

**Healthcare spending in the United States for
children and youth, 1996-2012**

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Abstract

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Objective

The objective of this study is to (1) provide estimates of healthcare spending of children and youth in the U.S. from 1996 through 2012 across types of goods and services, age groups, sex groups, and causes of illness and healthcare events; (2) explain changes in healthcare spending among children and youth over time; and (3) estimate average total healthcare spending between birth and age 16.

Method

Data from the National Health Expenditure Accounts (NHEA) are used to provide total healthcare spending across different categories of goods or services. Microdata are used to estimate the composition of healthcare spending across age groups, sex groups, and causes of illness or healthcare events within each category. Healthcare spending estimates are analyzed across levels and changes. A decomposition method is employed to explain changes in healthcare spending across increases in population, prevalence, utilization, and prices. Estimates are aggregated across cohorts to ascertain healthcare spending over an average child's childhood.

Results

From 1996 to 2012 children's healthcare spending increased from \$161 billion to \$259 billion, the most of which was ambulatory care spending. Per capita (per child) healthcare spending is greatest for under-1-year-olds. The \$98 billion increase in spending was mostly due to increases in prices over the time period. Over the course of the prior 16 years, on average, a 16-year-old in 2012 spent \$37,454 on healthcare.

Conclusion

The findings from these analyses will serve as valuable evidence for health policymakers, providers of pediatric services, and families in the planning for children's health.

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INTRODUCTION

In 2013 the U.S. spent \$2.9 trillion on healthcare, comprising over 17 percent of U.S. gross domestic product, which amounts to \$9,255 per person.¹ More than one in four Americans is a child or adolescent under the age of 20, representing over 80 million individuals and potential users of healthcare.² Because children and adolescents make up a sizable proportion of the U.S. population, it is important to understand how much is being spent on healthcare in this age group, what services are being utilized, and what trends are noted over time. Recent studies suggest that children's healthcare spending have increased at greatest rates compared to other age groups.^{3,4} As the number of children covered with health insurance is anticipated to grow with the expansion of Medicaid and Children's Health Insurance Program, health policy makers and officials require adequate healthcare spending and utilization data to better plan for allocation of health resources. Having sound evidence that reflects the realities of the healthcare system in the U.S. is an important aspect for policy setting at both state and national levels.⁵ Finally, financial resources for child and adolescent healthcare are anticipated to be more restrictive in the near future as a result of an increasing population age 65 and older who will have growing health care needs.⁶

Having an understanding of patterns and trends in child and adolescent healthcare spending will help policy makers and health planners set priorities for finance and insurance reform, service integration, and restructuring of population-focused disease prevention. Several studies have allocated U.S. healthcare or medical spending by age, but most lack national representativeness or only cover a few years.^{4,7-9} While previous studies have attempted to ascertain U.S. healthcare spending for children and youth, few have split spending across both dimensions of cause of illness and of type of service or good.^{8,10,11} In particular, the Health Care Cost Institute (HCCI) has produced two reports that assess healthcare spending for children, but their focus is only on children who are covered by employer-based insurance.^{10,11} Thus, the reports do not include children covered by state and federally funded health insurance programs, which has expanded since the introduction of the State Children's Health Insurance Program (SCHIP) in 1997.¹²⁻¹⁴ Increases in SCHIP have been shown to decrease employer-sponsored coverage of children.¹⁵ This finding indicates the need to understand healthcare spending for children covered across all types of insurers, as opposed to solely children covered by employer-sponsored insurance. Moreover, the bulk of healthcare spending and utilization research to date related to children in the U.S. are cost of illness studies that focus on one or a few specific causes of illness.¹⁶⁻²³ While these studies are useful to policymakers to assess specific trends over time, they do not provide an overall view of total healthcare spending on children nor do they allow for comparisons across disease-related spending.

The objective of this study is to estimate healthcare spending for children and youth in the U.S., split by age groups, sex, cause of illness, and type of healthcare service (e.g., inpatient care) or goods (e.g., prescribed pharmaceuticals) from 1996 to 2012. The aims of this study are three fold: (1) to describe how much the U.S. is spending on personal healthcare for children and youth by cause of illness or healthcare event and type of good or service; (2) to explain changes in healthcare spending among children and youth over time; and (3) to examine how much the U.S. spends on an average child's healthcare between birth and age 16. Estimates of healthcare spending by disease will be reported across disease categories from the Global Burden of Disease (GBD) study, allowing for descriptive comparisons between burden and spending.²⁴ Furthermore, the estimates are presented across different types of services or goods, such as inpatient care, ambulatory care, and prescription pharmaceuticals, categories that have been adapted from the National Health Expenditure Account.²⁵ The findings from this study can provide valuable context for health policymakers in planning for child health insurance programs and for healthcare administrators in operating pediatric care services.

METHODS

Data Sources

Two types of data are used to generate estimates of healthcare spending: macro data and micro data. First, data on total healthcare spending in the U.S. for all ages from 1996 to 2012 are obtained from the National Health Expenditure Account (NHEA) data of the Center for Medicaid and Medicare Services.²⁵ These data provide healthcare spending across categories of goods and services related to healthcare activities and are the official government estimate of healthcare spending in the U.S. The data were adjusted using survey data to further break them out into service and good categories of interest. These categories include inpatient care, ambulatory care, emergency care, retail prescribed pharmaceuticals, long-term nursing care, public health, home care, over-the-counter pharmaceuticals, therapeutics, and administration.

Secondly, I use microdata from eight different U.S. surveys and administrative data sets to obtain spending per encounter, split by age, sex, and cause of illness. (A list of all primary data sources is listed in Appendix 1.) Data sources include encounter-level data classified by International Classification of Disease (ICD) codes, age, and sex variables. Moreover, the boundaries of the data source (e.g., survey) fall within a specific category of good or service. Collective health categories, such as public health and healthcare administration, do not have microdata available for this exercise and are left unallocated. Thus, the focus of this research will describe personal healthcare spending that can be allocated by age, sex, and disease category. The vast majority of personal healthcare spending has encounter-level data, with the exception of over-the-counter

pharmaceuticals and therapeutic devices, which are therefore excluded from this analysis. Due to the nature of the micro data, spending on emergency care encounters that resulted in an inpatient admission are all captured in inpatient spending. Moreover, all spending on pharmaceuticals used during an ambulatory care, inpatient care, or emergency care visit are captured within these respective categories, as opposed to being captured in the retail pharmaceutical category.

