Supplementary Online Content


**eMethods.** Data Sources, Merging Data Sources, Decomposition, Code
**eResults.** eFigures
**eReferences**

This supplementary material has been provided by the authors to give readers additional information about their work.
Factors associated with increases in US health care spending, 1996–2013

Outline
1. Data sources
2. Merging data sources
3. Decomposition
4. Code
5. Results

Note: A substantial portion of the Section 1A in this supplement was drawn from the supplementary appendix associated with Dieleman et al.¹

Section 1: Data sources
Two data sources were used for this study. Health spending data came from the Disease Expenditure 2013 Project, produced by the Institute for Health Metrics and Evaluation. Epidemiologic data came from the Global Burden of Disease 2015 study.

Section 1A: Disease Expenditure data
The objective of this research was to comprehensively measure and describe spending on pediatric health care in the United States using granular, politically and clinically useful categories. We produced annual estimates for 1996 through 2013. These estimates were created to be as comprehensive as possible, and they aggregate to reflect the official US government estimates of US health spending, as reported in the National Health Expenditure Accounts (NHEA).² These estimates were produced to reflect actual spending on health, also known as expenditure or payments, rather than charges made by medical providers. In many cases, charges are not paid in full and tracking these would be an overestimate of the resources actually spent on health care.³–⁵ Spending estimates were adjusted for inflation using the economy-wide consumer price index from the International Monetary Fund, and were reported in 2015 dollars.⁶ In addition to health spending, volume of health goods or services was also estimated – measured as the number of visits, bed-days, or prescriptions filled.

This research focused on personal health care spending. Personal health care spending is defined in the NHEA as “the total amount spent to treat individuals with specific medical conditions,” and in 2013 was 84.8% of total US health spending. For this study, personal health care spending was disaggregated into six types of care, including inpatient care, ambulatory care, retail pharmaceuticals, emergency department care, nursing facilities care, and dental care.

The overarching research strategy was to use microdata to inform spending and volume estimates at the most granular level possible. For the disaggregation of personal health care spending, microdata consisted of administrative records, insurance claims, or household surveys that report health spending by cause of illness or reason for the health care event, type of good or service, and demographic information. These sources provided data at the patient, encounter, or claim level. In most cases,
spending and volume estimates were disaggregated into age-, sex-, cause-, type-of-care-, and year-specific categories. Table 1 lists all sources of microdata used in the estimation process by type of care.

<table>
<thead>
<tr>
<th>Type of care</th>
<th>Macro spending data and years</th>
<th>Micro spending data and years</th>
<th>Micro volume data and years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Other</strong></td>
<td>NHEA (1996 – 2013)</td>
<td>Not disaggregated</td>
<td>Not disaggregated</td>
</tr>
</tbody>
</table>

To provide a comprehensive yet granular set of health spending estimates, health spending was split into categories defined by simultaneously applying three distinct frameworks. These three frameworks reflect demography, epidemiology, and the type of health care provided.

1. **Demography:** Health spending and volume of goods and services were estimated for both sexes and for 18 age groups, under 1, 1-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, and 80 plus.

2. **Epidemiology:** Health spending and volume of goods and services were estimated for 155 causes. The cause list for this project was based on the Global Burden of Disease (GBD) 2013 study. GBD 2013 classified causes of health burden at five different levels of disaggregation.
Level III classification was extracted from GBD 2013 for this study. This included 144 causes of health burden. In addition to these, 14 other categories were added. Four risk factors for other underlying health causes were added because it was clear that there is substantial spending on the treatment of these risk factors, and this spending is intended to prevent a wide set of causes of illness. These additional categories are spending on the treatment of hypertension, treatment of hyperlipidemia, treatment of obesity, and tobacco cessation. Spending on these risk factors excludes health care spending on diseases caused by these risk factors but includes the cost of treating the risk factor. In addition to these, seven causes were added that were not associated with health burden (and are therefore not considered by GBD) but were associated with health spending. Examples of these causes were well-person care, pregnancy and postpartum care, and well-dental care. Finally, this project also tracked spending on three impairments. These impairments – heart failure, septicemia, and renal failure – are not underlying causes of health burden, but rather consequences of other underlying causes. Spending on these causes was tracked because they represent large portions of health spending and are of political interest. A description and full list of causes and how they map to the International Classification of Diseases version 9 (ICD-9) are provided in section three of this appendix.

3. Types of goods or services: Health care spending and volume of goods and services were estimated for six types of goods and services: ambulatory care, inpatient care, emergency department care, nursing care, dental care, and prescribed retail pharmaceuticals. Definitions for these types of goods and services were designed to reflect the underlying microdata.

- **Ambulatory care:** Ambulatory care included preventive, curative, and rehabilitative medical and psychiatric services, procedures, and medications provided in ambulatory care settings including physicians’ offices, freestanding clinics, and hospital outpatient departments. Emergency room visits and dental visits are excluded from ambulatory care. For ambulatory care, volume was measured as the number of visits.

- **Inpatient care:** Inpatient care included all spending in an inpatient hospital facility, whether preventive, curative, or rehabilitative, and included all medical goods, whether pharmaceuticals, diagnostics, or devices, consumed by inpatients, regardless of their length of stay. Emergency room visits that result in an inpatient stay are considered inpatient care. For inpatient care, volume was measured as the number of days spent in an inpatient setting.

- **Emergency department care:** Emergency department care included preventive, curative, and rehabilitative medical and psychiatric care provided at hospital-based and freestanding emergency departments. Emergency department care excluded visits that resulted in inpatient admission. For emergency department care, volume was measured as the number of visits.

