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Trends in critical care beds and use among population groups and Medicare and Medicaid beneficiaries in the United States: 2000–2010

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Abstract

Objectives—To analyze patterns of critical care medicine (CCM) beds, use, and costs in acute care hospitals in the United States (US), and relate CCM beds and use to population shifts, age groups, and Medicare and Medicaid beneficiaries from 2000 to 2010.

Design—Retrospective study of data from the federal Healthcare Cost Report Information System, American Hospital Association and US Census Bureau.

Setting—Acute care US hospitals with intensive care beds.

Measurements and Main Results—From 2000 to 2010, US hospitals with CCM beds decreased by 17% (3,586 to 2,977), while the US population increased by 9.6% (282.2M to 309.3M). Although hospital beds decreased by 2.2% (655,785 to 641,395), CCM beds increased by 17.8% (88,235 to 103,900), a 20.4% increase in the CCM/hospital bed ratio (13.5% to 16.2%). There was a greater percentage increase in premature/neonatal (29%, 14,391 to 18,567) than in adult (15.9%, 71,978 to 83,417) or pediatric (2.7%, 1,866 to 1,916) CCM beds. Hospital occupancy rates increased by 10% (59% to 65%), while CCM occupancy rates were stable (range 65%–68%). CCM beds per 100,000 total population increased by 7.4% (31.3 to 33.6). The proportional use of CCM services by Medicare beneficiaries decreased by 17% (37.9% to 31.4%) whereas that by Medicaid rose by 18% (14.5% to 17.2%). Between 2000 and 2010, annual CCM costs nearly doubled (92.9%, $56 to $108 billion). In the same period, the proportion of CCM cost to the Gross Domestic Product (GDP) increased by 32.1% (0.54% to 0.72%, $10,285 to $14,964 trillion).

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Conclusions—Critical care medicine use and costs in the US continue to rise. The increasing use of CCM by the premature/neonatal and Medicaid populations should be considered by healthcare policy makers, state agencies, and hospitals as they wrestle with critical care bed growth and the associated costs.

Keywords

critical care; intensive care; beds; occupancy; Medicare; Medicaid; hospital costs; national health expenditures; gross domestic product

Introduction

Critical care medicine (CCM) beds, utilization and costs have continuously increased in the United States (US) over the past three decades (1;2). However, it is unclear why this has occurred, especially as no local or national programs or society guidelines mandate expansion of the CCM enterprise. Furthermore, CCM beds and use increased despite clinical initiatives to decrease CCM bed utilization, such as increased use of noninvasive ventilation, improved perioperative care for low intensity patients (3), and enhanced palliative and end-of-life care in hospital wards.

The expansion of CCM beds may have been predicated upon a belief by hospitals and state health agencies in the 1990s that existing CCM resources were not sufficient to meet the needs of a growing elderly population. This rationale was popularized in the Committee on Manpower for Pulmonary and Critical Care Societies (COMPACCS) study published in 2000 and a federal report (4–6). Indeed, Medicare inpatient admissions involving ICU stays rose between 1994 and 2004 (7). However, by 2011, the population of Medicare beneficiaries (48.8M) actually accounted for only 15.6% of the US population (311.7M) (8;9). The majority of Medicare patients (83%) were over 65 years old (10). Medicaid, in contrast, accounted for 22% of the US population (68.4M) and is the single largest source of healthcare coverage in the US (11;12). Medicaid beneficiaries are much younger than Medicare with 48% below age 21 and 24% between ages 21 and 64.

The purpose of this study was first to update the national trends in CCM use and costs over a 10-year period from 2000 to 2010. We then specifically explore the changes in aggregate CCM bed numbers relative to population changes, the allocation of CCM bed types by age-specific groups, and the evolving trends of CCM utilization by Medicare and Medicaid beneficiaries.

MATERIALS AND METHODS

Hospitals

Data from all U.S. hospitals were obtained from the Healthcare Cost Report Information System (HCRIS) Master Files (2000–2004: released 5/10/2007; and 2005–2010: released 1/30/2013). HCRIS is composed of federally mandated and annually submitted hospital cost reports and is maintained by the Centers for Medicare and Medicaid Services (CMS) (13). Our focus was on non-federal, acute care general and pediatric hospitals with CCM beds. These hospitals were identified by their Provider Control Type and the last four digits

(Facility Code) of their Medicare Provider Number (short term: 0001–0879 and children/pediatric: 3300–3399). We excluded federal hospitals (i.e. Department of Defense and Department of Veterans Affairs) as they are not required to submit cost reports, as well as chronic care facilities and non-territorial facilities.

Only the final version of each hospital's cost report filed by fiscal year was used. Data from cost reports of less or greater than 12 months were annualized. Acute care hospitals without CCM beds or with fewer than two months, 10 inpatient days, or 10 inpatient beds in a fiscal year period were excluded. Quality controls were performed to assure that all possible cost reports were included, reports were not duplicated, and that cost report data were complete and accurate.

Hospital and CCM Beds

Hospital and CCM bed data were abstracted from CMS 2552–96 Worksheet S-3, Part I (14;15). The "beds" reflect beds available for use. HCRIS adheres to the federal definitions for hospital and CCM beds (16). Data are presented for hospital and CCM beds. "Hospital" includes all inpatient beds (adult, pediatric, nursery, and CCM). "CCM" includes aggregate bed data from five summary CCM categories:1) total, 2) adult (intensive care, coronary care, surgical/trauma, burn, psychiatric/detoxification), 3) child (pediatric and premature/neonatal), 4) pediatric (pediatric) and 5) neonatal (premature/neonatal). Intermediate, progressive or step-down bed data are not available within HCRIS bed categories. Using data from the US census bureau (8), we determined the corresponding populations for the five CCM bed groups: 1) total US (all ages), 2) adult (≥18 years), 3) child (< 18 years), 4) pediatric (1–17 years), and 5) premature/neonatal (<1 year).

