The Cost of Eight Chronic Conditions on Alaska's Medicaid Program

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Executive Summary

In February 2017, the Chronic Disease Prevention and Health Promotion (CDPHP) Section of the Division of Public Health engaged Evergreen Economics to estimate the cost to Alaska's Medicaid program of eight chronic conditions: cancer, diabetes, heart disease, injuries from falls, obesity, opioid abuse, stroke, and tobacco use. Evergreen Economics analyzed claims level data contained in the Medicaid Management Information System (MMIS) for fiscal year (FY) 2016 to identify Medicaid beneficiaries with each of the eight chronic conditions. We found that there were more than 18,000 adult Medicaid beneficiaries with one or more of the eight chronic conditions.

In addition to examining the cost of the eight chronic conditions, CDPHP requested Evergreen Economics to examine potential cost savings to the Medicaid program associated with diabetes self-management education (DSME).

Key Findings

- Only 10 percent of all Medicaid beneficiaries received treatment for one or more of the eight chronic conditions in FY2016.
- Nearly all (97%) of the Medicaid beneficiaries treated for one or more of the eight chronic conditions were adults 18 years of age or older.
- The likelihood that a Medicaid beneficiary is treated for one or more of the eight chronic conditions increases with age.
- The prevalence of being treated for one of the eight chronic conditions peaks at around 80 years of age at about 40 percent.
- Heart disease, tobacco use, and diabetes are the most prevalent of the eight chronic conditions.
- Adult beneficiaries treated for one of the eight chronic conditions represent only 18 percent of all adult Medicaid beneficiaries, but account for 47 percent of spending on Medicaid services for adults ($565 million of $1.2 billion).
- An adult beneficiary diagnosed with one or more of the eight chronic conditions incurred on average $30,000 in Medicaid services in FY2016.
- An adult beneficiary *not* diagnosed with any of the eight chronic conditions incurred on average $7,700 in Medicaid services in FY2016.
- On a per-beneficiary basis, the most expensive chronic conditions in FY2016 were strokes ($60,487) and injuries from falls ($81,009).

- Adult beneficiaries with heart disease alone or in combination with one or more of the other seven chronic conditions accounted for $330 million in Medicaid spending in FY2016.
- About 42 percent of adult Medicaid beneficiaries treated for any of the eight chronic conditions were treated for multiple chronic conditions.
- Findings from peer-reviewed research studies indicate that DSME programs lead to net savings in the cost of medical services.
- A DSME program could lead to net savings to the Medicaid program of about $1,900 per adult beneficiary in FY2018.
- If all working-age adult Medicaid beneficiaries with diabetes participated in DSME, the Alaska Medicaid program could save about $12 million in total spending and $4 million in state general fund spending in FY2018.

Recommendations

1. **Monitor trends in utilization and spending on Medicaid services by beneficiaries diagnosed as having one or more chronic conditions.**

   The only way to truly understand the extent to which chronic conditions are impacting Alaska's Medicaid program is repeated measurement. We recommend that the Alaska Department of Health and Social Services (DHSS), on a quarterly basis, analyze utilization and spending on Medicaid services by beneficiaries diagnosed as having one or more of the eight chronic conditions. While this recommendation would require an ongoing commitment by DHSS, it is relatively straightforward to query the MMIS by diagnosis code, to extract spending and other data, and to analyze the data and generate meaningful reports for DHSS leaders.

2. **Conduct a longitudinal analysis of a random sample of Medicaid beneficiaries diagnosed as having one or more chronic conditions.**

   We recommend DHSS randomly choose a sample of adults diagnosed in FY2016 with one or more of the eight chronic conditions, as well as a control group of adults with similar demographic characteristics that were not diagnosed with any of the eight chronic conditions in FY2016. Then, using FY2016 as a baseline, on a quarterly basis, track Medicaid enrollment, utilization and spending on Medicaid services, and diagnosis of chronic conditions for each beneficiary in the sample. The results of the longitudinal study, which would maintain the anonymity of each beneficiary, would inform DHSS leadership about many of the effects that chronic conditions have on the Medicaid program, including the ways in which chronic

conditions affect utilization and spending on Medicaid services, the persistence of each chronic condition, and changes in the prevalence of co-chronic conditions.

3. **Integrate diabetes self-management education (DSME) into the Medicaid program.**

   We believe there is sufficient evidence from peer-reviewed studies and this analysis to suggest that Alaska's Medicaid program could achieve cost savings through the implementation of a DSME program. We recommend that the State of Alaska consider making DSME a covered benefit for all adult beneficiaries with diabetes. We also recommend that CDPHP continuously evaluate the DSME program to demonstrate the value of DSME in reducing the cost of providing Medicaid services to beneficiaries with diabetes. Continuous evaluation would not require a complex experimental design (e.g. randomized control trial), but rather analysis on a quarterly basis (similar to Recommendation 2) of spending on participants receiving or who received DSME and a comparison group of beneficiaries who have not received DSME. While there is potential self-selection bias with this approach, its effect on the analysis can be minimized.

4. **Analyze potential cost savings from chronic disease self-management programs (CDSMP) for chronic conditions with significant cost impacts to the Alaska Medicaid program.**

   In this report, we only consider potential cost savings associated with diabetes self-management. We recommend CDPHP consider analyzing potential cost savings associated with self-management of heart disease, tobacco use, opioid abuse, obesity, and possibly other chronic conditions (either considered in this report or not).

1 Introduction

In this report, Evergreen Economics presents the results of our analysis of the costs of health services provided to Medicaid beneficiaries who have one or more of the following eight chronic health conditions: cancer, diabetes, heart disease, injuries from falls, obesity, opioid abuse, stroke, and tobacco use. It is our understanding that, while the Chronic Disease Prevention and Health Promotion (CDPHP) Section of the Division of Public Health is concerned with a wider array of chronic conditions affecting Medicaid beneficiaries and other Alaskans, it is particularly interested at this time in understanding the cost implications associated with these eight chronic conditions.

Alaska Medicaid reimburses hospitals, physicians, and other healthcare providers for providing healthcare services to Medicaid beneficiaries. In Alaska, Medicaid operates as a fee-for-service program, meaning that it reimburses (pays) providers per unit of service provided according to established rates of payment. Generally speaking, Alaska's healthcare system, like healthcare systems across the U.S., was organized to provide acute medical care.[1] However, throughout the U.S., increasing numbers of people suffer from one or more chronic diseases or conditions that require ongoing medical care along with educational programs and training to assist them in managing their chronic condition(s) (Boren et. al, 2009; de Bruin et. al, 2011; Freeman et. al, 2011).

Among medical professionals, there appears to be significant variation in the use of the term 'chronic conditions.'[2] The U.S. National Center for Health Statistics defines chronic conditions as diseases or other medical conditions lasting three months or more.[3] Based on data for 2012, the Centers for Disease Control and Prevention (CDC) reports that about half of adults in the U.S. had at least one chronic condition and that seven of the top 10 causes of death in 2010 were the result of chronic conditions.[4] Ward and Black (2016) report that nearly 26 percent of U.S. adults have at least two chronic conditions, but that in Alaska, the prevalence of adults with multiple chronic conditions is only 19.6 percent—among the lowest nationally.[5]

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[1] National Research Council (US); Institute of Medicine (US); Woolf SH, Aron L, editors. *U.S. Health in International Perspective: Shorter Lives, Poorer Health*. Washington, DC: National Academies Press (US); 2013. 4, Public Health and Medical Care Systems. Available from: https://www.ncbi.nlm.nih.gov/books/NBK154484/

[2] Bernell, B. and S. Howard, "Use Your Words Carefully: What is a Chronic Disease?" Frontiers in Public Health. 2016; 4: 159. Published online 2016 Aug 2. doi: http://dx.doi.org/10.3389%2ffpubh.2016.00159 (accessed April 17, 2017).

[3] National Health Council. "About Chronic Conditions." http://www.nationalhealthcouncil.org/newsroom/about-chronic-conditions

[4] Centers for Disease Control and Prevention. "Chronic Disease Prevention and Health Promotion." https://www.cdc.gov/chronicdisease/overview/index.htm

[5] Ward BW, Black LI. "State and Regional Prevalence of Diagnosed Multiple Chronic Conditions Among Adults Aged ≥18 Years — United States, 2014." MMWR Morb Mortal Wkly Rep 2016;65:735–738. DOI: http://dx.doi.org/10.15585/mmwr.mm6529a3.

The Centers for Medicare & Medicaid Services (CMS) define 27 chronic conditions, as well as 33 conditions referred to as *other chronic or potentially disabling conditions*.[6] For this study, we followed the CMS definition for seven of the eight chronic conditions we analyzed, some of which included more than one CMS chronic condition. The exception, opioid abuse, is not included in the CMS list of 27 chronic conditions. Table 1 lists the eight chronic conditions we analyzed in this report and (where applicable) the CMS chronic conditions categories that define the diagnosis codes that indicate the chronic condition.

Table 1: Chronic Conditions Considered in This Study

Chronic Condition	CMS Chronic Condition Categories
Cancer	Breast, Colorectal, Lung, Prostate, and Endometrial Cancer, Leukemias and Lymphomas
Diabetes	Diabetes (Type 1 or Type 2)
Heart Disease	Atrial Fibrillation, Acute Myocardial Infarction, Hypertension, Heart Failure, and Ischemic Heart Disease
Injuries from Falls	Hip/Pelvic Fracture, Spinal Cord Injury
Obesity	Obesity
Opioid Abuse	Not a CMS chronic disease; determined based on ICD-9 and ICD-10 descriptions
Stroke	Stroke/Transient Ischemic Attack
Tobacco Use	Tobacco Use

The remainder of the report is organized into three related, but largely stand-alone chapters:

- In Chapter 2, we examine data from an annual household survey administered each year by the Division of Public Health. We estimate the proportion of adults with each of the eight chronic conditions listed in Table 1 segmented by those who are Medicaid eligible and those who are not Medicaid eligible.
- In Chapter 3, we analyze Medicaid claims data to identify Medicaid beneficiaries that had paid Medicaid claims that included a diagnosis code indicating the beneficiary received treatment for one or more of the eight chronic conditions listed in Table 1.
- In Chapter 4, we estimate potential savings to the Medicaid program associated with providing diabetes self-management education programs to those Medicaid beneficiaries with diabetes.

[6] Chronic Conditions Data Warehouse. https://www.ccwdata.org/web/guest/condition-categories

2 Self-Reported Prevalence of Chronic Conditions in Alaska

We analyzed data from the 2014 Behavioral Risk Factor Surveillance System (BRFSS) survey that the Division of Public Health conducts each year, in order to develop estimates of the prevalence of the eight chronic conditions among all Alaska adults as well as among Alaska adults who, based on their responses to specific survey questions, appear to be eligible for Medicaid (but are not necessarily enrolled).[7]

The BRFSS survey is a statewide household telephone survey that collects detailed demographic, household, and health-related information on Alaskans 18 years of age or older.[8] Among the myriad of survey questions are ones that allow us to determine or predict whether an adult respondent is eligible for Medicaid. Specifically, adult respondents are asked their age, the number of other adults living in the home, the presence and ages of any dependent children living in the home, household income, and disability status. These are key factors that determine if an Alaska adult is eligible for Medicaid;[9] based on an individual's responses to these questions, we categorized the individual as being either Medicaid eligible or not-Medicaid eligible.[10]

Table 2 shows the self-reported prevalence among working-age Alaskans (18-64) for eight chronic conditions. We stratified the data based on a respondent's (self-reported) eligibility for Medicaid and tested whether the prevalence of each chronic condition is statistically significantly different between the Medicaid eligible and not-Medicaid eligible populations.[11] We found that there is not a statistically significant difference in the prevalence of cancer and heart disease between working age adults who are eligible and those who are not eligible for Medicaid. However, we found that working-age adults who

[7] Data from the 2016 BRFSS survey for Alaska have not been released. Initially, we planned to analyze data from the 2015 BRFSS survey; however, questions about injuries from falls were not asked in the BRFSS survey that year.