To be added into the study, data must include volume, price, and/or spending data. There are some instances in which different data sources are used to estimate price and utilization within a category of good or service in order to optimize data quality and representativeness. For example, within ambulatory care, price and spending data is derived from the Medical Expenditure Panel Survey (MEPS) and utilization data is derived from the National Hospital Ambulatory Medical Care Survey (NHAMCS) and National Ambulatory Medical Care Survey (NAMCS).

Estimating child and youth healthcare spending by cause of illness or healthcare event categories, age groups, sex, and type of good or service

Estimating medical care spending by disease and illness in the U.S. has been conducted since 1963.²⁶ Since then, several studies have evolved to estimate healthcare spending by disease,^{27–30} and, with the establishment of the Medical Expenditure Panel Survey (MEPS), more research focused on obtaining direct spending for diseases.^{31–34} The estimation strategy presented here takes an encounter-based approach that is often found in other disease expenditure research, in which claims or individuals' visits are assigned to disease categories based on coded diagnoses.³⁵

Data are processed and converted from primary ICD codes to Global Burden of Disease (GBD) causes. Each cause fits into one of four broad categories: non-communicable and chronic diseases; communicable, infectious, and nutritional disorders; injuries; and non-illness categories. Non-illness categories include reasons for utilizing healthcare in instances when there is no poor health state to remedy. Examples include well child visits, which are common across all ages, and well pregnancy visits, which occur among the adolescent female population. Age and sex restrictions are employed to correct improperly classified data. “Garbage codes” are redistributed to specific causesⁱ, and estimates of spending and volume are smoothed to address poor data quality.³⁶ Estimates are then adjusted for comorbidity using a regression approach. To address data quality and representativeness issues, data are adjusted to ensure injuries are in

ⁱ Garbage codes refer to ICD codes that cannot be assigned a Global Burden of Disease (GBD) cause due to lack of information connecting the encounter or patient to a specific illness (e.g., “headache”).

proper coding and to capture mental health facilities that may be underrepresented in the survey data.

Finally, I scale these estimates to the total spending amount within each category of good or service from the NHEA. From this process, I obtain spending estimates for youth and children, as defined by age 19 and younger, as well as data for price and utilization for each age group, sex group, and disease categories within a category of good or service for each year between 1996 and 2012. Age groups include under one-year-old, one to four-year old, five to nine-year old, 10 to 14-year-old, and 15 to 19-year-old. All estimates are adjusted for inflation and reported in 2014 United States Dollars. A standard bootstrapping approach is used throughout the process to develop uncertainty intervals.

Explaining changes in children and youth healthcare spending in the U.S. from 1996 to 2012

To obtain an overview of the change in healthcare spending from 1996 to 2012, differences across 1996 and 2012 levels of healthcare spending were calculated for total allocable spending and split by cause, type of good or service, age group, and sex.

To further explore these changes, I split the changes in U.S. healthcare spending during this time period across four factors: demography (population changes in size and population aging), epidemiology (prevalence in disease changes), utilization (changes in encounters per case), and prices (changes in spending per encounter). The decomposition is performed at the level of cause, category of good or service, age group, and sex group. I obtain demography and epidemiology data from the Global Burden of Disease 2013 study and fill in missing years using a linear extrapolation.^{36,37} I calculate utilization rates by dividing number of encounters within each category of good or service by number of cases for specific diseases, age groups, and sex groups. Prices are pulled from the analysis explained in Methods I.

The decomposition methodology employed is similar to the Shapley value decomposition method that is often used in economic, population, and health studies to explain change in an indicator as attributed to multiple factors.³⁷⁻³⁹ I use a simulation approach to develop counterfactual scenarios in which one of the four factors changes over time. First, I calculate spending for combinations of every observed valued of population, prevalence, utilization, and prices. Second, I pair these combinations together such that three of the factors match for the same time period, while the fourth factor (the factor of interest) differs in time. This creates eight pairs of combinations for each of the four factors. Third, I calculate the difference between the combinations for each pair. Fourth, for each factor of interest, I calculate the average difference, which indicates the average amount of spending that is explained by that factor for the given

cause, age, sex, and category of good or services of interest. Results are reported in average spending explained by each of these four factors. Moreover, average spending explained can be combined to examine aggregated causes, age groups, sexes, or categories of goods or services.

Quantifying childhood healthcare spending

The concept of measuring lifetime healthcare spending counts how much healthcare spending has occurred over one's lifetime. Previous research has been dedicated to finding per capita lifetime healthcare spending through using cross-sectional data and mortality experience in the United States^{40,41} and employing Markov models to estimate spending in Canada.⁴² Yet, this research has not quantified healthcare spending across categories of goods or services or by cause of illness. Most studies that can connect lifetime healthcare spending to disease categories are focused on one or a few specific disease areas.⁴³⁻⁴⁷ Having this narrow scope does not enable for cross-disease comparisons and may lead to overestimation of healthcare spending for particular disease groups.

To gain a clearer perspective on how much healthcare spending has been incurred on an average child's childhood, I quantify per capita childhood healthcare spending estimates for every age group within the 1996 to 2012 time period. I take estimates for relevant age groups following the birth cohort of 1996 up to year 2012 to obtain an estimate of how much healthcare spending an average 16-year-old has incurred across categories of goods or services and across disease categories. Because population and spending are reported mostly in five-year age groups, I assume an equal distribution of population and spending across the age group. In addition to 16-year-olds' spending, I obtain estimates to compare per capita spending of four cohorts up to age 4.

