



BUSINESS HEALTHCARE SUMMIT

Prepared by:



Prepared for:



**BUSINESS
HEALTHCARE
SUMMIT**

THE CONTRIBUTION
OF HEALTH CARE TO
BILLINGS' ECONOMY

2020
UPDATE

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 **BIG SKY
ECONOMIC
DEVELOPMENT**

Acknowledgements

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We would like to thank the following partners for supporting this research project.

Advanced Care Hospital

Big Sky Economic Development

Billings Clinic

Montana Bio Science Alliance

Montana State University Billings

Rehabilitation Hospital of Montana

RiverStone Health

Rimrock

Rocky Mountain College

St. John's United

St. Vincent Healthcare

Table of Contents

Acknowledgements.....	i
Table of Contents	ii
Summary.....	1
I. Introduction.....	4
II. What is health care?.....	4
III. What is health care in Billings?	5
IV. Why is health care so large in Billings?.....	7
V. How does one evaluate the contribution of an industry to a regional economy?	8
A. The Contribution of the Traded Sector.....	8
B. The Contribution of the Local Sector.....	9
VI. How valuable is health care?	11
VII. Is Billings' health care sector efficient?.....	12
A. How healthy is Billings?.....	13
B. How well does Billings' health care system perform?.....	13
C. How expensive is care in Billings?.....	14
VIII. If Billings' health care sector disappeared, what would happen to Billings' economy?.....	16
IX. How do health-care related industries contribute to Billings' economy?..	17
X. What does the future hold for health care in Billings?.....	19
Federal policy	20
Growth in the Billings hospital referral region	20
XI. Conclusion.....	21
Endnotes	22

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Summary

Health care is Billings largest industry, and one of its fastest growing. Billings' health care industry employs over 14,000 people (17 percent of total covered employment) and pays more than \$819,000,000 in wages (21 percent of total covered wages). Since 1990, health care employment in Billings grew by 118 percent, and total health care wages grew by 250 percent (adjusted for inflation).

How does health care contribute to Billings' economy? While size matters, looking only at the jobs and incomes tied to the health care sector fails to capture the full contribution of health care to the regional economy.

Health care is essential. It is essential for healthy people, and it is essential for healthy economies. In this report, we describe the different ways that health care contributes to Billings' economy, and we provide some numbers that help describe the magnitude of its contribution.

Highlights of this report include:

- Billings' health care sector is much larger than expected based on its population. Billings' health care sector serves a large non-local population. Figure 1 shows the size of Billings' Hospital Referral Region – i.e., the area over which patients travel for tertiary care. More than 40 percent of Billings' hospital inpatients and revenues come from outside of Yellowstone County. Outside money that enters

By the numbers

14,000

Number of workers in health care industry, 17 percent of Billings' employment.

\$891,000,000

Total payroll paid to health care workers, 21 percent of total payroll.

23,000

Total number of jobs in Billings directly or indirectly attributable to health care.

\$1,464,000,000

Total compensation directly or indirectly attributable to health care.

7,600

Number of health care jobs added since 1990. Roughly double the change of the next highest industry.

2,400

Number of health care jobs Billings is expected to add by 2028. Nationally, health care is projected to be the fastest growing industry over this period.

30

Percent of total employee compensation in Billings directly or indirectly attributable to health care plus related construction, education, bioscience, and travel.

Billings' economy through the health care sector supports over 5,000 health care jobs and \$400 million in health care wages. As such, the share of Billings' health care sector that is supported by non-local spending (the traded component) is Billings' 5th largest industry (as measured by employment), roughly the same size as Billings' construction and wholesale trade sectors.

- Billings' health care sector is necessary. Health care produces health and health is very valuable. The gains in life-expectancy generated by health care in recent decades create more than \$1 billion per year in economic value for Billings' residents and poor health costs Billings' economy more than \$500 million in lost potential output.
- Billings' health care sector is efficient. Billings' residents have average or better than average health outcomes, while spending less per person on health care. For instance, Medicare spent \$8,388 per beneficiary in Billings in 2016 – an amount that is approximately one-third of what it spent in the highest spending areas. A more efficient health care system benefits the regional economy. Lower spending plus equal or better health means more money in people's pockets.
- Billings' health care sector makes Billings' a desirable place to live and work. Without its health care sector many people and businesses would move away from

By the Numbers

620,000

Approximate population of the Billings Hospital Referral Region

40

Percent of hospital inpatients from outside of Yellowstone County.

5,200

Number of extra health care jobs attributable to non-local spending.

(or never move to) Billings. Quantifying the effects of the loss of health care is tricky. The presence of a large population creates demand sufficient for supply to exist. As such, economists have not seen what happens when a large community loses health care. Thus, our ability to describe the full effects of health care is limited. However, evidence from rural areas suggests many people consider access to health care a necessity.

- At a minimum, Billings' health care sector supports 20-30 percent of Billings' economy. If we assume that health care in Billings' disappeared and people do not move in response, three things would happen. First, Billings' residents would need to travel elsewhere for care. Second, the thousands of people who currently travel to Billings for care would travel elsewhere for care. Third, health care related investment—in creating buildings, technologies,

workers, etc.—would likely cease. Cumulatively, these losses and the ripple effects associated with them would leave a large hole in Billings' economy.

- Quantifying these effects using an economic contribution model suggests that Billings' health care sector supports over 23,000 jobs, \$1.5 billion in compensation, and over \$3 billion in output. If we define health care more broadly and add in impacts from health care related investment (e.g., construction and education), from Billings' bioscience sector, and from non-health care spending by out-of-area patients, the impact of health care grows. Broadly defined, the health care sector supports over 27,000 jobs and over \$1.7 billion in compensation.
- Looking into the future, health care is expected to continue to grow. Bureau of Labor Statistics projects that health care employment will grow by 17 percent between 2018 and 2028. This projected growth rate exceeds the projection for every other industry. A 17 percent increase in health care employment would mean 2,400 additional health care jobs in Billings by 2028. However, the future trajectory of health care will depend heavily on federal health policy choices.

By the Numbers

79%

Share of patients who would recommend both Billings' hospitals, This is seven percentage points higher than the US average and nine percentage points higher than the Montana average.

\$5,308

How much less Medicare spends per beneficiary per year in Billings relative to the 99th percentile regions in the US.

86

Percent of Billings' residents who report being in good, very good or excellent health. This ranks in the top 25 percent of all US Counties.

I. Introduction

Health care is a large and growing industry. Nationally, Americans spend more than one out of every six dollars on health care.¹ It's the largest industry in the country (measured by employment at the 2-digit NAICS level²), employing nearly 22 million people (14.9 percent of the total).³ Its employment has nearly doubled since 1990, and economists expect it to continue to grow. The Bureau of Labor Statistics projects that health care employment will grow by 17 percent between 2018 and 2028.⁴ This is the fastest projected growth rate for any industry.

Billings' health care sector is not different. In fact, health care in Billings constitutes a larger share of total employment, and it has grown faster over the past several decades. Billings' health care industry employs over 14,000 people (17 percent of total) and pays more than \$812,000,000 in wages (21 percent of total).⁵ Since 1990, health care employment in Billings grew by 118 percent, and health care wages grew by 250 percent (adjusted for inflation).

How does health care contribute to Billings' economy? While it employs lots of people, looking only at the jobs and incomes tied to the health care sector fails to capture how health care contributes to the regional economy.

