



PHILIP D. MURPHY  
Governor

## State of New Jersey

September 25, 2024

The Honorable Philip D. Murphy  
Governor of New Jersey  
Office of the Governor  
PO Box 001  
Trenton, NJ 08625

RE: Health Care Quality and Affordability Reports

Dear Governor Murphy,

As per signed Executive Orders (E.O. 217 and E.O. 277) that launched and required implementation of a health care spending growth benchmark program, the Governor's Office of Health Care Affordability and Transparency and the New Jersey Department of Banking and Insurance are submitting three reports that assess the quality and affordability of health care in New Jersey.

Commissioned by the New Jersey Health Care Affordability, Responsibility and Transparency (HART) Program, a joint initiative of the Governor's Office of Health Care Affordability and Transparency (OHCAT) and the Department of Banking and Insurance (DOBI), the reports represent an important milestone in advancing the State's long-term strategy to mitigate the unsustainable rate of health care cost growth.

Enclosed please find the following reports for your consideration:

- **First Annual Cost Growth Benchmark Report: 2018-2019**, which is based on comprehensive aggregate spending data submitted by health insurance carriers operating in New Jersey.
- **Health Care Spending Trends for New Jersey Residents with Commercial Insurance, 2016-2021**, which is based on detailed claims data for approximately 25% of New Jerseyans with employer-sponsored insurance, obtained through the [Health Care Cost Institute](#).
- **The Health Care Landscape in New Jersey: Select Indicators of Quality, Access, and Affordability**, which summarizes New Jersey's performance on a select set of measures of quality, access, and affordability that are obtained through secondary sources.

Most significantly, these reports bring greater transparency to health care spending, providing everyone in the state with a shared understanding of how rapidly health care costs are growing and the factors contributing to high costs and cost growth.

Thank you for your consideration of these reports.

Respectfully submitted,

Handwritten signature of Shabnam Salih in blue ink.

Shabnam Salih, Director  
Office of Health Care Affordability and Transparency

Handwritten signature of Justin Zimmerman in black ink.

Justin Zimmerman, Acting Commissioner  
New Jersey Department of Banking and  
Insurance

# Health Care Spending Trends for New Jersey Residents with Commercial Insurance, 2016–2021

Report to the New Jersey Health Care Affordability,  
Responsibility, and Transparency (HART) Program

September 2024

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## Executive Summary

The New Jersey Health Care Affordability, Responsibility, and Transparency (HART) Program aims to build a stronger, fairer New Jersey by helping to curb health care spending growth. The HART Program's goals are to facilitate transparent reporting of health care spending, to leverage data to understand the causes of rising health care spending, and to inform strategies to reduce health care spending growth.

To advance these goals, the HART program began by examining health care spending trends in the commercial population. Specifically, this report focuses on health care spending, trends in health care spending growth, and drivers of health care spending growth for New Jersey residents with full-benefit employer-sponsored insurance (ESI) between the ages of 18–64 at the time of service, covering the years 2016–2021; full-benefit insurance is defined in this analysis as coverage that includes both medical and pharmacy benefits.

Findings in the report come from an analysis of data from the Health Care Cost Institute (HCCI), a multi-payer, longitudinal claims database that includes data for employer-sponsored insurance plans from select health insurance carriers that have voluntarily submitted data to HCCI.

This study's population includes approximately 20–25 percent of New Jersey residents with ESI, and the trends shown only reflect this population and should not be generalized to all residents with ESI.

More specifically, following an introduction, this report contains the following chapters:

- **Chapter I** provides an overview of spending trends within New Jersey.
- **Chapter II** explores spending trends within the study population for four major categories of service: inpatient services, outpatient services, professional services, and pharmacy.<sup>1</sup>
- **Chapter III** examines drivers of health care spending growth within the study population, namely the quantity of services per person and the price of services.
- **Chapter IV** presents geographic variation in spending trends within the state for the study population.
- **Chapter V** takes a specific look at outmigration, defined as when New Jersey residents leave the state for care.

### **New Jersey's Health Care Affordability, Responsibility, and Transparency (HART) Program**

In 2021, New Jersey Governor Phil Murphy, signed Executive Orders to launch and implement a health care spending growth benchmark program. In an accompanying compact, health care stakeholders committed to working to meet a series of targets to curb health care spending growth and to providing data to monitor progress. Analyzing and reporting data from multiple sources is a pillar of the HART Program.

More information on the HART Program can be found at [https://nj.gov/dobi/division\\_insurance/HART/index.html](https://nj.gov/dobi/division_insurance/HART/index.html) and <https://www.cshp.rutgers.edu/projects/featured-projects/NJ-health-care-cost-growth-benchmark-program>. ▲

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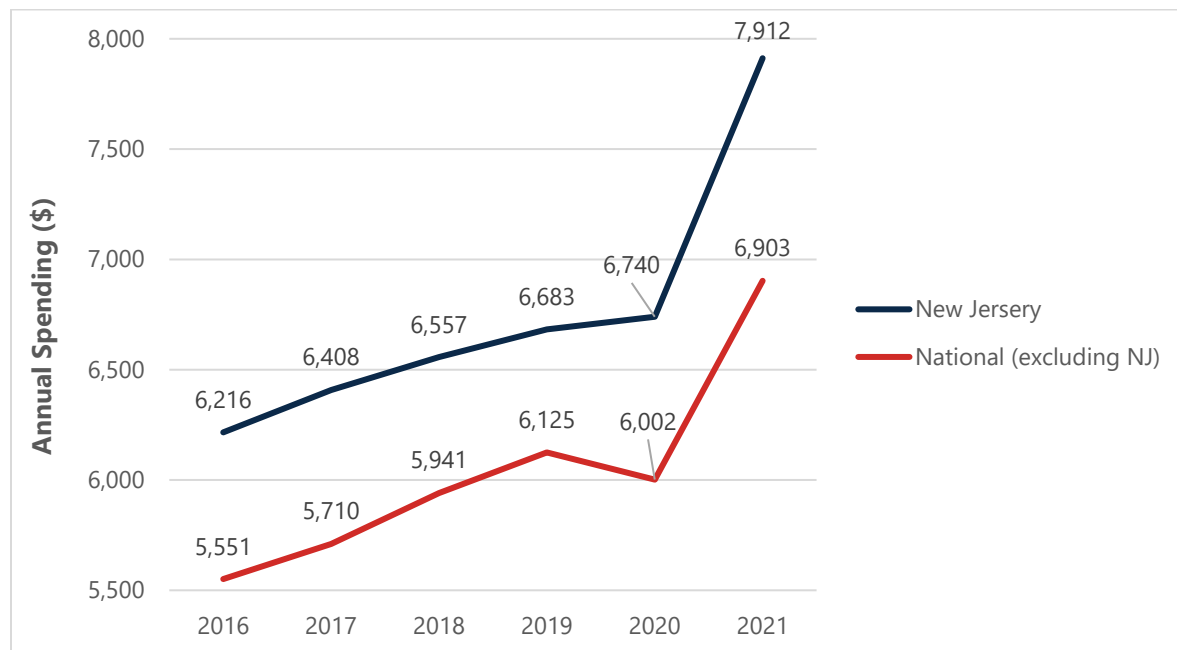
<sup>1</sup> Chapters II–V do not include national comparisons because the analytic file prepared for this project does not support additional detailed comparisons between NJ and national data.

## Key Findings for New Jersey

### Overall

- **In New Jersey, per-person health care spending increased at an average annual rate of 4.9 percent between 2016 and 2021** for adult residents with full benefit employer-sponsored insurance, from \$518 in 2016 to \$659 in 2021. (See Exhibit ES.1 below).
- **Spending in New Jersey was 15 percent higher than the national average.** In 2021, per-person spending in New Jersey was \$659 per month, 15 percent higher than the national average of \$575.
- **Spending growth slowed in 2020 due to the COVID-19 pandemic but had a significant “bounce-back” effect in 2021.**
- **Spending in all service categories grew.** Per-person inpatient facility spending increased at an average annual rate of 5.9 percent, professional spending at 5.1 percent, outpatient facility spending at 4.7 percent, and retail pharmacy spending at 4.2 percent.
- **Growth in the average price of services was the primary driver of spending growth for inpatient facility, outpatient facility, and professional services.** This suggests rising health care prices and not increased utilization of services are driving spending growth in the commercial sector.
- **However, price and quantity contributed equally to growth in spending for retail pharmacy.**
- **Spending increased across all geographic areas in New Jersey;** across eight hospital market areas (HMA), average annual growth rates ranged from a high of 5.8 percent in the New Brunswick area and a low of 4.3 percent in the Camden area.
- **About 8 percent of inpatient stays for New Jersey residents occurred in Pennsylvania hospitals in 2021, while 5 percent occurred in New York hospitals.**

**Exhibit ES.1.** Average annual total health care spending per person in New Jersey, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

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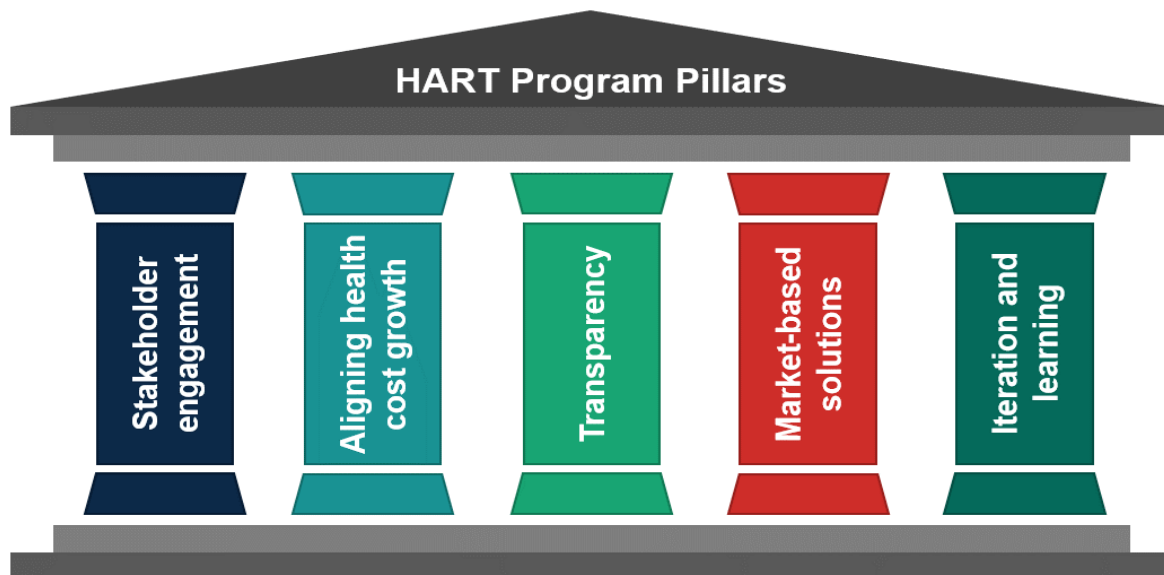
## Introduction

### A. HART Program background

In March 2022, New Jersey Governor Phil Murphy released the [blueprint for the Health Care Affordability, Responsibility, and Transparency \(HART\) Program](#), which aims to build a stronger and fairer New Jersey by helping to curb health care spending growth within the state.

The HART Program grew out of the Governor’s [Executive Order 217](#), signed in January 2021, that established an interagency working group tasked with launching a health care cost growth benchmark program. The group’s work culminated in [Executive Order 277](#), signed in December 2021, that outlined the implementation of the program. Executive Order 277 was accompanied by a [compact between stakeholders throughout the state](#), including hospitals and other health care providers, insurers, employers, consumer groups, unions, and policy organizations. Under the compact, the signatory stakeholders committed to working to meet a series of targets to curb health care spending growth and to provide data to monitor progress in meeting those targets. The HART Program is centered on five pillars—stakeholder engagement, aligning health cost growth, transparency, market-based solutions, and iteration and learning (**Exhibit Intro.1**).

#### **Exhibit Intro.1.** Five pillars of the HART Program



To work toward the goals of making health care more affordable, facilitating the transparent reporting of health care spending in the state, and leveraging data to understand the causes of rising health care spending and inform strategies to reduce health care spending growth, the HART Program will regularly produce two sets of reports: (1) reports on the cost growth benchmark that tracks the state’s progress in meeting its target for health care spending and (2) cost driver reports that shed light on factors driving spending growth and that identify opportunities to curb that growth. This report is the HART program’s inaugural cost driver report and focuses on the commercial health care coverage market in New Jersey.

