



# Tennessee Diabetes Action Report

February 2021



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# Executive Summary

In July 2015, the Tennessee General Assembly directed the Bureau of TennCare, the Department of Health (TDH), and the Department of Finance and Administration to jointly submit a report to the Health Committee of the House of Representatives and the Health and Welfare Committee of the Senate by February 1 of each odd-numbered year. This report contains a description of the financial impact and reach of diabetes of all types across Tennessee, an assessment of the benefits of implemented programs and activities aimed at controlling diabetes and preventing the disease, a description of the level of coordination existing between the reporting agencies, and an action plan for battling diabetes. Likewise, the Tennessee General Assembly directed the agencies to collaborate to identify goals and key performance indicators while also developing individual agency plans to reduce the incidence of diabetes, improve diabetes care, and reduce negative health outcomes associated with diabetes.

In Tennessee, 13.8%, or more than 710,000 adults, have been diagnosed with diabetes. These statistics rank the State 45th in diabetes prevalence according to the 2019 America's Health Ranking's Annual Report.

The state of Tennessee is diligently working toward a culture of health through statewide, regional, county, community, and individual initiatives. These efforts include a focus on strategies around increasing physical activity, access to healthy nutrition and clean potable water, decreasing tobacco use and exposure, and increase consistent access to quality preventive and clinical care.

The data for this report were compiled from state and national sources, including the Behavioral Risk Factor Surveillance System (BRFSS), Youth Risk Behavior Survey (YRBS), National Health Interview Survey (NHIS), Tennessee Vital Statistics Systems, Pregnancy Risk Assessment System (PRAMS), Healthcare Effectiveness Data and Information Set (HEDIS) and HRSA Health Center Program Grantee Data. Also, the Bureau of TennCare and the Department of Finance and Administration provided data on Tennessee's Medicaid program and state group insurance program populations, respectively.

The final report reflects work by all three authoring agencies, as guided by the stakeholder input. This report in response to the Tennessee General Assembly is an overview of the state of diabetes in Tennessee and the work specific to diabetes in each of the three agencies.

The authors are grateful for ongoing work and partnerships of other state agencies, individuals, community organizations, industry, health systems, providers, and academic institutions in their significant contributions to preventing and mitigating the impact of this disease. This report is not intended to catalogue those many efforts, nor is it intended to provide clinical guidelines. The ongoing planning process for each report is embedded into the Tennessee Department of Health (TDH) Division of Family Health and Wellness, Chronic Disease Prevention and Health Promotion Section's work in collaboration with the two aforementioned agencies.

## ***Recommendations***

### **The following are recommended actionable items for consideration by the General Assembly of Tennessee:**

1. Increase access to healthy food and beverage options where people work, learn, live, play, and worship with an emphasis on healthier choices so the likelihood of developing diabetes can be reduced.
2. Increase access to safe and affordable active living by: developing opportunities to pursue interventions targeting the built environment; pursuing policies that reduce barriers to physical activity with a particular focus on children (i.e. school-based activity, transportation policies to increase space for recreational activity); and multi-faceted approaches to encourage walking and cycling to school, healthier commuting and physically active leisure activities.
3. Increase stakeholder involvement in policy, system and environmental (PSE) change strategies that pertain to diabetes (i.e. continue to support Project Diabetes, built environment funding, and other state Health Promotion strategies).
4. Develop opportunities to pursue environmental interventions targeting the built environment, pursue policies that reduce barriers to physical activity (i.e. transportation policies to increase space for recreational activity), and engage in multi-faceted approaches to encourage walking and cycling to school, healthier commuting and physically active leisure activities.
5. Support investment in analytics, interoperability, and measurement opportunities particularly as they relate to population healthcare management and chronic disease prevention and long-term treatment strategies.
6. Support a statewide "Health in All Policies" approach to funding and infrastructure planning that ensures consideration is given to the health impact of all policy development and implementation. This approach should include sectors such as transportation, education, environment, etc.
7. Evaluate public and private insurance payment models to determine effectiveness in cost- savings and clinical quality improvement for diabetes prevention and management.
8. Ensure all populations at high-risk for diabetes have access to lifestyle modification programs such as the Diabetes Prevention Program including expansion of reimbursement mechanisms.
9. Ensure all people with diabetes have access to self-management education from a Diabetes Education Program (Diabetes Self-Management and Chronic Disease Self- Management Education programs).

## **Background**

Chronic diseases, including diabetes, are largely preventable. However, the solutions are not simple, or quick. Diabetes and other chronic disease conditions are enabled by the places, spaces, and relationships that shape individual, family and community-level choices which can challenge health on a daily basis. Underlying the chronic disease crisis are several critical contributors including physical inactivity, excessive caloric intake,

*Leading causes of death in Tennessee: physical inactivity, excessive caloric intake, tobacco and nicotine addiction and substance misuse*

tobacco and nicotine addiction and substance misuse, particularly opioid abuse. Taken together, these drive the leading causes of death in Tennessee and across the nation. Years of life, as well as their quality and productivity, are being lost. The approaches outlined in this report build off of the State Health Plan, available at <https://www.tn.gov/health/health-program-areas/state-health-plan.html>.

Historically, the medical care model has primarily focused on the individual with an emphasis on diagnosis, treatment, and patient care. The public health model primarily focuses on populations, emphasizing prevention and health promotion for the whole community. Health, as defined by World Health Organization (WHO), is a "state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity." A key goal of public health is to "promote physical and mental health, and prevent disease, injury, and disability." The population health model focuses on reducing the need for medical treatment by encouraging proactive, health-oriented decision-making at all levels and within all systems.

**The Vision:** *Move Tennessee into the top ten healthy states in the nation*

Establishing the focus and importance of primary prevention and early intervention is a priority of TDH. TDH has partnered with established and evolving chronic disease prevention programs to promote use of upstream strategies, including Policy, System and Environmental changes (PSE), addressing social determinants of health and "Health in all Policy" (HiAP) efforts when planning programmatic strategies. In recent years, the Department has made it a priority to align program work plans across funding streams, including federal and state dollars supporting preventive health, chronic disease prevention, maternal and child health, and women, infants and children (WIC). The goal has been to increase the use of evidence-based public health strategies while focusing limited resources on upstream approaches aimed at increasing program reach and influencing long-term outcomes to reduce chronic disease prevalence.

## Goals:

**TDH:** Protect, promote, and improve the health and prosperity of people in Tennessee.

**TennCare:** Improve lives through high-quality, cost-effective care with the vision for a Healthier Tennessee.

**Finance and Administration:** Deliver comprehensive, affordable, dependable, and sustainable benefits with a vision to have healthy members and peace of mind.

## Burden and Magnitude

Diabetes is a disease of metabolic dysregulation in which blood glucose levels are chronically higher than normal. There are several types of diabetes. **Table 1** shows the types of diabetes, clinical description, and the estimated prevalence among total cases of diabetes. Possible complications include heart disease, kidney disease, blindness, leg ulcers, damaged nerves, amputations, coma, stroke, other serious medical conditions, and death.

**Table 1: Types of Diabetes and Clinical Description**

Type	Clinical Description	Prevalence
Type 1 diabetes	insulin-dependent diabetes mellitus (IDDM) or juvenile-onset diabetes	About 5% to 10% of all diagnosed cases of diabetes
Type 2 diabetes	non-insulin dependent diabetes mellitus (NIDDM)	About 90% to 95% of all diagnosed cases of diabetes
Gestational diabetes	affects only pregnant women and can increase short- and long-term health risks for mother and child	2% to 10% of all pregnancies
Other specific types of diabetes	resulting from specific genetic syndromes, surgery, drugs, malnutrition, infections, and other illnesses	Accounts for 1% to 5% of all diagnosed cases of diabetes

Source: CDC National Diabetes Statistics Report, 2020

## Diabetes and Prediabetes Prevalence

According to the 2020 National Diabetes Statistics Report, 34.2 million people of all ages, or one in ten people in the United States have diabetes. It is estimated that there are 7.3 million adults with undiagnosed diabetes in the US. This number represents 2.8% of all US adults (Table 1a) and 21.4% of all US adults with diabetes. And another 88 million are living with prediabetes, which is approximately one in three people. Pre-diabetes is a chronic condition of mildly elevated blood sugar that puts individuals at high risk for developing diabetes in the future. Many who have prediabetes are unaware of the presence of the condition. In Tennessee, 13.8%, or more than 710,000 adults, have been diagnosed with diabetes and 9.9% reported being told that they had prediabetes. Considering the number of adults with undiagnosed diabetes in the US, the prevalence of diabetes in TN is most likely underestimated.