[8] The BRFSS survey is not unique to Alaska; it is conducted in all 50 states.

[9] A reviewer pointed out that our identification of Medicaid eligibility did not include assessments of the person's assets (the BRFSS asks limited questions about assets). Thus, some persons we identified as being Medicaid eligible may not be due to the value of certain assets. Nevertheless, our intent is not to predict the proportion of Alaska adults who are Medicaid eligible, but rather to categorize adults into those who may be Medicaid eligible and those who appear to not be Medicaid eligible in order to then compare prevalence of the eight chronic conditions.

[10] The 2014 BRFSS survey did ask about health insurance coverage; however, from our experience working with BRFSS survey data, it is clear that many respondents confused Medicaid and Medicare. In addition, some respondents stated that they do not know if they had health insurance, while others reported that they had health insurance, but did not know what type of insurance it was (e.g. Medicaid, employer provided, etc.).

[11] Testing was done using a t-test, which is a test of differences of means (averages). We tested with a 0.05 level of significance, which equates to a 95 percent level of confidence.

are Medicaid eligible do have a higher prevalence of the six other chronic conditions (diabetes, injuries from falls, obesity, tobacco use, drug abuse,[12] and stroke) than working-age adults who are not Medicaid eligible.

Table 2: Self-Reported Prevalence of Eight Chronic Conditions Among Working-Age Alaska Adults

Chronic Condition	Medicaid Eligible Adults	Not-Medicaid Eligible Adults	Difference (Percentage Points)	t-Test Value	Statistically Significantly Different?*
Cancer	5.2%	5.3%	-0.1	-0.12	No
Diabetes	7.5%	4.7%	2.8	2.82	**Yes**
Heart Disease	14.8%	12.9%	1.9	1.26	No
Injuries from Falls	8.8%	4.7%	4.2	4.18	**Yes**
Obesity	31.6%	27.4%	4.2	2.10	**Yes**
Drug Abuse[13]	43.8%	30.1%	13.7	6.66	**Yes**
Stroke	2.4%	1.2%	1.2	2.19	**Yes**
Tobacco Use	35.6%	16.8%	18.8	10.74	**Yes**
Respondents	**627**	**2,773**			

Source: Analysis by Evergreen Economics of data from the 2014 Alaska BRFSS survey.
* Evaluated at the 0.05 level of significance.

Table 3 shows the self-reported prevalence of chronic conditions among older Alaskans (65 and older). With the exceptions of tobacco use, drug abuse, and possibly obesity, the prevalence of chronic conditions tends to be higher for older Alaskans than it is for working-age adults. This finding is consistent with other studies that have found that the prevalence of chronic disease increases with age and/or is linked to the aging process.[14] Among older Alaskans, the (self-reported) prevalence of diabetes, heart disease, obesity, and stroke is statistically significantly higher for Medicaid eligible persons than for those not eligible for Medicaid.

The prevalence of tobacco use is lower for older Alaskans than for working-age adults. This finding is consistent with a 2015 CDC study, which reported the prevalence of cigarette smoking by adults age 65 and older to be 8.5 percent nationally, compared to about 23 percent for working-age adults.[15] There likely are multiple reasons for the lower

[12] The 2014 BRFSS survey asked respondents about their use of illegal drugs (including illegal use of prescription drugs) including opioids. It does not separate opioid use from the use of other drugs.
[13] ibid
[14] See for example, "Multiple Chronic Conditions Among Adults aged 45 and Over: Trends Over the Past 10 Years," https://www.cdc.gov/nchs/products/databriefs/db100.htm
[15] "Current Cigarette Smoking Among Adults – United States, 2005-2014," November 13, 2005 / 64(44);1233-1240 https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6444a2.htm

rate of smoking among older Americans including the well-documented health consequences associated with smoking. Higher mortality rates for persistent smokers relative to nonsmokers result in nonsmokers representing an increasingly higher proportion of older Alaskans.[16] In addition, it is also likely that many older Americans stop smoking as the negative health effects of smoking become more evident.

Table 3: Self-Reported Prevalence of Eight Chronic Conditions Among Older Alaska Adults (65 and Older)

Chronic Condition	Medicaid Eligible Prevalence	Not-Medicaid Eligible Prevalence	Difference (Percentage Points)	t-Test Value	Statistically Significantly Different?*
Cancer	26.9%	23.3%	3.6%	0.963	No
Diabetes	27.8%	20.1%	7.7%	2.134	**Yes**
Heart Disease	62.2%	48.2%	14.0%	3.194	**Yes**
Injuries from Falls	12.9%	10.9%	2.0%	0.709	No
Obesity	35.6%	27.0%	8.6%	2.181	**Yes**
Drug Abuse[17]	22.0%	23.0%	-1.0%	-0.278	No
Stroke	13.2%	8.0%	5.2%	2.092	**Yes**
Tobacco Use	14.6%	9.5%	5.1%	1.903	No
Respondents	**152**	**836**			

Source: Analysis by Evergreen Economics of data from the 2014 Alaska BRFSS survey.
* Evaluated at the 0.05 level of significance.

[16] Gallup, May 20, 2010, *Smoking and Age: The Baby Boomer Bulge*, http://www.gallup.com/poll/128183/smoking-age-baby-boomer-bulge.aspx

[17] The 2014 BRFSS survey asked about use of illegal drugs (including illegal use of prescription drugs) including opioids, but does not separate opioids from other drugs.

Table 4 shows the self-reported prevalence of multiple chronic conditions among Alaska adults who are Medicaid eligible based on analysis of BRFSS survey data. When considering all eight chronic conditions, we found that nearly 45 percent of Medicaid eligible adults have two or more chronic conditions. This number drops to 32.5 percent when we exclude tobacco use as a chronic condition, drops to 29 percent when we exclude drug abuse, and drops to 18.5 percent when we exclude both tobacco use and drug abuse. The trend is similar for Medicaid eligible adults with three or more and four or more chronic conditions, suggesting that for many people, tobacco use and drug abuse are co-chronic.

Table 4: Self-Reported Prevalence of Multiple Chronic Conditions Among Medicaid Eligible Adults

	Percentage of Medicaid Eligible Alaska Adults			
Number of Chronic Conditions	**Considering All Eight Chronic Conditions**	**Excluding Tobacco Use**	**Excluding Drug Abuse**	**Excluding Tobacco Use & Drug Abuse**
None	22.5%	30.6%	34.1%	50.5%
One	32.7%	37.0%	36.9%	31.0%
Two or More	44.8%	32.5%	29.0%	18.5%
Three or More	21.8%	13.3%	12.8%	8.6%
Four or More	9.3%	5.9%	5.8%	3.9%

Source: Analysis by Evergreen Economics of data from the 2014 Alaska BRFSS survey.

Table 5 shows the proportion of Alaska adults with each combination of two chronic conditions (28 pairs in total) based on their responses to the 2014 BRFSS survey.[18] This information is important because it provides insight on which chronic conditions tend to coincide with other chronic conditions. For example, obesity tends to coincide with several other chronic conditions (diabetes at 5.1 percent, heart disease at 9.7 percent, smoking at 6.7 percent, and drug abuse at 11.9 percent of Alaska adults). Comparatively, chronic conditions such as cancer, injuries from falls, and especially stroke have a relatively low rate of co-prevalence with other chronic conditions.[19]

[18] Note: the table is symmetric, so (row i, column j) = (row j, column i).

[19] Note: While Table 5 shows that only 1.3 percent of Alaska adults reported having cancer and using tobacco, this does not suggest that tobacco use is not linked to cancer. Rather, it shows that only a small proportion of Alaska adults reported having a diagnosis of cancer and being a smoker in 2014.

Table 5: Proportion of Alaska Adults with Each Pair of Chronic Conditions

Chronic Disease	Cancer	Diabetes	Injuries from Falls	Heart Disease	Obesity	Tobacco Use	Drug Abuse	Stroke
Cancer		1.3%	1.2%	3.4%	2.9%	1.3%	3.4%	0.5%
Diabetes	1.3%		1.5%	5.8%	5.1%	1.2%	1.2%	0.9%
Injuries from Falls	1.2%	1.5%		3.1%	2.9%	1.8%	3.0%	0.6%
Heart Disease	3.4%	5.8%	3.1%		9.7%	4.2%	6.9%	1.5%
Obesity	2.9%	5.1%	2.9%	9.7%		6.7%	11.9%	0.9%
Tobacco Use	1.3%	1.2%	1.8%	4.2%	6.7%		10.2%	0.9%
Drug Abuse	3.4%	1.2%	3.0%	6.9%	11.9%	10.2%		0.9%
Stroke	0.5%	0.9%	0.6%	1.5%	0.9%	0.9%	0.9%	

Source: Analysis by Evergreen Economics of data from the 2014 Alaska BRFSS survey.

Table 6 shows the same information as Table 5, but only for Alaska adults who are Medicaid eligible (based on their responses to the BRFSS survey). Comparing the two tables reveals that the prevalence of co-chronic conditions is greater for Medicaid eligible adults for all 28 pairs of chronic conditions and that for many pairs, the prevalence is about twice as high among Medicaid eligible adults. For example, 18.6 percent of Medicaid eligible adults reported tobacco use and drug abuse, compared to 10.2 percent of all Alaska adults.

Table 6: Proportion of Medicaid Eligible Adults with Each Pair of Chronic Conditions

Chronic Disease	Cancer	Diabetes	Injuries from Falls	Heart Disease	Obesity	Tobacco Use	Drug Abuse	Stroke
Cancer		1.4%	1.3%	3.0%	2.6%	2.7%	4.1%	0.9%
Diabetes	1.4%		3.2%	6.3%	6.6%	2.4%	3.2%	2.2%
Injuries from Falls	1.3%	3.2%		4.8%	4.9%	4.0%	4.2%	0.9%
Heart Disease	3.0%	6.3%	4.8%		9.2%	6.7%	7.2%	2.2%
Obesity	2.6%	6.6%	4.9%	9.2%		9.2%	13.4%	1.7%
Tobacco Use	2.7%	2.4%	4.0%	6.7%	9.2%		18.6%	1.4%
Drug Abuse	4.1%	3.2%	4.2%	7.2%	13.4%	18.6%		1.1%
Stroke	0.9%	2.2%	0.9%	2.2%	1.7%	1.4%	1.1%	

Source: Analysis by Evergreen Economics of data from 2014 Alaska BRFSS survey.

Finally, it is important to note that the information contained in Table 5 and Table 6 does not address issues of causation among chronic conditions; such issues are beyond the scope of this analysis. Nevertheless, understanding the tendency for certain chronic conditions to be present in combination with another chronic condition is useful in understanding how chronic conditions affect spending on healthcare services.

2.1 Limitations

There are two potential limitations associated with the findings from the BRFSS survey data.

