Diabetes Epidemic & Action Report

Washington State, December 2014

A report to the Legislature in response to Third Engrossed Substitute Senate Bill 5034. This is a collaborative report from the Washington State Department of Health, the Washington State Department of Social and Health Services, and the Washington State Health Care Authority.

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STATE OF WASHINGTON

Dear Washingtonians,

Diabetes is among the leading causes of hospitalization and death in our nation and our state, and the number of people with diabetes is growing to epidemic proportions.

To address this epidemic, the legislature and Governor have issued a call to action. The Department of Health, the Health Care Authority, and the Department of Social and Health Services, as well as many partners around the state, are responding. Those partners include health care professionals, local, state, and tribal agencies, community-based organizations, representatives from education, academia, research, and volunteer organizations, and the pharmaceutical industry.

The enclosed report, as requested by the legislature, is just one part of our response. Many programs, plans, and iniatives are already underway to address the diabetes epidemic. A few noteworthy efforts include:

- The Healthiest Next Generation Initiative (governor.wa.gov/issues/health/healthiest), launched by Governor Jay Inslee in September 2014, focuses on healthy eating and active living among our state's youth.
- In December 2014 Washington State received a grant to fund the Healthier Washington Initiative (hca.wa.gov/hw), which focuses on investing in connections and active collaboration with Washington's communities and providers to produce better health and better care at a lower cost.
- In 2013, the Department of Health released its comprehensive Washington State Plan for Healthy Communities (hcplan.doh.wa.gov), a statewide plan for better health.

These efforts, like the recommendations in this report, promote a proactive, comprehensive approach to life-long health.

This is time to invest in actions and plans that improve the overall health, and reduce the devastation of diabetets, in Washington's population, is now. Join us as we work together to make this generation healthier and the next generation the healthiest.

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Executive Summary

Background

In June 2013, the Washington State Legislature directed the Department of Health, the Department of Social and Health Services, and the Health Care Authority to report on the epidemic of diabetes in the state.

The data for this report were compiled from state sources, notably the Behavioral Risk Factor Surveillance System, as well as extensive literature reviews. In addition, the three authoring agencies invited stakeholders from across the state to a Stakeholder Summit in April 2014 to discuss policy recommendations and actions they believed should be included in this report. Fifty stakeholders representing 25 organizations attended. Later, stakeholders were invited to review and provide feedback on the main body of the report. The final report reflects work by all three authoring agencies, as guided by the stakeholder input.

Diabetes Prevalence

As of 2012, about 640,000 Washingtonians, or 9% of the state's total population, have diabetes. Over one fourth (or 172,000) of those with diabetes are undiagnosed. In addition, over one-third (or 1,871,900) of all adults in Washington have prediabetes, but most do not know it. Uncontrolled diabetes causes kidney disease, blindness, leg ulcers, damaged nerves, amputations, coma, other serious medical conditions, and death. Both gestational and maternal diabetes can create serious threats to mother and baby, including premature birth, preeclampsia (a disorder that occurs only during pregnancy and the postpartum period that can cause death), higher risk of birth injury, or cesarean delivery. Based on 2012 birth certificates in Washington, 6.9 percent of live births were affected by gestational diabetes, an increase from 4.3 percent in 2003.

Cost of Diabetes

Diabetes in Washington led to direct medical expenditures of $3.75 billion in 2012. This is expected to increase to $5.39 billion (in 2012 dollars) 10 years from now. A significant portion of money is spent through the Public Employees Benefits Board (PEBB) and Apple Health. For reference, PEBB manages insurance coverage for state employees, retirees, and their dependents through private health care providers. Apple Health (formerly known as Medicaid) provides medical coverage for Washington's low-income residents. More information about these programs is provided later in the report.

Diabetes Action Plan

There is no known way to prevent type 1 diabetes. This report discusses the significant commitment and costs of lifetime type 1 diabetes management. People with type 1 diabetes require insulin delivered through injections or an insulin pump, as well as healthy eating, active

living, regular medical and preventive care, and self-management. The substansial effort needed to prevent immediate life-threatening and longer-term complications in people with type 1 diabetes cannot be overstated.

Type 2 diabetes – which represents 90-95 percent of cases – is related to modifiable factors such as weight, physical activity, blood pressure, cholesterol, and smoking. There are also factors related to genetics, age, gender, race, origin, and socioeconomic status that affect the likelihood of developing type 2 diabetes. Our tribal populations, some racial and ethnic groups, and lower income Washingtonians have higher than average rates of diabetes, diabetes complications, and deaths from diabetes. The good news is that more than half of cases of type 2 diabetes can be prevented or, once diagnosed, prevented from progressing. Type 2 diabetes is most often managed with a combination of medications (injectable or oral), healthy eating, active living, regular medical and preventive care, and self-management.

The risk factors for type 2 diabetes and the treatments for diabetes (other than insulin injections) intertwine with risk factors and treatments for other chronic diseases, such as cancer and heart disease. Actions that promote good health for all Washingtonians help address all these diseases at once. Also, actions that reach out to people at higher risk of diabetes, or in early stages of its progression, are more effective and cost less.

From these findings, this report recommends 10 goals aimed at slowing and managing the diabetes epidemic. These goals involve ensuring that the people of Washington have opportunity and support to help prevent diabetes from developing, and access to the means of controlling diabetes after it is diagnosed to help avoid more severe health consequences. In addition, the goals aim to enhance the health system as a whole in ways that advance efforts to address diabetes. For each goal, this report also recommends the next steps we should take to achieve it.

The following are the ten recommended goals:

- Ensure all appropriate populations have access to the Diabetes Prevention Program in Washington.
- Increase access to safe and affordable active living where people work, learn, live, play, and worship across their lifespan.
- Increase access to healthy foods and beverages where people work, learn, live, play, and worship.
- Ensure all people with diabetes receive self-management education from a Diabetes Education Program.
- Ensure people with diabetes and gum disease have access to guideline-based oral health treatment.
- Enhance care coordination for people with both diabetes and mental illness.
- Ensure all appropriate populations have access to Chronic Disease Self-Management Education programs in Washington.
- Ensure involvement of Community Health Workers to address diabetes in populations with the greatest needs.
- Increase stakeholder involvement in policymaking that pertains to diabetes.
- Support the Plan for a Healthier Washington's investment in Analytics, Interoperability & Measurement.

Introduction

About This Report

In 2013, the Washington State Legislature passed, and the governor signed, Third Engrossed Substitute Senate Bill 5034, making operating appropriations for the state's 2013-2015 biennium. Among other things, this bill directed the Department of Health, the Department of Social and Health Services, and the Health Care Authority to work together to produce a report on the epidemic of diabetes in Washington.

The legislation requested information on the number of lives impacted by diabetes in our state and the financial impacts, including impacts on the various programs administered by these agencies. It also requested an assessment of the programs and benefits aimed at preventing or controlling the disease, and a description of the coordination between them. Finally, it sought recommendations for policies and actions to battle diabetes, with budget estimates. For the full text of the legislation, see Appendix 1.

Section 1 of this report lists the recommended goals and action steps. Section 2 briefly explains what diabetes is and how it is treated. Section 3 describes the human impacts of diabetes in Washington, including how many people are affected and who is most likely to be affected. Section 4 discusses the resulting financial impacts. Section 5 lists the many programs and services that respond to or are impacted by diabetes.

These sections summarize many of the issues surrounding diabetes. For references, supplemental data, more detailed explanations, and additional information, see Appendices 2-5.

Overview

Diabetes is a leading cause of death in our nation. It cannot be cured, but with proper treatment it usually can be controlled and managed so that it does not progress to the point of severe medical complications. Treatments vary; some patients require insulin continuously, while others need only oral medications or can self-manage the condition without medications. One essential treatment is a healthy lifestyle, including healthy eating and active living, which helps every person with diabetes to control it and helps prevent others from developing type 2 diabetes.

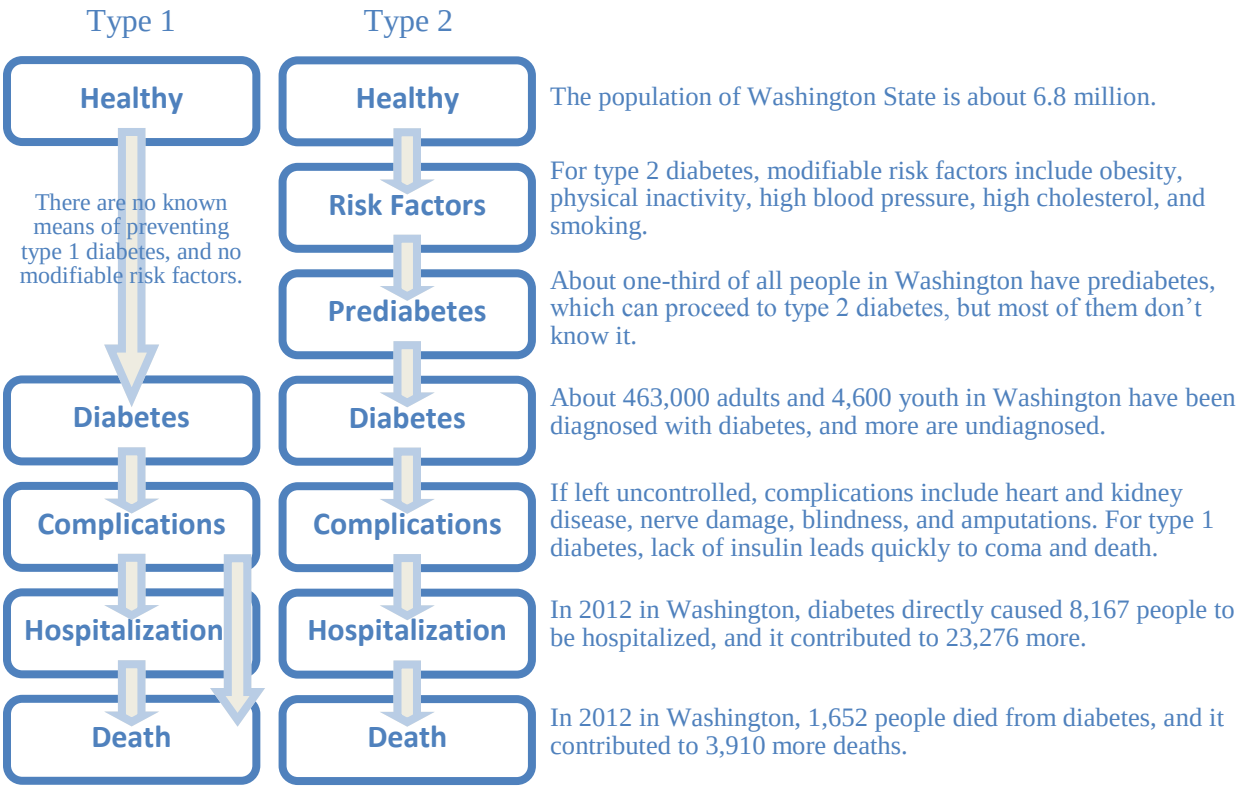
The risk factors for chronic diseases – type 2 diabetes as well as cancer, heart disease, and high blood pressure – are intertwined. Actions that address the physical, environmental, social, and emotional factors that promote good health for all Washingtonians help address all these diseases at once. Actions that identify and reach out to people who are at higher risk of diabetes or who are in the early stages of its progression will be more effective and cost less than waiting to treat the health consequences of uncontrolled diabetes. Some of these actions are recommended in this report.

The Progression of Diabetes

To understand diabetes, it is critical to understand that diabetes is a progressive disease. It progresses step-by-step: from healthy, to risk factors that may not immediately impact health (for type 2), to prediabetes (for type 2), to diabetes, to complications from diabetes, to hospitalization required because of those complications, to death. Each step brings more severe health consequences, more difficult medical interventions, and more cost. The key treatment objective at every step is to prevent the disease from progressing to the next step.

The following graphic, though simplified, represents the steps in this progression. Throughout this report, smaller versions of this graphic indicate which steps are primarily related to a given topic. Each arrow between the steps represents an opportunity to intervene – to prevent the impact of diabetes becoming worse, to enhance human health and well-being, and to save money.

Figure 1: The Progression of Diabetes



At every step, preventative treatment, including healthy eating and active living, can stop the further progression of diabetes.

Section 1: Goals and Recommended Actions

As described in this report, in the years ahead, Washington faces a tsunami of costs and complications from diabetes. However, there is hope. With appropriate resources, we are well poised to respond to this epidemic – and to reduce future suffering and reduce the increasing rate of spending due to diabetes – because of the investments in effective prevention that our state agencies and partners have already made. With federal, state, local, and partner funding, we have started to build systems that can not only diagnose an individual, but can also help large portions of the population prevent and control chronic diseases.

Out of the range of many possible actions going forward, the agencies that prepared this report, in consultation with stakeholders, identified 10 major long-term goals that would prevent and drive a reduction in the impact of diabetes in Washington. Below each one, we have listed the recommended next steps. These goals are grouped by the populations impacted: People with Prediabetes, People with Diabetes, or All People in Washington.

One limitation of this report, and its recommendations, is the scope set by the authorizing legislation. The recommendations below all involve one or more of the agencies tasked with producing the report. Other agencies with policies that directly impact youth and adults with diabetes include:

- Office of Superintendent of Public Instruction
- Office of the Insurance Commissioner
- Health Benefits Exchange
- Department of Corrections
- Department of Transportation
- Department of Early Learning

These agencies are not directly addressed in these recommendations. One of the recommendations below includes expanding stakeholder involvement in setting future policy, which can help expand the scope for greater policy reach.

This report serves as the beginning of a conversation. Upon review of the recommendations by the governor's office and the legislature, agencies will provide specific cost estimates on the next steps to be implemented.

Prevention Goals

A. Ensure all appropriate populations have access to the Diabetes Prevention Program in Washington.

Population impacted: Adults with prediabetes, an estimated one third of adults in Washington.

Recommended next steps:

a) Develop a pilot project proposal, to be designed jointly by the Department of Health and the Health Care Authority, to test enrollment of a subset of the Washington Apple Health (formerly Medicaid) population in the existing Diabetes Prevention Program.
b) Develop a budgetary proposal to fund a sufficient sample population for the pilot, so the results can provide necessary financial and health outcome information to assess the impact on costs and return on investment.
c) Use the results of this evaluation to inform future legislation and budgets for Apple Health policy.

Why? Diabetes rates are higher among low-income Washington residents, most likely because they have less access to health care and healthy living choices. Preventing diabetes is far more cost-effective – and better for one's well-being – than controlling it later. PEBB already offers the Diabetes Prevention Program to many eligible enrollees in its population through the SmartHealth program. Offering the same program to Apple Health enrollees would help the population that needs it the most, and curb future Apple Health costs.

What else is needed? All adults in Washington would benefit from access to the Diabetes Prevention Program. All health insurers in Washington should be encouraged to offer it, or a similar evidence-based program, to their enrollees. Other mechanisms to provide access to the program for those without health insurance should also be pursued.

B. Increase access to safe and affordable active living where people work, learn, live, play, and worship across their lifespan.

Population impacted: All Washingtonians.

Recommended next steps:

a) Promote the establishment, improvement, and use of indoor and outdoor spaces that are safe, tobacco free, accessible, and appropriate for play and physical activity.

b) Maximize opportunities to safely be physically active in daily transportation such as by walking or biking to school or work, through community design and transportation planning.
c) Increase active time in early learning sites and physical education in schools.

All

Why? This goal directly supports the Healthiest Next Generation Initiative. Access to regular physical activity is essential for preventing diabetes, prediabetes, and diabetes complications. Too few people, with and without diabetes, meet the recommendations for physical activity. This contributes to and complicates obesity, a major risk factor for diabetes. While medications for people with diabetes are available to all people with health insurance, multiple barriers exist to people's regular uptake of recommended levels of physical activity, which can be as or more effective than medications and which enhances the effects of medications to manage diabetes.

What else is needed? Although much progress has been made on physical activity environments in the past several years, we continue to see policies and environments that do not support an active lifestyle for children and adults. The Governor's Healthiest Next Generation Initiative has shone a spotlight on the issue of healthy weight among children. This multi-disciplinary, public-private collaboration will identify and champion specific policies that support community-led changes to promote active living. Current recommendations include Safe Routes to School, complete streets, school curriculum enhancements, recess, and additional early learning requirements and training.[1] Additionally, physical activity opportunities need to be culturally relevant and include persons of all abilities in order for all populations to partake of them.

C. Increase access to healthy foods and beverages where people work, learn, live, play, and worship.

Population impacted: All Washingtonians.

Recommended next steps:

a) Ensure healthy foods and beverages, including water, are available in schools and early learning facilities.
b) Include healthy eating concepts and language in municipal policies and tools such as comprehensive plans, zoning, ordinances, permits, and licensing rules.
c) Promote affordable healthy food and beverage options in corner stores, including ensuring the ability to accept WIC/SNAP.
d) Improve mechanisms for purchasing foods from farmers' markets and farms, including ensuring the ability to accept WIC/SNAP and farm-to-institution programs.

All

Why? Like Goal B, this goal also directly ties to the Healthiest Next Generation Initiative. Preventing unhealthy weight gain, and assistance

with achieving healthy weight, is key to diabetes prevention and management. While many communities have a grocery store that provides healthy food, many areas do not have readily accessible health food options. Many neighborhood convenience stores offer few if any healthy foods and drinks. For the many low-income residents of our state, access to affordable healthy foods is out of reach.

What else is needed? National priorities on school foods have played a large part in improving school food and beverage options. The Office of Superintendent of Public Instruction and schools around the state are working to enact the provisions of the Healthy Hunger Free Kids Act.[2] The Governor's Healthiest Next Generation Initiative has developed recommendations for healthy eating among children that include fruit and vegetable purchases through the Basic Food program, staffing the Food Systems Round Table, increasing voluntary breakfast programs and water bottle filling stations in schools, and adding early learning requirements and training.[1] Feedback from parents, such as allowing sufficient time for both healthy meals and recess, needs to be incorporated into these policies. For all people with diabetes, better management is assisted when nutritional information is readily available at all points of purchase, and includes total calories, grams of carbohydrates, fats, protein, and sodium.

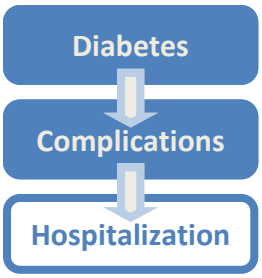
Treatment and Management Goals

D. Ensure all people with diabetes receive self-management education from a Diabetes Education Program.

Population impacted: Youth and adults with diabetes of all types in Washington.

Recommended next steps:

a) Require the Health Care Authority and the Department of Health to jointly develop a plan to increase appropriate use of the existing Diabetes Self-Management Education benefit in Apple Health and PEBB by October 2015.



Why? Diabetes Self-Management Education provided by a trained Diabetes Educator is already included in Apple Health and PEBB benefits. However, this benefit is not being utilized sufficiently to control diabetes in these populations. Connecting enrollees with diabetes to Diabetes Education Programs that are already approved to bill Medicaid through existing programs would yield better outcomes and costs, without the need to add or enhance existing benefits. This benefit, provided one-on-one or in a small group, is distinct from self-management education classes, such as the Chronic Disease Self-Management Program discussed below. The Health Care Authority and the Department of Health should continue to work to make sure more people with diabetes get the individual, specific diabetes education they need. In particular,

attention to the population that is dual-eligible for both Apple Health and Medicare can yield improved control and care for elderly and disabled people with diabetes.

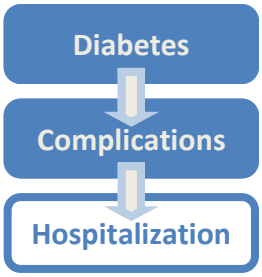
What else is needed? By working with private and public partners, such as managed care organizations, quality improvement organizations, diabetes educators, health systems, and health care providers, use of existing resources can be maximized to connect all people with diabetes in Washington to this guideline-based service. These same partnerships can be used to increase appropriate use of other essential preventive care services for people with diabetes, such as routine eye screening to diagnose diabetic retinopathy (damage to the blood vessels in the retina) and prevent further progression of the disease in the eye, and screening for end-stage renal disease.

E. Ensure people with diabetes and gum disease have access to guideline-based oral health treatment.

Population impacted: Youth and adults with diabetes of all types in Washington.

Recommended next steps:

a) Direct Apple Health to evaluate the expansion of treatment of periodontal disease among people with diabetes to align with the American Dental Association recommendations.
b) Direct, and if needed, provide supplemental funding for, the Health Care Authority to analyze dental and medical data within the PEBB population, so that accurate estimates of potential costs savings can be calculated.



Why? Nearly every potential complication of diabetes is commonly screened for, detected early, and treated – except that oral health problems, such as periodontal disease, are not. Problems with oral health may worsen diabetes control and lead to more costly problems. Apple Health can realize improvements in enrollee health and costs by providing this enhanced benefit to enrollees who need it. PEBB has both medical and dental data for its population that is difficult to analyze, and to do so would require additional time and funding.

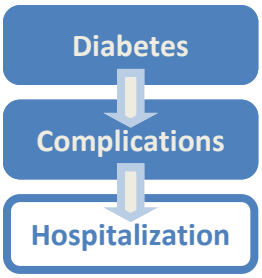
What else is needed? Apple Health enrollees need more access to dentists and oral health professionals. Health professionals and consumers need more information about the connections between oral health and diabetes. Public-private partnerships between the Department of Health, the Department of Social and Health Services, the Health Care Authority, and oral health stakeholders, such as providers and payers, should be enhanced. Additionally, all residents of Washington with diabetes need adequate oral health care.

F. Enhance care coordination for people with both diabetes and mental illness.

Population impacted: Youth and adults with diabetes of all types in Washington.

Recommended next steps:

a) Continue to support and enhance existing initiatives, such as the Health Home Program and those established in Senate Bill 6312 (2014), which recognize the importance of managing mental health along with physical health for people with, or at high risk for developing, diabetes.
b) Continue to identify resources for co-located services and other methods that lead to better care coordination for people who have a mental health diagnosis in addition to diabetes.
c) Support the Plan for a Healthier Washington's regionally responsive payment and delivery systems, which are driven by integrated purchasing of physical and behavioral health care.
d) Support availability of evidence-based programs, such as diabetes self-management education and chronic disease self-management, to the population of people with both diabetes and a mental health diagnosis.



Why? Even uncomplicated mental health conditions, such as mild depression or anxiety, can reduce a person's ability to control and self-manage diabetes. Serious mental illness can greatly compromise diabetes care. For example, anti-psychotic medications alter metabolism and can lead to the development of prediabetes, diabetes, high cholesterol, high blood pressure, and weight gain. Even when patients with a mental health diagnosis are doing their best to be physically active and eat well, these health issues can occur.

Compared to people with diabetes only, people with both diabetes and a mental health diagnosis are less likely to take their medication as prescribed, more likely to be impaired by or have complications of diabetes, have higher health care costs, and have an increased risk of early mortality. Coordinated care that addresses both mental and physical health can prevent or reduce these problems.

What else is needed? The providers who will deliver integrated services to this population need more education about the interactions of mental health issues and chronic disease. Mental health providers need training in diabetes self-management support, and physical health providers need to understand how best to treat people with mental health conditions. Both need to know how to better coordinate care. The Department of Health, the Department of Social and Health Services, and the Health Care Authority should partner with other public and private organizations to provide this education, through systems outlined in the

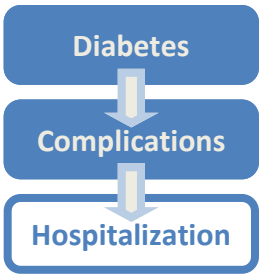
Plan for a Healthier Washington. All people with diabetes grapple with emotional aspects of having a chronic health condition, and benefit from screening for mental health and substance abuse in primary care according to the same guidelines as the general population.

G. Ensure all appropriate populations have access to Chronic Disease Self-Management Education programs in Washington.

Population impacted: Adults with diabetes in Washington.

Recommended next steps:

a) Develop a proposal to make Chronic Disease Self-Management Education programs available to all adults covered by Apple Health and PEBB.
b) Remove barriers to coverage that are limiting the number of Apple Health and PEBB enrollees who are using currently available education programs.



Why? Research demonstrates that quality self-management of diabetes contributes to better health outcomes and cost savings. Diabetes Self-Management Education provided by a diabetes educator is one essential piece of this, but another key piece is the Chronic Disease Self-Management Education (CDSME) programs, a suite of evidence-based group classes created by Stanford University Medical School's Patient Education Center that effectively – and cost effectively – teach people how to self-manage their diabetes. These programs are general education on chronic disease management, and they complement more specific and individualized diabetes education.

Currently only PEBB enrollees covered by Group Health have access to CDSME programs through their health plan. The majority of PEBB and Apple Health enrollees do not have access to CDSME programs as part of their health plan coverage. These programs are also available at low- or no-cost in communities across the state through other means. However, federal funding for this service ends August 2015, at which point the availability will sharply decline unless other sources of funding are identified. Expanding availability of the programs to all Apple Health and PEBB enrollees would allow more people to benefit from them.

What else is needed? Access to the CDSME programs would be valuable to all Washington residents, not just Apple Health and PEBB enrollees. All adults with chronic health conditions would benefit from these and other evidence-based education programs. Implementation of the Plan for a Healthier Washington should include consideration of how these programs could be funded and administered at the regional level. One possibility is regional funding structures in which all health plans, including Apple Health and PEBB plans, could participate. Urgent solutions to funding of these programs is needed until regional structures could take over this role, however.

H. Ensure involvement of Community Health Workers to address diabetes in populations with the greatest needs.

Population impacted: Adults and youth with prediabetes and diabetes in populations that experience disparities in diabetes prevalence, care and outcomes.

Recommended next steps:

a) Ensure that the services of Community Health Workers are included among the health services eligible for payment, regardless of which payment model is used.
b) Use a combination of public health and health systems funding at a regional level, in alignment with the Plan for a Healthier Washington, to ensure that Community Health Workers are available where needed.

All

Why? Community Health Workers play a key role in the health care system. As a trusted member of a community, they are well placed to work with hard-to-reach populations including those with higher rates of diabetes, more risk factors for developing type 2 diabetes, and more diabetes complications than average. For this reason, research suggests they can positively impact diabetes rates and complications.

What else is needed? We need greater efforts to support community health workers overall. Some community health workers may go on to join the ranks of health professionals, increasing the diversity of the health care workforce, while others may find financial stability through a continuing role in this essential community work. No matter the funding structure, it is essential to not underfund community health workers and the organizations that employ them. Using community health workers to address diabetes prevention and management is one strategy that can be tailored for use in populations that are culturally and linguistically different from the dominant culture. Other strategies to improve diabetes health equity include increasing the cultural and linguistic competence and relevance of self-management and prevention programs, as well as providers.

Health System Goals

I. Increase stakeholder involvement in policymaking that pertains to diabetes.

Population impacted: Youth and adults with diabetes of all types in Washington.

Recommended next steps:

a) Expand the Diabetes Network Leadership Team to include more stakeholders, including those representing youth and adults with type 1 diabetes.

b) Ensure state agencies with ability to impact diabetes prevention and care, including Office of the Superintendent of Public Instruction, Department of Corrections, Department of Services for the Blind, Department of Early Learning, Department of Transportation, and others, are represented on the Diabetes Network Leadership Team.
c) Ensure the Diabetes Network Leadership Team has an ongoing role in providing recommendations and data to further the goals identified in this report.
d) Encourage private partners, such as researchers, non-profit organizations, and health systems, to be represented on the Diabetes Network Leadership Team.

All

Why? There is no need to create a new commission or group to advise the state on diabetes policy. Rather, we can encourage expansion and greater membership in the Diabetes Network Leadership Team already convened and facilitated by the Department of Health.

What else is needed? Diabetes Network Leadership Team members must identify actions needed by all organizations involved in diabetes management and prevention. Such actions would be wide-ranging, and have the potential to identify and solve problems experienced by youth, adults, and elders in our state who have diabetes of all types and are at greatest risk of complications. The Diabetes Network Leadership Team was founded to guide not only the state in its actions, but also systems of care and payment. Many excellent recommendations emerged from stakeholders during the process of writing this report, and they cannot all be addressed by governmental action. The Diabetes Network Leadership Team, which is non-partisan and serves all populations in the state, is an ideal platform for establishing achievable objectives to improve diabetes care and minimize the impacts of diabetes on all Washingtonians.

J. Support the Plan for a Healthier Washington's investment in Analytics, Interoperability & Measurement.

Population impacted: All Washingtonians.

Recommended next steps:

a) Increase participation of health care purchasers and payers in the All Payers Claims Database.
b) Financially support efforts to develop and maintain population health data systems that collect, analyze, interpret, and report on diabetes risk behaviors, risk factors, care practices, morbidity, and mortality.
c) Support enhancement of information exchange and extraction capacity for data to drive local health decisions, support care delivery, and increase clinical-community linkages to improve health outcomes for people with diabetes.
d) Leverage and bridge to the Healthier Washington common performance measures set and other performance measurement strategies, to inform purchasing and benefit design.

These strategies include legislatively mandated outcomes-based performance measures such as in SSSB 5732 (improving behavioral health services), ESHB 1519 (establishing accountability measures for certain health care coordination services), 2SSB 6312 (concerning state purchasing of mental health and chemical dependency treatment services), and E2SHB 2572 (concerning the effectiveness of health care purchasing and transforming the health care delivery system).

e) Identify ways to ensure more consistent and accurate collection and coding of data so that differences among and between populations can be identified, with particular attention to diabetes types. This will allow type 1 diabetes, type 2 diabetes, gestational diabetes, and prediabetes to be better tracked and reported. Ensure data collection supports the ability to identify and decrease health disparities in diabetes prevention, screening, care and management.

All

Why? With better and more complete health information, such as de-identified clinical data on the impacts of different interventions, we can make better decisions about diabetes care and prevention. Improvements in health information technology, when they include the right measures, can help guide both policy-makers and individual patients and doctors. Right now, much of the data we need to drive decisions is stuck in silos. We need to ensure that the right information is being collected, that our health information technology is being used effectively to collect it, and that data systems can share that information.

What else is needed? When health information is stuck behind firewalls, our ability to improve care is impaired. Information should be transparent and shared, while preserving patient privacy. Participation by both private and public health care partners is needed. With larger shifts in health care, such as the shift from ICD-9 to ICD-10 for coding, attention needs to be paid so that the ability to gather and analyze specific and accurate data is ensured. Legislation that allows or requires participation by health systems, insurance companies, payers, and state agencies in information sharing may be needed in the future.

For references, supplemental data, and additional information about these recommendations, including more detailed rationales and return on investment, see Appendix 5. For discussion of stakeholder involvement in selecting these recommendations, see Appendix 6.

Section 2: What is Diabetes?

Diabetes is a complex group of diseases all related to harmfully high blood glucose (also called high blood sugar or hyperglycemia). Normally, our digestive tract breaks down the carbohydrates we eat and converts them to glucose. Cells throughout our body absorb the glucose and use it for energy, with the help of a hormone called insulin. If our body does not make insulin, does not make enough, or cannot use it effectively, we develop diabetes.

Diabetes is a chronic condition; there is no cure, but it can be controlled. Left uncontrolled, high blood glucose levels damage our eyes, heart, kidneys, nervous system, and other organs. Complications from diabetes can lead to heart attacks, strokes, blindness, kidney failure, foot infections, dental disease, and amputations. Diabetes is among the top 10 causes of deaths nationally, and it contributes to deaths from many other conditions.[3]

Type 1 Diabetes

Type 1 diabetes (also called juvenile diabetes or insulin-dependent diabetes) occurs when the body's immune system attacks and destroys certain cells in the pancreas which produce insulin. People with type 1 diabetes use insulin constantly to stay alive, via multiple daily injections or an insulin pump, and must carefully balance their food intake and exercise to regulate their blood sugar levels. Hypoglycemia, or dangerously low blood sugar, is a common and potentially life-threatening complication with which people who rely on insulin must contend. Tight control of blood glucose levels, which prevents the long-term complications associated with diabetes, can lead to more frequent hypoglycemia.

Type 1 diabetes is usually diagnosed in children, teenagers, or young adults. We do not know exactly why some people develop type 1 diabetes, though there appear to be genetic factors. There are no modifiable factors, such as obesity or high blood pressure, known to contribute to type 1 diabetes. Research is taking place in Washington and internationally to develop new treatments, tests for detecting risk of development of type 1 diabetes, and hopefully a cure for type 1 diabetes.

A variant type, called Latent Autoimmune Diabetes in Adults, is occasionally found in adults over 30. A very rare form, called monogenic diabetes, is sometimes mistaken for type 1 diabetes but typically strikes newborns.

Type 2 Diabetes

In type 2 diabetes, the pancreas makes some insulin but not enough, or the body is unable to use insulin correctly, or both. This type does not always require using insulin. Type 2 diabetes accounts for 90–95 percent of all people with diabetes.[3]

Many risk factors for type 2 diabetes have been identified. Some, such as age and family history, cannot be changed; others, however, can be changed. In particular, being overweight or obese, lack of physical activity, high blood pressure and cholesterol, and smoking each significantly increase the risk of developing type 2 diabetes. Once someone has diabetes (of any type), these factors can make the impacts and consequences of diabetes worse.

Table 1. Risk Factors for Type 2 Diabetes

Modifiable	Non-Modifiable	Socially Determined
Weight gain	Age	Education level
Overweight or obesity	Ethnicity	Income level
Sedentary lifestyle	Gender	Geography
Tobacco use	Family History	
High blood pressure	History of Gestational Diabetes	
High cholesterol	Polycystic Ovarian Syndrome (PCOS)	

Source: National Institutes of Health (http://diabetes.niddk.nih.gov/dm/pubs/riskfortype2/index.aspx) and Centers for Disease Control and Prevention for social determinants (http://www.cdc.gov/socialdeterminants/faq.html).

Excess weight especially complicates the management of diabetes and increases the risk of cardiovascular complications and cardiovascular death in people with diabetes. In 2012, 84% of Washington adults with diabetes were overweight or obese.[4] The same forces which have driven increases in overweight and obesity are likely leading to more cases of type 2 diabetes.

Insufficient physical activity also increases the risk of developing prediabetes and diabetes. For those who already have diabetes, regular physical activity improves blood glucose control, reduces cardiovascular risk factors, contributes to weight loss, and improves well-being. In 2012, 43 percent of Washington adults with diabetes did not get enough physical activity.[4]

Controlling risk factors for cardiovascular disease is an essential part of diabetes treatment. Clinical trials have shown that blood pressure and lipid (cholesterol) control reduce diabetes complications by up to 50 percent.[3] In 2011, 74 percent of Washington adults had a history of high blood pressure and 68 percent had a history of high cholesterol.[4]

Tobacco use is an independent risk factor for developing type 2 diabetes and cardiovascular disease, and smoking can make diabetes management more difficult for people with diabetes of all types. People who smoke have higher risks of serious complications from diabetes. In 2012, 15% of Washington adults with diabetes currently smoke cigarettes.[4]

Other factors known to be associated with increased risk of developing type 2 diabetes include having a parent or sibling with diabetes, polycystic ovary syndrome (hormonal disorder among women of reproductive age), and a history of cardiovascular disease.

In addition, factors such as insufficient sleep, psychological stress (including chronic stress associated with income inequality and discrimination), endocrine disruptors, medications, and intrauterine and intergenerational effects have been less thoroughly studied, and their contribution to type 2 diabetes may have been underestimated.[5]

Pregnancy and Diabetes

Gestational diabetes is a form of diabetes in women during pregnancy, and affects about 7 percent of pregnant women. Women who are older than 25, or who have pre-pregnancy hypertension or high cholesterol, a prior pregnancy, a family history of diabetes, or a higher body mass index are more likely to develop gestational diabetes.[6] There is no known way to prevent gestational diabetes, but it can be managed through diet, exercise, and, if necessary, insulin. Usually, a woman's blood glucose returns to normal after the birth; if not, she may be diagnosed with type 2 diabetes or prediabetes. Gestational diabetes also puts both mother and child at a higher risk of developing type 2 diabetes later in life.

Distinct from gestational diabetes, maternal diabetes occurs when a woman had diabetes before becoming pregnant. This occurs in about 1 percent of pregnancies. All women with diabetes who wish to become pregnant are encouraged to plan pregnancies in advance, and achieve ideal blood glucose control and manage weight prior to pregnancy for the best outcomes.

Both gestational and maternal diabetes can create serious threats to mother and baby, including premature birth, preeclampsia (a disorder that occurs only during pregnancy and the postpartum period that can cause death), higher risk of birth injury, or Cesarean delivery. Inadequate care of maternal diabetes before and during pregnancy can lead to birth defects such as heart or neural tube defects, pre-term birth, or miscarriage. Self-management and medical care to manage blood sugar before and during pregnancy reduces the risks. Treatments for gestational diabetes may include healthy eating and regular physical activity alone, or in combination with insulin or other medications.[7] When prenatal care is not accessed, gestational diabetes has potential to go undiagnosed and pose serious risks for both mother and baby. The U.S. Preventive Services Task Force recommends screening for gestational diabetes in asymptomatic pregnant women after 24 weeks of gestation. Women with symptoms of gestational diabetes, or who are at high risk, may be tested for the condition earlier in pregnancy.

Women who have delivered a baby weighing more than nine pounds are at higher risk of developing diabetes, both immediately following delivery and in subsequent years.

Prediabetes

Based on national surveys, about one-third of all adults in Washington have prediabetes, but most of them don't know it.[8] Prediabetes is largely asymptomatic. To identify people with prediabetes and type 2 diabetes, draft guidelines released by the U.S. Preventive Services Task Force in 2014 recommend screening for abnormal blood glucose and type 2 diabetes mellitus in adults who are at increased risk for diabetes. Prediabetes is defined as having blood glucose

levels higher than normal, but not high enough to be classified as diabetes, and results from the same factors that contribute to type 2 diabetes. People with prediabetes have a much greater chance of developing type 2 diabetes or gestational diabetes. Prediabetes is not associated with type 1 diabetes. Those with prediabetes are also at higher risk of cardiovascular disease, whether they later develop diabetes or not. Prediabetes indicates abnormalities in glucose levels have begun, but may be reversed. Once type 2 diabetes is diagnosed, few individuals are able to return to blood glucose levels in the prediabetes or normal ranges.

Complications

Uncontrolled or inadequately controlled diabetes often leads to severe health consequences. Short-term, life-threatening complications include ketoacidosis (where high levels of acids reach poisonous levels due to an inability to use carbohydrates for fuel), hyperosmolarity (where blood glucose levels are dangerously high), or coma. People with type 1 diabetes are generally at greater risk of short-term, life-threatening complications. Long-term complications include kidney disease, ulcers on the legs, damaged nerves in the arms and legs, and eye diseases that can cause blindness. Diabetes is the leading cause of new cases of blindness among adults ages 20–74 years.[9] Foot infections can develop and be resistant to healing, sometimes leading to amputations.

In addition, many patients hospitalized for heart disease, lower-extremity conditions (such as peripheral arterial disease, ulcer, inflammation, infection, or neuropathy), stroke, pneumonia, or influenza are also diagnosed with diabetes, which likely contributed to or worsened their condition.

People with diabetes, especially type 2, are at increased risk of heart attack and stroke. For people with type 2 diabetes, controlling blood pressure is essential to prevent heart disease and stroke, and the disability and death that can result from these conditions.

Prevention and Treatment

The good news is that many cases of type 2 diabetes can be prevented or delayed.[10] For most people with diabetes, a combination of diabetes self-management and preventive care can prevent or delay complications. For people with type 1 diabetes, near-constant self-management (or management by a parent or caregiver) of glucose levels is essential to prevent life-threatening short-term complications.

For people who have been diagnosed with prediabetes, type 2 diabetes can be prevented or delayed by adopting a lifestyle different from their current norm – one that includes at least 150 minutes of physical activity a week, eating a balanced diet, and, if they are overweight or obese, losing 5-10 percent of body weight.[10] Evidence-based programs, such as the Diabetes Prevention Program, provide support and education to people with prediabetes wanting to make these changes.

Until there is a cure, people with diabetes require regular preventive treatment to delay the natural progression of the disease. Much of the treatment, such as routine blood sugar monitoring, must be self-managed by the patient or a caregiver. In type 1 diabetes, daily insulin is required. Type 2 diabetes can often be controlled through oral medications without insulin. For all forms of diabetes, patients need annual eye, foot, kidney function, and dental exams, among other treatments. Checks of blood pressure and feet for sores are recommended at each medical visit.

Healthy eating and regular physical activity are crucial to successfully managing diabetes. People with diabetes face the same barriers to regular active living and healthy eating as everyone else, and people who have both diabetes and disabilities face even greater challenges.

For references, supplemental data, and additional information about diabetes, its risk factors, and its complications, see Appendix 2.

Section 3: Diabetes in Washington State

Diabetes in Adults

Based on 2012 Behavioral Risk Factor Surveillance System (BRFSS) Survey, an estimated 8.3 percent of adults 18 and older in Washington – 463,000 people – have diagnosed diabetes, predominantly types 1 and 2. For comparison, only about 5 percent of Washington adults have been diagnosed with coronary heart disease, though that disease leads to more hospitalizations and deaths than diabetes.

In addition, an estimated 3.4 percent of adults 20 and older in the nation have diabetes but don't know it.[3] Extrapolating this percentage to Washington yields an estimated 172,000 adults with undiagnosed diabetes.

The prevalence of diagnosed diabetes in Washington adults has steadily increased, from an age-adjusted 4.0 percent of adults 18 and older in 1993 to 7.3 percent in 2010. While diabetes is slightly less prevalent in Washington than the nation as a whole, nearly all the figures throughout this section are broadly consistent with national patterns.

Future trends in diabetes prevalence (the total percentage of people with the disease at a given time) and incidence (the rate of newly diagnosed cases in a given year) are uncertain. After doubling over the past two decades, nationally representative data have shown a potential slowing of the increase in the prevalence and incidence of diagnosed diabetes between 2008 and 2012.[11] However, there are continued increases in the prevalence or incidence of diabetes in some high-risk subgroups including non-Hispanic black and Hispanic subpopulations and those with a high school education or less.

Increases in diabetes prevalence and incidence reflects changes in demographics (including aging of population and growth of minority populations at increased risk), more people with risk factors (including obesity and sedentary lifestyle), more people with diabetes living longer, and enhanced detection of diabetes cases.[12,13] The number of youth and adults diagnosed with type 1 diabetes continues to increase, and the reasons for this increase are unknown.

Reasons for the slowing of the overall increases in diagnosed diabetes are difficult to determine. Some portion may be attributed to concurrent slowing in the growth of obesity and effects from changes in testing that alter how many new cases of diabetes are detected.[11]

Even with the slowing, we expect the number of people with diabetes to remain high. Policies and interventions focused on preventing new cases of diabetes must be maintained and enhanced to begin to see a lower proportion of people with diabetes over time.

Variation by Age, Gender, Race, Hispanic Origin, and Socioeconomics

BRFSS data for 2010-2012 combined show the prevalence of diagnosed diabetes increases with age. Only 6 percent of adults under 65 have diagnosed diabetes, but 20 percent of adults over 65 have the disease.

Men and women under 65 have the same prevalence of diagnosed diabetes. However, after age 65, about one-third more men have diagnosed diabetes than women.

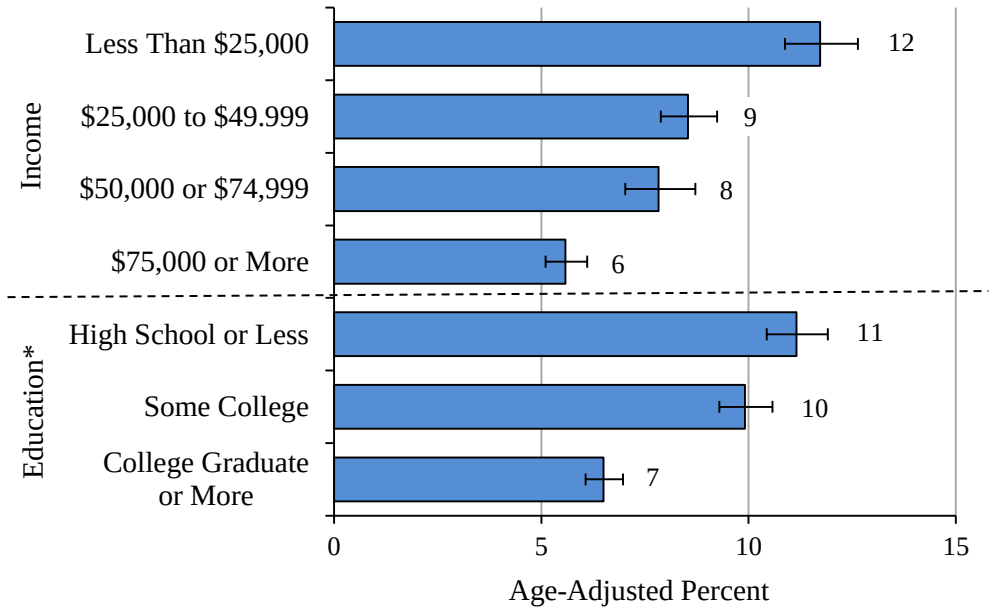
After adjusting for age, fewer non-Hispanic white adults have diagnosed diabetes (7 percent) than most other racial and ethnic groups, with the highest prevalence among American Indian and Alaska Native adults (17 percent).

Washington's Hispanic/Latino population has significantly higher risk of type 2 diabetes and is growing faster than the rest of the population, so it likely will include an increasing portion of all people with diabetes in the future.

After adjusting for age, people of lower socioeconomic position, as measured by income and education, are more likely to have diagnosed diabetes. Adults with incomes less than $25,000 are twice as likely to have diagnosed diabetes as those with incomes of $75,000 or more. Adults with a high school education or less are nearly twice as likely to have diagnosed diabetes as those with a college degree or more.

Differences in health behaviors, access to preventive health care services, access to material and social environments that make healthy behaviors easier to adopt, and effects of stress (including the stress experienced due directly to discrimination and poverty) may account for the relationship between socioeconomic position and diabetes.[14,15] These stressors are intensified for people with type 1 diabetes and those with diabetes complications, who require even more intense managroement of health behaviors and incur higher individual economic costs.

Chart 1. Diabetes Prevalence by Household Income and Education



Source: Washington State Behavioral Risk Factor Surveillance Sytem Survey, 2010-2012.
*Among adults ≥25 years.

The differences in diabetes prevalence among different racial, ethnic, and socioeconomic groups highlight the need to address specific populations when responding to diabetes. Those who are in a disadvantaged social position – due to language, racial/ethnic, educational, or income differences – are disproportionately impacted by diabetes. These populations benefit from focused, culturally appropriate approaches to diabetes prevention and treatment, with input from the communities affected.

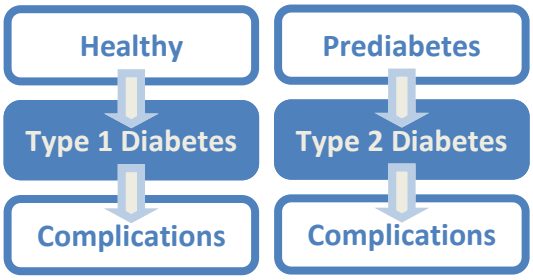
Variation by Geography

BRFSS data for 2010-2012 combined show that the age-adjusted percentage of adults with diagnosed diabetes varies by county. At the low end, San Juan (3 percent) and King (7 percent) counties are below the state average.

At the high end, Asotin (17 percent), Columbia (14 percent), Adams (14 percent), and Grays Harbor (13 percent) counties are above the state average. Asotin, Adams, and Grays Harbor counties also had lower percentages of college graduates, higher percentages of adults living below the federal poverty level, and fewer adults ages 18–64 with health insurance than the state as a whole, as of 2012. Also, Adams County had a higher percentage of Hispanics, and Grays Harbor County had a higher percentage of American Indian/Alaskan Natives. Looking at diabetes prevalence by county does not paint a complete picture, however.

It is important to note that local assessments have shown higher burden of diabetes for smaller areas and subpopulations within counties.

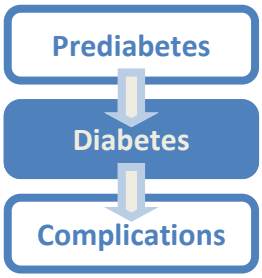
Diabetes in Youth



Diabetes is one of the most common chronic diseases of childhood.[16] Unfortunately, data are not readily available on how many youth in Washington have diabetes. Nationally, an estimated 0.26 percent of youth under 20 (2.6 in 1,000) have been diagnosed with diabetes.[3] Extrapolating this to Washington yields an estimated 4,600 youth with diabetes in our state. Percentages for undiagnosed diabetes in youth are not available.

As with adults, the prevalence of diabetes in youth is increasing and varies by racial and ethnic group.[17,18] Nationally, the prevalence of type 1 diabetes increased from 0.15 percent in 2001 to 0.19 percent in 2009. Compared with other groups, non-Hispanic white youth had the highest prevalence of this type. Prevalence of type 2 diabetes among youths 10-19 increased from 0.03 percent to 0.05 percent over the same period. For this type, prevalence is lower among non-Hispanic white youth than among other groups.

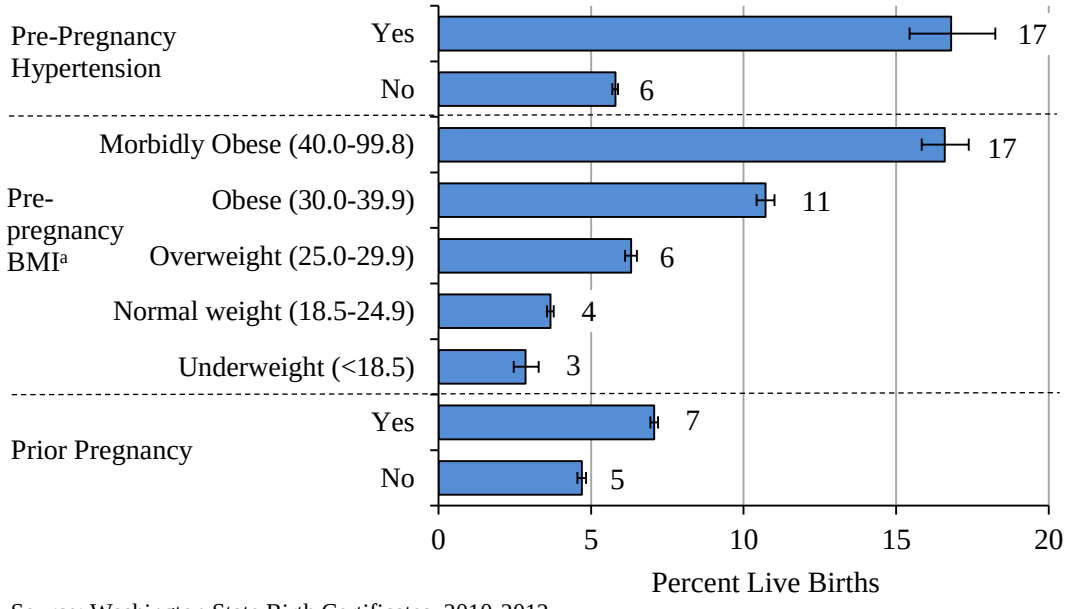
Diabetes and Pregnancy



Based on 2012 birth certificates in Washington, 6.9 percent of live births (6,029) were affected by gestational diabetes, an increase from 4.3 percent in 2003. Also, 0.7 percent of births (627) were to mothers with maternal diabetes; this has also increased, but more slowly than gestational diabetes.

As with type 2 diabetes, modifiable risk factors such as obesity and high blood pressure significantly increase a woman's chances of developing gestational diabetes. Prior pregnancy also slightly increases the chances.

Chart 2. Births to Mothers with Gestational Diabetes by Maternal Characteristics



Source: Washington State Birth Certificates, 2010-2012.
[a]Body mass index (BMI) is pre-pregnancy pounds/square of height in inches. Around 6 percent of birth records are missing pre-pregnancy weight or height.

Variation by Age, Race, and Hispanic Origin

Birth certificate data for 2010-2012 combined show older mothers are more likely to have gestational diabetes. Eleven percent of mothers 35 or older have the disease, compared to 2 percent of mothers under 20.

Non-Hispanic white women have gestational diabetes less often (5 percent) than other racial and ethnic groups, with the highest percentage among Asian women (11 percent).

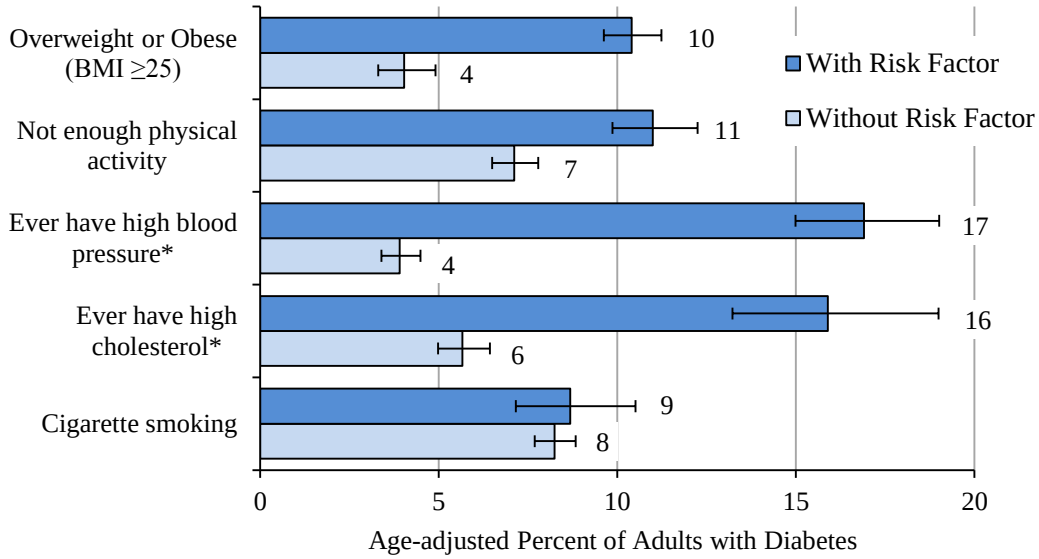
Birth Outcomes

Women with gestational or maternal diabetes, and their babies, are more likely to have medical problems during pregnancy and at birth.[19] For example, based on 2012 birth certificates, 13 percent of women with gestational diabetes and 21 percent of women with maternal diabetes have babies with high birth weight (over 4,000 grams/8.8 pounds), compared to 11 percent of women without diabetes. Also, 14 percent with gestational diabetes and 25 percent with maternal diabetes give birth prematurely, compared to 10 percent without diabetes.

Risk Factors

Risk factors of developing diabetes and its complications include being overweight or obese, lack of regular physical activity, high blood pressure and cholesterol, and smoking.[20] Chart 3 shows Washington adults who report being overweight, not getting enough physical activity, having a history of high blood pressure, or having a history of high cholesterol were 1.5 to 4 times more likely to report having diabetes than those without each risk factor, after adjusting for age.

Chart 3. Prevalence of Diabetes Among Adults With and Without Risk Factors for Developing Diabetes

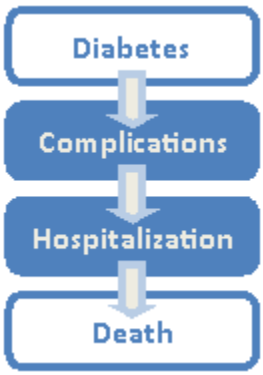


Source: Washington State Behavioral Risk Factor Surveillance Sytem Survey, 2012.
Abbreviations: BMI, body mass index in kilograms/meters^2.
*Asked in 2011 survey.

These same risk factors also make it more difficult to control diabetes once someone has it, and increase the likelihood of the disease progressing to more serious complications.

Based on the 2012 Washington State Healthy Youth Survey, about 26 percent of eighth-grade youth are overweight or obese, and about 44 percent do not get the recommended 60 minutes of physical activity most days. About 51 percent of all eighth-graders report spending three or more hours on screen time for fun (watching TV, playing video games, or using a computer for fun) on an average school day.