- **Nursing facilities care:** Nursing care included nursing care provided in nursing homes or other residential institutions. Home-based care and palliative or hospice care provided in inpatient settings were excluded. Spending on hoteling costs, such as room and board, are included. For nursing care, volume was measured as the number of days spent in a facility.
• **Dental care**: Dental care included preventive and curative health care at a dental facility. For dental care, volume was measured as the number of visits to a dental facility.

• **Prescribed retail pharmaceuticals**: Prescribed retail pharmaceuticals (pharma) included all prescription medicines purchased in a retail pharmacy setting. This category excluded any medications consumed in inpatient, ambulatory, long-term, and emergency settings during a visit. It also excluded over-the-counter (non-prescribed) medications and therapeutic devices. For prescribed retail pharmaceutical, volume was measured as the number of prescriptions filled. The cause of illness is captured by the diagnoses reported by an individual who held the prescription, not by an Anatomical Therapeutic Chemical (ATC) classification system or medication code.

For all estimates, uncertainty was propagated using a bootstrapping method.

Statistical models were used when necessary to generate a complete set of estimates, combine data sources, and adjust the data for known biases. The population-weighted estimates derived from the microestimates were compared and scaled to reflect the total health expenditure for each type of care and year. A brief summary of each step, including the types of care impacted, the effect of the process, and the motivating purpose of the process are described in Table 2 below. This table does not attempt to explain how each step was conducted. Rather, this table explains briefly why each step was conducted and how it impacted the data.
<table>
<thead>
<tr>
<th>Step</th>
<th>Types of care</th>
<th>Motivation</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format data</strong></td>
<td>Ambulatory, inpatient, emergency department, nursing care, dental, prescribed retail pharmaceuticals</td>
<td>To enable all data sources to go through same statistical machinery</td>
<td>All data were structured in the same manner, and variable names and variable formats were systematized across all data sources used</td>
</tr>
<tr>
<td><strong>Bootstrap</strong></td>
<td>Ambulatory, inpatient, emergency department, nursing care, dental, prescribed retail pharmaceuticals</td>
<td>To obtain 1,000 bootstrap samples upon which all other steps could be run independently, in order to quantify uncertainty</td>
<td>1,000 samples were created for analysis based on survey-adjusted bootstrapping methods</td>
</tr>
<tr>
<td><strong>De-truncation</strong></td>
<td>Ambulatory (spending data only), emergency department (spending data only), prescribed retail pharmaceuticals</td>
<td>To estimate more detailed four- and five-digit ICD-9 diagnoses from the three-digit diagnoses recorded in Medical Expenditure Panel Survey (MEPS)</td>
<td>Variation within each bootstrap draw and across draws for data from MEPS was increased</td>
</tr>
<tr>
<td><strong>Redistribution</strong></td>
<td>Ambulatory, inpatient, emergency department, nursing care, prescribed retail pharmaceuticals</td>
<td>To attribute all spending and volumes to causes that represent the true underlying reason for a health care encounter</td>
<td>Spending and volume originally attributed to ICD-9 codes that do not map to GBD causes were assigned to GBD causes based on redistribution packages developed by the IHME GBD research. This redistributions was designed to take into account age and sex. While each cause is impacted differently by the redistribution process, spending per cause, measured at the age, sex, type, and year level, goes up or stays the same, while spending attributed to “garbage codes” is removed</td>
</tr>
<tr>
<td><strong>Mapping</strong></td>
<td>Ambulatory, inpatient, emergency department, nursing care, dental, prescribed retail pharmaceuticals</td>
<td>To divide spending into 158 medically important and policy-relevant categories</td>
<td>Causes were aggregated from ICD-9 codes to 158 GBD causes, leading to more data for each cause-, year-, age-, sex-, type-combination</td>
</tr>
<tr>
<td><strong>Injury adjustment</strong></td>
<td>Ambulatory, inpatient, emergency department, nursing care, prescribed retail pharmaceuticals</td>
<td>To have all spending and volume due to injuries be defined by external cause of injury codes, rather than less actionable nature of injury codes</td>
<td>All spending attributed to injuries was defined by the external cause of injury</td>
</tr>
<tr>
<td><strong>Comorbidity adjustment</strong></td>
<td>Ambulatory, inpatient, emergency department, nursing care</td>
<td>To redistribute resources toward the underlying cause of the health care spending, rather than merely the primary diagnosis</td>
<td>Spending was moved from some causes to others, based on whether, on average, the cause leads to excess spending (as comorbidity) or is a primary diagnosis that has spending increased by excess spending on comorbidities</td>
</tr>
<tr>
<td><strong>Age-splitting</strong></td>
<td>Nursing care</td>
<td>To have Medicare nursing care claims data be consistent with all other data sources, as Medicare aggregates younger ages to ensure patient privacy</td>
<td>Charges captured in Medicare claims were split up from larger age bins into the age bins used in the study</td>
</tr>
<tr>
<td><strong>Inpatient charges-to-payments adjustment</strong></td>
<td>Inpatient</td>
<td>To estimate total inpatient spending from the inpatient facility charges report in the National Inpatient Sample</td>
<td>Inpatient spending estimates were made smaller than originally reported in National Inpatient Sample, based on cause, year, payer-specific payment to charge ratios</td>
</tr>
<tr>
<td>Completing the series</td>
<td>Ambulatory, inpatient, emergency department, nursing care, dental, prescribed retail pharmaceuticals</td>
<td>To have estimates for years in which data do not exist, to obtain estimates for spending that are missed due to survey designs, and to have estimates that are appropriately consistent across age and time</td>
<td>Multiple data sources were combined to leverage strengths across data sources, such that every type-, age-, year-, cause-, and sex-combination was estimated and “smooth” series were produced</td>
</tr>
<tr>
<td>Nursing-care adjustment</td>
<td>Nursing care</td>
<td>To estimate nationally representative spending and volume estimates for short- and long-term stays at nursing homes</td>
<td>Three data sources were leveraged together, two using linear regression, to create nationally representative spending and volume estimates for short-term and long-term nursing facility care</td>
</tr>
<tr>
<td>Mental health adjustment</td>
<td>Ambulatory, inpatient</td>
<td>To address the undersampling of mental health and substance abuse specialty facilities and create mental health and substance abuse health care spending aggregates that are commensurate with official US government estimates</td>
<td>Spending and volume on mental illnesses were increased, relative to non-mental illness causes, for the ambulatory and inpatient types of care</td>
</tr>
<tr>
<td>Scaling</td>
<td>Ambulatory, inpatient, emergency department, nursing care, dental, prescribed retail pharmaceuticals</td>
<td>To match spending estimates that reflect the official US government numbers, as no data source offers complete census of health care spending</td>
<td>Estimates for spending were increased or decreased depending on type of care</td>
</tr>
</tbody>
</table>
Section 1B: Global Burden of Disease data
The Global Burden of Disease study contains comprehensive estimates for disease burden for every country of the world. It contains information about mortality for 249 causes of death, information about incidence, prevalence, and years lived with disability for 310 health conditions and injuries, and information about 79 risk factors. Estimates are made at global, national, and subnational levels, in some cases. GBD contains estimates for years 1990, 2000, 2005, 2010, and 2015. For this study, we used prevalence and incidence data, as well as population data estimated in the GBD study. We extracted prevalence and incidence data for the 155 health conditions estimated by the DEX study for the United States for all years within our study period (2000, 2005, and 2010). Detailed methods for the GBD study are described elsewhere.8
Section 2: Merging data sources

