

Comparison of national data on ambulatory surgery from the National Hospital Ambulatory Medical Care Survey, Medicare, and the American Hospital Association

Margaret Jean Hall, Ph.D.

Division of Health Care Statistics, National Center for Health Statistics,
Centers for Disease Control and Prevention, DHHS
3311 Toledo Road, Hyattsville, MD 20782

Abstract

In 2010, nationally representative data on ambulatory surgery provided in hospitals and ambulatory surgery centers were gathered by the National Center for Health Statistics, Centers for Disease Control and Prevention, in the National Hospital Ambulatory Medical Care Survey (NHAMCS). The last time similar national data were gathered was in 2006 in the National Survey of Ambulatory Surgery (NSAS). This presentation brings together findings on trends in ambulatory surgery from the NSAS 2006 and the NHAMCS 2010, as well as from Medicare and the American Hospital Association data sources, from 2006 to 2010.

Key Words: Outpatient surgery, procedures, National Hospital Ambulatory Medical Care Survey

1. Background

The National Center for Health Statistics (NCHS), which is in the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services, is the Nation's principal health statistics agency. NCHS compiles statistical information to guide actions and policies to improve the health of the U.S. population. A number of health care provider surveys have been conducted by NCHS including surveys of hospitals, physicians' offices, community health centers, emergency departments, outpatient departments, and ambulatory surgery centers (ASCs). This paper focuses on ambulatory surgery survey data.

NCHS gathered nationally representative ambulatory surgery data from hospital-based and freestanding ambulatory surgery centers through the National Survey of Ambulatory Surgery (NSAS) from 1994-1996 and again in 2006(1). Ambulatory surgery, also known as outpatient or same-day surgery, consists of surgical and nonsurgical procedures that are non-emergency and scheduled in advance, generally without requiring an overnight hospital stay. Budgetary constraints required that NSAS be taken out of the field after the

2006 survey. When funding was again available, annual collection of ambulatory surgery data was phased into another NCHS survey, the National Hospital Ambulatory Medical Care Survey (NHAMCS) (2). Beginning in 2009, ambulatory surgery data were gathered from various hospital locations (formerly called hospital-based ambulatory surgery centers) and in 2010 data collection expanded to include ambulatory surgery centers (formerly called freestanding ambulatory surgery centers).

NHAMCS is an annual nationally representative survey which since 1992 collected data on visits to hospital outpatient departments (OPD) and emergency departments (ED). It has a multi-stage probability sampling design involving samples of geographic primary sampling units, hospitals with EDs and/or OPDs and, beginning in 2010, hospitals with ambulatory surgery and ambulatory surgery centers.

2. Objectives

The major objective of this research was to present the findings from the NSAS 2006 and the NHAMCS 2010 on trends in ambulatory surgery, and compare these findings to other national data on ambulatory surgery that were available during this time period. The focus was on answering the following questions of continuing interest to health care and health policy experts:

- How much ambulatory surgery in the period from 2006 to 2010 was provided in hospitals and how much was provided in ambulatory surgery centers?
- What kinds of ambulatory surgery services were provided in the period from 2006 to 2010?
- What was the expected source of payment for ambulatory surgery in the period from 2006 to 2010?
- Did ambulatory surgery in hospitals and ambulatory surgery centers increase, decrease, or remain the same over the time period?

Other objectives were to identify gaps in ambulatory surgery data, and to discuss NCHS ambulatory surgery data collection since 2010, and future plans for gathering and releasing these data.

3. Data Sources and Methods

For this research NCHS data from the 2006 NSAS and 2010 NHAMCS were examined along with data on ambulatory surgery from other non-NCHS national data sources.

3.1 Review of NCHS Data on Ambulatory Surgery

There were many similarities between the two NCHS surveys, NSAS and NHAMCS. For both, in scope hospitals were non-Federal and non-institutional, had six or more beds set up and staffed for inpatient use, and were either general service acute care hospitals or

hospitals whose average length of stay is less than 30 days. The hospital sample was selected from the Verispan, later the SDI, Hospital Database (3) (4).

Locations in hospitals where ambulatory surgery was performed for both surveys included

- main or general operating rooms,
- all dedicated ambulatory surgery rooms,
- cystoscopy units,
- endoscopy units,
- cardiac catheterization labs,
- laser procedure rooms,
- pain block rooms, and
- other procedure rooms.

