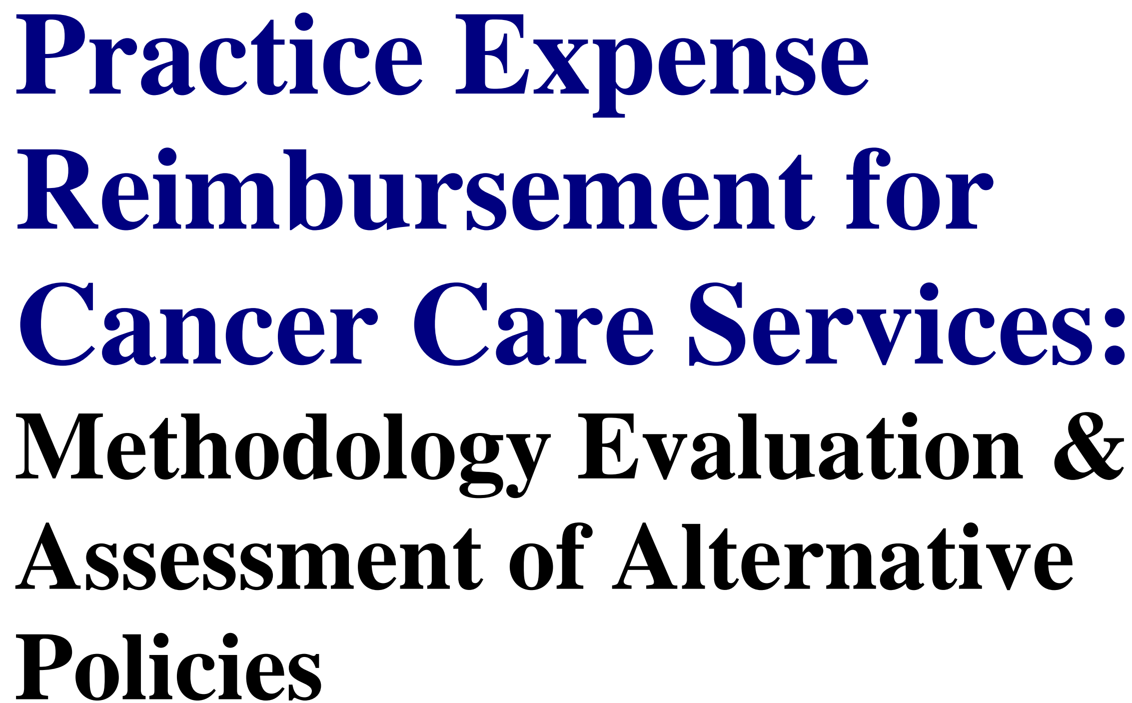

Practice Expense Reimbursement for Cancer Care Services:

Methodology Evaluation & Assessment of Alternative Policies

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1.0 Executive Summary

Background

The Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003, in addition to creating a comprehensive drug benefit that is scheduled to become available in 2006, contains many substantive changes in payment policies for services currently covered under Medicare. One such area where the MMA completely revamped coverage and reimbursement policy was in payments for medical oncology services, specifically the "practice expense" component of Medicare payments for those services. These changes were designed, in part, to provide a transition for physicians from the significant effects of payment reform for the limited number of drugs currently covered by Medicare.

In response to those drug payment reforms, various physicians raised issues about the adequacy of Medicare practice expense payments. In particular, oncologists argued that Medicare payments for practice expenses did not cover their costs for treating cancer patients. In response to these concerns, Congress added practice expense reforms to the MMA drug payment reform provisions.

The statute required the Centers for Medicare and Medicaid Services (CMS) to use practice expense data submitted by the American Society for Clinical Oncology (ASCO) in lieu of the American Medical Association's Socioeconomic Monitoring Survey (SMS) when setting payment weights for chemotherapy drug administration services. It also required CMS to account for the direct labor costs of oncology nurses and to impute work relative value unit (RVU) values to these services. Taken together, these changes to physician reimbursement represent an effort by the Congress to reform payment for drugs under Medicare, while ensuring that the changes implemented do not adversely affect patient access to chemotherapy services.

This study analyzes the CMS methodology for setting payments in these areas, and compares CMS practice expense payments to oncology practice costs as reported by the ASCO survey and discusses the reasons for any shortfalls. Finally, we provide potential policy options for policymakers seeking to mitigate or eliminate any shortfalls.

The Global Access Project (GAP) is a collaborative group of over forty patient advocacy organizations, health care providers, and members of the pharmaceutical and biotechnology industries that was organized to develop a comprehensive information resource to assist key policymakers in Congress and at the Centers for Medicare and Medicaid Services (CMS) as they examine the implementation of the new Medicare law. To improve policymakers' understanding of how cancer care is provided today and what is currently known about the cost of delivering cancer services, the National Patient Advocate Foundation (NPAF), on behalf of GAP, has initiated studies to examine, over time, the provision of cancer care at community-based

oncology centers and hospital outpatient departments. The studies are the first of a multi-year effort to document and measure changes in key aspects of cancer care during the implementation of the MMA.

This document is one of the studies being initiated by NPAF on behalf of GAP.

Findings

Based on our replication of the CMS practice expense methodology, we found:

- Practice expense reimbursement for oncology services is nearly 50% lower than oncology practice expense costs as measured by ASCO.[1]
- Approximately two thirds of this difference is derived from the fact that, on average, the Medicare physician fee schedule reimburses physicians for only about 70% of the average cost of treating Medicare patients.
- The remaining third is caused by reallocations across specialties caused by the CMS practice expense ratesetting methodology—which differentially affects oncologists because their measured practice expense is higher than any other specialty.

These differentials are not unique to oncology. Rather, oncology is simply the extreme value in any analysis of differences between cost pool data and practice expense reimbursement, due to the fact that, after the acceptance of the ASCO supplemental survey data, the oncology specialties have practice expense per hour values that are higher than those for any other specialty.

The report presents these findings in detail.

Policy Options

A number of commentators have suggested that failure to adequately reimburse cancer care services will create barriers to patient access to these services. The report also evaluates alternative technical and policy options that policymakers may wish to consider if they decide to mitigate access concerns by modifying the CMS payment methodology to increase reimbursement for oncology practice expenses.

Our study explores a variety of options for policymakers who are seeking ways to ensure that oncology practice expense is fully reimbursed. We discuss both modifications to the current CMS methodology as well as removing oncology services from the current physician fee schedule entirely.

[1] We based our analysis on the practice expense per hour amount attributed to the ASCO survey data in the CMS interim final rule published on January 7, 2004 (69 Fed. Reg. 1084 ff). We have not seen the ASCO report on the data. Therefore, we cannot evaluate, whether the ASCO survey's $189 in practice expense per hour is accurate.

Modifications of the Current CMS Payment Methodology

If the goal is to reimburse oncologists for 100% of their practice expense costs, policies seeking to change the current CMS methodology will need to address the reallocation that is inherent in that system, as well as the fact that the system is not presently designed to provide full practice expense reimbursement.

Eliminating Blending/Leakage
To address directly the cross-specialty reallocations (often referred to as "leakage") caused by the blending of practice expense information from various specialties, isolation of separate oncology practice expense pools would be required. These pools would receive all oncology practice costs under a revised methodology. The weights developed using these rules could then be moved up or down to capture the preferred percentage of oncology practice expense costs.

The study provides a discussion of the various challenges facing policymakers seeking to advance such a policy.

Establishing an Oncology Specific Conversion Factor
One more technically simple approach to eliminating any shortfall inherent in the CMS payment for oncology practice expense costs would be to maintain the current methodology but to create a separate conversion factor for oncologist, which could then be scaled to recapture the full amount of practice expense in the oncology care pools.

Policymakers could also choose to make this policy specific to various oncology procedures—rather than determined based on specialty.

Establishing an Adjustment Factor for Oncology Services
In conjunction with payment reforms for drugs and biologicals under the physician fee schedule, the MMA provided transitional adjustments to practice expense values in 2004 and 2005. Policymakers seeking full reimbursement of oncology practice costs could also apply a similar adjustment in the future for practice expense payments to oncologists.

Establishing a Separate Fee Schedule for Oncology Services

Another option for policymakers seeking to ensure that oncology reimbursements in Medicare fully capture practice expense costs is the establishment of an entirely new fee schedule for oncology services. There are a variety of different ways to do this, including establishment of a separate system similar to the current fee schedule or creation of a separate prospective payment system.

The report describes some of the challenges that policymakers would face if they sought to implement either system. Both options would require careful balancing of their effect on the current physician fee schedule.

All these policy options are discussed in greater detail in the body of our report.

Acknowledgements

The Moran Company wishes to thank Nancy Davenport-Ennis, and her colleagues at the National Patient Advocate Foundation, for conceiving the need for this study — and, of course, for funding it! Thanks to Cliff Goodman and Jed Perry at The Lewin Group, who helped crystallize the work in its early stages, and provided valuable advice along the way. We want to thank methodology experts at CMS, and Lane Koenig of The Lewin Group, for their extensive (and patient) assistance as we worked our way through the details of the methodology. Even as we acknowledge them for their help, we absolve them of any responsibility for any errors we may have made in interpreting their guidance.

Kara Suter served as the lead analyst on this project, and performed the replication of the CMS methodology described in Appendix 3.2. Dan Shostak managed the detailed analysis of prior CMS pronouncements on methodology, and provided the detailed methodology documentation presented in Appendix 3.1. Don Moran served as the project director, and as the principal author of the report, of which Kevin Kirby served as the editor. Mary Jo Braid provided valuable advice on both data and methodology issues.

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2.1 Policy Questions Addressed by This Study

The Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003,[2] in addition to creating a comprehensive drug benefit that is scheduled to become available in 2006, contains many substantive changes in payment policies for services currently covered under Medicare. One such area where the MMA completely revamped coverage and reimbursement policy was in payments for medical oncology services.

Chemotherapy drugs represent a large share of the limited number of prescription drugs that have been covered under Part B of Medicare since before the enactment of the MMA. For this reason, payment for these drugs will be affected significantly by changes in current drug reimbursement under Part B mandated by the MMA. In recognition of this impact, the Congress mandated changes in the way that physicians are reimbursed for administering chemotherapy drugs under the Medicare Physician Fee Schedule.[3] Taken together, these changes to physician reimbursement represent an effort by the Congress to reform payment for drugs under Medicare, while ensuring that the changes implemented do not adversely affect patient access to chemotherapy services.

The Global Access Project ("GAP") is a collaborative group of over forty patient advocacy organizations, health care providers, and members of the pharmaceutical and biotechnology industries that was organized to develop a comprehensive information resource to assist key policymakers in Congress and at the Centers for Medicare and Medicaid Services (CMS) as they examine the implementation of the new Medicare law. To improve policymakers' understanding of how cancer care is provided today and what is currently known about the cost of delivering cancer services, the National Patient Advocate Foundation (NPAF), on behalf of GAP, has initiated studies to examine, over time, the provision of cancer care at community-based oncology centers and hospital outpatient departments. The studies are the first of a multi-year effort to document and measure changes in key aspects of cancer care during the implementation of the MMA.

This study commissioned from the Moran Company by NPAF on behalf of GAP attempts to shed light on the question of whether the increased reimbursements to physicians for administering chemotherapy agents and supportive care drugs to Medicare patients are, in fact, adequate to cover the cost of providing these services.

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[2] Public Law 108-173, signed by President George W. Bush on December 8, 2003. The acronym "MMA", while not fully reflecting the short title of the Act, is currently being used by the Centers for Medicare and Medicaid Services.
[3] U.S. House of Representatives, "*Conference Report to Accompany H.R. 1.*" (Washington, DC: U.S. Government Printing Office, November 21, 2003), p. 582ff.

2.1.1 Relevant Policy History

Reimbursement for community-based oncology services[4] under Medicare comes from three sources: reimbursement for office-based evaluation and management services, reimbursement for chemotherapy administration procedures (and related supportive care services), and reimbursement for separately-covered pharmaceuticals.

Prior to the implementation of the new Medicare prescription drug benefit mandated by the MMA for 2006, separate reimbursement for drugs under Medicare will remain limited. Generally, Medicare separately pays for drugs only when they are furnished incident to a professional service; that is, they are administered by the physician (or his assistant) because they are not usually self-administered by the patient.[5] The complex injections and infusions that typify chemotherapy care and related supportive care services are, therefore, a very large share of the drug products eligible for Medicare reimbursement prior to 2006.[6]

Prior to enactment of the MMA, payment was generally set at 95% of the product-specific Average Wholesale Price (AWP), as that price was recorded in published sources of pharmaceutical pricing information. Over time, there was growing policy concern that the reported AWP was often substantially higher than the price actually being paid by physicians for these products, resulting in physicians earning substantial profit margins on infused or injected drugs.[7] The Congress chose MMA as the vehicle to enact reforms in the payment methodology for drugs. In Section 303 of that legislation, they provided for a transition from AWP-based pricing to a new payment regime. In that same section, Congress directed the Centers for Medicare and Medicaid Services (CMS) to modify the way in which it calculated reimbursements for chemotherapy administration procedures.

These latter provisions were designed to address concerns raised by community-based chemotherapy providers about the economic impact of the proposed drug reimbursement reforms. While acknowledging that reimbursement at 95% of AWP generated positive margins for many oncology products, oncologists argued that positive margins on these drugs were necessary to offset serious deficiencies in reimbursement for professional procedures related to cancer care.

