

- ◆ Measures have been taken, by the Utah Department of Health, Bureau of Health Promotions, to ensure no conflict of interest in this activity.
- ◆ CNE/CEU's are available for this live webinar. You must take the pre and post tests. 80% is required on the post test to receive CNE/CEU's.
- ◆ Certificates will be emailed out to you within two weeks

Dr. Len Novilla joined Brigham Young University in 2003 as an Associate Professor at the Department of Health Science. She teaches healthy aging and chronic disease prevention and control at the graduate and undergraduate levels.



Len's research interests include the role of the family as a sustaining framework in health promotion and disease prevention; addressing the social determinants of family and maternal and child health and their implications on policy and practice; defining the role of the family in addressing health inequities; and focusing on health systems assessment and strengthening within the context of chronic diseases and health disparities. Len has been involved in this area of research since 2010.

Len has since presented in various professional and academic venues such as Health Educators Association of Utah (HEAU) (2012); Utah Multicultural Commission (2012); Governor's Health Summit (2012); Salt Lake County Health Department (2012); Timpanogos Regional Hospital Board of Trustees (2012); Mayor Ralph Becker (2012-2013); American Public Health Association (APHA), Boston, Massachusetts (2013); Mayor Ben McAdams (2014 Keynote Speaker); Iowa Cancer Consortium Summit (2014-Keynote Speaker & Session Presenter); Association of Utah Community Health Centers (AUCH (2015); Women of the Mountain Conference-Utah Valley University (2015); Webinars for the American Planning Association-Iowa Chapter, Iowa Public Health Association, and the Iowa Environmental Health Association (2015); National Environmental Health Association-Region 4, Iowa (2015).

Len is an elected member of the Alpha Theta Chapter of the Delta Omega National Honorary Society in Public Health. She is a member of the American Public Health Association (APHA)-International Health Section and the Society of Public Health Educators (SOPHE). She currently serves as a commissioner for the Utah Multicultural Commission, appointed by Gov. Herbert last January 2013; Chair of the Health Disparities Advisory Council for the Utah Department of Health Office of Health Disparities Reduction; and as a member of the Executive Committee of the Thrasher Research Fund. She has also served as a member of the Board of Trustees of Timpanogos Regional Hospital and as the former Policy Unit Chair for the Utah Public Health Association (UPHA) Board.

The Social Determinants of Diabetes

2015 Healthy Living through Environment, Policy & Improved Clinical Care (EPICC) Program Webinar

Len B. Novilla, MD, MPH
Spencer Calder, BS PH (c)
Department of Health Science
Brigham Young University



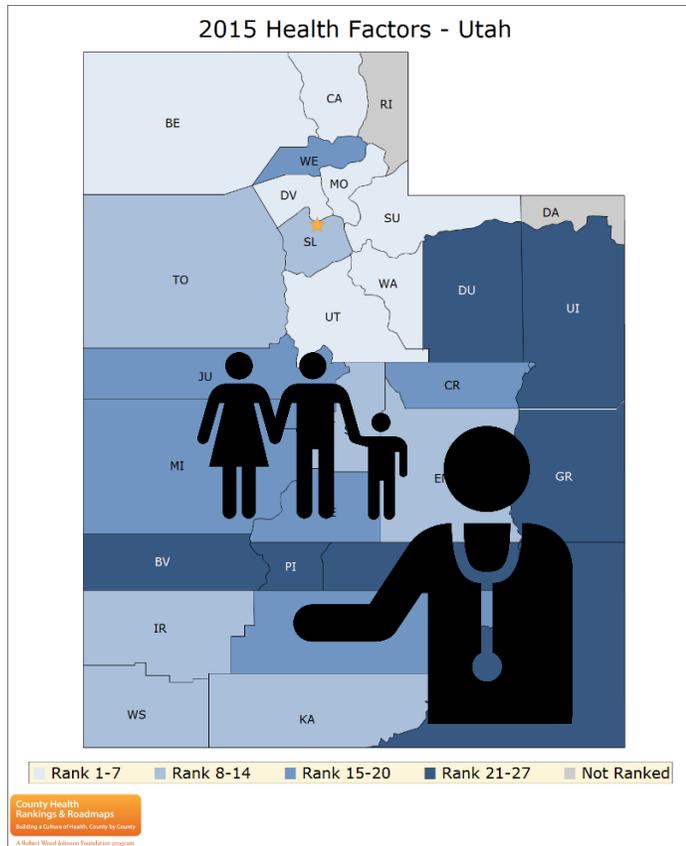
Photo Credit : © Todd McKinley

What You'll Learn

- 1. What is the state of diabetes in the nation? In Utah?**
- 2. What are the social determinants of health? How do they shape population health?**
- 3. As identified in the literature, how do social factors impact diabetes?**
- 4. Based on the literature, how can we address social factors to improve diabetes outcomes?**

Sum Up: Key Points

3 Major Points We'll Focus on:



Diabetes - Where We Grow, Live, Work, & Play



**Social Factors & Diabetes
How are they connected?**



Tackling Social Factors to Improve Diabetes Outcomes

DIABETES HAS A FACE.
Behind every face is a story.

DIABETES

Syndrome
Disordered metabolism
Inappropriate hyperglycemia

7th Leading Cause of Death, U.S., 2013

More than 29 million people (9.3%) are estimated to have diabetes

Diagnosed (21 million) & Undiagnosed (8.1 million)

86 million US adults, more than 1 of 3, have prediabetes

What kills us in the United States?

1. Heart disease: 611,105
2. Cancer: 584,881
3. Chronic lower respiratory diseases: 149,205
4. Accidents (unintentional injuries): 130,557
5. Stroke (cerebrovascular diseases): 128,978
6. Alzheimer's disease: 84,767
7. **Diabetes: 75,578**
8. Influenza and Pneumonia: 56,979
9. Nephritis, nephrotic syndrome, & nephrosis: 47,112
10. Intentional self-harm (suicide): 41,149

CDC. Number of deaths for leading causes of death. Deaths: Final Data for 2013, table 10

<http://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm>

TRY MATCHING THESE TERMS WITH THEIR DESCRIPTIONS:

A. Glucose

B. Diabetes

C. Prediabetes

- 1) High blood sugar levels but not high enough to be classified as diabetes; because it has “no clear symptoms,” “you may have it & not know it.”
- 2) Chronic high levels of glucose are “associated with long-term damage, dysfunction, & failure of different organs, esp. the eyes, kidneys, nerves, heart, & blood vessels.”
- 3) Also known as “blood sugar” & normal level is an A1c at about 5%; or a fasting plasma glucose less than 100 mg/dl; or an OGTT less than 140 mg/dl.

TRY MATCHING THESE TERMS WITH THEIR DESCRIPTIONS:

- A. Type 1 Diabetes
- B. Type 2 Diabetes
- C. A1c

- 1) Test to screen & diagnose diabetes because it reflects the average blood glucose levels over a 2- to 3-month period of time.
- 2) Most common type, accounting for about 90%-95% of diagnosed diabetes in U.S. adults; a combination of “diminished tissue responses to insulin” and “an inadequate compensatory insulin secretion.”
- 3) The body cannot make insulin. This absolute lack of insulin results from the body's immune system attacking & destroying the beta cells in the pancreas.

Blood Test Levels for Diagnosis of Diabetes and Prediabetes



	A1C (percent)	Fasting Plasma Glucose (mg/dL)	Oral Glucose Tolerance Test (mg/dL)
Diabetes	6.5 or above	126 or above	200 or above
Prediabetes	5.7 to 6.4	100 to 125	140 to 199
Normal	About 5	99 or below	139 or below

Definitions: mg = milligram, dL = deciliter

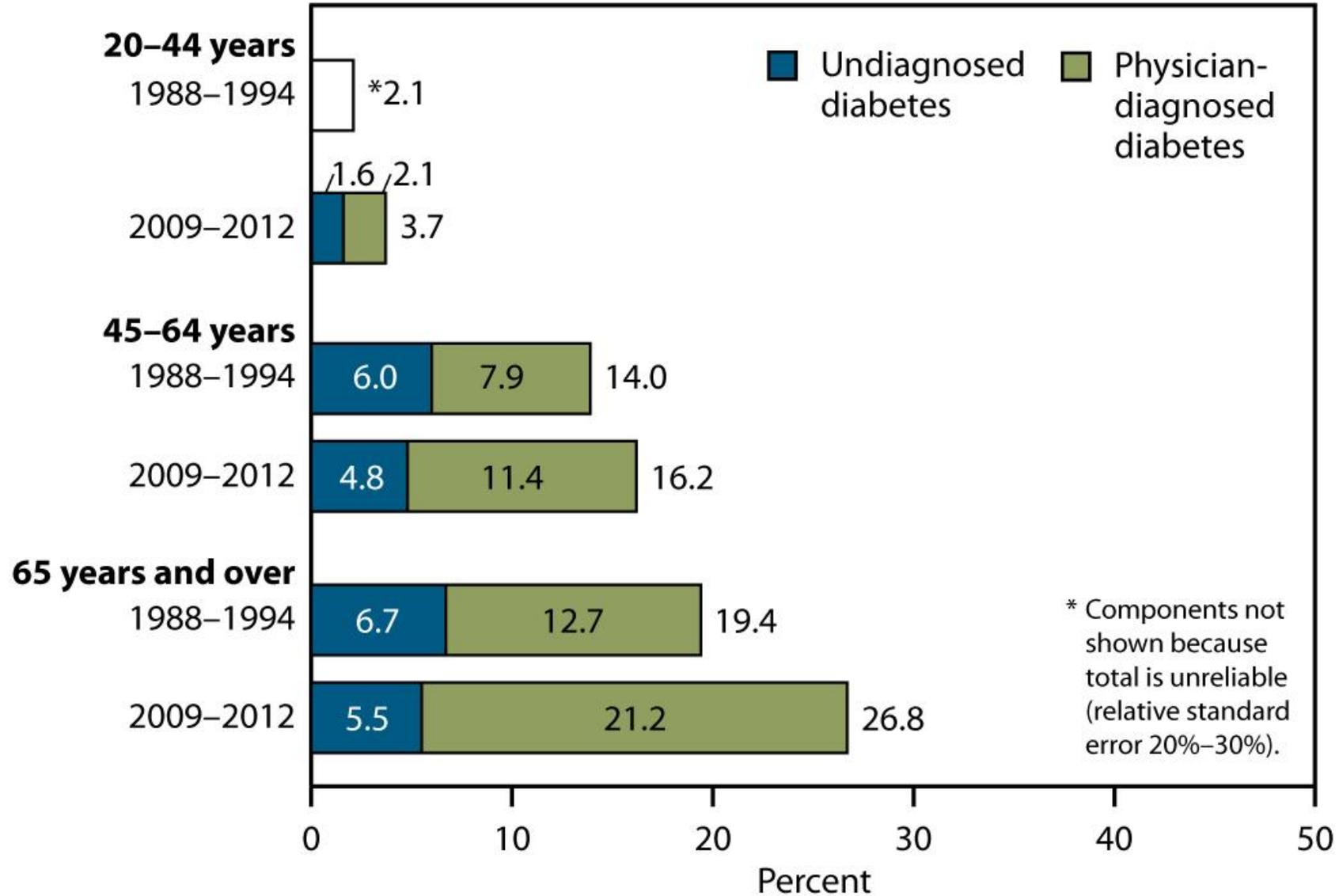
For all three tests, within the prediabetes range, the higher the test result, the greater the risk of diabetes.

