



State of Wisconsin
Department of Health Services

Tony Evers, Governor
Kirsten L. Johnson, Secretary

April 23, 2024

Ms. Linsay Hale
Acting Senate Chief Clerk
Room B20 Southeast, State Capitol
Madison, WI 53707

Mr. Edward A. Blazel
Assembly Chief Clerk
12 West Main Street, Room 401
Madison, WI 53703

Dear Ms. Hale and Mr. Blazel:

I am pleased to submit to the Legislature the Wisconsin Department of Health Services (DHS) report on Wisconsin's Diabetes Action Plan. Wisconsin Stat. § 255.085 was enacted on March 3, 2020, requiring that the Diabetes Action Plan report be submitted to the legislature biennially.

This report was prepared by the Bureau of Community Health Promotion and the Office of Health Informatics in the Division of Public Health and was done in consultation with the Department of Employee Trust Funds to update the plan to reduce the incidence of diabetes in Wisconsin, improve diabetes care, and control complications associated with diabetes.

This report includes:

- An assessment of the impact and reach of diabetes in Wisconsin.
- An overview of the implemented programs, activities, and funding aimed at preventing and controlling diabetes.
- A range of actionable items for consideration by the Legislature as well as other partners to reduce the number of new cases of diabetes, improve diabetes care, and manage diabetes-associated complications.

Diabetes is on the rise across Wisconsin and across the nation. National estimates are that annual health care expenditures for people with diabetes are 2.3 times greater than for those without diabetes. Diabetes is the eighth leading cause of death in Wisconsin, and it is the fifth leading cause of death for Hispanic and Asian people, sixth for Native American/American Indian people, and the seventh leading cause of death for Black people.

While there is a robust network of public and private sector partners working across Wisconsin to prevent and address diabetes and its consequences, more must be done. This report lays out DHS' recommendations for action. We look forward to engaging the legislature and other partners in this vitally important work.

Sincerely,

A handwritten signature in black ink, appearing to read "Kirsten L. Johnson".

Kirsten L. Johnson
Secretary-designee

Wisconsin Diabetes Action Plan

Report to the
State Legislature



WISCONSIN DEPARTMENT
of HEALTH SERVICES

P-03154 (04/2024)

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Executive Summary

This report responds to the [Diabetes Care and Prevention Action Program Act, Wis. Stat. § 255.085 \(2019\)](#). It is the second report from the Wisconsin Department of Health Services (DHS) to the state legislature that assesses the impact and reach of diabetes in Wisconsin, provides an overview of the implemented programs and activities, and details state government investments aimed at controlling diabetes and preventing the disease. This report also lists a range of actionable recommendations for consideration by the legislature to reduce the number of new cases of diabetes, improve diabetes care, and manage diabetes-associated complications.

Key data:

- In late 2022, DHS administered a public survey to inform recommendations for the legislature included in this report. DHS received over 500 responses, with 52% of respondents either living with or caring for someone with diabetes. The top three priorities identified in the survey were to address: 1) Insulin affordability and accessibility for all who need it; 2) Policy changes to address medical costs for people living with diabetes; and 3) Access to affordable and adequate diabetes care.
- There are two General Purpose Revenue (GPR) DHS allocations that fund diabetes programming directly. They total \$71,550 annually, or about 14 cents per adult with diabetes in Wisconsin.
- DHS relies heavily on federal funding for diabetes prevention and control initiatives, projects, and interventions.
- An estimated 4,700 children under the age of 18 have diagnosed diabetes.
- An estimated one in three adults, or 1.5 million Wisconsin residents, have prediabetes. Prediabetes is a serious condition that can lead to type 2 diabetes.
- An estimated 573,625 adults in Wisconsin have diagnosed or undiagnosed diabetes.
- Wisconsin is home to strong, robust networks of diabetes self-management education and support services and National Diabetes Prevention Program providers, but services and classes are underutilized.
- Rates of uncontrolled diabetes (those who are diagnosed, but their blood sugar levels are still too high) in Wisconsin have not improved in recent years.
- An average of 12,300 emergency department visits and 9,500 inpatient hospitalizations where diabetes was the principal diagnosis occur in Wisconsin each year. In 2022, 1,100 (5%) of these hospitalizations were for those less than 18 years old and 7,200 (33%) were for those under 45 years old.
- Our analyses suggest insulin makes up 33% of estimated per-patient-per-year direct, allowable costs for BadgerCare Plus members living with type 1 and 2 diabetes.
- Diabetes is the eighth leading cause of death in Wisconsin.

Recommendations for the Legislature Informed by Public Response

The Diabetes Care and Prevention Action Program Act called for a report to the legislature that included actionable recommendations the legislature could consider to reduce the number of new diabetes cases, improve diabetes care, and manage diabetes-associated complications.

The recommendations listed in this report are informed by and prioritized by public responses to the [Wisconsin Diabetes Action Plan Survey](#) (DAP) created and administered by DHS in 2022. The Wisconsin Diabetes Action Plan Survey was one way for the public to let DHS know what they would like to see included in the Wisconsin Diabetes Action Plan, and what challenges those living with diabetes or caring for someone with diabetes face day-to-day.

The 2022 Wisconsin Diabetes Action Plan Survey was available online in English, Hmong, and Spanish from September to December 2022 and received over 500 responses, with 52% of respondents either living with diabetes or caring for someone with diabetes. DHS used social media posts and email alerts, webinars and meetings, and support from community organizations and networks for survey promotion. Other survey respondents included community members interested in diabetes, community-based service providers, health care providers, educators, researchers, and government employees. Survey respondents ranked areas they thought the next Diabetes Action Plan should focus on. The top three priorities identified by those rankings were:

1. Make insulin affordable and accessible for all who need it.
2. Policy changes to address medical costs for people living with diabetes.
3. Access to affordable and adequate diabetes care.

The recommendations for consideration by the legislature below align with the top three identified priorities expressed in survey responses. Some recommendations include a “2024 Update” if they were previously made in the [P-03154 \(07/2022\) version](#) of this report but required updated context and information since that release.

Reduce patient cost-sharing of diabetes self-management education and support services (DSMES), devices, supplies, and medicines.

For people with diabetes, this includes the recurring costs of:

- Glucometers, including self-monitoring blood glucose and continuous glucose monitors.
- Test strips.
- Lancets.
- Supplies to deliver insulin in the form of an injection, pump, or pod.
- Emergency glucagon for severe hypoglycemia.

It is not only the cost of insulin that poses a financial challenge—there are a host of medically necessary, lifesaving supplies to consider. Many insurers apply supply cost to deductibles before covering supplies or charge a specialty co-pay for DSMES, creating an excessive out-of-pocket burden on people with diabetes.

"Managing diabetes is costly. I do not take insulin but do take [other diabetes medications], which can be costly for me. I'm lucky to have health insurance and be able to have an FSA to afford some of this, but also have a family and children to take care of. I'm not the only one with medical needs."

DAP Survey respondent with diabetes

Increase pricing and insurance coverage transparency for all diabetes medications throughout the supply chain.

The average list price of insulin tripled between 2002 and 2013 and doubled again from 2012 to 2016.¹ According to a report by the Centers for Disease Control and Prevention (CDC), nearly a quarter of people with diabetes report asking their doctor for a cheaper medication, and one in 10 said they didn't take

insulin as prescribed because of cost. Moreover, the cost of insulin to the state is significant.² Our analyses suggest insulin makes up approximately 33% of estimated per-patient-per-year costs for BadgerCare Plus members living with type 1 and 2 diabetes who were continuously enrolled from 2020-2021 (Table 6).

The [Governor's Task Force on Reducing Prescription Drug Prices](#) and the [Governor's 2021-2023 Budget](#) recommend statutorily limiting the copay an insurer can charge for a month's supply of insulin, and improving transparency and reporting to better understand the drivers of high-cost prescription drugs, like insulin.³ These recommendations align with the [American Diabetes Association's \(ADA\) policy recommendation](#) to lower or completely remove patient cost-sharing for insulin for improved insulin access and affordability.⁴ The ADA also recommends increasing pricing transparency throughout the insulin supply chain, competition through insulin biosimilars, and access to health care coverage for all people with diabetes.

Finally, the Governor's Task Force and the Governor's 2021-2023 Budget recommended creating an insulin safety net program, an urgent need program that allows eligible individuals who are in urgent need of insulin to get a one-time, 30-day supply of insulin from their pharmacy, for a \$35 copay.

"Often insurance will not cover necessary treatments, medications, and devices needed for patients to successfully manage diabetes. Specifically, insulin pump therapy and continuous glucose monitors."
DAP survey respondent health care provider

Improve access for personal continuous glucose monitoring (CGM) by expanding coverage across private and public marketplaces and expanding ForwardHealth's CGM device and accessory coverage by replacing the prior authorization requirement with revised qualifying criteria. Expansion should include individuals under 25 years of age, members with type 2 diabetes, and anyone out of ideal blood glucose control ranges.

2024 Update:

In 2021, DMS covered personal CGM devices and accessories only for those with type 1 diabetes who are 25 years or older with prior authorization (PA) approval criteria.⁵ Coverage is contingent on a member:

- Complying with intensive insulin treatment or an insulin pump and adequate self-monitoring of blood glucose with 6 to 10 finger sticks per day.
- Having the motivation to use the device daily, and having the ability and readiness as assessed by their medical team, including an endocrinologist, to make appropriate adjustments to their treatment regimen based on trending information from the device.
- Successfully completing a 72-hour trial using a professional CGM, where available, that was found to be both clinically meaningful and tolerated.
- Receiving in-depth diabetes education and remaining in regular close contact with their diabetes management team.
- Having documentation supporting hypoglycemic unawareness (e.g., nocturnal asymptomatic hypoglycemia) with recurrent ongoing hypoglycemia, a significant risk for hypoglycemia, or being unable to achieve optimal glycemic control as defined by the treating endocrinologist despite treatment compliance.

The DHS Division of Public Health (DPH) Chronic Disease Prevention Program (CDPP) has worked with the Division of Medicaid Services (DMS) to update the policy for use of personal CGM devices and accessories. DMS sent out notification in December 2021, "For dates of service on and after January 1, 2022, PA requests for personal continuous glucose monitoring devices and accessories may be approved for members who meet all of the following criteria:

- The member has type 1 and/or type 2 diabetes mellitus.
- The member is 21 years of age or older.

- The member is insulin-treated with multiple (three or more) daily administrations of insulin or a continuous subcutaneous insulin infusion pump.
- The member has the motivation to use a personal continuous glucose monitoring device on a near-daily basis and has the ability and readiness, as assessed by their medical team that includes an endocrinologist, to make appropriate adjustments to their treatment regimen from the trending information obtained from the continuous glucose monitoring device.
- The member is receiving in-depth diabetes education and is in regular close contact with their diabetes management team."

Collaborating with members of the Diabetes Advisory Group (DAG) in 2022, the DMS CGM policy changes continue to include persons with type 2 diabetes, starting at age 21 years, who are motivated to use a CGM, and keep in close contact with members of their diabetes management team including diabetes care and education specialists. They updated and removed requirement of working with an endocrinologist (primary care provider with CGM knowledge is eligible) and removed the "three or more" daily administration of insulin requirement from insulin-treated with multiple (three or more) daily administrations of insulin requirement.

"Many patients with diabetes have a marked improvement in their disease with the use of continuous glucose monitors but costs and coverage are prohibitive."

DAP survey respondent health care provider

Forward Health will continue to consider coverage of a personal continuous glucose monitoring device on a case-by-case basis for members under 21 years old who meet the above criteria despite appropriate modifications in insulin regimen under the HealthCheck "Other Services" benefit. There continue to be hurdles to overcome with the PA procedure and long wait time to receive notification of covered service of CGM, especially as we work with health maintenance organizations (HMO's) and differences in their coverage and PA procedures.

As we look at the best use of CGM results, we need access to Bluetooth and internet applications that best work to get glucose results to the diabetes care team who use the results to adjust medication. This timely medication management helps to prevent hypoglycemia and hospitalizations due to life threatening acute complications. As Wisconsin works to expand broadband internet access throughout all parts of the state, people with diabetes will be able to receive timely notifications in medication management to prevent acute complications plus have an avenue for continued education and support from their diabetes care team without adding the burden of travel, time away from work, and dependent care while away from home.

Reimburse DSMES delivered by all professional support providers, including pharmacists (PharmD), registered nurses (RNs), registered dietitian nutritionists (RDNs), and certified diabetes care and education specialists (CDCES).

This includes:

- Considering RDNs and diabetes educators to be Medicaid billable providers. This may allow RDNs to collaborate with behavioral health and medical providers in the care of patients.
- Reimbursing Medical Nutrition Therapy (MNT) provided by RDNs.

2024 Update:

DSMES is essential for diabetes management. Medicare and commercial insurers reimburse for DSMES services in varying ways. However, barriers fall when we look at which providers delivering the education are reimbursable. Accredited DSMES programs (required by Medicare) are provided by RNs, RDNs and PharmDs, many which receive certification for this work and become a CDCES. Yet Medicare does not recognize RN, PharmD, or CDCES as providers and

when they provide DSMES in-person or through telehealth they do not qualify for reimbursement for this service.

Wisconsin Medicaid added a diabetes education requirement for all persons requesting CGM as they are aware continued education helps people with diabetes manage their diabetes, keeping annual costs lower. However, Medicaid does not currently reimburse for education such as DSMES and the National Diabetes Prevention Program (National DPP).