Locations within hospitals dedicated exclusively to dentistry, podiatry, or small procedures are excluded.

In scope (formerly freestanding) ambulatory surgery centers included those which had been drawn from a frame created using Verispan's Outpatient Surgery Center Database (5) and Medicare's Provider of Services file on Ambulatory Surgery Centers (6). Facilities exclusively devoted to dentistry, podiatry, family planning, or birthing were out-of-scope. But these types of surgeries were included if they were part of a facility which included in-scope surgeries.

In both NSAS and NHAMCS a sample of ambulatory surgery visits was drawn. Sampled records were weighted to produce national estimates. An estimation process adjusts for survey nonresponse and makes ratio adjustments within and across facilities.

For both surveys, induction interviews were conducted with staff in the hospital ambulatory surgery locations and in the (freestanding) ASCs. Data were abstracted from the medical records of the sampled patients and included information on

- Patient demographics (e.g. age, sex, region, race)
- Expected source of payment
- Diagnoses and surgical and nonsurgical procedures
- Type of anesthesia and anesthesia provider
- Duration of surgery
- Prescriptions/drugs during and after surgery as well as at discharge
- Unexpected events during or directly after surgery, including complications
- Discharge disposition

Whether the facility checked on the status of patients after discharge

But there were also differences between these two surveys (7). The 2006 and the 2010 data were from surveys with different sampling designs and different data gathering procedures. Data from NHAMCS were gathered during randomly selected 4-week reporting periods, and NSAS data were gathered throughout the year.

The sample sizes for NHAMCS were half of what they had been for NSAS, so estimates have larger standard errors, making it more difficult for differences to achieve a level of statistical significance. The 2006 NSAS sample was drawn from recent frames of hospitals and freestanding ASCs. But the NHAMCS sample only had an updated hospital frame. The ASC frame used for NHAMCS sampling was the 2006 NSAS sample. This means that visits to ASCs which opened after 2005 are not represented. This sample was expected to yield data on the characteristics (if not the numbers) of ambulatory surgery visits occurring in ASCs until an updated one could be drawn (8).

In the NHAMCS, some hospitals had difficulty identifying all of the locations in the hospital where ambulatory surgery was provided. Procedures in 2010 were more scattered throughout the hospital, including within various medical clinics, whereas in 2006 a large share of the ambulatory surgery was provided in the hospital-based ambulatory surgery centers. Particularly at the beginning of the hospital ambulatory surgery data collection under NHAMCS, there may have been an undercount. More extensive training is believed to have corrected this problem.

Examination of the nature and extent of the issues determining whether or not procedures were in or out of scope for the ambulatory surgery component of NHAMCS, raised the possibility that in 2006, when ambulatory surgery was supposed to be out of scope for the outpatient component of NHAMCS, similar uncertainty occurred which may have resulted in procedures being counted in both the NHAMCS OPD data and the NSAS data.

3.2 Review of Non-NCHS sources of national ambulatory surgery data

3.2.1 Medicare data

Medicare releases annual data (9-10) on the number of Medicare certified ambulatory surgery centers. Since most of the patients who receive ASC services do so in certified centers, these data provide some limited information about trends in ambulatory surgery. The main problem is that information is not released about the size of ASCs over time, so it cannot be assumed that an increase or decrease in the number of ASCs means that the number of ambulatory surgeries changed in the same way.

There are also Medicare data on the utilization and costs of ASC services over time. But these data only include information on Medicare fee-for-service beneficiaries in ambulatory surgery centers (not in hospitals). The utilization and cost data are not nationally representative of Medicare beneficiaries as a whole because they do not include data from the 20-25% of Medicare patients who are enrolled in managed care programs. Managed care enrollees could have very different utilization patterns. There are other limitations with using these Medicare data to examine national trends in

ambulatory surgery. Close to two-thirds of ambulatory surgery patients have payment sources other than Medicare and are under 65 years of age.

3.2.2 American Hospital Association data

AHA data were gathered from an annual survey of hospitals and include facility level data only, not patient level data. Reporting is voluntary. The data are not nationally representative. Historically, the response rate for the AHA Annual Survey has been more than 75% each year (11). In contrast to Medicare data, which are primarily from ambulatory surgery centers, AHA data generally include only ambulatory surgery performed in hospitals. AHA gathers data on the number of surgeries based on what is reported by their respondents. Because surgeries using this definition can include one or more procedures these data are not equivalent to NCHS definitions of either patient visits or procedures received. These respondents were not randomly selected to represent hospitals as a whole so any results cannot be generalized. In addition, since hospitals are not tracked over time we don't know the extent to which the same or different hospitals responded over the period from 2006 to 2010.

