 2020 Behavioral Risk Factor Surveillance System (BRFSS).

Healthy Food Access

Morgantown, WV

grocery stores in morgantown wv



Results for **Morgantown, WV** · Choose area

Places : Rating Hours



Kroger

4.1 ★★★★★ (428) · \$\$ · Grocery store
500 Suncrest Towne Centre Drive · In Suncrest Towne Cent...
Open · Closes 12 AM
Supermarket with a deli, bakery & more



Kroger

4.1 ★★★★★ (461) · \$\$ · Grocery store
350 Patteson Drive · (304) 599-5324
Closes soon · 11 PM
Supermarket with a deli, bakery & more



Giant Eagle Supermarket

4.3 ★★★★★ (485) · \$\$ · Grocery store
Mountaineer Mall, 130 Green Bag Road · In Mountaineer M...
Closed · Opens 7 AM Fri
Senior hours: 7 AM–8 AM Mon

More places →



Clay, WV

Places : Rating Hours Sort by



Family Dollar

3.7 ★★★★★ (61) · \$ · Dollar store
31.1 mi · 274 Main St #16 · (681) 355-6022
Closed · Opens 9 AM Fri
Bargain retailer for household goods



Dollar General

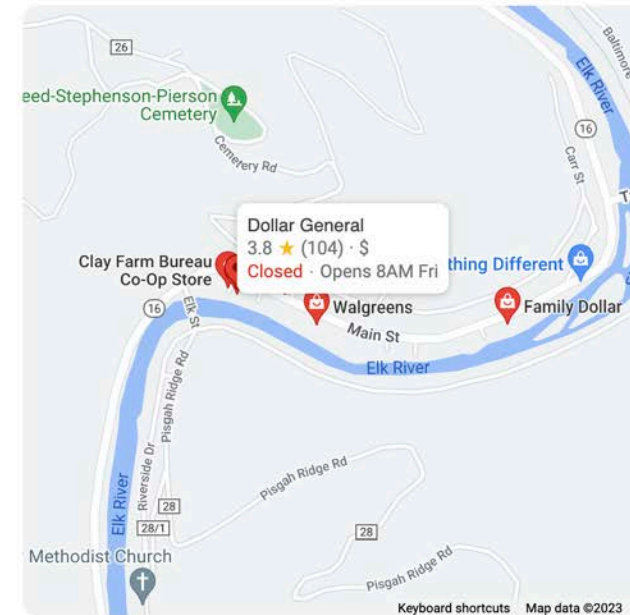
3.8 ★★★★★ (104) · \$ · Dollar store
30.6 mi · 117 Main St · (304) 587-2481
Closed · Opens 8 AM Fri
Wide array of items at discount prices



Walgreens

4.2 ★★★★★ (5) · Drug store
30.7 mi · 173 Main St · (304) 587-2224
Closed · Opens 8 AM Fri
Prescriptions plus health & beauty items

More places →



5

Healthy Food Access

Lyonnais MJ, Rafferty AP, Jilcott Pitts S, Blanchard RJ, Kaur AP. Examining shopping patterns, use of food-related resources, and proposed solutions to improve healthy food access among food insecure and food secure eastern north carolina residents. *International Journal of Environmental Research and Public Health*. 2020 May;17(10):3361.



Rural Track students calculating their budget while shopping in a local gas station on their Nutrition Health Disparities Immersion. October 2022

Methods: Mixed methods analysis of food access community survey from Beaufort County, NC. Both through a questionnaire and interviews.

N = 370 participants. (48.6% are food insecure)

Findings:

Food insecure participants were more likely to report shopping for groceries at a convenience/discount store, less likely to use their own vehicle for transportation, and less likely to purchase food from local producers.

Food insecure participants were more likely to suggest solutions related to reducing the cost of healthy food

Food secure participants were more likely to suggest educational or convenience-related interventions.

Training on SDoH and Obesity?



What is a rural immersion

- Basic Structure

- Didactic learning
- Experiential learning



- Introduce learners to

- Geography
- Culture
- Health systems
- Health culture
- Locally relevant health issues

Why Immersions?

- 46 million Americans live in rural locations.
- Health care in a rural area can represent up to 20% of the community employment.
- Gain an understanding of rural health settings, including benefits and barriers.
- Expose student to a variety of different health professions.

Why Immersions?

- Understand what health services are available/not available in the community outside of the hospital.
- Assess and understand the relationship and communication between the community and the health system.
- Identify health issues and challenges in the local community and think critically about solutions.
- Recruitment! Can you imagine yourself here?