## B. Overview of the cost driver report

Within the framework of the HART Program, this report aims to shed light on health care spending, including trends in spending and spending growth, and factors driving spending growth for New Jerseyans. Its purpose is to create a foundation of evidence to guide stakeholders as they innovate to improve health care value and affordability. The data and analysis included here are intended to inform New Jersey stakeholders as they make good on their commitment to curb spending growth and meet the benchmark target.

In this report, we provide a detailed look at trends in spending growth. Following this introduction, we present an overview of spending (**Chapter I**), examine spending by category of service (**Chapter II**), discuss the role of quantity and price in driving spending growth (**Chapter III**), describe geographic variation (**Chapter IV**), and consider outmigration, defined as the rate at which patients leave the state for care (**Chapter V**). Appendices list acronyms and define terms (**Appendix A**), describe the data (**Appendix B**), summarize methods (**Appendix C**), and provide the data that underlies figures (**Appendix D**).

## C. Data and methods

This analysis uses claims data from the Health Care Cost Institute (HCCI), a multi-payer, longitudinal claims database that includes data for employer-sponsored insurance (ESI) plans from select carriers that have opted in to submitting data. For more information on the HCCI, go to <https://healthcostinstitute.org/>.

HCCI coverage varies by state, and in New Jersey the HCCI database includes several large carriers and approximately 45–50 percent of residents with ESI. Approximately half of New Jersey residents in the HCCI data are full benefit enrollees—which are defined for the purposes of this report as having both medical and pharmacy coverage. Thus, the study population captured in this report includes 20–25 percent of all New Jersey residents with ESI and is not a representative sample, and results should not be generalized to all residents with ESI.<sup>2</sup>

This study is further limited to claims from 2016–2021 and to residents who were 18–64 years of age when service delivery occurred. An overview of this sample is presented in **Appendix B**. A description of methods can be found in **Appendix C**. The main narrative emphasizes graphics, and the data that underly the discussion and graphics are presented in **Appendix D**.

## D. Comparison to other research

We compared the results of this study to other research on cost trends and drivers and found that our results were generally similar to other authors' results. For example, using data from MarketScan, the Commonwealth Foundation also found that spending in New Jersey was growing faster than the national

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<sup>2</sup> The data do not allow us to compare HCCI's NJ population to the full NJ population with ESI, but they do allow us to compare HCCI's full-benefit population in NJ to the full HCCI population in NJ. We find that the full-benefit population is slightly older, which is consistent with higher spending. The full-benefit population is also more likely to be health maintenance organizations (HMOs) as opposed to preferred provider organizations or point-of-service plans (Appendix B).



average rate.<sup>3</sup> Drawing on data from all-payer claims databases, state agencies in Massachusetts and Oregon also concluded that increasing prices, as opposed to increases in the quantity of services delivered, were the primary driver of rising health spending.<sup>4</sup>

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<sup>3</sup> Radley, David C., Jesse C. Baumgartner, Sara R. Collins, and Laurie C. Zephyrin. "2023 Scorecard on State Health System Performance: Americans' Health Declines and Access to Reproductive Care Shrinks, but States have Options." New York: The Commonwealth Fund, June 2023. Available at <https://www.commonwealthfund.org/publications/scorecard/2023/jun/2023-scorecard-state-health-system-performance>.

<sup>4</sup> Massachusetts Health Policy Commission. "Annual Health Care Cost Trends Report and Policy Recommendations." Boston, MA, September 2023. Available at: <https://masshpc.gov/publications/annual>.

Oregon Health Authority. "Health Care Cost Trends: State and Market-Level Cost Growth in Oregon, 2013-2019." Portland, OR, July 2022. Available at <https://www.oregon.gov/oha/HPA/HP/Pages/cost-growth-target-reports.aspx>.

# I. Overview of Health Care Spending Trends

## Introduction

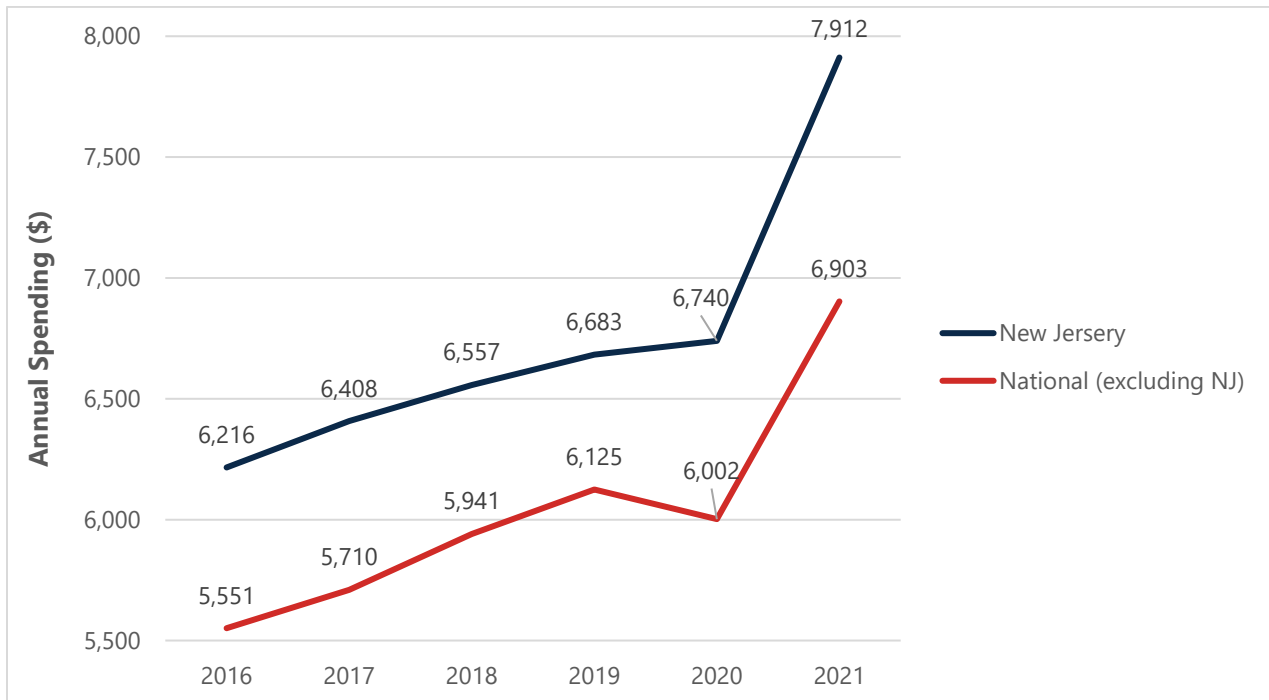
This section of the report covers (1) comparison of statewide and national total health care cost trends, (2) trends in out-of-pocket (OOP) spending for services covered by insurance, and (3) the distribution of spending across New Jersey residents. ▲

## A. Total health care spending trends

### 1. Multi-year trend

From 2016 to 2021, per-person total health care spending increased at an average annual rate of 4.9 percent for adult New Jersey residents with full-benefit employer-sponsored insurance (ESI) from a carrier that submits data to HCCI, a rate that is higher than the corresponding national rate of 4.5 percent.<sup>5</sup> In 2021, New Jersey's per-person spending was \$659 per month, or \$7,912 per year, which was 15 percent higher than the national average of \$6,903 per year (**Exhibit I.1**). This gap in the level of spending between New Jersey and the rest of the nation has continued to widen since 2016, when it was 12 percent.

**Exhibit I.1.** Average annual total health care spending per person in New Jersey compared to other states, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

<sup>5</sup> All results in this report pertain to adults with full-benefit employer-sponsored insurance and included in the HCCI sample, unless otherwise noted.

The multi-year trend in New Jersey's health care spending growth found in this study align with results from other data sources. The Centers for Medicare and Medicaid Services' (CMS) National Health Expenditure data show that between 2016 and 2019, the average annual growth rate in New Jersey for a similar spending measure was 4.5 percent, above the national rate of 4.1 percent but below the rate for the Mid-Atlantic region of 5.0 percent.<sup>6</sup>

The New Jersey HART Program team will continue to carefully monitor both the gap between New Jersey and the nation and the change within the state.

## **2. Single-year trend and the impact of COVID-19**

In the first three years of the study period, single-year spending growth was decelerating: 3.1 percent between 2017 and 2016, 2.3 percent between 2018 and 2017, and 1.9 percent between 2019 and 2018. Between 2020 and 2019, spending growth was .9 percent; this annual rate represents the net effect of the pronounced decrease in spending in early 2020 due to COVID-19 and the rebound in the latter part of 2020.<sup>7</sup> Between 2021 and 2020, growth was very high at 17.4 percent. A similar pattern exists nationally.

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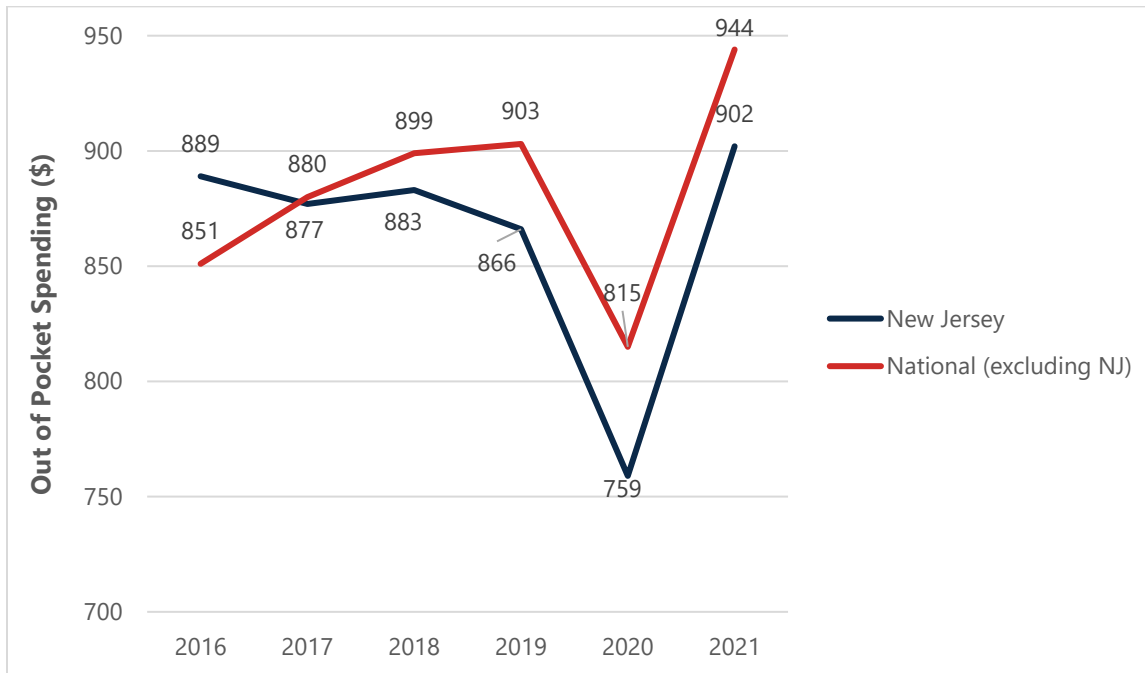
<sup>6</sup> This cost measure is per enrollee personal health care spending for private health insurance, sourced from CMS's Health Expenditures by State of Residence. The period of 2016–2019 was selected because 2021 was not available and 2020 was an atypical year because of the public health emergency. The Mid-Atlantic region includes the states of Delaware, Maryland, New Jersey, New York, and Pennsylvania and the District of Columbia. The data can be accessed at: <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/resident-state-estimates.zip>.

<sup>7</sup> In some other states, spending growth was negative in 2020, with the early-year decrease in spending more than offsetting the end-of-year rebound.

## B. Out-of-pocket spending trends

From 2016–2021, New Jersey residents’ per-person out-of-pocket spending (such as deductibles, co-pays, and coinsurance) for covered services increased at an average annual rate of 1 percent. In addition, New Jersey residents’ out-of-pocket spending of \$902 in 2021 was less than the national average of \$944 for that year. In contrast, as noted above, New Jersey’s total spending in 2021 exceeded the national average (**Exhibit I.2**).

**Exhibit I.2.** Average annual out-of-pocket spending per person in New Jersey compared to other states, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016-2021.

## II. Health Care Spending Trends by Service Category

### Introduction

For this report, the HART Program team analyzed spending in terms of four mutually exclusive major service categories: inpatient facility, outpatient facility, professional, and retail pharmacy. These categories, which are standard in claims analysis, are defined by the place of service and how the service is billed.

