Projected Health Care Spending in Minnesota: 2009-2019

Final Report

June 29, 2011

David Jones Michaela Vine Deborah Chollet



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Minnesota Department of Health Health Economics Program Golden Rule Building Suite 220, 85 East 7th Pl. St. Paul, MN 55164-0975

Project Officer: Stefan Gildemeister

Submitted by:

Mathematica Policy Research, Inc. 600 Maryland Avenue, S.W.

Suite 550

Washington, DC 20024-2512 Telephone: (202) 484-9220 Facsimile: (202) 863-1763 Project Director: Deborah Chollet Projected Health Care Spending in Minnesota: 2009–2019

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EXECUTIVE SUMMARY

Enacted as part of the 2008 reforms, Minnesota Statutes Section 62U.10 requires the Commissioner of the Minnesota Department of Health (MDH) to measure health care cost savings against projected costs without reform. Specifically, the Commissioner must establish a health care spending baseline for calendar years 2008 to 2018 and calculate the annual projected total private and public health care spending for state residents, excluding expenditures for Medicare and long-term care. In June 2009, Mathematica Policy Research delivered an initial set of expenditure projections (from 2007 to 2018) in the absence of Minnesota's reforms and a detailed review of the methods used to generate the forecasts. In a July 2010 report, Mathematica updated projections for 2008 to 2018 and summarized changes made to the methodology to account both for the impacts of severe economic recession and projected implementation of the national health care reform law. In this year's report, we update the projections to 2019. The projection models incorporate additional improvements to account for the impacts of recession, recovery from the recession, and national health care reform.

Methods for Projecting Health Care Spending in Minnesota

Projected expenditures for health services and supplies in Minnesota are calculated as the sum of projected private spending (modeled as described below) and public spending forecasts provided by (or extrapolated from) the Minnesota Department of Human Services (DHS). To project private health care spending in Minnesota to 2019 we began with the methodology as outlined in statute and employed in the June 2009 and July 2010 reports. Specifically, we developed a series of econometric models that explained past private health care spending as measured by MDH. The specifications for the models generally followed the Centers for Medicare and Medicaid Services (CMS) methods for forecasting the National Health Expenditure Accounts (NHEA) with several modifications to reflect Minnesota's health care experience and economic circumstances.

The model used to project health care spending in Minnesota for this report is changed from the model used in the July 2010 report in three respects:

- Nominal Minnesota per capita GDP replaced real national per capita GDP to better reflect economic conditions specific to Minnesota
- National nominal per capita private spending pre-federal reform (Health Services and Supplies) was added to help account for the economic recession and anticipated recovery
- The national index of the relative price of personal health care was removed because it is a primary component of the newly added national spending variable and therefore redundant (evidenced in that price was no longer a significant predictor of spending).

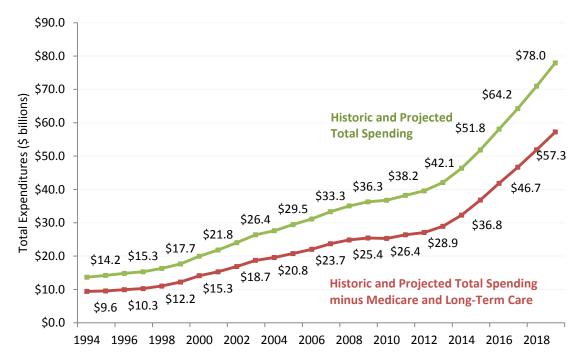
In addition, we expanded the historic spending data to include 2008 (compared to models run on data through 2007 in the two previous reports) and therefore, the projections now span from 2009 to 2019.

Projected Spending for Health Care in Minnesota

Excluding Medicare and long-term care expenditures, total spending in the absence of the 2008 reforms is projected to reach \$57.3 billion in 2019 (Figure ES.1). This level of expenditure is 123 percent greater than the \$25.7 billion spent in 2009 (the most recent year for which MDH has

estimated actual spending). Including both Medicare and long-term care, total spending for health services and supplies in the absence of the 2008 reforms is projected to be \$78.0 billion in 2019, 114 percent more than the estimated \$36.4 billion spent in 2009.¹

Figure ES.1. Historic and Projected Total Health Care Spending in Minnesota: 1994-2019 (current dollars in billions)



Mathematica Policy Research. Historic expenditure estimates (1994-2008) are from the Source:

Minnesota Department of Health.

Note: Estimates exclude the projected effects of the 2008 reform in Minnesota as well as effects of

the Patient Protection and Affordable Care Act.

Projected Spending Growth

Growth in spending for health services and supplies in Minnesota from 2009 to 2019 is projected to remain consistent with spending growth in past years (Table ES.1). Spending growth from 2009 to 2019 (minus Medicare and long-term care) is projected to grow at an average annual rate of 8.5 percent, similar to historic spending (from 1998 to 2008).

The average growth rates for projected total private spending (7.9 percent) is slightly lower (0.3 percentage points) than the historic average (8.2). A static or lower average growth rate is projected for each of the private payer types (private health insurance, other private, and out-of-pocket) as well as all service types except physician services and prescription drugs. In contrast, the average growth rate for projected total public spending (10.1 percent) is 0.8 percentage points higher than the

¹ Because Minnesota excludes uncategorized spending when reporting on spending projections, estimates reported by Minnesota may differ from those reported in this report.

historic average (9.3 percent), reflecting average growth in Medicaid spending that is 1.9 percentage points higher than historic growth.

Table ES.1. Estimated Average Annual Growth in Expenditures for Health Care Services and Supplies in Minnesota, minus Medicare and Long-Term Care, by Service Type and Payer: 1998-2019 (percent change in current dollars)

	Historic Average Annual Growth 1998–2008	Projected Average Annual Growth 2009–2019	Percentage Point Change in Average Annual Growth, from 1998–2008 time period to 2009–2019 period
Total Spending	8.5	8.5	0.0
Service Type			
Inpatient Hospital	8.7	7.4	-1.3
Physician Services	7.6	12.3	4.7
Prescription Drugs	8.0	11.2	3.2
Outpatient Hospital	11.8	7.3	-4.5
Dental	8.4	-0.5	-8.9
Other Professional	10.6	7.9	-2.7
Other	7.7	4.4	-3.3
Uncategorized	4.1	1.9	-2.2
Payer Type			
Total Private	8.2	7.9	-0.3
Private Health Insurance	9.1	9.1	0.0
Other Private	3.9	-1.0	-4.9
Out of Pocket	6.4	3.2	-3.2
Total Public	9.3	10.1	0.8
Medicaid	10.3	12.2	1.9

Source: Mathematica Policy Research. Historic expenditure estimates (1998-2008) are from the

Minnesota Department of Health.

Note: Percentage point changes may reflect rounding.

Economic recession and recovery. The recent downturn in the U.S. economy and pace of eco Factors that Could Affect the Accuracy of the Projections

A number of factors could significantly affect the accuracy of the expenditure projections. As discussed below, such factors include the accuracy of projected public expenditures and changes in environmental circumstances and government policy that are outside Minnesota's historical experience.

Public spending. The projections rely on the accuracy of projected future values of public spending in Minnesota in two ways: indirectly (it is an explanatory variable in the private spending models by spending type, but not included in the total spending model) and directly (as a major component of aggregate spending). We made assumptions about the growth rates of public spending for the various public programs in Minnesota based on the growth observed and projected prior to the 2008 reforms. Any changes unrelated to the 2008 reforms but that would affect future spending growth in Minnesota's public programs—including national health care reform—could substantially impact the accuracy of the projected spending.

Economic recession and recovery. The recent downturn in the U.S. economy and pace of economic recovery over the next decade are likely to affect the accuracy of projected spending. While the CMS models capture the usual relationship between general economic conditions and health care spending, the current economic situation is unprecedented. That is, we did not observe conditions from 1993 to 2008 in Minnesota that would provide evidence of how health care spending responds in the current economy. By adding variables that successfully predict change in health care spending in economic recession and recovery periods (employment and insurance coverage), the models are better able to predict spending during these periods. We also added the national spending estimates and projections to the total private spending model; these are built using a longer historic time period that is more likely to include similar economic experiences. However, it will it be possible to re-estimate the models and improve the accuracy of the projections only as data reflecting responses to current economic conditions in Minnesota become available.

Government policy. The Patient Protection and Affordable Care Act (PPACA) will change public and private health care spending nationwide and in Minnesota. Because (following CMS) we use public spending to predict private spending in Minnesota, even accurate projections of future public spending could lead to inaccurate projections of future private spending by service and payer sector if PPACA alters the relationship between public and private spending as it occurred historically (for our purposes, from 1993 to 2008). Consequently, accurately predicting the impacts of federal health reform (independent of both the historical relationship between public and private spending in Minnesota and the state's own reforms) is essential to predicting private spending absent Minnesota's reforms.

I. BACKGROUND

Minnesota enacted a wide-ranging set of health reforms in 2008. They included provisions to help improve Minnesotans' health status; increase access to MinnesotaCare and other state public health care programs; increase offer and take-up of Section 125 plans to help employees afford group coverage; expand the use of medical homes, especially for chronic care management; establish a statewide system of quality-based incentive payments for use by public and private health care purchasers alike; and improve efficiency via adoption of electronic health records and e-prescribing.²

Enacted as part of the 2008 reforms, Minnesota Statutes Section 62U.10 requires the Commissioner of the Minnesota Department of Health (MDH) to measure health care cost savings against projected spending without the reforms. Specifically, the Commissioner must establish a health care spending baseline for calendar years 2008 to 2018, and calculate the annual projected total private and public health care spending for state residents. The law instructs the Commissioner to use the Centers for Medicare and Medicaid Services (CMS) forecast for total growth in national health care expenditures excluding Medicare and long-term care spending, and adjusted to reflect Minnesota's particular circumstances as the Commissioner deems necessary.

In December 2008, MDH contracted with Mathematica Policy Research to develop expenditure projections in the absence of reform. In June of 2009, Mathematica submitted a report to MDH projecting health care expenditures in Minnesota from 2007 to 2018 (Jones and Chollet 2009). Mathematica submitted a second report, updating projections and summarizing improvements to the methodology, in July of 2010 (Jones and Chollet 2010).

This report builds on the analysis in the 2010 report. We present updated health spending projections in Minnesota from 2009-2019 and summarize additional improvements to the methodology. Expenditure projections without Medicare and long-term care spending are reported (as Minnesota Statutes Section 62U.10 specifies), as are estimates that include both spending components. Projected spending is reported both by major type of service (inpatient hospital, outpatient hospital, physician services, prescription drugs, dental services, other professional services, and other services and supplies) and by private payers (private insurance, other private sources, and out-of-pocket, or OOP) separately from public payers (Medicare, Medicaid, and other public sources). Finally, we present initial projections of the changes in total public and private spending with implementation of the new federal health care reform law.

A. Overview of methods

To develop projections of health spending in Minnesota assuming no passage of the 2008 reforms, it is necessary to draw on Minnesota's cost experience prior to reform. The projections presented in this report differ from those in the 2009 and 2010 reports for two reasons. First, MDH

² The health reform measures passed in the 2007-2008 session are largely included in Chapter 358, Senate File (S.F.) 3780. Additional reform measures enacted in 2008 include legislation passed as Omnibus tax bill Chapter 366, House File (H.F.) 3149 (which authorizes grants and tax credits to cover certain employers' cost of establishing Section 125 Plans); Supplemental budget bill Chapter 363, H.F. 1812 (which requires health care cost savings to be measured against projected costs without reform); and Omnibus higher education bill Chapter 298, S.F. 2942 (which requires a workgroup to develop recommendations for the education and regulation of oral health practitioners).

has made improvements to the estimates of health spending in Minnesota from 1993 to 2007 and added final spending estimates for 2008 and 2009. As a result, the underlying data used in the projection models changed. Second, we tested and adopted alternative specifications to several of the econometric models that produced the projections in the 2010 report. The projections in this report build upon improvements made to the models described in the 2010 report with several additional changes to the total private spending model to improve the plausibility of the estimates and the fit of the models to historic data. These improvements include: (1) the addition of a national nominal per capita private spending variable to account for national health care spending; (2) use of Minnesota nominal per capita GDP (replacing national per capita GDP) to better reflect the economic conditions in Minnesota; and (3) removing the national index of the relative price of personal health care to avoid redundancy with the total private national spending variable.

1. CMS's Projection Methods

Minnesota Statutes Section 62U.10 requires the Commissioner to use the CMS forecast for total growth in national health care expenditures, adjusted as deemed necessary for factors specific to Minnesota. CMS bases its forecast on the National Health Expenditure Accounts (NHEA), which include annual estimates of total expenditures for health services and supplies across the United States, projecting these estimates forward eleven years.³

CMS develops personal health care expenditures both by type of service and by source of financing. Expenditures are estimated for ten major service types: hospital care, physician and clinical services, other professional services, dental services, home health care, other personal care, nursing home care, prescription drugs, other non-durable medical products, and durable medical equipment. Compared to the NHEA, the health services and supplies category excludes research and construction expenditures.

In addition, the NHEA projections recognize five major sources of payment: (1) private health insurance, including all premiums to private insurers, divided between those paid by employers and by households or individuals; (2) OOP spending, including any direct payment for health care such as coinsurance and deductibles for private and government-sponsored plans, and the cost of services not covered by insurance; (3) other private sources, including philanthropic contributions and income from activities such as hospital gift shops, cafeterias, and parking lots; (4) federal government spending including Medicaid, Medicare, and CHIP; and 5) state government spending including Medicaid and CHIP. CMS also reports total projected expenditures for Medicaid and Medicare separately from federal and state spending.