In billing their own professional services, oncologists bill standard evaluation and management codes, for which the practice expense component is established based on multi-specialty averages. Practice expense reimbursement associated with these codes does not, therefore,

[4] Medicare also covers chemotherapy administration in the outpatient hospital setting, under a separate reimbursement system. In this study, we focus on the economics of care rendered in the non-facility setting.
[5] Limited coverage is available for certain classes of self-administered products, such as anti-emetics used as part of chemotherapy regimens, which are covered under special statutory exceptions. These exceptions, and general coverage rules can be found in §1861(s)(2) of the Social Security Act.
[6] While it adds a comprehensive outpatient drug benefit to Medicare, the MMA does not modify the requirements for those drugs that are currently covered under Part B.
[7] Several hearings on this issue were held, many relying on studies from the General Accounting Office (now the Government Accountability Office) and the Department of Health and Human Services Inspector General. See, for example "Medicare: Payments for Covered Outpatient Drugs Exceed Providers' Costs." General Accounting Office (September 2001).

reflect the average cost of the infrastructure required to equip and operate office-based infusion services. While in theory the practice expenses associated with infusion operations should be reimbursed through separate billing of the chemotherapy administration services themselves, oncologists argued that the methodology CMS uses to establish practice expense weights for these procedures failed to permit oncologists to recover their operating costs. Based on this critique, oncologists argued that reform of drug reimbursement under the physician fee schedule must be accompanied by payment reforms in other areas to keep office-based cancer care economically viable.[8]

The essence of this argument is that payment rates for chemotherapy administration services fail to adequately capture the full cost of providing infusion services, because cancer care involves unique costs, including supportive care services that are not adequately reimbursed under the physician fee schedule.[9] Under the Physician Fee Schedule, payment for the most frequently-billed chemotherapy administration codes is based primarily on the "practice expense" component of the fee schedule. Oncologists argued that the American Medical Association's Socioeconomic Monitoring Survey (SMS), the data set on which the CMS practice expense ratesetting methodology is based, failed to accurately typify the direct and indirect costs of providing infusion services.

In response to these arguments, the Congress, in fashioning the reform policy implemented by Section 303 of the MMA, directed CMS to modify the way it calculates the practice expense weights for chemotherapy drug administration services. The specific changes Congress directed were to:[10]

- Require CMS to use practice expense survey data submitted by the American Society for Clinical Oncology (ASCO), in lieu of the AMA SMS data, in setting payment weights;
- Require CMS to explicitly account for the direct labor costs of oncology nurses; and
- Require CMS to impute work RVUs to these procedures in allocating indirect expenses.[11]

In addition to these changes, the Congress provided for a "transitional adjustment": a payment add-on of 32% in calendar year 2004, and 3% in calendar year 2005, over and above the payment rates resulting from the methodology changes described above. The implicit rationale for these add-ons is that, for technical reasons, the methodology changes Congress prescribed were not expected — when run through the CMS practice expense ratesetting methodology — to return to oncologists the full amount by which drug reimbursements were being reduced. These transitional adjustments, therefore, were designed to temporarily cushion the full impact of lowering aggregate drug margins by a substantially greater amount than the amount of practice expense reimbursement increases.

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[8] See ASCO White Paper. *Reform of the Medicare Payment Methods for Cancer Chemotherapy. May 2001.* Available at http://www.asco.org/asco/downloads/MedicarePaymentReformASCOWhitePaper.pdf

[9] *Id.*

[10] For readers unfamiliar with the Physician Fee Schedule practice expense methodology, we provide an overview in the next Chapter — and a detailed presentation in Appendix 3.1.

[11] MMA section 303 amends adds these requirements to section 1848(c)(2) of the Social Security Act as new subparagraph (H).

2.1.2 Study Questions

Given this history, the questions we have been asked to study can be characterized as follows:

- How do the payment rates calculated under the MMA policy compare to oncology practice costs, as measured by the ASCO survey? Does the CMS methodology ensure that substantially all of the measured cost is returned to oncologists? Or are oncology practice expenses reallocated, under the CMS methodology, to other specialties?

- If a material difference between measured oncology practice expense and practice expense reimbursement is found, how particular is that finding to oncology services? Are there specific components of the CMS methodology that differentially affect oncology reimbursement? If not, what factors drive practice expense reallocations within the system?

- If full reimbursement of oncology practice costs is an important policy objective, what alternatives are available to policymakers seeking to achieve it? Are there technical modifications to the existing CMS methodology that will work? Or must policymakers consider alternative reimbursement methodologies outside the Medicare Physician Fee Schedule?

The results of our effort to answer these questions are presented in the next three Chapters of this report. In Chapter 2.2, we provide a high level overview of the CMS practice expense ratesetting methodology, as an introduction to discussing the technical factors in that methodology that affect the allocation of practice expense reimbursements across specialties. In Chapter 2.3, we present the findings of our analysis of practice expense allocations across specialties, and our diagnosis of the methodology features that drive these allocations. In Chapter 2.4, we discuss policy alternatives that might be considered — both inside and outside the Medicare Physician Fee Schedule — if policymakers wish to implement a policy of full reimbursement for oncology costs.

The first two Chapters are complemented by supplemental technical material presented in appendices. Appendix 3.1 provides a detailed technical presentation of CMS methodology issues. Appendix 3.2 describes our efforts to use the data and methodology descriptions CMS has made available to replicate the published 2004 practice expense weights, in order to support quantification of the respective contribution of different methodology components to the observed outcome for chemotherapy administration services.

2.2 Resource-Based Practice Expense Methodology Issues

The practice expense component of the Medicare Physician Fee Schedule is determined by a payment methodology that CMS first implemented in 1999, and subsequently "refined" over the last five years.[12] Each year, the methodology is changed somewhat to reflect suggestions made by medical professional societies, advisory bodies, and CMS's own internal analysts. In its proposed rules for the Physician Fee Schedule, which are typically promulgated each summer, CMS addresses prior methodology controversies, and proposes changes it believes will improve payment accuracy. In the fall, CMS receives and responds to comments on these proposals, and publishes a Final Rule that will govern professional payment for the subsequent calendar year.

Many of the changes CMS has implemented over the years have had the effect of making the underlying calculation of practice expense weights somewhat more complex than the original methodology design. The basic outline of the methodology, however, has remained constant since first implementation. In the section that follows, we provide a "lay overview" of the methodology. Readers interested in the technical details of the methodology are directed to Appendix 3.1.

2.2.1 Methodology Overview

The key to understanding the CMS practice expense weight construction methodology is that it represents a method for taking information about the cost of running a physician practice — which must, to be meaningful, be collected on a physician-by-physician basis divorced from specific procedures — and translating that information into estimates of costs to be allocated to specific procedures. To do this requires information of three different types:

- Information about the costs of running a physician practice.
- Information about the frequency with which different physicians perform different procedures; and
- Some mechanism to inter-relate practice level costs to procedure level costs.

2.2.1.1 Data and High Level Methodology

AMA Socioeconomic Monitoring Survey Generates Data on Physician Practice Costs Per Patient Care Hour for Specific Physician Specialties
In the CMS methodology, the first sort of information is drawn from the American Medical Association's Socioeconomic Monitoring Survey (SMS). This survey collects information, reported by individual physicians, about their professional activity time (e.g., patient care versus paperwork), and their share of the expenses generated in the practices in which they work. Importantly, this survey is designed to support estimates of variations in practice expenses across different specialties. Since the type of procedures performed by physicians vary materially by specialty, the ability to capture cross-specialty variations in practice costs before allocating those

[12] "Implementation" of the resource-based practice expense weights was, in a technical sense, phased in over a four year period from 1999-2002.

costs to individual procedures should enhance the accuracy of those allocations. The output of CMS's use of the SMS survey data is a file containing estimates of average "Practice Expense per Patient Care Hour" — divided into six discrete cost categories — for each physician specialty separately identified in the survey.

Medicare Claims Data are Used to Determine Frequency of Procedures by Specialty
Information on procedure frequency by specialty is drawn from two Medicare data sources. The frequency with which physicians in different specialties perform particular procedures is captured in Medicare claims history. Information on the amount of patient care time involved in performing each type of procedure is drawn from the procedure-level time information underlying the calculation of the Work values under the RBRVS. The output of this analysis is a set of estimates of "Total Patient Care Hours Spent Treating Medicare Patients" for each specialty.

Practice Expense Per Hour Combined with Frequency Information Creates "Cost Pools" for Each Specialty
The data from the first two steps are next combined to create "cost pools" for each specialty, across six different categories of practice expense costs. For example, a specialty with an average practice expense per hour of $10 for clinical staff labor, that was determined, in the second step, to provide one million hours of patient care to Medicare beneficiaries, would generate a "clinical staff cost pool" of $10 million. It is this pool of clinical staff cost that is then allocated to procedures in subsequent steps of the methodology. Under the methodology, three of the six cost pools (clinical staff, clinical equipment and medical supplies) are allocated separately as "direct costs" of care in different settings. The remaining three categories (administrative labor, office expense, and "other") are treated as indirect overhead expenses and allocated in a single step.

Specialty Cost Pools are then Allocated to Specific Procedures Using CPEP Data on Practice Expense Variation Across Procedures
To translate these practice-wide cost pools into procedure-level cost allocations, it is necessary to apply information about the relative cost of doing different procedures in different settings. While the expense data could, in theory, be allocated on the basis of specialty-specific procedure frequencies alone, doing so would rely on an exceedingly strong assumption: that direct clinical service costs do not vary across procedures.[13]

Clinical Practice Expense Expert Panel (CPEPs) Information is Refined by AMA Relative Value Update Committee (RUC)
To capture more detail on cross-procedure variations in practice expense, CMS has built a dataset based on information originally generated by convening a series of Clinical Practice Expert Panels (CPEPs). This information was subsequently refined by extensive effort of the AMA's Specialty Society Relative Value Update Committee (RUC), through its Practice Expense Advisory Committee (PEAC). These procedure-level data, which continue to be called

[13] It would be possible to capture variations in the physician time involved in performing specific procedures using the same time data that are used to estimate total Medicare hours. Variations in staff time, supplies consumed, and type of equipment used, however, could not be captured using such a method.

"CPEP values," are based on detailed time and motion analysis of the resource inputs required to perform specific procedures in different settings.[14]

CPEP Values Differentiate Between Facility and Non-Facility Practice Expense Costs
As used in the CMS methodology, the CPEP data provide information on procedure-level costs associated with distinct direct cost inputs (clinical labor, medical equipment and clinical supplies) across two different sites of service (facility and non-facility). The site of service distinction reflects CMS's policy decision that direct patient care cost allocations should reflect the fact that most of the clinical inputs purchased by physicians in their own offices are used to support services delivered in the office, rather than elsewhere. Hence the CPEP allocations result in a substantial amount of office-based practice expenses being allocated to the "non-facility" practice expense weights. As a result, total reimbursement (work, malpractice, and practice expense) for procedures performed in the office setting is typically substantially higher than for performance of the same procedure in a facility setting (outpatient hospital, ambulatory surgery center, etc.).

CPEP Values are Scaled Up or Down to Ensure that They Equal the Total Values in the SMS Cost Pools
Because the underlying detail from the CPEPs for procedures does not always add up to the corresponding specialty-specific values in the SMS cost pools, the CPEP values are "scaled", prior to allocation, up or down to make the sum of all CPEP values across the procedure frequencies for a specialty add up to the SMS cost pools determined in the earlier steps. This means that the explicit CPEP values for a specific procedure, e.g., $26 of medical supplies, do not go into the allocation as actual estimates of per-procedure cost. Rather, they are used to determine the share of the SMS cost pools, for that specialty, that will be allocated to procedure A versus procedure B (across both sites of service). The effect of this step is to ensure that the final allocation of practice expenses allocated across all specialties adds up to the total amount of physician practice expense estimated from the SMS survey.

Indirect Costs are Also Allocated to Procedures
After allocation of all the direct cost pools to procedures, the remaining indirect cost pool is allocated to procedures at the specialty level. The basis for allocation is the sum of (a) the direct cost allocations made in the previous step, valued in dollars, and (b) the dollar value of the physician work relative value weight associated with that procedure. In effect, this step converts the physician work associated with the procedure into a direct procedure cost allocation, and then spreads the indirect costs of the specialty across the procedures it performs in proportion to total direct costs.

Specialty Level Information is "Blended" to Produce a Single Practice Expense Amount for Each Procedure
Once all of the specialty-specific direct and indirect costs have been allocated to specific procedures, the "contributions" of each specialty that allocates practice expense to a particular

[14] While information from empirical time and motion studies has been used to inform this process, the actual values are determined by professional judgment; in many cases, CPEP values for certain procedures are established by analogy to other procedures, rather than being based on independent information about cost inputs specific to the procedure.

procedure (by site of service) are then "blended" to produce a single weighted allocation for each site of service for each procedure. This step reflects the Congressional policy that reimbursement for a particular procedure should not vary by the specialty of the physician performing the service. It results in a practice expense relative weight for the procedure that reflects the weighted average of the practice expense costs of all specialties performing that procedure. As will be discussed later in this Chapter, this "blending" step is a significant source of reallocations of practice expense reimbursements across specialties.

Practice Expense Dollar Amounts are then Divided by a Reference Procedure to Produce "Relative Weights" and Scaled for Budget Neutrality

Once the final blended practice expense allocation has been made to all procedures, the respective values are used to calculate raw relative weights by dividing the raw dollars per procedure calculated in the preceding step by a reference procedure. The resultant weights are then scaled based on the most recent utilization frequency data, to be neutral to the aggregate volume-weighted payment practice expense payment weights for the prior rate year. After this adjustment, the resultant values are published, and are used to calculate the practice expense component of the Physician Fee Schedule in the subsequent calendar year.

2.2.1.2 Technical Complexities

The methodology described above presents the "general rules" that apply to calculate the new procedure-level practice expense weights each year. This methodology, while complicated by the need to allocate practice expense data from dozens of specialties to thousands of procedures through discrete cost pools, is not conceptually complex.