1. As with all household surveys, the BRFSS survey relies on self-reporting by Alaska residents rather than observation by trained researchers. Because of this, there is the possibility of "self-report" bias in that respondents may, for example, not wish to reveal information that may be viewed as negative (e.g. drug or tobacco use) or may understate their household income due to concern that the information they provide could adversely affect public benefits the household may receive. The BRFSS survey is conducted in every state and has been conducted annually for many years. Because of the extensive experience associated with this survey and the researchers who administer the survey, we do not believe self-report bias to be a significant limitation.
2. We relied on data from only one year of the BRFSS survey (2014). Based on our experience with the BRFSS and other household surveys, we know that estimates derived from survey data often fluctuate year-to-year due to random error. It is possible that our estimates of the prevalence of each of the chronic conditions may be higher or lower than the actual prevalence due to random error.

3 Analysis of Medicaid Claims

The primary objective of this study was to examine the prevalence of the eight chronic conditions within the Alaskan Medicaid population and to estimate their cost to the Medicaid program.[20] To do this, we analyzed Medicaid claims data contained in the Medicaid Management Information System (MMIS)[21] for State Fiscal Year (FY) 2016 (July 1, 2015 to June 30, 2016) to identify Medicaid beneficiaries that had a paid Medicaid claim that included a diagnosis code indicating the beneficiary received treatment for one of the chronic conditions listed in Table 1.

A potentially confounding factor in our analysis is that Medicaid expansion began in Alaska in September 2015, which resulted in the enrollment of about 19,000 additional working-age adults who were not eligible for Medicaid prior to expansion. Because of this relatively large change in the Medicaid program, we recommend repeating this analysis using data for one or more additional fiscal years (e.g. FY2017and/or FY2018) to ensure that the estimated cost impacts to the Medicaid program presented in this report are not unique to FY2016.

During FY2016, there were more than 10.5 million claim records for services provided to Medicaid beneficiaries through the Medicaid program in Alaska. Each record corresponds to an individual billable service provided by a hospital, health clinic, or other provider of Medicaid services. Many, but not all, MMIS records also include a medical diagnostic code assigned by healthcare providers, which indicates the medical reason for the service.[22] We examined the diagnosis code for each Medicaid claim in FY2016 to identify if the service was associated with any of the eight chronic conditions considered in this analysis.

Each chronic condition is identified by one or more International Classification of Diseases (ICD) diagnosis codes. The ICD codes are updated periodically, with the most recent

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[20] The sole focus of this analysis is the cost to Alaska's Medicaid program. In fact, many persons 65 years of age or older, as well as disabled persons, are eligible for both Medicaid and Medicare. The fact that a person may also be enrolled in Medicare is not relevant to our analysis, as we are only concerned with the costs of medical and other healthcare related services provided through the Medicaid program.

[21] Every service provided through the Medicaid program is associated with one or more claims for payment. Once a claim is paid (or denied), a record of the transaction is maintained in the MMIS. It is not uncommon for a claim to take many weeks or even months to be fully processed. Data for FY2016 were extracted from the MMIS at the beginning of May 2017, allowing a minimum of 10 months for a claim incurred in FY2016 to be submitted to DHSS and fully processed (i.e., paid or denied). We estimate that the data extract included more than 99.5 percent of claims incurred in FY2016.

[22] Recall that for Medicaid services provided during the first three months of State FY2016 (July, August, and September 2015), ICD-9 diagnostic codes were used. For the remaining nine months of State FY2016, ICD-10 codes were used. The switch between the two diagnostic coding schemes corresponds with the beginning of federal FY2016 (October 1, 2015).

update occurring on October 1, 2015 with the conversion from ICD-9 to ICD-10.[23] Regardless of when a claim is submitted for payment, Medicaid services provided before October 1, 2015 are assigned an ICD-9 code, while Medicaid services provided on or after October 1, 2015 are assigned an ICD-10 code. This conversion matters for (and complicates) our analysis, because it occurred during State FY2016, thus requiring we query the MMIS database for both ICD-9 and ICD-10 diagnosis codes.

For each chronic condition except opioid abuse, we relied on the CMS Chronic Conditions Data Warehouse to determine which ICD-9 and ICD-10 codes indicated the respective chronic condition. For opioid abuse, we included every ICD-9 and ICD-10 code that included "opioid abuse" in its description.[24]

This approach to identifying the presence of a chronic condition represents a limitation in the study in that we likely underestimate the prevalence of each chronic condition within the Medicaid population because we only observe a beneficiary as having a chronic condition if he or she receives treatment for the condition through the Medicaid program and the care facility assigns a diagnosis code indicating the beneficiary received treatment for the chronic condition. The degree to which we underestimate the prevalence of each of the chronic conditions based on diagnosis code likely varies. For example, a higher proportion of Medicaid beneficiaries with diabetes may seek treatment for their diabetes, while beneficiaries who are obese may not be aware of medical treatments for obesity and/or may be less likely to seek such treatment.

Based on our analysis of Medicaid enrollment records, we found that there were 191,669 individuals in Alaska who were enrolled in Medicaid at some point in FY2016 (either all or part of the fiscal year). Of these, 102,547 were adults 18 years of age or older. We then analyzed the diagnosis codes of all claim records in the MMIS. We found that 29,533 Medicaid beneficiaries (28,437 of whom were adults) received a diagnostic code in FY2016 that suggested these beneficiaries had at least one of the eight chronic conditions of interest. Using the following criteria from the CMS Chronic Conditions Data Warehouse, we defined a Medicaid beneficiary with one or more ICD-9 and/or ICD-10 codes suggesting any of the eight chronic conditions as having that specific chronic condition:

- If the Medicaid beneficiary had at least one Medicaid claim that included inpatient hospital services, skilled nursing facility services, or home health services;

  or

[23] October 1, 2015 marks the beginning of federal FY2016, which is three months into State FY2016.
Note: The full acronyms are ICD-9-CM and ICD-10-CM, where "CM" stands for Clinical Modification. It is a common practice to drop the "-CM." ICD-10 codes provide greater specificity about the medical encounter; there are approximately 13,000 ICD-9 codes and approximately 68,000 ICD-10 codes.
[24] This resulted in 15 ICD-9 codes and 36 ICD-10 codes that we identified as opioid abuse.

- If the Medicaid beneficiary had at least two Medicaid claims that included outpatient hospital services or non-institutional services such as care provided by physicians, clinical social workers, and nurse practitioners.

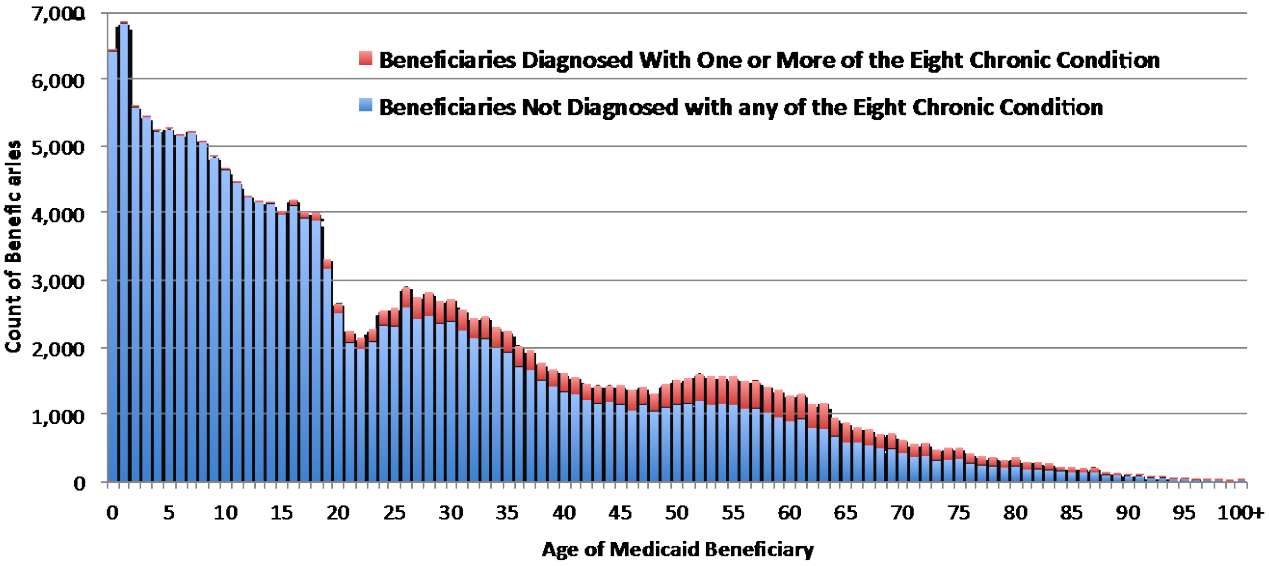
Once we applied these criteria, the number of Medicaid beneficiaries we identified as having a chronic disease dropped by a third to 19,119, with 18,591 of these beneficiaries being adults.

3.1 Chronic Conditions and Age

Traditionally, the Medicaid program focused on providing healthcare to low-income children and pregnant women. This changed to some degree in September 2015 (FY2016) when Alaska expanded Medicaid eligibility to non-disabled, working-age adults without dependent children. Today, nearly 55 percent of Medicaid beneficiaries in Alaska are 18 years of age or older. While children still account for a relatively large share of Medicaid enrollment, spending per beneficiary continues to be much lower for children than for working-age and older Alaskans. In FY2016, spending per child (17 years of age or younger) was about $5,700. Comparatively, for working-age adults, the spending per person was about $11,000 and for older Alaskans, it was $20,000 per person.

Figure 1 shows the distribution of Medicaid beneficiaries by age for those diagnosed with one or more of the eight chronic conditions considered in this analysis and those who were not. The figure shows two salient characteristics of the Medicaid program. The first characteristic is that Medicaid enrollment decreases with age due to a number of factors such as natural rates of mortality, differences in eligibility requirements for children and adults, availability of private and other forms of health insurance, and for older Alaskans, availability of Medicare insurance.

Figure 1: Distribution of Medicaid Beneficiaries by Age, FY2016



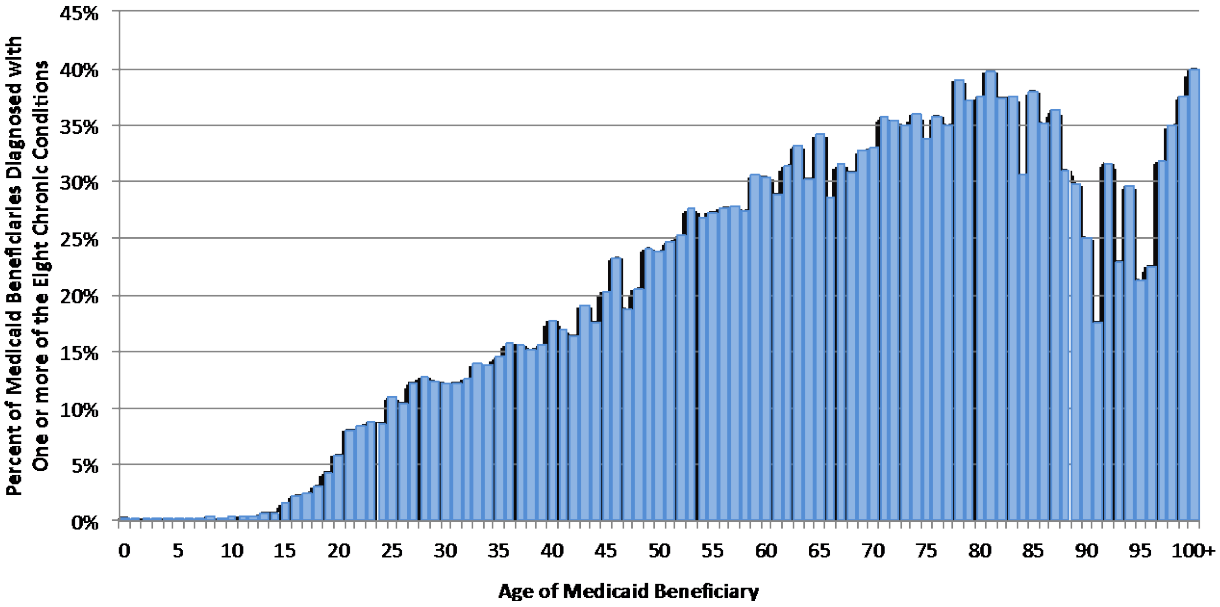
Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.

