



Guidebook

**HERC's Outpatient Average Cost Dataset for VA Care:
Fiscal Year 2010 Update**

10th Edition

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Note to Reader: A 2003 supplement to *Medical Care Research and Review* features papers based in part on the work presented in this guidebook. Copies of the articles are available on the HERC web site at

http://www.herc.research.va.gov/publications/supplement_mcr_2003.asp or upon request. Two refer specifically to the outpatient average cost data:

Barnett, P. G., and Wagner, T. H. "Preface to the supplement: Frontiers in VA cost determination," *Med. Care Res. Rev.* 60 (2003) 7S-14S.

Phibbs, C. S., Bhandari, A., Yu, W., and Barnett, P. G. "Estimating the costs of VA ambulatory care," *Med. Care Res. Rev.* 60 (2003) 54S-73S.

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Terms

AITC	Austin Information Technology Center
ALB	Account Level Budgeter
APC	Ambulatory Payment Classification
CDR	Cost Distribution Report
CPT	Current Procedural Terminology
DME	Durable Medical Equipment
DMEPOS	Durable Medical Equipment Prosthetics, Orthotics, and Supplies
DSS	Decision Support System
E&M	Evaluation and Management
FY	Fiscal Year
HCPCS	Healthcare Common Procedure Coding System
HERC	Health Economics Resource Center
MPCR	Monthly Program Cost Report
NDE	National Data Extract
NPCD	National Patient Care Database
PBM	Pharmacy Benefits Management
POC	Point of Contact
PSASSHG	Prosthetic and Sensory Aids Service Strategic Healthcare Group
RBRVS	Resource Based Relative Value Scale
RVU	Relative Value Unit
VIReC	VA Information Resource Center

Chapter 1. Overview

This document describes the Health Economics Resource Center (HERC) Outpatient Cost files. HERC produces a companion document for the HERC Inpatient Cost files available on the HERC web site. The HERC Outpatient Cost files contain our estimate of the cost for each outpatient encounter reported in national VA databases since October 1, 1997.¹ The HERC files can be linked to VA utilization databases to find patient demographics, location of care, services provided, and patient diagnosis. These estimates are designed to be useful to researchers and VA managers who need to estimate the relative value of service units delivered by VA providers and programs. The HERC Outpatient Average Cost files include three different estimates of the resources used in each VA outpatient encounter.

- **HERC Value.** This is the hypothetical reimbursement based on Medicare and other reimbursement methods. VA characterizes the services it provides to outpatients using the Current Procedural Terminology (CPT) coding system.² This is the same system that non-VA providers use to bill for their services. We used these codes to estimate a hypothetical payment for each VA outpatient visit. This hypothetical payment is our non-VA measure of relative value. We call this the “HERC value.”
- **National Cost Estimate.** The national cost estimate represents the national average cost of the visit, given its CPT codes and clinic type. It is the HERC value adjusted to reflect actual expenditures for outpatient care, as reported in the VA Cost Distribution Report (CDR) before Fiscal Year (FY) 2004, and as reported in the VA Decision Support System (DSS) Outpatient National Data Extract (NDE) since FY 2004. Adjustments were made so that the sum of the national cost estimates for all VA outpatient visits was equal to the cost that VA incurred in each of 11 categories of ambulatory care with pharmacy, prosthetics, and unidentified stops costs excluded. Beginning FY 2007, adult daycare and home care were also excluded. We created the national cost estimate by assuming that all visits to the same type of clinic that involve the same CPT codes have identical costs, regardless of the actual expenses of the medical center.
- **Local Cost Estimate.** The local cost estimate was constructed to represent the local average cost of the visit, given its CPT codes and type of clinic. It is the national cost estimate, adjusted to reflect the actual cost of ambulatory care at the medical center, as reported in the DSS Outpatient NDE. For each VA medical center, the sum of the local cost estimates equals the total DSS Outpatient NDE expenditure for ambulatory care at that medical center.

This guidebook provides a detailed description of the methods used to prepare these estimates. [Chapter 2](#) describes the methods we used to calculate VA’s cost of care. It describes how we merged VA utilization and cost databases. It also describes how we assigned each type of VA

¹ To obtain previous versions of this document, which contain complete details for earlier years of the HERC data, see Appendix A. Excel files with data for all years of the HERC Outpatient Cost files are found on the HERC web site and/or intranet site.

² CPT codes were developed by the American Medical Association to characterize physician services. Medicare characterizes other healthcare services using the Medicare Healthcare Common Procedure Coding System (HCPCS). When we refer to CPT codes in this document, we also mean HCPCS codes.

clinic to one of 14 categories of ambulatory care. Additionally, information on the use of the DSS Outpatient NDE as the source of the data on VA costs is provided. (For information on the CDR, which was used prior to FY 2004 for VA costs, refer to previous versions of the guidebook. See [Appendix A](#) for details.)

Chapters 3 and 4 describe our methods of estimating the HERC value. When outpatient care is provided in a hospital-based clinic, both the provider and the facility are reimbursed by Medicare. We followed Medicare’s methodology to estimate both the provider and facility payments. Provider payments are described in [Chapter 3](#) and facility payments are the subject of [Chapter 4](#).

We chose the Medicare reimbursement method as our primary source of payment rates because Medicare is a national program with a well described payment method based on extensive study of the “economic costs,” as compared to the “accounting costs,” of providing services.³ Medicare pays 22% of the cost of physician services provided in the U.S. Its reimbursement rate also represents costs from the perspective of the healthcare payer.

Because VA provides services that are not covered by Medicare, we supplemented the Medicare fee schedule with other payment methods. Some of the CPT codes used by VA are not normally used to bill for ambulatory care. We made judicious assumptions to estimate the appropriate reimbursement for services represented by these codes.

[Chapter 5](#) is the user’s guide. This chapter describes the variables in the HERC dataset. [Chapter 6](#) describes the results of our validation of the HERC dataset.

1.1 Assumptions Made to Estimate Payments and Costs

In FY 2010, VA provided more than 98 million outpatient encounters in hundreds of VA clinics. These visits included over 227 million services and procedures, which VA characterized with 11,940 different procedure codes. It was not possible for us to directly measure the cost of the individual encounters, or extensively investigate the accuracy of VA coding. Rather, estimating the cost of this care required a number of analytic assumptions. On the following pages, we list our major assumptions with further descriptions of each.

1. **All ambulatory care is comprehensively characterized by the CPT codes used in the national VA Outpatient Events database.** We assumed that the CPT codes recorded in VA outpatient databases (also called the SE files and part of the National Patient Care Database (NPCD)) accurately reflect the outpatient care VA actually provided and that no additional services were provided by VA. Note, prior to FY 2004, the SE files did not allow repeat use of a CPT code within encounters and allowed a maximum of 15 CPT codes per encounter. We have reported elsewhere that these limits omitted about 12% of the workload (Phibbs, et al., 2004). The file structure of the SE file from FY 2004 onward was changed to allow repeat use of CPT codes within an encounter and the

³ Economic costs are the opportunity costs of production; they may differ from accounting costs. Economic costs represent society’s long-run expenses for delivery of care.

number of CPT code data fields was increased to 20. These changes reduced the omitted workload to less than 0.5%.

2. **All CPT codes used by VA represent a service that should be assigned a cost.** Many of the CPT codes used by VA would be rejected by third party payers in the private sector. For example, telephone care, follow-up surgical visits, and services assigned non-specific procedure codes are not covered by Medicare. We assumed that every code used by VA represented a service that should be assigned a cost.
3. **Costs are proportionate to payment rates.** We assumed that the VA cost of providing ambulatory care was proportionate to the estimated Medicare payment associated with each CPT code. We used Medicare reimbursement schedules, supplemented with select private sector or other government reimbursement schedules for services not covered by Medicare.
4. **Some of Medicare's reimbursement methods are not appropriate for VA.** We calculated a national average Medicare payment without applying geographic adjustments for local market wage differentials. We did not use the Medicare-established global payments for surgical services; rather, we broke these down to a specific payment for each service covered by the global rate (e.g., we found separate payments for surgeries and follow-up visits). We assigned payments to services that would not be reimbursed by Medicare.
5. **Non-standard service codes represent valid costs.** Some CPT codes used by VA are not normally used to prepare outpatient bills in the private sector. These include codes for procedures that are only provided to inpatients, codes that are obsolete, and codes that are not sufficiently specific to be accepted by third party payers. We assumed that these codes represent a service provided by VA. Due to insufficient data, we used additional assumptions to estimate the payments for this care (described in Chapters 3 and 4).
6. **Payments should include facility payments.** Because most VA care is provided in a setting that meets the Medicare definition of a facility, we included facility payments. Examples of what Medicare defines as a facility are: hospital-based clinic, skilled nursing facility, freestanding surgery center, comprehensive outpatient rehabilitation facility, community mental health center, emergency room, federally qualified health center, rural health clinic, home health agency, or hospice.
7. **Prior to FY 2004, VA incurred the cost of ambulatory care reported in the CDR.** We used the CDR to adjust the resulting relative payments to VA total costs at the medical center and national levels. We assumed that patient care costs listed in the CDR were comprehensive and valid. To create our national cost estimates, we assumed that the total national cost of providing VA ambulatory care in each of 11 categories of care was as reported in the CDR. The same assumption was made for the local or medical center level aggregation. We did not adjust the relative payments for three categories of care (pharmacy, prosthetics, and unidentified clinic stops) because: (1) there is no outpatient pharmacy data in the VA Outpatient Events files, (2) there were data problems with the prosthetics data, and (3) unidentified stops do not match to the CDR.

8. **Starting FY 2004, VA incurred the cost of ambulatory care reported in DSS.** In FY 2004, we switched from using the CDR to using the DSS Outpatient NDE as the source of the cost data. The DSS costs for outpatient care were aggregated to the same 14 categories of care that were used for the earlier CDR-based estimates. However, for our national cost estimates pharmacy, prosthetics, and unidentified stops categories of care were again excluded. Additionally, beginning FY 2007, adult daycare and home care categories of care were also excluded.
9. **Indirect costs are incurred in proportion to direct costs.** We distributed the indirect costs of ambulatory care reported in DSS to different types of ambulatory care. We used direct costs as the basis of this distribution.
10. **The DSS distribution of cost between inpatient and outpatient care is accurate at each individual medical center.** To create our local cost estimates, we assumed that the total cost of ambulatory care at each medical center reported by DSS was accurate. We also assumed that the cost reported in each individual category of care at each medical center was accurate. The switch from the CDR to DSS as the source of the cost estimates improved the reliability of the category-specific costs at each medical center to allow for the creation of category-specific local cost-to-payment ratios. The local cost reflects both national and local distributions of cost, as described in Chapter 5.

1.2 Limitations of HERC Cost Estimates

Analysts who use the HERC database need to be aware of the limitations that resulted from our assumptions.

- **No pharmacy utilization, payments, or costs are estimated.** The SE file does not contain data for outpatient pharmacy services; therefore, we did not estimate pharmacy costs. Researchers who need this information should turn to the VA Pharmacy Benefits Management (PBM) system, or the national DSS pharmacy extract.
- **Several categories of care are underreported.** The total costs that VA allocated to outpatient prosthetics greatly exceeded our estimated Medicare reimbursements for the services provided in prosthetics clinic stops. Scaling these hypothetical Medicare payments to match VA costs would have resulted in unreasonable cost estimates for specific services. Thus, we only estimated the hypothetical payment associated with services provided in prosthetics “clinics.” Our national and local estimates of prosthetic clinics’ costs are simply a restatement of these payments. HERC obtained a summary of the CPT codes used by the National Prosthetics Patient Database. A review of these codes seemed to indicate that many of the items dispensed by the Prosthetics Service are dispensed in clinic stops associated with other VA services.

Beginning in FY 2007, the cost to payment ratios for adult daycare and home care categories of care were too high at the national level. Therefore, we believe these services have also been underreported.

- **HERC values do not necessarily equate to actual VA costs, practice patterns, or productivity.** We estimated economic values for each outpatient encounter. This estimate is useful for studies that need an estimate of product value from the payer's perspective such as Medicare. The HERC value does not necessarily reflect actual VA expenditures, nor does it reflect the effect of VA practice patterns or provider productivity. For example, it does not represent the effect of geographic variation in wages or other costs. Analysts who wish to determine the effect of practice patterns and provider productivity on resource use will need to undertake staff activity analysis, a method sometimes referred to as microcosting. For more information, see the HERC microcost methods guidebook at <http://www.herc.research.va.gov/publications/guidebooks.asp>.
- **There were known problems with the VA CPT codes that affected the cost estimates.** Prior to FY 2004, the program that creates the SAS extract of the NPCD set a limit of 15 CPT codes per encounter and stripped out duplicate CPT codes within each encounter. HERC worked with VHA National Data Systems staff to investigate the implications of these limits. HERC determined that these limits in the NPCD excluded about 12% of the CPT codes (Phibbs, et al., 2004). Therefore, the NPCD SAS extract was under-representing the services VA actually provided. This caused a moderate increase in the HERC outpatient cost estimates for each CPT code used as they spread the VA's costs across fewer services than VA actually provided. In response to this analysis, the VHA National Data Systems changed the SE file starting in FY 2004 to allow repeat use of CPT codes and up to 20 CPT codes in an encounter. Thus, the effect of the problem became much smaller starting with the FY 2004 data. For more information about the limits on CPT codes, see HERC Technical Report 15 on the HERC intranet site.