**Table 2** describes the prevalence of diabetes and prediabetes by various demographic groups: sex, race/ethnicity, age, education, and income. This data comes from the 2019 Behavioral Risk Factor Surveillance Survey (BRFSS), an annual survey of Tennessee adults that provides information regarding health-related risk behaviors, chronic health conditions and use of preventive services.

There is no discernible difference between diabetes prevalence among males and females. African-Americans have significantly higher prevalence of diabetes than Whites (17.6% vs 13.7%). Diabetes prevalence also progresses with age; older Tennesseans are significantly more likely to have diabetes compared to younger age groups. For example, almost 27.2% of adults ≥ 65 years were diagnosed with diabetes, which is over four times higher than those aged 44 years or younger.

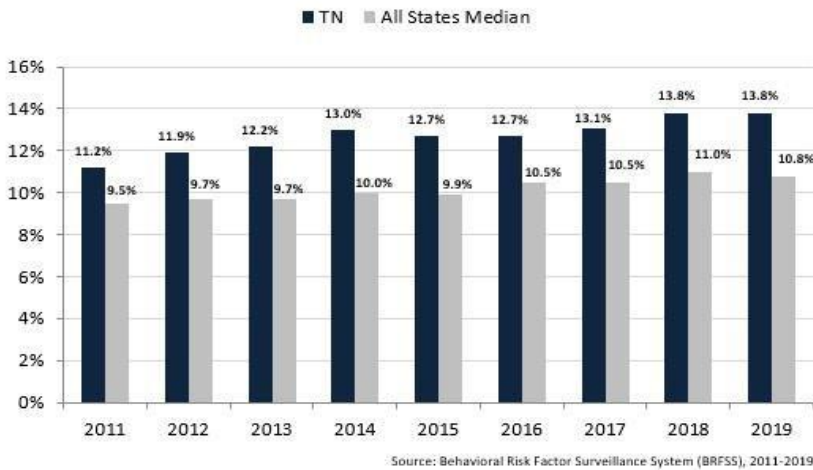
Socioeconomic factors (education and income) have a substantial role in risk of developing diabetes, as is evident throughout years of BRFSS data. In 2019, adults with less than a high school education (no diploma or G.E.D.) were more than twice as likely to have diabetes as those with a college degree. Furthermore, Tennessee adults earning less than \$25,000 per year have greater than a twofold prevalence of diabetes compared to those earning over \$75,000.

**Table 2:** Self-Reported Prevalence in Diabetes and Prediabetes in TN by Demographic Group

Demographic Group	Diabetes	Prediabetes
	Prevalence (%)	Prevalence (%)
<b>Total</b>	<b>13.8</b>	<b>9.9</b>
<b>Sex</b>		
Male	14.5	9.2
Female	13.1	10.5
<b>Race/Ethnicity</b>		
White/Non-Hisp.	13.7	9.7
Black or Afri. Am./Non-Hisp.	17.6	11.9
Other Race/Non-Hisp.	11.6	4.3
Multi-Racial/Non-Hisp.	14.8	9.0
Hispanic	3.7	-
<b>Age</b>		
18-24	0.3	4.5
25-34	1.8	5.8
35-44	6.3	7.7
45-54	17.0	12.4
55-64	21.9	14.8
65+	27.2	12.9
<b>Education</b>		
Less than H.S.	22.7	9.3
H.S. or G.E.D.	15.8	11.7
Some Post-H.S.	12.2	10.5
College Graduate	8.0	7.0
<b>Income</b>		
Less than \$15,000	25.2	15.4
\$15,000-24,999	17.8	12.5
\$25,000-34,999	16.5	10.2
\$35,000-49,999	10.7	13.0
\$50,000-74,999	11.7	9.5
\$75,000+	7.3	5.9

Source: Tennessee Behavioral Risk Factor Surveillance Survey

**Figure 1: Crude Prevalence of Adults with Diagnosed Diabetes**



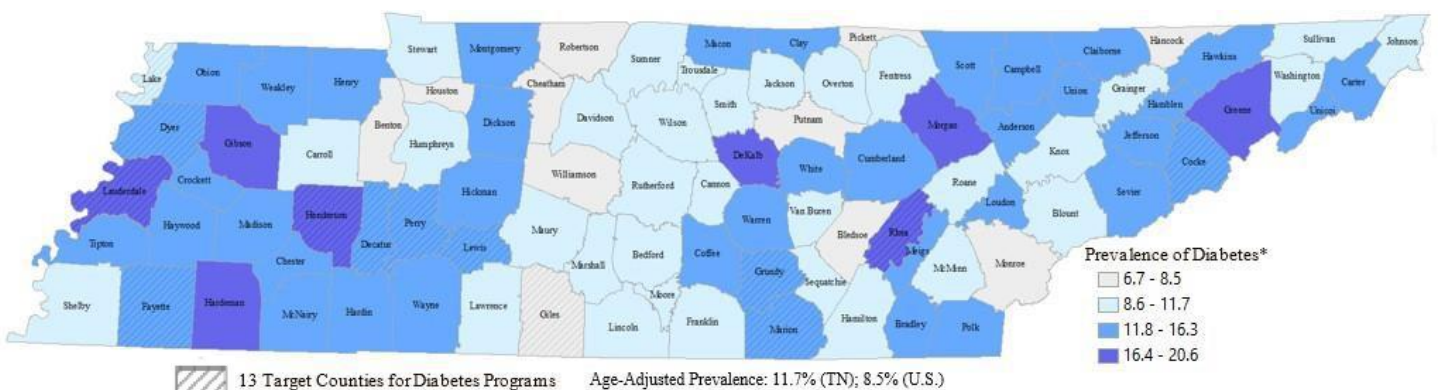
Tennessee’s overall prevalence of diabetes has risen steadily in recent years. Although diabetes prevalence has also increased nationally over the past decade, Tennessee’s rate has increased more than that of the rest of the nation. **Figure 1** displays the crude prevalence of adults with diagnosed diabetes in Tennessee and U.S between 2011 and 2019.

Tennessee’s rate is consistently higher than the national level. Based on 2019 BRFSS data, Tennessee rank 45<sup>th</sup> in diabetes prevalence.

Tennessee counties vary in their prevalence of diabetes. Urban counties generally have lower rates of diabetes, followed by suburban counties. Rural counties often have the highest prevalence of diabetes. **Figure 2** displays a map of county-specific age-adjusted prevalence of diabetes. Only 11 of 95 counties in Tennessee have three-year estimates at /lower than the national median for diabetes.

*Eighty-four counties in Tennessee have three-year estimates higher than the national median for diabetes.*

**Figure 2: Age-Adjusted Prevalence of Adults with Diagnosed Diabetes by County, Tennessee, 2016-2018**



Source: Centers for Disease Control and Prevention. Division of Diabetes Translation. [US Diabetes Surveillance System](https://gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html#). (https://gis.cdc.gov/grasp/diabetes/DiabetesAtlas.html#)

## Diabetes Incidence

Tennessee’s diabetes incidence rate, the frequency at which new cases of diabetes are identified, appears to have increased in recent years, although the differences are not statistically significant. When investigating county-specific rates of diabetes incidence, the corresponding map mirrors the prevalence map in Figure 2.

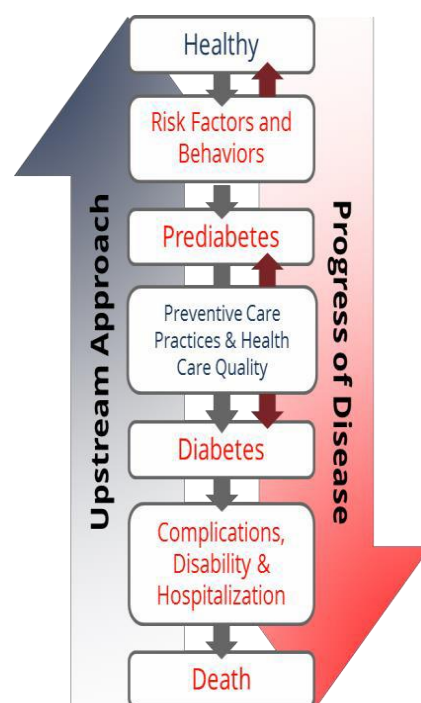
## Risk Factors & Complications

Type 2 diabetes is a progressive disease, advancing from the combination of non-modifiable and modifiable risk factors, to early signs of disease and, eventually, to diabetes and its complications. Each step adds to the severity of illness, required medical interventions and cost to the patient and health care system.