Source: NIDDK-National Institute of Diabetes & Digestive & Kidney Diseases

<http://www.niddk.nih.gov/health-information/health-topics/Diabetes/diagnosis-diabetes-prediabetes/Pages/index.aspx>

PERSON

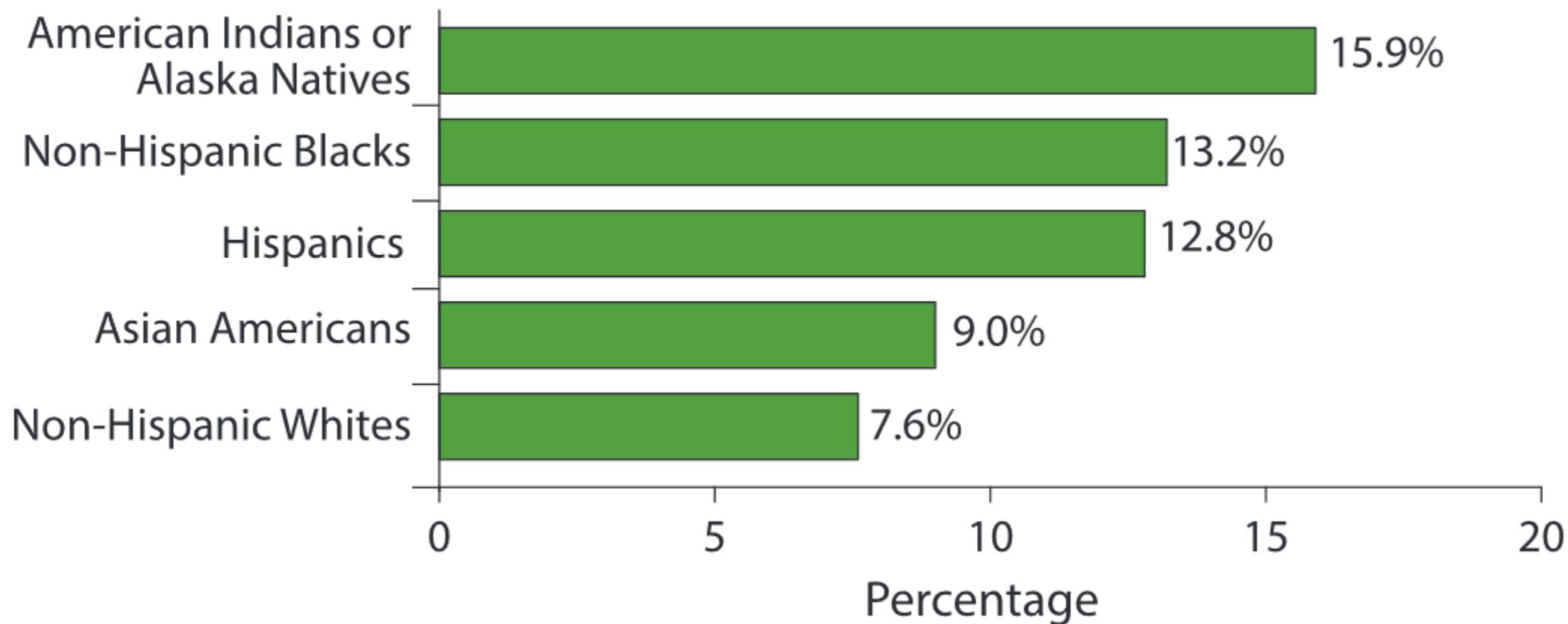
Diabetes Prevalence



NOTES: The components of diabetes may not sum to the total due to rounding. Undiagnosed diabetes is fasting plasma glucose of at least 126 mg/dL or a hemoglobin A1c of at least 6.5%.

SOURCE: CDC/NCHS, *Health, United States, 2014*, Figure 6 and Table 44. Data from the National Health and Nutrition Examination Survey (NHANES).

Figure 2. Percentage of US Adults Aged 20 or Older with Diagnosed Diabetes, by Racial and Ethnic Group, 2010-2012



Note: Percentages are age-adjusted to the 2000 US standard population.

Source: National Health Interview Survey, 2010-2012, and the Indian Health Service's National Patient Information Reporting System, 2012.

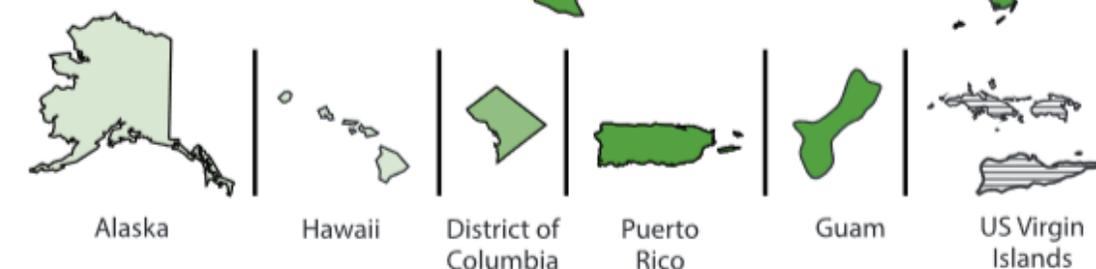
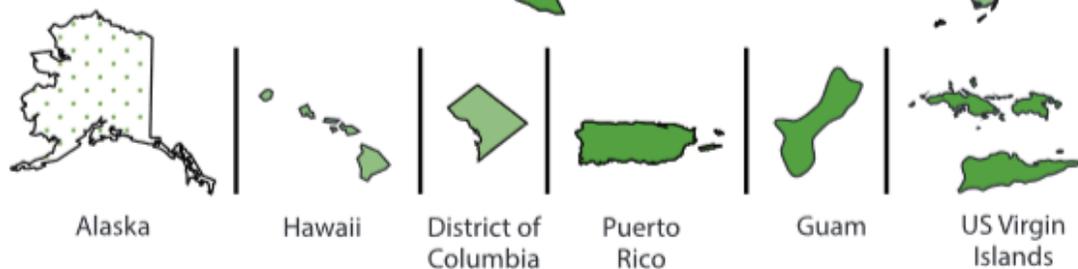
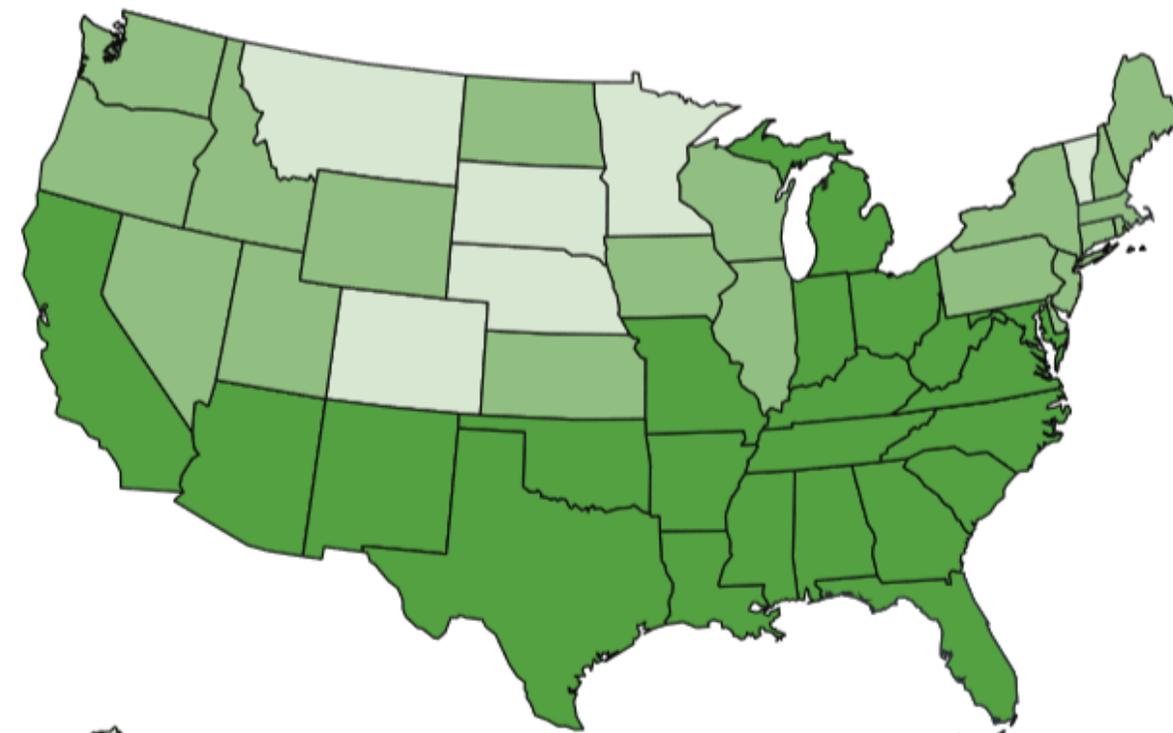
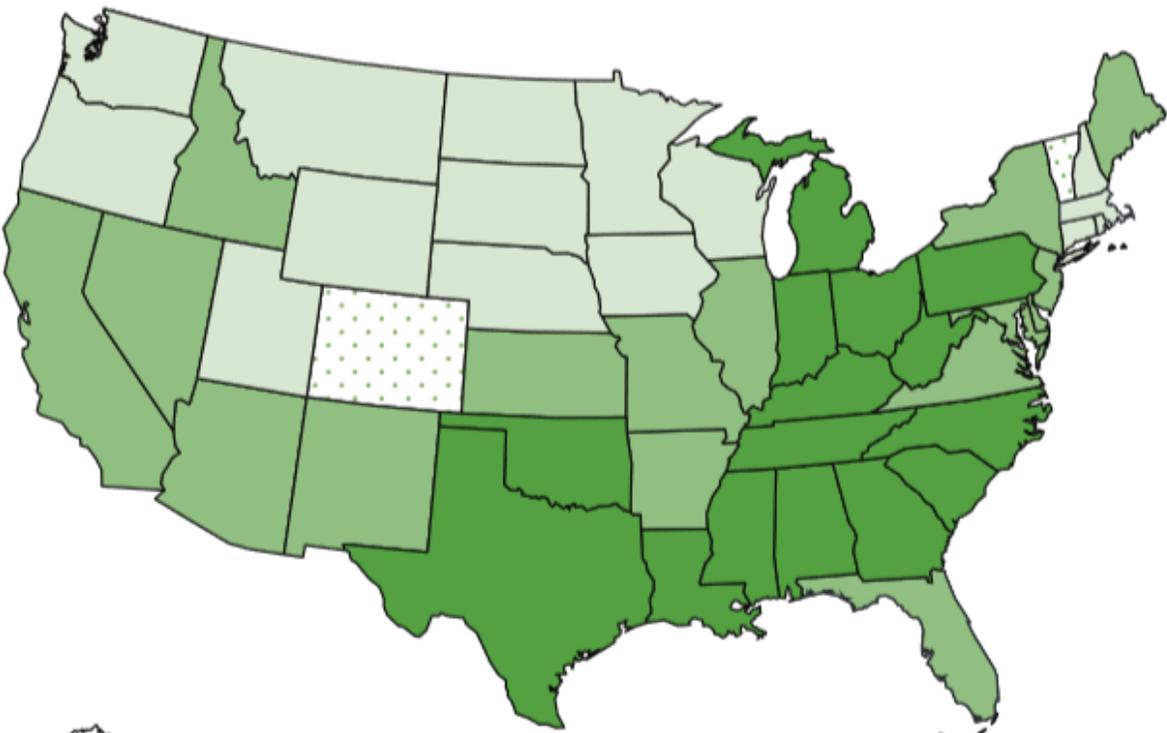
CDC. Diabetes 2014 Report Card at <http://www.cdc.gov/diabetes/pdfs/library/diabetesreportcard2014.pdf>

CDC National Diabetes Statistics Report at <http://www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf>