Beneath the surface description just provided, however, lurk several layers of deeper detail, all of which need to be understood by analysts in order to understand the true import of this methodology. The main areas of additional complexity are as follows:

- While the Physician Fee Schedule contains a wide variety of codes billed by non-physician providers (e.g., optometrists and occupational therapists), the SMS doesn't provide explicit information on practice expense costs for these providers. Under the CMS methodology, synthetic cost pools are generated for services performed by these specialties, based on "cross walks" to specialties for which practice expense per hour data do exist. The data from the SMS survey are used to estimate practice expense per hour values for these non-physician specialties by analogy. These estimated direct and indirect costs are then allocated to procedures under the general methodology.

- In several specific instances, CMS elected not to use actual SMS survey data to determine estimated practice expense per hour. In the case of "Oncology" and "Allergy and Immunology," the medical supplies practice expense data from the survey were deleted in favor of the "All Physicians" average, to account for the fact that Medicare

separately reimburses drugs, which were included in the SMS supply cost data.[15] In the case of Physical Therapy and Occupational Therapy, they elected to use the indirect cost data generated in the development of "salary equivalency" guidelines for reimbursement of these specialties.

- While the CMS methodology calls for allocation of indirect costs to procedures based (in part) on physician work values, many procedures have no work values.[16] In response to concerns about the potential misallocation of indirect costs to these procedures, CMS created a "non-physician work pool" (NPWP) to allocate direct costs to these procedures, which affects the amounts of both direct and indirect costs allocated to them in the methodology. Over time, CMS has, with the concurrence of various specialties, removed a substantial number of procedures from the non-physician work pool. Because the oncology drug administration codes were required, under the MMA, to be given explicit work values, they were removed from the non-physician work pool for the 2004 rate calculation.

- Prior to implementation of the resource-based practice expense system in 1999, the practice expense weights for radiology services were established based on a relative value scale developed by the radiology profession. In implementing the new system in 1999, CMS decided not to disturb the relationship of these prior relative values under the new system. The approach CMS elected to use was to calculate the total allocation of practice expense costs (direct and indirect) to covered radiology procedures using the new methodology, but then to re-spread this aggregate amount across procedures based on the prior relative values, as expressed by the 1998 practice expense weights. Subsequently, CMS has continued to rescale the radiology weights to the prior year weights, thus preserving the radiology RVUs inside the new system.

- With respect to procedures that have separate technical and professional components,[17] CMS faced a technical choice of how to deal with the fact that, under its methodology, the sum of the weights derived for the components, when billed separately in the claims data, might not agree with the weight calculated for the global fee billed when the components were billed together. CMS elected to set the global fee equal to the sum of the components, but to scale the values to the sum of all practice expense allocated to each procedure under the top-down methodology.[18]

- CPEP values are published by CMS, however CMS adjusts these values for some procedures when certain utility modifiers are present (see Appendix 3.2). These adjustments are not published but were identified by CMS staff.

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[15] It is our understanding that, in response to the explicit statutory directive to use the ASCO survey data in lieu of SMS data in setting the 2004 practice expense weights, this adjustment was not made for 2004, because the ASCO survey data distinguished drug costs from other medical supplies.

[16] For example, the "technical component" of a diagnostic procedure has a physician work value of zero.

[17] This distinction is made for diagnostic procedures, and for certain therapies involving the use of technical modalities that need not be operated by a physician (e.g., radiation therapy).

[18] In recent rulemakings, CMS has indicated that it is considering proposing to change this policy, in favor of calculating the technical component as a residual; i.e., calculating a PC and global using the straight methodology, and then setting the TC as the difference between the two.

As a result of these complications, analyzing the CMS practice expense ratesetting process is substantially more complex than a simple reading of CMS's methodology descriptions would suggest. While CMS makes a concerted effort to disclose the methodology it employs and the data it uses to set the payment rates, the process is not fully transparent.

In the course of this study, we attempted to replicate the CMS ratesetting methodology, in order to tease out the exact details of how CMS sets these rates, and to provide a framework for measuring the respective contributions of different components of the methodology to the final results. As discussed more fully in Appendix 3.2, we were not able to exactly replicate the 2004 payment rates published in the Interim Final Rule on January 7, 2004 using (a) the data furnished on the CMS Web site and (b) the methodology descriptions CMS has furnished to the public to date. During the course of the study, however, we received enough guidance from CMS staff to enable us to come fairly close to the published weights in our final reconstruction. Based on this reconstruction, we are confident that the findings presented in the next section, and in Chapter 2.3, fairly reflect the reality of the CMS process for establishing practice expense weights.

2.2.2 Implications of the Methodology

The intent of the CMS methodology is to increase the accuracy of payment relativities across procedures. While the methodology allocates specialty-specific practice expense information across procedures, it is not the stated intent of the methodology to accurately reimburse specific specialties for the full amount of their practice expense costs.[19] In fact, the methodology, as implemented, has a number of design elements that have the effect of reallocating practice expense reimbursements across specialties.

2.2.2.1 Blending & "Leakage"

One important step in the methodology has the explicit effect of reallocating practice expense reimbursements across specialties: the "blending" of cross-specialty practice expense data at the procedure level to base weights on the weighted average of all specialties performing the procedure. Many medical specialties have in fact criticized this policy, on the grounds that it fosters "leakage" of one specialty's practice expenses into increased reimbursement of other specialties.

The fact that blending produces such "leakage" is unambiguous. Under the "top-down" methodology, "leakage" occurs whenever two specialties, each contributing practice expense dollars from their cost pools to the same procedure, differ in their practice expense per hour.

[19] In 1997, the Agency writes in the Federal Register, "Establishing a practice expense RVU based on the resources involved with furnishing a service does not mean we recognize the actual cost to the physician to produce a service. Rather, it recognizes the components of the typical resource inputs for a specific equivalent under the physician fee schedule. The proposed values will represent "relative values" that can be translated into a dollar payment amount using the appropriate CF (conversion factor)." 62 FR 33160 (June 18, 1997).

This phenomenon can be illustrated with a few simple examples.

Figure 2.2.2.1

	Specialty Performing Procedure		
	A		B
Practice Expense Per Hour	$75		$75
Total Patient Care Hours for Procedure	1 M		1 M
Blended Rate		$75	
Percentage Gain/Loss	0%		0%

Let us suppose that exactly two specialties contribute practice expense to a specific procedure, as shown in Figure 2.2.2.1. In this illustration, we ignore the detail associated with allocating six discrete cost pools, in order to better isolate the phenomenon in the aggregate. If we suppose that the two specialties are identical in their practice expense per hour costs, and in the number of hours they devote to performing the procedure, then the blended average practice expense cost for the procedure will be identical to both specialties' hourly practice expense costs. After the final scaling step, the actual practice expense weight, when multiplied by the conversion factor, may reimburse both specialties more or less than their actual practice expense costs. Whatever this effect is, however, will be proportional across the two specialties.

If the practice expense per hour data used to make these allocations varies across specialties, however, the blend on this specific procedure will increase practice expense reimbursement, relative to actual cost per hour, for one specialty, while decreasing it for the other. Figure 2.2.2.2 shows the effect of differences in practice expense per hour, holding volumes constant.

Figure 2.2.2.2

	Specialty Performing Procedure		
	A		B
Practice Expense Per Hour	$100		$75
Total Patient Care Hours for Procedure	1 M		1 M
Blended Rate		$87.50	
Percentage Gain/Loss	-12.5%		17%

As shown in this figure, varying the practice expense per hour contributed by one specialty, holding respective volumes constant shifts the blend relative to the practice cost per hour of both contributing specialties. In this case, a $25 increase in the practice expense per hour translates into a $12.50 shift upward and downward in the blend relative to the specialties' respective practice expense costs.

Figure 2.2.2.3

	Specialty Performing Procedure		
	A		B
Practice Expense Per Hour	$100		$75
Total Patient Care Hours for Procedure	.5 M		1.5 M
Blended Rate		$81.3	
Percentage Gain/Loss	-18.8%		8%

As shown in Figure 2.2.2.3, increasing the volume share of the specialty with lower practice expense per hour can further exacerbate "leakage".[20] The percentage loss increases for the high-cost specialty relative to the equal volume scenario. The percentage gain for the low cost specialty is not as large in this example because the total amount of practice expense allocated is lower, and hence the blended rate is lower.

As all of these examples suggest, we can expect leakage to be a very common phenomenon in the CMS methodology. Since leakage will occur whenever the practice expense per hour of any of the six cost pool components for a specialty differs from that of any other specialty with which it shares a procedure, we should expect most pair-wise procedure comparisons to exhibit leakage, since the practice expense per hour data are rarely identical across specialties.[21]

It is important to note that, for many specialties, "leakage" will average out across the full range of pair-wise procedure comparisons they share with other specialties. To the extent this is true, the phenomenon may induce variations in reimbursement at the level of individual procedures, but will not distort a specialty's practice expense reimbursement relative to cost in the aggregate. While this statement should be true for the "average" specialty, we would, conversely, expect systematic net leakage from (to) specialties with atypically high (low) practice expenses per hour. In the next Chapter, we will present our findings regarding how blending-induced leakage differentially affects specialties.

[20] If the practice expense per hour of both specialties is identical, differences in volume share will not cause leakage.
[21] Those specialties whose data was established via crosswalk from another specialty or the all physicians average will have identical practice expense per hour inputs, and hence leakage cannot occur across these specialties. Such specialties could still exhibit leakage with other specialties.

2.2.2.2 Site of Service Differentials

A second methodology feature that can affect cross-specialty cost allocations is the division, for payment purposes, of most procedures by site of service. The clear intent of CMS policy is to direct most of the practice expense allocation to the site of care in which physician-purchased inputs are actually used. Since the CPEP values show much less use of such inputs in the facility setting, where facility-purchased inputs are typically used instead, the methodology generates substantially higher practice expense weights for many procedures in the non-facility setting.

Because different specialties exhibit different patterns of facility-based versus office-based practice, site of service payment differentials generate cross-specialty differences in reimbursement. These differences across specialties can be attributed to a variety of factors. Some specialties may be more likely than others to maintain "heavy office" configurations that permit relatively complex ambulatory surgeries to be performed outside a facility. Differences in patient mix may also explain why certain procedures are performed more frequently in one setting or another.

Whatever the reason for these differences, the net effect is that, for any given procedure, specialties with higher facility utilization rates will receive lower average reimbursement, relative to the practice expense per hour data they contribute to the weight construction for those procedures. Under the CMS policy, such differentials are considered appropriate, because those specialties with higher facility use rates should, on average, have proportionately lower direct clinical costs in the office setting. Whatever the underlying reality is here, the fact remains that the relationship between observed SMS practice cost and actual practice expense reimbursement varies across specialties due to site of service differentials.

As will be discussed more fully in the next Chapter, it is necessary to evaluate this issue in the context of the prior discussion of "leakage." In theory, a specialty that disproportionately loses practice expense reimbursement due to site of service differentials should be compensated by increased reimbursement, relative to practice cost, for services rendered in the office setting. For specialties subject to disproportionate leakage, however, these offsetting increases may not be available. Sorting out the respective contribution of these disparate effects is an important focus the next Chapter.

2.2.2.3 Normalizing to the Prior Weights

The final step in the CMS methodology is to normalize the weight values to be used for payment purposes to the prior practice expense weights. For the 2004 weights, this meant adjusting all the weights so that the sum of total system weights for 2004 would, assuming constant volume and case mix, equal the corresponding sum of the 2003 weights.

Depending on how the data work out, this normalization step could be expected to move the weights proportionately up or down, and should in and of itself not produce cross-specialty differentials. It will, however, either magnify or dampen the changes in payment rates that would otherwise occur relative to the SMS practice expense values used to construct the payment weights.

For 2004, there is an additional issue: how this calculation intersects with the statutory requirement to exempt the payment increases mandated by Sections 303-304 of the Medicare Modernization Act from budget neutrality. Under Section 303(a), increases in reimbursement that result from the policy changes directed under the new subparagraph 1848(c)(2)(H) are exempted from the budget neutrality requirements for 2004. Any subsequent adjustments made using new survey data in 2005 or 2006 would also be exempted. There is a further requirement, under §303(a)(2), that procedures remaining in the non-physician work pool after the removal of the chemotherapy administration procedures not be adversely affected by these changes.

The effect of these adjustments depends on how the statute is interpreted, and hence how the adjustment is done. The language of the statute, in "(H)" directs the Secretary to make three methodology changes; the language of §303(a)(1)(A) then exempts "the additional expenditures attributable to…subparagraph (H)…" from the budgetary neutrality requirements otherwise implemented §via 1848(c)(2).

One potential interpretation of this requirement is that CMS should make the changes required under subparagraph (H) to the weight calculation originally published as "final" for 2004 on November 7, 2003, and then publish the result without normalizing the weights. An alternative interpretation would be to apply the normalization step, but to exclude the weights (and volume) associated with the specific procedures CMS was directed to increase from the calculation. If this latter approach were taken, there could be a "reverse leakage" effect, since whatever incremental practice expense had "leaked" into the non-chemotherapy codes would cause the normalization step to reverse out the *aggregate* effect of that leakage. The individual procedures that had been relatively advantaged by blending, however, would remain relatively advantaged.

2.2.2.4 Implications of the Conversion Factor

While the CMS methodology is designed to "conserve" the full amount of SMS practice expense in computing the practice expense payment weights, it does not necessarily mean that physician specialties will, in the aggregate, be paid the full amount of their practice expense. This is due to the fact that the practice expense weights reflect only *relative values* — not absolute dollar amounts. The practice expense weights are converted into actual payment amounts by means of the system-wide *conversion factor*, a standardized dollar amount expressing the amount that should be paid for a procedure with weight 1.00000. This dollar amount is established in a manner that is totally unrelated to the SMS cost pools. Hence depending on how this value turns out, the total amount of practice expense reimbursement, in a year, could be materially different than the total amount of the SMS cost pools for that year. As we will see in the next Chapter, the disjunction between aggregate practice expense reimbursement and the total of the cost pools is a material part of the reason why oncologists are receiving practice expense reimbursements, in 2004, that are materially lower than their practice cost, as measured by the ASCO survey.