**Figure 3** shows how diabetes may progress into complications and death. It also shows how risk factors, health behaviors, preventive care, care management and health care quality influence outcomes.

**Table 3** provides a list of risk factors for type 2 diabetes. Type 2 diabetes accounts for 90-95% of all people with diabetes. Although some risk factors cannot be changed, modifiable risk factors provide significant opportunities to reduce the risk of developing diabetes or the worsening of its complications.

**Figure 3: Progression of Type 2 Diabetes**



**Table 3: Risk Factors for Type 2 Diabetes**

Modifiable	Non-Modifiable	Social-Environmental
Weight Gain	Age	Educational Attainment
Overweight or Obesity	Ethnicity	Income Level
Sedentary Lifestyle	Gender	Geography
Tobacco Use	Family History	
High Blood Pressure	History of Gestational Diabetes	
High Cholesterol	Polycystic Ovarian Syndrome (PCOS)	

Source: National Institutes of Health (NIH) and Centers for Disease Control and Prevention (CDC)

Tennessee adults with diabetes are significantly more likely to be overweight or obese, be physically inactive or sedentary, and to have been diagnosed with high blood pressure and/or high cholesterol. **Table 4** demonstrates how Tennessee compares to other states in “upstream” behaviors known to contribute to and complicate diabetes prognosis. According to 2019 BRFSS data, Tennessee ranks in the bottom quartile of states in adult fruit consumption, physical inactivity, tobacco use, hypertension, and high cholesterol. Tennessee ranks 45<sup>th</sup> in the U.S. for obesity (adults with a BMI of 30 or higher).

**Table 4: Modifiable Risk Factors for Type 2 Diabetes and Associated Prevalence Measures among Tennessee Adults**

Risk Factor	BRFSS Indicator	TN	U.S. Rank*	among TN adults w/ diabetes
Nutrition	Adults consuming < 1 fruit per day	43.0%	34th	41.5%
	Adults consuming < 1 vegetable per day	19.0%	14th	22.3%
Obesity	Percentage of adults with BMI of 30.0 or higher	36.5%	45th	61.7%
Sedentary Lifestyle (Physical Inactivity)	Percentage of adults who reported no physical activity or exercise other than their regular job in the past 30 days	30.1%	39th	47.1%
Tobacco Use	Percentage of adults who are smokers	19.9%	42nd	17.6%
High Blood Pressure	Percentage of adults who reported being told by a health professional that they have high blood pressure	39.3%	43rd	79.9%
High Cholesterol	Percentage of adults who reported having their cholesterol checked and were told by a health professional that it was high	36.2%	41st	68.3%

Note: \* U.S. rank is based on the age-adjusted prevalence.

Source: Tennessee Behavioral Risk Factor Surveillance Survey (BRFSS), 2019

Tennessee’s youth are also at high risk (**Table 5**). According to the 2019 Youth Risk Behavior Survey (YRBS), which gathers health behavior data from high school students, Tennessee youth are more likely to be obese and use tobacco than youth surveyed in most other states. Tennessee high schoolers are also less likely to consume adequate amounts of fruits and vegetables. Fortunately, Tennessee is outperforming many states in regards to its level of daily physical activity among youth.

*Children who are obese are more likely to have high blood pressure and high cholesterol, which are risk factors for cardiovascular disease.*

**Table 5: Modifiable Risk Factors for Type 2 Diabetes and Associated Prevalence Measures among Tennessee Youth**

Risk Factor	YRBS Indicator	TN	U.S. Rank* (# Participating States)
Nutrition	Did not eat fruit or drink 100% fruit juices (during the 7 days before the survey)	11.1%	39th (42)
	Did not eat vegetables (during the 7 days before the survey)	11.0%	28th (36)
Obesity	BMI >= 95th percentile based on sex- and age-specific CDC growth charts	20.9%	41st (44)
Sedentary Lifestyle (Physical Inactivity)	Were not physically active for a total of at least 60 minutes on at least one day (during the 7 days before the survey)	19.1%	30th (44)
Tobacco Use	Used cigarettes, smokeless tobacco, cigars or electronic vapor products on at least 1 day during the 30 days before the survey	27.9%	19th (35)

Note: \* U.S. rank is based on the age-adjusted prevalence.

Source: Tennessee Youth Risk Behavior Surveillance System (YRBSS), 2019

## Preventive Care Practices

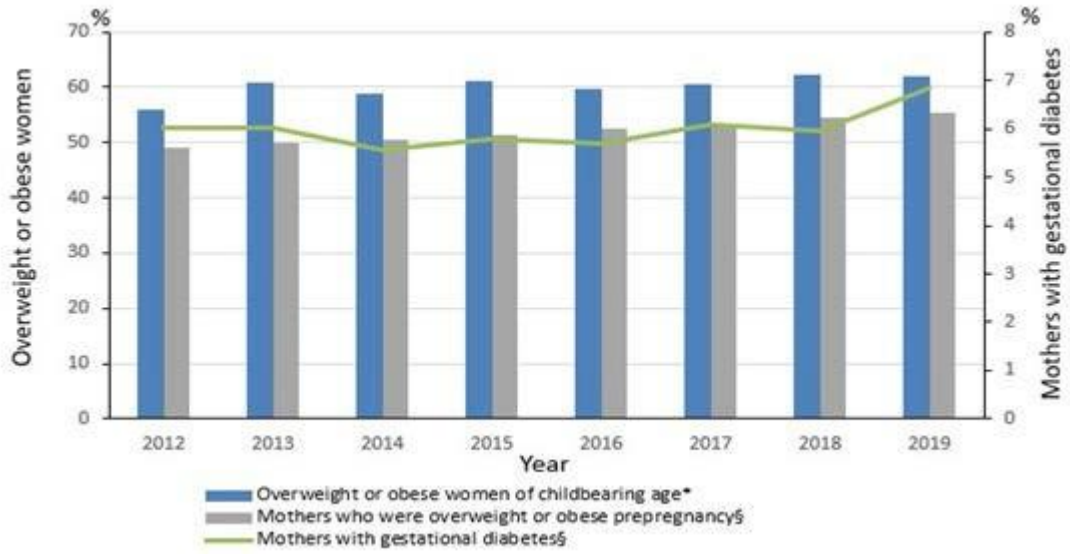
Managing diabetes requires access to health care services, coordinated efforts by health care providers, and engaged community and family systems. Specific recommendations for people with diabetes can be found in the annual publication of the American Diabetes Association’s *Standards of Medical Care in Diabetes*. These treatments range from being physically active and making healthy food choices to routine health care visits and vaccinations.

Unfortunately, many Tennessee adults with diabetes do not receive the recommended care. Since 2004, Tennessee adults are less likely to visit a health professional for diabetes, including annual foot and eye exams, than the national average. They are also less likely to monitor glucose, receive an influenza vaccination or attend a diabetes self-management class.

## Diabetes and Pregnancy

Over 60% of Tennessee women of childbearing age are overweight or obese, and the percent of mothers who were overweight or obese at the time they became pregnant has steadily increased from 49% in 2012 to 55.4% in 2019 (**Figure 4**). This has important implications for maternal and child health. Women whose weight gain during pregnancy is in excess of recommendations may experience adverse maternal outcomes, which include increased risk for developing gestational diabetes, postpartum weight retention and subsequent maternal obesity.

