

Treated Chronic Disease Prevalence and Spending in Minnesota

ESTIMATED SPENDING FOR 2009 AND 2016

PROJECTED SPENDING FOR 2016 THROUGH 2027

Introduction

Chronic diseases place enormous burdens on individuals, families, communities, and governments, and their burdens are unevenly distributed among populations and areas of the state. Certain chronic diseases, including heart disease, cancer, and diabetes, are among the leading causes of death and disability, and are major contributors to annual health care spending. To better understand the impact of chronic disease on health care utilization and spending in Minnesota, the Legislature has directed the Minnesota Department of Health (MDH) to report annually on actual and projected health care spending *directly related* to a specific set of chronic conditions and risk factors.

Specifically, the Minnesota Legislature directed MDH to:¹

1. Identify health care spending directly attributable to diabetes, hypertension, dementia, obesity, and smoking, and spending attributable to all chronic conditions among Minnesotans ages 60 and older;
2. Project future levels of condition-attributable spending;
3. Compare the latest actual health care spending estimates to projected spending for the conditions and risk factors; and
4. Estimate the share of the difference between actual and projected spending attributable to state-administered programs.

As with previous iterations of this report, this project brings together analyses of several data sources, research evidence from more than 50 studies, and expertise from analysts at the Minnesota Department of Health (MDH) and Mathematica Policy Research, Inc., the state's

¹ Minnesota Statutes, Chapter 62U.10, subd. 6 to 8.

analytic vendor for this project, to help us understand patterns in treated chronic disease prevalence and related health care spending, and how they compare to expectations.^{2,3,4}

In the conclusion, we describe two important changes to the underlying data, summarize the main limitations and interpretation challenges, and identify considerations to help inform future directions for this report. The accompanying Supplemental Appendices describe these issues in greater detail.^{5,6}

The following terms are used throughout this report:

- **Prevalence** – The proportion of people with a given condition or risk factor during a given year. Most prevalence estimates in this report reflect only individuals with the condition who either receive treatment or have a health care encounter related to the condition during that year. As such, these estimates should be interpreted as “treated prevalence.” Prevalence estimates for obesity and smoking exposure, in contrast, reflect a broader definition that includes those who did not receive treatment or have a related health care encounter.
- **Chronic Conditions** – Conditions altering the structures or functions of the body that are likely to last longer than twelve months and have a negative impact on health or functional status.⁷ The specific chronic conditions in this report, as directed by the Minnesota Legislature, are diabetes, hypertension, dementia, and obesity. An additional section focuses on all chronic conditions for Minnesotans ages 60 and older. Detail regarding the conditions included in this group as well as the operationalization of all conditions assessed in this report are described in detail in Appendices 3 and 6.⁸

² Minnesota Department of Health (2017) “Treated Chronic Disease Costs in Minnesota - a Look Back and a Look Forward”, Legislative Report; [Publications Using the MN APCD \(https://www.health.state.mn.us/data/apcd/publications.html\)](https://www.health.state.mn.us/data/apcd/publications.html).

³ Minnesota Department of Health (2019) “Treated Chronic Disease Prevalence and Costs in Minnesota: Estimated Costs for 2009 and 2015, Projected Costs for 2015 through 2025”, Legislative Report; [Publications Using the MN APCD \(https://www.health.state.mn.us/data/apcd/publications.html\)](https://www.health.state.mn.us/data/apcd/publications.html).

⁴ As requested by Minnesota Statute 3.197: This report cost approximately \$259,000 to prepare, including costs for an analytic vendor and Minnesota Department of Health staff time.

⁵ Minnesota Department of Health (2021) “Treated Chronic Disease Prevalence and Spending in Minnesota - Estimated Spending for 2009 and 2016, Projected Spending for 2016 through 2027: Supplemental Appendices” [Publications Using the MN APCD \(https://www.health.state.mn.us/data/apcd/publications.html\)](https://www.health.state.mn.us/data/apcd/publications.html).

⁶ For previous iterations of this report, MDH obtained actuarial certification of the underlying methods, data, and assumptions. For budgetary reasons, certification was not feasible for this report. However, methods, data, and assumptions remained largely unchanged from previous report iterations that did receive certification, and subsequent reports will again include such certification.

⁷ The Johns Hopkins University (2020) “The Johns Hopkins ACG® System Version 12.1 User Documentation”