2.3 Findings of Our Analysis

As noted in Chapter 2.1, this study has been designed to address two families of questions:

- How do the payment rates calculated under the MMA policy compare to oncology practice costs, as measured by the ASCO survey? Does the CMS methodology ensure that substantially all of the measured cost is returned to oncologists? Or are oncology practice expenses reallocated, under the CMS methodology, to other specialties?

- If a material difference between measured oncology practice expense and practice expense reimbursement is found, how particular is that finding to oncology services? Are there specific components of the CMS methodology that differentially affect oncology reimbursement? If not, what factors drive practice expense reallocations within the system?

In this Chapter, we present the findings of our study regarding the answers to these questions.

2.3.1 Oncology Practice Expense Compared to Practice Expense Reimbursement

As noted in Chapter 2.2, while information about aggregate practice expense by specialty is used in constructing the practice expense weights employed in the Medicare Physician Fee Schedule, these data are used only to generate *relative* payment weights across procedures. It is not the express intent of the CMS methodology to scale payment under the practice expense portion of the fee schedule to the aggregate practice cost levels observed in the survey data.

Evaluating the relationship between the published payment weights and total practice expenses is complicated by timing considerations. In setting the payment weights for 2004, CMS used the AMA SMS data from 1999, supplemented by survey data for oncology and thoracic surgery.[22] The procedure volumes it used reflected the procedure-level volume averages across 1997-2000.[23] As a first approximation of the relationship between measured practice expense and practice expense reimbursement, therefore, we conducted an analysis in which we:

- Held volumes constant at the 1997-2000 average;
- Used the actual 1999 survey data (SMS or supplemental) to measure practice expense;
- Used the 2004 payment weights generated from these data as the case mix measure; but
- Valued payments using the 1999 conversion factor, which was used to make practice expense payments in the year of the survey data.

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[22] The practice expense data from the ASCO survey were, according the summary analysis presented in the Lewin report on supplemental survey data for 2003, 2001 survey values. By calculating the practice expense per hour values used for the 2004 rate calculation, CMS elected not to adjust these data for those timing differences. This decision, in effect, transformed the nominal 2001 values into “1999-equivalents.”

[23] It is our assumption that the allowed service frequencies provided by CMS are an average of the 1997-2000 period.

The results of this analysis are shown in Table 2.3.1.1. This table shows the aggregate amount of survey practice expense recorded for each of the three CMS specialties that map to the SMS specialty "oncology" — the specialties for which the ASCO supplemental survey data were used to calculate the payment weights. The first column shows the aggregate amount of the practice expense pools generated from the survey data (practice expense per hour multiplied by respective hours). The second column shows the level of practice expense reimbursement for these specialties that would be generated using:

- The procedure volumes by specialty used to generate the weights;
- The weights generated using these volume data; and
- The conversion factor for the contemporary period.

Table 2.3.1.1

Aggregate Cost Pools vs. Aggregate Reimbursement

Specialty	Specialty Description	Total of Cost Pools	Total of PE Payments	Payments vs. Pools	% Change
82	Hematology	$ 192,150,001	$ 79,237,078	$ (112,912,923)	-58.8%
83	Hematology/Oncology	$ 3,250,800,000	$ 1,660,056,538	$ (1,590,743,462)	-48.9%
90	Medical Oncology	$ 1,174,950,001	$ 639,405,777	$ (535,544,224)	-45.6%
		$ 4,617,900,001	$ 2,378,699,392	$ (2,239,200,609)	-0.4849

As the table shows, by this metric, the practice expense payment system, when the combined effect of the weights and the conversion factor is measured, renders practice expense payments that are, in the aggregate, substantially lower, for these specialties, than the amount of the cost pool information used to generate the weights.

Is this a fair comparison? While the payment weight relativities are calculated using data centered around 1999, they were intended for use in 2004, when volumes, and hence the practice expense reimbursements generated by these weights, would be higher. To address this question, we projected the procedure volumes forward to 2004 using the rate of growth assumed for the CMS Office of the Actuary's projection of actual physician fee schedule payment over 1999-2004.[24] Since practice expenses would also be higher, we assumed that direct patient care costs would grow in proportion to procedure volume growth, while all costs would experience inflation at the projected rate of increase in the Medical Economic Index (MEI). We then applied the 2004 conversion factor to the payment volumes to generate Table 2.3.1.2:

[24] CMS Office of the Actuary, *Estimated Sustainable Growth Rate and Conversion Factor, for Medicare Payments of Physicians in 2005.* March, 2004.

Table 2.3.1.2

Aggregate Comparison Projected to 2004

Specialty	Specialty Description	Total of Cost Pools	Total of PE Payments	Payments vs. Pools	% Change
82	Hematology	$ 244,729,869	$ 116,446,809	$ (128,283,060)	-52.4%
83	Hematology/Oncology	$ 4,140,347,937	$ 2,439,619,089	$ (1,700,728,848)	-41.1%
90	Medical Oncology	$ 1,496,462,966	$ 939,670,729	$ (556,792,237)	-37.2%

As the data presented in Table 2.3.1.2 suggest, using different assumptions about the appropriate rate of growth in expense and volume to any given comparison year can affect the measured difference between practice expense and practice expense reimbursement for oncology, but the essential story is not affected by the exact metric used: practice expense reimbursements for oncology services are substantially lower than the amount of oncology practice expense, as measured by the ASCO survey.

What causes this disparity? As discussed in Chapter 2.2, theory predicts two potential causes:

- Disparities caused by the scaling effect of the Physician Fee Schedule conversion factor, and

- Disparities caused by the internal reallocation of practice expense weights across specialties generated by the CMS ratesetting methodology.

Our analysis shows that oncology reimbursement is affected materially by both of these factors.

2.3.1.1 Conversion Factor Effects

A significant amount of the disparity between practice expense and practice expense reimbursement is due to the scaling effect of the conversion factor on all specialties.
The data in Table 2.3.1.3 show the magnitude of this effect.

Table 2.3.1.3

Conversion Factor: CMS v "SMS"

Total of 1999 SMS/Supplemental Cost Pools	$ 115,024,777,187
Total of 1997-2000 Weighted Frequencies	2,208,704,123
"1999 SMS Conversion Factor"	$ 52.0779
Actual 1999 Conversion Factor	$ 34.7315
Scalar Effect of 1999 Conversion Factor	66.7%

As indicated in the table, the aggregate value of the 1999 cost pools used to establish the 2004 payment weights was $115.0 billion.[25] Applying the 2004 weights to the 1997-2000 annualized volume data, we calculate a total of 2.21 billion in practice expense RVUs in the data CMS used to set the weights. In order to provide reimbursement equal to the total of the cost pools, therefore, the Medicare Physician Fee Schedule conversion factor for 1999 would have to have been $52.08 (i.e., $115 billion divided by 2.2 billion of practice expense RVUs). Since the 1999 conversion factor was, in fact $34.73, the practice expense component of the fee schedule scaled down reimbursement, by this metric, by a third.

The implications of this analysis are presented in Table 2.3.1.4. In that table, we decompose the difference between oncology reimbursements and practice expense, as measured in Table 2.3.1.1, into the amount attributable to the scaling effect of the conversion factor, and the amount attributable to other factors.

Table 2.3.1.4

Decomposition of Oncology Reimbursement Differential

Total Measured Cost Pools	$ 4,617,900,001
Measured Reimbursement Differential	$ (2,239,200,609)
Percentage Difference	-48.5%
Amount Attributable to Conversion Factor Scaling	(1,538,158,923.98)
	-33.3%
Amount Attributable to Other Factors	(701,041,684.78)
	-15.2%

As these data show, by this metric, the general scaling effect of the conversion factor explains approximately two thirds of the differential between the cost pools and reimbursed practice expense for the three AMA specialties that crosswalk to the SMS oncology specialty.[26] The balance, by definition, must be attributable to the effects of CMS methodology features that have the effect of reallocating practice expense across specialties.

In order to analyze the components of the CMS methodology that induce this result, we performed a replication of the CMS ratesetting methodology for the 2004 Interim Final Rule. The details of our replication effort are presented in Appendix 3.2. Our purpose in performing

[25] This total exceeds the aggregate 1999 SMS estimate of physician practice expense due to the fact that SMS creates synthetic cost pools for non-physician specialties — which are included in the $115 B total.
[26] The amount attributable to the conversion factor scaling divided by the total measured reimbursement differential equals $1.5 billion divided by $2.2 billion which equals 69 percent.

this analysis was to tease out important technical details of the methodology, and permit us to measure the respective contributions of different methodology components that affect oncology reimbursement rates.

As hypothesized in Chapter 2.2, the methodology feature most likely to produce material changes in reimbursements is the step at which practice expense is blended across specialties at the level of individual procedures. As noted in that Chapter, blending induces “leakage” of practice expense values from specialties with relative high practice expense per hour to those with lower practice expense per hour.

Table 2.3.1.5

Analysis of the Effects of Blending

		Pre-Blend Costs	Post-Blend Costs	Change in Costs	% Change
82	Hematology	$ 192,655,490	$ 120,187,863	$ (72,729,685)	-37.8%
83	Hematology/Oncology	$ 3,253,219,748	$ 2,532,850,151	$ (726,737,594)	-22.3%
90	Medical Oncology	$ 1,175,391,935	$ 976,877,948	$ (200,821,794)	-17.1%
		$ 4,621,267,172	$ 3,629,915,963	$ (1,000,289,072)	-21.6%

Excludes codes in the NPWP

Our methodology replication confirms that leakage has a significant effect on payment rates for oncology services. Table 2.3.1.5 presents our measurement of the effects of this phenomenon.

In this Table, the first column of data shows the amounts in the aggregate oncology cost pools (direct and indirect) prior to blending at the procedure level. The second shows the costs attributable to oncology volumes after blending. For this calculation, a cost per procedure (CPP) is calculated before and after the blend.[27] Because the CPP values used for these three oncology specialties is greater than the value for any other specialty, the oncology specialties consistently allocate more practice expense cost to procedures than is returned to oncology based on its proportional share of the volume for each procedure at the blended rates. By this metric, blending explains a reduction of $1.0 billion, or 21.6%, in reimbursements relative to costs as measured in the ASCO survey data.[28]

In effect, then, the combined effects of conversion factor scaling and blending explain “more than 100%” of the reimbursement differentials we have measured using the methodology presented in Table 2.3.1.1.[29]

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[27] Because blending occurs on a category specific level, the pre-blend values were estimated by summing the category-specific costs per procedure to produce an aggregate cost per procedure (CPP). These aggregate CPPs and the post-blend weighted CPPs were then volume weighted based on the pre-blend volumes and summed.
[28] This analysis excludes codes in the NPWP because they are not subject to blending. The NPWP represent approximately 1% of the costs for these three specialties. In other words, the 21.6% reduction attributable to blending affects 99% of the codes in these specialties.
[29] Table 2.3.1.4 indicates that the total measured reimbursement differential is $2.2 billion and that the amount attributable to conversion factor scaling is $1.5 billion. Thus, the analysis leaves $685 million to be explained. Table 2.3.1.5 explains that blending accounts for $1 billion of the differential; $315 billion more than the anticipated amount.

What causes the methodology effects shown in Table 2.3.1.5 to scale back to the net differential due to methodology factors shown in 2.3.1.4?

Since both analyses are scaled to the aggregate SMS/supplemental 1999 survey data, this disparity cannot be due to scaling effects. We examined a variety of potential methodology features that may have produced this effect, including:

- Cross-specialty differences in the impact of the adjustments made to scale the global practice expense weights for PC/TC procedures to equal the sum of the PC and TC values.
- Cross-specialty differences caused by differences in the mix of facility versus non-facility procedures billed.
- Cross-specialty differentials in the effects of the methodology CMS chose to implement the budget neutrality exemption for chemotherapy administration procedures in the final step of the methodology.

While we observed some cross-specialty reallocations in the first and third of these analysis, they were so minor as to be trivial — moving measured volume-weighted RVUs by less than 0.01% in essentially all cases. We also learned that, once the effect of "leakage" at the blending stage is controlled for, differences in the relatively frequency of billing facility versus non-facility claims for a particular procedure do not produce further cross-specialty reallocations. In effect, the impact of site of service differentials is embedded in our measurement of leakage, as we have measured it.

We are left with the conclusion that our inability to exactly parse the causes of post-allocation differentials is an artifact of our inability to exactly replicate the CMS methodology. The analysis presented in Table 2.3.1.1 is based solely on CMS-furnished values, including:

- The practice expense per hour by specialty
- Medicare hours by specialty
- Procedure volumes per specialty in the 1997-2000 volume data set; and
- The published 1999 conversion factor.

The data presented in Table 2.3.1.5, by contrast, are drawn from our replication analysis, since we cannot see the intervening values calculated, under the CMS methodology, for these variables. To the extent the cost pool allocations we have calculated, pre- and post- blending, differ even slightly from those calculated by CMS, it would scale the analysis presented in 2.3.1.5 upward or downward. If our pre-blending values and post-blending values differed from the literal values used by CMS by as little as 3%, it could explain 100% of the differential between the analyses presented in Tables 2.3.1.4 and 2.3.1.5. For a more detailed discussion of the variance between our replicated weights and the published Addendum B weights, see Appendix 3.2.

