



## What is driving increases in healthcare spending? Observations from BLS disease-based price indexes

By Brett Matsumoto and Caleb Cho

It should come as no surprise that healthcare spending has risen substantially in recent years; you may have even noticed increases in your own family's medical bills. According to the Bureau of Labor Statistics (BLS) Consumer Expenditure Surveys, consumer units living in the United States spent, on average, \$4,342 out of their own pockets on healthcare in 2015—a nearly 60 percent boost from 2005. Yet the total amount spent on healthcare is much larger than out-of-pocket spending; it also includes government spending on healthcare—25 percent of government outlays in 2015—and the employer contribution to employer-provided health insurance, which has also grown over this period.<sup>1</sup> Healthcare spending increased from 15.5 percent of U.S. GDP in 2005 to 17.6

percent in 2015 and to 17.7 percent in 2018 (the most recent year for which data are available).<sup>2</sup> What impact do new technologies and medical innovations have on consumers in terms of lower prices, lower utilization, or better outcomes? Disease-based price indexes provide a meaningful price measure that can be used to separate price increases from changes in inflation-adjusted total medical expenditure.

In this **Beyond the Numbers**, we will analyze spending growth of 10 common diseases and break down the three key contributing factors: price changes, increases in the number of people treated, and increases in inflation-adjusted per-patient spending.

For the last 4 years, the BLS Division of Price Index Number Research has released monthly updates to experimental disease-based price indexes (DBPIs) for broad disease categories going back to 1999. We construct the indexes using the monthly medical price indexes in the Producer Price Index (PPI) and Consumer Price Index (CPI) published by the BLS and data from the Medical Expenditure Panel Survey (MEPS) published by the Department of Health and Human Services' Agency for Healthcare Research and Quality. One improvement recently made to the DBPIs is the publication of indexes for a set of more specific common medical conditions. For example, a specific medical diagnosis such as diabetes was previously included in a broader price index with related conditions (endocrine, nutritional, and metabolic diseases). In this article, we construct disease-based price indexes for specific common conditions in order to break down the expenditure growth into price changes and changes in real output. In a previous article celebrating the 1-year anniversary of publishing the experimental disease-based price indexes, we conducted this decomposition for the broad disease categories.<sup>3</sup>

Unlike traditional, service-based price indexes that track the prices of a sample of medical goods and services over time, disease-based price indexes measure changes in the price to treat a given condition. With this technique, changes in treatment patterns for a disease over time show up as a price change.<sup>4</sup> This method can be particularly important when new technologies allow for the treatment of a given condition in less intensive settings (such as a switch from inpatient treatment to outpatient). In addition to publishing the experimental indexes for more specific disease categories, BLS also plans to start publishing variances for the indexes this year.