TIME

2010

2012



Geographic Distribution of Diagnosed Diabetes in the United States, 2010 & 2012

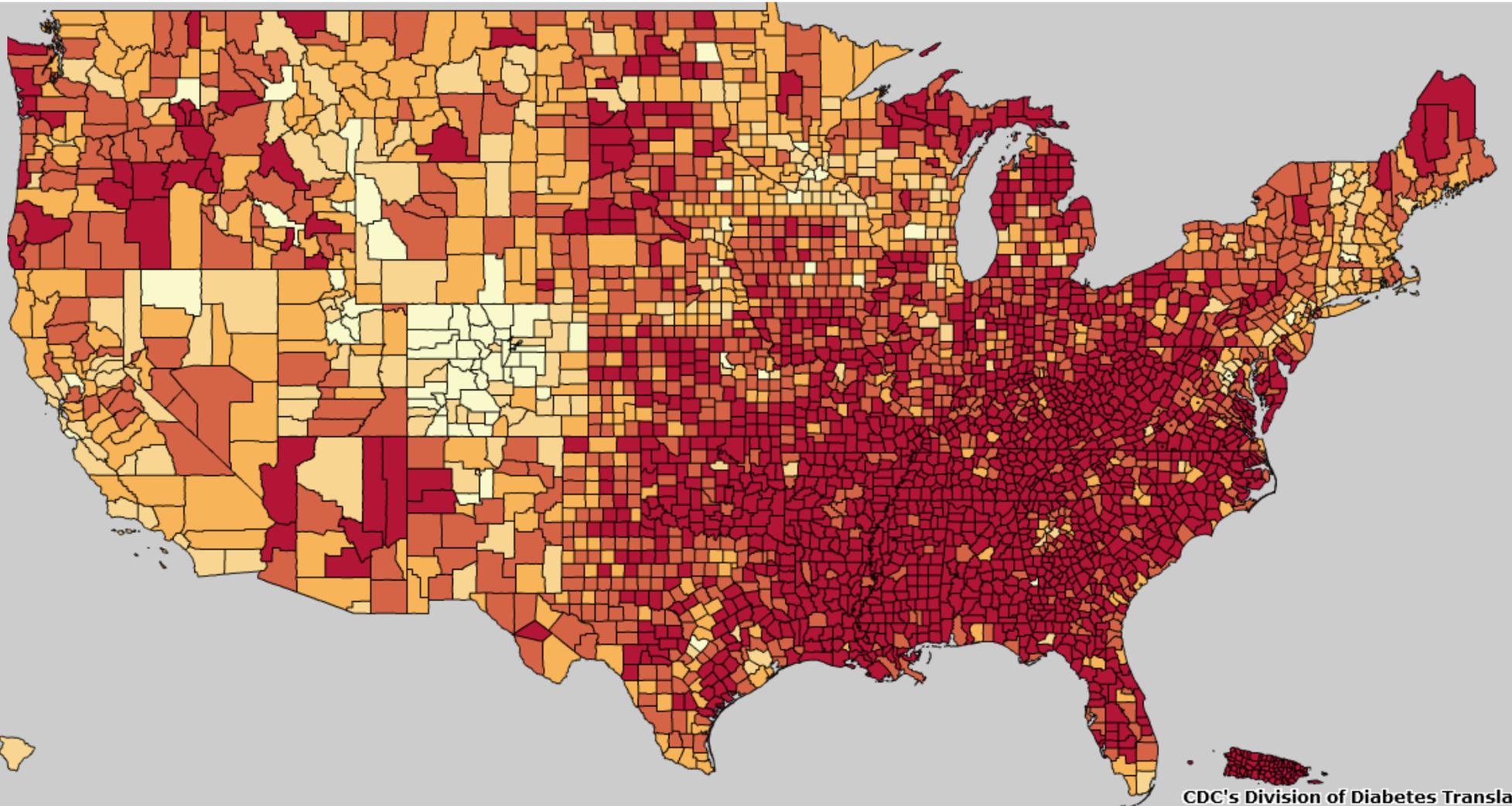
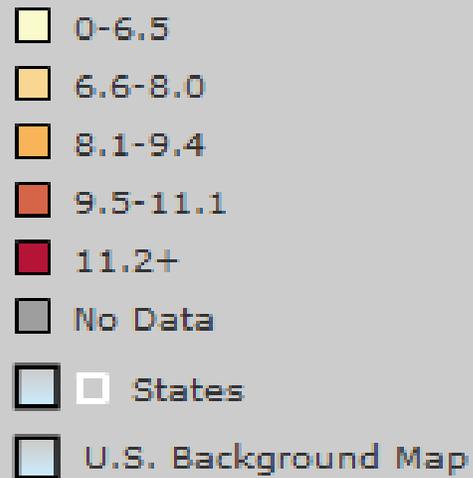
Rate (per 100)



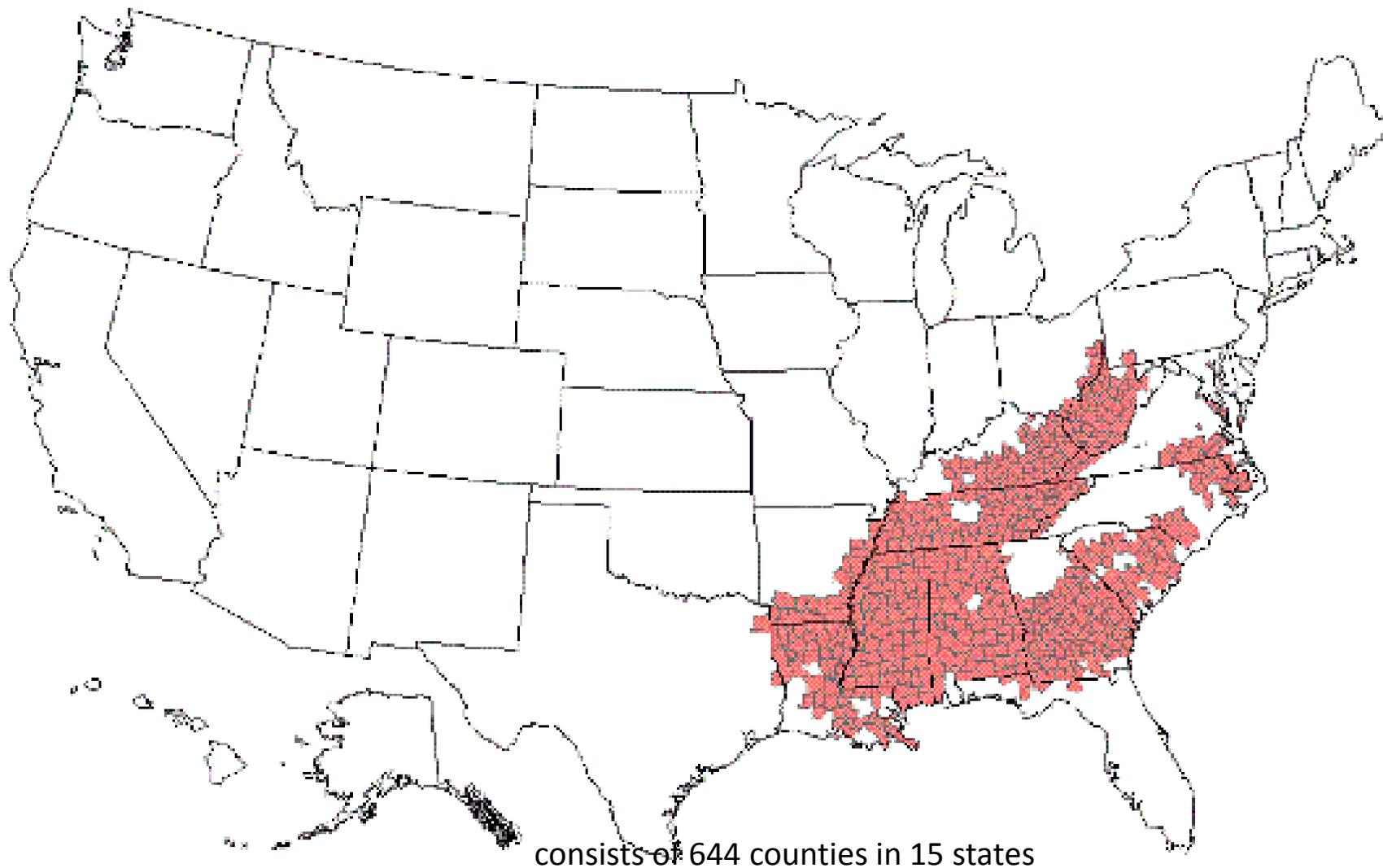
PLACE

Epidemiology: Disease Burden

Diagnosed Diabetes Percentage, 2012



CDC's Division of Diabetes Translation



 Diabetes Belt

Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, & the entire state of Mississippi

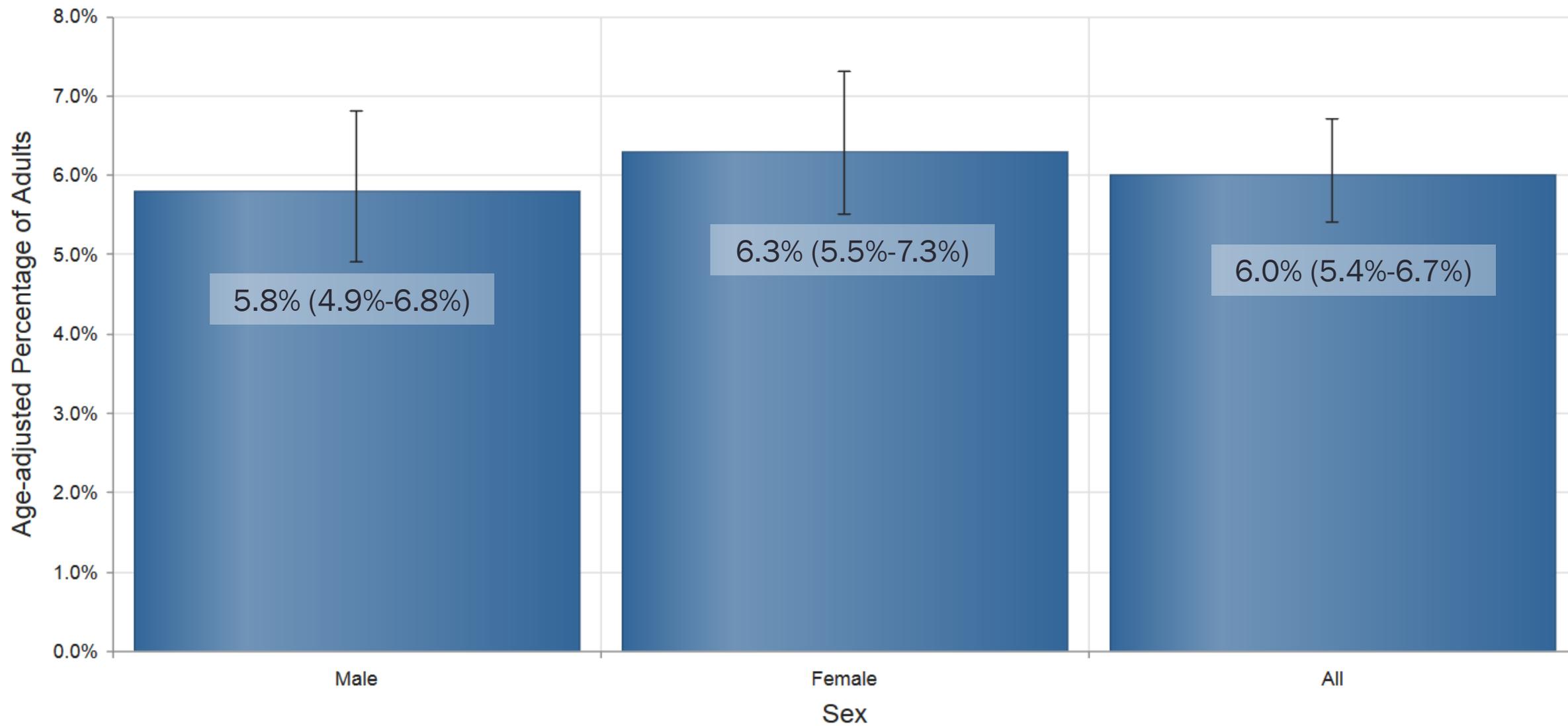
Source: http://www.cdc.gov/diabetes/news/docs/diabetes_belt.htm



