



Prevalence and Medicare reimbursement by recurrent International Classification of Diseases categories, 2006-2009

Utilization and Costs

Data Points #5

The United States spends more on health care per capita than any other developed country in the world.¹ Health care is currently responsible for 16.2 percent of the Gross Domestic Product (GDP) in the United States but is expected to rise to 25.2 percent by 2025.^{2,3} Chronic diseases account for the greatest surge in spending. High costs are associated with many chronic diseases that are increasing in prevalence, including mental disorders, hypertension, heart disease, pulmonary disorders, spine-related care, gastrointestinal upset, and kidney disease.^{2,4,5,6}

Chronic diseases disproportionately affect older adults.² Among the Medicare population, 10 conditions account for half of the inflation-adjusted growth in spending for Medicare in the past two decades.⁷ Specifically, the most notable increases in recent spending are attributable to diabetes, chronic obstructive pulmonary disease, kidney disease, hyperlipidemia, hypertension, mental disorders, and arthritis. Hypertension alone has been associated with \$108.8 billion in expenditures.⁸ Multiple comorbidities further contribute to high spending by Medicare; heart failure and diabetes together result in greater Medicare spending than either condition alone.⁹ These pervasive conditions require considerable care in inpatient, outpatient, and skilled nursing home settings. Also, specific conditions are more burdensome in a particular setting, rather than across settings. For example, wound care is most prevalent in skilled nursing home facilities and comprises a large portion of Medicare reimbursement.¹⁰

The goal of this *Data Points* is to examine disease burden among Medicare beneficiaries and associated reimbursement costs within inpatient, outpatient, and skilled nursing facility claims. Further, we examine geographic trends in reimbursement per claim for high-cost conditions that are common in the Medicare population.



In 2009, Medicare reimbursement for inpatient claims totaled \$126.7 billion, more than 25 percent of which was for circulatory diseases. The total per claim reimbursement was greatest for congenital anomalies, about \$15,600 per inpatient claim.

In 2009, Medicare reimbursement for noninstitutional outpatient (Carrier) claims totaled \$81.7 billion, about 15 percent of which was for circulatory diseases. The total per claim reimbursement was greatest for neoplasms, about \$225 per Carrier claim.

In 2009, Medicare reimbursement for skilled nursing facility claims totaled \$25.5 billion, more than 30 percent of which was for supplementary classification of factors influencing health status and contact with health services (V-codes). The total per claim reimbursement was also greatest for V-codes, nearly \$5,200 per skilled nursing facility claim.

Findings above are reflective of population under study (discussed on p. 8).



FINDINGS[†]

Inpatient Claims

In 2009, nearly 14.7 million inpatient claims were submitted to Medicare. The total Medicare reimbursement on these claims was \$126.7 billion, up from \$118.1 billion in 2006. Based on the principal diagnosis on each inpatient claim, the International Classification of Diseases, 9th Revision (ICD-9) chapters accounting for the five highest Medicare reimbursements were: (1) *Diseases of the circulatory system*; (2) *Diseases of the respiratory system*; (3) *Injury and poisoning*; (4) *Diseases of the digestive system*; and (5) *Diseases of the musculoskeletal system and connective tissue*. These rankings did not change over the 4-year study period (see Study Period, p. 8), as illustrated in **Figure 1**. Total Medicare reimbursements per claim are presented in **Figure 2**. Of note, the ICD-9 chapters accounting for the highest Medicare reimbursements per claim did not overlap with those with the highest total reimbursements overall, except for *Injury and poisoning*. For each of the 18 ICD-9 chapters, **Table 1** lists the 3-digit ICD-9 categories representing the highest total Medicare reimbursement among inpatient claims.

Figure 1: Percentage of total Medicare inpatient reimbursement for the five highest cost ICD-9 chapters among inpatient claims

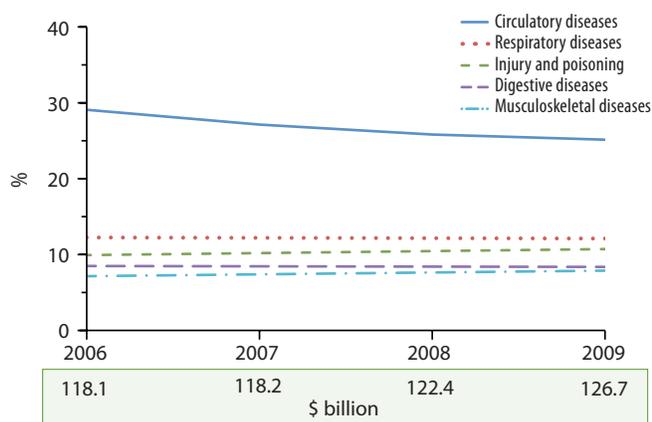
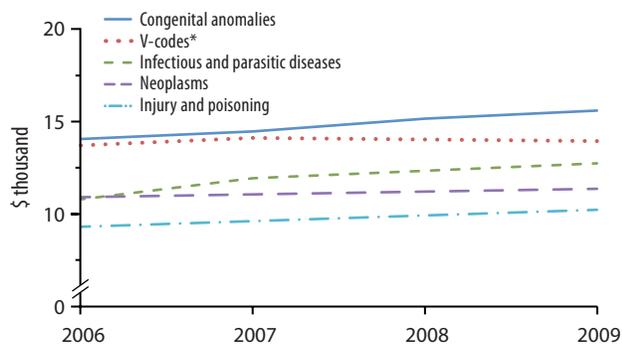


