

The Impact of Diabetes in Delaware 2019



DELAWARE HEALTH AND SOCIAL SERVICES



Dear Colleagues,

It is with great pleasure that we present to you this report as required by House Bill #203. This document provides you with an outline of a comprehensive approach that the Division of Medicaid and Medical Assistance, Division of Public Health, and the Statewide Benefits Office within the Department of Human Resources are implementing in order to address the burden of diabetes in Delaware.

The report – *The Impact of Diabetes, 2019*, provides you with data indicating the prevalence of diabetes in the state, in addition to highlighting activities being implemented in an effort to reduce the burden of diabetes throughout Delaware. Included are innovative methods that our agencies have designed to improve patient/consumer outcomes through practice transformation via the use of Health Information Technology such as Electronic Medical Records, and discussions regarding how data are being collected and used to collaborate with other partners to strategically improve outcomes.

This report provides details of the financial implications of the diabetes burden in Delaware and identifies associated risk factors that contribute toward a reduced quality of life among constituents that live with, or provide care for those, with this disease. Both prevention and treatment have elevated roles in securing successful results in reducing the burden of diabetes statewide. The integration of our three agencies' strategies, plans, and recommendations help define the state's efforts in securing a healthier future for all Delawareans. As you immerse yourself in this report, you will see the immense and diverse approaches that reflect achievements through dedicated work that is assuring access to healthcare, innovative outreach for treatment, and promoting healthy lifestyles. This report should serve as the foundation for better health outcomes and a much improved future for those living with, or at-risk for developing, diabetes.

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This report was prepared for the Delaware General Assembly, as required in House Bill (HB) 203 passed during the 149th General Assembly session, through a collaboration by the following three agencies (collectively referred to as “the Agencies”):

- i. Delaware Department of Health and Social Services (DHSS), Division of Public Health (DPH)
- ii. Delaware Department of Health and Social Services (DHSS), Division of Medicaid & Medical Assistance (DMMA)
- iii. Delaware Department of Human Resources (DHR), Statewide Benefits Office (SBO)

Per HB203, every two years, the Agencies will report to the Delaware General Assembly on the impacts and costs associated with diabetes. The first report is due by June 30, 2019. The report shall include the following components:

- i. Data reflecting the prevalence and burden of diabetes in Delaware.
- ii. Activities related to diabetes programs and initiatives throughout the State.
- iii. An estimate of the financial impact of diabetes on each of the Agencies.
- iv. The number of people impacted or served by each of the Agencies regarding diabetes, including programs and initiatives designed to reach individuals with diabetes and prediabetes.
- v. A description of each of the Agencies’ implemented programs and activities aimed at improving diabetes care and preventing the disease, and an assessment of the expected benefits and outcomes for each program and activity.
- vi. Current funding levels for each of the Agencies to implement programs and activities aimed at reaching individuals with diabetes and prediabetes.
- vii. Each of the Agencies’ individual plans, including recommendations to address the prevention and control of diabetes, the intended outcomes of the recommendations, and estimates of the funding and time required to implement the recommendations.

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EXECUTIVE SUMMARY

In 2017, the 149th Delaware General Assembly amended Title 16 of the Delaware Code to require a biennial report describing the public health consequences and financial impact of diabetes in Delaware. In accordance with House Bill 203, this report was prepared through the collaboration of the Division of Public Health (DPH), the Division of Medicaid and Medical Assistance (DMMA), both located within the Delaware Department of Health and Social Services (DHSS); and the Statewide Benefits Office (SBO), which is located within the Delaware Department of Human Resources (DHR).

The report includes data on the scope and cost of diabetes in Delaware, strategies used by partner agencies in addressing diabetes prevention and control for populations served, ways in which partner agencies are coordinating efforts, and recommendations for further reducing the burden of diabetes in Delaware.

THE SCOPE OF DIABETES IN DELAWARE

Diabetes is a chronic, progressive disease that affects the way a body metabolizes dietary glucose, leading to elevated blood glucose levels within the bloodstream (also known as hyperglycemia). Persistent hyperglycemia can damage nerves, blood vessels, and organs and increase the risk for other chronic diseases. While there is no cure for diabetes, the condition is treatable with effective disease management strategies.

There are three major types of diabetes: type 1 diabetes, type 2 diabetes, and gestational diabetes. Prediabetes, sometimes referred to as impaired glucose tolerance, is also a recognized medical condition. Type 2 diabetes accounts for 90-95% of all diabetes cases (CDC, 2017). It most often develops in individuals over age 45 but is becoming more common in teens and youth. Even small to moderate improvements in health behaviors can tremendously reduce the risk of developing type 2 diabetes. Type 1 diabetes is caused by an autoimmune reaction (the body attacks itself by mistake), and in some cases may be genetic. It is most often diagnosed in children, teens and young adults. Currently, type 1 diabetes cannot be prevented, but it can be managed through diet and lifestyle modifications.

Diabetes is a significant worldwide public health problem; an estimated 8.5% of the world's adult population currently has diabetes (WHO, 2016). The prevalence of diabetes in the United States (U.S.) (10.5%), exceeds the global estimate (CDC, 2019) for the disease. In 2015, an additional 33.9% of U.S. adults (84.1 million people) had prediabetes as determined through fasting glucose and hemoglobin A1C levels (CDC, 2017). Diagnoses are increasingly common, especially among youth ages 10-19. Annually, from 2002 to 2012, type 1 and type 2 diabetes prevalence among U.S. youth increased 1.4% and 7.1%, respectively (Mayer-Davis, et al., 2017).

Delaware's 2017 diagnosed diabetes prevalence was slightly higher than that of the U.S. (11.3% vs 10.5%, respectively) (CDC, 2017). In 2017, over 85,400 Delawareans age 18 or older had diabetes; an additional 94,628 adults had prediabetes (DPH, 2018).

The Impact of Diabetes in Delaware, 2019

Population-based studies suggest that 24,960 Delawareans may have undiagnosed diabetes (Mendola, Chen, Gu, Eberhardt, & Saydah, 2018). Conservatively, 23.84% of all Delaware adults have diabetes, or are at an elevated risk for development of the disease (DPH, 2018). In FY18, diabetes prevalence among Delaware Medicaid enrollees was 5.7% (13,532 clients). Among Group Health Insurance Plan (GHIP) enrollees, the FY18 diabetes prevalence was 9.4% (12,557 members).

Like all U.S. states, diabetes prevalence is increasing in Delaware. From 2000 to 2017, Delaware's adult diabetes prevalence rose 82%, increasing from 6.2% to 11.3% (CDC, 2019). Without substantial change in prevalence trends, researchers estimate that over 121,000 Delaware adults will be living with diabetes by 2030 (Segal, Rayburn, & Beck, 2017).

Following a coordinated, statewide approach to diabetes prevention and disease management, Delaware has made notable progress in reducing its diabetes mortality rate. From 2005 to 2017, Delaware's diabetes mortality rate declined 28%, falling from 26.1 per 100,000 population to 19.1 per 100,000 population (National Center for Health Statistics, 2019). Over this period, Delaware's diabetes mortality rank among all states dropped from 18th to 41st (National Center for Health Statistics, 2019). A continued, coordinated effort is necessary to further reduce Delaware's diabetes prevalence and mortality burden.

THE FINANCIAL IMPACT OF DIABETES IN THE FIRST STATE

The American Diabetes Association (ADA) estimates that diabetes and prediabetes cost \$1.1 billion in Delaware each year, reflecting \$818 million in direct medical expenses and \$293 million in indirect costs (ADA, 2018). In 2017, Delaware hospitals recorded 2,160 discharges due to diabetes (1.9% of all Delaware hospital discharges). From 2003 to 2017, Delaware's hospitalization rate due to diabetes increased 24.2%, rising from 16.1 hospitalizations per 10,000 population to 20.0 hospitalizations per 10,000 population (DHSC, 2018). The 2017 average length of inpatient stay for diabetes with accompanying complications was 5.6 days, totaling an average per-patient charge of \$28,684 (DHSC, 2018).

The total cost of diabetes hospitalizations among Medicaid enrollees reached \$7,949,287.59 in FY18. Fee-for-service spending accounted for \$1,261,703.62 of the total inpatient cost (or, 15.9% of the total diabetes-related hospitalization costs); Medicaid MCOs covered the remaining balance of \$6,687,583.97.

Diabetes is the leading cost driver considering clinical conditions by episodes of care among GHIP members, inclusive of the Medicare population. FY18 total allowed amount for diabetes, including net payments from the GHIP and member costs (i.e., copays, coinsurance and deductibles), reached \$64.9 million. Total allowed amount for diabetes-related care was 56% greater than the second-leading episode classification of osteoarthritis. In FY18, a total of \$31.4 million was spent by the GHIP on net payments for medical and drug claims for diabetes episodes of care within the active employee and early retiree populations. FY18 average net payment per episode of diabetes care was \$4,835 among active employees and \$5,269 among early retirees.

Costs related to diabetes episodes of care represented 5.0% of all GHIP net payments made on behalf of active employees and early retirees. In FY18, a total of \$76.1 million was spent by the GHIP on net payments for medical and drug claims for patients with prediabetes in the active employee and early retiree populations, reflecting 12.1% of total net payments for this population. The average net payment for patients with prediabetes in the active employee and early retiree population was \$8,243.

In the U.S., people with diabetes accrue average medical expenditures of \$16,750 per year, of which \$9,600 (57%) is directly attributable to diabetes (ADA, 2018). On average, medical expenditures for a person with diabetes are 2.3 times higher than for a person without diabetes (ADA, 2018). The lifetime direct medical costs of treating type 2 diabetes and resulting complications for a U.S. male and female diagnosed between the ages of 45 and 54 is \$106,200 and \$110,400, respectively (Zhuo, Zhang, & Hoerger, 2013). Diabetes prevention, as well as early diagnosis and comprehensive disease management, reduce disease prevalence and the risk of secondary chronic conditions, yielding substantial cost savings statewide.

PROGRAMS AND ACTIVITIES AIMED AT DIABETES PREVENTION AND IMPROVED DISEASE MANAGEMENT

Diabetes programs and activities implemented by DPH, DMMA, and SBO support improved health among Delawareans via self-management strategies and increased patient engagement. Overlapping work between agencies strengthens Delaware's statewide infrastructure aimed at diabetes prevention, early identification, and treatment. Increased personal health accountability among Delawareans is the critical component that translates health intervention strategies into improved health outcomes. Diabetes activities especially target the portion of cases attributable to obesity and other behavioral and environmental risk factors. Programs and activities are designed to move Delawareans from disease awareness to healthy lifestyle modification. Broad public health initiatives aimed at prevention, early identification, and treatment of diabetes serve the total population of Delawareans with emphasis on the 11.3% of Delawareans age 18 and older diagnosed with diabetes and the 12.5% of Delawarean adults diagnosed with prediabetes. Diabetes programs and activities offered as covered benefits to Delaware Medicaid and Group Health Insurance Plan (GHIP) members target narrower sub-populations of enrollees with or at-risk for diabetes. Activities of highest priority involve: (a) increased access and participation in accredited, evidence-based National Diabetes Prevention Program (NDPP) and Diabetes Self-Management Education (DSME) curricula; (b) the continued funding and management of statewide awareness campaigns to reduce diabetes and associated risk factors; and (c) targeted outreach to vulnerable populations of Delawareans.

DPH spearheads, manages, or otherwise participates in, activities embedded within a comprehensive statewide diabetes prevention and education approach designed to establish social norms and policies that promote physical activity, healthy diet, and tobacco-free lifestyles. DMMA and SBO work directly with health plans to offer a variety of disease management and wellness programs accessible to members in their preferred setting.

DMMA has committed to the My Health Weight pledge, an initiative focused on preventing and reducing obesity while improving health outcomes. SBO offers the NDPP as a covered benefit, discounts on YMCA memberships, and access to Livongo (a digital support platform for enrollees with diabetes), as well as other programs aimed at diabetes prevention. DMMA and SBO provide diabetes services to encourage personal health management, empower members to adopt proactive healthy attitudes, and provide those struggling with chronic conditions with tools to effectively manage their diseases.

RECOMMENDATIONS FOR PREVENTING DIABETES AND IMPROVING HEALTH OUTCOMES AMONG DELAWAREANS WITH DIABETES

An aging population, advances in medical care, and growing rates of health-damaging behaviors increase the likelihood that the number of Delawareans living with diabetes will increase in the future. DPH, DMMA, and SBO remain committed to providing a full continuum of diabetes-related services among their target populations. Special emphasis is placed on increasing Delawareans' participation in accredited NDPP and DSME programs. Additional cross-agency objectives include utilizing electronic health record (EHR) capabilities to identify and monitor high-risk patients, promoting ongoing practice-level transformation to improve patient outcomes, and strengthening community-clinical linkages to promote comprehensive diabetes management among Delawareans with or at risk for diabetes.

DPH, DMMA, and SBO make the following ten recommendations to further prevent new cases of diabetes and improve health outcomes for Delawareans living with diabetes. While these recommendations emphasize strategies to support prevention of type 2 diabetes, they facilitate awareness and control of all types of diabetes, including prediabetes, type 1 diabetes, type 2 diabetes, and gestational diabetes. Evidence-based research, national standards developed by the American Association of Diabetes Educators (AADE) and ADA, and peer state diabetes prevention and management strategies support these recommendations.

1. Increase access and participation in nationally recognized, gold standard National Diabetes Prevention Programs (NDPP) implemented across the state.
2. Increase online access and participation in nationally recognized, gold standard National Diabetes Prevention Programs (NDPP) to reduce barriers to participation for high-risk adults.
3. Increase promotion and engagement in the National Diabetes Prevention Program (NDPP) and Medicare Prevention Program (MPP) through an on-going comprehensive awareness campaign among State of Delaware Employees and Retirees. The targeted awareness campaign will educate individuals about diabetes signs and symptoms and highlight NDPP and MPP as covered benefits.

4. Expand the reach of structured formal Diabetes Self-Management Education (DSME) programs statewide, including accredited DSME programs (e.g., Self-Management Resource Center's (SMRC) Diabetes Self-Management Program (DSMP) and accredited hospital-based DSME programs).
5. Increase access and participation in online, accredited Diabetes Self-Management Education (DSME) programs to reduce barriers to participation for adults with diabetes.
6. Promote clinical-community linkages to emphasize the importance of receiving recommended medical tests and services for people with diabetes (e.g., HbA1c blood tests, foot examinations, dilated eye exams, dental visits, flu vaccines, and self-monitoring of blood glucose levels via tools such as Livongo®).
7. Leverage EHR capabilities and other technologies to improve medication adherence among Delawareans with diabetes and a comorbidity of hypertension.
8. Create and implement a standardized Diabetes Training Module designed for Community Health Workers (CHWs) in Delaware.
9. Develop and maintain a statewide Delaware Diabetes Registry to monitor diabetes management and reduce disparities in health outcomes among Delawareans with diabetes.
10. Implement a multisector approach to promoting physical activity, healthy food and beverage consumption, and healthy weight management (for example, through the national My Healthy Weight pledge).

Delaware must prepare for future increases in diabetes prevalence by ensuring that statewide diabetes prevention and control activities remain robust and fully funded. Recommendations endorsed by DPH, DMMA, and SBO reflect inter-agency collaboration and shared goals of diabetes prevention, early diagnosis, and comprehensive treatment and management.

PREFACE

House Bill No. 203 (HB203) of the 149th General Assembly, established that a comprehensive joint report be published biennially to quantify the public health and financial burden of diabetes in Delaware.

Per HB203, the following three State agencies co-authored the inaugural report, “The Impact of Diabetes in Delaware, 2019”:

- i. Delaware Department of Health and Social Services (DHSS), Division of Public Health (DPH)
- ii. DHSS, Division of Medicaid & Medical Assistance (DMMA)
- iii. Delaware Department of Human Resources (DHR), Statewide Benefits Office (SBO)

Division of Public Health (DPH), Diabetes and Heart Disease Prevention and Control Program (DHDPCP)

DPH touches the lives of all Delawareans by managing a wide range of programs and services aimed at protecting and improving the health of people who live and work in our state. DPH’s Delaware Diabetes Prevention and Control Program was established in 1997 to decrease the emotional, physical, and financial burden of diabetes in the state by preventing the disease and reducing complications. In 2013, when heart disease was added to the program’s operation, its name changed to the Diabetes and Heart Disease Prevention and Control Program (DHDPCP). These two diseases share risk factors and self-management strategies. Integrating efforts to reduce the burden of diabetes and heart disease increases program efficiency and success.

DHDPCP, housed in DPH’s Health Promotion and Disease Prevention Section, is funded by a cooperative agreement with the Centers for Disease Control and Prevention (CDC) with additional support from the Delaware Health Fund. The DHDPCP collects, analyzes and publicizes current and accurate information and develops evidence-based approaches to reduce the impact of uncontrolled diabetes and hypertension. The program encourages healthy lifestyle habits for prevention and control and promotes health equity among all Delawareans. DHDPCP links clinical and community resources; coordinates health-related efforts of public and private health organizations; and develops methods for quality improvement utilizing health information technology (HIT), including electronic health records (EHRs).

The DHDPCP implements diabetes prevention and management strategies that reach all Delawareans, an estimated 989,803 individuals (DPC, 2018). The DHDPCP program also targets the most vulnerable populations in Delaware, including those who do not meet insurance qualifiers and those whose insurance coverage does not cover necessary diabetes-related services and supplies (e.g., primary care providers, certified diabetes educators, glucose testing supplies, diabetes medications, and orthopedic shoes). Other populations at elevated risk for the development of diabetes and/or heart disease include African Americans, Hispanics, people of lower socioeconomic status (SES), people with disabilities, older adults, and Delawareans with

associated disease risk factors (e.g., tobacco use, obesity, limited/reduced access to healthy foods, and lack of physical activity).

Division of Medicaid & Medical Assistance (DMMA)

DMMA was established on July 1, 2005. DMMA improves health outcomes by ensuring that the highest quality medical services are provided to vulnerable populations of Delawareans in the most cost-effective manner. The Delaware Medicaid program furnishes medical assistance to eligible, low-income families and individuals whose income is insufficient to meet the cost of necessary medical services. Delawareans can apply for Medicaid coverage through the Delaware ASSIST website (<https://assist.dhss.delaware.gov/>).

DMMA identifies four specific goals related to quality care among its client population:

1. to improve timely access to appropriate care and services for adults and children with an emphasis on primary and preventive, and behavioral health care, and to remain in a safe and least-restrictive environment
2. to improve quality of care and services provided to Medicaid and CHIP enrollees
3. to control the growth of health care expenditures
4. to assure member satisfaction with services.

DMMA oversees multiple programs under the umbrella category of the Delaware Medical Assistance Plan (DMAP). Non-Medicaid programs include the Children's Health Insurance Program (CHIP) and several state programs (e.g., the Chronic Renal Disease Program and the Delaware Cancer Treatment Program). Medicaid is the largest DMAP program and is comprised of several sub-programs.