Three steps were taken in order to merge GBD data with Disease Expenditure data. First, a single epidemiologic metric, either prevalence or incidence, was selected for conditions included in the GBD based on expert opinion. Second, various methods were used to obtain disease burden estimates for those conditions included in the DEX study but excluded from GBD because they are not considered sources of disease burden. Third, data were adjusted to account for differences in cause granularity between GBD and DEX. Fourth, epidemiologic data were logarithmically interpolated to fill in years not estimated by the GBD study.

To measure changes in disease burden over the study period, prevalence and incidence data were extracted from the GBD 2013 database for the available years (1995, 2000, 2005, 2010, and 2013). Disease experts were consulted to determine which metric should be used for each condition. This metric should represent the number of people who were eligible and likely to be receiving treatment for a cause of illness in a given year. In general, we used prevalence for chronic diseases and incidence for acute illnesses. For example, diabetes is a long-term condition that is controlled by daily treatment. Consequently, prevalence is a more appropriate indicator than incidence because diabetic patients must receive regular care. Alternatively, most cancer treatment occurs within the first months of diagnosis. Once cancer is in remission, a person may technically still be a prevalent case and may be receiving some treatment, but the intensity of treatment is negligible relative to treatment in the first months. Consequently, we used incidence for all cancers. Table 3 contains a list of metrics used for each cause.