DIABETES IN UTAH

Where we live, grow, work, and play

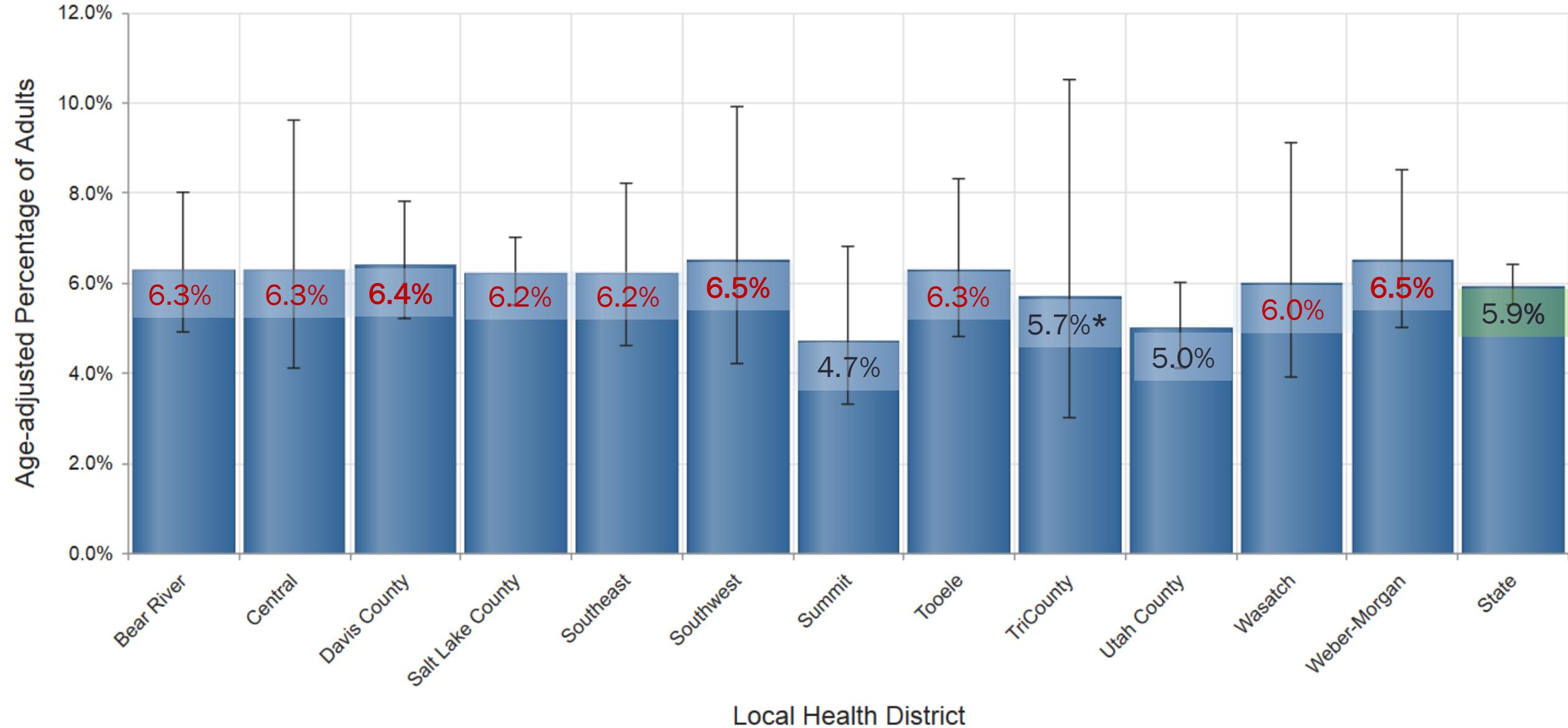
Prediabetes Age-adjusted Rates by Sex, Utah, 2011-2013



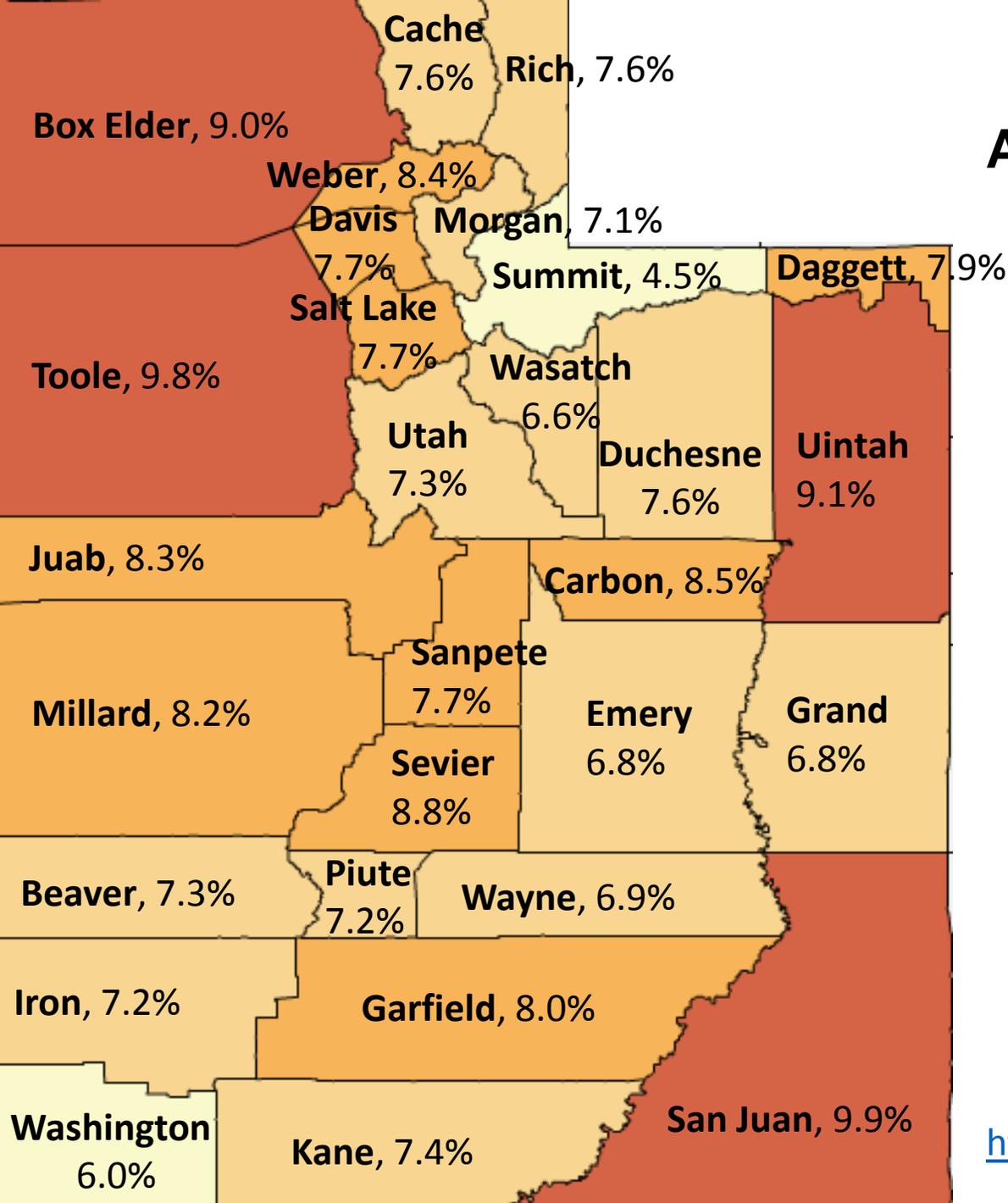
Public Health Indicator-Based Information System, Utah

<http://ibis.health.utah.gov/ibisph-view/indicator/view/PreDiab.Sex.html>

Prediabetes Age-adjusted Rates by Local Health District, Utah, 2009-2013



Diagnosed Diabetes Percentage Age-Adjusted by County, Utah, 2012



<http://www.cdc.gov/diabetes/atlas/countydata/atlas.html>

Adults With Diabetes by Utah Small Area, 2009-2013

Small Areas - Highest Prevalence	Age-adjusted Percentage
1. Kearns V2	13.5% (9.2%-19.5%)
2. Magna	12.7% (9.6%-16.6%)
3. Toole	11.5% (9.8%-13.5%)
4. Ben Lomond	11.1% (9.1%-13.6%)
5. South Salt Lake	11.0% (8.1%-14.7%)
6. West Valley, West	10.7% (7.7-13.7%)
7. Salt Lake, Rose Park	10.6% (8.0%-14.0%)
8. West Valley, East	10.5% (6.8%-15.7%)
9. Roy/Hooper	10.4% (8.4%-12.9%)
10. Salt Lake, Glendale	10.3% (7.7%-13.7%)
11. Provo, South	10.0% (7.4%-13.5%)

Adults With Diabetes by Utah Small Area, 2009-2013

Small Areas - Lowest Prevalence	Age-adjusted Percentage
1. Summit	3.8% (2.8%-5.2%)
2. Farmington/Centerville	3.9% (2.8%-5.5%)
3. West Jordan (W)/Copperton	4.7% (2.9%-7.4%)
4. Orem (East)	4.8% (3.2%-7.3%)
5. Millcreek & Holladay	5.0% (3.9%-6.3%)
6. St. George	5.1% (3.9%-6.5%)
7. SLC (Foothill/U of U)	5.3% (3.6%-7.9%)
8. Sandy (NE) & Pleasant Grove/Lindon	5.4% (3.9%-7.5%)
9. Cottonwood	5.7% (4.5%-7.0%)
10. Washington	5.8% (4.4%-7.6%)
11. Wasatch & Bountiful	5.9% (4.5%-7.7%)