## Analysis of spending growth for 10 common medical conditions

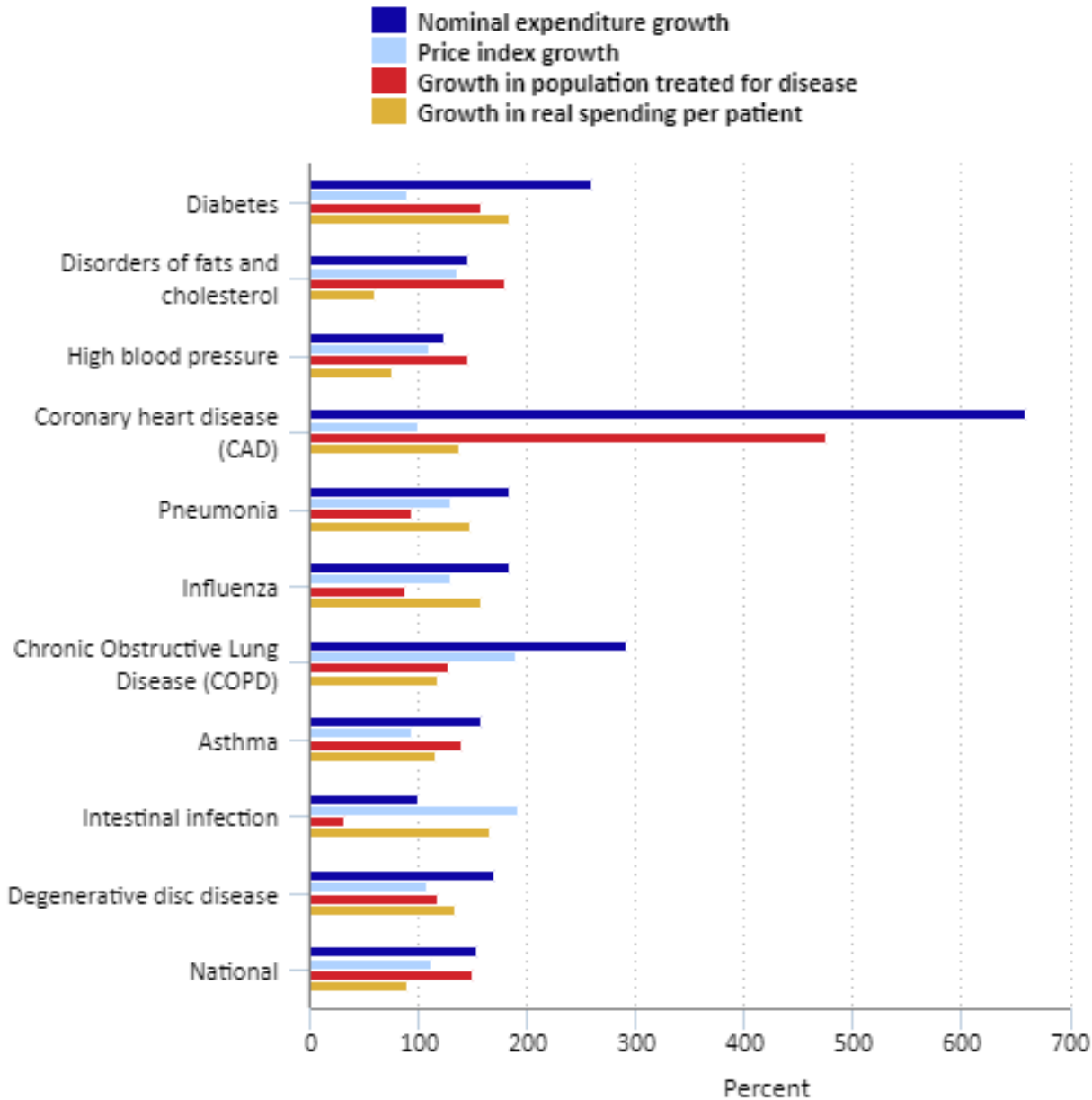
In this section, we present results using the disease-based price indexes for 10 common medical conditions. We use these price indexes to break down nominal expenditure growth to examine the possible factors that are driving expenditure growth for these conditions. Overall, nominal medical expenditures increased by 55 percent from 2005 to 2015. Price increases explain only part of this increase, as the price to treat a given condition increased by 13 percent on average across all diseases. The largest driver of nominal expenditure increases for all diseases was the 50 percent increase in the total population treated. The factors driving expenditure growth can differ when looking at individual diseases.

Chart 1 breaks down the nominal spending growth from 2005 to 2015 into 3 components for the 10 most common diseases:

- Changes in the price level as measured by the disease-based price index
- Changes in the number of people treated for the disease, which can be further broken down into changes in disease prevalence (share of population with the disease) and changes in population
- The inflation-adjusted dollar amount paid per patient

For diabetes, nominal expenditures increased by 260 percent from 2005-15, much larger than the average increase of 155 percent for all diseases. This increase is primarily due to growth in real spending per patient as well as an increase in the number of people treated for diabetes. The price of treating diabetes actually decreased over the period.