Despite the ability to completely parse these differences, however, we believe the following conclusions are warranted:

- Based on our analysis, total practice expense reimbursements to the oncology specialties under study for 2004, based on these payment weights, would be approximately 52% of what a 2004 SMS survey would find to be oncology practice expense in that year.[30]

- A substantial part of this difference—69%—is due to the system-wide effects of scaling differences between the SMS cost pools and the Physician Fee Schedule Conversion Factor.

- The remaining 31% of the difference is generated by the reallocative mechanisms embedded in the CMS ratesetting methodology.

- Our analysis makes clear that the cross-specialty blending mechanism at the procedure level essentially explains this differential.

2.3.2 Is This Effect Unique to Oncology?

In determining whether policy options are available to influence the level of reimbursement for oncology services under the Medicare Physician Fee Schedule, it is important to understand whether the just-described effects on oncology reimbursement are unique to oncology, or reflect methodology features that affect other specialties as well.

Clearly, the conversion factor scaling phenomenon which we describe in the preceding section is common to all specialties; regardless of how the payment weights come out, reimbursements are one third lower than would be the case if the conversions factor were scaled to the aggregate SMS cost pools.

Once adjusted for this system-wide impact, analysis of cross-specialty reimbursement differentials show that significant differentials are not unique to oncology — although oncology is among the limited number of specialties most strongly affected by methodology-induced differentials.

[30] A significant amount of this difference may be reversed by the 32% transitional adjustment payment add-on applied to total payments in that year. We have not, however, analyzed this effect.

Table 2.3.2.1

Estimate of Cross-Specialty Allocations
with Conversion Factor Scaled to SMS Cost Pools

Specialty	Specialty Description	Total SMS Pool	PE Scaled to SMS	Difference	% Difference
82	Hematology	$192.2	$119.0	-$73.2	-38.1%
83	Hematology/Oncology	$3,250.8	$2,507.9	-$742.9	-22.9%
24	Plastic and Reconstructive Surgery	$806.0	$651.2	-$154.8	-19.2%
22	Pathology	$1,693.7	$1,378.6	-$315.1	-18.6%
90	Medical Oncology	$1,175.0	$967.4	-$207.5	-17.7%
20	Orthopedic Surgery	$6,395.4	$5,915.7	-$479.7	-7.5%
18	Ophthalmology	$11,387.7	$11,439.5	$51.9	0.5%
10	Gastroenterology	$2,346.0	$2,374.2	$28.2	1.2%
13	Neurology	$2,009.7	$2,088.3	$78.6	3.9%
07	Dermatology	$3,760.3	$3,926.6	$166.4	4.4%
06	Cardiology	$10,127.9	$10,812.8	$684.9	6.8%
14	Neurosurgery	$734.8	$794.9	$60.1	8.2%
26	Psychiatry	$1,347.2	$1,473.5	$126.3	9.4%
16	Obstetrics/Gynecology	$1,039.0	$1,158.6	$119.6	11.5%
94	Interventional Radiology	$260.7	$292.2	$31.5	12.1%
08	Family Practice	$7,099.7	$8,065.5	$965.8	13.6%
01	General Practice	$2,131.4	$2,434.4	$303.0	14.2%
37	Pediatric Medicine	$99.2	$115.5	$16.3	16.4%
11	Internal Medicine	$12,342.4	$14,970.1	$2,627.7	21.3%
46	Endocrinology	$377.6	$473.3	$95.7	25.3%
98	Gynecological/Oncology	$63.9	$80.3	$16.4	25.7%
03	Allergy/Immunology	$349.9	$572.0	$222.1	63.5%

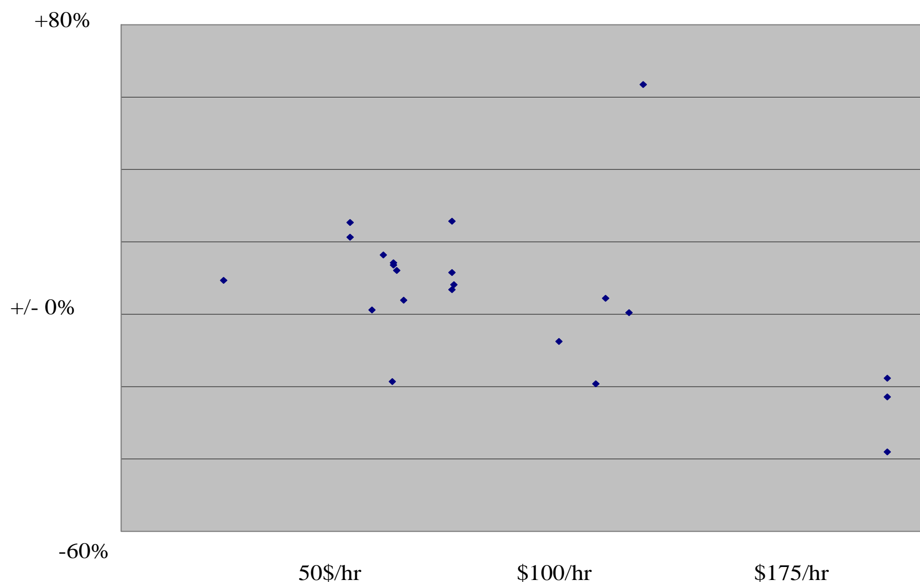
The data presented in Table 2.3.2.1 shed light on the magnitude of the cross-specialty reallocations within the overall practice expense system. They show the magnitude of the reallocations for 22 of the CMS specialties that map cleanly to AMA specialty categories.[31] It is important to note that the dollar values associated with the "gains" or "losses" have no real significance; their actual values are the result of imputing the "SMS conversion factor" to the weighted 1997-2000 volumes in order to adjust the comparison for the across-the-board effects of conversion factor scaling. These values are simply used to scale the percentage change values, which we believe accurately reflect the magnitude of practice expense reallocations occurring across specialties.

As these data suggest, several other specialties are substantial net exporters of practice expense values through the blending process. Based on the theory presented in Chapter 2.2, we'd predict that the primary reason for these variations is due to cross-specialty differences in Practice Expense Per Hour, which drive allocation differentials via leakage during the blending step.

[31] The data for the specialties that don't map cleanly — such as the non-physician specialties or the specialties cross-walked to the "all physicians" cost pool — often show more extreme variations in both directions. Such variations are clearly an artifact of the inexact nature of the crosswalk process, and hence are difficult to interpret in the present context.

Figure 2.3.2.1

Payment Differential Percentage vs. Practice Expense Per Hour



The scatter plot shown in Figure 2.3.2.1 shows the percentage gain or loss of these 22 specialties by specialty as a function of the specialty total practice expense per hour value. As predicted, those with low practice expense per hour values show positive returns; those with high values show negative returns.

In all then, our analysis suggests that the CMS resource based practice expense methodology does not contain a specific bias relative to oncology services that doesn't obtain in other areas. Rather, oncology is simply the extreme value in any analysis of differences between cost pool data and practice expense reimbursement, due to the fact that, after the acceptance of the ASCO supplemental survey data, the oncology specialties have practice expense per hour values that are higher than those for any other specialty. When the allocations to procedures run through the blending step of the methodology, the gap between the cost pools and ultimate reimbursement widens as the gap between the blending specialties' practice expense values increases. As the maximum value, oncology practice expense "leaks" in every cross-specialty comparison. It is for this reason that the CMS methodology produces differentially large spreads between survey cost and ultimate practice expense reimbursement for oncology services.

2.4 Technical & Policy Options to Provide Full Practice Expense Reimbursement for Cancer Care Services

In the preceding Chapter, we presented our finding that, due to mechanics of the CMS practice expense rate-setting system, the amount of practice expense reimbursement returned to medical oncology under the Medicare Physician Fee Schedule is, when measured against an assumption of constant volume, materially less than the total amount of oncology practice expense observed in the ASCO survey data.

While we found that medical oncology is not unique in that regard, a number of commentators have suggested that failure to adequately reimburse cancer care services poses particular problems for patient access to care. In this Chapter, we evaluate alternative technical and policy options that policymakers may wish to consider if they elect to pursue a policy of mitigating access concerns by modifying the CMS payment methodologies to increase reimbursement. Throughout, we take as given that the policy objective is to change the reimbursement methodology to produce payment rates that will approximate the actual cost of delivering cancer care.[32] Accordingly, our analysis is based on determining the advantages and disadvantages of different approaches to reaching this objective.

To assist policymakers in evaluating the full range of alternatives, we examine two types of policy options:

- Modifications to the CMS practice expense ratesetting methodology to increase the allocation of oncology practice expense to cancer care procedures.

- Options involving removing cancer care services from the Medicare Physician Fee Schedule, in favor of payment under an alternative methodology.

2.4.1 Technical Modifications to the "Top Down" Methodology

Because of the nature of our findings regarding the reasons for the reduction in oncology practice expense under the CMS practice expense ratesetting methodology, there are essentially three types of policy alternatives that could be used to increase reimbursement for cancer care services within the Medicare Physician Fee Schedule:

- Modifying the cost allocation logic of the system to isolate oncology practice expense from leakage;

- Maintaining the present cost allocation logic, but establishing a separate conversion factor for medical oncology services;

[32] Since we lack empirical evidence on the intersection between payment changes and patient access in cancer care, this choice reflects a policy decision, not a technical conclusion that can be reached as the result of this analysis.

- Leaving the existing methodology in place, but fashioning some permanent extension to the present transitional adjustment policy to provide increased reimbursement.

In addition to these potentially major changes, there are also policies that CMS could undertake as early as the upcoming final rule setting payments for Calendar Year 2005.

2.4.1.1 Modifications to Prevent Leakage

Because a substantial share of the reimbursement differential found for oncology was due to cross-specialty blending, any technical solution will require isolating the oncology costs pools from leakage. For whatever procedures are defined to constitute "cancer care,"[33] the methodology would need to be changed to spread the requisite amount of oncology practice expense over those procedures — and only those procedures. Hence, any technical fix, to be successful, would need to exempt oncology practice expense from blending.[34]

One important methodological issue here is to determine what that "requisite amount" of practice expense is. Neither the SMS, nor the ASCO supplemental survey modeled on the SMS, distinguishes costs across the boundary between "cancer care" and "other services." To implement a technical fix, therefore, CMS would need to estimate how much of the survey-reported practice expense to allocate to an "oncology cancer care" cost pool. To reach this, CMS would need either (a) more refined survey data, or (b) a methodology to estimate the split from the data CMS now has. Since the former would take substantial time to implement, any change likely to be implemented in either 2005 or 2006 would have to be based on the latter.

One potential technical approach to this problem, which we believe to be consistent with the CMS crosswalk methodology, would be to estimate the dollar value of "other services" using the "other services" volumes[35] in the 1997-2000 claims data, valued at the "all physicians" practice expense per hour rates.[36] Under this approach, all of the difference between the oncology practice expense per hour versus the "all physicians" practice expense per hour would then be attributed to cancer care services.

This approach would create six "cancer care" cost pools, which could then be allocated to the "cancer care" procedures using, per the regular CMS methodology, the CPEP values for the procedures (scaled to the cancer care cost pools), and the oncology volumes observed in the 1997-2000 claims data could be used to allocate these cost pools to procedures.[37] One technical

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[33] The technical question of defining what constitutes "cancer care" will be discussed more fully in section 2.4.2.

[34] Throughout this discussion, as elsewhere in this report, we use the term "oncology" or "medical oncology" to embrace three CMS specialty codes: Hematology (82), Hematology/Oncology (83), and Medical Oncology (90). These are the codes cross-walked from the AMA survey category "oncology". The balance of the oncology codes are cross-walked from non-oncology SMS data.

[35] Here, the term "other services" refers explicitly to the full list of codes billed by oncologists in the claims data, excluding the list of services specified to be "cancer care".

[36] It would be equally consistent to crosswalk this volume to another specialty, e.g., internal medicine.

[37] At a technical level, CMS would face a choice of either (a) using its present specialty split, and then blending the data, or (b) working with the AMA survey category in the aggregate. This choice will not materially affect the

choice at this step would be whether to add the dollar value of physician work effort to the allocated direct costs as a basis of allocation of the indirect cost pool(s). If this were done, there would then be a subsidiary question of whether to impute work values to codes without physician work values (as is currently required for 2004). Since the allocation process being described is a closed system from the standpoint of imputing oncology practice expense to cancer care procedures, the aggregate dollar value of the resultant practice expense weights for oncology would not be affected by this choice. The RVUs for the more complex procedures with physician work values would, however, be relatively higher if the original CMS methodology without work imputations were used at this stage.

As noted in Chapter 2.2, the final step in the CMS methodology involves scaling the RVUs across all procedures to equal the constant volume case mix of the system in the prior year. Policymakers' views of the appropriate scaling policy will, at this point, depend on how literally policymakers wish to pursue the objective of "full cost" reimbursement. If reimbursement of cancer care services at 100% of cost is the policy objective, it would be possible to separately scale the raw cancer care procedure weights, using an assumption of constant volumes, to an aged projection of the survey cost pool data to the rate year. If budget neutrality is then to be applied, the rest of the weights would be scaled to meet the prior year target holding the cancer care weights at the "100% of cost" level.

The scaling policy just described, of course, represents just one option out of many. It would be equally possible to permute or combine different choices regarding each technical factor described above to fashion a policy meeting other policy objectives, as well. If the goal is to reach (or approach) "100% of cost" reimbursement, however, the methodology must:

- Isolate the cancer care cost pools to prevent reallocation of oncology practice expense elsewhere in the system; and
- Isolate a set of cancer care procedures that receive the full allocation of that practice expense.

2.4.1.2 A Separate Oncology Conversion Factor

A technically simpler approach to achieving the same objective would be to compute payment weights using the current methodology, but to establish a separate conversion factor for chemotherapy services. There are two basic ways this could be done.