The states and the federal government jointly fund Medicaid. At least 50% of states' total Medicaid funds come from the Federal Medical Assistance Percentages (FMAP); states are responsible for generating the remaining portion of Medicaid funds through a combination of general revenues, taxes, local governments, and other sources. In FY2019, Delaware received 57.55% of its Medicaid funding through FMAP, leaving the state responsible for generating the remaining 42.45% of funds (Mitchell, 2018). As Delaware's total Medicaid spending increases, so, too, does the share of funds for which Delaware is responsible.

Most, but not all, Medicaid clients eligible for full benefits are required to enroll in Delaware's Medicaid managed care program, known as the Diamond State Health Plan (DSHP). DSHP currently covers 83% of Delaware's Medicaid population (DMMA, 2016). Fundamental to implementing a managed care model is the belief that the use of a managed care system will improve the quality of care delivered to all qualified recipients by consistently applying managed care principles, and having a strong quality assurance program, partnerships with providers, and review and evaluation by an External Quality Review Organization (EQRO). Managed care organizations (MCOs) create efficiencies in the Medicaid program and enable coverage expansion to certain individuals who would otherwise be ineligible for Medicaid. As of 2018, the DMMA contracts with two MCOs to provide services to members: AmeriHealth

Caritas Delaware and Highmark Blue Cross Blue Shield of Delaware (Highmark BCBS).

Smaller populations of Medicaid clients are exempt from enrolling in an MCO (e.g., Medicaid Breast and Cervical Cancer Program (BCCP) clients. Additionally, fully eligible Medicaid clients who are newly eligible for services will be served on a fee-for-service (FFS) basis until they are enrolled in an MCO, a process that typically takes one to two months.

Delaware's Program of All-Inclusive Care for the Elderly (PACE) program serves 200 to 250 fully eligible Medicaid clients. PACE is an option of integrated long-term care that provides comprehensive medical and social services so that older individuals remain living in the community. PACE provides all services covered by Medicare and Medicaid as determined necessary by the client's health care team. A sampling of services provided by PACE include primary and specialty care, dental care, prescriptions, hospital care, meals, home and personal care services, and nursing home care, if necessary.

Some Medicaid clients are eligible for partial benefits. Among this sub-population are clients who receive some Medicaid-funded services, including payment of Medicare co-pays, deductibles, or Medicare Part A or Part B premiums. These clients are qualified Medicare beneficiaries who receive partial Medicaid benefits. Another category of clients receives partial benefits due to their non-qualified/non-citizen status (including clients residing legally and illegally). For these clients, Medicaid will fund only emergency and labor/delivery services (Table 1).

Table 1: Unduplicated Medicaid Client Counts, Delaware: June 30, 2017 and June 30, 2018

Client Category	Enrollment Status	Client Count: June 30, 2017	Client Count: June 30, 2018
Full Benefits	MCO	197,687	200,203
Full Benefits	FFS	10,692	10,608
Full Benefits	PACE	216	239
Partial Benefits (Qualified Medicare Beneficiary)	None	17,008	17,337
Partial Benefits (Non-Qualified / Non-Citizen)	None	7,476	8,020
Total:		233,079	236,507

Note: MCO: managed care organization; FFS: fee-for-service; PACE: Program of All-Inclusive Care for the Elderly

Source: Delaware Department of Health and Social Services, Division of Medicaid & Medical Assistance, 2019.

Department of Human Resources (DHR), Statewide Benefits Office (SBO)

In July 2017, the Delaware General Assembly passed House Bill No. 4 to establish the Delaware Department of Human Resources (DHR). The Statewide Benefits Office (SBO) was relocated from the Office of Management and Budget (OMB) and realigned as a Section within the DHR. SBO is the “administrative arm” of the State Employee Benefits Committee (SEBC). SBO is responsible for the strategic planning, daily administration, and financial management of the Group Health Insurance Plan (GHIP) and all health and related benefit programs available to eligible members. The GHIP population represents individuals from State agency, public school district, charter school, higher education, and participating groups (i.e., towns, cities and fire companies). GHIP benefits include medical, prescription, wellness, disease management, vision, dental, and other services.

In Fiscal Year 2018 (FY18), the GHIP member population was comprised of an estimated 96,732 individuals in the active employee population (including employees, spouses, and dependents). There were 10,935 individuals within the early retiree population (including employees, spouses, and dependents) and 25,399 within the Medicare retiree population. In total, GHIP covered approximately 125,000 lives during FY18. Member counts are fluid and do not reflect continuous enrollment during the entire fiscal year. Additionally, member counts are not mutually exclusive; some members may shift from active employee to early retiree or from early retiree to Medicare retiree during a single fiscal year. Additionally, a small percentage of members may not be captured within member counts (e.g., those covered under the Consolidated Omnibus Budget Reconciliation Act (COBRA) or surviving spouses and dependents).

INTRODUCTION: DIABETES, A FORMIDABLE PUBLIC HEALTH CHALLENGE

Diabetes: Disease Overview

Types of diabetes. Diabetes is a chronic, progressive disease that affects the way a body metabolizes dietary glucose. Disruption of glucose metabolism occurs when the pancreas does not produce enough insulin (a glucose-regulating hormone) and/or the body is unable to effectively use insulin. A disruption in insulin production or function negatively affects the transportation of glucose from the bloodstream into the cells of the body, leading to elevated blood glucose levels within the bloodstream (also known as hyperglycemia). Persistent hyperglycemia can damage nerves, blood vessels, and organs and increase the risk for other chronic diseases. While there is no cure for diabetes, the condition is treatable with effective disease management strategies.

There are three major types of diabetes: type 1 diabetes, type 2 diabetes, and gestational diabetes. Prediabetes, sometimes referred to as impaired glucose tolerance, is also a recognized medical condition.

- **Type 1 diabetes**, previously known as juvenile- or childhood-onset diabetes, is characterized by the pancreas' insufficient production of insulin. People with type 1 diabetes require daily administration of insulin. Type 1 diabetes can develop at any age; common symptoms of the disorder include excessive thirst, excessive excretion of urine, constant hunger, weight loss, and fatigue (WHO, 2016).
- **Type 2 diabetes**, previously known as non-insulin-dependent or adult-onset diabetes, is the most common type of diabetes. Development of type 2 diabetes begins with ineffective insulin utilization; although insulin is present within the bloodstream, the body is unable to utilize it to transport glucose into cells. As a result, the pancreas detects prolonged elevated blood glucose levels and produces increasing amounts of insulin in response. Over time, the pancreas fatigues, insulin production tapers, and the body experiences prolonged periods of hyperglycemia. At one time, type 2 diabetes afflicted adults only. Now, increasing numbers of children, adolescents, and young adults are developing the disease.
- **Gestational diabetes** is defined by the World Health Organization (WHO) as hyperglycemia with blood glucose values above normal but below those diagnostic of diabetes, occurring during pregnancy (WHO, 2016). Pregnant women diagnosed with gestational diabetes did not have diabetes prior to pregnancy. Gestational diabetes increases health risks for pregnant women and their babies, including preeclampsia, pre-term birth, large weight at birth, and C-section, according to the Centers for Disease Control and Prevention (CDC) (CDC, 2018). Gestational diabetes most often develops in the middle of pregnancy without symptoms and pregnant women are typically tested for the condition between 24 and 28 weeks of pregnancy (CDC, 2017).

In most cases, gestational diabetes goes away after pregnancy. However, 5-10% of women with gestational diabetes develop diabetes immediately after pregnancy and women who have gestational diabetes have a 35-60% chance of developing diabetes within 20 years after their pregnancy (CDC, 2011).

- **Prediabetes** is characterized by higher-than-normal blood glucose levels that do not meet the threshold for a diabetes diagnosis. Prediabetes prevalence is increasing worldwide. Without intervention, approximately 5-10% of individuals with prediabetes develop diabetes each year; a similar proportion of individuals with prediabetes convert back to normal blood glucose levels. For individuals with prediabetes, lifestyle modification can invoke a 40-70% relative risk reduction in the eventual development of diabetes (Tabak, Herder, Rathmann, Brunner, & Kivimaki, 2012).

Advanced laboratory testing is required to distinguish between type 1 and type 2 diabetes. As a result, separate estimates of type 1 and type 2 diabetes prevalence do not exist within large-scale health surveillance studies. However, type 2 diabetes accounts for 90-95% of all diabetes cases. As a result, health surveillance trend data are more likely to characterize type 2 diabetes burden (CDC, 2017).

Global diabetes burden. Diabetes is a significant worldwide public health problem. Globally, from 1980 to 2014, the number of people living with diabetes increased from 108 million to 422 million (WHO, 2016). An estimated 8.5% of the world's adult population has diabetes. Diabetes prevalence rates are growing fastest in low- and middle-income countries (WHO, 2016). Increasing diabetes prevalence, especially in historically low-risk areas, largely results from concurrent increases in the prevalence of overweight and obesity (WHO, 2016). In 2012, diabetes directly caused an estimated 1.5 million deaths globally. Another 2.2 million deaths from cardiovascular and other diseases were attributed to diabetes (WHO, 2016). Diabetes' impact is not limited to the oldest cohorts of adults; 43% of deaths attributable to diabetes occur among individuals age 70 or younger (WHO, 2016).

U.S. diabetes burden. U.S. diabetes prevalence exceeds the global average; in 2017, 10.5% of all U.S. adults had been diagnosed with diabetes (CDC, 2019). Additionally, the 2015 estimated prevalence of undiagnosed diabetes was 2.9% (CDC, 2017); stated equivalently, 2.9% of all U.S. adults have diabetes and are not aware of their condition. In 2015, an estimated 1.5 million new cases of diabetes were diagnosed among U.S. adults (6.7 cases per 1,000 persons) (CDC, 2017).

Diabetes prevalence increases with age. Among U.S. adults age 65 and older, 25.0% have diabetes compared to 17.0% of adults aged 45-64 and 4.0% of adults aged 18-44 (CDC, 2017). U.S. diabetes prevalence differs significantly by race. The 2013 to 2015 diabetes prevalence for non-Hispanic Caucasian adults in the U.S. (7.4%) was significantly lower than comparable prevalence estimates for non-Hispanic African American and Hispanic adults (12.7% and 12.1%, respectively). The 2015 diabetes prevalence did not differ between U.S. males and females (11.7% and 12.7%, respectively) (CDC, 2017).

Education level, a proxy indicator of socioeconomic status, revealed that U.S. adults with less than a high school education had a diabetes prevalence significantly higher than U.S. adults with more than a high school education (12.6% and 7.2%, respectively) (CDC, 2017).

Type 2 diabetes prevalence estimates cluster geographically. Counties and states in the southern and Appalachian regions of the U.S. are disproportionately affected by the disease (CDC, 2017). Age-adjusted diabetes prevalence from 2003 to 2007 was highest in Mississippi, West Virginia, Louisiana, Texas, South Carolina, Alabama, and Georgia (ranging from 15.8 to 16.6% for men and 12.4 to 14.8% for women) (Danaei, Friedman, Oza, Murray, & Ezzati, 2009). Conversely, states in the Midwest and Northeast have the lowest diabetes prevalence in the U.S. Specifically, 2003 to 2007 diabetes prevalence estimates were lowest in Vermont, Minnesota, Montana, and Colorado (ranging from 11.0 to 12.2% for men and 7.3 to 8.4% for women) (Danaei, Friedman, Oza, Murray, & Ezzati, 2009).

In 2015, 33.9% of U.S. adults (84.1 million people) had prediabetes as determined through fasting glucose and hemoglobin A1C levels (CDC, 2017). However, among adults with prediabetes, only 11.6% reported that a health professional told them they had this condition (CDC, 2017). Like diabetes prevalence, prediabetes prevalence dramatically increases with age. In 2015, nearly half (48.3%) of U.S. adults age 65 or older had prediabetes, yet only 14.1% were aware of having the condition (CDC, 2017).

Diabetes risk factors. The presence, extent, and interaction of key risk factors increase a person's risk of developing diabetes. Diabetes risk factors are categorized as non-modifiable (i.e., intrinsic to the individual; unchangeable) or modifiable (i.e., lifestyle-based; behavioral) (Table 2, page 13).

Type 1 diabetes cannot be prevented, even with lifestyle changes; however, acute complications resulting from type 1 diabetes are largely preventable with proper management of the condition. In contrast, even small to moderate improvements in health behaviors can tremendously reduce the risk of developing type 2 diabetes. For example, structured disease prevention interventions combining physical activity and modest weight loss lower type 2 diabetes risk by up to 58% in high-risk populations (Colberg, et al., 2010). One recent study estimates that more than half of all type 2 diabetes cases in Australia could be preventable through health behavior modification (Dow, et al., 2019).

Table 2: Known Diabetes Risk Factors by Diabetes Type and Risk Factor Category

Diabetes Type	Non-Modifiable Risk Factors	Modifiable Risk Factors
Type 1	<ul style="list-style-type: none"> • Family history: have a first-degree relative with type 1 diabetes • Age: more likely to develop between childhood and young adulthood • Multiple exposures to certain viruses 	<ul style="list-style-type: none"> • None
Type 2	<ul style="list-style-type: none"> • Family history: have a first-degree relative with type 2 diabetes • Age: more likely to develop among adults age 45 and older • Race: more likely to develop among African Americans, Hispanic Americans, American Indians, or Alaska Natives, Native Hawaiians, and Pacific Islanders • Personal history of gestational diabetes • Acanthosis nigricans, a skin condition characterized by brown to black patches of skin on the back of the neck, the armpits, elbows, and/or knees 	<ul style="list-style-type: none"> • Have Prediabetes • Are overweight or obese • Have high blood pressure (hypertension) • Have elevated blood cholesterol • (hypercholesterolemia) • Have high blood triglyceride (fat) levels • High alcohol intake • Are physically active fewer than 3 times per week • Tobacco use • Poor dietary intake
Gestational	<ul style="list-style-type: none"> • Family history: have a first-degree relative with type 2 diabetes • Age: more likely to develop among women age 25 and older • Race: more likely to develop among African Americans, Hispanic Americans, American Indians, Alaska Natives, Native Hawaiians, or Pacific Islanders • Personal history of gestational diabetes • Personal history of polycystic ovary syndrome • Previously given birth to a baby weighing 9 or more pounds 	<ul style="list-style-type: none"> • Are overweight or obese • Poor dietary intake • Sedentary lifestyle

Source: Centers for Disease Control and Prevention (CDC), 2017.

Diabetes screening guidelines. In 2015, the U.S. Preventive Services Task Force (USPSTF) issued updated guidelines related to screening for prediabetes and type 2 diabetes. Screening guidelines include blood glucose testing as well as risk factor screening. Among asymptomatic adults aged 40-70, screening for abnormal blood glucose levels should be performed as part of a standard cardiovascular (CV) risk assessment. Patients with abnormal glucose should be referred to intensive behavioral counseling interventions. For adults with initial normal glucose tests, re-screening every three years may be reasonable (Sui, 2015). Obese adults with a Body Mass Index (BMI) greater than 30 kg/m² and overweight adults with a BMI greater or equal to 25 kg/m² and additional CV risk factors should be referred to intensive, multicomponent behavioral counseling (Sui, 2015). All adults age 18 and over should be screened for hypertension and tobacco use; providers should refer patients to tobacco cessation interventions as necessary. Men age 35 and older and women age 45 and older are at increased risk for coronary heart disease should be screened for elevated blood lipid levels (Sui, 2015).

Diabetes management. Diabetes can be effectively managed through healthy diet, regular physical activity, and a medication regimen to lower blood glucose levels. Medication adherence is a critical component to effective diabetes management. Those with type 1 diabetes must receive insulin via pump or injection. Some people with type 2 diabetes may require insulin to help control blood glucose levels. National medication management data show that among U.S. adults diagnosed with diabetes, 14% use insulin only, 15% use a combination of insulin and oral diabetes medication, 57% use oral diabetes medication only, and 14% do not require any medication to manage their diabetes (CDC, 2014).

The hemoglobin A1C (HbA1c) blood test is commonly used to diagnose diabetes and gauge disease management. HbA1c measures the proportion of glycated hemoglobin in the blood (i.e., the proportion of a protein in red blood cells that is coated with sugar); results reflect average blood glucose level for the past two to three months (Mayo Clinic, 2019). HbA1c results are reported as percentages and are directly correlated with risk of diabetes complications. A normal HbA1c level is considered below 5.7%. Levels between 5.7% and 6.4% are indicative of prediabetes. HbA1c levels above 6.5% on two separate testing occasions results in a diabetes diagnosis. HbA1c levels above 8.0% is indicative of uncontrolled diabetes and high risk of diabetes complications (Mayo Clinic, 2019).

If managed poorly, diabetes can negatively affect all systems within the body. In the U.S., diabetes is the leading cause of heart disease, stroke, kidney failure, non-traumatic lower-limb amputations, and new cases of blindness among adults. Diabetes also increases the risk for other chronic diseases. For example, diabetes is associated with a 20% increased risk of colorectal cancer (Huxley, et al., 2009).

Remaining Vigilant Amid Emerging Diabetes Trends

Emerging U.S. data trends highlight the need for continued diabetes prevention and management efforts at the state level. From 2002 to 2012, type 1 and type 2 diabetes incidence rates among U.S. youth aged 10-19 increased significantly, especially among minorities.

The Impact of Diabetes in Delaware, 2019

During this period, type 1 diabetes incidence rates increased 1.4% annually, from 19.5 cases per 100,000 youths per year in 2002 to 2003 to 21.7 cases per 100,000 youths per year in 2011 to 2012 (Mayer-Davis, et al., 2017). From 2002 to 2012, type 2 diabetes incidence rates increased 7.1% annually, from 9.0 cases per 100,000 youths per year in 2002 to 2003 to 12.5 cases per 100,000 youths per year in 2011 to 2012 (Mayer-Davis, et al., 2017). Emerging incidence trends among youth and young adults often forecast future disease burden. These surveillance data suggest that outreach efforts among younger populations may be beneficial in curbing diabetes prevalence rates among teenagers and young adults.

Additionally, after decreasing 43% between 2000 and 2009, non-traumatic lower-extremity amputation rates among U.S. adults with diabetes increased by 50% between 2009 and 2015 (from 3.07 per 1,000 adults with diabetes to 4.62 per 1,000 U.S. adults with diabetes) (Geiss, et al., 2019). Increases in the rates of total, major, and minor lower-extremity amputations were greatest among adults aged 18-44 and aged 45-65 (Geiss, et al., 2019). Potential increases in the number of individuals with poorly managed diabetes will generate excess health care costs from preventable comorbid conditions.