2021 Wisconsin Act 98 gives pharmacists provider status for Medicaid services within their scope of practice, allowing reimbursement for this work. This helps Wisconsin to start closing the gap on caring for the underserved using pharmacists and pharmacy services. Currently Medicaid is updating the definition of pharmacist scope of work, policies, and processes to include pharmacists as a provider, and Medicaid hopes to be near completion by the end of 2023.

Adding RN, CDCES, and RDN to the list of providers and making sure the new pharmacist scope of work includes education will give them acknowledgement of the importance of education for community members in an environment that is convenient and safe for people with diabetes. In addition, allowing RDNs to supply Medical Nutrition Therapy (MNT) with reimbursement is needed. MNT addresses individual nutrition needs based on personal and cultural preferences, health literacy, access to healthy foods, willingness, and ability to make behavioral changes. These educational services (DSMES, diabetes self-management training (DSMT), National DPP, and MNT) are team approaches to help keep Wisconsin's communities safe and healthy. The services should be available via both in-person and telehealth/distance learning.

Reimburse for DSMES delivered via telehealth.

Include all areas, both urban and rural, and expand the definition of eligible providers to include all certified diabetes care and education specialists (CDCES) providers, including pharmacists (PharmD), registered nurses (RNs), and registered dietitian nutritionists (RDNs). The COVID-19 pandemic highlighted this need.

2024 Update:

For Wisconsin Medicaid members, a new permanent telehealth policy became effective in May 2023. Eligible rendering providers may be a physician, nurse practitioner, physician assistant, or podiatrist enrolled in Wisconsin Medicaid.

ForwardHealth has expanded the definition of telehealth in permanent policy to mean the use of telecommunications technology by a Medicaid-enrolled provider to deliver health care services including assessment, diagnosis, consultation, treatment, or transfer of medically relevant data in a functionally equivalent manner as that of an in-person contact. Telehealth may include real-time interactive audio-only communication. Telehealth does not include communication between a provider and a member that consists solely of email, text, or fax transmission. Reimbursement for time spent conferring with a patient using telehealth is available for both the distant site (where the medical provider is located) and originating site fee (where patient is during telehealth services).

Recommendations to include PharmD, RN, and RDN to the list of providers able to use and receive compensation for telehealth when caring for Medicaid members. In addition, currently federally qualified health centers (FQHCs), clinics where many of Medicaid members see

"Being in a rural area, people have to travel a significant distance to receive diabetes-specific care. Even then, there is only 2 providers in a 40-mile radius to serve multiple counties. This means many patients go MONTHS without seeing a provider and the providers are burnt out."

DAP survey respondent with diabetes

providers, are not directly reimbursed as an originating site fee (where patient is during telehealth services).

Require Wisconsin health insurers to maintain at least one non-insulin drug in every diabetes drug class available on-formulary:

- Alpha-glucosidase inhibitors
- Amylin analogs
- Biguanides
- Bile Acid Sequestrants
- Dopamine-2 Agonists
- Dipeptidyl peptidase (DPP)-4 inhibitors
- Glucagon
- Glucagon-like peptide-1 (GLP-1) receptor agonists
- Incretin mimetics
- Meglitinides
- Sodium glucose co-transporter 2 (SGLT2) inhibitors
- Sulfonylureas
- Thiazolidinediones (TZDs)
- Oral combination therapy

Biguanides such as metformin have been and continue to be the first line of medications prescribed for type 2 diabetes. New recommendations from the ADA have focused on GLP-1 and DPP-4 inhibitors as second line medication added when diabetes is out of control. GLP-1 and DPP-4 inhibitors are showing a statistically significant reduction in risk for cardiovascular events and some weight loss, in addition to lowering glucose, making them more beneficial with less side effects when compared to older less expensive medication such as sulfonylureas and TZDs. However, medications, regardless of how beneficial and safe, still need to be affordable and available to all.

Reimburse community health workers who provide chronic disease management and care coordination services.

Community health workers (CHWs) serve as a liaison/link/intermediary between health/social services and the community to facilitate access to services and improve the quality and cultural competence of service delivery. Increasing public and private payer reimbursement and employer coverage of community-based care-coordination services provided by CHWs and advancing financing options will prioritize broad CHW scope of work and roles, including work addressing the social determinants of health (SDoH) and racial equity in Medicaid and beyond.

Consider various financing options including high-level policy mechanisms available under Medicaid including:

- Section 1115 Demonstration Waivers or Medicaid State Plan Amendments to include CHWs as providers under Wisconsin Medicaid state plan.
- Medicaid Managed Care Organizations (MCOs) contract requirements.
- CHW services covered by Medicaid MCOs as part of in lieu of services, administrative or quality improvement costs.

Blended or braided funding will allow for diversity of CHW activities despite limitations imposed by any single funding source (grants).

Increase awareness of and access to the National Diabetes Prevention Program and Diabetes Self-Management Education and Support.

The National Diabetes Prevention Program (National DPP) is a highly evidence-based program proven to improve nutrition and exercise (lifestyle intervention) and reduce by 58% the chance that a person at risk

will develop type 2 diabetes, and if the person is over age 60 the risk reduction increases to 71%. Diabetes Self-Management Education and Support (DSMES) supports informed decision-making, self-care behaviors, problem-solving, and active collaboration with the health care team to improve clinical outcomes, health status, and well-being in a cost-effective manner. The U.S. Preventive Services Task Force (USPSTF) [recommends](#) clinicians offer or refer adults aged 35 to 70 years who have overweight or obesity to effective preventive interventions such as the National DPP following screening for prediabetes and type 2 diabetes.

The impacts of diabetes and obesity in Wisconsin are not experienced equally. Stark sociodemographic and geographic disparities and inequities driven by social determinants of health (SDoH) persist. American Indian, Black, Hispanic, and Hmong persons experience diagnosed diabetes, diabetes risks, and related complications disproportionately, as do socially vulnerable communities, older adults, people with lower socioeconomic status, persons with Limited English Proficiency (LEP), and the lesbian, gay, bisexual, transgender, queer/questioning, and others (LGBTQ+) community.

"The camaraderie and support of the group was wonderful and really helped everyone in the group succeed. The program gets back to the basic fundamentals of good health. There are no flashy gimmicks or complicated rules here. Rather, small changes and challenges that combined to make a world of difference."

National DPP Participant

Wisconsin's legislature can impact the burden of diabetes and obesity in Wisconsin's most vulnerable populations by:

- Requiring coverage of the National DPP and DSMES as preventive services without requirements for copays or application to deductible, eliminating the burden of cost sharing and removing a major barrier to prevention of diabetes and its complications.
- Requiring coverage of the National DPP and DSMES for Wisconsin's Medicaid population.
- Requiring dedicated coverage of the National DPP and DSMES for patients of Wisconsin's community health centers.
- Increasing funding for the American Indian Diabetes Prevention and Control funding designated through Wis. Stat. § 20.435(1)(kf).
- Providing funding to local and tribal health departments to focus on diabetes prevention and control to reduce the burden of chronic disease in their communities.
- Replacing lost federal funding to support the DHS diabetes prevention and control program activities.

Funding Allocation Recommendation

In addition to the policy and fiscal recommendations noted above, DHS is requesting a General Purpose Revenue (GPR) allocation of \$1,000,000 annually for DHS as part of the 2025-2027 biennial budget.

While DHS has existing staff positions dedicated to diabetes-related activities, these positions are funded by federal prevention grants and are at capacity.⁶ In addition to assisting in the coordination and implementation of the work plan detailed later in this document, allocated staff would work on:

- Convening collaborating agencies for the implementation and evaluation of the diabetes action plan:
 - Gathering and summarizing diabetes surveillance and cost data for monitoring action plan progress across relevant agencies.
 - Conducting economic analyses detailing the impact of diabetes.
 - Creating and submitting biennial legislative reports.
- Increasing access to and awareness of National DPP by:
 - Scaling services in community settings.
 - Collaborating with DMS to secure Medicaid National DPP coverage.
 - Collaborating with insurers and employers to secure National DPP coverage.
 - Educating primary care providers.
 - Educating consumers.
- Increasing access to and awareness of DSMES by:

- Scaling services in community pharmacies.
 - Educating primary care providers.
 - Educating consumers.
- Scaling access to and awareness of family-centered childhood obesity interventions by:
 - Conducting a landscape assessment of existing programs and partners interested in being part of the planning process.
 - Convening a planning group to develop an implementation plan for family-centered childhood obesity interventions, including members of priority population(s).
 - Collaborating with community organizations to facilitate community conversations and/or other community engagement activities to understand barriers and facilitators to participation in a family-centered childhood obesity intervention.
- Improving sustainability of CHWs by:
 - Collaborating with CHWs and CHW allies to strengthen regional and statewide CHW networks.
 - Contributing to statewide CHW training and professional development opportunities to ensure equitable access to career development.
 - Working with the Division of Medicaid Services to identify and increase mechanisms toward financial sustainability and coverage for comprehensive CHW services.
- Collecting data, analyzing, and reporting the extent to which activities impacted identified process and outcome measures.

Introduction

This report is intended for the chief clerk of each house of the legislature for distribution to the legislature.⁷ It contains an assessment of the impact and reach of diabetes in Wisconsin, an overview of the implemented programs, activities, and funding aimed at controlling diabetes and preventing the disease by the Wisconsin Department of Health Services (DHS), as well as a range of legislative recommendations to reduce the number of new cases of diabetes, improve diabetes care, and manage diabetes-associated complications. This report and its recommendations are a result of:

- Reviewing data to document the impact of diabetes.
- Reviewing literature to inform gaps where Wisconsin data were missing.
- Conducting a statewide [Diabetes Action Plan Survey](#) as a way for the public to let DHS know what they would like to see prioritized.
- Documenting existing state agency-led diabetes prevention and management initiatives.
- Soliciting data from diabetes prevention and care stakeholders across Wisconsin, including:
 - [Wisconsin Department of Employee Trust Funds](#)
 - [DHS](#)
 - [Division of Public Health](#)
 - [Diabetes Advisory Group](#)
 - [Chronic Disease Prevention Program](#)
 - [Office of Health Informatics](#)
 - [Division of Medicaid Services](#)
 - [Wisconsin Health Information Organization](#)
 - [Wisconsin Collaborative for Healthcare Quality](#)
 - [Wisconsin Institute for Healthy Aging](#)

Scope and Scale

Here we describe the scope and scale of diabetes in Wisconsin. We estimate who is currently impacted by diabetes, and explore associated costs, risks, and outcomes. We organized this information into the following sections:

Diabetes

Diabetes is a chronic disease that affects how the body turns food into energy. It results from a lack of insulin production by the pancreas, or the body's ineffectiveness in using the insulin it makes. Insulin is a hormone produced naturally in the body that regulates blood glucose to maintain normal levels. The most common types of diabetes are type 1, type 2, gestational diabetes, and prediabetes. Type 2 diabetes accounts for 90–95% of all diagnosed diabetes cases. Type 1 accounts for approximately 5–10% of cases.

For all types of diabetes combined from our review, the number of adults living with diagnosed diabetes in Wisconsin has nearly doubled from 2000 to 2021.⁸ An estimated 573,625 adults in Wisconsin have diagnosed or undiagnosed diabetes (Appendix A, Table 1).

Type 1 Diabetes

Type 1 diabetes is caused by an autoimmune reaction that destroys the beta cells in the pancreas that produce insulin. Insulin is a hormone required to help your body turn blood sugar (glucose) into energy. Insulin also helps your body move glucose into cells to store it. Glucose is stored in your muscles, fat cells, and liver to use later when your body needs it.

For people with type 1 diabetes, where the body is not making insulin, insulin must be taken in the form of injections, pump, or pod to live. Type 1 diabetes most typically manifests during youth; however, it can develop at any age. The risk factors for developing type 1 diabetes are largely unknown, except that genetics play a strong role. Of all cases of diabetes, type 1 accounts for an estimated 5 to 10%.

Wisconsin data highlights:

- An estimated 28,680 to 57,360 adults have type 1 diabetes (Appendix A, Tables 1 and 2).
- We estimate that 4,711 youth currently have diagnosed diabetes (combination of all types), with the majority having type 1 (Appendix A, Table 3).
- In 2021, 3,182 BadgerCare Plus members who were continuously eligible for coverage since 2020 had claim encounters where type 1 diabetes was indicated. 799 were under the age of 18. (Appendix A, Table 4).
- In 2021, 9,689 people represented in the payers claims database had a medical claim for type 1 diabetes (Appendix A, Table 5). This database includes approximately 70% of Wisconsin's population.

Type 1 diabetes cases among youth are rising globally and nationally. Between 2002 and 2015, the rate of new cases among youth less than 20 years increased by 2% annually.⁹ We can't say for certain why this increase in type 1 diabetes is happening. Researchers believe that, because changes in genetics cannot evolve over this short of time, environmental factors seem to be the most likely explanation.