Figure 2: Total Medicare reimbursement per inpatient claim for the five highest cost per inpatient claim ICD-9 chapters



* Supplementary classification of factors influencing health status and contact with health services

Noninstitutional Outpatient (Carrier) Claims

In 2009, more than 841.8 million noninstitutional outpatient claims (as identified via the Carrier file) were submitted. The total Medicare reimbursement on these claims was \$81.7 billion, up from \$76.4 billion in 2006. Based on the principal diagnosis on each Carrier claim, ICD-9 chapters accounting for the five highest Medicare reimbursements were: (1) *Diseases of the circulatory system*; (2) *Neoplasms*; (3) *Diseases of the musculoskeletal system and connective tissue*; (4) *Symptoms, signs, and ill-defined conditions*; and (5) *Diseases of the nervous system and sense organs*. These rankings did not change over the 4-year study period, as illustrated in **Figure 3**. Total Medicare reimbursements per claim are presented in **Figure 4**. Of note, the ICD-9 chapters accounting for the highest Medicare reimbursements per claim did not overlap with those with the highest total reimbursements overall, except for *Neoplasms* and *Diseases of the nervous system and sense organs*. For each of the 18 ICD-9 chapters (plus E-codes), **Table 2** lists the 3-digit ICD-9 categories representing the highest total Medicare reimbursement among noninstitutional outpatient (Carrier) claims.

Figure 3: Percentage of total Medicare noninstitutional outpatient (Carrier) reimbursement for the five highest cost ICD-9 chapters among Carrier claims

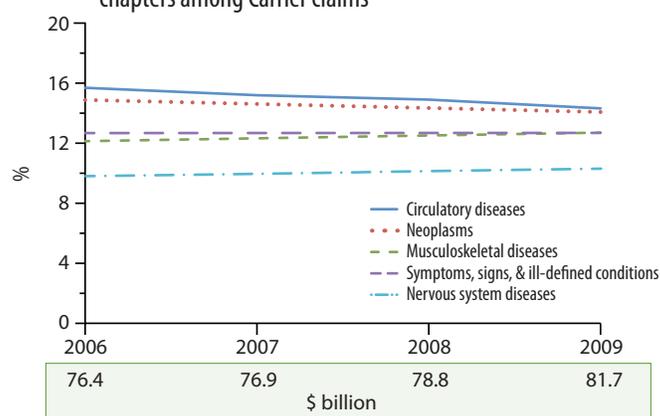
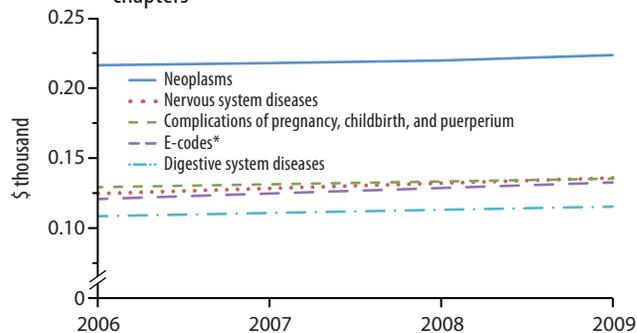


Figure 4: Total Medicare reimbursement per noninstitutional outpatient (Carrier) claim for the five highest cost per Carrier claim ICD-9 chapters



* Supplementary classification of external causes of injury and poisoning

[†] Findings are reflective of the population under study (discussed on p. 8).

Table 1. Three-digit ICD-9 categories with the highest total Medicare reimbursement within each ICD-9 chapter, inpatient claims, 2009