CHAPTER 1: DELAWARE'S DIABETES BURDEN

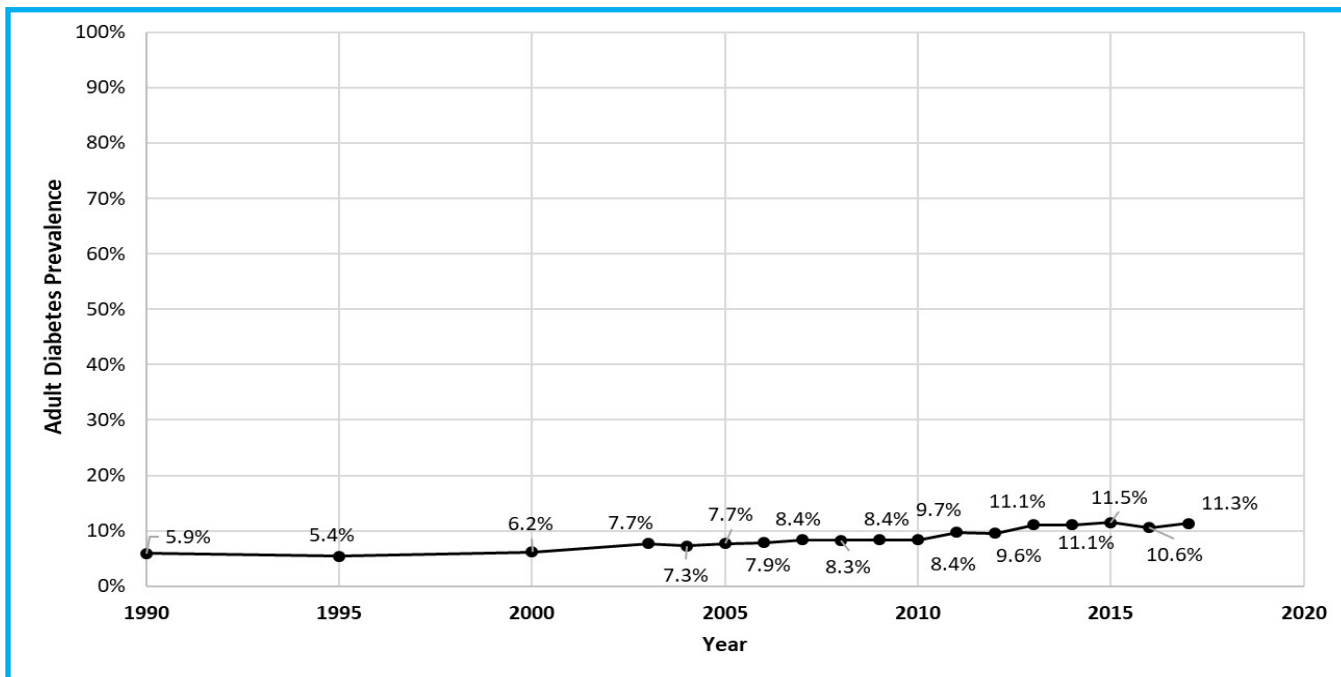
DPH, DMMA, and SBO report diabetes burden from the unique perspective of their target populations. To fully characterize Delaware's diabetes burden, reporting agencies analyzed public health surveillance data via the Behavioral Risk Factor Surveillance System (BRFSS), program evaluation data, and Medicaid and GHIP claims data. Taken together, the following disease burden data underscore the tremendous health and financial impact of diabetes in Delaware.

Diabetes from a Public Health Perspective

Diabetes prevalence. In 2017, 11.3% of Delawareans age 18 and older (approximately 85,400 adults) reported having been diagnosed with diabetes (not inclusive of gestational diabetes) (DPH, 2018). Delaware's 2017 diagnosed diabetes prevalence was slightly higher than that of the U.S. (10.5%) (CDC, 2019). Among U.S. states, 2017 diabetes prevalence estimates ranged greatly from 7.1% (Utah) to a high of 15.2% (West Virginia) (CDC, 2019).

In 2017, an additional 12.5% of Delawarean adults (approximately 94,628 individuals) reported having been diagnosed with prediabetes (DPH, 2018). Collectively, these data indicate that 23.8% of all Delaware adults have diagnosed diabetes or are at an elevated risk for development of the disease. This prevalence estimate is conservative as it does not include Delawareans with undiagnosed diabetes. From 1990 to 2017, Delaware's adult diabetes prevalence increased 91.5%, rising from 5.9% to 11.3% (Figure 1). At the current pace, Delaware is projected to have over 121,000 residents living with diabetes by 2030 (Segal, Rayburn, & Beck, 2017).

Figure 1: Adult Diabetes Prevalence, Delaware, 1990-2017



Source: Delaware Behavioral Risk Factor Surveillance Survey, 1990-2017.

Delaware Department of Health and Social Services, Division of Public Health, Diabetes and Heart Disease Prevention and Control Program; Delaware Department of Health and Social Services, Division of Medicaid and Medical Assistance; Delaware Department of Human Resources, Delaware Statewide Benefits Office

In 2017, Delaware's adult prediabetes and diabetes prevalence did not differ significantly by sex, race/ethnicity, education, county of residence, or disability status. The diabetes prevalence among Delaware males (12.1%) did not differ significantly from the comparable female rate (10.5%). Similarly, the difference in diabetes prevalence among Delaware non-Hispanic African American adults (11.6%), non-Hispanic Caucasian adults (11.2%), and Hispanic adults (9.7%) did not reach a level of statistical significance. In 2017, prediabetes and diabetes prevalence did not differ significantly among people with different levels of education or among Delaware's three counties. The difference in diabetes prevalence among Delawareans with a disability (17.3%) and those without a disability (8.6%) was non-significant when statistically adjusting for age, educational attainment, income level, county of residence, weight category, and disability status (DPH, 2018).

Conversely, 2017 prediabetes and diabetes prevalence among Delaware adults was significantly associated with two key demographic variables: age and weight status (Table 3). In 2017, prediabetes prevalence was highest among adults aged 55-64, while diabetes prevalence peaked among adults age 65 and older. Delawareans with obesity had prediabetes and diabetes prevalence estimates over two times as high as disease prevalence estimates among overweight Delawareans. Historical public health data demonstrate the strong correlation between increasing obesity and diabetes rates. From 1992 to 2017, obesity rates among Delaware adults increased sharply from 13.0% to 31.8%. During the same period, diabetes prevalence among Delaware adults also doubled from 4.9% to 11.3% (CDC, 2019). Considered together, these data reflect the nature of prediabetes and diabetes as related diagnoses on a disease continuum. As Delawareans with prediabetes age, and possibly maintain or gain additional weight, prediabetes advances to diabetes.

A third demographic variable, household income, was significantly associated with diabetes prevalence. In 2017, Delaware adults with the lowest household income (less than \$15,000 annually) were significantly more likely to report having diabetes. Household income was not significantly associated with prediabetes prevalence among Delawareans in 2017.

Table 3: Prediabetes and Diabetes Prevalence among Adults by Age and Weight, Delaware, 2017

	Prediabetes	Diabetes
Age		
18-44	6.5%	2.7%
45-54	14.0%	10.9%
55-64	18.8%	16.8%
65 and older	18.0%	23.4%
Weight Status		
Healthy Weight (BMI)	5.5%	6.3%
Overweight (BMI)	12.1%	9.6%
Obese (BMI)	22.4%	19.6%

Source: Delaware Department of Health and Social Services, Division of Public Health, Delaware Behavioral Risk Factor Survey, 2018.

In 2017, maternal gestational diabetes was diagnosed during pregnancy for 845 of 10,835 (7.8%) births in Delaware. As age increases, so does the prevalence of gestational diabetes: 1.0% of Delaware women aged 13-18 who gave birth in 2017 were diagnosed with gestational diabetes compared to 22.4% of Delaware women aged 40-49 (DPH, 2018).

Diabetes mortality. Diabetes is the eighth leading cause of death in Delaware. In 2017, 244 Delawareans died from diabetes (DHSC, 2018). However, the impact of diabetes on the number of deaths statewide is likely underestimated because diabetes is also a contributing risk factor to other leading cause of death, such as heart attack and stroke. Delaware's 2017 diabetes mortality rate (19.1 deaths per 100,000 persons) was lower than the comparable U.S. rate (21.5 deaths per 100,000 persons). In 2017, Delaware's diabetes mortality rate (19.1 diabetes deaths per 100,000 persons) ranked 41st among states for diabetes mortality. In 2017, West Virginia (34.0 diabetes deaths per 100,000 persons) ranked first while Connecticut (14.5 diabetes deaths per 100,000 persons) ranked 50th (National Center for Health Statistics, 2019). In recent years, Delaware has noticeably reduced its diabetes mortality burden. From 2005 to 2017, Delaware's diabetes mortality rate declined 28%, falling from 26.1 per 100,000 persons to 19.1 per 100,000 persons. Over this period, Delaware's diabetes mortality rank among all states dropped from 18th to 41st (National Center for Health Statistics, 2019).

Diabetes risk factor prevalence among Delawareans. In addition to diabetes prevalence, DPH and the DHPCP monitor diabetes risk factor prevalence among Delawareans to identify opportunities to reach vulnerable populations at high risk for the development of diabetes. Modifiable risk factors, such as obesity and hypertension, strongly impact diabetes risk; these associations are often complex. For example, research shows that the specific type of fat tissue, as well as the location of its accumulation, increases diabetes risk to varying extents (Eckel, et al., 2011). Additionally, not only do hypertension and diabetes share common risk factors, but hypertension is an independent risk factor for diabetes (Kim, Lim, Choi, & Park, 2015).

Nearly 20% of Delawareans with obesity have been diagnosed with diabetes; another 22.4% have been diagnosed with pre-diabetes (DPH, 2018). In 2017, 31.8% of Delaware's adult population was obese; another 36.7% was overweight. In 2017, African American Delawareans had the highest obesity prevalence (40.2%) compared to Caucasian Delawareans (30.4%), Hispanic Delawareans (30.3%), and Delawareans of other races (18.9%) (DPH, 2018).

In 2017, 34.9% of the state's adult population reported that a health care professional told them they have hypertension (HTN). Because HTN often produces no symptoms and can go undiagnosed for prolonged periods, actual HTN prevalence estimates are likely underestimated. African American Delawareans have a slightly, but not significantly, higher prevalence of reported HTN compared to non-Hispanic Caucasians (39.4% vs. 36.4%, respectively). HTN prevalence increases with age. Eight percent of Delawareans aged 18-24 report having been told they have HTN, compared to 32.3% of Delawareans aged 45-54. Among adults 55 to 64 years and 65 years and older, HTN prevalence increases to 53.1% and 61.0%, respectively. As income increases, HTN prevalence decreases.

Forty-four percent of Delawarean adults making \$15,000 or less per year report having HTN compared to 29.4% of those earning \$75,000 or more per year (DPH, 2018).

Other modifiable diabetes risk factors include elevated cholesterol, poor dietary intake, physical inactivity, and tobacco use. In 2017, 34.6% of adult Delawareans reported being diagnosed with high cholesterol. In 2017, 42.1% of Delaware adults reported eating less than one serving of fruit per day; 65.2% of Delaware adults reported eating less than one serving of dark green vegetables per day. In the same year, 31.0% of the state's adult population reported having no physical activity in the past 30 days other than their regular job (DPH, 2018).

Tobacco use can increase blood sugar, over time leading to insulin resistance. Smokers are 30-40% more likely to develop diabetes than nonsmokers (U.S. Department of Health and Human Services, 2014). Delaware's statewide tobacco use prevalence has declined over the past two decades. From 2011 to 2017, cigarette smoking prevalence among Delawareans declined from 22% to 17.0% (DPH, 2018). For state comparison purposes, 2017 current cigarette use prevalence among adults ranged from a low of 8.0% (Utah) to a high of 26.0% (West Virginia) (CDC, 2018). Yet, the need for continued anti-tobacco public health efforts remains. In 2017, 22.3% of Delaware adults used at least one type of tobacco (cigarettes, cigars, e-cigarettes, smokeless tobacco, hookahs, and/or other tobacco products) (DPH, 2018). Cigarette use prevalence is highest among 25 to 34-year-old Delawareans (26.2%); in 2017, just 13.0% of Delawareans aged 18-24 and 7.7% of Delawareans age 65 and older were current smokers (DPH, 2018). In 2017, 65.6% of Delaware smokers reported having tried to quit smoking within the past year (DPH, 2018). These data highlight the public health opportunity to interface with large numbers of Delawareans who align with the contemplation, preparation, and action stages of the Transtheoretical Model of Intentional Behavior Change Theory (Prochaska, Redding, & Evers, 2002).

Comorbid conditions among Delaware adults with diabetes. Prevalence for additional chronic conditions are higher among Delaware adults with diabetes compared to those without diabetes. In 2017, 16.4% of Delaware adults with diabetes had had a heart attack compared to 2.6% of the Delaware adults without diabetes. Fifteen percent of Delaware adults with diabetes were diagnosed with coronary heart disease or angina, compared to 2.8% of peers without diabetes. Furthermore, among Delaware adults with diabetes, 10.0% have had a stroke and 9.7% were diagnosed with kidney disease, compared to 2.6% and 2.3%, respectively, of Delaware adults without diabetes. These differences in comorbidity rates between Delaware adults with and without diabetes are statistically significant in 2017 (DPH, 2018).

Compliance with disease management recommendations among Delawareans with diabetes. The DHDPCH monitors Delawareans' adherence to annual recommended medical tests and services for people with diabetes (Table 4). In 2017, most Delawareans with diagnosed diabetes were compliant with yearly disease management recommendations including annual HbA1C screening, foot exams, and eye exams with pupil dilation. Smaller percentages of Delawareans with diabetes were compliant with daily and quarterly disease management recommendations. For example, in 2017, only 60.4% of Delawareans with diabetes checked their blood glucose level at least once per day.

Only 35.0% of Delawareans visited their doctor two to three times in 2017 (DPH, 2018). In 2017, only half of all Delawareans with diagnosed diabetes had ever participated in a course or class related to diabetes self-care, representing a need for continued educational outreach among Delawareans.

Table 4: Percentage of Self-Reported Compliance with Diabetes Management Recommendations among Residents with Diabetes, Delaware, 2017

Diabetes Management Recommendation	Percentage of Delawareans with Diabetes Compliant with Recommendation
Received an HbA1-C screening by a doctor one or more times in the past year	92.0%
Been checked by a health professional for sores or irritations of the feet one or more times in the past year	80.9%
Received an eye exam with dilation within the past year	76.9%
Check blood glucose levels one or more times a day	60.4%
Participated in a course or class related to diabetes self-management	50.4%
Visit their doctor 2-3 times per year	35.0%
Visit their doctor 4 or more times per year	33.8%

Source: Delaware Department of Health and Social Services, Division of Public Health, 2018.

Diabetes Prevalence among Delaware Medicaid Enrollees

Identifying Delaware Medicaid enrollees with diabetes. To determine the number of Delaware Medicaid enrollees with diabetes, DMMA analyzed Medicaid claims data from FY17 and FY18. A subset of records was obtained for enrollees with at least one paid diabetes claim during FY17 and FY18. Diabetes claims were operationally defined as those that list a diabetes code as the principal diagnosis code. Enrollee counts are provided for type 1, type 2, and gestational diabetes. A small proportion of enrollees had at least one diabetes claim that was not able to be categorized into a specific diabetes type; these enrollees are captured under the “Unknown Type” column in Table 5. Enrollees with one or more claims indicating more than one type of diabetes were assigned to a single diabetes sub-category; thus, resulting totals in Table 5 reflect the unduplicated number of Delaware Medicaid enrollees with at least one diabetes-based claim during FY17 and FY18.

In FY17 and FY18, respectively, N=13,996 and N=13,532 Delaware Medicaid clients had at least one paid claim with a principal diagnoses of diabetes. Expressed as percentages, 6.0% of Medicaid enrollees had at least one diabetes claim paid in FY17 and 5.7% of Medicaid enrollees had at least one diabetes claim paid in FY18.

In FY17, 411 enrollees had at least one claim with a principal diagnosis of prediabetes and an additional 411 enrollees had a claim involving diabetes screening. In FY18, 610 Delaware Medicaid enrollees had a claim involving prediabetes as a principal diagnosis and an additional 304 enrollees had a claim involving diabetes screening.

Most Delaware Medicaid clients with at least one paid diabetes claim were categorized as having type 2 diabetes. In FY17, 84% of Medicaid enrollees with at least one diabetes claim were determined to have type 2 diabetes. In FY18, type 2 diabetes accounted for 83% of Medicaid enrollees with at least one diabetes claim. Type 1 diabetes accounted for 11% of Delaware Medicaid enrollees with at least one diabetes claim in both FY17 and FY18. Gestational diabetes accounted for 3% of Delaware Medicaid enrollees with at least one diabetes claim in both FY17 and FY18. In FY17 and FY18, 2% of Medicaid enrollees with at least one diabetes claim were not able to be categorized to a specific diabetes sub-type.

Females accounted for a larger proportion of Medicaid enrollees with at least one diabetes claim (60% in both FY17 and FY18). Caucasian Medicaid enrollees accounted for 54% of enrollees with at least one diabetes claim in FY17 and 55% of enrollees with at least one diabetes claim in FY18. The number of Medicaid enrollees with at least one diabetes claim sharply increases after age 35. In FY18, 810 enrollees aged 21-35 had at least one diabetes claim of any sub-type (type 1, type 2, gestational, or unknown); this figure rose to 3,676 among Medicaid enrollees aged 35-50 and 5,825 among Medicaid enrollees aged 51-65.

Delaware Medicaid enrollees with any chronic condition. DMMA also analyzed Medicaid claims data to determine the number of Medicaid enrollees with chronic conditions often associated with diabetes (i.e., as a risk factor or as a comorbid condition). In FY17, 23,259 Delaware Medicaid enrollees had at least one paid claim with a principal diagnosis of hypertension. In the same year, 5,220 enrollees had at least one claim with a principal diagnosis of obesity and 10,702 Medicaid enrollees had at least one claim with a principal diagnosis of heart disease. These frequencies were similar to FY18 when 21,620 Medicaid enrollees had at least one claim for hypertension, 4,839 enrollees had at least one claim for obesity, and 10,535 enrollees had at least one claim for heart disease.

Table 5: Number of Medicaid Enrollees with at Least One Paid Diabetes Claim by Gender, Age, Race, and County, Delaware, FY18

	Type 1 Diabetes	Type 2 Diabetes	Gestational Diabetes	Unknown Diabetes Type	Number Enrollees with Any Type Diabetes	Total Number Delaware Medicaid Enrollees	Pre-Diabetes	Diabetes Screening
Total	1,462	11,298	473	299	13,532	236,507	610	304
Male	687	4,557	5	123	5,372		226	97
Female	775	6,741	468	176	8,160		384	207
<20 Yrs.	236	108	31	60	435		162	69
21-35 Yrs.	220	330	229	31	810		41	64
36-50 Yrs.	474	2,915	213	74	3,676		190	110
51-65 Yrs.	403	5,338	0	84	5,825		183	56
66+ Yrs.	129	2,607	0	50	2,786		34	5
Caucasian	880	6,107	291	161	7,439		329	157
African American	551	4,567	155	119	5,392		252	142
Asian	17	461	24	18	520		22	4
Hispanic	0	1	0	0	1		0	0
Other Race	14	162	3	1	180		7	1
New Castle	762	6,095	269	195	7,321		383	184
Kent	285	2,325	100	44	2,754		108	44
Sussex	401	2,748	94	55	3,298		114	72
Out of State	14	130	10	5	159		5	4

Source: Delaware Department of Health and Social Services, Division of Medicaid & Medical Assistance, 2019

Diabetes Prevalence among Delawareans Covered by GHIP

Identifying GHIP members with diabetes. IBM Watson Health is the SBO's contracted data mining vendor. GHIP claims data was used to identify individuals within the member population who have diabetes or prediabetes. SBO operationally defined diabetes prevalence using three definitions of increasing restrictiveness, referred to as Definitions A-C, are summarized as follows:

- In Definition A, the least restrictive definition, members with any diabetes diagnosis code on a claim during the defined timeframe were considered to have diabetes. Definition A likely includes many false positives, thus artificially inflating true disease prevalence estimates of diabetes among the GHIP member population.
- In Definition B, members were considered to have diabetes if they had a primary diagnosis of the disease on a claim during the defined timeframe. While Definition B is comparatively more restrictive than Definition A, overestimation of true disease prevalence among members remains likely.
- In Definition C, the most restrictive definition, GHIP members were identified as having diabetes if they had experienced a diabetes episode within the defined timeframe (FY17 and FY18). An episode is a summary of care (or, a claims record) related to a condition or disease for a patient; episodes reflect a combination of inpatient, outpatient, and prescription drug treatment for a condition or disease.