This report explores the contribution of health care to Billings' economy. Specifically, we investigate how health care contributes by addressing nine questions:

- (1) What is health care?
- (2) What is health care in Billings?
- (3) Why is health care so large in Billings?
- (4) How does one evaluate the contribution of an industry to a regional economy?
- (5) How valuable is health care?
- (6) Is Billings' health care sector efficient?
 - a. How healthy is Billings?
 - b. How well does its health care system perform?
 - c. How much does health care cost in Billings relative to other parts of the U.S.?
- (7) If Billings' health care sector disappeared, what would happen to Billings' economy?
- (8) How do health care-related industries contribute to Billings' economy?
- (9) What does the future hold for health care in Billings?

Each section of this report provides an answer to one of these questions

II. What is health care?

This report describes the contribution of health care to Billings' economy. Before we can describe how health care contributes, we need to define health care. In this report, we take both a narrow and a broad view.

Narrowly defined, health care is what you imagine it. It is all the places people go when they need someone to help improve or manage their health. It includes doctors' offices and hospitals and assisted living facilities.

Government data-keepers organize industry data using NAICS codes. The most inclusive NAICS code for health care is “62 – Health Care and Social Assistance”. We use this definition instead of sub-industry data because it is available across time and place for most places. Confidentiality restrictions often prevent the disclosure of sub-industry data in places without many firms.⁶

Broadly defined, the health care sector includes other parts of the health care system. It includes the firms that research new medicines and treatments. It includes firms that make medical devices or pharmaceuticals. It includes the firms that train new medical workers.

In this report, we use the narrow definition in sections 1-8. We focus on the broader parts of the health care sector in section 9.

III. What is health care in Billings?

Health care is the largest industry in Billings. In 2018, Billings’ health care sector employed over 14,000

\$819 million in wages.⁷ The health care sector accounted for 17 percent of Billings’ employment and 21 percent of wages. The next largest industry is retail trade, which represents 13 percent of total employment and only 9 percent of total wages.

Health care has also been one of Billings’ fastest growing industries. Since 1990, health care employment grew by 118 percent, from 6,400 to 14,000. Over the same period, total inflation-adjusted wages paid to health care workers increased by 250 percent, from \$234 million to \$819 million.

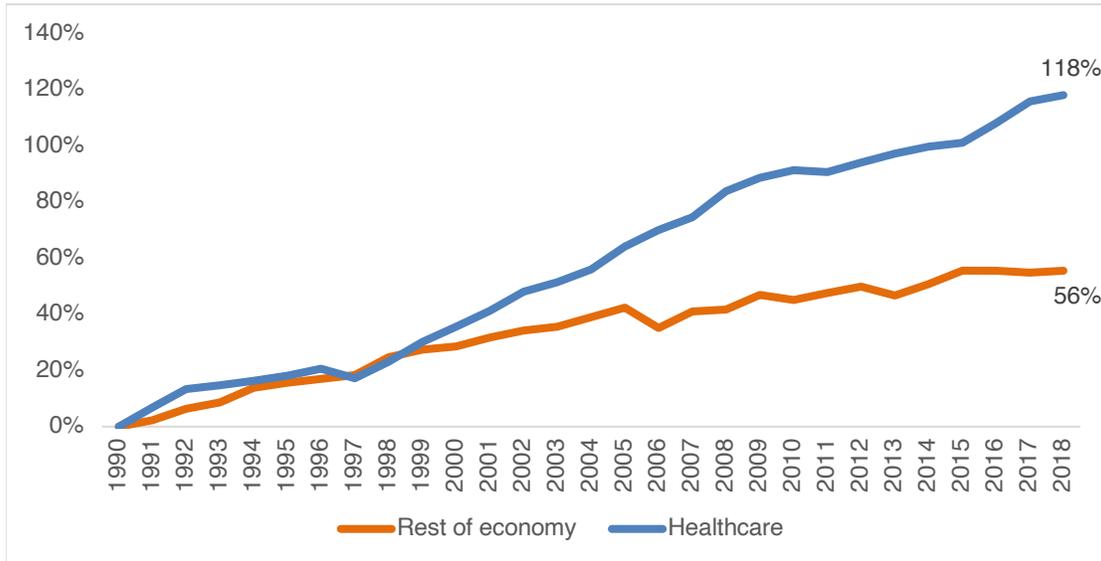
Over the past 25 years, health care in Billings grew much faster than the rest of the area’s economy. As shown in Figure 2, health care grew only slightly faster than the rest of the Billings’ economy during the 1990s. However, since 1999 health care grew much faster, and over the past several years nearly all of the growth in Billings’ employment has been in health care.

Table 1: Billings’ Largest Industries

NAICS Code	Industry	Employment	Wages (\$millions)	% of Total Emp.	% of Total Wages
10	Total, all industries	81,636	\$3,919		
62	Health care and social assistance	14,024	\$819	17%	21%
44-45	Retail trade	10,641	\$343	13%	9%
72	Accommodation and food services	9,181	\$174	11%	4%
23	Construction	5,473	\$337	7%	9%
42	Wholesale trade	5,235	\$325	6%	8%

people, and it paid approximately

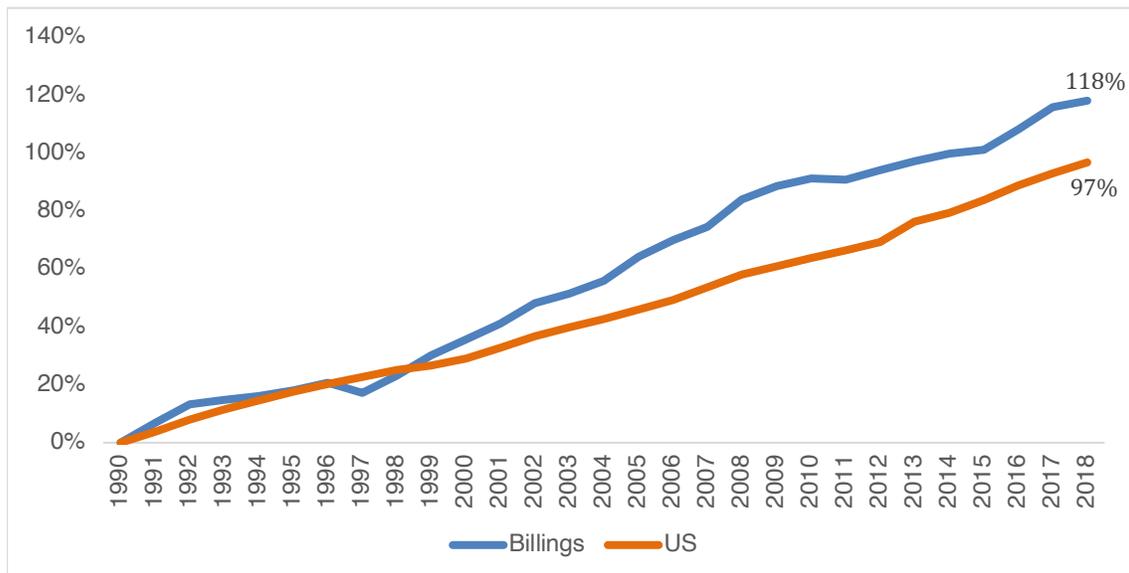
Figure 2: Cumulative Percent Change in Employment in Billings, Health Care vs. Rest of Economy, 1990-2018



Since 1990, total health care employment grew by 118 percent while Billings' non-health care employment grew by 56 percent. Similarly, since 1990, total health care wages grew by 250 percent, while Billings' non-health care total wages grew by only 122 percent.