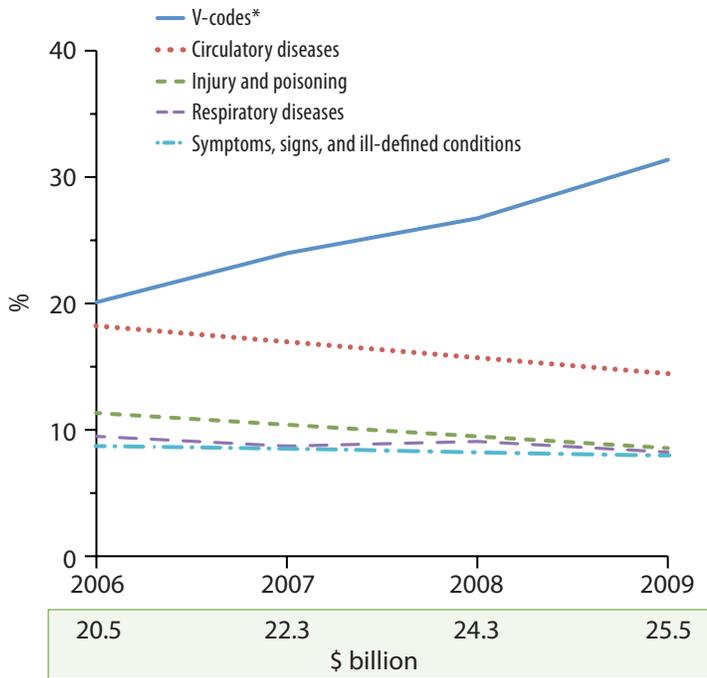
| ICD-9 chapter | Description | 3-digit ICD-9 category with highest within-chapter total reimbursement | Number of beneficiaries | Number of claims | Total Medicare reimbursement (\$ million) |
|---------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------|------------------|-------------------------------------------|
| 001-139 | Infectious and parasitic diseases | septicemia (038) | 461,679 | 526,920 | 7,575.1 |
| 140-239 | Neoplasms | malignant neoplasm of trachea, bronchus, and lung (162) | 78,097 | 86,029 | 1,022.3 |
| 240-279 | Endocrine, nutritional, and metabolic diseases, and immunity disorders | diabetes mellitus (250) | 178,487 | 222,905 | 1,733.5 |
| 280-289 | Diseases of the blood and blood-forming organs | other and unspecified anemias (285) | 72,843 | 79,554 | 403.9 |
| 290-319 | Mental disorders | episodic mood disorders (296) | 166,830 | 238,713 | 1,552.5 |
| 320-389 | Diseases of the nervous system and sense organs | other cerebral degenerations (331) | 70,626 | 81,089 | 678.6 |
| 390-459 | Diseases of the circulatory system | heart failure (428) | 542,262 | 716,324 | 5,381.0 |
| 460-519 | Diseases of the respiratory system | other diseases of lung (518) | 217,125 | 260,166 | 4,763.3 |
| 520-579 | Diseases of the digestive system | intestinal obstruction without mention of hernia (560) | 162,311 | 186,945 | 1,541.9 |
| 580-629 | Diseases of the genitourinary system | acute renal failure (584) | 237,603 | 258,300 | 1,872.2 |
| 630-677 | Complications of pregnancy, childbirth, and the puerperium | other current conditions in the mother classifiable elsewhere (648) | 3,770 | 4,973 | 20.7 |
| 680-709 | Diseases of the skin and subcutaneous tissue | other cellulitis and abscess (682) | 192,580 | 215,351 | 1,178.6 |
| 710-739 | Diseases of the musculoskeletal system and connective tissue | osteoarthritis and allied disorders (715) | 478,828 | 503,953 | 4,788.3 |
| 740-759 | Congenital anomalies | other congenital musculoskeletal anomalies (756) | 5,756 | 5,793 | 102.1 |
| 760-779 | Certain conditions originating in the perinatal period | other and ill-defined conditions originating in the perinatal period (779) | * | * | * |
| 780-799 | Symptoms, signs, and ill-defined conditions | general symptoms (780) | 290,343 | 304,094 | 1,191.3 |
| 800-999 | Injury and poisoning | complications peculiar to a certain specified procedure (996) | 269,240 | 327,166 | 4,274.9 |
| V01-V86 | Supplementary classification of factors influencing health status and contact with health services | care involving use of rehabilitation procedures (V57) | 356,809 | 393,265 | 5,698.9 |

* Small-sized cell omitted in consideration of Centers for Medicare and Medicaid Services privacy concerns

Table 2: Three-digit ICD-9 categories with the highest total Medicare reimbursement within each ICD-9 chapter, noninstitutional outpatient (Carrier) claims, 2009

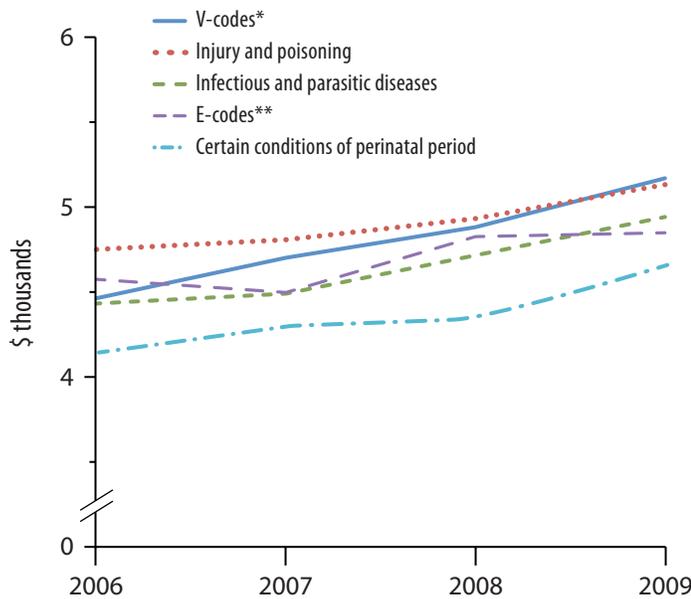
| ICD-9 chapter | Description | 3-digit ICD-9 category with highest within-chapter total reimbursement | Number of beneficiaries | Number of claims | Total Medicare reimbursement (\$ million) |
|---------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------|------------------|-------------------------------------------|
| 001-139 | Infectious and parasitic diseases | dermatophytosis (110) | 2,967,294 | 7,556,081 | 299.3 |
| 140-239 | Neoplasms | malignant neoplasm of female breast (174) | 738,293 | 5,501,110 | 1,330.3 |
| 240-279 | Endocrine, nutritional, and metabolic diseases, and immunity disorders | diabetes mellitus (250) | 7,300,708 | 32,213,992 | 1,927.3 |
| 280-289 | Diseases of the blood and blood-forming organs | other and unspecified anemias (285) | 2,790,457 | 9,816,430 | 920.0 |
| 290-319 | Mental disorders | episodic mood disorders (296) | 1,472,793 | 9,366,336 | 512.5 |
| 320-389 | Diseases of the nervous system and sense organs | cataract (366) | 5,969,684 | 14,752,057 | 2,783.5 |
| 390-459 | Diseases of the circulatory system | essential hypertension (401) | 13,758,863 | 38,385,790 | 2,129.2 |
| 460-519 | Diseases of the respiratory system | other diseases of lung (518) | 2,636,031 | 8,364,954 | 929.4 |
| 520-579 | Diseases of the digestive system | gastrointestinal hemorrhage (578) | 905,366 | 2,625,464 | 349.4 |
| 580-629 | Diseases of the genitourinary system | chronic kidney disease (585) | 1,637,128 | 13,765,987 | 1,805.9 |
| 630-677 | Complications of pregnancy, childbirth, and the puerperium | normal delivery (650) | 6,468 | 9,431 | 4.9 |
| 680-709 | Diseases of the skin and subcutaneous tissue | other dermatoses (702) | 3,410,322 | 5,657,197 | 542.6 |
| 710-739 | Diseases of the musculoskeletal system and connective tissue | other and unspecified disorders of back (724) | 4,469,019 | 17,807,518 | 1,827.4 |
| 740-759 | Congenital anomalies | other congenital musculoskeletal anomalies (756) | 99,642 | 186,465 | 27.6 |
| 760-779 | Certain conditions originating in the perinatal period | other respiratory conditions of fetus and newborn (770) | 4,070 | 5,750 | 0.5 |
| 780-799 | Symptoms, signs, and ill-defined conditions | symptoms involving respiratory system and other chest symptoms (786) | 9,836,544 | 32,389,712 | 2,974.6 |
| 800-999 | Injury and poisoning | complications peculiar to a certain specified procedure (996) | 736,640 | 2,366,216 | 578.9 |
| V01-V86 | Supplementary classification of factors influencing health status and contact with health services | encounter for other and unspecified procedures and aftercare (V58) | 4,349,740 | 16,868,402 | 796.1 |
| E800-E999 | Supplementary classification of external causes of injury and poisoning | other and unspecified fall (E888) | 31,504 | 41,542 | 5.8 |