Hospital and CCM Days and occupancy rates

Hospital and CCM inpatient days and bed days available were similarly abstracted from CMS 2552–96 Worksheet S-3, Part I. "Inpatient days" are the actual count of days used. "Bed days available" is a hospital based determination of all potential bed days based on operational beds. Occupancy rates were calculated by dividing inpatient days by bed days available.

At the hospital level, both traditional fee-for-service and managed care (third party) Medicare and Medicaid days were included. In contrast, only the traditional fee-for-service Medicare and Medicaid days were included at the CCM level as only fee-for-service days were included in HCRIS. We also obtained annual Medicare and Medicaid beneficiary enrollee totals from CMS (9;11).

CCM Costs

As in previous studies (1;2;17), we determined comprehensive CCM costs per day estimates using the modified Russell equation, a "top-down" approach that examines broad costing without patient-level details (18–21). The cost basis was the "Adjusted expenses per inpatient day" as calculated annually by the American Hospital Association (AHA) for its "nonfederal short-term and other special hospital category" (22). We used the 3:1 value to represent the CCM to non-CCM cost ratio for all study years to conform to previously

published studies and sensitivity analyses (1) and to permit our CCM cost data to be tracked longitudinally over 25 years. The CCM costs per day were then multiplied by CCM days per year (HCRIS) to determine annual CCM costs.

CCM costs per year were compared with three major US financial indexes: 1) Hospital Care (HC) - cost of all hospital care (inpatient and outpatient); 2) National Health Expenditures (NHE) - all health care spending; and 3) Gross Domestic Product (GDP) - the primary indicator of a country's economic health (23). As the cost per year was calculated for 11 years only, we elected not to index the annual values.

Statistical Analyses

Analyses performed—The HCRIS database was compiled by Health Data Insights (Las Vegas, NV; www.healthdatainsights.com) using Microsoft SQL Server 2012 and Excel 2010. Annual, 5 year (2000–2005 and 2005–2010), and 11 year (2000–2010) values were summarized for the variables mentioned above. The 5 year cut off was chosen after an initial graphical exploration of the data demonstrated a non-linear pattern for multiple outcomes. For all values, derived percent change in annual, 5- and 11-year differences served as the main metric to assess change over time. Additionally, the average and standard deviation percent changes across 11 years were calculated.

The relationship between CCM beds and the US population (8;23) was examined in two ways. First, we assessed the slopes describing the change in beds over the change in population across the 5 or 11 years [i.e., slope = $(beds_{2010} - beds_{2000}) / (population_{2010} - population_{2000})$]. Second, we determined the number of beds per 100,000 people (beds per 100K) for each year. Although beds/100K is a standard manner of reporting capacity, the slopes provide more nuanced information about the changes in both population and beds across time. We also calculated the proportion of total CCM beds taken up by adult, child, pediatric, and premature/neonatal CCM beds.

Inpatient total, CCM, Medicare, and Medicaid days were assessed in relation to population/number of Medicare and Medicaid beneficiaries (9;11) using the slope (i.e., days change over population change). We also calculated the proportion of CCM, Medicare, and Medicaid days from the total number of hospital and CCM days.

The year was the sample unit of measurement and we had a total sample size of 11 years. As an observational, macro level study, our results focus on trends and potential patterns on the national level. All computations were done using exact values from the data sources; rounded values are reported in this study for clarity of presentation. All analyses were performed using SAS 9.4 (The SAS Institute, Cary, NC).

The tables present data for 2000, 2005 and 2010. Supplemental digital content- Appendices 1–5 include data for each year. Bed totals for each individual type of CCM bed is also included in Appendix 2. This study was reviewed by the IRB and deemed to be exempt from IRB oversight.

RESULTS

Hospitals

Between 2000 and 2010, the numbers of acute care hospitals and acute care hospitals with CCM beds decreased 26.4% and 17%, respectively (Table 1). These decreasing trends were driven by steep changes in the first half of the decade.

Population

The overall US population increased 9.6% from 2000 to 2010 (Table 1). The majority subgroup, adults, showed a similar percentage (+12.1%) increase. In contrast, the growth was much smaller for the child (<18 years) group (+2.5%). Notably, the premature/neonatal subgroup showed negative growth from 2005 to 2010 (−1.3%).

Medicare and Medicaid Beneficiaries

Between 2000 and 2010, Medicare beneficiaries increased 20.3% (39.6M to 47.7M), with a greater increase in the second half of the decade (Table 1). In contrast, Medicaid beneficiaries increased 52.4% (42.8M to 65.2M), with a greater increase in the first half of the decade.

Beds

The number of hospital beds decreased by 2.2% (655,785 to 641,395) between 2000 and 2010. However, this decrease was not consistent, as the number of hospital beds increased 1.8% between 2005 and 2010 (Table 2). Conversely, CCM beds increased 17.8% (88,235 to 103,900) between 2000 and 2010, and the increase was consistent (1.6% average change per year). These divergent trends resulted in a 20.4% increase in the CCM/hospital bed ratio (13.5% in 2000 to 16.2% in 2010).