Gestational Diabetes

This section and referenced tables use the female-gendered term "mother" however the population represented in these data also includes gender non-confirming people and transgender men who could become pregnant and give birth. Gestational diabetes develops in pregnant people who have never had diabetes before. Every year, up to one in 10 pregnancies are affected. In 2021, an estimated 8.4% of Wisconsin births involved gestational diabetes (Appendix A, Table 7). There are generally no symptoms, and, although gestational diabetes usually goes away after the baby is born, both the mother's and the baby's risk of eventually developing type 2 diabetes increases.¹⁰ Gestational diabetes is on the rise nationally and in Wisconsin. In 2015, the rate of births to mothers with gestational diabetes was 65.2 per 1,000 (Appendix A, Table 7). It has steadily increased each year. In 2021, the rate of births to mothers with gestational diabetes reached 83.9 per 1,000 births, a 28% increase over seven years.

Having gestational diabetes increases the risk of hypertension during pregnancy.¹¹ For mothers with gestational diabetes, 11.9% of births between 2015 and 2021 involved hypertension during pregnancy (Table 8). In mothers without gestational diabetes, only 6.6% of births involved hypertension. Hypertension during pregnancy can put the mother and baby at risk for other problems: preeclampsia, eclampsia, and stroke for mothers, and preterm delivery for babies.¹² Gestational diabetes can also increase the risk having a large baby that needs to be delivered by cesarean section (C-section).¹³ In 2021, 35.5% of births to mothers with gestational diabetes were delivered by C-section compared to 26.5% of those without gestational diabetes (Appendix A, Table 9).

Although all pregnant people have some insulin resistance during late pregnancy, some people have it even before they become pregnant, making them more likely to have gestational diabetes.¹⁴ We know that a person's health prior to, during, and after pregnancy is influenced by a variety of environmental, genetic and social factors, such as access to medical care, experiencing interpersonal racism, experiencing food insecurity, and chronic stress.^{15 16 17 18 19 20 21} Below are highlights of Wisconsin women's health, and social and economic factors impacting it, before they give birth, during pregnancy, and after birth. These data come from the [Wisconsin Pregnancy Risk Assessment Monitoring System \(PRAMS\) 2018-2019 Surveillance Report, P-02500](#).²² [Wisconsin PRAMS](#) a population-based survey of individuals who recently gave birth in Wisconsin. PRAMS collects state-specific data on maternal attitudes and experiences before, during, and shortly after pregnancy.

Before birth:

- Prior to pregnancy, Wisconsin mothers are more likely to be uninsured (12%) than the general adult population age 18-44 years in Wisconsin (7%).
- Approximately one quarter of mothers of color experience interpersonal racism in the 12 months before their baby is born.
- Forty-two percent of women are living in poor or near-poor households before giving birth.

During pregnancy:

- Of Wisconsin mothers who sought prenatal care later than they wanted, 11% living in urban areas and 3.6% in rural areas cited lack of transportation as a reason.
- The Special Supplemental Nutrition Program [Women, Infants, and Children \(WIC\)](#) provides health care and nutritional support for pregnant and postpartum women and their infants and children. WIC supports approximately half of all infants born in the United States. While families who are enrolled in Medicaid are automatically eligible for WIC services, only 56% of them reported being enrolled in WIC during pregnancy.

After giving birth (postpartum):

- One in four mothers without insurance after their pregnancy reported that they did not receive a postpartum check-up.
- For new mothers who did receive a postpartum check-up, only 53% were told about healthy eating and exercise, and only 14% reported being tested for diabetes.

Prediabetes

[Prediabetes](#) occurs when your blood sugar levels are consistently higher than normal, but not yet high enough to be diagnosed as diabetes. It is a serious condition that can lead to type 2 diabetes, and increases the risk of developing cardiovascular disease, which can lead to heart attack or stroke. Although prediabetes is commonly thought of as a precursor to type 2 diabetes, it is far from harmless. In fact, there is evidence associating prediabetes with early forms of chronic kidney disease and diabetic retinopathy.^{23 24}

Prediabetes is more common than most people realize:

- An estimated one in three Wisconsin adults, or 1.5 million people, have prediabetes.
- The effects of prediabetes are serious, but the symptoms can go undetected for years. An estimated four out of five people with prediabetes don't know they have it.²⁵ Without knowing their risk, many people are unlikely to engage in measures to prevent type 2 diabetes.
- In 2021, 14,789 BadgerCare Plus members who were continuously eligible for coverage since 2020 had claim encounters where prediabetes was listed (Appendix A, Table 4).
- Although the risk of prediabetes and type 2 diabetes increases with age, younger adults are not immune. National surveys estimate that 38% of adults over age 18 have prediabetes.²⁶

Every year, an estimated 5 to 10% of people with prediabetes progress to developing type 2 diabetes.²⁷ According to an American Diabetes Association expert panel, up to 70% of all individuals with prediabetes could develop diabetes if no intervention occurs.

Prediabetes is a reversible condition. We know that moderate lifestyle changes to improve physical activity and nutrition can significantly reduce the risk of developing type 2 diabetes.

Type 2 Diabetes

Type 2 diabetes occurs when the body does not produce enough insulin or resists the effects of insulin. This can cause serious health problems, including heart attack, stroke, blindness, kidney failure, and loss of toes, feet, or legs. It is estimated that two out of five adults living today are expected to develop type 2 diabetes in their lifetime.²⁸

Wisconsin data highlights:

- An estimated 516,263 to 544,944 adults in Wisconsin have type 2 diabetes (Appendix A, Table 2).
- Although the risk for developing type 2 diabetes increases with age, over 300,000 estimated adults with type 2 diabetes in Wisconsin are under 65 (Appendix A, Table 2).
- In 2021, an estimated 65,888 people with type 2 diabetes had a medical encounter and were continuously enrolled in BadgerCare Plus from 2020-2021 (Appendix A, Table 4)
- In 2021, an estimated 127,084 people represented in the state's all payers claims had a medical encounter for type 2 diabetes.²⁹ This database includes approximately 70% of Wisconsin's population (Appendix A, Table 5).

Type 2 diabetes is generally thought to be caused by a combination of genetics and risk factors such as obesity, unhealthy diet, and lack of physical activity. Although type 2 diabetes was previously limited to adult populations, the number of cases among children is on the rise. Many health experts believe that this increase correlates with the increase of obesity among children.³⁰

Care and Quality

Preventing and Delaying Type 2 Diabetes

Type 2 diabetes can be delayed or completely prevented by adopting a healthy lifestyle. For adults with prediabetes or those at high risk of developing type 2 diabetes, lifestyle intervention programs, such as the [National Diabetes Prevention Program](#) (National DPP) are recommended. The National DPP is a year-long program structured around:

- **Centers for Disease Control and Prevention (CDC)-approved curriculum** with lessons, handouts, and other resources to help make healthy changes.
- **A lifestyle coach** specially trained to lead the program and help participants learn new skills and encourage them to set and meet goals. The coach facilitates discussions to help make programming fun and engaging.
- **A support group** of people with similar goals and challenges. Groups share ideas, celebrate successes, and work to overcome obstacles.

Research on the National DPP shows that participants who lost at least 5% of their body weight and exercised 2.5 hours each week cut their risk of type 2 diabetes by up to 71% for those aged 60 and older, and 58% for ages 59 and younger.³¹ Even a decade later, 33% of participants in the original study were less likely to develop type 2 diabetes.

Wisconsin is home to 38 National DPP providers recognized by the Centers for Disease Control and Prevention (to find current locations, visit dhs.wisconsin.gov/prediabetes/control.htm). Between 2014 and 2023, 10,459 people have participated in programming.³² Fourteen of the 38 National DPP providers are also Medicare Diabetes Prevention Program (MDPP) suppliers.

MDPP is available to those with Medicare Part B or Medicare Advantage plans with qualifying eligibility requirements. **Although we have a robust network of programs in our state, the National DPP is vastly underutilized. We estimate that less than 1% of Wisconsin adults with prediabetes have participated in programs.**

"The National DPP has given the support and opportunity to slowly change my lifestyle. I read labels when shopping, weigh, and measure what I eat, and am slowly losing weight. I didn't gain the weight overnight and even though I wish that it would disappear overnight, this has been successful. I have changed one thing at a time, and I believe that is the secret to success!"

National DPP Participant

In 2020, the DHS performed a cost-effectiveness analysis of offering the National DPP to Wisconsin Medicaid members and state employees covered under the [Department of Employee Trust Funds](#) group health insurance program who had been screened for prediabetes. We found that offering this program could produce cost savings after eight to ten years for the Medicaid population, and nine years for group health insurance program members.³³ That same analysis also found that the economic rate of return for offering two programs designed to prevent diabetes progression: the National DPP for people with prediabetes, and Healthy Living with Diabetes for those diagnosed with diabetes, is 16%. This economic rate of return is higher than 10%, which is the threshold where benefits are considered to outweigh costs after adjusting for time and value of money.³⁴

"The National DPP not only helped jump start my weight loss and healthy choices but also helped me with some struggling body images and strengthened empowerment. I was surprised to see my small efforts pay off in big ways so quickly."
National DPP Participant

Diabetes Self-Management Education and Support Services

Better health management can help people with diabetes live longer, healthier lives. Evidence-based services exist to help people with diabetes, and their health care teams prevent or delay diabetes complications.

[DSMES](#) is an evidence-based, cost-effective program that helps people with diabetes improve health behaviors and healthy outcomes. Guided by evidence-based standards, it is an ongoing process of facilitating the knowledge, skill, and ability necessary to empower people with diabetes to navigate self-management decisions and activities.

There are four critical times to receive DSMES:³⁵

- At diagnosis.
- During annual assessment.
- When a person with diabetes has new complicating factors.
- Upon transitions in care.

Organizations offering DSMES can apply for recognition by the [American Diabetes Association \(ADA\)](#) or accreditation by the [Association of Diabetes Care and Education Specialists \(ADCES\)](#), making them eligible for reimbursement by Medicare (as Diabetes Self-Management Training, DSMT) and many private health plans. However, covered benefits for DSMES vary by insurer, which can cause confusion for people with diabetes and their medical providers.³⁶

In Wisconsin, we have 45 ADA-recognized programs operating across 143 sites.³⁷ We also have 16 ADCES-accredited main sites, and 38 branch sites. **Although we have a robust network of programs and locations in our state, clinical DSMES are vastly underutilized.** In 2022, our state's ADA and ADCES programs reported 55,717 DSMES encounters with certified diabetes care and education specialists such as registered nurses, registered dietitian nutritionists, pharmacists, and providers.³⁸ If each encounter represented one Wisconsin adult with diagnosed diabetes, only 13% received DSMES through an accredited or recognized program in 2022.

Diabetes Self-Management Training (DSMT)

The Centers for Medicare and Medicaid Services (CMS) uses the term "training" instead of "education" when defining the reimbursable benefit for diabetes self-management. [Diabetes Self-Management Training](#) (DSMT) is provided by diabetes educators who:

- Are licensed or nationally registered health care professionals.
- Provide overall guidance related to all aspects of diabetes.
- Increase the person with diabetes's knowledge and skill about the disease.
- Promote self-care behaviors for effective self-management and glycemic control.

Medical Nutrition Therapy

[Medical nutrition therapy](#) (MNT) is a key component of diabetes education and management. MNT is a nutrition-based treatment provided by a registered dietitian nutritionist (RDN). It includes a nutrition diagnosis as well as therapeutic and counseling services to help manage diabetes. MNT:

- Is an intensive, focused, and comprehensive nutrition therapy service.
- Involves in-depth individualized nutrition assessment.
- Relies heavily on follow-up to provide repeated reinforcement to aid with behavior change.
- Establishes goals, a care plan, and interventions.
- Plans for follow-up over multiple visits to assist with behavioral and lifestyle changes relative to each individual's nutrition problems and medical condition or disease(s).

Diabetes Self-Management Programs

The Diabetes Self-Management Program (DSMP) is a community-based course developed by Stanford University for people with type 2 diabetes. The Wisconsin Institute for Healthy Aging supports evidence-based DSMP classes called [Healthy Living with Diabetes](#) (HLWD) or [Vivir Saludable con Diabetes](#) in community settings. HLWD workshops:

- Are facilitated by two trained leaders.
- Are offered in small group settings.
- Provide tools and resources to enhance knowledge of diabetes.
- Meet for two and a half hours, once a week, for six weeks.
- Are offered in both English and Spanish.

Between January 2018 and January 2022, approximately 2,300 participants from 65 counties and one tribal reservation engaged in HLWD workshops.³⁹

DHS reviews the percentage of Wisconsin adults with diabetes who self-reported ever attending a diabetes self-management class:

- Sixty-three percent of Wisconsin adults 18 to 64 with diagnosed diabetes report having ever attending a diabetes self-management class⁴⁰ This number has not changed significantly since 2011.
- Fifty-nine percent of adults 65 or older with diagnosed diabetes report having ever attended a self-management course.
- These estimates have not returned to pre-pandemic levels (67% for adults 18-64 and 65% for 65 and older).

Blood Glucose Monitoring and Management

Following a diagnosis of diabetes, management usually requires self-monitoring blood glucose with a glucometer: the two main types are **standard meters** that use a drop of blood to check levels at that given moment, and continuous glucose monitors (**CGMs**) that check levels regularly day and night.

Standard meters require people with diabetes to prick their finger with a lancet and place a drop of blood on a disposable test strip. This type of management, called self-monitoring of blood glucose (SMBG), has been the recommended standard of care since about the 1980s.

"We are very lucky to have great coverage of CGM devices for free of charge to patients. Wearing CGMs during the initial years of diabetes diagnosis is really a game changer - patients see and understand in real time how specific foods, drinks, activity, sleep, etc. impact their blood sugars."