- ◆ 11 Lowest Prevalence
- 11 Highest Prevalence

Small Areas with Highest Prevalence of Adults with Diabetes, 2009-2013

#4 Ben Lomond

#9 Roy/Hooper

#7 SLC Rose Park

#2 Magna

#1 KearnsV2

#3 Toole

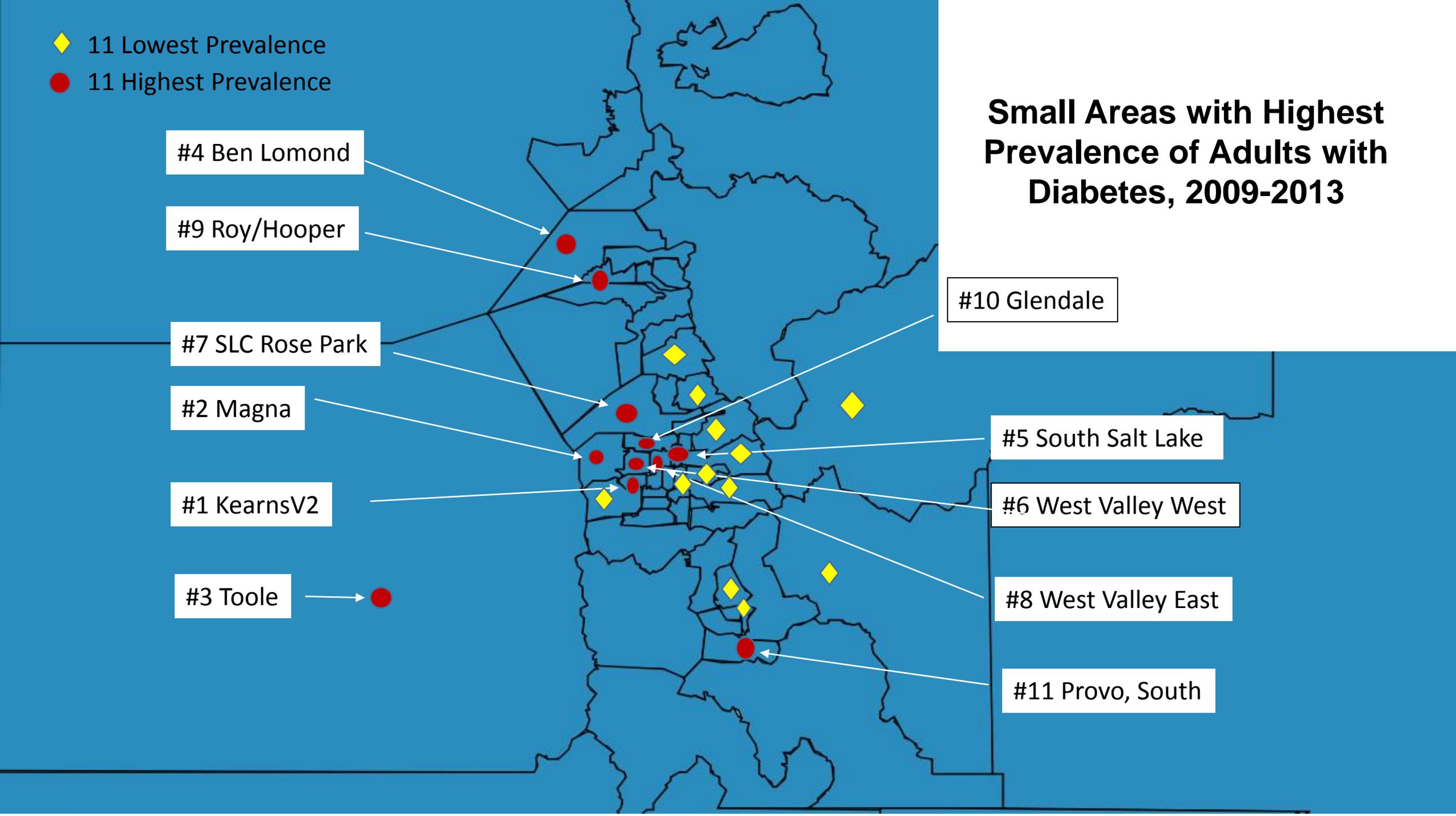
#10 Glendale

#5 South Salt Lake

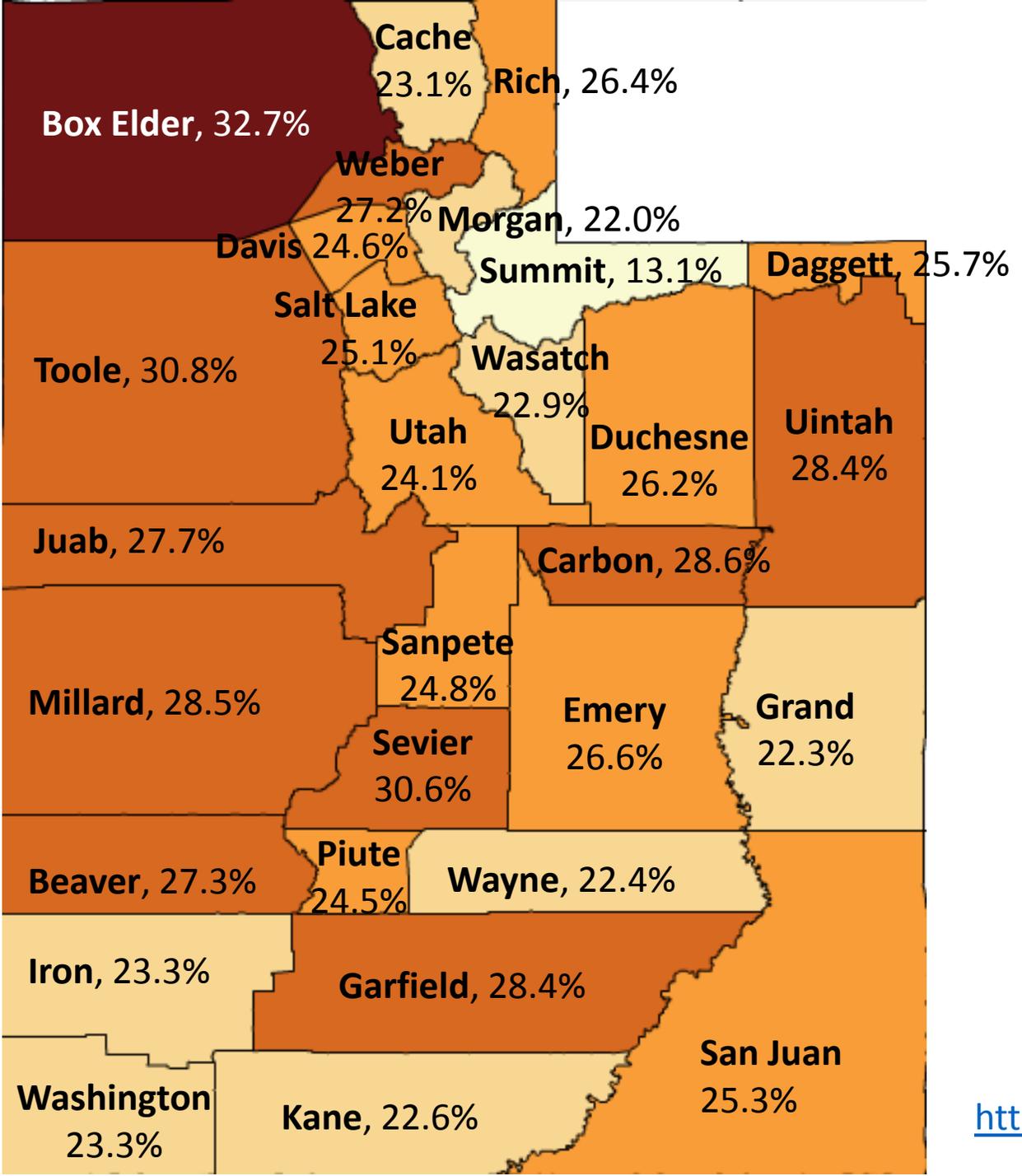
#6 West Valley West

#8 West Valley East

#11 Provo, South

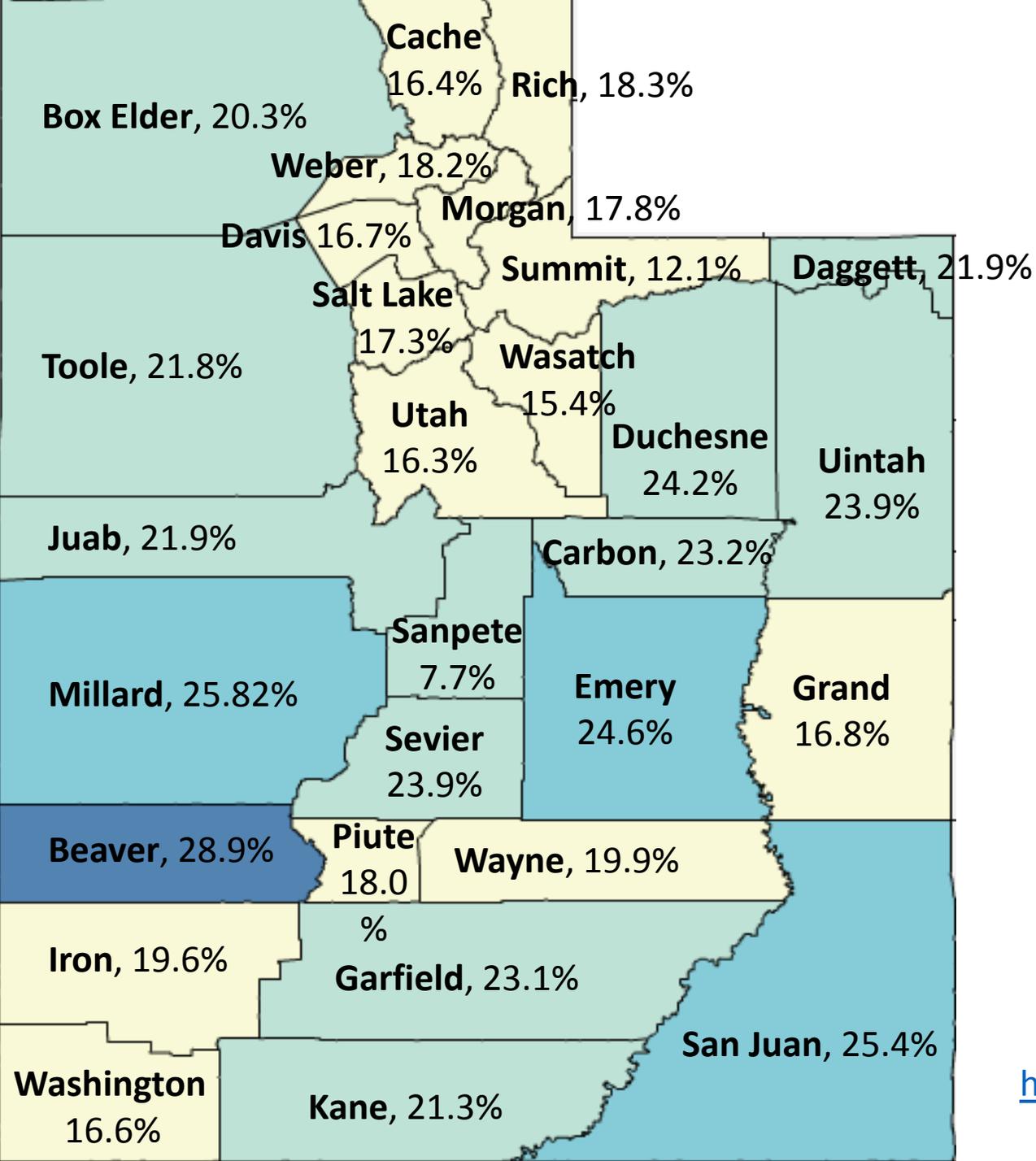


Obesity Percentage Age-Adjusted by County, Utah, 2012



<http://www.cdc.gov/diabetes/atlas/countydata/atlas.html>

Leisure Time Physical Inactivity Percentage Age-Adjusted by County, Utah, 2012



<http://www.cdc.gov/diabetes/atlas/countydata/atlas.html>

Location, Location, Location...

“Your longevity & health
are more determined by your zip code
than they are by your genetic code.”

- Tom R. Frieden, MD, MPH, CDC Director



SOCIAL FACTORS & DIABETES

Where we live, grow, work, and play

1 mi
1 km

Social Determinants of Health

“...the **conditions in which people are born, grow, live, work, and age**, including the health system...