Billings' health care sector not only grew faster than the Billings' economy, it also grew faster than the U.S. health care sector (Figure 3). Again, Billings' health care sector grew only slightly faster than the U.S. health care sector in the 1990s, but diverged starting around 1999.

Figure 3: Cumulative Percent Change in Employment, Billings' Health Care vs US Health Care, 1990-2018



IV. Why is health care so large in Billings?

While health care is the largest industry in most places, it is particularly large in Billings. Economists often use something called a location quotient to describe the concentration of an industry in a location. The location quotient for health care is simply health care's share of employment or wages in Billings divided by health care's share of employment and wages nationally. In 2018, Billings' health care location quotient was 1.25 for employment and 1.73 for wages. This means that Billings' share of health care employment is 25 percent larger than the national share. This ranks Billings in the top 20 percent of counties for the concentration health care employment and the top 11 percent for the concentration of health care wages.

As discussed in more detail below, Billings' health care sector is not large because it is inefficient or because Billings' residents are particularly unhealthy. Instead, the large size of Billings' health care sector reflects the fact that Billings is a health care hub for a large region.

Billings is the largest city in a large swath of the country. Its health care providers serve much of eastern Montana and parts of Wyoming and the Dakotas. As such, the population served by health care providers located in Billings far exceeds Billings' local population.

Health economists use something called a Hospital Referral Region (HRR) to describe the area over which patients travel for tertiary care.

Billings sits at the center of its own HRR. In 2018, the Billings HRR served close to 620,000 people.

Commiserate with these findings, Billings' health care providers receive a large share of patients and revenue from outside of Billings. Approximately, 40 percent of Billings' hospital inpatients come from outside of Yellowstone County.⁸ In addition, 30 percent of residents in long-term care facilities come from outside of Yellowstone County.⁹

Without the influx of patients from elsewhere, Billings' health care sector would be much smaller. On average, places with 160,000 people that are not the center of an HRR have fewer than 8,800 health care workers and pay \$413 million in health care wages.

This means that Billings' health care sector employs over 5,200 more health care workers and pays over \$400 million more in health care wages than expected.

As such, roughly 40 percent of Billings' health care employment and wages is attributable to money that comes into Billings from outside. This means that a substantial portion of Billings' health care sector is part of the traded sector. The traded sector included things like factories that primarily contribute to the local economy by bringing money in from outside the area. The traded component of Billings' health care sector is Billings' fifth largest industry

as measured by employment, roughly the same size as Billings construction and wholesale trade sectors. The traded component of health care is Billings' second largest industry as measured by total wages.

Thus, Billings' health care sector is large, growing, and includes a large traded component. What does this mean? Certainly, one should pay attention to any industry that employs one out of every six workers and pays one out of every five dollars of wages. However, health care is the largest industry in close to two-thirds of metro areas. Size alone does not capture how any industry contributes to the regional economy. A large health care sector could indicate that the local health care system is inefficient. To understand the full contribution of health care to the regional economy, we must look at more than size. We must understand how the economy would be different if the health care system was smaller, less efficient, or if it disappeared.

V. How does one evaluate the contribution of an industry to a regional economy?

To measure an industry's contribution to a regional economy, economists want to assess how the economy would differ if the industry disappeared (or changed in some other significant way).

Economists divide the regional economy into two main parts: the traded sector and the local sector. The

traded sector (or tradable sector) includes establishments that primarily sell to customers elsewhere. It includes things like factories, software companies, or corporate headquarters. The local sector (or non-traded sector) includes establishments that primarily sell to local customers. It includes things like schools, grocery stores, homebuilders, and local government. A healthy regional economy requires both parts to operate well.

The different sectors contribute to the regional economy in different ways. Traded sector industries contribute primarily by bringing in money from outside the community. Local sector industries contribute primarily by keeping money, people, and businesses inside the community.

A. The Contribution of the Traded Sector

A healthy traded sector contributes to the regional economy in two main ways.¹⁰ First, job growth in the traded sector generates job growth throughout the region. Economists find that, on average, each traded sector job supports 1.6 jobs elsewhere in the local economy. Second, economists argue that wage growth in the traded sector leads to wage growth throughout the region. Economists argue that much of the difference in wages (and prices) across regions stem from differences in the productivity of the traded sector.

In the traded sector size and productivity are what matter. People do not particularly care what their traded sector produces.¹¹ Local

residents are not dependent on its output. That is, if a region loses part of its traded sector, local consumers are not affected much. For instance, if a region had auto factories and the factories shut down, people living in the region could still buy a car. They would just buy a car made someplace else. The region, though, would lose a number of jobs. Thus, from an economic perspective, residents mostly want a large productive traded sector that supports jobs throughout the economy.

B. The Contribution of the Local Sector

The contribution of the local sector to the regional economy is more complicated. One finds local sector industries (almost) everywhere. It is hard to fathom economies without various parts of the local sector. Market forces ensure that any place with sufficient size has each of the main parts of the local sector. However, to understand the contribution of the local sector, one must attempt to imagine regions without various parts of the local sector.

To begin to understand the contribution of the local sector, consider how the economy would differ if a part of it disappeared. When a traded sector industry disappears, the economy loses jobs and incomes, but the choices available to local consumers are not directly affected. If a local sector industry disappears, the set of choices available to local consumers changes. A good or service is no longer available locally. For instance, if all grocery stores in a

region shut down, local residents could not make a quick trip to the grocery store.

To understand the effects of this loss, one needs to understand how consumers will respond to the lost local sector entity. Consumers have three choices. First, they can accept that certain goods and services are not available locally and find other things to do with their money. Second, they can travel and purchase the lost goods or services in some other community. Third, they can move to someplace else.

How consumers respond determines how the loss affects the economy. For instance, if the lost goods or services are not that valuable to consumers, the consequences of the loss will be small. The money that used to flow into the lost industry would return to local residents or businesses. Consumers would find something else to buy. The value to consumers of the new items would be less than the value of the old items. As such, consumers would lose something. However, the effect of the loss on economic activity – jobs and incomes – is ambiguous. It could increase, decrease, or remain the same. If people simply redirect their spending to a different local industry, economic activity would not change much. In this instance, one would likely conclude that the lost industry contributed little to the local economy.

If the lost good or service is sufficiently valuable, people or businesses may choose to travel to obtain the lost goods or services. In this case the lost sector becomes traded, and the impact on economic

activity mirrors that of the traded sector. Like the loss of a factory, the loss of the industry causes money to leave the community. As a result, local economic activity shrinks and jobs and incomes disappear. Consumers also suffer losses because they must pay the cost of travel and/or they may consume less of the lost good or service than they would like.

If people or businesses choose to move to obtain the lost goods or services, the consequences for the local economy are far worse. Rather than losing some fraction of the money spent at the lost industry, the region is losing all the money spent by the people or firms who view its presence as necessary. This would reduce jobs, incomes, and output throughout the region by a large amount.