CMS uses a series of single-equation econometric models to forecast growth in the private spending component of the NHEA—specifically, annual growth in real per capita private spending in total, and then by type of service and payer. The CMS model for total private spending includes three core explanatory variables: (1) growth in real per capita disposable personal income (DPI), less

³ The NHEA divide health services and supplies into three groups: (1) personal health care, including hospital care, professional services, nursing home and home health, and retail sales of medical products; (2) government public health activities, including expenditures to promote the general health of the population such as immunization and disease prevention programs; and (3) government administration and the net cost of private health insurance, including all expenditures net of benefits for private insurance and the cost of administering government programs. Nonprofit or government research expenditures as well as the costs of capital accumulation (structures and medical equipment) are classified separately as investment.

Medicare and Medicaid spending; (2) the relative price of medical care; and (3) real per capita public spending growth.⁴ Total future spending is the sum of the private spending projections (derived from the model) and public spending forecasts generated outside the model. Public spending is based primarily on Office of the Actuary (OACT) projections of Medicare and Medicaid spending. CMS's methods and data sources for projecting national health expenditures are explained more fully in documents available on the CMS website (CMS 2010a, CMS 2010b)^{5 6}.

CMS models real per capita private spending growth for the ten service types separately. In general, these models contain the same basic variables as the aggregate model with various exceptions to improve the predictive accuracy of each model. Once the aggregate and service type models are estimated, CMS constrains the predicted values from each service type model, so that they sum to the annual projections from the aggregate model. Spending for each payer type is modeled for the ten service types and then added across service types to estimate total spending by each payer. Again, spending is constrained for both payer and service types to ensure that the aggregate, service-type, and payer-type projections are consistent.

Finally, to estimate total projected spending for health services and supplies, public health activities and government administration and the net cost of private health insurance are estimated separately and added to spending by type of service.

2. Alternative Specifications to Forecast Expenditures in Minnesota

To update projections of future health care spending in Minnesota, we began with the econometric models used in our July 2010 report, making several modifications to the model specifications as described below. Projected total spending is estimated as the sum of projected private spending (modeled using the CMS approach) and public spending forecasts provided by the Minnesota Department of Human Services (DHS).

Our estimates and projections of total expenditures in Minnesota measure the same total set of services and payers as the NHEA. However, because our projections of private spending are based on the historic estimates constructed by MDH, they reflect the service categories and construction that MDH has reported historically. Specifically, MDH defines eight service categories: inpatient hospital, physician services, prescription drugs, outpatient hospital care, long-term care (including

⁴ CMS measures the explanatory variables in the model as follows. The DPI measure is constructed using the University of Maryland Long-Term Interindustry Forecasting Tool (LIFT). CMS estimates the relative price of medical care in a separate equation, primarily determined by a series of input prices. Projections of Medicaid and Medicare spending are based on forecasts by CMS's Office of the Actuary (OACT). Projections for other public expenditures are based on lagged growth in GDP.

⁵ Centers for Medicare and Medicaid Services (CMS). Projections of National Heath Expenditures: Methodology and Model Specification: February 2010 [https://www.cms.gov/NationalHealthExpendData/downloads/projectionsmethodology.pdf].

⁶ Centers for Medicare and Medicaid Services (CMS). National Health Expenditures Projections 2009-2019: September 2010. [https://www.cms.gov/NationalHealthExpendData/downloads/NHEProjections2009to2019.pdf].

⁷ Prescription drugs are the only exception to this part of CMS's methodology. CMS bases adjustments to estimates of prescription drug spending on outside research.

⁸ The July 2010 report includes a detailed description of the model specifications used and identifies all modifications made to the CMS NHEA models.

nursing home and home health care), dental care, other professional services, and other spending. In addition, public health activities, health plan administration and the net cost of private health insurance are included in the "other spending" category (and are not a separate expenditure category, as in the NHEA).

We estimated models for total private spending as well as for each expenditure category and payer type. We then explored a number of alternative specifications for total spending, focusing on the fit statistics for the models and the plausibility of the projections generated by the models. The variables included and fit statistics for each model are reported in Appendix C. To estimate the effects of federal reform implementation on projected spending, we changed the values of the variables used to estimate these models, but did not change the model specifications.

B. Organization of the Report

The remainder of the report is organized as follows. The methods used to project public and private spending are briefly described in Chapter II, together with the construction of key explanatory variables. Changes made to methodology (if any) relative to those documented in the July 2010 report are highlighted. In Chapter III, the models that support expenditure projections by service and payer type, and the performance of the models, are presented. In Chapter IV, we present the projection results, and in Chapter V we provide an analysis of the impacts of federal health care reform on projected spending in Minnesota. The methods used to project public and private spending are reported in Appendix B.

⁹ We modeled real per capita private spending rather than the growth in real per capita private spending (as CMS does) to improve the fit of the models. We also chose to include each variable as is rather than log-transformations as transforming the variables did not substantially change the distributions of the variables and it did not improve fit.

¹⁰ For the purposes of this report, "fit" refers to the performance of a model in predicting historic values of spending. The primary factors in determining which models have the best fit are R-squared and adjusted R-squared statistics, as well as the average absolute difference between actual and predicted historic values.

II. METHODS AND DATA

Future total spending for health services and supplies, minus Medicare and long-term care, were estimated as the sum of projected aggregate private and public spending for Minnesota residents. 11, 12 Private spending was derived by estimating a regression model of aggregate private spending. The original regression model, presented in the June 2009 report, incorporated variations of the macroeconomic and health sector variables that CMS used to project national expenditures. Specifically, we included Minnesota-specific versions of the variables whenever possible to maximize the fit of the model. The June 2010 report details two changes to the model that were made to improve the performance of the model in predicting health expenditures during the recent recession and potential recovery periods: total employment per adult population in Minnesota and the percent of the population under age 65 without health insurance. It also included a time trend, following CMS's addition of a time trend in its most recent model. The current model incorporates three additional modifications: (1) the replacement of U.S. real per capita GDP with Minnesota real capita GDP, in keeping with our original attempt to include Minnesota-specific variables whenever possible; (2) the addition of U.S. nominal private spending, included to account for economic conditions not seen in the historic Minnesota time series and the effects of federal health care reform, and (3) the removal of the national medical price index, as national prices are largely captured by the addition of the national private spending variable introduced above. In addition, 2008 was included in the historic series of health care spending data. For the remainder of the Methods and Data section, we refer only to changes made to the models described in the June 2010 report.

A. Public Health Care Spending

Public health care spending projections were determined outside the model, based on DHS forecasts and growth rates in past public spending. Spending projections for three major public programs from 2009 through 2015 were aggregated using the 2011 DHS forecasts: (1) Medical Assistance (MA), (2) General Assistance Medical Care (GAMC),¹³ and (3) MinnesotaCare (MNCare). To project spending from 2016 to 2019, we applied the average growth rate in expenditures for each program over the last three years to expenditures for the given program in the previous year. Similarly, we projected spending for all other public spending categories from 2009 to 2019 using either three or five year average growth rates (depending on whichever average was the best approximation of recent growth and the least influenced by any outliers) for each type of spending. A more detailed description of how we projected public spending can be found in Appendix B.

¹¹Health Services and Supplies (HSS) is an expenditure category defined by CMS for their National Health Expenditure Accounts (NHEA). HSS includes all personal health care as well as program administration and net cost of private health insurance, and government public health activities. Although the sub-categories within HSS defined by MDH are not an exact match with those defined by CMS, most of the sub-categories are equivalent and the MDH and CMS definitions of overall HSS are the same.

¹² From this point forward, any mention of expenditures excludes Medicare and long-term care unless noted otherwise.

¹³ Projections do not contain GAMC in years beyond 2011. GAMC ended February 28, 2011, when GAMC enrollees began to recieve benefits under MA.

B. Private Health Care Spending

The model of aggregate private expenditures is based on the historic aggregate private spending estimates for health services and supplies constructed by MDH.¹⁴ As mentioned in Chapter I, we began with the total spending model specifications described in the July 2010 report. These models were based on the CMS model with national data, with real per capita private spending entered as the dependent variable. The model specifications from the July 2010 report included the following variables: (1) national real per capita GDP; (2) real per capita disposable personal income in Minnesota; (3) real per capita public spending in Minnesota¹⁵; (4) a national index for the relative price of personal health care; (5) total employment per adult population in Minnesota; and (6) the rate of uninsured among the population under age 65. The final two variables are both thought to have strong, if potentially countervailing, effects on individuals' use of health care.¹⁶

1. Specification of the Models

For this report, we tested a series of alternative models as potentially better predictors of private spending in Minnesota. These included the basic set of variables measured in different ways and various combinations of the explanatory variables. We examined the fit of each model and the plausibility of the resulting projections to select a final model to project private spending.

The final total private spending model incorporated three changes relative to the model used in our July 2010 report:

- Nominal per capita GDP for Minnesota replaced national real per capita GDP, consistent
 with the goal of including Minnesota-specific variables whenever possible. This decision
 was made after observing that Minnesota GDP and U.S. GDP were not highly correlated
 during some historical periods. Because the price index also was removed from the model
 (discussed below), nominal GDP (which captures both the change in aggregate productivity
 and changes in prices in Minnesota) was used.
- National nominal private spending was added to the model to help account for the influence of the recent recession and a pace of recovery. The national spending projections are modeled using a longer historic time series than was available for Minnesota and

¹⁴ We incorporated historic MDH estimates of private expenditures through 2008 in estimating these models.

¹⁵ CMS has found a strong negative relationship in the growth of per capita public and private spending (CMS 2010a). They argue this is due to a shift in relatively low-cost individuals (in particular children and non-disabled adults) from private to public insurance as well as short-term cost shifting between public and private programs. However, it may as well be an artifact of estimating macroeconomic models across (versus within) states. We include public spending for its strong predictive power; although in Minnesota, growth in public spending is positively associated with the growth in private spending.

¹⁶ The logic for potentially countervailing effects is as follows: As unemployment rises, some individuals lose employer-sponsored coverage. Of these, some become uninsured; others continue group coverage under COBRA or buy individual coverage. Some unemployed workers and their families, who may or may not have had coverage while employed, become eligible for public coverage as their incomes fall. Individuals who become uninsured are likely to reduce their use of health care, and therefore, their total spending (previously insured spending plus OOP spending) for care. However, the research literature suggests that the stress of unemployment triggers health problems and additional need for services. Therefore, among those who continue to be privately insured, total spending may increase. Those who newly enroll in public coverage would see reduced OOP spending, whether or not they had been previously insured.

includes periods that more closely resemble current economic conditions. Therefore, these projections are better able to capture the likely impact of the recession and recovery on health spending. Empirically, the addition of national spending projections reduced unrealistic short-term projected growth rates. It also allowed us to account for the influence of federal health care reform in the post-reform estimates by including national spending in the private spending health care model.

• The national index for the relative price of personal health care was removed. The national private spending variable serves, in effect, as a catchall for US health spending behavior, making the price variable redundant.

For this report, we used the payer and spending type models described in detail in the July 2010 report, without any of the changes to the total private spending model described above.¹⁷ The decision not to incorporate the changes made to the total spending model in the payer and spending type models was made for two reasons. First, since both service and payer type models were constrained to the total spending model results, changes to this model were reflected in the sector type models, without deviating further from the original model specifications. Second, we strove to keep models the same to the extent possible for consistency and comparability to past years.

Like the aggregate model, the separate models are estimated using the private expenditure series that MDH constructs by service type. The dependent variables are real per capita private spending for the each service type: inpatient hospital, physician services, prescription drugs, outpatient hospital, dental, other professional services, and other spending. The methods used to estimate the three payer-type models of private spending (private health insurance spending, other private spending, and OOP spending) are the same as for the service type models.

Because the individual models were estimated separately from the aggregate model, the sum of the projections does not equal total projected private spending from the aggregate model. Therefore (generally following CMS's methodology), we constrained the results of both the service and payer type models to sum to the projected total of private spending in the aggregate model. Because the aggregate model was considerably better at predicting past spending levels than the individual service and payer models, we used the aggregate projections as the standard and to constrain the sum of the projections from the individual models. 19

For this report, we estimated the spending models using an historic time series through 2008 (compared with 2007 in the previous two reports). Given the short time series that we are working with, each additional year of data adds considerably to the predictive power of the models. However, we were aware that use of 2008 estimates might incorporate impacts of the state health care reform in the historic time series. In conversations with MDH staff, it was agreed that the likelihood of

¹⁷ Model specifications are reported in Appendix C.

¹⁸ CMS's methodology for this procedure is not publicly documented. We used the same basic process, as it was explained in various personal communications with NHEA staff.

¹⁹ Specifically, we constrained the separate projections by taking the difference between the summed and the aggregate projection in a given year and reducing each figure proportional to its contribution to total projected spending. For instance, if the projection for inpatient hospital spending makes up ten percent of the sum of the projections in a given year and the difference between the sum and the aggregate projection is \$100, then we reduce the inpatient hospital projection by \$10. This assumes that each service type contributes to the overestimate proportional to its contribution to spending as a whole.

measurable reform impacts on spending in 2008 was very low, and that the empirical benefits of including 2008 in the time series for predicting the models substantially outweighed the potential drawbacks.

Having estimated future values for public and private spending for health services and supplies, we aggregated the spending categories to arrive at annual projections of total spending. Projected total and per capita spending is reported, as well as growth in spending over time.

2. Construction of Key Variables

We collected the historic and projected values for the explanatory variables from a variety of sources. The construction of the dependent and explanatory variables is discussed in greater detail in Appendix B.