<table>
<thead>
<tr>
<th>Health condition</th>
<th>Disease burden metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute glomerulonephritis</td>
<td>incidence</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>prevalence</td>
</tr>
<tr>
<td>Alcohol use disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Alzheimer’s disease and other dementias</td>
<td>prevalence</td>
</tr>
<tr>
<td>Animal contact</td>
<td>incidence</td>
</tr>
<tr>
<td>Anxiety disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Aortic aneurysm</td>
<td>prevalence</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>incidence</td>
</tr>
<tr>
<td>Asthma</td>
<td>prevalence</td>
</tr>
<tr>
<td>Atrial fibrillation and flutter</td>
<td>prevalence</td>
</tr>
<tr>
<td>Attention-deficit/hyperactivity disorder</td>
<td>prevalence</td>
</tr>
<tr>
<td>Autistic spectrum disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Bipolar disorder</td>
<td>prevalence</td>
</tr>
<tr>
<td>Bladder cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Brain and nervous system cancers</td>
<td>incidence</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Cardiomyopathy and myocarditis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>prevalence</td>
</tr>
<tr>
<td>Cervical cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Chronic kidney diseases</td>
<td>prevalence</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>prevalence</td>
</tr>
<tr>
<td>Condition</td>
<td>Type</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
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</tr>
<tr>
<td>Cirrhosis of the liver</td>
<td>prevalence</td>
</tr>
<tr>
<td>Colon and rectum cancers</td>
<td>incidence</td>
</tr>
<tr>
<td>Complications of abortion</td>
<td>incidence</td>
</tr>
<tr>
<td>Conduct disorder</td>
<td>prevalence</td>
</tr>
<tr>
<td>Congenital anomalies</td>
<td>prevalence</td>
</tr>
<tr>
<td>Counseling services</td>
<td>population</td>
</tr>
<tr>
<td>Depressive disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>prevalence</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>incidence</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>prevalence</td>
</tr>
<tr>
<td>Donor services</td>
<td>population</td>
</tr>
<tr>
<td>Drowning</td>
<td>incidence</td>
</tr>
<tr>
<td>Drug use disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Eating disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Encephalitis</td>
<td>incidence</td>
</tr>
<tr>
<td>Endocarditis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Endocrine, metabolic, blood, and immune disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>prevalence</td>
</tr>
<tr>
<td>Esophageal cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Exposure to mechanical forces</td>
<td>incidence</td>
</tr>
<tr>
<td>Falls</td>
<td>incidence</td>
</tr>
<tr>
<td>Family planning</td>
<td>population</td>
</tr>
<tr>
<td>Fire, heat, and hot substances</td>
<td>incidence</td>
</tr>
<tr>
<td>Foreign body</td>
<td>incidence</td>
</tr>
<tr>
<td>Gallbladder and biliary diseases</td>
<td>incidence</td>
</tr>
<tr>
<td>Gallbladder and biliary tract cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Gastritis and duodenitis</td>
<td>incidence</td>
</tr>
<tr>
<td>Gout</td>
<td>prevalence</td>
</tr>
<tr>
<td>Gynecological diseases</td>
<td>prevalence</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>prevalence</td>
</tr>
<tr>
<td>Heart failure</td>
<td>prevalence</td>
</tr>
<tr>
<td>Hemoglobinopathies and hemolytic anemias</td>
<td>prevalence</td>
</tr>
<tr>
<td>Hemolytic disease in fetus and newborn and other neonatal jaundice</td>
<td>prevalence</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Hodgkin lymphoma</td>
<td>incidence</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>prevalence</td>
</tr>
<tr>
<td>Hypertension</td>
<td>prevalence</td>
</tr>
<tr>
<td>Hypertensive heart disease</td>
<td>prevalence</td>
</tr>
<tr>
<td>Idiopathic intellectual disability</td>
<td>prevalence</td>
</tr>
<tr>
<td>Indirect maternal deaths</td>
<td>prevalence</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>prevalence</td>
</tr>
<tr>
<td>Condition</td>
<td>Type</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Inguinal or femoral hernia</td>
<td>prevalence</td>
</tr>
<tr>
<td>Interpersonal violence</td>
<td>incidence</td>
</tr>
<tr>
<td>Interstitial lung disease and pulmonary sarcoidosis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Intestinal infectious diseases</td>
<td>prevalence</td>
</tr>
<tr>
<td>Iodine deficiency</td>
<td>prevalence</td>
</tr>
<tr>
<td>Iron-deficiency anemia</td>
<td>prevalence</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>prevalence</td>
</tr>
<tr>
<td>Kidney cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Larynx cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Leprosy</td>
<td>prevalence</td>
</tr>
<tr>
<td>Leukemia</td>
<td>incidence</td>
</tr>
<tr>
<td>Liver cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Low back and neck pain</td>
<td>prevalence</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>incidence</td>
</tr>
<tr>
<td>Malignant skin melanoma</td>
<td>incidence</td>
</tr>
<tr>
<td>Maternal hemorrhage</td>
<td>prevalence</td>
</tr>
<tr>
<td>Maternal hypertensive disorders</td>
<td>incidence</td>
</tr>
<tr>
<td>Maternal sepsis and other pregnancy related infection</td>
<td>incidence</td>
</tr>
<tr>
<td>Measles</td>
<td>prevalence</td>
</tr>
<tr>
<td>Meningitis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Mesothelioma</td>
<td>incidence</td>
</tr>
<tr>
<td>Migraine</td>
<td>prevalence</td>
</tr>
<tr>
<td>Mouth cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>incidence</td>
</tr>
<tr>
<td>Multiple sclerosis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Nasopharynx cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Neglected tropical diseases and malaria</td>
<td>prevalence</td>
</tr>
<tr>
<td>Neonatal encephalopathy (birth asphyxia and birth trauma)</td>
<td>prevalence</td>
</tr>
<tr>
<td>Non-Hodgkin lymphoma</td>
<td>incidence</td>
</tr>
<tr>
<td>Non-melanoma skin cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Obesity</td>
<td>prevalence</td>
</tr>
<tr>
<td>Obstructed labor</td>
<td>incidence</td>
</tr>
<tr>
<td>Oral disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other cardiovascular and circulatory diseases</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other chronic respiratory diseases</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other digestive diseases</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other infectious diseases</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other maternal disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other mental and behavioral disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other musculoskeletal disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other neonatal disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>-------------------------</td>
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</tr>
<tr>
<td>Other neoplasms</td>
<td>incidence</td>
</tr>
<tr>
<td>Other neurological disorders</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other nutritional deficiencies</td>
<td>prevalence</td>
</tr>
<tr>
<td>Other pharynx cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Other transport injuries</td>
<td>incidence</td>
</tr>
<tr>
<td>Other unintentional injuries</td>
<td>incidence</td>
</tr>
<tr>
<td>Otitis media</td>
<td>incidence</td>
</tr>
<tr>
<td>Ovarian cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Pancreatic cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Pancreatitis</td>
<td>incidence</td>
</tr>
<tr>
<td>Paralytic ileus and intestinal obstruction</td>
<td>incidence</td>
</tr>
<tr>
<td>Parkinson’s disease</td>
<td>prevalence</td>
</tr>
<tr>
<td>Peptic ulcer disease</td>
<td>incidence</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>prevalence</td>
</tr>
<tr>
<td>Pneumoconiosis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Poisonings</td>
<td>incidence</td>
</tr>
<tr>
<td>Pregnancy and postpartum care</td>
<td>prevalence</td>
</tr>
<tr>
<td>Preterm birth complications</td>
<td>prevalence</td>
</tr>
<tr>
<td>Prostate cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Protein-energy malnutrition</td>
<td>prevalence</td>
</tr>
<tr>
<td>Rheumatic heart disease</td>
<td>prevalence</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Road injuries</td>
<td>incidence</td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>prevalence</td>
</tr>
<tr>
<td>Self-harm</td>
<td>incidence</td>
</tr>
<tr>
<td>Sense organ diseases</td>
<td>prevalence</td>
</tr>
<tr>
<td>Sepsis and other infectious disorders of the newborn baby</td>
<td>prevalence</td>
</tr>
<tr>
<td>Septicemia</td>
<td>incidence</td>
</tr>
<tr>
<td>Sexually transmitted diseases excluding HIV</td>
<td>prevalence</td>
</tr>
<tr>
<td>Skin and subcutaneous diseases</td>
<td>prevalence</td>
</tr>
<tr>
<td>Social services</td>
<td>population</td>
</tr>
<tr>
<td>Stomach cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Tension-type headache</td>
<td>prevalence</td>
</tr>
<tr>
<td>Testicular cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Tetanus</td>
<td>incidence</td>
</tr>
<tr>
<td>Thyroid cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Tobacco</td>
<td>prevalence</td>
</tr>
<tr>
<td>Trachea, bronchus, and lung cancers</td>
<td>incidence</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>prevalence</td>
</tr>
<tr>
<td>Upper respiratory infections</td>
<td>incidence</td>
</tr>
</tbody>
</table>