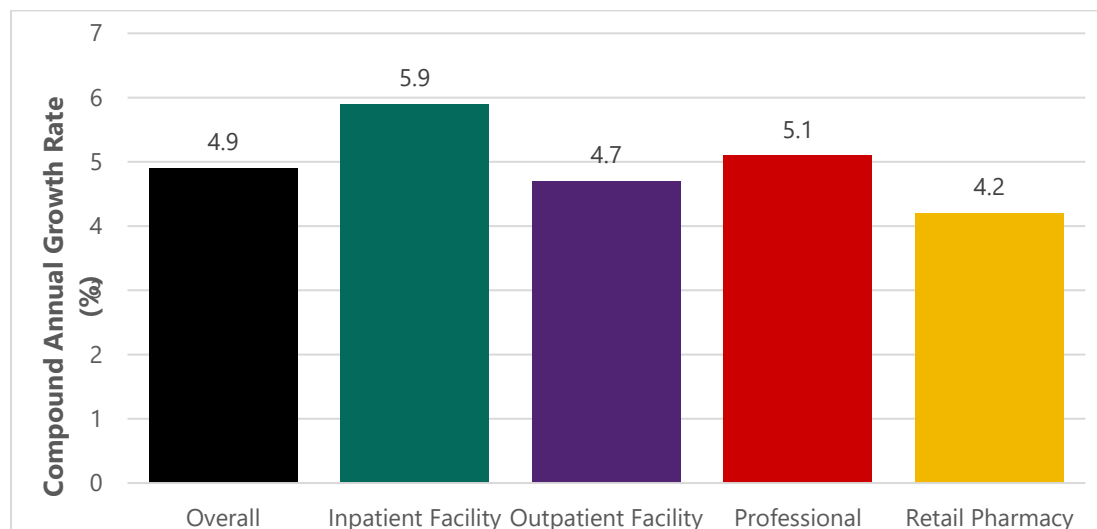
### Service Categories Descriptions

<b>Inpatient facility services</b>	Hospital-based inpatient care and emergency department (ED) spending immediately prior to an inpatient admission. Examples include childbirth and complex surgeries. This category includes drugs that are administered to patients admitted in a hospital.
<b>Outpatient facility services</b>	Services provided in clinic settings including ED services. This category includes outpatient procedures such as cataract surgery and vasectomy, imaging such as X-rays, and the facility fees associated with clinician visits. This category includes drugs that are administered to patients at an outpatient facility.
<b>Professional services</b>	Services provided by independent and hospital-affiliated clinicians, such as physicians, nurse practitioners, and physician assistants. This category includes both inpatient and outpatient professional services provided in offices, clinics, and hospitals.
<b>Retail pharmacy</b>	Retail drugs obtained at a pharmacy. This category does not include physician-administered medications. ▲

### A. Spending growth by service category

Spending for each service category grew at a different rate between 2016 and 2021. The average annual per-person growth rate for inpatient facility services was 5.9 percent, while professional, outpatient facility, and retail pharmacy spending for New Jersey residents increased at average annual per-person rates of 5.1 percent, 4.7 percent, and 4.2 percent, respectively (**Exhibit II.1**).

**Exhibit II.1.** Average annual per-person spending growth rate overall and by service category, 2016–2021

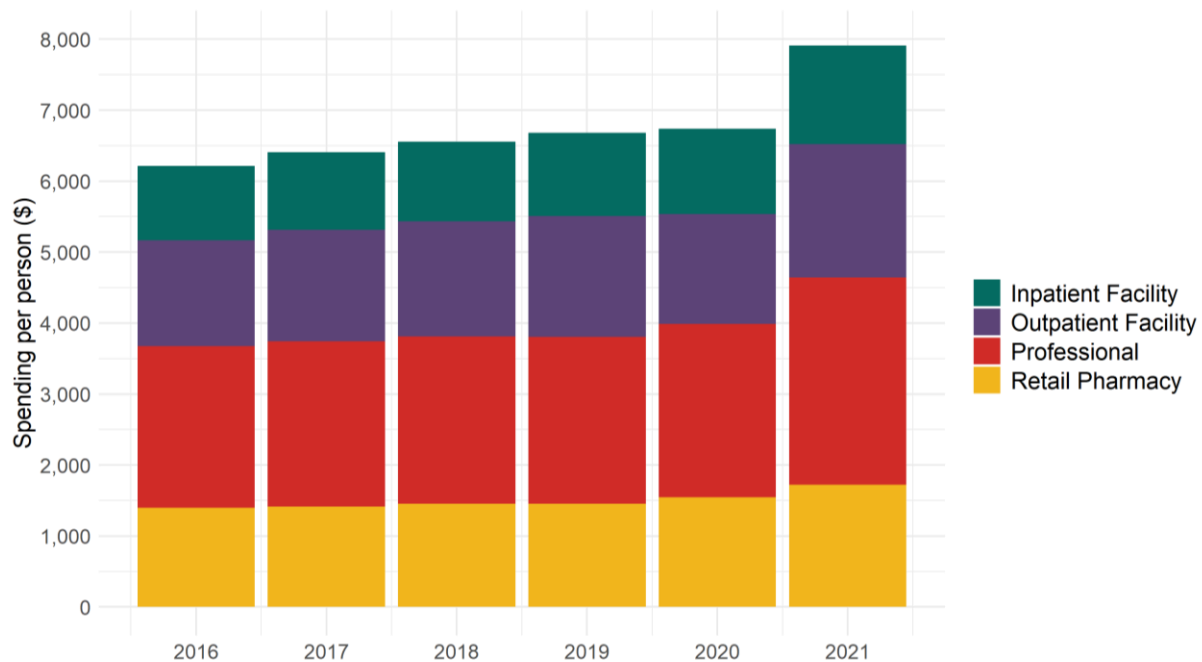


Source: Mathematica analysis of HCCI claims, 2016–2021.

## B. Spending levels by service category

In 2021, among the four major categories of service, the professional services category had the highest level of spending at \$2,919 per person, representing 37 percent of the total per-person spending of \$7,912. Outpatient facility services represented the second largest portion, \$1,879 or 24 percent of total spending, followed by retail pharmacy, at \$1,721 or 22 percent of total per-person spending, and inpatient facility services, at \$1,392 or 18 percent (**Exhibit II.2**).

**Exhibit II.2.** Average annual total health care spending per person by service category, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

Note: See Appendix D for data underlying this figure.

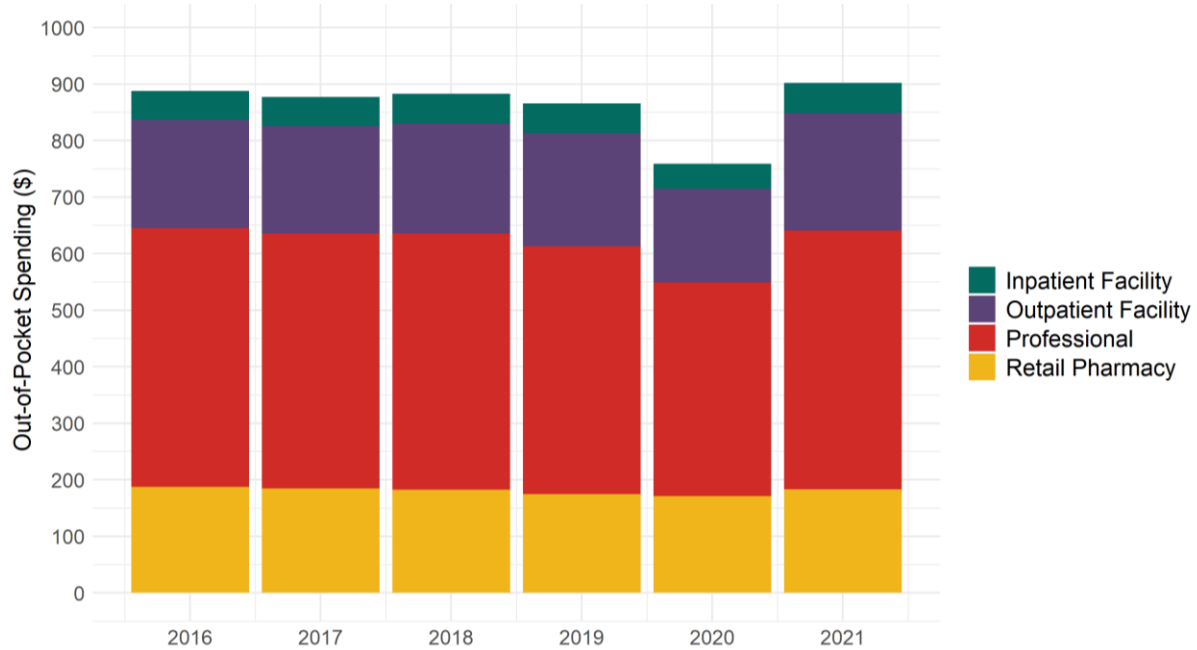
## C. Contribution of each service category to overall spending growth

Between 2016 and 2021, the professional services category accounted for the largest portion of overall spending growth, increasing \$645 per person between 2016 and 2021 and representing 38 percent of the \$1,697 growth in total per-person spending over the five-year period (**Appendix D4**). All three of the other categories contribute roughly similar amounts to spending growth with \$346 for inpatient facility, \$384 for outpatient facility, and \$322 for retail pharmacy. This represents 20 percent, 23 percent, and 19 percent of the \$1,697 spending growth, respectively. Note that the contribution to spending growth depends on both the base level of spending in the category and the rate of growth. For example, a 1 percent increase in a \$200 service category and a 10 percent increase in a \$20 service category would each add \$2 to spending growth.

### D. Out-of-pocket spending by service category

Residents’ average OOP payments for professional services, \$458 in 2021, represented more than half of their overall out-of-pocket spending of \$902. In 2021, residents paid for about 16 percent of their professional spending out of pocket; the corresponding percentages for retail pharmacy, outpatient services and inpatient services were 11 percent, 11 percent and 4 percent, respectively (**Exhibits II.3 and Appendix D5**).

**Exhibit II.3.** Average annual out-of-pocket spending per person by service category, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

Note: See Appendix D for data underlying this figure.

### III. Drivers of Health Care Spending: Quantity and Price

#### Introduction

Health care spending is a function of both the price and quantity of services, though it is primarily prices that have driven recent increases in spending in the commercial insurance market.<sup>8</sup> In this section, we discuss how changes in these two factors contributed to the growth in health care spending in New Jersey from 2016 to 2021.▲

#### Measuring Quantity and Price

The HART Program team measured the quantity of services by counting the number of patient care encounters in each category of service according to the following criteria:

- For the inpatient facility category, an encounter is defined as an inpatient discharge.
- For the outpatient facility and the professional services categories, an encounter is defined as a visit for care or treatment for a given health issue. If the care or treatment involves multiple encounters with the facility or professional to complete the course of care or treatment, it still counts as a single “encounter” for the purposes of this analysis.
- For the retail pharmacy category, an encounter is a day’s supply of a single drug.

The HART Program team measured price as spending per encounter; both changes in the prices of specific services and changes in the mix of specific services within the category affect this measure.

As shown in the example in Table III.1, per-person spending on Service A is \$200 with two encounters per person and an average price per encounter of \$100 in 2018. In 2019, the per-person spending on service A is \$216 with 1.92 encounters per person and average price of \$112.50. The total change in per-person spending is 8 percent, which is the net effect of a 4 percent decrease in quantity and a 12.5 percent increase in price.<sup>1</sup>

Example calculation of the effect of quantity and price

Year	Total per-person spending	Quantity (encounters per person)	Price (spending per encounter)
2018	\$200	2.00	\$100.0
2019	\$216	1.92	\$112.5

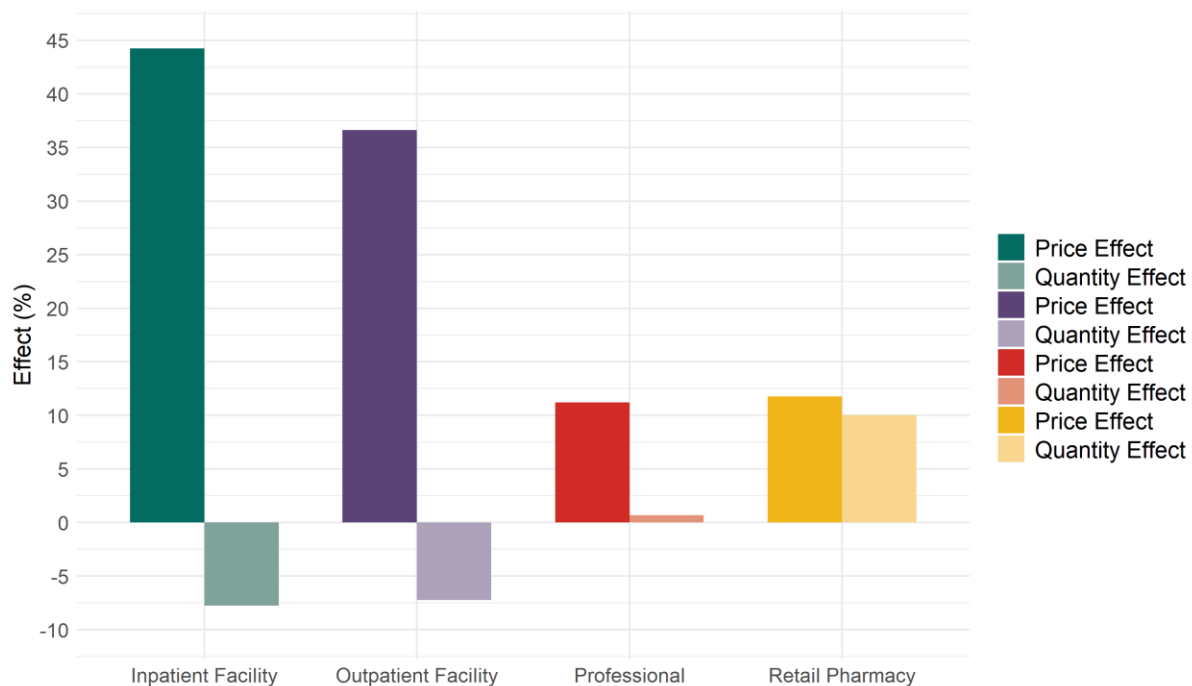
<sup>8</sup> For example, see the most recent report from the HCCI, available at: <https://healthcostinstitute.org/health-care-cost-and-utilization-report/annual-reports>.