Two new variables were tested and introduced into the specification of the total spending model used to project private spending for health care services and supplies in Minnesota:

- The national private spending variable was derived using CMS National Health Expenditure
 estimates for pre-reform Health Services and Supplies from 1993-2008 and projections
 from 2009-2019. To calculate nominal per capita national private spending, we divided
 nominal national spending by the total United States population, which was obtained from
 the US Census Bureau's annual estimates and projections.
- Minnesota nominal GDP estimates for 1993-2009 were obtained from the Bureau of Economic Analysis (BEA) website. We projected values for 2010-2018 using growth in national nominal per capita GDP (constructed by BEA in 2000 dollars). To calculate per capita GDP for Minnesota, the nominal GDP estimates and projections were divided by the total state population. Estimates of the state population were obtained from the Minnesota State Demographic Center.

C. Projections Including Medicare and Long-Term Care

We also estimated expenditures for health services and supplies in Minnesota that include Medicare and long-term care (nursing home and home health) spending. Medicare and long-term care were added to the analysis in three steps: (1) Medicare expenditures were extrapolated from 2009 to 2019, (2) a model of private long-term care expenditures was estimated, and (3) long-term care expenditures were added back into the aggregate private and public expenditure estimates.

We estimated Medicare expenditures in Minnesota from 2010 to 2019 using historic estimates provided by MDH and the projected growth rates in nationwide Medicare expenditures constructed by CMS. We applied the annual projected growth rate in Medicare expenditures per population over age 65 to the historic levels of Medicare expenditures in Minnesota per population over 65. We then multiplied this figure by the total projected number of Minnesota residents over the age of 65 (provided by the Minnesota State Demographic Center) to project total Medicare expenditures in Minnesota.

To project private expenditures for long-term care, we estimated a model of private spending for long-term care using the same methods as used for the other service types. The dependent variable is real per capita private expenditures for long-term care. The explanatory variables included in the final model are listed in Appendix C, together with goodness of fit statistics and confidence intervals for the projections.

III. ESTIMATION OF THE SPENDING MODELS

The model specifications reported in June 2009 and July 2010 performed very well in predicting past private spending in Minnesota.²⁰ That is, based on the explanatory variables, the predicted values were very close to actual historic estimates. In general, the models predicting aggregate spending and spending in the largest service and payer categories performed better than those attempting to predict relatively small expenditure amounts. Nevertheless, for each service type, the projection error was very small, typically averaging less than one dollar per capita over the time period. (Actual and projected real per capita private spending absent Medicare and long term care spending from 1994 to 2008 are reported in Appendix Table A.1.)

To produce spending estimates and projections for this report, we added nominal national per capita private spending, replaced national per capita GDP with Minnesota nominal per capita GDP, and removed the national index for the relative price of personal health care. We also tested the fit of alternative models and investigate the plausibility of the projections generated by the models. Finally, we expanded the historic spending data series to include 2008 (compared to models run on data through 2007 in previous reports), as effects from Minnesota health care reform enacted in 2008 were unlikely to be significant during this year. The performance of the models with these additions and other changes is described below.

A. Projected Aggregate Spending

After refreshing the input data series with MDH's revised historical estimates, we observed rates of growth in per capita spending that were much higher than expected growth in 2009 and 2010. The principal factor driving the large projected growth in the early years of the projection period was the per capita employment variable, which reflected anticipated recovery from the recession. The inclusion of the national private spending variable lessened projected spending growth in Minnesota during these years, more consistent with lower projected national growth rates which reflect a moderate pace of economic recovery. With the inclusion of national spending variable (expressed in nominal dollars), the national price variable was no longer a strong predictor of health care spending and therefore was removed from the model.

The changes to the model outlined above yielded the highest fit statistics among all of the alternate models investigated, including the baseline specification used in the July 2010 report. The model predicted historic values quite well and also predicted values in the near-term that were feasible given the early spending estimates produced by MDH. Projected total spending in 2009 was \$25.44 billion, compared with the actual estimate of \$25.65 billion.

B. Projected Spending by Service and Payer Type

We examined the fit statistics of the updated models and the plausibility of the projections from each model. Overall, the fit of the service and payer type models was very good (most payer and service types yielding adjusted R-squared values of 95 percent or higher), suggesting that further revisions to the sector models detailed in the July 2010 report were unnecessary. Changes to the total

²⁰ All models are estimated using Ordinary Least Squares (OLS) regression, including a constant term.

spending model automatically flowed to the sector and payer type models, since these models were constrained to the total spending model results. As dental care and other private service type spending, as well as other private payer type spending are very sensitive to changes to the model and data, the fit statistics for these small service and payer groups were lower.

IV. PROJECTED EXPENDITURES

The results of the modeling described in Chapter III are briefly presented in this chapter. Extensive tables are provided in Appendix A, reporting all modeling results in the aggregate and by service and payer type. Note that all projected expenditures reflect anticipated spending in the absence of the 2008 Minnesota reforms. Historic and projected health services and supplies expenditure estimates in Minnesota from 1993 to 2019, exclusive of Medicare and long-term care spending, are presented by service type in Tables A2 and A3. Total spending (in current-year dollars) is reported in Table A2, and spending per capita is reported in Table A3. Annual growth in total spending and spending per capita are reported in Tables A4 and A5, respectively. Spending estimates by payer type are reported in Tables A6 and A7. Finally, analogous estimates (total and per capita) that include both Medicare and long-term care spending are reported in Tables A10 and A11 (by service type) and in Tables A14 and A15 (by type of payer).

A. Overview of the Projection Results

In the absence of the 2008 reforms, total spending for health services and supplies in Minnesota are projected to reach \$57.3 billion in 2019, excluding Medicare and long-term care spending (Table A2). This level of spending is more than twice what was spent in 2009 (\$25.7 billion), the most recent year for which MDH has released estimates of actual expenditures. Including both Medicare and long-term care spending, total expenditures for health services and supplies in the absence of the 2008 reforms are projected to reach \$78.0 billion in 2019 (Table A10). Minnesotans are projected to spend \$13,520 per capita for health care in 2019, of which over 25 percent (\$3,590) is for Medicare and long-term care.

Annual rates of growth in nominal total and per capita expenditures, minus Medicare and long-term care spending, are presented in Tables 4 and 5 (by service type) and in Tables 8 and 9 (by type of payer). Annual growth rates in total and per capita expenditures including Medicare and long-term care spending are presented in Tables 12 and 13 (by service type) and in Tables 16 and 17 (by type of payer).

Total health care spending in Minnesota (minus Medicare and long-term care) is projected to grow at an average annual rate of 8.5 percent from 2009 to 2019 (Table A4). This compares with an historical average of 8.5 percent from 1997 to 2008, with double-digit growth in most years from 1999 to 2003. Double-digit growth is projected for total spending beginning in 2014, but is offset by slower predicted growth from 2009 to 2013. The increase in growth in later years is driven primarily by the projected increase in private spending nationally and projected growth in Minnesota personal income.

Compared with the historic growth rates in spending, the similar growth in total spending (minus Medicare and long-term care) reflects little change in projected growth in private spending. Private spending is projected to grow at an average annual rate of 7.9 percent from 2009 to 2019, compared with 8.2 percent growth from 1998 to 2008 (Table A8). Public spending is projected to grow faster, averaging 10.1 percent annual growth from 2009-2019, compared with 9.3 percent from 1998 to 2008.

Slower growth in spending (minus Medicare and long-term care) is apparent in most service types, with the exception of physician services and prescription drugs, which are projected to grow faster from 2009 to 2019. Exceptionally high growth is predicted for physician services from 2009 to 2019 (averaging 12.3 percent per year), compared with average growth of 7.6 percent from 1998 to 2008. In contrast, average growth in spending for both inpatient and outpatient hospital care is projected to decrease from 2009 to 2019: the average growth in spending for inpatient care is projected to slow from 8.7 to 7.4 percent, while the average growth in spending for outpatient care is projected to slow from 11.8 to 7.3 percent. In general, annual growth in spending across service types reflects the faster growth in total spending projected from 2014 to 2019.

With the addition of Medicare and long-term care spending projections, total spending growth from 2009 to 2019 (7.9 percent) is projected to be constant with the average rate of growth experienced from 1998 to 2008 (Table A12)—despite slightly faster average projected growth in total public spending (8.4 percent) compared with the average historic rate (8.0 percent) (Table A16). Faster growth in public spending reflects projected growth in non-Medicare public programs. In contrast, Medicare is projected to grow at a slightly lower average annual rate from 2009 to 2019 (6.4 percent) than in earlier years (7.6 percent).

The inclusion of Medicare and long term care spending have little effect on estimates of spending growth for private health insurance, out-of pocket spending, or other private spending (Table A16). The average rate of growth from 2009 to 2019 in projected private health insurance spending including Medicare and long term care is 7.6 percent compared with 7.9 percent when they are excluded. Out-of-pocket spending and other private spending are projected to grow somewhat faster (at an average annual rate of 3.8 percent and 1.8 percent) when Medicare and long term care are included. However, the projections for out of pocket spending and other private spending are relatively weak: they are extremely sensitive to the model specification and the explanatory variables perform relatively poorly in explaining spending variation in these categories.

Including Medicare and long term care, spending for outpatient care is projected to grow more slowly (averaging 9.8 percent per year) from 2009 to 2019 than from 1998 to 2008 (11.8 percent) (Table A12). In contrast, spending for prescription drugs is projected to grow much faster—averaging 12.4 percent per year from 2009 to 2019, compared with 8.9 percent per year from 1998 to 2008. Spending for physician care is also projected to grow faster, averaging 9.8 percent per year from 2009 to 2019, compared with 7.4 percent per year from 1998 to 2008.

B. Factors that May Affect the Accuracy of the Projections

The models perform quite well in predicting past private expenditures for health services and supplies, and they perform particularly well in predicting these expenditures in the aggregate and for large service and payer categories: inpatient hospital, physician services, prescription drugs, outpatient hospital, and private health insurance spending. However, the projections depend fundamentally on the projected values of the explanatory variables in the models, as described in Appendix B. Therefore, to the extent that the independent variables do not represent true future macroeconomic and health sector conditions, the accuracy of the predicted expenditures will be diminished. In addition, even if the explanatory variables are forecasted accurately, major changes to the health care system or fluctuations in the economy that are not reflected in the historic time series used to estimate the models could alter the relationship between the explanatory variables and spending such that the model would no longer accurately predict future expenditures.

Nevertheless, the advantage of using such aggregate macroeconomic variables is that they produce relatively robust estimates. That is, the expenditure projections do not necessarily rely on maintaining the status quo in the health sector as long as the forecasted explanatory variables continue to reflect the factors that would influence private spending.

The projections will most likely mirror actual future health care expenditures if there is no structural or policy change that would alter the relationship between health care spending and the variables that successfully predict past spending trends. For example, the national private spending and Minnesota GDP variables added to the models in this report will continue to be good predictors of private health care spending as long as their respective historical relationships to spending persist.

Nevertheless, a number of factors could affect the accuracy of the expenditure projections. For example, economic recovery may yield relatively low growth in employment nationwide, compared with earlier economic cycles. In this case, the employment variable that we use to project spending may be forecasted with error, causing error in the spending projections. In addition, the estimates do not account for the major system changes that federal reform will introduce. In all states, federal reform is intended to reduce the number of uninsured, improve the efficiency of health care, and potentially also change the prices paid for health care services. For this report, we investigate the potential impact on spending of just one of these changes—the expected change in the number of uninsured—in Chapter V, to develop preliminary projections of health care spending in Minnesota with the implementation of federal reform.

V. FEDERAL REFORM ESTIMATES

The Patient Protection and Affordable Care Act (ACA) reforms health care financing in every state. It calls for expansions of eligibility for public programs, removes barriers to the purchase of private insurance, and (with few exceptions) requires all Americans to obtain health insurance coverage. These provisions will affect total health care spending in future years—and would do so also in the absence of Minnesota's reforms.

In our July 2010 report, we introduced an approach to incorporating the effects of federal health care reform on projected expenditures in Minnesota. The approach relied primarily on adjusting macro variables in our sending models to account for the anticipated changes resulting from the reform. Given the uncertainty surrounding how reform will be implemented in Minnesota, the utility of the projections is limited. However, they provide a starting point for understanding how implementation of the ACA in Minnesota might impact total health care spending. In this section, we document changes to the methods used in our 2010 report to estimate the effects of federal reform on spending for health services and supplies in Minnesota, present initial results, and discuss the limitations of the estimates.

A. Post-Reform Expenditures in Minnesota

To project post reform health care spending in Minnesota, we used the same macroeconomic model specifications as described in Chapter III, but changed the values of three variables to reflect the effect of reform: public spending (which we adjusted to be consistent with OACT reform estimates), national private spending (which we changed from the February 2010 NHEA pre-reform estimates to the September 2010 post-reform estimates), and the percent of Minnesotans under age 65 who are uninsured (which we adjusted to be consistent with the experience in Massachusetts after its 2006 health care reforms). These modifications are discussed below.