DAP survey respondent

CGM technology was introduced in the early 2000s. CGM involves a sensor, which is placed under the skin, and measures real-time blood sugar levels (e.g., every five minutes). The sensor sends a signal to a small recording device. CGM technology provides insight into glucose trends throughout the day. Personal CGM technology can alert people with diabetes to blood glucose trending low or high, allowing for insulin adjustment to prevent hypoglycemia and long-term effects of the disease. CGM has become increasingly reliable, and has demonstrated efficacy through improved A1C, reduced hypoglycemia, and improved time in target glucose range.

DAP 2023 Survey from respondent with diabetes: "I think a CGM might be the most important tool... to fight this disease. I test 4 times a day and each test is the only time throughout the day when I know if my blood sugar level is dangerous or not. With a CGM I would know how different foods affect my glucose levels."
DAP 2023 Survey from respondent with diabetes

Early CGM technologies were costly, painful to insert, bulky in size, and required multiple fingerstick calibrations to accurately measure blood glucose. As the technology has improved, data have shown improved management and decreased rates of hypoglycemia in those using personal CGM. Today, the [Endocrine Society](#) and the ADA say that personal CGM use represents standard of care for patients with type 1 diabetes. Personal CGM use in Americans with type 1 diabetes is rising rapidly. In 2016, an estimated 38% of patients with type 1 diabetes use personal CGM.⁴¹

For people with type 2 diabetes, high costs and uncertainty over efficacy and necessity have kept CGM from widespread use. The newest CGM models address many technical barriers experienced with older systems:

- Newer sensors can be inserted painlessly and are small enough to fit easily under clothing. They can remain in place for about one to two weeks, and are FDA approved as sufficiently accurate to use in lieu of fingersticks to make insulin-dosing decisions.
- Data can now be seamlessly and continuously uploaded wirelessly to the cloud via a user's smartphone, allowing people to share their data with health care providers and trusted family members.
- Newer, lower-priced personal devices have been released, ranging from \$75 to \$150 each month for sensors (2 sensors that last 14 days each), translating to \$900 to \$1800 per year. This is significantly less than compared with older CGM technology, which ranged from \$3,000 to \$5,000 annually.

Blood glucose monitors are essential in measuring and managing daily blood sugar for many diabetes patients and their providers. An important clinical measure of blood sugar management is known as A1C. A1C is a simple blood test that provides information on a patient's average blood sugar level over the past two to three months. In general, it helps people with diabetes and providers see if treatment goals are being met.⁴² From a statewide perspective, clinical population A1C results help measure progress in improving care and management for patients with diabetes. A1C levels less than 8.0% in clinical data indicate good blood sugar control.

- **Diabetes control rates for Wisconsin patients have not improved dramatically in recent years.** Many Wisconsin health systems participate in public reporting of diabetes quality of care measures as members of the [Wisconsin Collaborative for Healthcare Quality](#) (WCHQ). Since 2013, the statewide average of good diabetes control has plateaued between 71% and 74% of patients for WCHQ member health systems.⁴³ This means nearly one fourth to one third of patients with diabetes could be at high risk of complications from the disease because of poor blood sugar control.
- WCHQ also reports that blood sugar control rates in patients with diabetes are substantially lower for Hispanic/Latino adults (62%) compared to White (74%) adults. Control rates were lower for American Indian/Alaska Native (65%), Asian/Pacific Islander (69%), and Black (66%) adults compared to White adults, too.⁴⁴
- WCHQ also reports that blood sugar control rates are substantially lower for adults with Medicaid (61%) or who were uninsured (64%) compared to those with Medicare (78%) and commercial insurance (72%).⁴⁵

Blood Pressure and Cholesterol Management

Over time, high blood sugar can damage blood vessels and the nerves that control the heart. People with diabetes are more likely to have other conditions that raise the risk for cardiovascular disease, including high blood pressure, elevated triglycerides, and elevated low-density lipoprotein (LDL) cholesterol, with smaller, denser, LDL particles.

Maintaining healthy cholesterol levels is important for preventing and reducing cardiovascular complications. The [American College of Cardiology](#) and the [American Heart Association](#) (ACC/AHA) guidelines state that statins of moderate or high intensity are recommended for adults with established clinical Atherosclerotic cardiovascular disease.⁴⁶ The ADA and the ACC/AHA guidelines also recommend statins for primary prevention of cardiovascular disease in patients with diabetes, based on age and other risk factors.^{47, 48}

DHS reviews quality of care measures for statin prescriptions, as well as blood pressure control for people with diabetes:

- The Wisconsin [Chronic Disease Quality Improvement Project](#) (CDQIP) tracks quality of care data among Wisconsin health plans. In 2022, CDQIP reported that **an average of 73% of patients with diabetes who met clinical recommendations for statin therapy actually received it.**⁴⁹ This means about one in four health plan members with diabetes are not getting all of the treatments available to reduce their risk of cardiovascular disease progression.
- **Rates of blood pressure control for patients with diabetes remain high overall but have not changed significantly since 2013.** WCHQ member health systems who publicly report blood pressure control rates for their patients with diabetes have maintained rates between 80% to 84%.⁵⁰

Patients at High Cardiovascular Risk

In 2020, the ADA added recommendations to its annual revision of the *Standards of Medical Care in Diabetes* to include two drug classes used to treat patients with type 2 diabetes and comorbidities: sodium glucose co-transporter 2 (SGLT2) inhibitors and glucagon-like peptide-1 (GLP-1) receptor agonists.⁵¹ Both treatments have shown cardiovascular protection for patients with type 2 diabetes at high cardiovascular risk. The latest annual revision stated that these medications should be considered for patients when atherosclerotic cardiovascular disease (ASCVD), heart failure, or chronic kidney disease predominates, independent of A1C. The American College of Cardiologists (ACC) also released a 2020 expert consensus on the use of these drugs for reducing cardiovascular risk in patients with type 2 diabetes.⁵²

Hospitalizations

Diabetes is often considered an ambulatory care condition: one in which opportune and effective primary care can reduce hospitalizations. While some hospitalizations are anticipated, many can be prevented with optimal disease control and management. Access to quality care, receiving the recommended tests and exams, and increasing or enhancing self-care skills (including support for behavior and lifestyle change) may help decrease the number of diabetes-related hospitalizations.

When a person is admitted to a hospital, the main reason for the admission is recorded as the primary diagnosis. In many cases, one or more additional diagnostic codes are listed. A diabetes-related condition (such as diabetic ketoacidosis) or diabetes itself may be listed in one or more of the subsequent diagnostic codes. In this report, we present inpatient and emergency department hospitalizations for where diabetes is the primary diagnosis (See Appendix B for primary diagnosis codes).

Diabetes-related hospitalization data are from the Wisconsin Inpatient Hospitalization Discharge database. These data include all ages, but do not include hospitalizations at any Veteran's Administration (VA) hospitals, which are exempt from the state reporting requirements. Hospitalizations for non-

Wisconsin residents and for Wisconsin residents hospitalized outside of Wisconsin are not included. Many Wisconsin counties share borders with other states. Therefore, diabetes-related hospitalizations are likely underreported, and this limitation should be taken into consideration when examining the data.

Wisconsin data highlights (Appendix A, Table 11):

- About 9,500 inpatient hospital admissions occur each year with diabetes as their primary diagnosis. In 2022, 402 were for patients less than 18 years old.
- The average length of hospital stay for primary diabetes inpatient hospitalizations is about 5 days. Notably, for older adults ages 65+, the length of stay is nearly double (6 or 7 days) compared to younger adults ages 18 to 44 (approximately 3 days).
- An average of 21,800 emergency department visits and inpatient hospitalizations where diabetes was the principal diagnosis occur in Wisconsin each year. In 2022, 1,100 (5%) of these hospitalizations were for those less than 18 years old and 7,200 (33%) were for those under 45 years old.

Medical Costs

The financial impacts of diabetes can be categorized into direct costs (e.g., health care spending) and indirect costs (e.g., reduced work productivity or inability to work due to disability).

National estimates indicate that annual health care costs for people with diabetes are estimated to be 2.3 times greater than for those without diabetes.⁵³ To describe medical costs specific to Wisconsin, we collaborated with the Wisconsin Health Information Organization (WHIO), the DHS Office of Health Informatics in the Division of Public Health, Wisconsin Division of Medicaid Services, and the Wisconsin Department of Employee Trust Funds. All three organizations provided data and analytical support. We summarized total estimated medical costs by diabetes type and organization.

There are three different kinds of costs available across the data sources we reviewed:

- **Billed cost:** the amount a physician, a hospital, or a pharmacy submits as charges to the health insurer or payer.
- **Allowable cost:** the maximum amount a payer is willing to pay for an encounter before adjusting for out-of-pocket and third-party costs.
- **Payable cost:** the amount the health insurer or payer pays the service provider after deducting out of pocket and third-party costs.

In this report we focus on total **direct, allowable costs** by diabetes type.

Medicaid

We queried Wisconsin Medicaid managed care and fee-for-service (FFS) medical and pharmacy claims databases for diabetes-related encounters and pharmacy claims. Our Medicaid cost analysis was limited to BadgerCare Plus members who were continuously enrolled for at least 9 months in 2021, and who had a claim or encounter that included ICD-10 codes described in Appendix B.

In 2021, we estimated per-patient-per-year (PPPY) direct, allowable cost for type 1, type 2, and prediabetes was: \$20,542, \$15,410, and \$3,608, respectively (Appendix A, Table 12). For members with type 1 and type 2, insulin contributed a significant amount to total estimated allowable health care costs. For members with type 1, insulin accounted for \$6,881 (33%) of PPPY costs we analyzed. For patients with type 2, insulin accounted for \$5,136 (33%) of PPPY costs analyzed.

Wisconsin Department of Employee Trust Funds

The [Department of Employee Trust Funds](#) (ETF) administers benefit programs for current and former public employees, retirees, and their beneficiaries. They manage the State of Wisconsin Group Health Insurance Program (GHIP): an employer-sponsored group health coverage to employees of state

agencies, the University of Wisconsin System, UW Hospitals and Clinics Authority, and participating local government employers.⁵⁴ Total GHIP enrollees as of January 2020:⁵⁵

- State employee health benefit plans represent:
 - 166,604 active employees and their dependents.
 - 40,450 retirees and their dependents.
- Wisconsin public (local government) employers that have elected to participate:
 - 28,933 active employees and their dependents.
 - 2,830 retirees and their dependents.

We partnered with ETF to estimate the cost of diabetes-related episodes for GHIP members with diagnosed prediabetes, type 1 or type 2 diabetes (Appendix A, Table 13). These data represent state employee-covered lives and are not representative of Wisconsin. Additionally, these data differ from what is available in the Medicaid claims databases. Specifically, ETF negotiates their contracts with private insurers. They report allowable costs which are generally higher than Medicaid's. They were also able to provide costs in greater detail (out-of-pocket, inpatient, and outpatient claims) than Medicaid.

In 2021, we estimated per-patient-per-year (PPPY) direct, allowable cost for type 1, type 2, and prediabetes was: \$27,711, \$28,261, and \$4,564, respectively (Appendix A, Table 13). For members with type 1 and type 2, insulin contributed a significant amount (18%) of total estimated allowable health care costs we analyzed.

Wisconsin Health Information Organization

The Wisconsin Health Information Organization (WHIO) databases include data on 4.9 million insured individuals, or 73% of Wisconsin's population. Commercial insurance, Medicaid, and Medicare Advantage comprise WHIO's claims databases. While most insurance members remain covered on the same plan over the course of a calendar year, members can be added and removed from coverage at any given time, and they will still be represented in this data set. Demographic information on individuals is limited to age and sex, and geographic information is limited to zip codes and counties.

We limited our WHIO analyses in this report to commercially insured covered lives only. Medical cost analyses using WHIO data include all medical claims where any diabetes-related ICD-10 codes (see Appendix B) were listed in the admission diagnosis or the primary diagnosis code. Pharmacy cost analyses using WHIO data used any pharmacy claim with one of the National Drug Codes detailed in Appendix B.

Table 14 (Appendix) presents annual diabetes costs for commercially insured covered lives in Wisconsin using WHIO data. Unlike DMS and the Department of Employee Trust Funds (ETF), WHIO collects billed cost data. To convert them to allowable costs for closer comparison to DMS and ETF data, we used county cost ratio-adjustments. We estimated per-patient-per-year (PPPY) direct, allowable cost for type 1, type 2, and prediabetes. Because pharmacy costs were not available in the analyses requested for type 1, type 2, and prediabetes individually, we could not estimate total PPPY costs like those presented in the ETF and Medicaid tables.

Mortality

Over time, diabetes can contribute to other chronic conditions, and lead to complications like chronic kidney disease, loss of vision, or nerve damage—all of which culminate in lower life expectancy. We know that diabetes:⁵⁶

- Reduces life expectancy, even for middle-aged adults. For adults 40 to 60 years of age, diabetes reduces life expectancy by 4 to 10 years.
- Independently increases the risk of death from cardiovascular disease, renal disease, and cancer by 1.3 to 3 times.

- Is the leading cause of non-traumatic lower limb amputation and blindness, especially in working-age adults.
- Increases the risk of cardiovascular disease by 2 to 3 times. About 30% of individuals with diabetes die from cardiovascular disease.