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Table 3. Disease burden metrics used for each health condition

<table>
<thead>
<tr>
<th>Health Condition</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary diseases and male infertility</td>
<td>prevalence</td>
</tr>
<tr>
<td>Uterine cancer</td>
<td>incidence</td>
</tr>
<tr>
<td>Varicella</td>
<td>incidence</td>
</tr>
<tr>
<td>Vascular intestinal disorders</td>
<td>incidence</td>
</tr>
<tr>
<td>Vitamin A deficiency</td>
<td>prevalence</td>
</tr>
<tr>
<td>Well dental</td>
<td>population</td>
</tr>
<tr>
<td>Well newborn</td>
<td>population</td>
</tr>
<tr>
<td>Well person</td>
<td>population</td>
</tr>
<tr>
<td>Whooping cough</td>
<td>prevalence</td>
</tr>
</tbody>
</table>

Some causes included in the DEX study are not included as causes of disease burden in the GBD study and do not have prevalence or incidence estimates. These causes of spending include all non-disease causes related to well-care and prevention, four conditions that are classified as risk factors in the GBD study, and three that are considered impairments. These conditions are included in DEX due to their substantial contribution to spending. For all well-care causes except pregnancy, we assigned a prevalence rate of one, to indicate that the entire population has the potential to be receiving this type of well-care. We used the fertility rate as a proxy for the prevalence of pregnancy. The risk factors included in DEX were hypertension, hyperlipidemia, obesity, and tobacco use. While these factors are not themselves considered health conditions, there is considerable spending on them in order to prevent conditions like cardiovascular disease. To obtain burden estimates for risk factors, GBD estimates on the prevalence of risk factors were used. Thresholds developed by GBD scientists were used to classify presence or absence of a risk factor. For example, hypertension was defined as having a systolic blood pressure over 140 mmHg. The impairments included as causes in the DEX study were septicemia, renal failure, and heart failure. These are excluded from the GBD study because they are considered consequences of underlying causes rather than causes themselves. We used the closest proxy available in the GBD for these cases.

There were also some cases where GBD and DEX cause definitions did not match due to differences in the granularity of measurement between the two studies: GBD allows for four levels of cause aggregation, and DEX allows for three. This discrepancy resulted in eight residual “other” causes that did not have prevalence estimates from GBD. For example, the GBD study produces estimates for total neonatal burden and several sub-causes of neonatal burden, but does not include a “neonatal other” category. Where these residual “other” causes remained, we subtracted the sub-causes from each master cause estimated by GBD.

As previously mentioned, the GBD study does not estimate prevalence and incidence for every year from 1996 through 2013. To produce estimates for all years, data were logarithmically interpolated by condition, age, and sex. This approach assumes a constant rate of change between 1995 and 2000 and predicts values for in-between years according to this trend. Because year-to-year differences in epidemiologic data are relatively small, this method is likely to produce reasonable estimates.

While population, prevalence, expenditure, and price are extracted directly from the databases described, the remaining factors were produced by manipulating extracted variables. Specifically, to calculate the population fraction, we divided the population in a given age category by the total
population for that year. To calculate utilization, we divided volume estimates by prevalence or incidence estimates for each condition.

It is important to note that, because of the differences in GBD and DEX data, the total spending increase does not completely match that reported in Dieleman et al. 2016. These modifications were primarily due to the exclusion of instances where the case rate was below 1 case nationwide.
Section 3: Decomposition

We used the decomposition method described by Das Gupta\textsuperscript{10} to decompose the contribution of each of the five factors to changes in health spending. This method is based on the calculation of standardized rates in order to eliminate the compositional effects of all other factors in different years. Our data structure enabled the use of this method, since the outcome variable (spending) is the product of the five factors of interest.