3.2.3 SDI Outpatient Profiling Solution data

SDI data (12) are gathered from outpatient surgery providers and from the states, and include general facility level information. These lists of providers have been useful for creating sampling frames for NCHS provider surveys, including ambulatory surgery centers. During the period of time examined for this paper, SDI experienced ownership changes. Response rates were low, particularly during the transition period, and some items, including estimated numbers of ambulatory surgery procedures per year, were more affected than others. Other identified problems were that facility updates occurred on a rotating instead of annual basis and imputations were not clearly documented. When providers were contacted about participating in NCHS surveys, certain data elements collected at an earlier time had to be verified and corrected, suggesting that the data on these files were not updated in a timely manner by SDI. Because of these data quality issues, SDI data were not used in this analysis.

4. Findings

Findings from NCHS, Medicare, and AHA data sources were examined to determine what is known about ambulatory surgery utilization from 2006 to 2010. In a number of instances the only sources of data on a particular issue were the 2006 NSAS and the 2010 NHAMCS. When this is the case, it is noted below. Very limited data were available from any sources for the years from 2007 to 2009 when NSAS and NHAMCS ambulatory surgery data were not collected.

4.1 How much ambulatory surgery in the period from 2006 to 2010 was provided in hospitals and how much was provided in ambulatory surgery centers?

Only data from the 2006 NSAS and the 2010 NHAMCS were available to address this question. In 2006, 58 percent of the ambulatory surgery procedures were performed in hospitals; while in 2010, this number was 53%. The percentage of procedures performed in ambulatory surgery centers was 42% in 2006 and 46% in 2010 (see Figure 1). There are no data available for 2006-2010 from any other data sources.

Figure 1. Percentage of ambulatory surgery procedures in hospitals and ambulatory surgery centers, 2006 and 2010

Ambulatory surgery procedures by location	2006 NSAS	2010 NHAMCS
Total	100%	100%
In hospitals	58%	53%
In ambulatory surgery centers	42%	46%

Sources: CDC/NCHS: 2006 National Survey of Ambulatory Surgery (NSAS) and the 2010 National Hospital Ambulatory Medical Care Survey (NHAMCS)



SAFER • HEALTHIER • PEOPLE™



1

4.2 What kinds of ambulatory surgery services were provided in the period from 2006 to 2010?

Only data from the 2006 NSAS and the 2010 NHAMCS surveys address this question. For both 2006 and 2010 (See Figure 2) the most common clinical categories of procedures were digestive procedures, including colonoscopies and other endoscopies; eye procedures, including cataract surgery; and musculoskeletal operations, like excision of semilunar cartilage of the knee and arthroscopy of the knee. Procedures in these categories made up 54% of the total in 2006 and 52% of the total in 2010. There are no data available for 2006-2010 from any other data sources.

Figure 2. Ambulatory surgery procedures in 2006 and 2010 by International Classification Of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) Chapters

ICD-9-CM Procedures	NSAS 2006	NHAMCS 2010
Digestive system	27%	21%
Eye	13	16
Musculoskeletal	14	15
Nervous system	6	9
Misc. diagnostic and therapeutic procedures	11	12
Other	29	27
Total	100%	100%

Sources: CDC/NCHS, 2006 National Survey of Ambulatory Surgery (NSAS) and the 2010 National Hospital Ambulatory Medical Care Survey (NHAMCS)



SAFER • HEALTHIER • PEOPLE™



2


4.3 What was the expected source of payment for ambulatory surgery in the period from 2006 to 2010?

Data on principal expected sources of payment for ambulatory surgery were only available from the 2006 NSAS and the 2010 NHAMCS (Figure 3). For a little over half of the visits, private health insurance was the expected source of payment, and for over 30% of the visits Medicare was the expected source of payment in both years. Medicaid payment was expected for 6 percent of visits in 2006 and 8 percent in 2010. Few visits were expected to be self-pay. There are no data available for 2006-2010 from any other data sources.