The second salient characteristic that Figure 1 shows is that the number and proportion of Medicaid beneficiaries diagnosed with at least one of the eight chronic conditions increases with age. In fact, the prevalence of these chronic conditions is near zero for beneficiaries under 15 years of age, but increases in number and proportion by age even as the number of Medicaid beneficiaries (generally) decreases. The number of beneficiaries with at least one of the eight chronic conditions peaked between ages 50 and 59 with a total of nearly 4,000 beneficiaries in this age range having a chronic condition.

Figure 2 shows the proportion of Medicaid beneficiaries of each age treated for at least one of the eight chronic conditions. The prevalence of chronic conditions increases rapidly for beneficiaries in their late 70s to mid-80s and then tails off. The prevalence drops through age 95, but increases again through age 100. It is important to note that Figure 2 shows the prevalence of just eight chronic conditions and does not include diseases such as Alzheimer's, dementia, Parkinson's, and other chronic conditions that are particularly prevalent among the very old.[25] Therefore, the figure should not be viewed as suggesting that the prevalence of *all* chronic conditions decreases for Medicaid beneficiaries in their late 80s through mid-90s.

[25] It is also important to note that the chronic conditions considered in this analysis can lead to early death. See Chronic Disease Prevention and Health Promotion for more information about the health impacts of chronic disease. https://www.cdc.gov/chronicdisease/index.htm

Figure 2: Proportion of Medicaid Beneficiaries Treated for at Least One of the Eight Chronic Conditions, FY2016



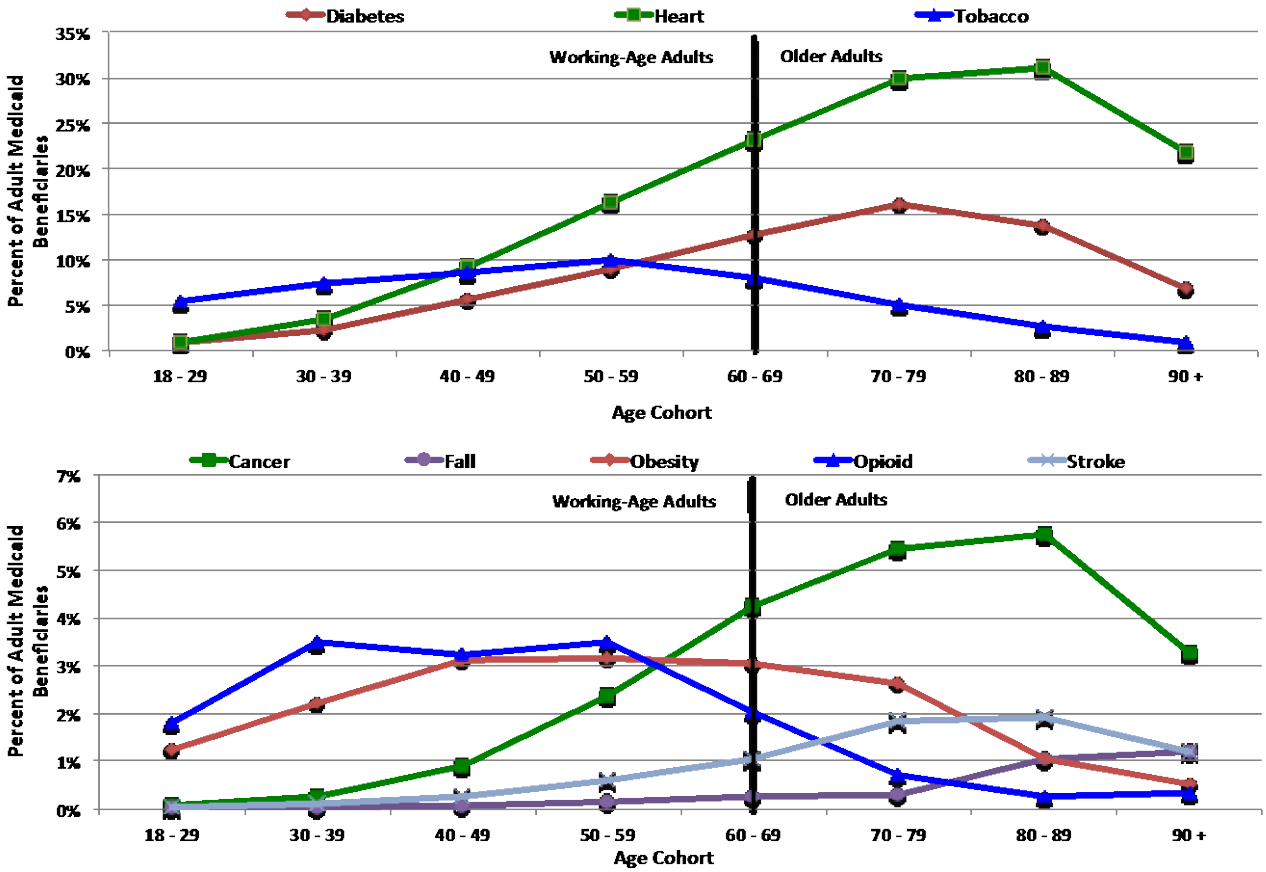
Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.

While Figure 2 shows the proportion by age of Medicaid beneficiaries treated for at least one of the eight chronic conditions, Figure 3 shows the prevalence of each chronic condition individually for Medicaid beneficiaries 18 years of age or older. For those under the age of 40, tobacco use is the most common chronic condition. Between 40 and 49 years of age, heart disease surpasses tobacco use as the most prevalent of the eight chronic conditions—even as the prevalence of tobacco use continues to grow among Medicaid beneficiaries through the 50 – 59 age cohort.[26] The prevalence of heart disease grows rapidly through the 70 – 79 age cohort, then slows but continues to grow among the 80 – 89 age cohort, and then drops substantially. At 31 percent, the prevalence of heart disease among Medicaid beneficiaries is greatest for the 80 – 89 age cohort.

[26] According to one reviewer, the number of Medicaid beneficiaries we identified as tobacco users may overstate the actual number of Medicaid beneficiaries who use tobacco, to the extent that non-tobacco users may have been misclassified as tobacco users. We identified 7,330 adult Medicaid beneficiaries as being tobacco users (based on the CMS approach to identifying chronic conditions described above). This represents 7.1 percent of the 102,547 adult Medicaid beneficiaries. According to information published in *Alaska Tobacco Facts: 2016 update* (http://dhss.alaska.gov/dph/Chronic/Documents/Tobacco/PDF/2016_AKTobaccoFacts.pdf) in 2014, 20 percent of Alaska adults smoked; for adults with "low socioeconomic status," the prevalence of smoking was 33 percent, which is consistent with our analysis of the 2014 BRFSS. This suggests that about one in five adult Medicaid beneficiaries (7.1%/33% = 22%) who used tobacco in FY2016 either pursued tobacco cessation services through a healthcare professional or were treated for a condition linked to tobacco use.

Diabetes also continues to increase with age, peaking at 16 percent for Medicaid beneficiaries 70 to 79 years of age. Because diabetes can be treated and controlled, but not cured, it is likely that the decrease in the prevalence of diabetes for Medicaid beneficiaries 80 years of age and older is due at least in part to increased mortality associated with diabetes.

Figure 3: Prevalence of Treatment for Each Chronic Condition by Age of Adult Medicaid Beneficiary, FY2016



Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.
Note: Different scales were used in the two graphs shown in Figure 3 to highlight variation in prevalence of treatment by chronic condition and age. The vertical line at the 60 – 69 age cohort of each graph indicates the age (65) when most adults are eligible for and increasingly rely on Medicare as their source of health insurance.

To the extent that the State considers disease self-management or other efforts to reduce or mitigate the impacts of chronic conditions on Medicaid spending, we recommend focusing on working-age adults who are less likely to already be receiving long-term care services either at home or in a skilled nursing facility.

The proportion of Medicaid beneficiaries requiring medical services due to cancer or a stroke also continues to grow through the 80 – 89 age cohort and then drops for

beneficiaries 90+ years of age or older. At their peak, nearly 6 percent and 2 percent, respectively, of Medicaid beneficiaries in the 80 – 89 age cohort required medical services due to cancer or a stroke in FY2016.

Like tobacco use, treatment specifically related to opioid abuse and obesity peak for Medicaid beneficiaries in the 50 – 59 age cohort. The proportion of Medicaid beneficiaries receiving care for opioid abuse drops from about 3.5 percent for those 50 to 59 years of age to about 2 percent for those 70 to 79 years of age and to less than 0.5 percent for those aged 80 and over. The proportion of beneficiaries receiving treatment for obesity drops only slightly for those in the 60 – 69 and 70 – 79 age cohorts, but then drops to about 1 percent for those 80 to 89 years of age.

Finally, the proportion of Medicaid beneficiaries requiring medical services due to a fall remain very low through the 70 – 79 age cohort, but then grows to about 1 percent for beneficiaries 80 years of age and older. As we will discuss below, while those receiving care for falls constitutes a small fraction of Medicaid beneficiaries, the per-beneficiary costs associated with falls are greater than the per-beneficiary costs associated with the other chronic conditions analyzed in this report.

3.2 Chronic Conditions and Medicaid Spending

Table 7 shows the total number of Medicaid beneficiaries and the average, median, and total spending on Medicaid services for those we identified as having at least one of the eight chronic conditions and those with no conclusive indication of any of the eight chronic conditions. While constituting only 10 percent of all beneficiaries, the average cost per beneficiary for those we identified as having at least one of the eight chronic conditions was nearly five times greater than those beneficiaries with no conclusive indication of a chronic condition. Of the $1.7 billion spent on Medicaid services in FY2016, $604 million (35 percent of the total cost) was spent on beneficiaries with at least one of the eight chronic conditions.

Table 7: Number of and Spending on Medicaid Beneficiaries of All Ages by Chronic Condition Status, Includes All Medicaid Beneficiaries, FY2016

Chronic Condition Status*	------- Beneficiaries -------		---------- Cost of Medicaid Services ----------			
	Number	Percent of Total	Average	Median	Total	Percent of Total
No Diagnosed Chronic Condition	172,550	90%	$6,561	$1,333	$1,132,025,462	65%
At Least One Diagnosed Chronic Condition	19,119	10%	$31,594	$13,772	$604,044,334	35%
All Medicaid Beneficiaries	**191,669**	**100%**	**$9,058**	**$1,722**	**$1,736,069,796**	**100%**

Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.
* Based on criteria contained in documentation for the CMS Chronic Conditions Data Warehouse. https://www.ccwdata.org/web/guest/home

Table 8 shows the same information as Table 7, but only for working-age adult beneficiaries (18 to 64 years of age). When considering only working-age adults, those we identified as having at least one of the eight chronic conditions constitute 16 percent of Medicaid beneficiaries (14,639 of 76,200), and their average spending per beneficiary was about four times greater than for working-age adults not diagnosed as having one of the eight chronic conditions ($28,515 versus $7,227). In FY2016, total spending on Medicaid services for working-age adults was $968 million, and $417 million (43 percent) was for beneficiaries with at least one of the eight chronic conditions.