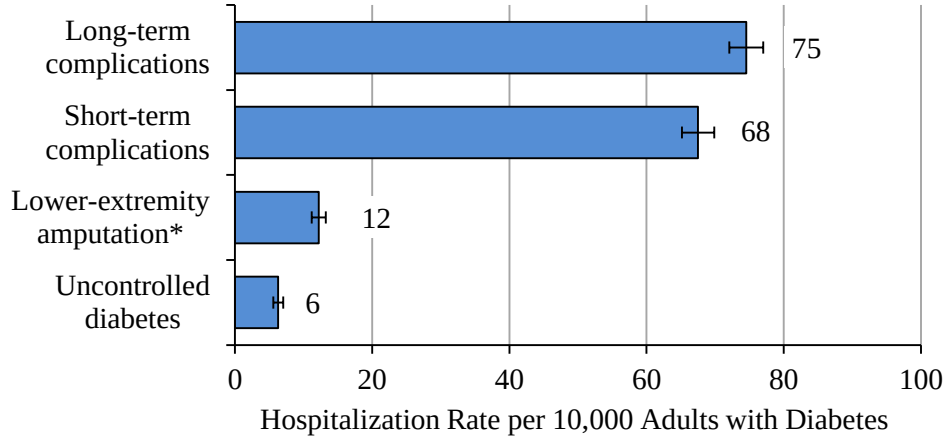
Complications and Hospitalizations



Based on 2012 hospital discharge data in Washington, 7,435 adults 18 and older were hospitalized with a primary diagnosis of diabetes (1.2 percent of all hospitalizations). Among these, 3,126 (42 percent) had diabetes related short-term complications, and 3,451 (47 percent) had diabetes-related long-term complications. Finally, 556 (7 percent) of these adults required leg amputations; this represents 60 percent of all non-traumatic (not caused by injury) amputations.

To put these rates into context, in 2012 in Washington, 17,968 people were hospitalized with a primary diagnosis of coronary heart disease (3 percent of all hospitalizations). In contrast to diabetes, hospitalizations for coronary heart disease have declined sharply in the past two decades.

Chart 4. Diabetes -related Ambulatory Care Sensitive Conditions Among Adults with Diabetes[a]



Source: Washington State Hospital Discharge Data and Behavioral Risk Factor Surveillance System Survey, 2012.
[a]Agency for Healthcare Research and Quality, Prevention Quality Indicators. Hospitalizations among adults ≥18 years. Excludes obstetric admissions and transfers from other institutions.
*Among hospitalizations with any-listed diagnosis of diabetes.

In addition, 732 youth under 18 were hospitalized with a primary diagnosis of diabetes, predominantly type 1 diabetes. This was less than 1 percent of all hospitalizations in this age group, but age-adjusted rates of hospitalizations have increased from 3.2 per 10,000 in 1990 to 4.7 in 2012.

The progression of diabetes does not always include hospitalization. Occasionally, complications may lead to death without a stay in the hospital. It is the complications themselves that negatively impact health, while hospitalization to treat them represents much of the financial cost. Some diabetes-related hospitalizations could be avoided with better management of diabetes in primary and specialty medical care, and access to diabetes education that matches the individual's culture, language and health literacy level.

Variation by Age and Gender

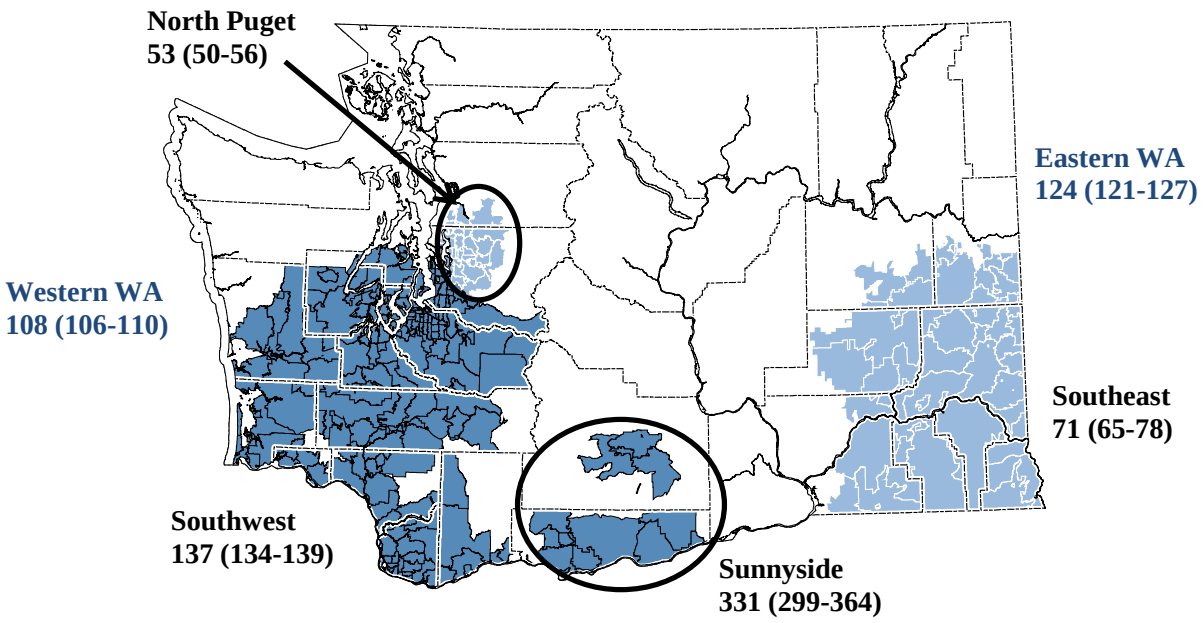
Hospital discharge data for 2010-2012 combined show men 45 and older are more likely to be hospitalized for diabetes. The rate of hospitalization increases with age, especially for those 65 and older, but due to population size, people under 65 accounted for more total hospitalizations.

Higher rates of diabetes-related short- and long-term complications occurred in patients 44 years or younger (an age group with a higher percentage of people with type 1 diabetes), while amputations were more frequent in those over 44.

Variation by Geography

Some regions of the state have higher or lower than expected hospitalizations and diabetes-related complications. For example, based on hospital discharge data for 2010-2012 combined, the Southwest region and especially the Sunnyside (south central) region had higher age-adjusted diabetes-related complication rates, while the North Puget and the Southeast regions had lower rates. These disparities between the higher and lower regions have widened in the last decade.

Figure 2. Regions with Higher or Lower than Expected Hospitalization Rates[a] for Diabetes Ambulatory Care Sensitive Conditions[b] by ZIP Code of Residence



Source: Washington State Hospital Discharge Data, 2009-2011.
[a]Data are hospitalization rates (95% confidence interval) per 100,000 adults 18 and older.
[b]Agency for Healthcare Research and Quality, Prevention Quality Indicators. Hospitalizations among adults ≥18 years. Excludes obstetric admissions and transfers from other institutions.

Other Complications

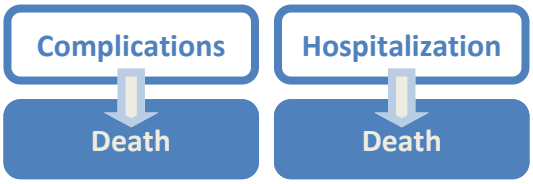
Diabetes is often a contributing factor to other medical conditions. In 2012, hospital discharge data show that 13,021 people in Washington were hospitalized with a primary diagnosis of heart

disease, 4,174 of lower-extremity conditions (such as inflammation, infection, or neuropathy), 3,348 of stroke, and 2,733 of pneumonia or influenza who also had a secondary diagnosis of diabetes.

In 2011, 801 (45 percent) of all new cases of end-stage renal disease in Washington were among people with diabetes.[21] Nationally, diabetes is the leading cause of new cases of blindness among adults ages 20–74 years.[9]

Washington BRFSS data for 2010-2012 combined show adults with diabetes are about twice as likely to be disabled or limited in their activities because of physical, mental, or emotional problems (46 percent) than adults without diabetes (22 percent). Adults with diabetes are also much more likely to require special equipment for health reasons – such as a cane, wheelchair, special bed, or special telephone – (26 percent) than adults without diabetes (6 percent).

Deaths



Diabetes is the seventh leading cause of death in Washington. Based on 2012 death certificates, 1,652 people died from diabetes. Plus, diabetes contributed to an additional 3,910 deaths from other primary causes. The age-adjusted rate at which diabetes was a primary or contributing factor to death increased from 72 deaths per 100,000 people in 1999 to 77 in 2012.

For comparison, coronary heart disease is the second leading cause of death in Washington (after cancer). In 2012, it caused 6,487 deaths. The age-adjusted death rate from coronary heart disease decreased by almost half since 1999, down to 88 per 100,000 in 2012.

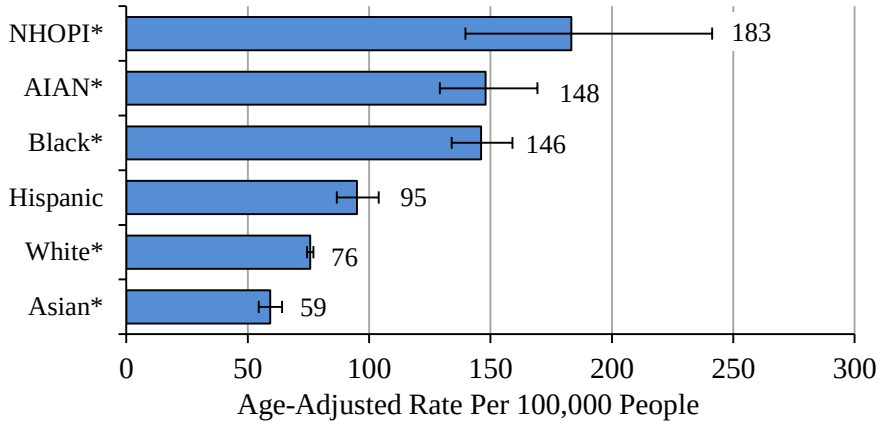
Nationally, age-adjusted rate of death from diabetes has dropped – one of the few instances where Washington does not follow the national pattern. It is not clear why Washington is different, especially given our slightly lower prevalence of diabetes. It may relate to access to care or to how reporting is done on death certificates.

Variation by Age, Gender, Race, Hispanic Origin, and Socioeconomics

Washington death certificate data for 2010-2012 combined show in older age groups, men have higher rates of death from diabetes than women.

After adjusting for age, the death rate is highest among Native Hawaiians and other Pacific Islanders, with the lowest among Asians.

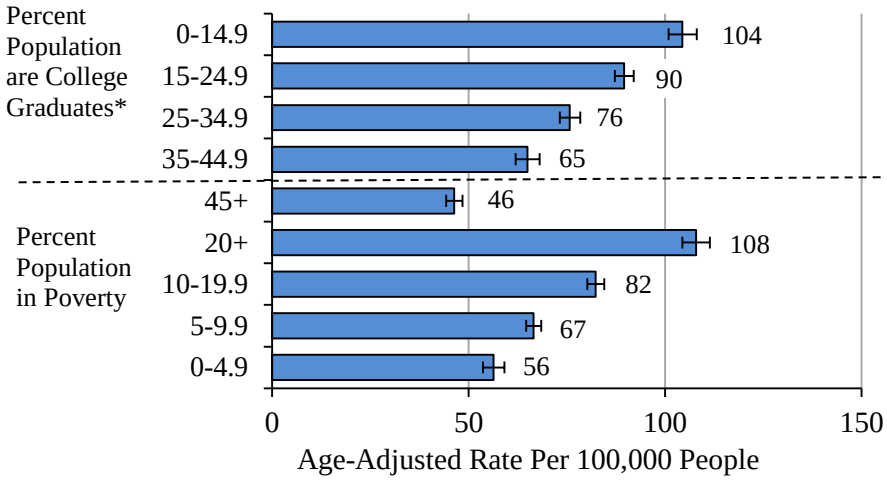
Chart 5. Diabetes Death Rates[a] by Race and Hispanic Origin



Source: Washington State Death Certificates, 2010-2012. Abbreviations: AIAN, American Indian/Alaska Native; NHOPI, Native Hawaiian/Other Pacific Islander.
[a]Deaths with any mention of diabetes as a listed cause of death.
*Non-Hispanic, single race only.

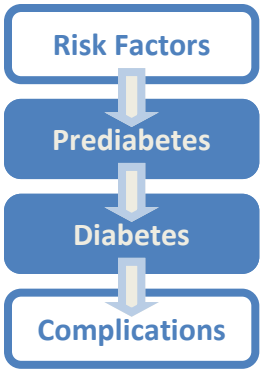
Individuals in lower socioeconomic groups experience higher rates of diabetes deaths than those in higher groups.[22] Studies also suggest that increased risk of diabetes death occurs in people living in lower socioeconomic neighborhoods, regardless of individual factors.[23] Chart 6 shows the age-adjusted death rates were two times higher for Washington residents in census tracts where 20 percent or more of the population lived below the federal poverty level than in census tracts where less than 5 percent of the population lived in poverty. Also, age-adjusted death rates were more than twice as high in census tracts where less than 15 percent of the population are college graduates than in census tracts where 45 percent or more of the population are college graduates.

Chart 6. Diabetes Death Rates[a] by Percent College Graduates and Percent in Poverty



Source: Washington State Death Certificates, 2010-2012. [a]Deaths with any mention of diabetes as a listed cause of death. *Among people ≥25 years.

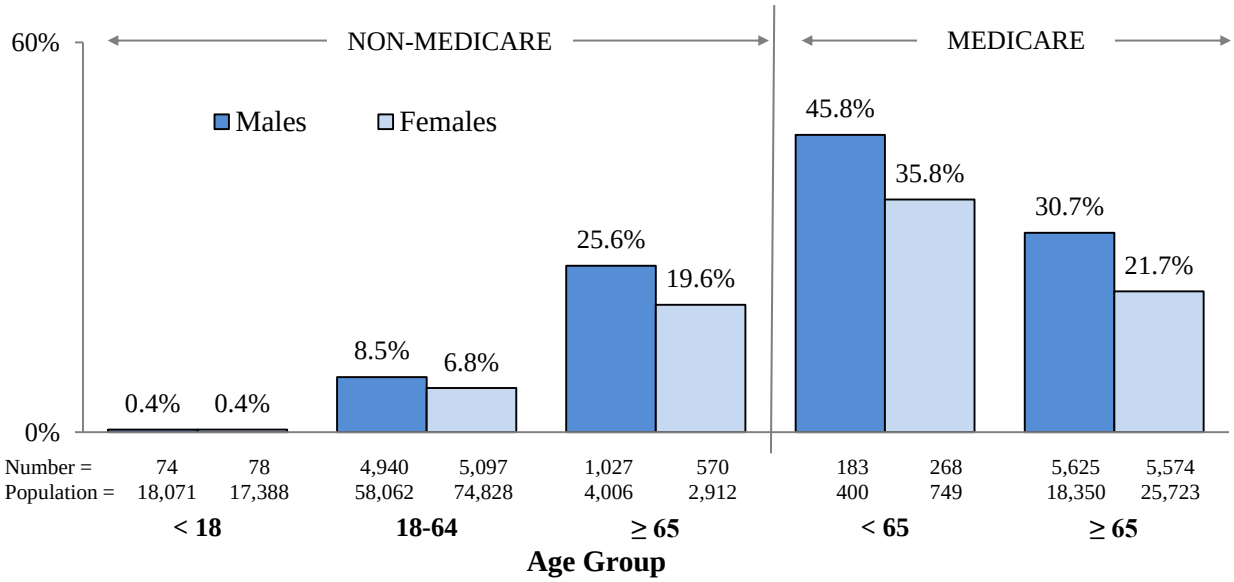
Diabetes among Public Employees Benefits Board Populations



In 2013, 11 percent of Uniform Medical Plan (UMP) enrollees – 23,400 people – received medical services related to diabetes. There may be additional UMP enrollees who have diabetes but did not receive services for it during 2013. Prevalence of diabetes was higher for those over 65 and for men compared to women. Of those 23,400 people, 6,300 (27 percent) were treated for short- or long-term complications from diabetes.

In addition, in 2013, 2.4 percent of UMP enrollees – 5,200 people – were diagnosed with prediabetes.

Chart 7. Prevalence of Diabetes Among Uniform Medical Plan Members[a]

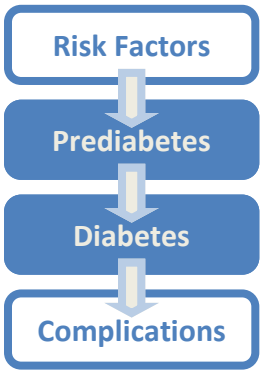


Source: Uniform Medical Plan 2013 claims data from Public Employees Benefits Board Managed Care source claims database.

[a]Presence of type 1 or type 2 diabetes identified by counting number of members who had a claim with a diabetes diagnosis in calendar year 2013.

PEBB costs are discussed in Section 4, and the PEBB itself is described in more detail in Section 5 under Health Care Authority.

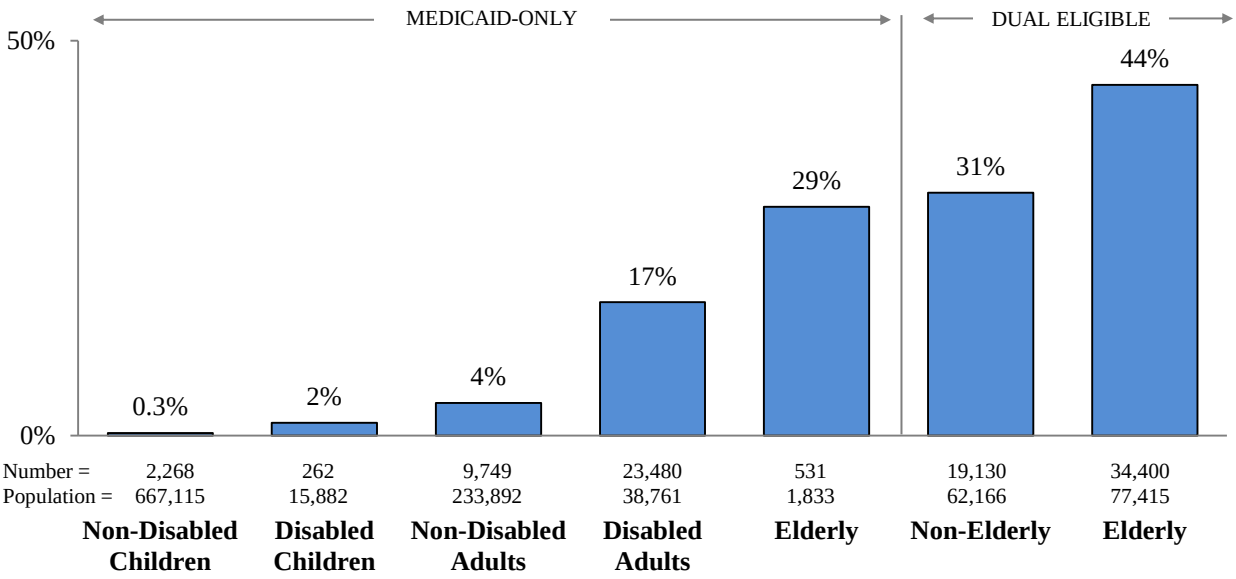
Diabetes among Apple Health Enrollees



As of January 2014, as allowed by the Affordable Care Act, Washington Apple Health (formerly Medicaid) changed dramatically, increasing from about 1.2 million people to more than 1.6 million. Broadly speaking, the enrolled population previously had been a mix of the elderly (65 and over), people with disabilities, low-income adults, and children. Children represented more than half of the enrollees. Then Apple Health added many adults who did not meet the previous qualifications but also did not previously have health insurance. These subgroups each have very different health risk profiles, including prevalence of diabetes.

Looking back, among people enrolled in 2011 (including those dual-eligible for Medicaid and Medicare), 89,820 (7.5 percent) had diabetes. The rate among Apple Health adults was 17 percent compared to the state adult rate of 8.3 percent in 2012. Rates were higher among the elderly and those with disabilities. The highest rate was among dual-eligible elderly at 44 percent. Proportionately, more than half of those with diabetes were also covered by Medicare. Rates were lower for non-Hispanic whites than for other racial and ethnic groups.

Chart 8. Prevalence of Diabetes Among Medicaid Clients[a]



Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
[a]Presence of type 1 or type 2 diabetes identified by diagnosis, pharmacy prescription, or CARE assessment using state fiscal year 2010 and 2011 claims, encounters, or assessment data.

When looking at both Apple Health and commercially-insured populations, Apple Health enrollees are less likely to receive preventative health screenings related to diabetes. Compared to commercial enrollees, Apple Health enrollees (not adjusted for age) are less likely to have

blood sugar testing (81-88 percent), cholesterol testing (67-79 percent), eye exams (51-to-60 percent), and kidney disease screening (75-81 percent). Among racial and ethnic groups Asian-Americans are most likely, and American Indian/Alaska Natives least likely, to receive this care. Spanish-speaking patients with diabetes also experience lower rates for kidney disease screening.[24]

As with the total population of the state, people with diabetes in the Apple Health population were more likely to have other conditions, such as cardiovascular disease or mental health issues, and to use more medical services than people without diabetes.

There is no historical data for the 376,000 newly eligible enrollees. Instead, the Health Care Authority used national data, adjusted for Washington-specific figures for age, gender, and similar factors (as described in Appendix 3), to estimate prevalence of diabetes among this group.

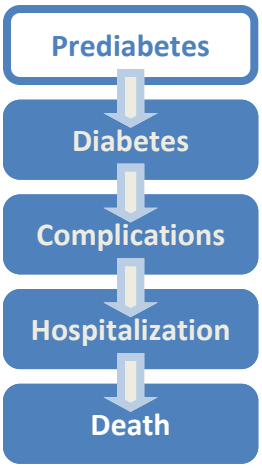
The estimates show that diabetes is more prevalent among newly eligible adults (7.6 percent) than among previously enrolled non-disabled adults (4.2 percent). Note that the newly eligible adult population includes persons with relatively high health needs who were previously eligible for medical assistance under the Presumptive SSI and Disability Lifeline programs.

The estimates show higher rates of undiagnosed diabetes and prediabetes among the newly eligible adults.

Apple Health costs are discussed in Section 4, and Apple Health itself is described in more detail in Section 5 under the Health Care Authority.

For references, supplemental data, and additional information about the rates of diabetes among people in Washington, including more detail about PEBB and Apple Health enrollees, see Appendix 3.

Section 4: Financial Costs of Diabetes in Washington State



Calculating the total costs of diabetes requires data on many different people receiving different kinds of treatments in different medical settings. Diabetes often exacerbates other conditions, the costs of which may or may not be attributed to diabetes. Methods for estimating costs differ in other ways as well, so two estimates may not be comparable. Calculations can only account for diagnosed cases of diabetes. For these reasons, it is not accurate to take a cost estimate from the past and use it to project a budget for the future without significant additional analysis.

Using American Diabetes Association (ADA) costs and the Office of Finacial Management population estimates, we estimate that, in 2012 in Washington, type 1 and type 2 diabetes combined led to $4 billion in direct medical expenditures, including institutional care, outpatient care, outpatient medications and supplies.[25] In addition, they caused $1.36 billion in lost work days due to worker premature mortality, absenteeism, and reduced productivity. The annual diabetes-attributable cost per person with type 1 or type 2 diabetes in Washington was $8,527. We are unable to distinguish between the cost of type 1 or type 2 diabetes due to constraints described in the methodology used by the American Diabetes Association.

Typically, the costs created by diabetes increase with the patient's age and length of years since diagnosis, due to the higher likelihood of complications from diabetes and of diabetes exacerbating other conditions. As type 1 diabetes is usually diagnosed before age 30, and technologies used to manage type 1 diabetes are often expensive, lifetime costs per person with type 1 diabetes are generally higher than costs for those with type 2 diabetes.[26] The ADA estimates that nationally 59 percent of all direct medical expenditures attributable to diabetes occur in people 65 and older, and 33 percent in people 45-64. These trends show in cost estimates for Washington.

Table 2. Average Annual Cost of Diabetes Per Person in Washington, By Age[22]

<45	45-64	≥ 65
$4,785	$6,094	$12,842

Table 3. Average Annual Cost of Diabetes Per Person in Washington, By Years Since Diagnosis[27]

≤5 years	6-15 Years	≥16 years
$6,380	$9,613	$14,412

Note: An average of the figures above may not equal the Washington state average due to the different sizes of each age group and adjustments made for Washington-specific costs.

Other research studies,[28,29] combined with Washington data given in Section 3 of this report, allow us to estimate the 2012 direct medical expenditures attributable to prediabetes at $709.5 million and the expenditures attributable to gestational diabetes at $22.7 million.

Several caveats about the cost estimates above are explained in detail in Appendix 3.

Costs for the Public Employee Benefit Board (PEBB)

PEBB cost data included in this report were obtained from 2013 claims data for PEBB's Uniform Medical Plan (UMP) enrollees. To better illustrate the full costs for UMP enrollees with diabetes, cost data in this report includes only non-Medicare UMP enrollees. PEBB did not include costs for UMP Medicare enrollees because their costs do not accurately reflect the full costs of care for UMP members with diabetes with Medicare coverage. UMP enrollees with Medicare primary coverage have UMP as a secondary coverage and payer. Because UMP is a secondary payer to Medicare, UMP pays for only services and costs that are not covered by Medicare. This results in significantly lower UMP costs for Medicare members.

In 2013, UMP non-Medicare costs for enrollees with diabetes, including both medical and pharmacy services, were $144,297,653, or about 18 percent of overall UMP non-Medicare costs. Table 4 below describes the per member per month (PMPM) costs for UMP Non-Medicare enrollees who have diabetes and compares to those without diabetes. Total PMPM costs for non-Medicare UMP enrollees with diabetes are more than three times higher than those of enrollees without diabetes, with pharmacy costs contributing 20 percent of the costs of care for people with diabetes.

Table 4. Uniform Medical Plan Non-Medicare 2013 Per Member Per Month Costs

UMP Non-Medicare enrollees	PMPM for CY2013		TOTAL
	Medical	Pharmacy	
Enrollees with diabetes	$897	$233	$1,130
Enrollees without diabetes	$296	$63	$359

Source: 2013 UMP/Regence and Moda claims data

The following charts illustrate average and median 2013 expenditures for non-Medicare UMP enrollees with diabetes and compares them to non-Medicare enrollees without diabetes. As seen with overall PMPM costs, average per case costs for enrollees with diabetes are about three times more than those of enrollees without diabetes, with pharmacy services comprising about 21 percent of the average per case costs.

Table 5. Uniform Medical Plan Non-Medicare 2013 Per Enrollee Average Annual Non-Medicare Expenditures

UMP Non-Medicare enrollees	Average Annual Expenditures for CY2013		TOTAL
	Medical	Pharmacy	
Enrollees with diabetes	$10,859	$2,941	$13,800
Enrollees without diabetes	$3,716	$993	$4,709

Source: 2013 UMP/Regence and Moda claims data

Median per case costs are lower than average per case costs. Pharmacy services comprise one-third of total median costs for enrollees with diabetes – a greater proportion of total costs than seen with PMPM or average costs. This likely reflects the impact of high cost complications or specific high cost services for a small number of non-Medicare enrollees.

Table 6. Uniform Medical Plan Non-Medicare 2013 Per Enrollee Median Annual Non-Medicare Expenditures

UMP Non-Medicare enrollees	Median Expenditures for CY2013		TOTAL
	Medical	Pharmacy	
Enrollees with diabetes	$2,393	$1,221	$3,614
Enrollees without diabetes	$785	$180	$965

Source: 2013 UMP/Regence and Moda claims data

Costs for Apple Health

Apple Health cost data included in this report were obtained from State Fiscal Year 2011 claims data for fee-for-service enrollees, excluding those who were dually eligible for both Medicare and Medicaid. Similar expenditure patterns would be expected for these enrollee categories under managed care.

Medicaid enrollees with diabetes have higher medical costs (Table 7), mental health costs (Table 8), long term care services and support costs (Table 9), and mixed results for substance use treatment costs. Different Medicaid population groups have different patterns of diabetes burden.

Higher utilization for Medicaid enrollees with diabetes drives most of the cost differentials noted in the tables. Key findings include:

- Outpatient Emergency Department utilization rates are significantly higher for persons with diabetes than for persons without diabetes (see Chart 33 in Appendix 3). For example, non-disabled adults with diabetes experienced 228 outpatient emergency department visits per 1,000 member months, compared to 95 visits per 1,000 member months for non-disabled adults without diabetes.

- Inpatient admission rates are significantly higher for persons with diabetes than for persons without diabetes (see Chart 34 in Appendix 3). For example, disabled adults with

diabetes experienced 68 inpatient admissions per 1,000 member months, compared to 27 inpatient admissions per 1,000 member months for disabled adults without diabetes.

Table 7. Health Care Authority Costs (Medical), Apple Health Fee-For-Service State Fiscal Year 2011 Per Member Per Month Costs

Apple Health Non-Medicare Children	PMPM for SFY2011	
	Non-Disabled	Disabled
Enrollees with diabetes	$1,208	$2,113
Enrollees without diabetes	$269	$1,383

Apple Health Non-Medicare Adults	Non-Disabled under 65	Disabled under 65	Over age 65
Enrollees with diabetes	$1,337	$1,977	$1,306
Enrollees without diabetes	$426	$899	$619

Source: Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, August 2014

Part of the differences in utilization and costs between Medicaid enrollees with and without diabetes reflects differences in the prevalence of other chronic conditions such as cardiovascular disease. Comorbidities were identified using the Chronic Illness and Disability Payment System (CDPS) diagnosis-based risk grouper developed by researchers at UC San Diego (see Appendix 3 for more detail). For example, among Medicaid-only disabled adults (Table 24):

- 13 percent of persons with diabetes have a "cardiovascular, medium" diagnosis, such as congestive heart failure, compared to only 3 percent of persons without diabetes.
- 18 percent of persons with diabetes have a "cardiovascular, low" diagnosis, such as myocardial infarction, compared to only 8 percent of persons without diabetes.
- 39 percent of persons with diabetes have a "cardiovascular, extra low" diagnosis, such as hypertension, compared to only 15 percent of persons without diabetes.
- Persons with diabetes are more likely to have a range of other chronic disease conditions, including gastrointestinal, renal and pulmonary conditions.

Per-member-per-month (PMPM) Medicaid-paid mental health service expenditures through capitated mental health plans are somewhat higher for persons with diabetes than for persons without diabetes (Table 8 and Chart 39 in Appendix 3).

Table 8. Division of Behavioral Health Costs, Apple Health Fee-For-Service State Fiscal Year 2011 Per Member Per Month Costs

Apple Health Non-Medicare Children	PMPM for SFY2011	
	Non-Disabled	Disabled
Enrollees with diabetes	$50	$94
Enrollees without diabetes	$11	$74

Apple Health Non-Medicare Adults	Non-Disabled under 65	Disabled under 65	Over age 65

Enrollees with diabetes	$29	$148	$78
Enrollees without diabetes	$16	$127	$43

Source: Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, August 2014

Per-member-per-month (PMPM) Medicaid-paid long-term services and supports expenditures are significantly higher for persons with diabetes than for persons without diabetes (Table 9 and Chart 37 in Appendix 3). The PMPM cost differences reflect the fact that 33 percent of non-elderly dual eligibles with diabetes used Medicaid-paid LTSS services, compared to only 15 percent of non-elderly dual eligibles adults without diabetes (see Chart 36 in Appendix 3).

Table 9. Long Term Care Services and Support Costs, Apple Health Fee-For-Service State Fiscal Year 2011 Per Member Per Month Costs

Apple Health Non-Medicare Children	PMPM for SFY2011	
	Non-Disabled	Disabled
Enrollees with diabetes	$0	$12
Enrollees without diabetes	$0	$2

Apple Health Non-Medicare Adults	Non-Disabled under 65	Disabled under 65	Over age 65
Enrollees with diabetes	$3	$279	$531
Enrollees without diabetes	$0	$75	$313

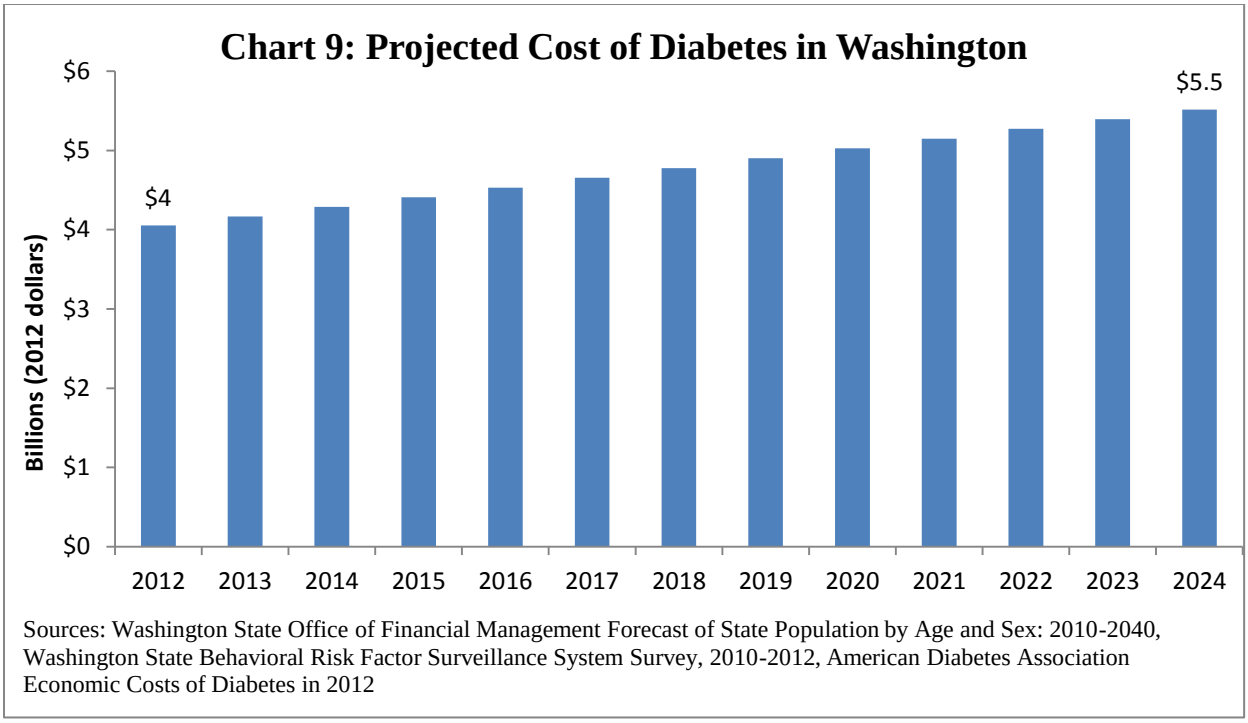
Source: Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, August 2014

Other Costs

This section describes the costs of direct medical services for people with diabetes. Separately, the Department of Health, the Department of Social and Health Services, and the Health Care Authority offer a variety of services and programs aimed at preventing or controlling the disease. These services and their associated costs are described in Section 5 and additional information is provided in the appendices.

Anticipating Future Costs

If current trends in diabetes prevalence continue, the increasing number of people with diabetes will increase both the need for health services and the total cost of managing the disease.[30] Regardless of medical cost inflation, the total lifetime cost of caring for a person with diabetes will increase as they live longer with the disease.



Sources: Washington State Office of Financial Management Forecast of State Population by Age and Sex: 2010-2040, Washington State Behavioral Risk Factor Surveillance System Survey, 2010-2012, American Diabetes Association Economic Costs of Diabetes in 2012

Assuming no change to the current incidence of diabetes in Washington, using the Office of Financial Management's (OFM) forecasted population estimates[31], using the ADA costs described above, and DOH BRFSS preveleance estimates, we estimate the cost of direct medical expenditures attributable to type 1 and 2 diabetes in Washington in 2024 will be about $5.5 billion (in 2012 dollars), an increase of about $1.5 billion dollars from today.

One of the main reasons for this increase is the overall aging of the state population. For example, in 2012, approximately 40 percent of the Washington population with diabetes was over 65, the most expensive cohort. Based on OFM's population projections, this is likely to increase to over 50 percent of the population with diabetes by 2024. Because of the increased elderly population with diabetes, the estimated average per person per year cost of diabetes in 2024 will increase from $8,527 in 2012 to $9,420 in 2024 (in 2012 dollars), assuming no change to the prevalence of diabetes.

This highlights the need to implement policies and interventions that prevent as many cases of diabetes as possible and, once it develops, effectively treat it so as to reduce the ultimate cost over time. For example, if interventions can reduce the incidence among all age cohorts by 2 percent, the estimate for 2024 becomes $4.60 billion, or about $800 million less than the original estimate.

For references, supplemental data, and additional information about the costs related to diabetes in Washington, including more detail about PEBB and Apple Health enrollees, see Appendixes 3 and 4.

Section 5: Services and Programs Addressing Diabetes in Washington State

The Department of Health, the Department of Social and Health Services, and the Health Care Authority have a longstanding tradition of collaboration on diabetes in Washington. Notable examples include:

- Reimbursement for Diabetes Self-Management Education by Apple Health, jointly managed by the Department of Health and the Health Care Authority.
- Stanford University's Chronic Disease Self-Management Education, including Diabetes Self-Management Education, supported through federal funding to the Department of Social and Health Services, with shared leadership by the Department of Health.
- All three agencies serving on the Diabetes Network Leadership Team.

Department of Health

At the Department of Health, work to address diabetes is predominantly housed in the Prevention and Community Health Division's Office of Healthy Communities. Its programs include:

- Heart Disease, Stroke, and Diabetes Prevention Program
- Healthiest Next Generation Initiative
- Washington Healthcare Improvement Network
- Community Health Worker Training
- Diabetes Surveillance, Epidemiology and Evaluation

These programs are described in detail below. In addition, several other programs in this office address the common risk factors for multiple chronic health conditions, including diabetes. These programs are the Healthy Eating, Active Living Program, which works to prevent obesity; Oral Health; Tobacco Prevention and Control and Marijuana Education; and Healthy Communities. These programs do not use a "single disease" approach to addressing chronic health conditions such as diabetes. Instead, they integrate funding from a variety of federally-funded programs to achieve greater change in the medical and social systems that broadly affect people's health.

Heart Disease, Stroke, and Diabetes Prevention Program

For FY 2015, the federal Centers for Disease Control and Prevention (CDC) is providing the Department of Health with $2.65 million to help prevent type 2 diabetes and prevent complications from all forms of diabetes through public health practices. Much of this funding goes to local health jurisdictions and to contracts with public and private partners. It also supports five staff positions in the Heart Disease, Stroke, and Diabetes Prevention Program and portions of numerous other positions that work across programs to address chronic diseases.

The Heart Disease, Stroke, and Diabetes Prevention Program, has three main focus areas:

- Diabetes Prevention Program
- Diabetes Network Leadership Team
- Diabetes Self-Management Education

Diabetes Prevention Program: The CDC considers the evidence-based Diabetes Prevention Program (DPP) to be the gold standard treatment for prediabetes in order to prevent or delay the onset of type 2 diabetes. The DPP is a public-private partnership of community organizations, private insurers, health care organizations, employers, and government agencies.

Currently, Washington has 25 diabetes prevention programs, the fourth most of any state, operated by YMCAs, Washington State University Extension, and non-profit health organizations. Washington State University and the University of Washington's Schools of Pharmacy have begun to integrate the Diabetes Prevention Program in their curricula; community pharmacists in urban, suburban and rural areas will also be able to offer the program. The program is available through health insurance or the wellness plans of several employers in the state, including the Public Employee Benefits Board for state employees and others accessing benefits through the board.

At a variety of events and community settings, the program uses a nine-question CDC Risk Quiz to assess a person's risk of developing diabetes. People with quiz scores indicating high risk are encouraged to receive blood testing, often onsite. Those who test in the prediabetes range are offered immediate access to a DPP provider (YMCA or Washington State University Extension) that can answer questions and enroll them in a DPP class.

In the class, participants work with a lifestyle coach in a group setting. They follow a curriculum involving 22 sessions over one year that teaches ways to reduce the chance of developing diabetes. The group setting makes the program more cost-effective.

A significant number of people tested receive a result in the diabetes range. These people are encouraged to follow up with a primary care provider for diagnostic testing.

An estimated $120,000 in federal funds from the Centers for Disease Control and Prevention were used by the Department of Health on work related to the Diabetes Prevention Program between July 1, 2013 and June 30, 2014. The goal of this work is to, over time, make the Diabetes Prevention Program available in Washington to all adults with prediabetes.

Diabetes Self-Management Education: Diabetes self-management education (DSME) is the ongoing process of facilitating the knowledge, skills, and abilities necessary for diabetes self-care. Through one-on-one coaching, it incorporates the needs, goals, and life experiences of the person with diabetes and is guided by evidence-based standards. The overall objectives are to support the person's informed decision-making, self-care behaviors, problem-solving, and active collaboration with the health care team and to improve clinical outcomes, health status, and quality of life.[32]

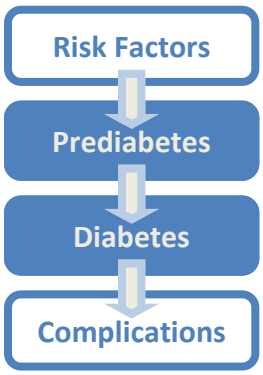
The Medicaid DSME Reimbursement Program is a partnership between the Department of Social and Health Services and the Department of Health. It provides access to DSME services for Apple Health clients with diabetes through about 130 DSME programs at local hospitals and clinics throughout the state. The reimbursement is from federal dollars, and the Department of Health operates the program.

Potentially, every person with diabetes and enrolled in Apple Health could use DSME. Due to the nature of the service, it is difficult to know how many people actually use it, yet there is broad agreement that DSME is underutilized.[33] Changes to billing instructions made in December 2014 are intended to expand access to DSME by better aligning with national standards for which provider types can provide DSME.

DSME is distinct from chronic disease self-management education (CDSME) programs, which are provided in a group setting by a lay leader and which complement DSME and diabetes management in primary care. CDSMP is described in greater detail below.

An estimated $120,000 in federal funds from the Centers for Disease Control and Prevention were used by the Department of Health to coordinate both DSME and chronic disease self-management education efforts between July 1, 2013 and June 30, 2014. This work is intended to reach all people with diabetes in Washington, but may be particularly beneficial for people with type 2 diabetes.

For greater coordination, referrals, and outreach for all health education programs available to people with diabetes in Washington, the Department of Health has partnered with WIN 211, Washington's Information Network. Approximately $100,000 in funding from federal sources has supported a contract with WIN 211 between July 1, 2013 and June 30, 2014.



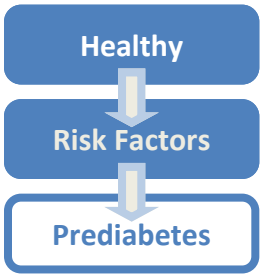
Diabetes Network Leadership Team: The Diabetes Network Leadership Team includes representatives from about 20 self-selected organizations and government agencies who work to promote diabetes prevention and/or control. Over the past10 years, the team has met quarterly to share information and identify shared goals, strategies, and priorities.

These goals, strategies, and priorities then informally guide the plans and work of all of the participating organizations and agencies. In this way, the efforts of all these groups are better coordinated and complementary.

An estimated $60,000 in federal funds from the Centers for Disease Control and Prevention were utilized by the Department of Health on convening and managing the Diabetes Network Leadership Team between July 1, 2013 and June 30, 2014. This work is intended to impact all people with diabetes of all types, as well as people at high risk for developing type 2 diabetes, in Washington.

For a list of currently represented organizations, see Appendix 4.

Healthiest Next Generation Initiative



Governor Jay Inslee launched the Healthiest Next Generation Initiative to help families across the state make our next generation the healthiest ever. The goal of the initiative is to make changes in early learning settings, schools, and communities that will help children maintain a healthy weight, enjoy active lives, and eat well.

According to the Centers for Disease Control and Prevention (CDC), children who are overweight or obese as preschoolers are five times as likely as healthy-weight children to be overweight or obese as adults.[34] Regular physical activity in childhood and adolescence helps control weight which can reduce the risk of developing obesity and chronic diseases, such as diabetes.[35]

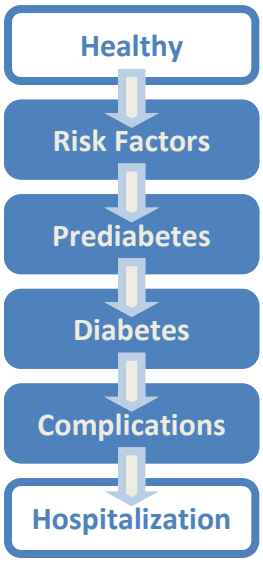
As a part of the initiative, the Department of Health, Department of Early Learning, and Office of Superintendent of Public Instruction are working together to help improve statewide systems to better support healthy weight in children. To begin this work, the three agencies issued a call for stories from communities, schools, and early learning settings across Washington State that are demonstrating success in breastfeeding and helping children maintain a healthy weight through active living, healthy eating and access to water. Over 200 stories were received. These stories were used to identify statewide recommendations for creating the healthiest next generation. In 2015, the agencies will work together to:

- Develop an infrastructure for collaborating with community, business and state agency leaders to create the healthiest next generation ever.

- Provide and promote toolkits with strategies to ensure children are active, eating healthy and drinking clean water in early learning settings and schools.
- Promote healthy eating and active living goals in the Early Childhood Education and Assistance Program (ECEAP) performance standards.
- Revise statewide guidelines for quality health and fitness education to help children be more active at school.
- Implement transparent and collaborative communication with opportunities for partner involvement.

The work being done by Department of Health, Department of Early Learning, and Office of the Superintendent of Public Instruction has a statewide approach and aims to improve the health of all children in Washington, including the estimated 4,400 kids with diabetes.[36] The Initiative is funded by the legislature as a budget proviso for one year. The funding, a total of $350,000 for all three agencies, provides one full time employee at each agency. The funding year is July 1, 2014 to June 30, 2015. In addition, all three agencies are contributing significant in-kind resources of leadership and communication staff to launch the initiative and help it become successful.

Washington Healthcare Improvement Network



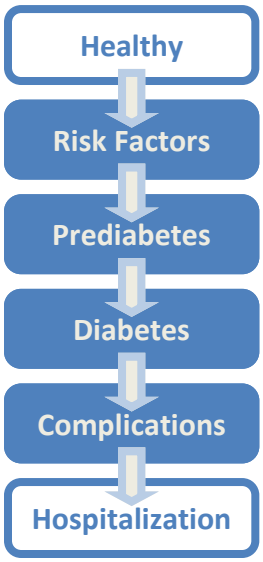
The Washington Healthcare Improvement Network (WHIN) offers individualized coaching for staff of clinics and health systems interested in patient-centered medical home development. It also offers technical assistance for monitoring population health metrics, including hypertension control and poor control of diabetes. WHIN coordinates live events and webinars, often focused on chronic disease prevention and management.

Since 2013, 43 practices and clinics from 14 Washington counties have participated in the WHIN collaborative. Combined, these clinics reach about 404,000 people, including about 61,000 covered by Medicare and 75,000 covered by Medicaid. For other counties and previous participants that want ongoing education, WHIN offers a self-paced, independent platform called the "WHIN Institute" that currently enrolls another 13 clinics.

WHIN grew in part from the Washington Patient-Centered Medical Home Collaborative, a two-year project of the department. In that project, 31 clinics across the state participated in intensive classes, coaching visits, and monthly webinars on how to implement effective medical homes. Among other findings, this resulted in more patients with diabetes receiving clinical services to address the disease.

The WHIN program is funded by the CDC at approximately $990,000 per year, which supports four Department of Health staff, CME credits for events, and four external contracts. There is no cost to clinics for the WHIN services.

Community Health Worker Training Program



Community health workers are frontline public health workers who are trusted members of their communities and have an unusually close understanding of it. The Community Health Worker Training is a free eight-week combination of online and in-person training designed to strengthen the skills, knowledge, and abilities of community health workers.

Department of Health staff facilitate the training, with local health educators as co-trainers. Community health workers who complete the training also have access to 11 on-line modules on topics such as Cardiovascular Health, Diabetes and Prediabetes, and Understanding Disparities & Social Determinants. Other modules are added as funding permits.

The program is low cost and easy to customize for different communities. Since 2012, it has provided core competency training to 623 community health workers across the state, and training to 311 community health workers about specific health topics. Of the latter, 73 have completed diabetes-specific training.

Currently, the program is funded at approximately $438,000 per year, which covers three staff, local co-trainers, and a contract for the web-based learning system, in addition to travel and in-person training costs.

Diabetes Surveillance, Epidemiology, and Evaluation

To make informed program and policy decisions about diabetes, we need good data. The Diabetes Surveillance, Epidemiology, and Evaluation section – along with many partners – collects and analyzes data, interprets the results, and disseminate its findings on health status, risk behavior, barriers to care, and other health issues related to diabetes through all stages of life. As part of this, the section evaluates whether programs are implemented as designed, who they affect, and how they affect them. It uses data and science to inform discussions on public health issues among programs and partners. It also offers technical assistance to help decision-makers integrate data and science into their decisions.

Partners include other Department of Health staff, other state and federal agencies, local health agencies, tribal nations, health care providers, universities and other researchers, peers in other states, advocacy groups, schools and education systems, and not-for-profit organizations. Working together, staff and partners receive more accurate, clear, relevant, and timely

information, can better integrate data into decision making, and make everyone more informed about the health status of the people of Washington.

An estimated $82,000 in federal funds from the Centers for Disease Control and Prevention were used by the Department of Health specifically on surveillance and evaluation of diabetes between July 1, 2013 and June 30, 2014. This work is intended to impact all people with diabetes of all types, as well as people at high risk for developing type 2 diabetes, in Washington. These costs vary from year to year, generally less than $100,000 per year.

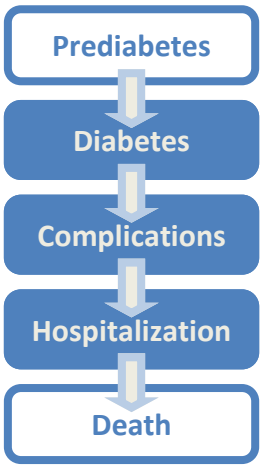
Department of Social and Health Services

Four of the eight administrations at the Department of Social and Health Services (DSHS) –

Aging and Long-Term Support Administration, Behavioral Health and Service Integration Administration, Children's Administration, and Developmental Disabilities Administration – provide services and resources that contribute to improving clinical outcomes for children and adults with diabetes.

As with Department of Health programs, most DSHS services address chronic diseases in general, or offer personalized care for each client, many of whom have diabetes, instead of focusing on diabetes alone.

Medicaid Health Homes Program

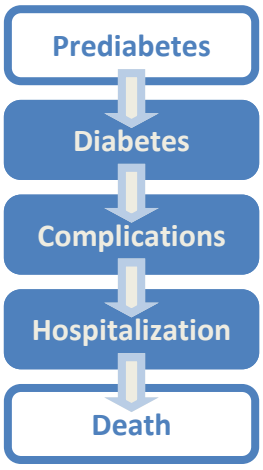


The Medicaid Health Homes Program is a service for Medicaid recipients allowed through the Affordable Care Act and administered in partnership by DSHS and the Health Care Authority. It serves people who already have one chronic disease and are at a higher risk of future medical expenses; about one-third of those eligible have diabetes.

Medicaid Health Homes provide outreach to patients, care coordination across all delivery systems, development of a personalized health action plan, education and coaching of patients, and care transition between institutional settings and the community. The service is available in all counties except King and Snohomish, where an alternative duals integration demonstration program is under development. CMS rules do not allow health homes in the same counties as a duals demonstration project.

In FY 2014, about 2,900 Medicaid clients with diabetes received health home services, costing $24,036 in state funds (health homes are 90 percent federally funded for the first eight quarters). This program began only recently, and enrollment will increase.

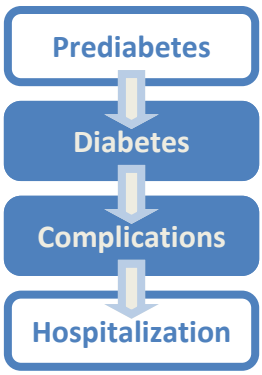
Care Transitions Program



Building on a demonstration project in Whatcom County, the Care Transitions Program was a four-week process that encouraged people with multiple chronic conditions, often including diabetes, to take a more active role in their health care. Participants had a "transition coach" who follows them across settings for four weeks after leaving the hospital. They learned skills such as medication self-management and recognizing "red flag" indicators of worsening condition.[37]

The program was launched in 2010 as a two-year project by DSHS in collaboration with Area Agencies on Aging, Qualis Health, Washington State Hospital Association, the Care Transitions Intervention[sm], and Insignia. It received total funding of $401,900 through the Affordable Care Act. Data from five counties showed an average 8.3 percent improvement in hospital readmission rates.[38]

Chronic Disease Self-Management Education Programs[39]



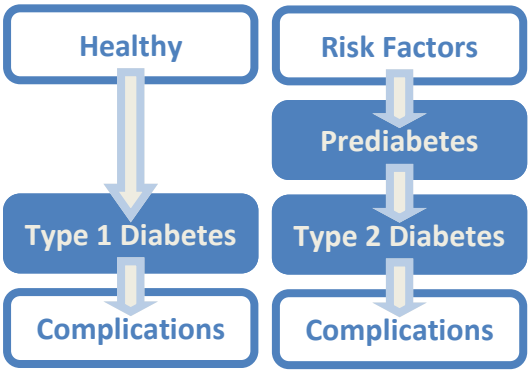
DSHS coordinates the delivery of workshops for people with chronic conditions, about one-quarter of whom have diabetes, or their friends and family. These six-week Chronic Disease Self-Management workshops are an example of an evidence-based approach to helping individuals self-manage their condition.

One such workshop focuses specifically on diabetes, and addresses topics such as appropriate exercise, healthy eating, and dealing with both physical symptoms and emotional problems. It is offered through weekly sessions for six weeks, in community settings such as churches, community centers, libraries, and hospitals. Participants make weekly action plans, share experiences, and help each other solve problems. Research by Stanford University, which developed the workshops, showed that six months later participants had significant improvements in depression, symptoms of hypoglycemia, communication with physicians, healthy eating, and reading food labels. Many studies indicate positive health outcomes for participants in Chronic Disease Self-Management Education programs, and recent studies have suggested that the savings from reduced health care expenditures by participants will either break even, or yield a return on investment for these programs of around 2:1. Details about the return on investment for Chronic Disease Self-Management Programs can be found in Appendix 5.

DSHS received a three-year federal grant starting in 2012 and totaling $984,933 to expand these programs in Washington. The grant requires full participation of the Department of Health, which provides substantial staffing. This shared coordination is required by federal funding, but has enhanced the sustainability of CDSME. The strength of having the program so firmly embedded in two state agencies, is demonstrated ability to mobilize diverse partnerships, share

efficiencies, and expand the reach of the program, as social services and public health are often not integrated at the local level. This seeming redundancy helps protect the program if funding cuts from federal sources occur at one agency, but not the other. So far, 53 organizations have become licensed to provide Chronic Disease Self-Management Education programs at 221 sites, and have engaged 5,164 participants.[40]

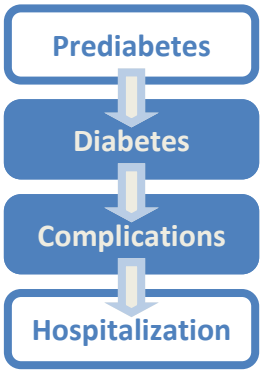
Fostering Well Being Program



The Fostering Well-Being Care Coordination Unit provides services for children who are in DSHS or tribal care and custody, including extended foster care for those age 18-21, and are Medicaid eligible. When children in foster care move from one setting to another – to different medical providers and different schools – doctors or teachers who might normally observe health changes do not see them over extended periods. This can lead to diabetes and other health issues going undiagnosed, causing lifelong implications for health and well-being.

In partnership between DSHS and the Health Care Authority, this program aims to ensure that these children's medical, mental health, and chemical dependency needs are identified and met. Anyone can make a referral including social workers, Child Health Education and Tracking CHET Screener, tribal Indian Child Welfare staff, Regional Medical Consultants, caregivers, and medical providers.[41] The Fostering Well-Being Care Coordination Unit (FWB CCU) is funded through general state funds and federal Medicaid funds totaling $1.5 million.