Figure 5: Percentage of total Medicare skilled nursing facility reimbursement for the five highest cost ICD-9 chapters among skilled nursing facility claims



* Supplementary classification of factors influencing health status and contact with health services

Figure 6: Total Medicare reimbursement per skilled nursing facility claim for the five highest cost per skilled nursing facility claim ICD-9 chapters



* Supplementary classification of factors influencing health status and contact with health services

** Supplementary classification of external causes of injury and poisoning

Skilled Nursing Facility Claims

In 2009, more than 5.6 million skilled nursing facility claims were submitted. The total Medicare reimbursement on these claims was \$25.5 billion, up from \$20.5 billion in 2006. Based on the principal diagnosis on each skilled nursing facility claim, ICD-9 chapters accounting for the five highest Medicare reimbursements were: (1) *Supplementary classification of factors influencing health status and contact with health services* (i.e., V-codes); (2) *Diseases of the circulatory system*; (3) *Injury and poisoning*; (4) *Diseases of the respiratory system*; and (5) *Symptoms, signs, and ill-defined conditions*. These rankings did not change over the 4-year study period, as illustrated in Figure 5. Total Medicare reimbursements per claim are presented in Figure 6. Of note, the ICD-9 chapters accounting for the highest Medicare reimbursements per claim did not overlap with those with the highest total reimbursements overall, except for *Supplementary classification of factors influencing health status and contact with health services* and *Injury and poisoning*. For each of the 18 ICD-9 chapters (plus E-codes), Table 3 lists the 3-digit ICD-9 categories representing the highest total Medicare reimbursement among skilled nursing facility claims.

Similar data for institutional outpatient (i.e., non-Carrier), home health, hospice, and durable medical equipment claims are available online at www.effectivehealthcare.ahrq.gov/index.cfm/search-for-guides-reviews-and-reports/?pageaction=displayproduct&productid=509.

Table 3: Three-digit ICD-9 categories with the highest total Medicare reimbursement within each ICD-9 chapter, skilled nursing facility claims, 2009

| ICD-9 chapter | Description | 3-digit ICD-9 category with highest within-chapter total reimbursement | Number of beneficiaries | Number of claims | Total Medicare reimbursement (\$ million) |
|---------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-------------------------|------------------|-------------------------------------------|
| 001-139 | Infectious and parasitic diseases | septicemia (038) | 13,642 | 26,250 | 116.0 |
| 140-239 | Neoplasms | malignant neoplasm of trachea, bronchus, and lung (162) | 8,309 | 14,874 | 61.9 |
| 240-279 | Endocrine, nutritional, and metabolic diseases, and immunity disorders | diabetes mellitus (250) | 38,287 | 97,702 | 342.0 |
| 280-289 | Diseases of the blood and blood-forming organs | other and unspecified anemias (285) | 14,206 | 31,708 | 129.5 |
| 290-319 | Mental disorders | persistent mental disorders due to conditions classified elsewhere (294) | 25,690 | 75,053 | 203.4 |
| 320-389 | Diseases of the nervous system and sense organs | other cerebral degenerations (331) | 22,876 | 70,941 | 173.7 |
| 390-459 | Diseases of the circulatory system | heart failure (428) | 87,171 | 200,762 | 819.3 |
| 460-519 | Diseases of the respiratory system | pneumonia, organism unspecified (486) | 98,275 | 212,579 | 907.9 |
| 520-579 | Diseases of the digestive system | gastrointestinal hemorrhage (578) | 22,345 | 50,690 | 208.4 |
| 580-629 | Diseases of the genitourinary system | other disorders of urethra and urinary tract (599) | 76,385 | 175,590 | 751.2 |
| 630-677 | Complications of pregnancy, childbirth, and the puerperium | venous complications in pregnancy and the puerperium (671) | 115 | 227 | 1.0 |
| 680-709 | Diseases of the skin and subcutaneous tissue | other cellulitis and abscess (682) | 33,368 | 72,905 | 343.4 |
| 710-739 | Diseases of the musculoskeletal system and connective tissue | disorders of muscle, ligament, and fascia (728) | 55,070 | 121,721 | 550.8 |
| 740-759 | Congenital anomalies | other congenital anomalies of heart (746) | 1,360 | 2,897 | 12.8 |
| 760-779 | Certain conditions originating in the perinatal period | respiratory distress syndrome (769) | 231 | 460 | 2.1 |
| 780-799 | Symptoms, signs, and ill-defined conditions | general symptoms (780) | 90,130 | 201,906 | 891.4 |
| 800-999 | Injury and poisoning | fracture of neck of femur (820) | 57,922 | 137,619 | 737.4 |
| V01-V86 | Supplementary classification of factors influencing health status and contact with health services | care involving use of rehabilitation procedures (V57) | 511,649 | 1,063,378 | 5,604.9 |
| E800-E999 | Supplementary classification of external causes of injury and poisoning | other and unspecified fall (E888) | 1,300 | 2,710 | 13.5 |