1.3 Changes to FY 2001 HERC Cost Estimates

As part of the annual update to add average cost estimates for new data, HERC also searched for better payment estimates for CPT codes that did not have established Medicare payments. The main changes made to the FY 2001 HERC outpatient average cost estimates were:

- Relative Value Units (RVUs), consistent with the Medicare payment methodology, were added for most dental services. These replaced the American Dental Association and Wasserman charge surveys, which were used to estimate the HERC value of dental services provided in prior years.
- Medicare payment data were available for many more types of durable medical equipment. As a result, fewer assumptions were needed to estimate the HERC value for this equipment. In prior years, the value relied on the payments for similar equipment, or the average values for each category of care.
- Actual VA pharmaceutical costs from the VA PBM data were used to estimate the cost of drugs administered in the ambulatory setting. In prior years, the average wholesale price from Red Book was used to estimate the HERC values. The Red Book prices were used in FY 2001 for drugs for which PBM data were not available.

We included additional detail on the sources that we applied to visits that had taken place in 2001. For earlier years, we indicated the number of visits whose value was based on the Ingenix schedule. This schedule gave both Medicare Resource Based Relative Values and Ingenix values for gap codes. For 2001, we subdivided this report into the six different sources that we used, including four different Medicare relative value schedules and two Ingenix schedules.

1.4 Changes to FY 2002 HERC Cost Estimates

With the continued evolution of the Medicare payment systems, Medicare payments were established for some CPT codes that were previously assigned a payment using other methods. The other main changes made to the FY 2002 HERC outpatient average cost estimates are described below.

Data were obtained from the VA National Prosthetics Patient Database developed by the Prosthetic and Sensory Aids Service Strategic Healthcare Group. In addition to the actual VA costs for prosthetic devices, these data also contain similar information for other devices that are implanted in patients, including cardiac devices. These data provided payment information for many CPT codes that were not directly matched to payment information in previous releases of the HERC outpatient average cost data.

Private sector charge data from a dataset of over 30 million claims were obtained for selected CPT codes from the William Mercer Company. HERC provided Mercer with a list of CPT codes for which HERC did not have payment data. Since the Mercer claims data had information on private sector charges, and the Medicare fee schedules are based on estimated costs, it was necessary to adjust the charge data. We rescaled Mercer charges so that they were comparable to Medicare payments. We multiplied Mercer charges by the ratio of Medicare payments to Mercer charges for procedures having values in both sources.

HERC changed the priority for using different fee schedules by using payments from the Medicare Durable Medical Equipment (DME) and Parenteral and Enteral Nutrition fee schedules before using Ingenix gap codes. This greatly increased the number of CPT codes for which the payment source was the DME fee schedule, but probably did not have large effects on the estimated payments.

In the Medicare payment schedules, many types of equipment (e.g., wheelchairs, hospital beds) can have up to three payment rates: new, rental, and used. Across all of the devices that have multiple payment rates, none of the rates are available for every device. Prior to FY 2002, HERC had used the first non-zero payment that was listed in the various electronic datasets it used for these data. Starting with FY 2002, HERC looked first for a used payment, then a new payment, and only used the rental payment if neither of the others were available.

In a notice distributed to all registered users of the HERC average cost data in March 2003, HERC changed the recommended method for linking the HERC outpatient average cost data with the NPCD. This change has been incorporated into the methods for linking the HERC data in [Chapter 5](#).

1.5 Changes to FY 2003 HERC Cost Estimates

There was only one significant change for the FY 2003 HERC outpatient average cost estimates. In response to a request from HERC, a variable that uniquely identifies each encounter was added to the NPCD SE file for FY 2003. As a result, HERC has changed the data method to link the HERC average cost data to the SE file to take advantage of this new variable. Full details of this change, and new SAS code for linking the HERC average cost data to the SE file, are included in [Chapter 5](#). This change will make it easier to link the HERC data and, more importantly, changes to the SE file will not affect the ability to link the HERC data to the SE file. This method applies only to data starting with FY 2003. Users will still need to use the previous linkage methodology to link data from earlier years.

In 2003, HERC published a supplement in *Medical Care Research and Review* on “Estimating VA Treatment Costs: Methods and Applications.” This supplement includes information on the HERC inpatient and outpatient average cost datasets. The paper in this volume on the HERC outpatient average cost dataset compares the HERC outpatient costs with Medicare reimbursement (Phibbs, et al., 2003).

1.6 Changes to FY 2004 HERC Cost Estimates

There were two major changes for the FY 2004 HERC outpatient average cost estimates. First, HERC switched from using the CDR to using the DSS Outpatient NDE as the source of aggregate VA outpatient costs. The switch to DSS was necessitated by the phasing out of the CDR. We have added [Section 2.4](#) to Chapter 2 which describes how we aggregated the DSS data. To illustrate the implications of this change, we have added Table 2.11⁴ that shows FY 2003 aggregate costs by HERC category in the CDR and DSS.

Second, in response to the HERC analysis in HERC Technical Report 15 (Phibbs, et al., 2004), the structure of the NPCD SE file was changed to correct limits that were causing about 12% of the workload to be omitted from the data. Some (10.5%) of the omitted workload was due to incorrect omissions of repeated CPT codes within an encounter. Because the use of repeated CPT codes varies by medical specialty, it is likely that the effect of this change will not be uniform across different types of care.

Changes to the NPCD SE file started in FY 2005. Austin staff retrospectively created a FY 2004 version of this expanded SE file. Thus, **for FY 2004 only**, the HERC Outpatient Cost file does NOT link to the regular SE file. Instead, it links to MDPPRD.MDP.SAS.REVISED.HERC.SE04.

1.7 Changes to FY 2005 HERC Cost Estimates **UPDATED**

In previous versions of this guidebook, we stated:

There were no changes in the methods used to create the FY 2005 HERC outpatient average cost estimates. There was, however, one significant difference in linking the SE file to the HERC data. Since FY 2003, HERC has used the ENCOUNTER_ID variable in the SE files as the

⁴ To view Table 2.11, refer to earlier versions of this guidebook. See Appendix A for details.

primary linkage variable. In the FY 2005 NPCD SE file, HERC staff found 701 cases where the same ENCOUNTER_ID was used in a second record. Although ENCOUNTER_ID is a unique value across all of VHA and meets the relational definition of a primary key, the data file used to load the SAS datasets, because of historical reasons, does not rely on ENCOUNTER_ID to define record uniqueness. Instead, the unique record keys in the data load file are SSN, STA5A, and VIZDAY. If any one of these keys is changed by the medical center staff before the existing record is deleted in Austin, the load process creates a duplicate record containing the same ENCOUNTER_ID. Most frequently this occurs when the SSN value is corrected for a patient. Austin has put a process in place to prevent this from happening in the future.

Because of the 701 cases where there were duplicate ENCOUNTER_ID values, the data linkage that HERC has recommended for data since FY 2003 will not result in unique matches. Thus, HERC has added the “LINK2SE” variable that was used for linking for FY 1998-2002 back to the HERC data for FY 2005. See Section 5.6 for instructions on how to link the HERC data to the SE file using the LINK2SE variable. If you need a list of the 701 ENCOUNTER_ID values that were duplicated, contact Ciaran Phibbs at Ciaran.Phibbs@va.gov.

FY 2010 update to Section 1.7:

Changes to the VA outpatient visits data from FY 2005 made it impossible to combine this file with the HERC outpatient average cost file. HERC rebuilt and uploaded its cost dataset to the Austin mainframe in February 2011. It is located at RMTPRD.HERC.SAS.OPCSE05R. Note the “R” at the end of the filename, which represents a revised version. This new file has 76,070,883 records and should be merged with MDPPRD.MDP.SAS.REVISED.SE05(0). Both revised HERC average cost and SE files no longer have duplicate ENCOUNTER_ID values. Therefore, please follow the instructions in [Section 5.7](#) for linking the two files using the ENCOUNTER_ID variable.

1.8 Changes to FY 2006 HERC Cost Estimates UPDATED

In previous versions of this guidebook, we stated:

In FY 2006, the recommended method for linking the HERC Outpatient Average Cost files to the Outpatient Events files changed. It was suggested in FY 2005 to link the HERC Outpatient Average Cost file to the Outpatient Events file using the LINK2SE variable due to duplicate ENCOUNTER_ID values. However, LINK2SE is no longer necessary. Instead, the ENCOUNTER_ID variable should be used as it now produces unique matches. See Section 5.7 for further information.

FY 2010 update to Section 1.8:

All HERC Outpatient Average Cost files created from FY 2003 through the current fiscal year can be merged with the Outpatient Events file using the variable ENCOUNTER_ID. This includes the FY 2005 Outpatient Average Cost file because it was rebuilt and does not contain duplicate ENCOUNTER_ID values. Please refer to [Section 5.7](#) for further information.

1.9 Changes to FY 2007 HERC Cost Estimates

There were two significant changes in the methods used to create the FY 2007 HERC outpatient average cost estimates. The first change was made to avoid double-counting the facility payment portion of the total value for a procedure. ([Chapters 3](#) and [4](#) provide more information on Medicare provider and facility reimbursements.) The second change dealt with discounting provider reimbursements to avoid overpayment for physicians performing multiple procedures on the same day.

Facility payment rates are calculated based on Medicare's Ambulatory Payment Classification (APC). (For more information on identifying Medicare facility reimbursements, see [Section 4.2](#).) Prior to FY 2007, we used the bundled payment rate for CPT codes, which includes both professional and technical components. In some cases, this method caused double-counting of the facility payment portion of the estimated cost of a procedure. To avoid double-counting the facility payment, we extracted the professional component of the provider payment if the facility reimbursement was available based on the APC. If there was no facility reimbursement calculated for a particular procedure, then the bundled payment rate was used. Details of this change are included in [Section 3.1.4](#).

Medicare discounting rules were applied to procedures reported on the same day as other procedures. These rules varied depending on the type of procedure and if more than one type of procedure was reported on the same day. In FY 2007, there were 4,103 CPT codes eligible for discounting. This accounted for approximately 2% of the total number of outpatient procedures in FY 2007. The percent difference between discounting for multiple procedures and not discounting was calculated and the error was found to be less than 1%. Details of the application of Medicare discounting rules are included in [Section 3.1.5](#).

1.10 Changes to FY 2008 HERC Cost Estimates

There were no changes made to the methodology of our outpatient average cost estimates. However, there are substantial changes to this guidebook. Tables and sections that were outdated have been removed, but are still available in older versions of this guidebook. (See [Appendix A](#) for details.) Additionally, some tables now appear only on the HERC web site.

1.11 Changes to FY 2009 HERC Cost Estimates

In [Chapter 5](#), we describe how to link the HERC Outpatient Average Cost files to the Outpatient Events files. In FY 2009, [Section 5.7](#) was updated. We now advise users to sort the Outpatient Events file by ENCOUNTER_ID before merging with the OPCSE file for FY 2003 onward. Additional SAS code has been included for reference.

As part of the update to this guidebook, outdated text and tables were removed. See [Appendix A](#) for details.

1.12 Changes to FY 2010 HERC Cost Estimates **NEW**

To determine national cost estimates, HERC values are multiplied by cost-to-charge ratios. These ratios are found by dividing the national total expenditures reported in DSS for each category of care by the national total of HERC values for the same category. (For more information, please see [Chapter 5](#).) While creating the FY 2010 Outpatient Average Cost file, HERC discovered that inpatient costs had inadvertently been incorporated into the calculation of the cost-to-charge ratios for several outpatient categories of care, specifically: 21 (Medicine), 24 (Rehabilitation), 28 (Surgery), and 29 (Psychiatry). These inpatient costs were included because of an error in categorization of primary clinic stop codes 290-296. The problem was fixed in FY 2010 by designating these observation codes to the “unassigned” category, 99.

