

HPC DATAPOINTS

Insulin Price Growth and Patient Out-of-Pocket Spending

A CASE STUDY: INTRODUCTION

The rising cost of prescription drugs is contributing to an increased health care cost burden for government, employers, and patients in Massachusetts. In recent years, the growth in prescription drug spending has outpaced almost every other category of spending growth and the state's health care cost growth benchmark.¹ While this cost growth is affecting residents with many different health conditions, the price increase for insulin and its impact on patients with diabetes has been particularly concerning.

Insulin is a necessary, life-saving prescription medicine for all patients living with Type 1 diabetes as well as a smaller proportion of patients living with Type 2 diabetes.² Patients who use insulin must receive regular injections to keep their blood sugar at safe levels. Large fluctuations in blood sugar levels can cause serious health consequences including long-term disability and death.

National [studies](#) show substantial growth in prices for insulin in recent years, with high costs leading some patients to [ration insulin](#). One [recent study](#) found that one quarter of patients reported using less insulin than prescribed due to high costs. Insulin was first [discovered](#) in 1921 and modifications were made to the formulation in the 1990s to improve blood sugar control. Patient advocates [highlight](#) that prices continue to increase exponentially without corresponding major product innovations. Manufacturers of insulin that serve the U.S. market (Eli Lilly, Novo Nordisk, and Sanofi) assert that net prices (prices after rebates) have actually decreased over time.³ While prices net of rebates are not publicly available, patients with high deductibles or co-insurance typically face cost-sharing amounts based on list prices.

The HPC presented initial data on the rising costs of insulin in Massachusetts and the corresponding increased financial burden of chronic condition management for individuals living with diabetes during the [2019 Benchmark Hearing](#).

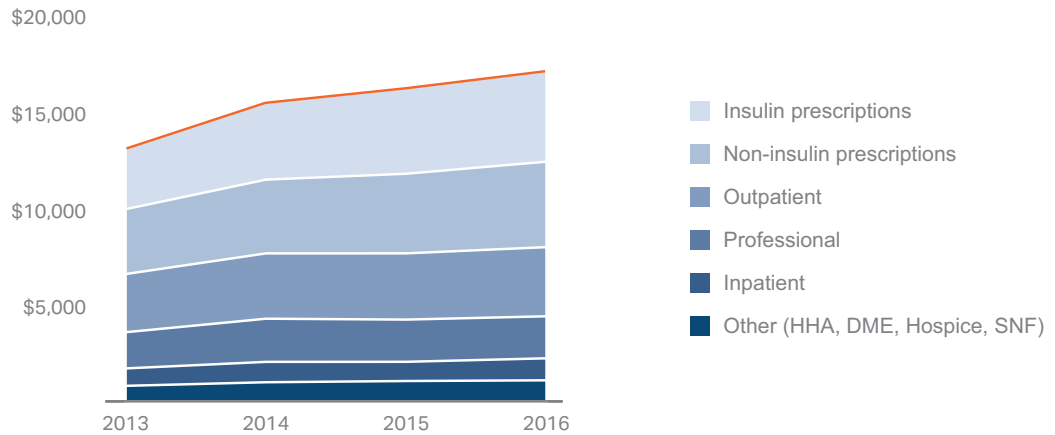
This issue of DataPoints analyzes spending trends from 2013 to 2016 for commercially insured patients who have diabetes and use insulin to manage their condition.⁴ The drug prices observed do not reflect rebates or other discounts that may occur after the point of sale.

This is a printable version of DataPoints. The online version features interactive graphics, and is available on the HPC's website at mass.gov/service-details/hpc-datapoints-series.

TOTAL ANNUAL SPENDING FOR PATIENTS WHO USE INSULIN

Annual health care spending increased by \$4,016 or 31 percent between 2013 and 2016 (from \$13,045 in 2013 to \$17,061 in 2016) for individuals who use insulin to manage their diabetes. Annual spending on insulin for this population increased by \$1,562 or 50 percent (from \$3,122 in 2013 to \$4,684 in 2016), accounting for 39 percent of the total spending increase. By 2016, spending on insulin represented the largest component of total health care spending for this population. The figure on the following page shows discrete categories of spending and their growth over time since 2013.