### A. Trends in quantity and price

For inpatient and outpatient facility services, the number of encounters per person declined between 2016 and 2021 by 8 percent and 7 percent, respectively, while the average price of an encounter increased by 44 percent and 37 percent, respectively.<sup>9</sup> For professional services, the number of encounters stayed flat, with an increase of 0.7 percent, while the average price increased by 11 percent. Finally, for retail pharmacy, both quantity and average price increased by similar amounts, at 10 percent and 12 percent, respectively (**Exhibit III.1**).

**Exhibit III.1.** Total percentage change in price and per-person quantity by category of service, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

Note: See Appendix D for data underlying this figure.

For every service category other than retail pharmacy, the number of encounters per person dropped sharply between 2019 and 2020 and then rebounded between 2020 and 2021, patterns that can be attributed to COVID-19 (**Exhibits III.2, III.3, III.4, and III.5**). A review of year-over-year changes in the number of encounters per person and the average price of these encounters determined that, for all categories, average prices increased in each year of the study period. The pattern for number of

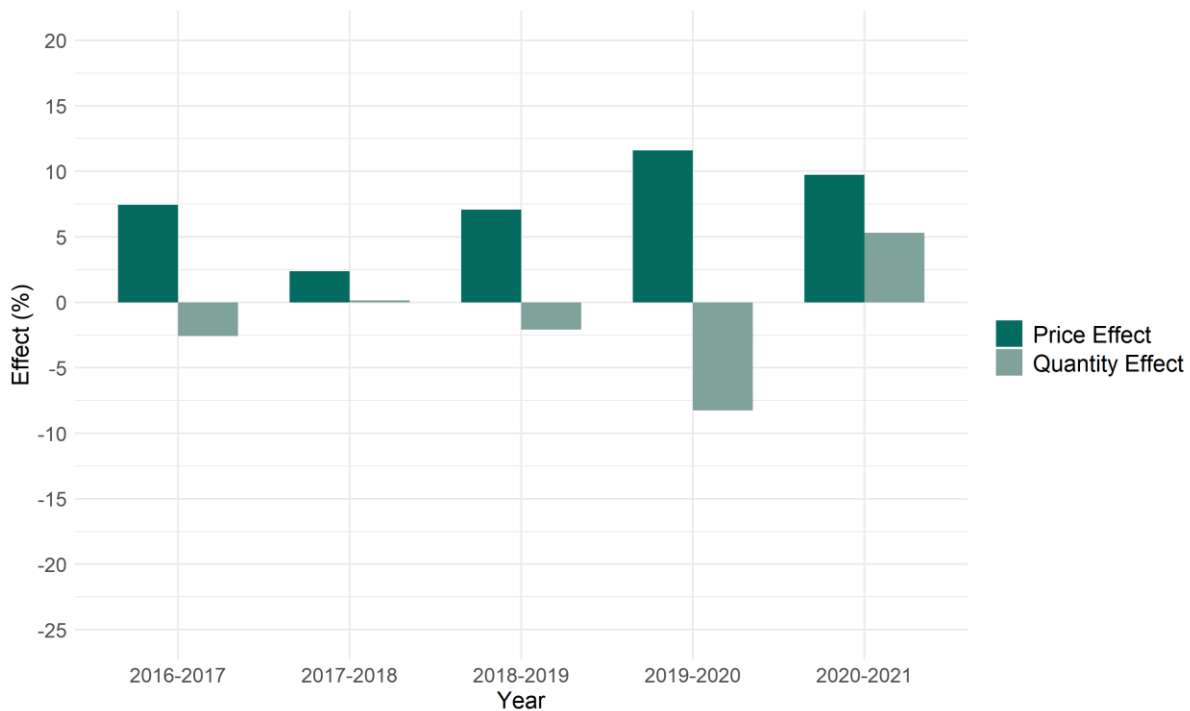
<sup>9</sup> For this analysis, we restricted the outpatient facility category to include outpatient visits for surgical procedures, for radiation and chemotherapy, and ED visits that did not result in an admission. We restricted the professional visit category to include professional visits in offices, inpatient hospitals, and outpatient hospitals. These restrictions create a more homogeneous grouping and lead to more meaningful results. However, the result in the average annual growth rates by category of service in Chapter III differs slightly from those reported in Chapter II.

encounters is more mixed in the years before the onset of the COVID-19 pandemic. During this period, the magnitude of the increase in average price generally outpaced changes in the number of encounters.

### 1. Inpatient Facility Services

Spending per inpatient discharge increased between 7 to 11 percent annually between 2016 and 2021, except in 2018 when inpatient spending per discharge increased by only 2 percent. Before 2020, the number of inpatient discharges changed very minimally, either decreasing by 2 percent or remaining flat. However, the pandemic caused a sharp decline of 8 percent in inpatient admissions in 2020. In 2021, there is evidence of a strong post-COVID “bounce back” as the number of discharges increased by 5 percent.

**Exhibit III.2.** Annual percentage change in price and per-person quantity for inpatient services, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

Note: See Appendix D for data underlying this figure.

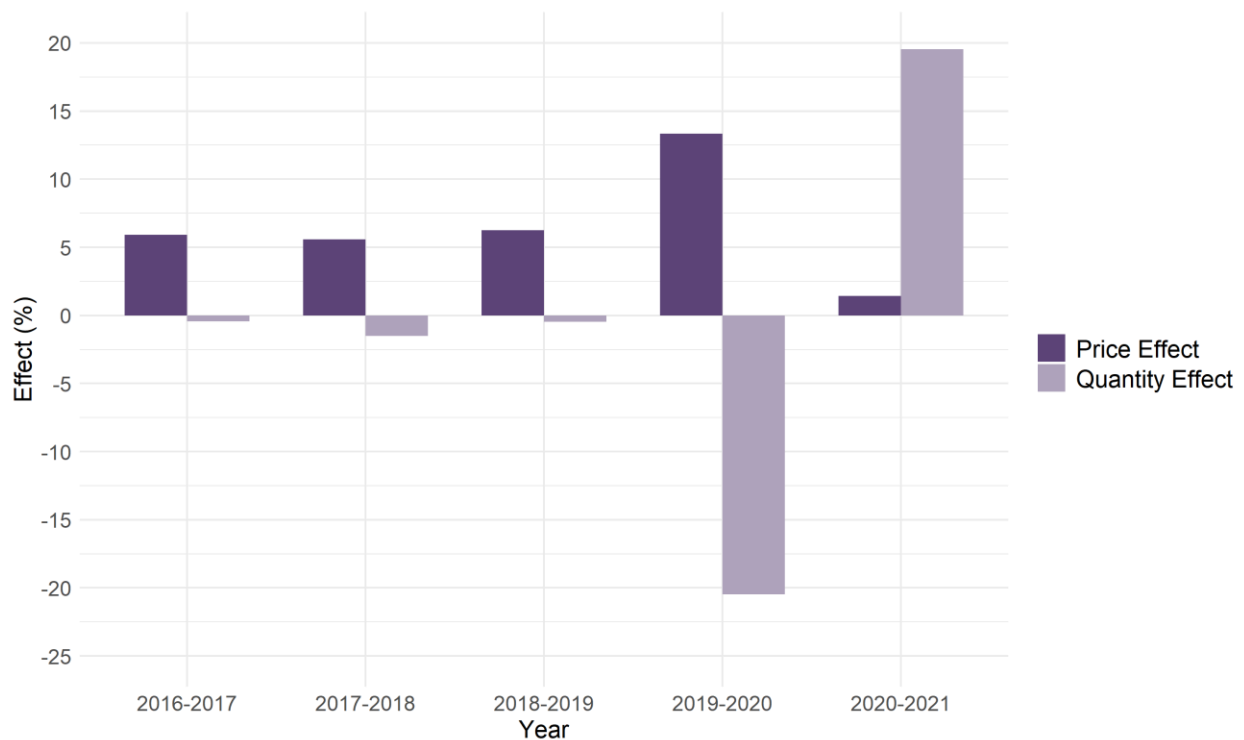
## 2. Outpatient facility services

Outpatient facility services is a broad category of different types of visits. For the purpose of analyzing the number of encounters per person and the average price of an encounter, this report limits the category of outpatient encounters to three types of encounters that make up the largest share of spending: (1) visits to an outpatient facility for surgery, (2) visits to a hospital emergency department, and (3) visits to an outpatient facility for radiation or chemotherapy treatment.

From 2016 to 2019, trends in these types of outpatient encounters resembled patterns observed for inpatient discharges. The average price of an outpatient encounter increased between 5.5 to 6 percent each year between 2016–2019, shot up 13.3 percent between 2019 and 2020 and then increased 1.4 percent between 2020 and 2021.

The number of outpatient encounters declined minimally between 2016 and 2019, by a rate ranging from -0.4 percent to -1.5 percent. The COVID-19 pandemic had an even larger effect on outpatient encounters than on inpatient discharges, as outpatient encounters declined by over 20 percent in 2020 before rebounding by 20 percent in 2021.

**Exhibit III.3.** Annual percentage change in price and per-person quantity for outpatient services, 2016-2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

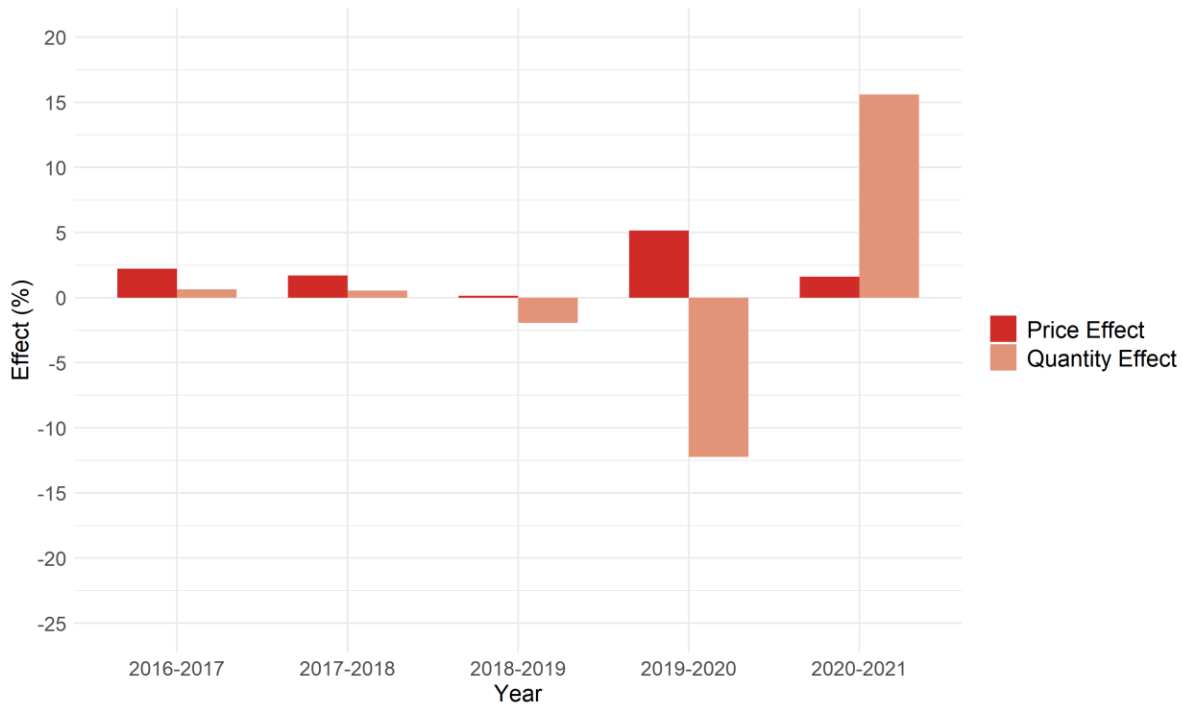
Note: This analysis is limited to surgery, ED, and radiation/chemotherapy encounters only. See Appendix D for data underlying this figure.