GHIP members with prediabetes were defined as those without an indication of diabetes and with a diagnosis of prediabetes, metabolic syndrome, or obesity within the defined timeframe. Table 6 summarizes differences in diabetes and prediabetes prevalence among GHIP members for FY18 when the affected member population is operationally defined using Definitions A, B, and C. Prevalence is expressed in two formats: (a) frequency and (b) rate per 1,000.

In FY18, Definitions A and B identified 25,198 and 16,213 GHIP members with diabetes, respectively. Definition C, the most restrictive definition, identified 12,557 GHIP members with diabetes – a prevalence rate of 94.3 per 1,000 GHIP enrollees. Another 11,061 GHIP members were identified as having prediabetes in FY18.

Thus, using the most conservative definition for identifying diabetes prevalence among GHIP members, the FY18 diabetes prevalence rate was 94.3 per 1,000 members among the GHIP population. The combined prevalence rate for diabetes or prediabetes was 177.3 per 1,000 members among the total GHIP population. The highest rate of diabetes episodes was among the Medicare retiree population (228.5 diabetes episodes per 1,000 GHIP members); this finding is in accordance with the established epidemiological relationship between age and diabetes prevalence.

Table 6: Group Health Insurance Plans (GHIP) Members Identified as Having Diabetes or Prediabetes, Diabetes, FY 2018

	Definition A: Members with Any Diagnosis of Diabetes Number (Rate per 1,000 GHIP Enrollees)	Definition B: Members with Primary Diagno- sis of Diabetes Number (Rate per 1,000 GHIP Enrollees)	Definition C: Members with one or more Diabetes Epi- sodes Number (Rate per 1,000 GHIP Enrollees)	Pre-Diabetes Number (Rate per 1,000 GHIP Enrollees)
Active Employee	12,075 (124.8)	7,276 (75.2)	4,979 (51.5)	8,374 (86.6)
Early Retiree	2,991 (273.5)	1,805 (165.1)	1,225 (112.0)	970 (88.7)
Medicare Retiree	10,020 (394.5)	6,685 (263.2)	5,803 (228.5)	1,753 (69.0)
Total	25,198 (189.2)	16,213 (121.7)	12,557 (94.3)	11,061 (83.0)

Note: Groups overlap due to member movement during the year; therefore, frequencies do not sum to totals.

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

To examine the association between age and diabetes prevalence over time, SBO analyzed diabetes prevalence rates (per 1,000 GHIP enrollees) by age cohort from FY16 through FY18 (Table 7). Regardless of the definition of identifying GHIP members with diabetes (i.e., Definition A, B, or C), diabetes prevalence increased linearly with age. The highest rate of diabetes prevalence was observed among GHIP members age 60 and older (130.8 per 1,000 females and 192.8 per 1,000 males). Diabetes prevalence rates more than double from the age 30 to 39 cohort to the age 40 to 49 cohort (increasing from 20.3 per 1,000 to 52.4 per 1,000 among females and from 25.0 per 1,000 to 77.2 per 1,000 among males). This sharp increase in rates may represent an opportunity to focus among GHIP members aged 30 49 to proactively reduce diabetes risk.

Among younger cohorts (aged 0-17, 18-29, and 30-39), diabetes prevalence rates are similar among males and females regardless of diabetes definition (e.g., Definition A, B, or C). However, among older cohorts, diabetes prevalence rates among male GHIP members are greater than female diabetes prevalence rates. Conversely, FY16 to FY18 prediabetes prevalence rates were greater among females within every age cohort. From FY1 to FY18, diabetes prevalence rates fluctuated slightly among males and females while prediabetes prevalence rates increased among males and females in the age 50 to 59 and 60 and older cohorts. Diabetes prevalence rates among GHIP members increased linearly with age, peaking among adults age 60 and older. Prediabetes prevalence rates did not increase linearly with age; rather, prediabetes prevalence rates peaked among GHIP members in the age 30 to 39 and 40 to 49 cohorts, further emphasizing the opportunity for outreach among these sub-populations.

In FY18, the prevalence rate of diabetes episodes among GHIP members in Sussex County

(66.3 per 1,000) was higher than the comparable rates for GHIP members in Kent and New Castle counties (62.0 per 1,000 and 54.2 per 1,000, respectively). In FY18, the prediabetes prevalence rate among GHIP members in Kent County (103.7 per 1,000) was higher than the comparable rates for GHIP members in New Castle and Sussex counties (84.4 per 1,000 and 82.1 per 1,000, respectively).

Table 7: Diabetes and Prediabetes Prevalence and Prevalence Rates among Active Employee and Early Retiree Group Health Insurance Plan (GHIP) Members by Age Cohort, Delaware, FY16-FY18													
		Definition A (Members with Any Diagnosis of Diabetes): Number (Rate per 1,000 GHIP Enrollees)			Definition B (Members with Primary Diagnosis of Diabetes): Number (Rate per 1,000 GHIP Enrollees)			Definition C (Members with one or more Diabetes Episodes): Number (Rate per 1,000 GHIP Enrollees)			Pre-Diabetes: Number (Rate per 1,000 GHIP Enrollees)		
Age	Sex	FY16	FY17	FY18	FY16	FY17	FY18	FY16	FY17	FY18	FY16	FY17	FY18
0-17	Female	84 (6.8)	85 (6.8)	82 (6.5)	61 (4.9)	62 (4.9)	49 (3.9)	45 (3.6)	49 (3.9)	40 (3.2)	686 (55.2)	639 (51.0)	590 (46.8)
	Male	65 (4.9)	88 (6.5)	86 (6.4)	53 (4.0)	55 (4.1)	59 (4.4)	48 (3.6)	40 (3.0)	43 (3.2)	637 (48.3)	611 (45.5)	549 (40.7)
18-29	Female	256 (23.5)	275 (25.0)	309 (28.7)	145 (13.3)	147 (13.4)	166 (15.4)	92 (8.4)	89 (8.1)	96 (8.9)	1,240 (113.7)	1,217 (110.5)	1,104 (102.4)
	Male	163 (16.0)	226 (22.1)	232 (23.3)	100 (9.8)	132 (12.9)	140 (14.0)	73 (7.1)	104 (10.2)	96 (9.6)	479 (46.9)	506 (49.5)	474 (47.5)
30-39	Female	577 (71.0)	619 (74.7)	624 (75.0)	310 (38.2)	327 (39.4)	305 (36.7)	197 (24.3)	192 (23.2)	169 (20.3)	1,299 (159.9)	1,320 (159.2)	1,290 (155.0)
	Male	383 (67.5)	429 (73.8)	451 (77.6)	225 (39.6)	248 (42.7)	219 (37.7)	161 (28.4)	166 (28.6)	145 (25.0)	467 (82.2)	488 (83.9)	463 (79.7)
40-49	Female	1,330 (137.9)	1,444 (149.3)	1,436 (148.6)	792 (82.1)	823 (85.1)	771 (79.8)	547 (56.7)	539 (55.7)	506 (52.4)	1,484 (153.8)	1,489 (154.0)	1,456 (150.7)
	Male	1,260 (179.2)	1,233 (177.4)	1,334 (193.2)	767 (109.1)	759 (109.2)	770 (111.5)	565 (80.3)	509 (73.2)	533 (77.2)	620 (88.2)	635 (91.4)	611 (88.5)
50-59	Female	2,736 (235.7)	2,991 (258.7)	3,128 (274.5)	1,749 (150.7)	1,853 (160.3)	1,802 (158.1)	1,254 (108.0)	1,270 (109.8)	1,197 (105.0)	1,308 (112.7)	1,367 (118.2)	1,361 (119.4)
	Male	2,591 (301.9)	2,699 (315.5)	2,779 (332.3)	1,628 (189.7)	1,671 (195.3)	1,662 (198.7)	1,181 (137.6)	1,160 (135.6)	1,134 (135.6)	632 (73.7)	677 (79.1)	664 (79.4)
60+	Female	2,352 (315.6)	2,502 (333.1)	2,534 (335.9)	1,512 (202.9)	1,558 (207.4)	1,517 (201.1)	1,053 (141.3)	1,067 (142.1)	987 (130.8)	669 (89.8)	708 (94.3)	702 (93.1)
	Male	2,597 (401.5)	2,749 (421.6)	2,784 (430.7)	1,742 (269.3)	1,802 (276.40)	1,748 (270.4)	1,280 (197.9)	1,308 (200.6)	1,246 (192.8)	411 (63.5)	423 (64.9)	442 (68.4)

Table 7 (cont.): Diabetes and Prediabetes Prevalence and Prevalence Rates among Active Employee and Early Retiree Group Health Insurance Plan (GHIP) Members by Age Cohort, Delaware, FY16-FY18

	Definition A: Members with Any Diagnosis of Diabetes Number (Rate per 1,000 GHIP Enrollees)			Definition B: Members with Primary Diagnosis of Diabetes Number (Rate per 1,000 GHIP Enrollees)			Definition C: Members with one or more Diabetes Episodes Number (Rate per 1,000 GHIP Enrollees)			Pre-Diabetes Number (Rate per 1,000 GHIP Enrollees)		
	FY16	FY17	FY18	FY16	FY17	FY18	FY16	FY17	FY18	FY16	FY17	FY18
County												
Kent	3,482 (130.9)	3,616 (135.7)	3,822 (144.9)	2,310 (86.8)	2,355 (88.4)	2,320 (87.9)	1,728 (65.0)	1,702 (63.9)	1,635 (62.0)	2,822 (106.1)	2,845 (106.8)	2,735 (103.7)
New Castle	6,037 (123.2)	6,494 (131.6)	6,689 (135.7)	3,922 (80.0)	4,085 (82.8)	3,993 (81.0)	2,830 (57.7)	2,845 (57.6)	2,672 (54.2)	4,281 (87.3)	4,301 (87.1)	4,158 (84.4)
Sussex	2,985 (138.9)	3,101 (143.2)	3,241 (149.5)	1,956 (91.0)	2,015 (93.0)	1,993 (91.9)	1,493 (69.5)	1,475 (68.1)	1,438 (66.3)	1,788 (83.2)	1,791 (82.7)	1,781 (82.1)
GHIP Plan												
Aetna CDHP*	---	---	461 (88.6)	---	---	234 (45.0)	---	---	161 (30.9)	---	---	345 (66.3)
Aetna HMO*	---	---	4,209 (138.1)	---	---	2,409 (79.0)	---	---	1,717 (91.7)	---	---	2,794 (91.7)
Highmark FSB*	---	---	9,475 (97.2)	---	---	337 (60.0)	---	---	215 (58.2)	---	---	5,745 (58.2)
Highmark Comp PPO*	---	---	546 (145.5)	---	---	5,931 (91.1)	---	---	4,036 (88.2)	---	---	327 (88.2)

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office 2019.

*Note: FY16 and FY17 prevalence and prevalence rate data by GHIP plan are not presented. Beginning in FY18, changes were made to the available plans, rendering comparisons across time invalid.

Comorbid conditions among GHIP members with diabetes. Comorbid conditions commonly occur among individuals with diabetes. SBO further analyzed GHIP claims data to determine the frequency of comorbid conditions among members who experienced a diabetes episode in FY18 (Table 8). Hypertension, infections, inflammatory conditions, and joint disorders represented the top comorbidities for active employees and early retirees with at least one diabetes episode in FY18. Among GHIP members who experienced a diabetes episode in FY18, 46.6% of active employees and 51.9% of early retirees had diagnosed hypertension. Addressing hypertension among members with diabetes reduces the risk of diabetes complications as well as cardiovascular disease, including heart attack and stroke.

Table 8: Top 10 Comorbid Conditions among Active Employee and Early Retiree Group Health Insurance Plan (GHIP) Members Experiencing a Diabetes Episode, Delaware, FY18

	Number and Percentage of Active Employees with a Diabetes Episode in FY18 Who Also Have Accompanying Comorbid Condition	Number and Percentage of Early Retirees with a Diabetes Episode in FY18 Who Also Have Accompanying Comorbid Condition
Hypertension	2,321 (46.6%)	636 (51.9%)
Eyes, Nose, and Throat (ENT) Infections, Excluding Otitis Media	1,847 (37.1%)	332 (27.1%)
Infection or Inflammation of the Skin or Subcutaneous Tissues	1,640 (32.9%)	429 (35.0%)
Arthropathies / Joint Disorders	1,317 (26.5%)	331 (27.0%)
Respiratory Infections	1,221 (24.5%)	256 (20.9%)
Spinal / Back Disorders, Lower Back	1,027 (20.6%)	287 (23.4%)
Overweight / Obesity	903 (18.1%)	190 (15.5%)
Osteoarthritis	892 (17.9%)	281 (22.9%)
Lipid Disorders	796 (16.0%)	206 (16.8%)
Eyes, Nose, Throat (ENT) Disorders	757 (15.2%)	---
Spinal / Back Disorders, Excluding Lower Back	---	179 (14.6%)

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

Diabetes quality of care metrics among GHIP members. Among individuals with diabetes, effective disease management is essential for slowing and/or preventing diabetes-related complications. National health care quality organizations such as the National Committee for Quality Assurance (NCQA) use performance improvement measures like the Healthcare Effectiveness Data and Information Set (HEDIS) to assess access and quality of care. Two commonly-used NCQA/HEDIS measures related to quality of diabetes care are (a) the percentage of adults with diabetes who receive annual HbA1c testing and (b) the percentage of adults with diabetes who receive annual nephropathy screening. Among active employee and early retiree GHIP members with diabetes, 86% received HbA1c testing and nephropathy screenings in FY18.

CHAPTER 2: THE FINANCIAL IMPACT OF DIABETES IN DELAWARE

In 2017, the total estimated cost of diagnosed diabetes in the U.S. reached \$327 billion, according to the American Diabetes Association (ADA) (ADA, 2018). Approximately \$237 billion was attributable to direct medical costs including inpatient care, prescription medications, physician office visits, diabetes supplies, and nursing facility stays. The remaining \$90 billion reflects indirect costs due to absenteeism, reduced productivity, inability to work, and lost productivity due to premature death (ADA, 2018). Data indicate that diabetes-related costs are climbing sharply; after adjusting for inflation, the economic cost of diabetes in the U.S. increased 26% from 2012 to 2017 (ADA, 2018).

On average, people with diabetes accrue average medical expenditures of \$16,750 per year, of which \$9,600 (57%) is directly attributable to diabetes (ADA, 2018). People with diagnosed diabetes have medical expenditures an average of 2.3 times higher than those without diabetes (ADA, 2018). The lifetime direct medical costs of treating type 2 diabetes and resulting complications for a U.S. male and female diagnosed between ages 45 to 54 is \$106,200 and \$110,400, respectively (Zhuo, Zhang, & Hoerger, 2013). Sixty-seven percent of the cost of diabetes care in the U.S. is provided by government insurance (including Medicare, Medicaid, and the military); private insurance covers 31% of the total cost of diabetes care in the U.S. (ADA, 2018). Early diagnosis, as well as diabetes prevention and management interventions, reduce the risk of secondary chronic conditions and yields substantial cost savings.

Diabetes and prediabetes cost an estimated \$1.1 billion in Delaware each year, reflecting \$818 million in direct medical expenses and \$293 million in indirect costs (ADA, 2018). Reducing preventable health care costs due to diabetes and related complications is especially critical for Delaware. Per-capita health care spending in Delaware is comparatively higher than in other states. In 2014, Delaware ranked highest among all U.S. states in per person prescription drug spending (an average of \$1,525 per Delawarean per year) (Kaiser Family Foundation, 2017). In the same year, Delaware ranked fifth among states for physician and clinical services spending (\$2,259 per Delawarean per year) and sixth among states for hospital care spending (\$4,078 per Delawarean per year) (Kaiser Family Foundation, 2017).

Chapter 3 provides an estimate of the financial impact of diabetes on DHDPCP, DMMA, and SBO. Because the DHDPCP is not a health care service payer, discussion of the financial impact of diabetes on the agency is limited to statewide hospital discharge surveillance data and the diabetes-related programs it funds. DMMA and SBO consider the financial impact of diabetes from a payer perspective.

Diabetes-Related Hospital Admissions and Discharges

The Delaware Health Statistics Center (DHSC), housed within DPH, monitors Delaware hospital discharge data and inpatient care trends. In 2013, Delaware hospitals recorded 1,793 discharges due to diabetes mellitus with complications and 87 discharges due to diabetes mellitus without complications. Collectively, diabetes accounted for 1.7% of all Delaware hospital

discharges. Diabetes was the 10th most-frequent reason for hospitalization among Delaware men and the 17th most-frequent reason for hospitalization among Delaware women (DHSC, 2018). Diabetes accounted for 1.2% of all patients admitted through hospitals' Emergency Departments (EDs) in 2013 (DHSC, 2018). From 2003 to 2013, Delaware's hospitalization rate due to diabetes increased 8.7%, rising from 16.1 hospitalizations per 10,000 to 17.5 hospitalizations per 10,000 (DHSC, 2018). The 2013 average length of inpatient stay for diabetes with accompanying complications was 5.2 days, totaling an average per-patient cost of \$21,389 (DHSC, 2018).

Financial Impact of Diabetes among Delaware's Medicaid Population

To quantify the financial impact of diabetes among Medicaid enrollees, DMMA analyzed inpatient hospital claims data. Inpatient claims in which the principal or admitting diagnosis was related to diabetes were identified for FY17 and FY18. Inpatient claims in which diabetes was listed as a diagnosis data object other than principal or admitting diagnosis were excluded from the query. Thus, the data shown in Table 9 are considered a conservative estimate of the total number and cost of inpatient hospital claims among Delaware Medicaid enrollees in FY17 and FY18. DMMA analysts included only facility claims (not ancillary claims), and included only the latest, paid inpatient claims in the query.