Within each age group, adult and child CCM beds steadily increased between 2000 and 2010 (15.9% and 26.0%, respectively). However, this increase in child CCM beds was largely attributable to the increase in Premature/Neonatal beds rather than pediatric beds, especially between 2005 and 2010 (Premature/Neonatal 19.9% vs. Pediatric 0.5%).

The proportion of CCM beds by age group remained relatively consistent for adults between 2000–2010 (Table 2). However, the proportion of child to total CCM beds increased by 7%. The majority of this increase is attributable to a 9.6% increase in the proportion of premature/neonatal beds rather than pediatric beds, which experienced a 12.8% decrease.

Changes in CCM beds in relation to population changes

In the context of relating population changes to CCM beds, the slope is positive between 2000–2010, indicating that as the population increased, the number of CCM beds increased (+576 beds per million people increase) (Table 2). The slope for adults was similar (+451 beds per million adults increase). However, the slope for children was much larger than adults (+2323 beds per million children increase) due to the slower growth in the child population with a decrease in premature/neonatal population growth, disproportional to the increase in the number of child beds (Table 1). Interestingly, the premature/neonatal slope is

positive between 2000 and 2005 because both beds and population grew; in contrast, the slope between 2005 and 2010 is negative because the premature/neonatal population decreased (4.00 to 3.95M) while the number of premature/neonatal beds continued to increase (15,490 to 18,567) (Table 2)

Beds per 100K in the context of population changes

From 2000 to 2010, the number of hospital beds per 100K decreased by 10.8% (232.4 to 207.3 with a −1.1% average decrease per year) (Table 3). Based on the slopes (Table 2), the decreasing beds per 100K trend is due to decreasing beds numbers up until 2005, followed by a much slower rate of bed increase relative to population increase from 2005 to 2010.

From 2000 to 2010, CCM beds per 100K increased 7.4% (31.3 to 33.6). Among age groups, adult CCM beds per 100K increased slightly (+3.4%; 34.3 to 35.5), and pediatric beds per 100K remained stable (2.7 beds per 100K). However, premature/neonatal beds per 100K grew by 25.9% (373.2 to 469.8), with the largest increase in 2005–2010 (Table 2).

Days

The number of hospital days increased overall by 4% between 2000 and 2010 (Table 4). In contrast, CCM days consistently increased (1.8% average per year) with an overall 19.3% increase. Consequently, the ratio of CCM to hospital days increased 14.7% (14.5% to 16.6%) from 2000 to 2010.

Days by payer mix

The overall change in hospital days from 2000 to 2010 was negative for Medicare (−10.4%) but positive for Medicaid (10.3%) (Table 4). Both payee groups experienced increases in hospital and CCM days from 2000–2005; however, from 2005–2010, CCM days decreased for Medicare (−8.5%), but increased for Medicaid (10.8%). Overall, these trends resulted in a decrease in Medicare CCM days (−1.3%) and an increase in Medicaid CCM days (41.1%) between 2000 and 2010.

Out of the total hospital and CCM days, the proportion of hospital and CCM days for Medicare (Figure 1 and Table 4) followed similar patterns (stable from 2000–2005 and similar decreases from 2005–2010). However, while the proportion of Medicaid hospital days was relatively stable between 2000 (14.0%) and 2010 (14.9%), the proportion of Medicaid CCM days increased from 2000 to 2010 (14.5% to 17.2%). Consequently, from 2000–2010, the proportion of Medicaid CCM days experienced large increases (18.3%) while the proportion of Medicare CCM days decreased (−17.3%).

Changes in Days by payer mix in relation to population changes (slope)

Medicare and Medicaid demonstrated differences in the relationship between changes in days versus changes in population over time. The slope of hospital Medicare days was negative from 2000–2010 (800K day decrease per million beneficiaries increase). Although Medicare beneficiaries grew (Table 1) between 2005 and 2010, Medicare days decreased (62.8M to 53.4M), and this resulted in a negative slope (−1.8M day per million beneficiary

increase). The slopes for Medicaid days were much less dramatic. From 2000–2010, the overall slope was positive (100K day increase per million Medicaid beneficiary increase).

Occupancy rates

From 2000 to 2010, hospital occupancy increased (+10.4%, 58.6% to 64.6%), rising steadily until 2008, followed by a decrease (Figure 2). CCM occupancy rates followed a similar trajectory until 2008 and increased overall from 2000 to 2010, but to a lesser degree (+1.5%, 65.2% to 66.2%).

Costs

Between 2000 and 2010, the AHA “adjusted expenses per inpatient day” increased 66.4% ($1,147 to $1,909) and CCM costs per day increased 61.1% ($2,669 to $4,300) (Table 5). National CCM costs nearly doubled in the same period (92.2%, $56 billion to $108 billion). For national indexes, HC and NHE increased 96.1% and 89.0%, respectively, from 2000 to 2010; however, GDP rose 45.5%, a far smaller percentage ($10.285 trillion to $14.964 trillion). Between 2000–2010, the proportion of CCM costs in relation to HC and NHE remained steady (Table 5 and Figure 3). In contrast, the proportion of CCM cost to GDP increased 32.1% (0.54% to 0.72%).