Figure 3. Expected Principal Payment Source for ambulatory surgery visits, 2006 and 2010

Expected Principal Payment Source	2006 NSAS	2010 NHAMCS
Private insurance	52%	51%
Medicare	32	31
Medicaid	6	8
Self pay	3	4
Other and not stated	7	6
Total	100%	100%

Source: CDC/NCHS, National Survey of Ambulatory Surgery (NSAS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS)

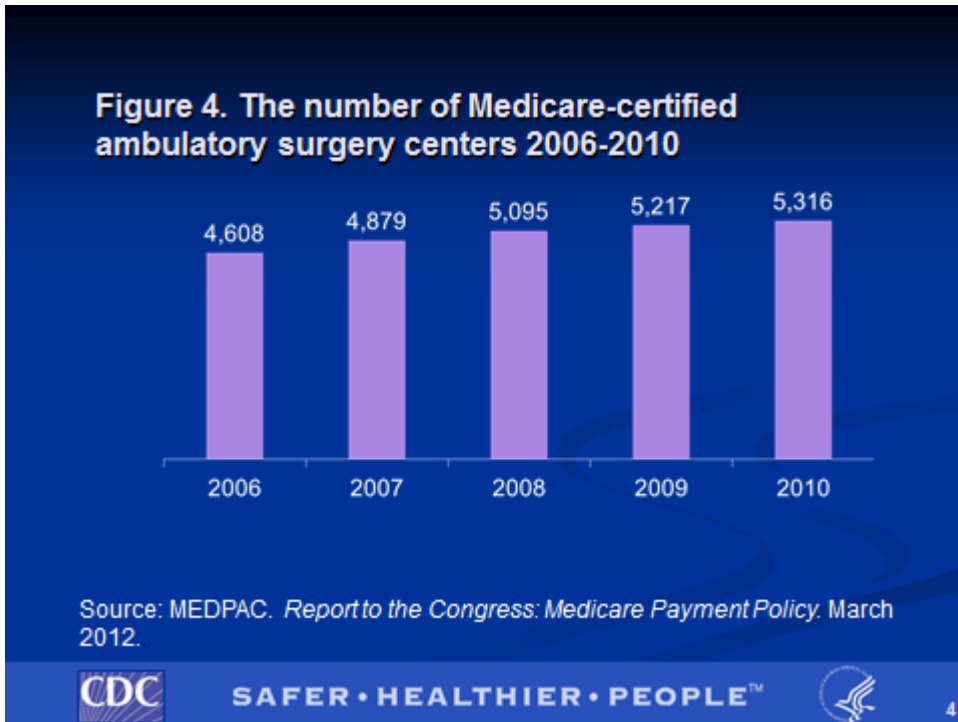
CDC SAFER • HEALTHIER • PEOPLE™  3

4.4 Did ambulatory surgery in hospitals and ambulatory surgery centers increase, decrease, or remain the same from 2006 to 2010?

NSAS and NHAMCS ambulatory surgery data included both ASC and hospital data. But there were no other data sources which combined these data. ASC data discussed below are from Medicare. Data on hospital ambulatory surgery discussed below are from AHA. (The proportions each of these settings made up of the whole are noted in Figure 1). Though these data sources had very limited data, and these data were not nationally representative, in the absence of other relevant data these data are presented.