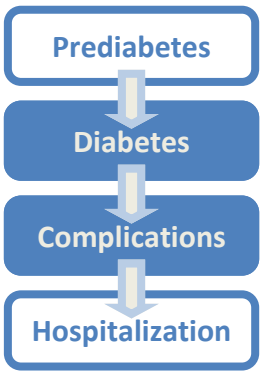
Senior Information and Assistance Services/Aging and Disability Resource Centers



The 13 Area Agencies on Aging are the hubs for a network of community services for older adults, people with disabilities, and family caregivers. These centers are designed to place highly visible and trusted staff in every community where older people of all incomes and disabilities can get information and one-on-one counseling on long term services and support options regarding many issues, including diabetes.[42] Priority is given to older people who are low-income, minorities, isolated and reside in rural areas, or have limited English proficiency. People with diabetes can benefit from services such as Chronic Disease Self-Management Education, nutrition screening and counseling, senior drugs education, and support for family caregivers.

Funding for this work is provided by both state funds and the Federal Older Americans Act.

Long Term Services and Supports Programs



Long term services and supports, provided through the Aging and Long Term Support Administration, are services for older adults and people with functional disabilities. Priority attention is given to low-income individuals and families. It is not limited to people with diabetes, but many clients receiving long term services and supports (48 percent) do have a diagnosis of diabetes. These services are designed to maximize each client's independence, dignity, and quality of life, and allow them to reside in the least restrictive care setting possible.

Case managers develop personalized service plans that address needs ranging from mobility support to bowel and bladder care to meal preparation, and coordinate with caregivers and other health and social service providers. Most clients receive in-home care, while others are in assisted living or adult family homes. These community settings are much less expensive than nursing homes. The program also conducts facility oversight and Adult Protective Services.

Table 10. Costs of Different Long-Term Care (LTC) Settings*

Community Service Setting	ADSA Clients	Total Funds Annual Cost (per member) (average)
In-Home Care (Individual Provider & home care agency)	35,000	$17,000
Boarding Homes/Assisted Living (Assisted Living, avg. 53 beds/home)	6,700	$14,000
Adult Family Home (up to 6 people per home)	5,400	$21,000
Total Community Settings	**47,100**	**$17,333 (weighted average)**
Institutions	ADSA Clients	Total Annual Cost (average)
Nursing Homes	10,000	$57,000

Source: ADSA forecasting, November 2012
*FY 2012 Actual/Forecasted Data (Rounded). Totals may not add due to rounding
** Per caps are driven by acuity of clients served and scope of services included in the setting
(table represents clients receiving personal care services (PCS) through Home and Community Services. It excludes clients who are receiving PCS through Developmental Disability Administration (DDA))

The 2011-2013 biennial budget for this program was $1.7 billion, with 90 percent allocated to contracted client services. This is nearly one-third of the total DSHS budget, and covers 1,382 employees.

Health Care Authority

The Health Care Authority oversees the state's two largest purchasers of health care: the Public Employees Benefits Board (PEBB), and Washington Apple Health.

Public Employees Benefits Board

All

As an employer, Washington state government provides medical, dental, life, and long-term disability insurance coverage to about 350,000 eligible state and higher-education employees, retirees, and their dependents. The Public Employees Benefits Board manages this coverage, through private health care providers.

- **Uniform Medical Plan*:*** The Uniform Medical Plan is a self-insured, preferred provider health insurance plan available to PEBB enrollees worldwide.
- **Group Health Cooperative and Kaiser Permanente:** These plans provide fully insured managed care health insurance coverage to PEBB enrollees in selected areas of Washington.
- Medicare eligible enrollees may also receive coverage through these health plans or may choose a Medicare Part F supplement through Premera Blue Cross.

For people with diabetes or prediabetes, commonly covered services include screening and diagnosis, routine testing and follow-up, medications, education, specialist care (such as by endocrinologists, ophthalmologists, and surgeons), inpatient hospitalization, and rehabilitation or long term care services. Also, preventative dental care is especially important for those with diabetes.

All

SmartHealth: In 2013, Governor Inslee issued Executive Order 13-06 (Improving the Health and Productivity of State Employees and Access to Healthy Foods in State Facilities) directing the Health Care Authority to implement a comprehensive wellness program. This program, dubbed SmartHealth, is managed by the PEBB. SmartHealth works to make healthy choices easier for state employees, retirees, and their dependents, and thereby improve productivity and slow the rise of health care costs. Among many other things, eligible PEBB subscribers who complete three wellness activities can earn a $125 financial incentive in the form of a reduced medical plan deductible or contribution to their health savings account.

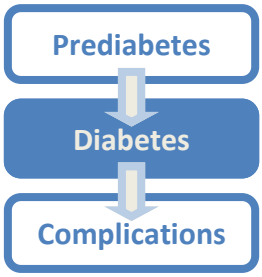
SmartHealth includes diabetes screening and access to the Diabetes Prevention Program and Diabetes Control Program for certain eligible PEBB members.

Diabetes Prevention Program: The PEBB is a leader is engaging their enrollees in the Diabetes Prevention Program. The program is described in more detail above, under the Department of Health. The PEBB brings the CDC Risk Quiz and blood testing directly to state employee worksites, including higher education institutions and other public employers covered by PEBB, and offers on-site classes.

The PEBB is expanding the reach of the Diabetes Prevention Program to areas of lower concentration of state employees by collaborating across multiple agencies to hold joint testing events and classes. The next

challenge is to collaborate more closely with providers of community classes and develop a promotional program for spouses and partners.

A significant number of PEBB enrollees tested receive a result in the diabetes range. These people are encouraged to see their medical provider and are given information regarding the Diabetes Control Program.



Diabetes Control Program: The Diabetes Control Program, launched in January 2014, provides enrolled PEBB members access to a pharmacist with specific training in supporting diabetes self-management. Through one-on-one coaching, the goal is improved outcomes for glucose, blood pressure, lipids, and weight control. Currently, the program operates mostly through Safeway pharmacies.

For now, the DCP is offered to non-Medicare members 18 years and older who are enrolled in the Uniform Medical Plan and have been diagnosed with diabetes. In 2015, the DCP will be promoted within the incentive structure of the SmartHealth program, and Diabetes Control Program participants will earn SmartHealth points that contribute toward the financial incentive.

Washington Apple Health and Medical Assistance Programs

Washington Apple Health (formerly known as Medicaid) is the largest medical assistance program in our state, providing health care coverage to approximately 1.6 million low-income residents.[43] Almost half of them are children covered by Apple Health for Kids. The cost of Apple Health is shared by the state and federal governments.

Like health insurance, the Apple Health fee-for-service program provides screening and diagnosis, routine testing and follow-up, medications, education, specialist care (such as by endocrinologists, ophthalmologists, and surgeons), inpatient hospitalization, and rehabilitation or long term care services for people who have diabetes or prediabetes. The adult dental benefit provides annual check-ups and certain x-rays, preventative services, basic restorative benefits and limited specialized services including dentures, oral surgery, and periodontal benefits. Clients receive six visits per year for diabetes education benefits, or more if medically necessary.

Managed care organizations (MCOs) that contract with Apple Health are expected to provide health care services similar to the fee-for-service benefits. In addition, managed care organizations contracts require monitoring and annual reporting of quality, utilization, and outcome measures, including for people with chronic conditions such as diabetes. One element of this reporting is the Healthcare Effectiveness Data and Information Set (HEDIS) standardized Comprehensive Diabetes measure. The Health Care Authority uses these performance measures to monitor MCO performance in delivering high quality, efficient health care services.

Finally, the MCOs engage in various health promotion, disease prevention, and disease management activities directed at clients at risk for or with diabetes. These include written educational material and posters, phone outreach to remind clients about gaps in care (such as diabetic eye exams), rewards to clients for closing those gaps, disease management coaching including home visits and certified diabetes educators, and communication to providers about members who need specific services.

For references, supplemental data, and additional information about the programs listed in this section, see Appendix 4.

Appendix 1: Legislation

ESSB 5034

In 2013, the Washington State Legislature passed, and the Governor signed, Third Engrossed Substitute Senate Bill 5034, making operating appropriations for the state's 2013-2015 biennium. Section 211(3), section 213(17), and section 219(23) of this bill directed and allocated funds for the Health Care Authority, the Department of Social and Health Services, and the Department of Health, respectively, to:

> ...Develop a report on state efforts to prevent and control diabetes. The [agencies] shall submit a coordinated report to the governor and the appropriate committees of the legislature by December 31, 2014, on the following:
>
> (a) The financial impacts and reach that diabetes of all types and undiagnosed gestational diabetes are having on the programs administered by each agency and individuals, including children with mothers with undiagnosed gestational diabetes, enrolled in those programs. Items in this assessment must include:
>
> > (i) The number of lives with diabetes and undiagnosed gestational diabetes impacted or covered by the programs administered by each agency;
> >
> > (ii) the number of lives with diabetes, or at risk for diabetes, and family members impacted by prevention and diabetes control programs implemented by each agency;
> >
> > (iii) the financial toll or impact diabetes and its complications, and undiagnosed gestational diabetes and the complications experienced during labor to children of mothers with gestational diabetes places on these programs in comparison to other chronic diseases and conditions; and
> >
> > (iv) the financial toll or impact diabetes and its complications, and diagnosed gestational diabetes and the complications experienced during labor to children of mothers with gestational diabetes places on these programs;
>
> (b) An assessment of the benefits of implemented and existing programs and activities aimed at controlling all types of diabetes and preventing the disease. This assessment must also document the amount and source for any funding directed to each agency for the programs and activities aimed at reaching those with diabetes of all types;
>
> (c) A description of the level of coordination existing between the agencies on activities, programmatic activities, and messaging on managing, treating, or preventing all types of diabetes and its complications;

(d) The development or revision of detailed policy-related action plans and budget recommendations for battling diabetes and undiagnosed gestational diabetes that includes a range of actionable items for consideration by the legislature. The plans and budget recommendations must identify proposed action steps to reduce the impact of diabetes, prediabetes, related diabetes complications, and undiagnosed gestational diabetes. The plans and budget recommendations must also identify expected outcomes of the action steps proposed in the following biennium while also establishing benchmarks for controlling and preventing all types of diabetes; and

(e) An estimate of savings, efficiencies, costs, and budgetary savings and resources required to implement the plans and budget recommendations identified in (d) of [this subsection].

Appendix 2: What is Diabetes?

Diabetes is a complex group of diseases with a number of causes. Diabetes is marked by harmfully high blood glucose, also called high blood sugar or hyperglycemia.

Diabetes is a disorder of metabolism. In a person without diabetes, the digestive tract breaks down carbohydrates—sugars and starches found in many foods—into glucose, a form of sugar that enters the bloodstream. With the help of the hormone insulin, cells throughout the body absorb glucose and use it for energy. Diabetes develops when the body doesn't make enough insulin, is not able to use insulin effectively, or both. Diabetes is categorized in two types according to the effect of insulin production in the body.

Insulin is made in the pancreas. In type 1diabetes, the pancreas no longer makes insulin, which allows glucose to enter the cells, which prevents blood glucose from entering these cells to be used for energy. Type 1 diabetes accounts for 5-10 percent of the total population of people with diabetes.[3] In type 2 diabetes the pancreas does not make enough insulin or the body is unable to use insulin correctly, or both. Type 2 diabetes accounts for 90–95 percent of the total population of people with diabetes.[3]

Individuals who have not been diagnosed with fully expressed diabetes may be diagnosed with prediabetes. Prediabetes is marked by blood glucose levels higher than normal but not yet high enough to be classified as diabetes. In most cases of type 2 diabetes, prediabetes develops first. Approximately 80 percent of people with type 2 diabetes are overweight or obese.[36] Approximately one third of adults in Washington have prediabetes but may not be aware of their status.[36] Prediabetes does not apply to type 1 diabetes.

Gestational diabetes is a form of higher than optimal levels of blood glucose when the body is not able to make and use all the insulin it needs during pregnancy. According to Washington State birth certificates nearly 1 in 14 (7 percent) births are affected by gestational diabetes.[36] Gestational diabetes poses serious risks to both mother and baby, including increased risk of birth injury or cesarean delivery, neonatal hypoglycemia, and preeclampsia. Some women are at greater risk for developing gestational diabetes because of their age, ethnicity, and other risk factors associated with development of type 2 diabetes.

Diabetes is a chronic health condition; currently, there are no safe, effective cures for diabetes. In type 1 diabetes, insulin treatment is required. These treatments are given through injections or an insulin administration device, called a pump, which mimics the action of the pancreas in releasing insulin into the body to maintain healthy blood glucose levels. In type 2 diabetes, oral medications alone or along with insulin may be used to maintain healthy blood glucose levels.

For all forms of diabetes, eating patterns that lead to healthy blood glucose levels and regular physical activity are necessary parts of treatment. Chronically uncontrolled blood sugar levels

lead to damage to essential organs, including the eyes, heart, kidneys, and the nervous system. Regular preventive treatment is necessary to not only support self-management of this chronic health condition, but to detect and treat early signs of complications that might otherwise lead to heart attacks, strokes, blindness, kidney failure and amputations. Diabetes is a leading cause of death nationally, and contributes to deaths from numerous other comorbid conditions.[3]

Much of the needed preventive health maintenance is the same for people with both type 1 and type 2 diabetes. In type 1 diabetes, interventions that prevent complications and mitigate the impact of the condition on the lives of people with diabetes are ideal. Managing type 1diabetes is particularly complex and requires supportive health care and engaged community and family systems. For people with diabetes, reliable access to high quality health care and continuity of this care is essential. Gaps in service and poor coordination of care can exacerbate an already difficult-to-manage health condition. Lack of access to proper medical treatment and medications can be life threatening; it is not possible to manage type 1 diabetes without insulin injections.

Below is a table of necessary preventive treatments for adults with diabetes. Specific recommendations are guided by the person's age, gender, diabetes control, and other health conditions. These are in addition to all recommended preventive services for children and adults, such as regular primary care visits and immunizations.

Table 11. Necessary Preventative Treatments for Adults with Diabetes

Daily	Each Visit	At least once a year	Once every 3-6 months	At least once, or more often as indicated
Self-monitor blood sugar	Review medicines	Dilated eye exam	A1C	Pneumonia shot
Be physically active	Review self-care plan	Complete foot exam		Hepatitis B shot
Eat healthfully	Foot check	Dental exam		Diabetes Self-Management Education
	Weight check	Cholesterol		
	Blood Pressure	Flu shot		
		Kidney check		

Source: American Diabetes Association. Standards of medical care in diabetes--2014. Diabetes Care. 2014;37(Suppl 1):S14-S80.

Unfortunately, not all people with diabetes receive the recommended care. In Washington, diabetes patients are slightly more likely to receive recommended care than in the rest of the nation, but still only about 60-70 percent of patients receive a given treatment.

Table 12. Percent of Adults with Diabetes Achieving Recommended Medical and Self Care

	Washington State	United States
Preventive Care	Percent (95% CI)	Percent (95% CI)
Glycosylated hemoglobin (A1c) measurement at least twice a year	72.2 (68.9-75.3)	73.3 (72.4-74.3)

Annual dilated eye examination	69.3 (66.1-72.3)	68.4 (67.5-69.4)
Annual foot examination by health care provider	77.0 (74.0-79.7)	73.0 (72.2-73.9)
Annual dental examination	60.2 (56.8-63.5)	56.5 (55.6-57.4)
Annual influenza vaccine	58.8 (55.4-62.1)*	54.1 (53.2-55.0)
Ever have pneumonia vaccine	67.5 (63.9-70.8)*	57.2 (56.2-58.1)
Received formal diabetes education	66.2 (62.8-69.3)*	55.1 (54.1-56.0)
Perform self-blood glucose monitoring at least once daily	62.4 (59.1-65.7)	64.4 (63.4-65.3)
Check feet for sores or irritations at least once daily	53.6 (50.2-57.0)*	64.6 (63.7-65.6)
Annual cholesterol check[a]	85.6 (82.3-88.4)	88.7 (88.1-89.3)

Source: Washington State and US Behavioral Risk Factor Surveillance System Surveys, 2012. Abbreviations: CI, confidence interval.
[a]Asked on 2011 survey.
*Age-adjusted percentages statistically significantly different.

The costs of regular preventive care are minor in comparison with the costs incurred by hospitalizations and emergency visits. They are also minor compared to the costs of care needed for people with complications from diabetes such as kidney disease, including the need for kidney dialysis, blindness, amputations and cardiovascular events. Nationally, the American Diabetes Association (ADA) estimates people with diagnosed diabetes incur average medical expenditures of about $13,700 per year, compared to $5,959 for people without diabetes. The American Diabetes Association estimates about $7,900 of $13,700 is attributable to diabetes.[25]

The original ADA estimate for direct medical expense attributable to diabetes in the state of Washington in 2012 was $3.75 billion and, for reduced productivity due to lost work time, $1.36 billion. This was confirmed through analysis with one population data set produced by the Office of Financial Management (OFM). Differences in population data sets from OFM and potential rounding errors mean the prevalence data for this estimate is approximately 25,500 less people than the Department of Health's prevalence estimates.[28] If we use the higher prevalence estimate given earlier in this report, the estimated cost rises to approximately $3.95 billion, plus $1.44 billion in reduced productivity. Similarly, for anticipating the future costs, if we use a larger prevalence estimate the total costs becomes $5.97 billion, an increase of about $580 million. The lower estimate was used in section 4 of this report, in the interest of being fiscally conservative.

The ADA cost figure includes some costs which are not clearly billed as diabetes-related costs, but are likely exacerbated by a diagnosis of diabetes. For example, a person hospitalized for a non-diabetes related event may be more likely to be held an additional day and thus incur a higher expense if they have a diagnosis of diabetes, out of fear of complication by this comorbidity. Accounting for this portion of the cost of diabetes among Medicaid is outside of the scope of the report, but this difference in methodology should be noted for those seeking to compare figures.

Gestational diabetes costs were estimated using costs reported in 2009. These were adjusted to 2012 dollars using a standard inflation rate, not a medical inflation rate, which may have been greater for some services.

Prediabetes costs were estimated using costs reported in 2012. Dollars are unadjusted because of the publication date. The final figure nevertheless relies on pre-2012 data, and may vary from a retrospective analysis of 2012 data.

Neither prediabetes nor gestational diabetes costs were adjusted for Washington State specific costs using the Missouri Economic Research Information Center. This is due to differing methodologies between the ADA cost of diabetes and Vojta and Yaozhu et al's costs of prediabetes and gestational diabetes. If prediabetes or gestational diabetes costs were adjusted for Washington State specific costs, they would likely be higher.

Gestational Diabetes

Because gestational diabetes can cause harm to both mother and baby and has few symptoms, it is recommended that all pregnant women be tested in weeks 24-28 of pregnancy. There are no known methods to prevent gestational diabetes; however, there are some risk factors for gestational diabetes that may be modified. During pregnancy, women can treat and manage their gestational diabetes through diet and exercise modification and if necessary, insulin or other medication.

After a woman with gestational diabetes gives birth, her blood glucose may return to normal. In some cases, however, women who had gestational diabetes may have blood glucose levels that remain elevated after the baby is born. A post-partum visit can confirm whether blood glucose has returned to normal. If blood glucose has not returned to normal, type 2 diabetes or prediabetes may be diagnosed. Gestational diabetes also puts both mother and child at a higher risk of developing type 2 diabetes later in life. This is one of many reasons that a post-partum visit five or six weeks after birth focused on the mother's health is crucial. Unfortunately, this visit is often delayed or missed.

Interventions associated with risk factors

There are several risk factors associated with the development of prediabetes, gestational diabetes, and type 2 diabetes that can be modified through interventions. However, there are others that cannot be modified. No known modifiable risk factors for type 1 diabetes have been discovered.

Table 13. Risk Factors Associated with the Development of Diabetes

Modifiable	Non-Modifiable	Socially Determined
Weight gain	Age	Education level
Overweight or obesity	Ethnicity	Income level
Sedentary lifestyle	Gender	Geography
Tobacco use	Family History	

High blood pressure	History of Gestational Diabetes
High cholesterol	Polycystic Ovarian Syndrome (PCOS)

Source: National Institutes of Health (http://diabetes.niddk.nih.gov/dm/pubs/riskfortype2/index.aspx) and Centers for Disease Control and Prevention for social determinants (http://www.cdc.gov/socialdeterminants/faq.html).

Health systems and public health interventions that raise awareness of non-modifiable risk factors and promote addressing modifiable risk factors have greatest potential impact on the prevention and/or delay of onset of type 2 diabetes.

Appendix 3: Diabetes in Washington

Diabetes in Adults

Diagnosed Diabetes

Self-reported data from the 2012 Behavioral Risk Factor Surveillance System (BRFSS) showed that an estimated 463,000 or 8.3 percent of adults 18 years and older were ever told by a doctor they had any type of diabetes. Type 1 diabetes accounts for about 5 percent (an estimated 23,000 adults) and type 2 accounts for 95 percent (an estimated 440,000 adults) of these diagnosed cases of diabetes.[44]

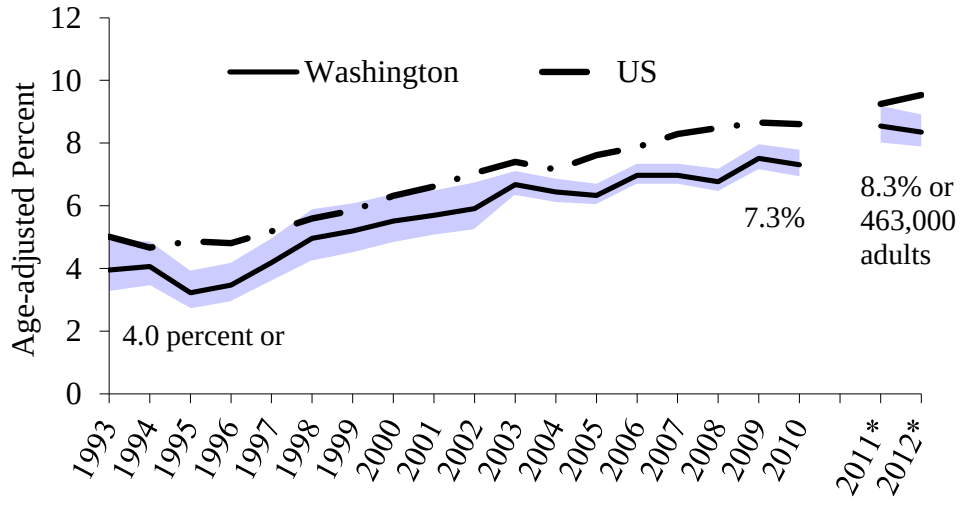
Undiagnosed Diabetes

Nationally it is estimated that 3.4 percent of adults 20 years and older are not aware that they have diabetes.[44] Applying this percentage to the Washington State population in 2012 yields an estimated 172,000 adults 20 years and older with undiagnosed diabetes.

Time Trends

Self-reported data from the BRFSS showed that the age-adjusted percent of Washington adults 18 and older with diabetes increased steadily from 4 percent in 1993 to 7 percent in 2010. This is similar to national trends.[45] The age-adjusted percent of Washington adults who reported having diabetes was 9 percent in 2011 and 8 percent in 2012. The national age-adjusted percent was slightly higher at 9 percent in 2011 and 10 percent in 2012. Data for 2011 and 2012 are not comparable to data from earlier years due to changes in methods of collecting and analyzing BRFSS data. This break in trend is shown in the chart below.

Chart 10. Diabetes Prevalence in WA and US

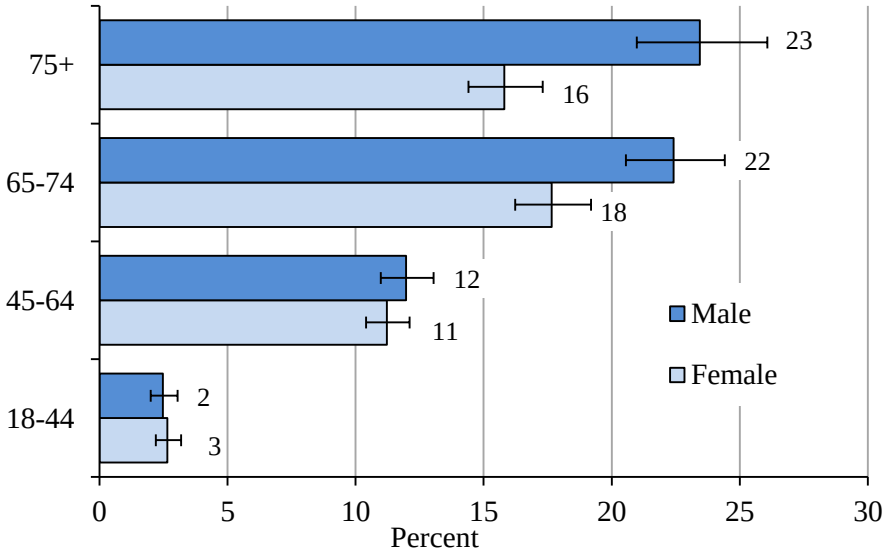


Source: Washington State and US Behavioral Risk Factor Surveillance Sytem Surveys, 1993-2012.
*Data not comparable to earlier years due to changes in methods of collecting and analyzing data.

Notable Differences

Age and Gender: Washington BRFSS data for 2010–2012 combined showed the percent of adults reporting diabetes increased with age. About 6 percent of adults under age 65 reported having diabetes. A higher percent of men than women reported having diabetes in age groups 65-74 and ≥75 years. This is similar to national patterns.[44]

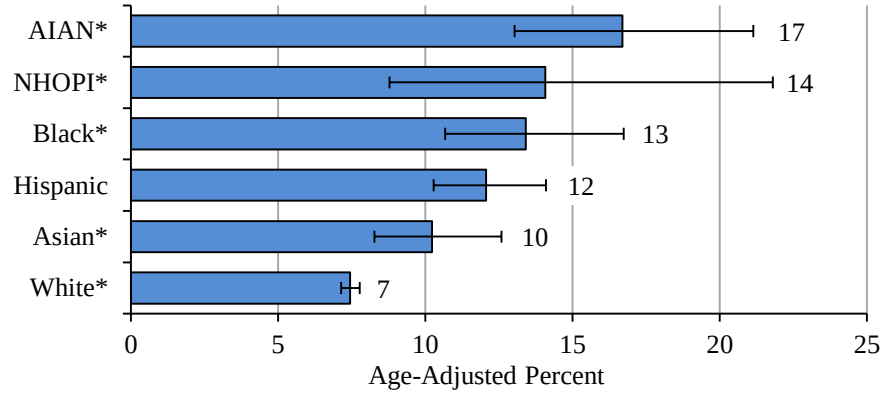
Chart 11. Diabetes Prevalence By Age and Gender



Source: Washington State Behavioral Risk Factor Surveillance Sytem Survey, 2010-2012.

Race and Hispanic Origin: Washington BRFSS data for 2010–2012 combined showed that white adults reported lower age-adjusted percent of diabetes (7 percent) than all other groups. Wide margins of error make it difficult to compare percentages between other groups. The high age-adjusted prevalence among American Indians and Alaska Natives (17 percent), followed by black (13 percent), Hispanic (12 percent) and Asian adults (10 percent) is consistent with national data.[44] National data are not available for Native Hawaiian and other Pacific Islanders. Poverty and lack of access to health care may be barriers to preventive care, including screening for diabetes, for some racial and ethnic minorities.[46] More detailed information on diabetes among American Indians and Alaska Natives can be found in reports from the Northwest Portland Area Indian Health Board, including the 2014 Portland Area Health Status Report.[47]

Chart 12. Diabetes Prevalence by Race and Hispanic Origin

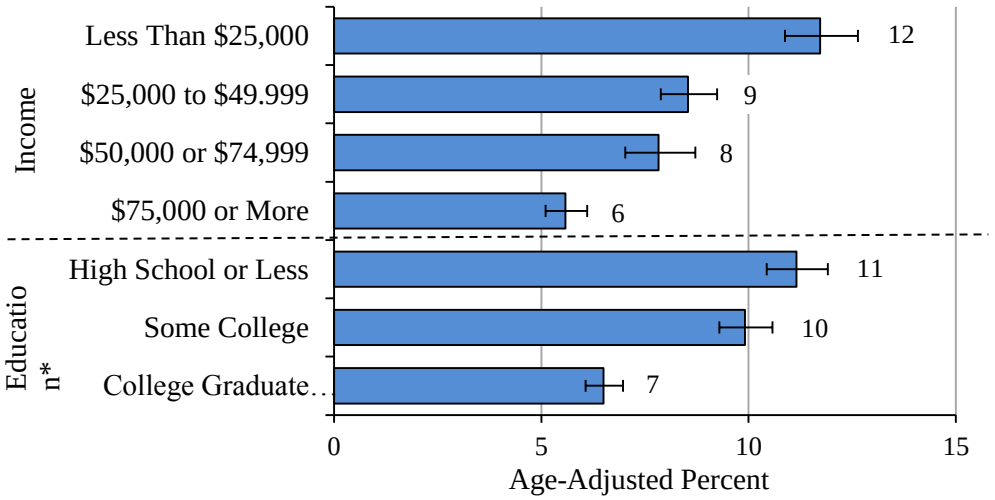


Source: Washington State Behavioral Risk Factor Surveillance Sytem Survey, 2010-2012.
Abbreviations: AIAN, Americian Indian/Alaska Native; NHOPI, Native Hawaiian/Other Pacific Islander. *Non-Hispanic, single race only.

Economic Factors and Education: People of lower socioeconomic position are more likely to develop diabetes.[48] Income and education are two common indicators used to measure socioeconomic position. Washington BRFSS data for 2010–2012 combined showed the age-adjusted percent of adults who reported diabetes increased with decreasing income. Adults with incomes less than $25,000 were 2 times more likely to report having diabetes than those with incomes of $75,000 or more.

Washington BRFSS data for 2010–2012 combined also showed the age-adjusted percent of adults 25 years or older who reported diabetes increased with decreasing levels of education. Adults with a high school education or less were almost two times more likely to report having diabetes than those with a college degree or more.

Chart 1. Diabetes Prevalence by Household Income and Education

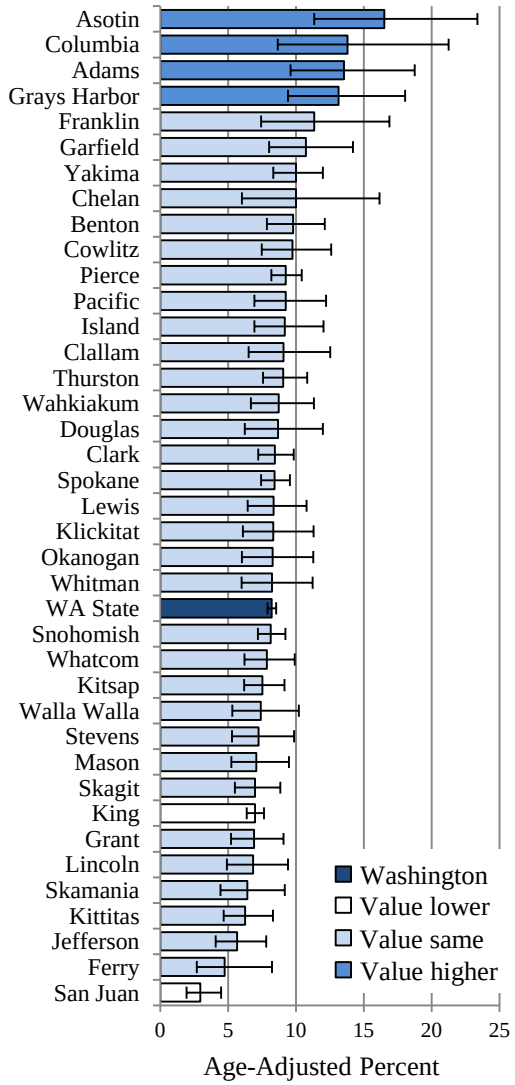


Source: Washington State Behavioral Risk Factor Surveillance Sytem Survey, 2010-2012.
*Among adults ≥25 years.

These relationships are similar to those found in other studies.[49,50,51] Differences in health behaviors, access to preventive health care services, access to material and social environments that make healthy behaviors easier to adopt, and effects of stress may account for the relationship between socioeconomic position and diabetes.[52,53]

Geographic Variation: On the Washington BRFSS for 2010–2012 combined, 8 percent (age-adjusted) of adults reported having diabetes. This ranged from 3 percent in San Juan County to 17 percent in Asotin County. Asotin, Columbia, Adams, and Grays Harbor counties had higher age-adjusted percentages of adults reporting diabetes than the state average; King and San Juan counties had lower percentages. There were too few BRFSS respondents in Pend Oreille County to report a reliable percent.

Chart 13. Diabetes Prevalence by County



Source: Washington State Behavioral Risk Factor Surveillance Sytem Survey, 2010-2012.

Older BRFSS data from 2001–2010 showed Adams, Asotin and Grays Harbor as having higher age-adjusted percentages of adults reporting diabetes compared to the state average. According to the 2012 American Community Survey, these counties also had lower percentages of college graduates, higher percentages of adults living below the federal poverty level, and fewer adults ages 18–64 with health insurance. Additionally, Washington State population estimates in 2012 showed that Adams County had a higher percentage of Hispanics and Grays Harbor County had a higher percentage of American Indian/Alaskan Natives than the state as a whole.

The counties with the largest numbers of people (that is, King, Pierce, and Snohomish) strongly influence diabetes prevalence statewide. The impact of these large urban counties needs to be considered when comparing counties to the state as a whole.

It is also important to note that, when data has been available to stratify below the county level for different factors such as racial, ethnic, and socioeconomic groups, local assessments have shown smaller areas and subpopulations within counties that have a higher burden of diabetes.

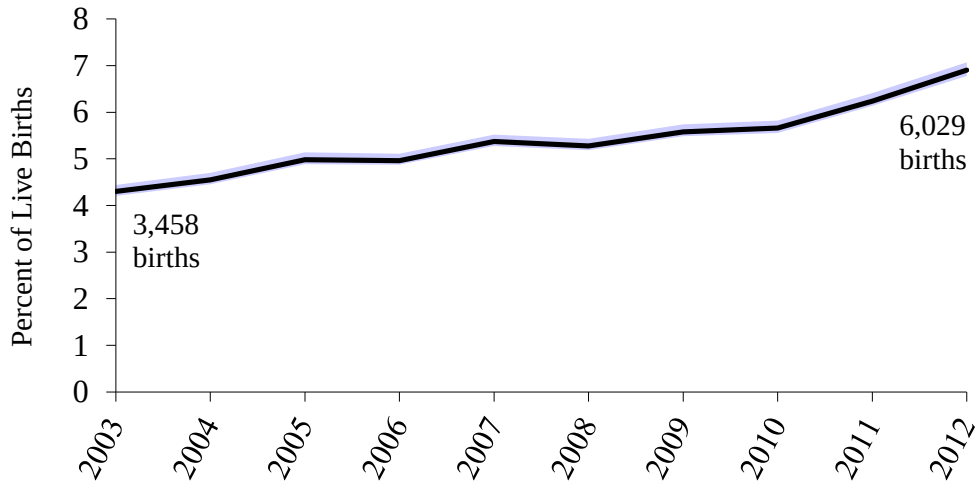
Diabetes and Pregnancy: Gestational Diabetes

The true prevalence of gestational diabetes is unknown. Nationally, gestational diabetes is estimated to affect 1 percent to 14 percent of pregnancies each year, depending on the population studied and diagnostic tests used.[54,55] Gestational diabetes recorded on birth certificates is used to monitor the impact and differences in gestational diabetes statewide. According to 2012 Washington State birth certificates, nearly 1 in 14 (7 percent) of live births were affected by gestational diabetes.

Time Trends

Washington birth certificate data showed the percent of births where mother has gestational diabetes steadily increased from 4.3 percent (3,458 live births) in 2003 to 6.9 percent (6,029 live births) in 2012.

Chart 14. Births to Mothers with Gestational Diabetes

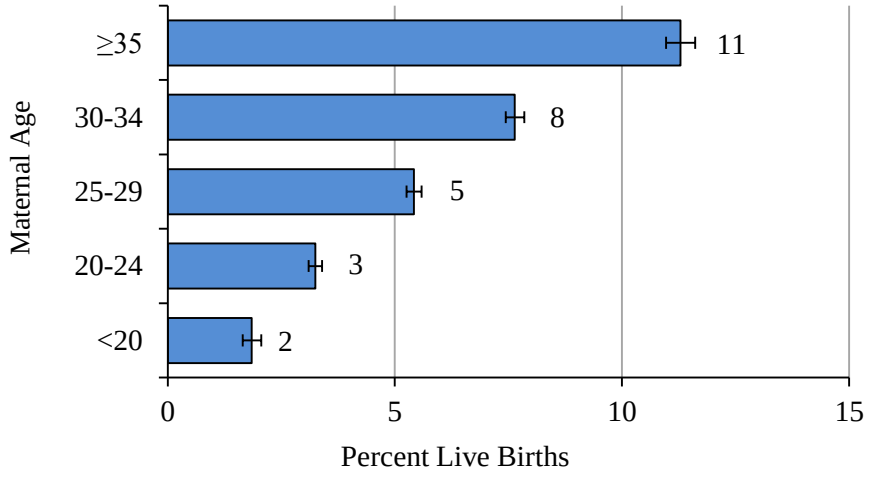


Source: Washington State Birth Certificates, 2003-2012.

Notable Differences

Maternal Age: Washington birth certificate data for 2010–2012 combined showed the percent of births with gestational diabetes increased with maternal age. This is similar to national patterns.[54]

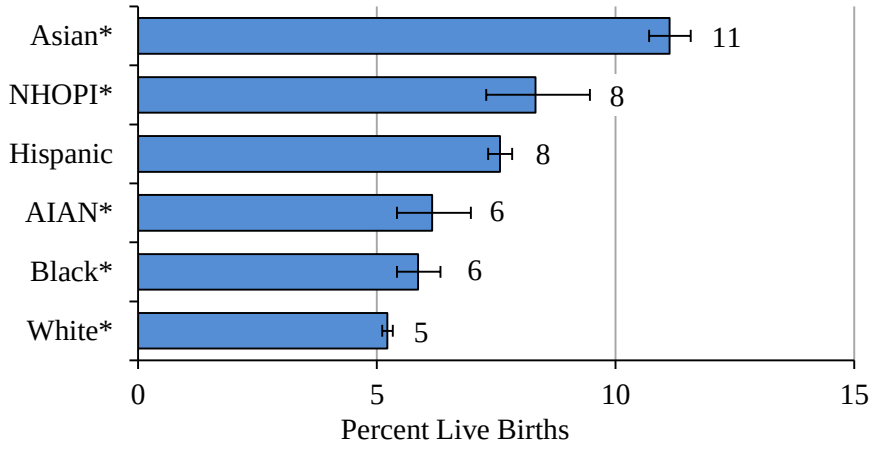
Chart 15. Births to Mothers with Gestational Diabetes by Maternal Age



Source: Washington State Birth Certificates, 2010-2012.

Race and Hispanic Origin: Washington birth certificate data for 2010–2012 combined showed white women had the lowest percent of births with gestational diabetes (5 percent) than all other groups. The high percent of births with gestational diabetes to Asian (11 percent), Native Hawaiian and Other Pacific Islanders (8 percent), and Hispanic (8 percent) women is consistent with national data.[54]

Chart 16. Births to Mothers with Gestational Diabetes by Race and Hispanic Origin

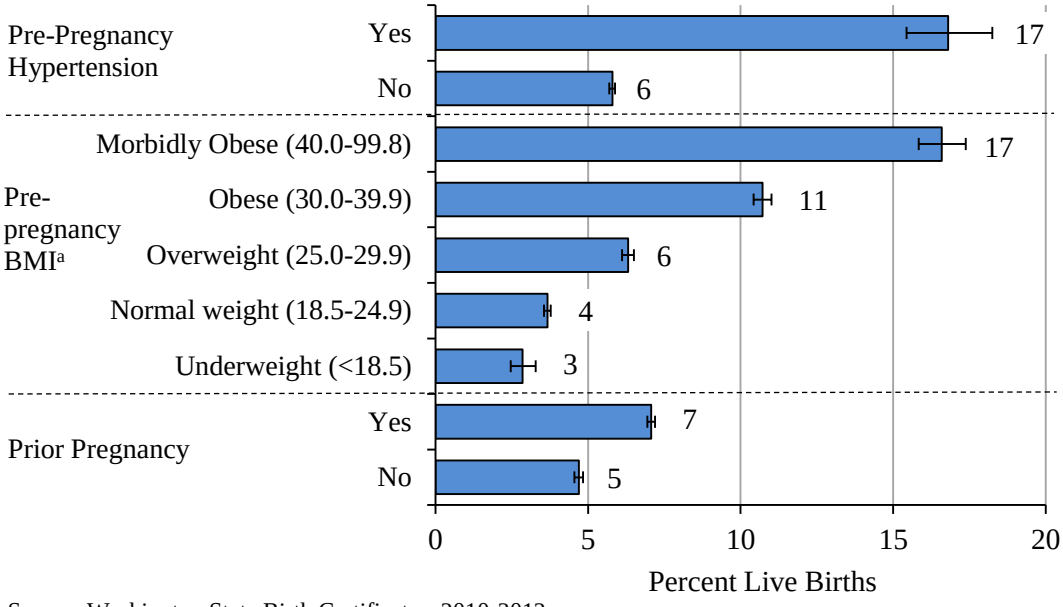


Source: Washington State Birth Certificates, 2010-2012. Abbreviations: AIAN, American Indian/Alaska Native; NHOPI, Native Hawaiian/Other Pacific Islander.
*Non-Hispanic, single race only.

Other: Washington birth certificate data for 2010–2012 combined showed a higher percent of births with gestational diabetes among women with pre-pregnancy hypertension (17 percent) and

prior pregnancy (7 percent) compared to those without. The percent of births with gestational diabetes also increased with a women's pre-pregnancy body mass index (kg/m^2).

Chart 2. Births to Mothers with Gestational Diabetes by Maternal Characteristics



Source: Washington State Birth Certificates, 2010-2012.
[a]Body mass index (BMI) is pre-pregnancy pounds/square of height in inches. Around 6% of birth records are missing pre-pregnancy weight or height.

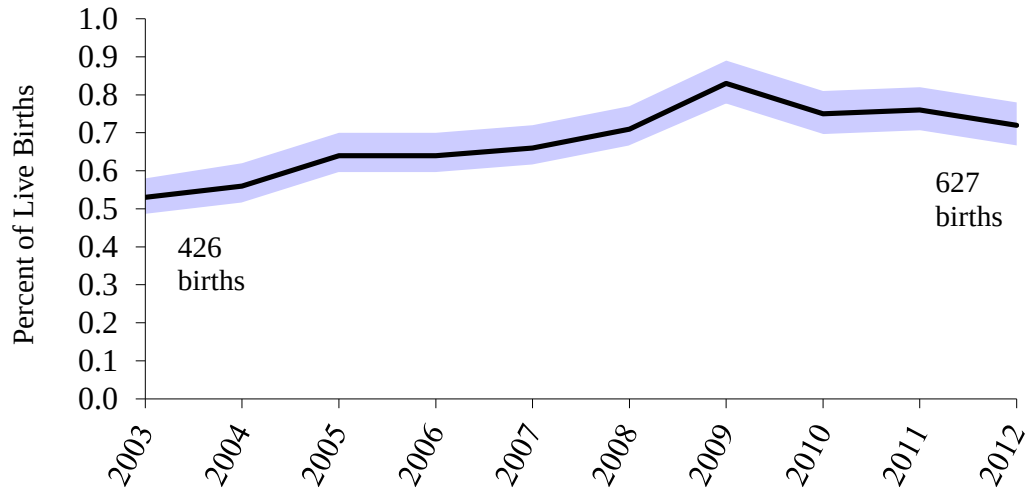
Diabetes and Pregnancy: Maternal Diabetes

In 2012, Washington birth certificate data showed that less than 1 percent of births are among mothers with pre-pregnancy type 1 or type 2 diabetes.

Time Trends

The percent of births to women with pre-pregnancy diabetes has only slightly increased from 0.5 percent (426 live births) in 2003 to 0.7 percent (627 live births) in 2012.

Chart 17. Births to Mothers with Pre-pregnancy Diabetes



Source: Washington State Birth Certificates, 2003-2012.

Diabetes and Pregnancy: Birth Outcomes

Blood sugar that is not well controlled in a pregnant woman with gestational or pre-pregnancy diabetes may lead to problems for the woman and the baby including birth defects, maternal high blood pressure, baby being born too early, miscarriage or stillbirth, and an extra-large baby resulting in a higher chance of needing a Caesarean section to deliver.[56] Studies show that if a woman with preexisting diabetes keeps her blood sugar well controlled before and during pregnancy, she can reduce the chance of having a baby with birth defects.[57]

The table below shows the distribution of select outcomes recorded in 2012 Washington State birth certificates for women with pre-pregnancy diabetes, gestational diabetes, and without diabetes. More mothers with gestational diabetes had a premature birth, gestational hypertension, and delivered by C-Section than mothers without diabetes. More mothers with pre-pregnancy diabetes had a high birth weight baby, premature birth, gestational hypertension, and delivered by C-Section than mothers with gestational diabetes and without diabetes.

Table 14. Birth Outcomes for Mothers with Gestational Diabetes, Pre-pregnancy Diabetes, and Without Diabetes

	Gestational Diabetes (6,099 total live births)		**Pre-pregnancy Diabetes** (645 total live births)		**Without Diabetes** (81,804 total live births)	
Birth Outcomes	Number of Live Births	Percent (95% CI)	Number of Live Births	Percent (95% CI)	Number of Live Births	Percent (95% CI)
Birth Weight[a]						
Low	468	7.7 (7.0-8.4)	93	14.4 (11.9-17.4)	4,958	6.1 (5.9-6.2)

Normal	4,846	79.5 (78.4-80.5)	419	65.0 (61.2-68.6)	68,254	83.4 (83.2-83.7)
High	785	12.9 (12.1-13.7)	133	20.6 (17.7-23.9)	8,592	10.5 (10.3-10.7)
Premature Birth						
Yes	821	13.5 (12.7-14.4)	163	25.3 (22.1-28.9)	7,772	9.5 (9.3-9.7)
Weight Gain During Pregnancy[b]						
Below Recommended	1,064	17.4 (16.5-18.4)	105	16.3 (13.6-19.3)	6,946	8.5 (8.3-8.7)
Recommended	1,446	23.7 (22.6-24.8)	122	18.9 (16.1-22.1)	11,976	14.6 (14.4-14.9)
Above Recommended	3,592	58.9 (57.6-60.1)	418	64.8 (61.0-68.4)	63,063	76.9 (76.6-77.2)
Hypertension						
Gestational	623	10.2 (9.5-11.0)	95	14.7 (12.2-17.7)	4,325	5.3 (5.1-5.4)
Final Delivery Method						
Vaginal	3,556	58.3 (57.0-59.5)	246	38.1 (34.5-42.0)	59,204	72.2 (71.9-72.5)
C-Section	2,546	41.7 (40.5-43.0)	399	61.9 (58.0-65.5)	22,776	27.8 (27.5-28.1)

Source: Washington State Birth Certificates, 2012.
Abbreviations: CI, confidence interval; g, grams.
[a]Birthweight catgories: low = 227-2,499 grams, normal = 2,500-3,999 grams, high = 4,000-8,164 grams.
[b]Weight gain is calculated as weight at delivery less pre-pregnancy weight. Based on 2009 Institute of Medicine recommendations, weight gain by pre-pregnancy body mass index status is underweight (28-40 pounds), normal weight (25-35 pounds), overweight (15-25 pounds), and obese (11-20 pounds).

Diabetes in Youth: Prevalence

Diabetes is one of the most common chronic diseases of childhood.[58] Unfortunately, data on how many youth have diabetes in Washington State are lacking. Nationally, the prevalence of diagnosed diabetes in youth younger than 20 years is monitored using the National Health Interview Survey. Information on diagnosed diabetes (type 1 of type 2) is obtained from a knowledgeable adult family member residing in the household for people younger than 18 years, and is self-reported for people aged 18–19 years. Currently, it is estimated that 0.26 percent of youth less than 20 years have diabetes in the United States.[44] Applying this percentage to the Washington State population in 2012 yields an estimated 4,400 youth with diabetes less than 20 years in Washington. National percentages for undiagnosed diabetes in youth are not available.

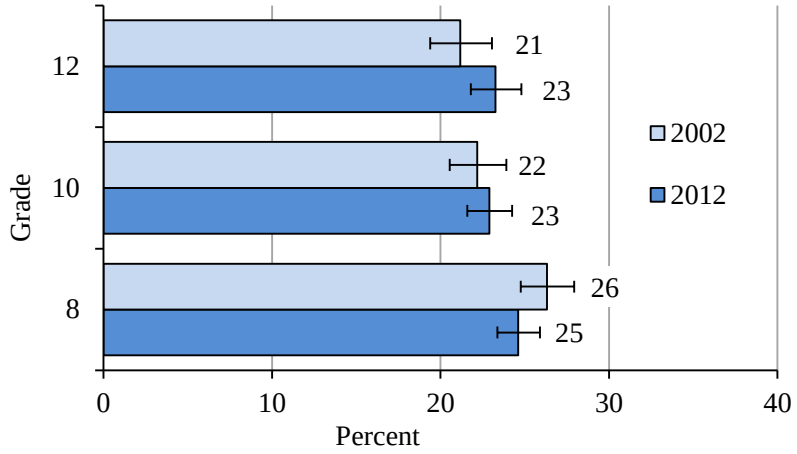
The SEARCH for Diabetes in Youth Study was funded in 2000 by the Centers for Disease Control and National Institutes of Health to examine the burden and changes over time in both type 1 and type 2 diabetes in children and youth.[59] It is a multicenter, epidemiological study, conducted in five areas of the United States, including five counties in Washington State. Latest SEARCH results showed that the prevalence of both type 1 and type 2 diabetes among children and adolescents has increased: type 1 diabetes increased from 1.48/1,000 youth <20 years in 2001 to1.93/1,000 in 2009, and type 2 diabetes increased from 0.34/1,000 youth age 10-19 years in 2001 to 0.46/1,000 in 2009).[60] Compared with other groups, in 2009, non-Hispanic white children and adolescents had the highest rate of type 1 diabetes.[61] The rates of type 2 diabetes, while still uncommon, were greater in youth 10-19 years than younger children, and higher among minority populations than in non-Hispanic whites.[61]

Diabetes in Youth: High Risk

Risk factors for type 2 diabetes in youth aged 18 years and younger include overweight and obesity, family history of type 2 diabetes in a first- or second-degree relative, race/ethnicity (Native American, African American, Latino, Asian American, Pacific Islander); signs of insulin resistance or conditions associated with insulin resistance (acanthosis nigricans, hypertension, dyslipidemia, polycystic ovarian syndrome, or small-for-gestational-age birth weight); and maternal history of diabetes or gestational diabetes during the child's gestation.[62]

Washington Healthy Youth Survey (HYS) data for 2012 showed that around 1 in 4 youth in grades 8, 10, and 12 reported heights or weights indicating overweight or obesity. As shown in the chart below this percentage has remained the same since 2002.

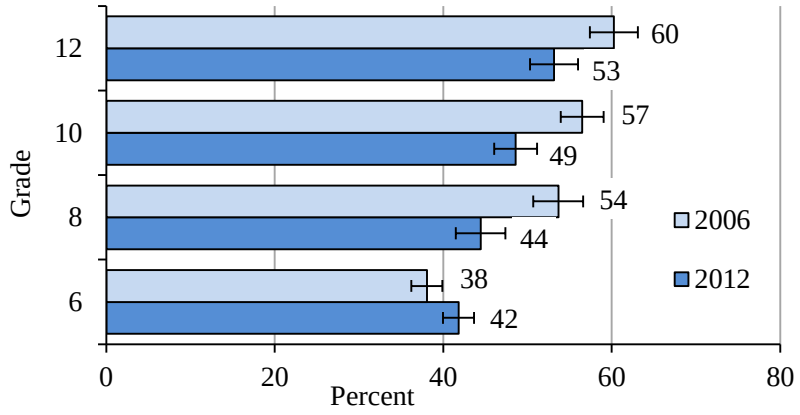
Chart 18. Percentage of Youth Overweight or Obese[a]



Source: Washington State Healthy Youth Survey.
[a]Overweight or obese defined as body mass index (kg/cm^2) >85th percentile for age and gender (based on growth charts).

Regular physical activity in childhood and adolescence helps control weight which can reduce the risk of developing obesity and chronic diseases, such as diabetes.[63] The Dietary Guidelines for Americans and the National Association for Sport & Physical Education recommend that children and adolescents participate in at least 60 minutes of physical activity most days of the week, preferably daily.[64] Washington HYS data for 2012 showed that 42 percent of youth in grade 6, 44 percent in grade 8, 49 percent in grade 10, and 53 percent in grade 12 did not meet current physical activity recommendations. As shown in chart 19 this percentage improved since 2006 for grades 8, 10, and 12, but around half still did not get enough physical activity.

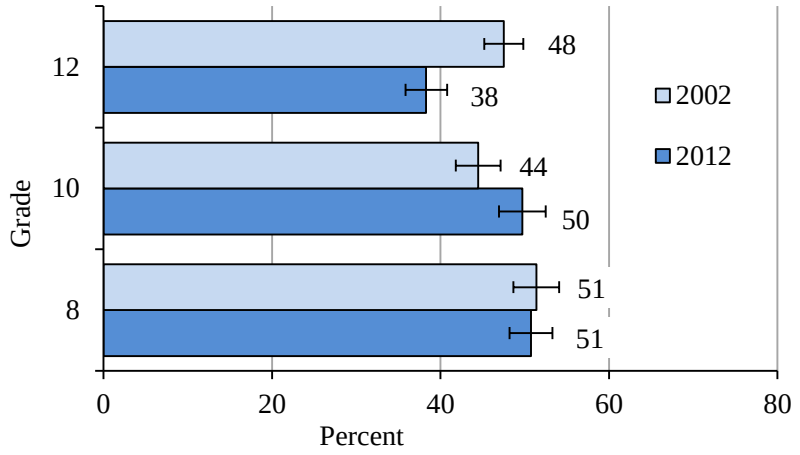
Chart 19. Percentage of Youth Did Not Meet Physical Activity Recommendations[a]



Source: Washington State Healthy Youth Survey.
[a]Dietary Guidelines for Americans and National Association for Sport & Physical Education recommend children and adolescents participate in at least 60 minutes of physical activity most days of the week.

One challenge to being more physically active is the amount of recreational screen time spent on sedentary activities such as watching TV, playing video games or using a computer for fun. Washington HYS data for 2012 showed that 51 percent in grade 8, 50 percent in grade 10, and 38 percent in grade 12 reported 3 or more hours of screen time for fun on an average school day. As shown in the chart below, this percentage only improved since 2002 for youth in grade 12.

Chart 20. Percentage of Youth With 3 or More Hours of Screen Time[a] on Average School Day

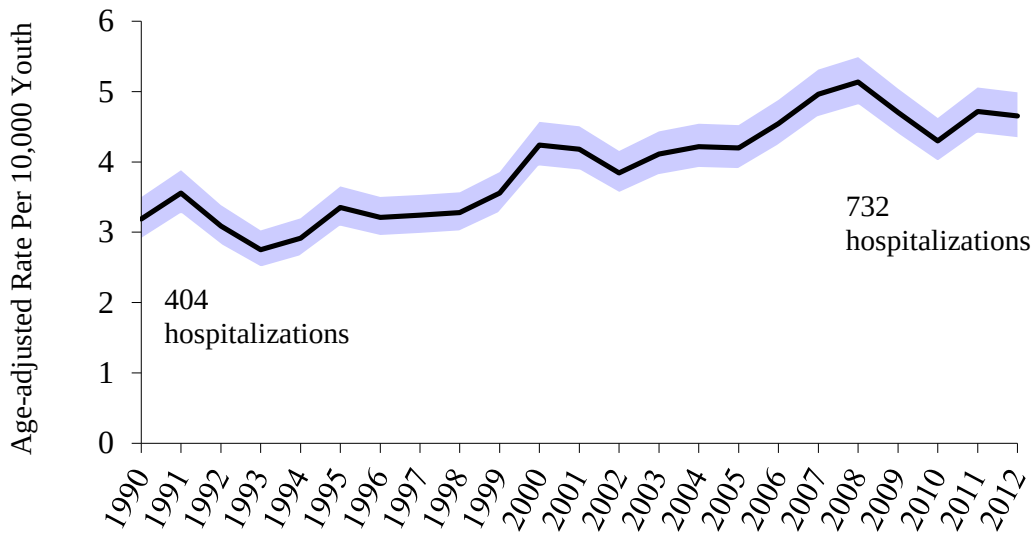


Source: Washington State Healthy Youth Survey.
[a]Watch television, play video games, or use computer for fun.