A sensitivity analysis was conducted to determine what effect, if any, the error in categorization would have on HERC cost estimates. Using FY 2010 data, results of the analysis indicated there was little impact on the final HERC cost estimates. Rehabilitation and Psychiatry categories were impacted the least. The total national cost estimate for these two categories both had a percent change of about 0.1%. Medicine and Surgery experienced a change of 1.5% and 1.6%, respectively - a very small effect considering the total national cost for Medicine is about \$8 billion.

Clinic stop 297, observation emergency room, was new in FY 2010. Therefore, it was not included in the sensitivity analysis. We assigned this code to category 99.

Note: In FY 2010 HERC rebuilt the FY 2005 HERC Outpatient Average Cost file. Please see [Section 1.7](#) for details.

Chapter 2. Cost and Utilization Data

This chapter describes sources of VA utilization and cost data used to create the HERC Outpatient Average Cost files. For information on the Cost Distribution Report (CDR), used as the source of VA cost data prior to FY 2004, refer to previous versions of this guidebook. See [Appendix A](#) for details.

2.1 The VA Outpatient Events Files

Utilization data are reported in the VA National Patient Care Database (NPCD) Outpatient Events (SE) files. These files contain data on over 98 million patient visits annually, including CPT codes, stations, and clinic stop codes. Table 2.1 lists the number of encounters and the number of CPT codes (procedures) identified in these files in each of the last five fiscal years. These files are named MDPPRD.MDP.SAS.SEfy, where “fy” represents the last two digits of the federal fiscal year.⁵

Table 2.1 Outpatient Encounters and Procedure Codes in VA Outpatient Events Files, FY 2006-2010

	2006	2007	2008	2009	2010
Outpatient Encounters	77,685,321	81,838,461	86,224,894	92,892,834	98,250,747
Services and Procedures (Number of CPT Codes Assigned)	164,524,748	188,469,654	199,710,221	216,250,328	227,090,014

2.2 Facility Integrations

In previous years, VA had consolidated some neighboring facilities into a single healthcare system. Cost and utilization reports identify facilities by a 3-digit number (STA3N). When two facilities are merged, one of the facilities switches to the identification number used by the other. Unfortunately, this switch may not occur in the cost and utilization databases at the same time.

We matched cost and utilization data so that facility integrations were handled uniformly in both databases. We treated all facility integrations as if they occurred at the beginning of the fiscal year. The facility identifier (STA3N) in the HERC Outpatient Cost file was not affected by this matching process because the HERC file uses the same identifier for each visit that appears in the Outpatient Events file. Table 2.2 lists the medical centers that were reassigned and the fiscal year in which the reassignment occurred.

⁵ Federal fiscal years begin October 1st and end September 30th, and are referred to by the year in which they end. Thus, the 1998 federal fiscal year is the 12-month period ending September 30, 1998.

Table 2.2 VA Facility Integrations that did not Occur Uniformly in Cost and Utilization Data

VHA Integrated Healthcare Systems	Fiscal Year	Old Facility	New Facility
Central Iowa Healthcare System	1998	Knoxville (592)	Des Moines (555)
Greater Nebraska Healthcare System	1998	Grand Island (574)	Lincoln (597)
Eastern Kansas Healthcare System	1998	Leavenworth (686)	Topeka (677)
Montana Healthcare System	1998	Miles City (617)	Ft. Harrison (436)
Boston Healthcare System	1999	Brockton (525)	Boston (523)
Greater Los Angeles HCS	1999	Sepulveda (665)	West Los Angeles (691)
Upstate NY Healthcare System	2000	Albany (500)	Buffalo (528)
Upstate NY Healthcare System	2000	Bath (514)	Buffalo (528)
New York Harbor Healthcare System	2000	Brooklyn Poly Place (527)	Brooklyn (630)
Upstate NY Healthcare System	2000	Canandaigua (532)	Buffalo (528)
Nebraska Western Iowa HCS	2000	Des Moines (555)	Omaha (636)
Nebraska Western Iowa HCS	2000	Lincoln (597)	Omaha (636)
Upstate NY Healthcare System	2000	Syracuse (670)	Buffalo (528)
Heartland East Healthcare System	2001	Columbia (543)	Kansas City (589)
Heartland East Healthcare System	2001	Marion (609)	St. Louis (657)
Heartland East Healthcare System	2001	Poplar Bluff (647)	St. Louis (657)
Heartland West Healthcare System	2001	Topeka (677)	Kansas City (589)
Heartland West Healthcare System	2002	Wichita (452)	Kansas City (589)

2.3 Definition of Categories of Outpatient Care

In the outpatient database, care is characterized by a 3-digit clinic stop code known as the Decision Support System (DSS) identifier. Prior to FY 2001, we grouped clinic stops into 13 categories of care based on the similarity of services provided and the personnel providing them. For example, all types of physical and occupational therapy were grouped together, and medical clinics were grouped together, but kept distinct from visits to surgery clinics. Starting FY 2001, we added a category for unidentified clinic stops, making 14 categories in total. See [Table 5.3](#) for a list of the categories of care. HERC has published a table with clinic stop category of care assignments. It is available on our intranet web site and includes telephone care.

2.4 Use of DSS to Assign Costs to HERC Categories of Care

For a HERC category-level cost dataset, we chose to aggregate costs from the DSS Outpatient National Data Extract (NDE) file by HERC category of care. The Outpatient NDE is an encounter-level dataset that tracks clinic stops. We initially considered the DSS Monthly Program Cost Report (MPCR) and the DSS Account Level Budgeter (ALB) as possible sources of aggregate VA costs by HERC category of care. However, we rejected them because MPCR excludes costs outside the Veterans Equitable Resource Allocation (VERA) system and ALB does not distribute overhead costs to patient care departments. We therefore turned to the DSS Outpatient file. We summed all costs that were allocated to each clinic stop and grouped them by HERC's category of care. Thus, starting FY 2004, the HERC Outpatient Average Cost files

use HERC's Medicare-based Relative Value Units (RVUs) to allocate the costs that DSS assigns to outpatient encounters to the care recorded in the NPCD SE file.

The HERC cost estimates are based on all records in the NPCD SE file. Although the NPCD is one of the sources for the DSS Outpatient NDE data, about 10% of the records in the file are from encounters that are not recorded in the NPCD. More information on these other types of encounters is available from the HERC Guidebook for the DSS NDEs, <http://www.herc.research.va.gov/publications/guidebooks.asp>. To obtain the aggregate VA costs in each HERC category of care, we included all of the encounters in the Outpatient NDE because they represented real costs of outpatient care that were incurred by VA. We did have one exclusion criterion though: we excluded those DSS clinic stops that were excluded from the NPCD by design. There were two broad groups of clinic stops that were excluded. First, DSS assigned observation bed care to outpatient care (clinic stops 290-297), while the NPCD / Patient Treatment file (PTF) assigned some to inpatient care. Second, there were several clinic stops that were not included in the NPCD. Table 2.3 shows the DSS costs and the number of visits from the Outpatient Events files for each category of care for FY 2007-2010.

Table 2.3 Costs and Utilization by HERC Category of Care, FY 2007-2010

		Costs (dollars)				Utilization (visits)			
		2007	2008	2009	2010	2007	2008	2009	2010
21	Outpatient Medicine	5,528,958,108	6,553,401,330	7,244,125,236	7,973,856,278	24,256,832	25,870,879	27,683,570	28,954,368
22	Outpatient Dialysis	165,162,771	193,752,497	198,755,675	215,139,050	325,699	340,305	356,288	366,631
23	Outpatient Ancillary Services	299,279,738	374,131,641	500,052,852	585,366,706	2,842,825	3,178,223	3,998,979	4,438,825
24	Outpatient Rehabilitation	495,842,444	595,775,600	740,404,528	845,457,190	3,217,511	3,528,019	4,201,412	4,655,922
25	Outpatient Diagnostics Services	2,275,044,672	2,604,076,197	2,915,712,929	3,142,722,509	20,448,655	21,137,148	22,618,632	23,393,614
26	Outpatient Pharmacy	4,713,811,409	4,693,579,219	4,915,737,869	5,281,682,499	NA	NA	NA	NA
27	Outpatient Prosthetics	1,031,794,436	1,307,378,473	1,474,404,880	1,740,051,624	5,039,163	4,920,264	5,055,499	5,659,459
28	Outpatient Surgery	2,289,675,725	2,701,773,066	3,025,026,303	3,243,651,299	6,974,695	7,239,728	7,804,940	8,252,126
29	Outpatient Psychiatry	1,385,542,136	1,740,676,305	2,072,991,695	2,473,426,754	8,333,633	8,560,222	9,040,193	10,364,416
30	Outpatient Substance Abuse Treatment	222,998,261	260,748,560	292,592,429	326,800,585	1,916,008	2,049,769	2,214,544	2,314,052
31	Outpatient Dental	451,811,777	497,396,480	550,161,454	611,892,957	1,081,013	1,164,304	1,277,389	1,350,882
32	Outpatient Adult Daycare	11,589,590	12,328,688	17,916,094	21,504,546	83,988	83,145	87,320	94,625
33	Home Care	503,104,527	680,392,233	868,661,827	578,930,986	1,225,098	1,492,127	1,851,061	1,471,795
99	Unidentified Stops	9,592,265	1,926,174	963,825	174,749,062	174,037	17,608	12,255	70,195
Total		19,384,207,859	22,217,336,463	24,817,507,596	27,215,232,045	75,919,157	79,581,741	86,202,082	91,386,910

Chapter 3. HERC Provider Payments

We calculated hypothetical payments for every VA outpatient visit using Medicare and private-sector reimbursement rates. We called this payment the “HERC value.”

Healthcare payers pay both providers and facilities. This chapter describes our method of finding the provider component of the HERC value. [Chapter 4](#) describes the facility component of the HERC value.

Medicare payments differ between office-based and facility-based physicians. Since we assumed that all VA care is provided in a facility, we used the payment rate for facility-based physicians. Although the payment to an office-based physician is usually greater than the payment to a facility-based physician, the facility receives a separate payment that usually exceeds this difference.

Medicare provider payments cover not only physician services, but include other items such as laboratory tests, diagnostic imaging, and medical supplies. Medicare uses the Resource Based Relative Value Scale (RBRVS) to calculate provider payments. The RBRVS is based on detailed study of the cost of production (Hsiao, et al., 1992) and replaced reimbursement based on customary fees in 1989. The RBRVS estimates the economic costs of a physician’s work. These RBRVS values are weights that are based on the time it takes to provide a service or perform a procedure. They also reflect the minimum training required to provide a given service to compensate providers for income lost during their years of training. Compensation is higher for more stressful tasks because of the effect stress has on productivity and the cognitive contribution that is required.

For the FY 1998-2000 cost estimates, the HERC values were all based on 2000 Medicare payment rates. Starting with FY 2001 data, the main source of payment information adjusts to match the fiscal year, which is described further in [Section 3.3.2](#).

3.1 Application of Medicare Reimbursement Methods

The Medicare reimbursement algorithm is complex. We adapted and simplified it to meet our goal of using this payment scheme to estimate economic costs as dollar values that reflect the special situation of the VA. These adaptations are discussed below. The discussion includes our handling of the geographic adjustment to provider payments, treatment of payments for the practice expense, procedures subject to global payment, treatment of payments for professional and technical components, and discounting for multiple procedures.

3.1.1 Geographic Adjustment

Medicare geographically adjusts all three components of the RBRVS payment: physician work, practice expense, and malpractice expense. We were interested in estimating a payment that represented the national average value (cost) of care rendered from the VA's (payer) perspective. Therefore, we used the national payment *without* any geographic adjustment. The HERC national value for an identical service is the same regardless of where in the country it is provided. Analysts who want estimates that reflect the effect of geographic variations in costs should use the HERC local cost estimates (see [Chapter 5](#)).

3.1.2 Resource-Based Practice Expense

HERC used the RBRVS Relative Value Units (RVUs) for the practice expense component of the provider payment. We did not use the historic rates that Medicare used to calculate payments. Before FY 1999, the Medicare payment was entirely based on historic physician practice cost. In FY 1999, Medicare began phasing in payment reimbursement rates that were based on the RBRVS relative value. This "phase-in" was completed in FY 2002. We used the RBRVS rates because we believe they are a more accurate estimate of the actual economic cost of the practice expense associated with each service.

3.1.3 Procedures Subject to Global Reimbursement Rates

Medicare reimburses providers with a global payment for some procedures. This payment is for preoperative, perioperative, and postoperative care. The payment is the same regardless of the number of preoperative and postoperative visits.

For procedures subject to global reimbursement, Medicare identifies what part of the reimbursement is for performing the procedure, and what part is for all other covered services. Our goal was to develop VA cost estimates that reflect actual resource use. Instead of using the Medicare global payment, we separated rates for services. For procedures that Medicare assigns a global payment, we used the payment for the procedure alone, and assigned specific costs for each preoperative and postoperative encounter. Our estimates thus reflect variations in resource use associated with a different number of preoperative and postoperative visits.