RESULTS

Trends in healthcare spending on children

Personal healthcare spending on children and youth that are age 19 and younger grew over 60 percent from \$161 billion to \$259 billion during the 1996 to 2012 time period. In 2012, this amount constituted about 10 percent of personal healthcare spending across all age groups. From 1996 to 2000 children healthcare spending faced an overall decrease from \$161 billion to \$155 billion, followed by steady increases in spending from 2001 through 2012. Figure 1 shows the contributions of each age group's spending over time. In 2012, infants, or under-1-year-olds, made up 16 percent of total children and youth spending, while 1-4-year olds made up 19

percent, 5-9-year olds made up 18 percent, 10-14-year olds made up 21 percent, and 15-19-year olds made up 27 percent.

Figure 2 shows children's personal healthcare spending from 1996 to 2012 split by type of good or service. Ambulatory care spending made up the largest proportion of healthcare spending in each year. Spending in this category grew from \$79 billion in 1996 to \$144 billion in 2012, making up 55 percent of healthcare spending in the last year. Inpatient spending ranked second in terms of goods and services, constituting 18.6 percent of spending in 2012. Retail pharmaceutical and emergency care spending each comprised of 10 percent of total healthcare spending, while home care made up 4 percent, and long-term nursing care made up 2 percent. Retail pharmaceutical spending grew the most over the period, more than doubling its spending from \$10 billion to \$26 billion.

Healthcare spending is better understood when presented in per capita terms. Examining per capita personal healthcare spending on children and youth in Figure 3 shows that spending among children is highest under age 1. In 2012, an annual per capita spending for under-1-year-olds was \$4,840 per capita (for each individual on average), compared to 1-4-year-olds who spent \$2,934, 5-9-year-olds who spent \$2,277, 10-14-year-olds who spent \$2,576, and 15-19-year-olds who spent \$3,171. The "U-shaped" trend seen across per capita spending in ages is evident in other research, where per capita spending is highest among infants, followed by decreases in spending through age 9 and increases into adolescence.

Per capita spending was also analyzed across categories of goods or services. Under-1-year-olds spent the most on inpatient care, while all other age groups spent the most on ambulatory care. Per capita spending on ambulatory care ranges from \$1,387 to \$1,921 across the five age groups. Additionally, trends of per capita spending were assessed over time by age group. Figure 4 shows that for the most part, all age groups had steady growth in per capita spending from 1996 to 2012, with the exception of under-1-year-olds, which experienced a sharp increase in spending in 2006.

Spending and utilization by disease categories

Figure 5 shows spending estimates split across disease categories. Children in 2012 spent \$173 billion on noncommunicable and chronic disorders (NCDs), three times more than the \$52 billion spent on communicable, infectious, and nutritional disorders. Nearly \$34 billion was spent on injuries, and \$7.7 billion on non-illness causes of healthcare.

Utilization was also assessed for all age groups, sexes, causes, and types of goods or services for each year. Estimates of volumes were measured in visits, bed days, or prescriptions filled. In 2012, 59 percent of volumes were attributed to noncommunicable and chronic disorders, while 20 percent were attributed to communicable, infectious, and nutritional disorders. Sixteen percent of volumes were associated with non-illness volume, including well child visits, while 5 percent were attributed to injuries.

The top causes of spending varied depending on age group. In 2012, infants (under 1) spent the most on preterm birth complications (\$1,190 per capita), congenital anomalies (\$919 per capita), and lower respiratory infection (\$316 per capita). Children age 1 to 4 spent the most on otitis media (\$338 per capita), congenital anomalies (\$248 per capita), and chronic upper respiratory conditions (\$155 per capita). Children age 5 to 9 spent the most on chronic upper respiratory conditions (\$116 per capita), attention-deficit/hyperactivity disorder (ADHD) (\$115 per capita), skin and subcutaneous diseases, and asthma (each \$97 per capita). Children age 10 to 14 spent the most on skin and subcutaneous diseases (\$113 per capita), chronic upper respiratory disorders (\$111 per capita), and ADHD (\$109 per capita). Adolescents age 15 to 19 spent the most on depressive disorders (\$134 per capita), skin and subcutaneous diseases (\$126 per capita), and chronic upper respiratory disorders (\$111 per capita).

Spending and volume proportions for the top 10 causes of spending for all children and well-child visits are provided in Table 1. While well-child visits are the number one cause of healthcare utilization among children in 2012, they are not among the top 10 causes of healthcare spending. Well-child visits may in fact be much less expensive compared to healthcare visits for disease-related reasons, especially because of a lack of pharmaceutical spending associated with the visit. Using two distinct datasets to describe price and utilization may be another reason for this discrepancy.

Explanation of changes in healthcare spending across type of good or service, age groups, and causes of illness

From 1996 to 2012 U.S. spending on healthcare for children increased \$98 billion. Figure 6 shows where this increase occurred by type of good or service. Ambulatory care spending increased the most at \$65 billion, while retail pharmaceutical spending increased \$16 billion, emergency care spending increased \$13 billion, and inpatient care spending increased \$2.5 billion.

The increase in spending was also analyzed across age groups, with the largest level of increase attributed to the oldest age group. Of the \$98 billion, 30 percent was attributed to the 15-19 age group, 22 percent to the 10-14 age group, 17 percent to the 5-9 age group, 14 percent to the 1-4 age group, and 17 percent to the under 1 age group.

Additionally, increases in spending were assessed across causes of illness. Over one-third of the increase was due to increases in only 6 causes of illness over the time period: preterm birth complications; endocrine, metabolic, blood, and immune disorders; skin and subcutaneous diseases; congenital anomalies; autistic spectrum disorders; and ADHD.

Explanation of changes in healthcare spending across changes in population, epidemiology, utilization, and prices

Figure 7 shows that across all possible scenarios, the average change in spending due to increase in population was an increase of \$13 billion, in prevalence was an increase of \$2 billion, in utilization was a decrease of 4 billion, and in prices was an increase \$75 billion. The vast majority of the increase in disease could be explained by the growth in prices over the time period, while utilization of healthcare overall decreased during the time period.