Diabetes in Youth: Morbidity

In 2012, 732 hospitalizations of Washington residents 18 years or younger hospitalized in Washington or Oregon included a primary diagnosis of diabetes. This is less than 1 percent of all hospitalizations in this age group. An additional 174 hospitalizations had a secondary diagnosis of diabetes. The age-adjusted rate of hospitalizations with a primary diagnosis of diabetes increased from 3.4 hospitalizations per 10,000 youth in 1990 to 4.6 hospitalizations per 10,000 youth in 2012.

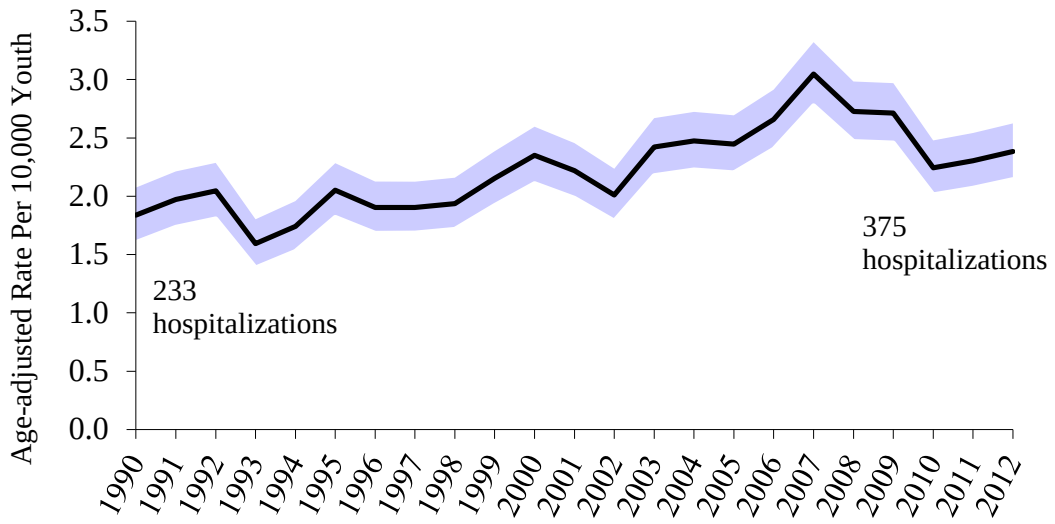
Chart 21. Rates of Diabetes Hospitalizations[a] Among Youth



Source: Washington State Hospital Discharge Data, 1990-2012.
[a]Hospitalizations with diabetes listed as primary diagnosis among youth <18 years.

Washington hospital discharge data in 2012 showed that over half of hospitalizations due to diabetes in youth 18 years or younger (375 hospitalizations) have diabetes short-term complications (including ketoacidosis, hyperosmolarity, or coma) as a primary diagnosis. The age-adjusted rate of hospitalizations with a primary diagnosis of diabetes increased from 1.8 hospitalizations per 10,000 youth in 1990 to 42.4 hospitalizations per 10,000 youth in 2012.

Chart 22. Rates of Diabetes Short-Term Complications[a] Among Youth

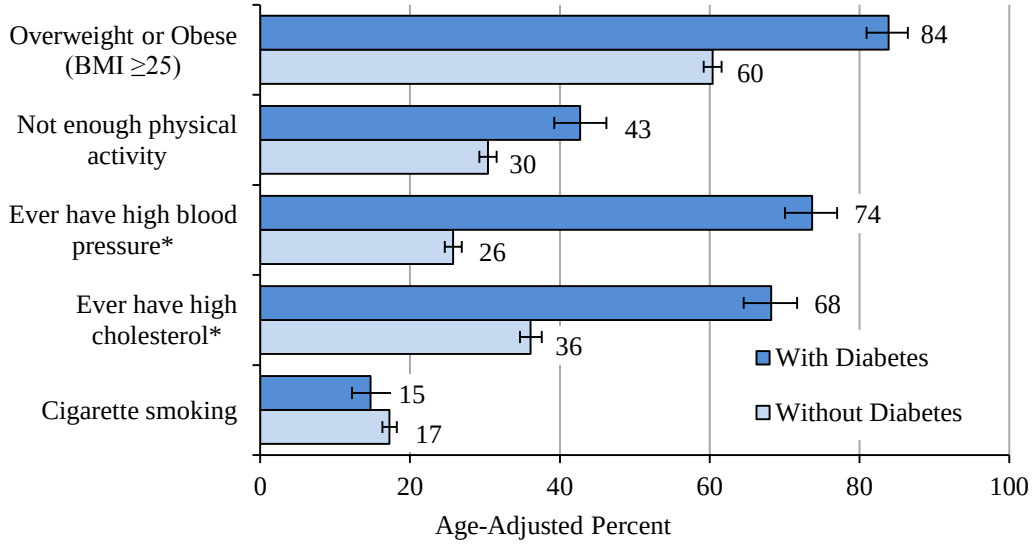


Source: Washington State Hospital Discharge Data, 1990-2012.
[a]Hospitalizations with diabetes short-term complications (ketoacidosis, hyperosmolarity, or coma) listed as primary diagnosis among youth <18 years.

High Risk: Type 2 Diabetes

The following factors are recognized as important in increasing risk of diabetes and its complications.

Chart 23. Distribution of Risk Factors for Diabetes and Resulting Complications Among Adults



Source: Washington State Behavioral Risk Factor Surveillance Sytem Survey, 2012.
Abbreviations: BMI, body mass index in kilograms/meters^2.
*Asked in 2011 survey.

Overweight and obesity

The risk of type 2 diabetes increases with increases in body mass index.[65] Washington BRFSS data for 2012 showed that adults who report heights or weights indicating overweight or obesity are three times more likely to report having diabetes (12 percent) compared to adults who are not considered overweight or obese (4 percent). In 2012, 60 percent of Washington adults without diabetes were overweight or obese. Excess weight complicates the management of diabetes as well and increases the risk of cardiovascular complications and cardiovascular death in people with diabetes.[66] In 2012, 84 percent of Washington adults with diabetes were overweight or obese.

Physical inactivity

Physical inactivity impairs the control of blood sugar levels resulting in an increased risk of developing prediabetes and diabetes.[67] Regular physical activity has been shown to delay or prevent type 2 diabetes in individuals at risk.[68,69,70] Washington BRFSS data for 2012 showed that adults who do not meet national guidelines for moderate or vigorous physical activity[64] are 1.5 times more likely to report having diabetes (12 percent) compared to adults who meet national guidelines (8 percent). In 2012, 30 percent of Washington adults without diabetes did not get enough moderate or vigorous activity.

Among people with diabetes, regular physical activity improves blood glucose control, reduces cardiovascular risk factors, contributes to weight loss, and improves well-being.[71] In 2012, 43 percent of Washington adults who reported having diabetes did not meet national guidelines for moderate or vigorous physical activity.

Hypertension and high cholesterol

Hypertension and high blood cholesterol are risk factors for the development of type 2 diabetes.[62,72] Washington BRFSS data for 2011 showed that adults who reported ever being told by a health professional they had high blood pressure were four times more likely to report having diabetes (17 percent) compared to adults who did not report high blood pressure (4 percent). Similarly, among people who had been tested for blood cholesterol, adults who reported ever being told by a health professional they had high cholesterol were about three times more likely to report having diabetes (16 percent) compared to adults who did not report high cholesterol (6 percent). In 2011, 26 percent of Washington adults without diabetes reported ever having high blood pressure and 36 percent reported ever having high cholesterol.

Clinical trials have shown that blood pressure and lipid control reduce diabetes complications by up to 50 percent.[44] In 2011, 74 percent of Washington adults with diabetes reported ever having high blood pressure and 68 percent reported ever having high cholesterol.

Smoking

Studies suggest that cigarette smoking is associated with an increased risk of developing type 2 diabetes.[73,74] Smoking as well as use of other tobacco products can interfere with how insulin

works.[75] Washington BRFSS data for 2012 showed that 17 percent of adults without diabetes reported currently smoking cigarettes.

People with diabetes who smoke have higher risks for serious complications, including heart disease, kidney disease, foot infections, ulcers, possible amputation, eye diseases that can cause blindness, and damaged nerves to the arms and legs.[74] In spite of the risks, in Washington, around the same percentage of adults with diabetes reported currently smoke cigarettes (15 percent) as adults without diabetes. People with diabetes who quit using tobacco have better control of their blood sugar levels, improved insulin functioning, and faster recovery from surgery.[74,75]

Pregnancy

Women who have gestational diabetes have a 35 to 60 percent chance of developing diabetes in the next 10 to 20 years.[44] Women who have delivered a baby weighing more than nine pounds are also at risk for developing diabetes, both immediately following delivery and in subsequent years.[62,72] In 2012, 12,602 pregnancies (14 percent of all single live births in Washington) were to women with gestational diabetes or who delivered a baby weighing more than nine pounds.

Additional risk factors

Other factors associated with increased risk of developing type 2 diabetes include having a first-degree relative with diabetes, polycystic ovary syndrome (hormonal disorder among women of reproductive age), or a history of cardiovascular disease.[62]

High Risk: Gestational Diabetes

Risk factors for gestational diabetes include advanced maternal age, nonwhite race, overweight and obesity, higher parity (number of births >20 weeks), and family history of diabetes.[76,77,78] The table below shows the distribution of select risk factors for gestational diabetes as recorded in 2012 Washington State birth certificates.

Table 15. Distribution of Births by Select Risk Factors for Gestational Diabetes[a]

Group	Number of Live Births	Percent (95% CI)
Maternal Age		
<20	5,005	6.1 (5.9-6.3)
20-24	17,647	21.5 (21.3-21.8)
25-29	24,549	30.0 (29.6-30)
30-34	22,381	27.3 (27.0-27.6)
≥35	12,375	15.1 (14.9-15.3)
Race and Hispanic Origin		
Non-Hispanic White	51,815	63.5 (63.2-63.8)
Non-Hispanic Black	3,403	4.2 (4.0-4.3)
Non-Hispanic American Indian/Alaskan Native	1,252	1.5 (1.5-1.6)
Non-Hispanic Asian	6,995	8.6 (8.4-8.8)
Non-Hispanic Native Hawaiian/Pacific Islander	899	1.1 (1.0-1.2)
Hispanic	14,445	3.4 (3.3-3.6)

Prior Pregnancy		
Yes	26,872	33.0 (32.7-33.3)
No	54,511	67.0 (66.7-67.3)
Pre-pregnancy Body Mass Index[b]		
Underweight (<18.5)	2,237	2.9 (2.8-3.0)
Normal weight (18.5-24.9)	36,863	47.5 (47.2-47.9)
Overweight (25.0-29.9)	20,599	26.6 (26.3-26.9)
Obese (30.0-99.8)	17,830	23.0 (22.7-23.3)

Source: Washington State Birth Certificates, 2012.
Abbreviations: CI, confidence interval.
[a]Live births to mothers without diabetes.
[b]Body mass index is pre-pregnancy pounds/square of height in inches. Around 6 percent of birth records are missing pre-pregnancy weight or height.

Prediabetes

Nationally, in 2009−2012, based on fasting glucose or A1C levels, 37 percent of U.S. adults 20 years or older had prediabetes, including 51 percent of those 65 years or older.[44] Applying this percentage to the Washington State population in 2012 yields an estimated 1,871,900 adults 20 years and older, including 455,800 adults 65 years or older, with prediabetes.

People with prediabetes (A1C of 5.7-6.4) have a much greater chance of going on to develop diabetes than those with normal A1C levels (below 5.7).[62] The higher the A1C, the greater the chance of progression to diabetes. Studies have shown hemoglobin A1C levels from 5.5 percent to 6.5 percent were associated with new cases of diabetes ranging from 9 percent to 50 percent incidence over five years.[79] Additionally, those with prediabetes are at increased risk of cardiovascular disease; whether or not they later develop type 2 diabetes.[80]

While over a third of adults are estimated to have prediabetes, the awareness of the risk condition is low. Washington BRFSS data for 2012 showed that only 7 percent percent of adults report ever being told by a doctor that they have prediabetes.

Morbidity & Mortality due to Diabetes: Complications

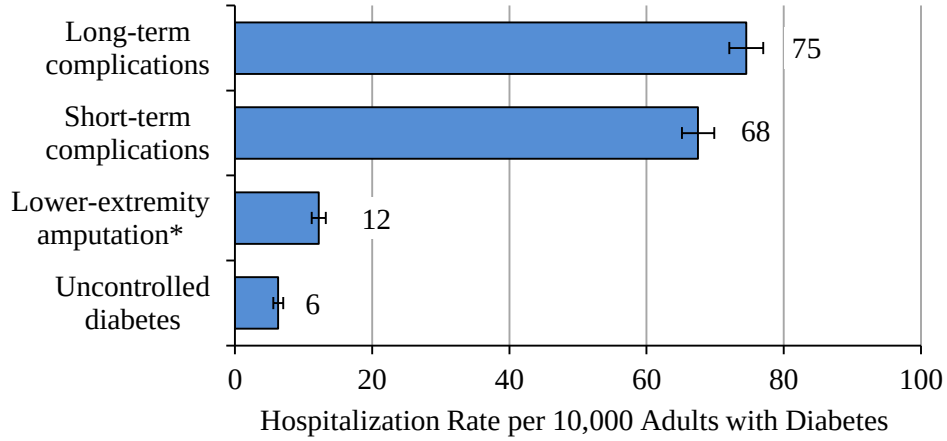
Diabetes-related Ambulatory Care Sensitive Conditions

Some diabetes-related hospitalizations can be prevented if high-quality primary care is available and used.[81,82] A standardized set of measures for identifying potentially avoidable hospitalizations has been identified by the U.S. Agency for Healthcare Research and Quality (AHRQ) through their Healthcare Utilization and Cost Project: Prevention Quality Indicators (PQIs).[83] The conditions covered by these measures are often referred to as "ambulatory care sensitive conditions" or ACSCs.

In 2012, among hospitalizations with a primary diagnosis of diabetes for adults 18 and older, 3,126 (42 percent) listed diabetes short-term complications (ketoacidosis, hyperosmolarity, or coma), 3,451 (47 percent) listed diabetes long-term complications (renal, eye, neurological,

circulatory, or otherwise not specified), and 292 (4 percent) listed uncontrolled diabetes (without mention of short-term or long-term complications). Diabetes also contributed to 566 (60 percent) of all hospitalizations with non-traumatic, lower extremity amputations. The chart below shows the rate of diabetes ACSCs per 10,000 adults with diabetes.

Chart 24. Diabetes -related Ambulatory Care Sensitive Conditions Among Adults with Diabetes[a]



Source: Washington State Hospital Discharge Data and Behavioral Risk Factor Surveillance System Survey, 2012.
[a]Agency for Healthcare Research and Quality, Prevention Quality Indicators. Hospitalizations among adults ≥18 years. Excludes obstetric admissions and transfers from other institutions.
*Among hospitalizations with any-listed diagnosis of diabetes.

Notable Differences

Age and Gender: In 2012 the hospitalization rates of diabetes long-term complications and non-traumatic lower extremity amputations in the population of adults with diabetes were higher in males than females. The highest rates of diabetes short-term and long-term complications were observed in younger adults aged 18-44 years. The high rates of non-traumatic lower extremity amputations were observed in the older age groups (45-64, 65-74, and 75 years or more).

Table 16. Diabetes-related Ambulatory Care Sensitive Conditions Among Adults with Diabetes[a]

Group	Number of hospitalizations	Number of adults with diabetes	Rate per 10,000 adults with diabetes (95% CI)
Diabetes Short-Term Complications (ketoacidosis, hyperosmolarity, or coma)			
Males	1,617	229,017	70.6 (67.2-74.0)
Females	1,509	234,014	64.5 (61.2-67.7)
18-44	2,023	70,598	286.6 (274.1-299.0)
45-64	865	208,142	41.6 (38.8-44.3)
65-74	139	103,281	13.5 (11.2-15.7)
75+	99	74,884	13.2 (10.7-16.1)
Diabetes Long-Term Complications (renal, eye, neurological, circulatory, or otherwise not specified)			
Males	1,929	229,017	84.2 (80.5-88.0)
Females	1,522	234,014	65.0 (61.8-68.3)

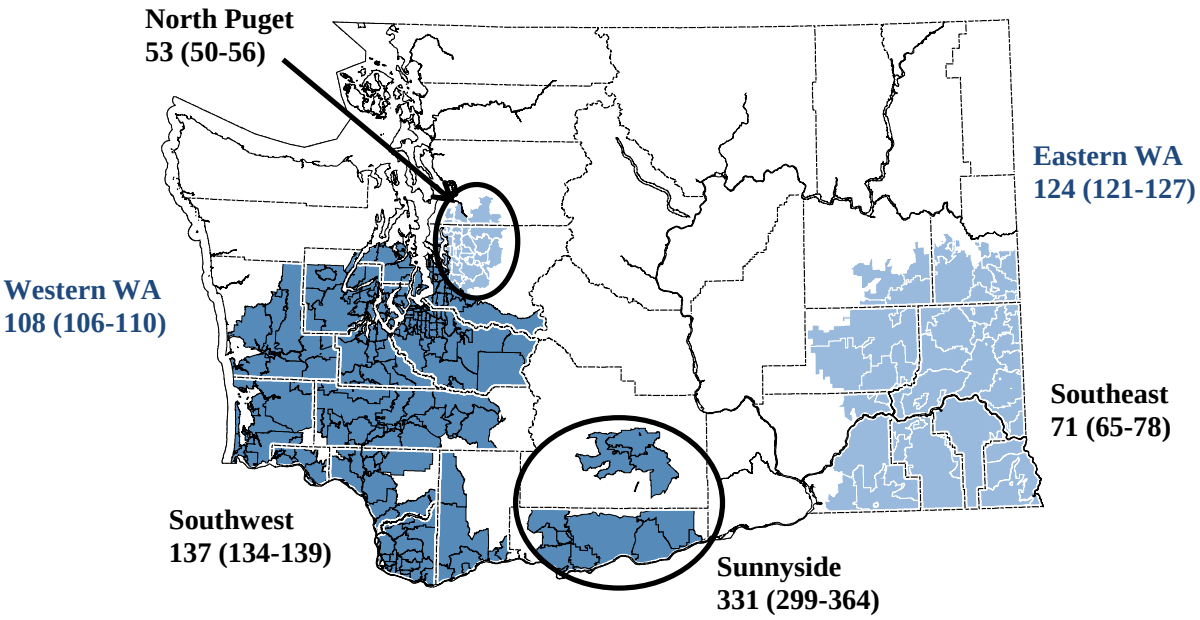
18-44	743	70,598	105.2 (97.7-112.8)
45-64	1,544	208,142	74.2 (70.5-77.9)
65-74	624	103,281	60.4 (55.7-65.2)
75+	540	74,884	72.1 (66.0-78.2)
Uncontrolled Diabetes Admission (without mention of short or long-term complications)			
Males	166	229,017	7.2 (6.1-8.4)
Females	126	234,014	5.4 (4.4-6.3)
18-44	70	70,598	9.9 (7.7-12.5)
45-64	124	208,142	6.0 (4.9-7.0)
65-74	47	103,281	4.6 (3.3-6.1)
75+	51	74,884	6.8 (5.1-9.0)
Non-traumatic Lower Extremity Amputation[b]			
Males	397	229,017	17.3 (15.6-19.0)
Females	169	234,014	7.2 (6.1-8.3)
18-44	43	70,598	6.1 (4.4-8.2)
45-64	271	208,142	13.0 (11.5-14.6)
65-74	150	103,281	14.5 (12.2-16.8)
75+	102	74,884	13.6 (11.0-16.3)

Source: Washington State Hospital Discharge Data and Behavioral Risk Factor Surveillance System Survey, 2012.
Abbreviations: CI, confidence interval.
[a]Agency for Healthcare Research and Quality, Prevention Quality Indicators. Hospitalizations among adults ≥18 years. Excludes obstetric admissions and transfers from other institutions.
[b]Among hospitalizations with any-listed diagnosis of diabetes.

Geographic Variation:

Using cluster identification software, regions of the state having higher and lower than expected hospitalizations for the four previously discussed diabetes-related ambulatory care sensitive conditions were identified. On the west side of the state, the Southwest region was identified as having higher than expected hospitalization rates for those four conditions combined, while the North Puget region was found to have lower rates. On the east side, the Sunnyside region was found to have higher hospitalization rates for those four conditions, while the Southeast region had lower rates. The regions are shown in the figure below.

Figure 2. Regions with Higher or Lower than Expected Hospitalization Rates[a] for Diabetes Ambulatory Care Sensitive Conditions[b] by ZIP Code of Residence



Source: Washington State Hospital Discharge Data, 2009-2011.
[a]Data are hospitalization rates (95% confidence interval) per 100,000 adults 18 and older.
[b]Agency for Healthcare Research and Quality, Prevention Quality Indicators. Hospitalizations among adults ≥18 years. Excludes obstetric admissions and transfers from other institutions.

Potential risk factors for these hospitalizations included obesity, lack of health care coverage, foregoing needed care due to costs, and lack of a personal health care provider. The distribution of these factors is shown in the table below.

Table 17. Distribution of Factors Affecting Regions with Higher or Lower than Expected Hospitalization Rates for Diabetes Ambulatory Care Sensitive Conditions[a]

Factor	Southwest Percent (95% CI)	North Puget Percent (95% CI)	Western WA Percent (95% CI)
Obesity[b]	27.3 (26.7-28.0)	20.5 (19.9-21.2)	23.9 (23.5-24.3)
Lack of Health Care Coverage	14.9 (14.2-15.5)	11.3 (10.7-11.9)	13.2 (12.7-13.6)
Forego Needed Care Because of Cost	13.9 (13.3-14.4)	10.5 (10.0-11.1)	12.1 (11.7-12.5)
No Personal Care Provider	23.6 (22.9-24.4)	18.9 (18.2-19.7)	21.3 (20.8-21.8)
Factor	Sunnyside Percent (95% CI)	Southeast Percent (95% CI)	Eastern WA Percent (95% CI)
Obesity	30.6 (27.8-33.3)	25.1 (24.0-26.3)	25.8 (25.1-26.1)
Lack of Health Care Coverage	25.0 (22.2-27.9)	13.9 (12.8-15.0)	17.4 (16.7-18.2)
Forego Needed Care Because of Cost	17.3 (15.0-19.7)	13.4 (12.4-14.4)	14.4 (13.7-15.0)
No Personal Care Provider	24.5 (21.6-27.3)	20.2 (18.9-21.4)	22.6 (21.8-23.4)

Source: Washington State Behavioral Risk Factor Surveillance System Survey, 2006-2010.
Abbreviations: CI, confidence interval.
[a]Agency for Healthcare Research and Quality, Prevention Quality Indicators.
[b]Body Mass Index ≥30kg/m2, based on self-reported height and weight.

The consequences – in addition to hospitalizations themselves – include higher per capita inpatient care costs, and higher age-adjusted diabetes death rates, as shown in Table 18.

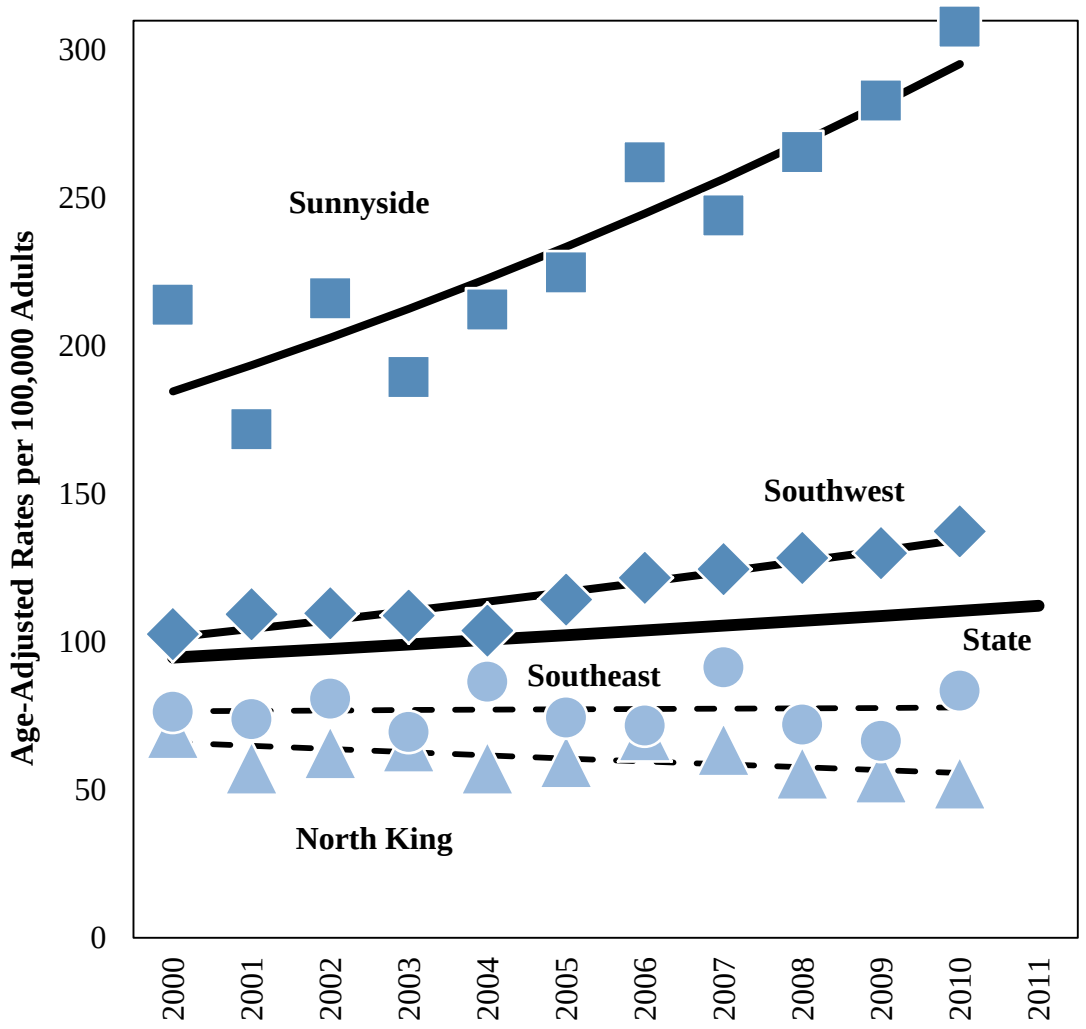
Table 18. Per Capita Hospitalization Costs and Diabetes Death Rates in Regions with Higher or Lower than Expected Hospitalization Rates for Diabetes Ambulatory Care Sensitive Conditions (ACSCs)[a]

Region	Per Capita Hospitalizations Costs for Diabetes ACSCs per 1,000 People[b]	Age-Adjusted Diabetes Death Rate per 100,000 People (95% CI)[c]
Western WA		21.3 (20.6-22.1)
- Southwest	$53,576	23.9 (22.8-25.0)
- North Puget	$15,738	13.1 (11.7-14.7)
Eastern WA		25.7 (24.3-27.2)
- Sunnyside	$81,909	37.8 (27.1-51.5)
- Southeast	$23,990	19.1 (16.2-22.5)

Source: Washington State Hospital Discharge Data and Death Certificates, 2009-2011.
Abbreviations: CI, confidence interval.
[a]Agency for Healthcare Research and Quality, Prevention Quality Indicators.
[b]Cost-to-charge ratio adjusted charges for hospital stays.
[c]Diabetes listed as underlying cause of death.

As seen in the chart below, the disparities between the high and low risk regions are widening as the diabetes-related ambulatory care sensitive conditions hospitalization rates are trending in opposite directions.

Chart 25. Trends in Rates of Diabetes Ambulatory Care Sensitive Conditions[a]

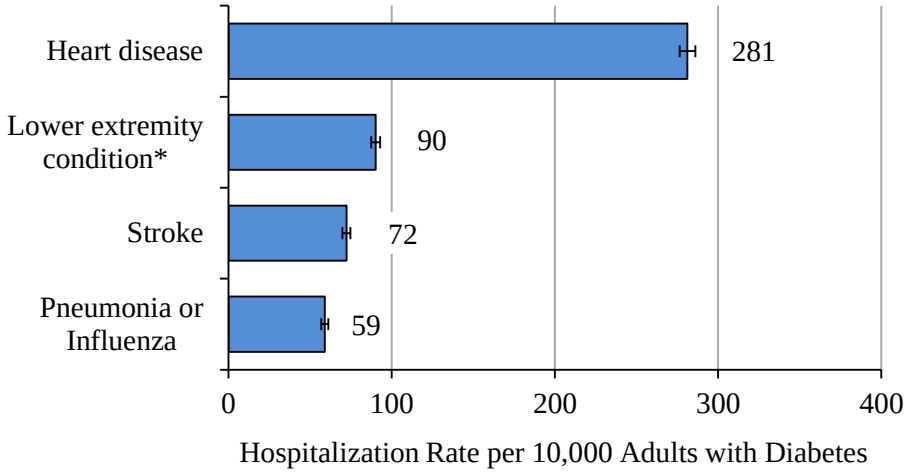


Source: Washington State Hospital Discharge Data, 2000-2011.
[a]Agency for Healthcare Research and Quality, Prevention Quality Indicators. Hospitalizations among adults ≥18 years. Excludes obstetric admissions and transfers from other institutions.

Additional Complications

In 2012, among hospitalizations having any-listed diagnosis of diabetes for adults 18 and older, 13,021 (15 percent) listed heart disease, 4,174 (5 percent) listed lower-extremity conditions (peripheral arterial disease, ulcer, inflammation, infection or neuropathy), 3,348 (4 percent) listed stroke, and 2,733 (3 percent) listed pneumonia or influenza as the primary diagnosis. During 2011, 801 (45 percent) of all new cases of end-stage renal disease in Washington were among people with diabetes.[84] Diabetes is the leading cause of new cases of blindness among adults aged 20–74 years.[44] The chart below shows the rate of diabetes complications per 10,000 adults with diabetes.

Chart 26. Complications Among Adults with Diabetes[a]



Source: Washington State Hospital Discharge Data and Behavioral Risk Factor Surveillance System Survey, 2012.
[a]Hospitalizations with any-listed diagnosis of diabetes among adults ≥18 years.
*Peripheral arterial disease, ulcer, inflammation, infection, or neuropathy.

Notable Differences

Age and Gender: The table below shows that, in 2012, rates of diabetes-related hospitalizations with a primary diagnosis of heart disease, stroke, and lower extremity conditions in the population of adults with diabetes were higher in males than females. Rates of diabetes-related hospitalization with heart disease, stroke, pneumonia or influenza increased with increasing age. The highest rates of diabetes-related hospitalizations with lower extremity conditions were observed in the youngest (18-44 years) and oldest (75 years or more) age groups.

Table 19. Complications Among Adults with Diabetes

Group	Number of hospitalizations[a]	Number of adults with diabetes	Rate per 10,000 adults with diabetes (95% CI)
Heart Disease			
Males	7,376	229,017	322.1 (314.7-329.4)
Females	5,645	234,014	241.2 (234.9-247.5)
18-44	446	70,598	63.2 (57.3-69.0)
45-64	4,194	208,142	201.5 (195.4-207.6)
65-74	3,780	103,281	366.0 (354.3-377.7)
75+	4,601	74,884	614.4 (596.7-632.2)
Stroke			
Males	1,746	229,017	76.2 (72.7-79.8)
Females	1,602	234,014	68.5 (65.1-71.8)
18-44	91	70,598	12.9 (10.4-15.8)
45-64	1,007	208,142	48.4 (45.4-51.4)
65-74	989	103,281	95.8 (89.8-101.7)
75+	1,261	74,884	168.4 (159.1-177.7)
Pneumonia or Influenza			
Males	1,331	229,017	58.1 (55.0-61.2)

Females	1,402	234,014	59.9 (56.8-63.0)
18-44	128	70,598	18.1 (15.0-21.3)
45-64	778	208,142	37.4 (34.8-40.0)
65-74	683	103,281	66.1 (61.2-71.1)
75+	1,144	74,884	152.8 (143.9-161.6)
Lower Extremity Conditions[b]			
Males	2,353	229,017	102.7 (98.6-106.9)
Females	1,821	234,014	77.8 (74.2-81.4)
18-44	772	70,598	109.4 (101.6-117.1)
45-64	1,747	208,142	83.9 (80.0-87.9)
65-74	903	103,281	87.4 (81.7-93.1)
75+	752	74,884	100.4 (93.2-107.6)

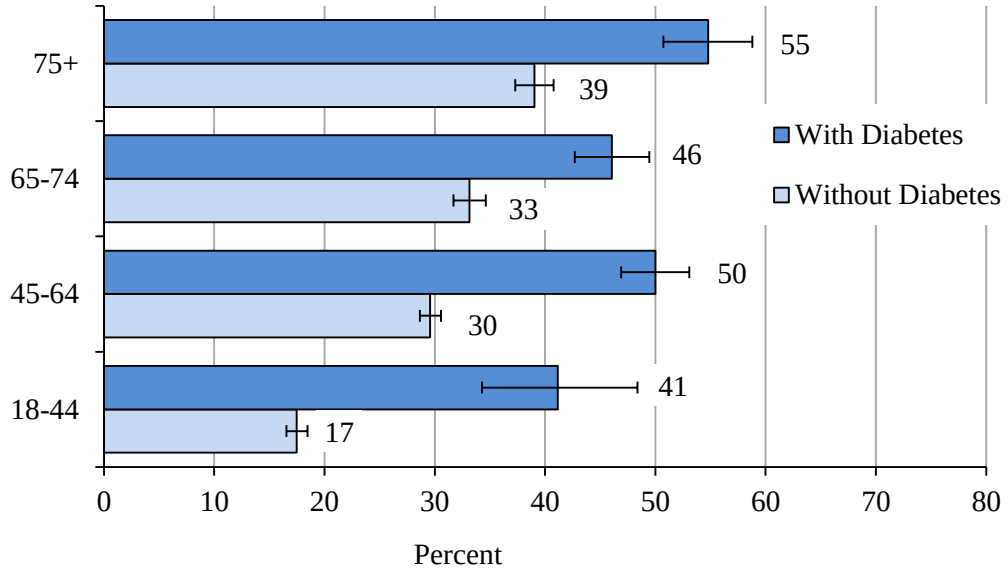
Source: Washington State Hospital Discharge Data and Behavioral Risk Factor Surveillance System Survey, 2012.
Abbreviations: CI, confidence interval.
[a]Hospitalizations with any-listed diagnosis of diabetes among adults ≥18 years.
[b]Peripheral arterial disease, ulcer, inflammation, infection, or neuropathy.

Morbidity & Mortality due to Diabetes: Disability

Washington BRFSS data for 2012 showed that adults with diabetes are about twice as likely to report being limited in activities because of physical, mental or emotional problems (46 percent) compared to adults without diabetes (22 percent). Adults with diabetes were about four times more likely to report use of special equipment, such as a cane, a wheelchair, a special bed or a special telephone for health problems (26 percent), compared to adults without diabetes (6 percent).

As shown in the following chart, regardless of age, more adults with diabetes reported limitation in activities compared to those without diabetes.

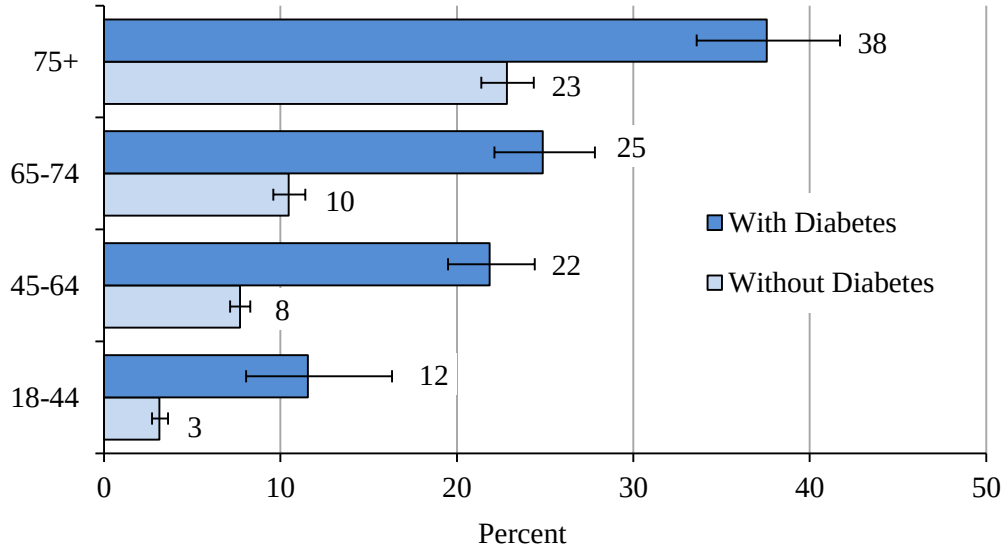
Chart 27. Percentage of Adults Limited in Activities Because of Physical, Mental, or Emotional Problems by Age



Source: Washington State Behavioral Risk Factor Surveillance Sytem Survey, 2010-2012.

The following chart shows use of special equipment increased with age but remained higher in adults with diabetes than those without diabetes across all age groups.

Chart 28. Percentage of Adults With Any Health Problem That Requires Use of Special Equipment[a] by Age



Source: Washington State Behavioral Risk Factor Surveillance Sytem Survey, 2010-2012.
[a]Such as a cane, wheel chair, special bed, or special phone.

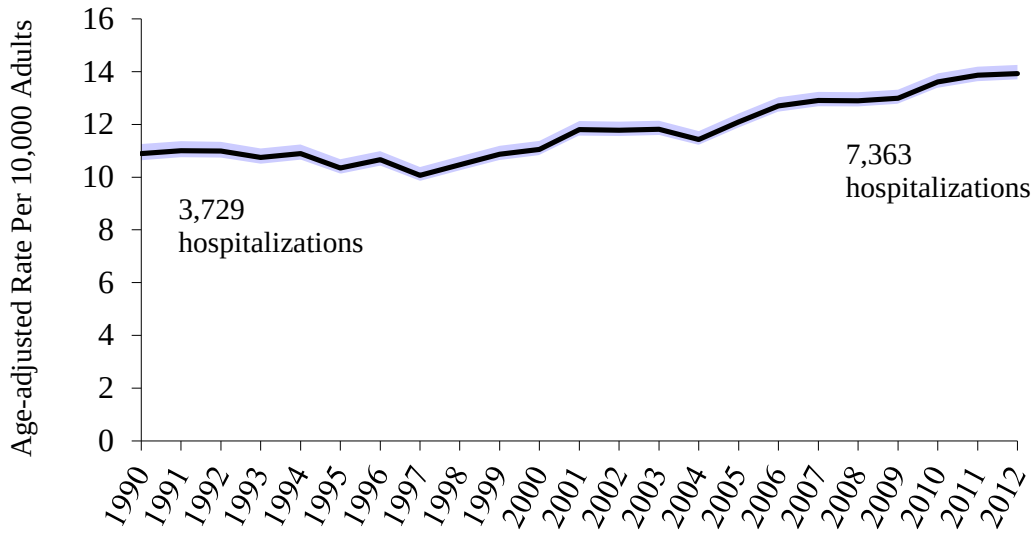
Morbidity & Mortality: Hospitalizations

Washington State Hospital Discharge data in 2012 showed that 7,363 hospitalizations (1.3 percent of all hospitalizations) of Washington adults hospitalized in Washington or Oregon included a primary diagnosis of diabetes. An additional 80,613 hospitalizations (12.8 percent of all hospitalizations) mentioned diabetes in one of the 8 secondary diagnoses listed.

Time Trends

The age-adjusted rate of hospitalizations among adults with a primary diagnosis of diabetes increased from 11 hospitalizations per 10,000 adults in 1990 to 14 hospitalizations per 10,000 adults in 2012. Note the unit of observation for these rates is the hospitalization episode, not the individual. One person hospitalized three times in a year counts as three hospitalizations for that year. Over the last two decades, rates in Washington were lower than national rates.[85] Washington's lower rates might reflect Washington's slightly lower rate of diabetes as well as a lower rate of potentially avoidable hospitalizations for adults with diabetes.

Chart 29. Trends in Diabetes Hospitalization[a] Rates Among Adults

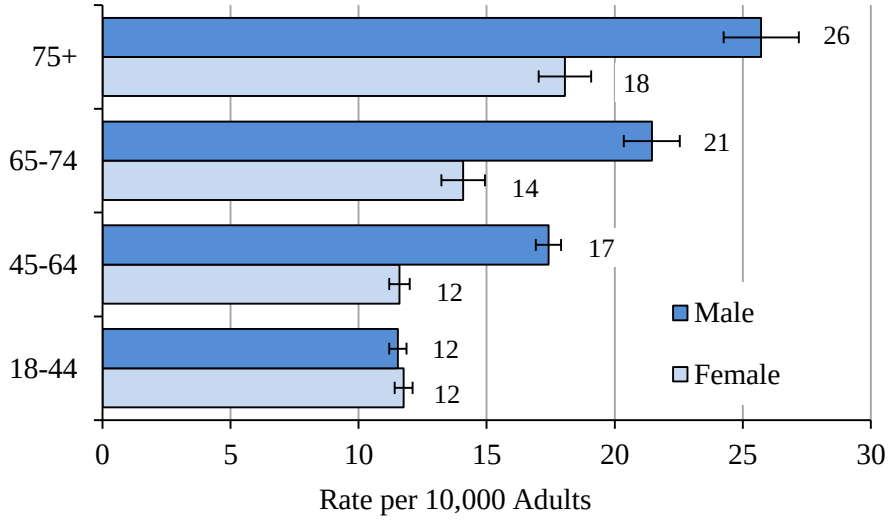


Source: Washington State Hospital Discharge Data, 1990-2012.
[a]Hospitalizations with diabetes listed as primary diagnosis among adults ≥18 years.

Notable Differences

Age and Gender: In 2010–2012 combined, males ages 45 and older were more likely than women to be hospitalized from diabetes. While hospitalization rates increase with age, in 2012, 88 percent of hospitalizations with a primary diagnosis of diabetes and 48 percent with a secondary diagnosis were among Washington adults less than 65 years.

Chart 30. Diabetes Hospitalizations[a] Rates By Age and Gender



Source: Washington State Hospital Discharge Data, 2010-2012.
[a]Hospitalizations with diabetes listed as primary diagnosis among adults ≥18 years.

Morbidity & Mortality: Deaths

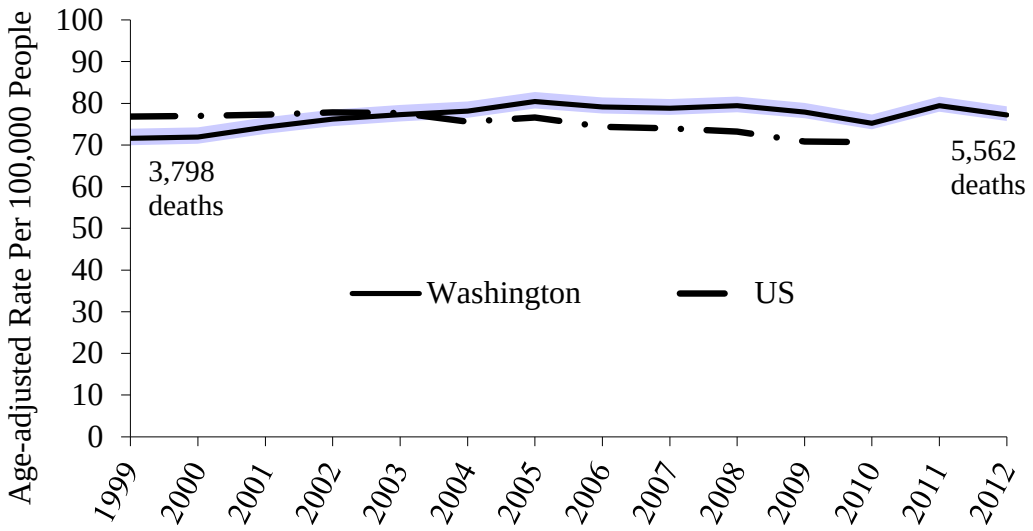
Washington State death certificate data showed that diabetes is the seventh leading cause of death. In 2012, 1,652 people in Washington died from diabetes, and diabetes contributed to an additional 3,910 deaths.

Note diabetes is likely to be underreported as an underlying cause of death. Studies have found that about 35 percent to 40 percent of decedents with diabetes had it listed anywhere on the death certificate and about 10 percent to 15 percent had it listed as the underlying cause of death.[86,87] Therefore, data in this section focus on diabetes as any-listed cause of death.

Time Trends

In Washington, the rate of deaths in which diabetes was either a primary or contributing factor increased between 1999–2012 from 72 to 77 deaths per 100,000 people. Nationally the age-adjusted rate has moved in the opposite direction, decreasing between 1999–2010 from 77 to 71 deaths per 100,000 people.[88] It is not clear why Washington's diabetes death rates are higher than those seen nationally given Washington's lower prevalence of diabetes. Differences in reporting on the death certificate might play a role.

Chart 31. Trends in Diabetes Death Rates[a], WA and US

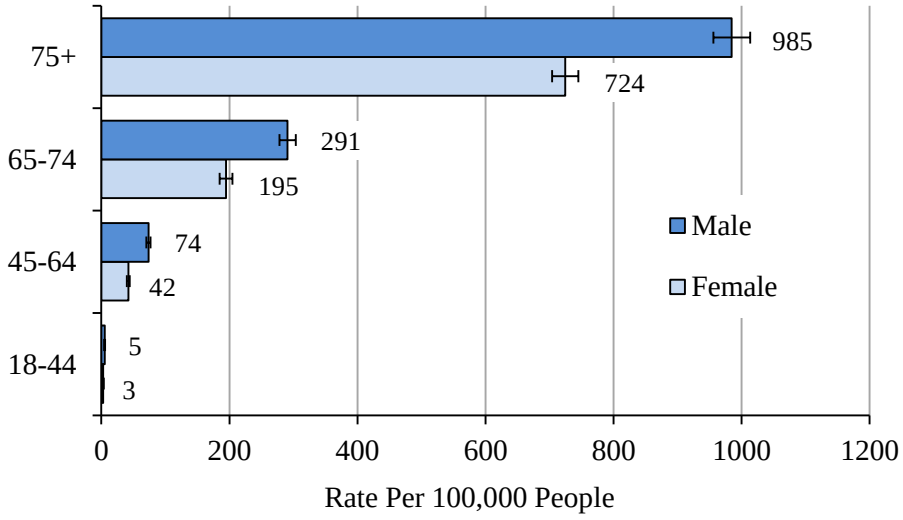


Source: Washington State and US Death Certificates, 1999-2012.
[a]Deaths with any mention of diabetes as a listed cause of death.

Notable differences

Age and Gender: Similar to national patterns,[88] the numbers and rates of diabetes deaths in Washington increased with age. In each age group above 44 years, males had higher rates than females. Twenty-one percent of these deaths occurred among people less than 65 years.

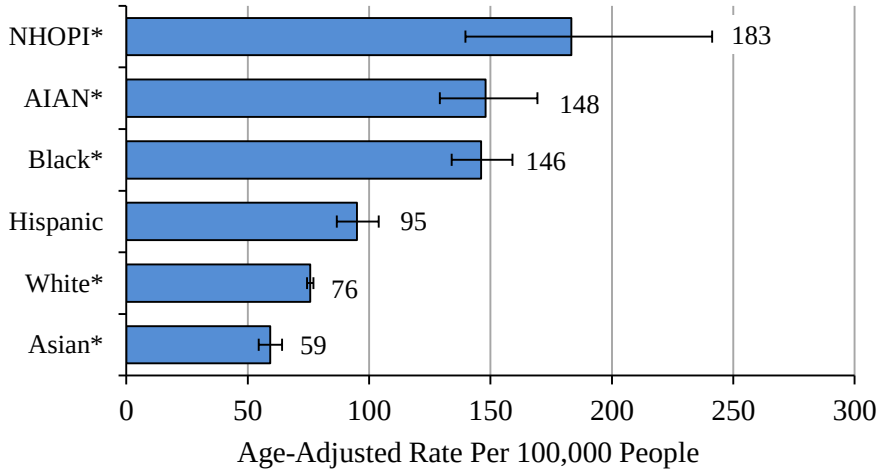
Chart 32. Diabetes Death Rates[a] by Age and Gender



Source: Washington State Death Certificates, 2010-2012.
[a]Deaths with any mention of diabetes as a listed cause of death.

Race and Hispanic Origin: Washington's age-adjusted diabetes death rate during 2010–2012 was highest among Native Hawaiians and other Pacific Islanders (183 deaths per 100,000 people), American Indians and Alaska Natives (148 deaths per 100,000 people), and blacks (146 deaths per 100,000 people), followed by Hispanics (95 deaths per 100,000 people). This is similar to national patterns except for Asians or Native Hawaiians and other Pacific Islanders where comparable national rates are not available.[88]

Chart 5. Diabetes Death Rates[a] by Race and Hispanic Origin



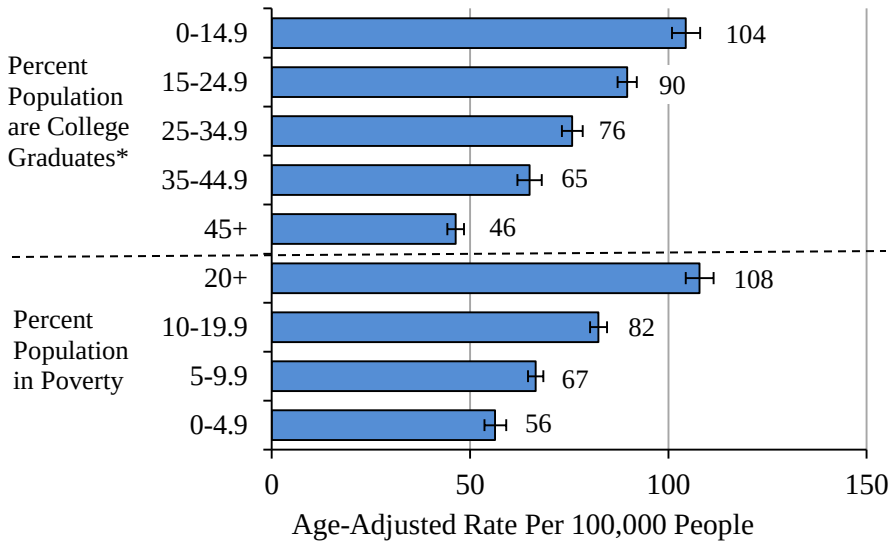
Source: Washington State Death Certificates, 2010-2012. Abbreviations: AIAN, American Indian/Alaska Native; NHOPI, Native Hawaiian/Other Pacific Islander.
[a]Deaths with any mention of diabetes as a listed cause of death.
*Non-Hispanic, single race only.

Economic Factors and Education: Individuals in lower socioeconomic groups experience higher rates of diabetes deaths than those in higher groups.[89] Studies also suggest that living in lower socioeconomic neighborhoods is associated with poorer health outcomes, including greater mortality.[90]

One measure of neighborhood socioeconomic characteristics is the percent of the population living in poverty. Using this measure, during 2010–2012 combined, age-adjusted diabetes death rates were two times higher for Washington residents in census tracts with 20 percent or more of the population living below the federal poverty level compared to rates in census tracts where less than 5 percent of the population lived in poverty.

Neighborhood educational level can be measured as the percent of the population ages 25 and older with a college education or more. During 2010–2012 combined, age-adjusted diabetes death rates were 2.3 times higher for Washington residents in census tracts where less than 15 percent of the population were college graduates compared to rates in census tracts where 45 percent or more of the population were college graduates.

Chart 6. Diabetes Death Rates[a] by Percent College Graduates and Percent in Poverty



Source: Washington State Death Certificates, 2010-2012.
[a]Deaths with any mention of diabetes as a listed cause of death.
*Among people ≥25 years.

Diabetes Among Populations Covered by Medicaid

The Medicaid population is comprised of subgroups with vastly different health risk profiles and utilization patterns. Distinct coverage groups include:

Dual eligible populations

- Elders age 65 and above
- Non elders under age 65 – almost all of whom are age 18-64 and qualify for Medicaid in disability-related coverage categories

Medicaid-only populations

- Elders age 65 and above
- Adults age 18 to 64 with disabilities, including in the state fiscal year 2011 cohort persons enrolled in Presumptive SSI, Disability Lifeline and ADATSA (Alcoholism and Drug Addiction Treatment and Support Act) coverage categories that transitioned to the "Newly Eligible Adult" coverage group after the expansion of Medicaid coverage under the Affordable Care Act (ACA)
- Adults age 18 to 64 without disabilities qualifying for "classic" Medicaid coverage in place prior to expansion under the ACA
- Adults age 18 to 64 without disabilities qualifying for expanded Medicaid coverage under the ACA beginning in January 2014
- Children under age 18 with disabilities

- Children under age 18 without disabilities

Prevalence of Diabetes Among Medicaid Populations

Diagnosed Diabetes

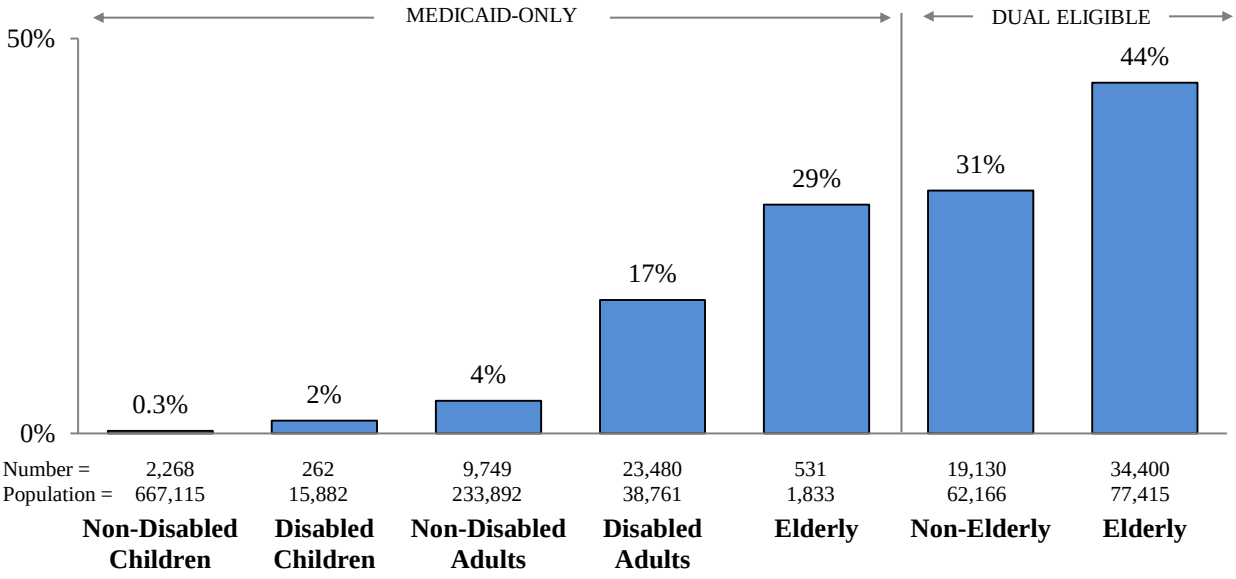
The presence of diabetes was identified using both diagnosis and pharmacy codes from ProviderOne, the Medicaid information system, fee-for-service claims and managed care encounters, as well as CARE assessments. A two-year window (state fiscal years 2010 and 2011) was used to identify the presence of diabetes for persons enrolled in Medicaid in state fiscal year 2011. *See Appendix 7 for information on data sources and technical notes.*

For some populations and prevalence rates of interest, it was not possible to directly estimate rates from past administrative claims, encounter and assessment data. The following prevalence estimates were derived from the National Health and Nutrition Examination Survey (NHANES) data using a synthetic estimation approach *(see technical notes in appendix 7)*:

- Type 1 and 2 diabetes prevalence for persons qualifying for expanded Medicaid coverage under the ACA and enrolled in Medicaid as of April 2014;
- Undiagnosed type 1 and 2 diabetes prevalence for (1) persons enrolled in "classic" Medicaid and (2) persons qualifying for expanded Medicaid coverage under the ACA and enrolled in Medicaid as of April 2014; and
- Prediabetes prevalence for (1) persons enrolled in "classic" Medicaid and (2) persons qualifying for expanded Medicaid coverage under the ACA and enrolled in Medicaid as of April 2014.