**Chart 1. Decomposition of growth in medical expenditures, in percent, 2005–15**



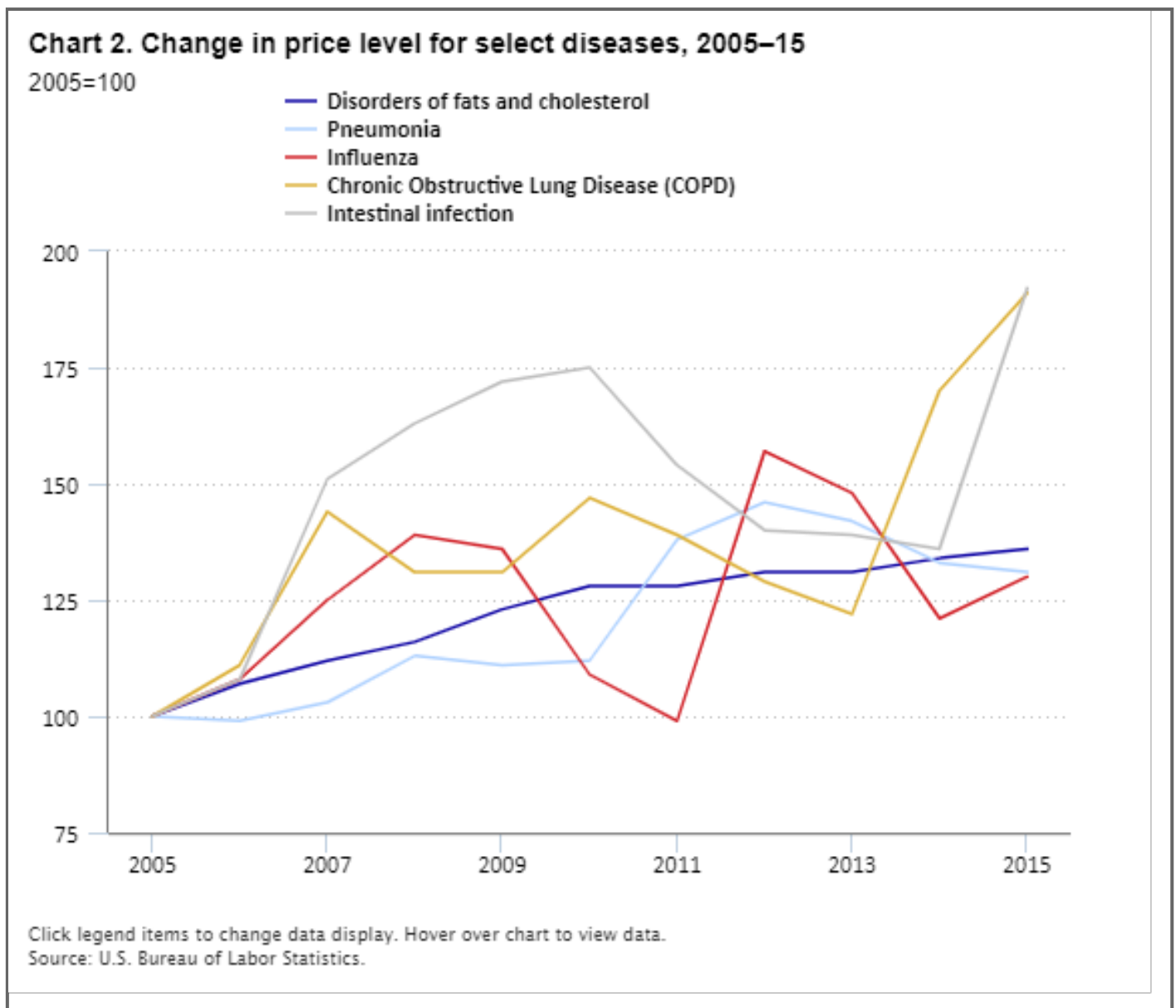
Click legend items to change data display. Hover over chart to view data.  
 Source: U.S. Bureau of Labor Statistics.

## Key factors driving the spending growth on common diseases

Although nominal expenditures grew for most common diseases, the key driving factors for the growth are specific to each medical condition. Let's look at the specific factors for select diseases, starting with the changes in the price index for each disease.

### Price changes for each disease

Price increases are key factors in nominal expenditure growth from 2005 to 2015 in treating fat and cholesterol—or lipid—disorders (36 percent increase), intestinal infection (92 percent increase), some respiratory diseases including chronic obstructive pulmonary disease (COPD) (91 percent increase), pneumonia (31 percent increase), and influenza (30 percent increase). During the same period, the price level for all diseases increased by 13 percent. While the price levels of medical services to treat lipid disorders and pneumonia show a smooth growing pattern, prices for intestinal infection, COPD, and influenza tend to fluctuate from year to year.<sup>5</sup> (See chart 2.)