Table 8: Number of and Spending on Working-Age Adult Medicaid Beneficiaries by Chronic Condition Status, FY2016

Chronic Condition Status*	------- Beneficiaries -------		---------- Cost of Medicaid Services ----------			
	Number	Percent of Total	Average Cost	Median Cost	Total Cost	Percent of Total
No Diagnosed Chronic Conditions	76,200	84%	$7,227	$1,388	$550,692,975	57%
At Least One Diagnosed Chronic Condition	14,639	16%	$28,515	$14,283	$417,431,530	43%
Adult Medicaid Beneficiaries	90,839	100%	$10,658	$2,306	$968,124,505	100%

Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.
* Based on criteria contained in documentation for the CMS Chronic Conditions Data Warehouse. https://www.ccwdata.org/web/guest/home

Table 9 shows information on Medicaid spending for older adult beneficiaries (65 years of age or older). We identified about one-third of older adult beneficiaries as having a chronic condition (3,952 of 7,756). On average, Medicaid spending per beneficiary was about three times greater for older adults diagnosed with at least one of the eight chronic conditions ($37,265 versus $12,557). In FY2016, total spending on Medicaid services for elderly adults was $245 million, and $147 million (60 percent) was for adults with at least one of the eight chronic conditions.

Table 9: Number of and Spending on Older Adult Medicaid Beneficiaries by Chronic Condition Status, FY2016

	------- Beneficiaries -------		---------- Cost of Medicaid Services ----------			
Chronic Condition Status*	**Number**	**Percent of Total**	**Average Cost**	**Median Cost**	**Total Cost**	**Percent of Total**
No Diagnosed Chronic Conditions	7,756	66%	$12,557	$1,396	$97,392,569	40%
At Least One Diagnosed Chronic Condition	3,952	34%	$37,265	$10,103	$147,272,017	60%
Adult Medicaid Beneficiaries	11,708	100%	$20,897	$2,306	$244,664,586	100%

Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.
* Based on criteria contained in documentation for the CMS Chronic Conditions Data Warehouse. https://www.ccwdata.org/web/guest/home

Table 10 shows the number of adult beneficiaries with just one of the eight chronic conditions and the average and total cost of providing Medicaid services in FY2016. In total, there were 10,836 beneficiaries with just one of the eight chronic conditions (compared to a total of 18,591 adult beneficiaries with one or more chronic conditions), and the average cost per beneficiary for any one chronic condition was $25,557 in FY2016. The average cost for a specific chronic condition ranged from $19,098 for tobacco use (only) to $83,097 for stroke (only).

Table 10: Number of and Spending on Alaska Adult Medicaid Beneficiaries Diagnosed With a Single Chronic Condition, FY2016

Chronic Condition*	Beneficiaries	Average Cost	Total Cost
Heart Disease only	3,465	$30,096	$104,282,548
Tobacco Use only	3,848	$19,098	$73,489,836
Diabetes only	1,189	$26,122	$31,058,558
Opioid Abuse only	1,095	$24,170	$26,465,973
Cancer only	492	$39,629	$19,497,342
Obesity only	658	$22,764	$14,978,533
Stroke only	49	$83,097	$4,071,773
Injuries from Falls only	40	$77,180	$3,087,185
Any One Diagnosed Chronic Condition	**10,836**	**$25,557**	**$276,931,748**
No Diagnosed Chronic Conditions	**83,956**	**$7,719**	**$648,085,544**

Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.
* Determined based on criteria contained in documentation for the CMS Chronic Conditions Data Warehouse. https://www.ccwdata.org/web/guest/home

Table 11 shows similar information as Table 10, but includes all adult beneficiaries with one or more of the eight chronic conditions. For those beneficiaries with multiple chronic conditions, their costs are included for each chronic condition.[27] Comparing the counts of beneficiaries in Table 11 to the counts in Table 10 provides important insights into the prevalence of co-chronic conditions among Medicaid beneficiaries with any chronic conditions. For example, Table 10 shows that there are 1,189 beneficiaries with diabetes *only*, while Table 11 shows that there are 5,400 beneficiaries with diabetes. The difference, (5,400 – 1,189 = 4,211) is the number of beneficiaries with diabetes *and* at least one other chronic condition. With the exception of stroke, the average cost of a Medicaid beneficiary with one or more chronic conditions is greater than the cost of a beneficiary with just one chronic condition.

[27] Thus, the sum of beneficiaries in Table 10 is greater than the actual count of beneficiaries with one or more of the eight chronic conditions. Likewise, the sum of the total cost of Medicaid services is greater than the total cost of services provided to beneficiaries with one or more chronic conditions.

Table 11: Number of and Spending on Alaska Adult Medicaid Beneficiaries Diagnosed With One or More Chronic Condition Status, FY2016

Chronic Condition*	Beneficiaries**	Average Cost	Total Cost
Heart Disease	9,527	$34,669	$330,294,684
Diabetes	5,400	$35,791	$193,272,588
Tobacco Use	7,330	$26,204	$192,078,143
Opioid Abuse	2,619	$34,306	$89,848,227
Obesity	2,285	$35,734	$81,652,718
Cancer	1,413	$40,103	$56,665,140
Stroke	406	$60,487	$24,557,604
Injuries from Falls	132	$81,009	$10,693,134

Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.
* Determined based on criteria contained in documentation for the CMS Chronic Conditions Data Warehouse. https://www.ccwdata.org/web/guest/home
** Note: The sum of the count of beneficiaries across the eight chronic conditions exceeds the number of beneficiaries with at least one chronic condition because some beneficiaries have multiple chronic conditions.

Table 12 segments adult beneficiaries between those with one, two, three, or four or more chronic conditions and includes comparisons to all adult beneficiaries and those not diagnosed with any of the eight chronic conditions (based on the CMS approach to identifying the eight conditions). As one might expect, the cost of Medicaid services received by a beneficiary is positively correlated with the number of chronic conditions the beneficiary has.

Table 12: Number of and Spending on Alaska Adult Medicaid Beneficiaries by Chronic Condition Status, FY2016

Chronic Condition Status*	Beneficiaries	Average Cost	Total Cost
All Adult Beneficiaries	102,547	$11,827	$1,212,789,090
No Chronic Conditions	83,956	$7,719	$648,085,544
Any of the Eight Chronic Conditions	18,591	$30,375	$564,703,546
One Chronic Condition	10,836	$25,557	$276,931,748
Two Chronic Conditions	5,472	$34,415	$188,320,744
Three Chronic Conditions	1,861	$41,041	$76,378,129
Four or More Chronic Conditions	422	$54,675	$23,072,925

Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.
* Determined based on criteria contained in documentation for the CMS Chronic Conditions Data Warehouse. https://www.ccwdata.org/web/guest/home

On average, the cost of an adult Medicaid beneficiary with one of the eight chronic conditions is about 3.3 times the cost of an adult without any of these chronic conditions.

For adult beneficiaries with two chronic conditions, the ratio increases to 4.5 times the cost; for adult beneficiaries with three chronic conditions, the ratio increases to 5.3 times the cost; and for adult beneficiaries with four or more chronic conditions, the ratio increases to 7.1 times the cost of an adult Medicaid beneficiary with no chronic conditions.

Table 13 shows spending on adult beneficiaries with at least one of the eight chronic conditions by Medicaid category of service. For the specific services included within each of these service categories, please see Table 20 in the appendix. In general, behavioral health constitutes relatively little of the cost of Medicaid services for adult beneficiaries with chronic conditions. The cost of behavioral health services ranged from $542 for adult beneficiaries with cancer to $2,987 for those being treated for opioid abuse; the average across all adult beneficiaries with at least one chronic condition was $1,490.

Table 13: Average Spending by Alaska Adult Beneficiaries with Chronic Conditions by Medicaid Category of Service, FY2016

			Primary Care		
Chronic Condition	**Behavioral Health**	**Long-Term Care**	**Inpatient Hospital**	**Pharmacy**	**Other Primary***
Cancer	$542	$11,917	$7,289	$2,435	$17,919
Diabetes	$1,012	$14,255	$6,541	$2,911	$11,073
Heart Disease	$1,065	$14,418	$5,752	$2,340	$11,095
Injuries from Falls	$159	$42,332	$20,148	$3,449	$14,920
Obesity	$1,123	$9,726	$8,393	$2,736	$13,757
Opioid Abuse	$2,987	$2,309	$9,740	$4,192	$15,079
Stroke	$563	$35,305	$8,465	$2,659	$13,493
Tobacco Use	$2,249	$2,995	$6,203	$2,141	$12,616
One or more of the Chronic Conditions	***$1,490***	***$9,510***	***$5,788***	***$2,191***	***$11,396***
No Chronic Conditions	***$528***	***$3,097***	***$771***	***$447***	***$2,875***

Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.
* See Table 19 for a list of the Medicaid services included in Other Primary Care.

Long-term care services constituted a large share of spending for beneficiaries with one or more chronic conditions ($9,510 of $30,375, or about 31 percent). This should not be a surprise, as the prevalence of chronic disease increases with age (Figure 1), and older Alaskans are much more likely to require long-term care services than working-age adults. Average spending on long-term care services varies significantly among the eight chronic conditions, with relatively low spending by those treated for opioid abuse or tobacco use ($2,309 and $2,995, respectively) to a high level of spending on beneficiaries being treated for injuries from a fall ($42,332) or a stroke ($35,305). The typical age of beneficiaries with these chronic conditions also varies significantly, with the average age of those being

treated for opioid abuse or tobacco use being 41 and 43, respectively. Comparatively, the average age of beneficiaries treated for injuries from a fall or for a stroke was 61 and 63, respectively.

On average, primary care constituted the largest share of Medicaid costs for adult beneficiaries with one or more of the eight chronic conditions.[28] In Table 13, primary care is divided into inpatient hospital, pharmacy, and other primary care. With one exception, the average cost of inpatient hospital services does not vary greatly among the eight chronic conditions. The exception is beneficiaries who receive care for injuries from a fall, which is 3.5 times the average cost for all chronic conditions ($20,148 versus $5,788). The cost of pharmacy services, which is primarily comprised of prescription drugs, constitutes a relatively small proportion of Medicaid costs for beneficiaries with a chronic condition, ranging from $2,141 for tobacco use to $4,192 for opioid abuse. Finally, other primary care constitutes on average a relatively large share of the cost of Medicaid services provided to beneficiaries with chronic conditions ($11,396 of $30,375, or 38 percent).

Comparatively, average spending on Medicaid beneficiaries without one of the eight chronic conditions was relatively low. On a per-beneficiary basis, spending was less than $500 for pharmacy, less than $600 for behavioral health, and less than $800 for inpatient hospital.

Table 14 shows the total cost of Medicaid services provided to adult beneficiaries with a chronic condition and the portions of costs paid through the State General Fund (GF) and the federal government. Table 15 shows the same information, but on a per-beneficiary basis. Overall, the State of Alaska paid for about 34 percent of the cost of Medicaid services provided to adults with one or more chronic conditions, which is slightly less than the average percent paid for adult beneficiaries without any of the chronic conditions.