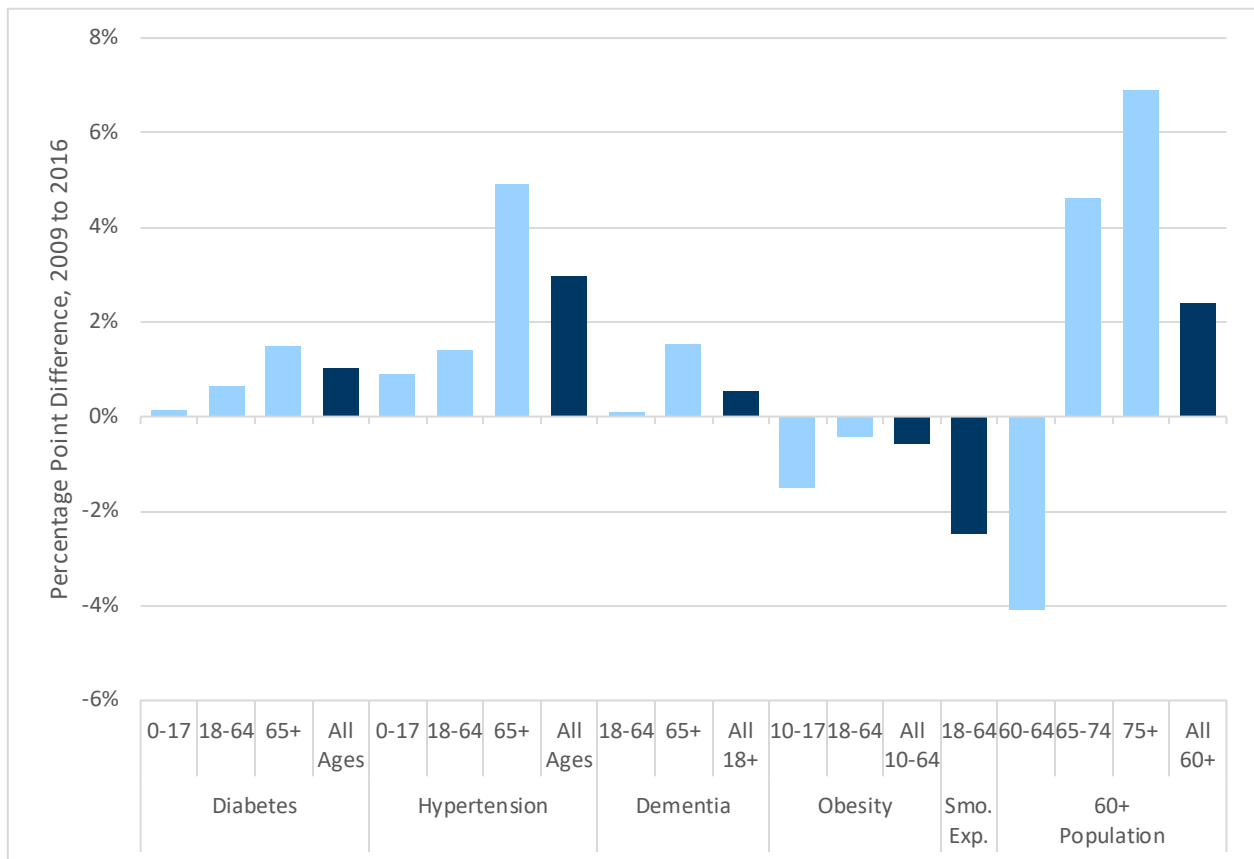
⁸ Minnesota Department of Health (2021) “Treated Chronic Disease Prevalence and Spending in Minnesota - Estimated Spending for 2009 and 2016, Projected Spending for 2016 through 2027: Supplemental Appendices” [Publications Using the MN APCD \(https://www.health.state.mn.us/data/apcd/publications.html\)](https://www.health.state.mn.us/data/apcd/publications.html).

- Risk Factors – Attributes, characteristics, behaviors, or exposures that increase the likelihood of a person developing a disease or health disorder. Smoking exposure is the sole risk factor identified by the Minnesota Legislature to be studied in this report.

Key Findings

Prevalence increased between 2009 and 2016: Treated prevalence of diabetes, hypertension, dementia, and all chronic conditions for Minnesotans ages 60 and older increased between 2009 and 2016, both in terms of the number of Minnesotans with a given condition as well as the percentage of the population with a given condition. Prevalence of obesity and smoking exposure decreased slightly over this period (Figure 1).

Figure 1: Change in Treated Prevalence, by Condition and Age, 2009 to 2016



Source: Mathematica Policy Research analysis of the Minnesota All Payer Claims Database and other data.

Note: “Smo. Exp.” – Smoking Exposure

Note: The obesity estimates presented throughout this report pertain to a different age group (10 to 64) than is commonly reported (for example, BRFSS typically reports estimates for ages 18 and older). A fuller explanation can be found in the obesity section of this report, as well as in the supplemental appendices.

Chronic Conditions are becoming increasingly prevalent among older Minnesotans: Roughly 928,000 adults ages 60 and older (about 80 percent) had at least one chronic condition in 2016. This represents an increase from about 695,000 (about 78 percent of those 60 and older) in 2009. Additionally, prevalence of chronic disease increases with age among this group, with a treated prevalence of chronic disease reaching about 91 percent among those ages 75 and older in 2016.

Per-person *total* spending for individuals with chronic conditions increased between 2009 and 2016: Overall per-person total spending for Minnesotans with diabetes, hypertension, or dementia – that is, the average total health care spending across all care in a year for individuals with a given condition – was materially higher than that of the population as a whole in 2016, and increased between 2009 and 2016 for each chronic condition category.

Disease-attributable per-person spending for Minnesotans with chronic conditions largely decreased: Condition-attributable per-person spending – that is, the average health care spending in a year that is attributable to a given condition among individuals with that condition – decreased for 5 of the 6 condition-specific groups from 2009 to 2016. The decreases in per-person attributable spending were largely driven by declines in medical services spending, whereas per-person pharmacy spending rose for most conditions. Attributable spending for Minnesotans with dementia increased slightly from 2009 to 2016.

Total disease-attributable health care spending for all select chronic conditions and smoking exposure is projected to rise steadily over the next decade: Total health care spending in Minnesota that is attributable to selected chronic conditions is projected to grow between 21 percent (obesity) to 58 percent (dementia) between 2016 and 2027.