Disease-based price indexes reflect changes in both prices of a single medical-service visit (price component) and in the average medical services used to treat a disease (quantity component). Traditional medical price indexes measure only the price component. For example, traditional medical price indexes ignore medical innovations or management improvements that treat diseases using fewer medical services or less expensive settings (for example, inpatient to outpatient medical procedures). In disease-based price indexes, those changes are reflected as price changes.

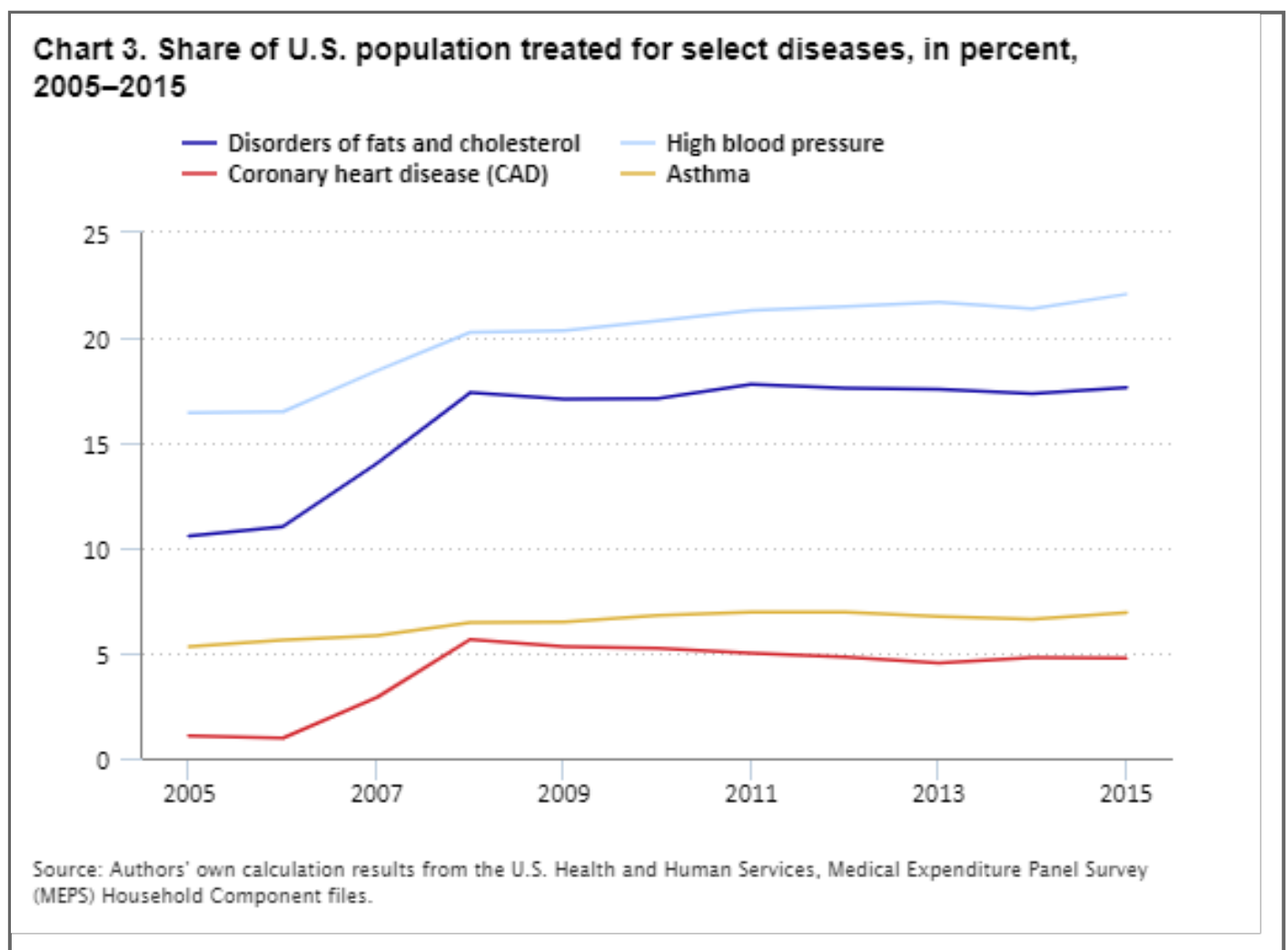
According to the Medical Expenditure Panel Survey (MEPS), the spikes in the disease-based price index for treatment of COPD between 2005 and 2015 are attributable to a substantial increase in the number of visits made to medical facilities for outpatient and inpatient services (155 percent and 67 percent increase, respectively) and in the use of home health services (74 percent increase).<sup>6</sup>