Geographic Trends in the Reimbursement per Claim for Select Medical Conditions

As described in the Generation of Maps section (p. 9), we examined trends in the reimbursement per claim for high-prevalence, high-cost conditions that overlapped with Medicare Modernization Act priority conditions, by hospital referral regions (HRRs). These included: *cardiac dysrhythmias* (ICD-9 427; Figure 7) and *other disorders of urethra and urinary tract* (ICD-9 599; Figure 8) in the inpatient setting; *osteoarthritis and allied disorders* (ICD-9 715; Figure 9) in the noninstitutional outpatient setting; and *pneumonia, organism unspecified* (ICD-9 486; Figure 10) and *care involving use of rehabilitation procedures* (ICD-9 V57; Figure 11) in the skilled nursing facility setting.

Figure 7: Average Medicare reimbursement (\$ thousand) per claim for cardiac dysrhythmias as a principal diagnosis on inpatient claims, by hospital referral region

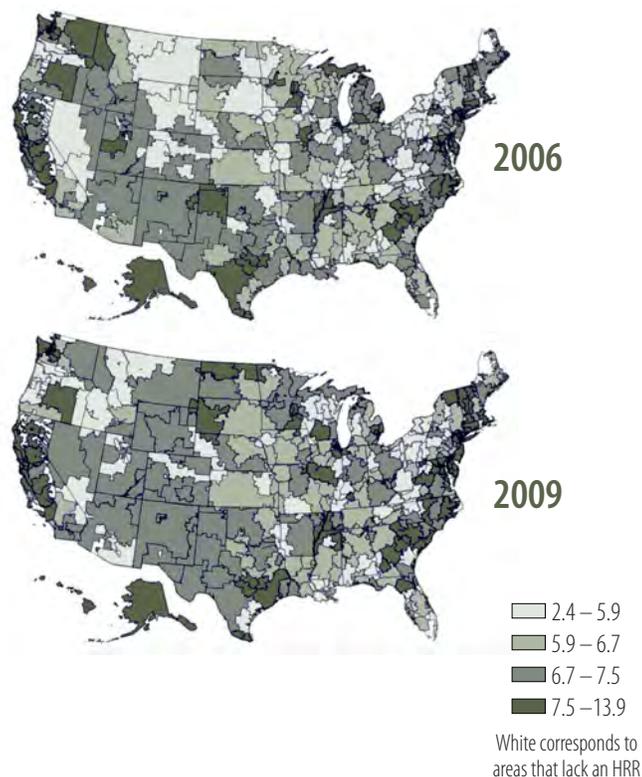


Figure 8: Average Medicare reimbursement (\$ thousand) per claim for other disorders of urethra and urinary tract as a principal diagnosis on inpatient claims, by hospital referral region

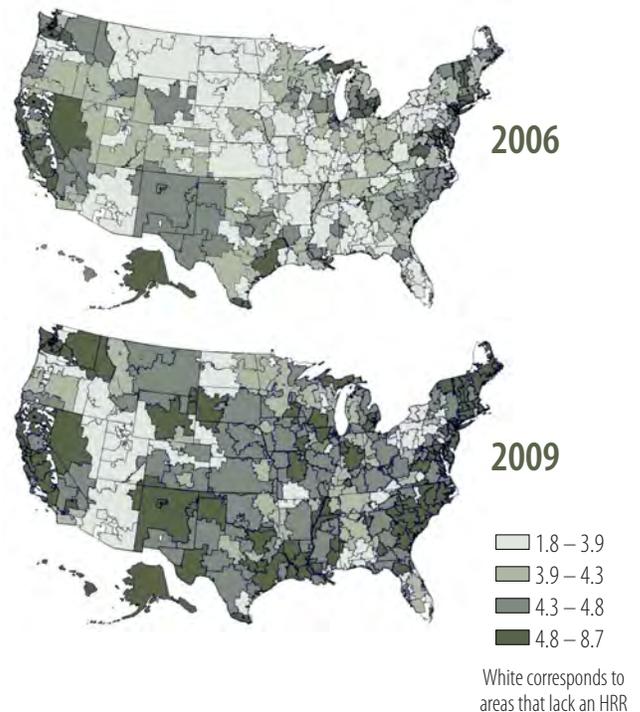


Figure 9: Average Medicare reimbursement (\$ thousand) per claim for osteoarthritis and allied disorders as a principal diagnosis on noninstitutional outpatient (Carrier) claims, by hospital referral region