Total annual spending per person who uses insulin, 2013-2016

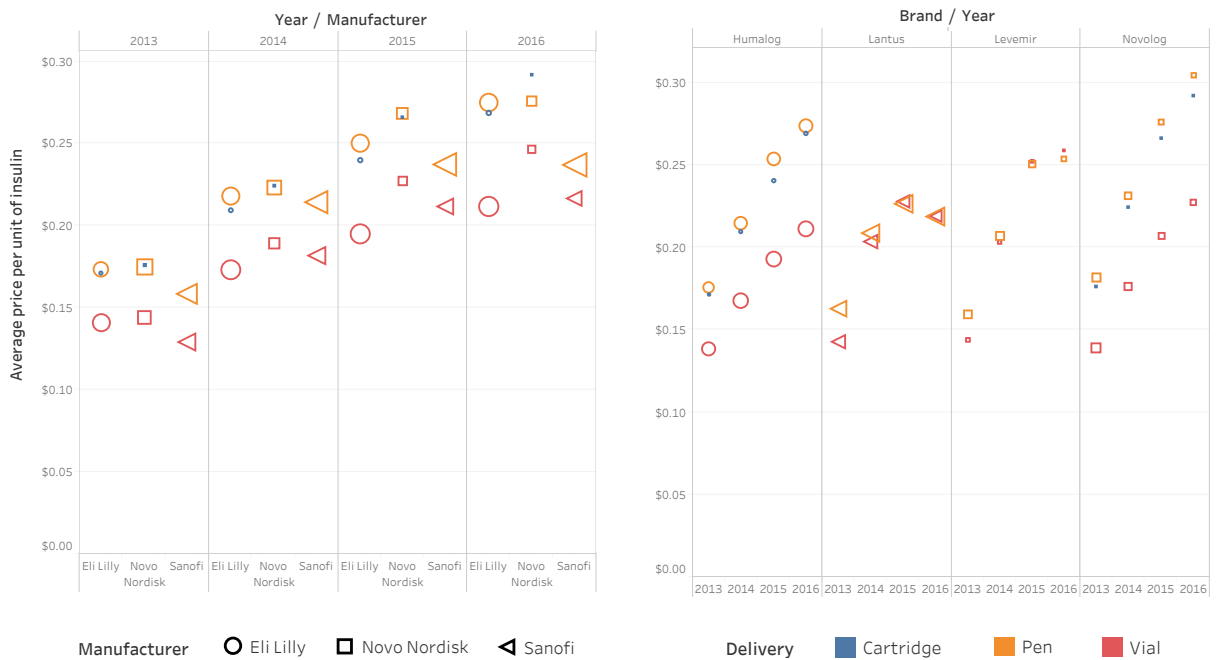


RISING PRICES OF INSULIN PRODUCTS

The mean price per unit of insulin across all products increased from 15 cents in 2013 to 23 cents in 2016.⁵ Average daily use across all insulin products remained consistent at 59 units of insulin per person per day.⁶

The following two figures explore the increase in analog insulin unit prices over time.⁷ The first figure displays unit price by manufacturer and product type, and shows similar price growth among manufacturers over time. The second graph highlights price growth for the four highest-volume analog insulin brands over this time period. Different insulin products may vary in their concentration; all reporting below is on a per unit basis for comparability.⁸