For pneumonia, emergency services have been used more frequently and have significantly contributed to price-level increases in the treatment of the disease (37 percent increase). Inpatient services and home health services

were used 65 percent and 56 percent more, respectively, in the treatment of fats and cholesterol diseases. The price-level change for the treatment of influenza is because of spikes in the use of emergency services (48 percent increase) and outpatient services (44 percent increase). Patients with intestinal infections spent 81 percent more on inpatient services in 2015 than they did in 2005.

## Increases in the number of people treated

The number of people who received any medical treatment for any condition increased by 50 percent from 2005 to 2015, while the total population in the United States increased by 9 percent. The largest increases were in the treatment of coronary heart disease (377 percent), lipid disorders (81 percent), high blood pressure (46 percent), and asthma (41 percent). Chart 3 shows the changes over time of the share of the population treated for select diseases. Changes in treated disease prevalence and overall population growth both contribute to the increase in the number of treated individuals over time.



In 2007, the Medical Expenditure Panel Survey (MEPS) changed how it recorded previously diagnosed medical conditions in certain common chronic disease categories, including high blood pressure, coronary artery diseases, high cholesterol, and asthma. For example, a person previously diagnosed with coronary artery disease will have this medical condition listed as a current condition in addition to any newly diagnosed conditions. Thus, cases of

these particular medical conditions sharply increase in 2007 and afterward, which makes it difficult to compare the prevalence of these diseases over time in the MEPS data.

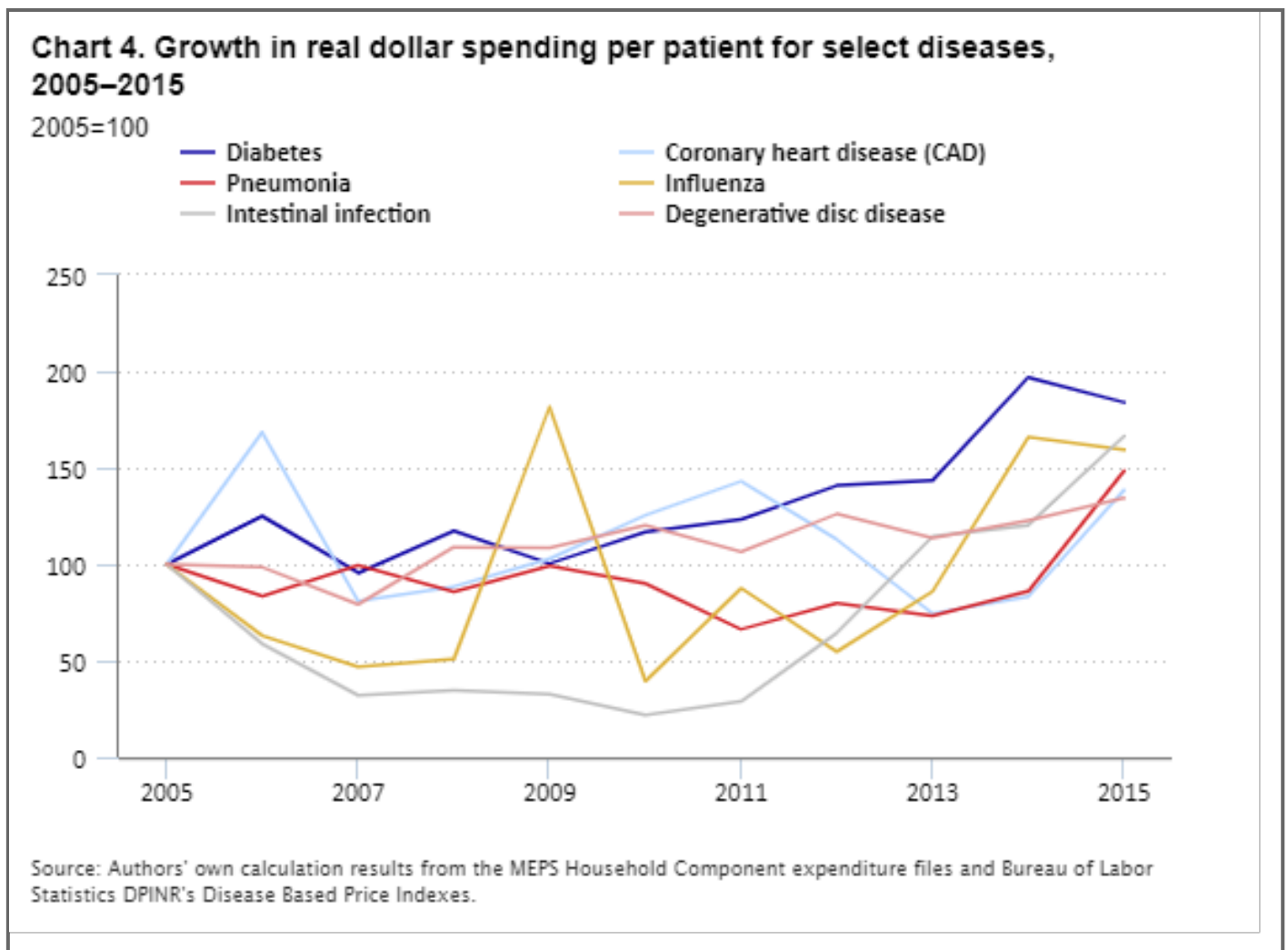
The number of people treated for each disease does not necessarily reflect the total number of people with the medical condition; it indicates the number of people who received treatment out of an entire population. High cholesterol does not have symptoms and requires a blood test for diagnosis; for this reason, many cases of high cholesterol may be undiagnosed and untreated. In that sense, the significant increase in the number of people treated for cholesterol-related diseases might result from more preventive cholesterol screening or from a rise in unhealthy dietary or sedentary lifestyles.