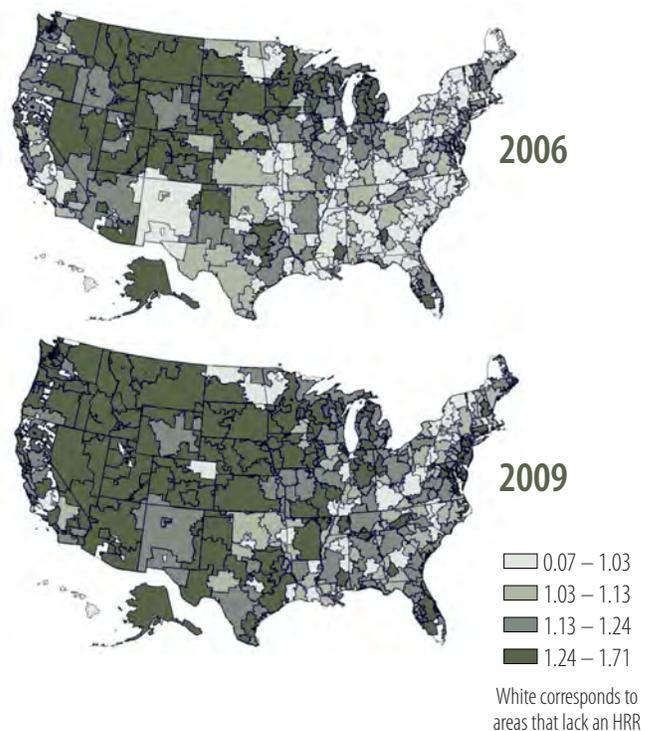


Figure 10: Average Medicare reimbursement (\$ thousand) per claim for pneumonia (organism unspecified) as a principal diagnosis on skilled nursing facility claims, by hospital referral region

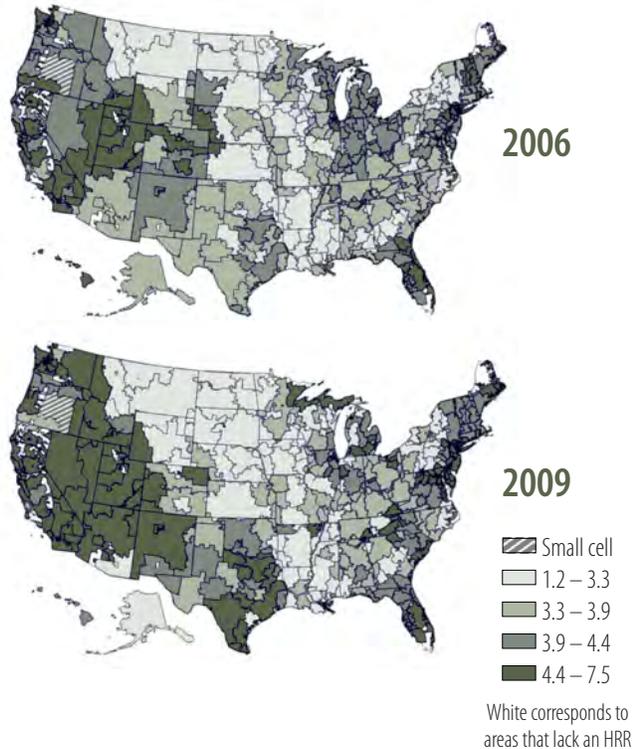
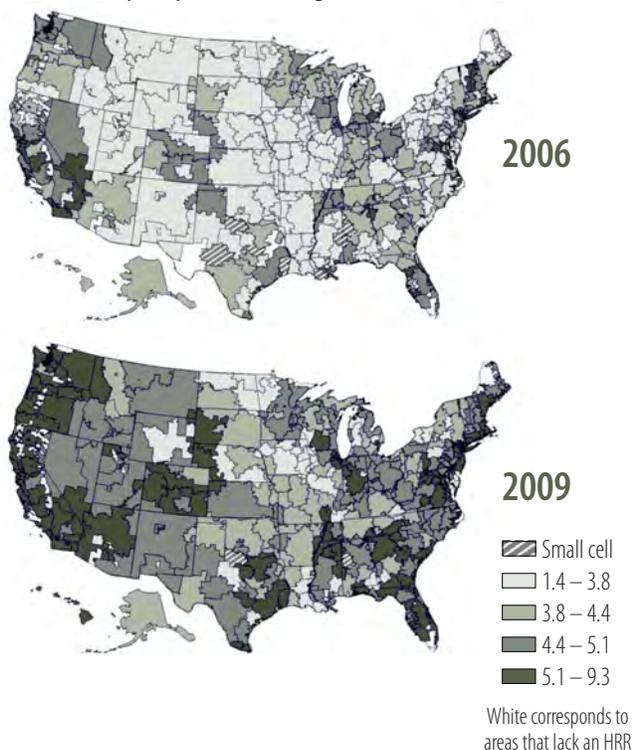


Figure 11: Average Medicare reimbursement (\$ thousand) per claim for care involving use of rehabilitation procedures as a principal diagnosis on skilled nursing facility claims, by hospital referral region



DATA SOURCE

The Department of Health and Human Services' Medicare data were used for this brief. Specifically, a version of the Common Working File (CWF) current through April 30, 2010, was used to identify 2006-2009 claims billed under Medicare Parts A and B. Medicare Part C claims were not considered. The use of these data was covered under a project-specific data use agreement with the Centers for Medicare & Medicaid Services.