Overall actual disease attributable spending in 2016 was substantially below baseline projections. However, for state-administered programs, actual spending was estimated to be greater than projections: Actual disease attributable spending – or health care spending directly related to a certain condition for all people with the condition – was below projected spending across all conditions and population groups. However, most of the net difference between actual and projected spending for 2016 occurred among people ages 60 years and older, with actual spending for Minnesotans under the age of 60 *exceeding* projections. To estimate spending for Minnesotans covered by state-administered programs, we employed various approaches that resulted in a range of estimates. Based on the midpoint of the range, we conclude that actual spending exceeded projections for 2016. As such, the criteria in state law for a transfer between the General and Health Care Access Funds are not met.⁹

⁹ Minnesota Statutes, Chapter 62U.10, subd. 8.

Diabetes-Attributable Health Care Spending (All Ages)

In 2016, roughly 367,000 Minnesotans of all ages—about 7 percent of the population—received health care services related to the treatment of diabetes, an increase of about 75,000 from 2009 (292,000 Minnesotans, 6 percent of the population).

Per-person total health care spending for Minnesotans treated for diabetes in 2016 was about 3.2 times as high as per-person total spending for all Minnesotans (\$20,370 vs \$6,366 respectively, as shown in Figure 2). Roughly 17 percent of the spending for people with diabetes in 2016, or \$3,526 per person, was directly attributable or related to the treatment of the disease.

As displayed in Figure 3, medical services spending accounted for most (about 68 percent) of diabetes-attributable spending (\$2,408 per person in 2016), with pharmacy spending making up the remaining 32 percent (\$1,119 in 2016). Medical spending decreased from 2009 to 2016 (\$3,054 vs \$2,408, respectively), while pharmacy spending increased (\$749 for 2009 vs \$1,119 for 2016).

Figure 2: Per-Person Health Care Spending Among All Minnesotans and People with Diabetes

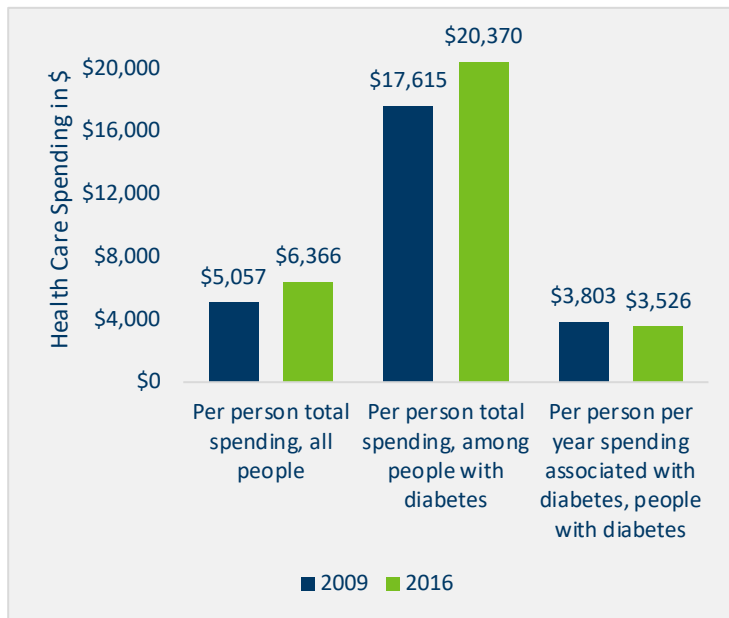
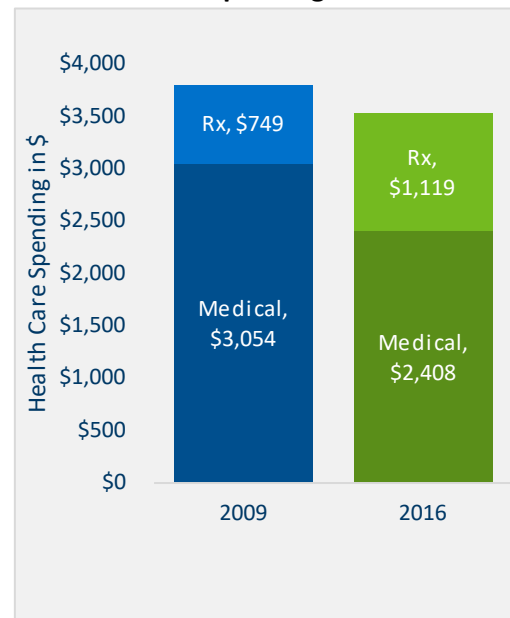


Figure 3: Per-Person Spending Associated with Diabetes, by Type of Spending



Source: Mathematica Policy Research analysis of the Minnesota All Payer Claims Database and other data.

Hypertension-Attributable Health Care Spending (All Ages)

In 2016, roughly 1.134 million Minnesotans of all ages—about 21 percent of the population—received health care services related to the treatment of hypertension (high blood pressure), an increase of 219,000 from 2009 (915,000 Minnesotans, 18 percent of the population).

Per-person total health care spending for people treated for hypertension was about 2.6 times as high as per-person total spending for all Minnesotans (roughly \$16,278 and \$6,366 per-person, respectively, as shown in Figure 4). Roughly 25 percent of the spending for people with hypertension in 2016, or \$4,056 per person, was directly attributable or related to the treatment of the disease.

As displayed in Figure 5, medical services spending accounted for about 77 percent of the directly attributable spending (\$3,141 per person in 2016), with pharmacy spending making up the remaining 23 percent (\$915 per person in 2016). Medical spending decreased from 2009 to 2016 (\$3,771 vs \$3,141 per person, respectively), while per-person pharmacy spending associated with hypertension increased (\$680 for 2009 vs \$915 for 2016).