- Public spending. With the implementation of reform, both total non-Medicare public spending and Medicare spending were assumed to increase by the respective OACT percentage estimates (per population aged 65 and older) as reported in Figure V.1. In Minnesota, relatively little public spending will move out of public programs. We expect that some MinnesotaCare enrollees and former GAMC enrollees will move into MA, and their benefits and costs will increase; many others who are now uninsured will newly enroll in MA. Only higher-income MinnesotaCare enrollees and all MCHA enrollees (together accounting for about 3 percent of current public health care spending in Minnesota) will move to private insurance.
- Percent of Minnesotans under age 65 who are uninsured. Individuals who are uninsured tend to spend less for health care than when insured. When insured they no longer pay the full price of their health care; as a result, they are more likely to seek care and providers are more likely to accept them as patients. It follows that PPACA's individual mandate, which will be implemented in 2014, will increase total private spending for health care as the number of privately insured Minnesotans increases. Under PPACA, the tax penalty for remaining uninsured, initially modest, increases in 2015. In Minnesota, the percentage of persons under age 65 who are currently uninsured is similar to that in Massachusetts prior to implementation of that state's individual mandate. Furthermore, PPACA's graduated tax penalty is similar to the graduated tax penalty in Massachusetts' reform law. We assume that the rate of uninsured under age 65

in Minnesota falls in the same pattern in 2014-2016 as the rate of uninsured fell in Massachusetts following implementation of reform in 2007. Specifically, we assume that Minnesota's uninsured rate falls from a projected rate of 7.8 percent in 2013, to 6.7 percent in 2014, and to roughly 3.4 from 2015 to 2019.²¹

• National Per Capita Private Spending. We also replaced the national private spending estimates/projections from the pre-reform figures reported in February 2010 with the September 2010 post-reform estimates. This change accounts for any effects of federal reform on private spending that is not accounted for by the change in the percentage uninsured.²²

By changing the value of these variables in the projection model, we developed revised projections of public and private spending in Minnesota, reported in Table A.19. We estimate that total spending in Minnesota will change modestly in the initial years of implementation. In 2013, PPACA implementation will raise total spending modestly (2.5 percent) relative to what would have occurred without reform, reflecting greater spending by Medicare and private health insurance. By 2019, projected total spending in Minnesota (\$81.6 billion) is 4.6 percent higher than would occur without implementation of reform.

Several caveats with respect to these projections are in order. First, it is impossible to validate the projections within Minnesota's experience. Although the statistical explanatory power of the underlying models is quite high, the projections lie outside Minnesota's historical experience since 1993 in two major respects, as mentioned in Chapter IV: Minnesota's uncertain path of recovery from severe economic recession and federal health care reform of an unprecedented scope.

Second, reliance on macroeconomic modeling could introduce error in projected spending under PPACA. For example, we implicitly assume that spending under PPACA will change as spending changed in past years with changes in employment, income, and health insurance coverage. However, if Minnesotans who are uninsured have systematically different health status or different preferences for using health care services than Minnesotans who are currently insured, our estimates would misstate the increase in total spending with implementation of PPACA. In addition, if the change in public spending in Minnesota differed from the national average rate of change, our estimates would be biased in direct proportion to the difference.

While it is fairly easy to identify how macroeconomic modeling may introduce error in estimates of both private and public spending under PPACA, it is impossible to estimate either the magnitude or direction of the net error, given the multiple sources and conflicting directions of change. To improve projections of private and public spending with PPACA implementation, future estimates should take into account the specific characteristics of uninsured Minnesotans who would gain coverage under PPACA, the sources of coverage they would gain, the proportion of the year they

²¹ Within the resources available for this report, there is no way to validate how well these assumptions are likely to predict Minnesota's experience under PPACA, even if Minnesota's implementation of PPACA would parallel Massachusetts' implementation of its 2006 reform law. To the extent that these assumptions over- or under-state the reduction in the number of uninsured in post-recession Minnesota, we anticipate that projected private spending would be (respectively) more or less than we have estimated.

²² The September 2010 post-reform estimates are preliminary, therefore the Health Services and Supplies series was not available. The total U.S. spending projections/estimates were used in our post-reform dataset.

are currently uninsured, and their demand for health care when insured. Disaggregated modeling methods, ideally using microsimulation techniques such as were developed for Minnesota's exchange study (Chollet et al. 2008) might resolve many sources of error in the aggregate method we used to develop projections in this report.

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APPENDIX A TABLES

Table A.1. Actual vs. Projected Real Per Capita Private Expenditures for Health Services and Supplies in Minnesota, minus Medicare and Long-Term Care Spending: 1994-2008 (calendar year 2000 dollars)

	Total			Inpatient Hospital			Physician			Prescription Drugs		
Year	Actual	Projected	Difference	Actual	Projected	Difference	Actual	Projected	Difference	Actual	Projected	Difference
1994	1,959	1,927	33	323	326	-2	575	576	-2	231	232	-1
1995	1,868	1,889	-21	324	323	1	583	595	-12	240	240	0
1996	1,874	1,899	-25	330	325	5	611	614	-3	253	247	6
1997	1,863	1,877	-13	335	336	-1	606	575	31	267	268	-1
1998	1,948	2,076	-128	349	354	-5	595	606	-11	263	269	-5
1999	2,089	2,147	-57	361	365	-4	656	665	-9	308	311	-3
2000	2,335	2,223	112	400	393	7	714	710	4	336	333	4
2001	2,372	2,264	108	405	406	-1	706	715	-9	360	357	3
2002	2,468	2,443	26	432	436	-4	760	753	7	394	396	-2
2003	2,619	2,636	-17	451	444	7	796	776	19	424	425	-1
2004	2,629	2,694	-66	451	454	-3	741	745	-4	441	439	2
2005	2,675	2,665	10	463	463	0	764	774	-10	436	438	-2
2006	2,746	2,774	-28	501	499	2	826	817	9	401	398	3
2007	2,805	2,826	-21	513	516	-3	836	839	-2	399	402	-3
2008	2,798	2,753	45	519	518	0	810	817	-7	377	376	1
Average	2,337	2,339	-3	410	410	0	705	705	0	342	342	0

	Οι	utpatient Hos	pital	Dental			Other Professional			Other		
Year	Actual	Projected	Difference	Actual	Projected	Difference	Actual	Projected	Difference	Actual	Projected	Difference
1994	146	149	-2	157	150	7	112	86	26	444	300	145
1995	163	161	1	134	136	-2	80	79	1	387	368	19
1996	174	169	5	121	123	-2	79	80	-1	332	339	-6
1997	181	183	-2	113	123	-10	78	77	1	300	313	-13
1998	194	197	-3	132	129	3	76	77	0	343	343	1
1999	224	226	-2	133	124	10	81	82	-1	342	372	-31
2000	239	234	5	139	142	-3	85	84	1	422	406	16
2001	248	251	-3	136	134	2	89	89	0	422	375	47
2002	273	273	0	140	150	-10	98	97	0	362	385	-23
2003	293	291	2	153	150	3	104	104	0	390	392	-2
2004	307	308	-1	146	152	-6	107	107	0	406	395	11
2005	333	332	1	159	149	10	111	110	1	391	408	-18
2006	340	339	1	161	164	-3	114	116	-2	387	402	-15
2007	349	350	-1	167	163	4	126	125	1	389	401	-12
2008	371	371	0	166	168	-2	126	126	0	399	372	27
Average	256	256	0	144	144	0	98	96	2	381	371	10

Source: Mathematica Policy Research, based on MDH estimates of spending and Minnesota State Demographic Center population estimates. Price indices provided by CMS were used to convert nominal to real spending.

Table A.2. Total Minnesota Expenditures for Health Services and Supplies by Service Type, minus Medicare and Long-Term Care Spending: 1993-2019 (current dollars in millions)

Year	Total	Inpatient Hospital	Physician	Prescription Drugs	Outpatient Hospital	Dental	Other Professional	Other	Uncategorized
1993	9,758	1,949	2,458	1,069	714	578	446	2,119	425
1994	9,432	1,899	2,361	1,044	771	590	519	1,979	268
1995	9,565	2,012	2,518	1,128	886	541	440	1,748	294
1996	9,936	2,088	2,744	1,243	976	520	451	1,620	294
1997	10,261	2,145	2,825	1,360	1,039	514	449	1,606	323
1998	11,025	2,252	2,894	1,439	1,123	617	451	1,892	357
1999	12,228	2,368	3,285	1,777	1,294	665	493	1,973	373
2000	14,136	2,681	3,765	2,054	1,453	731	532	2,526	393
2001	15,296	2,862	3,938	2,347	1,611	756	575	2,786	420
2002	16,881	3,246	4,422	2,761	1,847	833	667	2,681	425
2003	18,748	3,580	4,765	3,144	2,077	950	740	3,013	479
2004	19,597	3,744	4,691	3,374	2,268	964	799	3,268	489
2005	20,771	4,005	5,044	3,405	2,560	1,099	893	3,318	448
2006	22,046	4,468	5,579	3,130	2,755	1,188	983	3,464	478
2007	23,718	4,965	5,892	3,189	3,019	1,310	1,134	3,677	532
2008	24,844	5,178	6,006	3,120	3,418	1,385	1,236	3,965	537
Projected									
2009	25,439	5,582	5,643	3,211	4,019	1,445	1,384	3,630	526
2010	25,318	5,520	5,489	3,479	3,911	1,257	1,475	3,652	536
2011	26,395	5,638	6,156	3,845	3,913	1,139	1,518	3,641	546
2012	27,091	5,667	6,907	3,968	4,054	952	1,571	3,416	556
2013	28,943	6,044	7,687	4,315	4,306	903	1,637	3,484	567
2014	32,301	6,805	8,886	4,851	4,670	993	1,797	3,720	578
2015	36,814	7,707	10,418	5,620	5,275	1,089	2,014	4,102	589
2016	41,841	8,633	12,192	6,467	5,941	1,198	2,258	4,553	600
2017	46,671	9,489	13,999	7,345	6,635	1,234	2,494	4,865	611
2018	51,893	10,396	16,016	8,378	7,440	1,199	2,739	5,102	623
2019	57,257	11,406	17,927	9,248	8,104	1,380	2,973	5,584	635

Table A.3. Per Capita Minnesota Expenditures for Health Services and Supplies, minus Medicare and Long-Term Care Spending, by Service Type: 1993-2019 (current dollars)

Year	Total	Inpatient Hospital	Physician	Prescription Drugs	Outpatient Hospital	Dental	Other Professional	Other	Uncategorized
1993	2,142	428	539	235	157	127	98	465	93
1994	2,046	412	512	227	167	128	113	429	58
1995	2,053	432	540	242	190	116	94	375	63
1996	2,108	443	582	264	207	110	96	344	62
1997	2,154	450	593	286	218	108	94	337	68
1998	2,291	468	601	299	233	128	94	393	74
1999	2,509	486	674	365	265	136	101	405	77
2000	2,865	543	763	416	294	148	108	512	80
2001	3,070	574	790	471	323	152	115	559	84
2002	3,364	647	881	550	368	166	133	534	85
2003	3,714	709	944	623	411	188	147	597	95
2004	3,858	737	924	664	447	190	157	643	96
2005	4,068	784	988	667	501	215	175	650	88
2006	4,282	868	1,084	608	535	231	191	673	93
2007	4,569	956	1,135	614	581	252	219	708	102
2008	4,750	990	1,148	596	653	265	236	758	103
Projected									
2009	4,831	1,060	1,072	610	763	274	263	689	100
2010	4,699	1,025	1,019	646	726	233	274	678	99
2011	4,863	1,039	1,134	708	721	210	280	671	101
2012	4,953	1,036	1,263	725	741	174	287	625	102
2013	5,252	1,097	1,395	783	781	164	297	632	103
2014	5,817	1,226	1,600	874	841	179	324	670	104
2015	6,579	1,377	1,862	1,004	943	195	360	733	105
2016	7,422	1,531	2,163	1,147	1,054	212	401	808	106
2017	8,216	1,671	2,464	1,293	1,168	217	439	857	108
2018	9,067	1,816	2,799	1,464	1,300	210	479	891	109
2019	9,930	1,978	3,109	1,604	1,405	239	516	968	110

Table A.4. Percent Annual Growth in Minnesota Expenditures for Health Services and Supplies, minus Medicare and Long-Term Care Spending, by Service Type: 1994-2019 (percent change in current dollars)

Year	Total	Inpatient Hospital	Physician	Prescription Drugs	Outpatient Hospital	Dental	Other Professional	Other	Uncategorized
1994	-3.3	-2.6	-3.9	-2.3	8.0	1.9	16.5	-6.6	-36.9
1995	1.4	6.0	6.6	8.0	14.8	-8.2	-15.3	-11.7	9.5
1996	3.9	3.8	9.0	10.3	10.3	-4.0	2.4	-7.3	0.3
1997	3.3	2.8	3.0	9.4	6.4	-1.2	-0.4	-0.9	9.7
1998	7.5	5.0	2.4	5.8	8.1	20.1	0.5	17.8	10.7
1999	10.9	5.1	13.5	23.4	15.2	7.8	9.3	4.3	4.4
2000	15.6	13.2	14.6	15.6	12.3	10.0	7.9	28.0	5.3
2001	8.2	6.7	4.6	14.2	10.9	3.3	8.0	10.3	7.0
2002	10.4	13.4	12.3	17.6	14.6	10.2	16.0	-3.8	1.1
2003	11.1	10.3	7.8	13.9	12.4	14.1	10.9	12.4	12.7
2004	4.5	4.6	-1.6	7.3	9.2	1.4	8.0	8.5	2.2
2005	6.0	7.0	7.5	0.9	12.9	14.0	11.8	1.5	-8.5
2006	6.1	11.6	10.6	-8.1	7.6	8.1	10.1	4.4	6.9
2007	7.6	11.1	5.6	1.9	9.6	10.3	15.4	6.2	11.2
2008	4.7	4.3	1.9	-2.2	13.2	5.8	8.9	7.8	0.9
Average an	nual growth 1	.998–2008:							
	8.5	8.7	7.6	8.0	11.8	8.4	10.6	7.7	4.1
Projected									
2009	2.4	7.8	-6.0	2.9	17.6	4.3	12.0	-8.5	-2.0
2010	-0.5	-1.1	-2.7	8.3	-2.7	-13.0	6.6	0.6	1.9
2011	4.3	2.1	12.1	10.5	0.0	-9.4	3.0	-0.3	1.9
2012	2.6	0.5	12.2	3.2	3.6	-16.4	3.5	-6.2	1.9
2013	6.8	6.7	11.3	8.7	6.2	-5.2	4.2	2.0	1.9
2014	11.6	12.6	15.6	12.4	8.5	9.9	9.8	6.8	1.9
2015	14.0	13.3	17.2	15.8	13.0	9.8	12.1	10.2	1.9
2016	13.7	12.0	17.0	15.1	12.6	9.9	12.1	11.0	1.9
2017	11.5	9.9	14.8	13.6	11.7	3.0	10.4	6.9	1.9
2018	11.2	9.6	14.4	14.1	12.1	-2.8	9.8	4.9	1.9
2019	10.3	9.7	11.9	10.4	8.9	15.0	8.6	9.5	1.9
Average an	nual projected	d growth 2009–2	019:						
	8.5	7.4	12.3	11.2	7.3	-0.5	7.9	4.4	1.9