Routinely reported statistics for diabetes mortality are based on death certificates, and often underestimate diabetes-related deaths. This is because people with diabetes most often die as a result of the chronic complications of diabetes, such as cardiovascular and renal disease, and not of acute complications of diabetes (e.g., hypoglycemia or ketoacidosis). **Each death certificate contains a single underlying cause of death, and up to 20 additional multiple causes.** The single underlying cause of death listed is often referred to as the **cause of death**, or the disease or injury initiating the sequence of events leading to death. Below we describe diabetes deaths in terms of the underlying cause of death, and as one of the multiple causes of death.

Wisconsin data highlights:

- Diabetes is the eighth leading cause of death in Wisconsin when measured by underlying cause of death.⁵⁷
- Diabetes is the fifth leading cause of death for Hispanic people in Wisconsin, seventh leading cause of death for Black people, and sixth for Native American/American Indian and Asian people.⁵⁸
- In Wisconsin, 1,682 people in 2020 had diabetes listed as the underlying cause of death on their death record, and 443 (26%) were under the age of 65.⁵⁹
- The average age of death for those with diabetes is about two and a half years younger than all other causes combined (72.5 years compared to 75.1 years of age).⁶⁰
- Black and American Indian Wisconsinites with diabetes as an underlying cause of death pass away 8 to 10 years earlier than Whites. This difference has persisted for the last 20 years (Appendix A, Table 16).

Social Determinants of Health and Diabetes Disparities

Social determinants of health (SDoH) are the conditions in which we are born, grown, live, work, and age. They are factors in the physical and social environments that interact with one another, and they affect our health in complex ways. Social determinants of health are increasingly being recognized for their relationship to increasing type 2 diabetes incidence, as well as opportunities to reduce it.⁶¹

"I work in public health.....we are focused on improving social determinants of health, which are root causes to the development of diabetes and contribute to challenges in accessing quality medical care, affording medical treatment and medications, and connecting to services and resources to meet care management needs."

DAP survey respondent

Research demonstrates that:

- Income level, educational attainment, and employment status are associated with the disproportionate development of chronic conditions and difficulties encountered during chronic disease management.
- Clinical factors and behavioral choices do not fully explain the disparities observed in diabetes-related health outcomes, particularly among those with lower socioeconomic status.⁶²
- Type 2 diabetes incidence and prevalence rates follow a social gradient: individuals with lower income and less education are significantly more likely to develop diabetes than more advantaged individuals.

Wisconsin data highlights:

- Nearly one in four adults with diagnosed diabetes say they could not afford to eat balanced meals often or sometimes in the last 12 months.⁶³
- Thirteen percent of adults with diagnosed diabetes reported that there was a time in the past 12 months that they could not take their medications as prescribed due to cost. This rate twice as high as for the overall adult population without diagnosed diabetes (5.5%).⁶⁴

- Sixteen percent of adults who say they do not have enough money to make ends meet at the end of the month report having diagnosed diabetes. This rate is over two times higher than adults who report ending up with some money left (6.8%) (Appendix A, Table 17).

Currently, many diabetes interventions focus on biologic and behavioral factors, like diet and physical activity. However, to make meaningful, sustainable progress on combatting rising type 2 diabetes incidence, we must also address the influence of social and physical environments on health outcomes.⁶⁵

Social determinants are often the root causes of illnesses and are key to understanding health disparities. We often describe health disparities for risk behaviors and outcomes by demographic or socioeconomic groupings (e.g., income and education level, race and ethnicity, gender, and sexual orientation).

Here are some notable diabetes disparities observed in Wisconsin:

- American Indians/Alaskan Native, Hispanic, and Black adults are about two to three times more likely to have been told they have diabetes compared to Whites (Appendix A, Table 10).
- Some communities have diabetes rates significantly higher than others.
 - In some communities across Wisconsin, an estimated nearly one in five adults has diabetes. In others, 1 in 10 do.⁶⁶
 - In Milwaukee County, 29% of Black residents responding to a research survey reported they have diabetes. Of these, 82% indicated they also had comorbid hypertension (Appendix A, Table 18).⁶⁷
- Type 2 diabetes prevalence in the adult Hmong population (19.1%) may be three times higher than that of the non-Hispanic White population (7.8%). The Hmong are one of Wisconsin's newest immigrant populations who came from an area of the world with historically low rates of diabetes.⁶⁸
- People living with a disability are about six times as likely to have been told they have diabetes compared to those without.⁶⁹
- White Wisconsinites, and those with commercial insurance (72%) or Medicare (78%) are more likely than those with Medicaid (61%) to have their blood sugar in control.⁷⁰

What surrounds and influences health disparities between demographic and socioeconomic groups are the social, political, and institutional contexts in which they develop. Emerging public health practice is moving further upstream to address the contexts and environments that shape health inequities and disparities.

Diabetes Prevention and Management Efforts in Wisconsin

DHS' Federal Funding

The amount of federal funding spent on preventing disease and improving health comes primarily from the Centers for Disease Control and Prevention (CDC). CDC's chronic disease prevention funding is awarded to states in a combination of population-based formula grant programs (often based on disease rates or other incidence formulas), and a series of competitive grants. DHS' Division of Public Health (DPH) relies heavily on both competitive and non-competitive CDC cooperative agreements and grants to support diabetes prevention and management and related chronic disease prevention and management activities across Wisconsin.

DPH's Diabetes Prevention and Control Program

Between 1994 and 2013, Wisconsin DPH maintained a standalone Diabetes Prevention and Control (DPCP) program that implemented pre-determined core interventions and grant strategies outlined by the [CDC's Division of Diabetes Translation](#). During this time, DPCP supported multiple initiatives and projects, including:

- Wisconsin Diabetes Advisory Group meetings.
- Diabetes self-management programming.
- Wisconsin's Diabetes Essential Care Guidelines for health care providers.
- Clinical improvements in patient-centered team-based care.
- Diabetes surveillance and strategic planning.

Between 2013-2018, CDC provided grant funds that combined four previously standalone programs including diabetes, heart disease, nutrition and physical activity, and school health. The total funding for this grant was \$2,394,840 annually. The diabetes portion was \$816,985 annually.

DPH's Nutrition and Physical Activity Program

From 2013-2018, DPH spearheaded a cross-cutting Nutrition and Physical Activity Program with competitive federal funding from the CDC. This program addressed chronic disease prevention through:

- Promoting the adoption of food service guidelines and nutrition standards, as well as physical activity guidelines in early childcare centers, schools, and work sites.
- Increasing access to healthy foods and beverages, physical activity opportunities and outreach, and breastfeeding-friendly environments.

This program operated on an annual budget of approximately \$300,000. In the five-year award cycle 2018-2023, no federal funds from the CDC's Division of Nutrition, Physical Activity and Obesity were awarded to DHS. This program and its momentum significantly decreased without a state-level funding investment.

Limited and unstable funding can cause public health programs to fail, impact staff retention, limit ability to track progress, and inhibit program momentum.

DPH's Chronic Disease Prevention Program

The [Chronic Disease Prevention Program](#) at DPH had both competitive and non-competitive federal cooperative agreements and grants dedicated to diabetes prevention and management activities for the period of performance 2018-2023. Combined, the annual diabetes prevention and management funds totaled \$1.9 million (Appendix A, Table 19). These funds supported programming, surveillance, evaluation, and staffing to meet CDC's grant objectives and deliverables.

During the 2023-2028 five-year award cycle, CDC changed its allocation of funding to state health departments and other organizations. As a result, Wisconsin's allocation was reduced over \$1,000,000 annually to the current funding level of \$900,000/year.

Diabetes prevention and control funding under these grants support the following program strategies:

- Assist health care systems in implementing systems to identify people with prediabetes and refer them to the National Diabetes Prevention Program (National DPP).
- Implement bi-directional e-referral systems between health care systems and National DPP organizations.
- Collaborate with payers, and public and private sector organizations to expand the availability of the National DPP as a covered benefit.
- Increase enrollment in the National DPP.
- Support organizations to establish new, and sustain existing, National DPP programs.
- Use tailored communication/messaging to reach underserved populations at greatest risk for type 2 diabetes to increase awareness of prediabetes and the National DPP.
- Support advanced training for National DPP lifestyle coaches to strengthen skills needed to engage and retain participants.
- Explore and test innovative ways to eliminate barriers to participation and retention in National DPP and DSMES.
- Work with health care systems to establish or expand the use of telehealth technology to increase access to National DPP in underserved areas.
- Improve access to and participation in Diabetes Self-Management Education and Support (DSMES).
- Increase engagement of pharmacists in medication management and DSMES for people with diabetes.
- Develop a statewide infrastructure to promote long-term sustainability and reimbursement for community health workers to establish and/or expand their involvement in National DPP and DSMES programming and service delivery.
- Plan and implement evidence-based family-centered childhood obesity interventions as recognized by CDC.

"A community health worker is a frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served. This trusting relationship enables the worker to serve as a liaison/link/ intermediary between health/social services and the community to facilitate access to services and improve the quality and cultural competence of service delivery."⁵⁷

*American Public Health Association,
2021*

DHS GPR Allocations

There are two General Purpose Revenue (GPR) DHS allocations that fund diabetes programming directly. They total \$71,550 annually (Appendix A, Table 21).

GPR American Indian Diabetes Prevention and Control funding is designated through Wis. Stat. § 20.435(1)(kf). This allocation totals \$22,500 and is distributed to the 11 federally recognized American

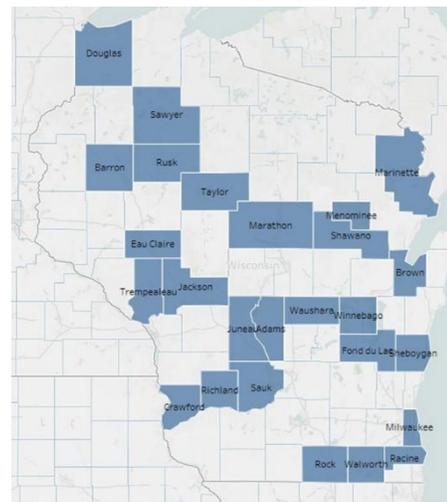
Indian Nations of Wisconsin. The funding is intended to create community infrastructure to address diabetes prevention and management.

Since 2013, \$49,050 of GPR General Aids and Local Assistance allocation has supported Wisconsin’s National DPP programming, primarily by training lifestyle coaches in Wisconsin and other evidence-based diabetes prevention strategies.

Goals and Actions to Improve Diabetes Prevention and Outcomes

The CDPP and its partners have developed a plan for prevention of new cases of type 2 diabetes and improving outcomes for those already diagnosed with diabetes among the state’s populations most at risk. Each objective includes one or more outcome measures. The identified objectives are based on accepted standards of practice and scientific evidence for improving diabetes prevention and control outcomes for those with diabetes. Note that these objectives are *not* listed in order of priority; rather, they are listed in the logical sequence of prevention of type 2 diabetes, reimbursement, improved self-management of diabetes, and recommendations for building infrastructure necessary to address the diabetes epidemic.

CDPP has identified 26 high-need counties in Wisconsin and additional funding is needed to help reach them with the important work outlined below. CDPP used CDC methodology to identify the counties based on a scoring above the age-adjusted U.S. county median on diabetes incidence, or diabetes prevalence, or obesity prevalence, and 0.5 Social Vulnerability Index (SVI). While the below plan includes work by CDPP and its partners in many of these high-need counties, additional funding would allow the work to expand into many more of these high-need counties.