Differences in the prevalence of diabetes exist across the Medicaid subpopulations.

Chart 8. Prevalence of Diabetes Among Medicaid Clients[a]



Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011. Includes fee-for-service and managed care data.
[a]Presence of type 1 or type 2 diabetes identified by diagnosis, pharmacy prescription, or CARE assessment using state fiscal year 2010 and 2011 claims, encounters, or assessment data.

Diabetes is more prevalent among elders than among non-elderly adults or children. Elderly dual eligibles have the highest prevalence rate among all groups at 44 percent. Among Medicaid-only clients, elders have the highest prevalence rate at 29 percent.

Diabetes is more prevalent among persons dually eligible for Medicare than persons enrolled in comparable Medicaid-only coverage. The prevalence of diabetes among elderly duals is 44 percent, compared to 29 percent among non-dual, Medicaid-only elderly. Among (primarily disabled adult) non-elderly dual eligibles, diabetes prevalence is 31 percent, compared to 17 percent for Medicaid-only disabled clients.

Diabetes is more prevalent among persons with disabilities than persons without disabilities. The prevalence of diabetes among Medicaid-only disabled adults is 17 percent, compared to only 4 percent among non-dual Medicaid-only elderly. Among disabled children, diabetes prevalence is 1.8 percent, compared to 0.3 percent for Medicaid-only non-disabled children.

Diabetes is more prevalent among adults qualifying for Medicaid as "Newly Eligible" under the ACA, compared to non-disabled adults enrolled in pre-existing Medicaid coverage categories. Using synthetic estimates derived from NHANES data, the prevalence of diabetes in the April 2014 population of beneficiaries in the "newly eligible adult" coverage category was estimated to be 7.6 percent (28,646 clients with diabetes out of 376,622 newly eligible adults). This compares to the prevalence of diabetes of 4.2 percent for non-disabled Medicaid-only adults in the state fiscal year 2011 cohort reported in Chart 12. Note that the "newly eligible adult"

population includes persons with relatively high health needs previously eligible for medical assistance under the Presumptive SSI and Disability Lifeline programs.

Notable Differences

There was little difference in the prevalence of diabetes among Medicaid-only children by gender, race, and ethnic origin. The prevalence of diabetes was higher among youth 12-17 years compared to those less than 12 years.

Table 20. Prevalence of Diabetes Among Medicaid-Only Children[a]

	Non-disabled Children			Disabled Children		
	With Diabetes	Total	Prevalence	With Diabetes	Total	Prevalence
Gender						
Males	985	337,923	0.3%	142	10,414	1.4%
Females	1,283	329,191	0.4%	120	5,468	2.2%
Race and Hispanic Origin[b]						
White	1,740	425,710	0.4%	219	12,141	1.8%
Black	206	56,037	0.4%	32	2,793	1.1%
Asian/NHOPI	132	47,294	0.3%	19	887	2.1%
AI/AN	160	35,277	0.5%	32	1,479	2.2%
Hispanic	691	195,289	0.4%	73	4,050	1.8%
Other	773	210,723	0.4%	104	4,594	2.3%
Age						
0-5	270	265,847	0.1%	29	3,693	0.8%
6-11	594	216,647	0.3%	69	6,184	1.1%
12-17	1,404	184,621	0.8%	164	6,005	2.7%
Total	**2,268**	**667,115**	**0.3%**	**262**	**15,882**	**1.6%**

Source: Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
Abbreviations: AIAN, American Indian/Alaska Native; NHOPI, Native Hawaiian or Other Pacific Islander.
[a]Presence of type 1 or type 2 diabetes identified by diagnosis, pharmacy prescription, or CARE assessment using state fiscal year 2010 and 2011 claims, encounters, or assessment data.
[b]Duplicative – a person can report one or more categories.

Diabetes was more prevalent in Medicaid-only disabled women than men. Diabetes was more prevalent in select non-white racial and ethnic groups across the Medicaid-only adult and elderly coverage groups. Prevalence of diabetes increased with age as well.

Table 21. Prevalence of Diabetes Among Medicaid-Only Adults[a]

	Non-Disabled Adult			Disabled Adult			Elderly		
	With Diabetes	Total	Prevalence	With Diabetes	Total	Prevalence	With Diabetes	Total	Prevalence
Gender									
Males	2,382	66,510	3.6%	10,053	74,970	13.4%	207	748	27.7%
Females	7,367	167,382	4.4%	13,427	63,791	21.0%	324	1,085	29.9%
Race and Hispanic Origin[b]									
White	7,112	176,523	4.0%	18,647	114,951	16.2%	212	735	28.8%
Black	1,088	24,318	4.5%	2,816	16,964	16.6%	55	200	27.5%

Asian/NHOPI	869	17,050	5.1%	2,008	9,471	21.2%	162	543	29.8%
AI/AN	856	17,264	5.0%	2,299	13,727	16.7%	9	22	40.9%
Hispanic	1,963	37,956	5.2%	2,254	10,804	20.9%	87	283	30.7%
Other	2,424	47,603	5.1%	3,543	19,060	18.6%	165	524	31.5%
Age									
18-44	7,659	217,778	3.5%	5,944	67,718	8.8%	0	0	0.0%
45-64	2,085	16,090	13.0%	17,486	70,906	24.7%	0	0	0.0%
65-74	0	0	0%	0	0	0%	353	1,189	29.7%
≥75	0	0	0%	0	0	0%	178	644	27.6%
Total	**9,749**	**233,892**	**4.2%**	**23,480**	**138,761**	**16.9%**	**531**	**1,833**	**29.0%**

Source: Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
Abbreviations: AIAN, American Indian/Alaska Native; NHOPI, Native Hawaiian or Other Pacific Islander.
[a]Presence of type 1 or type 2 diabetes identified by diagnosis, pharmacy prescription, or CARE assessment using state fiscal year 2010 and 2011 claims, encounters, or assessment data.
[b]Duplicative – a person can report one or more categories.

Diabetes is more prevalent in non-elderly dual-eligible females than males. Within the dual-eligible population, elderly and non-elderly Hispanics had the highest prevalence rates (51.4 percent and 42.5 percent, respectively) compared to whites (44.2 percent percent and 29.9 percent, respectively). Diabetes also increased with age among non-elderly dual eligible clients.

Table 22. Prevalence of Diabetes Among Dual Eligible Clients[a]

	Non-Elderly			Elderly		
	With Diabetes	Total	Prevalence	With Diabetes	Total	Prevalence
Gender						
Males	8,184	29,956	27.3%	11,318	25,401	44.6%
Females	10,946	32,210	34.0%	23,082	52,014	44.4%
Race and Hispanic Origin[b]						
White	16,315	54,638	29.9%	24,165	54,725	44.2%
Black	2,027	6,084	33.3%	1,720	3,365	51.1%
Asian/NHOPI	1,210	3,348	36.1%	7,242	15,685	46.2%
AI/AN	1,420	4,441	32.0%	1,122	2,245	50.0%
Hispanic	1,727	4,062	42.5%	3,332	6,477	51.4%
Other	2,501	6,833	36.6%	4,961	9,821	50.5%
Age						
<18	10	73	13.7%	0	0	0.0%
18-44	4,688	24,025	19.5%	0	0	0.0%
45-64	14,432	38,068	37.9%	0	0	0.0%
65-74	0	0	0.0%	15,213	33,041	46.0%
≥75	0	0	0.0%	19,187	44,374	43.2%
Total	**19,130**	**62,166**	**30.8%**	**34,400**	**77,415**	**44.4%**

Source: Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
Abbreviations: AIAN, American Indian/Alaska Native; NHOPI, Native Hawaiian or Other Pacific Islander.
[a]Presence of type 1 or type 2 diabetes identified by diagnosis, pharmacy prescription, or CARE assessment using state fiscal year 2010 and 2011 claims, encounters, or assessment data.
[b]Duplicative – a person can report one or more categories.

Undiagnosed Diabetes

Undiagnosed diabetes is estimated to be more prevalent among "newly eligible adults" than among persons enrolled in "classic" Medicaid coverage. Based on synthetic estimates derived from NHANES data and the demographic composition of the April 2014 Washington State Medicaid caseload, the estimated prevalence of undiagnosed diabetes is 3.8 percent among newly eligible adults (14,106 out of 376,622), compared to 2.7 percent among persons 12 or above enrolled in classic Medicaid coverage (17,639 out of 646,404). People without a history of diagnosed diabetes but with a fasting plasma glucose greater than or equal to 126 mg/dl or an A1c level greater than or equal to 6.5 percent were classified as having undiagnosed diabetes.

Prediabetes Among Medicaid Populations

Prediabetes is estimated to be more prevalent among "newly eligible adults" than among persons enrolled in "classic" Medicaid coverage. Based on synthetic estimates derived from NHANES data and the demographic composition of the April 2014 Washington State Medicaid caseload, the estimated prevalence of prediabetes is 35 percent among newly eligible adults (133,274 out of 376,622), compared to 28 percent among persons 12 or above enrolled in classic Medicaid coverage (181,846 out of 646,404). People without diabetes were classified as having prediabetes if they had fasting plasma glucose values of 100 to 125 mg/dl or A1c values of 5.7 percent to 6.4 percent.

Morbidity Among Medicaid Populations

Complications

Among persons with diabetes, diabetes complications are relatively common. Short-term complications are most common among children with diabetes and least common among elders. Long-term complications are most common among persons with disabilities including (non-elderly dual eligibles). Lower-extremity amputations are rare events, but occur most frequently among non-elderly disabled persons with diabetes.

Table 23. Complications Among Medicaid Clients with Diabetes[a]

	Short-term Complications[b]		Long-term Complications[c]		Lower Extremity Amputation	
Eligibility Group	Number	Percent	Number	Percent	Number	Percent
Medicaid only						
Non-disabled children	312	28.1%	238	21.5%	0	0.0%
Disabled children	20	18.9%	26	24.5%	0	0.0%
Non-disabled adult	291	7.5%	975	25.2%	3	0.1%
Disabled adult	805	6.1%	4,495	34.1%	119	0.9%
Elderly	4	1.4%	79	26.8%	0	0.0%
Dual eligible						
Non-elderly	547	5.0%	4,247	38.7%	75	0.7%
Elderly	325	1.6%	6,059	29.5%	24	0.1%

Source: Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State

Fiscal Year 2011.
[a]Presence of type 1 or type 2 diabetes identified by diagnosis, pharmacy prescription, or CARE assessment using state fiscal year 2010 and 2011 claims, encounters, or assessment data.
[b]Includes ketoacidosis, hyperosmolarity, or coma.
[c]Includes renal, eye, neurological, circulatory, or otherwise not specified.

Co-existing Conditions

Comorbidities were identified using the Chronic Illness and Disability Payment System (CDPS) diagnosis-based risk grouper developed by researchers at University of California, San Diego. Disease prevalence is hierarchically unduplicated within each disease category. For example, a client with diagnoses of congestive heart failure and hypertension will be counted only once in the "Cardiovascular, medium" category. Thus, percentages can be added within a disease category (e.g., Cardiovascular) to produce the unduplicated percentage of clients in that disease category at all levels of severity. Clients with diagnoses in multiple disease categories (e.g., Cardiovascular and Psychiatric) will be counted once in each broad disease category represented in their health care claim/encounter diagnoses.

Persons with diabetes are significantly more likely to have cardiovascular disease than persons without diabetes. For example, among Medicaid-only disabled adults:

- 13 percent of persons with diabetes have a "cardiovascular, medium" diagnosis, such as congestive heart failure, compared to only 3 percent of persons without diabetes.
- 18 percent of persons with diabetes have a "cardiovascular, low" diagnosis, such as myocardial infarction, compared to only 8 percent of persons without diabetes.
- 39 percent of persons with diabetes have a "cardiovascular, extra low" diagnosis, such as hypertension, compared to only 15 percent of persons without diabetes.

Persons with diabetes are more likely to have a range of other co-existing chronic disease conditions, including gastrointestinal, renal and pulmonary conditions.

The table below shows the prevalence of co-existing conditions among the Medicaid-only population by coverage group.

Table 24. Prevalence of Disease Condition Comorbidity Among Medicaid-Only Clients With and Without Diabetes[a]

CDPS Disease Group	Disabled Adult		Disabled Child		Non-disabled Adult		Non-disabled Child		Elderly	
Has diabetes?	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
Cancer, very high	1.5%	0.9%	0.4%	0.1%	0.1%	0.0%	0.0%	0.0%	1.1%	0.8%
Cancer, high	1.9%	1.1%	5.3%	1.2%	0.5%	0.1%	0.7%	0.0%	1.5%	1.6%
Cancer, medium	0.8%	0.5%	0.0%	0.3%	0.2%	0.1%	0.1%	0.0%	0.8%	0.9%
Cancer, low	2.0%	1.0%	0.0%	0.2%	0.6%	0.2%	0.1%	0.0%	2.4%	1.5%
Cardiovascular, very high	1.3%	0.4%	3.1%	0.6%	1.9%	0.0%	0.0%	0.0%	0.8%	0.3%
Cardiovascular,	12.8%	3.0%	3.8%	2.0%	2.0%	0.4%	0.9%	0.3%	13.9%	5.7%

medium										
Cardiovascular, low	18.1%	7.5%	6.5%	6.3%	6.6%	1.8%	2.0%	0.8%	18.8%	13.7%
Cardiovascular, extra low	38.8%	14.6%	8.4%	0.7%	27.3%	3.5%	4.2%	0.2%	45.0%	29.1%
Cerebrovascular, low	5.1%	1.7%	1.9%	1.3%	0.8%	0.1%	0.3%	0.1%	6.2%	3.2%
CNS, high	0.9%	0.7%	2.7%	1.8%	0.1%	0.0%	0.2%	0.0%	0.6%	0.2%
CNS, medium	3.9%	2.2%	6.1%	4.7%	0.9%	0.2%	0.4%	0.1%	0.8%	0.8%
CNS, low	23.3%	9.4%	15.3%	9.1%	8.4%	1.8%	2.8%	1.1%	13.9%	6.1%
DD, medium	0.1%	0.1%	1.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
DD, low	1.0%	0.9%	9.9%	6.5%	0.1%	0.0%	0.6%	0.1%	0.0%	0.2%
Eye, low	1.7%	0.4%	0.4%	0.2%	0.7%	0.1%	0.3%	0.0%	2.4%	0.5%
Eye, very low	9.9%	2.4%	1.9%	1.5%	2.2%	0.3%	0.4%	0.3%	25.2%	15.8%
Genital, extra low	6.3%	3.7%	2.3%	1.4%	7.5%	4.4%	1.6%	0.6%	10.0%	6.2%
Gastro, high	1.9%	1.0%	10.7%	4.8%	0.4%	0.1%	2.0%	0.1%	2.1%	0.8%
Gastro, medium	11.3%	4.8%	1.9%	0.8%	5.5%	1.0%	2.4%	0.2%	5.3%	2.8%
Gastro, low	23.2%	12.4%	11.8%	5.7%	13.1%	5.1%	4.9%	2.7%	20.9%	15.2%
Hematological, extra high	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hematological, very high	0.0%	0.0%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hematological, medium	3.5%	1.4%	3.4%	1.0%	1.1%	0.3%	0.7%	0.2%	1.1%	1.1%
Hematological, low	3.9%	1.7%	1.1%	0.7%	1.3%	0.5%	0.6%	0.2%	3.2%	1.5%
AIDS, high	0.7%	1.1%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%
HIV, medium	0.6%	0.2%	0.8%	0.1%	0.1%	0.0%	0.1%	0.0%	0.4%	0.2%
Infectious, high	0.3%	0.1%	1.1%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Infectious, medium	4.0%	1.1%	1.9%	0.5%	0.9%	0.2%	0.3%	0.1%	3.4%	1.1%
Infectious, low	9.5%	6.6%	1.1%	1.0%	2.8%	1.0%	0.4%	1.1%	4.0%	2.8%
Metabolic, high	3.5%	0.8%	15.6%	1.7%	2.7%	0.2%	6.6%	0.2%	2.3%	0.8%
Metabolic, medium	8.5%	2.5%	2.7%	1.3%	2.3%	0.4%	1.1%	0.1%	8.1%	2.2%
Metabolic, very low	7.8%	3.9%	15.3%	13.0%	3.5%	1.1%	2.8%	1.3%	5.1%	4.4%
Psychiatric, high	7.4%	5.9%	1.9%	0.3%	0.4%	0.2%	0.3%	0.0%	2.3%	0.7%
Psychiatric, medium	8.8%	8.2%	13.7%	11.7%	3.2%	1.5%	1.4%	0.5%	2.3%	1.2%
Psychiatric, medium low	19.7%	18.1%	24.8%	21.7%	15.0%	8.2%	13.1%	5.4%	5.1%	5.5%
Psychiatric, low	13.4%	8.7%	5.7%	2.2%	10.2%	4.9%	5.8%	1.6%	10.0%	6.6%
Pulmonary, very high	2.9%	0.7%	5.0%	1.3%	0.2%	0.0%	0.6%	0.0%	1.7%	0.5%
Pulmonary, high	0.6%	0.3%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.8%	0.6%
Pulmonary, medium	11.9%	5.3%	8.0%	4.5%	3.2%	0.9%	1.1%	0.6%	11.1%	7.3%

Pulmonary, low	23.0%	13.6%	19.5%	14.3%	13.4%	6.3%	13.6%	8.3%	11.7%	9.5%
Renal, extra high	1.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.8%	0.4%
Renal, very high	8.8%	1.3%	0.4%	0.5%	1.3%	0.1%	0.2%	0.0%	10.2%	3.5%
Renal, medium	1.3%	0.3%	2.7%	0.2%	0.7%	0.1%	0.2%	0.0%	0.8%	0.2%
Renal, low	10.6%	5.1%	16.0%	10.9%	2.5%	0.8%	2.1%	1.0%	16.2%	10.2%
Skeletal, medium	9.7%	5.8%	7.3%	4.8%	3.4%	1.6%	2.5%	0.9%	5.5%	3.5%
Skeletal, low	15.5%	10.3%	7.6%	5.2%	7.9%	3.4%	3.4%	1.6%	11.3%	12.5%
Skeletal, very low	10.2%	7.9%	9.2%	5.1%	5.5%	3.2%	5.1%	2.7%	4.0%	3.5%
Skin, high	2.4%	0.6%	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	2.6%	0.7%
Skin, low	4.4%	0.8%	0.8%	0.2%	0.9%	0.1%	0.0%	0.0%	1.9%	0.5%
Skin, very low	15.8%	9.3%	15.6%	6.5%	10.6%	4.7%	7.9%	3.6%	6.4%	3.6%
Substance abuse, low	11.2%	11.9%	0.4%	1.0%	5.0%	4.0%	1.7%	0.5%	1.3%	0.8%
Substance abuse, very low	5.9%	6.8%	0.4%	0.4%	2.8%	2.3%	0.6%	0.3%	0.4%	1.1%

Source: Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.

[a]HOW TO INTERPRET THIS TABLE: Chronic disease conditions were identified by applying the Chronic Illness and Disability Payments System (CDPS) to clients' fee-for-service medical claims in State Fiscal Year 2011. Counts are hierarchically unduplicated within the disease group. For example, a client with diagnoses of schizophrenia and depression will be counted only once in the "Psychiatric, high" category. Thus, percentages can be added within a disease category (e.g., Psychiatric) to produce the unduplicated percentage of clients in that disease category. Clients with diagnoses in multiple categories (e.g., Cardiovascular and Psychiatric) will be counted once in each broad category represented in their medical claims diagnoses. For more information about the CDPS, see Kronick R, Gilmer T, Dreyfus T, et al. Improving health-based payment for Medicaid beneficiaries: CDPS. Health Care Fin Rev 2000; 21:29-64.

The table below shows the prevalence of co-existing conditions among the dual-eligible population by coverage group.

Table 25. Prevalence of Disease Condition Comorbidity Among Dual-Eligible Medicaid Clients With and Without Diabetes[a]

CDPS Disease Group	Elderly		Non-Elderly	
Has diabetes?	Yes	No	Yes	No
Cancer, very high	2.7%	2.6%	1.8%	1.2%
Cancer, high	3.9%	3.6%	3.6%	2.4%
Cancer, medium	2.0%	1.7%	1.5%	0.9%
Cancer, low	7.0%	6.5%	3.7%	2.4%
Cardiovascular, very high	2.8%	0.8%	6.9%	1.7%
Cardiovascular, medium	35.3%	22.4%	20.6%	6.3%
Cardiovascular, low	30.1%	28.9%	25.5%	16.4%
Cardiovascular, extra low	25.2%	26.0%	30.8%	20.8%
Cerebrovascular, low	20.1%	13.8%	12.6%	5.7%
CNS, high	1.2%	0.9%	3.3%	3.3%
CNS, medium	4.9%	2.3%	9.8%	7.5%
CNS, low	36.6%	25.9%	40.3%	23.6%
DD, medium	0.3%	0.3%	1.7%	1.7%

DD, low	0.6%	0.7%	4.8%	6.4%
Eye, low	3.9%	2.3%	4.2%	1.2%
Eye, very low	45.9%	36.7%	23.1%	10.9%
Genital, extra low	14.6%	12.5%	14.7%	10.5%
Gastro, high	3.2%	2.1%	4.8%	2.8%
Gastro, medium	9.4%	6.2%	18.0%	8.7%
Gastro, low	37.1%	32.5%	36.8%	27.4%
Hematological, extra high	0.1%	0.0%	0.1%	0.1%
Hematological, very high	0.0%	0.0%	0.0%	0.1%
Hematological, medium	3.3%	2.3%	6.2%	3.1%
Hematological, low	7.8%	5.2%	8.2%	4.1%
AIDS, high	0.2%	0.2%	1.4%	1.9%
HIV, medium	1.4%	0.6%	3.3%	1.4%
Infectious, high	0.3%	0.2%	0.8%	0.3%
Infectious, medium	10.3%	5.5%	10.6%	3.8%
Infectious, low	6.8%	6.2%	11.4%	9.4%
Metabolic, high	4.4%	1.7%	8.3%	2.8%
Metabolic, medium	19.1%	11.8%	20.6%	8.6%
Metabolic, very low	13.5%	11.8%	12.0%	9.2%
Psychiatric, high	7.0%	5.6%	18.7%	17.5%
Psychiatric, medium	7.3%	6.1%	14.0%	14.3%
Psychiatric, medium low	12.5%	10.1%	21.9%	20.4%
Psychiatric, low	21.9%	21.3%	15.3%	11.4%
Pulmonary, very high	5.4%	3.0%	5.9%	1.6%
Pulmonary, high	1.4%	1.3%	1.4%	0.6%
Pulmonary, medium	23.9%	18.3%	22.4%	11.8%
Pulmonary, low	23.9%	21.3%	29.4%	23.7%
Renal, extra high	2.8%	0.4%	6.8%	1.1%
Renal, very high	23.8%	11.7%	12.8%	2.9%
Renal, medium	1.6%	0.7%	2.4%	0.9%
Renal, low	29.6%	29.4%	22.5%	18.7%
Skeletal, medium	19.2%	15.3%	23.2%	15.4%
Skeletal, low	29.5%	28.5%	28.1%	23.1%
Skeletal, very low	10.3%	8.8%	12.3%	11.5%
Skin, high	9.4%	5.5%	7.9%	3.0%
Skin, low	7.4%	3.4%	9.4%	2.5%
Skin, very low	18.3%	13.4%	30.8%	24.2%
Substance abuse, low	2.9%	2.3%	17.2%	17.3%
Substance abuse, very low	2.7%	3.4%	7.0%	8.5%

Source: Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.

[a]HOW TO INTERPRET THIS TABLE: Chronic disease conditions were identified by applying the Chronic Illness and Disability Payments System (CDPS) to clients' fee-for-service medical claims in State Fiscal Year 2011. Counts are hierarchically unduplicated within the disease group. For example, a client with diagnoses of schizophrenia and depression will be counted only once in the "Psychiatric, high" category. Thus, percentages can be added within a disease category (e.g., Psychiatric) to produce the unduplicated percentage of clients in that disease category. Clients with diagnoses in multiple categories (e.g., Cardiovascular and Psychiatric) will be counted once in each broad category represented in their medical claims diagnoses. For more information about the CDPS, see Kronick R, Gilmer T, Dreyfus T, et al. Improving health-based payment for Medicaid beneficiaries: CDPS. Health Care Fin Rev 2000; 21:29-64.

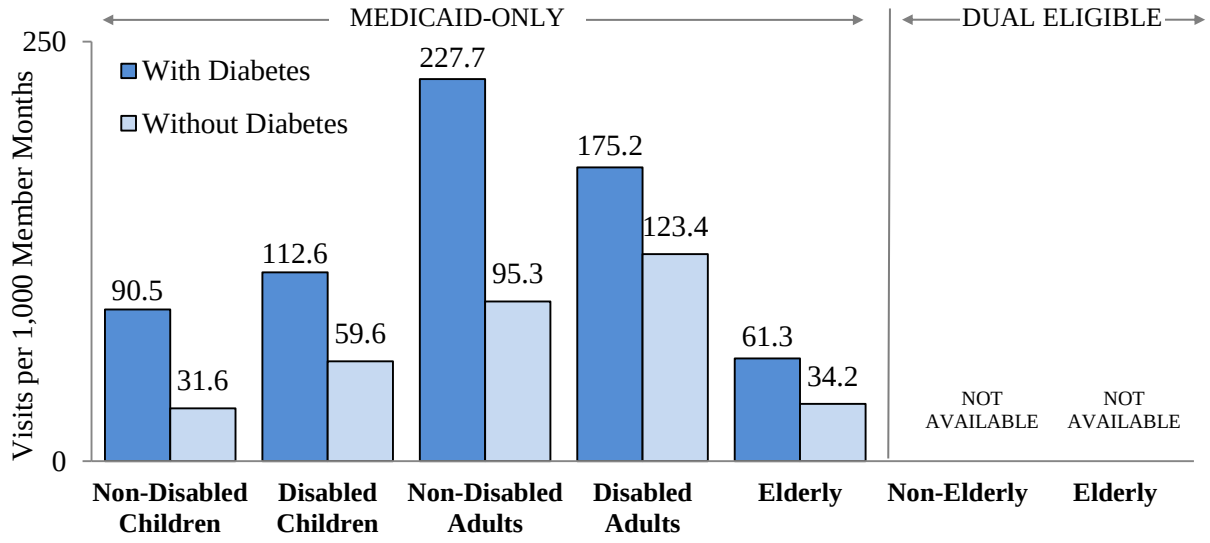
Health Service Utilization Among Medicaid Populations

Medical services

Medical service utilization information is provided for persons enrolled in Medicaid-only fee-for-service coverage in state fiscal year 2011. Corresponding cost and utilization encounter data for managed care clients was not available for this report.

Outpatient emergency department utilization rates are significantly higher for persons with diabetes than for persons without diabetes. For example, non-disabled adults with diabetes experienced 228 outpatient visits per 1,000 member months, compared to 95 visits per 1,000 member months for non-disabled adults without diabetes.

Chart 33. Outpatient Emergency Room Visits Among Medicaid Clients[a]

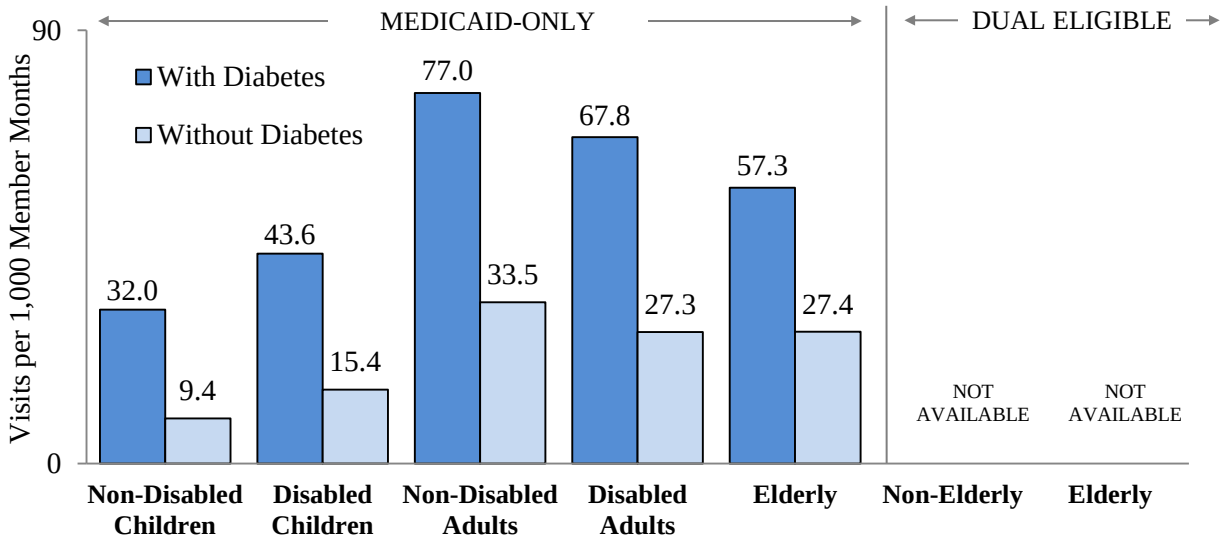


Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.

[a]Fee-for-service Medicaid enrollees only. Excludes clients with dual Medicare eligibility or other third-party coverage.

Inpatient admission rates are significantly higher for persons with diabetes than for persons without diabetes. For example, disabled adults with diabetes experienced 68 inpatient admissions per 1,000 member months, compared to 27 inpatient admissions per 1,000 member months for disabled adults without diabetes.

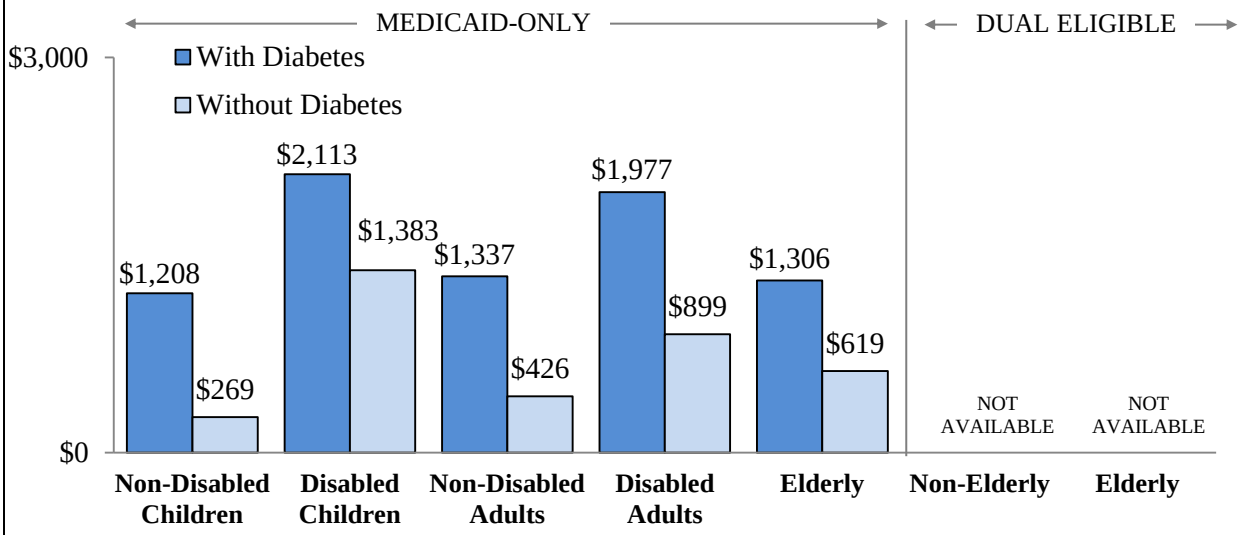
Chart 34. Inpatient Admissions Among Medicaid Clients[a]



Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
[a]Fee-for-service Medicaid enrollees only. Excludes clients with dual Medicare eligibility or other third-party coverage.

Per-member-per-month (PMPM) medical expenditures are significantly higher for persons with diabetes than for persons without diabetes. For example, PMPM expenditures for disabled adults with diabetes were $1,977 PMPM, compared to $899 PMPM for disabled adults without diabetes.

Chart 35. Medicaid Medical Assistance Expenditures per Member per Month[a]



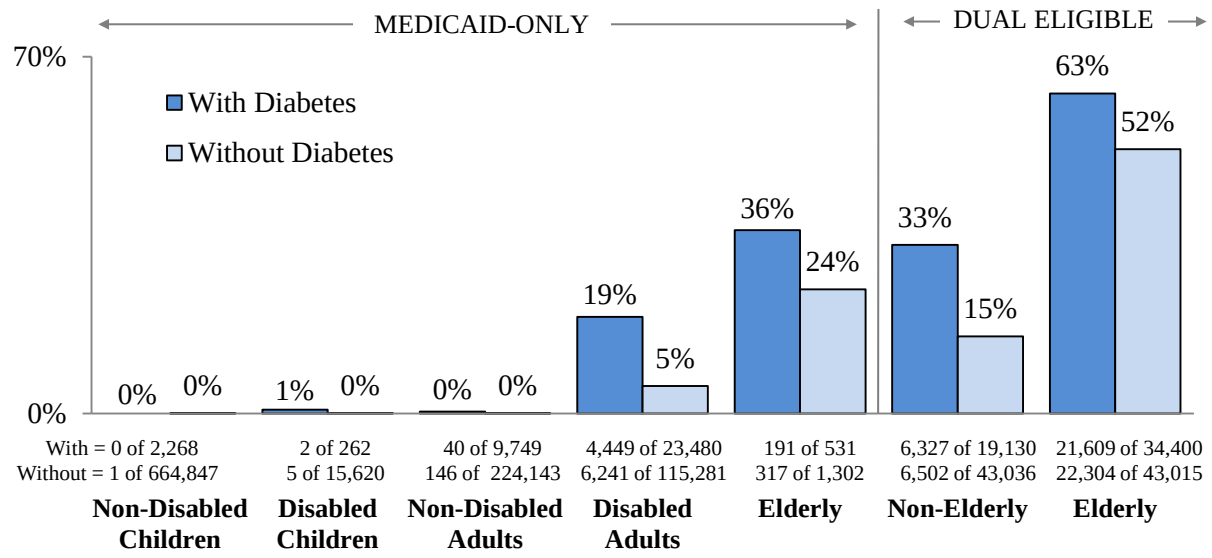
Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.

Other Medicaid-funded Health Services

Information on the use of other Medicaid-funded health services (long-term services and supports, mental health services, and substance use disorder treatment services) is provided for Medicaid populations in the charts below. Information in these service areas is provided for persons dually eligible for Medicare, although services paid for by Medicare are not included in the utilization data reported here.

More long-term services and supports were used by Medicaid clients with diabetes than those without diabetes for the following coverage groups: Medicaid-only disabled adults and elderly, and dual eligible non-elderly and elderly.

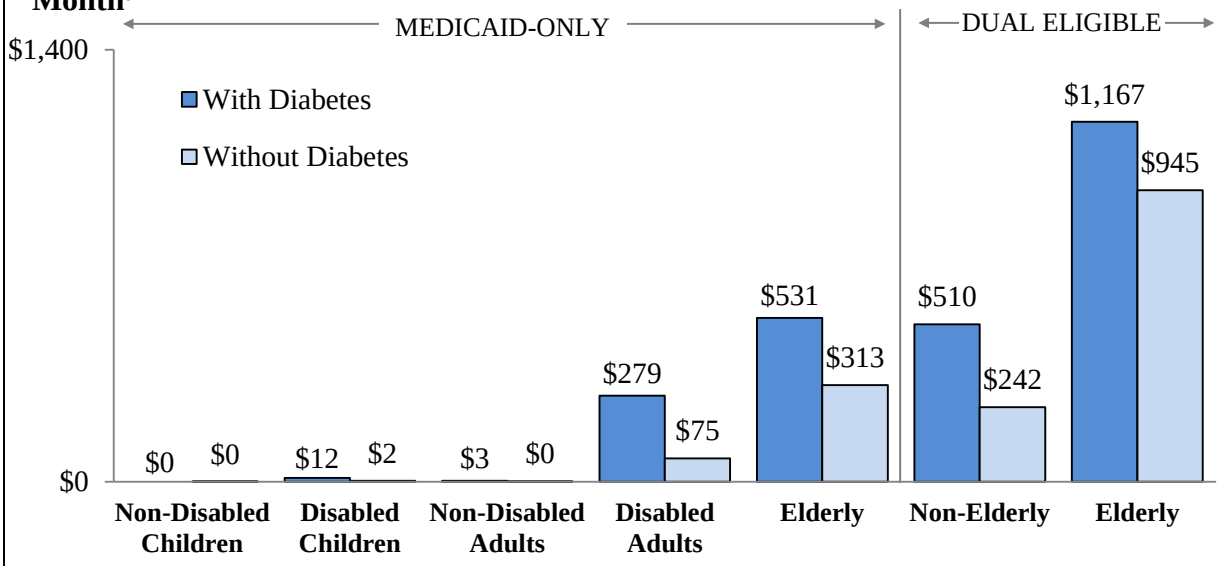
Chart 36. Use of Long Term Services and Supports Among Medicaid Clients[a]



Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.

Per-member-per-month (PMPM) Medicaid-paid long-term services and supports expenditures are significantly higher for persons with diabetes than for persons without diabetes. For example, PMPM expenditures for non-elderly dual eligibles with diabetes were $510 PMPM, compared to $242 PMPM for non-elderly dual eligibles adults without diabetes. The PMPM cost differences reflect the fact that 33 percent of non-elderly dual eligibles with diabetes used Medicaid-paid LTSS services, compared to only 15 percent of non-elderly dual eligibles adults without diabetes.

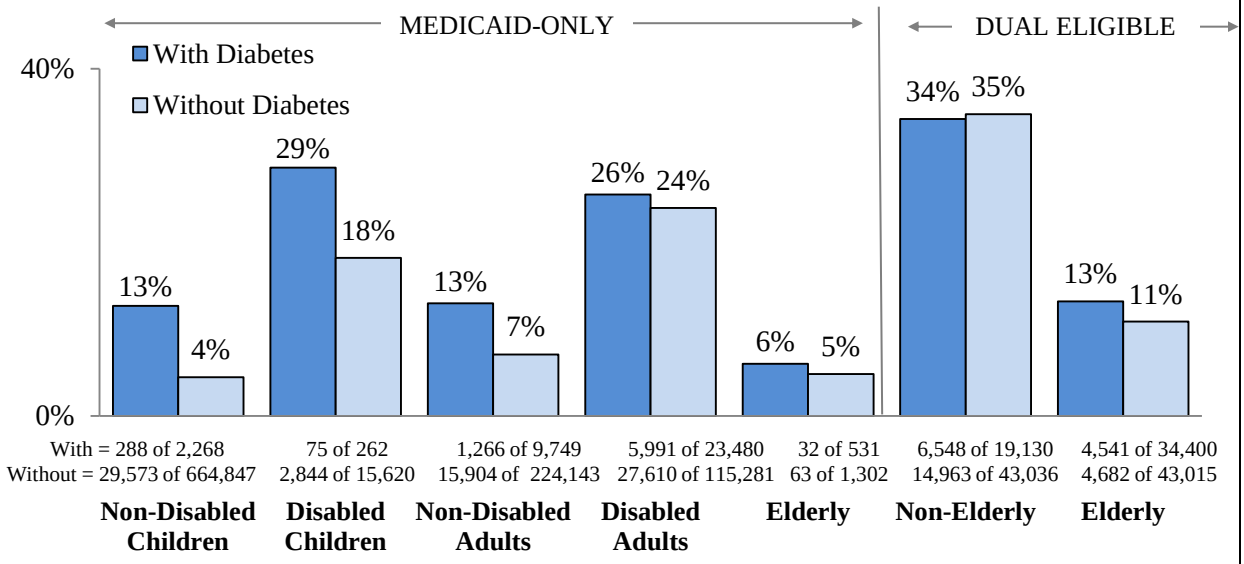
Chart 37. Medicaid Long-Term Services and Supports Expenditures per Member per Month[a]



Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.

More mental health services were used by Medicaid clients with diabetes than those without diabetes for the following coverage groups: Medicaid-only non-disabled children, disabled children, and non-disabled adults.

Chart 38. Use of Mental Health Services Among Medicaid Clients[a]

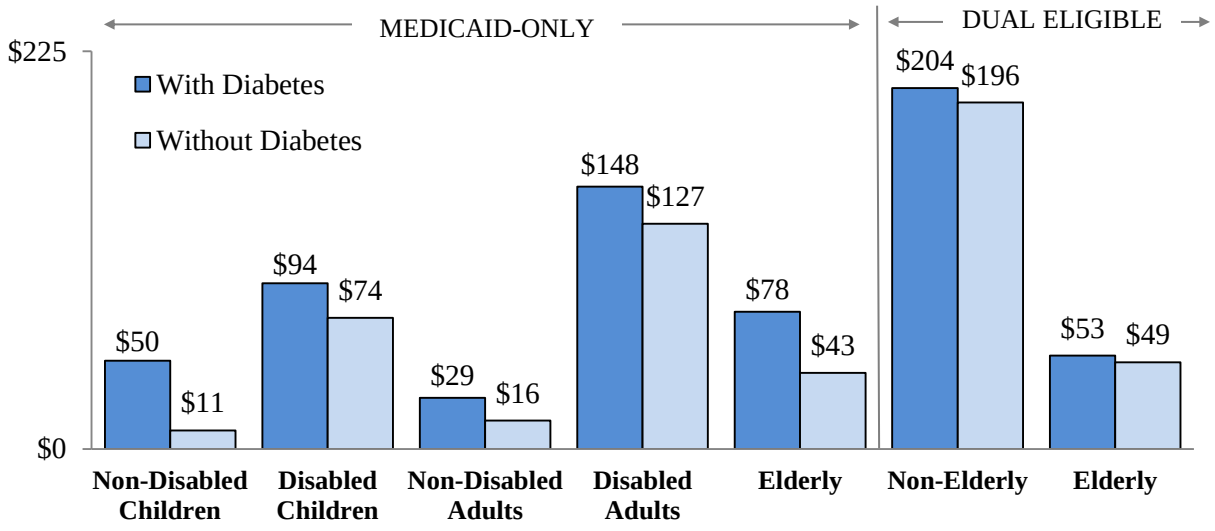


Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.

[a]Services through the Division of Behavioral Health and Recovery.

Per-member-per-month (PMPM) Medicaid-paid mental health service expenditures are higher for persons with diabetes than for persons without diabetes. For example, PMPM mental health expenditures for Medicaid-only disabled adults with diabetes were $148 PMPM, compared to $127 PMPM for disabled adults without diabetes.

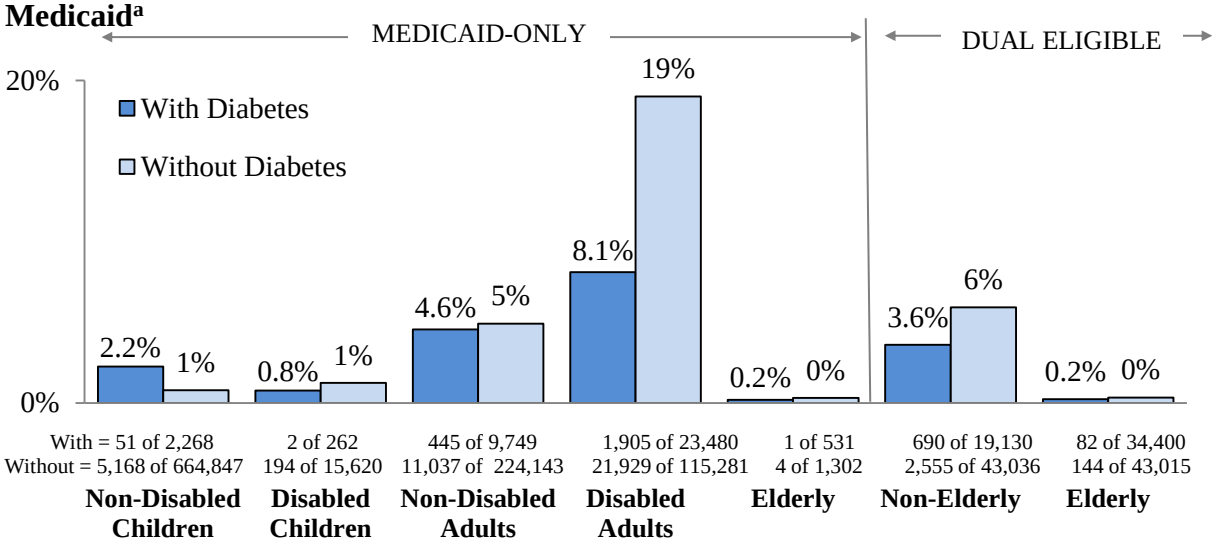
Chart 39. Medicaid Mental Health Services Expenditures per Member per Month[a]



Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
[a]Services through the Division of Behavioral Health and Recovery. Data are imputed.

The same or even fewer Medicaid clients with diabetes used substance use disorder services than those without diabetes. Compared to those with diabetes, the use of substance use disorder services among those without diabetes was higher in Medicaid-only disabled adults and non-elderly dual eligibles.

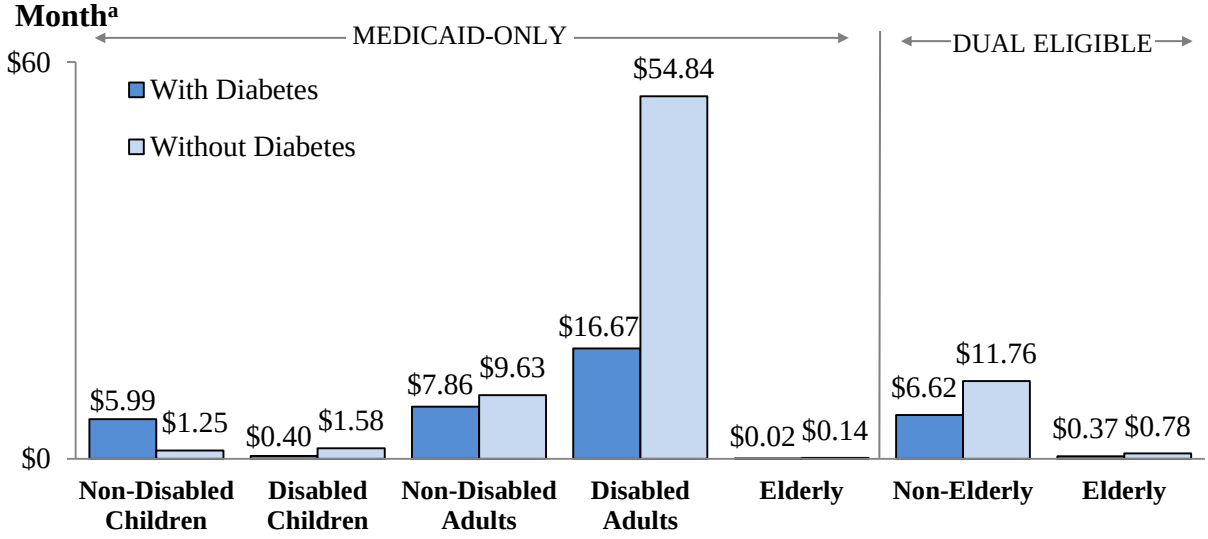
Chart 40. Use of Substance Use Disorder Services Among Populations Covered by Medicaid[a]



Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
[a]Services through the Division of Behavioral Health and Recovery.

Per-member-per-month (PMPM) Medicaid-paid substance use disorder service expenditures are generally lower for persons with diabetes than for persons without diabetes. For example, PMPM expenditures for disabled adults without diabetes were $55 PMPM, compared to $17 PMPM for disabled adults with diabetes.

Chart 41. Medicaid Substance Use Disorder Services Expenditures per Member per Month[a]

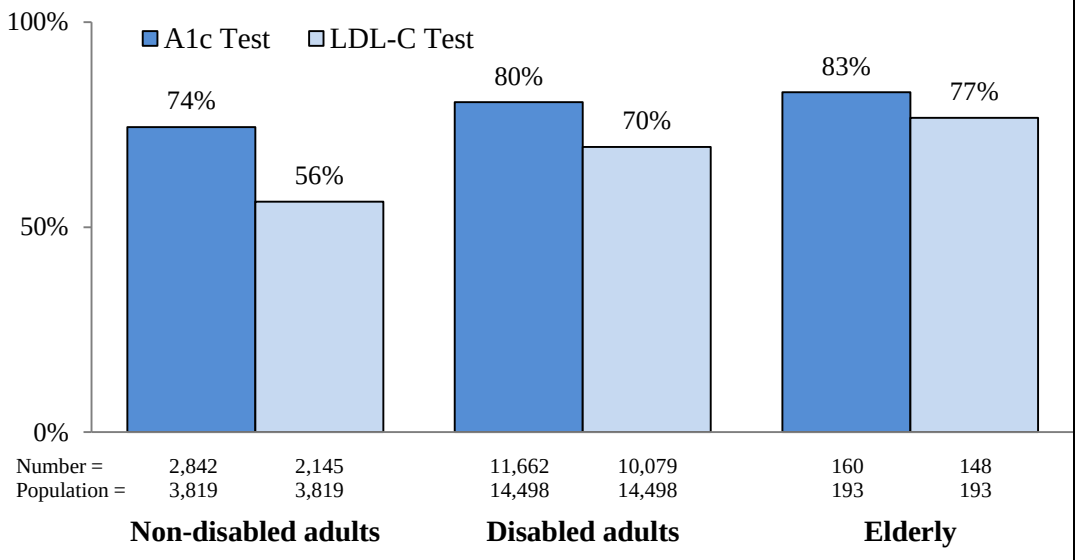


Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
[a]Services through the Division of Behavioral Health and Recovery.

Diabetes Quality Measures Among Medicaid Populations

The charts below show the diabetes-related health care quality and outcome metrics that are emerging as performance standards for Medicaid delivery systems. These metrics are components of the Healthcare Effectiveness Data and Information Set (HEDIS), Comprehensive Diabetes Care (CDC) metric and Agency for Healthcare Research and Quality (AHRQ), Prevention Quality Indicators (PQI) pertaining to hospitalization rates for diabetes short-term complications. These measures are part of the Centers for Medicare & Medicaid Services Initial Core Set of health care quality measures for adults enrolled in Medicaid, and are presented only for Medicaid-only adult and elder populations.[91] Non-disabled adults tend to score lowest on the Hemoglobin A1c and LDL-C testing components of the HEDIS CDC metric, while elders score highest on these components.

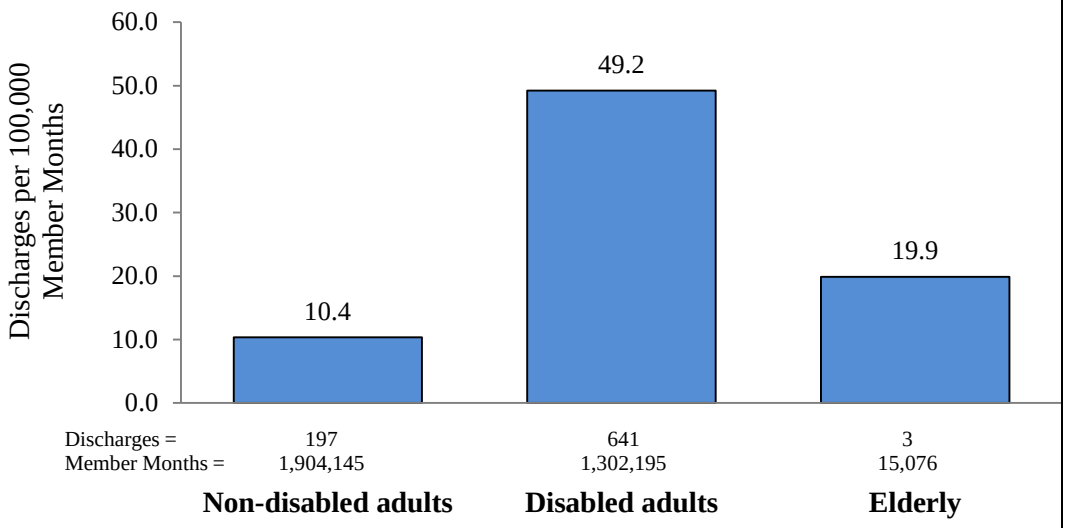
Chart 42. Receipt of Hemoglobin A1c and Cholesterol Tests Among Medicaid Clients with Diabetes[a]



Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
Abbreviations: LDL-C, low-density lipoprotien cholesterol.

Disabled adults have the highest rate of hospitalization for diabetes short-term complications (49 admissions per 100,000 member months), while non-disabled non-elderly adults fare best on this measure (10 admissions per 100,000 member months).

Chart 43. Discharges for Diabetes Short-term Complications[a] Among Medicaid Clients with Diabetes[b]



Source: Washington State Department of Social and Health Services, Research and Data Analysis Division, Client Outcomes Database, State Fiscal Year 2011.
[a]Includes ketoacidosis, hyperosmolarity, or coma.
[b]Age ≥ 18 years.

Diabetes among Populations Covered by Public Employees Benefits Board (PEBB) Programs

PEBB data are only provided for Uniform Medical Plan (UMP) enrollees. UMP is a self-insured preferred provider organization (PPO) plan available to PEBB enrollees worldwide. Medicare eligible PEBB members who are enrolled in UMP receive primary coverage through their Medicare benefits and UMP pays secondary coverage only for UMP covered services and allowable costs that are not covered by Medicare. Because UMP is a secondary payer, UMP and PEB experience lower expenditures for UMP Medicare enrollees.

Prevalence of Diabetes Among PEBB Populations

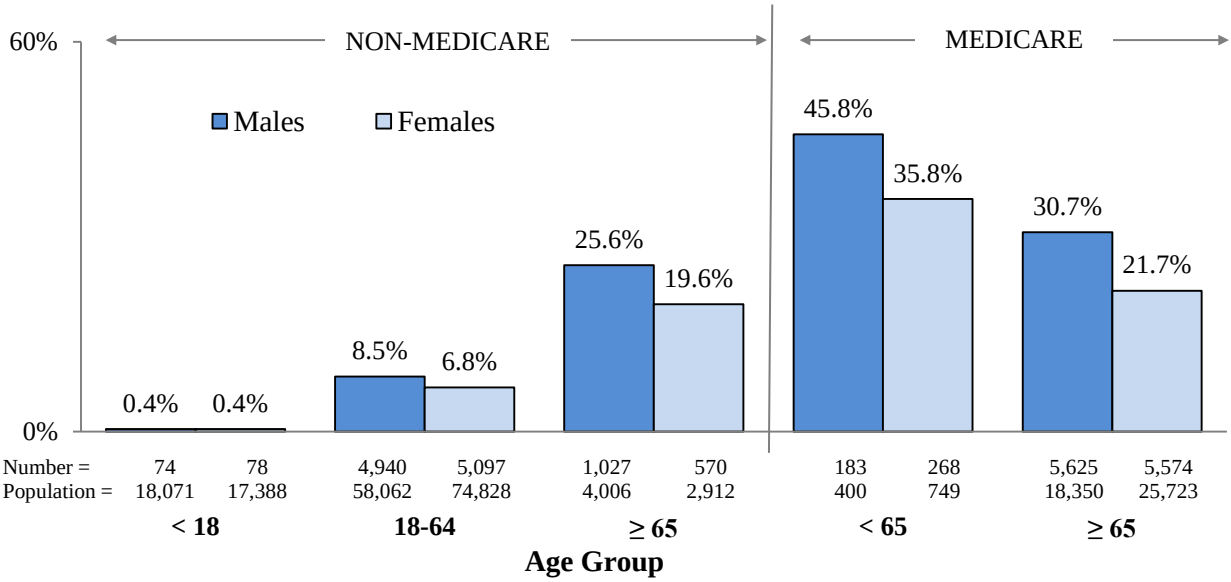
Diagnosed Diabetes

About 11 percent of Uniform Medical Plan enrollees, or 23,400 people, had a diabetes diagnosis in 2013. These enrollees were identified by counting the number of members who received medical services and had a claim with a diabetes diagnosis submitted to their health plan during 2013. These claims may not include all members with diabetes if some UMP enrollees did not receive services during 2013.

Diabetes is more prevalent in UMP enrollees over 65 years (about 25 percent). Men tend to have higher prevalence of diabetes than women in the UMP population. People under 65 who have Medicare coverage have the highest prevalence of diabetes. This may be a result of the small

number of people in this group or a higher likelihood of chronic conditions among the disabled Medicare population.