If the intention were to ensure "full reimbursement" for the services of oncologists, a specialty-specific conversion factor could be established that would apply to services when billed by physicians with the registered specialty of oncology. The conversion factor could then be scaled to replicate the full amount of practice expense recorded in the oncology cost pools. Such an approach, however, would violate the requirement of uniform reimbursement by procedure without regard to specialty.

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outcome, however, since the PEPH data for all three specialties (82, 83 and 90) are cross-walked from the same SMS specialty "oncology".

An alternative approach would be to apply a separate conversion factor to the list of procedures for which reimbursement was increased in 2004 under §303 of the MMA. While this would eliminate the problem of cross-specialty fee differentials, there is a separate problem of how to determine the appropriate amount, since one important pair of procedure codes on this list, CPTs 90780-81, is routinely billed by non-oncologists. If the intent was to return the full amount of ASCO survey practice expense to oncologists, the conversion factor would have to be increased by more than amount to account for the incremental payments to non-oncologists.

2.4.1.3 A Permanent Add-On Policy

Under current law, the 32% transitional adjustment applicable in 2004 is scheduled to be reduced to 3% in 2005, and then be eliminated altogether thereafter. Rather than mandating adjustments to the ratesetting methodology, it would be possible for policymakers concerned about access problems to simply extend, and make permanent, a separate payment surcharge for cancer care services.

If this policy were adopted, the primary concern would be deciding what level of add-on to provide. The Statement of the Managers of the conference on H.R. 1, provides no specific rationale for the choice of 32% as a payment add-on for drug administration codes. Policymakers interested in such a policy could either specify a percentage increase consistent with their own views of the amount of additional reimbursement required, or delegate to the Secretary the task of estimating the required adjustment.

2.4.1.4 Short-term CMS Changes

In addition to the fairly significant changes discussed above, there are various policies that CMS might explore—and indeed in some cases has already begun implementing. For instance, in response to requirements in MMA section 303(a)(3), CMS has allowed physicians to bill for more than one administration per day for chemotherapy drugs issued through the "push technique." Various providers have argued that this policy helps them to recover practice costs that were not being reimbursed under the previous policy limiting push administration reimbursement to once per day. CMS has the current administrative authority to expand this policy to include non-chemotherapy drugs.

CMS could also adopt a similar policy for drugs administered by infusion—where reimbursement at the higher "first hour" rate is currently limited to one administration per day, regardless of how many drugs are administered. Providers have argued that the time and resources required to infuse each new drug are the same, and the policy of lower reimbursement for subsequent hours of administration should only apply to subsequent hours involving the same drug for which a "first hour" rate has already been paid.

CMS is presently considering other coding changes that will affect the way providers bill for various types of drug administration, and could probably adopt each of these policies in the final rule setting physician payments in 2005.

2.4.2 Policy Options Outside the Medicare Physician Fee Schedule

As the discussion in the preceding section makes clear, the leakage effect of cross-specialty blending in the CMS ratesetting process is so pervasive that any alternative cost allocation methodology, to be effective, must completely override the normal CMS ratesetting process. Whether this is done by apply an external adjustment factor, or forcing an alternative cost allocation method into the system for cancer care services only, either approach amounts to devising a method for calculating cancer care payments that is separate and discrete from the methods used to determine payment for other services.

If policymakers are willing to consider such options, they may also want to consider the option of removing cancer care drug administration costs from the Medicare Physician Fee Schedule altogether, in favor of determining payment rates for these services under some alternative payment methodology independent of the CMS ratesetting methodology.

2.4.2.1 Precedents & Policy Rationale

There are several precedents for considering this policy option. The cancer care drugs themselves are, under current law, reimbursed outside the Physician Fee Schedule.[38] Moving reimbursement for the administration of these drugs outside the system could be viewed as providing parallel treatment for all services on claims involving chemotherapy administration.

Clinical diagnostic laboratory services are also reimbursed outside the Physician Fee Schedule, despite the fact that many of these services are furnished in physicians' offices.[39] Since the inception of the RBRVS payment system in 1992, these services have continued to be paid based on a fee schedule implemented prior to 1992, the values of which are indexed to the Consumer Price Index-Urban.[40]

Beyond the desire to ensure adequate reimbursement to offset access concerns, policymakers considering such options may find a structural rationale for excluding these services from the Physician Fee Schedule in favor of an alternative payment methodology. The administration of long-duration infusion services to patients is logistically dissimilar to most other services rendered to patients in an office setting. It typically requires infrastructure to be established in a discrete area of the provider's facility, which then functions as an "infusion clinic" in which physicians' professional services are rarely rendered. The uniqueness of this infrastructure configuration is underscored by the atypically high practice expense per patient care hour observed, in the ASCO survey data, relative to that of other specialties observed in the SMS data. Cancer care services in physicians' offices are, in fact, analogous to the dialysis services

[38] Historically, these drugs have been reimbursed under the provisions of §1842(o) of the Social Security Act. In 2005, they will be reimbursed under §1847A, and henceforth under either §1847A or §1847B, at the provider's option.

[39] Because these services are separately reimbursed under Section 1883(h), these services are also excluded from payment under the Hospital Outpatient Prospective Payment System.

[40] In the Balanced Budget Act of 1997, Congress froze the payment rates through 2002; the MMA continues this policy through 2008.

rendered to patients with End Stage Renal Disease, which are also exempted from the Physician Fee Schedule, and paid under a separate methodology.[41]

2.4.2.2 Generic Technical Issues

Any effort to de-link cancer care services must deal with two generic issues:

- How to define the distinction between cancer care services and other types of services; and
- How to benchmark the payment rates under the new payment system.

2.4.2.2.1 Defining Excluded Services

De-linking cancer care services from the fee schedule would be, in the main, substantially easier than de-linking other services. Most of the codes under which cancer care infusions are administered are chemotherapy-specific, and hence could be excluded from the RBRVS system without disadvantaging other providers.[42] Since none of these codes have separate technical and professional components, removing these codes from the fee schedule would not affect the ability of other physicians to be paid for their own professional services.

In a few cases, however, defining the line between cancer care and other services will require some effort. In particular, the non-chemotherapy infusion codes, 90780-81, are used extensively by oncologists,[43] but also by other specialties.

In the case of these codes, there are two main technical options.

One option would be to split these codes in order to distinguish cancer care non-chemotherapy infusions from other non-chemotherapy infusions. Another is to move these codes to a new payment system, but then permit non-oncologists to bill these codes under that system. A third potential option — to leave 90780-81 in the fee schedule, permitting oncologists to bill it there — is also feasible, but does not address the presumed policy concern about the adequacy of reimbursement for all cancer care services.

As between these options, the first one — splitting the non-chemotherapy infusion codes — is technically simplest. Many non-oncologists billing this code, however, could be concerned that the payment weights for the "non-cancer care non-chemotherapy" residual would, if split, fall

[41] With the exception of a limited number of physician services billed under the initial methodology, ESRD physicians are paid a monthly capitation fee. The facility receives a flat per-treatment fee known as the composite rate.

[42] The main codes are found in the Current Procedure Terminology sequence 96400-96549, which are all chemotherapy-specific.

[43] Most commonly, these codes are used by oncologists to bill infusion of supportive care drugs, e.g., anti-emetics, which are not classified as "chemotherapy".

below the level adequate to cover the cost of administering complex infusions. These providers, therefore, would probably prefer that the second option be implemented.[44]

Throughout this discussion, we have assumed that the scope of services being considered for exclusion are the cancer care services rendered in the oncology office, and not the full scope of professional services rendered in that office, including evaluation and management services. This assumption is, we believe, most consistent with a policy rationale based on the distinctive character of cancer care services. It would theoretically be possible, of course, to consider pulling reimbursement for all procedures out of the fee schedule in favor of reimbursing cancer care providers as a discrete provider class for all services. Doing this more extensive restructuring, it might be argued, would permit adjustment to the payment rates for other services to reflect the distinct cost structure of community-based cancer care providers. As will be discussed in the next section, however, this same objective could be achieved by benchmarking the new payment system to capture all of these costs.

2.4.2.2.2 Benchmarking the New Payment System

A second important technical issue involves deciding how much money should be moved into the new system — and whether or not the budget neutrality limits on the Physician Fee Schedule should be adjusted downward, in whole or in part, to offset that transfer.

While there are technical issues involved in this decision, this is essentially a policy choice.

As we describe more fully in Chapter 2.2.2.3, in the MMA, Congress elected to direct CMS not to make budget neutrality adjustments—for the 2004 rates—to net out the increased cost of cancer care services resulting from implementation of Section 303(a).[45] Absent more explicit guidance from CMS via rulemaking, we assume that the baseline for subsequent budget neutrality adjustments for cancer care services would be benchmarked to the level of expenditures resulting from 303(a) *as implemented by CMS.* If the resource-based practice expense calculation were recalibrated by removing the requisite amount of oncology practice expense from the rate computation, the requirements of budget neutrality *within the RBRVS* would be met, even if aggregate reimbursements *outside the RBRVS* were increased to improve reimbursement for oncology practice expense.[46]

We note that, in making this determination, establishing the “requisite amount of oncology practice expense” to remove from the oncology cost pools requires CMS to make estimates based on its judgment about the best proxy for reality. This necessity flows from the fact that the SMS data (and, presumably, the ASCO survey data on which the revised oncology practice expense values were generated) do not distinguish infusion services from other services in analyzing direct clinical costs in the oncology office. In order to make such an adjustment

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[44] As this report was being finalized, the AMA CPT Advisory Committee adopted modifications to these codes that will affect the technical choices available here. We have not, however, had the opportunity to evaluate the impact of these changes to the coding structure.
[45] The statute also provides that increases in other areas resulting from the adoption of supplemental survey data in either 2005 or 2006 would be exempt from budget neutrality in the year implemented.
[46] If this were done by legislation, the Congressional Budget Office would undoubtedly score such a policy as cost-increasing.

budget neutral, therefore, CMS would need to establish a methodology to estimate the split of practice expense between infusion services (which would leave the fee schedule) and all other services (which would remain).

One possible technical approach to this split, as indicated in our discussion of within system technical reforms in the preceding section, would be to impute the "all physicians" practice expense per hour to the oncology services volume that would remain in the system, and then deem the excess over that amount to represent the extra cost of providing cancer care services in the office, which would be removed from the system.

However this split is determined, a policy choice must also be made about how to benchmark total payments under the new payment system outside the fee schedule. If policymakers intend to make such reimbursements approach or equal total oncology costs, this amount will be greater, as already noted, than the amount removed from the RBRVS. The exact amount required will depend on how policymakers choose among available options, including:

- Benchmarking to the incremental amount needed to replicate the ASCO survey data aggregates, trended forward to the rate year.
- Benchmarking to the amount required to maintain reimbursements at the level prevailing, in 2004, under the 32% transitional adjustment policy.
- Benchmarking to some new source of information about cancer care practice expense.

2.4.2.3 Payment Methodologies

Once policymakers have determined the amount of cancer care reimbursement required to mitigate access concerns, attention turns to the payment mechanism that should be used to distribute the payment pool.

Policymakers have a wide array of options from which to choose.

At the simple and straightforward end of the spectrum, it would be possible to establish a fee schedule based on the 2004 RBRVS relativities, but based on a separate conversion factor tied to the overall cost benchmark. Presumably, the rebased system would be trended forward over time, since new weights for these codes would no longer be calculated under the fee schedule. It would, of course, also be possible to adjust the relativities in pursuit of a variety of other policy objectives.

At the complex and challenging end of the spectrum, it would be possible to devise a bundled payment system that provided the positive incentives of a prospective payment system with a design/classification scheme that was realistic for cancer care. To be realistic, such a system would need to be regimen-based, that is, to provide payment bundles that mapped to the specific mix of chemotherapy agents, support care drugs and administration techniques actually employed in specific named regimens for treatment of specific diseases. If such a system

provided for the creation of new regimen codes whenever new chemotherapy products became available, it would be possible to consider packaging reimbursement for the drugs together with reimbursement for the administration procedures. If the system forced care employing new products to be paid under codes reflecting prior regimens, however, packaging drugs would be inadvisable, since doing so would create a powerful disincentive to use new drugs as they become available.

In choosing among these options, it is important to note that the "complex and challenging" model would require considerable development work, and might not be launchable by CMS prior to, say, 2007, even if a requirement to implement were enacted immediately. Design and operational challenges include:

- Developing a mechanism to validate and register standardized characterizations of all active chemotherapy regimens.

- Devising a mechanism to obtain sufficient advance notice of new regimens involving emerging drugs to be prepared to implement new codes and payment rates quickly once the products start being used.

- Devising mechanisms to implement frequent payment rate updates — at least quarterly — within the carrier's payment systems.[47]

Absent the ability to implement a payment system that is highly adaptive to the entry of new products and regimens, it is prudent for policymakers to be cautious about the potential for a highly bundled or "packaged" system to accurately pay for cancer care.[48] In comparison to other areas of medicine, cancer care is highly dynamic, with new protocols being developed often for treatment of a wide variety of conditions. In a packaged system based on annual updates, a substantial number of payment bundles established at the rate year would, in oncology, be obsolete before the end of the year — while a substantial share of patients would be receiving care that was inadequately reimbursed because the payment bundles failed to reflect the new regimens on which they were being treated.

Taking all these factors together, our analysis suggests that a bundled payment system for cancer care is theoretically possible, but sufficiently far from the first feasible implementation date to be unavailable to policymakers as an option at present. Policymakers interested in pursuing long term solutions along these lines could, however, implement a separate fee schedule as a transitional policy pending development of a realistic bundled payment methodology.