For the conditions that contributed to the largest changes in spending, the vast majority are explained due to increases in larger prices, including endocrine, metabolic, blood, and immune disorders; skin and subcutaneous diseases; congenital anomalies; and autistic spectrum disorders. Increases in preterm birth complications and ADHD were mostly explained by increases in utilization rates.

Children's lifetime healthcare spending

Per child healthcare spending were analyzed to understand aggregate healthcare spending up to certain ages across different cohorts. Figure 8 shows per capita U.S. spending on personal healthcare for two different age groups, under-1-year-olds and 1-4-year-olds, across four cohorts: 1996, 2000, 2004, and 2008. Overall, healthcare spending per capita has increased across each cohort within each age group. The increase in under-1-year-old spending is predominantly driven by increases in inpatient care, while the increase in 1-4-years-old spending is mostly driven by increases in ambulatory care.

In addition to looking at under-5-year-olds, I paid particular interest in obtaining an overall healthcare spending estimate for those born in 1996 up until 2012, the last year of data available. This provides us an aggregate estimate of personal healthcare spending for the average 16-year-old in 2012, which is shown in Figure 9. In total, 16-year-olds in 2012 had spent an average of \$37,454 on healthcare during their lifetime, with the most coming from their first, 15th, and 16th year of life, spending \$2,956, \$2,955, and \$3,171 per capita respectively. Inpatient care spending comprises the majority of spending during infancy (under age 1), while the majority of spending throughout childhood mostly consists of ambulatory care spending.

For the average 16-year-old in 2012, healthcare spending was spent on chronic upper respiratory disorders (5 percent), otitis media (5 percent), asthma (4 percent), ADHD (4 percent), and congenital anomalies (4 percent).

DISCUSSION

To my knowledge this study is the first of its kind that provides estimates of healthcare spending for children across all types of payers, splitting spending by age groups, sex, causes of illness or healthcare event, and type of good or service. It uses both survey data and administrative data to obtain its estimates. By having a comprehensive set of data that disaggregates healthcare spending over time, by age groups and sex, by type of goods and services, and by disease, researchers, policymakers, and healthcare clinicians can have a foundation to explore important relationships between healthcare spending, utilization, and disease burden.

Healthcare spending per capita trends indicate that highest spending occurs for children under 1 and into adolescents, while spending during middle ages from age 1 to age 14 are lower. This “U-shaped” trend is evident in other research. A recent HCCI report that provides estimates of healthcare spending on employer-based insured children found that the average healthcare spending per capita was \$2,437 in 2012. They found infants and toddlers from 0-3-years-old to spend on average \$4,446 per capita, 4-8-years-old to spend \$1,653 per capita, 9-13-years-old to spend \$1,776 per capita, and 14-18-years-old to spend \$2,617 per capita, depicting this similar “U-shaped” trend.¹¹ Differences between the HCCI report and this study’s estimates are likely due to differences in this study’s inclusion of children who are uninsured and covered by public insurance, as well as to adjustments in inflation.

A novel aspect to this study is the use of a decomposition method to explain changes in children and youth healthcare spending across population, epidemiology, utilization, and prices. Past research has accounted for growth in overall healthcare spending, splitting growth by price inflation, medical-specific price inflation, population changes, age and sex composition, and intensity of services.¹ Yet their study does not take into growth of each cause of illness within a type of good or service, nor does it adjust for epidemiological changes.

There are some limitations to this study. First, the survey data sources are not fully representative of the U.S. population. For example, the Medical Expenditure Panel Survey (MEPS) does not include institutionalized or homeless individuals, and thus may bias the spending estimates for ambulatory care, emergency care, home care, and retail pharmaceuticals. However, the proportion of children healthcare spending from homeless youth is expected to be quite minimal in comparison to that of the adult population. It is worthwhile to recognize that the results thus cannot be interpreted to describe specific populations within the U.S. but instead aim to generalize U.S. healthcare spending on children and youth.

Second, it is difficult to draw conclusions on trends in spending on rare conditions. This study relies on survey data, rather than large claims databases, and thus may have instances of very

little data to produce estimates of spending for rare causes of disease. Furthermore, surveys that provide spending data may underreport spending on deaths.

Third, the lack of encounter data for over-the-counter medications and therapeutics hinders the ability to draw conclusions of total personal healthcare spending. For example, spending on eye glasses and medications to treat headaches and the common cold that can be purchased without a prescription are not captured in these results. Including them would increase overall estimates for per capita spending.

Fourth, the decomposition method, like any other method assessing growth rates, is dependent on the baseline year of interest. The method was run across various points in time to ensure the robustness of the results.

Finally, the study component showing children's lifetime spending is limited in the time series of the data, thus only enabling a maximum analysis for 16-year-olds. Additionally, because the data are reported in five-year age groups, I must assume an equal distribution of spending and volume among each singular age within the age group. Thus, it is important to interpret these findings as averages within the age group, instead of extrapolating patterns for specific ages.

Two practical limitations of this study include that it is not conducted at a subnational level or at the level of a payer. Much of the publicly available data is not reported at a state or county level, making it difficult to conduct the analysis at these levels. Having a subnational analysis would enable users of this research to explore the geographical variation across healthcare spending by disease and can mitigate concerns about ecological fallacy. Furthermore, policymakers would favor an analysis that allocates healthcare spending by payer (e.g., public insurance, private, insurance, or out-of-pocket). While such data is beneficial for policy planning, it was out of the scope of this study. I hope that future research can be conducted to explore these two areas using the findings from this study as a foundation.

CONCLUSION

This study produces and describes healthcare spending for children and youth from 1996 to 2012, split by age groups, sex, types of goods and services, and causes of illness or healthcare utilization. Moreover, it explains changes in children's healthcare spending across changes in population, prevalence of the condition, utilization rate, and price. Explaining changes in healthcare spending across these four factors can help elucidate important economic and behavioral patterns and provide greater evidence for policymakers in planning of pediatric healthcare and health systems.