Healthcare policy also may be a factor in the increase in treatment of those diseases. For example, the number of people treated for all high-cholesterol related diseases increased significantly from 2006 to 2008. According to the MEPS, the number of people treated for lipid disorders and coronary artery diseases increased by 58 percent and 483 percent, respectively, between 2006 and 2008. This coincides with when the Medicare Modernization Act began to offer prescription drug coverage to senior citizens. Changes in policy would not account for all of the increase in treatment, however. Nearly half the U.S. population and more than half of adults have some kind of metabolism disorder or high blood pressure, and the share has been growing steadily as the population ages and life expectancy increases.<sup>7</sup>

Asthma has become one of the fastest growing diseases in the United States. There are more than 25 million Americans with asthma, and the disease is more prevalent in children.<sup>8</sup> Innovations have made the treatment of asthma more affordable than before; the price for treating asthma decreased by 5 percent from 2005 to 2015. However, the increase in the prevalence of asthma has resulted in an almost 60 percent increase in spending over the last 10 years.

## Real spending per patient

Real per-patient spending is calculated from what is left over after accounting for price changes and changes in the number of people treated. It is often hard to pinpoint the exact factors that contribute to real per patient spending, but it can arise due to unmeasured changes in treatment intensity. Between 2005 and 2015 the real per-patient spending fell by 9 percent.<sup>9</sup> However, the most common diseases did not follow this trend. While the average real per-patient spending has increased on coronary heart disease (38 percent increase) and influenza (59 percent increase) over the period (with year-to-year fluctuations), real spending on diabetes (84 percent increase) and degenerative disc diseases (34 percent increase) has steadily increased. Real spending also rose for treating intestinal infection (67 percent) and pneumonia (48 percent). (See chart 4.)