More important, the loss of people and businesses mean the loss of economic capacity. Losing capacity – particularly skilled, creative workers – diminishes the region’s growth prospects.

Ultimately, the local sector helps the regional economy by contributing to an attractive quality of life and a reasonable cost of living. It also helps create a robust and resilient business climate. A robust and resilient business climate is important. Traded sector industries will wax and wane. The local sector helps smooth the transition between old dying sectors and new growing ones.¹²

Thus, residents care about the local sector because they are its customers. A healthy local sector contributes to the regional economy

by making sure that local residents can obtain the goods and services they desire. People do not want to live in places that lack good schools, extensive shopping, ample entertainment, functioning infrastructure, and affordable housing. Businesses that cannot access workers, professional services, or transportation networks struggle to compete.

Beyond its existence, the efficiency of the local sector is also important. People want an efficient local sector because the money to support it comes out of local pockets. A large, but inefficient local sector is a drain on the local economy. It increases the cost-of-living or the cost-of-business and reduces the attractiveness and competitiveness of the region.

While some argue that the traded sector is more important than the local sector (or vice versa), neither sector is superior to the other. A region needs both sectors to function. That is, each part is necessary but not sufficient to generate local economic health.

Economists usually place health care in the local sector. Most places in the United States offer health care, and most consumers purchase health care from local providers. However, in some places, a large proportion of health care consumers come from outside the area. In these places, health care includes a large traded component. Billings is one of these places. Thus, to understand the contribution of health care to Billings’ economy, we need to examine its contributions as both a local sector and a traded sector entity.

VI. How valuable is health care?

We cannot assess the contribution of health care to Billings' economy without assessing the value of this care. The reason health care exists in Billings is because people who live in Billings want care. Thus, it would be incomplete to describe the contribution of health care to Billings' economy without discussing the value that consumers place on the care they receive.

Because health care is semi-ubiquitous, people tend to take its contributions for granted. They should not. Health care improves health. This is the primary way health care contributes to regional economies. Health is important. Health helps boost local economic capacity. Health is valuable. We cannot live without it.

People want to live, and not just live, but live well. We want to run, jump, see, hear, taste, smell, and feel. We want to experience. Health is necessary for a high-quality life. As such, people value health, a lot.

It's not only you, though, that values your health. Your health affects others. If you're unhealthy, your friends and family suffer. If you are unhealthy, you are less productive at work and your employer (and the rest of the economy) suffers. Combined, these factors indicate that your health is valuable.

While people claim that life is priceless, economists have developed estimates for it. Technically, economists estimate the value of a

statistical life (VSL). Economists recognize that your life is likely priceless to you. Instead of estimating the value people place on their own lives, economists investigate how much people are willing to pay to reduce their chance of dying. If people are willing to pay \$700 to reduce their chances of dying by 1 in 10,000, then a life is worth \$7 million.¹³ Researchers commonly find VSLs that range between \$8 million and \$13 million.¹⁴

To help place these values in perspective, consider the following. Since 1970, life expectancy at age 50 for men increased from 21.8 years to 29.5 years. Thus, a 50-year-old today expects to live 7.7 years longer than a 50-year-old in 1970. Imagine that God came to you on your 50th birthday and offered you a choice. You could have the normal life expectancy for a 50-year-old (29.5 years), or you could trade it for the life expectancy of a 50-year-old in 1970 and a suitcase full of cash. How much money would need to be in the suitcase to get you to choose the shorter life? On average, economists find that God would need to pay more than \$500,000 to get people to accept the shorter life.¹⁵

One paper estimated that the gains in longevity achieved between 1970 and 2000 contributed more than \$4 trillion per year to the U.S. economy.¹⁶ That amount is equal to over one-quarter of U.S. GDP. Applying this increase to Billings, life expectancy gains over this period contributed over \$2 billion of value each year to Billings' economy.¹⁷ These estimates underestimate the value of mortality reductions in the current economy. They do not include the two-year

increase in life expectancy achieved since 2000.

To further illustrate the enormous value of health. The same paper argues that the value of a 1 percent reduction in cancer mortality exceeds \$500 billion, and a cure for cancer is worth more than \$50 trillion.¹⁸

Health care contributes not just by extending people's lives. It also generates value by improving the quality of people's lives. Economists estimate that people value one year of good health at approximately \$150,000.¹⁹

While people value longer life and better health, the value of one's health extends to other parts of the economy. Healthy people are productive people. When people live longer, avoid disability, come to work, and actually work while at work, the capacity of the economy grows. Billings' employers may lose 900,000 work-days each year to absenteeism (workers not coming to work because their sick) and presenteeism (workers coming to work while sick, but not getting work done).²⁰ That's the equivalent of 3,750 worker-years.²¹

The value of productivity gains (or losses) due to health is large. When fewer people die young, the economy gains workers. One study found that the reduction in mortality between 1970 and 2000 added \$1.9 trillion to the capacity of the labor force.²² When fewer people are disabled or sick, the capacity of the labor force also grows. Chronic health conditions cost the economy more than \$1 trillion each year in lost worker time.²³ Applying this value proportionally to Billings,

suggests that these chronic conditions cost Billings \$500 million per year in lost worker time.

In sum, people want health care because health is valuable, and health care contributes to health. While health outcomes reflect a mix of genetic, behavioral, and environmental factors, economists argue that 50 percent of gains in life expectancy since 1950 stem from improvements to health care.²⁴ Applying this fraction to the values calculated above and allocating them proportionally to Billings suggests that health care generates more than \$1 billion per year by extending lives. It contributes more than \$475 million per year in additional work-life capacity. To help place these values in context, Billings' total output in 2012 was \$8.5 billion. Such values indicate that regardless of any other effects on the economy, health care contributes a substantial amount to Billings' economy simply by keeping people healthy.

VII. Is Billings' health care sector efficient?

Health care's contribution to the local sector is not limited to whether it exists. Efficiency matters. Regions with health care systems that produce more health at lower costs are better off. Better health is good for all the reasons described in the previous section. Lower cost means residents have more money in their pockets and firms have more flexibility when constructing compensation packages and when setting prices.

To assess the efficiency of Billings' health care system, we look at three things: health outcomes, hospital performance, and health care spending. If Billings' residents have good health outcomes, if its hospitals rate well, and if spending is low (relative to the outcomes obtained), we can conclude that Billings' health care system further contributes to the local economy by operating efficiently.