Because Medicare pays for postoperative visits via global payments, it does not have a reimbursement rate for postoperative visits, for example, Current Procedural Terminology (CPT) code 99024. We used the reimbursement rate for a brief Evaluation and Management (E&M) visit with an established patient, CPT code 99211, when CPT code 99024 was used. VA may code some postoperative visits with other visit codes, such as standard E&M codes.

3.1.4 Professional and Technical Components

Medicare allows separate payments for the professional and technical components of services that can be split across providers. Radiographic images, for example, include a technical component for the provider who takes an x-ray and a professional component for the physician who interprets it. Since VA does not distinguish between these

activities in the data, the bundled payment rate was used prior to FY 2007. This method, however, sometimes caused double-counting of the facility payment portion of the total cost for a particular procedure. (See [Chapter 4](#) for details on facility reimbursement.) To deal with this issue, we implemented a new method for calculating costs. First, we identified CPT codes from The Essential RBRVS Annual Data Files (Ingenix) that had the following three components: 1) professional, 2) technical, and 3) total value (bundled). Next, we determined the payments associated with a CPT code. If there was a professional component, as well as both bundled and facility payment rates, then only the professional component was retained as the provider portion of the total cost of the procedure. However, if there was no facility payment, then the bundled payment (or total value of the professional and technical components) was assigned instead. Using the new method for estimating the cost of a procedure in FY 2007, there were 880 CPT codes, out of 11,602, where the professional component was assigned as the provider reimbursement.

3.1.5 Discounting for Multiple Procedures

Medicare provides indicators to identify procedures that are subject to discounting rules if other procedures are performed on the same day. Standard payment adjustment rules are applied to multiple procedures. This entails ranking the procedures by fee schedule amount and applying the appropriate reduction to each procedure. Special payment rules are applied to endoscopic and diagnostic imaging services. Discounts for endoscopies are based on whether other endoscopic procedures have the same base code. If other procedures are performed on the same day, then standard payment adjustments are made. Similarly for diagnostic imaging, cost reductions are based on whether other diagnostic imaging services have the same imaging family indicator. Full details of Medicare's discounting rules can be found in their Claims Processing Manual.

For simplicity, some modifications were made to the discounting rules. One example is the application of various discounts to multiple outpatient surgeries. The rule here is to first rank the procedures by fee schedule amount. The first procedure is paid in full. The second through fifth procedures are reduced by 50%, the floor amount. All subsequent procedures should be determined on a "by report" basis and cannot be lower than the floor amount. We decided to discount the second and all subsequent procedures by the floor amount instead of individually reviewing each case.

As mentioned in [Section 1.9](#), in FY 2007, there were 4,103 CPT codes eligible for discounting in the case of multiple procedures performed on the same day. Out of a total of 188,469,654 VA outpatient procedures, approximately 2% were eligible for discounting.

3.2 RVUs and Fee Rate Conversion Factors

Under RBRVS, Medicare calculates payments in terms of RVUs. Medicare issues a "conversion factor" that converts the RVUs to dollars. There are separate conversion factors for anesthesiologists and for other providers. The conversion factors used by Medicare are updated annually. The six most recent years of these conversion factors are

listed in Table 3.1. An Excel file with the conversion factors for all years of the HERC cost dataset is available on the HERC web site:

http://www.herc.research.va.gov/methods/methods_cost_ac.asp.

Table 3.1 Medicare Conversion Factors for RVUs, FY 2005-2010

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Anesthesiology	17.76	16.96	16.19	17.82	20.92	21.11
All Other Providers	37.90	36.18	37.90	38.09	36.07	36.08

For some services, the reimbursement is not set by RVUs and conversion factors, but instead is found in a Medicare fee schedule.

3.3 Sources of Provider Payment Data

We relied on Medicare RBRVS methods wherever possible for provider payment data, but used a variety of sources so that every CPT code was assigned a plausible payment. [Section 3.4](#) describes how we estimated payments for VA services characterized by VA’s non-standard use of CPT codes.

3.3.1 Fiscal Year Medicare Reimbursement Schedule

The HERC value for FY 1998-2000 was primarily based on RVUs in the FY 2000 Medicare RBRVS schedule. We used this because it was the most comprehensive data source. It was also consistent with other sources of data which were only available for FY 2000, including RVUs for gap services (described in [Section 3.3.4](#)) and the schedule of facility payments (described in [Chapter 4](#)).

The consequences of applying Medicare RVUs from 2000 to earlier years’ data were very small for several reasons. Medicare makes few year-to-year changes in RVUs. Most changes involve the addition of new procedures or modifications of the procedure coding system. We also used the conversion factor for the year in which in the service was actually provided. For example, to estimate the provider portion of the HERC value in FY 1998, we multiplied the 1998 conversion rate by the 2000 Medicare RVU.

Starting with FY 2001 data, we used the Medicare reimbursement schedules that matched the fiscal year of the utilization data. The Medicare RBRVS fee schedule and those of other Medicare fee schedules are available on the Medicare web site:

<http://www.cms.hhs.gov/FeeScheduleGenInfo/>.

3.3.2 Medicare Schedules from Other Years

For some procedures, we used Medicare RVUs from other years. We used the RVUs in the 1997 Medicare RBRVS schedule for procedure codes that had become obsolete by

the year 2000. We also used the 2001 Medicare RBRVS schedule for professional services that were not covered by Medicare in 2000.

For the 2001 Outpatient Average Cost dataset, we used the 2001 Medicare RBRVS as the main source of payment data. However, we used the 2000 and 2002 RBRVSs as secondary sources. This pattern has been maintained over time for all subsequent fiscal years.

3.3.3 Other Medicare Fee Schedules

Other Medicare fee schedules were added as sources of payment information. The Medicare Durable Medical Equipment Prosthetics, Orthotics, and Supplies (DMEPOS) fee schedule, added as a data source, had payments for CPT codes that did not have a Medicare payment rate in earlier years' schedules. This resulted in the use of Medicare payments for the HERC value for many more of these types of services. For example, of the 153 CPT codes assigned DMEPOS payments, almost all were new for FY 2001. Also, the Medicare Parenteral and Enteral Nutrition Items and Services fee schedule was added as a data source starting in FY 2001.

For FY 2002 data, we changed the priority for using payment rates from these other Medicare fee schedules. Previously, the Ingenix gap codes had a higher priority than other Medicare fee schedules. We reversed this for FY 2002. As a result, there was a big jump in the number of CPT codes that matched to DMEPOS payments (from 153 to 1,342), and a corresponding reduction in the use of Ingenix gap codes. These payments tended to have very similar, if not identical, RVUs. Thus, the effect on the HERC values was minimal.

3.3.4 Gap Codes - RBRVS Methods for Services not Covered by Medicare

Many outpatient professional services provided by VA are not covered by Medicare. Examples of these services include telephone contacts and some types of preventive care. Although Medicare does not cover these services, we wished to assign a comparable reimbursement (the HERC value).

Many non-Medicare payers use RBRVS methodology. These payers reimburse providers for some services not covered by Medicare. Since these professional services represent a "gap" in Medicare coverage, these codes for the services are often times referred to as "gap codes."

RVUs for gap code services are published by Ingenix Corporation (Ingenix, 2000 - present). Ingenix uses the same RBRVS method employed by Medicare to estimate relative values. We used available Ingenix RVUs for the year 2000 to find the HERC value for gap code services provided in FY 1998-2000. We supplemented these with Ingenix codes for the year 2001. We applied the same methods, assumptions, and conversion factors that we applied to RVUs obtained from Medicare. Starting with FY 2001, HERC used the contemporary year (e.g. 2001) of the Ingenix relative values to determine payments for that fiscal year. Other years of the Ingenix data (e.g. 2000 and 2002) were used as secondary sources of gap code RVUs.

3.3.5 Cost Pass-Through Payments

There are some CPT codes, mostly Healthcare Common Procedure Coding System (HCPCS) codes, that represent supplies, devices, or pharmaceuticals that Medicare historically paid for on a “cost pass-through” basis. For these CPT codes, there is only a facility payment and no provider payment. Codes with an established Medicare Hospital Outpatient Prospective Payment were assigned a HERC provider payment of zero. This means that the facility reimbursement represents the full payment.

3.3.6 Dental Fee Surveys

Dental services are characterized by HCPCS codes that begin with the letter “D.” We estimated the HERC value using the national median charge reported in two national surveys. Prior to FY 2001, we used data from the 1999 survey of the American Dental Association (ADA, 2000). For dental services not covered by the American Dental Association, we used the 1999 survey data from the 2000 National Dental Advisory Service (NDAS, 2000). We adjusted charges from the survey year to the years of utilization using the average ratio of Medicare conversion factors for the same years.

The FY 2001 Ingenix relative values included values for most dental services. Thus, starting that fiscal year, the HERC values for almost all dental services are based on gap code RVUs, instead of the surveys of dental charges.

3.3.7 VA Contract Rates

For VA compensation and pension exams, we used the national average contract cost of \$437.⁶ These statistics represent data from May 1 through December 27, 1998. The average cost is based on 18,907 exams performed under contract by QTC Medical Group, Incorporated. The payment to QTC includes physician time, scheduling, correspondence, and a complaint resolution process. This rate is adjusted annually for inflation.

3.3.8 California Workers’ Compensation Charges

We used payments allowed by the California Workmen’s Compensation System to calculate the HERC values for rehabilitation services not covered by Medicare (State of California, 1999). We rescaled the California RVUs so that they could be used with the Medicare conversion factor. For services that were covered by Medicare that were also in the California RVU schedule, we calculated the ratio of Medicare to California RVU. This median ratio was multiplied by the California RVU to remove any regional inflation rates.

3.3.9 Physician Charge Surveys

For the remaining physician services for which we had no payment amount, we used the median charge reported in a survey of U.S. physicians (PFR, 2000). We adjusted these charges to make them consistent with Medicare reimbursement rates.

⁶ The data were obtained from a status report provided by Robert Epley, Director, Compensation and Pension Service. The data are from a pilot study authorized by PL 104-275.

For services covered by Medicare that had a charge reported in the survey, we calculated the ratio of FY 2000 Medicare reimbursement rates to this survey's median charge. We multiplied the charges in the survey by this value to find the HERC value for FY 2000. For earlier years, we also adjusted the payment for the change in Medicare conversion factors. Starting FY 2001, this adjustment for inflation was also carried forward.

3.3.10 Private-Sector Claims Data

In FY 2002, we obtained private-sector claims data from the William Mercer Company that were drawn from a dataset of over 30 million claims records. HERC submitted to Mercer a list of all the CPT codes for which HERC lacked Medicare and Ingenix payment data. So the Mercer claims data could be scaled to Medicare payment rates, we also obtained Mercer data for selected CPT codes that had Medicare or Ingenix payment data. For each CPT code, Mercer provided HERC with the number of claims and the median charge.

There was large variance in the ratios of the median charges in the Mercer data to Medicare payment rates. We therefore classified the CPT codes into groups of similar services, and calculated ratios of the Mercer charges to Medicare payments for each group. We used a total of nine groups:

- Surgery
- E&M / medicine
- Vaccines, pharmaceutical, injections
- Prosthetics
- Behavioral health
- Laboratory, diagnostic test, imaging
- Chemotherapy drug or contrast medium
- Occupational, physical, or speech therapy
- Home care

We used these ratios to scale the charges from the Mercer data down so that they were comparable to Medicare payment rates.

3.3.11 Pharmacy Data

We used average wholesale prices from Red Book (2000 - present) as the primary alternative source for payments of pharmaceuticals not listed in Medicare payment schedules. When medication is administered by a provider, a HCPCS code is assigned. The codes for these services begin with the letters "J" or "S." Note that these data are limited to pharmaceuticals administered during outpatient encounters. The VA Outpatient National Patient Care Database Events files (commonly referred to as the "SE files") do **not** contain data on dispensed prescriptions.

The VA Pharmacy Benefits Management (PBM) Strategic Healthcare Group maintains a database of the VA costs for most pharmaceuticals dispensed by VA. To maintain consistency with the other sources of the HERC values, we used Medicare payment rates for pharmaceuticals when they were available. If there was no Medicare payment for a CPT code for a pharmaceutical, we used the PBM rate as an alternative.