Discussion

Our study shows that CCM beds, utilization and costs in the US continued to rise from 2000 to 2010. To our knowledge, this is the first study to analyze the allocation of CCM resources to age-specific populations on a national level. We found that CCM beds predominantly increased between 2005 and 2010 in the adult and premature/neonatal categories. Whereas the increase in the adult CCM beds aligned with the increase in the adult population, a larger percentage increase occurred in premature/neonatal beds despite a decline in this population between 2005 and 2010. These findings suggest that the aggregate CCM beds are not necessarily increasing just to accommodate an aging population and that nuanced analyses are helpful in understanding the aggregate data (24).

The seemingly paradoxical increases in CCM beds for premature infants and neonates may be explained in part by the increasing survival over the past two decades of premature infants with congenital anomalies and very low birthweight (25). This has occurred as a result of improvements in obstetric and infant care practices for premature infants that allow them to survive but at the cost of requiring more premature/neonatal ICU beds and intensive care. However, the increases in neonatal beds, possibly outstripping their need, may also be secondary to non-clinical factors. These include the deregionalization of neonatal units, variability in state-based certification of neonatal units, possible overuse of neonatal beds based upon special allowances for neonatal costs or styles of care, and the inclusion of multiple levels of neonatal beds (Levels I–IV) within the cost report’s non-nuanced worksheet neonatal bed reporting structure (26–29).

The stable aggregate CCM occupancy rates (68%–70%) from 2000 to 2010 reflect a steady and parallel increase in CCM beds and days. This phenomenon, characterized in the 1950s as Roemer’s Law, suggests that hospital beds are used more as hospital bed numbers

increase (30;31). Current CCM researchers have applied this concept to CCM beds and expressed concerns regarding the resource optimization of CCM beds (32;33). Without judging the appropriateness of CCM bed use, we believe that the long term constancy of the CCM occupancy rates suggests unchanging hospital practices and societal norms of CCM use, triage, and end-of-life care in the ICU as well as an absence of CCM bed expansion and capacity control regulations (34–36).

Our study is also the first to focus on the long term trends of CCM utilization by Medicare and Medicaid beneficiaries. We found that proportionally Medicaid recipients are increasingly using more CCM services than Medicare beneficiaries. This observation appears to coincide with the greater rate of growth and the larger number of beneficiaries in Medicaid than in Medicare (9;11;12), and illustrative of recent reports that less than 10% of healthcare cost increases between 1980 and 2011 were driven by demand for care of Medicare beneficiaries (37). Within Medicaid inpatient use, we found an increasing proportion of Medicaid CCM vs. general hospital days, reflective of recent studies that showed that Medicaid beneficiaries are often in poor health as they enter the inpatient environment (38;39).

The cost of CCM nearly doubled between 2000 and 2010 and the proportion of the GDP used by CCM increased by 32.1% (0.54% to 0.72%). Interestingly, the percentage increases for CCM, hospital care and national healthcare costs all greatly surpassed the rise in the GDP. However, our cost estimates for CCM may actually understate the actual CCM costs for several reasons. First, the Russell equation, using CCM days as a proxy of CCM use, did not include CCM type days incurred in non-CCM hospital areas. Second, CCM physician billings were not included in the AHA “adjusted inpatient cost per day” (21). It is unlikely that CCM will be cost contained unless national health expectations for critically ill patients are reevaluated (40). This may involve critical reassessments of the benefits of CCM as currently delivered, decreasing CCM bed numbers and use, and only offering CCM level care within CCM designated areas (i.e., ICUs vs. step down units and wards) (32;41).

Our study has several limitations inherent to the use of administrative databases. Patient-level clinical data (i.e., number of patients represented by the days, patient age, days per CCM discharge, illness severity, beneficiary status, and outcomes) are not available in HCRIS. Of particular note, we used the US Census Bureau 0–1 year designation to represent the corresponding population for premature/neonatal units. Ideally, the premature population would be represented by the number of premature (preterm) babies by gestational weeks, and neonates, by the number of babies at 0–28 days. However, the US Census Bureau does not maintain population data below 1 year (8). Therefore, our age based population analysis performed in conjunction with CCM bed categories is incomplete without a more granular view of the ages of the general population and the actual number of patients and their ages cared for within each type of CCM unit.

Similar “big-data” problems exist in our Medicare and Medicaid analyses. First, the trends of Medicare and Medicaid percentage use of days at the hospital and CCM levels are not fully comparable because Medicare and Medicaid hospital days included both fee-for-service and managed care; whereas the analyses of Medicare and Medicaid CCM days

included fee-for-service only. Second, we use hospital and CCM days to proxy beneficiary status without knowledge of the number of beneficiaries that accrued these days or their ages. Moreover, the divergent trends observed between Medicare and Medicaid CCM days (Figure 1 and Table 4) may be an understatement of the actual differences between these two insurers. The expanding proportional difference in days that we describe occurred with traditional fee-for-service CCM days only and does not account for managed care CCM days which are predominant in Medicaid (managed care beneficiaries: Medicaid 71% versus Medicare 25% in 2010) (9;42). The differences in Medicare and Medicaid CCM days may be further exaggerated as Medicaid enrolls additional patients under the Affordable Care Act (43).