[47] This statement presumes that existing Part B carriers would process these claims. It would be possible, however, to consider contracting this workload out to specialized contractors.

[48] Policymakers introduced transitional pass-through payments in the Hospital Outpatient Department for fear that the Outpatient Prospective Payment System, which tends to bundle or "package" combinations of services in its payment weights, was not sufficiently open to new technologies because wide variations in the cost of bundled therapies could cause access problems for certain products. *See,* Medicare Balanced Budget Refinement Act, Report of the Committee on Ways and Means. House Report 106-436 (November 2, 1999).

2.4.3 Summary and Conclusions

This report has detailed a variety of ways that the design of the physician fee schedule does not fully capture physician practice expense costs. As we have stated, these reductions—whether through the blending of practice costs across specialties or the scaling effect of the conversion factor—tend to affect all specialties. However, the impact on oncology services is especially acute, since practice expense costs for oncologists tend to be higher than other specialties.

As we have discussed, a new system could be devised to address this issue, but policymakers will have to wrestle with several complexities, including budget neutrality issues and whether or not the new payments would be within or outside the current physician fee schedule.

We hope this report is helpful to policymakers seeking more information on physician payment for oncology services.

Appendix 3.1 Overview of CMS's Resource-Based Practice Expense Methodology

The Resource-Based Practice Expense Relative Value Unit (PE-RVU) methodology has been developed and continuously revised since its legislative enactment in 1994 (Public Law 103-432). The initial "bottom-up" concept was rejected in favor of the "top-down" approach 1998. This appendix will review the basic elements of the "top-down" methodology. CMS has made revisions to the methodology in both its annual Notices of Proposed Rule Making (NPRMs) and final rules. These revisions are presented following the overview.

The 2004 CMS Methodology

On November 7, 2003, CMS published "**Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule for Calendar Year 2004; Final Rule** (68 FR 63196-63395). The PE-RVU methodological review in the rule is reprinted below:

• *Step 1*—Determine the specialty specific practice expense per hour of physician direct patient care. We used the AMA's SMS survey of actual aggregate cost data by specialty to determine the practice expenses per hour for each specialty. We calculated the practice expenses per hour for the specialty by dividing the aggregate practice expenses for the specialty by the total number of hours spent in patient care activities.

• *Step 2*—Create a specialty specific practice expense pool of practice expense costs for treating Medicare patients. To calculate the total number of hours spent treating Medicare patients for each specialty, we used the physician time assigned to each procedure code and the Medicare utilization data. We then calculated the specialty specific practice expense pools by multiplying the specialty practice expenses per hour by the total physician hours.

• *Step 3*—Allocate the specialty specific practice expense pool to the specific services performed by each specialty. For each specialty, we divided the practice expense pool into two groups based on whether direct or indirect costs were involved and used a different allocation basis for each group. (i) Direct costs—For direct costs (which include clinical labor, medical supplies, and medical equipment), we used the procedure specific CPEP data on the staff time, supplies, and equipment as the allocation basis. (ii) Indirect costs—To allocate the cost pools for indirect costs, including administrative labor, office expenses, and all other expenses, we used the total direct costs combined with the physician fee schedule work RVUs. We converted the work RVUs to dollars using the Medicare CF (expressed in 1995 dollars for consistency with the SMS survey years).

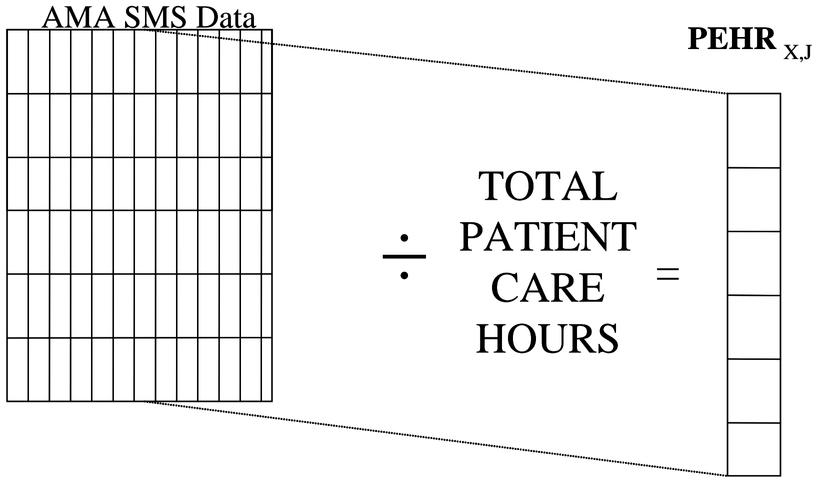
• *Step 4*—For procedures performed by more than one specialty, the final procedure code allocation was a weighted average of allocations for the specialties that perform the procedure, with the weights being the frequency with which each specialty performs the procedure on Medicare patients.

It should be noted that the initial CPEP data (Clinical Practice Expert Panel) was created for the proposed bottom-up process.

The methodology can be graphically, if not more easily, interpreted.

STEP ONE

CMS starts with specialty-specific practice expense in six categories…



..and converts to "practice expense per patient care hour"

STEP TWO:

Next, hours spent by each specialty in treating Medicare patients are estimated:

HSAIO RUC

MEDICARE CLAIMS

MINUTES(HRS) PER PROCEDURE * PROCEDURE COUNT BY SPECIALTY = SPECIALTY HOURS TREATING MEDICARE PATIENTS BY PROCEDURE

“$HOURS_J$”

STEP THREE:

The results of these steps are combined to produce four “cost pools” for each specialty:

$PEHR_{X,J}$

$* HOURS_J$

CLINICAL PAYROLL

SUPPLIES

EQUIPMENT

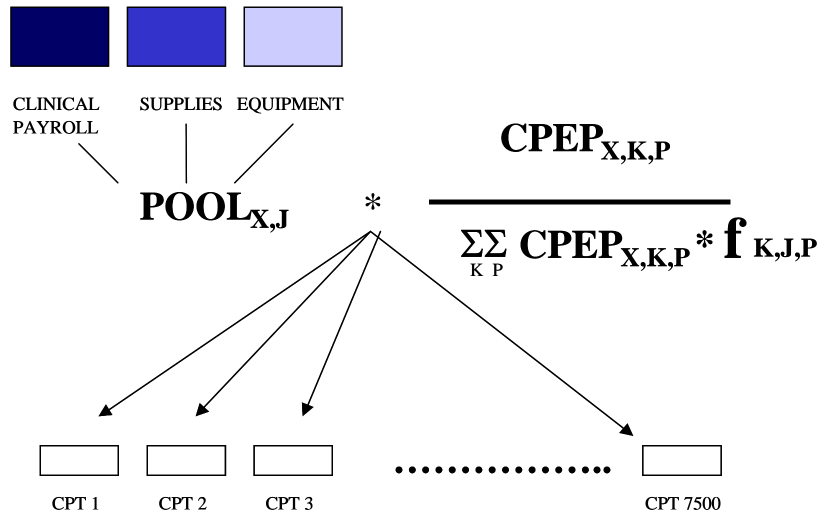
ADMINISTRATIVE PAYROLL, OFFICE EXPENSE & “OTHER COSTS”

“Direct” Cost Pools

“Indirect Cost Pool”

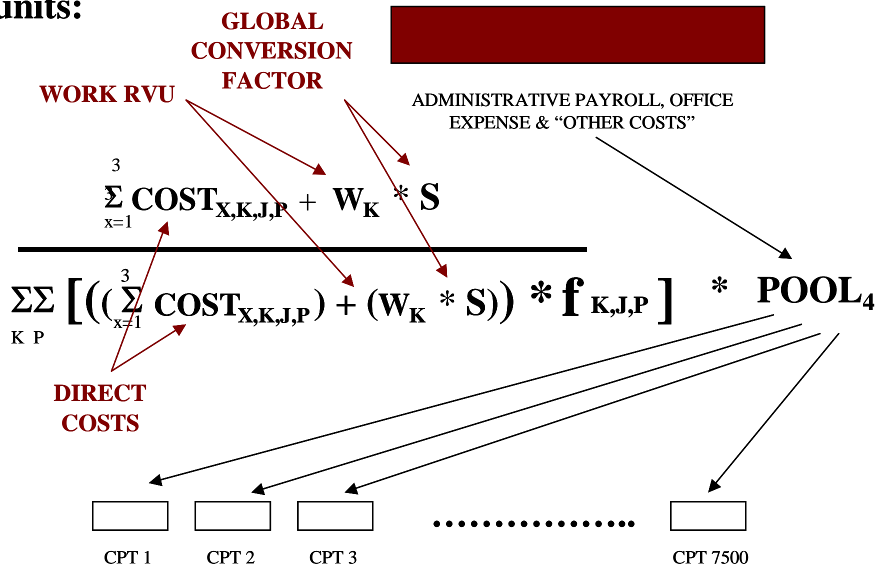
STEP FOUR:

Next, dollars in the specialty -specific direct cost pools are allocated to procedures using ratios derived from Clinical Practice Expert Panel (CPEP) data



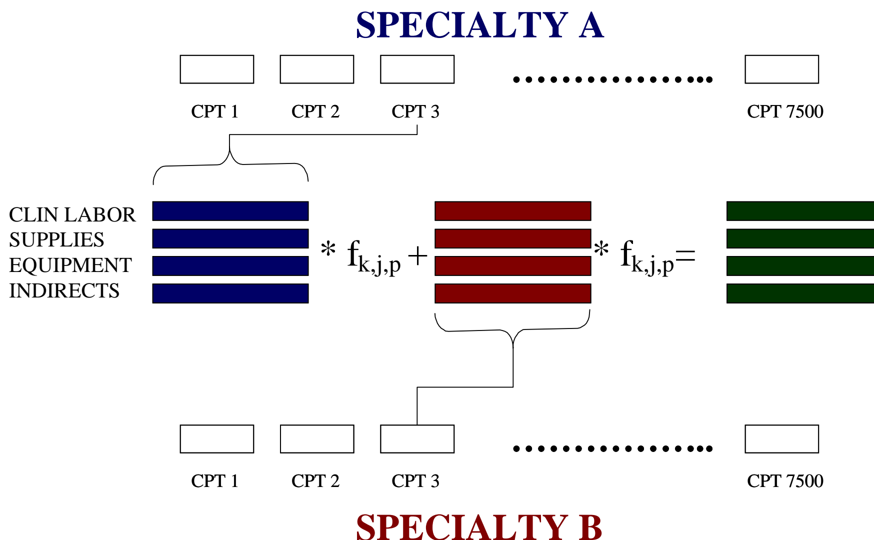
STEP FIVE

Indirect costs, by contrast, are allocated on the basis of direct practice costs and converted work units:



$$\frac{\sum_{x=1}^{3} COST_{X,K,J,P} + W_K * S}{\sum_K \sum_P \left[\left(\left(\sum_{x=1}^{3} COST_{X,K,J,P} \right) + (W_K * S) \right) * f_{K,J,P} \right]} * POOL_4$$

STEP SIX



Adjustments to the Top-Down Process
The PE-RVU methodology and data have been subject to continuous debate since the enactment of the law. Legislation and evolving views at the Agency have led to numerous specific adjustments to the methodology and data. Most, but not all, of these adjustments have been noted in the Federal Register.

The following table presents amendments/changes to the PE RVU methodology and data as discussed in the Federal Register. Adjustments are noted where they were first read, not necessarily when they were issued. Proposed changes that were not implemented may not be listed. To the extent possible, repetition is avoided. The changes are presented in reverse chronological order (January 7, 2004 first). Where appropriate, specific codes are indicated. Additionally, various discussions and precedents are included. Note that the Zero-Physician Work Pool and the Non-Physician Work Pool are synonymous.

Amendments/Changes to the PE RVU Methodology and Data as Discussed in the Federal Register

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
1.	1/7/04	FR 1092-1093	Use of ASCO and Society for Thoracic Surgery Survey Data. CMS Specialty Code: 33 (thoracic surgery), 78 (cardiac surgery), 82 (hematology), 83 (hematology/oncology), 90 (medical oncology)	Data	Substituted practice expense per hour survey data.
2.	1/7/04	FR 1093	Pricing of clinical oncology nurses	Data	Substituted ASCO data. Raised wage rate for oncology certified nurses to 0.79 per minute.
3.	1/7/04	FR 1093-1094	Adjustments in PE RVUs for certain drug administration services in 2005 and 2006	Methodology	Exempted from budget neutrality requirements additional expenditures that result from the increase in drug administration PE RVU in 2005 and 2006 that were based on specialty group surveys. Affects specialties where 40% or more of their 2002 Part B payments are attributable to the administration of drugs. Affects gynecology/oncology (specialty code 98), rheumatology (66) and urology (30).
4.	1/7/04	FR 1094	Non Physician Work Pool	Methodology	Changed the per hour practice expense assignments for Non-physician work pool from “all physician average” to weighted average of practice expense per hour of the specialties that perform the affected services.
5.	1/7/04	FR 1094	Nonphysician Work Pool	Data	Switched to the use of total staff time from maximum staff time.
6.	1/7/04	FR 1095	MEI adjustment to RVU	Methodology	Adjusted PE RVU by -1.32 percent (factor 0.9868)
7.	11/7/03	FR 63200	Calculation of Technical Component for pathology services (CPT 80000 series). Exact codes to be determined.	Methodology	Extended for one year the moratorium on calculating the technical component of practice expense RVUs as the difference between the global and professional component for **pathology** services.
8.	11/7/03	FR 63201	Practice expenses for professional component of cardiac services	Data	Added PEAC proposed staff times to the professional component of selected cardiac services.