3.3.12 VA National Prosthetics Patient Database

In FY 2002, we obtained prosthetics summary data from the VA National Prosthetics Patient Database developed by the Prosthetic and Sensory Aids Service Strategic Healthcare Group (PSASSHG). Every time a prosthetic or sensory aid is dispensed, it is supposed to be reported to the prosthetics database. Items reported to these data include a wide range of items, many of which might not normally be considered prosthetics, including catheters, some bandages, and cardiac devices such as pacemakers and automatic implantable defibrillators. While there had been past problems with the reporting of these data to the prosthetics database, PSASSHG staff believed these reporting problems had been resolved for the FY 2002 data. HERC worked with PSASSHG staff to verify the completeness of the reporting of these data. Technical Report 21 on the HERC intranet site presents these findings.

To scale the VA costs to Medicare payments, we compared the ratio of VA costs to Medicare payments for those items for which there were established Medicare payments. The median of these ratios was 65%. Thus, on average, the VA costs for these items were 65% of Medicare payments. We shared this information with PSASSHG staff, and they confirmed that this was similar to what previous Government Accountability Office studies had found. Therefore, we divided the VA costs by 0.65 to make them comparable to Medicare payments. We should note that there was considerable variance in the ratios of VA costs to Medicare payments. PSASSHG staff informed us that much of this was probably due to the fact that they often contract for bundles of services, and that they often obtain very low costs for some items as part of a package that will include higher costs for other items. This packaging of services results in VA costs for some services differing considerably from Medicare payments. HERC has no way of unbundling these packaged VA costs. Since this source of payment data was used to assign payments to items previously assigned to category average costs, they probably represent an improvement in HERC values, even with the known variance in payments for individual items.

3.3.13 Other Sources

We used the rates proposed by Medicare as payment for fixed wing and helicopter ambulance services. We used additional sources of payment rates for services that did not have RVUs in the Medicare or Ingenix gap code schedules. As an example, for some types of medical supplies, we used the rates from the Home Health Prospective Payment System Demonstration.

3.3.14 Summary of the Sources of HERC Value Data

VA's provision of outpatient services has grown over time. In FY 1998, VA used 9,100 different CPT codes to characterize over 97 million services and procedures. By FY 2010, this had increased to 11,940 different CPT codes to characterize more than 227 million services and procedures. The provider component of the HERC value assigned to these visits had also grown from over \$3.5 billion in FY 1998 to more than \$6.8 billion in FY 2010.

Starting FY 2001, we added more detail to the sources of provider RVUs used to calculate the HERC values. We separated the Medicare RBRVS and Ingenix gap code data into some of their component parts, with separate rows for Ingenix gap codes, Ingenix dental gap codes, laboratory codes, anesthesia codes, codes with Medicare global payments, and the rest of the RBRVS (see [Appendix A](#) for the location of Table 3.3). We also separately identified those CPT codes that have no provider payment because they are cost pass-through payments to facilities for devices or other supplies (e.g. chemotherapy agents).

In FY 2002, there was a large drop in the number of HERC values based on Ingenix gap codes (609 down from 1,674 in FY 2001). Most of this change was the result of the preferential use of the Medicare DMEPOS fee schedule, discussed in [Section 3.3.3](#). Since these CPT codes were not used frequently, the effect on the number of procedures with gap code-based HERC values only declined slightly.

Table 3.2 (see [Appendix A](#)) characterizes VA outpatient care by the source of the HERC value. For the vast majority of care, the value was estimated from Medicare fee schedules and Ingenix gap codes. Table 3.3 (see [Appendix A](#)) provides additional details about the application of Medicare and Ingenix RVU schedules to estimate the cost of VA outpatient care.

3.4 Assignment of Payments to Services Characterized by Non-Standard Codes

Some of the CPT codes used by VA are not normally used to bill for ambulatory care. We made assumptions to estimate a hypothetical payment associated with each of these codes. The following sections describe each coding problem that we encountered, and the assumptions that we made in order to assign a payment.

3.4.1 Codes for Unlisted Services and Procedures

Each group of CPT codes includes a code for “unlisted service or procedure.” The designers of the CPT coding system developed these codes for flexibility, to allow coders to represent services that are not otherwise reflected with a CPT code. These codes are widely used by VA.

Neither Medicare, nor any other provider, assigns a standardized RVU or payment to codes for unlisted procedures. Instead, providers are reimbursed for the services with payments established on a case review basis. We did not study the true nature of the services that VA represents with these codes. We assumed that these codes in fact represent services for which there is a more specific CPT code, with an associated RVU. In the absence of more precise information about the services represented by the unlisted codes, we applied the weighted average payment for “similar” procedures. For example, we calculated the HERC value for unlisted hematology and coagulation procedures as the weighted mean payment of hematology and coagulation procedures performed by VA that were assigned a specific code. The mean was weighted by the frequency of the similar listed codes for that year.

3.4.2 Obsolete Codes

VA uses CPT codes that have become obsolete and therefore do not have a payment associated with them in the RBRVS or Ingenix data. These obsolete codes are generated by the annual revisions to the CPT coding system. New codes are added for new services. A single older code may be replaced by two or more new codes that provide greater specificity in describing a service. For example, a revision split the CPT codes for a quantitative laboratory test of amino acids (82130) into three distinct codes according to the number of amino acids analyzed. Therefore, CPT code number 82130 became obsolete. There are also cases where a new code number is assigned because of the revised definition of the service.

We examined the payment rates and RVUs assigned to new codes that replaced obsolete CPT codes. Most cases were in three categories:

- When an old code was replaced by a single code, we used the RVU of the new code.
- When a code was split into two or more codes with identical RVUs, we used the new code.

In some cases, the code was split into two or more new codes with different RVUs, but it was clear which new code applied to VA patients. For example, some of the vaccine codes were split into adult and pediatric doses; we used the RVU for the adult vaccine.

- There were a few instances where an old code was replaced by more than one new code with different RVUs, but there was no clear way to identify which code to use. We used the VA weighted average payment for these new codes.

3.4.3 Inpatient Procedures

Medicare has identified CPT codes for services that can only be done on an inpatient basis. Medicare does not reimburse providers for these services when they are provided in the ambulatory setting.

There are inpatient E&M CPT codes for care in inpatient settings such as skilled nursing facilities. In the absence of more precise information about the services provided, we assumed that they were ambulatory care E&M visits. We assigned these visits a payment based on the RVUs associated with the corresponding outpatient E&M codes.

There were codes also assumed to be coding errors and the services were assigned the average VA payment per CPT code for that category of care.

3.4.4 Pediatric or Obstetric Services

For pediatric codes that had a direct adult equivalent, HERC assumed that these represented coding errors, and the codes were matched to their adult equivalent. For example, as mentioned earlier, many of the vaccine codes have separate codes for pediatric and adult doses.

Pediatric codes that did not have a direct adult equivalent were assumed to be coding errors, and assigned the average VA payment per CPT code for that category of care. All of the pediatric codes that were assigned the average payment were rarely used.

Obstetric codes were examined for their content and frequency of use. Any code that represented services that the VA might provide or that were used more than 100 times was assumed to represent actual provision of service. Those remaining were assumed to be coding errors, and were assigned the average VA payment per CPT code for that category of care (see Section 3.4.6). In fact, the overall use of these codes is very rare.

There was a marked decrease in the use of codes for pediatric or obstetric services not covered by VA in FY 2002. This decline can be attributed to a change in VA benefit rules to include coverage for pregnancy and for some assisted reproductive services. For FY 2002, HERC adjusted its criteria for this group so that it now only includes CPT codes for pediatric, abortion, and ineligible assisted reproductive procedures. As a result, the number of CPT codes in this group decreased to 11 codes that were used by VA only 113 times. As would be expected, VA use of CPT codes for newly covered obstetric services increased. In FY 2010, these non-covered pediatric and obstetric services were used 113 times, and were limited to 9 CPT codes.

3.4.5 Payment Rate for Similar Services

Despite our effort to find payments from a variety of Medicare and private charge schedules and to make assumptions to assign payments to unlisted, obsolete, and certain inpatient codes, a number of codes still did not have an assigned payment.

We reviewed all remaining CPT codes used by VA to see if we could identify another CPT code that represented the same or a very similar service. If there was another CPT code that represented the same or a very similar service, we used the RVU for that code to estimate the HERC value. Details on how codes were matched are available from HERC. For example, there is no Medicare or Ingenix RVU for CPT code 75556, which represents a type of cardiac magnetic resonance imaging. Similar services, assigned CPT codes 75552 through 75555, have been assigned RVUs. We chose the RVU for CPT code 75553, as it was the most similar to 75556 in that both required a contrast medium.

We then considered the codes that had not been assigned a HERC value in any of the preceding steps. Each was reviewed to determine whether it was appropriate to assume that the service should be assigned the average HERC value. We considered whether these services were very expensive (e.g. a custom motorized wheelchair), or very inexpensive (e.g. a disposable syringe). When we deemed it inappropriate to assign an average payment to a service, we obtained a recommendation from a member of our clinician panel about what constituted a similar service, and then used the associated RVU.

The CPT codes for which the payment rates were obtained from similar services are reported on two rows of data in Table 3.4 (see [Appendix A](#)) under "Clinically Similar

Codes” and “Clinically Similar Payments.” The former were used when the clinically similar CPT code had an established Medicare or Ingenix RVU; whereas, the latter represented CPT codes where there was a payment rate but no RVU for the clinically similar code.

3.4.6 Average HERC Value per CPT Code

We calculated a national average HERC value per CPT code for each category of care by dividing the total payments in the category of care by the number of procedures and services represented by CPT codes in that category. Services that could not be assigned a value by any other method (including residual inpatient and pediatric or obstetric codes) were assigned the mean value of the service for that HERC category of care. The estimate of the total HERC provider payment assigned to these services in Table 3.4 (see [Appendix A](#)) was based on the mean value assigned to the medicine clinic category of care.

A change was made in methods to assign codes that were obsolete by more than two years to the average value instead of mapping them to new codes. This change was made because VA coding directives do not allow the use of these obsolete codes. Thus, there is a significant chance that they represented data entry errors and could actually have RVUs that were different from the obsolete code.

Table 3.4 (see [Appendix A](#)) characterizes non-standard use of CPT codes. It gives the number of problem CPT codes, the number of VA services represented by non-standard codes, and the total provider payment that we assigned to these codes. The numbers in the row “All HERC Average Payments” of this table were calculated using an approximation, and so the table does not precisely reconcile to Table 3.2 (see [Appendix A](#)).

Chapter 4. HERC Facility Payments

Medicare reimburses healthcare facilities for certain types of ambulatory care. This payment is in addition to the provider payment. The types of facilities eligible for Medicare reimbursement include hospital-based clinics, emergency rooms, freestanding ambulatory surgical centers, federally qualified health centers, skilled nursing facilities, rural health clinics, comprehensive outpatient rehabilitation facilities, home health agencies, hospices, and community mental health centers.

Facility reimbursements are a significant expense to Medicare. Based on HERC values, when care is provided in an ambulatory care facility, Medicare spends more on facility payments than it does on physician services. However, total costs are similar.

We used the prospective payment method implemented by Medicare in 2000 to determine the HERC facility payment. We adapted the Medicare rules to estimate facility payments for services provided by VA that are not covered by Medicare.

4.1 VA Facilities and the Medicare Definition of a Facility

All VA acute care hospitals meet the Medicare definition of a “healthcare facility.” If VA could bill Medicare, all outpatient care provided at these medical centers would qualify for facility reimbursement. Some VA visits occur at satellite outpatient clinics. These settings may not meet the Medicare definition of a facility.

VA databases may not reliably identify the site where care is provided. The site is characterized using a 5-digit code, called STA5A. This variable distinguishes hospital-based clinics from satellite outpatient centers. Unfortunately, visits to satellite clinics that involve laboratory tests run at the parent hospital have sometimes been assigned the hospital location code.

Due to the difficulty in determining which of the hundreds of VA sites meet the Medicare definition of a facility, we created the HERC Outpatient Cost files with the assumption that all VA outpatient care would be eligible for Medicare facility payments. The result, however, is that the HERC value for care provided at satellite clinics may be overstated. This is because Medicare reimbursement is greater when care is provided at a facility.⁷ This overstatement of payments applies to care, such as routine visits that can be provided in either a facility or an office-based practice. The HERC value is an accurate statement of Medicare reimbursement for outpatient care that can be provided only in a facility, such as the more complex types of outpatient surgery.

⁷ When care is provided at a facility, the sum of facility and provider reimbursements is greater than the reimbursement to an office-based provider who provides the same service.

4.2 Identifying Medicare Facility Reimbursement

Medicare adopted a new method of paying ambulatory care facilities in August 2000. This method assigns Current Procedural Terminology (CPT) codes to Ambulatory Payment Classifications (APCs) based on similar services with similar facility costs. A facility reimbursement is assigned to each APC. Additional information on the Medicare Hospital Outpatient Prospective Payment System is available on the Medicare web page, http://www.cms.hhs.gov/hospitaloutpatientpps/01_overview.asp?