Chart 7. Prevalence of Diabetes Among Uniform Medical Plan Members[a]



Source: Uniform Medical Plan 2013 claims data from Public Employees Benefits Board Managed Care source claims database.
[a]Presence of type 1 or type 2 diabetes identified by counting number of members who had a claim with a diabetes diagnosis in calendar year 2013.

Gestational Diabetes

About 295 (13 percent) of UMP women delivering babies in 2013 had a diagnosis of gestational diabetes identified on a claim during their pregnancy. More women 25 and older had a claim for gestational diabetes (14 percent) than women 18-25 years (6 percent).

Gestational Diabetes

PEBB prediabetes data estimates are not included at this time. Data collection and reporting relies on accurate and complete coding. Because current coding practices underreport prediabetes diagnoses and care, no prediabetes prevalence estimates were made for PEBB populations.

Morbidity Among PEBB Populations

Complications

In 2013, 6,320 (27 percent) of all UMP enrollees with diabetes had complications identified on a claim submitted for medical services. Enrollees with complications were identified from the population of enrollees with a diabetes diagnosis on a medical claim during 2013, along with diagnosis codes for diabetes-related complications. *See technical notes in Appendix 7.*

In 2013, UMP expenditures for diabetes complications totaled $17.3 million, with an average cost per person of $2738. Twenty-seven percent of people with diabetes experienced long-term

complications. The incidence of long term complications was higher as age increased and among people with Medicare coverage. Adults with Medicare coverage experienced the highest rate of long term complications. A higher proportion of men experienced long term complications than women in all age categories.

Less than 1 percent of people with diabetes experienced short term complications. They had a higher average cost ($9763) than those with long term complications ($2504). Children under 18 had the highest rate of short term complications (8.5 percent of children with diabetes) and the highest average short term costs.

Table 26. Complications Among Uniform Medical Plan Members with Diabetes[a]

		Short-term Complications[b]				Long-term Complications[c]			
Age Group	Gender	Number	Percent	Expenditures	Average Expense	Number	Percent	Expenditures	Average Expense
Non-Medicare									
<18	Male	7	9.5%	$166,320	$23,760	9	12.2%	$6,032	$670
	Female	6	7.7%	$48,732	$8,122	9	11.5%	$57,419	$6,380
18-64	Male	50	1.0%	$1,003,626	$20,073	1,055	21.4%	$4,205,663	$3,986
	Female	42	0.8%	$589,702	$14,041	1,018	20.0%	$4,561,948	$4,481
≥65	Male	4	0.4%	$4,711	$1,178	275	26.8%	$1,236,071	$4,495
	Female	4	0.7%	$71,498	$17,875	129	22.6%	$598,008	$4,636
Medicare									
<65	Male	2	1.1%	$2,596	$1,298	69	37.7%	$158,971	$2,304
	Female	0	0.0%	$0	$0	83	31.0%	$105,063	$1,266
≥65	Male	46	0.8%	$69,089	$1,502	1,809	32.2%	$2,338,772	$1,293
	Female	43	0.8%	$35,485	$825	1,660	29.8%	$2,050,635	$1,235

Source: Uniform Medical Plan 2013 claims data from Public Employees Benefits Board Managed Care source claims database.
[a]Presence of type 1 or type 2 diabetes identified by counting number of members who had a claim with a diabetes diagnosis in calendar year 2013.
[b]Includes ketoacidosis, hyperosmolarity, or coma.
[c]Includes renal, eye, neurological, circulatory, or otherwise not specified.

Diabetes Quality Measures Among PEBB Populations

The PEBB Program receives annual Uniform Medical Plan quality performance reports from Regence. The Washington Health Alliance also provides annual quality performance reports for Uniform Medical Plan and Group Health Cooperative.

PEBB will participate in the design and implementation of Healthier Washington Common Performance Measures set to inform purchasing and benefit design. As of November 2014, the Performance Measures Coordinating Committee is reviewing and seeking comment on the draft common measures set, which includes measures related to diabetes care.

Appendix 4: Services and Programs Addressing Diabetes in Washington State

Department of Health

Diabetes prevention and control programs

First funded by the Centers for Disease Control and Prevention (CDC) in 1979, the Diabetes Control Program at the Department of Health has worked to reduce disability and deaths from diabetes through public health practices. For FY2015, CDC is providing the department with $2.65 million to address prevention of type 2 diabetes and prevention of complications from all forms of diabetes. Much of this funding goes to local health jurisdictions and contracts with essential public and private partners. This funding supports five staff positions that work directly in the Heart Disease, Stroke and Diabetes Prevention Program, and portions of numerous other positions that work across programs to address chronic diseases.

Work to address diabetes is predominantly housed within programs in the division of Prevention and Community Health's Office of Healthy Communities. The Heart Disease, Stroke and Diabetes Prevention program addresses diabetes by developing community-clinical partnerships and promoting evidence-based programs. The Washington Healthcare Improvement Network provides guidance on health/medical home quality improvement to provider practices and health systems. Within the Community-Based Prevention section, the Healthy Eating Active Living, Oral Health, Tobacco, and Healthy Communities programs provide support to address policy, systems and environments that impact food, active living, tobacco use, oral health and obesity. Additionally, the Community Health Worker Training System offers free online training that strengthens common skills, knowledge and abilities of this growing workforce.

These programs do not employ a "single disease" approach to addressing chronic health conditions such as diabetes. These programs integrate funding from a variety of federally-funded CDC programs, such as the Comprehensive Cancer Control Program, Tobacco Prevention and Control, Heart Disease and Stroke, and Nutrition, Physical Activity, and Obesity Prevention to achieve greater system change.

Washington Healthcare Improvement Network

The Washington Healthcare Improvement Network (WHIN) provides individualized coaching through year-long collaboratives to clinics and health systems interested in patient-centered medical home development and offers technical assistance for monitoring population health metrics, including hypertension control (blood pressure less than 140/90) and poor control of diabetes (A1c greater than 9.0 percent). Additionally, WHIN coordinates live events and webinars for its participants, of which chronic disease prevention, management, and the treat to target model have been of focus. Between 2013-2014, there were two collaboratives – one in

Whatcom county, and one for Thurston, Mason, Lewis and eastern Grays Harbor counties – in which 26 practices enrolled. In June 2014, WHIN launched a new collaborative in the Eastern WA region, and 17 clinics from Adams, Asotin, Columbia, Ferry, Grant, Lincoln, Pend Oreille, Spokane and Stevens counties enrolled.

For regions that WHIN has not yet reached or for previous participants who want ongoing education, WHIN offers a self-paced, independent platform called the "WHIN Institute" in which there are 13 clinics currently enrolled. There are two tracks, 1) Olympus, in which participants have access to webinars and e-learning modules and 2) Rainier, in which participants have access to Olympus offerings and limited, virtual coaching support for quality improvement and population health metrics. There is no charge for this program.

Washington Patient-Centered Medical Home Collaborative

In 2008, the legislature directed the department to develop the Washington Patient-Centered Medical Home Collaborative. Thirty-one clinics from around the state participated in this two-year quality improvement project, a joint project of the department and the Washington Academy of Family Physicians. The clinics represented a diverse mixture of organization types, ranged in size from small to large, and were located in rural, suburban and urban settings in fourteen different counties.

Participants enrolled as teams that engaged in eight full days of learning sessions, as well as coaching visits and monthly webinars. A pre-work handbook, ongoing e-mail and phone contact, an e-newsletter and supports for data reporting were provided. The collaborative collected outcome measures for diabetes patients, including blood pressure and lab results for blood sugar (A1c) and cholesterol (LDL). It also collected data on other quality indicators for patients with diabetes. These included frequency of foot exams, eye exams, neuropathy exams, smoking cessation assessment and counseling.

Clinic data were combined to assess overall performance on the eight quality measures for patients with diabetes. The table below shows the level of improvement, from most to least improved. All but one measure – eye exams – showed some amount of improvement over the 20 months. Progress made in these measures may reflect actual improvements in patient outcomes or improvements in clinics' ability to track the measures. Both are constructive improvements.

Table 27. Combined Clinic Performance on Diabetes Measures

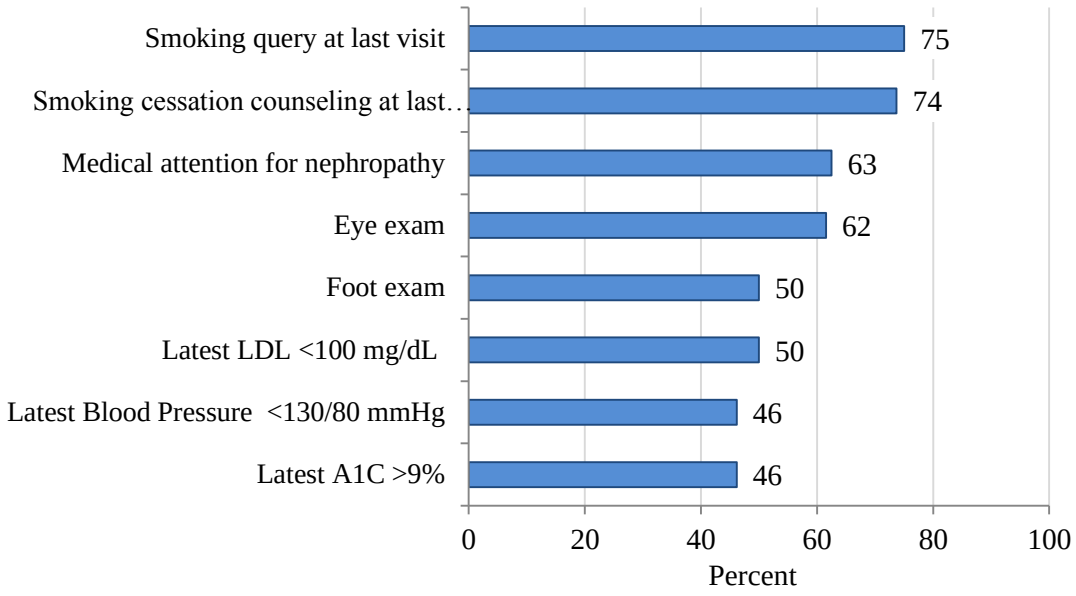
Patients with…	January 2010	August 2011	Percent Improved
Cessation counseling at last visit, among smokers	53%	82%	28%
Foot exam	49%	71%	22%
Smoking query at last visit	64%	78%	14%
Latest Blood Pressure <130/80 mmHg	40%	50%	10%

Latest LDL<100 mg/dl	42%	51%	9%
Medical attention for nephropathy	68%	76%	8%
Latest A1c>9% (decrease = better performance)	27%	19%	-8%
Eye exam	49%	47%	-2%

Source: Department of Health Patient Centered Medical Home 2012 Report

Individual clinic improvement was also assessed, in addition to the overall results for the collaborative. Several individual clinics had modest improvement (a difference of at least five percentage points from baseline to most recent measurement) in the eight quality measures for their patients with diabetes. The chart below shows the percentage of clinics that improved or maintained a high level of performance for each measure over time.

Chart 44. Percent of Clinics Improved[a] or Maintained High Level of Performance Among Their Patients with Diabetes Over Time



Source: Aggregate perforamnce data submitted by clinics participating in WA State Patient-Centered Medical Home Collaborative, Jan 2010-Aug 2011.
[a]Improved by at least 5 percentage points from baseline to most recent measurement.

Diabetes Surveillance, Epidemiology and Evaluation

The purpose of diabetes surveillance, epidemiology, and evaluation section in the Office of Healthy Communities is to inform and support program and policy decision making with internal staff and external partners through the collection and use of data and science. Activities include:

- Analysis of data, interpretation of results, and dissemination of findings on health status, risk behavior, barriers to care and other health issues through all stages of life.
- Evaluation of whether programs are implemented as designed and what is the impact – who is affected and how they are affected.

- Technical assistance on data and science to help integrate data into decision making.
- Use of data and science to convene programs and partners to address public health issues.

Activities are conducted in partnership with internal Department of Health staff, local health jurisdictions, other state agencies, federal agencies, providers, universities and other researchers, peers in other states, community members, advocacy groups, schools and education systems, not for profit organizations, tribes, and other stakeholders. As a result of these activities:

- Staff and partners receive accurate, clear, relevant, and timely information.
- Staff and partners integrate data into decision making.
- People are more informed about the health status of Washington.

An estimated $82,000 in federal funds from the Centers for Disease Control and Prevention were utilized by the Department of Health specifically on surveillance and evaluation of diabetes between July 1, 2013 and June 30, 2014. This work is intended to impact all people with diabetes of all types, as well as people at high risk for developing type 2 diabetes, in Washington. These costs vary from year to year, generally less than $100,000 per year.

Diabetes Self-Management Education

Diabetes self-management education (DSME) is the ongoing process of facilitating the knowledge, skills, and ability necessary for diabetes self-care. This process incorporates the needs, goals, and life experiences of the person with diabetes and is guided by evidence-based standards. The overall objectives of DSME are to support informed decision-making, self-care behaviors, problem-solving, and active collaboration with the health care team and to improve clinical outcomes, health status, and quality of life.[92]

Hallmarks of DSME are its individual assessments and subsequently tailored plans.[93] These differentiate it from more general chronic disease self-management. The DSME standards include:

> *An individual assessment and education plan will be developed collaboratively by the participant and instructor(s) to direct the selection of appropriate educational interventions and self-management support strategies. This assessment and education plan and the intervention and outcomes will be documented in the education record*.[94]

This assessment and subsequently tailored plan are what makes it different from other forms of diabetes education, and are keys to efficacy.

The Medicaid DSME Reimbursement Program is a partnership between the Department of Social and Health Services/Medicaid and Department of Health. The aim of the program is to provide access to quality Diabetes Self-Management Education services statewide for Medicaid clients who have diabetes. DSME coverage for Medicaid varies by state. This program provides the mechanism for coverage in Washington. The program has been in existence for

approximately 25 years. Currently, at least 130 DSME programs are approved nationwide to provide DSME to Medicaid clients and receive reimbursement.

The role of the department is to provide technical assistance to DSME program applicants, review and approve applications, and notify Medicaid and the applicant of approval. Renewal of the initial application is required every 4 years, and also is handled by the department. The department staff person who manages this program is a Certified Diabetes Educator.

The role of Medicaid is to enter new and renewal approvals into the Provider One claims system, and to work with approved organizations that encounter claims denials. The two agencies work together to update the Medicaid Provider Guide to align with National Standards for Diabetes Education and with the National Certification Board for Diabetes Education.

The application form and list of currently (as of May 2014) approved programs is available on the Department of Health website.

The rules for coverage and reimbursement of DSME for Medicare are distinct from those for Medicaid. The department is working in partnership with Qualis Health and other partners to increase access to Diabetes Self-Management Education for people with Medicare in Washington. In order to be able to seek reimbursement for Medicare, a diabetes program requires national accreditation from either the American Diabetes Association or the American Association of Diabetes Educators. There are currently about 83 programs in Washington with this accreditation. Accreditation is rigorous and requires fees that begin at $900 per program, with higher costs for additional sites and numbers of people served.

While rates of utilization of DSME are difficult to acquire, due to the nature of the service provided, across all payment types, publically funded and privately insured, there is agreement that DSME is underutilized.[95]

Another key in providing Diabetes Self-Management Education is the state's Certified Diabetes Educators® (CDE). A CDE is a qualified health professional who possesses comprehensive knowledge of and experience in diabetes management, prediabetes, and diabetes prevention. A CDE educates and supports people affected by diabetes to understand and manage the condition and promotes self-management to achieve individualized behavioral and treatment goals that optimize health outcomes. In January 2014, there were 504 CDEs in Washington,[96] which corresponds to about one for every 930 people with diabetes in the state. Some geographic areas may be completely without access to a CDE.

CDEs are not the only health professionals able to provide quality DSME, but they are uniquely positioned to manage diabetes programs. Some states have additional certification programs for Diabetes Educators, but this is a path not chosen by Washington. The requirements to become a Certified Diabetes Educator are rigorous, consisting of documented practice requirements and an exam. To create and administer another certification mechanism in Washington would be

duplicative and expensive. Instead, Washington focuses on "certifying" DSME programs, through the Medicaid reimbursement program described above.

Diabetes Network Leadership Team

The Washington State Diabetes Network and the network's Leadership Team were founded in 2004 as a result of a CDC-proscribed assessment of the Diabetes Prevention and Control Program. The Washington State Diabetes Network is made up of a broad array of organizations and people working in public, private, tribal, community and academic/training sectors to prevent and control diabetes among residents of Washington. Membership is open to people and organizations based in or who have a significant presence in Washington State and who work to promote diabetes prevention and/or control. As of September 2014, there were nearly 400 email list members.

The Washington State Diabetes Network Leadership Team is made up of around 20 members from the public, private, tribal, educational, health care, public health, non-profit, and governmental organizations. The members of the leadership team meet quarterly to identify priorities and develop strategies to meet goals that are reassessed annually. These priorities and goals apply not only to the work of the Department of Health, but also to the organizations whose members serve on the Leadership Team. Work is then conducted in workgroups that meet 8-10 times per year by phone to report on activities and maintain alignment.

Table 28. Diabetes Network Leadership Team – Represented Organizations

American Diabetes Association	Pacific Medical Centers - Living Well Alliance	Washington State Department of Health
Benton-Franklin Health District	Pacific Northwest University of Health Sciences - College of Osteophathic Medicine	Washington State Department of Social and Health Services
Colwitz Family Health Center	Public Health Seattle & King County	Washington State Health Benefit Exchange
Columbia Valley Community Health	Qualis Health	Washington State Health Care Authority - Medicaid
Franciscan Medical Group Diabetes Services	Tacoma-Pierce County Health Department	Washington State Health Care Authority - Public Employee Benefits Division
Fresenius	Tri-Cities Diabetes Coalition	Washington State University Extension
International Community Health Services	Trios Health	Washington State University College of Pharamacotherapy
Kitsap Public Health	Washington Dental Service Foundation	Yakima Valley Memorial Hospital
Novo Nordisk Inc.	Washington Health Alliance	YMCA of Seattle

Source: Washington State Department of Health Diabetes Network Leadership Team Membership List, Nov. 2014

Diabetes Prevention Program

The Centers for Disease Control and Prevention consider the evidence-based Diabetes Prevention Program to be the gold standard treatment for prediabetes in order to prevent or delay the onset of type 2 diabetes. The National Diabetes Prevention Program is a public-private partnership of community organizations, private insurers, health care organizations, employers, and government agencies. Partners work to establish local evidence-based lifestyle change programs for people at high risk for type 2 diabetes.

The Diabetes Prevention Program research study showed that making modest behavior changes helped participants lose 5 percent to 7 percent of their body weight – that is 10 to 14 pounds for a 200-pound person. These lifestyle changes reduced the risk of developing type 2 diabetes by 58 percent in people with prediabetes. Through translational research, the study results were translated into a curriculum that is usually delivered in a group setting, making the program more cost-effective. Participants work with a lifestyle coach in a group setting to receive a 1-year lifestyle change program that includes 16 core sessions (usually 1 per week) and 6 post-core sessions (1 per month).

CDC maintains a registry of programs as part of the Diabetes Prevention Recognition Program (DPRP). The purpose of the DPRP is to recognize organizations that have shown that they can effectively deliver a lifestyle change intervention program based on a nationally-recognized curriculum to prevent type 2 diabetes. Currently, there are 25 programs in the registry in Washington, operated by YMCAs, Washington State University Extension, and non-profit health organizations. These programs have all been built since 2009. Through investing federal funding in training and incubating programs, Washington is now one of the top states with DPP availability nationally. Only Minnesota, New York, and Florida have more programs in this national registry than Washington. The program is available through health insurance or wellness plans through several employers in the state. King County, the Public Employee Benefits Board are among the largest employers to make the program available to enrollees who meet the criteria for participation.

Community Health Worker Training System

The Community Health Worker Training is a free eight week combination of online and in-person training designed to strengthen the common skills, knowledge and abilities of the Community Health Worker. The online training is offered quarterly in seven regions across the state. The online training curriculum provides an efficient and easy to access platform that ensures consistency across the state. It is low cost, easy to customize and trains a high volume of workers. Department of Health staff members serve as online training facilitators with local health educators serving as co-trainers during the first and final in-person sessions. Upon completion of core competencies, community health workers have access to 8 additional on-line modules including Cardiovascular Health, Diabetes and Prediabetes, and Understanding Disparities & Social Determinants. Other modules are added as funding permits. Through

partnerships with the regional Breast, Cervical and Colon Health Prime Contractors and organizations like Foundation for a Healthier Generation, the program has:

- Provided core competency training to more than 330 community health workers across the state and health specific training to more than 60 community health workers.
- Established the training schedule for 2014 with a capacity to train more than 500 new community health workers as demand increases in the new health reform environment.

Department of Social and Health Services

The Department of Social and Health Services (DSHS) is made up of eight administrations, of which four have programs that provide services and resources that can contribute to the improvement in clinical outcomes for children and adults that have diabetes. Those four administrations are:[97]

Aging and Long-Term Support Administration (ALTSA) which provides long-term support and services to more than 60,000 seniors and individuals with disabilities and supports 13 local Area Agencies on Aging (AAA). Home and Community Services staff and AAA's provide case management services for individuals in community based residential care settings and in their own homes and disease prevention and health promotion services and resources for older adults. ALTSA is also the home to the Fostering Well Being Care Coordination Unit (FWB CCU). This unit provides care coordination and health recommendations for children in foster care.

Behavioral Health and Service Integration Administration (BHSIA) which provides prevention, intervention, inpatient treatment, outpatient treatment, and recovery support to people with addiction and mental health needs. BHSIA's Division of Behavioral Health and Recovery (DBHR) provides financial support and direction to 11 Regional Support Networks, providing mental health services to 200,000 consumers bi-annually. BHSIA also designs and implements innovative integrated care systems to improve client health outcomes and contain costs.

Children's Administration (CA) which works to keep children safe from abuse and neglect and to support birth, foster, kinship and adoptive families. CA helps families find resources to keep kids safe and in collaboration with the FWB CCU, coordinates health services for foster and adoptive children.

Developmental Disabilities Administration (DDA) which provides residential services, day services and employment support services for clients with development disabilities. DDA supports 25,000 clients with some paid services, operating 27 local offices, four state operated residential habilitation centers, and four state-operated supported living alternative programs.

Medicaid Health Homes Program

The Health Home Program is a State Plan service provided through the Affordable Care Act. The department (through ALTSA and BHSIA) offers this Medicaid benefit in partnership with the Health Care Authority. The program serves beneficiaries who have one chronic disease and are

at high risk of a second chronic condition. These beneficiaries are either dually eligible for Medicare and Medicaid or are Medicaid recipients of all ages. Diabetes is typically one of the qualifying conditions of eligible beneficiaries, and may receive intensive care coordination to integrate behavioral health, primary care, and long term services and supports. The service is available in all counties except King and Snohomish, where an alternative duals integration demonstration program is under development; CMS rules do not allow health homes in the same counties as a duals demonstration project.

Care coordination includes outreach and engagement to beneficiaries, care coordination across all delivery systems, development of a health action plan, education and coaching of clients and their collaterals, and care transition between institutional care settings and the community.

HCA and the department have been working with Health Home Lead Organizations and Care Coordination Organizations (CCO) to implement this program. The Lead Organizations contract with community based Care Coordination organizations such as behavioral health, primary care or long term care providers that provide the care coordination services. The first activity for the Health Home Care Coordinator is to discuss with the client and their caregivers the development of a Health Action Plan (HAP). The HAP identifies the beneficiaries' readiness for change, their short and long term goals and associated action steps to achieve their goals. Commonly, beneficiaries with diabetes will identify short term goals intended to improve their diabetes. These goals may include improved nutrition understanding, better medication management, increased physical activity, weight loss and communication strategies with their health care providers**.**

This program was launched in two phases, in July and October 2013. This program is early in its development. Enrollment will continue to increase and when fully implemented has the potential for a wide reach across the state.

In SFY 2014, 33 percent of Medicaid clients eligible for health home services had type 1 or 2 diabetes. Since the program began, 2,944 Medicaid clients with diabetes actually received health home care coordination services in that time period, for a total of $24,036 in state funds (health homes is 90 percent federally funded for the first 8 quarters) for care coordination.

Care Transitions Program

The Care Transitions Program was launched by ALTSA in collaboration with the Area Agencies on Aging – Aging and Disability Resource Centers (AAA-ADRC), Qualis Health, Washington State Hospital Association (WSHA), the Care Transitions Intervention[sm], and Insignia as a two year project starting in 2010. The intent has been to establish an ADRC Care Transitions Intervention Model in Washington, building on the CMS-funded Care Transitions Intervention (CTI) demonstration project that had been conducted in Whatcom County.

The model is based on the work of Eric Coleman, MD, from the University of Colorado. In a randomized controlled trial, use of CTI resulted in lower hospital readmission rates. On average,

for every 17 patients who work with a transition coach, one re-hospitalization will be prevented. Researchers estimate that for every 350 patients who receive the intervention, hospital costs will be reduced by approximately $300,000. In addition, people who have used the care transitions model rate their hospital discharge experience as very good or excellent.[98]

The objectives have been to increase ADRC capacity and their reach with hospitals in implementing this model in order to decrease readmission rates and improve health and chronic condition self-management by CTI participants. Individuals participating in the care transitions intervention commonly have multiple chronic conditions including diabetes, however there has not been a way to capture diagnostic data. Funding for this program was initially provided by the Affordable Care Act (3206) which expired at the end of 2012. There was a no-cost extension to complete the CMS 2012 fiscal year. The ADRCs are currently supported through braided funding including Health Homes, local funding, Older American Act funding and some state general funds. The department and Qualis Health continue to provide un-funded technical support to the ADRC.

Training has been provided to over 100 ADRC staff and their contractors in 11 out of the 13 AAAs (tribal AAAs did not participate), and an ADRC CTI Implementation Toolkit has been developed as a resource for the trained staff.[99]

The program requires coordination with hospital discharge planning staff, ADRC or subcontractor transitions coaches, and clients and their families/friends. CTI is a four-week process that encourages patients to take a more active role in their health care. Patients receive specific tools and skills that are reinforced by a "transition coach" who follows patients across settings for the first four weeks after leaving the hospital and focuses on the following components:[100]

- Medication self-management
- Use of a patient-centered health record that helps guide patients through the care process
- Primary care provider and specialist follow-up
- Patient understanding of "red flag" indicators of worsening condition and appropriate next steps

The budget in 2010/2011 was $162,417 and in 2011/2012 was $239,483.[101] The project anticipated reaching 4000 individuals. DSHS did not have the capability to capture the number of participants, their diagnosis or outcomes data. Qualis Health captured data for 5 counties (Benton, Franklin, Skagit, Whatcom and Yakima) for individuals having Medicare and participating in any number of care transition programs in the state. Their data showed an 8.3 percent average improvement in readmission rates as compared to baseline**.**[102]

Chronic Disease Self-Management Education Programs[103]

DSHS coordinates the delivery of evidence-based self-management workshops for adults over 18, researched and developed by Stanford University. These include general chronic condition

workshops (Chronic Disease Self-Management Program, CDSMP), specialty diabetes workshops (Diabetes Self-Management Programs, DSMP) and chronic pain workshops (Chronic Pain Self-Management Program, CPSMP). Tomando Control de su Salud (Taking Control of Your Health) is the Spanish language version of the CDSMP and there is an online program called Better Choices, Better Health. These workshops support people with chronic conditions or friends and family of those with chronic conditions in learning problem solving skills.

People with chronic conditions are high utilizers of the health care delivery system. Chronic conditions account for three-fourths of all health-related costs nationally. Thirty eight percent of adults over 18 have one or more chronic conditions. In Washington, 5 percent of the Medicaid chronic care population accounts for 50 percent of Medicaid health care expenses. One evidence-based approach for helping individuals self-manage their condition(s), supported by an expanding body of research, are these 6 weeks Chronic Disease Self-Management Workshops.[104]

The Diabetes Self-Management Program is provided for 2½ hours once a week for six weeks, in community settings such as churches, community centers, libraries and hospitals. The workshops are led by lay leaders and master trainers qualified by Stanford University in delivering the DSMP curriculum.

People with type 2 diabetes attend the workshop in groups of 12 to 16 people. Subjects covered include:

- Techniques to deal with the symptoms of diabetes, fatigue, pain, hyper/hypoglycemia, stress, and emotional problems such as depression, anger, fear and frustration
- Appropriate exercise for maintaining and improving strength and endurance
- Healthy eating
- Appropriate use of medication
- Working more effectively with health care providers

Participants make weekly action plans, share experiences, and help each other solve problems they encounter in creating and carrying out their self-management program. Classes are highly participative, where mutual support and success build the participants' confidence in their ability to manage their health and maintain active and fulfilling lives.

Stanford's research showed that in six months after the workshop, participants had significant improvements in depression, symptoms of hypoglycemia, communication with physicians, healthy eating, and reading food labels. They also had significant improvements in patient activation and self-efficacy. At 12 months, DSMP participants continued to demonstrate improvements in depression, communication with physicians, healthy eating, patient activation, and self-efficacy. There were no significant changes in utilization or A1c (A1c values were already in the desirable range at the beginning of the study for most participants).[105] Many studies indicate positive health outcomes for participants in Chronic Disease Self-Management Programs, and recent studies have suggested that the savings from reduced health care

expenditures by participants will either break even, or yield a return on investment for these programs of around 2:1.

ALTSA received a three year federal grant (September 2012 – August 2015) from the Administration for Community Living through Prevention and Public Health funds. The award amount for the three year grant totals $984,933 to expand these programs in Washington State. Washington Home and Community Based waivers provide coverage to eligible beneficiaries to receive waiver funded Chronic Disease Self-Management Education programs in the community. While this grant is housed at ALTSA, the grant requires full participation of the state Department of Health. The Department of Health provides substantial staffing to the grant, and jointly operates the Steering Committee for the grant. Funding from CDC is used to enhance capacity, support travel, and staff the program.

Workshops are provided through partnerships with the Department of Health, all thirteen AAAs and their local organizations who hold a license from Stanford to offer CDSME workshops in their areas, People First of Washington, and the tribal program managed by Northwest Regional Council known as Wisdom Warriors.

Other programs across the state are conducted and funded by Group Health Cooperative, Federally Qualified Health Care Centers, and other health systems such as Physicians of Southwest Washington.

Coordination among agencies has grown significantly since initiating the CDSME grants. Grant funding has allowed 53 organizations to become licensed to provide Chronic Disease Self-Management Education programs at 221 workshop sites and engaging 5,164 workshop participants in 477 workshops.

Washington has used cost estimates of $300 per workshop ($50 session) for each individual. This covers the workshop book and materials, meeting room, leader costs, registration coordination, and marketing materials.

The Living Well website, though funded by the ALTSA allocation from Older Americans Act, is hosted on a Department of Health website. Funding to maintain this centralized workshop, training and resource website is $20,000 annually**.**

In all workshop types between September 2012 and August 2014, 25.8 percent of the participants self- reported as having diabetes. In the DSMP workshops in that period, 44.2 percent of the participants self-reported as having diabetes.[106]

Fostering Well Being Program

The Fostering Well-Being Care Coordination Unit (FWB CCU) provides services for children who are under 18 years (or age 18 to 21 and enrolled in the extended foster care program), in DSHS or tribal care and custody, and Medicaid eligible and enrolled in a managed care plan.

ALTSA, Health Care Authority, and the Children's Administration (CA) partner in the delivery of health care services for children in out-of-home placements to ensure that these children's medical, mental health, and chemical dependency needs are identified and met through a person-centered health home model. Oversight of the FWB CCU is provided by ALTSA and CA staff responsible for children's health programs. Care coordination addresses interrelated medical, dental, mental health substance abuse, and developmental needs to achieve optimal health and wellness outcomes. Anyone can make a referral including social workers, CHET Screener, tribal Indian Child Welfare staff, Regional Medical Consultants, caregivers, and medical providers.[107]

Children in the foster care system have a history of barriers when accessing appropriate health care. Children are often moved from one setting to another, resulting in different medical providers and different school systems. Support systems that would normally observe for health changes as a matter of day-to-day supervision or regular care over extended periods are not often available. This may also explain the low numbers of reported diabetes in foster children. Washington has identified a need to better coordinate medical information and education for children in the foster care system.

The FWB CCU is funded through general state funds and federal Medicaid funds of $1.5 million. Effective linkages between caregivers and community-based health care services, state and local agencies, and other key partners are all part of care coordination. Activities include:

- Facilitating access to primary and specialty health care providers
- Analyzing medical records, billing data, immunization reports, social worker case notes, and Child Health Education and Tracking (CHET) screening reports to determine needs
- Accessing for gaps in care, including medical, dental, mental health, and substance abuse domains
- Consulting with social workers and caregivers regarding individual health concerns
- Provide health recommendations that assist social workers in the development of the child's case plan and that inform the caregiver about the child's health/mental health needs

Using information from the Integrated Client Outcomes Database, the following table shows how many persons receiving long term services and supports have been diagnosed with type 1 and 2 diabetes. This represents a small snapshot of the potential need in Washington. The number of diagnosed cases may not reflect the real need due to the nature of foster care movement. Diabetes and other medical conditions often go undiagnosed in this population just as it does in persons with developmental disabilities.

Table 29. Individuals with Diabetes Type 1 and Diabetes Type 2 with and without complications, receiving long term services and supports

	Foster Children				Persons with Developmental Disabilities			
	Age < 18		Age≥18		Age< 18		Age≥18	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Type 1 Diabetes (high) with renal manifestations/coma	2	0.05	0	0.0%	0	0.0%	15	0.1%
Type 1 Diabetes (medium) without complications	36	0.3%	2	0.4%	41	0.3%	312	1.5%
Type 2 Diabetes (medium) or unspecified diabetes with complications	2	0.0%	0	0.0%	5	0.0%	218	1.0%
Type 2 Diabetes (low) or unspecified diabetes w/out complications	18	0.1%	7	1.3%	19	0.1%	1242	5.9%

Source: DSHS ALTSA GSK Project Proposal Application: Diabetes management for children in foster care and individuals with developmental disabilities and their caregivers: A focus on education and self-management (grant not received). *Survey Question:* Have you ever been told by a doctor or other health professional that you have diabetes? *Note:* Percentages represent students who reported they were ever told they had diabetes.

Senior Information and Assistance Services/Aging and Disability Resource Centers

The 13 Area Agencies on Aging (AAAs) are the hubs for a network of community services for older adults, people with disabilities, and family caregivers. Priority is given to older people who are low-income, minorities, or isolated and reside in rural areas, or have limited English proficiency. These centers are designed to place highly visible and trusted staff in every community where older people of all incomes and disabilities can get information and one-on-one person-centered counseling on the full range of long term services and support options by:[108]

- Creating a person-centered, community-based environment that promotes independence and dignity for individuals
- Providing easy access to information and one-on-one counseling to assist consumers in exploring a full range of long-term support options
- Providing resources and services that support the needs of family caregivers

Services and resources provided that can support individuals with diabetes vary somewhat region to region, but generally include:

- Diabetes support groups
- Meals on Wheels (home delivered meals)
- Foot care through contracts with nurses
- Nutrition education
- Family or Kinship caregiver programs
- Nursing and social worker evaluations and connection to services (i.e. home services), if clients

- Nutritional screening and tool kits for individuals with diabetes
- Nutrition counseling
- Senior drugs education
- don't meet the threshold for Medicaid
- Enhanced fitness®
- Adult Day Health

Funding for this work is provided by both State funds and the Federal Older Americans Act.

The services authorized under this funding are:

- Services designed to enable older individuals to attain and maintain physical and mental well-being through programs of regular physical activity, exercise, music therapy, art therapy, and dance-movement therapy
- Services designed to provide health screening (including mental health screening) to detect or prevent illnesses, or both, that occur most frequently in older individuals
- Health and nutrition education services, including information concerning prevention, diagnosis, treatment, and rehabilitation of age-related diseases and chronic disabling conditions
- Provide disease prevention and health promotion services and information at multipurpose senior centers, at congregate meal sites, through home delivered meals programs, or at other appropriate sites

Collaborative partnerships exist with a broad group of governmental and private agencies and organizations.

Client level information (cost and reach) may be able to be retrieved from the CLC (community living connections) in the future. This is a new reporting system that will have client level information for many of the OAA programs. Currently there is not an ability to identify information on specific diabetes-focused interventions.

Long Term Services and Supports Programs

Home and community based services include personal care services provided in the home and in community-based residential care facilities for recipients receiving Home and Community Services (HCS), Area Agencies on Aging (AAA), and Developmental Disability Administration (DDA) case management for the elderly and persons with disabilities. Priority attention is provided to low-income individuals and families. Services are designed to maximize independence, dignity and quality of life, and allow eligible Medicaid beneficiaries to reside in the least restrictive care setting.

Table 30. Long-Term Care (LTC): Most people get services in their own homes or in smaller community settings*

Community Service Setting	ADSA Clients	Total Funds Annual Cost (per member) (average)
In-Home Care (Individual Provider & home care agency)	35,000	$17,000
Boarding Homes/Assisted Living (Assisted Living, avg. 53 beds/home)	6,700	$14,000
Adult Family Home (up to 6 people per home)	5,400	$21,000
Total Community Settings	**47,100**	**$17,333** (weighted average)
Institutions	**ADSA Clients**	**Total Annual Cost (average)**
Nursing Homes	10,000	$57,000

Source: ADSA forecasting, November 2012
*FY 2012 Actual/Forecasted Data (Rounded). Totals may not add due to rounding
** Per caps are driven by acuity of clients served and scope of services included in the setting
(table represents clients receiving personal care services (PCS) through Home and Community Services. It excludes clients who are receiving PCS through Developmental Disability Administration (DDA))

Additional long-term care services include:

- Comprehensive Assessments
- Case Management
- Facility Oversight
- Adult Protective Services
- Senior Information and Assistance (referral open to all)
- Family Caregiver Support Program

Key partners are HCS, AAA, DDA, SEIU, residential providers, home care agencies and individual paid providers. The case manager for each client completes an assessment, develops a service plan and coordinates with caregivers and other health and social service providers as needed.

LTC and DDA case managers use the CARE assessment to determine the service needs of each individual. Assessment areas related to diabetes in CARE include:

- Diagnosis
- Medications, use, and ability to self-administer
- Treatments related to diabetes including injections and blood glucose testing
- Meal preparation, feeding and shopping
- Skin care needs including foot care and care to lower extremities and pressure ulcers
- Bowel and bladder care
- Care to support impaired vision
- Fall risk and fall impacts
- Pain and pain impacts
- Mobility support (wheel chair, bed, transfers , ambulation and orthotic use)

The 2011-2013 biennial budget was $1.7 billion with 1, 383 employees, with 90 percent allocated to contracted client services. This is nearly one third of the total DSHS budget.

Health Care Authority

The Washington State Health Care Authority oversees the state's two top health care purchasers, the Public Employees Benefits Board (PEBB) Program and Washington Apple Health (formerly Medicaid), as well as other programs.

Public Employees Benefits Board

The state of Washington, through the PEBB Program, provides medical, dental, life, and long-term disability coverage (and offers optional insurances) through private health insurance plans to about 350,000 eligible state and higher-education employees, retirees, and their dependents as a benefit of employment.

Washington Apple Health and Medical Assistance Programs

Apple Health is the largest Washington State medical assistance program, providing health care coverage to approximately 1.2 million low-income Washington residents. About two-thirds of Medicaid's clients are children covered by Apple Health for Kids. Apple Health's costs are shared by the state and federal governments.

Services for People Eligible for Public Employees Benefit Board Coverage

Medical Coverage

These plans provide fully insured managed care health insurance coverage to PEBB enrollees in selected areas of Washington.

- Uniform Medical Plan: The Uniform Medical Plan (UMP) is a self-insured, preferred provider health insurance plan available to PEBB enrollees worldwide.
- Group Health Cooperative and Kaiser Permanente: These plans provide fully insured managed care health insurance coverage to PEBB enrollees in selected areas of Washington.
- Medicare eligible enrollees may also receive coverage through these health plans or may choose a Medicare Part F supplement through Premera Blue Cross.

Covered Services for Diabetes

Covered services for people with diabetes and prediabetes include screening and diagnosis, routine testing and follow-up, diabetes medications and testing supplies, medical management, diabetes education and evaluation, and care by specialists as needed (endocrinologists, ophthalmologists, surgeons, etc.). Coverage also includes inpatient hospitalization, mental health services, rehabilitation, and long term care services such as home health, skilled nursing care, physical therapy, occupational therapy, or speech therapy.

Dental Coverage: Eligible public employees, retirees or dependents with diabetes or prediabetes may receive PEBB dental coverage through three plan options: Uniform Dental Plan (UDP), a preferred provider plan, and DeltaCare and Willamette Dental Group offering managed dental care plans. Available services include annual preventive and diagnostic services (including

check-ups), certain x-rays, basic restorative services (fillings and crowns), endodontics (root canals), and selected specialized services including dentures, oral surgery, and periodontal services.

SmartHealth: In October 2013, Governor Inslee issued Executive Order 13-06 (Improving the Health and Productivity of State Employees and Access to Healthy Foods in State Facilities), which directs the Health Care Authority to implement a comprehensive wellness program. This program, named SmartHealth, is managed by the Public Employees Benefit Board Program. In 2014, eligible PEB subscribers who complete three wellness activities and attested to these within PEB timelines can earn a $125 financial incentive in 2015 in the form of a reduced medical plan deductible or contribution to their health savings account.

SmartHealth works to make healthy choices easier for state employees, retirees, and their dependents, improve the productivity of state employees, and positively impact the medical cost trend of state health plans' enrollees. In 2014, the SmartHealth program offers diabetes screening and access to the Diabetes Prevention Program and Diabetes Control Program for certain eligible PEBB subscribers. In 2015, SmartHealth's wellness activities plan to continue to offer access to the Diabetes Prevention Program and Diabetes Control Program for certain eligible subscribers.

Diabetes Prevention Program: The Diabetes Prevention Program (DPP), described in more detail under Department of Health, is offered to all non-Medicare members 18 years and older that meet the eligibility criteria established by the Diabetes Prevention and Control Alliance (DPCA).

PEBB has established a worksite model as the primary modality for DPP promotion and operation during 2014, the initial year of the program. PEBB insured state employees are the primary target population. The worksite (agency, higher education institution, or public employer) launches a turnkey promotion program approximately 4 weeks prior to a prediabetes and diabetes testing event. That event then includes the nine-question CDC Risk Quiz. People who score nine or above on the Risk Quiz are encouraged to register for and participate in the onsite testing event. Participants that test in the prediabetes range (based on a fingerstick A1c blood test) are offered immediate access to a DPP provider (YMCA or Washington State University Extension) that can answer questions regarding DPP. DPP staff can also enroll these members in an upcoming onsite or community based DPP class.

A second enrollment model is available. Eligible members that have a prior A1c or blood sugar test in the prediabetes range, or who do not have a blood sugar determination but have a Risk Quiz score of nine or above, can call the DPCA directly to determine eligibility for enrollment. If the member meets DPP criteria, they can be enrolled in an upcoming DPP class.

The PEB program is currently expanding the reach of the DPP program to areas of lower state employee concentration by collaborating across multiple agencies to hold testing events and

classes. The next challenge is to collaborate more closely with providers of community classes and develop a promotional program for spouses and partners.

Diabetes Control Program: The Diabetes Control Program (DCP) is offered to all non-Medicare members 18 years and older that are enrolled in the Uniform Medical Plan (UMP) and meet the eligibility criteria (diagnosis of diabetes) established by the Diabetes Prevention and Control Alliance. The DCP Program launched on January 15, 2014.

The initial DCP promotion was a letter of invitation sent to UMP eligible members identified by claims analysis as having a diagnosis of diabetes. The letter described the program and provided a phone number for enrollment. This opt-in method of engaging members yielded a predictably low number of participants.

A significant number of participants at the DPP testing events received a result in the diabetes range. These participants were encouraged to see their medical provider for follow up, and were given information regarding DCP if the follow up with their provider resulted in a diagnosis of diabetes.

In 2015, the DCP will be promoted within the incentive structure of the SmartHealth program. DCP participants will earn SmartHealth points that contribute toward the financial incentive.

PEBB anticipates increasing enrollment rates in DCP during 2015 using targeted promotions for eligible participants who indicate on their Well Being Assessment that they have diabetes. PEB will monitor enrollment to determine the impact of these promotions.

The DCP vendor in Washington is the Diabetes Prevention and Control Alliance. DCP is offered at all Safeway stores that have a pharmacy.

Table 31. Diabetes Prevention Program and Diabetes Control Program Performance

Diabetes Prevention Program (DPP)

			Test Results			Classes			Performance Results	
	Testing Offered To	*DPCA Data**	Normal (< 5.7)*	Prediabetes (5.7-6.4)*	Diabetes (> 6.4)*	Enrollment (1 class)	Participation (4 classes)	Completion (9 classes)	Weight Loss >= 5%	Weight Loss >= 9%
January		*967*	767	173	27	15	0	0		
February		*321*	242	73	6	62	17	0		
March		*175*	124	43	8	72	27	3		
April		*157*	104	42	11	143	104	33		
May		*188*	133	49	6	51	112	53	11	3
June		*63*	40	20	3	31	38	83	15	4
July		*124*	77	40	7	32	38	47	12	7
August		*0*	0	0	0	15	16	18	14	3
Totals:	**17,631 (17%)**	**1995**	**1487**	**440**	**68**	**421**	**352**	**237**	**52**	**17**

**Weight loss recorded after 16 classes. Only participants in prediabetes range are eligible for classes*

Diabetes Control Program (DCP)

	Letters Sent	Pharmacy Initial Visit	Pharmacy Subsequent Visit
January			
February	6,714	2	
March		29	
April		46	1
May		31	1
June		15	9
July		7	14
August		5	23
Totals:	**6714**	**135**	**48**

Source: Data from test results file. Encounter and Performance Measure Data from Diabetes and Prevention Control Alliance Activity Report (DPP and DPCA vendor). January - June, 2014.

Services for People Eligible for or Covered by Medicaid

The Washington Apple Health (formerly Washington Medicaid) fee-for-service program provides services for clients with diabetes and those with prediabetes. The services include screening and diagnosis, routine testing and follow-up, diabetes medications and testing supplies, medical management, and evaluation and care by specialists as needed (endocrinologists, ophthalmologists, surgeons, etc.). Diabetes education benefits include six visits per year and additional visits if medically necessary.

Dental Coverage

The adult dental benefit applies to people with diabetes and prediabetes and includes a number of benefits summarized in table 32. Available services include annual check-ups and certain x-rays, preventative services, basic restorative benefits and limited specialized services including dentures, oral surgery, and periodontic benefits.

Table 32. Adult Dental Benefits for people with diabetes and prediabetes

Diagnostic Procedures	Exams - Initial Comprehensive Exam – Once per client, per provider or clinic - Periodic Exam – 1 every 12 months - Limited Exam – as needed X-rays - Complete Series (FMX) – 1 every 3 years - 4 Bitewings – every 12 months - Panorex – every 3 years *(A panorex is a two-dimensional dental x-ray that displays both the upper and lower jaws and teeth, in the same film).* - Periapical – as needed (common need: a possible abscess)
Preventive Services	Prophylaxis (Cleaning) – 1 every 12 months Fluoride Application (Varnish) - 21 and older – 1 every 12 months - Residents of alternative living facility – 3 every 12 months
Basic Restorative (Fillings)	Composite or Amalgam restorations - once per tooth in a 2-year period Crowns NOT COVERED
Periodontal (Gum Disease)	Scaling and Root Planing – every 2 years per quadrant Perio Maintenance– once every 12 months
Endodontic (Root Canal)	Anterior (front) teeth only – upper and lower
Oral Surgery	Simple extractions, Surgical extractions, Biopsies, Intraoral and Extraoral Incise, and Drain Nitrous oxide sedation covered Oral and other sedation methods NOT COVERED.
Dentures / Partials	Complete Dentures – covered, with Prior Authorization (PA) required Partial Dentures – Resin Based (Acrylic) – covered, but Prior Authorization required - At least one anterior tooth or 4 posterior teeth, not *including* 2nd or 3rd molars, missing per arch to be considered for approval. - If in alternative living facility, requires medical diagnosis, prognosis, and documentation of medical necessity to be considered for approval. Replacement of Partials – may be covered if existing dentures are at least 3 years old. Rebase and Reline of Dentures – once in a 3-year period, at least 6 months after original dentures inserted.
Orthodontics	Clients over the age of 20 are NOT COVERED.
Other Non-Covered Services	Implants Bridges
Division Of Developmental Disabilities (DDD) For adults with this designation, all coverage is the same as above with the following additions: - Topical Fluoride – 3 times per year - Sealants – covered for posterior teeth - Crowns – Stainless Steel only, covered for posterior teeth with supporting documentation	

- Prophylaxis, Scaling and Root Planing, and Perio Maintenance – any combination of the 3 in a 12-month period

Source: Washington Administrative Code (WAC) 182-535-1088. Dental-related services—Covered—Periodontic services. Washington State Legislature Website. http://app.leg.wa.gov/wac/default.aspx?cite=182-535-1088. Accessed November 18, 2014.

Managed Care Contractors

Managed care organizations (MCOs) are expected to provide health care services for those with diabetes similar to the fee-for-service benefits described above. In addition, managed care contracts include requirements for monitoring the quality of care and services provided to people with chronic conditions, including diabetes. The Health Care Authority (HCA) uses performance measures to monitor MCO performance in delivering high quality, efficient health care services.

MCO contracts require annual reporting of quality, utilization and outcome measures. These are compiled in an annual report documenting: between MCO performance, performance against a state MCO average, and comparisons to the National Committee for Quality Assurance 90 percent percentile for all Medicaid MCOs in the United States. HCA requires the MCO to report the Healthcare Effectiveness Data and Information Set (HEDIS) standardized Comprehensive Diabetes measure, in their contract with Apple Health MCOs.

Assignment Methodology and Performance Measure Reporting

First, in 2015 HCA is awarding new enrollee assignments to MCOs for performance on one nonclinical and two clinical measures. One of the clinical measures used to award assignments is performance on a measure of completed retinal eye exams. HCA selected eye exams because the Apple Health state average for retinal eye examination was quite low, at 45.7 percent, and presents an opportunity for improving care.

Second, the HCA Apple Health enrollee booklet will include a MCO performance measure comparison chart in 2015. Four performance measures will be highlighted, two related to nutrition and exercise counseling and two others related to diabetes: the hemoglobin A1c blood test and diabetes eye exam. Footnotes underscore the importance of these measures in the booklet.

The following tables show health plan quality measures and scores. Beneficiaries can use the scores to help decide which health plan is best for them. Higher percentages mean the MCO's performance is high; lower percentages means the MCO's performance is low and needs improvement. Beneficiaries will also find a description of the measures, and why receiving this care is important for them or their family member’s health.

Table 33. Managed Care Plan Comparison 2013

	Amerigroup	Coordinated Care	Community Health Plan	Molina Healthcare	United Health Care
Child Vaccinations	54%	64%	77%	68%	60%
Teen Vaccinations	63%	77%	77%	73%	66%
Nutrition Counseling for Children and Teens	45%	46%	53%	45%	40%
Exercise Counseling for Children and Teens	38%	45%	52%	38%	35%
Diabetes HemoglobinA1c *Blood Test*	82%	86%	92%	88%	83%
Diabetes *Eye Exam*	39%	47%	52%	53%	38%
Source: Apple Health Member Handbook (Draft 2015)					

The following table includes four measures important to parents of children and two measures important to those with diabetes.

Table 34. Measures Important to People and Parents of Children with Diabetes

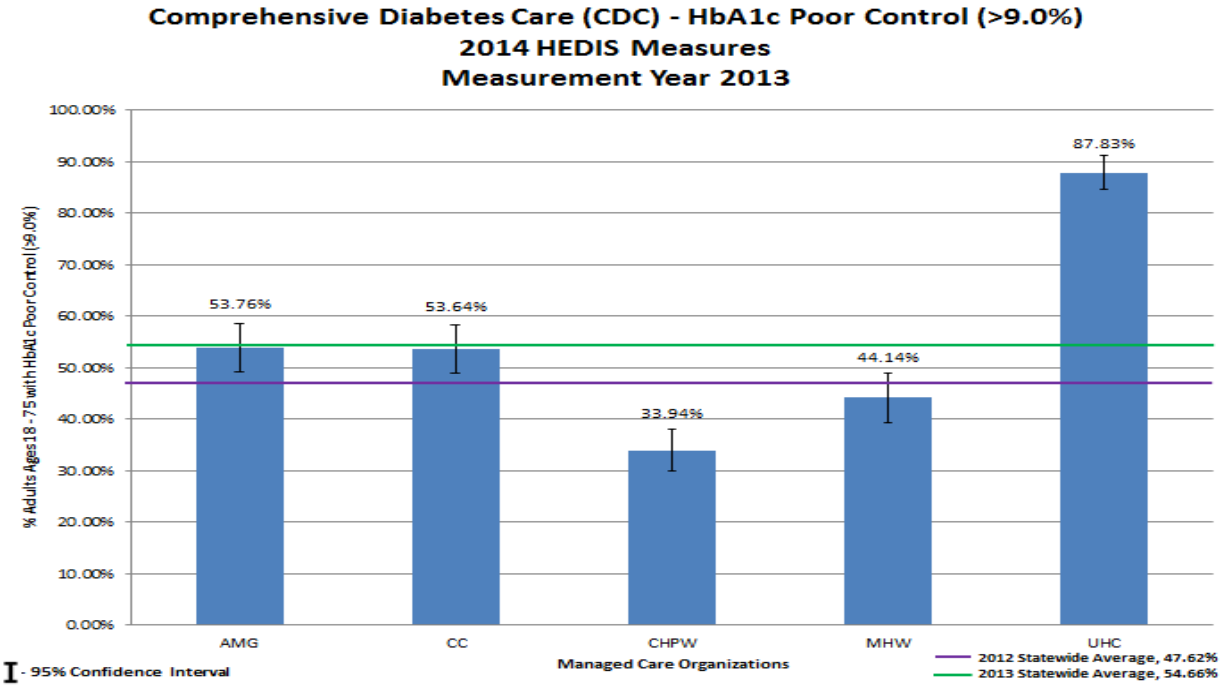
Category	Definition
Childhood Vaccinations	The percent of children 2 years of age who had all the recommended vaccines by their second birthday. Vaccines protect children from disease. If vaccines were not given, the bacteria and viruses that cause these diseases could begin to infect more and more children again.
Teen Vaccinations	The percent of adolescents who had all the recommended vaccines by their 13th birthday. Vaccines help teens stay healthy.
Nutrition Counseling for Children and Teens	The percent of children ages 3 to 17 whose doctor or nurse practitioner provided help on proper nutrition or referral for nutritional education. Children should eat a variety of fruits and vegetables, low fat foods and foods high in protein, such as milk daily.
Exercise Counseling for Children and Teens	The percent of children ages 3 to 17 whose doctor or nurse practitioner encouraged physical activity or referral for physical activity. Children should have 60 or more minutes of physical activity daily.
Diabetes *HemoglobinA1c Blood Test*	The percentage of people ages 18 to 75 with diabetes who had their Hemoglobin A1c tested. The HemoglobinA1c is a blood test that shows the average level of blood sugar (glucose) in the last 3 months. It shows how well you are managing your diabetes. Blood levels of 7 or lower is

	best
Diabetes *Eye Exam*	The percent of people ages 18 to 75 with diabetes who had a dilated retinal eye exam. A dilated eye exam can detect diabetic eye disease that often has no symptoms until the disease reaches a serious stage.