In FY17, 620 Delaware Medicaid enrollees were hospitalized 817 times for diabetes, yielding 3,813 hospital inpatient days (Table 9). The total cost (fee-for-service (FFS) plus MCO) for FY17 diabetes-related hospitalizations reached \$7,493,828.45. The FFS portion of the total cost was (\$1,191,365.03) The remaining balance (\$6,302,463.42) represents expenditures made by the MCOs to the actual service providers. In FY18, 660 Delaware Medicaid enrollees were hospitalized 686 times for diabetes, resulting in 5,097 hospital inpatient days. The total cost of these hospitalizations reached \$7,949,287.59. Fee-for-service paid \$1,261,703.62 toward the total cost; MCOs covered the remaining balance of \$6,687,583.97.

Table 9: Hospitalization Claims Data for Medicaid Enrollees Hospitalized due to Diabetes by Fiscal Year, Delaware, FY17 and FY18

	Number Enrollees Hospitalized due to Diabetes	Number of Hospitalizations due to Diabetes	Total Hospital Inpatient Days due to Diabetes	Total Cost of Diabetes-Related Hospitalizations (FFS and MCO)	Amount Paid by DMMA (FFS)	Amount Paid by MCO
FY17	620	817	3,813	\$7,493,828.45	\$1,191,365.03	\$6,302,463.42
FY18	660	868	5,097	\$7,949,287.59	\$1,261,703.62	\$6,687,583.97

Source: Delaware Department of Health and Social Services, Division of Medicaid & Medical Assistance, 2019.

Nontraumatic lower-extremity amputation (LEA) is a serious complication that may result from diabetic neuropathy (i.e., nerve damage due to elevated blood glucose levels). DMMA analyzed hospital admission data to identify inpatient episodes of diabetes-related LEA.

The Impact of Diabetes in Delaware, 2019

LEA was considered diabetes-related if diabetes was listed on the inpatient claim as at least one of 15 diagnosis code objects. Seventy-seven Medicaid enrollees were hospitalized in FY17 for 88 diabetes-related LEA, yielding 918 hospital inpatient days (Table 10). In FY18, 59 Medicaid enrollees were hospitalized for 66 diabetes-related LEA, yielding 772 hospital inpatient days.

In FY17, the total cost for all diabetes-related LEA reached \$4,298,813. The FFS portion of the cost was (\$793,470) and the remaining balance (\$3,505,343) was paid directly to service providers by Medicaid MCOs. In FY18, the total cost for all diabetes-related LEA was estimated at \$3,340,363; FFS covered \$987,304 in costs. The remaining balance (\$2,353,059) was paid directly to service providers by Medicaid MCOs.

Table 10: Diabetes-Related Lower Extremity Amputations (DRLEA) among Medicaid Enrollees by Fiscal Year, Delaware, FY17 and FY18

	Number Enrollees with DRLEA	Number of DRLEA Occurrences among Enrollees	Total Hospital Inpatient Days due to DRLEA	Total Cost of DRLEA (FFS and MCO)	Amount Paid by DMMA (FFS)	Amount Paid by MCO
FY17	77	88	918	\$4,298,813	\$793,470	\$3,505,343
FY18	59	66	772	\$3,340,363	\$987,304	\$2,353,059

Source: Delaware Department of Health and Social Services, Division of Medicaid & Medical Assistance, 2019.

Financial Impact of Diabetes among GHIP Members

Diabetes is the leading cost driver considering clinical conditions by episodes of care among GHIP members, inclusive of the Medicare population (Table 11). FY18 total allowed amount for diabetes, including net payments from the GHIP and member costs (i.e., copays, coinsurance and deductibles), reached \$64.9 million. Total allowed amount for diabetes-related care was 56% greater than the second-leading episode classification of osteoarthritis.

Table 11: Total Allowed Amount for the Ten Costliest Episode Disease Categories among

Episode Disease Category	FY17 Allowed Amount	FY18 Allowed Amount
Diabetes	\$57,532,452	\$64,898,965
Osteoarthritis	\$42,001,529	\$41,686,868
Hypertension	\$28,807,112	\$30,894,244
Coronary Artery Disease	\$29,671,811	\$29,364,841
Spinal / Back Disorders	\$26,746,412	\$21,779,909
Rheumatoid Arthritis	\$16,369,218	\$19,302,561
Breast Cancer	\$15,056,430	\$18,969,563
Multiple Sclerosis	\$14,245,851	\$17,967,327
Renal Failure	\$19,946,775	\$17,896,466
Cardiac Arrhythmias	\$18,164,869	\$17,705,126

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

In FY18, a total of \$31.4 million was spent by the GHIP on net payments for medical and drug claims for diabetes episodes of care within the active employee and early retiree populations (Table 12). FY18 average net payment per episode of diabetes care was \$4,835 among active employees and \$5,269 among early retirees. Costs related to diabetes episodes of care represented 5.0% of all GHIP net payments made on behalf of active employees and early retirees. In FY18, a total of \$76.1 million was spent by the GHIP on net payments for medical and drug claims for patients with prediabetes in the active employee and early retiree populations, reflecting 12.1% of total net payments for this population. The average net payment for patients with prediabetes in the active employee and early retiree population was \$8,243.

Table 12: Group Health Insurance Plan (GHIP) Net Spending among Active Employees and Early Retirees with a Diabetes Episode of Care or Prediabetes, Delaware, FY18

	Net Payments: Diabetes Episodes	Net Payments: Total	Net Payment per Diabetes Episode	Diabetes Episode Spending as a Percentage of Total Spending
Diabetes				
Active Employees	\$24.7M	\$522.6M	\$4,835	4.7%
Early Retirees	\$6.7M	\$104.1M	\$5,269	6.5%
Active Employees & Retirees	\$31.4M	\$626.7M	\$4,922	5.0%
	Net Payments: Prediabetes Diagnosis	Net Payments: Total	Net Payment per Patient	Prediabetes Spending as a Percentage of Total Spending
Prediabetes				
Active Employees	\$63.7M	\$522.6M	\$7,607	12.2%
Early Retirees	\$12.4M	\$104.1M	\$12,812	11.9%
Active Employees & Retirees	\$76.1M	\$626.7M	\$8,243	12.1%

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

Apart from preventive care visits, active employee and early retiree GHIP members with a diabetes episode of care from FY16 through FY18 utilized health care service categories at rates higher than the total Active Employee and Early Retiree GHIP population (Table 13). For some utilization categories (e.g., office visits and prescription drug scripts), considerably larger utilization rates among Active Employee and Early Retiree GHIP members with a diabetes episode of care may reflect improved quality of and access to care, as well as disease self-management efforts. However, the substantially larger utilization rates for hospital admissions, avoidable admissions, and readmissions increased among the Active Employee and Early Retiree GHIP population with a diabetes episode of care from FY16 to FY18 highlight opportunities for improvements in diabetes management.

From FY16 to FY18, the largest percentage differences in service category utilization between Active Employee and Early Retiree GHIP members with diabetes compared to the total population involved avoidable hospital admissions and prescription drugs.

In FY18, the avoidable hospital admission rate among Active Employee and Early Retiree GHIP members with a diabetes episode of care was 360% greater than the total population of Active Employee and Early Retiree GHIP members (18.4 per 1,000 vs. 4.0 per 1,000, respectively). Similarly, in FY18, the total population of Active Employee and Early Retiree GHIP members received prescription drug scripts at a rate of 9,342 per 1,000 population (or, an average of 9.3 scripts per member per year). In comparison, Active Employee and Early Retiree GHIP members with a diabetes episode of care in FY18 received prescription drug scripts at a rate of 23,713 per 1,000 population (or, an average of 23.7 scripts per member per year), a utilization rate 154% higher than that of the total reference population.

SBO analyzed key cost metrics related to medical and prescription care among the Active Employee and Early Retiree GHIP population for the FY16-FY18 period. In Table 14, cost comparisons are presented for two groups: (i) Active Employee and Early Retiree GHIP members with a diabetes episode and (ii) the total Active Employee and Early Retiree GHIP population. Costs were determined using claims data and are provided for the following metrics: (a) net pay per patient (NPPP); (b) NPPP Medical; (c) NPPP Prescription; (d) NPPP Maintenance Medication; (e) NPPP Hospital Inpatient Admissions; (f) NPPP Complications; (g) NPPP Outpatient Services; (h) net payments per employee per month (PEPM); and (i) net payments per member per month (PMPM). See Table 13, page 33.

For FY16 to FY18, the largest percentage difference in costs of care between Active Employee and Early Retiree GHIP members with a diabetes episode compared to the total Active Employee and Early Retiree population is net pay per patient (NPPP) Prescriptions. During this time, the NPPP prescription costs among Active Employee and Early Retiree GHIP members with diabetes was 150% to 172% greater than the reference population. The costliest expenditure in this population between FY16 to FY18 was NPPP hospital inpatient admissions. NPPP hospital admissions among active employee and early retiree GHIP members were \$40,786 in FY16, \$42,254 in FY17, and \$46,770 in FY18. In comparison, NPPP hospital admission costs among the total active employee and early retiree population were \$28,270 in FY16, \$29,669 in FY17, and \$29,776 in FY18. See Table 14, page 34.

Table 13: Health Care Service Utilization Rates per 1,000 among Active Employee and Early Retiree Group Health Insurance Plan (GHIP) Members with a Diabetes Episode Compared to the Total Active Employee and Early Retiree GHIP Population, Delaware, FY16-FY18

	FY16			FY17			FY18		
	Members with Diabetes	All Members	Percentage Difference	Members with Diabetes	All Members	Percentage Difference	Members with Diabetes	All Members	Percentage Difference
Hospital Admissions	118.2	69.1	71.1%	119.2	68.8	73.3%	121.4	63.2	92.1%
Avoidable Admissions	17.0	5.0	240.0%	15.7	4.2	273.8%	18.4	4.0	360.0%
Readmissions	6.8	3.6	88.9%	6.1	3.4	79.4%	9.3	3.2	190.6%
ER Visits	401.3	270.7	48.2%	379.0	264.7	43.2%	435.3	270.2	61.1%
Preventive Visits	395.9	429.5	-7.8%	401.0	443.9	-9.7%	428.4	459.5	-6.8%
Office Visits	13,416.4	8,498.1	57.9%	13,441.7	8,472.3	58.7%	13,434.4	8,248.2	62.9%
Prescriptions	22,594.1	9,538.8	136.9%	23,089.5	9,478.4	143.6%	23,713.1	9,341.9	153.8%

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

Table 14: Costs of Medical and Prescription Care among Active Employee and Early Retiree Group Health Insurance Plan (GHIP) Members with a Diabetes Episode Compared to the Total Active Employee and Early Retiree GHIP Member Population by Fiscal Year, Delaware, FY16-FY18									
	FY16			FY17			FY18		
	Members with Diabetes	All Members	Percentage Difference	Members with Diabetes	All Members	Percentage Difference	Members with Diabetes	All Members	Percentage Difference
Net Pay Per Patient (NPPP)	\$13,506	\$6,236	116.6%	\$13,606	\$6,221	118.7%	\$14,948	\$6,409	133.2%
NPPP: Medical	\$9,834	\$5,019	95.9%	\$9,901	\$5,038	96.5%	\$10,761	\$5,150	109.0%
NPPP: Prescription	\$4,052	\$1,621	150.0%	\$4,085	\$1,574	159.5%	\$4,583	\$1,681	172.6%
NPPP: Maintenance Medication	\$3,503	\$1,338	161.8%	\$3,645	\$1,327	174.7%	\$4,168	\$1,469	183.7%
NPPP: Inpatient Admissions	\$40,786	\$28,270	44.3%	\$42,254	\$29,669	42.4%	\$46,770	\$29,776	57.1%
NPPP: Complications	\$7,691	\$6,385	20.5%	\$7,705	\$7,769	-0.8%	\$9,487	\$8,034	18.1%
NPPP: Outpatient Services	\$6,326	\$3,396	86.3%	\$6,246	\$3,413	83.0%	\$6,881	\$3,635	89.3%
Net Pay Per Employee Per Month (PEPM)	\$1,719	\$1,154	49.0%	\$1,759	\$1,168	50.6%	\$1,928	\$1,193	61.6%
Net Pay per Member per Month (PMPM)	\$1,172	\$514	128.0%	\$1,194	\$520	129.6%	\$1,312	\$535	145.2%
Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.									

CHAPTER 3: PROGRAMS AND ACTIVITIES AIMED AT DIABETES PREVENTION AND IMPROVED CARE

Diabetes programs and activities implemented by DPH, DMMA, and SBO support improved health among Delawareans' via self-management strategies and increased patient engagement. Increased personal health accountability among Delawareans is the critical component that translates health intervention strategies into improved health outcomes. Diabetes activities especially target the portion of cases attributable to obesity and other behavioral and environmental risk factors. Programs and activities are designed to move Delawareans from disease awareness to healthy lifestyle modification. Activities of highest priority involve (a) increased access and participation in accredited, evidence-based National Diabetes Prevention Program (NDPP) and Diabetes Self-Management Education (DSME) curricula; (b) the continued funding and management of statewide awareness campaigns to reduce diabetes and associated risk factors; and (c) targeted outreach to vulnerable populations of Delawareans.

DPH spearheads, manages, or otherwise participates in activities embedded within a comprehensive statewide diabetes prevention and education approach designed to establish social norms and policies that promote physical activity, healthy diet, and tobacco-free lifestyles. DMMA and SBO work directly with health plans to offer a variety of disease management and wellness programs accessible to members in their preferred setting. DMMA and SBO provide diabetes services to encourage personal health management, empower members to adopt proactive healthy attitudes, and provide those struggling with chronic conditions with the tools they need to effectively manage their diseases. Chapter 3 summarizes current DPH, DMMA, and SBO activities related to diabetes prevention and management in Delaware. Programs and activities are mapped to expected benefits and outcomes.

Public Health Activities and Programs

DPH programs target all three fundamental levels of disease prevention: primary, secondary, and tertiary. Primary prevention aims to prevent disease before it occurs (e.g., empowering Delawareans to reduce their diabetes risk through behavior change; identifying sub-populations at elevated risk for diabetes). Secondary prevention focuses on reducing the impact of existing cases of diabetes, often through timely detection and disease management (e.g., covering the cost of testing supplies for Delawareans through the Delaware Emergency Medical Diabetes Fund). Tertiary prevention seeks to ease the impact of ongoing illness and permanent treatment effects (e.g., providing care coordination services to connect Delawareans with diabetes, and their caregivers, with community-based support resources).

DHDPCP partners with existing DPH programs to increase access to and quality of care for Delawareans with diabetes; one such program is Health Care Connection (HCC). DPH established HCC using funds from the Delaware Health Fund. HCC's mission includes simplifying methods for screening uninsured Delawareans for public program eligibility,

linking vulnerable Delawareans with appropriate financial resources and a medical home, and ensuring a continuum of care (DHSS, 2017). Through HCC, medical services are provided via community-based health centers and private physicians who participate in the Medical Society of Delaware's Voluntary Initiative Program (VIP). HCC works to improve health outcomes by facilitating a more effective use of primary and preventive health services and providing case management and education for those with chronic health conditions such as diabetes, hypertension, cancer, and asthma.

DHDPCP also collaborates with the Delaware Tobacco Prevention and Control Program (TPCP) to address the impact of tobacco use as an established risk factor for diabetes and diabetes-related complications (Tyrberg, et al., 2017). The TPCP is administered by DPH and funded using appropriations from the Delaware Health Fund. The TPCP carries out tobacco prevention and cessation activities across the state, ranging in scale from grassroots educational campaigns to legislative policy change at the state level. The program also conducts ongoing tobacco use surveillance activities to monitor statewide tobacco use trends (DHSS, 2017). The TPCP funds the Delaware Quitline, a telephone-based support resource, to help adult smokers who seek to quit using tobacco. Delaware Quitline services include motivational support from a trained specialist or counselor, follow-up support, and educational information about the quitting process. Delaware Quitline expanded its services to include a web-based service, Quitnow.net (DHSS, 2017).

The DHDPCP collaborates with other state agencies including, but not limited to, the Delaware State Police, Department of Corrections, Department of Education, Division of Aging and Adults with Physical Disabilities, Division of State Service Centers, Division for the Visually Impaired, and the Division of Vocational Rehabilitation. Collaboration among State agencies permits the sharing of programmatic surveillance data, allowing DHDPCP to respond quickly to diabetes-related trends. External partners include the Administration for Community Living, American Diabetes Association, CDC, CHEER Foundation, Christiana Care Health System Blood Pressure Ambassador Program, Delaware Aging and Disability Resource Center, Delaware Aging Network, Delaware Diabetes Coalition (DDC), Delaware Pharmacists Society, Delaware Valley Outcome Research, Easter Seals, Medical Reserve Corp, Million Hearts, National Association of Chronic Disease Directors, National Council on Aging, Quality Insights, Self-Management Resource Center, University of Delaware, Walgreens, and YMCA of Delaware. DPH also maintains collaborations with faith-based organizations, Federally-Qualified Health Centers (FQHCs), hospitals, media outlets, provider offices, and rent-assisted senior housing facilities.

DHDPCP's efforts surrounding diabetes prevention and management are categorized into the following 11 core activities:

- 1. Identify, support and strengthen Delaware health systems utilizing National Quality Forum (NQF) measure 0059 (HbA1c) for quality improvement purposes.**

a. Activities: Using a dashboard methodology, DHDCP collects, identifies, and tracks Delaware health systems and physician practices that utilize and report NQF measure 0059 (A1c). Tracking this specific measure aligns with the National Quality Strategy and represents a nationwide effort to improve health care quality and patient outcomes. Standardized NQF 0059 reporting, through electronic health record systems (EHRs), promotes early identification of diabetes and prediabetes. Consequently, Delawareans identified as having prediabetes or diabetes are linked with appropriate educational materials, community-based resources, and referrals to the Diabetes Self-Management Program (DSMP) and the YMCA Primary Prevention Program.

b. Expected Benefits and Outcomes: Increased EHR adoption and the use of health information technology for improved performance and patient health outcomes.

2. Provide critical diabetes education and awareness messaging among Delawareans with uncontrolled diabetes.

a. Activities: DPH uses DHDCP programmatic surveillance data to develop media campaigns communicating the signs and symptoms of diabetes, as well as the availability of diabetes services, to the public. Earlier diagnoses translate into improved quality of life and reduced health care costs. Media campaigns are created using social-marketing research, demographic data, and health access information; certain components of health media campaigns are translated into Spanish to reach Hispanic Delawareans. Health messages are disseminated via broad media channels (e.g., radio, television, and print media), as well as smaller-scale media channels (e.g., physician information binders, quarterly newsletters, fact sheets, and employer pamphlets). Message saturation is greater in priority regions across the state. Message content includes awareness of diabetes complications and the importance of disease management, including knowing signs and symptoms of blood glucose crisis situations, HbA1c testing, self-monitored blood pressure and glucose testing, healthy nutrition, and physical activity.

b. Benefits and Outcomes: Early identification of individuals with diabetes, improved access to primary care, and increased rates of Delawareans with diabetes who adhere to national testing guidelines.