**Figure 4: Characteristics of Overweight or Obese among Women of Childbearing Age and Pre-pregnancy Gestational Diabetes**



Source: \* Tennessee Behavior Risk Factor Surveillance System (BRFSS), 2012-2019  
 § Tennessee Birth Data 2012-2019

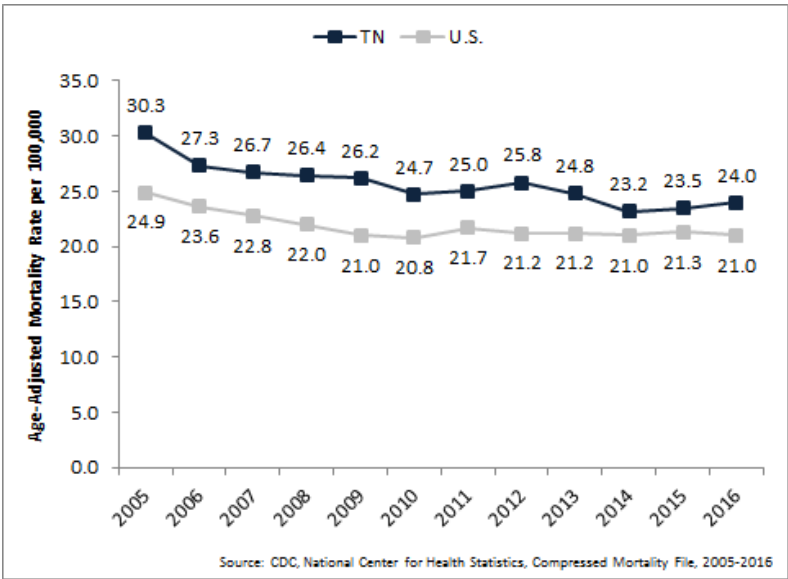
## Diabetes during Pregnancy

Gestational diabetes is a type of diabetes that develops during pregnancy. High blood sugar during pregnancy can lead to health problems for both a pregnant woman and her baby, including the delivery of a larger infant that may result in serious birth trauma for both the mother and infant and the necessity of a cesarean section delivery. About 6% of pregnant individuals develop gestational diabetes. Hispanic women are more likely than white non-Hispanics to have gestational diabetes. In 2019, 8.0% of Hispanic mothers developed gestational diabetes, while around 6.8% of non-Hispanic mothers had the same diagnosis. Affected women are also at increased risk of developing type 2 diabetes later in life. Infants born to women with diabetes and uncontrolled blood sugar during pregnancy are at higher risk for birth defects, respiratory distress, blood sugar dysregulation at birth and long-term risk of obesity and diabetes themselves.

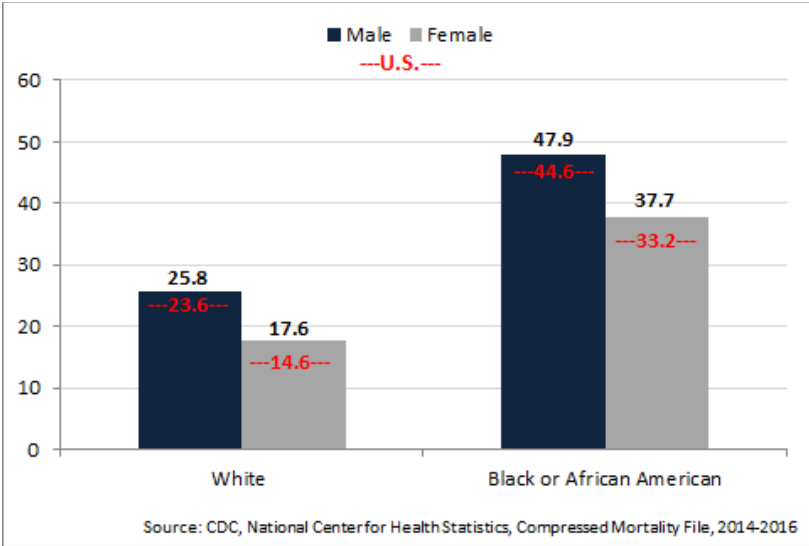
# Morbidity and Mortality

Diabetes is the 7<sup>th</sup> leading cause of death in Tennessee. The age-adjusted death rate from diabetes rose from 1990 to 2004, but since 2005, the death rate has been in a slight, but steady decline. Diabetes claims the lives of approximately 1,700 Tennesseans each year. Despite declines in the overall death rate, there continues to be significant differences in the impact upon Tennessee’s various demographic groups. Males are more likely to die from diabetes than females, and black Tennesseans are at a substantially higher risk than whites.

**Figure 5: Diabetes Deaths, Age-Adjusted Mortality Rate Per 100,000**



**Figure 6: Diabetes Deaths, Age-adjusted Mortality Rates by Race and Gender in TN vs. US**



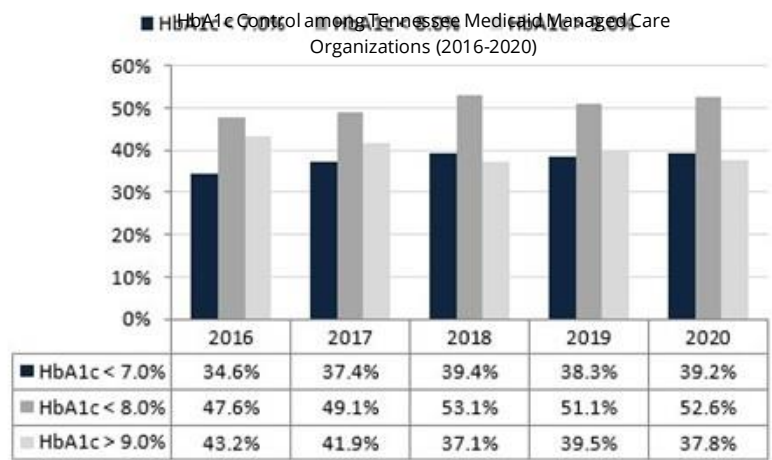
## Diabetes and Health Care Quality

### HEDIS/CAHPS Report

Medicaid managed care organizations (MCOs) are required to report Healthcare Effectiveness Data and Information Set (HEDIS) measures as a part of accreditation mandates in Tennessee. These measures allow for comparisons to national benchmarks and between Tennessee’s MCOs, as well as tracking over time. Within HEDIS, there are specific measures associated with comprehensive

diabetes care, including hemoglobin A1c (HbA1c) testing and control, retinal and neuropathy exams and blood pressure control. Over the past five years, Tennessee MCOs report moderate increases in HbA1c testing and medical attention towards neuropathy and vision screenings. HbA1c testing has increased from 82.6% 2016 to 86.6% in 2020, and the performance of annual retinal exams has increased from 42.8% in 2016 to 51.3% in 2020. The percentage of patients with controlled HbA1c (<7%) remained relatively stable during the same time period.

**Figure 7: Comprehensive Diabetes Care**



Source: Annual HEDIS/CAHPS Report

## Financial Burden of Diabetes

### Sum of Costs

According to the American Diabetes Association (ADA), average medical expenditures among people with diagnosed diabetes were 2.3 times higher than what expenditures would be in the absence of diabetes. The total costs of diagnosed diabetes in the United States in 2017 were \$327 billion, a 26% increase from the previous estimate of \$245 billion in 2012. This included direct medical costs of \$237 billion and a reduction in productivity of \$90 billion. According to CDC Chronic Disease Cost Calculator cost projections, **the total estimated cost of diagnosed diabetes in Tennessee in 2017 was \$6.6 billion.**

### TennCare

TennCare provides medical coverage for eligible low-income residents in Tennessee. According to TennCare data, the total cost of diabetes-related medical claims was \$263 million in 2018.

**Table 6** demonstrates that the medical cost paid per recipient with diabetes in TennCare has increased over the past two years. Furthermore, costs are increasing rapidly for members less than 21 years of age with diabetes.



Additionally, the TennCare population with prediabetes represents a significant cost risk and opportunity. Shifting this population towards greater health would significantly reduce care-related costs. However, there will be a significant increase in cost burden should the disease progress in this population.