Figure 4: Per-Person Health Care Spending Among All Minnesotans and People with Hypertension

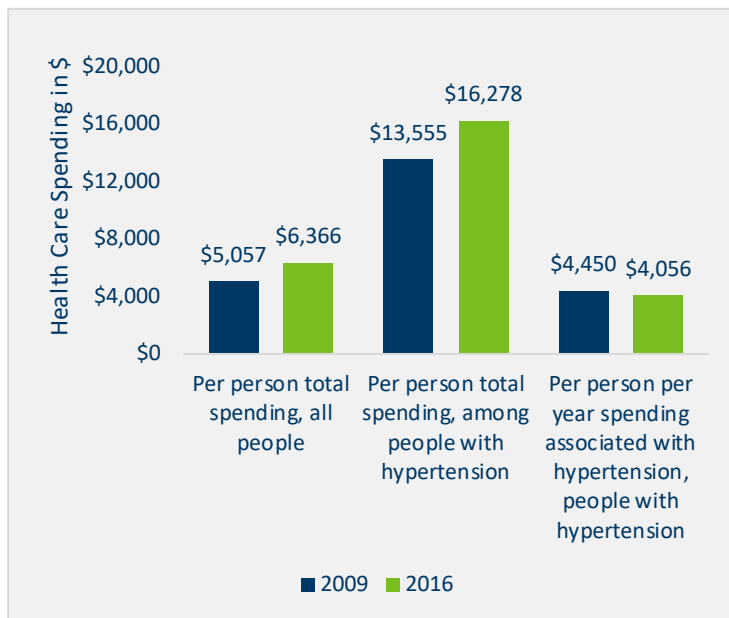
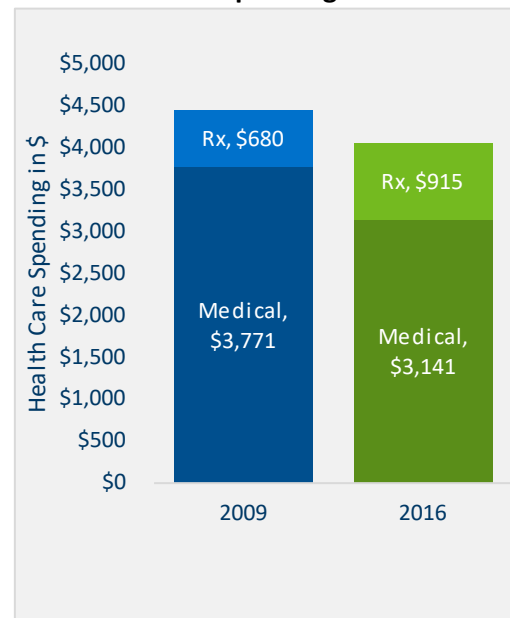


Figure 5: Per-Person Spending Associated with Hypertension, by Type of Spending



Source: Mathematica Policy Research analysis of the Minnesota All Payer Claims Database and other data.

Dementia-Attributable Health Care Spending (Ages 18 and Older)

In 2016, roughly 74,000 Minnesotans ages 18 and older—about 2 percent of that population—were estimated to have been treated for a diagnosis of Alzheimer’s disease, vascular dementia, or a similar condition, an increase of about 28,000 from 2009 (46,000 Minnesotans, 1 percent of the population ages 18 and older).

Per-person total health care spending for adults treated for a form of dementia was roughly 4.8 times as high as per-person total spending for all Minnesota adults (\$34,971 vs \$7,255, respectively, as shown in Figure 6). Roughly 12 percent of the spending for people with dementia in 2016, or \$4,247 per person, was directly attributable or related to the treatment of the disease.

For Minnesotans with dementia, nearly all per-person health care spending attributable to the disease (roughly 95 percent or \$4,039 in 2016) was for medical services spending, with the remainder (5 percent or \$208 in 2016) attributed to pharmacy spending (Figure 7).

Figure 6: Per-Person Health Care Spending Among Minnesotans and People with Dementia, Persons Ages 18 and Older

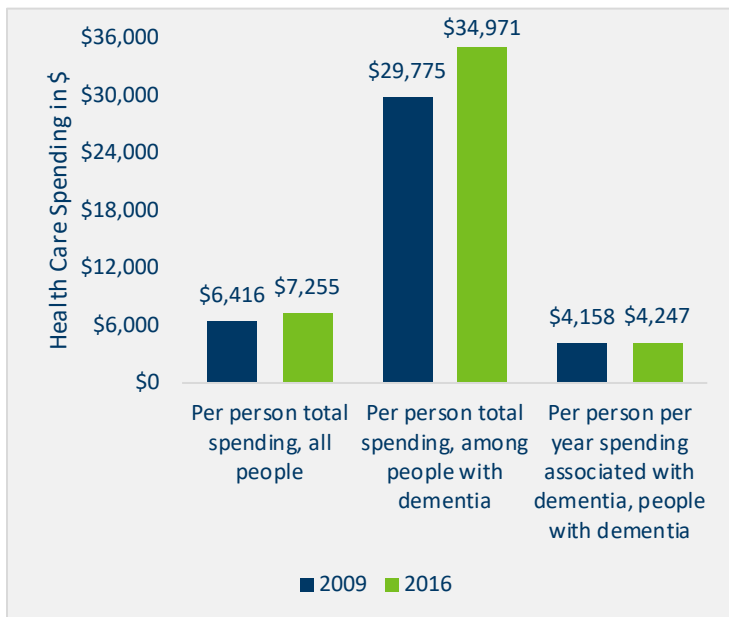
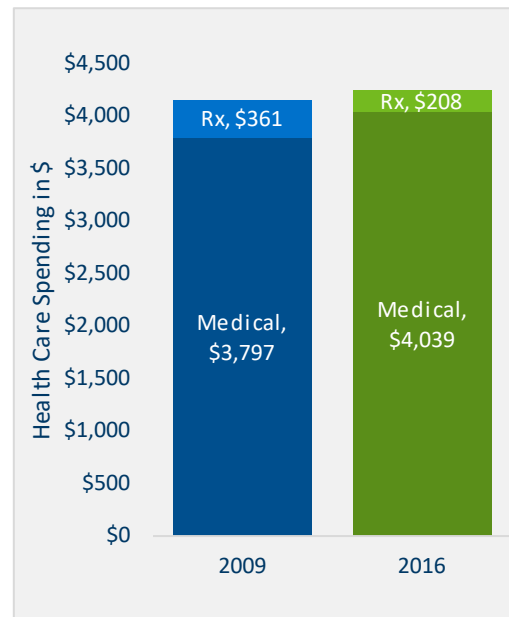