3. Oversee management of Emergency Medical Diabetes Fund (EMDF) for high-risk Delawareans.

a. Activities: Delaware's EMDF is managed by the DHDCP and administered by staff in the Delaware State Service Centers. The EMDF provides Delawareans in emergency need with prediabetes and diabetes services, medications, testing supplies, and funds for non-insurance reimbursable items directly related to prediabetes or diabetes. The EMDF aims to alleviate or eliminate the diabetes-related emergency condition, reduce health disparities, and improve access to care.

b. Benefits and Outcomes: Increased access to care and improved health outcomes among vulnerable Delawareans at increased risk for negative diabetes health complications.

4. Provide infrastructure and support to the Delaware Diabetes Coalition (DDC).

a. Activities: The DDC provides community outreach services aimed at diabetes prevention and management, unites multiple diabetes- and heart disease-related agencies, disseminates diabetes-related communications, contributes to state- and national- diabetes objectives, and hosts an annual Diabetes Wellness Expo that attracts between 450 and 500 Delawareans. The DHDPCCP provides infrastructure and administrative support to the DDC and furthers the shared mission of DDC and DHDPCCP. Specifically, DHDPCCP staff schedule conference calls, webinars, and meetings; take and disseminate meeting minutes; coordinate reminder notices of all meetings; and facilitate development of the Diabetes Wellness Expo.

b. Benefits and Outcomes: Increased collaboration among stakeholders, continued support for community-based resources such as the Diabetes Wellness Expo and the Resource Guide for People with Diabetes.

5. Utilize pharmacists as health care extenders to promote clinical-community linkages and improve medication adherence among Delawareans with diabetes.

a. Activities: Medication therapy is important for improving the management and control of uncontrolled diabetes, reducing health care costs, lowering the risk of developing complications and, in some cases, premature death. This initiative targets high-risk populations of Delawareans in their community settings, yet it reaches the general population as well. Pharmacists work with patients, physicians, and other health care experts to identify and resolve patient concerns and refer patients for additional diabetes-related follow-up care when appropriate. Promoting self-monitoring and management, such as through pharmacist counseling and medication monitoring, is associated with improved patient health outcomes in areas such as pain management, blood pressure control, anticoagulation and A1c control, and lipid management.

b. Benefits and Outcomes: Increased engagement of community pharmacists in the provision of medication/self-management for adults with diabetes, improved medication adherence among those with prediabetes and diabetes.

6. Facilitate provider access to the annual Diabetes Update, a multi-agency collaboration focused on providing diabetes education among Delaware health professionals.

a. Activities: DHDPCCP annually provides a technological interface so that health providers and professionals across the state can participate in the annual Diabetes Update, a collaboration between the Medical Society of Delaware, Christiana Care Health Systems, and the DDC. This one-day educational opportunity targets regional and national health care professionals, health plans, researchers, and other consultants, and is designed to improve awareness and clinical care outcomes related to diabetes. The overarching objective of the Diabetes Update is to educate participants on the magnitude of the diabetes burden in the U.S. and Delaware. Cross-cutting diabetes intervention strategies and treatment options are presented, and providers learn quality improvement skills to improve patient outcomes. Delaware providers received Continuing Medical Education credits (CMEs) for their successful completion of the educational training.

b. Benefits and Outcomes: Increased engagement of community pharmacists in the provision of medication/self-management for adults with diabetes, improved medication adherence among those with prediabetes and diabetes.

7. Enhance prediabetes awareness and diabetes early identification information among Delawareans through the nationally recognized, gold-standard National Diabetes Prevention Program (NDPP).

a. Activities: NDPP is a yearlong, structured, lifestyle and health behavior change program implemented across the U.S. NDPP is evidence-based, certified by the CDC and endorsed by the Centers for Medicare and Medicaid Services. Impact evaluations demonstrated that NDPP confers a 58% lower risk of developing type 2 diabetes among program participants; among participants over age 60, risk of developing type 2 diabetes is 71% lower among those who complete the program (NIDDK, 2008). NDPP goals include reducing body weight by 5 to 7% and gradually increasing physical activity to at least 150 minutes per week. The DHDP-CP successfully integrated the CDC-recognized lifestyle change NDPP into statewide practice transformation efforts with an overall goal of coordinating provider efforts and maximizing diabetes-related services. The DHDP-CP advocated for the NDPP as a reimbursable service under new health care payment models. As part of this advocacy work, the NDPP was assigned a CPT code to facilitate reimbursement among direct and claims based payers. DHDP-CP also works to increase health provider awareness of the benefit and availability of NDPP.

b. Benefits and Outcomes: Increased referrals to, participation in, and reimbursement for the CDC-recognized NDPP, enhanced prevention of type 2 diabetes, reduction in BMI among Delawareans at high-risk for the development of type 2 diabetes.

8. Evidence-Based Programming and Training for Diabetes Self-Management Education (DSME)

a. Activities: The DHDP-CP promotes evidence-based programs that address diabetes education and management. For people with diabetes, participating in a quality, accredited DSME program delays or prevents complications such as heart disease, stroke, kidney damage, blindness, and diabetes-related lower-extremity amputations. The DHDP-CP manages implementation of the Self-Management Resource Center's (SMRC) DSMP.

This evidence-based program is provided over the course of six 2.5-hour sessions held in community settings such as senior centers, churches, libraries, and hospitals. Delawareans diagnosed with type 2 diabetes attend the programs in groups of 12 to 16 participants. Two lay-trained leaders, at least one of whom has type 2 diabetes, facilitate the programs. Leaders trained by certified Master Trainers or who are Master Trainers deliver program content from a detailed, standardized program manual. The DSME program is designed to help people gain self-confidence with their ability to manage their diabetes and utilize action plans, shared experiences, and problem-solving skills. Participants who complete at least four of the six program sessions are considered to have completed the program. The DHDP-CP also works with hospital-based accredited DSME programs to increase participation among eligible Delawareans.

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b. Benefits and Outcomes: Increased number of Delawareans with diabetes who attend a diabetes self-management education program, increased knowledge of diabetes self-management skills, reduction in diabetes-related health complications and health care costs.

9. Promote Healthydelaware.org as a web-based resource for prediabetes and diabetes-related information and services.

a. Activities: The DHDPCH promotes the Healthydelaware.org website as an online resource for information on hypertension and other modifiable diabetes risk factors, early detection of prediabetes and diabetes, signs and symptoms of uncontrolled diabetes, and how to access the NDPP, the SMRC DSMP, and hospital-based DSME programs.

b. Benefits and Outcomes: Increased referrals to the NDPP and diabetes self-management programs, improved access to local health resources in Delaware.

10. Work-site wellness and Provider Referral

a. Activities: The DHDPCH works to: (1) identify employees at high risk for diabetes, prediabetes, or hypertension within the worksite setting and educate them on the importance of disease prevention and management; (2) teach self-monitoring (i.e. use of blood pressure cuffs and glucose meters), medication adherence, and makes referrals to self-management education programs; and (3) promote healthy lifestyles and utilization of standard preventive exams and/or tests. The work targets companies that employ between 100 and 500 employees and currently have little or no formal health promotion initiatives in place. The project includes facilities in all three counties, identifying locations as worksites with the highest risk populations.

b. Benefits and Outcomes: Early identification of prediabetes and diabetes, improved access to diabetes-related services within the workplace setting.

11. Medication Adherence for Optimal Diabetes Control

a. Activities: The DHDPCH supports work that educates pharmacists and patients on adherence to both drug and non-drug treatments for hypertension (elevated blood pressure) as well as diabetes. This initiative provides opportunities for pharmacist education and patient care projects. The pharmacist education program includes continuing education related to Medication Therapy Management for patients with diabetes and hypertension along with recommended immunizations for this patient population. A patient presentation on “The Dangers of Medication Non-adherence” regarding both treatment and self-management of diabetes and hypertension, is included as a resource. In addition, during community health events, the DHDPCH provides the ADA Risk Assessments and DRAW (Drug Adherence Work-up) tool to identify individuals with diabetes who may not adhere to their medications and who may benefit from additional counseling.

b. Benefits and Outcomes: Provides better blood sugar control through medication adherence for those people who have diabetes and/or hypertension.

Diabetes Prevention and Treatment Programs Available to GHIP Members

The SBO and the State Employee Benefits Committee (SEBC) offer resources at no cost to members. SEBC's goals are to control health care costs, increase patient engagements, and prevent and manage chronic health conditions. Several resources focus directly on diabetes prevention and management while the remaining resources indirectly target diabetes through overall health and wellness promotion (Table 15).

Table 15: Diabetes Resources Available at No Cost to Group Health Insurance Plan Members, by Plan

Highmark Delaware	Aetna HMO	Aetna CDH Gold
▪ National Diabetes Prevention Program (NDPP)	▪ National Diabetes Prevention Program (NDPP)	▪ National Diabetes Prevention Program (NDPP)
▪ Diabetes Program (as part of the Express Scripts Plan)	▪ Diabetes Program (as part of the Express Scripts Plan)	▪ Diabetes Program (as part of the Express Scripts Plan)
▪ Diabetes Care Value Program	▪ Diabetes Care Value Program	▪ Diabetes Care Value Program
▪ Diabetes Education	▪ Diabetes Education	▪ Diabetes Education
▪ 24/7 Informed Health Line	▪ 24/7 Informed Health Line	▪ 24/7 Informed Health Line
▪ Nutritional Counseling	▪ Nutritional Counseling	▪ Nutritional Counseling
▪ Member Website	▪ Member Website	▪ Member Website
▪ Livongo® (available beginning 7/1/19)	▪ Livongo® (available beginning 7/1/19)	▪ Livongo® (available beginning 7/1/19)
▪ Customer Care Advocacy Team (CCMU)	▪ Carelink CareNow	▪ Aetna Health Connections Disease Management Program
	▪ Able To, Inc.	▪ Able To, Inc.
	▪ Simple Steps to a Healthier Life	▪ Simple Steps to a Healthier Life
		▪ Healthy Lifestyle Coaching

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

Note: Non-Medicare GHIP members enrolled in the EyeMed Vision Care plan also have access to the Diabetic Eye Care Benefit.

Resources Available to State of Delaware, Non-Medicare Members Enrolled in Highmark Delaware Plans

1. National Diabetes Prevention Program (NDPP)

a. Activities: The NDPP launched as a Highmark Delaware member benefit in September 2017 with the goal of helping Delawareans prevent type 2 diabetes. The NDPP is a year-long, lifestyle and health behavior change program. The State of Delaware covers the NDPP under preventive care and offers the program at no cost to eligible members. Highmark Delaware members must meet specific criteria to be eligible for NDPP participation. Highmark Delaware partners with two vendors – the YMCA and Retrofit – to offer State of Delaware plan members the choice of participating in the NDPP via an in-person/on-site option or an online/mobile option.

i. YMCA (in-person/on-site format): Over the course of 25 one-hour sessions in a relaxed classroom setting (YMCA branches, community sites, or worksites), a trained Lifestyle Coach teaches participants skills that will help them lead a healthy lifestyle. Topics include nutrition, beginning a physical activity routine,

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overcoming stress, and maintaining motivation for making healthy choices. As added benefits through the YMCA of Delaware, participants receive up to four free months of family membership and an additional eight months at 50% off membership fees.

ii. Retrofit (online/mobile format): Members receive a welcome kit with a wireless scale and activity tracker. Program content is delivered via expert-led online coaching sessions related to nutrition, behavior change, and exercise. Telephone-based support is an option for members without computer access. The Retrofit platform provides moderated online community/peer support; an app- or web-based dashboard for tracking food intake, activity, and weight status; and text-based messaging for personalized coaching.

b. Benefits and Outcomes: Enhanced prevention of type 2 diabetes, reduction in BMI among members at high-risk for the development of type 2 diabetes.

2. Diabetes Program (as part of the Express Scripts Prescription Plan)

a. Activities: Medication compliance and regular glucose testing comprise the foundation of diabetes management. According to 2017 BRFSS data, 27.8% of all Delaware adults with diabetes report currently taking insulin as a component of their disease management protocol (DPH, 2018). Under the State of Delaware prescription plan, diabetes supplies (including lancets, test strips, and syringes/needles) are provided at no cost (e.g., \$0 copay) when the prescription is filled at a retail participating pharmacy or the mail-order-based Express Scripts Pharmacy. Supplies do not need to be ordered at the same time as medications to take advantage of the \$0 copay. Multiple diabetes medications may be obtained for just one copay when the prescriptions are filled at the same time at a 90-day participating pharmacy or the Express Scripts Pharmacy (mail order).

b. Benefits and Outcomes: Improved medication adherence, reduction in the number of members with uncontrolled diabetes, improvement in member health-related outcomes.

3. Diabetes Care Value Program (DCV) (as part of the Express Scripts Prescription Plan)

a. Activities: Highmark Delaware members (beginning in June 2017) can enroll in the DCV, which features a network of pharmacies who work with patients and payers to increase medication adherence while decreasing health care costs. The Mango Health solution (via smartphone app) is available for adult members and is designed to motivate patients and deliver healthier outcomes to contain diabetes costs through patient engagement technologies and quality pharmacy networks.

Beginning in March 2019, Express Scripts members were provided access to StepIn, a free weight management and healthy living program. Members are invited to participate in the program based on criteria in their Express Scripts claim history. The StepIn program helps members take healthy steps to lose weight, feel better, and tackle chronic conditions like high blood pressure, diabetes, prediabetes, and high cholesterol. Participants receive a smart scale, personalized coaching, an easy-to-use mobile app, and more.

b. Benefits and Outcomes: Improved medication adherence, reduction in the number of members with uncontrolled diabetes, improvement in member health-related outcomes.

4. Diabetes Education

a. Activities: Diabetes education provides instruction on the care and treatment of diabetes including foot care, eye exams for diabetes retinopathy, blood sugar monitoring, medication management, and diabetes nutrition counseling. Diabetes education can be performed by physicians or Certified Diabetes Educators (CDEs) in individual or group settings. CDEs are health care professionals who specialize in teaching people with diabetes to develop the necessary skills and knowledge to manage their chronic condition. CDEs are certified by the National Certification Board for Diabetes Educators (NCBDE).

b. Benefits and Outcomes: Increased education among members about the importance of diabetes self-management, improvement in member health-related outcomes.

5. Blues on Call (24/7 Informed Health Line)

a. Activities: As of July 2015, Highmark Delaware members can access a 24/7 staffed Informed Health Line by calling 1-888-258-3428. Registered nurses answer health-related questions and provide medical guidance for specific health problems, including diabetes.

b. Benefits and Outcomes: Increased member access to diabetes self-management resources, increased access to care, reduction in the number of members with uncontrolled diabetes, reduction in avoidable ED visits.

6. Nutritional Counseling

a. Activities: Nutritional counseling is indicated for members with certain diagnoses, including diabetes, malnutrition, eating disorders, and cardiovascular disease. Nutritional counseling services are also advised for members at nutritional risk due to nutritional history, current dietary intake, medication use, or chronic illness. Nutritional counseling benefits are not provided for weight loss in the absence of comorbid conditions or for conditions that have not been shown to be nutritionally related.

b. Benefits and Outcomes: Enhanced prevention of type 2 diabetes, reduction in BMI among members at high-risk for the development of type 2 diabetes.

7. Highmark Delaware Member Website

a. Activities: Through Highmarkbcbsde.com, Highmark Delaware members can access discounts on gym memberships; health and wellness products and services (e.g., fitness footwear, activity trackers, and private weight loss coaching); and alternative health services (e.g., massage, personal trainers, nutrition counseling, yoga, Tai chi, and acupuncture). The member website also includes an extensive library of articles, recipes, and videos created to improve members' 'health smarts' and inspire members to live happier, healthier lives.

b. Benefits and Outcomes: Improvement in member health-related outcomes.

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8. Livongo® Diabetes Monitoring Program (available beginning July 1, 2019)

a. Activities: Beginning July 1, 2019, Livongo® is a free diabetes monitoring program available to employees, pensioners, and their covered spouses and dependent children living with type 1 or type 2 diabetes who are enrolled in an Aetna or a Highmark Delaware health plan. Livongo® provides members with access to CDEs who assist with diabetes management decisions via the Livongo® meter, mobile app, and text. Livongo® Diabetes Response Specialists are available 24 hours a day to answer diabetes questions or to provide real-time acute interventions. Livongo® gives members as many test strips as needed at no cost and even delivers them right to the member's door. Diabetes management information can be shared with the member's PCP, enhancing continuity of care.

b. Benefits and Outcomes: Enhanced management of type 1 and type 2 diabetes and improvement in member health-related outcomes.

9. Customer Care Advocacy Team (CCMU)

a. Activities: Beginning in July 2017, Highmark Delaware members have had access to a dedicated Customer Care Advocacy team (CCMU). The CCMU serves as members' one-call resource for matters related to health care services and health plan coverage. To access the CCMU service, Highmark Delaware members dial 1-844-459-6452 for free, direct access to a Customer Care Advocate. Advocates are trained to answer questions pertaining to health coverage benefits, wellness resources, and billed services. When appropriate, Advocates connect members with a registered nurse or health coach who assist members in establishing a point of accountability for ongoing health management and improvement. This may include creating a care plan specific to members' health needs and goals; ensuring members receive appropriate diabetes services (e.g., HbA1c screening and diabetes eye exams); connecting members with diabetes management resources; and assisting with scheduling appointments.

b. Benefits and Outcomes: Increased member access to diabetes self-management resources, increased access to care, reduction in the number of members with uncontrolled diabetes.

Resources Available to State of Delaware, Non-Medicare Members Enrolled in Aetna HMO and Aetna CDH Gold Plans

1. National Diabetes Prevention Program (NDPP)

a. Activities: The NDPP launched as an Aetna member benefit in January 2018 to help Delawareans prevent type 2 diabetes. The NDPP is a year-long lifestyle and health behavior change program. The State of Delaware covers the NDPP under preventive care and offers the program at no cost to eligible members. Aetna members must meet specific criteria to be eligible for NDPP participation.

Aetna partners with the YMCA to offer the NDPP to State of Delaware plan members in-person/on-site setting. Over the course of 25 one-hour sessions in a relaxed classroom setting (YMCA branches, community sites, or worksites), a trained Lifestyle Coach teaches participants skills that will help them lead a healthy lifestyle.

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Topics covered include nutrition, beginning a physical activity routine, overcoming stress, and maintaining motivation for making healthy choices. As added benefits through the YMCA of Delaware, participants receive up to 4 free months of family membership at the YMCA of Delaware and an additional 8 months at 50% off membership fees.

b. Benefits and Outcomes: Enhanced prevention of type 2 diabetes, reduction in BMI among members at high risk for the development of type 2 diabetes.

2. Diabetes Program (as part of the Express Scripts Prescription Plan)

a. Activities: Medication compliance and regular glucose testing comprise the foundation of diabetes management. According to 2017 BRFSS data, 27.8% of all Delaware adults with diabetes report currently taking insulin as a component of their disease management protocol (DPH, 2018). Under the State of Delaware prescription plan, diabetes supplies (including lancets, test strips, and syringes/needles) are provided at no cost (e.g., \$0 copay) when the prescription is filled at a retail participating pharmacy or the mail-order-based Express Scripts Pharmacy. Supplies do not need to be ordered at the same time as medications to take advantage of the \$0 copay. Multiple diabetes medications may be obtained for just one copay when the prescriptions are filled at the same time at a 90-day participating pharmacy or the Express Scripts Pharmacy (mail order).

b. Benefits and Outcomes: Improved medication adherence, reduction in the number of members with uncontrolled diabetes, improvement in member health-related outcomes.