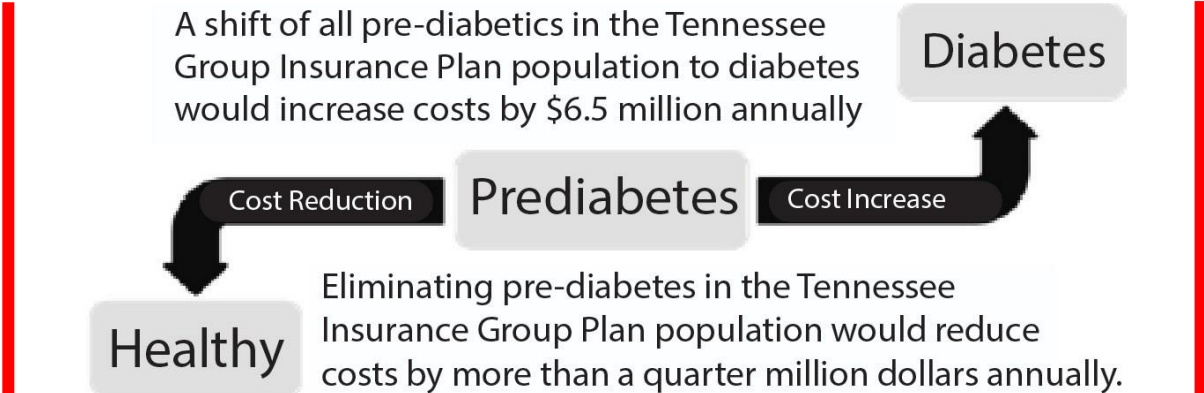
**Table 6: Average Medical Costs of Diabetic TennCare Recipients**

Age Group	Average Costs Per Member 2017	Average Costs Per Member 2018	Percentage Increase
< 21 Years	\$2,700	\$3,129	15.9%
≥ 21 Years	\$1,924	\$2,030	5.5%

Source: Medicaid Claims Data, Bureau of TennCare

### State Group Insurance Program

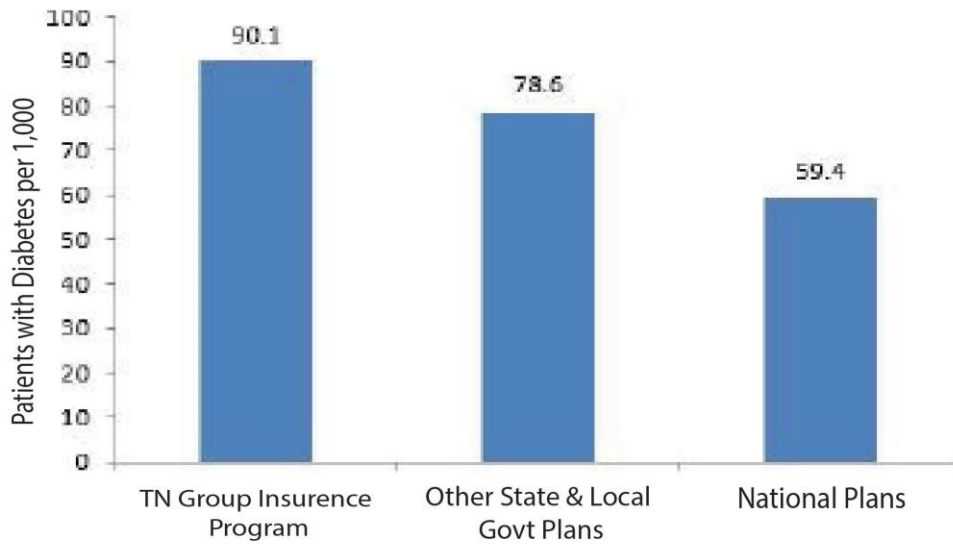
The Department of Finance and Administration (F&A) manages insurance coverage for 285,000 state employees, retirees, and their dependents as well as participating local education and local government employees, retirees, and dependents. According to F&A data, the total cost of diabetes-related medical and pharmacy claims was over \$136 million in 2019.



Based on biometrics (glucose1) and clinical condition (primary diagnosis) data for members ages 18-65, members with diabetes cost 1.9 times more than those without diabetes. Members with prediabetes cost 1.9 times more than those without diabetes[1].

[1] Based on 2019 biometric data and Net Pay PMPY = Per Member Per Year. In 2019 the wellness program was entirely voluntary and differed from previous wellness programs. This data cannot be compared to previous years.

**Figure 8: Diabetes Burden - State Plan Comparison**



*Source: Data pulled from IBM database on 09/29/2020 for incurred calendar year 2019; National and State and Local norms measures are based on specific cost and utilization measures (which are based on an average) pulled using IBM's Marketscan Benchmarks. The TN Group Insurance Program is the entire plan population and is not specific to the wellness plan. The National (IBM's book of business nationally) and Other State and Local Gov't Plans (Truven's book of business for state and local gov't agencies) measure definitions are based on Truven's book of business.*

In 2019, Tennessee's Group Insurance Program has a high rate of diabetes patients (per 1000) compared to other state and local government and national plans (Table 7). Due to Tennessee Group Insurance Program's increased burden, the plan incurs nearly \$7.9 million in increased costs compared to national plans and nearly \$4.4 million dollars in additional costs compared to other state and local government plans, based on the average cost per patient.

In terms of diabetes comprehensive care, the Tennessee Insurance Group Plan is performing better than HEDIS or exceeding national standards for several of the measures (Table 7).

**Table 7: Diabetes Comprehensive Care-State Plan Comparison**

Measure	National Average	TN Average	Best National Plan
<b>Poorly controlled diabetes (HbA1c &gt; 9.0%) (lower is better)</b>	34.2	29.5	14.9
<b>Controlled diabetes (HbA1c &lt;8%)</b>	54.5	55.7	75
<b>Retinal or dilated eye exam</b>	52.6	47.8	89.6
<b>Screened/monitored for kidney disease</b>	90.1	89.4	96.2
<b>Hemoglobin A1c (HbA1c) test</b>	90.7	91.3	98.1
<b>Blood pressure &lt;140/90 mm Hg</b>	58.6	56.6	89.2

The cost of regular preventive care is minimal compared to the costs of complications caused by diabetes. Nationally, the American Diabetes Association (ADA) estimates that people with diagnosed diabetes incur medical expenses more than twice that of those without the disease. Furthermore, the cost of care for conditions not directly related to diabetes is increased by the exacerbated effect diabetes has on the individual.

## ***Services and Programs Addressing Diabetes in Tennessee***

Many traditional health programs have focused strictly on health education, the thought being that if people are better informed, they will choose to make better decisions independent of the access and/or social barriers they may face. However, in order to achieve lifestyle change, there also needs to be practical, readily available healthy options in the surrounding environment as well as a pervasive culture in which the healthy choice is the easiest choice.

Policy, system, and environmental change strategies address these additional factors.

*Healthy decisions occur when healthy options are available and routine.*

## **Policy, System, and Environmental Change**

Policy, System and Environmental (PSE) changes are strategies that modify the environment to make healthy choices practical and available to all community members, independent of individual resources. Changing laws and shaping physical landscapes (built environment), as well as changing organizational policies, systems and/or environments, can make a significant impact upon large populations.

These changes assist communities in tackling health issues such as obesity, chronic diseases, injury, violence, and substance abuse and promote culture change resulting in improved health, wellness and safety.

Where someone lives directly impacts how they live. Healthy decisions are more likely to be made in an environment where healthy options are consistently available. How someone lives significantly impacts their physical, mental, and spiritual health and wellbeing. Policy, system, and environmental changes make healthier choices real, feasible options for every community member by impacting the laws, rules and environments that influence behavior.

**Table 8: Policy, System and Environmental Change**

Setting	Traditional Programs/Events	Policy, System, and Environmental Change (PSE)
School	Celebrate National Nutrition Month	Use Smarter Lunchroom design and healthy food placement techniques
Community	Host a community fun run to raise awareness about diabetes	Add sidewalks, cross-walks, bike lanes, and bike racks to make walking and biking safer and more enjoyable
Worksite	Hold health screenings for staff	On-site fitness facilities and workplace policies that promote walking breaks
Hospital	Hold free breastfeeding courses for new moms	Implement the World Health Organization 10 Steps to Successful Breastfeeding and promote a breastfeeding-friendly hospital environment

Source: [http://www.healthpolicyohio.org/wp-content/uploads/2014/02/owpn\\_psec\\_factsheet.pdf](http://www.healthpolicyohio.org/wp-content/uploads/2014/02/owpn_psec_factsheet.pdf)

*\*Adapted from the Ohio Wellness and Prevention Network PSE Fact Sheet*

*Project Diabetes implements policy, systems, and environmental changes through grants for initiatives such as the Rethink Your Drink campaign, where students in more than 44 schools led their peers to sign a pledge to drink fewer sugary beverages and more water.*

## **Statewide Prevention Initiatives**

### **Project Diabetes**

Project Diabetes is a state-funded initiative administered by the Tennessee Department of Health. Grants are awarded to community partners and fund projects which focus on reducing overweight and obesity as risk factors for the development of diabetes. Grant activities are geared toward prevention strategies that are applied before there is any evidence of disease. There is a significant focus on built environment and PSE strategies. <https://www.tn.gov/health/health-program-areas/mch-diabetes/project-diabetes.html>

Projects were required to draw upon the prevention goals and strategies identified in the report *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation* issued by the National Academy of Medicine (formally known as the Institute of Medicine).