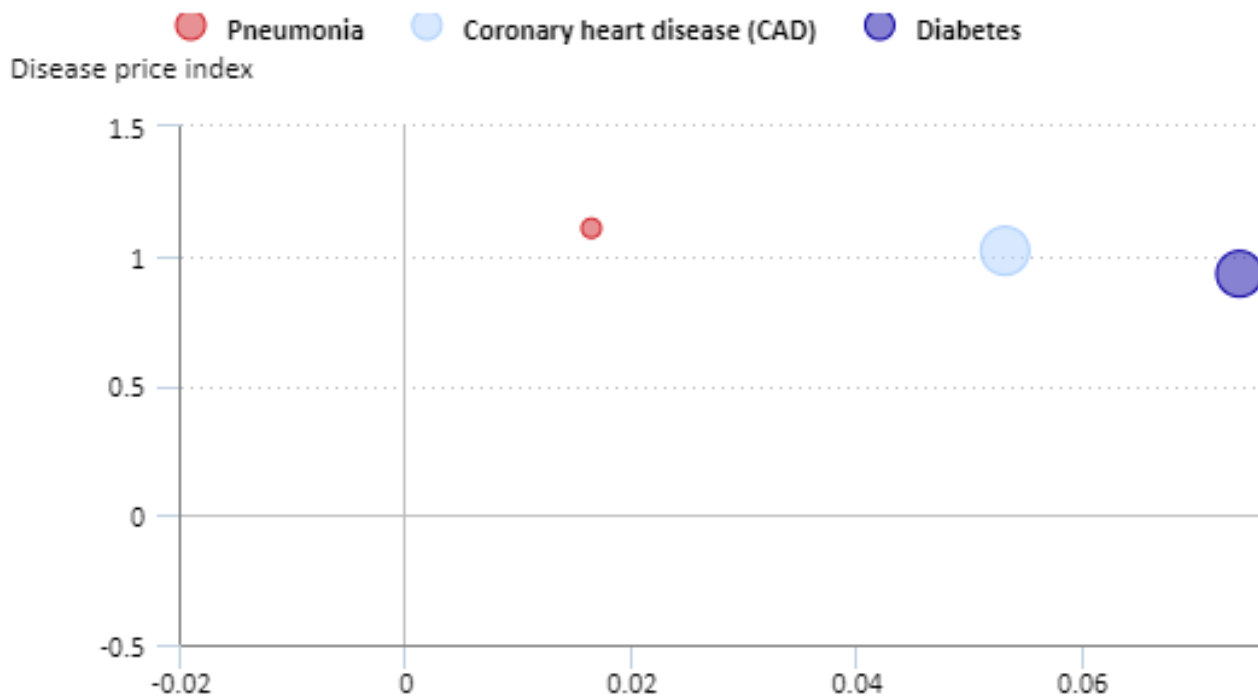


These increases could emerge as the average case becomes more severe over time. For example, in 2009 there was a spike in the average spending on influenza because of the H1N1 virus. The resulting pandemic saw more than 250,000 hospitalizations and 12,000 deaths in the United States.<sup>10</sup>

One limitation that is common to both the disease-based price indexes and traditional service-based medical price indexes is that prices are typically not quality-adjusted for changes in treatment outcomes over time. Chart 5 shows how prevalence, prices, and nominal spending have changed for some of the most common diseases between 2005 and 2015. The horizontal axis shows the change in the number of people treated for a disease. The vertical axis shows the price level change for each disease. The size of a dot represents the nominal expenditure of the disease. The price level for pneumonia has fluctuated but significantly increased. The number of people treated for coronary artery disease has spiked by more than 4 times. From 2005 to 2015, Americans have been spending more and more on treating diabetes, making it one of the most costly diseases (alongside high blood pressure). It also implies that diabetes is one of the key contributors to the growth in nominal expenditure in healthcare spending over the past 10 years, in large part because of intensive use of medical services at a personal level.



**Chart 5. The changing prevalence, prices, and nominal spending for select diseases, 2005–2015**



Click play button at top to change data display. Hover over chart to view data.

Source: Authors' own calculation results from the MEPS Household Component expenditure files and Bureau of Labor Statistics DPINR's Disease Based Price Indexes.