### 3. Professional services

Like outpatient facility services, professional services is a broad and diverse category of services. For the purpose of analyzing the number of encounters per person and the average price of an encounter, we limited the professional services category to professional encounters in practitioner offices, outpatient hospitals, and inpatient hospitals; again, there are the three types that make up the largest share of spending.

Trends in professional service encounters were generally flat pre-COVID-19 but demonstrated large swings after the onset of the pandemic. From 2016–2019, spending per professional encounter increased slightly by a rate of 0 to 2 percent, and the number of professional encounters declined by a rate of 0.5 percent to 2 percent. After the onset of the pandemic in 2020, the number of encounters declined by over 12 percent, before increasing by 15 percent in 2021. The average price of an encounter grew slightly in each year.

**Exhibit III.4.** Annual percentage change in price and per-person quantity for professional services, 2016–2021



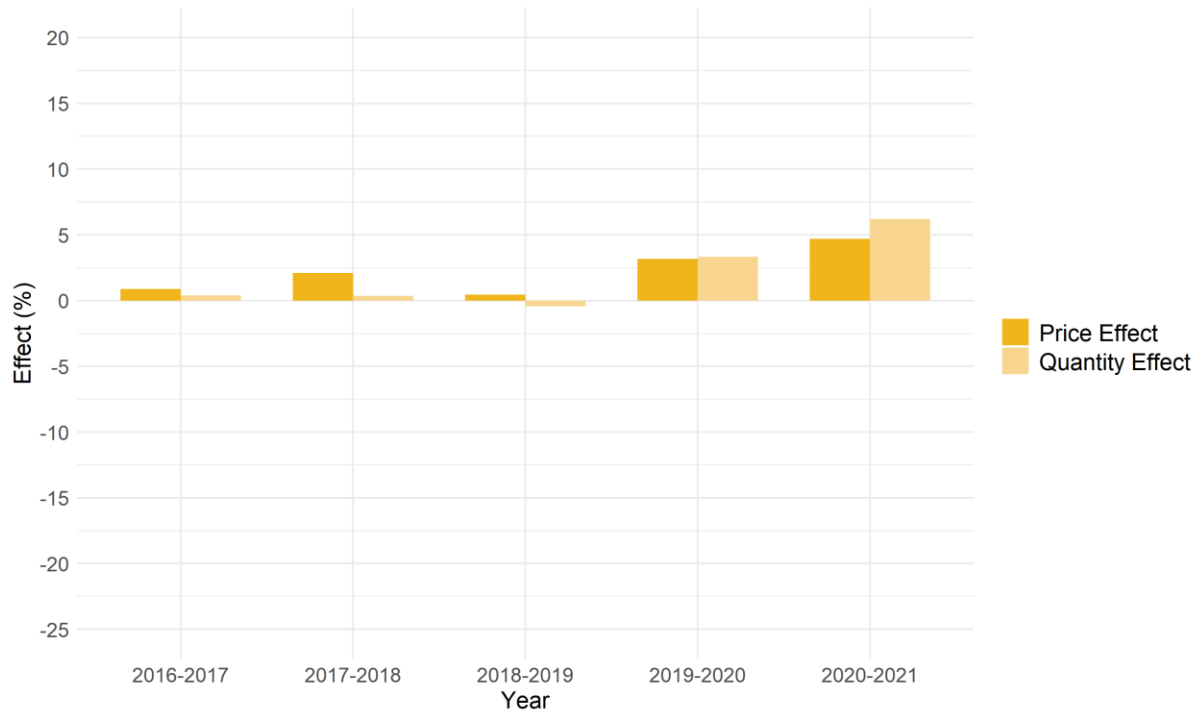
Source: Mathematica analysis of HCCI claims, 2016–2021.

Note: This analysis is limited to professional encounters in offices, inpatient hospitals, and outpatient hospitals only. See Appendix D for data underlying this figure.

#### 4. Retail pharmacy

The retail pharmacy trends are markedly different than the other categories, as both the number of days supplied and average price per day either stayed flat, with a change of under 0.5 percent, or increased. Pre-pandemic, the magnitude of changes was quite low, at a rate of between -0.4 percent to 2 percent. In 2020 and 2021, the number of days supplied increased by 3.3 percent and 6.2 percent annually and the average price per day increased by 3.2 percent and 4.7 percent annually.

**Exhibit III.5.** Annual percentage change in price and per-person quantity for retail pharmacy services, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

Note: See Appendix D for data underlying this figure.

#### Special Topic: Medical Pharmacy

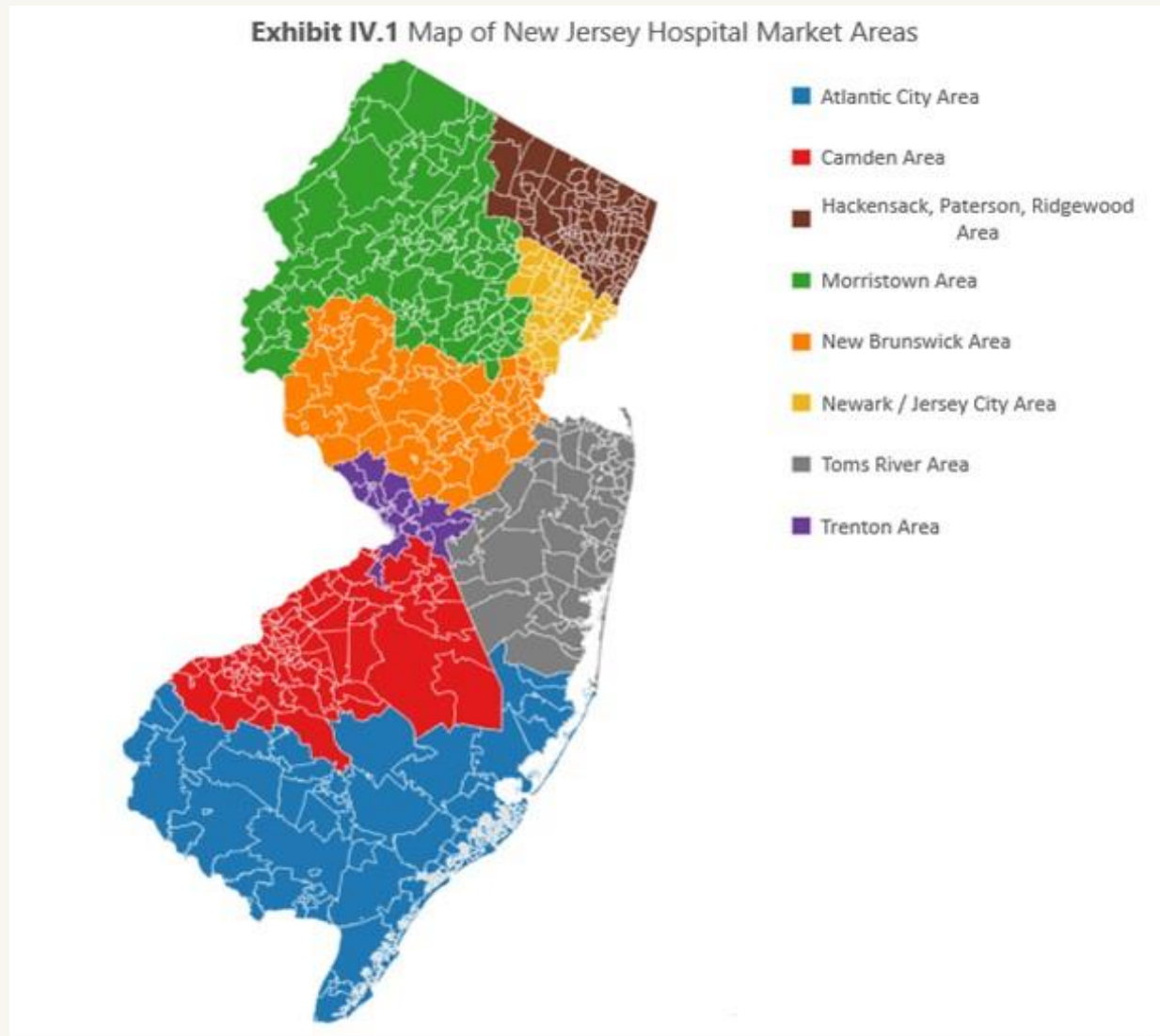
Medical pharmacy refers to drugs, such as infusion drugs and chemotherapy, that are administered by a health care provider in an office or outpatient setting. In analyses that categorize spending as inpatient facility, outpatient facility, professional, or retail pharmacy, spending on these medical pharmacy drugs is counted under the professional and outpatient categories. Between 2016 and 2021, per-person spending on medical pharmacy increased at an annual rate of 3.3 percent per year, which is slower than per-person spending on retail pharmacy, which increased at a rate of 4.2 percent, professional services, which increased at a rate of 5.1 percent, and outpatient services, which increased at a rate of 4.9 percent. The level of per person spending on medical pharmacy was 71 percent of the level of retail pharmacy spending in 2016, and 86 percent in 2021. All growth stemmed from increases in average price per day supplied, rather than increases in the number of days supplied. The number of days supplied fell between 2016 and 2021 by -20.7 percent, while the average price per day increased by 48.6 percent. ▲

## IV. Geographic Variation in Health Care Spending

### Introduction

Trends in statewide health care spending growth can help inform policy discussions, but it is also important to identify whether some regions within the state have particularly high or particularly low spending growth. The HART Program team analyzed the growth and levels of spending in each of the eight hospital market areas (HMAs) shown on the map below.<sup>10</sup>

### New Jersey Hospital Market Areas



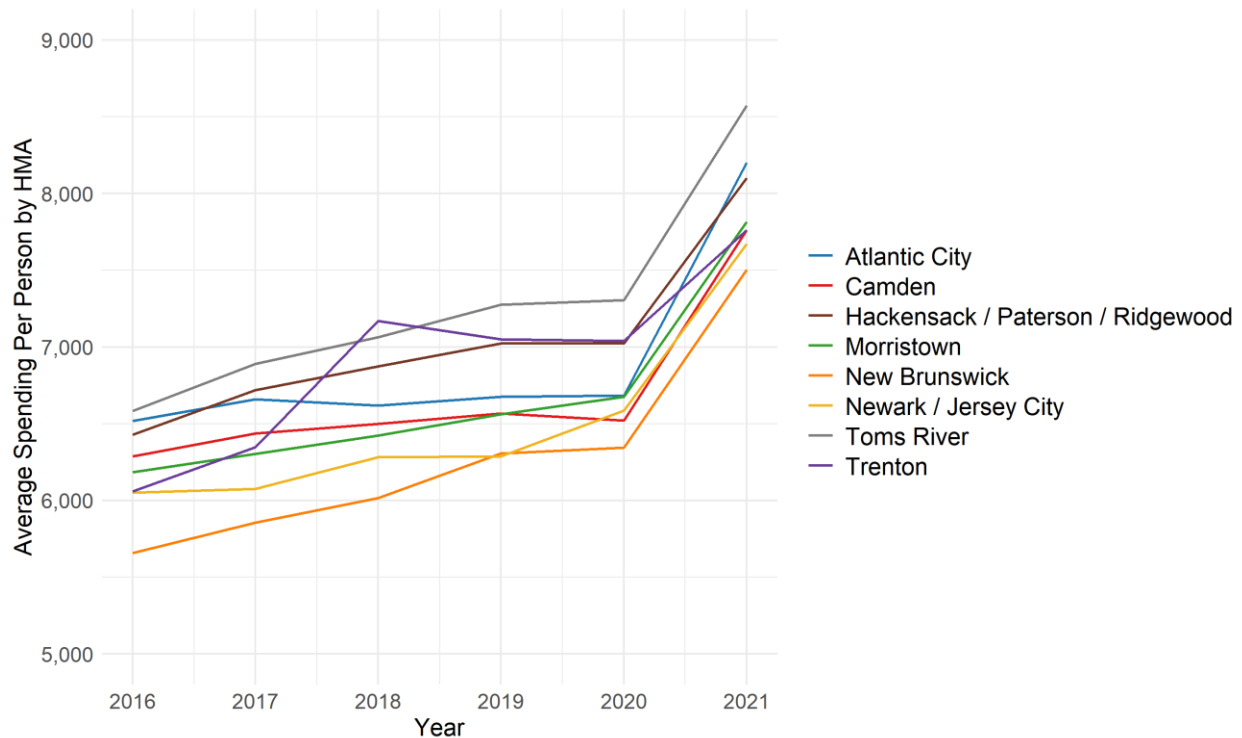
<sup>10</sup> HMAs reflect markets and referral patterns for specialized hospital care. They were developed by the New Jersey Commission on Rationalizing Health Care Resources as a modified version of Hospital Referral Regions from the Dartmouth Atlas. For more information, see Appendix 2 of the Commission's Final Report, available at [https://www.nj.gov/health/rhc/documents/entire\\_finalreport.pdf](https://www.nj.gov/health/rhc/documents/entire_finalreport.pdf).