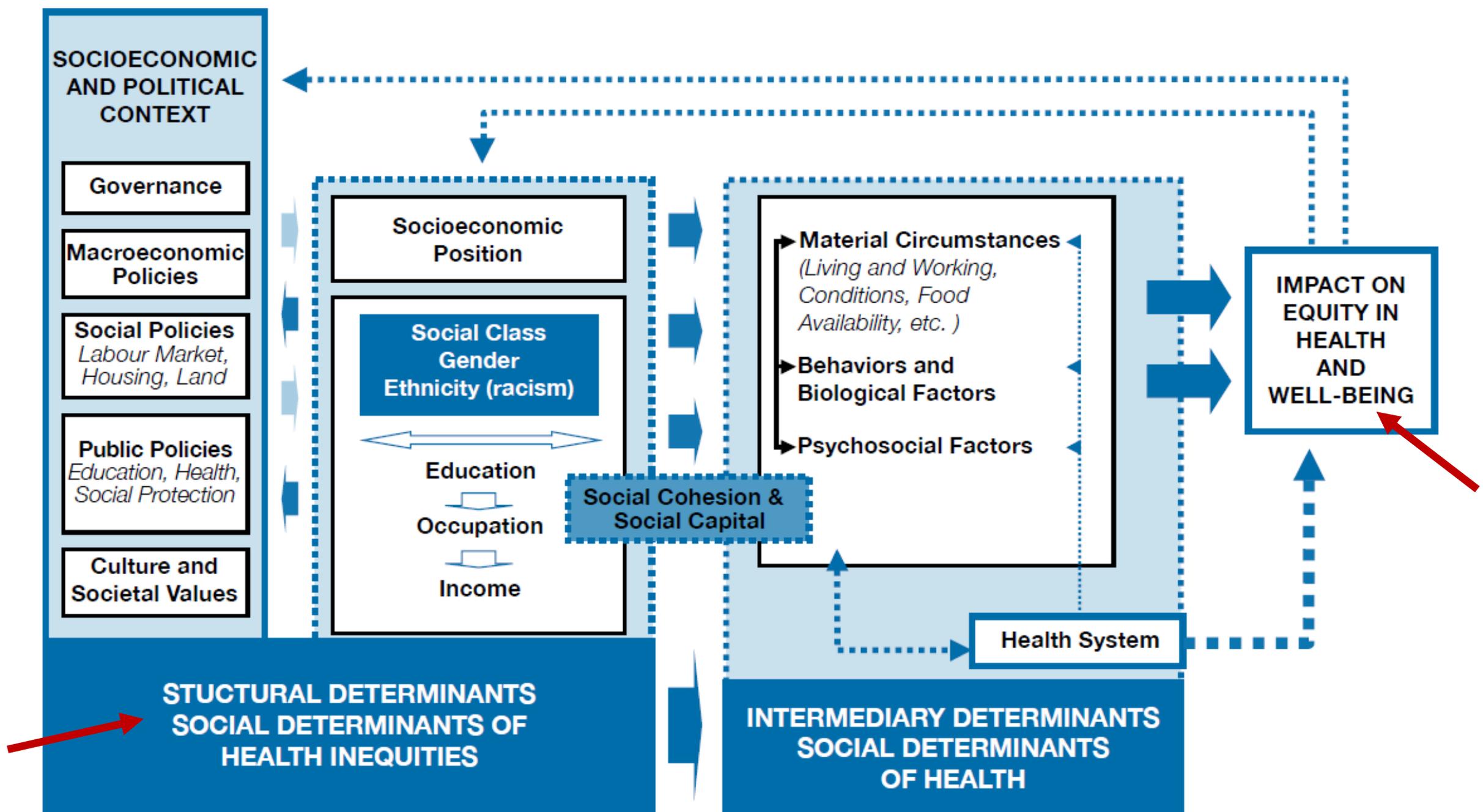
...shaped by the **distribution of money, power & resources** at global, national & local levels

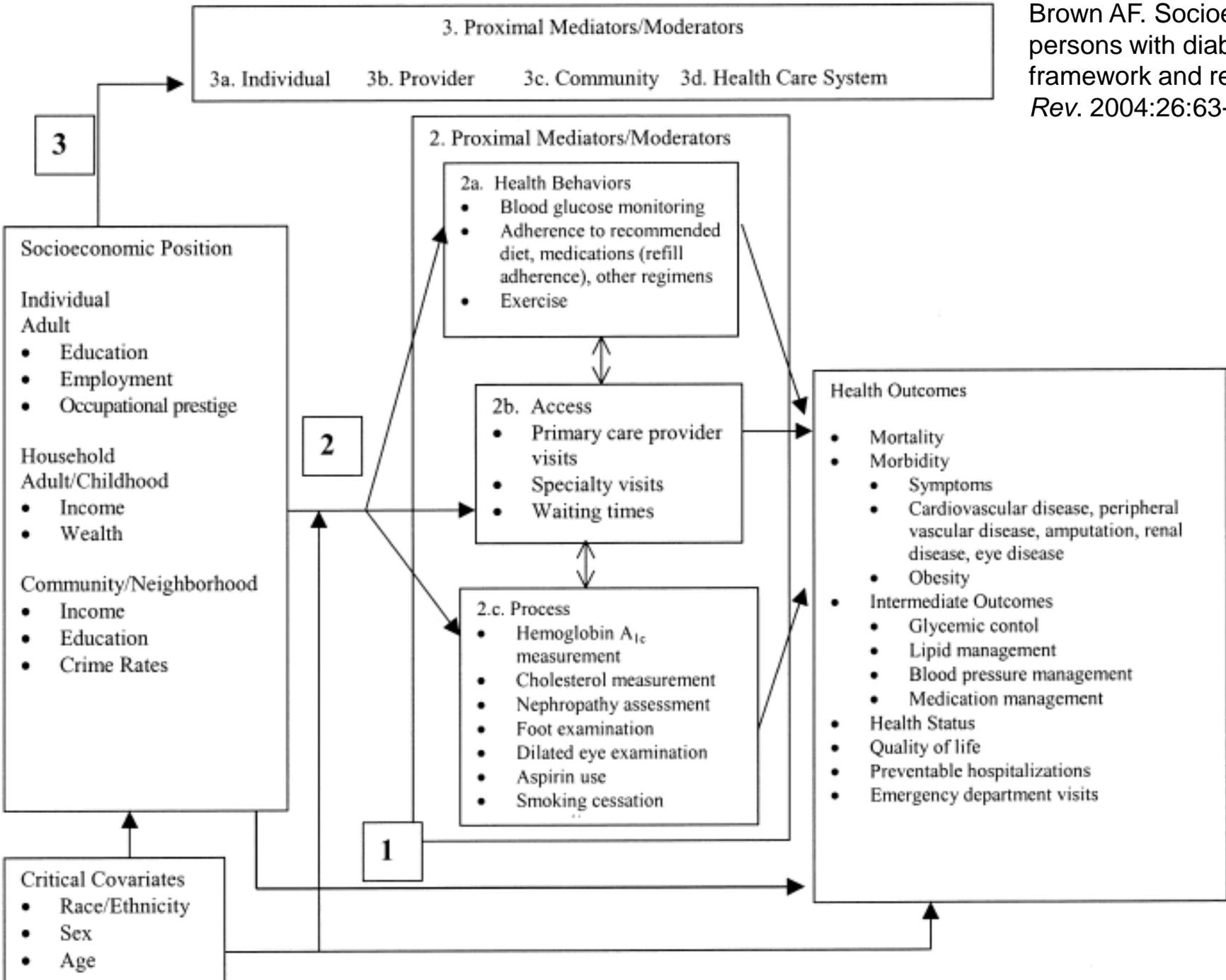
...**mostly responsible for health inequities** — the unfair and avoidable differences in health status seen within & between countries.”

World Health Organization on the Social Determinants of Health

http://www.who.int/social_determinants/sdh_definition/en/

Photo Credit : © Todd McKinley





3. Distal Mediators/Moderators of Social Position

3a. Individual
Communication
Culture/Acculturation
Mental health
Social support/
Competing demands
Stress

3b. Provider
Decision-making style
Specialty
Language concordance

3c. Community
Availability of healthy foods
Availability of places to exercise
Neighborhood safety
Transportation
Environmental exposures

3d. Health Care System

Facilitators

Registries

Guidelines

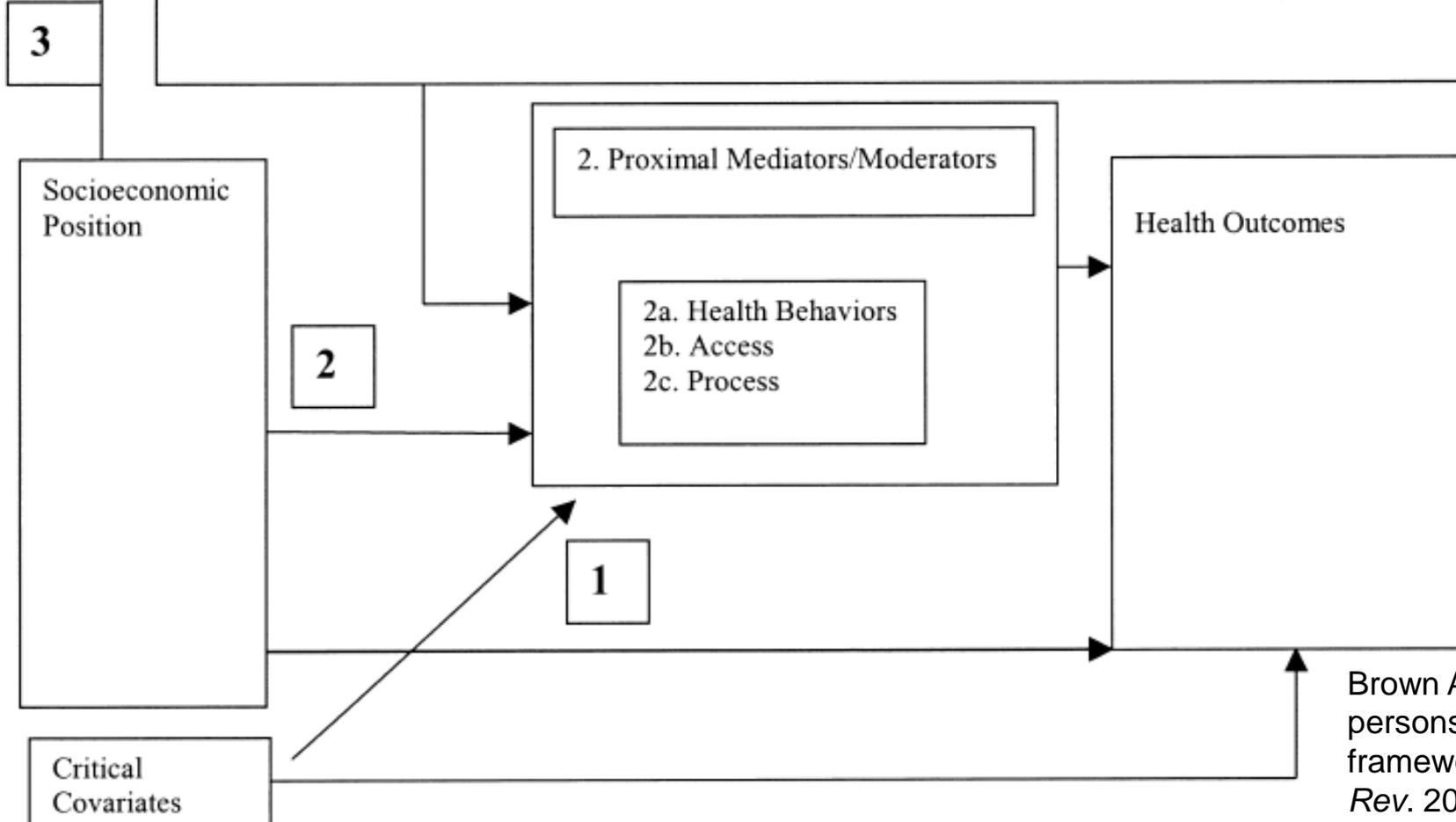
Patient education

Provider education

Barriers

Management of referral care

Clinician incentives to reduce care



Brown AF. Socioeconomic Position and health among persons with diabetes meliitus: A conceptual framework and review of the literature. *Epidemiol Rev.* 2004;26:63-77

Relationship between social determinants of health and processes and outcomes in adults with type 2 diabetes: validation of a conceptual framework

Walker et al. BMC Endocrine Disorders 2014, 14:82

<http://www.biomedcentral.com/1472-6823/14/82>

Rebekah J Walker^{1,2,3}, Mulugeta Gebregziabher^{1,4}, Bonnie Martin-Harris^{3,5} and Leonard E Egede^{1,2,6*}

Abstract

Background: The aim of this study was to empirically validate a conceptual framework and elucidate the pathways linking social determinants of health to outcomes in individuals with type 2 diabetes.

Methods: 615 adults were recruited from adult primary care clinics in the southeastern United States. The model was estimated using path analysis to determine if socioeconomic (education, employment, income) and psychosocial (fatalism, self-efficacy, depression, diabetes distress, serious psychological distress, social support, and perceived stress) factors would independently predict glycemic control or be associated with mediator/moderators of self-care, access to care, and processes of care. Covariates were gender, age, race and health literacy.