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Table A.5. Percent Annual Growth in Minnesota per Capita Expenditures for Health Services and Supplies, minus Medicare and Long-Term Care Spending, by Service Type: 1994-2019 (percent change in current dollars)

Year	Total	Inpatient Hospital	Physician	Prescription Drugs	Outpatient Hospital	Dental	Other Professional	Other	Uncategorized
1994	-4.5	-3.7	-5.0	-3.5	6.7	0.7	15.1	-7.7	-37.6
1995	0.3	4.8	5.5	6.8	13.6	-9.2	-16.2	-12.6	8.4
1996	2.7	2.6	7.8	9.0	9.0	-5.1	1.3	-8.3	-0.9
1997	2.2	1.7	1.9	8.3	5.3	-2.2	-1.4	-1.9	8.5
1998	6.3	3.9	1.4	4.7	6.9	18.8	-0.6	16.6	9.5
1999	9.5	3.8	12.1	21.9	13.8	6.5	8.0	3.0	3.1
2000	14.2	11.8	13.2	14.2	10.9	8.6	6.6	26.4	4.0
2001	7.1	5.7	3.6	13.1	9.8	2.3	6.9	9.2	5.9
2002	9.6	12.6	11.5	16.8	13.8	9.4	15.2	-4.5	0.4
2003	10.4	9.6	7.1	13.2	11.8	13.4	10.2	11.7	12.0
2004	3.9	3.9	-2.2	6.6	8.5	0.8	7.3	7.8	1.6
2005	5.4	6.4	7.0	0.4	12.3	13.4	11.2	1.0	-9.0
2006	5.3	10.7	9.7	-8.8	6.7	7.2	9.2	3.6	6.0
2007	6.7	10.2	4.7	1.0	8.7	9.3	14.5	5.3	10.3
2008	4.0	3.5	1.2	-2.9	12.4	5.0	8.1	7.0	0.1
Average anr	nual growth 19	998–2008:							
	7.6	7.8	6.7	7.1	10.9	7.5	9.7	6.8	3.3
Projected									
2009	1.7	7.1	-6.7	2.2	16.8	3.6	11.2	-9.1	-2.6
2010	-2.7	-3.3	-4.9	5.9	-4.9	-15.0	4.2	-1.7	-0.4
2011	3.5	1.4	11.3	9.7	-0.7	-10.1	2.2	-1.0	1.1
2012	1.9	-0.2	11.4	2.4	2.8	-17.0	2.7	-6.9	1.1
2013	6.0	5.9	10.5	7.9	5.4	-5.9	3.4	1.2	1.1
2014	10.8	11.7	14.7	11.6	7.6	9.1	9.0	6.0	1.1
2015	13.1	12.4	16.3	15.0	12.1	8.9	11.2	9.4	1.1
2016	12.8	11.2	16.2	14.2	11.8	9.1	11.2	10.2	1.1
2017	10.7	9.1	14.0	12.7	10.8	2.2	9.6	6.1	1.1
2018	10.4	8.7	13.6	13.2	11.3	-3.5	9.0	4.1	1.1
2019	9.5	8.9	11.1	9.6	8.1	14.2	7.7	8.6	1.1
Average anr	nual projected	growth 2009-2							
	7.5	6.4	11.2	10.2	6.3	-1.4	7.0	3.5	1.0

Table A.6. Total Minnesota Expenditures for Health Services and Supplies, minus Medicare and Long-Term Care Spending, by Payer Type: 1993-2019 (current dollars in millions)

		Priv	/ate			Public				
Year	Total	Private Health Insurance	Other Private	Out of Pocket	Total	Medicaid	Other Public			
1993	7,911	5,269	599	2,043	1,847	971	876			
1994	7,588	5,124	597	1,866	1,844	1,097	748			
1995	7,661	5,349	605	1,706	1,905	1,101	804			
1996	7,950	5,625	618	1,707	1,986	1,148	838			
1997	8,166	5,787	629	1,749	2,095	1,208	888			
1998	8,814	6,270	644	1,899	2,212	1,264	948			
1999	9,876	7,157	671	2,048	2,352	1,367	985			
2000	11,521	8,444	743	2,334	2,615	1,527	1,089			
2001	12,290	9,051	828	2,411	3,006	1,741	1,264			
2002	13,375	9,939	844	2,592	3,506	2,054	1,452			
2003	14,808	11,108	843	2,857	3,941	2,293	1,648			
2004	15,487	11,666	859	2,963	4,109	2,426	1,683			
2005	16,526	12,512	877	3,137	4,246	2,572	1,673			
2006	17,670	13,609	871	3,190	4,376	2,646	1,729			
2007	18,786	14,431	905	3,450	4,932	3,089	1,843			
2008	19,464	14,983	948	3,533	5,381	3,372	2,009			
Projected				_						
2009	19,547	15,155	1,046	3,346	5,892	3,663	2,229			
2010	19,192	14,868	1,084	3,241	6,126	3,896	2,230			
2011	19,339	15,437	930	2,973	7,056	4,744	2,312			
2012	19,142	15,659	796	2,687	7,949	5,654	2,296			
2013	20,042	16,650	707	2,686	8,901	6,364	2,536			
2014	22,465	18,807	721	2,938	9,835	7,134	2,701			
2015	26,062	22,035	786	3,242	10,752	7,867	2,884			
2016	30,094	25,598	856	3,641	11,747	8,668	3,079			
2017	33,831	28,972	898	3,961	12,840	9,550	3,290			
2018	37,854	32,808	933	4,112	14,039	10,522	3,518			
2019	41,901	36,352	950	4,599	15,356	11,593	3,764			

Table A.7. Per Capita Minnesota Expenditures for Health Services and Supplies, minus Medicare and Long-Term Care Spending, by Payer Type: 1993-2019 (current dollars)

 Year		Pri	vate	Public			
	Total	Private Health Insurance	Other Private	Out of Pocket	Total	Medicaid	Other Public
1993	1,736	1,157	131	448	405	213	192
1994	1,646	1,111	130	405	400	238	162
1995	1,644	1,148	130	366	409	236	173
1996	1,687	1,194	131	362	421	244	178
1997	1,714	1,215	132	367	440	254	186
1998	1,831	1,303	134	394	460	263	197
1999	2,026	1,469	138	420	483	281	202
2000	2,335	1,711	151	473	530	309	221
2001	2,467	1,816	166	484	603	349	254
2002	2,666	1,981	168	517	699	409	289
2003	2,933	2,200	167	566	781	454	326
2004	3,049	2,297	169	583	809	478	331
2005	3,236	2,450	172	614	831	504	328
2006	3,432	2,643	169	620	850	514	336
2007	3,619	2,780	174	665	950	595	355
2008	3,721	2,865	181	675	1,029	645	384
Projected							
20Ŏ9	3,712	2,878	199	635	1,119	696	423
2010	3,562	2,760	201	602	1,137	723	414
2011	3,563	2,844	171	548	1,300	874	426
2012	3,500	2,863	146	491	1,453	1,034	420
2013	3,637	3,021	128	487	1,615	1,155	460
2014	4,046	3,387	130	529	1,771	1,285	486
2015	4,658	3,938	140	579	1,922	1,406	516
2016	5,338	4,540	152	646	2,084	1,537	546
2017	5,956	5,100	158	697	2,260	1,681	579
2018	6,614	5,733	163	718	2,453	1,838	615
2019	7,267	6,305	165	798	2,663	2,010	653

Table A.8. Percent Annual Growth in Minnesota Expenditures for Health Services and Supplies, minus Medicare and Long-Term Care Spending, by Payer Type: 1994-2019 (percent change in current dollars)

		Priv	ate/	Public			
Year	Total	Private Health Insurance	Other Private	Out of Pocket	Total	Medicaid	Other Public
1994	-4.1	-2.8	-0.3	-8.7	-0.1	12.9	-14.6
1995	1.0	4.4	1.3	-8.6	3.3	0.4	7.5
1996	3.8	5.2	2.2	0.0	4.3	4.3	4.3
1997	2.7	2.9	1.7	2.5	5.5	5.2	5.9
1998	7.9	8.3	2.4	8.5	5.6	4.7	6.8
1999	12.1	14.1	4.1	7.8	6.3	8.2	3.9
2000	16.7	18.0	10.7	14.0	11.2	11.7	10.5
2001	6.7	7.2	11.5	3.3	14.9	14.1	16.1
2002	8.8	9.8	1.9	7.5	16.6	17.9	14.8
2003	10.7	11.8	-0.1	10.2	12.4	11.7	13.5
2004	4.6	5.0	1.8	3.7	4.3	5.8	2.2
2005	6.7	7.3	2.1	5.9	3.3	6.0	-0.6
2006	6.9	8.8	-0.7	1.7	3.1	2.9	3.3
2007	6.3	6.0	3.9	8.2	12.7	16.7	6.6
2008	3.6	3.8	4.7	2.4	9.1	9.2	9.0
Average ann	ual growth 199	08_2008·		_			
Average ann	8.2	9.1	3.9	6.4	9.3	10.3	7.8
Projected							
2009	0.4	1.1	10.4	-5.3	9.5	8.6	11.0
2010	-1.8	-1.9	3.6	-3.1	4.0	6.4	0.1
2011	0.8	3.8	-14.2	-8.3	15.2	21.8	3.7
2012	-1.0	1.4	-14.4	-9.6	12.7	19.2	-0.7
2013	4.7	6.3	-11.2	0.0	12.0	12.6	10.5
2014	12.1	13.0	2.0	9.4	10.5	12.1	6.5
2015	16.0	17.2	9.0	10.3	9.3	10.3	6.8
2016	15.5	16.2	8.9	12.3	9.3	10.2	6.8
2017	12.4	13.2	4.9	8.8	9.3	10.2	6.8
2018	11.9	13.2	3.9	3.8	9.3	10.2	6.9
2019	10.7	10.8	1.7	11.8	9.4	10.2	7.0
Average ann	ual projected o	growth 2009–2019:					
, crage ann	7.9	9.1	-1.0	3.2	10.1	12.2	5.4

Table A.9. Percent Annual Growth in Minnesota per Capita Expenditures for Health Services and Supplies, minus Medicare and Long-Term Care Spending, by Payer Type: 1994-2019 (percent change in current dollars)

<u></u>		Priv	ate/			Public	
Year	Total	Private Health Insurance	Other Private	Out of Pocket	Total	Medicaid	Other Public
1994	-5.2	-3.9	-1.4	-9.7	-1.3	11.6	-15.6
1995	-0.1	3.3	0.3	-9.5	2.2	-0.7	6.3
1996	2.6	4.0	1.0	-1.1	3.1	3.1	3.1
1997	1.6	1.8	0.7	1.4	4.4	4.1	4.7
1998	6.8	7.2	1.4	7.4	4.5	3.6	5.7
1999	10.7	12.7	2.8	6.5	5.0	6.8	2.6
2000	15.2	16.5	9.3	12.6	9.8	10.3	9.2
2001	5.6	6.1	10.4	2.3	13.8	12.9	15.0
2002	8.1	9.1	1.2	6.8	15.8	17.1	14.0
2003	10.0	11.1	-0.7	9.5	11.7	11.0	12.8
2004	3.9	4.4	1.2	3.1	3.6	5.1	1.5
2005	6.1	6.7	1.6	5.3	2.8	5.5	-1.1
2006	6.1	7.9	-1.5	0.9	2.2	2.0	2.5
2007	5.4	5.2	3.1	7.3	11.8	15.8	5.7
2007	2.8	3.0	3.9	1.6	8.3	8.3	8.2
Average annı	ual growth 199						
	7.3	8.2	3.1	5.5	8.4	9.4	6.9
Projected							
2009	-0.3	0.5	9.6	-5.9	8.8	7.9	10.2
2010	-4.0	-4.1	1.3	-5.3	1.6	4.0	-2.2
2011	0.0	3.1	-14.9	-9.0	14.3	20.9	2.9
2012	-1.8	0.7	-15.0	-10.3	11.8	18.3	-1.5
2013	3.9	5.5	-11.9	-0.8	11.1	11.7	9.7
2014	11.2	12.1	1.2	8.6	9.7	11.3	5.7
2015	15.1	16.3	8.2	9.5	8.5	9.4	6.0
2016	14.6	15.3	8.1	11.5	8.4	9.3	6.0
2017	11.6	12.3	4.2	8.0	8.5	9.3	6.0
2018	11.1	12.4	3.2	3.0	8.5	9.4	6.1
2019	9.9	10.0	1.0	11.0	8.6	9.4	6.2
Average annı	ual projected (6.9	growth 2009–2019: 8.2	-1.9	2.3	9.1	11.2	4.4
	0.5	0.2	-1.9	۷.5	9.1	11.4	7.7

Table A.10. Total Minnesota Expenditures for Health Services and Supplies by Service Type: 1993-2019 (current dollars in millions)