3. Diabetes Care Value Program (DCV) (as part of the Express Scripts Prescription Plan)

a. Activities: Beginning in June 2017, Aetna plan members have been able to enroll in the DCV, which features a network of pharmacies who work with patients and payers to increase medication adherence while decreasing health care costs. The Mango Health solution (via smartphone app) is available for adult members and is designed to motivate patients and deliver healthier outcomes to contain diabetes costs through patient engagement technologies and quality pharmacy network.

Beginning in March 2019, Express Scripts members were provided access to StepIn, a free weight management and healthy living program. Members are invited to participate in the program based on criteria in their Express Scripts claim history. The StepIn program helps members take healthy steps to lose weight, feel better, and tackle chronic conditions like high blood pressure, diabetes, prediabetes, and high cholesterol. Participants receive a smart scale, personalized coaching, an easy-to-use mobile app, and more.

b. Benefits and Outcomes: Improved medication adherence, reduction in the number of members with uncontrolled diabetes, improvement in member health-related outcomes.

4. Diabetes Education

a. Activities: Outpatient DSME programs are covered for Aetna members with diabetes when such programs meet the following criteria: (i) the program consists of

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of services performed by recognized health care professionals (e.g., physicians, registered dietitians, registered nurses, registered pharmacists); (ii) the program is designed to educate the member about medically-necessary diabetes self-care; and (iii) the program is ordered by the physician treating the member's diabetes and includes a statement signed by the physician that the service is needed.

b. Benefits and Outcomes: Increased education among members about the importance of diabetes self-management, improvement in member health-related outcomes.

5. Informed Health Line (24/7 Nurse Line)

a. Activities: Since July 2015, Aetna members can access a 24/7 staffed Nurse Line by calling 1-800-556-1555 (or via an email link on the Aetna member website). Registered nurses answer health-related questions and provide medical guidance for specific health problems, including diabetes.

b. Benefits and Outcomes: Increased member access to diabetes self-management resources, increased access to care, reduction in the number of members with uncontrolled diabetes, reduction in avoidable ED visits, reduction in diabetes-related health care costs.

6. Nutritional Counseling

a. Activities: Nutritional counseling is indicated for members with certain diagnoses, including diabetes, malnutrition, eating disorders, and cardiovascular disease. Nutritional counseling services are also advised for members at nutritional risk due to nutritional history, current dietary intake, medication use, or chronic illness.

b. Benefits and Outcomes: Enhanced prevention of type 2 diabetes, reduction in BMI among members at high-risk for the development of type 2 diabetes.

7. Aetna Member Website

a. Activities: Through Aetna.com, Aetna members can access discounts on gym memberships, health and wellness products and services (e.g., home exercise equipment), weight loss programs (e.g., Jenny Craig® and Nutrisystem®), and alternative health services (e.g., massage and personal trainers). The member website also includes an extensive library of articles, recipes, and videos created to improve members' 'health smarts' and inspire members to live happier, healthier lives.

b. Benefits and Outcomes: Improvement in member health-related outcomes.

8. Livongo® Diabetes Monitoring Program (available beginning July 1, 2019)

a. Activities: Beginning July 1, 2019, Livongo® is a free diabetes monitoring program available to employees, pensioners, and their covered spouses and dependent children living with type 1 or type 2 diabetes who are enrolled in an Aetna or Highmark Delaware health plan. Livongo® provides members with access to CDEs who assist with diabetes management decisions via the Livongo® meter, mobile app, and text. Livongo® Diabetes Response Specialists are available 24 hours a day to answer diabetes questions or to provide real-time acute interventions. Livongo® gives members as many test strips as needed at no cost and even delivers them right to the member's door. Diabetes management information can be shared with the member's

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Primary Care Provider (PCP), enhancing continuity of care.

b. Benefits and Outcomes: Enhanced management of type 1 and type 2 diabetes and improvement in member health-related outcomes.

9. Simple Steps to A Healthier Life

a. Activities: This interactive online health and wellness program is built upon a themed health journey. Upon completion of the Compass Health Assessment, accessed via the Aetna member website, members receive e-mail encouraging them to address their unique health risks. A suite of online health coaching programs, known as Directions, offer support for wellness and chronic condition management. Participants select a Direction that aligns with their personal health goals, as well as a Journey that best meets their health needs. The average member completes his or her health Journey in 32 days. Journeys include Be Tobacco Free, Blood Pressure in Check, Eat Healthier, Get Active, Healthy Back, Heart-Healthy Cholesterol, Sleep Well, Stress Less, Weigh Less, Health in a Hurry, and Diabetes Life.

Diabetes Life Journeys begin with the premise that each member is his or her own best coach. Diabetes Life Journeys encourage members to adopt and extend new healthy habits in small increments. Program content such as “Team Up with the Pros,” “Master Your Meds,” and “Glucose Sleuth” help members discover ways to live well with diabetes.

b. Benefits and Outcomes: Improved medication adherence, reduction in the number of members with uncontrolled diabetes, improvement in member health-related outcomes.

10. AbleTo, Inc.

a. Activities: AbleTo, Inc. is a national outpatient provider group specializing in behavioral health support. AbleTo, Inc. provides behavioral health treatment to members identified with certain medical conditions (including cardiovascular disease, diabetes, and breast cancer), or who are going through significant life changes. At regular intervals, Aetna provides a member list of potential program candidates to AbleTo, Inc., and their staff contacts members to introduce and explain the services. Members can self-refer to the program by contacting AbleTo, Inc. directly (either online at AbleTo.com/enroll or call 1-866-287-1802).

b. Benefits and Outcomes: Increased access to behavioral health support, improvement in member health-related outcomes.

11. Carelink CareNow (available to Aetna HMO members only)

a. Activities: The Carelink CareNow care coordination program launched in July 2017 and works to maximize the partnership between Aetna HMO members and their health care providers. The Carelink CareNow team consists of a medical director, nurse care coordinators, pharmacists, and social workers. Carelink CareNow staff initiate outreach to Aetna HMO members based on clinical data obtained through EHRs. Members can also call the Carelink CareNow service to initiate the program independently.

The Carelink CareNow team answers members' questions related to medical conditions (including diabetes), medication adherence, and lab tests. For members with diabetes, the Carelink CareNow program staff verify blood glucose control, perform medication reconciliation, and create individualized care plans. Individuals for whom HbA1c results indicate poorly-controlled diabetes, defined as HbA1c > 8.5, are assigned a multidisciplinary team to coordinate evidence-based care in conjunction with members' endocrinologists and primary care providers.

b. Benefits and Outcomes: Reduction in negative lifestyle behaviors among members at high risk for the development of diabetes; improved care coordination among health care providers; strengthened clinical-community linkages; and improvement in member health-related outcomes.

12. Healthy Lifestyle Coaching Program (available to CDH Gold Plan members only)

a. Activities: Launched in July 2015, this program focuses on members' overall well-being by empowering them to make positive and permanent lifestyle changes. The program provides six weekly one-on-one coaching sessions (led by nurses, dietitians, and wellness coaches), and educational materials and web-based interactive tools to help members quit tobacco use, manage weight, deal more effectively with stress, and learn about proper nutrition and physical fitness to help better manage chronic conditions such as diabetes. Coaching sessions take place via telephone, online, or through email. At the end of the six-week coaching session, members may opt to join another group coaching session if they need additional support. To access the program, members log in their member website at Aetna.com or call toll-free at 1-866-213-0153.

b. Benefits and Outcomes: Prevention of prediabetes and diabetes, improvement in member health-related outcomes.

13. Aetna Health Connections Disease Management Program (available to CDH Gold Plan members only)

a. Activities: Beginning in July 2015, the Aetna Health Connections Disease Management Program identifies and monitors members with chronic conditions (including diabetes) and encourages them to close gaps in care via change-management techniques. The program is combined with evidence-based clinical tools and develops individualized actions that motivate and empower members to engage in behaviors that reduce their health risks. Nurses work with members via telephone to address their health conditions using a holistic approach that combines monitoring and education. Members may also self-refer into the program by calling 1-866-269-4500.

As part of the program, alerts are sent to members and/or providers when the following situations arise: (i) a member is a candidate for specific health screening; (ii) a member may require ongoing monitoring due to a health condition or prescribed drug; (iii) a member is taking at least two drugs concomitantly which may result in an adverse side effect; (iv) a member is a candidate for lifestyle modification (e.g., smoking cessation and nutritional counseling); and (v) a member should avoid a certain drug.

b. Benefits and Outcomes: Increased member access to diabetes self-management resources, increased access to care, reduction in the number of members with uncontrolled diabetes, reduction in avoidable ED visits, reduction in diabetes-related health care costs.

Resources Available to State of Delaware Members Enrolled in the EyeMed Vision Plan

1. Diabetic Eye Care Benefit

a. Activities: Aetna members with type 1 or type 2 diabetes are eligible to receive supplemental coverage for additional services from their vision provider. With the Diabetic Eye Care benefit, members can obtain a vision evaluation every six months to monitor for signs of diabetes complications. Subject to provider determination and benefit frequency limitations, eligible members may also receive the following diagnostic testing: retinal imaging, extended ophthalmoscopy, gonioscopy, or laser scanning. Availability of diagnostic equipment and services varies by location. Members are encouraged to call their provider to confirm availability of services.

b. Benefits and Outcomes: Reduction in the number of eye-related diabetes complications among members, reduction in diabetes-related health care costs.

CHAPTER 4: NUMBER OF DELAWAREANS IMPACTED OR SERVED BY DIABETES INITIATIVES

DHDPCP diabetes initiatives address diabetes at a population health level. Through DHDPCP initiatives and activities aimed at reducing diabetes in Delaware, a large segment of the total population receives, or has access to, diabetes prevention and management services. The DHDPCP's efforts to transition the NDPP as a benefit covered by payers have been successful. Highmark BCBS and Aetna enrollees fully cover NDPP services for eligible enrollees. Medicare and Medicaid are finalizing procedures to classify NDPP as a covered benefit for members. Over the next four years, DHDPCP will continue education and legislative efforts around remaining payers who have not yet covered NDPP. Awareness efforts are multi-faceted and ongoing. Statewide mass media health communications designed to reach all Delawareans include information on diabetes symptoms and available resources. Pharmacies and primary care providers across the state partner with DHDPCP to disseminate information about NDPP and DSME services to increase program participation among Delawareans with diabetes or at risk for the development of diabetes.

The GHIP member population has access to multiple diabetes prevention and health management resources. Highmark members access NDPP services via Retrofit or the YMCA. Aetna members access NDPP services through the YMCA. Despite the availability of NDPP services through Highmark and Aetna, FY18 enrollment in NDPP services among the GHIP member population was objectively low (Table 16). SBO, Highmark and Aetna are actively working to increase NDPP enrollment among GHIP members with prediabetes or elevated diabetes risk. Through Highmark and Aetna, the NDPP is available to employees, spouses, dependent children and early retirees (non-Medicare) who meet the following eligibility requirements:

- 18 years of age or older;
- Not pregnant;
- Not diagnosed with type 1 or type 2 diabetes or ESRD (End Stage Renal Disease);
- Overweight (BMI \geq 25; BMI \geq 23 for Asian individuals);

And have ONE of the following:

- Diagnosed within the past year with pre-diabetes by qualifying blood test values:
 - o Fasting blood glucose: 100-125 mg/dL
 - o HbA1c: 5.7-6.4%
 - o 2-hour plasma glucose: 140-199 mg/dL
- Previous diagnosis of gestational diabetes; or
- Qualifying Risk Score (must be 9 or greater) as determined by the risk assessment:
 - o A woman who has had a baby weighing more than 9 lbs. (1)
 - o Have a parent with diabetes (1)
 - o Have a brother or sister with diabetes (1)
 - o Weigh as much as or more than the recommended weight for your height (5)
 - o Younger than 65 years old and gets little to no physical activity in a typical day (5)
 - o Between the ages of 45 and 64 (5)
 - o 65 years or older (9)

Table 16: FY18 National Diabetes Prevention Program (NDPP) Enrollment among Group Health Insurance Plan (GHIP) Members, Delaware, FY18

	Number Enrolled GHIP Members
RETROFIT (<i>Highmark Members Only</i>)	19
YMCA (<i>Highmark and Aetna Members</i>)	38
Total Enrolled	57

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

To quantify the impact of Diabetes Management resources, SBO compared cost and utilization metrics for GHIP members who engage with Diabetes Management services to those of GHIP members with diabetes who do not engage with Diabetes Management services. Aetna HMO's Carelink CareNow program, Aetna CDH Gold plan's traditional case and disease management program, and Highmark's Custom Care Management Unit (CCMU) provided a member list for all beneficiaries engaged with disease management program (DMP) services at some point during FY18. SBO attempted to match plans' member lists with claims data using unique identifiers. The definition of DMP engagement varied between plans, but each included at least contact with a case manager, nurse, or Health Coach to assess health and discuss disease management.

Aetna's Carelink CareNow program identified 298 members who engaged in disease management services during FY18. Members identified with other areas of primary disease management focus (e.g., comprehensive case management, heart disease, or cancer) were excluded from further analyses; however, it is possible that diabetes was a comorbid condition for some of these patients. Therefore, member enrollment in Carelink CareNow for the purposes of diabetes self-management is conservative. Of the 298 members engaged in Carelink CareNow during FY18, 114 were identified as having diabetes and 98 were successfully linked to the claims database of active employees and early retirees. Aetna's CDH Gold plan identified six members engaged in its traditional case and disease management program; all six of these members were successfully identified in the SBO claims database. Because of low program enrollment in Aetna's CDH plan's disease management program, the Carelink CareNow and CDH disease and case management patients were combined to generate member participation rates. A total of 1,207 members engaged with Highmark's CCMU program in FY18; 1,128 members were successfully identified in the claims database of active employees and early retirees. Among GHIP enrollees with diabetes episodes, FY18 diabetes management participation rates were 50.6 per 1,000 patients with diabetes episodes for Aetna services and 242.6 per 1,000 patients with diabetes episodes for Highmark CCMU (Table 17).

Table 17: Diabetes Management Enrollment Rates per 1,000 Patients with a Diabetes Episode, Delaware, FY18

	Number Patients Engaged in Diabetes Management	Patients Engaged in Diabetes Management Per 1,000 Patients with Diabetes Episodes
Aetna (Carelink & CDH Gold)	104	50.6
Highmark CCMU	1,128	242.6

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

Except for preventive visits, and outpatient imaging visits among the engaged Aetna population, service utilization rates among GHIP members engaged in Diabetes Management services were higher than those with diabetes who were not engaged in Diabetes Management services (Table 18). These findings are logical given that members who enroll in Diabetes Management services may be more likely to have poorly-controlled diabetes, thus requiring higher level of care services to achieve a more optimal disease management state. Engaged members in the Highmark CCMU utilized services at a higher rate than engaged members in the Aetna Carelink CareNow program. Of note are the higher rates in hospital admissions and office visits for the engaged members in Highmark's CCMU compared to engaged members in the Carelink CareNow program. A portion of these differences in utilization rates may be attributable to Aetna's comparatively conservative method of identifying claims data attributable to diabetes for members in the Carelink CareNow program.

Table 18: Service Utilization Rates per 1,000 among Group Health Insurance Plan (GHIP) Members who Engaged in Diabetes Management Services Compared to Non-Engaged GHIP Members with Diabetes, Delaware, FY18

Service Category	Aetna Carelink CareNow		Highmark CCU	
	Engaged Members: Utilization Rates per 1,000	Non-Engaged Member: Utilization Rates per 1,000	Engaged Members: Utilization Rates per 1,000	Non-Engaged Member: Utilization Rates per 1,000
Hospital Admissions	244.9	114.8	564.9	46.5
Avoidable Admissions	112.2	22.7	87.7	3.4
Readmissions	30.6	7.0	56.5	2.5
ER Visits	969.4	530.0	1,193.1	267.0
Preventive Visits	336.7	378.5	354.1	392.7
Office Visits	11,949.0	11,752.6	20,826.3	12,998.3
Scripts	30,142.9	23,563.1	36,140.8	23,454.8
Primary Care Provider Visits	6,142.9	2,579.1	8,086.8	4,074.4
Urgent Care Visits	510.2	455.3	379.4	336.7
Outpatient Imaging Visits	3,663.3	3,807.3	6,106.2	3,623.6
Laboratory Visits	1,173.5	1,276.7	2,963.7	1,292.5

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

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Except for outpatient medical costs for non-engaged Aetna members with diabetes, engaged members incurred more costs per patient than non-engaged members for every cost category (Table 19). Among Aetna Carelink CareNow enrollees, the largest percentage difference in incurred health care costs between engaged and non-engaged members involved net pay-per-patient costs due to complications. Among Highmark CCMU enrollees, the largest percentage difference in incurred health care costs between engaged and non-engaged members involved net pay per patient medical costs.

Comparatively higher health care costs among engaged GHIP members may reflect a poorer baseline health status at the time of engagement. As a result, health care costs among engaged members initially may be higher compared to non-engaged members; however, as engaged members' disease management and health status improves, incurred health care costs are expected to decline.

Table 19: Health Care Costs for Group Health Insurance Plan (GHIP) Members with Diabetes who Engaged in Diabetes Management Services Compared to Non-Engaged GHIP Members with Diabetes, Delaware, FY18

Cost Category	Aetna Carelink CareNow			Highmark CCU		
	Engaged Members: Utilization Rates per 1,000	Non-Engaged Member: Utilization Rates per 1,000	Percentage Difference in Costs: Engaged vs. Non-Engaged	Engaged Members: Utilization Rates per 1,000	Non-Engaged Member: Utilization Rates per 1,000	Percentage Difference in Costs: Engaged vs. Non-Engaged
Net Pay Per Patient (NPPP)	\$21,513	\$14,924	44.20%	\$49,121	\$11,033	345.20%
NPPP: Medical	\$13,748	\$9,972	37.90%	\$41,487	\$6,193	569.90%
NPPP: Prescription	\$8,359	\$5,268	58.70%	\$7,891	\$5,117	54.20%
NPPP: Maintenance Medication	\$7,714	\$4,818	60.10%	\$7,090	\$4,677	51.60%
NPPP: Inpatient Admissions	\$50,692	\$38,364	32.10%	\$61,982	\$27,854	122.50%
NPPP: Complications	\$27,602	\$8,842	212.20%	\$15,403	\$4,522	240.60%
NPPP: Outpatient Services	\$5,804	\$6,547	-11.30%	\$19,690	\$5,050	289.90%
Net Pay Per Employee Per Month (PEPM)	\$2,826	\$1,858	52.10%	\$6,584	\$1,442	356.60%
Net Pay per Member per Month (PMPM)	\$1,835	\$1,304	40.70%	\$4,329	\$976	343.50%

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

CHAPTER 5: CURRENT FUNDING LEVELS FOR DIABETES INITIATIVES

Funding for the DHDPCP facilitates Delaware's continued efforts to improve the quality of life for those with or at risk for diabetes. Activities and best practices that address hypertension and high cholesterol concurrently address heart disease burden within the total population. In FY19, the DHDPCP received \$2,106,286 in funding to support statewide diabetes programming activities (Table 20). Most of these funds (\$1,838,886; 87% of program funding) come from federal sources via the CDC 1815 Grant, administered by the CDC. Thirteen percent of programmatic funding (\$267,400) represents state-based appropriations from the Delaware Health Fund. The DHSS Division of Aging and Adults with Physical Disabilities (DSAAPD) also provided \$61,000 in programmatic funding in FY18. All funds dedicated to the prevention, early identification, and treatment of diabetes are managed by DHDPCP.