A. How healthy is Billings?

Health outcomes in Billings' tend to be better than average. For instance, a recent study found that life expectancy in Billings at age 40 is longer than the US level, even after adjusting for demographics and income.²⁵ Similarly, Billings' residents are less likely to rate their health poorly. Only 14 percent of people in Billings say they are in fair or poor health. This is four percentage points below the national share (18 percent).²⁶

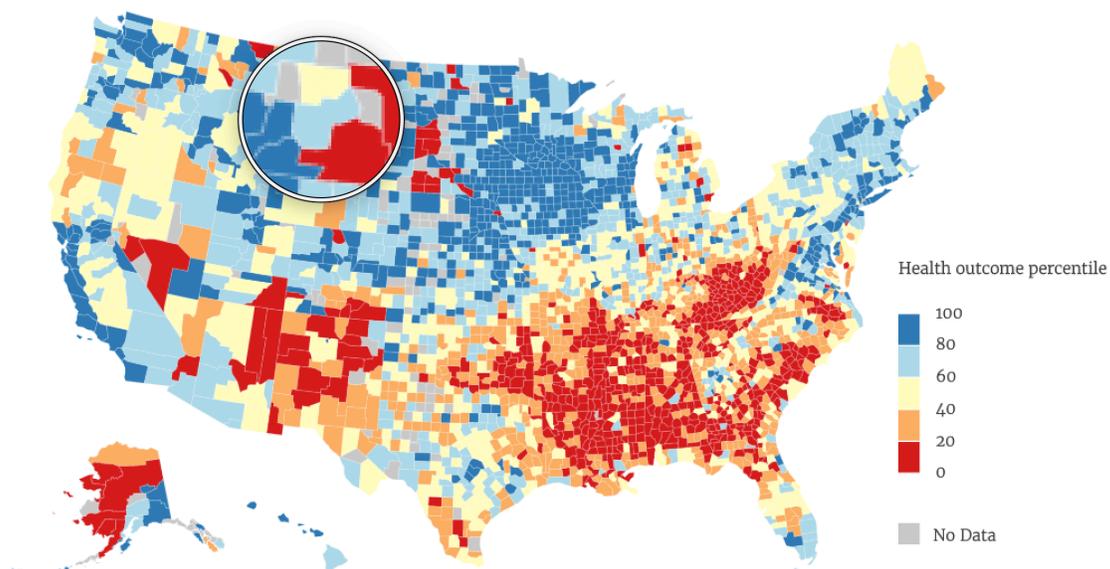
Figure 4 summarizes several measures of health outcomes using data and weights from County Health Rankings.²⁷ This measure combines data on years of potential life lost, health rating, number of poor physical health days, number of poor mental health days, and low birthweight babies. Based on this metric, Billings ranks in the top 35 percent of counties.

While Billings performs better than this on some metrics and worse on others, it seems safe to conclude that Billings' residents are relatively healthy. Billings could do better, but it could also do a whole lot worse.

B. How well does Billings' health care system perform?

Another part of health care efficiency is health system performance. When people seek care, they want to have a good experience, they want to get better, and they do not want care to cause them harm.

Figure 4: County percentile rank on County Health Rankings Health Outcome Index (100=best)



Similar to health, health care system performance can be evaluated along hundreds of dimensions. However, Billings performs well on several key indicators.

For instance, Billings rates highly on preventable hospital stays (i.e., hospital stays for ambulatory care sensitive conditions).²⁸ Billings ranks in the top 16 percent of all counties with data on this measure.

Similarly, Billings' hospitals rate highly on Medicare.gov's "Hospital Compare" tool.²⁹ This tool compiles data on nearly 100 measures of hospital performance. Based on the metrics available, Billings' hospitals perform well. Nearly 80 percent of patients at Billings' hospitals would recommend the hospital. Over 75 percent of patients rate the hospitals as 9 or 10 (out of 10). Unplanned readmission and death rates are at or above the U.S. national rate. Across almost every measure, Billings' hospitals score at or above the national average.

C. How expensive is care in Billings?

The final part of regional health care efficiency is cost. Patients want to get better outcomes for a lower price. While the complexity of the health care payment system makes it difficult to say exactly who benefits when health care gets cheaper, it is clear that regions that offer cheaper care enjoy some advantages.

Health care spending varies across regions. Spending in the highest cost

regions can be two to three times spending in the lowest cost regions.³⁰

Given that local residents provide much of the health care sector's revenues, regions that offer cheaper care allow residents to keep more money in their pockets. Lower health care costs also may allow firms greater flexibility in how they compensate their workers or how they price their products.

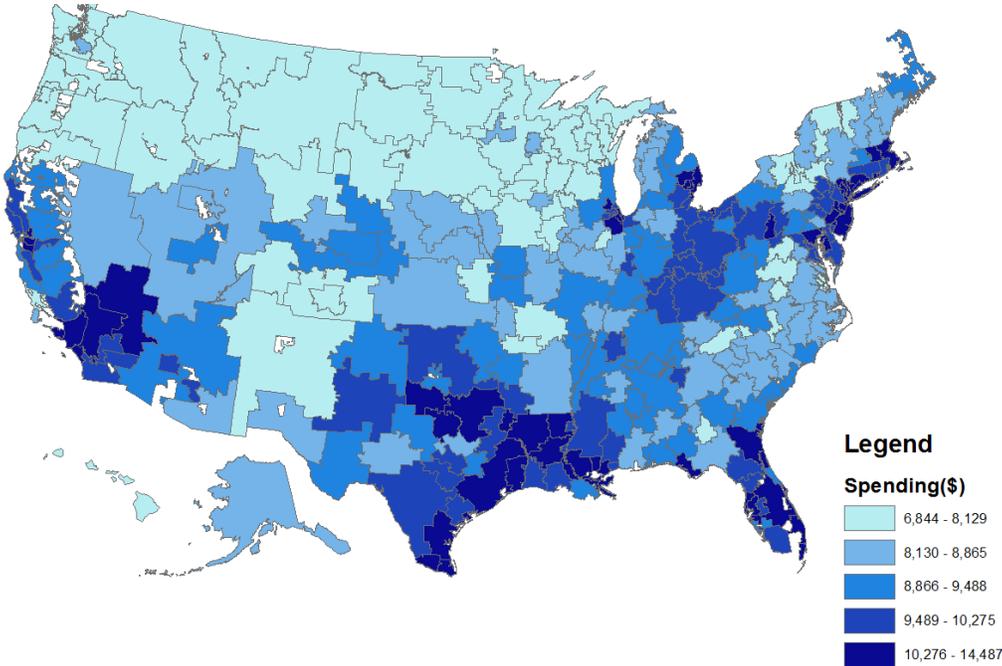
The top part of Figure 5 presents one of the most famous descriptions of geographic variation in health care spending. This figure shows spending per Medicare beneficiary by hospital referral region.³¹ Billings is a low-spending area. Medicare spent \$8,388 per beneficiary in Billings in 2016. This is \$1,800 less than the national average.

Recent research, though, finds that private health care spending is not highly correlated with Medicare spending.³² As such, it is important to understand what non-Medicare patients pay for care. Unfortunately, data on spending among non-Medicare patients is limited, particularly in Montana.