Year	Total	Inpatient Hospital	Physician	Long Term Care	Prescription Drugs	Outpatient Hospital	Dental	Other Professional	Other	Uncategorized
1993	13,844	2,981	2,913	2,203	1,084	897	586	451	2,304	425
1994	13,683	2,935	2,851	2,342	1,058	966	597	525	2,142	268
1995	14,228	3,117	3,046	2,652	1,141	1,102	549	445	1,883	294
1996	14,823	3,273	3,288	2,755	1,260	1,213	524	456	1,759	294
1997	15,309	3,396	3,393	2,806	1,384	1,294	514	455	1,743	323
1998	16,318	3,545	3,478	2,978	1,463	1,380	618	458	2,041	357
1999	17,670	3,725	3,912	3,026	1,802	1,552	667	501	2,111	373
2000	19,981	4,061	4,455	3,292	2,083	1,727	734	547	2,688	393
2001	21,847	4,356	4,713	3,714	2,375	1,929	759	593	2,989	420
2002	24,033	4,817	5,221	4,102	2,799	2,239	836	691	2,904	425
2003	26,397	5,241	5,628	4,375	3,193	2,501	953	763	3,263	479
2004	27,623	5,508	5,621	4,523	3,422	2,761	967	825	3,507	489
2005	29,464	5,889	6,080	4,769	3,468	3,129	1,103	928	3,651	448
2006	31,136	6,313	6,573	4,820	3,435	3,388	1,193	1,025	3,911	478
2007	33,330	6,881	6,959	5,099	3,495	3,723	1,317	1,190	4,134	532
2008	35,061	7,225	7,088	5,411	3,426	4,201	1,392	1,304	4,477	537
Projected										
2009	36,286	7,738	6,703	5,784	3,623	4,713	1,344	1,428	4,428	526
2010	36,759	7,973	6,632	5,713	3,988	4,901	1,090	1,512	4,414	536
2011	38,227	8,253	6,958	5,877	4,437	5,111	1,044	1,610	4,389	546
2012	39,575	8,600	7,348	6,058	4,707	5,488	968	1,745	4,105	556
2013	42,095	9,185	7,918	6,287	5,158	5,963	994	1,876	4,147	567
2014	46,365	10,068	8,876	6,657	5,829	6,587	1,128	2,087	4,555	578
2015	51,825	11,086	10,218	7,005	6,763	7,448	1,263	2,362	5,090	589
2016	58,078	12,197	11,793	7,461	7,857	8,442	1,443	2,691	5,594	600
2017	64,241	13,295	13,420	7,862	9,044	9,531	1,571	3,037	5,870	611
2018	70,965	14,525	15,258	8,260	10,424	10,825	1,647	3,408	5,997	623
2019	77,959	15,690	17,089	8,630	11,656	11,952	1,979	3,772	6,557	635

Table A.11. Per Capita Minnesota Expenditures for Health Services and Supplies by Service Type: 1993–2019 (current dollars)

Year	Total	Inpatient Hospital	Physician	Long Term Care	Prescription Drugs	Outpatient Hospital	Dental	Other Professional	Other	Uncategorized
1993	3,039	654	639	484	238	197	129	99	506	93
1994	2,968	637	618	508	229	210	130	114	465	58
1995	3,053	669	654	569	245	236	118	96	404	63
1996	3,145	695	698	585	267	257	111	97	373	62
1997	3,214	713	712	589	291	272	108	95	366	68
1998	3,390	737	723	619	304	287	128	95	424	74
1999	3,626	764	803	621	370	319	137	103	433	77
2000	4,050	823	903	667	422	350	149	111	545	80
2001	4,385	874	946	745	477	387	152	119	600	84
2002	4,790	960	1,041	818	558	446	167	138	579	85
2003	5,229	1,038	1,115	867	633	495	189	151	647	95
2004	5,438	1,084	1,107	891	674	544	190	162	690	96
2005	5,770	1,153	1,191	934	679	613	216	182	715	88
2006	6,048	1,226	1,277	936	667	658	232	199	760	93
2007	6,420	1,325	1,341	982	673	717	254	229	796	102
2008	6,703	1,381	1,355	1,034	655	803	266	249	856	103
Projected										
20Ó9	6,890	1,469	1,273	1,098	688	895	255	271	841	100
2010	6,823	1,480	1,231	1,060	740	910	202	281	819	99
2011	7,042	1,520	1,282	1,083	817	942	192	297	809	101
2012	7,236	1,572	1,343	1,108	861	1,003	177	319	750	102
2013	7,638	1,667	1,437	1,141	936	1,082	180	340	752	103
2014	8,350	1,813	1,598	1,199	1,050	1,186	203	376	820	104
2015	9,262	1,981	1,826	1,252	1,209	1,331	226	422	910	105
2016	10,302	2,163	2,092	1,323	1,394	1,497	256	477	992	106
2017	11,309	2,340	2,363	1,384	1,592	1,678	277	535	1,033	108
2018	12,400	2,538	2,666	1,443	1,821	1,891	288	595	1,048	109
2019	13,520	2,721	2,964	1,497	2,022	2,073	343	654	1,137	110

Table A.12. Percent Annual Growth in Minnesota Expenditures for Health Services and Supplies by Service Type: 1994-2019 (percent change in current dollars)

Year	Total	Inpatient Hospital	Physician	Long Term Care	Prescription Drugs	Outpatient Hospital	Dental	Other Professional	Other	Uncategorized
1994	-1.2	-1.6	-2.1	6.3	-2.4	7.7	1.8	16.2	-7.0	-36.9
1995	4.0	6.2	6.8	13.2	7.9	14.0	-8.1	-15.2	-12.1	9.5
1996	4.2	5.0	7.9	3.9	10.5	10.1	-4.5	2.4	-6.6	0.3
1997	3.3	3.8	3.2	1.8	9.8	6.7	-1.8	-0.2	-0.9	9.7
1998	6.6	4.4	2.5	6.1	5.7	6.6	20.1	0.6	17.1	10.7
1999	8.3	5.1	12.5	1.6	23.2	12.5	7.9	9.4	3.4	4.4
2000	13.1	9.0	13.9	8.8	15.6	11.2	10.1	9.1	27.3	5.3
2001	9.3	7.3	5.8	12.8	14.0	11.7	3.3	8.5	11.2	7.0
2002	10.0	10.6	10.8	10.4	17.9	16.1	10.2	16.5	-2.8	1.1
2003	9.8	8.8	7.8	6.6	14.1	11.7	14.1	10.5	12.4	12.7
2004	4.6	5.1	-0.1	3.4	7.2	10.4	1.5	8.0	7.5	2.2
2005	6.7	6.9	8.2	5.4	1.4	13.3	14.0	12.5	4.1	-8.5
2006	5.7	7.2	8.1	1.1	-1.0	8.3	8.1	10.5	7.1	6.9
2007	7.0	9.0	5.9	5.8	1.7	9.9	10.5	16.1	5.7	11.2
2008	5.2	5.0	1.8	6.1	-2.0	12.9	5.7	9.6	8.3	0.9
Average an	nual growt	h 1998–2008:								
	7.9	7.4	7.4	6.2	8.9	11.8	8.5	11.0	8.2	4.1
Projected										
2009	3.5	7.1	-5.4	6.9	5.7	12.2	-3.4	9.5	-1.1	-2.0
2010	1.3	3.0	-1.1	-1.2	10.1	4.0	-18.9	5.9	-0.3	1.9
2011	4.0	3.5	4.9	2.9	11.3	4.3	-4.2	6.5	-0.6	1.9
2012	3.5	4.2	5.6	3.1	6.1	7.4	-7.3	8.4	-6.5	1.9
2013	6.4	6.8	7.8	3.8	9.6	8.6	2.7	7.5	1.0	1.9
2014	10.1	9.6	12.1	5.9	13.0	10.5	13.5	11.2	9.9	1.9
2015	11.8	10.1	15.1	5.2	16.0	13.1	12.0	13.2	11.7	1.9
2016	12.1	10.0	15.4	6.5	16.2	13.3	14.2	13.9	9.9	1.9
2017	10.6	9.0	13.8	5.4	15.1	12.9	8.9	12.8	4.9	1.9
2018	10.5	9.3	13.7	5.1	15.3	13.6	4.8	12.2	2.2	1.9
2019	9.9	8.0	12.0	4.5	11.8	10.4	20.1	10.7	9.3	1.9
Average an	nual proiec	ted growth 20	009-2019:							
J	7.9	7.3	9.8	4.1	12.4	9.8	3.9	10.2	4.0	1.9

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Table A.13. Percent Annual Growth in Minnesota per Capita Expenditures for Health Services and Supplies by Service Type: 1994-2019 (percent change in current dollars)

Year	Total	Inpatient Hospital	Physician	Long Term Care	Prescription Drugs	Outpatient Hospital	Dental	Other Professional	Other	Uncategorized
1994	-2.3	-2.7	-3.3	5.1	-3.5	6.5	0.6	14.9	-8.1	-37.6
1995	2.9	5.1	5.7	12.0	6.7	12.8	-9.1	-16.1	-13.0	8.4
1996	3.0	3.9	6.7	2.7	9.2	8.9	-5.6	1.3	-7.7	-0.9
1997	2.2	2.7	2.1	0.8	8.6	5.6	-2.9	-1.3	-1.9	8.5
1998	5.5	3.3	1.4	5.0	4.6	5.5	18.8	-0.4	15.9	9.5
1999	6.9	3.8	11.1	0.4	21.6	11.1	6.6	8.1	2.2	3.1
2000	11.7	7.7	12.5	7.4	14.2	9.9	8.8	7.8	25.8	4.0
2001	8.3	6.2	4.7	11.7	12.9	10.6	2.3	7.4	10.1	5.9
2002	9.2	9.8	10.0	9.7	17.1	15.3	9.4	15.7	-3.5	0.4
2003	9.2	8.2	7.2	6.0	13.4	11.0	13.4	9.8	11.7	12.0
2004	4.0	4.4	-0.7	2.8	6.5	9.7	0.8	7.4	6.8	1.6
2005	6.1	6.3	7.6	4.9	0.8	12.7	13.4	11.9	3.6	-9.0
2006	4.8	6.3	7.2	0.2	-1.8	7.4	7.3	9.6	6.3	6.0
2007	6.2	8.1	5.0	4.9	0.9	9.0	9.5	15.2	4.8	10.3
2008	4.4	4.2	1.1	5.3	-2.7	12.0	4.9	8.8	7.5	0.1
Average an	nual growth	1998-2008:								
	7.1	6.5	6.5	5.3	8.0	10.9	7.6	10.1	7.3	3.3
Projected										
2009	2.8	6.4	-6.1	6.2	5.0	11.4	-4.1	8.7	-1.8	-2.6
2010	-1.0	0.7	-3.3	-3.4	7.6	1.6	-20.7	3.5	-2.6	-0.4
2011	3.2	2.7	4.1	2.1	10.4	3.5	-4.9	5.7	-1.3	1.1
2012	2.7	3.4	4.8	2.3	5.3	6.6	-8.0	7.5	-7.2	1.1
2013	5.6	6.0	6.9	3.0	8.8	7.8	1.9	6.7	0.3	1.1
2014	9.3	8.8	11.2	5.1	12.2	9.6	12.6	10.4	9.0	1.1
2015	10.9	9.3	14.3	4.4	15.1	12.2	11.1	12.4	10.9	1.1
2016	11.2	9.2	14.5	5.7	15.3	12.5	13.4	13.1	9.1	1.1
2017	9.8	8.2	12.9	4.6	14.2	12.1	8.1	12.0	4.2	1.1
2018	9.6	8.4	12.8	4.3	14.4	12.7	4.0	11.4	1.4	1.1
2019	9.0	7.2	11.2	3.7	11.0	9.6	19.3	9.9	8.5	1.1
Average an	nual projecte	ed growth 200	09-2019:							
3	7.0	6.4	8.8	3.1	11.4	8.8	3.0	9.2	3.1	1.0

Table A.14. Total Minnesota Expenditures for Health Services and Supplies by Payer Type: 1993-2019 (current dollars in millions)

		Pri	vate			Pu	blic	
Year	Total	Private Health Insurance	Other Private	Out of Pocket	Total	Medicare	Medicaid	Other Public
1993	8,588	5,328	599	2,662	5,256	2,066	2,265	924
1994	8,244	5,183	597	2,464	5,439	2,134	2,506	799
1995	8,396	5,404	605	2,387	5,832	2,277	2,698	857
1996	8,691	5,685	618	2,388	6,132	2,436	2,801	895
1997	8,940	5,856	629	2,455	6,368	2,572	2,848	948
1998	9,753	6,346	644	2,762	6,565	2,618	2,939	1,008
1999	10,845	7,238	671	2,936	6,825	2,685	3,098	1,042
2000	12,568	8,538	743	3,288	7,412	2,871	3,389	1,152
2001	13,427	9,158	828	3,441	8,420	3,249	3,836	1,335
2002	14,591	10,064	844	3,684	9,442	3,498	4,415	1,529
2003	16,107	11,248	843	4,015	10,290	3,731	4,826	1,733
2004	16,788	11,805	859	4,124	10,835	4,016	5,042	1,777
2005	17,890	12,679	877	4,335	11,574	4,489	5,310	1,774
2006	19,021	13,794	871	4,357	12,115	4,811	5,471	1,834
2007	20,182	14,610	905	4,667	13,148	5,099	6,088	1,960
2008	20,925	15,172	948	4,805	14,136	5,449	6,543	2,144
Projected				_				
2009	21,107	15,284	1,053	4,770	15,178	5,788	7,006	2,384
2010	20,678	15,078	1,016	4,585	16,081	6,359	7,322	2,399
2011	20,793	15,552	[°] 937	4,304	17,434	6,500	8,438	2,496
2012	20,499	15,705	858	3,936	19,077	6,965	9,614	2,497
2013	21,378	16,699	819	3,860	20,717	7,359	10,600	2,758
2014	23,883	18,685	862	4,335	22,481	7,787	11,750	2,944
2015	27,674	21,708	965	5,000	24,152	8,143	12,858	3,151
2016	31,898	25,214	1,067	5,617	26,180	8,642	14,166	3,371
2017	35,766	28,624	1,141	6,002	28,475	9,257	15,608	3,610
2018	39,915	32,335	1,217	6,362	31,050	9,985	17,197	3,868
2019	44,067	35,871	1,262	6,933	33,892	10,800	18,947	4,148