Medical Education

- Rural Immersion

- Rural Track
- Area Health Education Centers (AHEC)
AHEC Scholars Program

- Topics:

- Nutrition in the setting of Health Disparities (Rural Track/AHEC)
- Black Lung (Rural Track)
- Health Inequities & Disparities in Rural Communities (AHEC)
- Food Insecurity and Preservation in Rural Communities (AHEC)
- Health Policy and Advocacy for Rural/Underserved (AHEC)
- Rural Maternal Healthcare (AHEC)



Nutrition Immersion

- Friday:
 - 3:30-6 – Students and faculty check in to housing
 - Dinner
 - Dinner Lecture: Immersion Overview
 - Dinner Lecture: Presentation on Food Insecurity
- Saturday:
 - Breakfast
 - Breakfast Lecture: Supplemental Nutrition Programs (partner with WVU Extension)
 - Lunch group SNAP Challenge departs
 - Lunch Lecture: Obesity Treatment in Rural WV Patients
 - Dinner group SNAP Challenge departs
 - Dinner Lecture: Healthy Eating with Limited Resources
 - Dinner Discussion: Nutrition Analysis of lunch and dinner choices in SNAP challenge

Nutrition Immersion

- Sunday:
 - Discussion with area practicing physician about rural practice
 - Faculty SNAP challenge for breakfast food
 - Debrief

- Faculty: Primary Care Physicians, Registered Dietitians, Public Health, Community Members from local resources

Immersion Outcomes

- Pulled data from AHEC Scholar immersion debrief in online class system from 2019-2021
- Content analysis was completed on data source. Student responses were read through by two authors and emerging themes were discussed. Emerging themes were discussed with the project analysis team and group discussion expanded the resulting themes. Discrepancies were resolved through these discussions.

Theme 1: Immersion was a transformative experience

- “Prior to reading the numbers for health disparities in the Appalachian Region, I knew the numbers were grim, I have a better understanding of the why and the how to bring about change.” – Masters of Social Work student (MSW)
- “Researchers and policy makers are working towards implementing programs to reduce these disparities and promote equality of health no matter a person’s geographic location, environment, or culture. This immersion made me realize how important it is for researchers and policy makers to implement these programs to improve the overall health of these rural communities.” – Bachelor of Science Nursing student (BSN)
- “This immersion also made me realize that as a physician, I too, can work with my community to establish healthy programs.” -Doctor of Medicine student (MD)

Theme 2: Immersion experiences resulted in planned future practice changes

- “After participating in these immersions, I am more likely to educate myself on local resources in my future area of practice and seek their assistance to meet patient needs.” - Doctor of Medicine student (MD)
- “This will alter the way I counsel patients or manage their treatment, is to focus on what extenuating circumstances may play a hidden role in the patient's ailments, and to ensure that they comprehend and understand the nature of their disease process and to ensure that every opportunity or help they can receive to obtain their medications to optimize their treatment options.” - Doctor of Osteopathic Medicine student (DO)
- “In my future role as an epidemiologist, I am going to take everything I learnt in this immersion to become a holistic public health professional who has empathy, who values teamwork and takes into consideration every aspect of the society and rural health while designing interventions or conducting research.” – Master of Public Health student (MPH)

Theme 3: Provided perspectives on stigma of diagnoses

- “This experience has taught me that there is a lot of stigma around seeking treatment for opioid addiction.” – Doctor of Pharmacy student (PharmD)
- “She expressed there was a lot of stigma among first responders about seeking mental health treatment, though trauma and emotional fatigue were huge problems in the community, severe enough she had lost men to suicide.” – Doctor of Clinical Psychology student (PsyD)
- “Several people were uncomfortable with having a mental health screening, so it became clear to me that psychologists need to be doing more outreach and be involved in the community to help reduce the stigma related to seeking mental health services.” – Doctor of Clinical Psychology student (PsyD)

Theme 4: Immersion provided knowledge of resources for future practice

- “This experience taught me a lot more about resources outside of healthcare available to patients who suffer from substance abuse disorder which was incredibly helpful to me as a future provider.” - Physician Assistant student (PAc)
- “I also learned of additional resources which I need to consider as a part of my inter professional team. For example, I had never previously thought about social workers and how discussion with my patients, social worker can be helpful and important in understanding my patient.” – Doctor of Dentistry Surgery Student (DDS)

Nutrition Immersion Video

<https://youtu.be/M37azbPGX2w>

Acknowledgements

- WVU School of Medicine Rural Track
 - Heather Hanks – WVU SOM Rural Track Coordinator
- WVU Institute for Community and Rural Health
- WV Area Health Education Centers (WV AHEC)
- WVU Extension



Questions?

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