STUDY PERIOD

The study period over which disease burden and costs were examined was 2006-2009.

DEFINITIONS AND METHODS

Determination of Counts of Beneficiaries and Claims

For each study year, claims were extracted from the CWF. The principal (i.e., first-listed) diagnosis on each claim was identified and placed into each of four diagnostic groupings of increasing granularity: (1) ICD-9 chapter (e.g., 390-459 = *Diseases of the circulatory system*); (2) ICD-9 subchapter (e.g., 420-429 = *other forms of heart disease*); (3) 3-digit ICD-9 category (e.g., 427 = *cardiac dysrhythmias*); and (4) 5-digit ICD-9 code (e.g., 427.41 = *ventricular fibrillation*). More information on ICD-9 conventions and diagnoses can be found at www.cdc.gov/nchs/data/icd9/icdguide10.pdf. Claims with nonnumerical diagnoses (except characters E and V, indicative of *Supplementary classification codes*) were labeled as invalid and reported as such.

Claims were further stratified by the setting from which they arose. Institutional claims included the following claim types: inpatient; home health; hospice; outpatient (i.e., non-Carrier); and skilled nursing facility. Noninstitutional claims included Carrier and durable medical equipment transactions.

Numbers of claims and beneficiaries were summed across diagnostic groups.

Determination of Cost

For the Medicare Parts A and B claims identified above, total Medicare reimbursement was calculated using the claim payment amount variable. Payments were summed across diagnostic groups.

Determination of Hospital Referral Regions

For institutional claims, the provider identification number on each claim was identified and mapped to ZIP Code based on the Provider of Services (POS) file. The POS file, an extract of the Online Survey and Certification Reporting System database, provides identification number, name, and address

information for participating institutional providers. For Carrier claims, the performing provider ZIP Code was extracted directly from the line item with the highest line payment. For durable medical equipment claims, the ordering physician identification number on each claim was identified and mapped to ZIP Code using National Provider Identifier files.

For 2006 claims, ZIP Codes were then mapped to Dartmouth Atlas of Health Care HRRs using the 2006 hospital service area-HRR crosswalk file. For 2007-2009 claims, ZIP Codes were then mapped to Dartmouth Atlas of Health Care HRRs using the 2007 hospital service area-HRR crosswalk file (the most recent available). Crosswalk files were downloaded from www.dartmouthatlas.org/downloads.aspx.

Generation of Maps

Maps were generated using Dartmouth Atlas of Health Care HRRs (www.dartmouthatlas.org). Reimbursement amounts were grouped into quartiles and mapped accordingly. Regions with fewer than 11 beneficiaries contributing to the proportions presented were mapped in a striped pattern. Geographic regions that did not correspond to an HRR were mapped in white.

Conditions were selected for presentation as maps based on the following methodology. Using the 3-digit ICD-9 categories, conditions were rank ordered separately by: (1) number of beneficiaries, (2) number of claims, and (3) total Medicare reimbursement. The intersection of the 10 highest ranked conditions across these three groups was then identified for inpatient, outpatient, and skilled nursing facility claims. From this listing of high-prevalence high-cost conditions, the funding agency selected conditions of interest, in alignment with Medicare Modernization Act priority conditions.

ADDITIONAL FINDINGS AVAILABLE ONLINE

TABLES

Beneficiary and Claim Counts, by File Type and Category of Primary Diagnosis Code: Summary Statistics

The following five tables are available for each of the following file types: inpatient, outpatient, skilled nursing facility, home health, hospice, durable medical equipment, and Carrier.

Number of Beneficiaries, Number of Claims, and Total Medicare Reimbursement in File Type by 5-Digit ICD-9 Code of Principal Diagnosis, 2006-2009

Number of Beneficiaries, Number of Claims, and Total Medicare Reimbursement in File Type by 3-Digit ICD-9 Category of Principal Diagnosis, 2006-2009

Number of Beneficiaries, Number of Claims, and Total Medicare Reimbursement in File Type by ICD-9 Subchapter of Principal Diagnosis, 2006-2009

Number of Beneficiaries, Number of Claims, and Total Medicare Reimbursement in File Type by ICD-9 Chapter of Principal Diagnosis, 2006-2009

Number of Beneficiaries, Number of Claims, and Total Medicare Reimbursement in File Type by Provider Hospital Referral Region and ICD-9 Chapter of Principal Diagnosis, 2006 - 2009

MAPS

Average Medicare Reimbursement per Claim for Cardiac Dysrhythmias as a Principal Diagnosis on All Claims, by Hospital Referral Region, 2006-2009

Average Medicare Reimbursement per Claim for Cardiac Dysrhythmias as a Principal Diagnosis on Inpatient Claims, by Hospital Referral Region, 2006-2009

Average Medicare Reimbursement per Claim for Pneumonia (Organism Unspecified) as a Principal Diagnosis on All Claims, by Hospital Referral Region, 2006-2009

Average Medicare Reimbursement per Claim for Pneumonia (Organism Unspecified) as a Principal Diagnosis on Skilled Nursing Facility Claims, by Hospital Referral Region, 2006-2009

Average Medicare Reimbursement per Claim for Other Disorders of Urethra and Urinary Tract as a Principal Diagnosis on All Claims, by Hospital Referral Region, 2006-2009

Average Medicare Reimbursement per Claim for Other Disorders of Urethra and Urinary Tract as a Principal Diagnosis on Inpatient Claims, by Hospital Referral Region, 2006-2009.