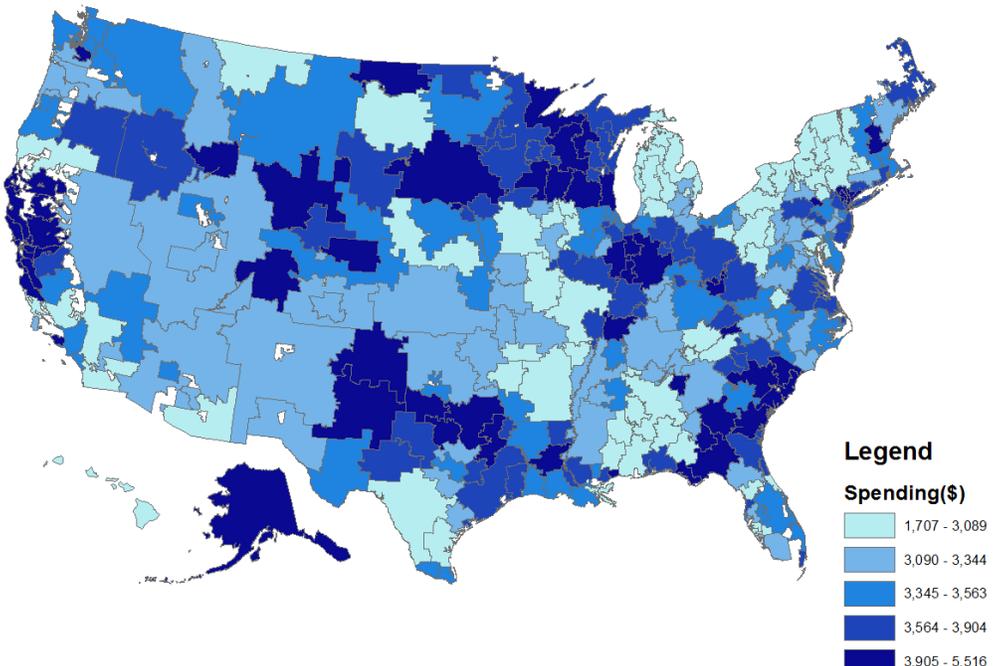
One recent study found that private health care spending in the Billings' areas was roughly average, although this study had relatively little data from Montana (only 8.8 percent of Montanans were in the data).³³ Recent data on health care spending and private health insurance premiums for all of Montana suggest that spending in Montana is close to the national average.³⁴

Figure 5: Health care spending per beneficiary by HRR from Cooper et al (2015)

Total Medicare spending per beneficiary, 2011



Total private spending per beneficiary, 2011



Collectively, the evidence suggests that Billings' health care sector is relatively efficient. Billings' residents are healthy. Billings' hospitals are above average on most metrics. Billings' patients appear to receive less unnecessary care, and the cost of care in Billings is below average.

VIII. If Billings' health care sector disappeared, what would happen to Billings' economy?

If Billings' health care sector disappeared several things would happen. First, at a minimum, Billings' residents would need to travel elsewhere for care. Second, the thousands of people who currently travel to Billings for care would travel elsewhere for care. Third, health care related investment—in creating buildings, technologies, workers, etc.—would likely cease. Cumulatively, these losses and the ripple effects associated with them would leave a large hole in Billings' economy.

To begin, I focus on the first two effects. If all health care spending in Billings transferred to some other place, the economic activity supported by health care would transfer with it. As noted above, not including proprietors, Billings' health care sector employs over 14,000 people and pays more than \$819 million in wages. Without a health care sector, this employment and these wages would disappear. All the jobs and incomes supported by the health care industry would disappear as well.

Economists refer to these ripple effects as indirect and induced impacts. Table 2 describes the economic activity supported by Billings' health care sector as measured by IMPLAN (a standard software package used to conduct economic impact analysis). This analysis suggests that over 23,000 jobs, nearly \$1.5 billion in labor income, and over \$3.2 billion in economic output are directly or indirectly related to health care spending.

Table 2: Economic contribution of health care in Billings

	Employment	Labor income (\$millions)
Direct	14,715	\$1,098
Indirect	4,069	\$198
Induced	4,341	\$168
Total	23,125	\$1,464

These estimates, though, underestimate the impact of health care on Billings' economy. They assume that the primary impact of the loss of its health care sector is the loss of spending on health care. However, it is likely that many, though not all, of Billings' residents would move if health care disappeared in their community. For many people, access to health care is a prerequisite for living in a community. One study found that 84 percent of a rural population indicated that living near a hospital was important or very important.³⁵ Research finds that people who live near developed health care systems experience better health outcomes.³⁶ People understand this,

and this shapes where they consider living.

A clear, though not the only, example of these effects are people who move into Billings' assisted living facilities. A substantial proportion of people who live in Billings' assisted living facilities come from outside of Billings.³⁷ These people come to take advantage of the facilities themselves and their proximity to the other parts of Billings' health care sector.

If people or businesses will not locate in a place without health care, then the impact of health care on Billings' economy may be many times larger than the estimates described in Table 2. It is easy to imagine that losing health care would turn Billings into small town over the long-run. Thus, the true economic impact of health care is substantially larger than the values reported in Table 2.

Unfortunately, estimating the full value of health care is difficult. Because the market generates supply where sufficient demand exists, economists do not have data to compare economies with health care to similar economies without health care. Thus, we cannot describe precisely how Billings' economy would differ without its health care system. However, sufficient evidence exists to support the conclusion that losing its health care sector would weaken the economy.

IX. How do health-care related industries contribute to Billings' economy?

If Billings' health care sector disappeared, it is also possible that there would be additional spillover effects not captured in the standard economic contribution model used in section VIII.

In particular, the economic contribution model using in section VIII does not fully account for growth. Billings' health care sector is growing. To support this growth, a variety of other industries must help build Billings' capacity. In particular, the construction sector must expand facilities and the education sector must help create new workers.

In recent years, Billings has invested tens of millions in expanding the capacity of its health care facilities. Health care related construction supports approximately 330 jobs and \$22 million in compensation. This spending also ripples through Billings economy supporting additional jobs and incomes.

To help support the growth of health care jobs, Billings' educational institutions have developed a variety of programs to help create the human capital necessary for the health care system to thrive. Billings' health care sector needs an ample, skilled workforce to fill its 14,000 jobs. A local medical education sector makes it easier to do that. It is much easier to recruit workers who already live in a

place than it is to conduct national or regional searches. It is cheaper, and firms do not face the risk that a new worker will not like Billings and leave after a short period.

Furthermore, collaboration between the local health care sector and the local education sector can make workers' training more efficient. Hands-on training is part of many health care education programs. People schooled in Billings, thus receive part of their training from health care workers in Billings. This allows students to be educated in the culture and practices of Billings' health care while still in school. This reduces training costs for hiring firms. It also allows places with more efficient health care delivery (like Billings) to more easily propagate that efficiency.³⁸

While these programs might exist even if Billings' health care sector disappeared, it seems likely that their success would diminish in the absence

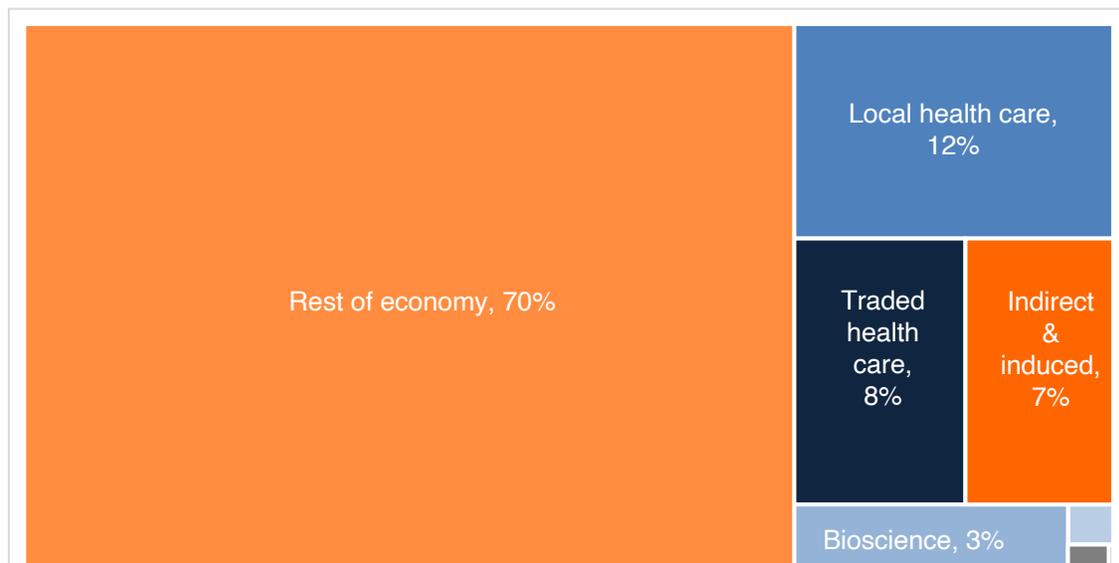
of a local health care sector.