Figure 7: Per-Person Spending Associated with Dementia, by Type of Spending



Source: Mathematica Policy Research analysis of the Minnesota All Payer Claims Database and other data.

Chronic Disease-Attributable Health Care Spending (Ages 60 and Older)

Most people ages 60 years and older have been diagnosed with one or more chronic conditions for which they receive medical care or prescription drugs. In 2016, roughly 928,000 Minnesotans fell into this group, representing about 80 percent of Minnesotans ages 60 years and older (compared to 695,000 or 78 percent of the population in 2009). Overall, this group has grown by roughly 34 percent or 233,000 individuals since 2009.

Because of the high prevalence of chronic conditions among people ages 60 and older, per-person health care spending for Minnesotans 60 years of age and older with a chronic condition was similar to that of all individuals in that age group (\$13,983 compared to \$11,129, as shown in Figure 8). Because this section reports spending attributable to any identifiable chronic condition, rather than one specified condition, roughly 70 percent of the spending for people in this age group with chronic conditions, or \$9,857 per person in 2016, was directly attributable or related to the treatment of chronic disease.

As displayed in Figure 9, 89 percent of per-person spending (\$8,798 per-person) for this group was attributed to medical services spending, with the remaining 11 percent or (\$1,059) attributable to pharmacy spending.

Figure 8: Per-Person Health Care Spending Among All Minnesotans and People with a Chronic Condition, Persons Ages 60 and Older

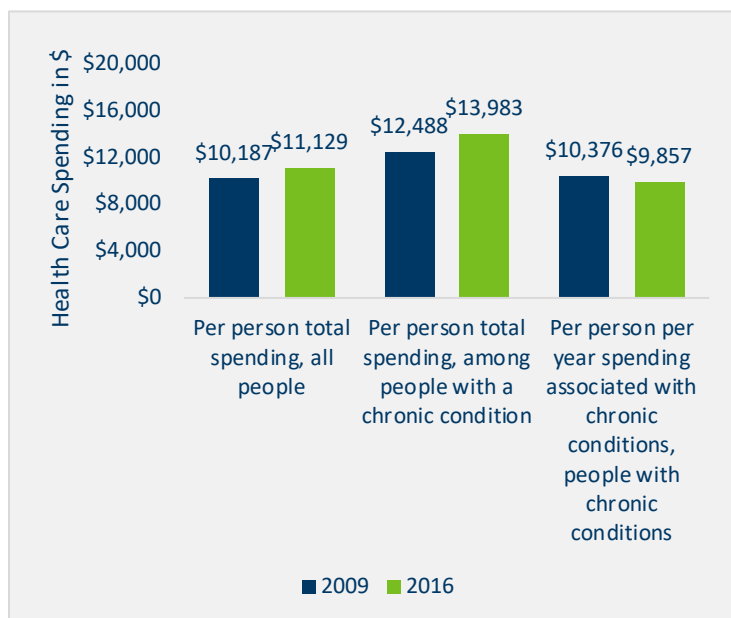
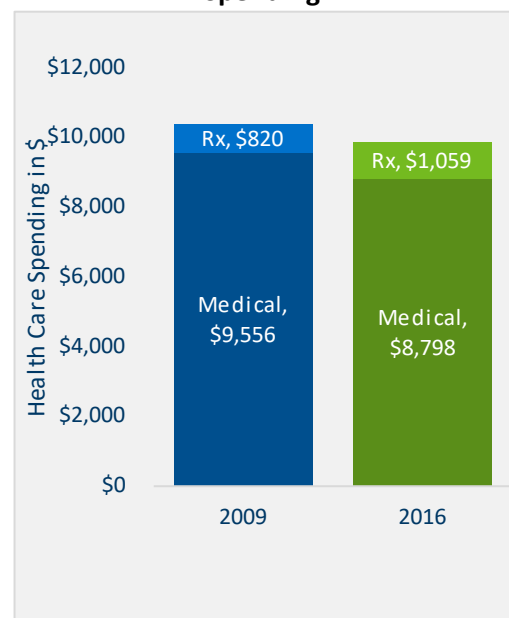


Figure 9: Per-Person Spending Associated with Chronic Disease, Persons Ages 60 and Older, by Type of Spending



Source: Mathematica Policy Research analysis of the Minnesota All Payer Claims Database and other data.