Table A.15. Per Capita Minnesota Expenditures for Health Services and Supplies by Payer Type: 1993-2019 (current dollars)

<u> </u>		Pri	vate			Pu	blic	
Year	Total	Private Health Insurance	Other Private	Out of Pocket	Total	Medicare	Medicaid	Other Public
1993	1,885	1,169	131	584	1,154	454	497	203
1994	1,788	1,124	130	534	1,180	463	543	173
1995	1,802	1,160	130	512	1,251	489	579	184
1996	1,844	1,206	131	507	1,301	517	594	190
1997	1,877	1,229	132	515	1,337	540	598	199
1998	2,026	1,318	134	574	1,364	544	611	209
1999	2,225	1,485	138	602	1,400	551	636	214
2000	2,547	1,730	151	666	1,502	582	687	233
2001	2,695	1,838	166	691	1,690	652	770	268
2002	2,908	2,006	168	734	1,882	697	880	305
2003	3,191	2,228	167	795	2,038	739	956	343
2004	3,305	2,324	169	812	2,133	791	993	350
2005	3,503	2,483	172	849	2,266	879	1,040	347
2006	3,695	2,679	169	846	2,353	934	1,063	356
2007	3,888	2,814	174	899	2,533	982	1,173	378
2008	4,000	2,901	181	919	2,703	1,042	1,251	410
Projected				<u> </u>				
2009	4,008	2,902	200	906	2,882	1,099	1,330	453
2010	3,838	2,799	189	851	2,985	1,180	1,359	445
2011	3,831	2,865	173	793	3,212	1,197	1,554	460
2012	3,748	2,871	157	720	3,488	1,274	1,758	457
2013	3,879	3,030	149	700	3,759	1,335	1,923	500
2014	4,301	3,365	155	781	4,049	1,402	2,116	530
2015	4,946	3,880	173	894	4,317	1,455	2,298	563
2016	5,658	4,472	189	996	4,644	1,533	2,513	598
2017	6,297	5,039	201	1,057	5,013	1,630	2,748	635
2018	6,974	5,650	213	1,112	5,425	1,745	3,005	676
2019	7,642	6,221	219	1,202	5,878	1,873	3,286	719

Table A.16. Percent Annual Growth in Minnesota Expenditures for Health Services and Supplies by Payer Type: 1994-2019 (percent change in current dollars

_		Priv	/ate			Pul	blic	
Year	Total	Private Health Insurance	Other Private	Out of Pocket	Total	Medicare	Medicaid	Other Publi
1994	-4.0	-2.7	-0.3	-7.4	3.5	3.3	10.6	-13.5
1995	1.8	4.3	1.3	-3.1	7.2	6.7	7.7	7.2
1996	3.5	5.2	2.2	0.0	5.1	7.0	3.8	4.5
1997	2.9	3.0	1.7	2.8	3.9	5.6	1.7	5.9
1998	9.1	8.4	2.4	12.5	3.1	1.8	3.2	6.4
1999	11.2	14.1	4.1	6.3	4.0	2.6	5.4	3.4
2000	15.9	18.0	10.7	12.0	8.6	6.9	9.4	10.5
2001	6.8	7.3	11.5	4.7	13.6	13.2	13.2	15.8
2002	8.7	9.9	1.9	7.0	12.1	7.7	15.1	14.6
2003	10.4	11.8	-0.1	9.0	9.0	6.7	9.3	13.4
2004	4.2	5.0	1.8	2.7	5.3	7.6	4.5	2.5
2005	6.6	7.4	2.1	5.1	6.8	11.8	5.3	-0.2
2006	6.3	8.8	-0.7	0.5	4.7	7.2	3.0	3.4
2007	6.1	5.9	3.9	7.1	8.5	6.0	11.3	6.9
2008	3.7	3.8	4.7	3.0	7.5	6.9	7.5	9.4
Average an	nual growth 1	.998-2008:		_				
	7.9	9.1	3.9	5.7	8.0	7.6	8.3	7.8
Projected								
2009	0.9	0.7	11.1	-0.7	7.4	6.2	7.1	11.2
2010	-2.0	-1.4	-3.6	-3.9	5.9	9.9	4.5	0.6
2011	0.6	3.1	-7.8	-6.1	8.4	2.2	15.2	4.1
2012	-1.4	1.0	-8.4	-8.6	9.4	7.2	13.9	0.0
2013	4.3	6.3	-4.5	-1.9	8.6	5.7	10.3	10.4
2014	11.7	11.9	5.3	12.3	8.5	5.8	10.9	6.7
2015	15.9	16.2	11.9	15.3	7.4	4.6	9.4	7.0
2016	15.3	16.2	10.6	12.3	8.4	6.1	10.2	7.0
2017	12.1	13.5	6.9	6.8	8.8	7.1	10.2	7.1
2018	11.6	13.0	6.7	6.0	9.0	7.9	10.2	7.2
2019	10.4	10.9	3.7	9.0	9.2	8.2	10.2	7.2
Average ar	nual projected	d growth 2009-201	.9:					
_	7.6	8.9	1.8	3.8	8.4	6.4	10.5	5.7

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Table A.17. Percent Annual Growth in Minnesota per Capita Expenditures for Health Services and Supplies by Payer Type: 1994-2019 (percent change in current dollars)

		Priv	ate .			Pu	blic	
Year	Total	Private Health Insurance	Other Private	Out of Pocket	Total	Medicare	Medicaid	Other Public
1994	-5.1	-3.9	-1.4	-8.5	2.3	2.0	9.3	-14.6
1995	0.8	3.1	0.3	-4.1	6.1	5.6	6.5	6.1
1996	2.4	4.0	1.0	-1.1	4.0	5.8	2.6	3.3
1997	1.8	1.9	0.7	1.7	2.8	4.5	0.6	4.8
1998	8.0	7.2	1.4	11.3	2.0	0.7	2.1	5.3
1999	9.8	12.6	2.8	5.0	2.7	1.3	4.1	2.1
2000	14.5	16.5	9.3	10.6	7.3	5.6	8.1	9.2
2001	5.8	6.2	10.4	3.6	12.5	12.1	12.1	14.7
2002	7.9	9.1	1.2	6.3	11.4	6.9	14.3	13.8
2003	9.7	11.1	-0.7	8.4	8.3	6.0	8.7	12.7
2004	3.6	4.3	1.2	2.1	4.6	7.0	3.8	1.9
2005	6.0	6.8	1.6	4.5	6.2	11.2	4.8	-0.7
2006	5.5	7.9	-1.5	-0.3	3.8	6.3	2.2	2.5
2007	5.2	5.0	3.1	6.2	7.6	5.1	10.4	6.0
2008	2.9	3.1	3.9	2.2	6.7	6.1	6.7	8.6
Average an	nual growth 1	998-2008:						
	7.0	8.2	3.1	4.8	7.1	6.7	7.4	6.9
Projected								
2009	0.2	0.1	10.4	-1.4	6.6	5.5	6.4	10.4
2010	-4.2	-3.6	-5.7	-6.0	3.6	7.4	2.2	-1.6
2011	-0.2	2.4	-8.5	-6.8	7.6	1.4	14.4	3.3
2012	-2.2	0.2	-9.1	-9.2	8.6	6.4	13.1	-0.7
2013	3.5	5.5	-5.3	-2.7	7.8	4.9	9.4	9.6
2014	10.9	11.0	4.5	11.5	7.7	5.0	10.0	5.9
2015	15.0	15.3	11.1	14.5	6.6	3.8	8.6	6.2
2016	14.4	15.3	9.7	11.5	7.6	5.3	9.3	6.2
2017	11.3	12.7	6.1	6.0	7.9	6.3	9.3	6.3
2018	10.8	12.1	5.9	5.2	8.2	7.1	9.4	6.4
2019	9.6	10.1	2.9	8.2	8.3	7.3	9.4	6.4
Average an	nual projected	d growth 2009–201	 L9:					
J	6.7	7.9	0.9	2.9	7.4	5.5	9.5	4.7

 $\begin{tabular}{ll} Table A.18. \begin{tabular}{ll} Projected Minnesota Health Care Expenditures With and Without PPACA Impacts, 2010-2019 \end{tabular}$

Calendar Year	Total Spending	Total Public Spending	Medicare	MA and Other Public Spending	Total Private Spending	Private Health Insurance Spending
	li id in	24.64 : 1		·		
		PACA implementat				45.4
2010	36.8	16.1	6.4	9.7	20.7	15.1
2011	38.2	17.4	6.5	10.9	20.8	15.6
2012	39.6	19.1	7.0	12.1	20.5	15.7
2013	42.1	20.7	7.4	13.4	21.4	16.7
2014	46.4	22.5	7.8	14.7	23.9	18.7
2015	51.8	24.2	8.1	16.0	27.7	21.7
2016	58.1	26.2	8.6	17.5	31.9	25.2
2017	64.2	28.5	9.3	19.2	35.8	28.6
2018	71.0	31.1	10.0	21.1	39.9	32.3
2019	78.0	33.9	10.8	23.1	44.1	35.9
Projected tot	al spending with	PPACA implement	ation, in hillio	ons of current do	ollars:	
2010	38.1	16.4	6.6	9.8	21.6	15.8
2011	39.2	17.6	6.6	11.0	21.6	16.2
2012	40.7	19.1	7.0	12.2	21.5	16.5
2013	43.1	20.7	7.3	13.4	22.4	17.5
2014	49.1	23.1	7.6	15.5	26.0	20.4
2015	53.5	24.7	7.8	16.9	28.7	23.0
2016	60.8	26.7	8.1	18.5	34.1	27.5
2017	67.7	28.6	8.6	20.0	39.1	31.8
	74.2		9.2		43.2	35.5
2018 2019	81.6	31.0 33.7	9.2 9.8	21.9 23.9	43.2 47.8	39.5
2019	01.0	33.7	9.0	23.9	47.0	39.3
		with PPACA imple		millions of curr		
2010	1,323.6	361.0	243.4	117.6	962.6	701.9
2011	962.3	123.4	53.7	69.6	838.9	627.5
2012	1,084.0	48.3	0.0	48.3	1,035.7	793.5
2013	1,048.2	-17.3	-82.2	64.9	1,065.6	832.4
2014	2,729.5	607.3	-196.8	804.1	2,122.2	1,750.2
2015	1,645.3	570.0	-336.4	906.5	1,075.3	1,278.8
2016	2,702.8	475.8	-498.9	974.7	2,227.1	2,237.5
2017	3,505.3	154.7	-659.1	813.9	3,350.6	3,177.1
2018	3,284.5	-20.9	-807.0	786.1	3,305.3	3,179.2
2019	3,598.6	-174.7	-956.5	779.4	3,773.3	3,597.1
Projected ne	rcentage change	from pre-reform s	nendina:			
2010	3.6%	2.2%	3.8%	1.2%	4.7%	4.7%
2011	2.5%	0.7%	0.8%	0.6%	4.0%	4.0%
2012	2.7%	0.3%	0.0%	0.4%	5.1%	5.1%
2012	2.5%	-0.1%	-1.1%	0.5%	5.0%	5.0%
2013	5.9%	2.7%	-2.5%	5.5%	8.9%	9.4%
2014	3.2%	2.4%	-4.1%	5.7%	3.9%	5.9%
2015	4.7%	1.8%	-4.1% -5.8%	5.6%	7.0%	8.9%
2016	4.7% 5.5%	0.5%	-3.8% -7.1%		7.0% 9.4%	8.9% 11.1%
				4.2%		
2018	4.6%	-0.1%	-8.1%	3.7%	8.3%	9.8%
2019	4.6%	-0.5%	-8.9%	3.4%	8.6%	10.0%

Source: Mathematica Policy Research, based on MDH estimates of spending.

APPENDIX B METHODS USED TO PROJECT PUBLIC AND PRIVATE SPENDING

This section provides an overview of the methods used to project Minnesota public and private spending, with a particular focus on the changes to the methods used in our July 2010 report. The overview supplements the updates to both public and private spending projection methods described in Section II (Methods and Data) of this report.

A. Public Expenditures

1. Medical Assistance, General Assistance Medical Care, and MinnesotaCare

Projecting public health care expenditures in Minnesota entailed several key steps. First, spending was projected from 2010 to 2014 for three major public programs: (1) Medical Assistance (MA), (2) General Assistance Medical Care (GAMC), and (3) MinnesotaCare (MNCare).²³ Managed care and fee-for-service (FFS) spending were estimated separately for each of the three state programs. These projections use MDH's estimation methods for historic public expenditures and DHS's February 2011 forecast of future managed care and FFS expenditures.

To estimate managed care expenditures for MA, GAMC, and MNCare, we summed DHS spending projections each year from 2010 to 2014 (the final year in the 2011 DHS projections). For MA, managed care expenditures are comprised of (1) Managed Care (HMO); (2) Managed Care Performance Payment and Gross Adjustments; and (3) payments under Minnesota's Managed Care Elderly Waiver, Community Alternatives for Disabled Individuals Waiver, and Traumatic Brain Injury Waiver. Expenditures were reallocated from fiscal years (FY) to calendar years (CY) by adding one half of reported spending in any given fiscal year and one half of spending in the following fiscal year (for example, CY2001 = 0.5*FY2001 + 0.5*FY2002). To allocate expenditures for MA, GAMC, and MNCare across service types, we used program-specific spending data from DHS for large service categories. To allocate the remaining spending in state public programs, we used the Health Plan Financial and Statistical Report (HPFSR) for the nine HMOs and County Based Purchasing entities that provided Prepaid Medical Assistance Program (PMAP) coverage.