Finally, as discussed in more detail in a recent report, Billings is also home to a bioscience sector.³⁹ The bioscience sector includes a variety of industries that are often complements to health care like medical labs, pharmaceuticals, and medical devices. In recent years, this sector employed slightly less than 600 people in Billings.

Similar to health occupation training, these industries could exist in Billings without a health care sector. However, there may be some complementarities between Billings' bioscience sector and its health care sector. In that case, if Billings' health care sector disappeared, its bioscience sector (or at least part of it) might disappear with it.

Combining the impacts of these health care related industries to those described in the previous section yields a broader measure of the

Figure 6: Employee compensation in Billings supported by health care and health care related sectors



contribution of health care to Billings economy described in Table 3 and Figure 6.

Table 3: Economic contribution of health care and related sectors in Billings

	Employment	Labor income (\$millions)
Direct	17,244	\$1,289
Indirect	5,041	\$244
Induced	4,857	\$187
Total	27,142	\$1,719

In total, Billings health care sector (broadly defined) supports over 27,000 jobs and over \$1.7 billion in compensation. Focusing only on employee compensation, the health care sector (broadly defined) directly or indirectly supports nearly 30 percent of all of the compensation paid to Billings' employees.

X. What does the future hold for health care in Billings?

Most forecasters expect health care to grow into the future. For instance, the Bureau of Labor Statistics projects that health care employment will grow by 1.6 percent per year between 2018 and 2028.⁴⁰ The Montana Department of Labor and Industries forecasts that health care employment will grow at a slightly slower rate (15 percent) between 2019-2027.⁴¹ These translate into a 16-17 percent increase in health care employment over a decade. This suggests Billings could add between 2,200 and 2,400 additional health care jobs by 2028.⁴²

Such forecasts are consistent with various forecasts for health care spending growth. While health care spending growth has slowed in recent years, economists still expect health care to grow faster than the economy. As a result, health care spending as a share of GDP will continue to rise. Forecasts suggest that the health care spending will rise from 17.9 percent of GDP to 19.4 percent by 2027.⁴³

These forecasts, like all forecasts, contain a large margin of error. The path of health care spending and employment reflects the confluence of many factors. Changes to any one factor ripple through the system. As such, it is better to focus on the logic that underlies the forecast, and not its precise numbers.

Health care spending forecasts combine expectations for both utilization and price. Utilization reflects how much care each person receives. Utilization rates change when patients change, when policy changes, and when medical science changes. Prices reflect the cost of delivering care and the extent of market power. Prices change in the cost of care changes or when the relative market power of providers change.

To forecast utilization, economists consider a series of questions:

- Is the population going to be less healthy and require more care per person (i.e., will it become older or will it become more obese)?
- Is a greater share of the population going to have health insurance?

- What new technologies will become available, and how will new technology affect total utilization?
- Will health care delivery become more efficient (e.g., will better coordinated care lead to fewer errors, better outcomes, and a better understanding of how best to care for patients)?

When considering the likelihood of price changes, economists ask:

- How much expensive new technology will be adopted?
- How will the cost of skilled workers, etc. change?
- How much market power will exist and how might it be exercised?

Some of these questions are easier to answer than others. For instance, we know that the population will age with the baby boomers over the next several years and that will increase health care utilization. We also know that the Affordable Care Act (ACA) has increased the share of the population with health insurance. Furthermore, we have little ability to project what new medical technologies will exist or how much market power will be exercised.

Thus, forecasts tend to entail assuming recent trends will continue with adjustments for the things we know will change. Many (and perhaps most) of the determinants of health spending, though, remain unknown, so forecasts have a large margin of error.

The main forces that shape the forecast for the U.S. apply in Billings. Thus, health care in Billings should grow along with the U.S. health care sector.

There are, however, two factors which may affect the growth of Billings' health care over the short- and long-run that merit additional discussion—federal policy and growth in the hinterlands

Federal policy

Federal health policy remains a focus of much political debate. People across the political spectrum have very different visions for America's health care sector. Those differing visions, if implemented, could dramatically change health care in Billings (and elsewhere).

While no one knows what will happen, changes that cut spending and/or reduce insurance coverage would likely shrink health care (or at least slow its growth). The details matter, though. Efforts that reduce spending on pharmaceuticals would likely have a smaller effect on Billings than efforts that reduce the number of people covered by Medicaid.

Ultimately, what happens to health policy remains a source of significant uncertainty when attempting to forecast the future of health care.

Growth in the Billings hospital referral region

Population is the single biggest determinant of health sector growth.

To the extent population grows in Billings and the surrounding areas, health care will likely grow.

However, growth in the hinterland may ultimately reduce demand for Billings' health care sector. As towns in these areas grow, their population may become large enough to support expanded health care services. As health care develops in these areas, patients in these areas may obtain more care locally. The ultimate impact of these changes on Billings will depend on the connection between the new providers and Billings and the types of services that grow locally. Growth in the hinterland may change (but not necessarily diminish) the impact of hinterland patients on Billings' economy. It is difficult to say when such effects may occur and how large they may be.

billions spent on health care by residents and non-residents would be spent elsewhere. As such, health care brings lots of money into Billings' economy which helps create or support jobs for tens of thousands of people in Billings. Without health care, Billings' economy would be much smaller.

XI. Conclusion

In sum, Health care is Billings' largest industry, and it is essential to Billings' economic success. First and foremost, health care produces health, and health is extremely valuable. Health is necessary for people to live and live well. Health is also important for creating and maintaining a productive workforce. Second, given the high value of health and the importance of access to health care for maintaining health, many people will not live someplace that lacks health care. As such, Billings' large, efficient health care sector is integral to making Billings a desirable place to live and work. Third, if people could not access health care in Billings, the

Endnotes

¹ Specifically, health care consumed 17.7 percent of GDP in 2018. Centers for Medicare and Medicaid Services, National Health Expenditures 2018 Highlights.

² Throughout this report, we use 2-digit NAICS codes as the primary unit of analysis. When we refer to industries, we refer to 2-digit industries.

³ These data come from the Quarterly Census of Employment and Wages (QCEW) area annual average file for the whole U.S.

⁴ Table 2.1 of Bureau of Labor Statistics, Employment Projections

<https://www.bls.gov/emp/tables/employment-by-major-industry-sector.htm>

⁵ BBER analysis of annual average QCEW data.

⁶ For instance, because the hospital sector in Billings includes only 2 firms, employment and payroll for Billings' hospital sector is not publicly available.