## Conclusion

The United States has experienced significant increases in nominal healthcare spending between 2005 and 2015. Key driving factors behind the rapid spending growth vary across diseases. However, technology plays a pivotal role in rising healthcare spending on the most common diseases. On one hand, medical technology can directly increase treatment cost per case by introducing more expensive equipment and medications into the market. Technological improvements can also increase the number of people who receive treatments for diseases over time and thus total expenditures as well. On the other hand, high-tech drugs and devices improve survival rates and lifespans for patients. Current measures of medical prices are limited in their ability to capture quality changes that result from improvements in treatment outcomes. Incorporating quality improvements that arise from new medical technologies is an active area of ongoing research. Disease-based price indexes are a useful tool to disentangle the different causes of increases in medical spending. Although severely constrained by data limitations, we continue to research and implement improvements in our disease-based price indexes.

## RELATED ARTICLES

[How have healthcare expenditures changed? Evidence from the Consumer Expenditure Surveys](#)

[Improving the CPI physicians' services index](#)

[The cost of care: new insights into healthcare spending growth](#)

## GLOSSARY

This **Beyond the Numbers** article was prepared by Brett Matsumoto and Caleb Cho, economists, Office of Prices and Living Conditions, U.S. Bureau of Labor Statistics. Telephone: 202-691-6597.

Email: [matsumoto.brett@bls.gov](mailto:matsumoto.brett@bls.gov) and [cho.caleb@bls.gov](mailto:cho.caleb@bls.gov)

Information in this article will be made available upon request to individuals with sensory impairments. Voice phone: (202) 691-5200. Federal Relay Service: 1-800-877-8339. This article is in the public domain and may be reproduced without permission.

## NOTES

- <sup>1</sup> The government spending includes the federal spending on Medicare (net of offsetting receipts), Medicaid, the Children's Health Insurance Program, and subsidies for health insurance purchased through exchanges and related spending. Authors' own calculation from "Historical Budget Data" table in Congressional Budget Office.
- <sup>2</sup> These are estimates from the National Health Expenditure Accounts (NHEA) by the Centers for Medicare & Medicaid Services
- <sup>3</sup> See Ralph Bradley, "The cost of care: new insights into healthcare spending growth," *Beyond the Numbers* vol.6 no. 7 (Bureau of Labor Statistics, June 2017), <https://www.bls.gov/opub/btn/volume-6/cost-of-care.htm>.
- <sup>4</sup> See the experimental disease-based price index website for more details on the methodology and data: <https://www.bls.gov/pir/diseasehome.htm>.
- <sup>5</sup> Pneumonia here excludes diseases caused by tuberculosis or sexually transmitted disease; disorders of fats and cholesterol indicate the broad range of disorders of lipid metabolism; chronic obstructive pulmonary disease include emphysema, and chronic bronchitis in the United States.
- <sup>6</sup> Authors' own calculation results from Household Component expenditure files of the Medical Expenditure Panel Survey.
- <sup>7</sup> "More than 100 million Americans have high blood pressure, AHA says," The American Heart Association (January 2018), <https://www.heart.org/en/news/2018/05/01/more-than-100-million-americans-have-high-blood-pressure-aha-says>; Peter Toth, Danielle Potter, and Eileen E Ming, "Prevalence of lipid abnormalities in the United States: The National Health and Nutrition Examination Survey 2003–2006," *Journal of Clinical Lipidology*, volume 6 issue 4 (July 2012), [https://www.lipidjournal.com/article/S1933-2874\(12\)00219-X/fulltext](https://www.lipidjournal.com/article/S1933-2874(12)00219-X/fulltext).
- <sup>8</sup> "Asthma facts and figures," The Asthma and Allergy Foundation of America (June 2019), <https://www.aafa.org/asthma-facts/>.
- <sup>9</sup> Authors' own calculation from Medical Expenditure Panel Surveys' healthcare total expenditure adjusted for change in price level and growth in prevalence.

<sup>10</sup> “Ten Years of Gains: A Look Back at Progress Since the 2009 H1N1 Pandemic,” Centers for Disease Control and Prevention (June 2019), <https://www.cdc.gov/flu/spotlights/2018-2019/decade-since-h1n1-pandemic.html>.

**SUGGESTED  
CITATION**

Brett Matsumoto and Caleb Cho, “What is driving increases in healthcare spending? Observations from BLS disease-based price indexes,” *Beyond the Numbers: Prices and Spending*, vol. 9, no. 17 (U.S. Bureau of Labor Statistics, December 2020), <https://www.bls.gov/opub/btn/volume-9/what-is-driving-increases-in-healthcare-spending.htm>