To estimate FFS expenditures for MA and GAMC (there are no MNCare FFS enrollees), we began by aggregating projected FFS spending in the DHS forecasts (2010 to 2014) into the appropriate service categories.²⁵ DHS forecasts FFS spending in detailed categories that closely approximate the service types estimated by MDH. Thus, it was not necessary to apply past service type distributions to the DHS forecasts as they were already in categories analogous to the MDH service types.²⁶ Again, because DHS forecasts fiscal year spending, we reallocated expenditures to calendar years. We added the FFS and managed care estimates (by service type) to calculate total calendar year spending projections by service type for MAand MNCare from 2010 to 2013. GAMC was projected from 2010 to 2011 only, as the program ended in 2011.

²³ Total public spending in Minnesota in 1993-2009 was estimated as the sum of public spending by program, based on data provided by DHS. Public spending in 2010 to 2014 are DHS projections.

²⁴ Given this method, it is necessary to estimate expenditures in FY 2015 in order to estimate spending in CY 2014. We used the average growth rate over the previous years for each expenditures category (variously, three, four, or five years to smooth the effect of outlier values in any one year) to estimate spending in FY 2015.

²⁵ MNCare does not have FFS enrollment.

²⁶ See pages 9-10 of MDH (2009a) for an explanation of which DHS categories map to which service types for MA.

To estimate MA and MNCare expenditures from 2015 to 2019, we used the growth in projected spending for these three programs reported in the DHS forecasts. We applied the average growth rate in expenditures for each program over the last three years (that is, *projected* expenditures from 2011 to 2014) to expenditures for the given program in the most recent year (also a *projected* value). This method assumes that the average growth rate observed from 2011 to 2014 will continue into the future; it also relies on the accuracy of the predicted expenditures based on the DHS forecasts.

We investigated average growth rates over longer periods of time to determine which rates best characterized the recent overall patterns of expenditure growth. When the three-year trend contained an outlier value, we increased the range to four or five years to better approximate the general growth trend and reduce the impact of any short-term phenomena driving the three-year rate.

2. Other Public Spending

The next step in projecting total public spending was to estimate other public spending (that is, public spending other than spending in MA, GAMC, and MNCare). This payer category includes (but is not limited to): (1) Government Workers Compensation, (2) Veterans Administration, and (3) Public Health Activities (federal, state, and local).²⁷ Forecasted expenditures for these five spending categories are not available.

Several aspects of the input data series used to project public expenditures changed, relative to the input data series used to project expenditures in our July 2010 report. With respect to public expenditures, the nature of the data available from DHS necessitated additional changes, as follows:

- Public Expenditure Projections absent Minnesota's 2008 Reforms. The DHS projections of MA spending through 2013 include changes in payments to providers as of 2011, as part of the fees associated with the creation of medical homes. MDH and DHS estimated these amounts to be roughly \$4,500,000 per year for the physician payments and \$500,000 per year for payments to hospitals. We adjusted the MA spending projections from DHS downward to arrive at projections of public spending for MA that do not include these impacts of the 2008 reforms.
- Projecting GAMC 2010-2011. GAMC has ceased to exist as a program; instead, funding for services is made available through direct appropriation to health care providers. Because GAMC is no longer part of the state's forecast, it was necessary to develop projections by service type for 2010 and 2011. MDH constructed projections of total GAMC expenditures for 2010 and 2011 based on a fiscal note which estimated the funding. Projected expenditures from 2011 to 2013 were allocated among service types in two steps. First, expenditures for prescription drugs were set at \$51,875,000 for all three years. The remaining total was then distributed among four service categories (inpatient hospital, physician services, outpatient hospital, and other expenditures) based on the actual distribution of GAMC expenditures in 2009. I'll verify this.

²⁷ These sources make up roughly two-thirds of the other public spending category from 1993-2006.

• Projecting Net Cost of Insurance 2010-2014. MDH's revised expenditure series from 1993 to 2009 adds the net cost of insurance (the difference between premiums collected and health care spending) for MA, GAMC, and MNCare to the "other spending" service category. We projected the net cost of insurance from 2010 to 2013 for each program using a three-year moving average of past growth in the net cost of insurance for public programs.

To estimate other public spending from 2010 to 2019, we applied past growth rate trends to historic expenditures in each of the five payer categories. We estimated future growth in each category as the average growth rate over either the past three or five-year period. As described above, we chose a three-year moving average growth rate when it best characterized the recent general growth trend. However, when there was a spike in the growth rate in a single year over the past three years, we investigated whether growth rates calculated over longer periods of time might represent the general growth trend better. Having estimated total expenditures in each payer category, we then allocated expenditures by service type using the most recent historic distribution by service type for each category, assuming implicitly that the distribution of expenditures by service type will not change in future years. Lastly, we subtracted long-term care spending from each public spending category to complete the time series of projected public spending (minus Medicare and long-term care) in Minnesota from 2010 to 2019.

B. Private Expenditures

This section details the construction of the original private expenditures models and all changes to the models made for the July 2010 report, and is not a complete description of the dependent or explanatory variables used for this year's report. A full description of the changes made for this report can be found in Section II (Methods and Data).

1. Dependent Variables

The dependent variables are real per capita private spending for health services and supplies (minus long-term and home health care) in Minnesota from 1993 to 2008. These estimates are taken directly from MDH's resident-based expenditure estimates by service and payer type. We calculated per capita expenditures by dividing total expenditures by the total population in Minnesota (population variables are discussed below). We adjusted the nominal per capita expenditure estimates using a price index for personal health care developed by CMS to arrive at real per capita expenditures (in 2000 dollars).

2. Explanatory Variables

As the measure of relative price for each expenditure category, we used CMS's price index for that category divided by a general price index for all consumer spending. The various price indices (for each service type) were also used to adjust the categories of private and public nominal expenditures to real values (2000 dollars). The Minnesota State Demographic Center reports historic and forecasted estimates for the total population of Minnesota by age. The Center constructs annual population estimates from 1990-2009 and population projections from 2010-2060. We used the total population projections to construct each of the per capita variables used in the analysis. We calculated the percent of the population over age 65 as the number of Minnesota residents over 65 years divided by the total population.

We obtained nominal personal income estimates and projections for Minnesota residents from Minnesota Management and Budget (MMB). MMB reports this series quarterly from 1990 to 2013. To obtain yearly estimates, we calculated the average of the four quarterly values. To project the MMB variables from 2014 to 2019, each variable was regressed on a time trend, and future values were predicted using the estimated regression equation. To better approximate the personal income of the population that accounts for private health care spending, we subtracted public spending (as previously defined for this study: Medical Assistance, GAMC, and MinnesotaCare, plus other public spending) from aggregate personal income.²⁸ To calculate real per capita personal income in Minnesota, we divided nominal personal income by the total population and adjusted this measure using the price index for personal health care (in 2000 dollars). Total employment estimates and projections (measured as total payroll) for Minnesota residents were obtained from MMB. MMB reports this series quarterly from 1990 to 2013. We calculated yearly estimates as the average of the four quarterly values and applied the projected rate of growth in national total employment (generated by Global Insight) to project total employment in Minnesota from 2014 to 2019. Total employment per adult population was calculated by dividing total employment by the population in Minnesota age 19-64.

The percentage of Minnesota residents under age 65 without health insurance is based on the results from the Minnesota Health Access Survey fielded in 2001, 2004, 2007, and 2009. The uninsured rates for the years between the survey years were calculated by smoothing the growth rate between the survey years. We estimated the uninsured rates for those years outside of 2001-2009 by regressing the uninsured rate on the lagged unemployment rate in Minnesota and then applying the straight line trend to the missing years. The historic and projected unemployment rates were obtained from the Bureau of Labor Statistics (BLS).

²⁸ CMS begins with disposable personal income (personal income minus taxes) and then subtracts Medicare and Medicaid spending.

APPENDIX C PERFORMANCE OF MODELS TO PROJECT HEALTH CARE EXPENDITURES IN MINNESOTA

Appendix C presents two tables that provide additional information summarizing the performance of the models used to predict future health care spending in Minnesota: (1) model specifications and fit statistics for total private spending and by spending and payer types and (2) confidence intervals for total private spending with and without Medicare and long-term care included.

A. Model Specifications and Fit Statistics

Table C.1 lists the explanatory variables included in each of the private spending models. The table also includes three model fit statistics: R-squared, adjusted R-squared, and the mean absolute difference between the actual and projected per capita spending figures (in current dollars). Similar to the results in the 2009 and 2010 reports, in general, the models fit the historic data quite well. The adjusted R-squared values are above 0.9 for most of the models and only the fit for the "Other Spending" model would be considered below average (we observed a similar result in 2009 and 2010, primarily due to the volatility in the historic time series for this spending type and the resulting difficulty in predicting future values).

Table C.1. Specifications and Fit Statistics for Total Expenditures and Service and Payer Type Models

Model	Explanatory Variables	R- Squared Value	Adjusted R-Squared Value	Mean Absolute Difference Between Actual and Projected Per Capita Spending
Total Spending	MN real per capita personal income, MN nominal per capita GDP, MN per capita employment, MN percentage uninsured (lagged), national nominal private spending, time trend	0.970	0.950	47.2
Inpatient Hospital Spending	Hospital price index, price index, MN public real per capita hospital services spending, national public real per capita hospital services spending, MN real per capita personal income, national real per capita personal income, national real per capita GDP, MN real per capita employment, MN percentage uninsured (lagged), time trend	0.997	0.989	3.1
Physician Services	Physician services price index, price index, MN public real per capita physician services spending, MN real per capita personal income, national real per capita personal income, national real per capita GPD, MN per capita employment, MN percentage uninsured (lagged), time trend	0.980	0.950	9.3
Prescription Drugs	Prescription drugs price index, national price index, national public real per capita prescription drugs spending, MN public real per capita prescription drugs spending, MN real per capita personal income, national real per capita personal income, national real per capita GDP, MN per capita employment, MN percentage uninsured (lagged), time trend	0.998	0.995	2.5

Table C.1 (continued)

Model	Explanatory Variables	R– Squared Value	Adjusted R-Squared Value	Mean Absolute Difference Between Actual and Projected Per Capita Spending
Outpatient Hospital Care	Outpatient hospital care price index, price index, national public real per capita outpatient hospital care spending, MN public real per capita outpatient hospital care spending, MN real per capita personal income, national real per capita personal income, national real per capita GDP, MN per capita employment, MN percentage uninsured (lagged), time trend	0.999	0.996	2.0
Dental Care	Dental care price index, price index, MN public real per capita dental care spending, MN real per capita personal income, national real per capita personal income, MN per capita employment, MN percentage uninsured (lagged)	0.856	0.712	5.1
Other Professional	Price index, national public real per capita other professional spending, MN public real per capita other professional spending, MN real per capita personal income (lagged), national real per capita personal income (lagged), national real per capita GDP, MN per capita employment, MN percentage uninsured (lagged)	0.998	0.994	2.4
Other Spending	Other private spending price index, national public real per capita other private spending, MN public real per capita other private spending, MN real per capita personal income, national real per capita personal income, MN per capita employment, MN percentage uninsured (lagged)	0.638	0.215	25.6
Long–Term Care	Nursing home spending price index, MN public long-term care spending, national real per capita GDP, MN real per capita employment, MN real per capita disposable personal income (lagged), MN percentage over 65 years of age, MN percentage uninsured (lagged)	0.936	0.872	3.7
Private Health Insurance	Medical spending price index, MN public real per capita spending, MN real per capita personal income, national real per capita GDP, MN per capita employment, MN percentage uninsured (lagged)	0.989	0.981	28.5
Other Private	Price index, national public real per capita total spending, MN public real per capita total spending, MN real per capita personal income (lagged), national real per capita personal income (lagged), MN per capita employment, MN percentage uninsured (lagged)	0.828	0.655	2.2
Out of Pocket	Price index, national public real per capita total spending, MN public real per capita total spending, MN real per capita personal income, national real per capita personal income, national real per capita GDP, MN per capita employment, MN percentage uninsured (lagged)	0.989	0.976	3.4

B. Confidence Intervals for Projected Total Health Care Expenditures

Table C.2 present the 95% confidence intervals for projected total spending in Minnesota with and without Medicare and long-term care expenditures. The purpose of Table C.2 is to illustrate that the projected values in the body of the report come from model estimates that can also be viewed as a range of potential values. The 95% confidence intervals in the long term are particularly wide. Any conclusions drawn from the projections should take these ranges into account.

Table C.2. Confidence Intervals for Projected Total Minnesota Expenditures for Health Services and Supplies 2009-2019 (current dollars in millions)

	Total Spending	95% Confidence Interval			95% Confidence Interval	
Calendar Year	minus Medicare and Long-Term Care Spending	Lower	Upper	Total Spending	Lower	Upper
2009	25,439	21,902	28,976	36,286	32,680	39,891
2010	25,318	19,950	30,687	36,759	31,237	42,281
2011	26,395	19,418	33,372	38,227	31,044	45,410
2012	27,091	19,264	34,919	39,575	31,537	47,614
2013	28,943	21,297	36,589	42,095	34,261	49,929
2014	32,301	24,531	40,071	46,365	38,409	54,320
2015	36,814	29,118	44,509	51,825	43,948	59,703
2016	41,841	34,159	49,524	58,078	50,222	65,935
2017	46,671	38,747	54,596	64,241	56,148	72,334
2018	51,893	43,429	60,357	70,965	62,329	79,600
2019	57,257	47,988	66,526	77,959	68,501	87,417

Source: Mathematica Policy Research, based on MDH estimates of health spending.



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