We used this payment method to calculate facility payment rates. For services that are not covered by Medicare, we extended the Medicare method to estimate the appropriate facility payment.⁸

4.2.1 Care Excluded from APC Reimbursements

Under the Medicare rules, the following types of care are not eligible for facility payments:

- Procedures where the facility reimbursement comes from the APC payment for another CPT code. For example, facilities do not receive an APC payment for anesthesia CPT codes, since the payment is included in the APC associated with the procedure.
- Services in which the facility payment is included with provider reimbursement. Examples of this include laboratory tests, dialysis, and medical supplies.
- Procedures that can only be provided in an inpatient setting.

4.2.2 Implementation of the APC Method to VA Data

For FY 1998-2000, the primary source of payment rates was based on the APC rules from 2000 (the first year in which Medicare used the APC to calculate facility payments). We also used the new APC categories created for 2001. We adjusted APC payments for the year that the service was provided. The Resource Based Relative Value Scale (RBRVS) conversion factors were used as our index. We multiplied the APC payment by a ratio equal to the conversion factor for the year of the visit, divided by the conversion factor for the year of the APC payment.

Starting FY 2001, the main source of APC payments was adjusted so that the fiscal years of the utilization data and the APC payments matched. When APC payment rates were not available for the current fiscal year, APC payment rates from other fiscal years were used if they were available.

⁸ In the past, ambulatory care facilities submitted itemized bills to Medicare. There were no published data on the average bill, or the average Medicare reimbursement for different outpatient services. The current Medicare payment method fills this gap. Medicare studied past payments to determine how much it should pay facilities according to the number and type of services provided.

When a visit involves several CPT codes, the facility receives an APC payment for each code. In the case of multiple procedures, the APC payments for many surgical procedures are reduced by 50%. However, the APC payment for a surgical procedure is not reduced if it is the largest APC payment for the visit. Over the years as Medicare has refined the APC payment system, more CPT codes have been assigned to an APC, and the number of CPT codes and procedures used in each of these categories (APCs subject to discounting and APCs not subject to discounting) has increased. Table 4.1 (see [Appendix A](#)) shows each source of facility payment data.

Adjustments were made starting in FY 2007 to avoid double-counting of the APC payment. This method entails using only the professional component of the provider payment when a facility payment exists or using the bundled payment rate when a facility payment does not exist. See [Section 3.1.4](#) for more information.

4.2.3 Other Codes without Facility Payment

VA has used many codes that are not covered by Medicare and have not been assigned an APC. To deal with these codes, we first considered whether a facility payment was appropriate. We applied Medicare rules and excluded laboratory tests, dialysis, most dental services, and medical supplies from further consideration. We also excluded procedures such as anesthesia whose facility reimbursement comes from the APC payment for another CPT code.

There were large growths in the numbers of CPT codes and procedures with no APC payment allowed, especially between FY 2002-2003. Much of this shift was attributed to Medicare formally classifying services as not eligible for APC payment for which we had previously estimated a facility payment, from gap code facility practice expense Relative Value Units (RVUs).

Following the methods used for provider payments, we examined the CPT codes that did not have a Medicare-assigned APC to see if there were similar procedures that had APC payments. For example, Medicare reimburses facilities for some, but not all types of imaging tests. When this occurred, we assigned the APC payment for the similar service.

4.2.4 Gap Codes - Facility Payments for Services not Covered by Medicare

We considered what facility value was appropriate for the remaining CPT codes that we believed should be assigned a facility payment, but which were not assigned an APC group by Medicare.

We first considered gap code services that included an RVU for practice expense and could be provided in an office-based setting. We determined that an APC payment was appropriate and calculated a facility value based on the practice expense RVU by assuming that the facility payment should be proportionate to the provider practice expense payment. An adjustment was made to the provider practice expense to reflect the higher costs of facilities. We estimated the amount of this adjustment by studying Medicare-covered services that had both a facility payment based on an APC group, and a provider practice expense for office-based providers. We applied the ratio of APC

facility payment to provider practice expense payment to estimate facility payments for gap code services provided in office-based settings.

4.2.5 1997 Medicare Facility Payments

We also examined the 1997 Medicare RBRVS to look for practice expense payments for CPT codes not listed in the 2000 RBRVS. We used the same method to calculate a facility payment from the practice expense RVU (see previous section).

4.2.6 Codes for Unlisted Services and Procedures

Medicare did not initially assign APC payments to some CPT codes for unlisted procedures. We assumed that these codes represented services for which there was a more specific CPT code, with an associated APC. For these missing codes, we applied the weighted average facility payment for similar procedures. The weights were the frequency of VA use of each of the similar procedures. This method was used much less for facility payments than for provider payments because Medicare assigned APCs to many of the unlisted procedure codes.

4.2.7 Obsolete Codes

We examined the APC values for the new codes that replaced obsolete CPT codes. When an obsolete code was replaced by two or more codes with identical APC payments, we used this payment. When it was clear which new code should be used, we used the APC payment for that code. For example, the CPT codes for laparoscopy were reassigned from a single block of CPT codes (56300-56323) to individual CPT codes that corresponded to each specific laparoscopic procedure. These new codes were grouped with the specific organ systems for each procedure.

4.2.8 Inpatient Codes

Similar to assigning provider payments in [Section 3.4.3](#), we used the facility payment of the APC of the corresponding outpatient Evaluation and Management codes.

4.2.9 Average HERC Facility Payment per CPT Code

Codes that were assigned the average HERC provider payment were simply assigned the national average HERC facility payment for that category of care. These codes were the inpatient CPT codes, the pediatric or obstetric CPT codes for services not provided by VA, and the CPT codes that we could not match to any payment data. We calculated the mean HERC facility payment by dividing the total facility payments in the category of care by the number of procedures and services represented by CPT codes in that category. The category of care is based on the clinic stop, or type of clinic, for each visit.

Table 4.1 (see [Appendix A](#)) indicates the sources of information used to calculate the facility component of the HERC value. It gives both the number of CPT codes involved and the number of procedures. This table provides information about the relative importance of the assumptions described above. The table does not include information on the dollar amount of the facility-component HERC values. This is because the APC payment for a given CPT code varies according to the other codes that were assigned in

the same visit. The facility payments associated with each of the sources of the HERC value were not tracked in the creation of the HERC outpatient cost dataset.

With the application of the Medicare rules for discounting APC payments, the portion of the total HERC value for facility payments in FY 2010 was \$7.4 billion, compared to \$6.8 billion for HERC provider payments. Thus, facility payments comprised more than half of the total HERC value.

Chapter 5. User’s Guide to the HERC Outpatient Average Cost Files

5.1 Overview of the HERC Outpatient Average Cost Files

We estimated the hypothetical third-party reimbursement of every record in the VA National Patient Care Database (NPCD) Outpatient Events (SE) file. We call this the “HERC value.” We estimated this payment based on Current Procedural Terminology (CPT) codes as described in [Chapters 3](#) and [4](#).

For each outpatient visit, we also determined a “national cost estimate” and a “local cost estimate.” We created these cost estimates by adjusting the HERC value to reflect VA’s actual expenditures for ambulatory care, as described below.

5.1.1 Assumptions Made to Estimate Payments and Costs

It was not possible for HERC to directly measure the cost of each individual outpatient encounter or extensively investigate the accuracy of VA coding. Therefore, a number of analytical assumptions were made to estimate the cost of outpatient care. The assumptions listed below are described in further detail in [Section 1.1](#).

1. All ambulatory care is comprehensively characterized by the CPT codes used in the national VA SE File
2. All CPT codes used by the VA represent a service that should be assigned a cost
3. Costs are proportionate to payment rates
4. Some of Medicare’s reimbursement methods are not appropriate for VA
5. Non-standard service codes represent valid costs
6. Payments should include facility payments
7. Prior to FY 2004, VA incurred the cost of ambulatory care reported in the CDR
8. Starting FY 2004, VA incurred the cost of ambulatory care reported in DSS
9. Indirect costs are incurred in proportion to direct costs
10. The DSS distribution of cost between inpatient and outpatient care is accurate at each individual medical center

5.1.2 Limitations of HERC Outpatient Cost Estimates

Analysts who use the HERC Outpatient Average Cost file should be aware of the limitations that resulted from the assumptions mentioned above. The following limitations are described in more detail in [Section 1.2](#).

- No pharmacy utilization, payments, or costs are estimated
- There are incomplete data on prosthetics, adult daycare, and home care services
- HERC values do not necessarily equate to actual VA costs, practice patterns, or productivity
- There were known problems with the VA CPT codes that affected the cost estimates

5.2 Applying for Access to Use the HERC Outpatient Average Cost Files

To gain access to the HERC Outpatient Average Cost files, you are required to:

1. Have a VA account with Austin Information Technology Center (AITC)
2. Register to use HERC data
3. Submit a Time Sharing Access Request (Form VA-9957) to your AITC Point of Contact (POC)

To register to use HERC data, please find instructions and a link to download the registration form on our intranet site. Select “Resources” on the sidebar and then choose “Register to Use Average Cost Data.” Once your form has been reviewed, you will be provided a “functional task code.” This code should be specified on Form 9957 and then submitted to your AITC POC. To locate your POC, call the **AITC Help Desk** at **(512) 326-6780**. If you have any other questions, please contact us at herc@va.gov.

5.3 Names of the HERC Outpatient Average Cost Files

The HERC Outpatient Average Cost files are stored at the AITC. The MVS/TSO names of each file, as well as the number of records the file contains, are listed on Table 5.1.

Table 5.1 HERC Outpatient Average Cost Files, FY 1998-2010

Year	File Name	Number of Records
FY 1998	RMTPRD.HERC.SAS.OPCSE98	57,630,056
FY 1999	RMTPRD.HERC.SAS.OPCSE99	61,642,904
FY 2000	RMTPRD.HERC.SAS.OPCSE00	63,637,301
FY 2001	RMTPRD.HERC.SAS.OPCSE01	60,962,621
FY 2002	RMTPRD.HERC.SAS.OPCSE02	64,477,062
FY 2003	RMTPRD.HERC.SAS.OPCSE03	68,148,617
FY 2004*	RMTPRD.HERC.SAS.OPCSE04	72,518,792
FY 2005**	RMTPRD.HERC.SAS.OPCSE05R*	76,070,883
FY 2006	RMTPRD.HERC.SAS.OPCSE06	77,685,321
FY 2007	RMTPRD.HERC.SAS.OPCSE07	81,838,461
FY 2008	RMTPRD.HERC.SAS.OPCSE08	86,224,894
FY 2009	RMTPRD.HERC.SAS.OPCSE09	92,892,834
FY 2010	RMTPRD.HERC.SAS.OPCSE10	98,250,747

*The FY 2004 HERC file links to a revised version of the SE file: MDPPRD.MDP.SAS.REVISED.HERC.SE04.

** Beginning January 2011, the FY 2005 HERC file links to a revised version of the SE file: MDPPRD.MDP.SAS.REVISED.SE05(0).

5.4 Variables in the HERC Outpatient Average Cost Files

Table 5.2 contains the names and brief descriptions of variables in the HERC Outpatient Average Cost files.

5.4.1 Variables in Common with the Outpatient Events (SE) Files

The HERC Outpatient Average Cost files have four variables in common with the VA Outpatient Events files. They include the patient’s scrambled social security number (SCRSSN), the site where care was provided (STA5A), the date of service (VIZDAY), and the type of clinic visited as identified by the 3-digit clinic stop code (CL). These variables identify the encounter, but do not uniquely define a particular outpatient visit since a patient may visit a particular clinic stop at a given site two or more times in a single day.

5.4.2 Link Variable

The link variable, LINK2SE, serves as the identifier for each record and is not constant over time. Prior to FY 2003, HERC created this variable as the observation number of each record in the Outpatient Events file. As a result, this number could change if the SE file was rebuilt (which happened in FY 2010 to the FY 2005 SE file). Starting FY 2003, a unique identifier for each record in the SE file, ENCOUNTER_ID, was added to the Outpatient Events file. This variable is common to both the HERC Outpatient Average

Cost files and the SE files, allowing them to be merged more easily. Instructions for merging the two files are described in [Sections 5.5, 5.6, and 5.7](#).