### A. Spending trends by hospital market area

From 2016 to 2021, the rate of increase of per-person total health care spending for New Jersey residents with ESI varied by geographic area, with a high of 5.8 percent in the New Brunswick HMA and a low of 4.3 percent in the Camden HMA (**Exhibits IV.2**). Toms River had the highest level of per-person spending in 2021, at \$8,573, while New Brunswick had the lowest level of per-person spending, at \$7,503, despite its high recent population growth rate. The Atlantic City and Hackensack/Paterson/Ridgewood HMAs were also higher spending areas, at \$8,202 and \$8,101 respectively, and the Newark/Jersey City HMA displayed lower spending, at \$7,671.

When area-level spending was adjusted for the age and gender of the study population, Toms River, Atlantic City, and Hackensack/Paterson/Ridgewood HMAs remained the highest spending areas, and New Brunswick and Newark/Jersey City remained the lowest. This indicates that differences among areas in age and gender within the study population were not the primary driver of observed differences in health care spending. There were not obvious and straightforward relationships between HMA-level spending and HMA-level income, racial composition, or rurality, although such relationships might be observed in more specific and in-depth analyses (**Appendix D12**).

**Exhibit IV.2.** Annual total health care spending per person by Hospital Market Area, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016-2021. Note: See Appendix D for data underlying this figure.

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## V. Outmigration

### Introduction

“Outmigration” occurs when New Jersey residents seek care out of the state, typically in New York or Pennsylvania. Outmigration may cause more travel burden or lead to higher costs for patients and their families than is necessary for care of equal or greater quality closer to home. Outmigration is also of concern to New Jersey providers because it could harm their financial viability.<sup>11</sup>▲

### A. Outmigration

For New Jersey residents, the percentage of inpatient stays that took place in New Jersey hospitals increased between 2016 and 2021, from 85.7 percent to 87.1 percent. This increase was offset by a decrease in the percentage of inpatient stays that took place at New York hospitals, from 6.7 percent to 5.0 percent. Over this time period, there was also a slight increase in the percentage of inpatient stays that occurred in Pennsylvania hospitals from 7.7 to 7.9 (**Exhibit V.1**).

About 10 percent of inpatient stays for residents of the Hackensack/Paterson/Ridgewood HMA and of the Newark/Jersey City HMA occurred in New York in 2016. In both cases, these percentages declined slightly over the five-year period, with inpatient stays for Hackensack/Paterson/Ridgewood residents declining from 11.3 percent to 9.5 percent, and inpatient stays for Newark/Jersey City residents declining from 9.9 percent to 7.8 percent (**Exhibit V.2**).

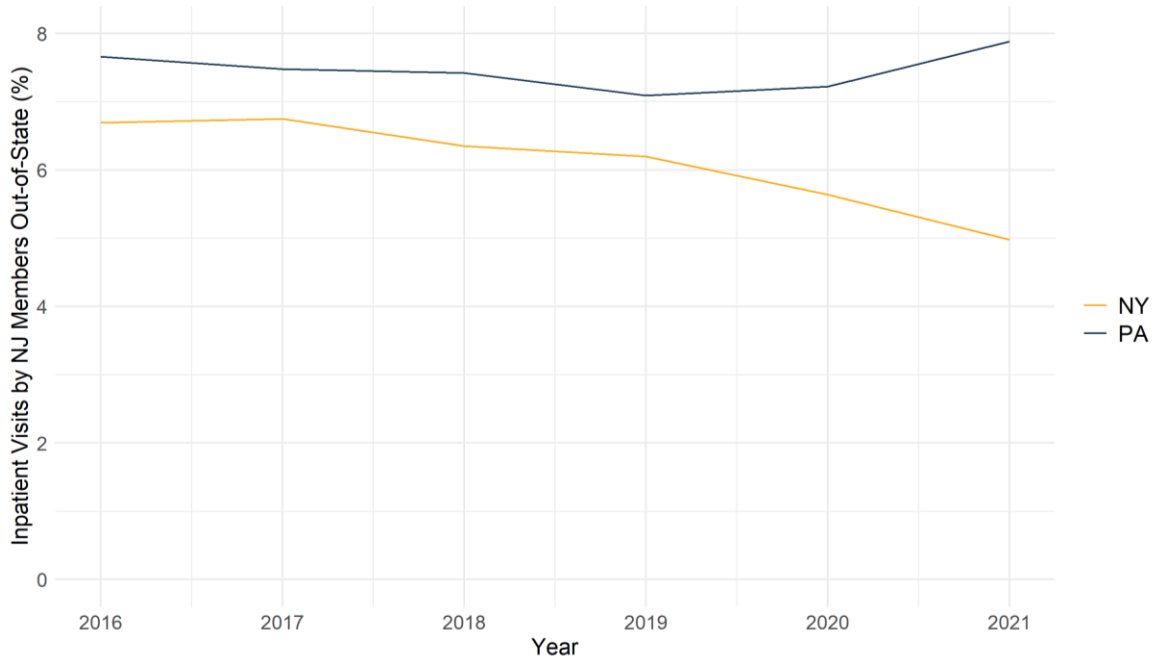
For residents of the Camden HMA, the percent of inpatient stays that occurred in Pennsylvania hospitals increased from 20.3 percent in 2016 to 21.6 percent in 2021. In 2016, two other HMAs had relatively high rates of outmigration to Pennsylvania, with Atlantic City at 15.7 percent and Trenton at 15.9 percent, but both these rates declined in 2021, with Atlantic City at 13.2 percent and Trenton at 11.1 percent (**Exhibit V.3**).

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<sup>11</sup> Due to small sample sizes and differences between the patients that seek care out of state and those that do not, the HART Program team was not able to analyze the impact of outmigration on spending.



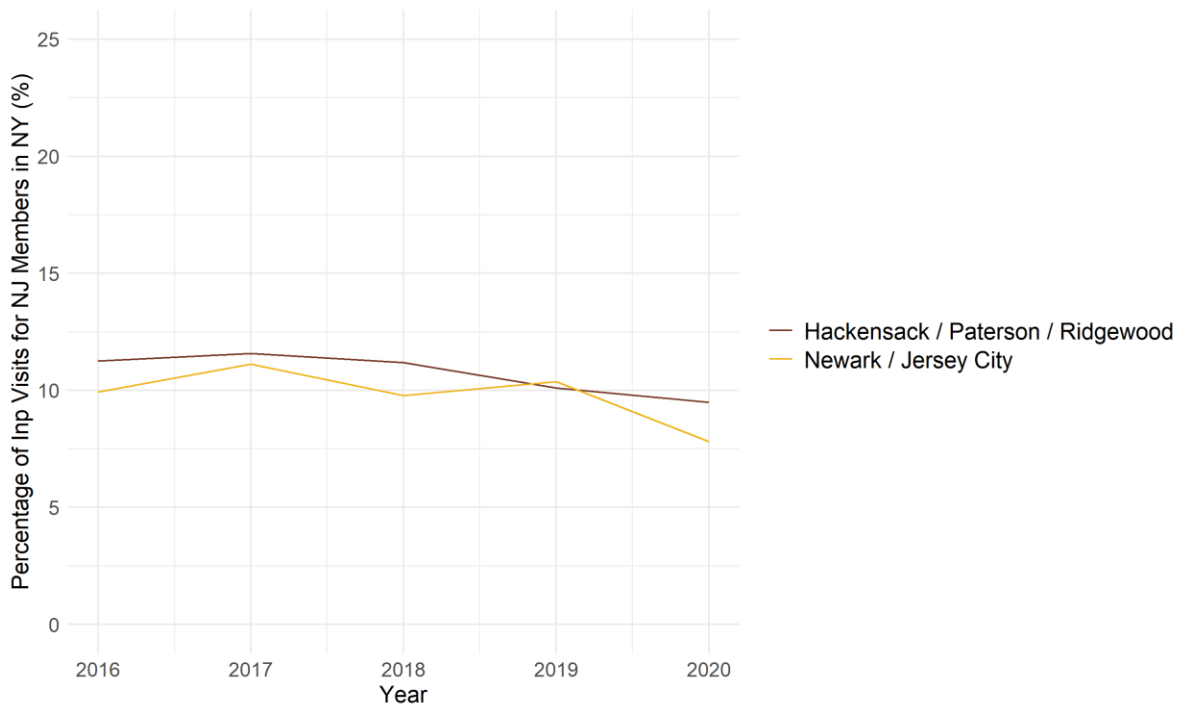
**Exhibit V.1.** Percentage of inpatient Stays for NJ Residents that occurred in NY and PA, 2016-2021



Source: Mathematica analysis of HCCI claims, 2016-2021.

Note: See Appendix D for data underlying this figure.

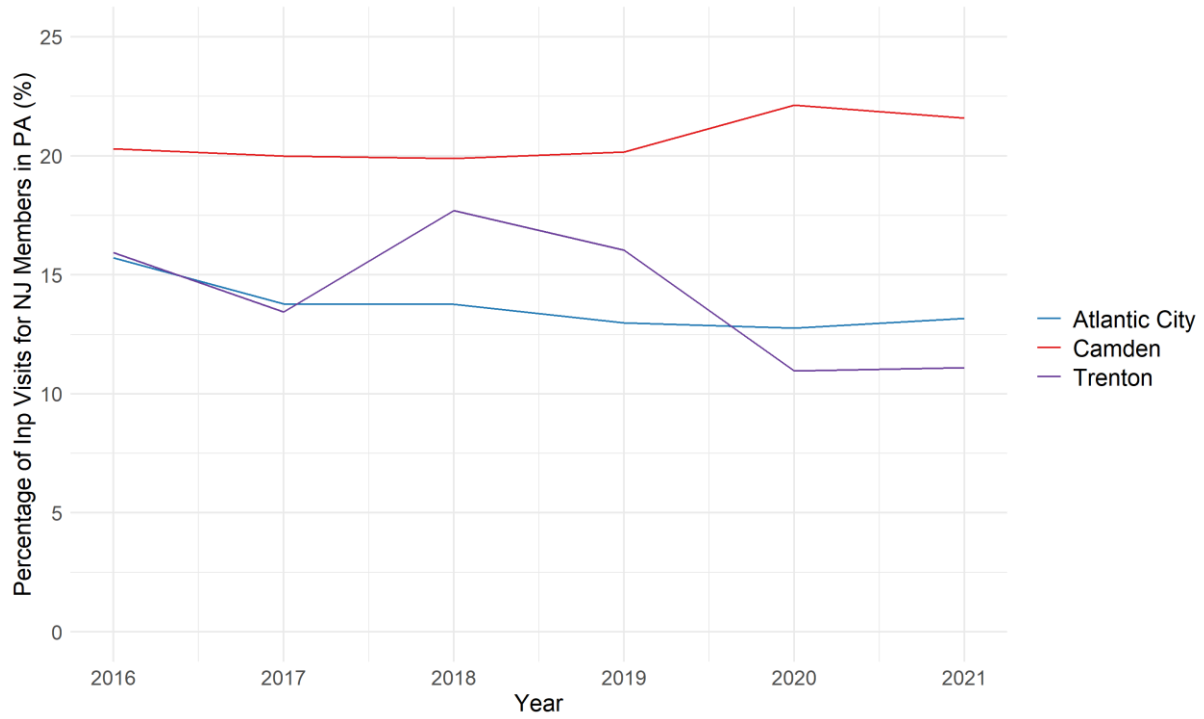
**Exhibit V.2.** Percentage of inpatient stays for New Jersey residents that occurred in New York, selected HMAs, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

Note: This graph only contains values from 2016–2020 because the 2021 data did not meet cell size requirements. See Appendix D for data underlying this figure.

**Exhibit V.3.** Percentage of inpatient stays for New Jersey residents that occurred in Pennsylvania, selected HMAs, 2016–2021



Source: Mathematica analysis of HCCI claims, 2016–2021.