Average Medicare Reimbursement per Claim for Osteoarthritis and Allied Disorders as a Principal Diagnosis on All Claims, by Hospital Referral Region, 2006-2009

Average Medicare Reimbursement per Claim for Osteoarthritis and Allied Disorders as a Principal Diagnosis on Carrier Claims, by Hospital Referral Region, 2006-2009

Average Medicare Reimbursement per Claim for Care Involving Use of Rehabilitation Procedures as a Principal Diagnosis on All Claims, by Hospital Referral Region, 2006-2009

Average Medicare Reimbursement per Claim for Care Involving Use of Rehabilitation Procedures as a Principal Diagnosis on Skilled Nursing Facility Claims, by Hospital Referral Region, 2006-2009

Direct your Web browser to: www.effectivehealthcare.ahrq.gov/index.cfm/search-for-guides-reviews-and-reports/?pageaction=displayproduct&productid=509.

REFERENCES

1. Reinhardt UE, Hussey PS, Anderson GF. U.S. health care spending in an international context. *Health Aff (Millwood)* 2004;23(3):10-25.
2. Thorpe KE, Ogden LL, Galactionova K. Chronic conditions account for rise in Medicare spending from 1987 to 2006. *Health Aff (Millwood)* 2010;29(4):718-24.
3. Munoz E, Munoz W 3rd, Wise L. National and surgical health care expenditures, 2005-2025. *Ann Surg* 2010; 251(2):195-200.
4. Martin BI, Turner JA, Mirza SK, et al. Trends in health care expenditures, utilization, and health status among U.S. adults with spine problems. *Spine* 2009;34(19): 2077-84.
5. Cryer BL, Wicox CM, Henk HJ, et al. The economics of upper gastrointestinal bleeding in a U.S. managed-care setting: a retrospective, claims-based analysis. *J Med Econ* 2010;13(1):70-77.
6. Yu W, Ravelo A, Wagner TH, et al. The relationships among age, chronic conditions, and health care costs. *Am J Manag Care* 2004 ;10(12):909-16.
7. Thorpe KE, Howard DH. The rise in spending among Medicare beneficiaries: the role of chronic disease prevalence and changes in treatment intensity. *Health Aff (Millwood)* 2006;25(5):w378-88.
8. Hodgson TA, Cai L. Medical care expenditures for hypertension, its complications, and its comorbidities. *Med Care* 2001;39(6):599-615.
9. Bogner HR, Miller SD, de Vries HF, et al. Assessment of cost and health resource utilization for elderly patients with heart failure and diabetes mellitus. *J Card Fail* 2010;16(6): 454-60.
10. Davanzo JE, El-Gamil AM, Dobson A, et al. A retrospective comparison of clinical outcomes and Medicare expenditures in skilled nursing facility residents with chronic wounds. *Ostomy Wound Manage* 2010;56(9):44-54.

AUTHORS

Charles E. Leonard, Pharm.D.^{1,2}
Cristin P. Freeman, M.P.H.^{1,2}
*Thomas MaCurdy, Ph.D.*³
Craig A. Umscheid, M.D., M.S.C.E.^{1,2,4}
*Karla López de Nava, Ph.D.*³
*Teresa Molina, B.A.*³
*Sean MaCurdy, B.A.*³
Christina D. Kang-Yi, Ph.D.^{1,5}
Hanieh Razzaghi, M.P.H.^{1,2}
*David Hsia, J.D., M.D., M.P.H.*⁶

¹ University of Pennsylvania Developing Evidence to Inform Decisions about Effectiveness (DEcIDE) Center, University of Pennsylvania School of Medicine, Philadelphia, PA

² Center for Clinical Epidemiology and Biostatistics, University of Pennsylvania School of Medicine, Philadelphia, PA

³ Acumen LLC DEcIDE Center, Burlingame, CA

⁴ Center for Evidence-Based Practice, University of Pennsylvania Health System, Philadelphia, PA

⁵ Center for Mental Health Policy and Services Research, Department of Psychiatry, University of Pennsylvania School of Medicine, Philadelphia, PA

⁶ Agency for Healthcare Research and Quality, Rockville, MD

This project was funded under Contract No. HHS290200500411 from the Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services, as part of the Developing Evidence to Inform Decisions about Effectiveness (DEcIDE) program. The authors of this report are responsible for its content. Statements in the report should not be construed as endorsement by the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

Acknowledgments: The authors wish to thank Dr. Sean Hennessy for his guidance and Medicare claims expertise, Ms. Mary A. Leonard, Ms. Anne L. Pugh, and Ms. Doreen Bonnett for their graphic design expertise, and Mr. Edmund Weisberg for his medical editing expertise. Furthermore, the work presented herein was based on the authors' interests in prior publications by Dr. Thomas A. Hodgson, such as *Prev Med* 1999;29:173-86 and *Med Care* 1999;37(10):944-1012.

Suggested Citation: Leonard CE, Freeman CP, MaCurdy T, et al. Prevalence and Medicare reimbursement by recurrent International Classification of Diseases categories, 2006-2009. Utilization and Costs. *Data Points* #5 (prepared by the University of Pennsylvania DEcIDE Center under contract no. HHS290200500411). Rockville, MD: Agency for Healthcare Research and Quality. 2011. AHRQ Publication No. 11-EHC036.