This study can serve as a foundation for future work in the analysis of healthcare spending by payer and income level. Stratifying results by type of payer (e.g., private insurance, public insurance, or out-of-pocket), by individual income-level, and by state or county can enable policymakers to better target healthcare financing, preventative, and curative care interventions. Finally, future researchers can consider forecasting spending to build upon childhood lifetime spending and assess different cohorts over time.

The results for this study indicate that healthcare spending on children and youth in the U.S. continue to grow, with a particular focus on non-communicable and chronic disorders. As the U.S. approaches an era of health system reform, where nearly 20 cents of every dollar is spent on healthcare, it is important for policy makers and healthcare practitioners to have a greater understanding of where spending occurs. Responding to children's healthcare can help decrease the growing prevalence of chronic disorders among adulthood. Ultimately these data can aid in better allocating health resources and planning for children's futures.

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Figures

Figure 1 | U.S. spending on personal healthcare for age 0-19, 1996-2012

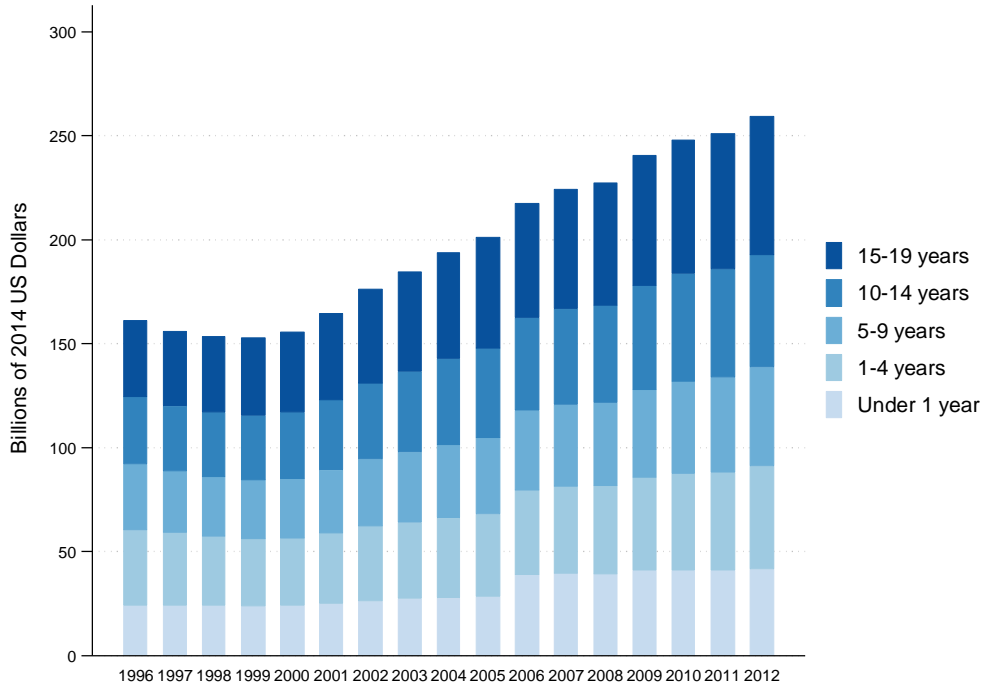


Figure 2 | U.S. spending on personal healthcare for age 0-19 by type of good or service, 1996-2012

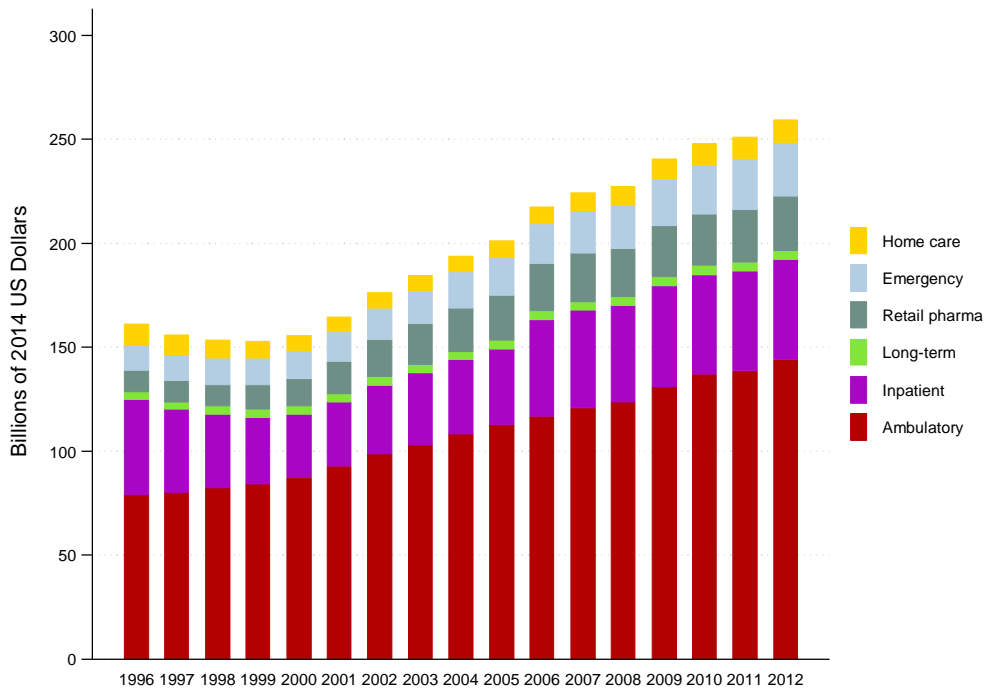


Figure 3 | Per capita U.S. spending on personal healthcare for age 0-19 by type of good or service, 2012