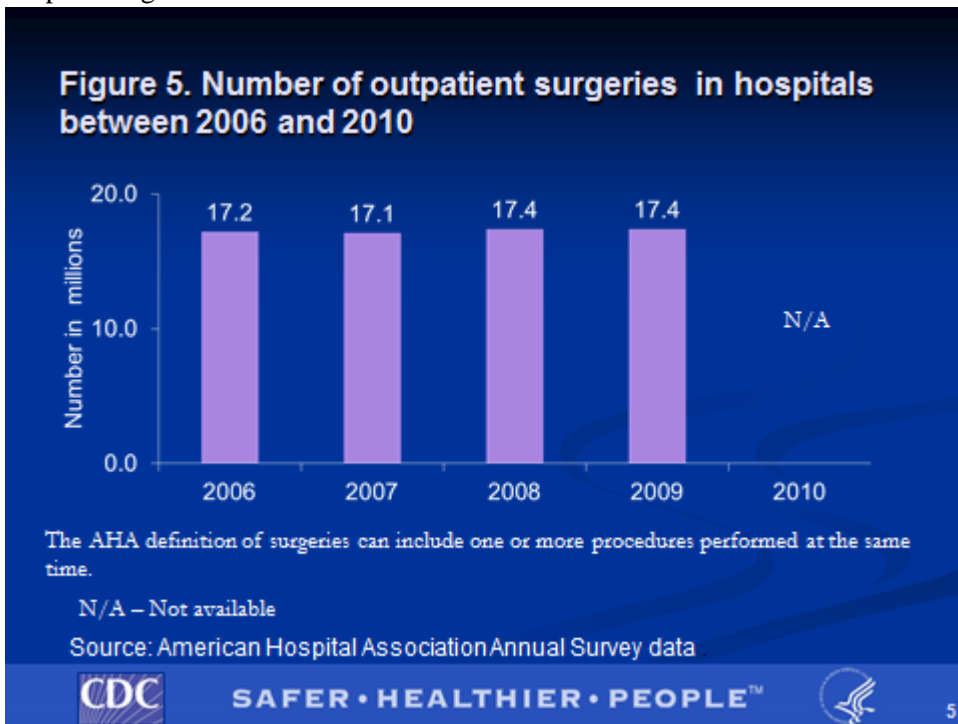
4.4.1 Medicare data on ASCs

Medicare data show that the number of Medicare certified ASCs (Figure 4) increased by 15% over the time period from 2006 to 2010, though the rate of growth slowed over time. These were the only Medicare data considered relevant for assessing national trends because most ambulatory surgery for patients of all age groups, and with all payment sources, are performed in Medicare certified facilities. Comparing Medicare utilization data, which includes mostly those over 65 years, would not have been useful since less than a third of ambulatory surgery patients have Medicare as their primary payer. But the usefulness of the data on number of certified ASCs is also limited in value since the size of ASCs could have changed over time, and so an increase in facility numbers does not necessarily mean that there was an increase in ambulatory surgery.



4.4.2 AHA data on hospital ambulatory surgery

AHA data (Figure 5) show that, based upon those hospitals that responded to the annual survey, there were 17.1 to 17.4 million outpatient surgeries performed in hospitals throughout the period from 2006 to 2009. Though these data are not representative of all hospitals, it is interesting to note that there was only a 1% increase in the number of hospital surgeries from 2006 to 2009.





4.4.3 NSAS 2006 and NHAMCS 2010 Ambulatory Surgery Data

The total ASC and hospital combined ambulatory surgery data from the 2006 NSAS and the 2010 NHAMCS (Figure 6) showed that the total number of ambulatory surgery procedures in 2010 did not differ significantly from the number of these procedures in 2006. There were also no significant differences in the number of ambulatory surgery procedures in either ASCs or hospitals over this time period. The total number of ambulatory surgery visits decreased significantly (by 18%) from 2006 to 2010, as did the number of hospital ambulatory surgery visits (by 21%), but ASC visits were not significantly different.

Figure 6. Ambulatory surgery procedures and visits in ambulatory surgery centers and in hospitals in 2006 and 2010

Ambulatory surgery utilization	2006 NSAS	2010 NHAMCS	Difference
Procedures in millions	53.3	48.3	-9%
in ASCs	22.6	22.5	<1%
in hospitals	30.8	25.7	-20%
Visits in millions	34.7	28.6	-18% S
in ASCs	14.9	12.9	-13%
in hospitals	19.9	15.7	-21% S

S – Difference between the 2006 National Survey of Ambulatory Surgery (NSAS) and the 2010 National Hospital Ambulatory Medical Care Survey (NHAMCS) data were significant at the 0.05 level

 SAFER • HEALTHIER • PEOPLE™  6

5. Discussion

The only nationally representative data in the past 10 years on ambulatory surgery were from the 2006 NSAS and the 2010 NHAMCS. There were no other national data sources which could be used to verify or supplement the results from these surveys. Two sources that potentially could have provided these data were Medicare and AHA. But these sources had very limited comparable data on ambulatory surgery and none of it was nationally representative.

The results comparing data from the NHAMCS 2010 and the NSAS 2006 showed no significant difference between the number of procedures in 2006 and 2010. They also showed a decrease in total visits for ambulatory surgery from 2006 to 2010. These results were different from what was expected based upon the limited data that were available, and on projections from past trends. These projections anticipated a continued increase in ambulatory surgery.