We calculate standardized rates for each factor by considering all possible combinations of other factors across time. For example, if only considering two factors, utilization (U) and price (P), and two years, 1996 and 2013, the price-standardized rate in each year would be:

\[
\text{1996 Price standardized rate: } \frac{P_{2013} + P_{1996}}{2} U_{1996}
\]

\[
\text{2013 Price standardized rate: } \frac{P_{2013} + P_{1996}}{2} U_{2013}
\]

The difference between the 1996 price-standardized rate and the 2013 price-standardized rate is the effect of utilization, or the contribution of utilization to changes in the outcome between 1996 and 2013 (below equation).

\[
\text{Effect of Utilization} = \frac{P_{2013} + P_{1996}}{2} (U_{2013} - U_{1996})
\]

The decomposition for our purposes was performed using the expanded 5-factor equation with calculations adjusted to ensure internal consistency, described elsewhere.\textsuperscript{11} The decomposition was completed for each of the condition, age and sex, and type of care stratified groups, and for every possible combination of years (an input into the equation which accounts for multiple populations, as described by Das Gupta).\textsuperscript{11} The impact of each driver can be aggregated to assess the impact of the driver for any condition, age and sex group, or type of care of interest. To calculate uncertainty, we performed the decomposition analysis 1,000 times for each of the 1,000 draws of input data.

An outlier detection was conducted in order to stabilize the final decomposition estimates. For each driver and type of care, we compute modified z-score, where:

\[
\text{Modified z-score} = \frac{X_{f,e,d} - \text{median}(X_{f,e})}{\text{MAD}(X_{f,e})} \times 0.6745
\]

where \(f\) is a specific function, \(e\) is a specific driver, and \(d\) is a draw. Using the threshold defined in Iglewics and Hoaglin (1993),\textsuperscript{12} the maximum modified z-score of each draw was computed and was dropped if the absolute computed value within the draw exceeded 3.5. This resulted in 69 of the 1,000 draws being dropped. The point estimate reported is the mean of the remaining 931 draws, while the uncertainty interval is the 2.5\textsuperscript{th} and 97.5\textsuperscript{th} percentile of the full set of 1,000 draws.
Section 4: Code

// Decomposition Analysis of Disease Expenditure Data
// Description: This code performs the Das Gupta decomposition for every possible combination of years, which is necessary for the method that achieves internal consistency of annual estimates. In Step 1, the initial decomposition is run, which calculates the effect of each driver at the most granular level of data, for every possible combination of years. These data are then used as an input into Step 2, in which the estimates are adjusted for internal consistency over time. This final step will output a file with the amount of spending increase attributable to each of the five drivers, at the age-sex-health condition-type of care level.

** STEP 1: RUN INITIAL DECOMPOSITION TO CALCULATE EFFECTS OF EACH DRIVER FOR EVERY COMBINATION OF YEARS **

// Looping through all possible combinations of years (where year "1" = 1996, year "2" = 1997, etc.)
forvalues i = 1/17 {
    forvalues j = 2/18 {
        // restrict to yearly combinations that make sense (i.e., only where start year < end year)
        if `i' != `j' & `i' < `j' {

            // set startyear and endyear of the analysis
            local startyear = `i'
            local endyear = `j'

            ***********************
            ** Step 1A: Prepare data **
            ***********************

            // Load prepared dataset containing values for each of the five drivers and spending by age, sex, health condition, type of care, and year
            use "prepped_data", clear

            // recode years to be 1-18 rather than 1996-2013
            replace year = year-1995

            // restrict to the two years we are interested in
            keep if year == `startyear' | year == `endyear'
Generate population fraction - keep just one health condition and type of care to get total population for each year

```
preserve
keep if acause == "diabetes" & function == "AM"
collapse(sum) population, by(year)
sum population if year == `startyear'
local total_`startyear' = `r(mean)'
sum population if year == `endyear'
local total_`endyear' = `r(mean)'
restore

// fill in with total population values calculated above
gen total_pop = .
replace total_pop = `total_`startyear'' if year == `startyear'
replace total_pop = `total_`endyear'' if year == `endyear'
```

// Calculate population fraction
```
gen pop_frac = population/total_pop
```

// replace age-sex specific population with total population
```
rename population old_pop
rename total_pop population
```

// drop all observations where cases are below 1 -- prevalence is too low to allow for accurate estimation
```
gen drop = 0
replace drop = 1 if cases < 1
bysort acause function age sex: egen prob_cases = sum(drop)
```

```
count if prob_cases > 0 & !regexm(acause, "neo") & function != "LT"
drop if prob_cases > 0
```

```
drop drop prob_cases
```

// Keep relevant variables
```
keep year population epi_rate util_rate price expend acause age sex function pop_frac
order acause age sex function year population pop_frac epi_rate util_rate price expend
```

```
sort acause age sex function year
```

**************************************************
** Step 1B: Run decomposition **

/* reshape wide so we have start year and end year variables for each factor */
reshape wide population pop_frac epi_rate util_rate price expend, i(function acause sex age) j(year)

// loop through five drivers of interest
forvalues execute = 1/5 {
    noisily di "On loop `execute'/4.. " _c

    // Set variable names as locals for this iteration
    
    // Factor 1 - Population growth
    if `execute' == 1 {
        local exp "demo"
        local var1 "population"
        local var2 "epi_rate"
        local var3 "util_rate"
        local var4 "`middle'price"
        local var5 "pop_frac"
    }

    // Factor 2 - Epidemiology: Prevalence/Incidence
    if `execute' == 2 {
        local exp "epi"
        local var1 "epi_rate"
        local var2 "population"
        local var3 "util_rate"
        local var4 "`middle'price"
        local var5 "pop_frac"
    }