Note: See Appendix D for data underlying this figure.

## Appendix A

### List of Acronyms and Definitions

## Acronyms

CMS	Centers for Medicare & Medicaid
ED	Emergency Department
ESI	Employer-Sponsored Insurance
HART	New Jersey Health Care Affordability, Responsibility, and Transparency
HCCI	Health Care Cost Institute
HMA	Hospital Market Area
OOP	Out-of-pocket

## Definitions

### Chapter I

- Total spending. Total payments to providers from both commercial carriers and patients. Calculated using the allowed amounts recorded on claims.
- Out-of-pocket spending. Total payments to providers from patients. Includes deductibles, coinsurance, and copayments as recorded on claims.
- Average annual growth rate. The compound annual growth rate (CAGR); if spending had grown steadily at this annual rate of growth for the entire multi-year period, then we would achieve the level of spending observed in the final year.
- Full-benefit employer-sponsored insurance (ESI). ESI that incorporates drug benefits.

### Chapter II

- Inpatient facility services. Hospital-based inpatient care and emergency department spending immediately prior to an inpatient admission.
- Outpatient facility services. Services provided in clinic settings including emergency department services. This category includes outpatient procedures, imaging, facility fees associated with clinician visits, and drugs administered at an outpatient facility.
- Professional services. Services provided by independent and hospital-affiliated clinicians.
- Retail pharmacy. Retail drugs obtained at a pharmacy.

### Chapter III

- Quantity of service. The number of patient care encounters in a category of service.
  - For the inpatient facility category, an encounter is defined as an inpatient discharge.
  - For the outpatient facility category and the professional services category, an encounter is defined as a visit for care or treatment of health issue with a single provider on a single day.
  - For the retail pharmacy category, an encounter is a day's supply of a single drug.

- Price of service. The average spending per encounter within a category of service; both changes in the prices of specific services and changes in the mix of specific services within the category can affect this measure
- Primary care. Care intended to offer a patient an ongoing relationship with a healthcare provider and to create better access to care, reduce spending, and improve outcomes.

#### **Chapter IV**

- Hospital market area (HMA). Areas that reflect health care markets and referral patterns for specialized hospital care in New Jersey. Mutually exclusive and collectively exhaustive.

#### **Chapter V\***

- Outmigration. Outmigration is when a New Jersey resident seeks care outside the state.

## Appendix B

### Sample Overview

This appendix shows the demographic characteristics of the study population – adult residents of NJ with full-benefit coverage from full-benefit employer-sponsored insurance (ESI) from a carrier that submits data to HCCI. For comparison, we also show the demographics characteristics of the study population before the restriction to full benefits was applied.

**Exhibit B.1.** Overview of the final study population, adult NJ residents with full benefits

Demographic Type	Demographic	2016	2017	2018	2019	2020	2021
	Member Equivalents (Member Months / 12)	776,003	745,244	700,195	687,868	689,334	624,982
Gender	% Female	51.1%	51.0%	50.9%	51.5%	51.7%	51.6%
	% Male	48.9%	49.0%	49.0%	48.5%	48.3%	48.4%
Age	% Age 18 - 24	14.1%	14.0%	14.2%	14.3%	14.5%	14.6%
	% Age 25 - 34	20.1%	20.3%	20.8%	21.2%	21.3%	21.4%
	% Age 35 - 44	19.9%	20.1%	20.3%	20.5%	20.7%	20.7%
	% Age 45 - 55	24.1%	23.5%	22.8%	22.1%	21.6%	21.4%
	% Age 55 - 64	21.8%	22.1%	22.0%	22.0%	21.9%	21.9%
Product Type	% HMO or Exclusive Provider Organization	38.0%	38.7%	38.4%	39.1%	39.5%	35.7%
	% PPO	31.1%	29.5%	29.4%	29.4%	29.5%	29.8%
	% Indemnity	0.2%	0.1%	0.1%	0.4%	0.2%	0.2%
	% Point of Service	30.4%	31.3%	31.7%	30.7%	30.1%	32.8%

**Exhibit B.2.** For comparison - overview of the HCCI population (adult NJ residents) before the sample was limited to individuals with full benefits

Demographic Type	Demographic	2016	2017	2018	2019	2020	2021
	Unique Members	1,629,123	1,613,400	1,595,197	1,817,048	1,771,584	1,531,942
Gender	% Female	51.3%	51.2%	51.2%	51.7%	51.5%	51.8%
	% Male	48.7%	48.8%	48.8%	48.3%	48.5%	48.2%
Age	% Age 18 – 24	15.2%	15.2%	15.3%	15.5%	15.3%	15.9%
	% Age 25 – 34	21.1%	21.4%	21.7%	21.6%	21.6%	22.1%
	% Age 35 – 44	19.7%	19.8%	20.0%	20.0%	20.4%	20.4%
	% Age 45 – 55	23.3%	22.8%	22.1%	21.7%	21.3%	20.8%
	% Age 55 – 64	20.6%	20.9%	20.9%	21.3%	21.4%	20.8%
Product Type	% HMO or Exclusive Provider Organization	29.2%	27.9%	26.9%	24.4%	22.9%	24.2%
	% PPO	28.6%	27.1%	26.2%	29.2%	30.8%	32.1%
	% Indemnity	0.3%	0.2%	0.2%	0.4%	0.9%	0.6%
	% Point of Service	41.8%	44.7%	46.6%	45.7%	45.3%	42.5%

# Appendix C

## Methods



This appendix presents methods and is organized according to the chapters of the report.

### C1. Chapter I. Spending Trends

We sum up the allowed amount field by year in each claims file (inpatient facility, outpatient facility, professional, and retail pharmacy) to calculate total spending. We also add up the deductible, coinsurance, and copay fields by year in each claims file to calculate out-of-pocket spending.

#### Average Annual Spending Growth Rates

We calculate average annual spending growth rates using the compound annual growth (CAGR) formula. To calculate this growth rate, we use spending from the beginning and end of our study period. This corresponds to spending in 2016 and 2021 respectively. We use the following formula. In this context  $t$  is the number of years over which we are calculating the growth in spending which is 5 [2021-2016].

$$\text{Growth Rate} = \left( \frac{\text{Spending}_{2021}}{\text{Spending}_{2016}} \right)^{1/t} - 1$$

We report the average annual growth rate in spending for overall spending, and for each service category: inpatient facility, outpatient facility, professional, and retail pharmacy.

### C2. Chapter II: Spending Trends by Service Category

There are four different service categories: (1) inpatient facility (2) outpatient facility (3) professional (4) retail pharmacy. Inpatient facility includes all hospital-based inpatient care and emergency department spending immediately prior to an inpatient admission. Outpatient facility includes all services provided in clinic settings including emergency department settings. Professional services are claims for services provided by independent and hospital-affiliated clinicians in both inpatient and outpatient settings. Finally, retail pharmacy refers to retail drugs obtained at a pharmacy. We calculated per person spending separately for each service category and year.

### C3. Chapter III: Drivers of Spending: Quantity and Price

#### Measuring Quantity and Price

We measure quantity by counting units within each service category.<sup>12</sup> For each service category described below we calculate the total number of units and the total spending each year. We divide total spending by the number of units to calculate the average spending per unit in the year which is a proxy for price.

#### Inpatient Facility

The unit for inpatient facility is an admission. We define an admission by leveraging a unique identifier in the inpatient facility data that groups together all claims for a specific admission. We sum together the allowed amount field to calculate total spending, and the spending on the deductible, coinsurance, and

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<sup>12</sup> In this more technical appendix, we use the term "units," although the main text uses the term "encounters."

## Appendix C Methods

copay fields to calculate out-of-pocket spending. We drop all admissions where total spending is \$0 as these indicate cancelled claims.

### Outpatient Facility

The unit for outpatient facility is a visit. We group together all claims in the outpatient facility file that have the same (a) Patient ID (b) Date (c) Provider ID. A visit is a unique combination of these three variables. We sum together the allowed amount field to calculate total spending, and the spending on the deductible, coinsurance, and copay fields to calculate out-of-pocket spending. We drop all visits where total spending is \$0 as these indicate cancelled claims.

We use the revenue code fields specified for each encounter to categorize each outpatient facility visit as belonging to one of the following mutually exclusive categories: (1) Emergency Department (2) Surgery (3) Ambulance (4) Behavioral Health (5) Dialysis (6) Radiation and Chemotherapy (7) Hospice (8) Home Health (9) Skilled Nursing Facility (10) Physical Therapy (11) Occupational Therapy (12) Clinic (13) Laboratory (14) Imaging (15) Telemedicine. We use a hierarchy of codes to create these mutually exclusive categories. This means that if an outpatient facility visit has multiple revenue codes, we will assign it to the category that is highest in the above hierarchy. As an example, if an outpatient facility visit includes revenue codes for Emergency Department and Imaging then we will classify that visit under the Emergency Department category. A full list of revenue codes used is in the table below.

#### Exhibit C.1. Revenue codes used for creating outpatient service categories

Hierarchy	Outpatient Facility Category	Revenue Codes
1	Emergency Department	0450 – 0459, 0762
2	Surgery	0360 – 0369, 0490 - 0499
3	Ambulance	0540, 0542, 0543, 0545, 0549
4	Behavioral Health	0900 – 0907, 0911 – 0919, 1001 - 1003
5	Dialysis	0820 – 0822, 0824, 0825, 0829, 0831, 0841, 0845, 0851, 0853, 0855, 0881
6	Radiation & Chemotherapy	0330 – 0333, 0335, 0339
7	Hospice	0650 – 0652, 0655 – 0658, 0690 - 0691
8	Home Health	0023, 0560, 0561, 0569 – 0572, 0580 – 0582, 0589, 0601, 0640, 0649
9	Skilled Nursing Facility	0022, 0550 – 0552, 0559
10	Physical Therapy	0420 – 0424, 0429
11	Occupation Therapy	0430 – 0434, 0439 – 0444, 0449
12	Clinic	0510 – 0529
13	Laboratory	0300 – 0312, 0314, 0319
14	Imaging	0320 – 0324, 0329, 0340, 0341, 0350 – 0352, 0359, 0400 – 0404, 0409, 0610 – 0612, 0614 – 0616, 0618, 0619, 0921
15	Telemedicine	0780

### Professional

The unit for professional is a visit. As with the outpatient facility we group together all claims in the professional file that have the same (a) Patient ID (b) Date (c) Provider ID. A visit is a unique combination

## Appendix C Methods

of these three variables. We sum together the allowed amount field to calculate total spending, and the spending on the deductible, coinsurance, and copay fields to calculate out-of-pocket spending. We drop all visits where total spending is \$0 as these indicate cancelled claims.

### Exhibit C.2. Place of service codes used for creating professional service categories

Professional Category	Place of Service Code
Pharmacy	1
Telehealth	2
Homeless Shelter	4
Office	11
Home	12
Mobile Unit	15
Walk-In Retail Health Clinic	17
Off-Campus Outpatient Hospital	19
Urgent Care Facility	20
Inpatient Hospital	21
On-Campus Outpatient Hospital	22
Emergency Room	23
Ambulatory Surgical Center	24
Birthing Center	25
Skilled Nursing Facility	31
Ambulance – Land	41
Independent Clinic	49
Federally Qualified Health Center	50
Inpatient Psychiatric Facility	51
Psychiatric Facility	52
Community Mental Health Center	53
Non-Residential Substance Abuse Treatment Facility	57
Mass Immunization Center	60
Comprehensive Inpatient Rehabilitation Facility	61
Comprehensive Outpatient Rehabilitation Facility	62
End-Stage Renal Disease Treatment Facility	65
Independent Laboratory	81
Other Place of Service	99

### Retail Pharmacy

The unit for retail pharmacy is a prescription drug day supply. Each retail pharmacy prescription is for a specific number of days (for example 14 days, 28 days, 30 days, 60 days). To standardize the spending per unit we calculate it for a single day supply. We sum together the allowed amount field to calculate total

spending, and the spending on the deductible, coinsurance/copay<sup>13</sup> fields to calculate out-of-pocket spending. We drop all visits where total spending is \$0 as these indicate cancelled claims.

### Identifying the Role of Quantity and Price in Spending Growth

In the two-factor decomposition section we calculate the year-over-year change in number of units and in spending per unit. This allows us to decompose the change in spending into these two factors. In section C2 we outlined how we calculated the number of units and the spending per unit for each service category. We simply calculate the percentage change in number of units and spending per unit from one year to the next. We can then relate the percentage change in spending (total effect) to the percentage change in the number of units (quantity effect) and spending per unit (price effect) as follows:

$$1 + \text{total effect} = (1 + \text{quantity effect}) * (1 + \text{price effect})$$

We calculate the annual two-factor decomposition for each service category. For outpatient facility visits we limit the decomposition to those that are classified as being emergency department, surgery, and radiation or chemotherapy. For professional visits we limit the decomposition to those that occur in offices, outpatient hospitals, and inpatient hospitals. We do this because both these categories are extremely large and encompass a lot of different types of visits. To make the results easier to interpret, limit our analysis to the three largest subcategories by spending.