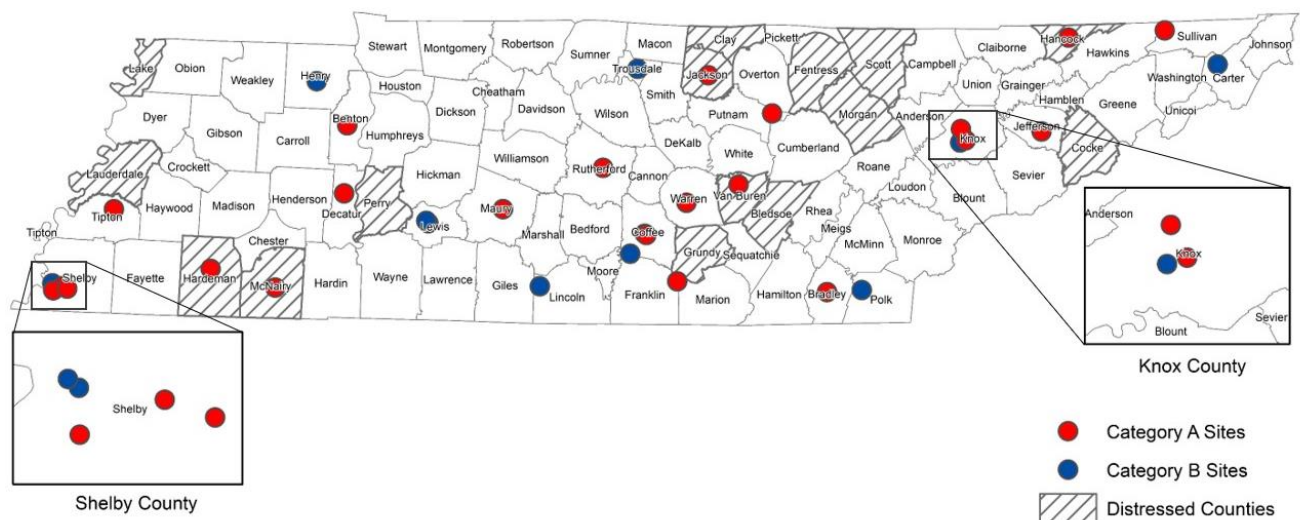
Goals for the 2019 - 2022 funding are:

**Goal 1: Make physical activity an integral and routine part of life.**

**Goal 2: Create food and beverage environments that ensure that healthy food and beverage options are the routine, easy choice.**

There are two levels of Project Diabetes funding. Category A grants are funded for up to 3 years for a maximum amount of \$150,000 per year. Category B grants are funded for up to 2 years for a maximum amount of \$15,000 per year. Organizations receiving funding for 2019 through 2022 are displayed on the map below. (**Figure 9**).

**Figure 9: Location of Project Diabetes Grantees, 2019-2022**  
**Project Diabetes Project Sites, 2019-2022**  
**Category A and Category B**



## Preventive Health and Health Services Block Grant

The Preventive Health Services Block Grant focuses on the prevention of cancer, heart disease, diabetes, overweight and obesity in children and adolescents, poisoning, and rape/sexual assault, as well as promoting healthy weight in adults, providing preventive dental services for children and adolescents, and community-based primary prevention efforts. The Preventive Health Services Block Grant strategies are all aligned with the Tennessee Department of Health’s Vital Signs and strategic priorities.

Funding supports the work of health promotion in all 95 counties, including 85 health educators located throughout the state, the poison control hotline and the rape prevention and assistance hotline. The work of health educator specialists in Tennessee spans the Prevention Institute's Spectrum of Prevention model, which encompasses a range of strategies including: strengthening individual knowledge and skills; promoting community and school education; educating providers; fostering coalitions and networks; changing organizational practice; and influencing policy.

## Women, Infants, and Children Program

The Women, Infants and Children program (WIC) is a federal program designed to provide supplemental food to low-income, pregnant, postpartum and breastfeeding women, infants and children until the age of five years. The program provides nutrition education, healthy supplemental foods, breastfeeding promotion and support, and referrals for health care. TDH provided WIC services in 126 locations to approximately 111,000 eligible participants each month FFY2020. A CDC Morbidity and Mortality Weekly Report (MMWR) that was released in 2019 analyzed WIC data from 2010-2016. The study reported a statistically significant decrease in obesity for 2-4 year old Tennessee WIC enrollees, from 16% to 14.69%.

## Maternal and Child Health Funding

TDH administers state and federal Maternal and Child Health (MCH)/Title V Block Grant funds throughout the state to promote the health and wellbeing of families. Obesity prevention for children is one of the MCH priority areas, and funding supports wide-ranging efforts including breastfeeding policies in workplaces and hospitals, daycare nutrition education, and physical activity program implementation in schools and workplaces. MCH funds core infrastructure and provides adaptable funding to meet population needs.

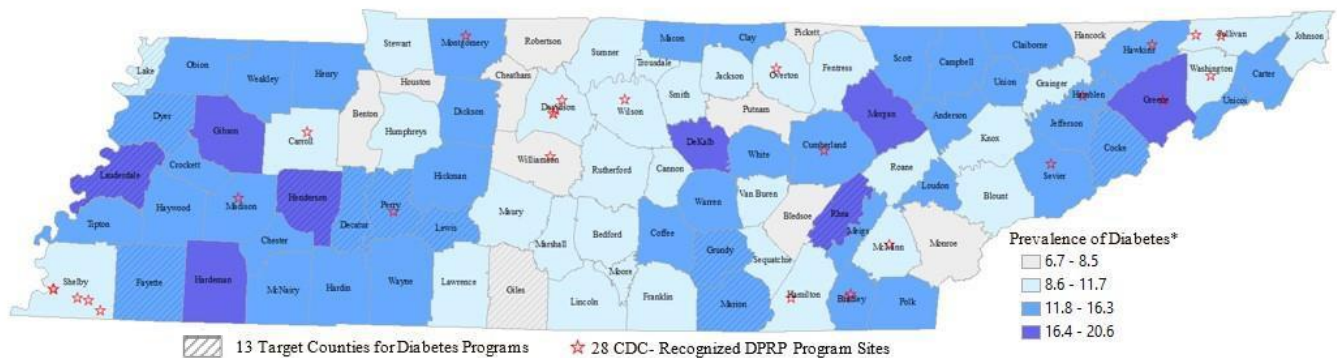
## State Public Health Actions to Prevent and Control Diabetes, Heart Disease and Stroke (CDC 1815 Funding)

The Tennessee Department of Health received funding via the Improving the Health of Americans Through Prevention and Management of Diabetes and Heart Disease and Stroke, (CDC 1815) cooperative agreement. The purpose of this funding is to implement and evaluate evidence-based strategies contributing to the prevention and management of cardiovascular disease and type 2 diabetes across Tennessee. Target populations are those affected disproportionately by high blood pressure, high cholesterol, type 2 diabetes, and/or prediabetes due to socioeconomic or other factors— inadequate access to care, poor quality of care, rural environment, age and/or minority status. The Tennessee Department of Health and its CDC1815 partners provide interventions that are designed to achieve measurable outcomes by reducing risks associated with prediabetes, diabetes, heart disease and stroke among disparate populations and communities.

## Diabetes Prevention Programs (DPP)

Lifestyle change programs are offered through the Center for Disease Control and Prevention's National Diabetes Prevention Program (DPP). The DPP is a yearlong lifestyle change program that helps participants make lasting behavioral changes to reduce their risks of developing diabetes. Research shows that DPPs help to reduce risk of developing type 2 diabetes by as much as 58 percent. When TDH began working directly with Tennessee DPPs in May of 2015, there were approximately 10 DPPs statewide. As of July 2020, there are 27 registered DPPs, with eleven having full CDC-DPP recognition, 2 with preliminary CDC-DPP recognition and thirteen with pending CDC- DPP recognition. In March 2020, most Diabetes Prevention Programs in-person events were put on hold due to COVID-19. The Tennessee Diabetes Prevention Regional Coalitions distributed a survey to all current Diabetes Prevention Programs (DPPs) in July 2020 to determine how COVID impacted their programs. The DPP responses that were received showed that while most DPPs in the state had offered DPPs in-person, with the pandemic issues of social distancing and spread reduction, the majority of the current DPPs have successfully transitioned to providing diabetes prevention programming using telehealth, accommodating up to 20 people. The use of distance learning and online programs have become the viable option for DPPs to sustain and reach populations to continue their efforts with diabetes prevention.