Source: Apple Health Member Handbook (Draft 2015)

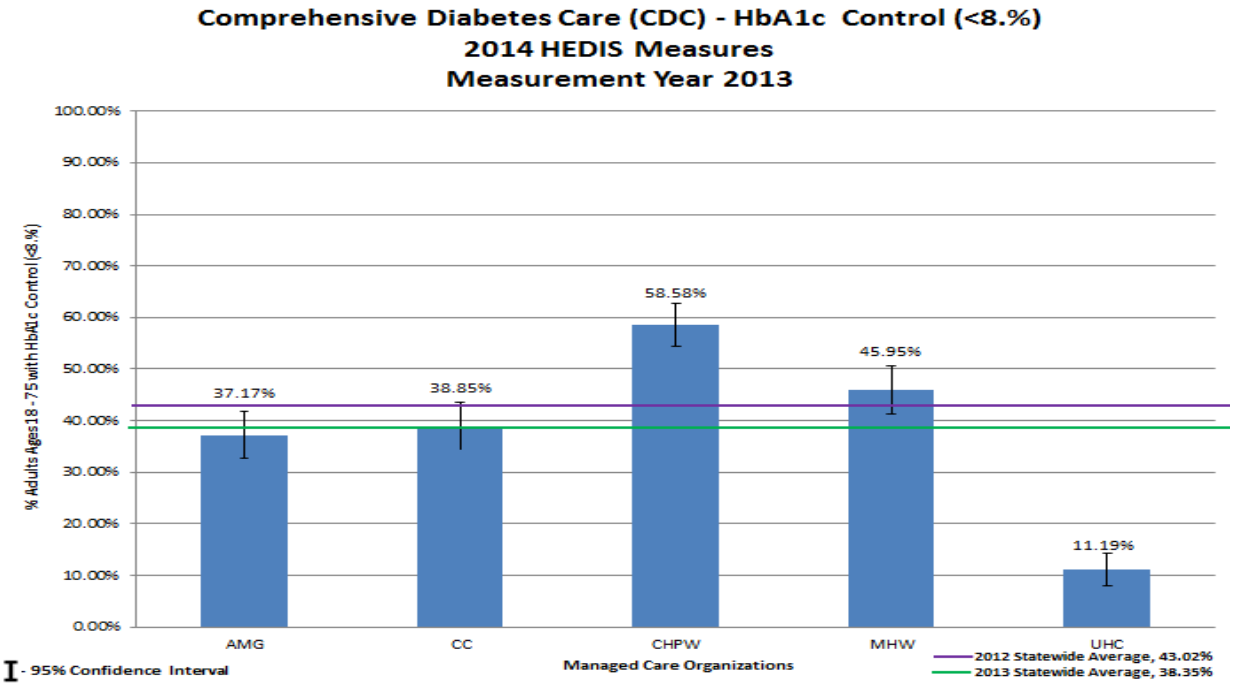
HCA's required set of Healthcare Effectiveness Data and Information Set (HEDIS) measures for diabetes care reveals significant variation on certain outcomes. Results from 2013 experience (reported in 2014) are below:

Chart 45. A1c Poor Control (>9.0 percent): The percentage of adult patients (ages 18-75) with diabetes whose A1c levels are poorly controlled (the most recent A1c level is greater than 9.0 percent during the measurement year).



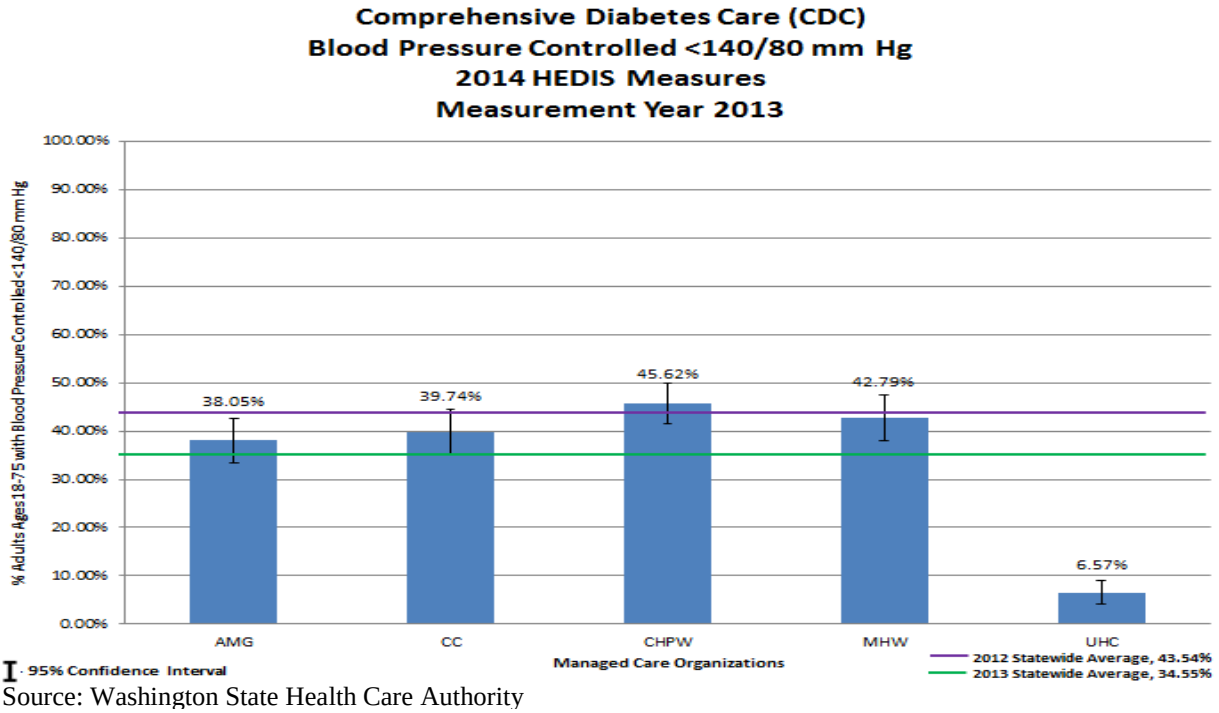
Source: Washington State Health Care Authority

Chart 46. A1c Good Control (<8.0 percent): The percentage of adult patients (ages 18-75) with diabetes whose A1c levels are well controlled (the most recent A1clevel is less than 8.0 percent during the measurement year).



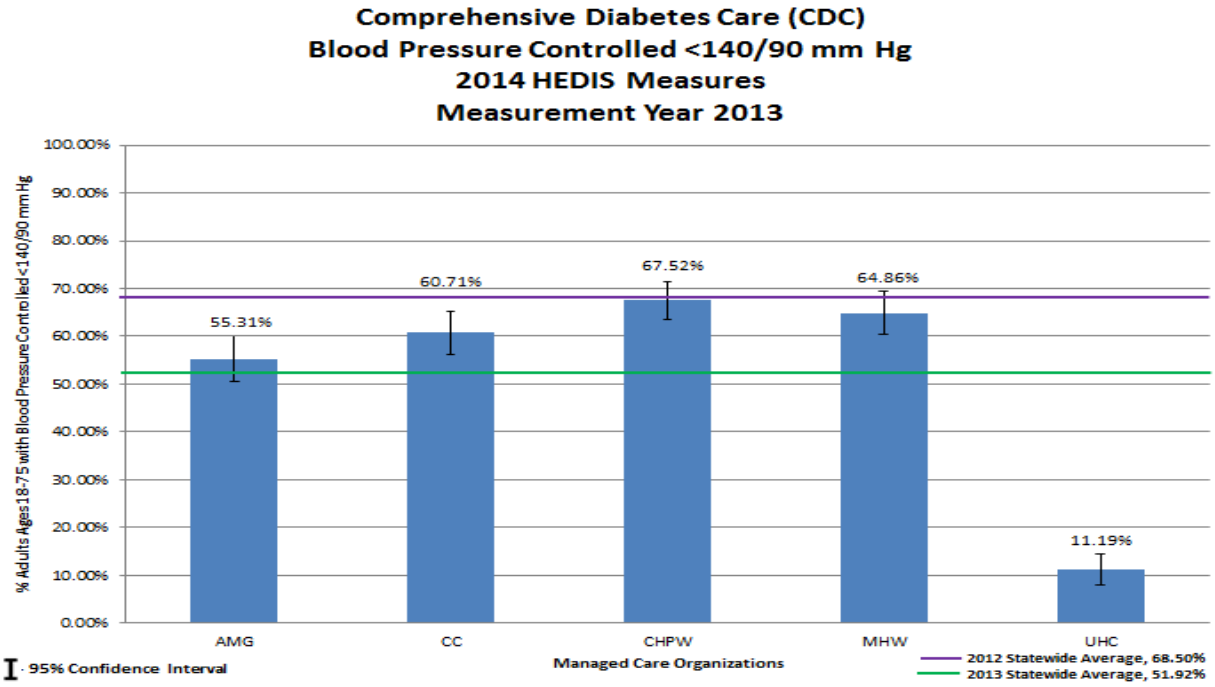
Source: Washington State Health Care Authority

Chart 47. Blood Pressure Controlled <140/80 mm Hg: The percentage of adult patients (ages 18-75) with diabetes who had at least one blood pressure reading of less than 140/80 mm Hg during the measurement year.



Source: Washington State Health Care Authority

Chart 48. Blood Pressure Controlled <140/90 mm Hg: The percentage of adult patients (ages 18-75) with diabetes who had at least one blood pressure reading of less than 140/90 mm Hg during the measurement year.



Source: Washington State Health Care Authority

Managed Care Organizations' Prevention and Health Promotion Activities

Finally, the Apple Health MCOs engage in various health promotion, disease prevention, and disease management activities that are directed at clients at risk for and with diabetes. These include:

- Written educational material, including newsletters, on-line resources, and targeted mailings for general information on nutrition, exercise, and recommendations for routine screening
- Outreach via interactive voice responses or live calls to members to remind enrollees about gaps in care (such as diabetic eye exams)
- Rewards to members for closing gaps in care
- Outreach to providers, with education about members who need specific services
- Access to website for providers to look up member adherence to recommendations
- Educational brochures and posters for distribution to clinics and provider offices
- Outreach to offer disease management coaching, including home visits and certified diabetes educators as needed

Appendix 5: Goals and Recommended Actions

This appendix contains more detailed background, rationale, and economic analysis when possible, for recommended goals A, B, C, E, F, G, H, and J. Goals D and I are not included here because they were added later, and constraints on staff time prevented further details from being gathered. The goals and recommended actions in this report were determined through a stakeholder and partner meeting in April 2014. For more information about the stakeholders and their involvement in this process, see Appendix 6.

Methodology Notes

It is important to remember that all the estimated cost savings in the following sections are from review of literature; that is, they are based on the authors' projections for avoided future costs of treating diabetes. They are not budget figures. They should not be considered in the budgeting process until there has been more rigorous budgetary analysis and until the savings from a specific program have been confirmed through rigorous study.

A. Ensure all appropriate populations have access to the Diabetes Prevention Program in Washington.

Prediabetes is defined by impaired glucose tolerance (IGT) or impaired fasting glucose (IFG), putting them at significantly increased risk for developing diabetes. The nationally recognized Diabetes Prevention Program (DPP), from the Center for Disease Control, has demonstrated that a lifestyle weight-loss intervention can delay or prevent the progression from IGT to type 2 diabetes up to10 years and beyond.[109,110,111]

Considering the growing epidemic of diabetes among Washingtonians, Medicaid should reimburse the National Diabetes Prevention Program at no cost to participants by:

- Contracting with several different organizations to provide no cost prediabetes screening for patients covered by Medicaid that are at risk for prediabetes.
- Developing an outreach plan to educate primary care providers to test for and refer Medicaid patients that have prediabetes to attend no cost DPP classes.
- Contracting with organizations that are already on the CDC list of recognized Diabetes Prevention Programs, and potential new organization, to provide the DPP at no cost in a classroom type setting to eligible Medicaid enrollees that have prediabetes.

This recommendation is a result of a return on investment (ROI) analysis that was performed using a range value of effectiveness based of the reduced incidence of diabetes among

participants reported by the DPP clinical trials. Conservative preliminary ROI analysis by the Department of Health indicates a10 year ROI of 4.33 – 8.26 at 30-50 percent of clinical trial effectiveness, with a positive ROI of 1.18 for 50 percent effectiveness by year four. A 100 percent effectiveness would yield a positive ROI by year three. An effectiveness of 50 percent is likely to be a conservative estimate based off of preliminary results from translational studies.

Department staff analysis suggests that the DPP will only have to prevent 1 of 22 cases of diabetes among participants per year to break even for that year. Any additional participants or years per participants with delayed or prevented diabetes will yield a cost saving intervention.

Before coverage is offered, more rigorous budgetary analysis will be needed.

Literature Review

Department of Health staff conducted a quasi-systematic literature review to evaluate costs and benefits associated with the DPP. Several studies were identified that showed the DPP is cost effective. These benefits are principally the reduced medical expenses of participants over a fixed period of time (e.g., one or two years).

Early clinical trials suggested a 1:1 participant-educator ratio was an effective but costly approach. Researchers from the clinical trials hypothesized the intervention could be just as effectively delivered in groups, and translational studies have since confirmed this. [112,113,114] Many of these studies show positive health outcomes such as reduced BMI or A1c, while a few reported short term cost savings attributable to direct medical expenditures such as reduced inpatient usage.[115,116,117,118, 119]

The largest reported direct cost savings recorded are from Lawlor et al who conducted a study on the cost effectiveness of administering the DPP in a group setting. The study group of patients received lifestyle weight loss intervention, which involved six months of weekly meetings and three individual sessions followed by 18 months of monthly group meetings. The control group was designed to exceed the level of care routinely provided to patients with prediabetes and was composed of two individual sessions with a nutritional counselor during the first three months followed by a monthly newsletter. Results suggested $2,277 in reduced direct medical costs for the lifestyle group over two years.[120]

Also, the ten-year follow up from the DPP trials indicate diabetes incidence was reduced from approximately 10.8 percent in the placebo group to 7.13 percent in the intervention group, a 34 percent reduction over 10 years.[121]

Following the results of the DPP clinical trials, numerous reviewed translational studies, locally reported cost data, and a published systematic literature review by Whittemore et al, staff constructed a preliminary cost benefit analysis of offering the DPP to Medicaid beneficiaries. Literature and local costs and benefits are summarized in the table below.

Table 35. Literature and Local Cost Benefit Summary Table

DPP or Study	Attrition	Cost per participant	Benefit per participant
DPP Clinical Trials	N/A	$1,799.43, estimated at $600 for group setting	58 percent reduction to the incidence of diabetes over 2-8 years, 34 percent at 10 year, 49 percent in relative risk of developing diabetes among participants with prediabetes.
Drozek[122]	5 percent	$350-450	N/A
King County	22%	$582 group	35/104 registered members achieved 5-9+ percent weight loss
Lawlor	1%	$708	Declines in fasting blood glucose, insulin, body weight, waist circumference and BMI resulting in Medical Cost Savings = $2,277) over two year study- $1138 annually
Dept. of Health	25%	$417	N/A
Avalere YMCA[123]	3%	$440	15 percent reduction to prediabetes, 34 percent to cumulative incidence of diabetes over 10 years
Whittemore	0-43%	$108-325	Meta-analysis, only effectiveness data no cost analysis
Washington State University Extension	15-22%	$340.85	Average class size of 9, n=186, 57 percent of participant achieved 5 percent to 7 percent weight loss
Range Values	0-43%	$108-708	Differences in results must at least be partially attributable to differences in programs, thus generalizing results between programs may be fundamentally limited without rigorous meta-analysis

Methods

Benefit cost analysis was performed using the highest reported local costs ($440), using arbitrary values of 100 percent DPP effectiveness (34 percent reduced incidence), 50 percent DPP effectiveness (17 percent), approximately 30 percent DPP effectiveness (10 percent), and 10 percent DPP effectiveness (3.4 percent). Local costs of administering the diabetes prevention program were obtained from Department of Health staff and key partners at the King County Public Health Department and Washington State University Extension program.[124] The eligible population is defined as the estimated number of Medicaid recipients with prediabetes. Staff performed sensitivity analysis to compare the effect of using different rates of progression to diabetes as reported in a meta-analysis by Gerstein et al,[125] summarized in a study by Tabak et al.[126]

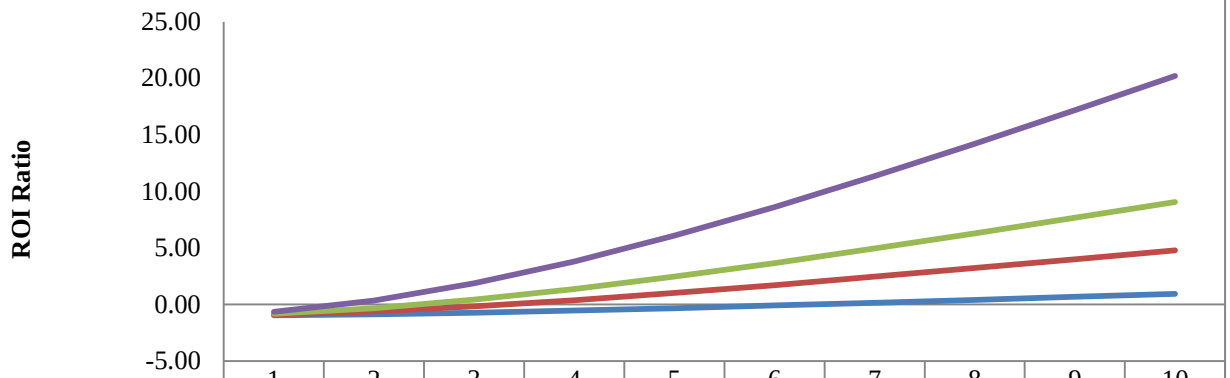
The annual cost of diabetes is based off the American Diabetes Association's estimates for the economic costs of diabetes in 2012 for Washington, specifically all associated direct medical expenses attributable to diabetes.[127] Staff performed additional sensitivity analysis to evaluate

savings of program using costs by year since diagnosis of diabetes, as reported in a study by Xiaohui et al.[128]

Results

The estimated cost to treat the current number of estimated Medicaid enrollees in Washington with prediabetes (315,120) that are projected to become individuals with diabetes over the next 10 years, is $10.8 billion. This figure is based on the critical assumptions that 10.8 percent of individuals with prediabetes will develop diabetes each year, at the estimated $8,571 cost per year per patient.

Chart 49. Annual DPP Return on Investment Over 10 years



	1	2	3	4	5	6	7	8	9	10
3.4% ROI	-0.97	-0.87	-0.72	-0.53	-0.32	-0.09	0.16	0.41	0.67	0.93
10% ROI	-0.90	-0.61	-0.17	0.38	1.01	1.71	2.45	3.22	4.00	4.78
17% ROI	-0.82	-0.33	0.42	1.36	2.46	3.67	4.96	6.30	7.67	9.05
34% ROI	-0.65	0.35	1.86	3.80	6.08	8.61	11.34	14.21	17.17	20.20

Based off the cost savings generated through reduced incidence of diabetes, the chart above shows that all scenarios where DPP effectiveness is at least 30 percent (greater than or equal to 10 percent reduced incidence) will yield a positive ROI by year 4, with the savings scaling naturally towards 100 percent of program effectiveness. With the exception of the 10 percent of effectiveness (3.4 percent reduced incidence), all other scenarios will break even and become cost saving by year 10 if not prior. It should be noted that while 10 percent of DPP effectiveness (3.4 percent) and 100 percent DPP effectiveness (34 percent) were used as range values, in lieu of further evidence, neither result reflects the most likely outcome, which conservatively is between 30 percent and 50 percent values.

Table 36. Return on investment and total costs of Diabetes Prevention Program

Assumed Costs	
Cost of Screening (per enrollee)	$6.80
Cost of DPP program (per enrollee)*	$440
Number of potential enrollees	315,120

Total max cost of DPP program	$140,795,616
Estimated 10 year cost of diabetes for enrollee group w/o intervention	$10,895,485,717
3.4 Percent Reduced Incidence	
Estimated 10 year cost of diabetes for enrollee group (3.4 percent delay/prevention)	$10,624,131,459
Savings at 3.4 percent delay/prevention	$130,558,642
10 Year ROI at 3.4 percent delay/prevention	0.93
10 Percent Reduced Incidence	
Estimated 10 year cost of diabetes for enrollee group (10 percent delay/prevention)	$10,081,083,204
Net savings at 10 percent delay/prevention	$673,606,897
10 Year ROI at 10 percent delay/prevention	4.78
17 Percent Reduced Incidence	
Estimated 10 year cost of diabetes for enrollee group (17 percent delay/prevention)	$9,480,745,192
Net savings at 17 percent delay/prevention	$1,273,944,909
10 Year ROI at 17 percent delay/prevention	9.05
34 Percent Reduced Incidence	
Estimated 10 year cost of diabetes for enrollee group (34 percent delay/prevention)	$7,911,290,124
Net savings at 34 percent delay/prevention	$2,843,399,977
10 Year ROI at 34 percent delay/prevention	20.20

*$440 is the highest reported cost per participant, specifically this comes from a YMCA sponsored study evaluating the ROI for Medicare reimbursement of the DPP, and may not reflect the Washington State YMCA per participant costs of the DPP.

For the investment of $140.8 million, which includes the cost of screening and the DPP program for all eligible enrollees, the potential savings range from $130.6 million to $2,843.4 million (10 -100 percent effectiveness). These figures result in a10 year return on the program of $0.93, $4.78, $9.05 and $20.20 respectively, for every dollar invested.

Sensitivity Analysis

The $8,571 used as our unit cost for direct medical expenditures attributable to diabetes is a mean cost reported by the American Diabetes Association for Washington in 2012. Given that attributable costs of diabetes tend to be lower in the first years of diagnosis, sensitivity analysis was performed to evaluate the difference in results if the cost of diabetes was treated as cost during years 1-5 since diagnosis for the entire 10 year period, or if costs transitioned from 1-5 year costs to 6-15 year costs at year six, as reported by Xiaohui et al.[129] Costs were adjusted using the percent increase cost adjustment used for state specific health care cost-of-living index published by the Missouri Economic Research and Information Center for the second quarter of 2012, as used by the ADA in their estimate for the cost of diabetes.[25]

Because attrition rates are factored in based on the per participant costs reported, additional sensitivity analysis was not performed on attrition rates.

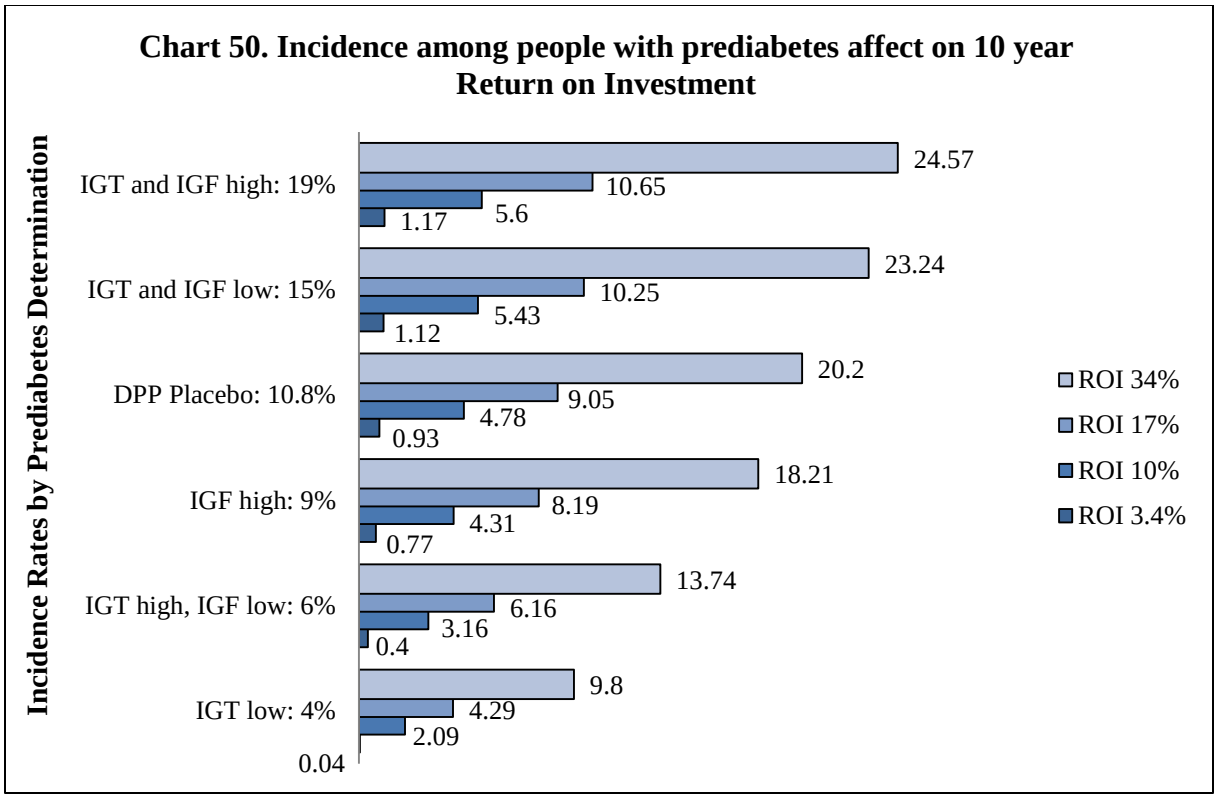
Table 37. Diabetes Annual Costs by years since diagnosis

Xiaohui Costs	**Average for 10 yr: $7,996.5**	**≤5 years: $6,380**	**6-10 years: $9,613**
ADA Costs	Average cost of: $8,571		
Five Year ROI 3.4%	ROI 10%	ROI 17%	ROI 34%
-0.49	0.50	1.57	4.27
Ten Year* ROI 3.4%	ROI 10%	ROI 17%	ROI 34%
0.73	4.19	8.00	17.9

*Xiaohui 1-5 year cost were utilized for the first half of the period, 6-15 year costs were used for years 6-10.

Adjusting for the difference in cost between the ADA estimate and the per years since diagnosis costs provided by Xiaohui shows a significant decrease to the ROI, but does not alter the conclusions about positive ROI byyear 10, or the breakeven point for effectiveness of scenarios 30-100 percent. Furthermore, while using the ADA estimate may somewhat overestimate the costs in the early periods following a diagnosis of diabetes, if we extend our ROI time horizon beyond 10 years, it seems likely the higher costs of the Xiaohui study in years 6-10 will lead to a regression towards the mean in favor of a similar value reported by the ADA.

As described in the results section, the estimated 10 year cost of diabetes among our modeled population is based on 10.8 percent rate of progression to diabetes among pre-individual with diabetes populations, as was the mean value observed at 10 years during the DPP clinical trials. However, in reality, the rate of progression is mitigated by many factors. For example, a person may be considered to have prediabetes if they have Impaired Glucose Tolerance (IGT), Impaired Fasting Glucose Tolerance (IFG), or both. These two conditions have a slightly different rate of progression to diabetes, and roughly twice the rate of progression for individuals who have both.[130] To account for the potential variability of this rate, we performed sensitivity analysis on the annualized rate of progression using at 4 percent, 6 percent, and 9 percent for people with IGT or IFG, following from the results of meta-analysis by Gerstein et al, [131] summarized in a study by Tabak et al.[132] Specific rates for IGT and IFG among Washington Medicaid populations were unavailable at the time of this writing.



Like the hypothetical high and low points of our DPP effectiveness range (34 and 3.4 percent), using either just the highest or lowest or any of the quasi-prediabetes rates above is not likely an accurate measure of the rate of progression. Rather, because the DPP clinical trials already controlled for the requirements for an individual to be eligible for the DPP in Washington State, we recommend the 10.8 percent progression rate be used, as was the case in our results section.

Regardless, this chart demonstrates the effect of variation in the rate of progression, which might be anticipated depending on which subset of the population is viewed. As long as the rate of progression is less than or equal to 5 percent (less than half of that observed in the DPP) the DPP will yield a positive return at year 10.

Conclusion

Based on this analysis, it is reasonable to conclude that expanding coverage of the Diabetes Prevention Program as a benefit for all Medicaid participants that have prediabetes will likely be cost saving. Furthermore, the results suggest that offering DPP to all Washington residents that have prediabetes would also be cost saving. Steps should be taken to broaden the application of this program. Specifically, for the investment of $140.8 million, which includes the cost of screening and the DPP program for all eligible enrollees, the return at reasonable effectiveness rates (i.e. 30-50 percent of program effectiveness) ranges from $4.78 to $9.05 for every one dollar invested at 10 years.

Sensitivity analysis revealed that reasonable hypothetical adjustments to the estimated cost of diabetes and rate of progression to diabetes has significant effects on the ROI of the DPP, but is not likely to alter the conclusion that the DPP will have a significant and positive ROI by year ten, if not prior.

Given the anticipated variability between translational programs and the DPP trials, it might be best to conceive of results in terms of number of cases prevented needed to make the program cost saving. Specifically, based off the ADA cost of diabetes estimate, the DPP would only have to delay or prevent diabetes for one out of 22 enrollees per year to break even for that year. Any additional enrollees that delay or prevent diabetes, or years delayed per enrollee, would increase the savings.

Limitations

There are several limitations to our analysis which should be considered. These limitations are primarily a reflection of our conservative assumptions about the effectiveness of the program.

Economic evaluation of DPP in Washington is underway by the Washington State Institute for Public Policy. This will include far more rigorous meta-analysis of trial results that we were not able to analyze due to constrains on staff time and a lack of institutional access to scholarly databases. As such, these results may differ from ours in their reported cost effectiveness, but are likely to reflect a more rigorous quality of analysis.

This analysis was not intended to address budgetary specific concerns. More complex modeling by Medicaid staff is warranted to determine if these results will still be cost saving.

The capacity for new participants and outreach of existing recognized and unrecognized DPP providers is unknown.

An unknown number of eligible Medicaid enrollees have already completed DPP, though one could argue that a "refresher program" would still benefit enrollees. Similarly, we do not have an estimate for the number of participants who may re-enroll in the program. Speculatively, these are both likely to be low numbers.

The per year per patient estimated cost of diabetes of $8,571 includes span of disease newly developed to patients with complications. Using this value assumes that the subgroup of new diabetes patients present similar medical costs of the entire population of diabetes patients. In the sensitivity analysis, using the rates of $6,380 and $9,613 given for years since diagnosis will provide a better estimate in terms of years from diagnosis, but will still lack a control for demographic variability or comorbid conditions that may exist at more prevalent rates in the Medicaid eligible population. Furthermore, these costs were inflated to account for Washington specific costs following the methodology used by the American Diabetes Association. Unadjusted costs will be somewhat lower, resulting in slight reduction to savings.

The 10.8 percent annual rate of transition from prediabetes to diabetes is a critical factor. Because 10.8 percent is the reported value for the placebo group in the DPP clinical trials, speculatively, it seems likely to be higher among the Medicaid population. If this is true, reimbursing the DPP for Medicaid enrollees may be significantly more cost effective.

Earlier in the DPP study period, the decrease to incidence rate was significantly higher at about 58 percent (as opposed to 34 percent at the 10 year). We made a conservative choice to make hypothetical decreases in our range of effectiveness based off the 34 percent finding, and thus did not account for what could be a higher reduction in the first few years following the program, which may yield more short term cost savings than are accounted for in our results.

Furthermore, since the incidence of diabetes has been steadily growing for the past few years, it is reasonable to speculate that the rate of transition from prediabetes to diabetes will likely also increase overtime, potentially increasing the cost-effectiveness of the DPP with it. No attempt on our part was made to adjust for an increasing progression.

Additional analysis was not performed to evaluate the role of uptake in the Medicaid clients.

This analysis is presented in 2012 dollars and does not adjust for inflation. Medical costs have been rising faster than general inflation so these figures will likely be more favorable.[133]

B. Increase access to safe and affordable active living where people work, learn, live, play and worship across their lifespan.

Active living improves health for people of all ages. For adults, regular physical activity lowers risk of early death, coronary heart disease, stroke, high blood pressure, diabetes, and colon and breast cancers. Physical activity also prevents weight gain, helps with weight loss, reduces depression, and improves cognitive functioning in older adults. The results of physical activity directly improve the chances of preventing diabetes or preventing it from getting worse once diagnosed.

Federal Healthy People 2020 goals[134] and the Governor's priorities for the Healthiest Next Generation[135] include measures specifically tied to increasing the amount of physical activity for adults and children during work and leisure time. Much of this work is underway by Department of Health staff in the Community Based Prevention section and their partners. The goal of this recommendation is to continue to support their work, and to underscore its importance in the prevention and management of diabetes.

The Community Preventive Services Task Force systematically reviews evidence for population based interventions to improve health and publishes official findings in "The Community Guide." The Guide recommends several community-wide campaigns, behavioral and social approaches, and environmental and policy approaches for increasing physical activity. For more information, please review the Health of Washington State chapter on physical activity.

C. Increase access to healthy foods and beverages where people work, learn, live, play, and worship.

Poor dietary practices contribute substantially to preventable illness and premature death in the United States. Nutrition affects health at all stages of life, from fetal development to elderly health and well-being. Nutritional factors are associated with heart disease, stroke, high blood pressure, some types of cancer, osteoporosis, obesity, and type 2 diabetes. The results of healthy eating directly improve the chances of preventing diabetes or preventing it from getting worse once diagnosed.

Healthy eating includes a healthy diet at all stages of life, starting with breastfeeding of infants for up to six months. Infants who are breastfed for up to six months are less likely to become obese or develop type 1 or 2 diabetes in adulthood. Similarly, women with gestational diabetes may be less likely to develop type 2 diabetes if they breastfeed for at least three months.

Federal Healthy People 2020[209] goals and the Governor's priorities for the Healthiest Next Generation[210] include measures specifically tied to increasing the access to health eating sources, breast feeding, and healthy school environments. Department of Health staff and their partners lead much of this work. The goal of this recommendation is to continue to support their work, and to underscore its importance in the prevention and management of diabetes.

The Health of Washington State chapter on nutrition is currently undergoing an update to reflect the most current research. In lieu of this resource, staff conducted a quasi-systematic literature review of meta-analysis and review articles relevant to healthy eating interventions. The results are summarized in the table below.

Table 38. Healthy Eating Interventions Literature Review Summary Table

Study Title	Key Results/Summary
"The Influence of Menu Labeling on Calories Selected or Consumed: A Systematic Review and Meta-Analysis"[136]	Findings support menu-labeling approaches that include contextual or interpretive nutrition information along with calories. Calorie only labeling does not seem to be significant enough.
"Do Implementation intentions help to eat a healthy diet? A systematic review and meta-analysis of the empirical evidence"[137]	Implementation intentions are somewhat more effective in promoting healthy eating than in diminishing unhealthy eating, although some studies promoting healthy eating effect size may have been inflated.
"The Role of Infant Nutrition in the Prevention of Future Disease"[138]	Growing evidence that nutrition is one of the environmental factors affecting the incidence of various diseases. The effect starts in the prenatal life- apparently at the epigenetic level, during pregnancy- maternal nutrition affects fetal growth, during early life, and throughout childhood.
"Interventions to promote healthy eating: a systematic scoping review of regulatory approaches"[139]	Regulations can achieve compliance in terms of increasing proportion of food items, people, organizations with the regulation. Whether this

	affects food choices, nutrition, obesity, or other outcomes, is currently unclear. School-based fruits and vegetables demonstrate healthier choices during the period, but the long term decision making outcome is unclear.
"Supermarket and Grocery Store-Based Interventions to Promote Healthful Food Choices and Eating Practices: A Systematic Review"[140]	More rigorous testing of interventions aimed at improving food and beverage choices in food stores, including their effect on diet and health outcomes, is needed.
"Policy Interventions to promote healthy eating: A review of what works, what does not, and what is promising"[141]	Measures to support informed choice have a mixed and limited record of success. More intensive interventions, such as providing vouchers for health foods to vulnerable groups, show early signs of success, but are as of yet inconclusive.
"The influence of natural feeding on human health: short and long-term perspectives"[142]	Current analysis shows the uniqueness of natural milk. Improved health and reduced risk of diseases especially of the digestive, respiratory and immune systems can be seen in adulthood.
"Beneficial effects of breastfeeding in women with gestational diabetes mellitus"[143]	Results of observational and small number of prospective studies suggest that breastfeeding is associated with improvements in glucose and lipid metabolism, together with reduced risk of T2DM in women with GDM. However, women who breastfeed are also more likely to engage in other healthy behaviors, so these results must be treated with caution.
"The protective effects of breastfeeding on chronic non-communicable diseases in adulthood: a review of evidence"[144]	Growing body of evidence suggests that breastfeeding has protective roles against obesity, hypertension, dyslipidemia, and type 2 diabetes mellitus during adulthood.
"Obesity and Women's Health: An Evidence-based Review"[145]	Obesity is associated with a variety of negative health outcomes for women. Studies indicate that obesity is single most important predictor of diabetes type 2. Maternal obesity is also associated with a decrease intention to, initiation of, and decreased duration of breastfeeding.

E. Ensure people with diabetes and gum disease have access to guideline-based oral health treatment.

The American Dental Association recommends periodontal services including three to four root and scaling visits and three to four maintenance visits per year. Currently Medicaid reimburses only for one scaling and root planning visit for one quadrant of the mouth every two years, one periodontal maintenance visit, one annual prophylactic follow up visit, and, for adolescents age 13-18 only, one to three tooth root scaling procedures.[146] These fall under reimbursement codes:

- D4341 for periodontal scaling and root planing (4 teeth per quadrant) or
- D4342 for periodontal scaling and root planing – 1-3 teeth per quadrant

- D4910 for periodontal maintenance 3-4 times per year

Medicaid currently reimburses these services at about 9.5 percent of the median market value.[147,148]

Preliminary analysis suggests that if Medicaid follows the current fee for service rates for this recommendation, they will see a two year ROI of 13.76. If they follow a median market rate, they will see a two year ROI of 2.40.

Calculating benefits is critically limited to one study. While many studies demonstrate a clinical link between periodontitis and diabetes, only one study analyzed demonstrated an associated cost savings from reduced ED and inpatient utilization. Additional work should be done to evaluate if this association is consistent with Washington State PEBB data.

Periodontal Disease and Diabetes

There is a growing body of evidence that periodontal (gum) disease is associated with negative systemic health consequences for individuals with certain diseases and conditions including type 2 diabetes. The effect of periodontitis on diabetes is believed to result from the nature of the inflammatory response in the periodontal tissues. The infection and inflammation associated with periodontitis can aggravate blood glucose control and increase risk for many of the complications associated with diabetes. Evidence suggests that periodontal changes are the first clinical manifestation of diabetes.

Periodontal disease is a chronic inflammatory disease in which a pathogenic bacterial biofilm develops on the tooth root surface in a susceptible patient. If untreated, it can lead to alveolar bone resorption, infection, and tooth loss. It has been suggested that periodontal disease may also have an impact on systemic health via dissemination of bacterial species, host response factors, or some combination thereof. The deep pockets that are often present in untreated patients with periodontal disease offer a favorable environment for proliferation of pathogenic plaque bacteria and facilitate entry of bacteria and bacterial products into the bloodstream of otherwise apparently healthy patients via ulcerated and inflamed tissues.

A number of related questions have been raised regarding the data supporting a bidirectional relationship between diabetes and periodontitis. This relationship between periodontal disease and diabetes mellitus makes diabetes a disorder of importance to dentists and dental hygienists and to patients seen in the dental office. Therefore, the dental office is a health care site that can help identify undiagnosed diabetes, which can lead to better management of the care of patients with diabetes. Using dental visits for diabetes screening is a procedure outside of the scope of this recommendation, but one which nevertheless warrants consideration.

It is reasonable to expect that successful treatment of periodontal disease might prevent or mitigate at least some adverse effects associated with diabetes. This implies that oral health care

providers can have a significant, positive effect on the oral and general health of patients with diabetes mellitus.

If evidence continues to support the existence of an oral-systemic health link to improve type 2 diabetes, two important consequences can be expected. Clinically, a routine assessment and treatment of periodontal disease needs to be considered in the management of type 2 diabetes. Scientifically, future research should be better focused on the underlying pathways and causal factors.

Periodontal Treatment and its Costs

Periodontal therapy varies according to the extent of the bone loss and tissue inflammation and the treatment prescribed by the dentist. Treatment of periodontal disease can be as simple as the removal of tarter or calculus above and below the gum line, termed "scaling and root planning," and cleaning the teeth. A local anesthetic may be administered during these procedures and dentist may also administer antibiotics to treat the bacteria housed in the pocketed areas of the gums. It is sometimes augmented by use of a disinfecting mouthwash, such as chlorine dioxide or chlorhexidine.

In more advanced cases, periodontal surgery may also be required to remove the diseased tissue and create an environment that will respond to home care. Such procedures aim to reduce gingival inflammation, thereby reducing bacterial biofilms on the tooth and root surface, ultimately leading to a reduction of both bacterial populations and transmission of bacteria and toxins through the gingival tissue.

Fees to remove damaged or inflamed gum tissue and contour the remaining gum surface run from $250-$500 per quadrant. A quadrant is either the upper right, lower right, upper left or lower left side of the mouth. This equates to approximately $1200-$2000 or more for the whole mouth. Tissue regeneration or tissue grafts to replace receding gums start around $500-$1000 for a single procedure in one specific area. The extent of the gum tissue damage in your mouth will determine the number of procedures or visits required.

Treatment for gum disease usually begins with a periodontal diagnosis exam and x-rays which can add an additional $150-$400, if not included in the total fee. A full mouth debridement – cleaning away excess buildup so the gums and bones are visible and can be evaluated – can cost $75-$150 or more. This is sometimes needed for new patients who have not had dental treatment for quite a while. While most dental insurance covers exams and x-rays, they usually do not cover debridement. Periodontal maintenance procedures, when needed, can cost $150-$250 per visit.

Literature Review

Department staff conducted a quasi-systematic literature review to evaluate the relationship of periodontal disease and diabetes. A total of nine articles were retrieved, including one literature review provided by external partners.

A literature review provided by the Washington Dental Service Foundation concludes that periodontal disease predicts the development of end-stage renal disease and deaths from cardiovascular disease among some people with diabetes. Similarly, diabetes is associated with increased incidence, extent, and severity of periodontal disease, indicating that periodontal disease is considered a major complication of diabetes. The review then describes a several articles indicating cost savings through the provision of periodontal treatment, some of which were re-analyzed by department staff and described below.[149]

Taylor and Borgnakke studied the findings of seven randomized controlled trials examining the effect of periodontal therapy on glycemic control. The results from four of the seven demonstrated a positive effect as indicated by a reduction in A1c. In four of the seven studies, antibiotics were used systemically (three studies) or were delivered locally (one study), and the results from three of the four studies (two systemic, one local) indicated a beneficial effect. Taylor and Borgnakke[2] also examined 13 periodontal treatment studies that were not randomized controlled trials and found that the results of eight indicated a beneficial effect of treatment on glycemic control. [150]

A number of observational studies provided further evidence to support the concept that periodontitis can adversely affect glycemic management. Taylor and colleagues reported that when they compared patients with and without periodontitis who had moderate-to-good glycemic control, the patients with periodontitis had a greater likelihood of having poor glycemic control two years later.[151]

Saremi and colleagues studied 628 adults 35 years or older who had diabetes for a median of 11 years. Using a fully adjusted model, the researchers found that the risk of death from cardiac or renal disease for people with severe periodontitis was 3.2 times higher than that of people with no, mild, or moderate periodontitis.[152]

Shultis and colleagues examined periodontitis as a risk factor for renal complications of diabetes, including nephropathy and end-stage renal disease. Using a fully adjusted model, they found that the incidence of nephropathy was 2.0 to 2.6 times greater in people who had moderate or severe periodontitis than it was in those who had no or mild periodontitis.[153] The incidence of end-stage renal disease was even higher for patients with moderate or severe periodontitis.

A number of related questions have been raised regarding the data supporting a bidirectional relationship between diabetes and periodontitis. Periodontitis is a clinical complication of diabetes mellitus. Lalla suggests that approximately 30 percent of people with diabetes are undiagnosed. Therefore, the dental office is a health care site that can help identify undiagnosed diabetes mellitus, which can lead to better management of the care of patients with diabetes.[154]

Borrell and colleagues used the National Health and Nutrition Examination Survey (NHANES III) database to develop a predictive model for identifying undiagnosed diabetes. They used self-reported information and a periodontal examination in their analysis to calculate probabilities of

undiagnosed diabetes for people with different racial backgrounds who were 45, 50, 55 and 60 years of age. For people 45 years of age who had periodontitis, probabilities ranged from 53 percent (Mexican-American men) to 27 percent (white women). These probabilities increased with age. The primary conclusion from this study was that the dental office could be a location at which previously undiagnosed diabetes mellitus can be identified.[155]

Direct confirmation of the link between periodontal disease and diabetes generally poses formidable difficulties. These difficulties arise from the long time course of diabetes as a chronic disease, the complex and multifactorial nature of the medical outcomes, and the ethical issues surrounding controlled clinical trials. Nevertheless, the potential preventive value of such a simple and low-risk intervention as dental hygiene in the management of patients with serious medical conditions justifies efforts to determine whether, and to what degree, a causal link exists.

Mosen et al evaluated whether or not dental care was associated with lower diabetes specific emergency department (ED) usage and hospital admissions using a large claims database run by Kaiser Permanente. Mosen did not provide cost estimates, but concluded that dental care was associated with significantly lowered odds of ED or hospital admissions (odd ratio means, 0.61 for both). Mosen et al did not find a relationship between dental care and A1c level.[156]

A presentation by Taylor found, in four years of claims analysis, that non-surgical periodontal treatment and prophylaxis procedures were associated with 11.6 percent cost savings over 1-2 years, and 11.9 percent cost saving over 3-4 years not counting prescription costs. The presentation goes on to list more specific features of the savings. However, additional follow up info could not be obtained for the purposes of generalizing for this report.[157]

Jeffcoat and colleagues conducted a retrospective observational cohort study to estimate the effects of periodontal therapy on medical costs and hospitalizations among individuals with diagnosed type 2 diabetes. This retrospective intervention cohort study drew on insurance records for the years 2011–2013 and was designed to test the hypothesis that treatment of periodontal disease reduces medical costs and inpatient hospital admissions during the five years after periodontal treatment in individuals with five systemic medical diseases including type 2 diabetes.[158]

The differentiation between treated and untreated groups was determined by the level of treatment as the number of periodontal visits in 2005. They found a threshold of four visits in 2005 that optimized discrimination between outcomes based on periodontal treatment intensity. The four-visits was subsequently taken as the definition of completed treatment throughout the study. According to them, this level happens to coincide with the typical recommended course of therapy for moderate to severe periodontitis. Only a small portion (approximately 1 percent) of patients diagnosed with periodontal disease received treatment by this standard (four visits in 2005).

The researchers identified 91,454 patients with diabetes, making this study the largest in a series suggesting that periodontal care can improve the health of these patients. From this group of individuals with diabetes, the investigators analyzed 773 (approximately 1 percent) patients who chose to have a complete periodontal treatment (four visits in 2005) and 60,706 who chose not to have a complete periodontal treatment (control group, those with one, two, or three treatments in 2005). Both groups were covered by dental and medical insurance.

Their findings suggest that patients with diabetes who had a complete periodontal treatment (four visits in 2005) were less likely to see a physician and less likely to be hospitalized. Furthermore, they cost the health care system $2,840 (40.2 percent) less per patient per year compared to patients in control group (those with 1,2, or 3 treatments in 2005). This $2,840 was the difference between the total per capita medical costs of the untreated patient ($7,056) and treated one ($4,216). These three figures represent the mean annual values for the years 2006-2009 as reported in Table 3 of the published article. [158]

There was a 33 percent reduction in the number of hospitalizations with treatment: a mean number of 5.9 in the treatment group and 9.0 in the control group. The biggest surprise was the tremendous decrease in doctor visits: a 13 percent reduction in the number of physician visits with treatment; the mean number of visits was 16.4 in the treatment group and 19.0 in the control group. The observed differences in total per capita medical costs and number of hospitalizations shows the positive impact of periodontal treatment on health service use and costs of a patient with diabetes. These represent reasonable surrogates for a wide spectrum of health outcomes, including but not limited to those directly associated with the underlying medical condition.

The findings of this study do not prove the existence of a causal relationship between treatment of active periodontal disease and diabetes. However, they are entirely consistent with such a hypothesis. Nevertheless, simple periodontal treatment comes at modest cost and minimal risk. When caught early, periodontal diseases can be treated using simple non-surgical techniques which can restore ones mouth to a healthy state. Therefore, although its interventional efficacy remains open to debate, it should be considered part of the preventive armamentarium for chronic disease management.

Methods

Range values of costs were estimated using the current Medicaid reimbursement rates for the applicable billing codes. Costs were compared to literature estimates of associated savings, as demonstrated by Jeffcoat et al. Medicaid reimbursement rates and market rates are described in the table below.

Table 39. Billing Rates for Periodontal Procedures

Rates	Periodontal Scaling/4 teeth quad	Periodontal scaling 1-3/quad	Periodontal Maintenance	Prophylaxis
Billing Code	D4341	D4342	D4910	D1110 (adult)

				D1120 (child)
Medicaid Rate fee for service rate	$24.18 (21+)	$12.57 (21+)	$46 (21+)	$34.38 (21+)
Medicaid Encounter Rate*	Mean/$203 (135-275)	Mean/$203	Mean/$203	Mean/$203
Median Market Rate	$259	$180	$131	$85

*The Medicaid encounter rate is that which is provided to community health centers for visitations.

The estimated co-morbid population with diabetes and periodontal disease was calculated by multiplying the total Medicaid only and Dual-Eligible individual with diabetes populations by a rate of 25-37 percent (provided by Kelly Richburg from the Washington Dental Service Foundation). Use rates between D4341 and D4342 were calculated using their mean rate for years 2008-2010.[159]

Table 40. Medicaid 2008-2010 utilization of scaling billing codes

Estimated Comorbid individual with diabetes population	**D4341 4 – 4+ teeth /quad**	**D4342 1-3 teeth / quad**
290,193 – 429,586	Mean utilization rate of all eligible adults (2008-2010) 12.74%	Mean utilization rate of all eligible adults (2008-2010) 32.6%

*Mean utilization rates are relative to the entire eligible population between 2008-2010, and hence do not add up to 100 percent.

Results

Assuming the same mean utilization rate as existed in 2008-2010, and assuming the associated benefits observed by Jeffcoat et al can be replicated in patients not currently receiving periodontal services, we anticipate an ROI of $13.76 per dollar invested for the current Medicaid fee for service reimbursement rate, and an ROI of $2.40 per dollar invested if this was shifted to the Median Market rate. All results were calculated using rates applicable to adults 21 or more years old. Using the community health center encounter rate for all codes associated with this recommendation is both a non-cost effective and unrealistic depiction of this codes application, but included as a conservative frame of reference nonetheless.

Table 41. Two Year Total Direct Medical Cost/Benefit Table

Reimbursement Rate	Total cost*	Total Savings	Two year ROI**
Medicaid Fee For Service	$50,635,943 - $74,958,708	$747,337,515 - $1,106,317,980	13.76
Medicaid Encounter	$11,785,535,296 - $17,446,668,134	$747,337,515 - $1,106,317,980	-0.94

Median Market	$220,095,139 - $325,816,924	$747,337,515 - $1,106,317,980	2.40

*Total costs reflect only the maximum number of visits an enrollee could receive under the recommendation. Sensitivity analysis was not performed on reducing the benefit with fewer visits, as corresponding benefit data from the literature only assumed benefits at the highest standard of treatment.
**a two year ROI was calculated, as this may be the amount of time required to receive all services recommended in this proposal.

It is currently unknown if the monetary benefits of these interventions will persist past a two to three year period. If this is the case, returns will logically increase.

Conclusion

Based off the clinical evidence detailed in the literature review, it is hypothesized that the benefits observed by Jeffcoat et al are generalizable to co-morbid individuals with diabetes with periodontal disease not currently receiving periodontal treatment. Assuming their benefits are consistent, reimbursing providers at the current fee for service rate will provide a very high two year return of $13.76 for each dollar spent.

Because the fee for service reimbursement rate is very low (approximately 9.5 percent of the median market rate), a more realistic estimate might be the ROI at median market rate. This generates a positive ROI of $2.4 per dollar invested, reasonably lower than the fee for service rate.

A more thorough analysis by Medicaid is warranted to determine the best course for increasing the Medicaid reimbursement rate for these services. It is clear that an increased rate is necessary, based on sentiments relayed by experts in consultation for this recommendation. It is unreasonable to suspect many dental providers will accept Medicaid clients at 9.5 percent of the median market rate, a reimbursement low enough that many may not break even on the labor costs of the procedure.

Limitations

There are several major limitations to this analysis.

The distribution between standard providers billing for dental services and community health centers billing for services was unknown. Given the intense range between these values, results may be skewed accordingly. Uptake rate estimates and population estimates for comorbid diabetes/periodontal disease were provided graciously by Kelly Richburg at the Washington Dental Foundation. While they provide a useful benchmark for estimating, they do not reflect the same methodology utilized in creating the synthetic Medicaid estimates presented earlier in this report, and results may vary after making new adjustments for expansion. Additionally, the estimated uptake applied to all eligible Medicaid enrollees may not be applicable to populations with comorbid diabetes and periodontal disease. Since individuals with diabetes tend to have

higher rates of periodontal disease than the general population, hypothetically, they would have higher uptake rates of this service.

Benefits are drawn directly from the literature where it is currently unknown if they describe a casual or corollary relationship. This is a critical limitation of our analysis, and conservative investment may warrant further analysis with state data to justify Medicaid reimbursement of these services. Hypothetically, because the health benefits of receiving periodontal treatment with comorbid diabetes are clear, the associated savings observed in the literature (Jeffcoat et al) can reasonably be generalized, but the fact remains the casual relationship was not established in that study, and may prove to confounding results.

Similarly, it is not known what benefits should be anticipated for those who do not require the full cost of treatment given in this recommendation. The study by Jeffcoat et al is a "bounding" study with a high degree of data aggregation (as to time, treatment, and diagnoses), absence of a significant correlation would not constitute evidence against an oral-systemic link in specific conditions and medical outcomes. On the other hand, the statistically significant relationships reported are strongly suggestive of an underlying biomedical link, irrespective of the mechanisms and causal chains that might drive it.

Future approaches should let cost and hospitalization vary with the number of periodontal visits defined as "treated." Instead of using treatment as a categorical variable with those one, two, and three visits be considered as control group and only those with a complete four treatments be included in the experimental group. Such dose-response data would provide valuable insight into benefits derivable from less-than-optimal patient adherence.

F. Enhance care coordination for people with both diabetes and mental illness.

For people who have diabetes, or are at high risk for developing diabetes, and who also have serious mental illness, enhanced care coordination or intensive case management holds promise for improving outcomes, reducing disparities, and reducing costs.

Individuals with a serious mental illness may have increased difficulties managing a chronic condition such as diabetes. Also, providers may not have the skills to be able to help patients manage both conditions, due to lack of training or knowledge. Enhanced care coordination between providers and case workers would help manage patients who are at risk of developing or worsening diabetes due to comorbid mental illness. Additionally, intensive case management would help patients learn to manage both chronic mental illness and diabetes related illness.

Literature Review

Department of Health staff conducted a quasi-systematic literature review to assess the value of enhanced case management or care coordination for people with diabetes and comorbid mental

illness. Results suggest a wide variety of definitions, approaches and benefits of care or enhanced case management. Developing a complex approach to account for all the potential variability between interventions and benefits was outside of the scope of this report. A summary of articles retrieved during the literature review is included below.

Table 42. Literature Review Summary Table

Study	Key Results/Summary
"The effect of serious mental illness on the risk of rehospitalization among patients with diabetes"[160]	Large study of Washington State community hospital patients. Finds mental illness as a co-morbid factor. Results in 1.07-1.44 greater odds (mean 1.25) of rehospitalization after a medical surgical hospitalization.
"Homeless and Diabetes: Reducing Disparities in Diabetes Care Through Innovations and Partnerships"[161]	Collects reported "social determinants of health" as well as baseline characteristics of homeless people with diabetes. Authors conclude that effective diabetes care for addressing multifaceted challenges of the homeless need to incorporate an understanding of social determinants of health.
"Impact of colla comm,. Case mgmt. program on a low-income uninsured pop in Sedgwick county KS"[162]	Key results include a 48 percent reduction in ED usage with significant cost savings. Though a closer read is warranted for determining applying such results to diabetes specific populations, it is seemingly unlikely considering the top list of complaints, but more than or equal to 50 percent of patients did have a chronic illness.
"Clinical practice guidelines for diabetes and mental health in Canada"[163]	Provides overview of interaction between mental illness and diabetes and makes recommendations. Useful for my review, probably not for content experts.
"Economic aspects of the association between diabetes and depression: A systematic review"[164]	Resource for specific cost estimates from multiple studies. Concludes that there is an evidence base demonstrating the adverse economic impacts of co-morbid diabetes and depression and potential for cost effective intervention.
"Cardiovascular disease and diabetes in people with severe mental illness"[165]	Provides an overview of support in favor of more coordinated services between mental health and diabetes.
"Longitudinal study of affective and anxiety disorders, depressive affect and diabetes distress in adults with Type 2 diabetes"[166]	Diabetes patients displayed higher rates of affective and anxiety disorder over time relative to control group.
"Diabetes and Psychiatric disorders"[167]	Large summary article providing an overview of the interaction between diabetes and psychiatric disorders.