Average price per unit of analog insulin, 2013-2016

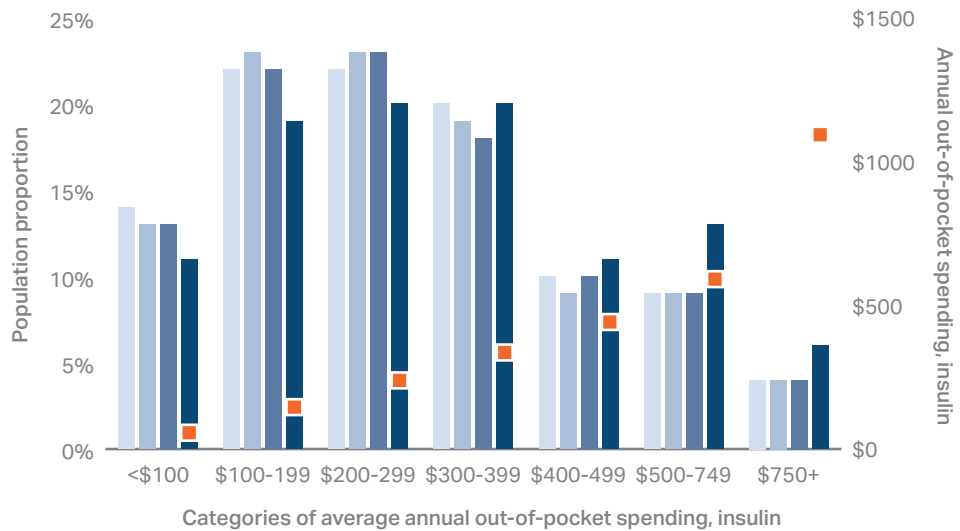
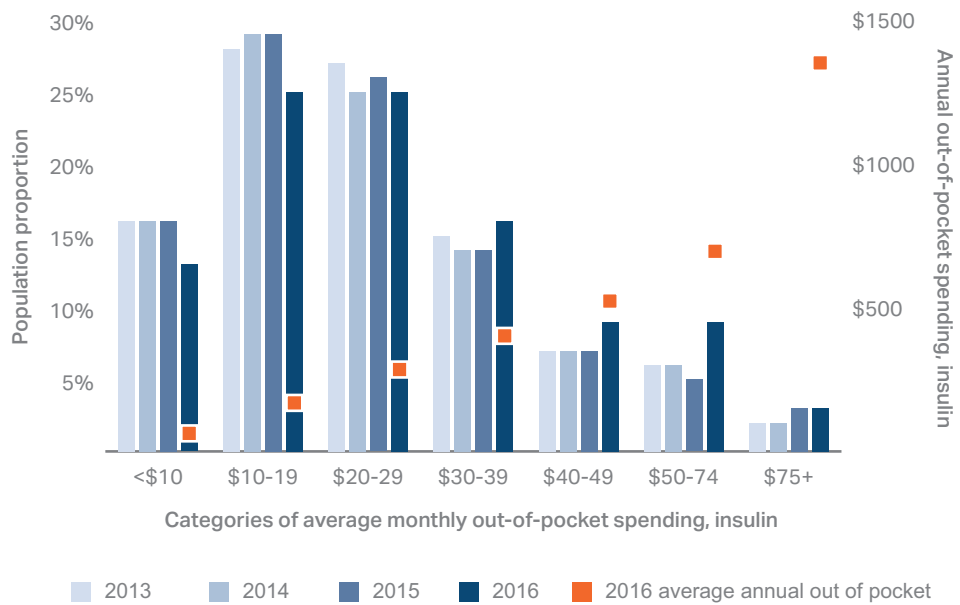


THREATS TO AFFORDABILITY AND ACCESS

Rising costs of prescriptions for medical management of diabetes threaten access to and affordability of evidence-based care, and may lead to unnecessary complications and avoidable hospitalizations.⁹ High insulin prices particularly impact lower-income commercially insured patients. In 2016, the average annual out-of-pocket spending for insulin among commercially insured patients was \$28 per month (\$340 per year), and 18 percent paid more than \$500 per year. Five percent of the study population experienced substantially higher out-of-pocket insulin costs of \$96 per month on average (\$1,156 per year).

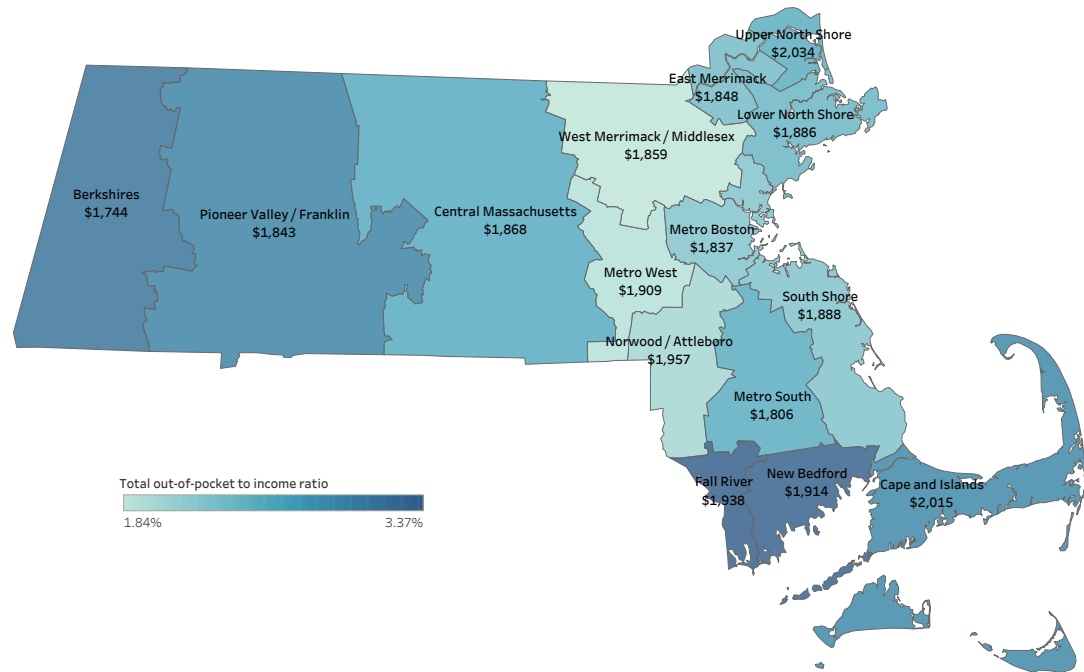
The following two figures illustrate the shifting distribution of out-of-pocket spending for insulin over time, on an annual and monthly basis.