Conclusions

Critical care medicine beds, use and costs in the US continued to increase between 2000 and 2010. The greatest percentage growth in CCM beds occurred for premature/neonatal patients despite a decrease in that population. Additionally, Medicaid recipients are increasingly using proportionally more critical care services than Medicare beneficiaries, thus sicker and younger patients, rather than the aging population, may be the main driver for increasing the number of CCM beds. Legislators, state-based departments of health, and hospitals should account for the increased use of CCM by the premature/neonatal and Medicaid patient populations as they grapple with critical care bed growth and the associated costs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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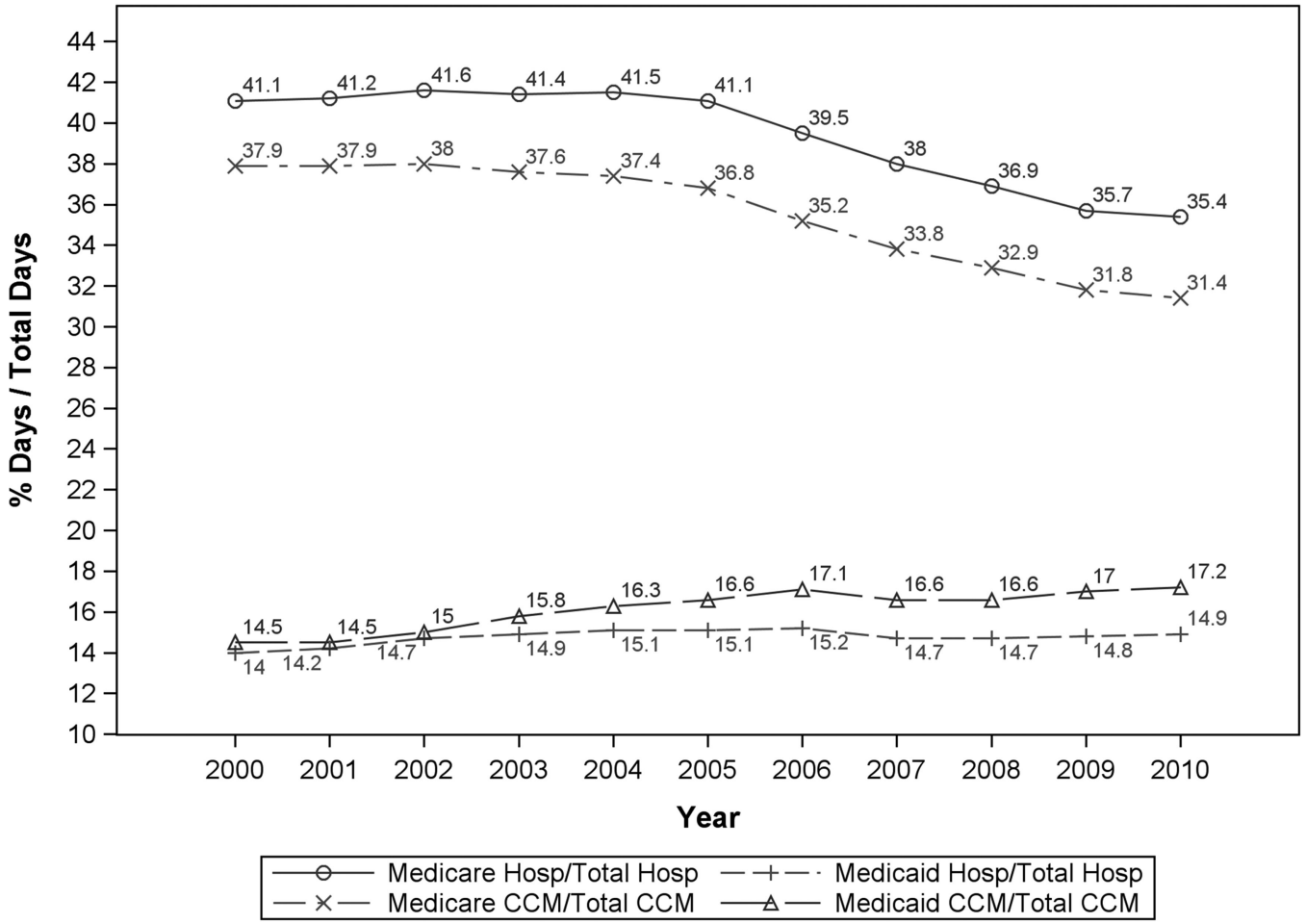

Figure 1.

Proportion of hospital and CCM days for Medicare and Medicaid beneficiaries by year. The proportion of Medicare hospital and CCM days followed similar patterns of stability from 2000–2005 and then decreased from 2005–2010. The proportion of Medicaid CCM days increased over time (14.5% to 17.2%), while the proportion of Medicaid hospital days remained relatively stable (14.0% to 14.9%). The proportion of Medicare CCM was always lower than the proportion of Medicare hospital days, although the gap was similar throughout 2000–2010. In contrast, the proportion of Medicaid CCM days was always higher than the Medicaid hospital days with a widening gap as the years increased.