Table 5.2 Variables in the HERC Outpatient Average Cost Files

Variable	Description	Source
SCRSSN	Scrambled Social Security number	Outpatient Events (SE) files
STA5A	Medical center (3-digit station code with 2-digit location suffix)	
VIZDAY	Date of visit	
CL	3-digit code indicating the type of clinic visited	
ENCOUNTER_ID	Unique VHA Encounter ID (not available before FY 2003)	
LINK2SE	Observation number of this visit in the Outpatient Events files (SE) (FY 1998–2002)	HERC Outpatient Average Cost files
CAT	HERC category of outpatient service	
PAYMHERC	HERC value for this visit	
COSTN	National VA average cost for this visit	
COSTL	Local VA average cost for this visit	
PAYMPROV	Provider component of the HERC value for this visit	
PAYMFACL	Facility component of the HERC value for this visit	
IMP	Number of CPT codes in this visit assigned the mean HERC value per CPT code for this category of care	

5.4.3 Category of Care

Each visit was assigned to a “HERC Category of Care” (CAT) based on the location where the service was provided. VA identifies the location of care using a 3-digit code, the DSS identifier (formerly called the clinic stop). We defined 14 categories of care, as described in [Chapter 2](#). Table 5.3 provides the name of each HERC category of care with its category number. Note we did not calculate national and local cost estimates for outpatient pharmacy, prosthetics, adult daycare, and home care. (See limitations of HERC cost estimates described in [Section 1.2](#).)

Table 5.3 HERC Outpatient Categories of Care

Category Number	HERC Category of Care Name
21	Outpatient Medicine
22	Outpatient Dialysis
23	Outpatient Ancillary Services
24	Outpatient Rehabilitation
25	Outpatient Diagnostics Services
26	Outpatient Pharmacy
27	Outpatient Prosthetics
28	Outpatient Surgery
29	Outpatient Psychiatry
30	Outpatient Substance Abuse Treatment
31	Outpatient Dental
32	Outpatient Adult Daycare
33	Home Care
99	Unidentified Stops

5.4.4 HERC Value

The HERC value (PAYMHERC) is based on the CPT codes assigned to the visit. It is the sum of the provider and facility payments, as described in [Chapters 3 and 4](#). Wherever possible, we used the Medicare payment method as the national average reimbursement rate. For services not reimbursed by Medicare, we used one of several other sources. These included the “gap code Relative Value Units” created by Ingenix Corporation and data from surveys of physicians and dentists. For a limited number of CPT codes, we used the mean payment for similar codes or the mean payment per CPT code for that category of care.

The HERC value is a useful estimate of the cost of care from the perspective of the average healthcare payer. It may be used to understand the implications of a cost-effectiveness result for the entire U.S. healthcare system. However, the HERC value should not be used to understand the costs of a particular site, or to determine the effect of an intervention at a particular site.

5.4.5 National Cost Estimate

As noted in [Section 2.4](#), starting in FY 2004, the DSS Outpatient NDE replaced the CDR as the source of the aggregate VA costs by category of care. The aggregated costs that were summarized from the DSS Outpatient file were applied in exactly the same manner as the CDR costs were previously. The national cost estimate (COSTN) was created to reflect VA national expenditures in each category of care. To find the national cost estimate, the HERC value was multiplied by a ratio of costs to payments calculated for each category of care. These ratios were found by dividing the national total expenditures reported in DSS for each category by the national total of HERC values for the same category. For example, if the cost to payments ratio for the psychiatry category

was 1.10, then we would multiple all the HERC values within this category by 1.10 to generate the national cost. Therefore, the sum of the national cost estimates for visits in each category of care was equal to the actual VA expenditures for that category, as reported in the Outpatient NDE.

The national cost estimates were derived for all records except for the following categories: pharmacy (26), prosthetics (27), adult daycare (32), home care (33), and unidentified stops (99). Adult daycare and home care were excluded starting FY 2007. An Excel file with cost to charge ratios for all years of the HERC Outpatient Average Cost files is on the HERC intranet site.

Note: For records with missing national cost estimates, we recommend using the HERC values instead.

5.4.6 Local Cost Estimate

The local cost estimate (COSTL) was created to reflect VA expenditures for ambulatory care at a particular medical center. It is a further refinement of the national cost estimate. We multiplied the national cost estimate by a factor for each medical center. This factor was calculated so that the sum of the local cost estimates for visits to a particular medical center was equal to the actual VA expenditures for ambulatory care at that medical center, as reported in DSS. The switch from the CDR to DSS as the source of the cost estimates improved the reliability of the category-specific costs at each medical center to allow for the creation of category-specific local cost-to-payment ratios. Because we used the national cost estimates as our basis, the sum of the local cost estimates for visits in each category of care will approximately equal the total national expenditures for each category.

The factor used to find the local cost estimate was a medical-center-specific ratio of costs to national cost estimates. For each medical center, we found the sum of the national cost estimates. This was divided by the sum of the ambulatory care expenditures for that medical center, as reported in DSS. Similar to the previous section, pharmacy, prosthetics, adult daycare, home care, and unidentified stops were excluded when these ratios were calculated.

The local cost estimates were created with the assumption that the parent medical center and satellite clinics incur identical costs for the same type of care. Local estimates reflect expenditures and utilization reported with the 3-digit facility identifier (STA3N). VA also identifies facilities with a 5-digit facility identifier (STA5A). The quality of information incorporated in this more specific location variable is uncertain so it was not used.

5.4.7 Provider and Facility Components of the HERC Value

The provider component (PAYMPROV) and the facility component (PAYMFACL) are also given. Note that the provider and facility components of the HERC value equal the total HERC value.

5.4.8 Count of Codes Assigned Average Payment

The variable IMP contains the number of CPT codes in the record for which the HERC value was estimated. The estimated payments for these CPT codes were the mean payment per CPT code for the HERC category of care where the visit occurred.

5.5 Prior to Linking the HERC Outpatient Average Cost Files to the Outpatient Events Files **NEW**

To find the cost of outpatient care for your cohort, you will need each patient's unique VA medical record number, i.e., the social security number (SSN). The social security number must be converted to a scrambled social security number (SCRSSN). The VA Information Resource Center (VIREC) (<http://www.virec.research.va.gov/>) can provide you with instructions on how to accomplish this. Your cohort file may include other key variables: the patient's date of birth, the date they enrolled in your study, and the date they completed the study. Be sure to observe the necessary information security precautions to protect the confidentiality of all research data.

5.6 Linking the HERC Outpatient Average Cost Files to the Outpatient Events Files, FY 1998-2002

The HERC cost estimates are included in a file with five variables that identify the visit. The HERC file does not duplicate any other fields found in the SE file. Analysts who wish to obtain more information about the visit (such as diagnosis or procedures) or the patient (such as demographic variables) must obtain this information from the SE file. This requires merging the HERC outpatient file with the SE file.

In response to problems that some users had linking the HERC Outpatient Average Cost files to the Outpatient Events files, HERC revised its suggested method to link these data in March 2003. The SE file has four variables that characterize each visit: the patient's scrambled social security number (SCRSSN), the site where care was provided (STA5A), the date of service (VIZDAY), and the location of care, or clinic stop (CL). These four variables do not uniquely define a particular outpatient visit, however. This is because a single patient may visit a particular clinic stop at a particular site two or more times on a given day. This is not an infrequent occurrence. About 34% of the records in the SE file share values for these four variables with another record; therefore, another variable (LINK2SE) is needed to uniquely define each visit.

There are three steps to find the HERC cost of outpatient visits for a cohort of patients: (1) define your cohort, (2) create a file of their visits from the Outpatient Events file, and (3) combine your extract from the Events file with HERC cost data.

1. Define your cohort.

Your cohort file is a list of the scrambled social security numbers of the participants in your study. It is strongly advised that you have an additional identifier in your cohort file, preferably the patient's date of birth. Birth date is

used to confirm that you have obtained the correct utilization data. This is discussed in more detail in the next section.

There must be no more than one record for each patient in your cohort file. The following SAS code shows how to use the NODUPKEY option to ensure there are no duplicate entries for the patient identifier, SCRSSN, the scrambled social security number. Note: The Events file is already sorted by this variable. Do not sort the SE file. It is a very large file and quite costly to sort.

```
PROC SORT DATA=COHORT NODUPKEY;  
  BY SCRSSN;  
RUN;
```

2. Create a file of your cohort's visits from the Outpatient Events file.

The next step is to identify visits to VA providers by your cohort members. These visits are recorded in the VA Outpatient Events file (also known as the Medical SAS Outpatient Dataset of the NPCD, or the SE file).

Use SAS to merge your cohort list with the Outpatient Events file. You will merge files by patient scrambled social security number (SCRSSN). Social security numbers are sometimes transcribed incorrectly. You should confirm that you have identified the correct patients by checking that the birth date you obtained when the subject enrolled in your study is the same as the birth date variable, DOB, recorded in the Events file.

You must also create a new variable LINK2SE in order to find the HERC cost estimates. LINK2SE is the record number in the Outpatient Events file. The following SAS code shows how to select visits from the NPCD and define LINK2SE.

```
DATA OUT1.COHEVENT;  
MERGE COHORT (IN=INCOHORT)  
  IN.SE00 (IN=INEVENT)  
  ;  
  BY SCRSSN;  
  
  IF INEVENT THEN DO;  
    IF LINK2SE=. THEN LINK2SE=1;  
    ELSE LINK2SE=LINK2SE+1;  
  END;  
  RETAIN LINK2SE;  
  IF INCOHORT AND INEVENT;  
RUN;
```

The SAS DATA step merges the two files based on SCRSSN. The temporary variables INCOHORT and INEVENT take a value of 1 if the record is in the cohort file or if the record is in the Events file, respectively. The statement “IF INCOHORT AND INEVENT” will select the Events file records of all members of the cohort, and none of the records of other patients.

The LINK2SE variable is defined only if the DATA step involves a record in the Events file. When the first record in the NPCD visit dataset is encountered, LINK2SE does not have a value so the program assigns it a value of 1. LINK2SE is retained for the next and subsequent SAS DATA steps. Subsequently when an NPCD record is encountered, the value of LINK2SE is incremented by 1. If there is a patient in the cohort file who is not found in the NPCD dataset, the value of LINK2SE is simply carried forward unchanged.

Caution: When selecting records from the Events file using a cohort file, it is best not to use the SAS variable `_N_` to define LINK2SE. If `_N_` is used, and there is a patient in your list who is not found in the visits file, LINK2SE will be incorrect. The SAS variable `_N_` is a count of the iterations of the dataset. When SAS reads the record of the patient who is not in the NPCD outpatient file, a DATA step occurs, and `_N_` is incremented. For all subsequent records in the NPCD file, the value of `_N_` will not correspond to the record number in the file.

3. Combine your extract from the Events file with HERC cost data.

The following DATA step merges your Outpatient Events file extract (IN2.COHEVENT) with the HERC cost file (IN1.OPCSE00), using the LINK2SE variable. Both datasets are already sorted by this variable so it is not necessary to sort them again. Both files also contain the variables: station identifier (STA5A), scrambled social security number (SCRSSN), visit day (VIZDAY), and clinic stop (CL). These variables from the HERC cost file are renamed so that, in a subsequent step, we can confirm that the merge was done correctly. The file MISSING00 contains records that appear in your cohort visits file but not in the HERC file.

```

DATA OUT2.SECOST00 MISSING00;
  MERGE IN1.OPCSE00 (RENAME=(STA5A=HCSTA5A SCRSSN=HCSCRSSN
    VIZDAY=HCVIZDAY CL=HCCL) IN=INHERC)
    IN2.COHEVENT (IN=INSE);
  BY LINK2SE;
  IF INSE AND INHERC THEN OUTPUT OUT2.SECOST00;
  ELSE IF INSE THEN OUTPUT MISSING00;
RUN;

DATA CHECK1;
  SET OUT2.SECOST00;
  IF HCSCRSSN NE SCRSSN OR
    CL NE HCCL OR
    VIZDAY NE HCVIZDAY OR
    HCSTA5A NE STA5A;
RUN;

*** NOTHING SHOULD PRINT HERE ***;
PROC PRINT DATA=CHECK1;
RUN;

```

It is important to check that the data were correctly merged, that is, the correct cost estimate has been assigned to each visit. The DATA step CHECK1 looks for mismatched records by identifying HERC visits that do not match Event file visits based on the key variables. If there are no mismatches, then the file CHECK1 will not have any records and nothing will be printed in the output.