PREVENTION OF TYPE 2 DIABETES

| Objective | Actions | Annual Funding Allocation |
|--|---|---------------------------|
| Staffing (salary, fringe, allocated direct costs) | <ul style="list-style-type: none"> • Program and Policy Analyst – Advanced • 1.0 FTE to lead the coordination of the Diabetes Action Plan including preparation of the biennial report to the legislature, coordination with other state and local agencies and organization | \$140,000 |
| Increase enrollment and retention of priority populations in the National Diabetes Prevention Program (National DPP) lifestyle intervention and the Medicare Diabetes Prevention Program (MDPP) by improving access, appropriateness, and feasibility of the programs among | <ul style="list-style-type: none"> • Provide technical assistance to Wisconsin’s existing National DPP/MDPP suppliers as they work to increase enrollment and retention. • Develop and implement community-based action plans addressing National DPP/MDPP enrollment and participation barriers in a minimum of five high-need counties. • Collaborate with two National DPP suppliers, one local health department and one large rural health system, as they work to establish relationships to assist in enrollment and participation among priority populations. • Expand Wisconsin’s network of National DPP/MDPP suppliers working to increase | \$200,000 |

| | | |
|--|--|------------------|
| <p>Hispanic or Latino, American Indian, African American, or Black, Hmong, LGBTQ+, male, rural, urban, low-income and those over 65 years of age.</p> | <p>enrollment and retention among priority populations.</p> <ul style="list-style-type: none"> • Engage existing and new multi-sector partners committed to increasing enrollment and retention of priority populations by improving access, appropriateness, and feasibility of the programs for priority populations. • Collaborate with existing Umbrella Hub Organizations to expand and scale National DPP/MDPP UHA services among priority populations. • Collaborate with partners to establish data-driven process for identification of Social Determinants of Health (SDoH) needs that includes multi-directional information sharing for National DPP/MDPP participants. • Conduct communication activities to increase enrollment and retention among priority populations. • Collect data, analyze, and report the extent to which activities impacted identified process and outcome measures. | |
| <p>Implement, spread, and sustain evidence-based, family-centered childhood obesity interventions.</p> | <ul style="list-style-type: none"> • Complete an implementation plan to provide access to family-centered childhood obesity interventions in a variety of settings reaching populations most impacted by childhood obesity. • Become familiar with the components, similarities, and differences of CDC-recommended family-centered childhood obesity interventions. • Conduct a landscape assessment of existing programs and partners interested in participating in the planning process. • Convene a planning group to develop an implementation plan for family-centered childhood obesity interventions, including members of priority population(s). • Collaborate with community organizations to facilitate community conversations and/or other community engagement activities to understand barriers and facilitators to participation in a family-centered childhood obesity intervention. • Collect data, analyze, and report the extent to which activities impacted identified process and outcome measures. | <p>\$100,000</p> |
| <p>Expand availability of the National DPP lifestyle intervention as a covered health benefit for Medicaid beneficiaries and/or employees and</p> | <ul style="list-style-type: none"> • Develop a Medicaid Case for Coverage in collaboration with Wisconsin Department of Health Services (DHS) Division of Medicaid Services (DMS) to create a National DPP reimbursement pathway for Wisconsin's Medicaid population. | <p>\$60,000</p> |

| | | |
|--|--|--|
| <p>covered dependents at high risk for type 2 diabetes.</p> | <ul style="list-style-type: none"> • Maintain and expand the <i>Wisconsin Lifestyle and Prevention Benefits Network</i> (LPBN) to create a National DPP reimbursement pathway for Wisconsin adults aged 18 and older by increasing the number of National DPP suppliers using the LPBN and payers interested in using the LPBN. • Collect data, analyze, and report the extent to which activities impacted identified process and outcome measures. | |
|--|--|--|

PREVENTION OF DIABETES COMPLICATIONS

| Objective | Actions | Annual Funding Allocation |
|---|---|---------------------------|
| <p>Strengthen self-care practices in priority populations by improving access, appropriateness, and feasibility of diabetes self-management education and support (DSMES) services among Hispanic or Latino, American Indian, African American, or Black, Hmong, LGBTQ+, male, rural, urban, and those over 65 years of age.</p> | <ul style="list-style-type: none"> • Develop and implement community-based action plans addressing barriers to enrolling and participating in Diabetes Self-Management Education and Support (DSMES) and Healthy Living with Diabetes (HLWD) programs in a minimum of five high-need counties. • Develop a Medicaid Case for Coverage for DSMES in collaboration with Wisconsin Department of Health Services (DHS) Division of Medicaid Services (DMS). • Recruit a minimum of three Community Pharmacy Enhanced Services Network Wisconsin (CPESN WI) community pharmacies to develop, deliver, and achieve accreditation of a DSMES program based within high-need counties. • Plan, develop and facilitate quarterly convenings with insurer members of Chronic Disease Quality Improvement Project (CDQIP). • Conduct communication activities to increase enrollment and participation in DSMES and HLWD among priority populations. • Collect data, analyze, and report the extent to which activities impacted identified process and outcome measures. | <p>\$200,000</p> |
| <p>Improve the sustainability of community health workers (CHWs) by building or strengthening a supportive infrastructure to expand their involvement in evidence-based diabetes prevention</p> | <ul style="list-style-type: none"> • Develop and disseminate a communication and marketing plan to increase awareness of CHW roles, competencies, and skills within public health and health care sectors. • Engage existing and new multi-sector partners to commit to activities to improve the sustainability of CHWs by building or strengthening a supportive infrastructure to expand their involvement in evidence-based diabetes prevention and management programs and services for priority populations. | <p>\$300,000</p> |

| | | |
|--|---|--|
| <p>and management programs and services</p> | <ul style="list-style-type: none"> • Contribute to statewide CHW training and professional development opportunities to ensure equitable access to career development. • Work with the Division of Medicaid Services (DMS) to identify and increase mechanisms toward financial sustainability and coverage for expansive CHW services. • Collaborate with CHW partners to strengthen regional and statewide CHW networks. • Collect data, analyze, and report the extent to which activities impacted identified process and outcome measures. | |
|--|---|--|

Resources

Prediabetes awareness: [ADA/WI DHS Prediabetes Risk Test](#)

DHS information:

- [Chronic Disease Prevention Program > Prediabetes](#)
- [Chronic Disease Prevention Program > Diabetes](#)

National Diabetes Prevention Program, provider locations:

- Wisconsin National DPP provider locations: [DHS, Prediabetes: Take Control of Your Health](#)
- National DPP provider locations: [CDC, Recognized Lifestyle Change Programs](#)
- MDPP provider locations: [CMS: MDPP Expanded Model](#)

Diabetes Self-Management Education and Support, provider locations:

- [Wisconsin accredited and recognized DSMES program locations](#)
- Find a Wisconsin Institute for Healthy Aging's [Healthy Living with Diabetes workshop](#)

Helpful websites:

- [Health Insurance Coverage Laws for Diabetes Self-Management Education and Training by State](#)
- [CDC's DSMES Toolkit](#)

Report Contributors

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Appendix A

Table 1. Estimated diabetes status by awareness and type by age.

| Age | Diagnosed ¹ | Undiagnosed ² | WI Population ³ | Diagnosed ¹ | Undiagnosed ^{2,3} | Total |
|--------------|------------------------|--------------------------|----------------------------|------------------------|----------------------------|----------------|
| 18-44 | 2.7% (0.8) | 1.9% (1.3 – 2.7) | 2,003,963 | 54,800 | 38,075 | 92,875 |
| 45-64 | 12.1% (1.4) | 4.5% (3.3 – 6.0) | 1,541,218 | 177,700 | 69,355 | 247,055 |
| 65+ | 17.2% (1.5) | 4.7% (4.10 – 7.10) | 1,016,909 | 185,900 | 47,795 | 233,695 |
| Total | | | | 418,400 | 155,252 | 573,625 |

¹DHS, WISH, Behavioral Risk Factor Survey Module, 2021.

²CDC Diabetes Surveillance Report, 2022, [Table 1a](#).

³DHS WISH, Population Module, 2020.

Table 2. Estimated diabetes type by age. Total estimates derived from table 1.

| Age | Type 2 Diabetes Estimate | | Type 1 Diabetes Estimate | |
|--------------|--------------------------|----------------|--------------------------|---------------|
| | 90% of Total | 95% of Total | 5% of Total | 10% of Total |
| 18-44 | 83,588 | 88,231 | 4,644 | 9,288 |
| 45-64 | 222,350 | 234,702 | 12,353 | 24,706 |
| 65+ | 210,326 | 222,010 | 11,685 | 23,370 |
| Total | 516,263 | 544,944 | 28,681 | 57,363 |

Table 3. Estimated diagnosed diabetes in youth less than 18 years and 95% confidence intervals (CI).

| Age | Diagnosed Diabetes | | | |
|-----|--------------------|---------|-----------|------------|
| | Estimate | Percent | 95 CI Low | 95 CI High |
| <18 | 4,711 | 0.08% | 1,766 | 7,656 |

Family Health Survey (2018, 2019, 2021 combined) estimates provided by the Office of Health Informatics.

Table 4. Number of BadgerCare Plus members with continuous eligibility in 2020-2021 with at least one medical encounter claims for type 1, type 2, or prediabetes by service year and age (Source: Department of Health Services).

| Age | 2020 | | | 2021 | | |
|----------------------|---------------|--------------|---------------|---------------|--------------|---------------|
| | Prediabetes | Type 1 | Type 2 | Prediabetes | Type 1 | Type 2 |
| 0 to 17 | 562 | 763 | 1,042 | 877 | 799 | 1,278 |
| 18 to 34 | 1,606 | 1,021 | 4,365 | 2,075 | 1,041 | 4,694 |
| 35 to 54 | 4,888 | 898 | 18,018 | 5,945 | 907 | 19,370 |
| 55 to 64 | 3,157 | 272 | 15,049 | 3,692 | 284 | 16,321 |
| 65 to 74 | 1,251 | 109 | 10,600 | 1,614 | 113 | 12,438 |
| 75+ | 571 | 52 | 11,603 | 586 | 38 | 11,787 |
| Total Members | 12,035 | 3,115 | 60,677 | 14,789 | 3,182 | 65,888 |

Table 5. Number of Wisconsin commercial members with at least one medical encounter claim for type 1, type 2, and prediabetes by service year and age, Wisconsin Health Information Organization.

| Age | 2020 | | | 2021 | | |
|----------------------|---------------|--------------|----------------|---------------|--------------|----------------|
| | Prediabetes | Type 1 | Type 2 | Prediabetes | Type 1 | Type 2 |
| 0-17 | 197 | 1,025 | 1,030 | 270 | 1,061 | 1,245 |
| 18-34 | 2,156 | 2,762 | 4,215 | 3,095 | 3,039 | 5,484 |
| 35-54 | 15,616 | 3,084 | 33,602 | 21,588 | 3,457 | 41,324 |
| 55-64 | 20,672 | 1,601 | 45,902 | 28,245 | 1,771 | 58,312 |
| 65-74 | 5,012 | 339 | 13,362 | 6,058 | 321 | 15,747 |
| 75+ | 826 | 43 | 4,069 | 1,024 | 40 | 4,972 |
| Total Members | 44,479 | 8,854 | 102,180 | 60,280 | 9,689 | 127,084 |

Table 6. Estimated allowable per patient per year (PPPY) costs in service year 2021 by diabetes claim type for BadgerCare Plus members with continuous eligibility in 2020-2021.

| Visits and Estimated Costs Category | 2021 | | |
|--|---------|---------|-------------|
| | Type 1 | Type 2 | Prediabetes |
| Pharmacy | | | |
| Diabetes Medications (excluding insulin) | \$975 | \$763 | \$904 |
| Insulin | \$6,882 | \$5,136 | \$0 |
| Emergency Department Visit | \$303 | \$134 | \$247 |
| Hospitalization | \$8,886 | \$4,966 | \$0 |
| Outpatient Visit | \$378 | \$228 | \$51 |

Table 7. Births by mother’s gestational diabetes status. Wisconsin Vital Records, 2015-2021.

| Year | Total Births | Gestational Diabetes (% total births) | Rate per 1,000 births |
|------|--------------|--|--------------------------|
| 2015 | 67,004 | 4,366 (6.5%) | 65.2 |
| 2016 | 66,593 | 4,174 (6.3%) | 62.7 |
| 2017 | 64,994 | 4,294 (6.6%) | 66.1 |
| 2018 | 64,143 | 4,518 (7.0%) | 70.4 |
| 2019 | 63,280 | 4,555 (7.2%) | 72.0 |
| 2020 | 60,614 | 5,037 (8.3%) | 83.1 |
| 2021 | 61,814 | 5,186 (8.4%) | 83.9 |

Table 8. Births by mother’s gestational diabetes (GDM) and hypertension during pregnancy status, 2015-2021. Wisconsin Vital Records.

| | | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Percent Hypertension of Total Births 2015- 2021 ¹ |
|-----|-----------------|--------|--------------|--------|--------|--------|--------|--------|---|
| | | GDM | Hypertension | 426 | 435 | 487 | 538 | 574 | |
| | No Hypertension | 3,940 | 3,739 | 3,807 | 3,980 | 3,981 | 4,365 | 4,485 | |
| No | | 3,620 | 3,668 | 3,851 | 4,463 | 4,763 | 4,449 | 4,945 | 11.9% |
| GDM | No Hypertension | 58,827 | 58,435 | 56,574 | 54,922 | 53,678 | 50,975 | 51,518 | |

Table 9. Births by delivery type and mother’s gestational diabetes status. Wisconsin Vital Records, 2021. Excludes births with unknown gestational diabetes status.

| Method of Delivery | No Gestational Diabetes | Gestational Diabetes |
|---------------------------------|-----------------------------|-------------------------|
| Primary C-Section | 8,756 | 1,038 |
| Repeat C-Section | 6,216 | 801 |
| Vaginal Spontaneous | 37,730 | 3,003 |
| Vaginal Vacuum | 1,651 | 126 |
| Vaginal Birth After C-Section | 1,648 | 175 |
| Vaginal Forceps | 399 | 40 |
| Unknown | 63 | 3 |
| Total 2021 Births | 56,463 ¹ | 5,186 |
| Vaginal Combined (% of Total) | 41,428 (73.4%) ¹ | 3,344 (64.5%) |
| C-section Combined (% of Total) | 14,972 (26.5%) ¹ | 1,839 (35.5%) |

¹Total births and percent of total births exclude those to mothers with unknown gestational diabetes status.

Table 10. Adult diabetes awareness (self-reported as diagnosed by a health provider) rates by race and Hispanic ethnicity.

| Race/Ethnicity | Rate | Age-adjusted rate |
|---|-------|-------------------|
| Non-Hispanic American Indian/Alaskan Native | 18.4% | 18.5% |
| Hispanic/Latino | 9.0% | 14.9% |
| Non-Hispanic Black | 12.0% | 12.2% |
| Non-Hispanic Other | 4.5% | 6.9% |
| Non-Hispanic White | 8.8% | 7.1% |

DHS, WISH, Behavioral Risk Factor Survey Module, 2019-2021 combined.