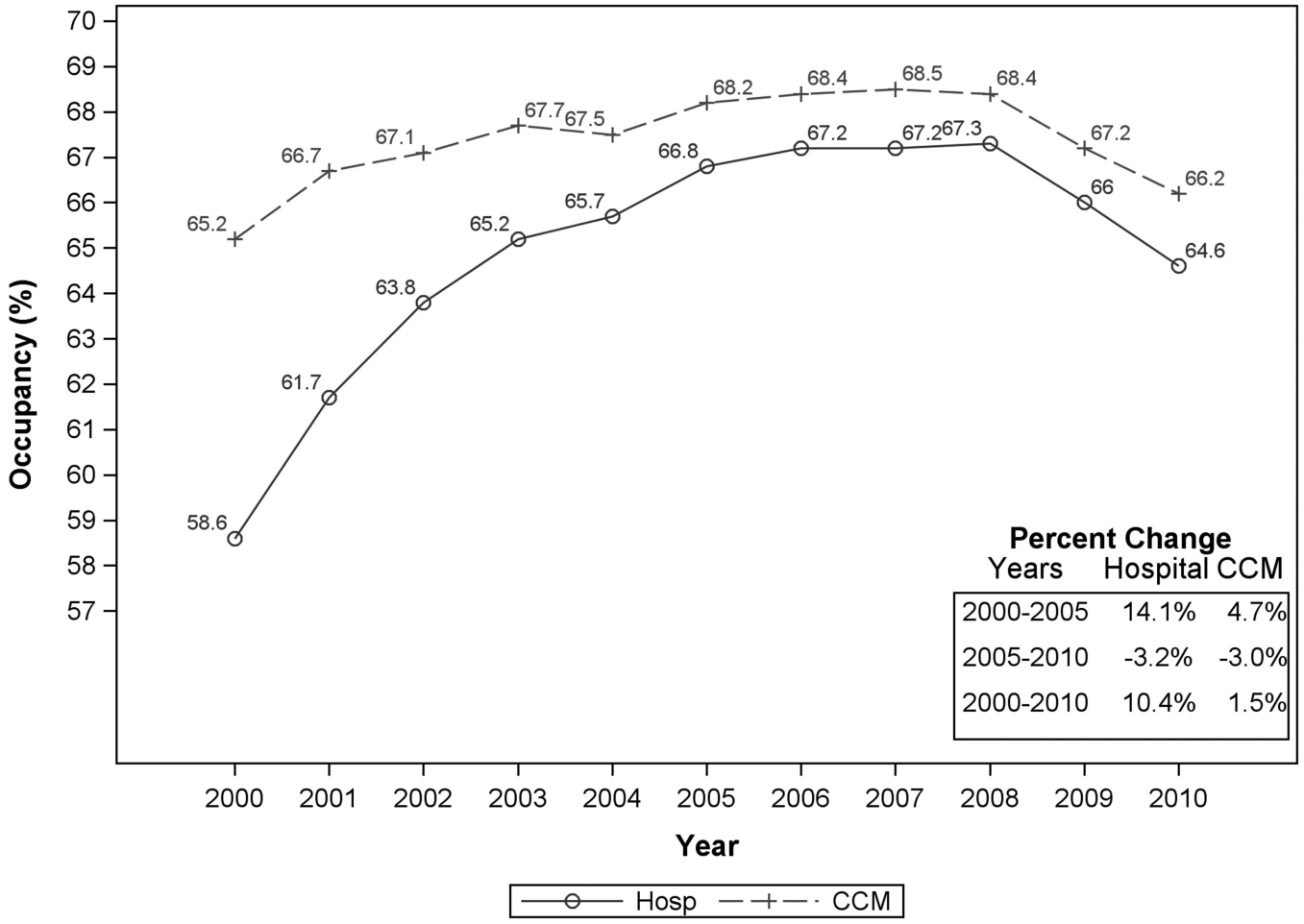

Figure 2.

Hospital and CCM occupancy rates by year. Both hospital and CCM occupancy follow a similar pattern. Even though occupancy increased overall from 2000–2010 for hospital (+10.4%) and CCM (+1.5%), occupancy rates decreased between 2008 and 2010.