Results: The final model ($\chi^2(15) = 17.68, p = 0.28; RMSEA = 0.02, CFI = 0.99$) showed lower glycemic control was directly associated with less hours worked ($r = 0.13, p = 0.002$), more fatalistic attitudes ($r = -0.09, p = 0.03$), more self-efficacy ($r = -0.30, p < 0.001$), and less diabetes distress ($r = 0.12, p = 0.03$), with the majority of total effects being direct. Significant paths associated self-care with diabetes distress ($r = -0.14, p = 0.01$) and perceived stress ($r = -0.15, p = .001$); access to care with income ($r = 0.08, p = 0.03$), diabetes distress ($r = -0.21, p < 0.001$) and social support ($r = 0.08, p = 0.03$); and processes of care with income ($r = -0.11, p = 0.03$), social support ($r = 0.10, p = 0.04$), and perceived stress ($r = 0.10, p = 0.04$). The paths explained 76% of the variance in the model.

Conclusions: Consistent with the conceptual framework, social determinants were associated with glycemic control through a direct association and mediators/moderators of self-care, access to care and processes of care. This study provides the first validation of a conceptual framework for the relationship between socioeconomic and psychological components of social determinants of health and diabetes outcomes.

Keywords: Diabetes, Social determinants, Socioeconomic, Psychological, Glycemic control, Conceptual framework

How are social factors found to be associated with control of blood sugar?

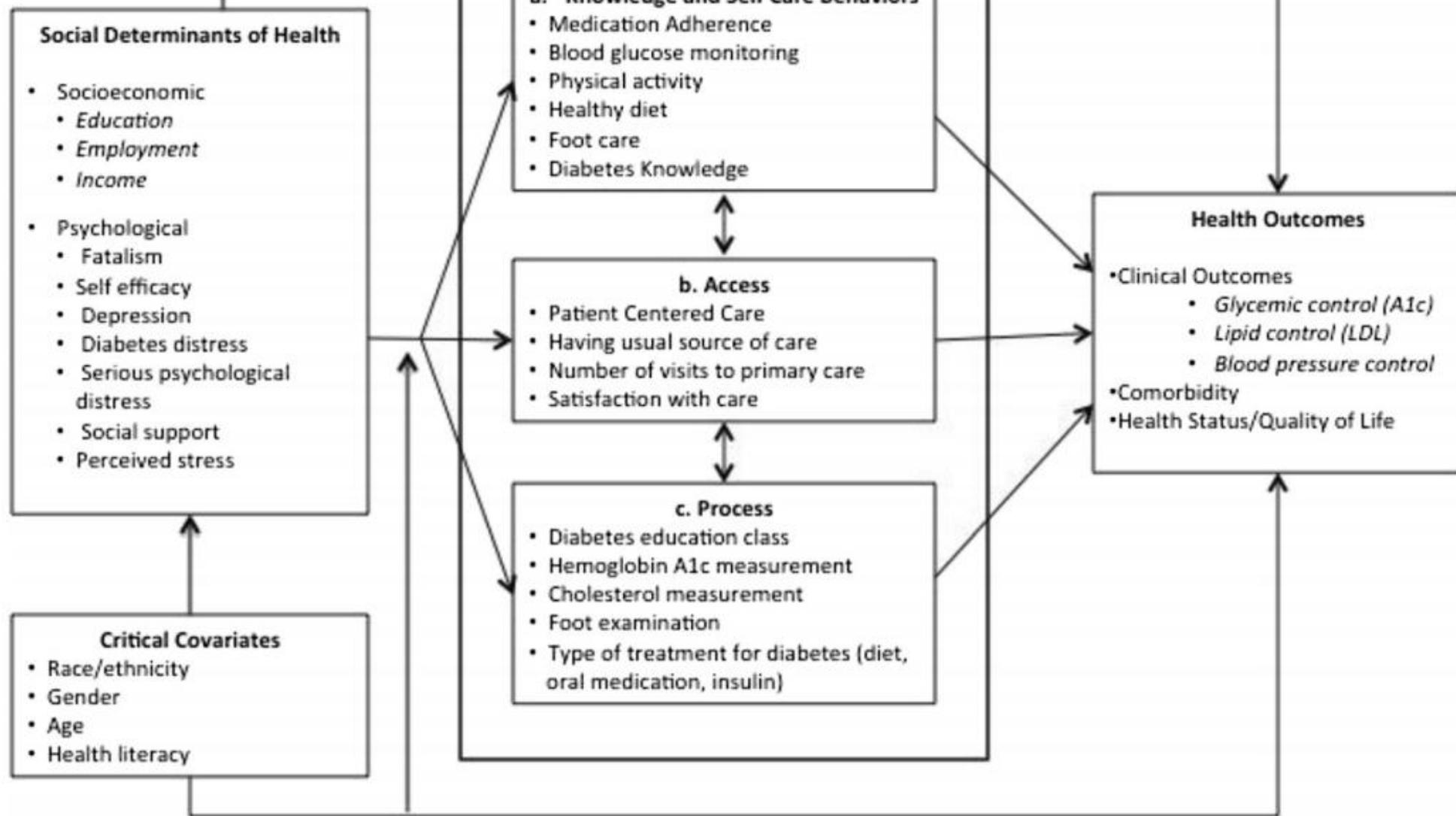


Figure 1 Modified model adapted from Brown et al. (2004) [15] for the relationship between socioeconomic and psychosocial social determinants of health factors and health outcomes in patients with type 2 diabetes.

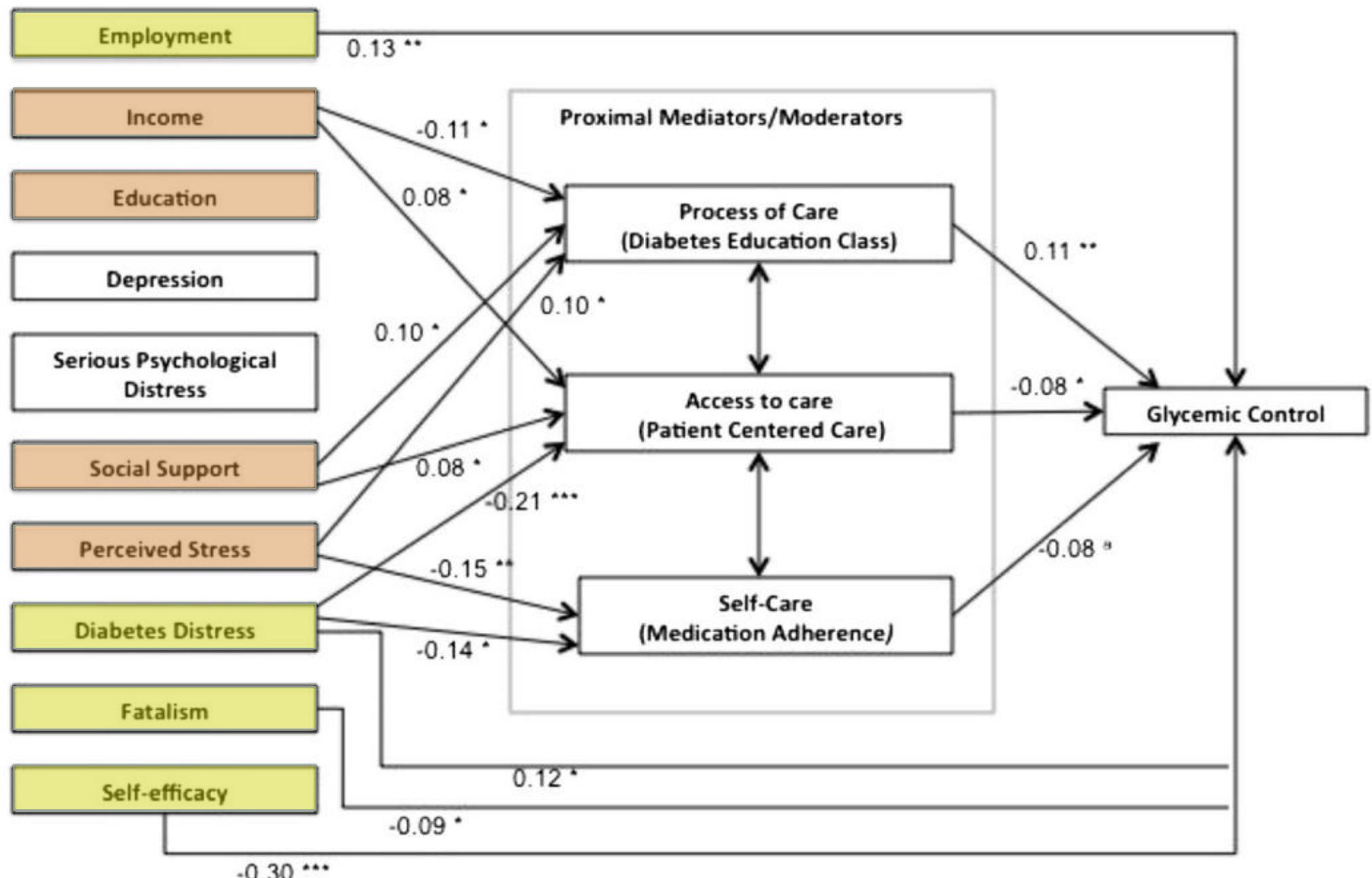
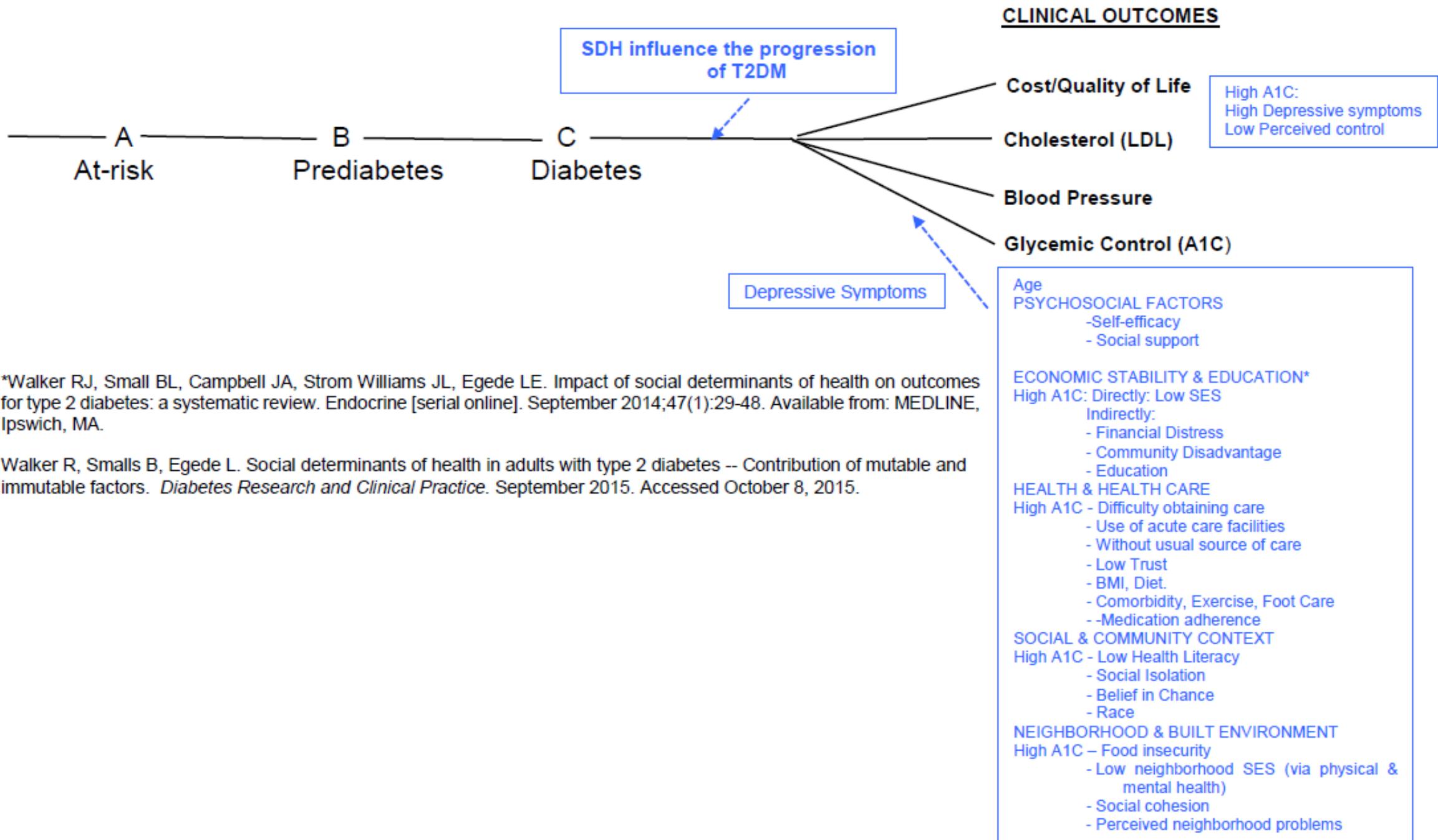


Figure 2 Path model of social determinants of health on glycemic control, adjusting for age, gender, race and health literacy. Overall model fit $\chi^2(15) = 17.68$, $p = 0.28$; RMSEA = 0.02 (90% CI 0.00, 0.04), CFI = 0.99. # $p = 0.06$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Note: coefficient for path between access to care and glycemic control is based on visits to primary care rather than patient centered care.