Table 14: Total, State General Fund, and Federal Spending by Adult Beneficiaries with Chronic Conditions, FY2016

Chronic Condition*	Total Spending	State GF Spending	Percent State GF	Federal Spending	Percent Federal
Cancer	$56,665,140	$19,929,070	35.2%	$36,736,070	64.8%
Diabetes	$193,272,588	$72,369,656	37.4%	$120,902,932	62.6%
Heart Disease	$330,294,684	$122,645,368	37.1%	$207,649,316	62.9%
Injuries from Falls	$10,693,134	$3,946,629	36.9%	$6,746,505	63.1%
Obesity	$81,652,718	$29,013,629	35.5%	$52,639,089	64.5%
Opioid Abuse	$89,848,227	$27,220,546	30.3%	$62,627,681	69.7%

[28] See Table 19 for a listing with descriptions of the services included in primary care services.

Chronic Condition*	Total Spending	State GF Spending	Percent State GF	Federal Spending	Percent Federal
Stroke	$24,557,604	$10,250,016	41.7%	$14,307,588	58.3%
Tobacco Use	$192,078,143	$56,939,110	29.6%	$135,139,033	70.4%
One or more of the Chronic Conditions	***$564,703,546***	***$191,231,143***	***33.9%***	***$373,472,403***	***66.1%***
No Chronic Condition	***$648,085,544***	***$226,369,097***	***34.9%***	***$421,716,447***	***65.1%***

Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.

On a per capita basis, the State of Alaska spent nearly four times more on the Medicaid services received by adult beneficiaries with one or more of the eight chronic conditions than it did on adults without one of the chronic conditions ($10,286 versus $2,696).

Table 15: Average Per Capita State General Fund and Federal Spending by Adult Beneficiaries with Chronic Conditions, FY2016

Chronic Condition*	Average Spending	State GF Spending	Percent State GF	Federal Spending	Percent Federal
Cancer	$40,103	$14,104	35.2%	$25,999	64.8%
Diabetes	$35,791	$13,402	37.4%	$22,389	62.6%
Heart Disease	$34,669	$12,873	37.1%	$21,796	62.9%
Injuries from Falls	$81,009	$29,899	36.9%	$51,110	63.1%
Obesity	$35,734	$12,697	35.5%	$23,037	64.5%
Opioid Abuse	$34,306	$10,393	30.3%	$23,913	69.7%
Stroke	$60,487	$25,246	41.7%	$35,240	58.3%
Tobacco Use	$26,204	$7,768	29.6%	$18,436	70.4%
One or more of the Chronic Conditions	***$30,375***	***$10,286***	***33.9%***	***$20,089***	***66.1%***
No Chronic Condition	***$7,719***	***$2,696***	***34.9%***	***$5,023***	***65.1%***

Source: Analysis by Evergreen Economics of data from Alaska Medicaid Budget Group.

3.3 Limitations

There are several potential limitations to the analysis of the MMIS data.

1. Only one year of data was used in the analysis; a multi-year analysis would provide a more complete picture of the prevalence of chronic conditions within Alaska's Medicaid population and the cost of providing services. In addition, the year of analysis, FY2016, coincides with Medicaid expansion, which may have had a confounding impact on this analysis.

2. We likely are underreporting the prevalence of each of the chronic conditions to some extent, because some beneficiaries may not have sought medical care (through the Medicaid program) for the chronic condition during FY2016, while for others who did seek care for symptoms directly or indirectly related to their chronic condition, the care provider may not have assigned a diagnosis code indicating the chronic condition.
3. We only look at the direct costs to Alaska's Medicaid program. We do not consider other costs, such as the inability of some persons suffering from one or more chronic conditions to maintain full or even part-time employment.

4 Potential Cost Savings to the Medicaid Program from Diabetes Self-Management

While the primary motivation of this report is to understand the costs associated with chronic conditions among Alaska's Medicaid population, we also estimated potential savings to the Medicaid program associated with providing diabetes self-management education (DSME) programs, which are led by healthcare professionals, to those Medicaid beneficiaries with diabetes. Burke et al. (2014) defines DSME as a collaborative process through which people with diabetes gain the knowledge and skills necessary to modify their behavior and to self-manage the disease and any related conditions.

Comparatively, a diabetes self-management program (DSMP), which was developed by the Stanford University Patient Education Research Center, is specifically for people with type 2 diabetes and is led by two lay people, at least one of whom has Type 2 diabetes.[29] DSMP workshops consist of six once-a-week classes that are typically held in a community setting (e.g. churches, community centers), and the program covers a range of topics including exercise, diet, and nutrition; methods to successfully deal with problems associated with chronic disease; appropriate use of medications; communicating effectively with family, friends, and health professionals; and how to evaluate new treatments.[30]

4.1 Prior Analysis of Potential Cost Savings to Alaska Medicaid Program from Diabetes Self-Management

In February of 2014, the Division of Public Health, together with the Alaska Diabetes Prevention and Control Program, engaged Evergreen Economics to assess the cost impacts to Alaska's Medicaid program associated with Medicaid beneficiaries who attended a trial chronic disease self-management program, including DSME and DSMP. Evergreen conducted statistical analysis to determine if there is a relationship between participation in self-management training and reductions in spending on Medicaid services.

Due to the small number of Medicaid beneficiaries who participated in the DSMP training, we were not able to develop statistically meaningful estimates for either program. However, we did find that Medicaid recipients with diabetes who attended at least one DSME class experienced a 21.7 percent reduction in annual Medicaid spending relative to Medicaid recipients with diabetes who did not attend any DSME classes. For FY2014, we estimated the savings would be approximately $5,670 per Medicaid beneficiary, focused in

[29] National Association of County and City Health Officials, *Diabetes Self-Management Education and Training*, August 2013

[30] Chronic Disease Self-Management Program (Better Choices, Better Health® Workshop, Stanford Medicine, http://patienteducation.stanford.edu/programs/cdsmp.html

two areas: inpatient and outpatient hospital services.[31] Decreased spending on inpatient and outpatient hospital services indicates a reduced need for critical care by those who participated in DSME training.

In order to extrapolate our findings to all adults on Medicaid with diabetes, we analyzed beneficiary-level data used in the Long-Term Medicaid Spending in Alaska (MESA) Forecast and data gathered through the 2012 BRFSS survey. We estimated that in FY2014, there were approximately 6,300 adult Medicaid beneficiaries with diabetes in Alaska. If all of these beneficiaries had participated in DSME training in the prior fiscal year, total savings to the Medicaid program could have been as much as $36 million for FY2014 if each of these beneficiaries, on average, realized the $5,670 in cost saving estimated from attending the trial workshops.

There are two important caveats associated with the results of this earlier work: first, the statistical analysis we conducted was based on a small sample of Medicaid beneficiaries (104 in total), of whom only 21 had participated in DSME training. Second, those who participated in DSME training were not randomly assigned to participate, but rather voluntarily chose to participate. We noted in our 2014 report that the results of the analysis lacked the statistical robustness on which policy decisions should be made and that in an ideal study, the sample size would be several hundred or more beneficiaries with approximately half being randomly assigned to participate in DSME training and the remainder serving as controls. Such a study design would eliminate the selection bias associated with an opt-in based research study.

4.2 Review of Published Literature on the Effectiveness of Diabetes Self-Management Education

For this study, we reviewed published research that examined the effect of DSME programs on the cost of medical care. Many of these same articles also examined the effect that disease self-management had on patient outcomes in addition to some estimated indirect economic impacts (e.g. reductions in lost productivity). However, for this study, we focused solely on the impact that DSME had on the direct cost of medical care for people with diabetes. Over the past 10 years, several articles have been published that review and summarize primary research on the cost impacts of DSME.

Mattke et al. (2007) examined 29 studies that were either reviews or meta-analyses of other (primary) studies. The authors reported that the 29 studies covered 317 unique primary analyses; they did not attempt to re-review the primary studies, but rather relied on the

[31] In that analysis, we assumed the cost savings were due to DSME training. In practice, individuals who volunteer to participate in DSME training likely are more highly motivated, which may result in better outcomes even without the training.

findings and conclusions presented in the review and meta-analyses studies. Of the 317 primary studies, 64 focused on diabetes disease management in which patient self-management education is a significant component. They concluded that while there is a documented link between disease control and long-term outcomes, they found no consistent evidence linking disease management to improved long-term outcomes. The authors did acknowledge that this may be due to the short post-period considered in the primary studies (generally about one year).

The authors also stated that the role of disease management in reducing utilization of healthcare services is inconclusive, and that when the costs of disease management are appropriately accounted for, the evidence that disease management leads to reductions in direct medical costs is inconclusive. However, they qualified this conclusion as limited because many of the primary studies did not address the issue of cost, but rather focused on quality of care and outcomes.

Boren et al. (2009) reviewed 26 papers that examined DSME, of which 23 attempted to measure cost impacts of DSME. Of these 23 studies, 18 reported findings that DSME results in decreased costs, cost savings, cost effectiveness, or a positive return on investment. Four studies found no evidence that DSME has an impact (negative or positive) on healthcare costs, and one study found that healthcare costs are greater with DSME. The authors stated that from their review, the benefits associated with DSME are positive and outweigh the costs to operate the DSME program. Nevertheless, the authors also stated that more research is needed to confirm that DSME is cost effective.

Freeman et al. (2011) reviewed more than 80 studies published between 2000 and 2011 that included economic analysis of disease management programs, many of which included patient self-management education, for Medicaid beneficiaries with one or more chronic conditions. The authors stated that the findings from these studies support the claim that disease management programs improve quality of care for Medicaid beneficiaries and reduce costs. They concluded that disease management programs are more cost effective and improve quality of care when dealing with the severely ill and those with co-morbidities. The most-often cited health benefit is greater adherence to pharmaceutical prescriptions, though this resulted in greater spending on pharmaceuticals. Cost savings were realized through reduced hospitalizations, fewer hospital readmissions, and fewer emergency room visits.

Specific findings from the published literature cited by the authors include the following:

- There is an increase in the number of patients receiving flu shots and a reduced utilization of unnecessary drugs (Krause 2005; Piecoro et al. 2001);
- There is a positive relationship between improved clinical outcomes and cost savings (Peck 2008);

- Reducing hospital admissions by just 10 percent covers the cost of operating a disease management program; and
- Enrolling the highest utilizers of emergency room and inpatient care into a disease management program can lead to a 60 percent reduction in emergency room visits and a 22 percent reduction in annual medical costs (Medicaid Health Plans of America 2010-2011).

More recently, Desmedt et al. (2016) conducted a systematic review of the literature to assess the potential financial benefits of integrated care for patients with chronic disease. Among the published literature examined by the authors were eight studies conducted in the U.S. that examined the impact that diabetes disease management has on direct medical costs (hospitalization, medication, and consultation). The authors noted that self-management and self-monitoring, which were components of the eight U.S.-based studies of diabetes disease management, are central to effectively managing diabetes. The authors found that in each of these studies, an integrated care model that includes self-management is associated with lower healthcare expenditures.

Table 16 shows a summary of the eight studies. Four of the studies were based on a controlled before-after design for which one group of persons with diabetes (the treatment group) was recruited into an integrated care program and followed over time. The change in medical costs for this group pre- and post-participation in the integrated care program was then compared to the change in medical costs over this same timeframe for a similar group of persons with diabetes who did not participate in the integrated care program (the control group). After adjusting for any differences between the treatment and control groups with respect to demographic factors and spending on medical care prior to recruitment of the treatment group into the integrated care program, the authors calculated the impact of the program using a difference-in-differences approach.[32]

Of the other four studies, two followed a prospective cohort design and two followed a retrospective cohort design. Both are longitudinal in nature, but differ based on timing. In a prospective cohort study, none of the persons in the study have been exposed to the treatment of interest (e.g. a disease self-management program). Candidates are then recruited into the treatment, and a control group is formed; both groups are followed for some period of time, and impacts of the treatment are computed using a difference-in-differences approach. For the retrospective cohort study, a group of persons that received the treatment form the treatment group, then a control group is formed comprised of

[32] Difference-in-differences is a commonly used statistical method that uses observational data to mimic an experimental research design. The difference-in-differences approach measures the impact of a treatment by comparing the average change over time in the outcome variable for a treatment group to the average change over time for a control group.

persons with similar characteristics who did not receive the treatment. Cost impacts of the treatment are computed using a difference-in-differences approach.