**Figure 10: CDC Recognized Diabetes Prevention Programs (DPP), TN**



**Source:** Centers for Disease Control and Prevention, Diabetes Prevention Recognition Program, Data access at [https://nccd.cdc.gov/DDT\\_DPRP/Registry.aspx](https://nccd.cdc.gov/DDT_DPRP/Registry.aspx) as of September 20, 2020

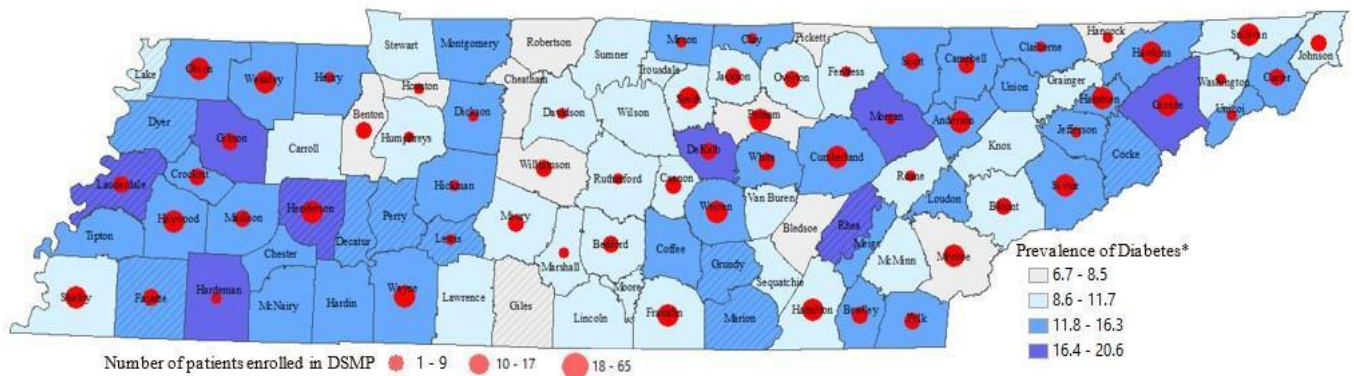
## University of Tennessee (UT) Extension Partnership

Tennessee Department of Health (TDH) and the University of Tennessee (UT) Extension collaborated to conduct the Self-Management Resource Center (SMRC), formerly Stanford Patient Education Research Center, programs statewide to address communities at high-risk for diabetes. In Tennessee, 84 of 95 counties have diabetes rates higher than the national average. Over the years, TDH and UT Extension have been successful in expanding workshops and recruiting new leaders across the state, as the reach of these programs have increased significantly. In 2013, only 55 of the 95 counties had the Diabetes Self-Management Program (DSMP) represented; as of 2019, at least one trained DSMP leader is represented in all 95 counties.

TDH and UT Extension strive to continue this momentum and increase access to the program across the state. They have worked together to enlist public health educators, UT-Extension agents, and community members across the state to promote and become trained leaders in the program

Between 2018 and 2019, 61 new DSMP leaders were trained to deliver the program and 90 workshops were delivered. During this timeframe, 891 Tennesseans participated in a DSMP workshop.

**Figure 11: Patients Enrolled in DSMP Workshops by County, 2018-2020**



Source: Data source: UT-Extension Annual Report, 2018-2020

## Tennessee Pharmacists Association (TPA) Partnership

The Tennessee Pharmacy Association (TPA) continues their engagement with current Association of Diabetes Care & Education Specialists (ADCES), formerly known as the American Association of Diabetes Educators (AACE), accredited programs to increase the number of programs offered in high need areas/for high risk populations, as well as help with additional accreditation assistance. TPA also supports pharmacy sites to become diabetes prevention program (DPP) providers. TPA work also focuses on joint education between pharmacists and physicians. By incorporating the use collaborative pharmacy practice agreements to manage patients diagnosed with diabetes or at risk of developing diabetes to increase the engagement of pharmacists in diabetes prevention and management through a multi-disciplinary team approach. As pharmacists provide vital services as part of the team-based care approach, compensation for providing these services is needed for sustainability. The TPA has worked successfully to get a 'pharmacists as providers' law passed in Tennessee that would require pharmacists to be treated as other providers under managed care organizations. TPA provides education to managed care organizations (MCOs) about this law to promote the inclusion of pharmacists as recognized providers of service. TPA has successfully worked with BlueCross BlueShield of Tennessee to add a category in their plan so that pharmacists can bill for 'Disease management Services', which includes diabetes management and support.



## Environmental Approaches to Promote Health

Many of the PSE strategies to combat obesity and prevent diabetes work across the lifespan and incorporate multiple funding sources. For example, TDH and the Tennessee Department of Education work closely together on many school-based strategies through the Coordinated School Health Program (CSH). According to the 2017-2018 Coordinated School Health BMI Report, there was no statistically significant change in the prevalence of overweight or obesity between the 2017-18 school year (39.3 percent) and the 2016-17 school year (39.2 percent). CSH and TDH partner on strategies to improve healthy food access and physical activity in schools across the state, using state and federal funding sources. Smarter lunchrooms is one strategy shared by multiple funding streams that focuses on food appeal and placement to decrease consumption of excessive sugar and calories and increase consumption of healthy foods.

Another PSE strategy is the Gold Sneaker Initiative. Gold Sneaker consists of policies on physical activity, nutrition, and tobacco-free campuses that are adopted in licensed child care facilities in TN. Participation in Gold Sneaker is voluntary, and there is no cost for participating licensed child care providers. Child care providers that complete an application, the required training, and implement the policies are certified Gold Sneaker providers. They are also provided with a complimentary toolkit containing resources that promote physical activity and healthy eating and are offered ongoing technical assistance and optional training opportunities. Part of the growth process for the Gold Sneaker Initiative includes a continued and evolving partnership with the Tennessee Department of Human Services (TDHS) to integrate Gold Sneaker policies onto the DHS Star-Quality Report Card Program.

The Star-Quality Child Care Program is a voluntary program that recognizes child care agencies that exceed minimum licensing standards. These agencies can receive a rating of one, two or three stars. Effective July 31, 2018, Tennessee licensed child care facilities seeking a 3-star rating must be Gold Sneaker designated and enforce Gold Sneaker policies. Due to the COVID-19 pandemic, the Tennessee Department of Human Services (TDHS) is not currently evaluating child care providers for Gold Sneaker compliance. Rather, TDHS is assisting providers with re-opening and focusing on safety for children, families, and staff. The Tennessee Department of Health (TDH) and TDHS will continue to collaborate to determine the best way to promote Gold Sneaker within TDHS child care rules and policies.

PSE change is also implemented through the WIC program. WIC promotes breastfeeding to all pregnant women as the optimal infant feeding choice through efforts such as employment of breastfeeding peer counselors and the presence of a designated breastfeeding expert in every county health department.

Recognizing the health benefits to the mother and child and the potential impact of breastfeeding on long-term overweight/obesity risk for children, Title V/Maternal Child Health Block Grant and WIC funding are utilized to support the Tennessee Breastfeeding Hotline as one strategy to improve the breastfeeding culture in Tennessee. The Hotline routinely receives more than 415 calls per month. Additionally, hospitals in Tennessee continue to implement policies that support breastfeeding. Health educators across the state partner with businesses to develop supportive breastfeeding environments, and over 1,243 have received a “Breastfeeding Welcomed Here” designation. In 2019, the rate of breastfeeding initiation in TN was 80.6%, up 6% from 75.9% in 2015.

TDH has also worked closely with local and state agencies to develop sustainable plans for built environment infrastructure and policies to prevent obesity including community walking trails, worksite wellness policies, and joint use facility agreements. TDH also offers funding opportunities for local PSE work and participates in several working groups such as the interagency Tennessee Livability Collaborative.