*Walker RJ, Small BL, Campbell JA, Strom Williams JL, Egede LE. Impact of social determinants of health on outcomes for type 2 diabetes: a systematic review. *Endocrine* [serial online]. September 2014;47(1):29-48. Available from: MEDLINE, Ipswich, MA.

Walker R, Smalls B, Egede L. Social determinants of health in adults with type 2 diabetes -- Contribution of mutable and immutable factors. *Diabetes Research and Clinical Practice*. September 2015. Accessed October 8, 2015.



TACKLING SOCIAL FACTORS to improve diabetes outcomes – Lessons from the Literature

Prevent Diabetes **STAT**

Screen / **T**est / **A**ct **T**oday™

86 **MILLION**
AMERICAN ADULTS
HAVE PREDIABETES

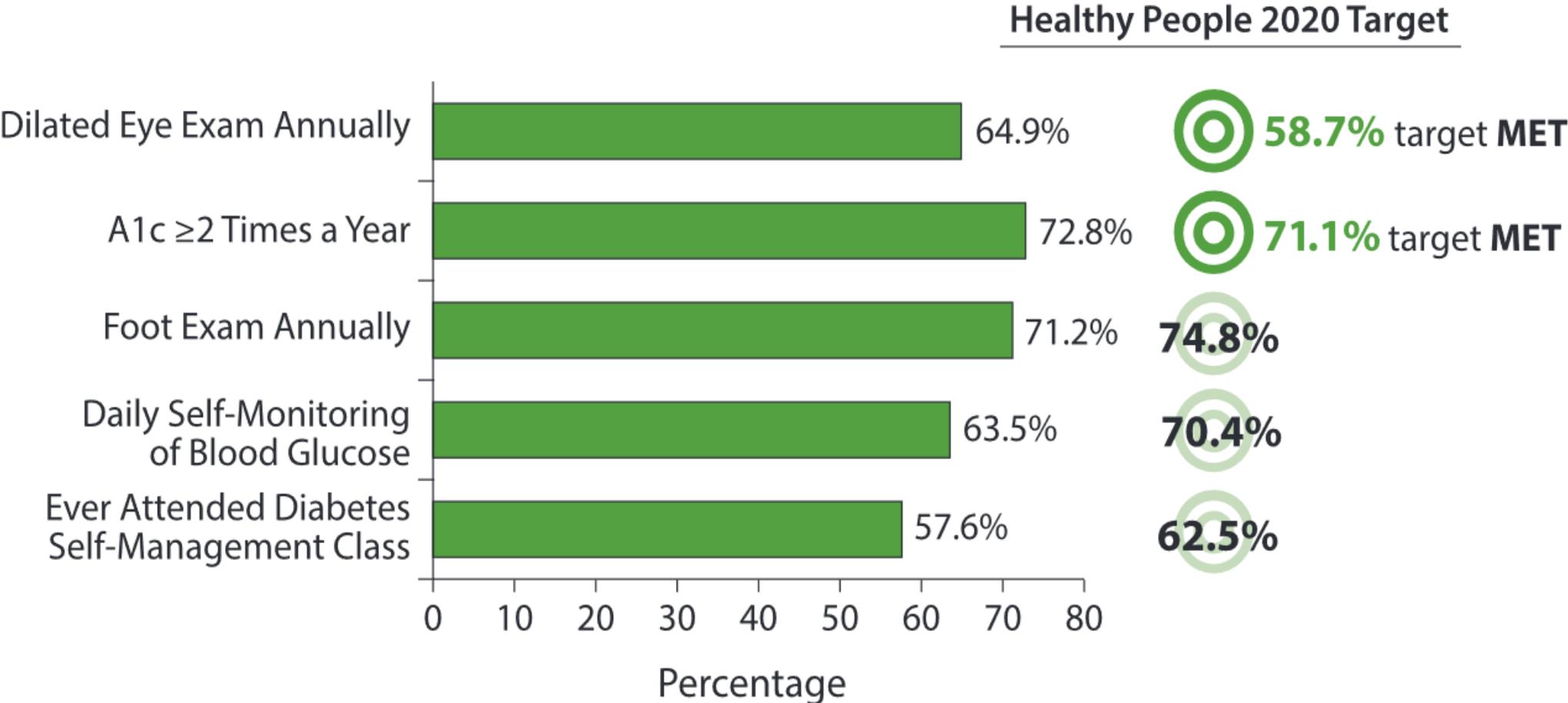
9 OUT OF **10**

PEOPLE WITH
PREDIABETES DON'T
KNOW THEY HAVE IT.¹

AMA & CDC. Prevent Diabetes STAT

<http://www.ama-assn.org/sub/prevent-diabetes-stat/>

Figure 6. Healthy People 2020 Targets^a and Percentage of US Adults Aged 18 or Older with Diagnosed Diabetes Who Reported Receiving Recommended Preventive Care Practices,^b 2012



^a Available on the [Healthy People 2020 Diabetes](#) website.
^b Percentages are age-adjusted to the 2000 US standard population.
 Source: National Diabetes Surveillance System, Behavioral Risk Factor Surveillance System data.

“Psychosocial factors address the interaction between individuals and their social environment, and have been shown to be a strong influence in diabetes.”

Walker R, Gebregziabher M, Martin-Harris B, Egede L. Relationship between social determinants of health and processes and outcomes in adults with type 2 diabetes: validation of a conceptual framework. *BMC Endocrine Disorders*. 2014; 14:82..

Psychological Barriers

- “Studies indicate that healthcare professionals may need to reassess the way they conduct consultations with their diabetes patients”
 - The importance of clear, meaningful communication for patients
 - Scientific terms are not meaningful to them
- Patients feel that diabetes isn’t that important.
 - 22% believe that diabetes won’t have much of an effect on their health
- Depression is twice as prevalent in people with diabetes.
- “Emotional well-being is pivotal to achieve effective self-management
- “We need to change the goal-setting process so that patients are informed, involved, and supported in their self-care”

“Combining psychosocial support with medical care may markedly improve diabetes outcomes.”

Skinner T. Psychological barriers. *European Journal Of Endocrinology / European Federation Of Endocrine Societies* [serial online]. October 2004;151 Suppl 2:T13. Available from: MEDLINE, Ipswich, MA.

These findings show the importance of considering a **comprehensive view of treatment, which includes clinical, behavior, and psychosocial factors together.**”

Walker R, Smalls B, Egede L. Social determinants of health in adults with type 2 diabetes -- Contribution of mutable and immutable factors. *Diabetes Research and Clinical Practice*. September 2015.

“Special efforts to increase diabetes self-efficacy among minority elderly patients with diabetes are strongly needed to improve the quality of diabetes care outcomes among minority elders. This may eventually contribute to the reduction of existing racial and ethnic disparities in diabetes care.”

Kim G, Shim R, Ford K, Baker T. The relation between diabetes self-efficacy and psychological distress among older adults: do racial and ethnic differences exist?. *Journal Of Aging And Health* [serial online]. March 2015; 27(2):320-333. Available from: MEDLINE, Ipswich, MA.

“Psychosocial factors such as self-efficacy and social support can be addressed through **psychological interventions aimed at improving glycemic control** through therapies such as **cognitive behavioral therapy and problem-solving**. A study by Alam et al. showed that generalists could deliver these psychological interventions with equal effectiveness if trained.”

“Use of psychological interventions to address self-efficacy and social support will allow additional psychosocial factors to be taken into account, such as **depression and stress**. Individuals with more depressive symptoms were shown to have **greater gains in self-efficacy following self-management training**.”

“...**obstructive family behaviors** were shown to **exacerbate** the association between both stress and depression with **medication non-adherence**.”

Walker R, Smalls B, Egede L. Social determinants of health in adults with type 2 diabetes: Contribution of mutable and immutable factors. *Diabetes Research and Clinical Practice*. September 2015.

“Encouragement of spousal support within the construct of acknowledging cultural norms may provide a means for improving diabetes outcomes and health.”

Clark M, Utz S. Social determinants of type 2 diabetes and health in the United States. World Journal Of Diabetes [serial online]. June 15, 2014; 5(3):296-304. Available from: MEDLINE, Ipswich, MA.

“Family members frequently provided **reinforcement for positive dietary change** by providing **encouragement and praise and by initiating, supporting, and participating in changes to eating habits** made by family members with diabetes.”

“Household and community members may play in diabetes-related dietary change by acting as existing and potential **sources of reinforcement, observational learning, and enhancement of behavioral capability.**”

Pollard S, Zachary D, Wingert K, Booker S, Surkan P. Family and Community Influences on Diabetes-Related Dietary Change in a Low-Income Urban Neighborhood. The Diabetes Educator [serial online]. March 31, 2014; 40(4):462-469. Available from: MEDLINE, Ipswich, MA.

What are some evidence-based recommendations from the literature in tackling social factors to improve diabetes outcomes?

ADDRESS PSYCHOSOCIAL FACTORS – Self-efficacy & Social Support

- Use psychological interventions to improve glycemic control
 - Train clinicians in delivering cognitive behavioral therapy & problem-solving
 - Train patients in self-management that also address issues of depression & stress
 - Identify obstructive family behaviors that increase non-adherence to medications
 - Encourage spouse & family members to be sources of support & reinforcement

An aerial photograph of a city, likely Denver, Colorado, showing a mix of residential neighborhoods, commercial buildings, and green spaces. In the background, there are large, snow-capped mountains under a clear blue sky. The text is overlaid on a semi-transparent white box in the upper half of the image.

Link Primary Care & Public Health

To achieve substantial & lasting improvements in population health

~ Institute of Medicine

What is the MESSAGE?

**“Human development, community development,
& health are inseparable.**

**...the communities we live in can help us or hurt us in
every conceivable way.**

The effects of living in poverty can be life-long and can affect one’s ability to be physically, mentally and emotionally healthy.

...living in quality housing in a good community reduces obesity and diabetes by as much as 20% - which is an impact as great as a medical intervention! We also know medical interventions can solve only about 10% of our health issues. Much, much more of a person’s health outcomes are a result of our environment, our upbringing and our habits...”



**“The brain gives the heart its sight.
The heart gives the brain its vision.”**

~ Rob Kall