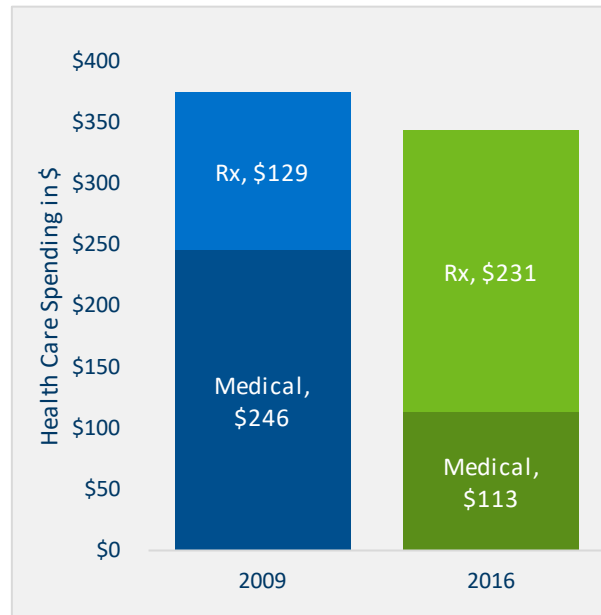
Obesity-Attributable Health Care Spending (Ages 10 to 64)

In 2016, about 914,000 Minnesotans between the ages of 10 and 64—23 percent of that population—met definitions for obesity. This represents a negligible decrease of roughly 5,000 from 2009 (919,000 Minnesotans, 24 percent of the population ages 10 to 64).

Per-person disease attributable spending for Minnesotans who met the definition of obesity was \$344 in 2016, a decrease of about 8 percent from 2009 (\$375, as displayed in Figure 10). Pharmacy spending comprised roughly two thirds (67 percent) of per-person obesity-attributable spending in 2016, with medical services, such as doctors' appointments, laboratory tests, procedures and equipment making up the remaining 33 percent.

Because obesity is a condition that cannot be ascertained from health care claims data, these estimates are based largely on data from the Medical Expenditure Panel Survey (MEPS) and the Behavioral Risk Factor Surveillance System (BRFSS) as described in the Supplemental Appendices. Due to sample size and other limitations of survey data, the estimates of medical and pharmacy spending associated with obesity do not include Minnesotans ages 65 or older and should be interpreted with caution. It is also important to keep in mind that some of the health consequences of obesity take many years to develop. Producing one-year estimates of obesity-associated spending is challenging because the health consequences of obesity include many different conditions and are not necessarily consistent from year-to-year.

Figure 10: Per-Person Spending Associated with Obesity, by Type of Spending



Source: Mathematica Policy Research analysis of the Minnesota All Payer Claims Database and other data.

Smoking-Attributable Health Care Spending (Ages 18 to 64)

In 2016, an estimated 1.254 million Minnesotans ages 18 to 64—37 percent of that population—were current smokers, former smokers, or lived with a person who smoked. Relative to 2009, the number of adults under 65 who at some point were exposed to the effects of smoking fell in absolute terms (by roughly 53,000 Minnesotans) and as a share of all adults under 65 years (from 40 percent).

Per-person health care spending estimates for 2009 and 2016 have been intentionally omitted from this report. The high-level interpretation of the 2016 estimates calculated for this report remains consistent with our findings from earlier years. Considering not only the cost of health care, but also the propensity to use health care, smoking attributable per-person health care spending for Minnesotans ages 18-64 is relatively low in any one year and subject to considerable uncertainty.

We have always recommended cautious interpretation of these estimates, taking into consideration the data sources used, the population studied, and the methodology for attributing health care spending to those exposed to smoking.¹⁰ Because smoking exposure cannot be ascertained from claims data, these estimates are based largely on data from the Behavioral Risk Factor Surveillance System (BRFSS), as well as the Medical Expenditure Panel Survey (MEPS) linked with the National Health Interview Survey (NHIS). Due to sample size and other limitations of survey data, the estimates of medical and pharmacy spending associated with smoking exposure do not include Minnesotans ages 65 or older, an age group more likely than younger adults to have substantial health care costs related to smoking. As a result, the per-person spending values presented here are almost certainly underestimates of health care spending related to smoking exposure. As with obesity, producing one-year estimates of smoking-associated spending is challenging because the health consequences of smoking include many different conditions, some of which may take many years to develop, and are not necessarily consistent from year-to-year. Additionally, the methods for calculating per-person per-month spending account for not only the cost of health care used by those exposed to smoking, but also the propensity to use health care.

¹⁰ Methods for estimating smoking exposure and associated health care spending are explained in detail in the Supplemental Appendices.

These methodological challenges are not unique to Minnesota or this report. A review of the literature conducted for the 2014 iteration of this report noted a wide range of estimates of the health care spending associated with smoking, with researchers regularly noting the complexities in analyzing this population.¹¹ Nevertheless, the detrimental effects of smoking on human health are well-established, as are the benefits of quitting.

¹¹ Congressional Budget Office (2012) ["Raising the Excise Tax on Cigarettes: Effects on Health and the Federal Budget"](https://www.cbo.gov/sites/default/files/cbofiles/attachments/06-13-Smoking_Reduction.pdf), Legislative Report; (https://www.cbo.gov/sites/default/files/cbofiles/attachments/06-13-Smoking_Reduction.pdf).

Current Disease Attributable Spending and Spending Projections

The statute directing this study requires MDH to compare total estimated actual disease attributable spending for the current year with an updated projection from 2009 baseline estimates. For 2016, we found that total *actual* estimated spending for the conditions assessed in this report was *lower than* projected spending (about \$456.2 million less than the total projected spending of \$11.7 billion).¹² As shown in Table 1, this difference between actual and projected spending was driven primarily by lower-than-expected disease-attributable spending for individuals ages 60 years and older (by \$814.3 million), with spending for individuals under the age of 60 exceeding projections (by \$358.2 million).