"Cost-Effectiveness of Diabetes Case Management for Low-Income Populations"[168]	ICER of 10,141, 24,584, 44,941, 69,587 / QALY were estimated for Project Dulce participants for uninsured, Couty Med Services, Medi-Cal and commercial insurance cohorts.
"Effect of managed care on emergency department use in an uninsured population"[169]	Retrospective observation study to assess reduced ED use for managed care among uninsured populations. Study concludes that it was not successful, providing a primary care provider and health care benefits alone was insufficient to reduce ED use in the study population.
"Mental illness and substance use disorders among women vets with diabetes"[170]	45 percent of women vets with diabetes had either a mental illness, substance use disorder, or both. Authors conclude care for mental and physical illness needs to be integrated into health care planning and delivery of service to women vets with diabetes.
"Positive Emotional Health and Diabetes Care"[171]	Literature review, suggesting from 22 studies that "aspects of positive wellbeing" were linked to health-related outcomes and self-management success. Authors conclude more research is needed, but include model to guide interventions on positive wellbeing, presumably somewhat integrated into self-management skill building.

Though not discussed in the literature review above, depression and/or anxiety disorders usually do not meet the access criteria for severe mental illness which is required for Medicaid covered mental health services, yet may have significant impacts on a person with diabetes. Furthermore, diabetes may contribute to depression or anxiety. There would likely be a benefit from more support and training for primary care in screening, and from team care approaches for patients with multiple chronic conditions, including information about which patients should be referred to mental health providers for depression/anxiety, particularly for the Medicaid population.

G. Ensure all appropriate populations have access to Chronic Disease Self-Management Education Programs in Washington.

The Chronic Disease Self-Management Education Program (CDSMP), developed by Stanford University, has demonstrated that group educational classes can be administered by non-medical health workers to promote self-management skills. Multiple independent studies have recorded positive health outcomes from these courses.

The diabetes-specific curriculum of the CDSMP is the Diabetes Self-Management Education Program (DSMP). This could be offered at no cost to Apple Health enrollees by reimbursing the DSMP for the cost of Medicaid participants, when led by registered Community Health Workers or lay health workers as part of the allowance of the Medicaid Health Home State Plan Amendment that approves adding community health workers as providers of preventive services. It would also be important to support the inclusion or improvement of oral health modules in DSMPs throughout the state, and improve coordination between the Health Care Authority and the Department of Health on the reimbursement of DSMPs.

Issues with the fee for service model for reimbursement for DSMP were identified by our colleagues in Oregon. An alternative payment model must be used to allow for a breakeven or cost saving intervention. Consolidated billing should be offered for ease of use by community providers and insurers.

The DSMP should not be confused with Diabetes Self-Management Education (DSME) which is already offered as a Medicaid benefit when administered by providers.

Literature Review

A systematic literature review and meta-analysis by the Department of Veterans Affairs, and an additional review by lead author Quinoes et al, conclude that for group DSMPs there is little evidence that the programs improve quality of life over the long and short term. Evidence exists on modest effects on A1c level on the short and long term. The authors conclude that much of this may be due to inconsistencies between study methods and weakness found in studies reporting positive effects.[172,173] Although this is discouraging, policy makers should keep in mind that even modest changes to A1c level in individuals with diabetes reduces the risk of complications from diabetes and reduces health care expenditures.[174,175,176,177,178]

It is difficult to estimate the effectiveness of increasing adequate oral health education as part of the DSMPs in Washington State. However, if Apple Health covers periodontal treatment for individuals with diabetes, it should also ensure that they receive an opportunity for adequate oral health education.

Conflicting evidence currently exists about the state of oral health education in DSMPs nationally. A 2009 survey in South Carolina study found that almost 95 percent of DSMEs did not provide or cover an "adequate" oral health module for their program.[179] Yet a 2010 multi-state survey found that approximately 90 percent DSMPs in high diabetes prevalence states, and approximately 85 percent in low prevalence states, included an oral health benefit. Only 27 percent of these DSMPs covered management of dry mouth (a very common diabetes related phenomena with adverse oral health outcomes), and only 10.1 percent demonstrated oral health techniques, while less than 1 percent required return demonstration.[180] The exact prevalence of "adequate" oral health modules in Washington DSMPs is unknown. However, speculating from national results, it seems possible that it is somewhat under taught.

Following from the conclusions of the literature reviews by Quinoes et al and Urbanski et al, together summarizing the findings of six literature reviews from the last decade, there is limited cost-effectiveness studies to refer to for estimating the exact cost-effectiveness or quasi-return on investment from a DSMP.[181,182] Despite the limitations on data, these reviews conclude that the program is likely cost-effective, though a precise estimate for modeling is difficult to pin down.

We constructed the following preliminary cost benefit analysis leaning on benefit data from the literature review and the Alaska Department of Health and Social Services (DHSS), and cost data supplied to us by King County Public Health and the Oregon State Health Department.[183]

Methods

Minimum and maximum cost estimates were populated from literature reported and local sources, while estimated savings were populated from the literature and from the Alaska DHSS. It was assumed savings could be populated along a minimum-maximum range and broadly applied to existing Washington programs. Savings from a health system perspective were estimated using three distinct sources:

- Self-reported reduced utilization of emergency department and hospital inpatient services, given in an article by SangNam et al[184,185]
- Estimated reductions in utilization of services associated with decreases in A1c levels, compiled by Chenoweth and Associates Inc. on behalf of the North Carolina Department of Health and Human Services.[186] Because the effects of Washington State programs on the A1c level of participants are unknown, it is assumed that anticipated benefits from the results of North Carolina could be generalized to Washington State. Note that this study suffers from some critical limitations, but because its results were more conservative than those by SangNam et al, it was included for analysis.
- Observed savings from the Evergreen Economics and the Alaska DHSS. This is the greatest savings figure reported, but unfortunately suffers from study limitations described in the below sections.[140]

One additional study described savings directly monitored through claims data, with benefits roughly 2-4 times greater than those given in the sources above. However, this source was omitted as the program in the study included a direct pharmacist intervention, unlike the DSMPs offered in Washington State, and this seemed unreasonable to generalize to Washington programs.[187]

Savings results from these sources were estimated for cost benefit analysis using local costs. Both of these estimates are based only on direct medical expenditures and do not make attempts to factor in social costs such as decreased productivity or increased mortality.

Cost figures were calculated by comparing per capita or per participant costs listed with a savings drawn from the review by SangNam et al and other review sources.[188] Cost per

participant figures provided by local providers of the DSMP, including King County Public Health and the Oregon State Health Department were also used.[189,190,191,192]

Results

Table 43. First Year Direct Medical Cost Literature Benefit Table

Cost Range	Cost Per Participant	Savings Per Participant	ROI ratio
Min – Max Range	$218-960	$454.5-713.8	-0.53 – 2.27
Local Cost Range*	$350-455	**	0 – 1.04

*Local costs reflect a range of figures provided by King County, Oregon State, and Washington State Dept. of Health staff. **Savings per participant were only calculated using literature sources due to a lack of available local data.

Benefits reported by Evergreen Economics and the Alaska DHSS are omitted from this section due to limitations expressed by the author.

Evaluating just the benefits from literature sources generated by the DSMP on annual direct health care expenditures (reduced emergency department and inpatient utilization) suggests breakeven outcomes with the lowest reported local costs, and a positive ROI of 2.27 if utilizing the lowest costs recorded in literature. It is unknown if this will be sustained over multiple years.

The above table includes only estimates measuring direct savings attributable to the DSMP. From a pharmacy-led intervention, Cranor et al describe indirect savings in reduced sick days equal to roughly $486 per person.[144] Although these results are unlikely to generalize, factoring them into the total value of the program suggests a savings per participant that significantly increase the benefit of the program, suggesting external value of the program that may warrant closer study.

Cost Savings from the Alaska Diabetes Program

An additional resource for attributing possible benefits comes from a cost savings analysis completed by Evergreen Economics, the Alaska Diabetes Program, and the Alaska DHSS. Specifically this analysis found a 21.7 percent reduction in medical expenditures between participants who attended the DSMP classes compared to those who did not. In real costs this amounts to an average savings of about $5,730 per participant. This is several times greater than the figure used in the above analysis. The analysis by Evergreen Economics, while statistically significant and rigorous in its efforts, has several caveats articulated by its authors, including a small sample size of about 21 participants, whom were not randomly selected, which may confound results via selection biases. It is unfortunate then, that it seems the burden of proof is on these authors to investigate through a more rigorous study, if in fact their observed savings can be used as a better estimate for savings associated with DSMP.

Basing analysis off of this evidence is therefore rightfully questionable, and the results of it should not be taken as an assumption moving forward. Nevertheless, if the benefits observed by

Evergreen Economics can be confirmed, then preliminary analysis suggests we should see a far greater ROI, as articulated in the table below.

Table 44. First Year Direct Medical Cost Alaska DHSS Benefit Table

Cost Range	Cost Per Participant	Savings Per Participant*	ROI ratio
Min – Max Range	$218-960	$5,730	4.97 – 25.30
Local Cost Range	$350-455	$5,730	11.61 – 15.40

*5,730 is the mean potential savings per beneficiary during study period of 2008-2014 reported by Evergreen Economics.

Conclusion

Based off local costs and literature benefits, the DSMP is likely to either break even if the lowest reported local costs of $350 per participant are used. If these recorded benefits persist over multiple years, is almost certain to break even with either local cost, with a high potential for cost savings over multiple years. If novel evidence arises in support of the savings observed by the Alaska Department of Health and Social Services, it is possible the return on investment will be significantly greater.

Additional qualitative results listed by studies include metrics such as increases in patient activation and self-reliance, and decreases in self-reported depression and "bad health days." These are unaccounted for in our analysis and, with more rigorous study, may show an increase in the value of the program. All of these may be associated with additional savings, even if their success in improving quality of life is unknown.

Because the state of oral health education in Washington State DSMPs is unknown, it is difficult to estimate how this may increase the effectiveness of the program. However, it is well established that there is relationship between diabetes and oral health, and that individual with diabetes are prone to worse oral health outcomes, warranting closer inspection of the role of oral health education in these programs.

Discussion

Coordinated efforts across agencies will be needed to develop accurate billing for this DSMP. For example, an issue with the Medicaid fee for service/encounter payment model was reported by our colleagues in Oregon. This issue raises the reimbursement rate to around $150-$250 per attendee per DSMP session, raising the cost per person to $900-$1500, far above the estimated cost saving per participant anticipated at $218-$350 per participant. A new billing solution is needed to solve this issue. It is beyond the scope of the paper to address this.

However, as discussed in the CHW recommendation, Washington has recently filed and been approved for Medicaid Health Home State Plan Amendment to add community health workers as providers of preventive services.[193] The services described in the State Plan Amendment are administrative,[194] but it is worth investigating to see if this might provide an opportunity for a

billing solution that would allow reimbursement for the DSMP and/or CDSMP at a cost-effective and equitable rate.community health workers are well demonstrated as facilitators of the DSMP,[195,196] and have been, in some cases, shown to be associated with greater success of a DSMP on health indicators. In two cases, such success involved A1c, a measure which can be strongly associated with health care expenditures.[197,198,199,200]

Additionally, according to a literature review by Gucciardi, attrition in the DSMP and CDSMP in the US may be anywhere from 12-50 percent.[201] Because one of the most commonly cited reasons for attrition from the program is a lack of funds or time, programs offered at little or no cost and facilitated by community health workers may help to overcome the financial barrier. They may also improve outreach of the program, and lead to a lower attrition rate and a more cost effective program. If Medicaid populations have higher no-show rates then study populations, than specific attempts to reduce attrition should be considered.

Finally, one article estimated lifetime costs and benefits of participants in a similar group led education program delivered in the UK. It indicated their program was likely to be cost effective at a threshold of $20,000 per Quality Adjusted Life Year, and the mean of cost per participant after deduction of benefits was likely to be 82 British pounds per person, suggesting the intervention is above break-even rates.[202] These results are using the studies within trial costs, which if substituted by costs from our local partners, are likely to result in cost savings. Still, a more rigorous cost effectiveness analysis of a similar program not resulting in overall cost savings or break-even results should give us pause.

Limitations

There are several limitations to this analysis.

All the savings benefits are secondary, except the savings recorded by Evergreen Economics and Alaska Department of Health and Social Services, though these have their own critical limitations. For budgeting, a more rigorous literature review and meta-analysis is warranted. This literature review was quite limited due to constraints on staff time and a lack of institutional access to scholarly databases. While the preliminary analysis warrants pursuit of this recommendation, that pursuit must include more rigorous review and analysis to determine if coverage of these programs will be cost saving.

Primarily, all savings utilized are speculative, estimated from either reported effectiveness rates and corresponding modeled cost estimates, or self-reported utilization metrics generalized over a wide range of national programs. As discussed in the methods section, one study which directly recorded health care expenditures, possessed a far more rigorous intervention, and showed significantly higher savings (less than $1,500 per participant) was deemed unlikely to be applicable to most interventions given throughout the state. The only observed savings were reported by Evergreen Economics from the Alaska Department of Health and Social Services,

but unfortunately, as the authors describe, are subject to serious caveats and will require further study to determine their validity.

It is unknown if the recorded cost reductions modeled by Chenoweth et al and estimated by SangNam et al will persist beyond two years. If they do, the DSMP will almost certainly be cost saving, with a high likelihood of a significant ROI.

The highest unit cost in our range ($960 per participant) is based off an older and retrospective estimate of cost effectiveness of the program, where the study's author believed this would still produce a cost effective result of around $25,000 per Quality Adjusted Life year. Because our local partners have reported costs at less than half this estimate, $960 as a maximum cost per participant is probably an unrealistic figure for budgeting concerns, but included as a conservative frame of reference nonetheless.

This analysis was not intended to address budgeting specific concerns, and does not have estimates for the number of people who have already enrolled in the program, or will reenroll in the program. This may significantly affect costs in implementation and must be considered in future analysis.

The current capacity of DSMP providers to absorb new patients and outreach is unknown.

H. Ensure involvement of Community Health Workers to address diabetes in populations with the greatest needs.

Community health workers take on many versatile roles throughout Washington. In these roles, they can impact rates of diabetes and diabetes complications, in particular with groups experiencing disparities in diabetes.

The costs of utilizing community health workers should be integrated into budgetary plans as new payment models emerge. A combination of public health and health systems funding at a regional level, in alignment with Healthier Washington structure and goals, may yield the best outcomes.

As of December 2013, Washington has filed and had the Medicaid Health Home State Plan Amendment approved to add community health workers in roles assisting care coordinators.[203] The services described in the State Plan Amendment include providing administrative support for care coordinators, and assisting with the facilitation of work assigned by the health home care coordinator.[204]

Kathy Burgoyne at the foundation for Healthy Generations describes in her presentation Developing Lay Community Health Worker Pilots for Policy & Systems Change (Washington State Public Health Association 2014 Conference) that community health workers average an approximate ROI of $3 per dollar invested.

Background

Based on a literature review provided by King County Public Health, community health workers are best defined as fulfilling five distinct roles. These roles by no means apply to all community health workers, nor are they are necessarily the extent of the roles community health workers fulfill. However, for the purposes of review in this recommendation, community health workers will be defined as occupying one or more of the following five roles:[205,206]

- **Educator**: This is the most commonly identified role for community health workers, though there is contention on when this role is appropriate for community health workers or lay workers, and when a professional health worker is required. Examples of this role might include the use of community health workers as lifestyle coaches for facilitating Diabetes Prevention Program or Chronic Disease Self-Management Education class sessions.
- **Case manager**: Variance exists in the extent of this role. However, King County indicates this may include patient navigator roles such as providing follow-up, reviewing medications, managing registries, providing basic clinical checks and monitoring for diabetic complications, and identifying community resources.
- **Role model/mentor**: Community health workers may act in a peer mentoring role. This could include peer support from a CHW with diabetes who has come far in the self-management of their condition, presenting or supporting their peers with the same condition.[207]
- **Advocate**: This is similar to the patient navigation work done by community health workers in a case manager role, with added emphasis on building community capacity within organizations or coalitions.
- **Program facilitator/coordinator**: This is similar to the educator role, though this may extend to administrative and facilitative functions such as organizing or coordinating group participants, supervising or training other community health workers, conducting door-to-door visits, and leading community specific workshops.[208,209]

King County's review describes the recruitment criteria for community health workers as identified through a systematic review of four databases. The most common criteria described was a "strong community connection/commitment or reside(ing) in the targeted community." Half of the studies King County reviewed required community health workers working on diabetes to have diabetes themselves. Additional criteria included good interpersonal skills, a willingness to learn, a certain level of education or literacy skills, and in some cases specific race, ethnicity or gender.[195]

Utilization of community health workers in community settings to prevent and manage diabetes is an effective method of reinforcing evidence-based programming. The multiple roles that community health workers are able to play make them ideal community leaders. Trust, familiarity with the barriers in specific communities, and approachable mentorship are appealing to participants in evidence-based community programming such as the Diabetes Prevention

Program and Diabetes Self-Management Program. Reimbursement for these services provides incentive for further training and utilization of community health workers in clinics and community settings.

Enrollment in the Washington State Community Health Worker Training Program has been increasing each quarter, providing a burgeoning workforce with specific skills and ties to the community that intersect with barriers and gaps faced by practitioners and medical professionals.

Literature Review

King County Public Health provided the results of systematic literature review conducted in 2011. Additional articles and resources were received from Kathy Burgoyne with the Foundation for Healthy Generations.[210] Department of Health staff conducted additional quasi-systematic literature searches to collect articles related to the cost effectiveness of community health workers as related to diabetes management, or prevention activities, for publication years 2011-2014. Key results from King County and Department of Health searches are summarized below.

Table 45. CHW Literature Review Summary Table

Study Identifier	CHW Role	Benefits	CE Results
Fedder et al (2003)[211]	Case Mngt, n=38	Over three years, 38 percent reduced ED use, 53 percent reduced ED re-admit, 30 percent decrease in mean hospitalizations, 27 percent decrease in mean Medicaid expenses.	Savings of ~$3,000 / 3 years
Babamoto et all (2009)[212]	Education Advocate	Health status report, 52 percent point increase in those reporting good or excellent health status. No significant change in ED admits in study group from baseline, compared to 13-28 percent increase in standard care group. Physical activity reported at 3 days/week increased from 28-63 percent in study group. No significant group level BMI changes were detected, but, study group had 2.9 greater odds of decreasing BMI.	Decreased hospitalization numbers reported, not attributed to specific costs
Thompson et al (2007)[213]	Education Advocate	A1c lowered, 8.73 to 8.37, (6 months) to 8.25 (year). Greater CHW contacts associated with greater decrease in A1c.	
H Shelton Brown (2012)[214]	Education Advocate	Results suggest the intervention is CE.	10,995 – 33,319 / QALY
Culicia Dan et al (2008)[215]	Education Advocate	A1c (6mo) 8.14-7.36%, (12) 7.0% (full par). Partial: 12mo 8.35-7.45%.	Cost of about $461 /

		A1c attributed to availability of immediate meds. BMI did not change. Significant changes in blood pressure observed.	participant
Skelly et al (2010)[216]	Case mgt	Minimal contact of 3 CHW home visits associated with 23 percent "less likely to have ED visits."	
Lorig et al[217]	Edu	No significant changes in Utilization or A1c, significant improvements in depression, symptoms of hypoglycemia, communication with physicians, healthy eating and reading food labels and as measured "patient activations and self-efficacy" compared to controls.	.
Prezio et al[218]	Edu	Significant A1c changes observed between intervention and control, specifically -0.9 percent in control, -1.6 percent in intervention, for a great decrease 0.7 percent. No difference found for secondary outcomes including BMI, Blood Pressure, or lipid status.	
Felix et al[219]	Case Mgmt Advocate	CHW program to utilize Community health workers for connecting highly at risk rural participants eligible for Medicaid services, to their services. Extremely effective and promising results, but consider that they may have been at work in the single most high risk region of the U.S.	ROI of $2.92 during three year period
Ryabov[220]	Case Mgmt Edu	Rigorous model, but makes some large assumptions about the enduing effects of the clinical outcomes.	Cost of $13,810 / QALY
Tang et al[221]	Edu	75 percent in Domain 1, 75 percent in Domain 2, 63 percent in Domain 3, and 75 percent in Domain 4 of peers were able to pass test on first try, remaining percent passed on second. Study conclusions are simply that it is feasible to train DSME peers as educators for use in DSME programs.	

J. Support the Plan for a Healthier Washington's investment in Analytics, Interoperability & Measurement.

The Plan for a Healthier Washington[222] refers to the combination of grant funding expected to be received through the State Innovation Model Grant and foundational legislation signed by Governor Jay Inslee. The Healthier Washington project will:

- Build healthier communities and people through prevention and early attention to disease.
- Integrate care and social supports for individuals who have both physical and behavioral health needs.
- Reward quality health care over quantity, with state government leading by example as Washington's largest purchaser of health care.

To expand interventions that help control or prevent diabetes, we need effective data systems in place to evaluate both health outcomes and cost-effectiveness of these interventions at the provider level. The action items described below will help the state make more advanced investments in actions that will reduce the financial and social burden of diabetes in the Washington. This work is supportive of the Healthy People 2020 Health Communication and Health Information Technology goal.[223]

a) Increase participation of health care purchasers in the All Payers Claims Database.

In the 2014 legislative session, Second Substitute House Bill 2572 established the all payer claims database, with mandatory participation for public health insurance providers and voluntary participation for private providers.

The National Council for State Legislators describes All Payer Claims databases as designed to inform cost containment and quality improvement efforts.[224] All payer databases enable researchers to track changes in individual utilization of health care services on a massive scale. The most beneficial way of collecting this data is in real time, able to address patient encounter and utilization data. A truly All Payer Claims database would give data at the county level as well as the state level.

This is a pivotal and complementary strategy to the other goals recommended, providing enhanced care coordination, disease management, and diabetes prevention program, as this database will allow us to assess differences in utilization of services for individuals receiving these interventions.

The goal of this database as a dashboard for consumer transparency can only be achieved with public access to cost and de-identified claims data. If the database is limited in sample size, or if requests to use the database are too costly, the application of this resource could be limited.

b) Financially support efforts to gather population health data through surveillance systems, such as the Behavioral Risk Factor Surveillance System.

Surveillance systems, such as the Behavioral Risk Factor Surveillance System, are the backbone of this report and are essential for monitoring population health. As federal financial support for these systems decline, it's imperative the state take an increasing role in maintaining these systems.

For this reason and more, the State Innovation Model (SIM) Grant that HCA anticipates receiving will invest in increasing the BRFSS sample size significantly. For the coming budget, the Department of Health will use existing state funding to support BRFSS at about $0.8-$1.0 million. Additional, more sustainable funding sources should also be pursued for BRFSS and other surveillance systems.

c) Support enhancement of information exchange and extraction capacity for data to drive local health decisions, support of care delivery, and increased clinical-community linkages to improve health outcomes for people with diabetes.

This is the single largest target for investments from the SIM grant. Many providers who report on quality indicators and diabetes specific indicators do not receive financial support and have a limited incentive to provide this data. This critically limits the ability of some providers to assess their success with new interventions, including those specifically designed to prevent or control diabetes. To be able to recommend the expansion of interventions designed to prevent and control diabetes, we must take the necessary steps to ensure data on these interventions are being collected to ensure their delivery in a cost effective way. Leverage and bridge to existing legislated mandated outcomes-based performance measurement included in SSSB5732, improving behavioral health Services; ESHB 1519, establishing accountability measures for certain health care coordination services; 2SSB 6312, concerning state purchasing of mental health and chemical dependency treatment services; and E2SHB 2572, concerning the effectiveness of health care purchasing and transforming the health care delivery system.

Appendix 6: Stakeholder Involvement in Writing This Report

To face the challenge of the diabetes epidemic and improve diabetes prevention and care in Washington, we need partnerships. Health care professionals, local, state, and tribal agencies, community-based organizations, representatives from education, academia, research, volunteer organizations, and the pharmaceutical industry, and anyone else who works to respond to diabetes every day should align their goals and support each other.

To this end, the three authoring agencies invited nearly 100 stakeholders from across the state to an all-day Stakeholder Summit in April 2014 to discuss policy recommendations and actions they believe should be included in this report. The invitation read, in part:

> *The cross-agency "Diabetes Epidemic and Action Report (DEAR)" team has convened to address sections of the Senate Bill 5403 budget proviso passed in July 2013. This legislation requires the Department of Health, Department of Social and Health Services, and Health Care Authority to prepare a report for the Legislature and Governor on the scope of the Diabetes Epidemic in Washington State. This report needs to include data and statistics to describe the problem, the financial costs, what these agencies are currently doing to address diabetes, and provide policy recommendations to address the problem. The report is due in December 2014.*
>
> *The purpose of this Summit is for stakeholders to look at current policy recommendations and provide assistance with prioritizing. The recommendations that emerge from this Summit will guide which policies the DEAR team will investigate further for cost-benefit analysis.*

Fifty stakeholders representing 25 organizations, attended this meeting. Additional stakeholders who were unable to attend stayed connected via email. The stakeholders included:

Table 46. Organizations represented at the April 23 Stakeholder Meeting

American Diabetes Association	**University of Washington**
American Indian Health Commission	Washington Association of Community and Migrant Health Centers
Commission on Asian Pacific American Affairs	Washington Dental Service Foundation
Cowlitz Indian Tribe	Washington State Department of Health
Kitsap Public Health	Washington State Department of Social and Health Services
Living Well Alliance, Pacific Medical Centers	Washington State Health Care Authority
Migrant Clinicians Network	Washington State House of Representatives

Novo Nordisk Inc.	Washington State Governor's Office
Private practitioner	Washington State Office of Financial management
Private citizen, Kentucky	Washington State Office of the Superintendent of Public Instruction
Public Health Seattle & King County	Washington State University College of Pharamacotherapy
Qualis Healthcare	Washington State University Extension
Seattle Indian Health Board	Western Washington Medical Group
Tri-Cities Diabetes Coalition	YMCA of Seattle

Each stakeholder, based on the organization's primary work focus, was assigned to one of five groups addressing different populations of people affected by diabetes. The five population groups were:

1. People with risk factors for diabetes
2. People with prediabetes
3. People with diabetes
4. Women with gestational diabetes
5. People with complications from diabetes

In their groups, participants were asked to brainstorm policies and recommendations that might keep their population's diabetes, or risk of diabetes, from further developing. Within each group, participants prioritized the policies they suggested.

A representative from each group presented the top policies to the rest of the participants, and provided clarity as needed. After each group presented their ideas, all the participants together prioritized among all the policy suggestions. Finally, the whole group discussed and confirmed the results.

The recommendations brainstormed at the Stakeholder Summit are listed below, in order of priority.

Table 47: Policy Recommendations brainstormed by stakeholders at the April 23 Stakeholder Summit

Policy Recommendation	Votes
Include oral health to care management - Enriched oral benefit for those with diabetes (3-4 annual periodic visits) Community health worker reimbursement / peer educators due to language proficiency / cultural proficiency / use of local services - Clear medical guidelines for treatment; enhanced reimbursement.	**18**
DOH, DSHS, HCA, (PEBB) (expand DPP) coverage to Medicaid [OIC] via letter from the president (everyone?) even uninsured marketplace. Classifying DPP regarding essential health benefits.	**16**
Incentive pay for performance/ pay for improvement (both).	**12**

HCA cover increase care management for dual diagnosed (psych / diabetes) 1. Aggressive medication management 2. Psych medications 3. BMI monitoring 4. Home Visit / Case Management- wrap around services	**12**
Provide resources for community engagement / mobilization to identify champions for community based prevention. (partners: Ethnic Commissions / Relevant Partners)	**12**
Promote Healthy Eating policies across all sectors (food procurement, healthy vending, etc…)	**11**
State defined screening guidelines. AIC course of action, all practices follow	**11**
Provide reimbursements for evidence based programs like (DPP, CDSMP, HCA)	**8**
Measuring outcomes – data collection that supports continued success of interventions - Risk test / point value? - More information needed - Data for particular programs (eg. Medicaid) - Percent of people with prediabetes	**8**
Require those who get WIV vouchers to attend educational course à link to diabetes education	**7**
Team based approaches to manage prediabetes and co-morbid conditions for holistic care	**7**
Coverage for non-medical health care services including self-management, engagement, and diabetes specific self-management programs (evidence based(CDSMP/DSMP/ CPSMP)	**7**
Recommend care management /care coordination for people with complications of diabetes. FFS to provide care coordination	**7**
Partner public health / community health to provide education, screenings, community outreach education (FQHC, school, community events)	**7**
Target specific pops via mobile clinics	**4**
Fund a broad-based and culturally relevant public awareness / education campaign highlighting risk factors & prevention for diabetes / healthier living	**4**
Incentives to prevent diabetes /2-1-1 prediabetes	**4**
Referring women postpartum to DPP criteria: history of gestational diabetes possibly through walk-in clinics	**3**
Provide provider education on high risk populations including racial and ethnic populations	**3**
Mandate all pregnant women are screened for gets. Diabetes	**3**
Provide reimbursement (via plans) for weight management	**3**
Cultural competency/recognition for various DPP programs / populations within the state	**3**
Investigate feasibility of 24 nurse line for FFS duals and Medicaid only	**3**
Provide adult dental care on par with expansion benefits	**3**
Demonstration projects allowing communities to design / deliver services	**3**
Medicaid is required to cover all evidence based ADA clinical protocols / pathway (services, frequency, periodicity)	**3**
Add an hour to school day for exercise, art and music	**2**

Case management for getting needed services (dental, mental health, eye exam, foot, etc…)	**2**
Proclamation mandating CLAS standards for state agencies (in program policy work)	**2**
Work with managed care to implement programs involving incentives / environmental systems changes	**2**
Creation & uniform application of prediabetes code	**2**
Quality measures are established and shared to demonstrate outcomes of care for the people with complications	**2**
Add dental hygienists to case management programs. (SW/RN)	**2**
Focus on built environment to promote healthy communities	**1**
Targeted job development in high poverty area	**1**
Support funding for tobacco cessation (evidence-based programs, quit lines, etc..)	**1**
Support reimbursement and provide a mid-level practitioner program	**1**
Colorado clinical guidelines collaborative gestational diabetes guidelines (resource)	**1**
Leveraging Community health workers to encourage empowerment & self-advocacy of patients with prediabetes	**1**
Money for care coordinators to purchase ancillary services (Health Homes)	**1**
Zoning /planning around food access, transportation (Prevention Alliance language)	**1**
Awareness of risk factors with providers & patients & common diag. code	**1**
Guidelines / recommendations for SNAP benefits	**1**
Community of practice for DPP coaches along with community health workers	**1**
Focus on funding for high risk people with diabetes complications	**1**
Require disability competent care	**1**
Expand access to urgent care, inside and outside of emergency departments	**1**
Public health awareness campaign (cardio vascular) risk to diabetes management, targeting high risk communities	**1**
Appropriate access to primary care. Address lack of access to care for people with Medicaid	**1**

Following the Summit, the DEAR Team chose five of the top nine stakeholder recommendations on which to complete an economic analysis and/or literature review. These five recommendations were chosen based on the DEAR Team's judgment of priority, feasibility, and potential cost. The subsequent analyses can be found in Appendix 5.

Participants at the Stakeholder Summit were asked to complete a meeting evaluation so that they could provide their opinion of how it was executed, if they felt their organization's voice was heard, and any other thoughts or ideas they wanted the DEAR group to be aware of. The results from this evaluation are as follows:

Table 48: Stakeholder Summit Ranking Questions

Question	Avg Score (5 = highest)
Was this a valuable use of your time?	4.8

Appropriateness of the content for the amount of time allowed.	4.4
How valuable was this meeting for policy discussions & networking?	4.5
Effectiveness of your small group session.	4.6
How well do you think your input & organization's voice was heard & valued?	4.8
Overall, how would you rate this summit?	4.7
Total average rating of the Summit	**4.6**

Table 49: Answers to, "If available, what future information about the report would you like to receive before it is published?"

Thank you! Looking forward to the opportunity to review the draft.
Key data summaries; final policy recommendations with action steps
Participants.
A summary of the top priorities – including the nuanced detail & assumptions attributed to them
Hope to see a written summary with policy rec's and priorities (dots). Data - would like to see the background data report (not the actual data). Interested in seeing the way the issues are characterized before report is final.
Emerging data; emerging economic analysis of options
Draft report with enough time to have feedback incorporated; In advance of the full draft, specific sections sent to content experts for in-depth
Yes, It will be good to receive the report about today's meeting.
Would be happy to look at the interim product. Recommendations, draft & report, additional data.
The review of a health economist – that is more information re: how our recommendations – if translated into policy – would work. So that we could get a handle on who really makes the most sense to invest in.
I am not sure.
Would love to see drafts or participant in further discussion.
I would be happy to review and share feedback. Definitely look forward seeing this report.
I appreciate the format and the preparation for group #1 was especially impressed with the assembly of stakeholders.
Being new to Washington, this summit helped me realize that WA state is proactive in DM health care and stakeholders do have a voice! I feel this is the most healthy approach to making guideline laws.
The data and recommendations.
This was a valuable, important, experience for sharing information, experiences & ideas to improve diabetes prevention & care. Thank you!
The data and final recommendations. Basically the whole report. :)
I am on the DEAR steering committee - assume I will have access to the information as we complete our work.
I enjoyed talking to people from other sectors and learning about their experiences. That is the way I learn best.

Table 50: Answers to, "Is there something you would have done differently to gather stakeholder input?"

This always seems sort of corny at meetings (and time consuming) but brief introductions would be helpful. Thank you for including local public health! :)
I am not sure.
Those of us representing the agencies - DOH/HCA/DSHS - must be urged not to dominate the conversation. This happened at my table. Also There were a few items put on the flip chart that were not discussed in my small group. That should not have happened. The presenter from DSHS - while she knew her data was not clear. The information not that useful as presented for this group & she needed to be a little more energetic.
I would not have ended early. Small group ' following large group sharing may have elicited other insights.
Our team needed more time to synthesize (combine) common ideas / suggestions; I have real issues inviting pharma to the meeting
It was well organized, congratulations!
No. Excellent summit.
Directions with yellow vs. green dots could have been slightly clearer. In general, facilitation was great.
Not sure pretty good many topics not covered, school nurses etc?
More introductions to participants.
No, this was great.
Prioritize in general categories; understand DEAR will do this but nice to know as decisions are made; Group like recommendations
No.
I would suggest adding an additional step to the small group discussion - combining the various ideas that overlapped, so it would be easier to go around the different groups and prioritize.
I would have allowed for groups to combine similar policy recommendations (asked) into common policy theme before voting – 4 votes (or 5? Each group)
I would like a segment to clarify goals/ outcomes before brainstorming policies. What is the "so what" for each segment / group?
Background on participants, existing programs barriers / limitations / issues
Coffee in the morning :)
Sara Eve and the team - you did a great job at the stakeholder engagement. My table was activity engaged.
I would recommend stakeholder to include health care provider.
No, well done.

Table 51: Answers to, "Do you have any additional thoughts or comments that the DEAR group should take into consideration when developing policy recommendations for the legislature?"

I wonder if it would be helpful to contract the assessment section @ PHSKC re: mapping. King County has such significant disparities but the maps seemed to Reflect "better than average" by calling out North King County.
Not at this time.

Please keep in mind the importance of language access for non-Spanish speaking. Thank you for disaggregating Asians & pacific islanders.
Think big. How do you make it easier for people to live healthy lives in general? (built environment, food system, etc…) Add established clinical screening guidelines for prediabetes & diabetes. The mental health connection with diabetes diagnosis is profound - don't let that get lost. Really need to separate Type I & Type II diabetes data
Good luck, I don't think the legislature will devote additional dollars, without cutting other programs to fund it. I would see this solution, if chosen as unwise.
I would like a copy of presentation slides shared during the meeting.
The idea for reimbursing community health workers included funding peer educators and lifestyle coaches - I would integrate this with Nancy Lee's Social Marketing Techniques. How are you coordinating with a healthy built environment? Schools? Recreation Facility?
Were all stakeholders represented in the group? Providers? ADA? Great meeting should be repeated.
Good meeting, thanks the chance to participate.
Much discussion about culturally relevant support - would also emphasize - support, reimbursement for rural populations. Thank you and great work!
Be inclusive. Keep in mind health
Be sure overall context is clear. Diabetes is much more than just Medicaid, HCA, PEBB, DSHS and DOH.
Mr. Perry noted the 'take away' that a legislative might have when looking at a data slide that was shown - and it wasn't the intended message. It was a good reminder that information for the legislature needs outside review. And review from the people the experience communicating to legislators.
Just keep everyone in the loop with outcomes/actions/changes as the year progresses. Thank you!
Great group, thank you for the opportunities.
Case management/coaching/ community health workers/ peer educators - incorporating evidence -based models involving these providers is essential & addressing wrap around services (i.e. nutrition, physical activity, oral health, behavioral health, etc…)
I will continue to share these - Thank you.

Later, all stakeholders who were invited to the Summit were given an opportunity to review and provide feedback on the main body of this report (Sections 1-5). A draft copy of the report was sent to them via email on October 30, 2014. To help guide their review, a feedback form was also included with the report (Figure 3). Stakeholders were given one week to review the report and provide feedback.

Figure 3: Diabetes Epidemic and Action Report Stakeholder Feedback Form

Report Feedback Form

DRAFT Washington State Diabetes Epidemic & Action Report, 2014

Thank you for your participation in the April 23 Stakeholder Summit in Kent, Washington. We have done our best to incorporate your thoughts and suggestions into the goals and recommended actions of the report. To help guide your review, below are a few questions we'd like you to consider.

Please keep in mind that:

- This is a working draft. Tables, charts, and data may change slightly in the final document. Also, there are some highlighted areas that will be addressed later.
- We have not included the Appendices for your review. They contain 130+ pages of supporting information and data that need to be further verified and vetted by leadership before they can be publicly released. As promised, a full description of the Stakeholder Summit and additional suggested recommendations from that day are included in the appendix.
- While we look forward to hearing your comments and value your feedback, we may not be able to accommodate all suggestions or edits.
- We recognize the importance of this report beyond use by the legislature. For this reason, our team intends to create a plan for the full finalized report to be further distributed in 2015.

Does the report accurately portray the population of Washington with regard to diabetes? Please state Yes or No, and feel free to add additional comments below.

There are 9 Goals in the report. Currently, they are in no particular order. We would like your feedback on what order they should be in. Please write numbers 1-9 (1 = first, 9 = last) next to each goal below, indicating which order you think they should appear in.

#	Goal
	Ensure all appropriate populations have access to the Diabetes Prevention Program to in Washington.
	Ensure all people with diabetes receive self-management education from Diabetes Education Programs
	Ensure all appropriate populations have access to Chronic Disease Self-Management Education Programs in Washington
	Enhance care coordination for people with both diabetes and mental illness
	Ensure people with diabetes and gum disease have access to guideline-based oral health treatment
	Support the Plan for a Healthier Washington's investment in Analytics, Interoperability & Measurement
	Ensure involvement of Community Health Workers to address diabetes in populations with the greatest needs
	Increase access to safe and affordable physical activity where people work, learn, live, play and worship across the lifespan
	Increase access to healthy foods and beverages where people work, learn, live, play and worship

Does the report meet your expectations? If not, what critical pieces would you change?

Do you have any other comments or suggestions?

If you would like to provide review, please complete this feedback form and
Email it to **Lanae.Caulfield@doh.wa.gov** by **COB Friday, November 7, 2014**.
Your feedback is very valuable to the direction of diabetes care in Washington State. Thank you!

Feedback was received from the following organizations:

- Allergan Pharmaceuticals
- Autoimmune Advocacy Alliance
- Clallam County Health and Human Services
- ConnecT1D
- Department of Health Surveillance and Evaluation Section
- Novo Nordisk Pharmaceuticals
- Qualis Health
- Trios Health
- Washington Dental Service Foundation
- Washington Health Alliance
- Washington State Commission on Asian Pacific American Affairs
- Washington State Governor's Office
- Washington State Office of Financial Management
- Washington State University

The results from the stakeholder feedback proved to be very helpful in assuring that this report is as comprehensive as possible. Where possible and within the scope of the report, the feedback was incorporated by the DEAR Team. When feedback fell outside the scope of the report, we encouraged those organizations to participate in the statewide Diabetes Network Leadership Team to continue to raise the issues that are important to them.

Appendix 7: Data Sources & Technical Notes

Data Sources

Statewide:

Washington State Behavioral Risk Factor Surveillance System (BRFSS) Data: 1987–2012. Olympia, Washington: Washington State Department of Health, under federal cooperative agreement numbers: U58/CCU002118 (1987–2003), U58/CCU022819 (2004–2008), U58 DP001996 (2009–2010), or U58/SO000047 (2011–2012).

United States Behavioral Risk Factor Surveillance System: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC). Atlanta, Georgia, [1993–2012].

Washington Hospital Discharge Data, Comprehensive Hospitalization Abstract Reporting System (CHARS) 1987–2012, Washington State Department of Health, Center for Health Statistics, July 2013.

Oregon State Hospital Discharge Data 1987–1999. Office for Oregon Health Policy and Research.

Oregon State Hospital Discharge Data 2000–2012. Nationwide Inpatient Sample (NIS), Healthcare Cost and Utilization Project (HCUP), Agency for Healthcare Research and Quality.

Washington State Death Certificate Data: Washington State Department of Health, Vital Registration System Annual Statistical Files, Deaths 1980–2012, released September 2013.

Washington State Birth Certificate Data: Washington State Department of Health, Vital Registration System Annual Statistical Files, Births 2003-2012.

Washington State population counts: 2000 and 2010 U.S. Census and 2001–2009 intercensal and 2011–2012 post-censal estimates, Washington State Office of Financial Management, Forecasting Division (OFM), released January 2014; 1990 U.S. Census and 1991–1999 OFM intercensal estimates, Vista Partnership and Krupski Consulting, released October 2007; 1980 U.S. Census and 1981–1989 OFM intercensal estimates.

Washington State population by poverty and educational attainment: 2012 US Census American Community Survey 5-year summary files (2008-2012), poverty from Table B17001 and education from Table B15002.

Populations Covered by Medicaid Programs:

Information on Medicaid populations is provided from the following data sources contained in the DSHS Integrated Client Database (ICDB), linked at the client level:

- ProviderOne Operational Data Store (P1 ODS). The P1 ODS contains Medicaid enrollment and health service data from paid claims processed through the State's Medicaid Management Information System (MMIS), and from encounter data submitted by medical and behavioral health managed care organizations (Regional Support Networks).
- Medicare claims and encounters. For persons dually enrolled in Medicaid and Medicare ("dual eligibles"), the ICDB contains diagnosis and pharmacy information from Medicare Part A, B and D claims and encounters for the time period used for this report.
- Social Service Payment System (SSPS). SSPS was used to identify costs and utilization of home- and community-based long-term services and supports funded through the DSHS Aging and Long-Term Services Administration.
- TARGET substance use disorder treatment data system. TARGET provides substance use disorder (SUD) service utilization and cost data to supplement SUD service data processed through the ProviderOne payment system.
- CARE assessment data. For persons receiving home- and community-based long-term services and supports funded through the DSHS Aging and Long-Term Services Administration, CARE assessment data helped identify the prevalence of diabetes diagnoses in the study population.

In addition, National Health and Nutrition Examination Survey (NHANES) data were used to develop synthetic prevalence estimates (methods described in technical notes) in cases where direct estimation from Medicaid and Medicare health service and assessment data was not feasible.

Populations Covered By Public Employees Benefits Board Programs:

Uniform Medical Plan 2013 claims data from Public Employees Benefits Board Managed Care source claims database.

Technical Notes

Age-adjustment. Age-adjustment is a statistical process applied to rates or proportions of disease, death, or other health outcomes which allows populations with different age structures to be compared. Age confounding occurs when the two populations being compared have different age distributions and the risk of the disease or outcome varies across the age groups. The process of age-adjustment by the direct method changes the amount that each age group contributes to the overall rate or proportion in each population, so that the overall rates or proportions are based on the same age structure. Rates and proportions that are based on the same age distribution can be compared to each other without the presence of confounding by age.

Adjustment is accomplished by first multiplying the age-specific rates or proportions of disease by age-specific weights. The weights used in the age-adjustment of data in this report are the proportion of the 2000 US population within each age group. The weighted rates or proportions are then summed across the age groups to give the age-adjusted rate or proportion.

Confidence Intervals. Sometimes called the "margin of error." Confidence intervals account for the differences in estimates that are due to random factors or chance. 95 percent confidence intervals are typically expressed as a range between an upper and lower value which will contain the population or "true" prevalence 95 percent of the time.

Discontinuity in BRFSS trend. The addition of cell phone data and the new raked weighting method in the 2011 BRFSS are expected to result in more accurate estimates of health behaviors. The estimates are expected to shift as a result of these improvements. Special analysis to assess the effect of change in BRFSS methodology in 2011 indicate that the age-adjusted percent of adults with diabetes increased slightly from 8 percent using older methods to 9 percent using newer methods. Health estimates from 2011 (and beyond) should not be compared directly to those from 2010 (and earlier). This limits our ability to observe annual trends that cross 2010 and 2011.

Disease condition comorbidity codes used in Medicaid analysis. The prevalence of disease condition comorbidities among populations covered by Medicaid programs were classified using the Chronic Illness and Disability Payments System (CDPS) disease groups listed below. For more information about the CDPS see http://cdps.ucsd.edu/.

CDPS DISEASE GROUP	SAMPLE DIAGNOSES
Cancer, very high	Pancreatic cancer, secondary malignant neoplasms, multiple myeloma
Cancer, high	Lung cancer, ovarian cancer
Cancer, medium	Mouth, breast or brain cancer, malignant melanoma
Cancer, low	Colon, cervical, or prostate cancer, carcinomas in situ
Cardiovascular, very high	Heart transplant status/complications
Cardiovascular, medium	Congestive heart failure, cardiomyopathy
Cardiovascular, low	Endocardial disease, myocardial infarction, angina
Cardiovascular, extra low	Hypertension
Cerebrovascular, low	Intracerebral hemorrhage, precerebral occlusion
CNS, high	Quadriplegia, amyotrophic lateral sclerosis
CNS, medium	Paraplegia, muscular dystrophy, multiple sclerosis
CNS, low	Epilepsy, Parkinson's disease, cerebral palsy, migrane
DD, medium	Severe or profound mental retardation
DD, low	Mild or moderate mental retardation, Down's syndrome
Eye, low	Retinal detachment, choroidal disorders
Eye, very low	Cataract, glaucoma, congenital eye anomaly
Genital, extra low	Uterine and pelvic inflammatory disease, endometriosis
Gastro, high	Peritonitis, hepatic coma, liver transplant
Gastro, medium	Regional enteritis and ulcerative colitis, enterostomy
Gastro, low	Ulcer, hernia, GI hemorrhage, intestinal infectious disease
Hematological, extra high	Hemophilia
Hematological, very high	Hemoglobin-S sickle-cell disease

Hematological, medium	Other hereditary hemolytic anemias, aplastic anemia
Hematological, low	Other white blood cell disorders, other coagulation defects
AIDS, high	AIDS, pneumocystis pneumonia, cryptococcosis
HIV, medium	Asymptomatic HIV infection
Infectious, high	Staphylococcal or pseudomonas septicemia
Infectious, medium	Other septicemia, pulmonary or disseminated candida
Infectious, low	Poliomyelitis, oral candida, herpes zoster
Metabolic, high	Panhypopituitarism, pituitary dwarfism
Metabolic, medium	Kwashiorkor, merasmus, and other malnutrition, parathyroid
Metabolic, very low	Other pituitary disorders, gout
Psychiatric, high	Schizophrenia
Psychiatric, medium	Bipolar affective disorder
Psychiatric, medium low	Major recurrent depression
Psychiatric, low	Other depression, panic disorder, phobic disorder
Pulmonary, very high	Cystic fibrosis, lung transplant, tracheostomy status
Pulmonary, high	Respiratory arrest or failure, primary pulmonary hypertension
Pulmonary, medium	Other bacterial pneumonias, chronic obstructive asthma
Pulmonary, low	Viral pneumonias, chronic bronchitis, asthma, COPD
Renal, extra high	Hypotension of hemodialysis, dialysis catheter infection
Renal, very high	Chronic renal failure, kidney transplant status/complications
Renal, medium	Acute renal failure, chronic nephritis, urinary incontinence
Renal, low	Kidney infection, kidney stones, hematuria, urethral stricture
Skeletal, medium	Chronic osteomyelitis, aseptic necrosis of bone
Skeletal, low	Rheumatoid arthritis, osteomyelitis, systemic lupus
Skeletal, very low	Osteoporosis, musculoskeletal anomalies
Skin, high	Decubitus ulcer
Skin, low	Other chronic ulcer of skin
Skin, very low	Cellulitis, burn, lupus erythematosus
Substance abuse, low	Drug abuse, dependence, or psychosis
Substance abuse, very low	Alcohol abuse, dependence, or psychosis

Hospital discharge data statewide. These data do not include hospitalizations for Washington residents from U.S. Department of Veterans Affair Hospitals (VA), federal hospitals (e.g., Bremerton, Madigan, Oak Harbor), or out-of-state hospitals in Idaho serving Washington residents of border counties. If these hospitalizations were added, the count of hospitalizations with diabetes would be larger. Data from Oregon hospitals serving Washington residents of border counties are included.

Identification of diabetes using claims, encounter, and assessment data. The presence of diabetes was identified using the following diagnosis and pharmacy codes.

Diagnosis codes for diabetes using International Classification of Disease Codes, Clinical Modification: ICD-9-CM diagnosis codes 250.00-250.93.

Diagnosis and pharmacy codes for diabetes from the Chronic Illness and Disability Payment System (CDPS) diagnostic classification system.

Diagnosis Disease Category	Description	Sample Diagnoses
DIA1H	Diabetes, type 1 high	Type 1 diabetes with renal manifestations/coma
DIA1M	Diabetes, type 1 medium	Type 1 diabetes without complications
DIA2M	Diabetes, type 2 medium	Type 2 or unspecified diabetes with complications
DIA2L	Diabetes, type 2 low	Type 2 or unspecified diabetes without complications

Prescription Disease Category	Description	Summary Drug Descriptions
MRX10	Diabetes	Hypoglycemics, insulin

Incidence and Prevalence. Incidence expresses the frequency of a new event of disease or death. Measures of incidence represent the number of new events occurring in a defined population over a specified period of time, typically divided by the population at risk for that event over that time. Incidence helps describe the risk of developing any new health- or disease-related event. Prevalence expresses the frequency of existing cases of disease or other conditions. Measures of prevalence represent the number of cases (new and existing) in a given population at a certain time or period. Prevalence helps describe the magnitude of current health problems.

International Classification of Diseases Codes. The International Classification of Diseases (ICD) codes are used to classify diseases and other health problems recorded on many types of health and vital records, including death certificates and health records. In this report, the ICD Clinical Modification (ICD-9-CM) below were used to code and classify morbidity data from inpatient and outpatient records. The ICD-10 were used to code and classify mortality data from death certificates. Additional information on these codes from the National Center for Health Statistics can be found here: http://www.cdc.gov/nchs/icd.htm.

Morbidity: ICD-9-CM Diagnosis Codes

Diabetes: 250.00-250.93

Gestational Diabetes: 648.80-648.84

Diabetes Short-Term Complications: 250.10-250.33

Diabetes Long-term Complications: 250.40-250.93

Uncontrolled Diabetes: 250.02, 250.03

Non-Traumatic Lower Extremity Amputation:

- Inclusion: 84.10, 84.12-84.19 (procedure codes)

- Exclusion: 84.11 (procedure code), 895.0-897.7 (traumatic amputation of lower extremity diagnosis codes)

Coronary Heart Disease: 410-414, 429.2

Stroke: 430-434, 436-438

Pneumonia or Influenza: 480-487

Lower Extremity Condition:

- Peripheral Arterial Disease (PAD): 250.7, 440.2, 442.3, 443.8-443.9, 444.22
- Ulcer/Inflammation/Infection: 454, 707.1, 680. 6-680.7, 681.1, 682.6-682.7, 711.05-711.07, 730.05-730.07, 730.15-730.17, 730.25-730.27, 730.35-730.37, 730.85-730.87, 730.95-730.97, 785.4
- Neuropathy: 337.1, 357.2, 355, 358.1, 713.5, 094.0, 250.6

A full description of the ICD-9-CM codes can be found here: http://www.cms.gov/medicare-coverage-database/staticpages/icd-9-code-lookup.aspx.

Mortality: ICD-10 Diagnosis Codes

Diabetes: E10-E14

A full description of the ICD-10 codes can be found here: http://apps.who.int/classifications/icd10/browse/2015/en.

Race and Hispanic Origin. U.S. federal government agencies must adhere to standards issued by the Office of Management and Budget (OMB), which specify that race and Hispanic origin (also known as ethnicity) are two separate and distinct concepts. These standards generally reflect a social definition of race and ethnicity recognized in this country, and they do not conform to any biological, anthropological, or genetic criteria. Additional information on these standards is available at: http://www.whitehouse.gov/omb/fedreg_1997standards/.

The 1997 OMB guidelines specify federal agencies to use a minimum of two ethnicities in collecting and reporting data: Hispanic or Latino and Not Hispanic or Latino. OMB defines "Hispanic or Latino" as a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race. Data on Hispanic ethnicity must be collected separately from data on race.

OMB guidelines specify a minimum of five racial categories in collecting and reporting data. It also allows for reporting of more than one race in collecting and reporting data. The five categories are:

- White – A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

- Black or African American – A person having origins in any of the Black racial groups of Africa.
- American Indian or Alaska Native – A person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment.
- Asian – A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- Native Hawaiian or Other Pacific Islander – A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

In 2011, the U.S. Department of Health and Human Services issued guidelines for data collection under the Affordable Care Act. These guidelines specify collecting subpopulation detail for Asian and Native Hawaiian or Other Pacific Islander groups instead of information on the larger groups. The guidelines also provide direction on aggregating to larger groups. The new guidelines are used in some federal and state data collection systems, but not all. Additional information on these new standards is available at: http://minorityhealth.hhs.gov/omh/browse.aspx?lvl=2&lvlid=23.

Even when data is collected according to federal guidelines, small numbers and lack of population counts limit the ability to present reliable data for Asian and Native Hawaiian or Other Pacific Islander subgroups and for people reporting more than one racial group. For additional information, see the Washington State Department of Health Guidelines for Using Racial and Ethnic Groupings in Data Analysis at http://www.doh.wa.gov/Portals/1/Documents/5500/RaceEthnGuidelines.pdf.

Small Numbers. Statistical estimates developed when there are few events or when the population in which the events occurred is relatively small risk breaching confidentiality. Additionally, interpreting data based on few survey respondents or a small number of events can be difficult, because random fluctuation can be relatively large, and make estimates unreliable. This instability makes it difficult to use estimates based on small numbers for program planning or policy development. Considerable caution should be used in interpreting any data where the number of events is small.

To ensure confidentiality and to provide relatively stable estimates, where possible, years of data may be combined to increase the numbers of events or survey respondents for subpopulations, such as when presenting data by race, income, education or county. But even when years of data are combined, some subgroup data are too few to obtain reliable estimates.

For data that capture nearly all events in a population (hospitalizations, deaths, or births), statistical estimates are only presented for subpopulations (such as county or race group) with a minimum of about 20 events. Survey data, in which a sample of the population represents the

population as a whole, are presented only if the relative standard error (RSE) is ≤ 30 percent. The RSE is the standard error of the estimate divided by the estimate and multiplied by 100. For additional information, see the Washington State Department of Health Guidelines for Working with Small Numbers at http://www.doh.wa.gov/Portals/1/Documents/5500/SmallNumbers.pdf.

Synthetic estimation approach used in Medicaid analysis. Synthetic estimation is a statistical technique that produces "small area" population prevalence estimates by using information from larger population areas. The NHANES contains national survey data on the prevalence of type 1 and 2 diabetes, undiagnosed diabetes, and prediabetes. Age, gender, race/ethnicity, income and health insurance status information from the NHANES was used, along with population weights from the April 2014 Washington State Medicaid caseload, to estimate the prevalence of those without a history of diagnosed diabetes and with prediabetes.

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