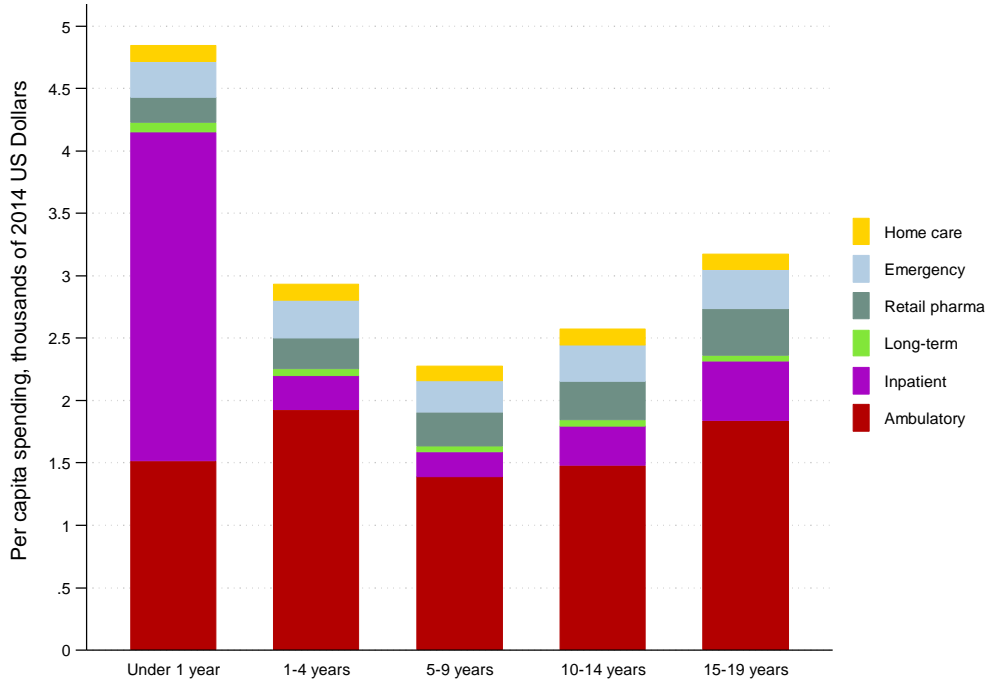


Figure 4 | Per capita U.S. spending on personal healthcare by age group, 1996-2012

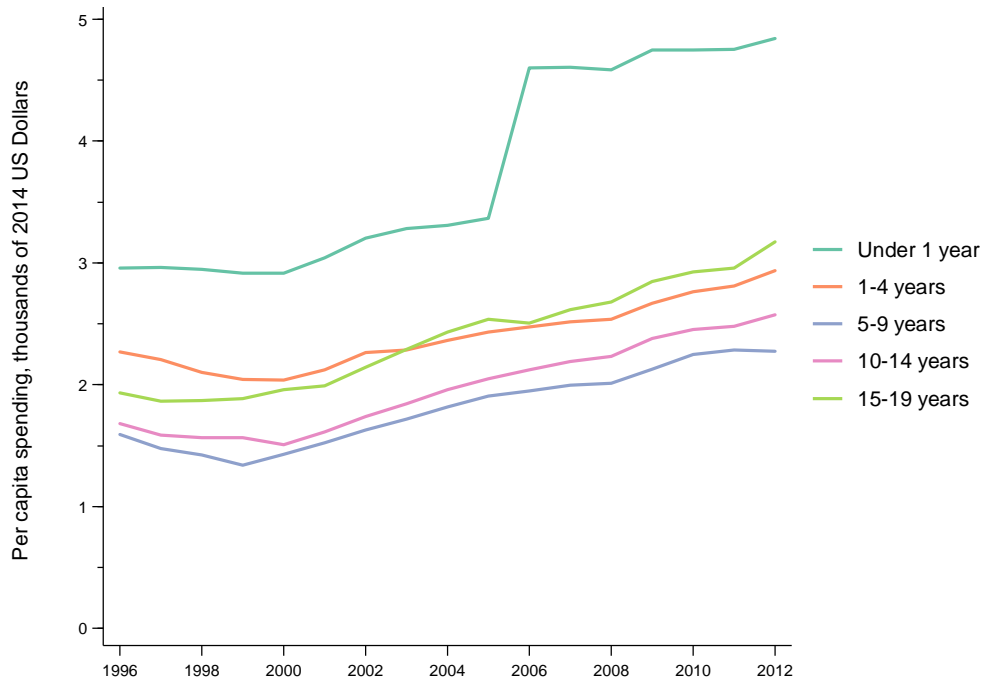


Figure 5 | U.S. spending on personal healthcare split by aggregate disease categories for age 0-19, 2012

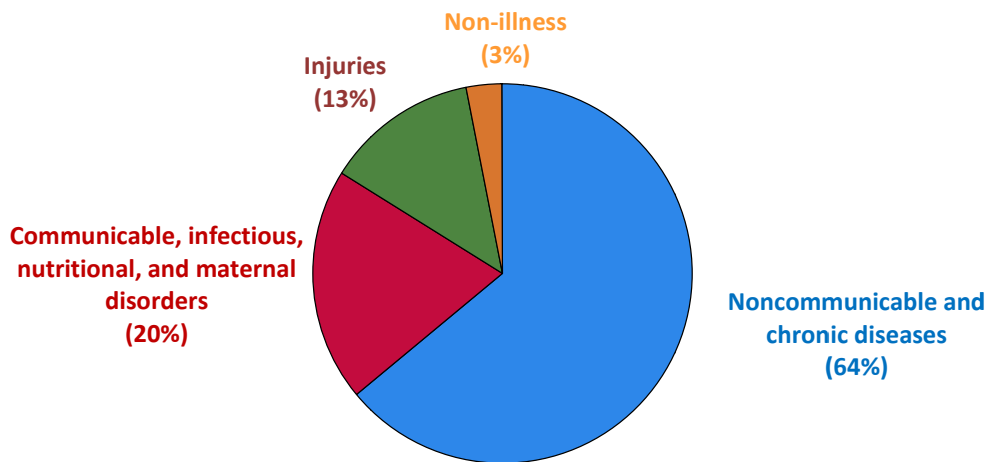


Figure 6 | Explaining \$98 billion increase in children’s healthcare spending by type of good or service, 1996-2012