Table 1: Actual and Projected Estimates of Disease-Attributable Spending, 2016

Group		Spending (Million \$)		
		Actual	Projected	Difference
Condition Categories	Diabetes (all ages)	\$1,293.3	\$1,385.0	(\$91.7)
	Hypertension (all ages)	\$4,599.4	\$5,143.0	(\$543.7)
	Dementia (ages 18 and older)	\$312.3	\$249.1	\$63.2
	Obesity (ages 10 to 64)	\$314.7	\$414.2	(\$99.6)
All chronic conditions ages 60 and older		\$9,150.4	\$9,964.7	(\$814.3)
Selected chronic conditions under age 60		\$2,085.7	\$1,727.5	\$358.2
Total		\$11,236.1	\$11,692.2	(\$456.2)

Source: Mathematica Policy Research analysis of the Minnesota All Payer Claims Database and other data.

The statute also requires MDH to estimate the difference between actual and projected spending for populations covered by state-administered programs—Medicaid, MinnesotaCare and the State Employee Group Insurance Program. Various approaches result in estimates ranging from actual spending falling \$18.1 million below projections to actual spending

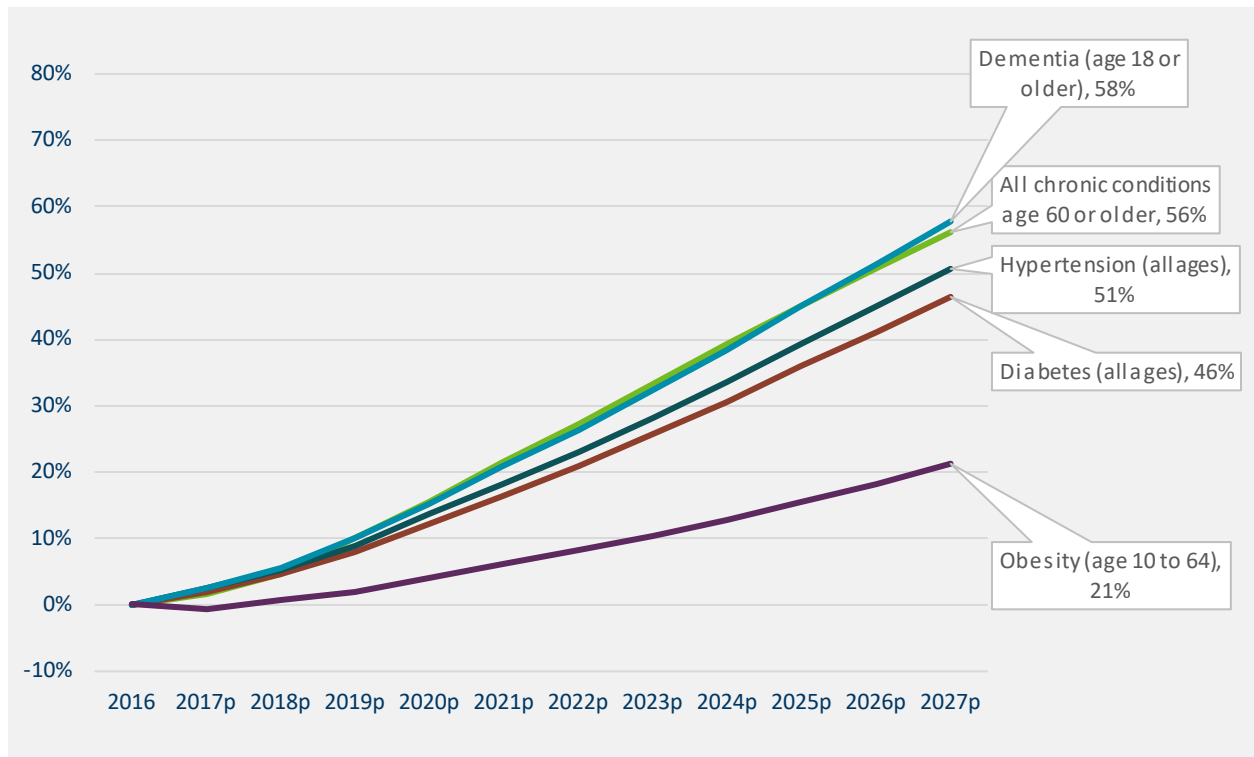
¹² Due to our ongoing concerns with the data and methods underlying the smoking exposure portion of this report, smoking exposure-attributable spending estimates have not been incorporated here. For this report and previous years, there is little difference in these calculations regardless of whether the smoking estimates are included or not included.

exceeding projections by \$29.3 million in 2016. Based on the midpoint of this range, we conclude that actual spending exceeded projections for 2016.

Because the portion of the difference accruing to state-administered programs does not meet or exceed \$50 million, the condition that would trigger the requirement in statute for a transfer of resources between the General Fund and the state’s Health Care Access Fund is not met.¹³

Projections of health care spending over a ten-year period show steady increases across all chronic conditions and risk factors studied. As shown in Figure 12, projected cumulative spending growth between 2016 and 2027 ranges from 21 percent for adults ages 10-64 with obesity to 58 percent for adults with dementia.