    // Factor 3 - Utilization rate
    if `execute' == 3 {
        local exp "util"
        local var1 "util_rate"
        local var2 "population"
        local var3 "epi_rate"
        local var4 "`middle'price"
        local var5 "pop_frac"
    }

    // Factor 4 - Service price & intensity

    // Factor 5 - Other factors
}
if `execute' == 4 {
    local exp "price"
    local var1 "middle'price"
    local var2 "population"
    local var3 "epi_rate"
    local var4 "util_rate"
    local var5 "pop_frac"
}

// Factor 5 - Population aging
if `execute' == 5 {
    local exp "frac"
    local var1 "pop_frac"
    local var2 "population"
    local var3 "epi_rate"
    local var4 "util_rate"
    local var5 "middle'price"
}

// Calculate "Q" for each factor
gen double `var1'_func_`i'_to_`j' =
    (`var2'`endyear'*`var3'`endyear'*`var4'`endyear'*`var5'`endyear' +
    `var2'`startyear'*`var3'`startyear'*`var4'`startyear'*`var5'`startyear')/5 +
    (`var2'`endyear'*`var3'`endyear'*`var4'`endyear'*`var5'`startyear' +
    `var2'`endyear'*`var3'`endyear'*`var4'`startyear'*`var5'`endyear' +
    `var2'`endyear'*`var3'`startyear'*`var4'`endyear'*`var5'`endyear' +
    `var2'`startyear'*`var3'`endyear'*`var4'`endyear'*`var5'`endyear' +
    `var2'`startyear'*`var3'`startyear'*`var4'`startyear'*`var5'`endyear' +
    `var2'`startyear'*`var3'`endyear'*`var4'`startyear'*`var5'`startyear')/20 +
    (`var2'`endyear'*`var3'`endyear'*`var4'`startyear'*`var5'`startyear' +
    `var2'`startyear'*`var3'`endyear'*`var4'`startyear'*`var5'`startyear' +
    `var2'`endyear'*`var3'`startyear'*`var4'`endyear'*`var5'`endyear' +
    `var2'`startyear'*`var3'`endyear'*`var4'`endyear'*`var5'`endyear' +
    `var2'`startyear'*`var3'`startyear'*`var4'`endyear'*`var5'`startyear')/30

// Calculate effect of each driver - multiply Q by observed difference between two years
gen double `var1'_effect_`i'_to_`j' = `var1'_func*(`var1'`endyear'-`var1'`startyear')
}

// Total effect of all factors to get the expenditure change from year i to year j
egen double sum_effect\_`i'_to\_`j' = rowtotal(*_effect*)

// save data for use in later analysis
tempfile results\_`startyear'_\_`endyear'
save `results\_`startyear'_\_`endyear'' , replace

**********
** STEP 2: COMPILE DATA AND CALCULATE EFFECTS USING DAS GUPTA EQUATION FOR INTERNAL CONSISTENCY **
**********

** Step 2A: Merge tempfiles created above **
*******************************
// start with years 1 to 2, and merge all subsequent combinations
use "`results\_1\_2''", clear
tempfile all\_data
save `all\_data', replace

forvalues i = 1/17 {
    forvalues j = 2/18 {
        if `i' != `j' & `i' < `j' {
            use `all\_data', clear

            merge 1:1 acause function sex age using `results\_`i'\_`j'' , nogen

            save `all\_data', replace
        }
    }
}

// drop if missing - occurs when GBD or DEX do not estimate any values for a given year combination (0.5% of data)
egen miss = rowmiss(*effect*)
drop if miss > 0

*****************************************************************************
** Step 2B: Calculate effects of each driver for one-year increments **
*****************************************************************************

// first get "backwards in time" effects as variables
foreach n in "population_effect" "pop_frac_effect" "epi_rate_effect" "util_rate_effect" "price_effect" {
    forvalues i = 1/17 {
        forvalues j = 2/18 {
            if `i' != `j' & `i' < `j' {
                gen `n'_`j'_to_`i' = `-`n'_`i'_to_`j'
            }
        }
    }
}

// next calculate the terms for the numerator of the Das Gupta equation for internal consistency
foreach n in "population_effect" "pop_frac_effect" "epi_rate_effect" "util_rate_effect" "price_effect" {
    forvalues i = 1/17 {
        local j = `i'+1

        forvalues k = 1/18 {
            if (`k' != `j' & `k' != `i') {
                di "I:`i' J:`j' K:`k"
                gen double `n'_term`k'_`i'_`j' = `n'_`i'_to_`j' + `n'_`j'_to_`k' - `n'_`i'_to_`k'
            }
        }
    }
}

// calculate numerator = sum of the 16 effects calculated above
egen double `n'_num_`i'_`j' = rowtotal(`n'_term*_`i'_`j')

// calculate final effect
gen double `n'_`i'_`j' = `n'_`i'_to_`j' - (`n'_num_`i'_`j'/18)
}

// add up all factor effects to get final factor effects from year 1 to 18.
foreach n in "population_effect" "pop_frac_effect" "epi_rate_effect" "util_rate_effect" "price_effect" {
    egen final_`n' = rowtotal(`n'_12 `n'_23 `n'_34 `n'_45 `n'_56 `n'_67 `n'_78 `n'_89 `n'_910 `n'_1011 `n'_1112 `n'_1213 `n'_1314 `n'_1415 `n'_1516 `n'_1617 `n'_1718)
}