One factor which could explain why the NSAS/NHAMCS comparison did not show continued growth in ambulatory surgery is the deep recession which began in 2007. By 2010, when NHAMCS began gathering ambulatory surgery data in both hospitals and ASCs, the economy had not recovered fully. Over the time period from 2006 to 2010, there was an increase in both unemployment and the number of people who did not have health insurance both of which could have affected patients' utilization of ambulatory surgery(13) (14). Even for those who continued to have health insurance, the increased out-of-pocket costs (higher deductibles and coinsurance), which became more common in health insurance plans during this time, may have contributed to a decrease in the number of visits for ambulatory surgery (15).

Trends in ambulatory surgery should continue to be tracked comparing NHAMCS 2010 with later year's data. Information on the availability of these data and plans for future data collection follows.

6. Availability of NHAMCS Ambulatory Surgery Data

The 2010 NHAMCS ambulatory surgery data are now available through the NCHS Research Data Center (16). Within the next few months we hope to release this data set as a public use data file and release detailed data tables on our website. We are currently working on a National Health Statistics Report summarizing the major findings from the 2010 NHAMCS data set, including estimates and standard errors, for frequently requested procedures.

Ambulatory surgery data from both hospitals and ambulatory surgery centers continued to be gathered in 2011 and in 2012. In 2013, the ambulatory surgery center data collection stopped so that a new sampling frame could be developed. When the sampling frame is completed, and an updated sample is drawn, this portion of the survey is expected to return to the field. Data on ambulatory surgery occurring in hospitals continue to be gathered annually in NHAMCS.

References

National Survey of Ambulatory Surgery, 2006. Public Use Data file Documentation. Centers for Disease Control and Prevention. National Center for Health Statistics. Hospital Care Statistics Branch, Hyattsville, MD. Available online at ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NSAS/NSAS2006rev.pdf

National Hospital Ambulatory Medical Care Survey, 2009 and 2010. Public Use Data File Documentation. Centers for Disease Control and Prevention. National Center for Health Statistics. Ambulatory and Hospital Care Statistics Branch, Hyattsville, MD. Available online at ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHAMCS/

- Verispan LLC. Healthcare Market Index and Hospital Market Profiling Solution. Hospital Market Profiling Solution, 2005.
- SDI (formerly Verispan LLC). Healthcare Market Index and Hospital Market Profiling Solution, 2009.
- Verispan LLC. Freestanding Outpatient Surgery Centers Database. Chicago: Healthcare Information Specialists. 2005.
- Centers for Medicare and Medicaid Services. Provider of Services file – ambulatory surgery centers. Baltimore, MD: 2005.
- The challenges of gathering and interpreting national data on ambulatory surgery over time. Proceedings from the 2013 JSM Annual Meeting. Montreal, Canada.
- Shimizu I. Sampling design for the 2010-12 National Hospital Ambulatory Medical Care Survey. Proceedings from the 2011 JSM Annual Meeting. Survey Research Section. Available online at http://www.amstat.org/sections/srms/proceedings/y2011/Files/300754_65586.pdf
- MEDPAC. Report to the Congress: Medicare Payment Policy, Washington, DC. March 2012.
- MEDPAC Report to Congress: Medicare Payment Policy. Chapter 5. Ambulatory surgical center services. Washington, DC. March 2013
- American Hospital Association. Data Viewer. Annual Survey Data. Data Collection Methods. Available online at <http://www.ahadataviewer.com/about/>
- SDI, formerly Verispan, Outpatient Surgery Center Profiling Solution, now IMS Health.
- Alliance for Health Reform and the Kaiser Commission on Medicaid and the Uninsured. Briefing on Trends in Health Insurance Coverage in the U.S.: The Impact of the Economy. December 6, 2010. Available online at: <http://www.allhealth.org/briefingmaterials/TrendsInHealthInsuranceTranscript12-6-2010-1923.pdf>
- Kaiser Family Foundation. Commission on Medicaid and the Uninsured. The Uninsured: A Primer – Key Facts about Health Insurance of the Eve of Coverage Expansions. October 23, 2013. Available online at: <http://kff.org/report-section/the-uninsured-a-primer-2013-conclusion/>
- Manchikanti L, Parr AT, Singh V, and Fellows B. Ambulatory surgery centers and interventional techniques: A look at long-term survival. Pain Physician 14:E177-E215, 2011.
- Research Data Center. National Center for Health Statistics. Hyattsville, MD. <http://www.cdc.gov/rdc/>