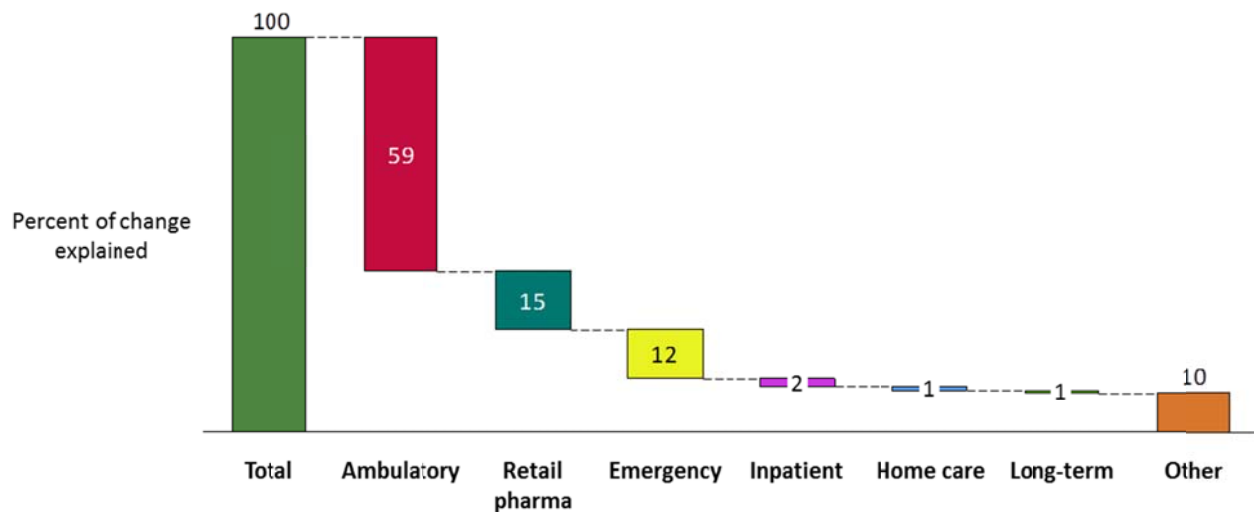


Figure 7 | Decomposition of \$98 billion increase in children’s healthcare spending, 1996-2012

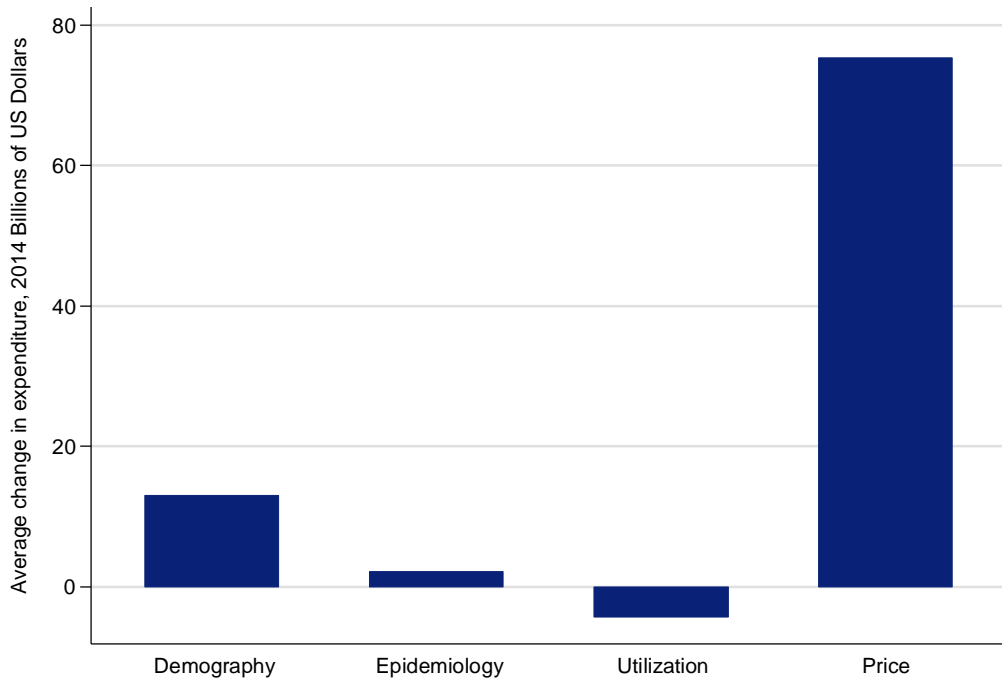


Figure 8 | Per capita U.S. spending on personal healthcare for under 5 year olds by cohort