### Special Topic: Medical Pharmacy

In the special topic section, we conduct analyses on the infusion drugs category of service.

#### Medical Pharmacy

We identified medical pharmacy encounters and spending using HCPCS procedure codes in outpatient facility and professional files. The unit for medical pharmacy is a visit. As with the previously mentioned visits, we group together all claims in the professional or outpatient files that have the same (a) Patient ID (b) Date (c) Provider ID. A visit is a unique combination of these three variables. We included HCPCS procedure codes categorized as 'Injections and Infusions (nononcologic)' or 'Chemotherapy' in the Restructured BETOS Classification System, excluding codes for vaccines and codes for drug administration. The exhibit below includes the procedure codes that were used. Once we have identified all medical pharmacy visits, we count the number of units and sum up the allowed amount field to calculate the total spending. We exclude visits with a 0 or negative allowed amount from utilization and spending.

#### Exhibit C.3. Medical pharmacy codes

RBCS Subcategory	RBCS Family	HCPCS Codes
Chemotherapy	Chemotherapeutic Agent	C9016, C9021, C9024, C9025, C9027, C9028, C9030, C9031, C9033, C9042, C9045, C9049, C9064, C9065, C9257, C9293, C9442, C9448, C9449, C9453, C9455, C9463, C9464, C9467, C9472, C9474, C9475, C9476, C9477, C9480, C9483, C9485, C9486, C9491, C9492, J0202, J0207, J0594, J0780, J0894,

<sup>13</sup> Unlike the inpatient facility, outpatient facility, and professional visit files, the retail pharmacy files contain a single variable that sum up coinsurance and copay amounts.

**Appendix C** Methods

RBCS Subcategory	RBCS Family	HCPCS Codes
		J1453, J1454, J1626, J1627, J1790, J2469, J2797, J3250, J7503, J7505, J8501, J8562, J8655, J8670, J9000, J9010, J9015, J9017, J9019, J9020, J9022, J9023, J9025, J9027, J9030, J9031, J9032, J9033, J9034, J9035, J9036, J9039, J9040, J9041, J9042, J9043, J9044, J9045, J9047, J9050, J9055, J9057, J9060, J9065, J9070, J9098, J9100, J9118, J9119, J9120, J9130, J9145, J9150, J9151, J9153, J9155, J9160, J9171, J9173, J9175, J9176, J9177, J9178, J9179, J9181, J9185, J9190, J9198, J9200, J9201, J9202, J9203, J9204, J9205, J9206, J9207, J9208, J9209, J9211, J9212, J9213, J9214, J9215, J9216, J9217, J9218, J9219, J9225, J9226, J9227, J9228, J9229, J9230, J9245, J9250, J9260, J9261, J9262, J9263, J9264, J9265, J9266, J9267, J9268, J9269, J9270, J9271, J9280, J9285, J9293, J9295, J9299, J9300, J9301, J9302, J9303, J9304, J9305, J9306, J9307, J9308, J9309, J9310, J9311, J9312, J9313, J9315, J9320, J9325, J9328, J9330, J9340, J9351, J9352, J9354, J9355, J9356, J9357, J9358, J9360, J9370, J9371, J9390, J9395, J9400, J9600, J9999, Q0161, Q0162, Q0163, Q0164, Q0166, Q0167, Q0169, Q0173, Q0175, Q0177, Q0180, Q0181, Q2017, Q2040, Q2041, Q2042, Q2043, Q2049, Q2050, Q5107, Q5111, Q5112, Q5113, Q5114, Q5116, Q5117, Q5118, Q9978, Q9981
	No RBCS Family	96521, 96522, 96523, G0498, Q0083, Q0084, Q0085, Q0173, Q0180, Q3001
Injections and Infusions (nononcologic)	Erythropoiesis - Stimulating Agent	J0881, J0885, J0888, J0896, J1439, J1750, J1756, J2916, Q0138, Q5106, Q9970
	Injection – Anticoagulant	C9121, J0585, J0883, J1642, J1644, J1645, J1650, J1652, J1945, J2720
	Injection - Clotting Factors	C9041, C9047, C9136, C9137, C9138, C9139, J7169, J7175, J7177, J7178, J7179, J7180, J7181, J7182, J7183, J7185, J7186, J7187, J7188, J7189, J7190, J7191, J7192, J7193, J7194, J7195, J7196, J7197, J7198, J7199, J7200, J7201, J7202, J7203, J7204, J7205, J7207, J7208, J7209, J7210, J7211, Q9975
	Injection - Colony Stimulating Factors	C9058, J1442, J1446, J1447, J2505, J2820, Q5101, Q5108, Q5110, Q5120
	Injection - Enzymes	C9022, C9478, J0180, J0220, J0221, J0775, J1120, J1322, J1458, J1743, J1786, J1931, J1940, J2504, J2507, J2783, J2840, J3060, J3385
	Injection - Growth/Hormone Factor	J2425, J2503, J2778
	Injection - Hyaluronan or Derivative	C9465, C9471, J3470, J3471, J3472, J3473, J7318, J7320, J7321, J7322, J7323, J7324, J7325, J7326, J7327, J7328, J7329, J7331, J7332, J7333, Q9980
	Injection - Immune Globulin	90283, 90284, 90371, 90375, 90376, 90378, 90384, 90385, 90393, 90396, J0850, J1162, J1459, J1460, J1555, J1556, J1557, J1558, J1559, J1560, J1561, J1562, J1566, J1568, J1569, J1571, J1572, J1573, J1575, J1599, J1670, J2788, J2790, J2791, J2792
	Injection - Immunomodulator	C9038, C9044, J0129, J1595, J1744, J1826, J1830, Q3027, Q5115, Q5119
	Injection - Macular Degeneration	J0178, J0179

Appendix C Methods

RBCS Subcategory	RBCS Family	HCPCS Codes
	Injection - Monoclonal Antibodies	C9026, C9029, C9040, C9050, C9052, C9053, C9061, C9062, C9063, C9466, C9473, C9487, C9490, C9494, J0130, J0490, J0517, J0565, J0640, J0791, J0897, J1300, J1303, J1628, J1745, J1746, J2182, J2323, J2350, J2357, J3031, J3032, J3111, J3241, J3245, J3262, J3357, J3358, J3380, J7170, J9210, M0239, M0243, Q0239, Q0243, Q5102, Q5103, Q5104, Q5109, Q5121, Q9979, Q9989, Q9995
	Injection – Somatostatin	C9454, J1930, J2353, J2354, J2502
	Injection - Tumor Necrosis Factor Blocker	J0135, J0717, J1602, J1610
	Injection – Vasodilator	J0270, J0278, J0360, J1325, J2260, J2760, J2785, J3285
	No RBCS Family	38242, 38243, 90645, 90646, 90669, 90703, 90712, 90719, 90720, 90721, 90735, 95120, 95125, 96377, 96379, 0232T, 0438T, B4187, C8957, C9015, C9023, C9032, C9035, C9036, C9037, C9039, C9043, C9048, C9055, C9056, C9057, C9059, C9066, C9113, C9132, C9135, C9136, C9137, C9138, C9139, C9248, C9254, C9275, C9290, C9441, C9443, C9444, C9445, C9446, C9450, C9451, C9452, C9456, C9460, C9462, C9469, C9470, C9479, C9481, C9482, C9484, C9488, C9489, C9493, C9743, J0120, J0121, J0122, J0131, J0132, J0133, J0150, J0151, J0153, J0171, J0185, J0190, J0200, J0210, J0215, J0222, J0223, J0256, J0257, J0280, J0282, J0285, J0287, J0288, J0289, J0290, J0291, J0295, J0300, J0330, J0348, J0364, J0365, J0380, J0390, J0400, J0401, J0456, J0461, J0470, J0475, J0476, J0480, J0485, J0500, J0515, J0520, J0558, J0561, J0571, J0583, J0584, J0586, J0587, J0588, J0592, J0595, J0596, J0597, J0598, J0600, J0606, J0610, J0620, J0630, J0636, J0637, J0638, J0641, J0642, J0670, J0690, J0691, J0692, J0694, J0695, J0696, J0697, J0698, J0702, J0706, J0710, J0712, J0713, J0714, J0715, J0716, J0720, J0725, J0735, J0740, J0742, J0743, J0744, J0745, J0760, J0770, J0795, J0800, J0833, J0834, J0840, J0841, J0850, J0875, J0878, J0895, J0900, J0945, J1000, J1020, J1030, J1040, J1050, J1070, J1071, J1080, J1094, J1095, J1096, J1097, J1100, J1110, J1130, J1160, J1165, J1170, J1180, J1190, J1200, J1201, J1205, J1212, J1230, J1240, J1245, J1250, J1260, J1265, J1267, J1270, J1290, J1301, J1320, J1324, J1327, J1330, J1335, J1364, J1380, J1410, J1428, J1430, J1435, J1436, J1437, J1438, J1439, J1443, J1444, J1450, J1451, J1452, J1455, J1457, J1570, J1580, J1590, J1600, J1620, J1630, J1631, J1640, J1655, J1700, J1710, J1720, J1725, J1726, J1729, J1730, J1738, J1740, J1741, J1742, J1800, J1810, J1815, J1833, J1835, J1840, J1850, J1885, J1890, J1942, J1943, J1944, J1950, J1953, J1955, J1956, J1960, J1980, J1990, J2001, J2010, J2020, J2060, J2150, J2170, J2175, J2180, J2185, J2186, J2210, J2212, J2248, J2250, J2265, J2270, J2271, J2274, J2275, J2278, J2280, J2300, J2310, J2315, J2320, J2325, J2326, J2355, J2358, J2360, J2370, J2400, J2405, J2407, J2410, J2426, J2430, J2440, J2460, J2501, J2510, J2515, J2540, J2543, J2547, J2550, J2560, J2562, J2590, J2597, J2650, J2675, J2680, J2690, J2700, J2704, J2710, J2724, J2730, J2765, J2770, J2780, J2786, J2788, J2790, J2791, J2792, J2793, J2794, J2795, J2796, J2798, J2800, J2805, J2810, J2850, J2860, J2910, J2916, J2920, J2930, J2941, J2950,

RBCS Subcategory	RBCS Family	HCPCS Codes
		J2993, J2995, J2997, J3000, J3010, J3030, J3070, J3090, J3095, J3101, J3105, J3110, J3120, J3121, J3130, J3140, J3145, J3150, J3230, J3240, J3243, J3246, J3260, J3265, J3280, J3300, J3301, J3302, J3303, J3304, J3310, J3315, J3316, J3320, J3350, J3355, J3360, J3364, J3370, J3396, J3398, J3400, J3410, J3411, J3415, J3420, J3430, J3465, J3475, J3480, J3485, J3486, J3489, J7030, J7040, J7042, J7050, J7060, J7070, J7100, J7110, J7120, J7121, J7131, J7298, J7313, J7314, J7316, J7330, J7342, J7351, J9246, L8607, P9041, P9043, P9045, P9046, P9047, P9048, Q2004, Q2009, Q2026, Q2028, Q4155, Q9950, Q9974, Q9975, Q9985, Q9986, Q9991, Q9992, Q9993

## C4. Chapter IV. Geographic Variation

### Hospital Market Areas

To examine area-level variation, we use Hospital Market Areas (HMAs) as our geographic units. HMAs were developed by the New Jersey Commission on Rationalizing Health Care Resources and are meant to reflect health care markets and referral patterns for specialized hospital care. We obtain patient zip code from the patient demographics and eligibility file. Please refer to the report for a full list of zip codes mapping to HMAs.<sup>14</sup>

### Age-Gender Adjustment

We report both unadjusted HMA-level spending, and adjusted HMA-level spending in 2021 in Chapter 5. We calculated adjusted spending by conducting a linear regression of HMA-spending on the age and gender characteristics of the county. We then constructed predicted spending figures that accounted for the predicted effect of the observed demographic variations.

## C5. Chapter V. Outmigration

For the outmigration analyses, we use the provider zip code on the inpatient facility file to characterize a stay as being conducted in New Jersey or in a different state. We created three mutually exclusive categories to classify out-of-state care: (1) New York (2) Pennsylvania (3) All others. NY and PA are the two largest destinations of out-of-state care for NJ residents.

<sup>14</sup> Refer to Appendices 1, 2, and 3 in the report from the [New Jersey Commission on Rationalizing Health Care Resources](#).