Table 16: Summary of Studies on Cost Effectiveness of Diabetes Management*

#	Author / Year	Self-Management Support	Study Design	Study Period (years)	Savings Per Patient Year (2016)**
1	Berger et al. (2001)	Patient education through telephone and mailing	Before-after	4	$470.80
2	Sidorov et al. (2002)	Patient education and self-monitoring	Retrospective	2	$1,282.27
3	Berg and Wadhwa (2002)	Patient education and self-monitoring	Before-after	1	$1,675.78
4	Snyder et al. (2003)	Patient education through telephone and mailing	Before-after	4	$1,584.93
5	Villagra and Ahmed (2004)	Patient education through mailing, telephone, educational material, and equipment for self-monitoring	Before-after	1	$1,635.34
6	Dall et al. (2010)	Patient education through newsletters and online educational material	Prospective	1	$802.73
7	Rosenzweig et al. (2010)	Patient education and self monitoring	Prospective	1	$1,009.59
8	Dall et al. (2011)	Patient education is important	Retrospective	1	$813.86

*Source: Desmedt, et al. 2016.
** Savings are incremental above the cost of providing the integrated care models, including self-management training.

Across the eight studies, estimated savings per patient per year ranged from a low of $471 to a high of $1,676 (in 2016 dollars). The average and median annual savings are $1,159 and $1,146, respectively. None of the studies included residents of Alaska, which is important to note because per unit costs of healthcare services are substantially greater in Alaska compared to the U.S. as a whole.

4.3 Estimating the Potential Cost Savings of Providing Diabetes Self-Management Education to Medicaid Beneficiaries

Relying on the estimates of cost savings contained in the studies shown in Table 16, we estimated the potential cost savings to the Alaska Medicaid program from the statewide implementation of a DSME program. We did this in three steps:

1. We estimated the number of adult Medicaid beneficiaries (18 years of age or older) with diabetes.
2. We estimated the average cost savings per Medicaid beneficiary per year by adjusting the savings estimates shown in Table 16 to account for the higher costs of medical care in Alaska.
3. We multiplied the estimated number of Medicaid beneficiaries by the estimate of average annual cost savings.

4.3.1 Number of Adult Medicaid Beneficiaries with Diabetes

To estimate the number of adult Medicaid beneficiaries with diabetes, we multiplied the estimated rate of diabetes prevalence (shown in Table 2 and Table 3) by the number of adult Medicaid beneficiaries in FY2016 and the projected number of beneficiaries in FY2017 through FY2020. Based on analysis of BRFSS survey data for 2014, we estimate the prevalence of diabetes among Medicaid beneficiaries to be 7.5 percent for working-age adults and 27.8 percent for older adults. These estimates of the prevalence of diabetes among Medicaid beneficiaries are greater than what we estimated based on analysis of diabetes diagnosis codes in the FY2016 MMIS. We believe these larger rates of diabetes prevalence are warranted because in our analysis of the MMIS, we only identified those individuals with diabetes who were treated through the Medicaid program for diabetes at a healthcare facility that recorded that the treatment provided was directly related to the beneficiary's diabetes diagnosis.

Table 17 shows the annual unduplicated count of enrollment for all Alaska adult Medicaid beneficiaries and the estimated number of Medicaid beneficiaries with diabetes based on the 2014 BRFSS survey data.

Table 17: Estimated Count of Adult Medicaid Beneficiaries with Diabetes

	Medicaid Beneficiaries		Beneficiaries with Diabetes (Estimated)		
Fiscal Year	Working-Age Adults*	Older Adults*	Working-Age Adults	Older Adults	All Adults
2016	79,810	11,637	5,536	2,726	8,262
2017	91,624	12,036	6,355	2,820	9,175
2018	94,724	12,373	6,570	2,899	9,469
2019	96,509	12,675	6,694	2,970	9,664
2020	97,788	12,978	6,783	3,041	9,824

Sources: Analysis by Evergreen Economics of data from the 2014 Alaska BRFSS survey and the *Long-term Forecast of Medicaid Enrollment and Spending in Alaska 2016-2036*.
* Annual unduplicated count of enrollment estimated for FY2016 and projected for FY2017 – FY2020.
Note: the large increase in Medicaid enrollment of working-age adults between FY2016 and FY2017 is due to Medicaid expansion, which began on September 1, 2015.

4.3.2 Average Cost Savings Per Medicaid Beneficiary

There are two alternative approaches to developing estimates of cost savings from a DSME program. The first is to conduct original research on Alaska's Medicaid population using a randomized experimental design to assign individuals into a treatment or control group. Done correctly, this is the best method for developing estimates of cost savings. However, a randomized experimental design would also be costly and time consuming, requiring the development and implementation of the DSME program and at least one year of follow up of individuals in the two groups.

The alternative approach is to apply estimates of cost savings developed from other studies to the Alaska Medicaid program. This approach has the advantage of being much less time consuming and costly. However, it also presents a challenge in that one must choose studies that meet three criteria: (1) they are reasonably similar in scope, (2) they are of a population with similar characteristics, and (3) they rely on a similar model of healthcare delivery. For our purposes, we believe the eight U.S. based studies reviewed by Desmedt et al. (2016) and shown in Table 16 meet these three criteria. Each of these studies considers an integrated care management approach that emphasizes DSME. The subjects in the studies are adults with diabetes living and receiving care in the U.S.

Before applying estimates of cost savings from the eight studies, we adjusted the savings estimates to account for the substantial difference in the cost of health care in Alaska relative to the average for all of the U.S. According to analysis published by the Missouri Economic Research and Information Center (MERIC), a widely used source of information on state-level costs of living, the cost of medical care in Alaska is on average 46.6 percent higher than the national average.[33] Adjusting the estimates of cost savings shown in Table 16 to account for the higher cost of medical services in Alaska, we would expect savings of nearly $1,700 per patient per year (in 2015 dollars) from an integrated care system that emphasized self-management (a range of $689 to $2,452).

4.3.3 Annual Potential Savings from Diabetes Self-Management

Table 18 shows our estimates of total potential savings associated with providing all working-age adult Medicaid beneficiaries who have diabetes with self-management training through the DSME program.[34] Our estimates of net savings per working-age beneficiary increase at the projected rate of medical price inflation for Alaska, based on analysis of the medical care component of the Anchorage All Urban Consumer Price Index. These annual rates are the same as those used for the *Long-term Forecast of Medicaid*

[33] See https://www.missourieconomy.org/indicators/cost_of_living/

[34] To err on the side of developing conservative estimates of savings, we assume DHSS will only target diabetes self-management programs to working-age adults, the vast majority of whom are not in nursing homes or other long-term care facilities.

Enrollment and Spending in Alaska: 2016–2036. The lower and upper bounds on our estimates of potential savings are based on statistical variation in savings published by Desmedt et al. (2016).

We estimate that had all working-age adults on Medicaid with diabetes been provided with DSME in FY2016, the Medicaid program would have saved about $9.4 million. Over time, assuming DSME remains available to Medicaid beneficiaries, we estimate savings would increase at approximately the same rate as the growth in the adult Medicaid population and medical price inflation. This could lead to net savings to the Medicaid program of about $13.5 million by FY2020.

Table 18: Estimated Total Cost Savings to Alaska's Medicaid Program from Diabetes Self-Management Education Targeted at Working-Age Adults

Fiscal Year	Working-Age Adult Beneficiaries with Diabetes*	Net Savings per Beneficiary**	Total Estimated Cost Savings	Lower Bound of Cost Savings	Upper Bound of Cost Savings
2016	5,536	$1,700	$9,411,200	$3,262,800	$15,559,600
2017	6,355	$1,779	$11,305,545	$3,919,557	$18,691,533
2018	6,570	$1,848	$12,141,360	$4,209,329	$20,073,391
2019	6,694	$1,915	$12,819,010	$4,444,265	$21,193,755
2020	6,783	$1,986	$13,471,038	$4,670,319	$22,271,757

Sources: Analysis by Evergreen Economics of data from the 2014 Alaska BRFSS survey and the *Long-term Forecast of Medicaid Enrollment and Spending in Alaska 2016–2036.*

* Estimated based on self-reported rate of diabetes from the 2015 BRFSS survey (6.9% for working-age adults). The estimated prevalence of diabetes is lower in the 2015 BRFSS survey than in the 2014 survey. Assumed rate of growth in adults with diabetes is based on rates reported in *the Long-term Forecast of Medicaid Enrollment and Spending in Alaska 2016–2036*. For working age adults, the rates of growth for FY2017 – FY2020 are 14.8%, 3.4%, 1.9%, and 1.3%.

** Mean estimated savings of $1,771 (in 2016 dollars) based on information presented in Desmedt et al. (2016) inflated by expected rates of inflation for FY2017 – FY2020 (4.5%, 3.7%, 3.5%, 3.6%) reported in the *Long-term Forecast of Medicaid Enrollment and Spending in Alaska 2016–2036*. Estimated cost savings are net of the cost of operating the DSME program.

In FY2016, the federal government paid about 67 percent of the cost of Medicaid services provided to working-age adult beneficiaries we identified as being treated for diabetes. The remaining 33 percent was paid with State General Fund dollars. As the federal financial participation (FFP) rate for Medicaid expansion continues to decrease each calendar year (reaching 90 percent by calendar year [CY] 2020), the proportion of costs paid with General Fund dollars will increase. We estimate that by CY2020, the federal government will pay 64.8 percent of the cost of Medicaid services provided to working-age beneficiaries with diabetes (with the remaining 35.2 percent paid through the State General Fund).

Table 19 shows our estimates of General Fund savings associated with providing working-age adult Medicaid beneficiaries who have diabetes with self-management training through the DSME program. We estimate that the state would have saved $3.1 and $3.7 million, respectively, in FY2016 and FY2017. Projected savings grow each year, reaching $4.4 million by FY2020. These savings estimates are net of the cost of providing the DSME program.

Table 19: Estimated General Fund Cost Savings to Alaska's Medicaid Program from Diabetes Self-Management Education Targeted at Working-Age Adults

Fiscal Year	Working-Age Adult Beneficiaries with Diabetes*	Net GF Savings per Beneficiary**	Estimated Net GF Cost Savings	Lower Bound of GF Cost Savings	Upper Bound of GF Cost Savings
2016	5,536	$560	$3,102,191	$1,075,509	$5,128,874
2017	6,355	$586	$3,726,620	$1,291,994	$6,161,246
2018	6,570	$609	$4,002,128	$1,387,511	$6,616,744
2019	6,694	$631	$4,225,500	$1,464,953	$6,986,047
2020	6,783	$655	$4,440,426	$1,539,466	$7,341,386

Sources: Analysis by Evergreen Economics of data from the 2014 Alaska BRFSS survey and the *Long-term Forecast of Medicaid Enrollment and Spending in Alaska 2016–2036.*

* Estimated based on self-reported rate of diabetes from the 2015 BRFSS survey (6.9% for working-age adults) The estimated prevalence of diabetes is lower in the 2015 BRFSS survey than in the 2014 survey. Assumed rate of growth in adults with diabetes is based on rates reported in *the Long-term Forecast of Medicaid Enrollment and Spending in Alaska 2016–2036*. For working age adults, the rates of growth for FY2017 – FY2020 are 14.8%, 3.4%, 1.9%, and 1.3%.