Tennessee Livability Collaborative, facilitated by the TDH Office of Primary Prevention, is a working group of 17 Tennessee state agencies with a mission to improve the prosperity, quality of life and health of Tennesseans through state department collaboration in the areas of policy, funding and programming. Collectively these agencies work to improve the livability of Tennessee communities, which includes opportunities for education, employment, health, transportation, healthy foods, housing, recreation, and culture. The Collaborative takes a Health in All Policies approach to primary prevention, where health-promoting work is integrated into decision-making in non-health sectors. This approach aims to ensure Tennesseans live in health-promoting communities that reduce the incidence of disease, particularly those preventable chronic diseases that account for most of Tennessee’s leading causes of death. The Collaborative was convened in 2016 and meets bi-monthly. It is jointly owned by all member agencies and operates as a voluntary initiative, and meetings are designed to facilitate resource-and information- sharing about current agency initiatives.

The TDH Office of Primary Prevention also manages two built environment grant programs, which aim to increase access to safe and publicly accessible places that provide opportunities for physical activity for a diverse group of users, including those who live, visit, work, play, worship, and learn in the community. In 2019, Tennessee Department of Health made \$20,000 of grant funding available to every county in Tennessee to increase publicly accessible, physical activity-promoting built environment infrastructure. Counties embarked on a myriad of projects, including playgrounds, trails, walking tracks, and improvements to parks and green spaces. In addition, a competitive built environment grant program is available to local governments, state government agencies, non- profits, and non-governmental organizations. The department awarded over \$1.8 million in competitive grants to 34 grantees across Tennessee. <https://www.tn.gov/health/health-program-areas/office-of-primary-prevention.html>

Funded projects include convening, programming, planning, and construction of built environment projects that promote physical activity, including outdoor fitness equipment, greenway and trails construction, and creating greenspaces and recreation spaces such as playgrounds and walking tracks.

## ***Division of TennCare***

TennCare's goals to improve diabetes prevention and treatment are integrated into the State Innovation Model payment reform initiatives, including both episodes of care and primary care transformation. Episode-based payment seeks to align provider incentives with successfully achieving a patient's desired outcome during an "episode of care," a clinical situation with predictable start and end points. Episodes reward high-quality care, promote the use of clinical pathways and evidence-based guidelines, encourage coordination, and reduce ineffective and/or inappropriate care. Wave 6 included diabetes exacerbations such as diabetic ketoacidosis.

Results of the first full year of accountability for the diabetes episode are included in this report. <https://www.tn.gov/content/dam/tn/tenncare/documents2/EpisodesOfCare2018PerformancePeriod.pdf> TDH has participated with TennCare in the episode design process by participating in the Technical Advisory Groups which helped create the episodes.

Patient Centered Medical Home (PCMH) is part of TennCare's Primary Care Transformation initiative. PCMH is a comprehensive care delivery model designed to improve the quality of primary care services for TennCare members, the capabilities of and practice standards of primary care providers, and the overall value of health care delivered to the TennCare population.

Tennessee has built on the existing PCMH efforts by providers and payers in the state to create a robust PCMH program that features alignment across payers on critical elements. To date, approximately 37% of TennCare Members (over 550,000) are attributed to one of the 82 PCMH-participating provider organizations at nearly 500 locations throughout the state. PCMH providers commit to member centered access, team-based care, population health management, care management support, care coordination, performance measurement and quality improvement. Participating providers receive training and technical assistance, quarterly reports with actionable data, and access to the Care Coordination Tool. These providers are compensated with ongoing financial support and an opportunity for an annual outcome payment based on quality and efficiency performance. More information is available here:

<https://www.tn.gov/tenncare/health-care-innovation/primary-care-transformation/patient-centered-medical-homes-pcmh.html>

## ***Tennessee Department of Finance and Administration***

### **Wellness Program**

Benefits Administration (BA) within Finance and Administration also administers an employee assistance program and integrated disease management and wellness programs. The wellness program provides a variety of health management and wellness services, using best practices and evidence-based approaches to achieve positive member outcomes. A health assessment plus disease management (DM), including diabetes DM with coaching support, is available to all members of the State group Insurance Program. State and Higher Education members also have access to additional wellness resources such as a weight management program and biometric screenings, providing a comprehensive wellness approach.

Members are also eligible to receive Lifestyle Management Coaching, which includes coaching for lifestyle improvement to address behaviors that may contribute to the development of chronic conditions and diseases. The program addresses the whole person in areas related to exercise, nutrition, stress, hypertension, cholesterol, and weight management. Disease Management Coaching focuses more specifically on five Disease Management programs, including: diabetes, asthma, chronic obstructive pulmonary disease, coronary artery disease, and congestive heart failure. <https://www.tn.gov/content/tn/partnersforhealth.html>

### **Diabetes Prevention Program (DPP)**

The state group health plan offers the DPP at no cost to all adult state group health plan members who meet the eligibility criteria for the program. Currently there are two options to participate: in-person at the ParTNers Health & Wellness Center or via a virtual program through the member's health carrier (either BlueCross BlueShield of Tennessee or Cigna).

<https://www.tn.gov/content/tn/partnersforhealth/other-benefits/wellness-program/diabetes-prevention-program.html>

## Diabetes Reversal Pilot

Benefits Administration is engaged in a 12-month no cost diabetes reversal pilot with Virta Health that covers 50 enrolled diabetic patients. Virta is a virtual diabetes reversal clinic focused on eliminating diabetes-specific medications while getting and keeping patients reversed (HgbA1c below 6.5 threshold). This is accomplished through Virta Reverse, a nutritional protocol using a ketogenic diet. Nutritional ketosis can reverse type 2 diabetes by reducing blood sugar, improving insulin sensitivity and reducing inflammation. The program also includes Continuous Remote Care, with real-time access to Virta coaches and medical providers. Virta coordinates care with a member's PCP and other providers, providing regular reports on patient progress along with safe medication reductions and biomarker tracking and supervision.

## Patient-Centered Medical Home (PCMH) Initiatives

Both BCBST and Cigna state health plans have PCMH Initiatives for their clients. Cigna's Collaborative Accountable Care program is a primary care-centric population health, value-based payment program. BCBST's program focuses on improving the health of a population by focusing on high risk members, those with chronic conditions and those in need of preventative services. There is an emphasis on care coordination, reducing emergency department utilization and improving HEDIS quality metrics.

### ***Cross-Collaboration and Coordination between Agencies***

#### Working for a Healthier Tennessee Initiative

"Working for a Healthier Tennessee" (WFHT) launched in June 2013. WFHT builds on the foundation established by the ParTNers for Health Wellness and Employee Assistance Programs and expands health and wellness resources to all state employees, regardless of enrollment in medical coverage. WFHT has three key focus areas: physical activity, healthy eating and tobacco cessation. There is also an emphasis on emotional health as this has a direct impact upon the health and productivity of employees. Creating an environment that encourages employees to maintain their total health, both physical and emotional, aligns all participants to lead the way to a healthier Tennessee.

<https://www.tn.gov/wfhtn>

## ***Summary and Conclusions***

Long-term planning is key to successful diabetes prevention and reduction of overall diabetes-associated financial burden. Community engagement is critical and must consider factors influencing health, such as poverty, education, employment, race/ethnicity/biases, system barriers and built environment. Type 2 diabetes represents the majority of diabetes cases and is primarily related to modifiable factors such as excess body weight and physical inactivity. Research evidence indicates that more than half of type 2 diabetes cases can be prevented or, once diagnosed, prevented from worsening. Type 2 diabetes is most often managed with a combination of medications (injectable or oral), healthy eating, active living, regular medical and preventive care, and self-management.

Current information suggests that patients with type 2 diabetes are more likely to have significant complications from COVID 19, including increased ICU admissions, longer hospital stays and increased risk of death. Poorly controlled type 2 diabetes is a risk factor for infections in general, and the mortality rate of COVID 19 appears to be higher in patients with poorly controlled type 2 diabetes.

Based on current work in Tennessee and supported by evidence-based public health practice, this report recommends interventions (page 6) aimed at slowing and managing the diabetes epidemic in Tennessee. These interventions include opportunities for individuals and communities to help prevent diabetes from developing, as well as increased access to programs aimed at controlling diabetes to avoid more severe health consequences. There is a focus on policy, system and environmental (PSE) changes/built environment strategies, as well as increased access to prevention, health care and self-management services. The recommendations aim primarily to prevent and reduce diabetes occurrence and build a culture of healthy eating and active living.



**This report was compiled by the Tennessee Department of Health, Bureau of TennCare and the Department of Finance and Administration in accordance with Tennessee Code Annotated 68-1-2601, 68-1-2602, and 68-1-2603.**