Population distribution of out-of-pocket insulin spending, 2013-2016



The relative burden of out-of-pocket (i.e., copayments, deductibles) health care spending varied by region for this commercial population. The percentage of income spent on out-of-pocket health care costs varied from 1.8 percent (\$1,859 in total annual out-of-pocket spending) in West Merrimack/Middlesex (lightest) to 3.4 percent (\$1,938 in total annual out-of-pocket spending) in Fall River (darkest).¹⁰ Insulin-specific out-of-pocket spending was lowest in the Berkshires (\$307 annually) and highest in Norwood/Attleboro (\$364 annually). The average total out-of-pocket spending in 2016 for patients in each region is shown below.

Insulin-specific and total out-of-pocket spending to income ratio by HPC region, 2016



The Massachusetts Health Policy Commission (HPC), established in 2012, is an independent state agency charged with monitoring health care spending growth in Massachusetts and providing data-driven policy recommendations regarding health care delivery and payment system reform. The HPC's mission is to advance a more transparent, accountable, and innovative health care system through its independent policy leadership and innovative investment programs.

HPC DataPoints is a series of online briefs that spotlight new research and data findings relevant to the HPC's mission to drive down the cost of health care. It showcases brief overviews and interactive graphics on relevant health policy topics. The analysis underlying these briefs is conducted by HPC staff. To view all HPC DataPoints, visit our [website](#).

Endnotes

- 1 "2018 Annual Report on the Performance of the Massachusetts Healthcare System." Center for Health Information and Analysis, Sept. 2018. <http://www.chiamass.gov/assets/2018-annual-report/2018-Annual-Report.pdf>
- 2 [Diabetes Mellitus](#) is a chronic condition that disrupts the way your body uses sugar, which needs the hormone insulin to get into cells. When the body produces little or no insulin (Type 1 diabetes), and/or cells are not responsive to insulin that is produced (Type 2 diabetes), too much sugar builds up in the blood and can cause serious health problems. These problems can be acute, as in coma, or chronic, including nerve damage, kidney disease, vision problems, heart disease, and strokes ([CDC](#)).
- 3 "2018 Integrated Summary Report." Eli Lilly, March 2019. https://assets.ctfassets.net/hadumfdtzsru/d6mQkK4ss-wwM4j4ZoHGrA/af9e78215e6c2c5c4dac1e3c6596fcff/2018_ISR_03062019_Final-WithCover.pdf
- 4 The HPC identified commercially insured individuals who had at least one pharmacy claim for any insulin product in each of the study years from 2013 to 2016. The study population was limited to individuals who had a diabetes chronic disease indicator from the Johns Hopkins ACG® System, an ACG risk score less than five, and were continuously enrolled for each year of study. This methodology identified over 9,000 commercially insured beneficiaries for each year under study.
- 5 One limitation of this brief is the availability of more recent data on insulin prices in Massachusetts. National sources with more [recent data](#) indicate that the list price of insulin products has continued to rise since 2016.

- 6** Most individuals, especially those with Type 1 Diabetes, who use insulin for glycemic control have medical regimens that incorporate both a basal (intermediate or long-acting) and bolus (short-acting) mealtime insulin product. There are also a small number of combination products, which may include both functions. Within these two main groups of insulin products, the active ingredient of each product is either human insulin or a synthetic insulin analog. Insulin analogs have been modified to create formulations which improve blood sugar control, through adjustments in the onset, peak, and duration. More information on types of insulin products can be found [here](#).
- 7** Analog insulin products made up 94% of all insulin products by unit volume in this sample.
- 8** Afrezza is an inhalable insulin product that was launched in 2014. Claims for Afrezza were excluded from analyses reporting on the price of an individual product because the volume of claims was very low, and a unit of Afrezza is not clinically equivalent to a unit of any other injected insulin product available during the study period.
- 9** "Prevent Complications." Centers for Disease Control and Prevention, March 2019. <https://www.cdc.gov/diabetes/managing/problems.html>
- 10** The total out-of-pocket to income ratio was computed with 2016 median income statistics from the American Community Survey. Median income statistics were linked to a patient's zip code tabulation area, and results were summarized at the HPC region level.

Sources: HPC analysis of the Massachusetts All-Payer Claims Database, 2013-2016; American Community Survey, 2016; AHFS Clinical Drug Information, 2016; The Johns Hopkins ACG® System