** Mean estimated General Fund savings of $560 (in 2016 dollars) based on information presented in Desmedt et al. (2016) inflated by expected rates of inflation for FY2017 – FY2020 (4.5%, 3.7%, 3.5%, 3.6%) reported in the *Long-term Forecast of Medicaid Enrollment and Spending in Alaska 2016–2036.* Estimated cost savings are net of the cost of operating the DSME program. The weighted average FFP rate for working-age adults with diabetes was 67% for FY2016 (i.e., 33% of costs paid through the General Fund). We assume this will drop slowly over the next few years as the FFP for expansion drops from 100% to 95% in CY2017, 94% in CY2018, 93% in CY2019, and 90% in CY2020. We expect the effective FFP for Medicaid beneficiaries with diabetes to slowly decrease over this period to just under 65% by FY2020.

4.4 Limitations

There are a number of potential limitations to our analysis of cost savings to the Medicaid program from diabetes self-management.

1. Our estimate of the number of beneficiaries with diabetes is based on the best available survey information, but is still just an estimate. The actual number of persons with diabetes may be smaller or larger.
2. Our estimates of potential cost savings are based on published results from other states. In each of the studies, the populations analyzed were comprised of adults; however, we do not have any other characteristics on which to compare to the Alaska adult Medicaid population (e.g. differences with respect to age distribution,

ethnicity, severity of disease, and co-chronic disease). There is, therefore, significant uncertainty in the potential savings associated with DSME training.

3. We assume that all Medicaid beneficiaries with diabetes are provided with DSME training. In fact, even if the Section of Chronic Disease Prevention and Health Promotion of the Division of Public Health was provided with sufficient funding for DSME training to all beneficiaries with diabetes, it is unlikely that all beneficiaries would actually participate in the training.
4. We do not have information on the persistence of DSME training and therefore do not know if, for example, a six-week DSME training course today would result in cost savings two, three, or more years from now.
5. Our estimates of cost savings include only direct medical services provided through Alaska's Medicaid program and do not include potential indirect benefits such as reduced absenteeism from work or reductions in the costs of other public welfare benefits and public services.

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6 Appendix

The Alaska Medicaid Program

Medicaid is an entitlement program established by Title XIX of the Social Security Act in 1965 to provide payment for healthcare services for low-income citizens. Medicaid is jointly funded by the federal government and individual states, with each state managing its own program. Participation in the Medicaid program is optional, but all states choosing to participate in the program must follow certain federal guidelines pertaining to eligibility and services provided. The federal government covers at least 50 percent of the cost of most services.[35] The federal government paid approximately 58 percent of the cost of Alaska's Medicaid program in fiscal year (FY) 2015 and 63 percent in FY2016.

People qualify for Medicaid by meeting federal income standards specific to each state and by meeting specified eligibility requirements related to age, family status, and disability status. Traditionally, Medicaid covered only children, blind, or disabled persons, adults 65 years of age or older, and adults with dependent children. Medicaid expanded coverage in 1998 through the Children's Health Insurance Program (CHIP) to children whose family income is too high to qualify for regular Medicaid, but too low to afford private health insurance. In Alaska, the Division of Health Care Services administers CHIP. The Division of Public Assistance manages eligibility for regular Medicaid and CHIP.

Alaska expanded Medicaid coverage to low-income adults without dependent children in September of 2015, an option available to all states under the Affordable Care Act (ACA) of 2012. In doing so, 100 percent of the cost of Medicaid services provided for this "expansion" population was paid by the federal government through calendar year (CY) 2016. In CY2017, federal participation drops to 95 percent, to 94 percent in CY2018, to 93 percent in CY2019, and finally to 90 percent in CY2020 where it will remain.

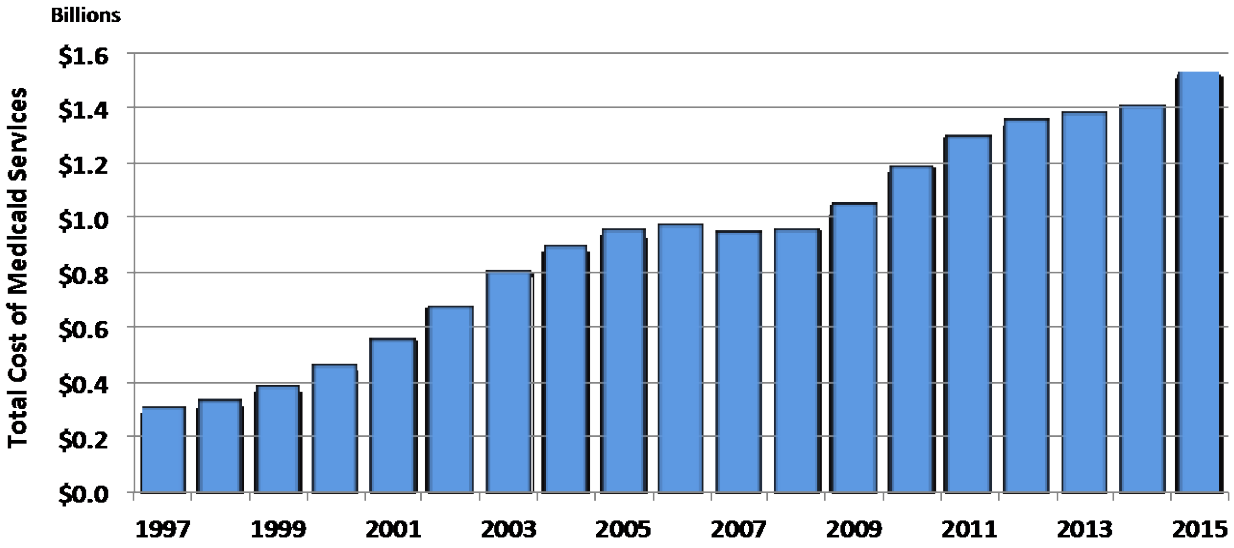
Alaska Medicaid reimburses hospitals, physicians, and other healthcare providers for providing healthcare services to Medicaid beneficiaries. It operates as a fee-for-service program, meaning that it reimburses (pays) providers per unit of service rendered according to established rates of payment. This is in contrast to managed care, where a healthcare organization receives a monthly payment for each Medicaid recipient enrolled in the plan. In a managed care arrangement, the health care organization is responsible for ensuring that the beneficiaries have access to a comprehensive range of medical services.

[35] The few services for which the federal government does not cover at least 50 percent of the cost are referred to as "state-only" services.

Recent Historical Trends in Medicaid Spending

Spending on Alaska's Medicaid program grew rapidly from FY1997 through FY2005, increasing an average of 16 percent per year (see Figure 4).[36] The rate of growth in spending slowed greatly beginning in FY2006 due at least in part to program changes put in place by DHSS following the release of the *Long Term Forecast of Medicaid Enrollment and Spending in Alaska: 2005-2025* in January 2006. However, with the severe national economic recession beginning in 2008, enrollment in and spending on Medicaid again increased rapidly in Alaska. Between FY2008 and FY2011, spending on Medicaid increased on average by 10.7 percent per year before slowing again in FY2012.

Figure 4: Total Cost of Medicaid Services by Fiscal Year in Which Service Occurred



Source: Analysis by Evergreen Economics of data provided by the Medicaid Budget Group.
Note: Due to issues with the new MMIS during FY2014, it is likely that the costs of some services provided in FY2014 were recorded as having been provided in FY2015.

Between FY1997 and FY2014, spending on Medicaid increased on an average annual basis by 9.4 percent. Part of this growth—3.5 percentage points—is due to growth in Medicaid enrollment, which grew from 90,130 (annual unduplicated count) in FY1997 to 162,059 in FY2014. In addition, approximately 4.1 percentage points of the 9.4 percent average annual spending increase is due to healthcare price inflation.[37] The State of Alaska negotiates prices with healthcare providers for medical services provided to Medicaid beneficiaries. While the cost of medical services provided to Medicaid beneficiaries may differ from

[36] FY1997 is the earliest year for which we had data on spending.
[37] Healthcare price inflation (also commonly referred to as medical care cost inflation) is a measure of growth in prices charged for healthcare services.

prices paid by private insurance, the long-run trend in price inflation is essentially the same.

The remainder—1.8 percentage points—is due to growth in utilization and intensity of use of Medicaid services.[38] For our purposes, we define utilization as the number of Medicaid service categories a beneficiary uses during a fiscal year (regardless of "how much" of the service the beneficiary uses), and we define intensity of use as the amount of a service category the beneficiary uses during the year.

Categorizing Medicaid Services

Table 20 shows how we mapped the categories of service listed for each Medicaid claim in the MMIS to the component of Medicaid shown in Table 13.

Table 20: Mapping of DHS Categories of Service to Component of Medicaid Services

Category of Service	Description	Component of Medicaid
1	Inpatient Hospital Services	In Patient Hospital
3	Inpatient Psychiatric Services	Behavioral Health
7	Outpatient Hospital Services	Other Primary Care
9	Personal Care Services	Long-term Care
10	Long Term Care Services	Long-term Care
11	SNF Services	Long-term Care
12	ICF Services	Long-term Care
13	ICF/MR Services	Long-term Care
14	Chiropractic Practices	Other Primary Care
17	Mental Health Services	Behavioral Health
18	Psychological Services	Behavioral Health
22	X-Ray Services	Other Primary Care
23	Laboratory Services	Other Primary Care
24	Outpatient Surgery Services	Other Primary Care
26	Home Health Services	Long-term Care
27	Family Planning Services	Other Primary Care
28	Hospice Care	Long-term Care
30	Prescribed Drugs	Pharmacy
31	Medical Supplies Services	Other Primary Care
32	DME Services	Other Primary Care
34	Prosthetics and Orthotics	Other Primary Care

[38] The remainder is computed as 9.4 - 3.5 - 4.1 = 1.8 percentage points.

Category of Service	Description	Component of Medicaid
36	Drug Abuse Center	Behavioral Health
37	Transportation Services	Other Primary Care
39	Accommodation Services	Other Primary Care
40	Nutrition Services	Long-term Care
41	Nutrition Services Under 21	Long-term Care
42	Private Duty Nursing	Long-term Care
43	Physician Services	Other Primary Care
45	Dental Services	Other Primary Care
47	Vision Services	Other Primary Care
48	Podiatry	Other Primary Care
49	Midwifery Services	Other Primary Care
50	Advanced Nurse Practitioner	Other Primary Care
51	Rehabilitative Services	Other Primary Care
53	Hearing Services	Other Primary Care
54	Occupational Therapy	Other Primary Care
56	FQHC	Other Primary Care
66	ESRD Services	Other Primary Care
68	Care Coordination	Long-term Care
69	Residential Habilitation	Long-term Care
70	Day Habilitation	Long-term Care
71	Supported Employment	Long-term Care
73	Intensive Active Treatment/Therapy	Long-term Care
74	Chore Services	Long-term Care
75	Specialized Equipment and Supplies	Long-term Care
76	Environmental Modifications	Long-term Care
77	EPSDT Screening	Other Primary Care
78	CASE Management Services	Behavioral Health
81	Meals	Long-term Care
82	Specialized Private Duty Nursing	Long-term Care
83	Transportation	Long-term Care
84	Residential Supported Living	Long-term Care
85	Adult Day Care	Long-term Care
86	Respite Care	Long-term Care
90	Physician IHS Clinic	Other Primary Care