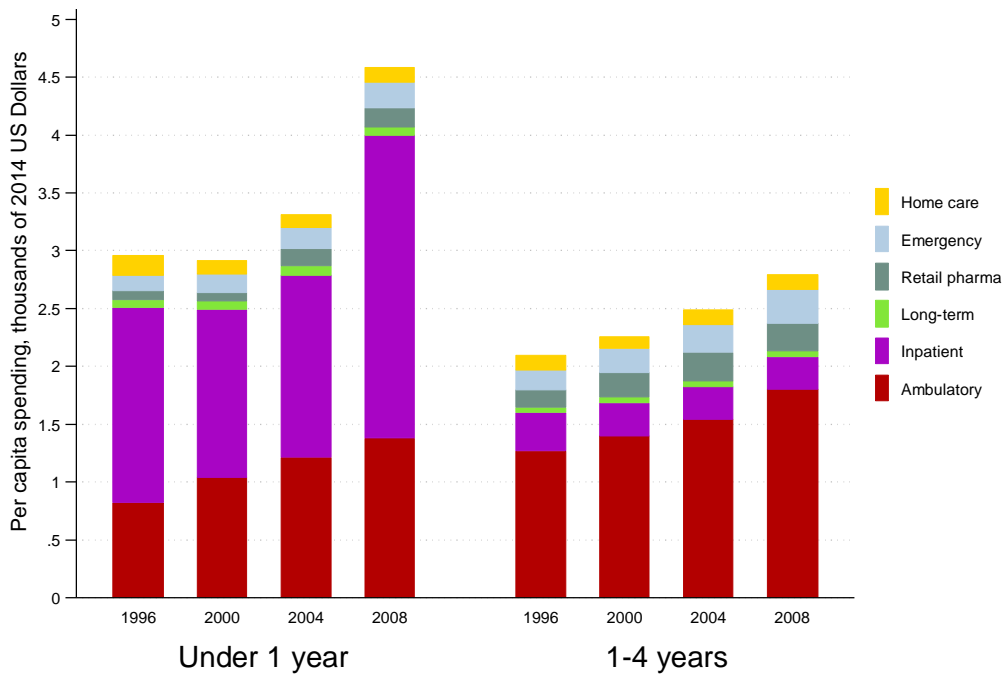
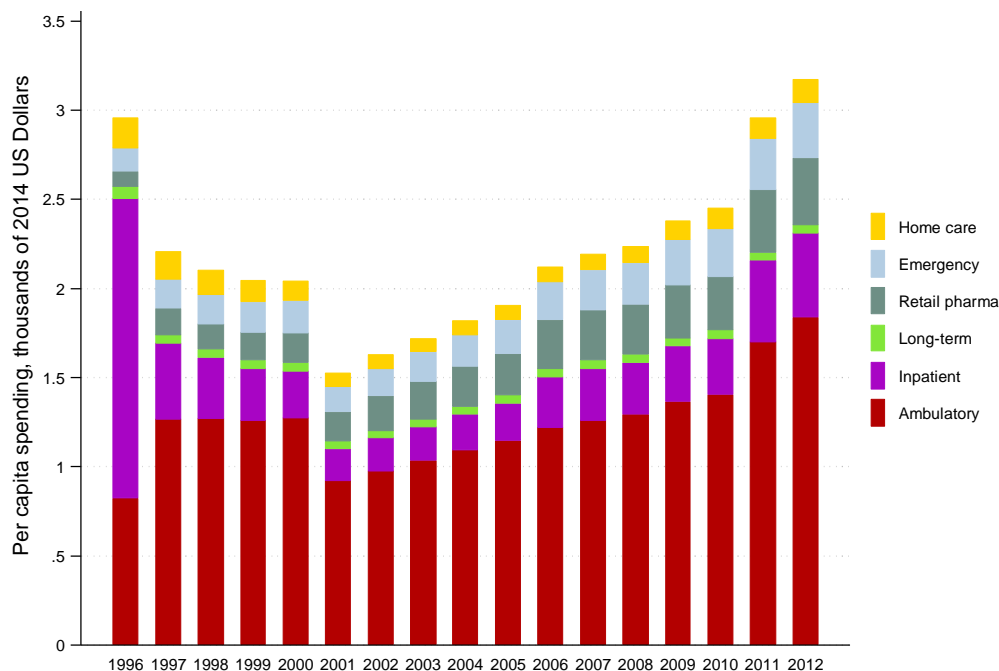


Figure 9 | Per capita U.S. spending on personal healthcare for average individual in 1996 cohort



Tables

Table 1 | Top 10 causes of spending vs. well-child visits, age 0-19, 2012

Disease	Spending in 2012 (2014 \$US billion)	Percentage of total spending	Percentage of total volume*
Congenital anomalies	\$14.9	5.7%	2.0%
Skin and subcutaneous diseases	\$10.2	4.0%	5.7%
Preterm birth complications	\$10.2	3.9%	1.3%
Chronic upper respiratory	\$9.7	3.7%	4.2%
Endocrine, metabolic, blood, and immune disorders	\$9.6	3.7%	1.4%
Otitis media	\$9.0	3.5%	4.1%
Attention-deficit hyperactivity disorder	\$8.6	3.3%	4.6%
Asthma	\$7.8	3.0%	5.3%
Falls	\$7.7	3.0%	1.1%
Depressive disorders	\$7.1	2.7%	2.7%
Well-child visits	\$2.0	0.7%	8.0%

*Note: Percentage of total volume is provided in number of encounters, bed days, and prescriptions

Appendix

Appendix 1 | Table of Data Sources

Type of care	Macro spending data and years	Micro spending data and years	Micro volume data and years
Ambulatory	National Health Account, NHEA (1996 – 2012)*	Medical Expenditure Panel Survey, MEPS (1996 – 2012); Substance Abuse and Mental Health Services Administration, SAMHSA (1998, 2002, 2004, 2005, 2009); MarketScan (2012)	National Ambulatory Medical Care Survey, NAMCS (1996 – 2010); National Hospital Ambulatory Medical Care Survey, NHAMCS (1996 – 2010); MarketScan (2012)
Inpatient	NHEA (1996 – 2012)	National Inpatient Sample, NIS (1996 – 2011); MEPS (1996 – 2012), SAMHSA (1998, 2002, 2004, 2005, 2009); MarketScan (2012)	NIS (1996 – 2011); MarketScan (2012)
Emergency Department	NHEA (1996 – 2012)*	MEPS (1996 – 2012); MarketScan (2012)	NHAMCS (1996 – 2010); MarketScan (2012)
Long term care	NHEA (1996 – 2012)	Medicare claims data (1999 – 2001, 2002, 2004, 2006, 2008, 2010, 2012); National Nursing Home Survey, NNHS (1997, 1999, 2004), SAMHSA (1998, 2002, 2004, 2005, 2009); MarketScan (2012)	Medicare claims data (1999 – 2001, 2002, 2004, 2006, 2008, 2010, 2012); NNHS (1997, 1999, 2004); MarketScan (2012)
Home care	NHEA (1996 – 2012)	MEPS (1996 – 2012); MarketScan (2012)	MEPS (1996 – 2012); MarketScan (2012)
Dental	NHEA (1996 – 2012)	MEPS (1996 – 2012); MarketScan (2012)	MEPS (1996 – 2012); Market Scan (2012)
Prescribed retail pharmaceuticals	NHEA (1996 – 2012)	MEPS (1996 – 2012); MarketScan (2012)	MEPS (1996 – 2012); MarketScan (2012)
Other	NHEA (1996 – 2012)		

*Note: Total spending on ambulatory and emergency department were derived from NHEA total spending for outpatient care and ambulatory-emergency fractions from MEPS.