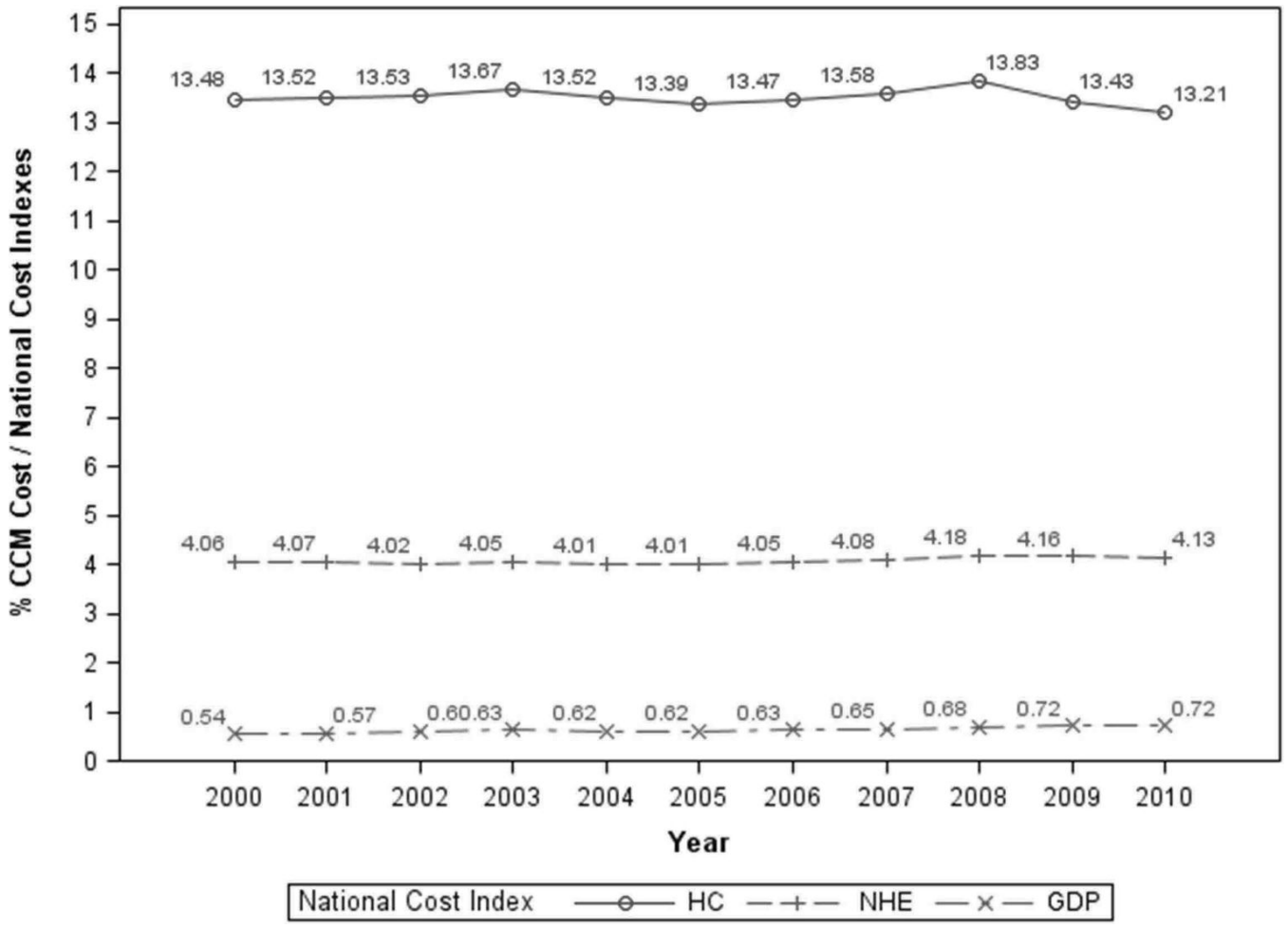

Figure 3.

CCM Costs as a percentage of national cost indexes (23). The proportion of CCM costs to Hospital care (HC) costs and National Health Expenditures (NHE) remained relatively stable throughout 2000 and 2010. CCM/HC decreased by 2.11% (13.48% to 13.19%) and CCM/NHE increased by 1.81% (4.07% to 4.14%). In contrast, the percent increase in CCM/GDP (Gross Domestic Product) was quite large at 32.1% (0.54% to 0.72%).

TABLE 1

Hospital, Population, and Medicare and Medicaid Data: 2000–2010

	Year			Percent Change				
	2000	**2005**	**2010**	**2000–2005**	**2005–2010**	**2000–2010**	**Avg**	**SD**
Hospitals								
All	5,818	5,880	5,934	1.10%	0.90%	2.00%	0.20%	0.50%
Acute Care	4,718	3,754	3,474	−20.40%	−7.50%	−26.40%	−3.00%	2.20%
Acute Care with CCM	3,586	3,155	2,977	−12.00%	−5.60%	−17.00%	−1.80%	1.10%
Population (in millions)								
Overall US	282.2	295.5	309.3	4.70%	4.70%	9.60%	0.90%	0.00%
Adult (Age ≥18)	209.8	222	235.2	5.80%	5.90%	12.10%	1.10%	0.00%
Child (Age <18)	72.4	73.5	74.1	1.60%	0.90%	2.50%	0.20%	0.10%
Pediatric (Age 1–17)	68.5	69.5	70.2	1.50%	1.00%	2.50%	0.20%	0.10%
Premature/Neonatal (Age <1)	3.9	4	3.9	3.80%	−1.30%	2.50%	0.30%	2.10%
Beneficiaries (in millions)								
Medicare	39.6	42.5	47.7	7.20%	12.20%	20.30%	1.90%	0.60%
Medicaid	42.8	57.3	65.2	34.10%	13.70%	52.40%	4.30%	2.80%

TABLE 2

Hospital and Critical Care Medicine Bed Data: 2000–2010

	Year			Percent Change				
	2000	**2005**	**2010**	**2000–2005**	**2005–2010**	**2000–2010**	**Avg**	**SD**
Hospital Beds								
Total	655,785	630,095	641,395	−3.90%	1.80%	−2.20%	−0.20%	1.40%
Slope *				−1924	817	−529	−565	3481
CCM Beds								
Total	88,235	94,300	103,900	6.90%	10.20%	17.80%	1.60%	0.70%
Slope				454	694	576	579	240
Adult (Age ≥18) **	71,978	76,904	83,417	6.80%	8.50%	15.90%	1.50%	0.70%
Slope				404	495	451	451	206
Child (Age <18) ***	16,257	17,396	20,483	7.00%	17.70%	26.00%	2.40%	1.80%
Slope				993	4593	2323	6145	10374
Pediatric (Age 1–17)	1,866	1,906	1,916	2.10%	0.50%	2.70%	0.30%	3.50%
Slope				40	14	29	40	431
Premature/Neonatal (Age<1)	14,391	15,490	18,567	7.60%	19.90%	29.00%	2.60%	2.20%
Slope				7404	−59231	43280	−11098	19455
Beds / Total Hospital Beds (%)								
CCM	13.50%	15.00%	16.20%	11.20%	8.20%	20.40%	1.90%	1.40%
Beds / Total CCM Beds (%)								
Adult	81.60%	81.60%	80.30%	0.00%	−1.60%	−1.60%	−0.20%	0.40%
Child ***	18.40%	18.40%	19.70%	0.10%	6.90%	7.00%	0.70%	1.50%
Pediatric	2.10%	2.00%	1.80%	−4.40%	−8.80%	−12.80%	−1.30%	3.60%
Premature/Neonatal	16.30%	16.40%	17.90%	0.70%	8.80%	9.60%	0.90%	1.80%