After validating the merged file, the four variables, HCSCRSSN, HCVIZDAY, HCCL, and HCSTA5A, may be dropped. Note that there are different versions of the check step below for FY 1999 and FY 2000 because HERC excluded a small number of records from the HERC data for these years. If a user runs the provided program for FY 1999 or FY 2000 data without using these steps specific to each of these years, the excluded observations could show up in the check dataset.

```

*** FOR FY99 THIS DATASET SHOULD BE EMPTY ***;
DATA CHECK2A;
  SET MISSING99;
  IF CL IN (610,731) THEN DELETE;
RUN;

*** NOTHING SHOULD PRINT HERE ***;
PROC PRINT DATA=CHECK2A;
RUN;

*** FOR FY00 THIS DATASET SHOULD BE EMPTY ***;
DATA CHECK2B;
  SET MISSING00;
  IF CL IN (610,650,731) THEN DELETE;
RUN;

*** NOTHING SHOULD PRINT HERE ***;
PROC PRINT DATA=CHECK2B;
RUN;

```

5.6.1 Notice Regarding Linking FY 2000 Data

Any patient cohort data pulled from the FY 2000 SE file **before** November 2002 will no longer correctly link to the HERC outpatient average cost dataset for FY 2000. After the FY 2000 SE file was officially closed by Austin, errors were discovered that caused the Austin custodians of these data to rebuild the file. This resulted in a change in the number of observations in the FY 2000 SE data. Thus, the HERC LINK2SE variable in the original HERC dataset could no longer be used to link to the SE file. HERC recreated the HERC outpatient average cost dataset for FY 2000 so that the LINK2SE variable in the HERC data correctly corresponds to the SE file at Austin. Because the LINK2SE variable was created using the revised number of observations, any patient cohort data pulled from the FY 2000 SE file before November 2002 will no longer correctly link to the HERC outpatient average cost dataset for FY 2000.

5.7 Linking the HERC Outpatient Average Cost Files to the Outpatient Events Files, FY 2003-Present

Matching HERC cost records to visit records for FY 2003 and subsequent years is now easier. Starting FY 2003 a new variable, ENCOUNTER_ID, was added to the SE data that provides a unique identifier for each record in the SE file. As a result, HERC has changed the recommended method for linking the HERC Outpatient Cost file to the Outpatient Events (SE) file. This section describes the new method, including example SAS code.

Similar to previous years, the linking programs start by sorting the cohort file by the key variable of scrambled social security number (SCRSSN) and removing any duplicate values.

```
PROC SORT DATA=COHORT NODUPKEY;  
  BY SCRSSN;  
RUN;
```

The following SAS DATA step selects the visits of cohort members based on scrambled social security number using the IF statement and Boolean flags, INCOHORT and INEVENT. The program includes an option ELSE IF statement to keep track of cohort members who did not have visits. Their records are output to the file called EXCLUDED03. With the inclusion of the unique ENCOUNTER_ID variable, it is no longer necessary to create the variable LINK2SE. (LINK2SE is an essential part of matching records for FY 2002 and earlier years.)

```
DATA OUTPUT1.COHEVENT EXCLUDED03;  
  MERGE COHORT (IN=INCOHORT)  
        INSE03 (IN=INEVENT)  
  ;  
  BY SCRSSN;  
  IF INCOHORT AND INEVENT THEN OUTPUT OUTPUT1.COHEVENT;  
  ELSE IF INCOHORT THEN OUTPUT EXCLUDED03;  
RUN;
```

If you are using the OPCSE files prior to FY 2006, the following precautionary measure may be omitted; however, this SORT procedure may avoid an error in the subsequent merge step.

```
PROC SORT DATA=IN1.COHEVENT;  
  BY SCRSSN VIZDAY STA5A ENCOUNTER_ID;  
RUN;
```

The following DATA step merges the Outpatient Events file extract (IN1.COHEVENT) with the HERC cost file (IN2.OPCSE03), using the key variables: scrambled social security number (SCRSSN), day of visit (VIZDAY), station identifier (STA5A), and unique encounter identification (ENCOUNTER_ID). The additional key variable of ENCOUNTER_ID uniquely identifies each visit and eliminates the need for post-merge validation. The ELSE IF statement is optional. MISSING03 keeps track of any visit records that were not found in the HERC Outpatient Average Cost file. There should be no records that meet this condition.

```

DATA OUTPUT2.SECOST03 MISSING03;
  MERGE IN1.COHEVENT (IN=INSE)
        IN2.OPCSE03 (IN=INHERC)
        ;
  BY SCRSSN VIZDAY STA5A ENCOUNTER_ID;
  IF INSE AND INHERC THEN OUTPUT OUTPUT2.SECOST03;
  ELSE IF INSE THEN OUTPUT MISSING03;
RUN;

```

If you are using the OPCSE file from FY 2006 or after, you must sort the Outpatient Events file extract by ENCOUNTER_ID prior to the merge.

```

PROC SORT DATA=IN1.COHEVENT;
  BY ENCOUNTER_ID;
RUN;

```

The following DATA step merges the Outpatient Events file extract (IN1.COHEVENT) with the HERC cost file (IN2.OPCSE09), using only the key variable unique encounter identification (ENCOUNTER_ID).

```

DATA OUTPUT2.SECOST09 MISSING09;
  MERGE IN1.COHEVENT (IN=INSE)
        IN2.OPCSE09 (IN=INHERC)
        ;
  BY ENCOUNTER_ID;
  IF INSE AND INHERC THEN OUTPUT OUTPUT2.SECOST09;
  ELSE IF INSE THEN OUTPUT MISSING09;
RUN;

```

5.7.1 Notice Regarding Linking FY 2005 Data **NEW**

After the SE file was officially closed by AITC for FY 2005, the dataset had 75,932,227 observations and contained duplicate ENCOUNTER_ID (as noted in the 701 cases mentioned in [Section 1.7](#)). Therefore, in previous versions of this guidebook we advised researchers to use the LINK2SE variable when linking the SE and HERC Outpatient Average Cost files. However, in FY 2010, an error occurred during a data transfer at Austin which required the AITC custodians of these data to rebuild the FY 2005 SE file. Changes to the VA outpatient visits data from the newly rebuilt file made it difficult to merge with the HERC Outpatient Average Cost file using the LINK2SE variable, even though the data still contained duplicate ENCOUNTER_ID. In response to this, HERC rebuilt the FY 2005 average cost file using a revised version of the FY 2005 SE file that did not contain duplicate ENCOUNTER_ID. The rebuilt HERC file was uploaded to the Austin mainframe in February 2011 and is located at RMTPRD.HERC.SAS.OPCSE05R. Note the “R” at the end of the filename, which represents a revised version. This new file

has 76,070,883 records and should be merged with MDPPRD.MDP.SAS.REVISED.SE05(0). Both revised HERC average cost and SE files no longer have duplicate ENCOUNTER_ID; therefore, use the method described in [Section 5.7](#) to link the two.

Chapter 6. Data Validation

We validated the HERC ambulatory care file to determine whether the following were true:

- Every visit in the SE file (also called the National Patient Care Database (NPCD) Outpatient Events file) was represented in the HERC Outpatient Average Cost file.
- Every Current Procedural Terminology (CPT) code in the SE file was assigned a payment in the HERC Outpatient Average Cost file.
- The sum of the national costs in each category of care in the HERC Outpatient Average Cost file equaled the sum of costs reported in Decision Support System (DSS) Outpatient National Data Extract (NDE) for that category of care.
- The sum of the local costs at each medical center in the HERC Outpatient Average Cost file equaled the total costs reported in DSS Outpatient NDE for that medical center.

The HERC files have the same number of records that appear in the Outpatient Events files, except for those records explicitly excluded in FY 1999 and 2000. In these cases, the Outpatient Events files included records for clinic stops that represented inpatient or contract services provided by non-VA providers. Because these visits represented care not included in the CDR outpatient costs, we deemed them “invalid,” and did not assign them a HERC value or cost. There was a large increase in the number of records we could not match to CDR outpatient costs. Starting FY 2001, these visits were assigned to the unidentified stops category.

Tables 6.1 through 6.3 report the reconciliation of national costs between HERC outpatient costs and the DSS costs by category of care for FY 2008-2010. The outpatient pharmacy, prosthetics, adult daycare, home care, and unidentified stops categories are not included in these tables. These categories were excluded because the ratios of costs to payments were too high for these categories at the national level. We believe the possible cause for the high ratios is that these services are underreported in the VA outpatient database. If cost estimates were calculated (by multiplying the HERC value and costs to payments ratio), then the resulting figures would have been unreliable.

We also examined descriptive statistics for the estimated costs for each CPT code and for each encounter. There was a very large range in the set of HERC values, with a low of \$0.05 and a high of over \$40,000. The low value corresponded to a Healthcare Common Procedure Coding System payment rate for a strip of gauze. The high value was for an electronic elbow microprocessor.

Table 6.1 Reconciliation of National Costs between HERC Outpatient Costs and DSS by Cost Category, FY 2008

	CATEGORY	DSS COST	HERC COST
21	MEDICINE	6,557,309,732	6,557,193,993
22	DIALYSIS	191,176,586	191,249,964
23	ANCILLARY	374,131,641	374,131,689
24	REHABILITATION	595,775,600	595,775,551
25	DIAGNOSTIC	2,604,076,197	2,604,076,952
28	SURGERY	2,701,773,066	2,701,772,718
29	PSYCHIATRY	1,740,676,305	1,740,675,886
30	SUBSTANCE ABUSE	260,748,560	260,748,452
31	DENTAL	496,483,063	496,485,840

Table 6.2 Reconciliation of National Costs between HERC Outpatient Costs and DSS by Cost Category, FY 2009

	CATEGORY	DSS COST	HERC COST
21	MEDICINE	7,247,754,267	7,246,751,518
22	DIALYSIS	196,901,501	197,292,307
23	ANCILLARY	500,052,852	500,052,762
24	REHABILITATION	740,404,528	740,404,765
25	DIAGNOSTIC	2,915,712,929	2,915,713,956
28	SURGERY	3,025,026,303	3,025,027,290
29	PSYCHIATRY	2,072,991,695	2,072,991,177
30	SUBSTANCE ABUSE	292,592,429	292,592,412
31	DENTAL	549,133,326	549,361,663

Table 6.3 Reconciliation of National Costs between HERC Outpatient Costs and DSS by Cost Category, FY 2010

	CATEGORY	DSS COST	HERC COST
21	MEDICINE	7,978,023,407	7,975,427,401
22	DIALYSIS	212,169,519	212,658,413
23	ANCILLARY	585,366,706	585,366,651
24	REHABILITATION	845,457,190	845,456,970
25	DIAGNOSTIC	3,142,722,509	3,142,721,387
28	SURGERY	3,243,651,299	3,243,650,748
29	PSYCHIATRY	2,473,426,754	2,473,425,940
30	SUBSTANCE ABUSE	326,800,585	326,800,726
31	DENTAL	610,695,358	611,503,853

Appendix A: Location of Data Files

A.1 Previous Versions of Guidebook

Contact Nicole Flores at Nicole.Flores@va.gov to obtain previous versions of HERC's Outpatient Average Cost Dataset for VA Care.

A.2 Tables Available Only on the HERC Web Site

Refer to Table A.1 below for the web site location of tables identified in the guidebook.

Table A.1 Web Site Location of Tables

Table Number	Description	Locations	
		HERC Internet Site	HERC Intranet Site
3.2	VA Utilization by Source for Provider Component of the HERC Value, FY 1998-2010	Yes	Yes
3.3	VA Utilization by Source for Provider Component of the HERC Value, FY 2001-2010: Details of the Medicare of Ingenix Relative Value Unit Schedules	Yes	Yes
3.4	Non-Standard Usage of Current Procedural Terminology Codes for Ambulatory Services, by Type of Coding Problem FY 1998-2010	Yes	Yes
4.1	Facility Component of the HERC Value by Source, FY 1998-2010	No	Yes

Appendix B: References

- ADA (2000). American Dental Association 1999 Survey of Dental Fees. ADA: Chicago, IL 2000.
- Hsiao, WC, Braun P, Dunn DL, Becker ER, Yntema D, Verrilli DK, Stamenovic E, Chen SP (1992). An Overview of the Development and Refinement of the Resource-Based Relative Value Scale: The Foundation for Reform of U.S. Physician Payment. Medical Care 30:NS1-NS12.
- Ingenix (2009). St. Anthony's 2009 RBRVS: A Comprehensive Listing of RBRVS Values for all CPT and HCPCS Codes. Salt Lake City, 2009.
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- NDAS (2000). 2000 National Dental Advisory Service Comprehensive Fee Report. Yale Wasserman, D.M.D., Medical Publishers Ltd.: West Allis, 2000.
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- Phibbs CS, Bhandari A, Yu W, Barnett PG (2003). Estimating the Costs of VA Ambulatory Care. Medical Care Research and Review 60:54S-73S.
- Phibbs CS, Su P, Barnett PG. (2004). The Effects on Measured Workload and Costs of Limiting CPT Codes in the NPCD SE file. HERC Technical Report 15. Menlo Park, CA: VA Health Economics Resource Center.
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