Table 20: Diabetes and Heart Disease Prevention and Control Program (DHDPCP) Funding Sources and Amounts, Delaware, FY 19

Funding Source	Funding Type	Amount Funded
Delaware Health Fund	State	\$267,400
CDC 1815 Grant	Federal	\$1,777,886
Delaware Division of Aging and Adults with Physical Disability	Federal	\$61,000
Total		\$2,106,286

Source: Delaware Department of Health and Social Services, Division of Public Health, 2019.

SBO does not allocate specific funds for the prevention and treatment of prediabetes and diabetes among Delawareans; rather, SBO builds the cost of diabetes programs and chronic disease management programs into health plan vendor contracts. Payment to health plan vendors is made using funds from the State of Delaware Group Health Fund. Health plan vendors submit to SBO monthly administration invoices that include the cost of National Diabetes Prevention Program (NDPP) fees for enrolled members. After the initial enrollment fee, additional fees are triggered as participants meet pre-defined milestones (i.e., number of lessons/sessions completed and body weight loss). The maximum total cost paid-per-participant ranges from \$555.00 to \$695.00. Highmark Delaware and Aetna use SBO payments to reimburse their subcontracted partners who deliver NDPP services (i.e., Retrofit and YMCA).

Health plan vendors submit to SBO monthly administration invoices that include the cost of disease management program fees for enrolled members. The amount billed for monthly administration invoices fluctuates based on the number of members enrolled per month. Disease Management Program Fees are not specific to diabetes but, rather, reflect the cost of all vendor programs aimed at helping enrolled members achieve optimum control of chronic conditions (include diabetes management). The Disease Management Program Fees vary by vendor and plan between \$6.50 and \$9.25 per member per month and total approximately \$500,000 per month for all members across all plans.

CHAPTER 6: RECOMMENDATIONS AND CONCLUSION

DPH, DMMA, and SBO make the following ten recommendations to further prevent new cases of diabetes and improve health outcomes for Delawareans living with diabetes. While these recommendations emphasize strategies to support the prevention of type 2 diabetes, they facilitate awareness and control of all types of diabetes, including prediabetes, type 1 diabetes, type 2 diabetes, and gestational diabetes. Recommendations are supported by evidence-based research, national standards developed by the AADE and ADA, and peer-state diabetes prevention and management strategies. These ten recommendations are echoed in state agencies' action plans (Figures 2 and 3 of the Appendix).

Recommendation #1:

Increase access and participation in nationally recognized, gold standard National Diabetes Prevention Programs (NDPP) across the state.

Intended Outcomes: Increased access to accredited NDPP will facilitate structured formal diabetes prevention education among Delawareans with prediabetes and associated risk factors, ultimately reducing the prevalence of type 2 diabetes. Improving methods for the identification, recruitment, and retention of high-risk adults from clinical- and community-based settings will increase the proportion of at-risk adults who complete the formal NDPP curriculum.

Anticipated Timeline: June 1, 2019 – May 31, 2024
Estimated Funding: \$300,000 / 5 years (\$60,000 per year)

Recommendation #2:

Increase access and participation in online, accredited National Diabetes Prevention Programs (NDPP) to reduce barriers to participation for high-risk adults.

Intended Outcomes: An online NDPP option will eliminate a variety of participation barriers among Delawareans with prediabetes and associated risk factors. Frequently cited barriers to participation in the multi-session NDPP include financial, transportation, and childcare-related obstacles. The ability to access NDPP program content 24/7 in a preferred setting will increase the proportion of at-risk adults who initiate and complete the formal NDPP curriculum.

Anticipated Timeline: June 1, 2019 – May 31, 2024
Estimated Funding: \$250,000 / 5 years (\$50,000 per year)

Recommendation #3:

Increase promotion and engagement in the National Diabetes Prevention Program (NDPP) and Medicare Prevention Program (MPP) through an on-going comprehensive awareness campaign among State of Delaware Employees and Retirees. The targeted awareness campaign will educate individuals about diabetes signs and symptoms and highlight NDPP and MPP as covered benefits.

Intended Outcomes: This targeted awareness campaign, designed for State of Delaware Employees, will assist in addressing the need for more emphasis on Delawareans' understanding type 2 diabetes, its signs and symptoms and how to prevent it.

Without intervention, approximately 5-10% of individuals with prediabetes develop diabetes each year; a similar proportion of individuals with prediabetes convert back to normal blood glucose levels. Improved understanding of diabetes, as well as increased participation in an accredited NDPP, will allow for a higher proportion of State of Delaware Employees with prediabetes or those at increased risk to prevent progression to type 2 diabetes.

Anticipated Timeline: June 1, 2019 – May 31, 2024

Estimated Funding: \$300,000 / 5 years (\$60,000 per year)

Recommendation #4:

Expand the reach of structured formal Diabetes Self-Management Education (DSME) statewide, including accredited DSME programs (e.g., Self-Management Resource Center's (SMRC) Diabetes Self-Management Program (DSMP) and accredited hospital-based DSMEs).

Intended Outcomes: Increased access to DSME programs and the identification, recruitment, and retention of adults with diabetes from clinical- and community-based settings will reduce Delaware's rates of diabetes-related complications, hospitalizations, and avoidable ED use. Because DSME emphasizes lifestyle modification and reducing or eliminating shared risk factors, these programs will also reduce rates of other chronic diseases such as hypertension and cardiovascular disease.

Anticipated Timeline: June 1, 2019 – May 31, 2024

Estimated Funding: \$250,000 / 5 years (\$50,000 per year)

Recommendation #5:

Increase access and engagement in online, accredited Diabetes Self-Management Education (DSME) programs to reduce barriers to participation for adults with diabetes.

Intended Outcomes: An online, accredited DSME option will eliminate a variety of participation barriers among Delawareans with prediabetes and associated risk factors. Frequently

cited barriers to participation in the multi-session DSME include financial, transportation, and childcare-related obstacles. The ability to access DSME program content 24/7 in a preferred setting will increase the proportion of adults with diabetes who initiate and complete the formal DSME curriculum.

Anticipated Timeline: June 1, 2019 – May 31, 2024
Estimated Funding: \$225,000 / 5 years (\$45,000 per year)

Recommendation #6:

Promote clinical-community linkages to emphasize the importance of receiving recommended medical tests and services for people with diabetes (e.g., HbA1c blood tests, foot examinations, dilated eye exams, dental visits, flu vaccines, and self-monitoring of blood glucose levels via tools such as Livongo®).

Intended Outcomes: Increased adherence to annual recommended medical tests will reduce the number of Delawareans with uncontrolled diabetes and reduce Delaware's rates of diabetes-related complications, hospitalizations, and avoidable ED use.

Anticipated Timeline: June 1, 2019 – May 31, 2024
Estimated Funding: \$250,000 / 5 years (\$50,000 per year)

Recommendation #7:

Leverage electronic health record (EHR) capabilities and other technologies to monitor diabetes management, reduce disparities in health outcomes and improve medication adherence among Delawareans with diabetes and a comorbidity of hypertension.

Intended Outcomes: Delaware payers and providers should capitalize on capabilities afforded through EHRs and other technologies to identify high-risk patients with diabetes and a comorbidity of hypertension who are not currently using statin therapy or, who are not in adherence with prescribed statin therapy. Proper medication adherence will reduce Delaware's rates of diabetes-related complications, hospitalizations, and avoidable ED use.

Anticipated Timeline: June 1, 2019 – May 31, 2024
Estimated Funding: \$250,000 / 5 years (\$50,000 per year)

Recommendation #8:

Create and implement a standardized Diabetes Training Module designed for Community Health Workers (CHWs) in Delaware.

Intended Outcomes: Delaware CHWs will receive standardized diabetes education training, including evidence-based strategies for increasing patient engagement and personal health accountability, via the Diabetes Training Module. CHWs will subsequently disseminate this

information in home and community-based settings for Delawareans to incorporate disease management into daily living. Ultimately, providing CHWs with standardized training via the Diabetes Training Module will improve Delawareans' health outcomes and reduce Delaware's rates of diabetes-related complications, hospitalizations, and avoidable ED use.

Anticipated Timeline: June 1, 2019 – May 31, 2024

Recommendation #9:

Develop and maintain a statewide Delaware Diabetes Registry to monitor diabetes management and reduce disparities in health outcomes among Delawareans with diabetes.

Intended Outcomes: An efficient Delaware Diabetes Registry is an important tool for ensuring systematic and comprehensive care for Delawareans with diabetes. Health equity refers to the equal opportunity for all individuals to attain their optimal level of health. A statewide Delaware Diabetes Registry will assist in identifying sub-groups of vulnerable Delawareans for whom targeted diabetes prevention and management strategies will be developed.

Anticipated Timeline: June 1, 2019 – May 31, 2024

Estimated Funding: \$1,000,000 / 5 years (\$200,000 per year)

Recommendation #10:

Implement a multi-sector approach to promoting physical activity, healthy food and beverage consumption, and healthy weight management (for example, through the national My Healthy Weight pledge).

Intended Outcomes: A comprehensive, multisector approach in which Delawareans are encouraged to adopt healthy lifestyle behaviors has the potential to prevent diabetes, diabetes-related complications, and comorbid chronic diseases. Inter-agency and multisector coordination will increase the number of Delawareans reached through messaging efforts.

Anticipated Timeline: June 1, 2019 – May 31, 2024

Estimated Funding: \$750,000 / 5 years (\$150,000 per year)

CONCLUSION

In 2017, approximately 85,400 Delawareans age 18 or older had ever been diagnosed with diabetes. In addition, approximately 78,000 Delawareans had ever been diagnosed with pre-diabetes. As many as 24,960 Delawareans may have undiagnosed diabetes. Conservatively, 23.8% – nearly one-quarter of all Delaware adults – have diabetes or are at risk for development of the disease. While Delaware's diabetes mortality rate has declined noticeably in recent years, diabetes prevalence is increasing statewide. Delaware must prepare for future increases in diabetes prevalence by ensuring that statewide diabetes prevention and control activities remain robust and fully funded. Diabetes is a manageable disease; in the case of type 2

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diabetes, cases are largely preventable through lifestyle modification. Recommendations endorsed by DPH, DMMA, and SBO promote diabetes prevention, early diagnosis, and comprehensive treatment and disease management. Collectively, these recommendations promote a healthier population, a more productive workforce, and a reduced burden on Delaware's health care system in terms of both staff/resources and of cost, ultimately improving the quality of life among Delawareans with or at risk for diabetes.

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APPENDIX

Figure 2: Diabetes and Heart Disease Prevention and Control Program (DHDPCP) Logic Model to Address the Prevention and Control of Diabetes among Delawareans with an Emphasis on Priority Populations

Category	Short-Term Outcome	Intermediate Outcome:	Long-Term Outcome
Diabetes Prevention (DP)			
DP Strategy 1: Assist health care organizations in implementing systems to identify people with pre-diabetes and refer them to the National Diabetes Prevention Program (NDPP)	Number of patients served within health care organizations with systems to identify people with pre-diabetes and refer them to the NDPP	Number of participants enrolled in the NDPP	Number of people with prediabetes who participate in the NDPP and achieve a 5-7% weight loss
DP Strategy 2: Collaborate with payers and relevant public and private sector organizations within DE to expand NDPP as a covered benefit for Medicaid beneficiaries, as well as state, public, and private sector employees	Number of Medicaid beneficiaries, as well as state, public, and private sector employees who have NDPP as a covered benefit	Number of participants enrolled in the NDPP	Number of people with prediabetes who participate in the NDPP and achieve a 5-7% weight loss
DP Strategy 3: Implement strategies to increase enrollment in the NDPP	N/A	Number of participants enrolled in the NDPP	Number of people with prediabetes who participate in the NDPP and achieve a 5-7% weight loss
Diabetes Management (DM)			
DM Strategy 1: Improve access to and participation in ADA- and AADE-accredited Diabetes Self-Management Education (DSMEs)	Number and proportion of DSME programs available statewide	Increased number of Delawareans with at least one encounter with an accredited DSME program	Improved disease management, operationally defined as a reduction in the proportion of Delawareans with diabetes with HbA1c > 9.0
DM Strategy 2: Expand / strengthen DSME coverage policy among public and private insurers and employers with an emphasis on Medicaid recipients	Increased number of employees / beneficiaries with DSME as a covered benefit	Increased participation among beneficiaries in accredited DSME programs	Improved disease management, operationally defined as a reduction in the proportion of Delawareans with diabetes with HbA1c > 9.0
DM Strategy 3: Increase engagement of pharmacists in the provision of medication management and/or DSMEs via pharmacist-utilized patient care processes	Number of pharmacy locations / pharmacists using patient care processes to promote medication management and DSME for people with diabetes	N/A	Improved disease management, operationally defined as a reduction in the proportion of Delawareans with diabetes with HbA1c > 9.0

Figure 2 (cont.): Diabetes and Heart Disease Prevention and Control Program (DHDPCP) Logic Model to Address the Prevention and Control of Diabetes among Delawareans with an Emphasis on Priority Populations					
Cardiovascular Disease (CVD) Prevention and Management (CVDPM)					
CVDPM Strategy 1: Promote adoption and use of EHRs and HIT to improve provider and patient outcomes for identifying those with undiagnosed and/or unmanaged hypertension	Number and percent of patients within health care systems with systems to report standardized clinical quality measures for the management and treatment of high blood pressure (NQF0018)	Increased medication adherence among patients with high blood pressure and high blood cholesterol	Increased control among adults with known high blood pressure and high blood cholesterol		
CVDPM Strategy 2: Promote adoption of evidence-based quality measures at the provider-level (i.e., dashboard measures to monitor health care disparities and activities to eliminate health care disparities)	Number and percent of clinics or providers that use standardized quality measures to track blood pressure control and cholesterol management among priority populations	Increased medication adherence among patients with high blood pressure and high blood cholesterol	Increased control among adults with known high blood pressure and high blood cholesterol		
CVDPM Strategy 3: Support engagement of non-physician team members (e.g., nurses, nurse practitioners, pharmacists, nutritionists, physical therapists, social workers) in hypertension and cholesterol management in clinical settings	Number and percent of patients in health care systems that have policies or systems to encourage a multi-disciplinary team approach to blood pressure control and cholesterol management	Increased medication adherence among patients with high blood pressure and high blood cholesterol	Increased control among adults with known high blood pressure and high blood cholesterol		
CVDPM Strategy 4: Promote the adoption of MTM (promotion of medication self-management and lifestyle modification) between pharmacists and physicians for the purpose of managing high blood pressure and cholesterol	Number and percent of pharmacists engaged in the practice of MTM	Increased medication adherence among patients with high blood pressure and high blood cholesterol	Increased control among adults with known high blood pressure and high blood cholesterol		
CVDPM Strategy 5: Facilitate use of self-measured blood pressure monitoring with clinical support for patients with hypertension	Number and percent of patients within health care systems with policies or systems to encourage self-monitoring of blood pressure with clinical support	Increased medication adherence among patients with high blood pressure and high blood cholesterol	Increased control among adults with known high blood pressure and high blood cholesterol		
CVDPM Strategy 6: Implement systems to facilitate systematic referral of adults with hypertension and/or high blood cholesterol to community programs and resources (e.g., evidence-based lifestyle programs such as the DPP and CDSMP)	Number and percent of patient in health care systems with high blood pressure and high blood cholesterol referred to an evidence-based lifestyle program	Increased medication adherence among patients with high blood pressure and high blood cholesterol	Increased control among adults with known high blood pressure and high blood cholesterol		
Source: Delaware Department of Health and Social Services, Division of Public Health, 2018.					

Figure 3: Statewide Benefits Office (SBO) Logic Model to Address the Prevention and Control of Diabetes among Delaware Group Health Insurance Plan (GHIP) Members

Inputs →	Activities →	Outputs →	Results-Based Outcomes →			Impact
			Short-Term (1-3 yrs.)	Intermediate (4-6 yrs.)	Long-Term (7-10 yrs.)	
<ul style="list-style-type: none"> State Employee Benefits Committee (SEBC) and Sub-committees Third-Party Administrators (TPAs) and sub-contractors Programs and initiatives Providers Partnerships 	<ul style="list-style-type: none"> On-going data tracking of diabetes prevalence, cost and utilization Continue to promote wise consumerism, wellness and condition management through targeted communications and events Explore and implement ways to further promote quality and cost transparency tools Explore opportunities to expand access to primary care Explore ways to further reduce barriers to accessing care for diabetes Continue to hold medical TPAs accountable for expanding their value-based contracts with providers Explore additional vendor solutions Leverage community-based programs and classes 	<ul style="list-style-type: none"> # of programs and tools offered # of members participating in and completing the prediabetes programs and diabetes management programs # of communications provided # of website page views # of onsite and online trainings offered 	<ul style="list-style-type: none"> Raise awareness Increase knowledge Change attitudes Build skills Increase access 	<ul style="list-style-type: none"> Reduce risk through behavior change (i.e., exam and medication compliance) and modification of risk factors (i.e., weight, nutrition, physical activity, diabetes) 	<ul style="list-style-type: none"> Reduce diabetes and associated co-morbidities in terms of overall cost and utilization 	<ul style="list-style-type: none"> Improved health status Reduced prevalence of diabetes Reduced costs associated with managing diabetes

Source: Delaware Department of Human Resources, Delaware Statewide Benefits Office, 2019.

NOTES

NOTES

The Impact of Diabetes in Delaware 2019

ACTION SIGNS AND SYMPTOMS OF DIABETES

Type 1 Diabetes - sudden occurrence of symptoms

- * Rapid weight loss
- * Extreme hunger
- * Fatigue
- * Frequent urination
- * Excessive thirst
- * Nausea and vomiting
- * High amounts of sugar in the urine and/or blood
- * Irritability and mood changes

Type 2 Diabetes - these symptoms occur gradually, but should receive immediate medical attention. These symptoms increase risk in youth for Type 2 Diabetes.

- * Frequent infections of the skin
- * Itchy skin
- * Blurred vision
- * Drowsiness
- * Slow healing of bruises and cuts
- * Elevated blood sugar
- * Numbness or tingling in the feet, fingers, or legs
- * Recurring skin, urinary tract or gum infections
- * Any of the symptoms of Type 1 Diabetes

Source: American Diabetes Association



DELAWARE HEALTH AND SOCIAL SERVICES