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egen final_effect = rowtotal(final_*)

// Keep variables that we want (just one-year increments, not all time periods used in above calculation)
foreach n in "population_effect" "pop_frac_effect" "epi_rate_effect" "util_rate_effect" "price_effect" {
    local vars_`n' `n'_12 `n'_23 `n'_34 `n'_45 `n'_56 `n'_67 `n'_78 `n'_89 `n'_910 `n'_1011 `n'_1112 `n'_1213 `n'_1314 `n'_1415 `n'_1516 `n'_1617 `n'_1718
}
local keep_vars `vars_population_effect' `vars_pop_frac_effect' `vars_epi_rate_effect'
    `vars_util_rate_effect' `vars_price_effect'

keep function acause sex age final_* `keep_vars'

save "compiled_results.dta", replace
Section 5: Results
The following series of figures show all the figures from the main manuscript including uncertainty intervals, in addition to health condition-specific decomposition for each of the 150 health conditions included in the decomposition.
Acute glomerulonephritis

Change in spending due to each factor, 1996–2013, $ Billions

-0.04 -0.03 -0.02 -0.01 0.00 0.01 0.02 0.03 0.04

Ambulatory care

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Emergency departments

Population size  Disease prevalence or incidence  Service price and intensity  Population age  Service utilization  Total change

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

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Cirrhosis of the liver

- Ambulatory care
- Inpatient care
- Prescribed retail pharmaceutical
- Nursing facility care
- Emergency departments

Change in spending due to each factor, 1996–2013, $ Billions

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Emergency departments

Ambulatory care

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Change in spending due to each factor, 1996–2013, $ Billions

Colon and rectum cancers

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Change in spending due to each factor, 1996–2013, $ Billions

- Population size
- Disease prevalence or incidence
- Service price and intensity
- Population age
- Service utilization
- Total change

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<table>
<thead>
<tr>
<th></th>
<th>Emergency departments</th>
<th>Nursing facility care</th>
<th>Prescribed retail pharmaceutical care</th>
<th>Inpatient care</th>
<th>Ambulatory care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Change in spending due to each factor, 1996–2013, $ Billions

- Population size
- Population age
- Disease prevalence or incidence
- Service utilization
- Service price and intensity

Total change

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Change in spending due to each factor, 1996–2013, $ Billions

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Population size
Disease prevalence or incidence
Service price and intensity
Population age
Service utilization
Total change
Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

-0.6 -0.5 -0.4 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.3 0.4

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

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Emergency departments
Prescribed retail pharmaceutical
Nursing facility care
Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

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Emergency departments

Ambulatory care

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Gallbladder and biliary tract cancer

Change in spending due to each factor, 1996–2013, $ Billions

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Gynecological diseases

Change in spending due to each factor, 1996–2013, $ Billions

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-5 -4 -3 -2 -1 0 1 2 3 4 5 6
Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

Population size
Disease prevalence or incidence
Service price and intensity
Population age
Service utilization
Total change

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Hemoglobinopathies and hemolytic anemias

Change in spending due to each factor, 1996–2013, $ Billions

Population size
Disease prevalence or incidence
Service price and intensity
Population age
Service utilization
Total change

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Lower respiratory tract infections

Ambulatory care

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Emergency departments

Change in spending due to each factor, 1996–2013, $ Billions

-10 -5 0 5 10

Population size
Disease prevalence or incidence
Service price and intensity
Population age
Service utilization
Total change

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

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- Population size
- Disease prevalence or incidence
- Service price and intensity
- Population age
- Service utilization
- Total change

Malignant skin melanoma
Emergency departments

Nursing facility care

Prescribed retail pharmaceutical

Inpatient care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

Multiple myeloma

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Population size

Disease prevalence or incidence

Service price and intensity

Population age

Service utilization

Total change

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

-0.6 -0.4 -0.2 0.0 0.2 0.4 0.6 0.8 1.0

Population size
Disease prevalence or incidence
Service price and intensity
Population age
Service utilization
Total change

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Other cardiovascular and circulatory diseases

Change in spending due to each factor, 1996–2013, $ Billions

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

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Otitis media

Change in spending due to each factor, 1996−2013, $ Billions

-3 -2 -1 0 1 2 3

Population size
Population age
Disease prevalence or incidence
Service utilization
Service price and intensity
Total change

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Sexually transmitted diseases excluding HIV

-1.0 −0.8 −0.6 −0.4 −0.2 0.0 0.2 0.4 0.6 0.8 1.0

Change in spending due to each factor, 1996–2013, $ Billions

- Ambulatory care
- Inpatient care
- Prescribed retail pharmaceutical
- Nursing facility care
- Emergency departments

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

- Population size
- Disease prevalence or incidence
- Service price and intensity
- Population age
- Service utilization
- Total change

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Emergency departments

Nursing facility care

Prescribed retail pharmaceutical

Inpatient care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

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Emergency departments

Inpatient care

Prescribed retail pharmaceutical

Nursing facility care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

−0.10 −0.05 0.00 0.05 0.10 0.15 0.20 0.25 0.30

Varicella

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Population size
Disease prevalence or incidence
Service price and intensity
Population age
Service utilization
Total change
Dental care

Change in spending due to each factor, 1996−2013, $ Billions

- Population size
- Disease prevalence or incidence
- Service price and intensity
- Population age
- Service utilization
- Total change

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Emergency departments

Nursing facility care

Prescribed retail pharmaceutical

Inpatient care

Ambulatory care

Change in spending due to each factor, 1996–2013, $ Billions

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