Figure 11: Cumulative Percent Change in Projected Health Care Spending Attributed to Selected Chronic Conditions and Smoking Exposure



Source: Mathematica Policy Research analysis of the Minnesota All Payer Claims Database and other data. Additional detail available in Appendix 6.

¹³ If the estimated difference between actual and projected health spending attributable to state-administered programs in one year or cumulatively over two or more years is greater than or equal to \$50 million, a transfer of funds from the general fund to the health care access fund is triggered. (Minnesota Statutes, Chapter 62U.10, subd. 8).

To help assess if Minnesota is making progress over time with respect to prevention and control of chronic conditions, these projections consider only the factors contributing to chronic condition prevalence and spending that are *not* amenable to public health intervention. Two such factors are (1) the expected impact of changes in the age and sex distribution of the population on overall prevalence, assuming that age- and sex-specific prevalence remains constant, and (2) the expected growth in the cost or price of health care and prescription drugs.

Given this aspect of the projections, if we continue to see increasing prevalence of these conditions *within* most age groups, future spending has the potential to considerably outpace these projections.¹⁴ On the other hand, if prevalence of these conditions decreases within most age groups, we would expect to observe future spending that is below projections.

Conclusion, Limitations and Future Directions

In its third year, this annual report confirms many of the observations from previous years:

- Chronic disease-related health care spending is substantial, particularly for Minnesotans ages 60 and older;
- Treated prevalence of many chronic conditions continues to rise across nearly all age groups; and
- Over time, health care spending attributable to chronic conditions and smoking is expected to continue rising steadily.

In the first and second reports on disease-attributable spending, we emphasized that solutions to this ongoing crisis must focus on prevention and on building environments that promote health and well-being for all. We also noted that these efforts must be system-wide and persistent, given the years or decades required for the needed changes and their impacts to fully manifest. This third analysis offers continued evidence in support of these conclusions. For health system transformation to have a meaningful impact, it must address both prevention of chronic conditions and cost-efficient health care for Minnesotans with chronic conditions.

Technical challenges associated with this work have been described in previous iterations of this report and are important considerations for interpreting findings in this report as well.

¹⁴ Projections in our analysis are designed to only consider the likely impact of demographic changes (how will the population within certain age groups change) and of inflation (how are medical and pharmaceutical prices expected to change).

Briefly, because of the complexity of the task, this research has several limitations resulting from the various data sources, assumptions, and methods required. For the most part, these limitations apply to all versions of the report. For example, adjusting results to account for individuals not captured in the MN APCD (e.g., those without health insurance), accounting for limited sample size and various biases inherent in survey data, and controlling for unrelated health care spending all carry the potential to introduce error in the final estimates. Additionally, as previously noted, prevalence estimates in this report (with the exception of obesity and smoking exposure) should be considered as “treated prevalence,” requiring a condition-related encounter or medication to be identified. This likely underestimates the “true” prevalence of these conditions, but crucially captures the vast majority of condition-attributable spending among those who received health care for their condition.

There were two important changes to the underlying data used in the analyses for 2016. First, the transition from ICD-9 diagnosis coding to ICD-10, which took effect in the last quarter of 2015, affects estimates of disease prevalence simply because of differences in coding.¹⁵ Second, reductions in the volume of available data for Minnesotans covered by certain commercial plans governed by the Employee Retirement Income Security Act (ERISA) pose additional challenges for this and future iterations of this report.¹⁶ Even with adjustments to the estimates, intended to represent the broader population, this change likely biases prevalence and spending estimates in unknown ways. Together, these limitations affect the precision of point estimates and trends, and we urge caution in drawing conclusions from the year-over-year change and the magnitude of differences between estimated actual spending and projected spending. **Overall, however, the trends in Minnesota and the U.S. are that the population is aging, chronic conditions are becoming more prevalent, and spending on health care and prescription drugs is increasing.**

These limitations and other issues are described in greater detail in the Supplemental Appendices. Readers should also be aware that, because of continuous improvements to the MN APCD, there will be minor differences in results reported across the different iterations of this report. Further, because of these ongoing improvements, it will be necessary to recalculate the baseline data when we prepare each update to this report.

¹⁵ The transition to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD) has been shown to affect estimates of treated prevalence and spending for a range of diseases. See Appendix 6 for additional detail.

¹⁶ This was due to a 2016 U.S. Supreme Court decision in *Gobeille v. Liberty Mutual*, which holds that states do not have the authority to mandate reporting by ERISA-covered plans to state all payer claims databases. The decision does not prohibit the voluntary submission of ERISA-governed self-insured plan data to the MN APCD.

Any research study will have inherent strengths and limitations, and it is important to identify, address, and reduce the limitations as much as possible, while maximizing the strengths. The Legislature may wish to consider ways to better align the reporting requirements or the research questions with the available data or strengthen the data infrastructure to improve our ability to answer critical questions. Given that most patients with chronic conditions will have more than one condition, it is worth considering whether the current approach, which focuses on spending associated with each single condition (e.g., diabetes, hypertension, etc.), produces the most important desired information. Further, the current study approach focuses on *health care* spending, which fails to capture considerable indirect costs of chronic conditions (e.g., lost productivity and wages, family caregivers, etc.).

A reconsideration of the aims and related methodological approach could potentially improve the applied value of this report for Minnesota patients, providers, payers, public health professionals and agencies, and other stakeholders.

December 2021

Minnesota Department of Health
Health Economics Program
PO Box 64882
St. Paul, MN 55164-0882
651-201-4520 | health.hep@state.mn.us
www.health.state.mn.us/health/economics

To obtain this information in a different format, call: 651-201-4520.