Table 11. Diabetes hospitalization counts by discharge year and type, principal diagnosis only. Wisconsin Inpatient Hospitalization records, 2018-2022.

| Age | Discharge Type and Inpatient Average Length of Stay (LOS) | 2018 | 2019 | 2020 | 2021 | 2022 |
|--------------------|---|---------------|---------------|---------------|---------------|---------------|
| 0-17 | Emergency Department | 738 | 655 | 612 | 738 | 698 |
| | Inpatient | 484 | 433 | 484 | 501 | 402 |
| | Total | 1,222 | 1,088 | 1,096 | 1,239 | 1,100 |
| | Average LOS | 1.6 | 1.6 | 1.8 | 2.0 | 1.7 |
| 18-44 | Emergency Department | 3,820 | 3,884 | 3,307 | 3,744 | 3,582 |
| | Inpatient | 2,715 | 2,593 | 2,529 | 2,543 | 2,518 |
| | Total | 6,535 | 6,477 | 5,836 | 6,287 | 6,100 |
| | Average LOS | 2.9 | 3.0 | 3.1 | 3.0 | 3.0 |
| 45-64 | Emergency Department | 4,662 | 4,969 | 4,115 | 4,516 | 4,584 |
| | Inpatient | 3,312 | 3,376 | 3,326 | 3,348 | 3,224 |
| | Total | 7,974 | 8,345 | 7,441 | 7,864 | 7,808 |
| | Average LOS | 5.5 | 5.7 | 5.4 | 5.9 | 6.2 |
| 65+ | Emergency Department | 3,324 | 3,552 | 3,094 | 3,512 | 3,545 |
| | Inpatient | 2,824 | 3,079 | 3,075 | 3,277 | 3,275 |
| | Total | 6,148 | 6,631 | 6,169 | 6,789 | 6,820 |
| | Average LOS | 6.2 | 6.2 | 6.2 | 6.7 | 7.7 |
| Total | | 21,879 | 22,541 | 20,542 | 22,179 | 21,828 |
| Average LOS | | 4.7 | 4.9 | 4.9 | 5.2 | 5.7 |

Table 12. Patient Counts and Estimated PPPY 2021 Direct, Allowable Costs by Claim/Encounter Type, Medicaid.

| Cost/Count Category | Claim/Encounter Type ¹ | | |
|--|-----------------------------------|-----------------|----------------|
| | Type 1 | Type 2 | Prediabetes |
| Total patient count¹ | 3,182 | 65,888 | 813,509 |
| Pharmacy² | | | |
| PPPY cost diabetes medications including insulin | \$4,094 | \$4,946 | \$3,311 |
| (Total patients) | (70) | (10,538) | (355) |
| PPPY cost insulin | \$6,881 | \$5,136 | \$0 |
| (Total patients) | (2,341) | (7,282) | (0) |
| Hospitalizations | | | |
| PPPY cost | \$8,886 | \$4,966 | \$0 |
| (Total patients) | (292) | (390) | (0) |
| Emergency Department | | | |
| PPPY Cost | \$303 | \$134 | \$246 |
| (Total patients) | (486) | (1,704) | (1) |
| Outpatient Visits | | | |
| PPPY Cost | \$378 | \$228 | \$51 |
| (Total patients) | (1,598) | (12,536) | (598) |
| Estimated PPPY Direct, Allowable Costs | \$20,542 | \$15,410 | \$3,608 |

¹BadgerCare Plus members with a claim or encounter that included ICD-10 codes described in Appendix B, and who were continuously enrolled for at least 9 months in 2021.

²Estimated pharmacy costs for diabetes medications use NDC associated with the drug classes described in Appendix B.

Table 13. Patient Counts and Estimated PPPY 2021 Direct, Allowable Costs by Claim/Encounter Type, Department of Employee Trust Funds.

| PPPY Category | Claim/Encounter Type ¹ | | |
|--|-----------------------------------|-----------------|----------------|
| | Type 1 | Type 2 | Prediabetes |
| Total patient count¹ | 1,026 | 8,564 | 10,756 |
| Pharmacy² | | | |
| PPPY cost diabetes medications including insulin | \$2,109 | \$2,876 | \$3,311 |
| PPPY cost insulin | \$5,081 | \$5,297 | \$0 |
| Hospitalizations | | | |
| PPPY cost (median) | \$18,004 | \$17,818 | NA |
| Emergency Department | | | |
| PPPY Cost (median) | \$1,208 | \$1,225 | \$899 |
| Outpatient Visits | | | |
| PPPY Cost | \$1,309 | \$1,045 | \$354 |
| Estimated PPPY Direct, Allowable Costs | \$27,711 | \$28,261 | \$4,564 |

Source: Department of Employee Trust Funds.

¹non-Medicare ETF members with a claim or encounter that included ICD-10 codes described in Appendix B, and who were continuously enrolled for at least 9 months in 2021.

²Estimated pharmacy costs for diabetes medications use NDC associated with the drug classes described in Appendix B.

Table 14. Patient Counts and Estimated PPPY 2021 Direct Allowable* Costs by Claim/Encounter Type, WHIO

| PPPY Category | Claim/Encounter Type | | |
|--|----------------------|-------------------|------------------|
| | Type 1 | Type 2 | Prediabetes |
| Total patient count¹ | 1,920 | 25,202 | 16,184 |
| Pharmacy² | | | |
| PPPY cost diabetes medications including insulin (Total Patients) | ----- | -\$1,333----- | ----- |
| PPPY cost insulin (Total Patients) | ----- | -(17,045)----- | ----- |
| PPPY cost insulin (Total Patients) | ----- | -\$2,967----- | ----- |
| PPPY cost insulin (Total Patients) | ----- | -(7,021)----- | ----- |
| Hospital Inpatient¹ | | | |
| PPPY cost (median) (Total Patients) | \$8,088 (71) | \$4,499 (290) | 1,041 (4) |
| Emergency Department¹ | | | |
| PPPY Cost (median) (Total Patients) | \$606 (89) | \$490 (237) | \$425 (5) |
| Outpatient Visits³ | | | |
| PPPY Cost (Total Patients) | \$1,197 (1,669) | \$894 (55,985) | \$185 (5,346) |

Source: WHIO.

¹Commercial members with a claim or encounter that included ICD-10 codes described in Appendix B in the admission diagnosis or diagnosis code 01, and who were continuously enrolled for at least 9 months in 2021.

²Estimated pharmacy costs for diabetes medications use NDC associated with the drug classes described in Appendix B. Pharmacy costs only available for all diabetes types combined. RASA

³Outpatient visits are three service types grouped (Urgent care, professional/office, and clinic visits), and total patient counts are not unique.

*PPPY direct, allowable costs calculated using a county cost-to-charge ratio applied to the requested amount included on the claim since WHIO only has requested amounts available in their database, not allowable amounts.

Table 16. Three-year average age of death by race, diabetes cause-of-death. Wisconsin Interactive Statistics on Health, Mortality Module.

| Years | Average Age of Death | | | |
|-----------|----------------------|-------|-----------------|-------|
| | White | Black | American Indian | Asian |
| 2000-2002 | 75.6 | 66.3 | 66.4 | 76.0 |
| 2003-2005 | 75.1 | 65.1 | 63.6 | 73.9 |
| 2006-2008 | 75.0 | 67.3 | 69.0 | 71.3 |
| 2009-2011 | 75.0 | 65.4 | 63.5 | 70.8 |
| 2012-2014 | 75.1 | 66.8 | 65.4 | 75.6 |
| 2015-2017 | 74.3 | 65.3 | 67.9 | 68.7 |
| 2018-2020 | 74.1 | 64.8 | 66.0 | 72.4 |

Table 17. Adult diagnosed diabetes rates (95% confidence intervals) for select Social Determinants of Health Module questions, Wisconsin Behavioral Risk Factor Survey, 2017.

| | |
|--|--------------------|
| During the last 12 months, was there a time when you were not able to pay your mortgage, rent, or utility bills? | |
| Yes | 12.5 (8.2-16.7) |
| No | 8.6 (7.5-9.6) |
| The food that I bought just didn't last, and I didn't have money to get more. Often, sometimes, or never true for you in the last 12 months? | |
| Often or Sometimes | 11.0 (7.3-14.7) |
| Never | 8.5 (7.4 to 9.5) |
| I couldn't afford to eat balanced meals. Often, sometimes, or never true in the last 12 months. | |
| Often or Sometimes | 12.2 (8.7 to 15.8) |
| Never | 8.1 (7.1 to 9.2) |
| In general, how do your finances usually work out at the end of the month? Do you find that you usually: | |
| Do not have enough money to make ends meet | 15.6 (10.3-20.8) |
| Have just enough money to make ends meet | 10.9 (8.7-13.2) |
| End up with some money left over | 6.8 (5.7-7.9) |

Table 18. Self-Reported Chronic Diseases among African American residents aged 44-94 in Milwaukee County, Wisconsin who completed the baseline MIDUS survey of Milwaukee African Americans in 2005, and follow-up MIDUS III in 2016-2017.

| Chronic Disease | Number (Percent of Total Surveyed)* |
|--|-------------------------------------|
| Diabetes | 112 (28.8) |
| Medication for diabetes | 101 (90.0) |
| Hypertension | 239 (61.4) |
| Co-morbid Diabetes and Hypertension | 112 (82.1) |
| Medication for co-morbid diabetes and hypertension | 66 (58.9) |
| Diabetes and severe obesity (BMI > 40) | 112 (25.0) |

*389 adult African American residents aged 44-94 in Milwaukee County, Wisconsin completed the baseline MIDUS survey of Milwaukee African Americans in 2005 (ICPSR Study 22840), and the follow-up MIDUS III in 2016-2017. The sampling design was a stratified area probability sample of households in Milwaukee County, Wisconsin. The sampling frame included Census tracts in which at least 40% of the population was African American. The Census tracts were stratified by income, with roughly half coming from tracts in which the median household income was \$40,000 or greater, and the rest coming from tracts in which the median household income was below \$40,000.

Table 19. Past and current federal and state funding for diabetes prevention, control, and management programming in Wisconsin.

| Diabetes Funding Source | Total Annual | Years |
|---|--------------|-----------|
| CDC Competitive Cooperative Grant: 1817 | \$900,000 | 2017-2023 |
| CDC Non-competitive Cooperative Grant: 1815 | \$1,026,453 | 2017-2023 |
| CDC Cooperative Agreement: 2320 | \$900,000 | 2023-2028 |
| GPR General Aids and Local Assistance | \$49,050 | Annual |
| GPR American Indian Diabetes Prevention and Control | \$22,500 | Annual |

Appendix B

ICD-10 codes in for prediabetes, type 1, and type 2 medical claims analyses included: E10.10, E10.11, E10.21, E10.22, E10.29, E10.3, E10.34, E10.3411, E10.3412, E10.3413, E10.3419, E10.3491, E10.3492, E10.3493, E10.3499, E10.35, E10.3511, E10.3512, E10.3513, E10.3519, E10.3521, E10.3522, E10.3523, E10.3529, E10.3531, E10.3532, E10.3533, E10.3539, E10.3541, E10.3542, E10.3543, E10.3549, E10.3551, E10.3552, E10.3553, E10.3559, E10.3591, E10.3592, E10.3593, E10.3599, E10.36, E10.40, E10.41, E10.42, E10.43, E10.44, E10.49, E10.51, E10.52, E10.59, E10.61, E10.610, E10.618, E10.620, E10.620, E10.621, E10.622, E10.628, E10.628, E10.630, E10.630, E10.638, E10.638, E10.641, E10.649, E10.65, E10.8, E10.9, E11.00, E11.01, E11.10, E11.11, E11.21, E11.22, E11.29, E11.311, E11.319, E11.3211, E11.3212, E11.3213, E11.3219, E11.3291, E11.3292, E11.3293, E11.3299, E11.3311, E11.3312, E11.3313, E11.3319, E11.3391, E11.3392, E11.3393, E11.3399, E11.34, E11.3411, E11.3412, E11.3413, E11.3419, E11.3491, E11.3492, E11.3493, E11.3499, E11.35, E11.3511, E11.3512, E11.3513, E11.3519, E11.3521, E11.3522, E11.3523, E11.3529, E11.3531, E11.3532, E11.3533, E11.3539, E11.3541, E11.3542, E11.3543, E11.3549, E11.3551, E11.3552, E11.3553, E11.3559, E11.3591, E11.3592, E11.3593, E11.3599, E11.36, E11.40, E11.41, E11.42, E11.43, E11.44, E11.49, E11.51, E11.52, E11.59, E11.61, E11.610, E11.618, E11.620, E11.621, E11.622, E11.628, E11.630, E11.638, E11.641, E11.649, E11.65, E11.69, E11.8, E11.9, E16.2, G99.0, N18.1, N18.2, N18.30, N18.31, N18.32, N18.4, N18.5, N18.9, R73.01, R73.02, R73.03, R80.9, Z46.81, Z79.4, Z79.84, Z96.41

NCD codes in pharmacy claims analyses included those for GLP-1 receptor agonists, SGLT2 inhibitors, DPP-4 inhibitors, DPP4 inhibitor-biguamide combinations, sulfonyleureas, biguanides, sulfonyleurea-biguamide combinations, TZDs, TZD-biguamide combinations, meglitinide analogues, meglitinide-biguamide combinations, sulfonyleurea-TZD combination, antidiabetic combinations, and insulins.