⁷ We report the data from the Bureau of Labor Statistics Quarterly Census of Employment and Wages. These data include "covered employment," i.e., people who work at jobs with unemployment insurance coverage. Other data sources (e.g., the Census Bureau's County Business Pattern or the Bureau of Economic Analysis' Regional Accounts data) provide slightly different values.

⁸ Data provided by Billings Clinic and St. Vincent Healthcare.

⁹ Data provided by St. Luke's

¹⁰ This description includes only a high level summary of the traded sector's contribution. For a more detailed discussion, see, Ward, B. et al (2012) "The Traded Sector in Portland's Regional Economy."

¹¹ People may take some pride in their region's output, and they may prefer industries that do not create negative spillovers (like pollution); however, for the most part, what the traded sector produces is less important than how big and productive it is.

¹² Economist Wilbur Thompson commented over 50-years ago, "... [A]ll products wax and wane, and so the long-range viability of any area must rest ultimately on its capacity to invent and/or innovate or otherwise acquire new export bases. The economic base of the larger metropolitan area is, then, the creativity of its universities and research parks, the sophistication of its engineering firms and financial institutions, the persuasiveness of its public relations and advertising agencies, the flexibility of its transportation networks and utility systems, and all the other dimensions of infrastructure that facilitate the quick and orderly transfer from old dying bases to new growing ones."

¹³ Imagine, 10,000 people in a basketball stadium, and we know that two of them will die at random. Someone comes in and asks each person what they would pay to ensure that only 1 person would die. If people would on average pay \$700 to reduce their risk of dying by 1 in 10,000, then collectively the 10,000 would pay \$7 million to keep one person alive. In this case, economists say that the value of a statistical life is \$7 million.

¹⁴ Aldy, J. E. (2019). Birds of a feather: Estimating the value of statistical life from dual-earner families. *Journal of Risk and Uncertainty*, 58(2-3), 187-205.

¹⁵ This value is adapted from Murphy and Topel (2003). They estimated that the value of longevity increases between 1970 and 2000 for 50 year-olds was \$350,000 in 2000. We adjusted this value to \$2014 and scaled it up slightly to reflect the addition gains in life expectancy since 2000. Murphy, K. M., & Topel, R. H. (2003). Diminishing returns?: The costs and benefits of improving health. *Perspectives in biology and medicine*, 46(3), S108-S128.

¹⁶ This is the value reported in Murphy and Topel (2005) adjusted for inflation. Murphy, K. M., & Topel, R. H. (2005). *The value of health and longevity* (No. w11405). National Bureau of Economic Research.

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- ¹⁷ This is the Murphy and Topel (2005) estimate adjusted for inflation and scaled in proportion to Billings' share of the US.
- ¹⁸ Murphy and Topel (2005)
- ¹⁹ Frakt, A. (2019) "Is our health care spending worth it?" <https://www.nytimes.com/2019/05/20/upshot/actual-worth-health-care-spending.html>
- ²⁰ This calculation assumes that, on average, each worker misses approximately 11 days of work due to absenteeism or presenteeism. This is based on the estimates from Mitchell, R. J., & Bates, P. (2011). Measuring health-related productivity loss. *Population health management*, 14(2), 93-98. Other studies, though, report different magnitudes for the number of days lost to absenteeism and presenteeism, e.g., Davis, K., Collins, S. R., Doty, M. M., Ho, A., & Holmgren, A. L. (2005). Health and Productivity Among US Workers, Goetzl, R. Z., Long, S. R., Ozminkowski, R. J., Hawkins, K., Wang, S., & Lynch, W. (2004). Health, absence, disability, and presenteeism cost estimates of certain physical and mental health conditions affecting US employers. *Journal of Occupational and Environmental Medicine*, 46(4), 398-412.
- ²¹ This calculation assumes a work-year includes 240 days.
- ²² Bhattacharya, J., & Lakdawalla, D. N. (2006, January). The labor market value of health improvements. In *Forum for Health Economics & Policy* (Vol. 9, No. 2).
- ²³ DeVol, R., Bedroussian, A., Charuworn, A., Chatterjee, A., Kim, I., Kim, S., & Klowden, K. (2007). An unhealthy America: The economic burden of chronic disease. *Santa Monica, CA: Milken Institute*. Other studies use different assumptions and find different values (e.g., Davis et al (2005) estimate the losses of \$328 billion (\$2014) in 2004).
- ²⁴ Cutler, D. M., Rosen, A. B., & Vijan, S. (2006). The value of medical spending in the United States, 1960–2000. *New England Journal of Medicine*, 355(9), 920-927.
- ²⁵ Chetty, R., Stepner, M., Abraham, S., Lin, S., Scuderi, B., Turner, N., ... & Cutler, D. (2016). The association between income and life expectancy in the United States, 2001-2014. *Jama*, 315(16), 1750-1766.
- ²⁶ Analysis of County Health Rankings data for Yellowstone County and BRFSS 2016 data for the US.
- ²⁷ We compute this index by computing a z-score for each variable, applying the weights used by County Health Rankings, and summing.
- ²⁸ Analysis of County Health Rankings data.
- ²⁹ <https://www.medicare.gov/hospitalcompare/search.html?>
- ³⁰ Institute of Medicine of the National Academies (2013) *Variation in Health Care Spending: Target Decision Making Not Geography*. Washington D.C.: The National Academies Press; Cooper, Z., Craig, S. V., Gaynor, M., & Van Reenen, J. (2019). The price ain't right? Hospital prices and health spending on the privately insured. *The Quarterly Journal of Economics*, 134(1), 51-107.
- ³¹ <http://www.dartmouthatlas.org/data/topic/topic.aspx?cat=21>
- ³² Cooper et al (2019)
- ³³ <https://healthcarepricingproject.org/>
- ³⁴ See also National Health Expenditures by state and Medical Expenditure Panel-IC by state.
- ³⁵ Sørensen, J. F. (2008). The potential migration effect of rural hospital closures: A Danish case study. *Scandinavian journal of public health*, 36(5), 460-466
- ³⁶ E.g., http://ruralhealth.stanford.edu/health-pros/factsheets/downloads/rural_fact_sheet_5.pdf Jones, C. A. (2010). *Health status and health care access of farm and rural populations* (No. 57). DIANE Publishing, Chan, L., Hart, L. G., & Goodman, D. C. (2006). Geographic access to health care for rural Medicare beneficiaries. *The Journal of Rural Health*, 22(2), 140-146. Gujral, K., & Basu, A. (2019). *Impact of Rural and Urban Hospital Closures on Inpatient Mortality* (No. w26182). National Bureau of Economic Research.
- ³⁷ An estimate from one provider suggests that more than 30% of people move directly to Billings' assisted living facilities directly from outside of Billings.
- ³⁸ Research has shown that some of the geographic variation in health care spending stems from differences in training and culture.

³⁹ Ward, B. (2020). *Understanding Montana's Bioscience Sector*. ABMJ Consulting.

⁴⁰ Bureau of Labor Statistics, Employment Projections

⁴¹ Montana Department of Labor and Industries Montana Employment and Labor Force Projections (<https://lmi.mt.gov/Portals/193/Publications/LMI-Pubs/Labor%20Market%20Publications/Projections2017-27.pdf>)

⁴² 29 percent is the BLS's national forecast for health care employment growth. Growth in Billings may differ (and has differed recently) from US overall.

⁴³ Chandra, A. et al (2014)