* Slope indicates change in beds per million change in population

** Adult includes intensive care, coronary care, surgical/trauma, burn, psychiatric/detoxification beds

*** Child includes pediatric and premature/neonatal beds

TABLE 3

Hospital and Critical Care Medicine Beds per 100,000 Population: 2000–2010

	Year			Percent Change				
Per 100K People	**2000**	**2005**	**2010**	**2000–2005**	**2005–2010**	**2000–2010**	**Avg**	**SD**
Hospital								
Total	232.4	213.2	207.3	−8.30%	−2.80%	−10.80%	−1.10%	1.40%
CCM								
Total	31.3	31.9	33.6	2.00%	5.30%	7.40%	0.70%	0.70%
Adult*	34.3	34.6	35.5	1.00%	2.40%	3.40%	0.30%	0.70%
Child**	99.4	104.6	112.4	5.20%	7.50%	13.10%	1.20%	0.70%
Pediatric	2.7	2.7	2.7	0.70%	−0.50%	0.20%	0.10%	3.50%
Premature/Neonatal	373.2	386.8	469.8	3.60%	21.40%	25.90%	2.40%	4.00%

*Adult includes Intensive care, coronary care, surgical/trauma, burn, psychiatric/detoxification beds

**Child includes pediatric and premature/neonatal beds

TABLE 4

Hospital and Critical Care Medicine Inpatient Days: 2000–2010

	Year			Percent Change				
	2000	**2005**	**2010**	**2000–2005**	**2005–2010**	**2000–2010**	**Avg**	**SD**
Hospital Days (in millions)								
Total	145.1	152.9	150.9	5.40%	−1.30%	4.00%	0.40%	1.20%
Slope *				0.6	−0.1	0.2	0.2	0.7
Medicare	59.6	62.8	53.4	5.40%	−15.00%	−10.40%	−1.10%	2.50%
Slope				1.1	−1.8	−0.8	−0.2	2.2
Medicaid	20.3	23.1	22.4	13.80%	−3.10%	10.30%	1.00%	2.20%
Slope				0.2	−0.1	0.1	0.1	0.6
CCM Days (in millions)								
Total	21	23.3	25	11.10%	7.40%	19.30%	1.80%	0.90%
Slope				0.2	0.1	0.1	0.1	0.1
Medicare	8	8.6	7.9	7.80%	−8.50%	−1.30%	−0.10%	2.10%
Slope				0.2	−0.1	0	0.1	0.3
Medicaid	3	3.9	4.3	27.30%	10.80%	41.10%	3.50%	2.50%
Slope				0.1	0.1	0.1	−0.1	0.4
Days (CCM, Medicare and Medicaid)/ Total Hospital Days (%)								
CCM	14.50%	15.20%	16.60%	5.50%	8.80%	14.70%	1.40%	0.60%
Medicare	41.10%	41.10%	35.40%	0.00%	−13.80%	−13.80%	−1.50%	1.80%
Medicaid	14.00%	15.10%	14.90%	8.00%	−1.80%	6.10%	0.60%	1.60%
CCM Days/Total CCM Days (%)								
Medicare	37.90%	36.80%	31.40%	−3.00%	−14.80%	−17.30%	−1.90%	1.70%
Medicaid	14.50%	16.60%	17.20%	14.60%	3.20%	18.30%	1.70%	2.30%

* Slope indicates change in inpatient days per million increase in population

TABLE 5

Critical Care Medicine and National Cost Indexes: 2000–2010

	Year			Percent Change				
	2000	**2005**	**2010**	**2000–2005**	**2005–2010**	**2000–2010**	**Avg**	**SD**
Cost Per Day								
Inpatient *	$1,147	$1,522	$1,909	32.70%	25.40%	66.40%	5.20%	1.10%
CCM **	$2,669	$3,499	$4,300	31.10%	22.90%	61.10%	4.90%	1.20%
National Cost Indexes *** (in billions)								
National CCM ****	$56	$82	$108	45.70%	31.90%	92.20%	6.80%	2.00%
Hospital Care	$416	$609	$815	46.70%	33.70%	96.10%	7.00%	1.20%
National Health Expenditure	$1,378	$2,035	$2,604	47.70%	28.00%	89.00%	6.60%	2.00%
Gross Domestic Product	$10,285	$13,094	$14,964	27.30%	14.30%	45.50%	3.90%	2.60%
CCM / National Cost Indexes (%)								
CCM / HC	13.48%	13.39%	13.21%	−0.67%	−1.33%	−1.99%	−0.19%	1.44%
CCM / NHE	4.06%	4.01%	4.13%	−1.34%	3.10%	1.71%	0.17%	1.04%
CCM / GDP	0.54%	0.62%	0.72%	14.43%	15.45%	32.11%	2.85%	2.51%

* Inpatient cost per day is the adjusted expenses per inpatient day as determined by the AHA

** CCM cost per day is determined by the Russell Equation

*** National costs indices (HC: Hospital Care, NHE: National Health Expenditure and GDP: Gross Domestic Product) are obtained from the Centers for Medicare and Medicaid Services

**** National CCM Costs are calculated by multiplying the CCM cost per day/year by the number of CCM inpatient days/year