ICD-10 codes used for principal diagnosis in hospitalization discharge records include: E08—E11, and E13.

Citations

- ¹ Cefalu, W. et al. 2018. "Insulin Access and Affordability Working Group: Conclusions and Recommendations." *Diabetes Care*, 41(6): 1299-1311.
- ² Cohen RA, Cha AE. Strategies used by adults with diagnosed diabetes to reduce their prescription drug costs, 2017–2018. NCHS Data Brief, no 349. Hyattsville, MD: National Center for Health Statistics. 2019.
- ³ "Report of the Governor's Task Force on Reduce Prescription Drug Prices, October 2020." Accessed May 18, 2021. Available online at: <https://oci.wi.gov/Documents/AboutOCI/RxTaskForceFinalReport.pdf>.
- ⁴ Maier, K. and Riley, M. Public Policy Statement: Improving Insulin Access and Affordability Summary of Recommendations. Accessed May 18, 2021. Available online at <https://www.diabetes.org/sites/default/files/2019-10/insulin-affordability-one.pdf/>.
- ⁵ Gee, G. C. (2008). A Multilevel Analysis of the Relationship Between Institutional and Individual Racial Discrimination and Health Status. *American Journal of Public Health*, 48(Suppl 1), s48-s56. doi:10.2105/AJPH.98.Supplement_1.S48
- ⁶ Wisconsin State Legislature. 2019 Fiscal Estimates and Reports for SB217. Accessed May 17, 2021. Available online at <https://docs.legis.wisconsin.gov/2019/related/fe/sb217>.
- ⁷ Diabetes Care and Prevention Action Program Act, Wis. Stat. §255.085 (2019).
- ⁸ United States Diabetes Surveillance System. Centers for Disease Control and Prevention. Available online at <https://gis.cdc.gov/grasp/diabetes/diabetesatlas.html>. Accessed on September 29, 2023.
- ⁹ Divers, J. et al. 2020. Trends in Incidence of Type 1 and Type 2 Diabetes Among Youths—Selected Counties and Indian Reservations, United States, 2002-2015. *Morbidity and Mortality Weekly Report*, 69 (6): 161-165.
- ¹⁰ Centers for Diabetes Control and Prevention. "Gestational Diabetes and Pregnancy." Accessed November 3, 2020. Available online at: <https://www.cdc.gov/pregnancy/diabetes-gestational.html>.
- ¹¹ Centers for Diabetes Control and Prevention. "High Blood Pressure during Pregnancy." Accessed November 3, 2020. Available online at: <https://www.cdc.gov/bloodpressure/pregnancy.htm>.
- ¹² Ibid.
- ¹³ Ibid.
- ¹⁴ Ibid.
- ¹⁵ Healthy People 2020. "Maternal, Infant, and Child Health: Life Stages & Determinants." Accessed November 9, 2020. Available online at <https://www.healthypeople.gov/2020/leading-health-indicators/2020-lhi-topics/Maternal-Infant-and-Child-Health/determinant>.
- ¹⁶ Williams, D. R., Neighbors, H. W., & Jackson, J. S. (2008). Racial/Ethnic Discrimination and Health: Findings From Community Studies. *American Journal of Public Health*, 98(Suppl 1), s29-s37D.
- ¹⁷ Vines, A. I., Ward, J. B., Cordoba, E., & Black, K. Z. (2017). Perceived Racial/Ethnic Discrimination and Mental Health: a Review and Future Directions for Social Epidemiology. *Current Epidemiology Reports*, 4(2), 156-165. doi:10.1007/s40471-017-0106-z.
- ¹⁸ Gee, G. C. (2008). A Multilevel Analysis of the Relationship Between Institutional and Individual Racial Discrimination and Health Status. *American Journal of Public Health*, 48(Suppl 1), s48-s56. doi:10.2105/AJPH.98.Supplement_1.S48
- ¹⁹ Pager, D., & Shepherd, H. (2008). The Sociology of Discrimination: Racial Discrimination in Employment, Housing, Credit, and Consumer Markets. *Annual Review of Sociology*, 34, 181-209.
- ²⁰ Yearby, R. (n.d.). The Impact of Structural Racism in Employment and Wages on Minority Women's Health. Retrieved from American Bar Association: https://www.americanbar.org/groups/crsj/publications/human_rights_magazine_home/the-state-of-healthcare-in-the-united-states/minority-womens-health/.
- ²¹ Laraia, B. A., Siega-Riz, A., & Gundersen, C. (2010). Household food insecurity is associated with self-reported pregravid weight status, gestational weight gain and pregnancy complications. *Journal of American Dietetic Association*, 110(5), 692-701.
- ²² Wisconsin Department of Health Services. Wisconsin PRAMS 2018-2019 Surveillance Report, P-02500 (03/2022). Available online at: <https://www.dhs.wisconsin.gov/publications/p02500-2019.pdf>.
- ²³ Melsom, T. et al. 2015. "Prediabetes and Risk of Glomerular Hyperfiltration and Albuminuria in the General Nondiabetic Population: A Prospective Cohort Study." *Am J Kidney Dis.*: 67 (6): 841-50.
- ²⁴ Diabetes Prevention Program Research Group. 2007. "The prevalence of retinopathy in impaired glucose tolerance and recent-onset diabetes in the Diabetes Prevention Program." *Diabet Med.*: 24 (2): 137-144.
- ²⁵ Centers for Disease Control and Prevention. "Prediabetes: Your Chance to Prevent Type 2 Diabetes." Accessed March 4, 2021. Available online at: <https://www.cdc.gov/diabetes/basics/prediabetes.html>.
- ²⁶ Centers for Disease Control and Prevention. National Diabetes Statistics Report website. <https://www.cdc.gov/diabetes/data/statistics-report/index.html>. Accessed September 29, 2023.
- ²⁷ Tabák, A. G. et al. 2012. "Prediabetes: A high-risk state for developing diabetes." *Lancet*: 379 (9833): 2279-2290.

- ²⁸ Lin, J., Thompson, T.J., Cheng, Y.J. et al. Projection of the future diabetes burden in the United States through 2060. *Popul Health Metrics* 16, 9 (2018). <https://doi.org/10.1186/s12963-018-0166-4>
- ²⁹ Ibid.
- ³⁰ Centers for Disease Control and Prevention. "Prevent Type 2 Diabetes in Kids." Accessed March 4, 2021. Available online at: <https://www.cdc.gov/diabetes/prevent-type-2/type-2-kids.html>.
- ³¹ Centers for Disease Control and Prevention. "Research Behind the National DPP." Accessed March 4, 2021. Available online at: <https://www.cdc.gov/diabetes/prevention/research-behind-ndpp.htm>.
- ³² Diabetes Prevention Recognition Program Quarterly State Report, January 2024. Available online at: <https://nationaldppcsc.cdc.gov/s/article/DPRP-State-Report>.
- ³³ Wisconsin Department of Health Services, Office of Health Informatics. Economic Costs, Incremental Cost Effectiveness Ratio, and Economic Rate of Return, P-03154A.
- ³⁴ Ibid.
- ³⁵ Powers MA, Bardsley J, Cypress M, et al. 2015. "Diabetes Self-Management Education and Support in Type 2 Diabetes: A Joint Position Statement of the American Diabetes Association, the American Association of Diabetes Educators, and the Academy of Nutrition and Dietetics." *J Acad Nutr Diet.*: 115 (8): 1323-1334.
- ³⁶ Centers for Disease Control and Prevention. "Diabetes Self- Management Education and Support Toolkit." Accessed March 4, 2021. Available online at <https://www.cdc.gov/diabetes/dsmes-toolkit/index.html>.
- ³⁷ Chronic Disease Prevention Program, Wisconsin Department of Health Services. Internal DSMES State Report, 2022.
- ³⁸ Ibid.
- ³⁹ Wisconsin Institute for Health Aging. Healthy Living with internal attendance reporting to the Wisconsin Department of Health Services' Chronic Disease Prevention Program, September 2020.
- ⁴⁰ United States Diabetes Surveillance System. Centers for Disease Control and Prevention. Available online at <https://gis.cdc.gov/grasp/diabetes/diabetesatlas.html>. Accessed on September 29, 2023.
- ⁴¹ Foster NC, Beck RW, Miller KM, et al. State of type 1 diabetes management and outcomes from the T1D exchange in 2016-2018. *Diabetes Technol Ther.* 2019;21(2):66-72.
- ⁴² National Institutes of Health - National Institute of Diabetes and Digestive and Kidney Diseases. The A1C Test & Diabetes. April 1, 2018; <https://www.niddk.nih.gov/health-information/diabetes/overview/tests-diagnosis/A1C-test>. Accessed July 19, 2019.
- ⁴³ Wisconsin Collaborative for Health Care Quality. <https://reports.wchq.org/trend/73/-1/0>. Accessed December 6, 2023.
- ⁴⁴ Wisconsin Collaborative for Healthcare Quality and the University of Wisconsin Health Innovation Program. Wisconsin Health Disparities Report, 2019.
- ⁴⁵ Ibid.
- ⁴⁶ Goldberg, R.B., Stone, N.J., and Grundy, S.M. *Diabetes Care.* 2020 Aug; 43(8): 1673-1678. <https://care.diabetesjournals.org/content/43/8/1673>.
- ⁴⁷ Ibid.
- ⁴⁸ American Diabetes Association. *Diabetes Care.* 2020 Jan; 43(Supplement 1): S111-S134. https://care.diabetesjournals.org/content/43/Supplement_1/S111.
- ⁴⁹ Wisconsin Chronic Disease Quality Improvement Project. 2022 Annual HEDIS® Report. Available online at <https://www.dhs.wisconsin.gov/disease/chronic-disease-cdqip-report.htm>. Accessed September 29, 2023.
- ⁵⁰ Wisconsin Collaborative for Health Care Quality, "Diabetes: Blood Pressure Control, Historical Trend." Statewide Reports. Accessed September 29, 2023. Online at reports.wchq.org/trend/83/0/0.
- ⁵¹ American Diabetes Association. *Diabetes Care.* 2020 Jan; 43(Supplement 1): S98-S110. <https://doi.org/10.2337/dc20-S009>.
- ⁵² 2020 Expert Consensus Decision Pathway on Novel Therapies for Cardiovascular Risk Reduction in Patients with Type 2 Diabetes: A Report of the American College of Cardiology Solution Set Oversight Committee. *J Am Coll Cardiology*, 2020, Sep, 76 (9): 1117-1145.
- ⁵³ American Diabetes Association. "The Staggering Cost of Diabetes." Accessed March 12, 2021. Available online at: <https://www.diabetes.org/resources/statistics/cost-diabetes>.
- ⁵⁴ Department of Employee Trust Funds. "State of Wisconsin Group Health Insurance Fact Sheet 2020." Available online at: <https://etf.wi.gov/publications/et8902/download?inline=>.
- ⁵⁵ Ibid.
- ⁵⁶ "The Lancet: Ahead of World Diabetes Day, experts call for urgent action to address global diabetes epidemic." AAAS News Release 12-Nov-2020. Available online at https://www.eurekalert.org/pub_releases/2020-11/tl-pss111020.php#:~:text=On%20average%2C%20diabetes%20reduces%20life,cancer%20by%201.3%2D3%20times.
- ⁵⁷ Wisconsin Dept. of Health Services, Division of Public Health, Office of Health Informatics. Wisconsin Interactive Statistics on Health (WISH) data query system, <https://www.dhs.wisconsin.gov/wish/index.htm>, Mortality Module, accessed 9/29/2023.
- ⁵⁸ Wisconsin Department of Health Services. Wisconsin Interactive Statistics on Health, 2020 data. Comparing diabetes deaths and all-cause deaths. Available online at <https://www.dhs.wisconsin.gov/wish/mortality/broad-form.htm>, accessed 9/29/2023.

⁵⁹ Ibid.

⁶⁰ Ibid.

⁶¹ Hill, J. et al. 2013. "Understanding the Social Factors that Contribute to Diabetes: A Means to Informing Health Care and Social Policies for the Chronically Ill." *Perm J.*, 17(2): 67-71.

⁶² Jack L, Jr, Liburd L, Spencer T, Airhihenbuwa CO. Understanding the environmental issues in diabetes self-management education research: a reexamination of 8 studies in community-based settings. *Ann Intern Med.* 2004 Jun 1;140(11):964–71.

⁶³ Woolf SH, Braveman P. Where health disparities begin: the role of social and economic determinants—and why current policies may make matters worse. *Health Aff (Millwood)* 2011 Oct;30(10):1852–9. DOI: <http://dx.doi.org/10.1377/hlthaff.2011.0685>.

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ PLACES Project. Centers for Disease Control and Prevention. Accessed April 26, 2021. <https://www.cdc.gov/places>.

⁶⁷ Ryff, Carol D., Almeida, David, Ayanian, John, Binkley, Neil, Carr, Deborah S., Coe, Christopher, ... Williams, David. *Midlife in the United States (MIDUS 3): Milwaukee African American Sample, 2016-2017*. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2018-09.

⁶⁸ Thao, KK et al. 2015 *Wisconsin Medical Journal*. The Prevalence of Type 2 Diabetes Mellitus in Wisconsin Hmong Patient Population.

⁶⁹ Internal State Health Assessment data collection, Wisconsin Division of Public Health. Referenced by the Chronic Disease Prevention Program, May 2021.

⁷⁰ Ibid.