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
9.	11/7/03	FR 63202	CPT 77418 Intensity Modulated radiation therapy	Methodology	The PE RVUs for this procedure will be calculated using the nonphysician Work Pool methodology.
10.	11/7/03	FR 63203	CPT 10060, 11000, 11055, 11056, 11057 and 11752	Data	Corrected PEAC data
11.	11/7/03	FR 63203	Transplant CPT codes	Data	Restored original CPEP clinical staff pre-times and used the RN staff type for 2004.
12.	11/7/03	FR 63203-63204	CPT codes	Data	Corrected PEAC supply data and pricing for 45321 and 45327 in facility setting only.
13.	11/7/03	FR 63204	CPTs: 45900, 45905, 45910, 47382, 49320, 49321, 49322, 49422 and 49429	Data	Updated supply database
14.	11/7/03	FR 63204	CPT 92507	Data	Revised clinical staff time for this service from 46 to 58 minutes.
15.	11/7/03	FR 63204	E/M nursing home and home visit codes	Data	Rejected PEAC recommendations for reduction in clinical staff time. This was a reversal from an earlier proposal.
16.	11/7/03	FR 63204	Radiological codes	Data	Revised CPEP supply data and pre-service clinical staff time
17.	11/7/03	FR 63205	CPT 52647	Data	Corrected supply cost data for laser fiber from $290 to $850.
18.	11/7/03	FR 63205	Pacemaker maintenance	Data	Eliminated transtelephonic monitor from supply costs.
19.	11/7/03	FR 63205-6	Thoracic and sleep supplies	Data	Deleted selected supplies from CPEP data
20.	11/7/03	FR 63206	Radiology supplies	Data	Defined thrombectomy device and Seldinger needle as single use.
21.	11/7/03	FR 63206	CPT 58353	Data	Updated thermal ablation balloon catheter price and supply and equipment list for otolaryngology based upon PEAC recommendations.
22.	11/7/03	FR 63206	Safety syringe price	Data	Updated syringe price from $.28 to $.435
23.	11/7/03	FR 63206	Venom immunology CPT codes: 95145, 95146, 95147, 95148 and 95149	Data	Updated venom supply costs.
24.	11/7/03	FR 63207	CPT 95004 and 95010	Data	Added multi-tine per test price of $.233.
25.	11/7/03	FR 63207	Diagnosis and treatment of aphasia	Data	Updated supply costs.
26.	11/7/03	FR 63207	CPT 46917 and 46924	Data	Changed and added equipment for codes.

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
27.	11/7/03	FR 63207	Iontophoresis CPT 97033	Data	Revised supply database.
28.	11/7/03	FR 63210	CPT 99183 Hyperbaric oxygen therapy	Data	Revised staff time and supplies. Recommended that PEAC review inputs.
29.	11/7/03	FR 63211	Maxillofacial prosthetic services	Methodology	Eliminated special PE pool for maxillofacial prosthetic services and used otolaryngology as crosswalk for oral and maxillofacial surgeons.
30.	11/7/03	FR 63211	Holter monitoring	Data	Deleted specific supplies.
31.	11/7/03	FR 63211	Eyelid closure CPT 67875	Data	Removed direct costs associated with post procedure follow up.
32.	11/7/03	FR 63211-12	External counterpulsation CPT G0166	Data	Corrected CPEP data.
33.	11/7/03	FR 63212	Immunization services: 90471 and 90472	Methodology	Returned codes to non-physician work pool.
34.	11/7/03	FR 63212	Diathermy CPT 97024	Data	Revised equipment and staff time costs.
35.	11/7/03	FR 63213	Extracorporeal photopheresis therapy CPT 36522	Data	Added photopheresis kit to supply database.
36.	8/15/03	FR 49032	Converting Indirect Expenses	Methodology	Converted work RVUs to dollars using the Medicare Conversion Factor expressed in 1995 dollars for consistency with SMS survey data
37.	8/15/03	FR 49032	Computing Non-physician work pool	Methodology	Used the average clinical staff time from CPEP and the “all physician” practice expense per hour to create pool. Then used **the adjusted 1998 practice expense RVUs** to allocate this pool to each service
38.	8/15/03	FR 49032-3	Radiology services with work	Methodology	For radiology services with assigned work RVUs, used adjusted 1998 practice expense RVUs to allocate the direct practice expenses cost pool
39.	8/15/03	49033	Physical therapy crosswalk	Methodology	Crosswalked all utilization for therapy services in CPT 97000 series to the physical and occupational therapy PE pool
40.	8/15/03	49033	Cardiac services	Data	Proposed to add PEAC recommended staff times to the PC selected codes

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
41.	8/15/03	49034	Utilization data	Methodology	• For existing codes: Used utilization data from 1997-2000 • For new codes, used first available utilization data for the code. CMS to make assumptions about specialty mix or use "all physician" average
42.	8/15/03	49034	Standard clinical staff times for 90-day codes	Data	• Established standardized staff times for pre-service, discharge management and post service office visit time • Accepted other PEAC recommendations for clinical staff time for globals
43.	8/15/03	49038	Miscellaneous PE issues	Data	• Established practice expense inputs for 99183-physician attendance and supervision of hyperbaric therapy • Eliminated special practice expense pool for maxillofacial prosthetics and cross walk oral surgeons and maxillofacial surgeons to otolaryngology. • Eliminated various inputs for holter monitoring codes
44.	8/15/03	49038	Nonphysician Work Pool: 93225, 93226, 93231, 93232	Data	Noted that holter monitoring codes are in non-physician work pool
45.	12/31/02	79970	Physical therapy crosswalk: 97010-97750; 97001-97004	Methodology	• Crosswalked utilization for therapy codes (97010-97750) to physical and occupational therapy practice cost pools • Used physician utilization data for therapy evaluation codes (97001-97004)
46.	12/31/02	79972-03	Physical Therapy Practice Expense Per Hour	Data	Accepted APTA data and revised PEHR for physical therapy (specialty code 65) and occupational therapy (67). Took 1999 cost data and deflated by MEI to 1995.
47.	12/31/02	79973-77	2001 PEAC/RUC CPEP recommendations	Data	Various recommendations accepted or modified

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
48.	12/31/02	79976	Exclusion of clinical staff time in the facility setting	Data	Reaffirmed 2 Nov 99 decision to exclude facility based clinical staff time input data.
49.	12/31/02	79976	Non-physician work Pool, PC and TC calculations	Methodology	Affirmed: • TC codes are in non-physician work pool • CPEP data is not used to calculate PE RVUs for NPWP • Direct cost inputs are not assigned to PC codes
50.	12/31/02	79978	Non-physician Work Pool	Methodology	• For codes not in NPWP — TC value equals Global minus PC • For codes in NPWP — Global value equals PC value plus TC value
51.	12/31/02	79979	Non-Physician Work Pool	Methodology	Noted that there are no Practice Expense Per Hour information for independent laboratories, which therefore are cross-walked to the "all physician" estimates
52.	12/31/02	79979	Non-Physician Work Pool — Pathology and various codes: 80000 series; G0141, P3001, 10021, 10022, 36430, 36440, 36450, 36455, 36460, 36520, 38220, 38221, 38230 and 38231	Methodology	• Instituted one year moratorium for pathology codes on switching the calculation of TC values. • For selected codes, continued to determine the global PE RVUs as the sum of PC and TC
53.	12/31/02	79980-1	Non-Physician Work Pool — Staff Time	Data	• Created the non-physician cost pool using the highest/maximum staff time in place of average staff time • Declined to use revised clinical staff time to create the non-physician work pool
54.	12/31/02	79981	Non-Physician Work Pool — Removal of codes from NPWP	Methodology	As requested by the American Urological Association, removed 76857, 76872, 76942 and 96400 from NPWP
55.	12/31/02	79982	Non-Physician Work Pool — Removal of Immunization Codes from NPWP	Methodology	• Remove 90471 and 90472 from NPWP • Administration of influenza (G0008), pneumonia (G0009) and hepatitis B ((G0010) vaccines were exempted from budget neutrality

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
56.	12/31/02	79982-3	Utilization Data	Data	Adopted proposal to use data from CY 1997-2000 until the five year review of PE RVUs
57.	12/31/02	79983	Site of service designations	Data	• Designated additional place-of-services as either facility or non-facility • Reaffirmed basic rule: If separate payment is made to an institution than the service is a facility service • Established that physical and occupational therapy services have only non-facility rates
58.	6/28/02	43848	Physical and occupational therapy	Data	Crosswalked all therapy services in 97000 series to physical and occupational therapy practice expense pool
59.	6/28/02	43848	CPEP Data	Data	Various data changes
60.	6/28/02	43849	Zero Physician Work Pool - TC	Methodology	• Proposed to make the TC value equal to the difference between the global and the PC for services not in the ZPWP • For ZPWP services, global value will equal the sum of the PC and TC
61.	6/28/02	43851	Zero Physician Work Pool — Staff Time	Data	Proposed to create ZPWP cost pool with the highest staff time in place of average staff time
62.	6/28/02	43851	Zero Physician Work Pool — Removal of codes: • 93875-93990 • 90471-90472	Data	• Proposed to remove non-invasive vascular diagnostic study codes • Proposed to remove immunization CPT codes from ZPWP
63.	6/28/02	43851-2	Utilization Data	Data	• Proposed to develop PE RVUs using 1997-2000 utilization • Proposed not to update the utilization data with 2001 data • Proposed not to update the utilization data until the 5 year review of PE RVUs is undertaken.
64.	6/28/02	43852	Site of Service	Data	Assigned and reassigned site of service designations to facility or non-facility

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
65.	11/1/01	55250	Average scaling factor adjustment	Methodology	When the specialty-specific scaling factor exceeded the average scaling factor by more than three standard deviations, CMS used the average scaling factor (See discussion 64 FR 59390, November 1999)
66.	11/1/01	55250	Global Practice Expense	Methodology	For services with PC and TC, the global equals the sum of PC and TC
67.	11/1/01	55250	Practice Expenses Per Hour Adjustments and Specialty Crosswalk	Data	• For Physical and Occupational Therapy: admin payroll, office and other expenses per hour from specialty data. Other expenses used "all physician" PEHR • Audiologist PEHR derived from other specialties perform these services • For emergency medicine, used "all physician PEHR for cost pools for clerical payroll and other expenses • Podiatry used "all physician" PEHR • For pathology removed Part A associated hours • Maxillofacial prosthetics used "all physician" PEHR and allocated pools using the adjusted 1998 PE RVUs • Split the PEHR for radiology into radiation oncology and radiology other than radiation oncology to create separate pools
68.	11/1/01	55250	Time associated with Work RVU including: • 00100-01996	Methodology	• For services with no assigned physician time, CMS calculated estimated total physician time based on work RVUs, maximum clinical staff time for each service as shown in the CPEP data or the judgment of clinical staff • 00100-01996, used base and time units from anesthesia fee schedule and Medicare allowed claims data

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
69.	11/1/01	55251	SMS Survey	Data	• For CY 01, incorporated 1998 SMS data into a four-year average and for CY 02, incorporated 1999 SMS data into a five-year average • Adjusted data to 1995 • Decided to continue to use the mean in calculating specialty-specific PEPR
70.	11/1/01	55252	Physician time	Data	Updated and corrected specific codes
71.	11/1/01	55252	Specialty crosswalk	Data	• Crosswalked emergency medicine cost pools for administrative labor and other expenses with "all physicians" PEHR • Eliminated separate PE pools for midlevel practitioners (i.e., nursing)
72.	11/1/01	55252	Site of Service	Methodology	Capped PE RVUs for a physician service in facilities at the nonfacility practice expense level
73.	11/1/01	55255-7	CPEP	Data	Various changes made. Of note: • Deleted separately billable supplies when listed in the recommended supply list • Rounded fractions of minutes of clinical staff time to nearest minute
74.	11/1/01	55257-62	Clinical staff wage rates	Methods and data	• To calculate cost per minute converted data to 2001 using MEI, divided by 2080 and then divided by 60. Then multiplied by 1.366 to account for benefits • Various other changes • Deleted clinical staff that can bill separately • Calculated simple average of wage rates for blended clinical staff types
75.	11/1/01	55262-3	Physician Time	Data	Accepted RUC updates
76.	11/1/01	55264	Zero Work Pool	Methodology	Affirmed that CPEP data are not used as allocators in the ZPWP
77.	11/1/01	55264	Site of service — ASC	Methodology	Facility RVUs to be used if procedure is at an ASC and on the ASC procedure list. Non facility RVUs are used when a procedure is at an ASC but not on the ASC procedure list.

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
78.	8/2/01	40374	BBA adjustments to 1998 RVUs	Methodology	• Statute required an increase to PE RVUs for office visits • For other services in which PE RVUs exceeded 110 percent of the work RVUs **and** were furnished less than 75 percent of the time in an office setting, the statute required a reduction of the 1998 PE RVUs to a number equal to 110 percent of the work RVUs. • Reduction did not apply to services that had proposed PE RVUs that increased from their 1997 PE RVUs as reflected in the 18 June 1997 proposed rule. • Affected services are at 62 FR 59103, October 1997.
79.	8/2/01	40375	PEHR	Data	• Various changes
80.	8/2/01	40375	Specialty Crosswalk	Data	• Audiologists PE RVUs derived from PEHR of the other specialties performing their services • Emergency Medicine used the "all physician" PEPR to create clerical and other cost pools • Podiatry used the "all physician" PEHR • Pathology removed time associated with Part A reimbursement • Maxillofacial prosthetics used "all physician" PEHR and allocated the pools using adjusted 1998 PE RVUs • Split radiology into radiation oncology and radiology other than radiation oncology and split PEPR to create pools

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
81.	8/2/01	40376	Equipment costs	Methodology	• Combined procedure-specific and overhead equipment into a single equipment category • Deleted stand-by equipment and equipment used for multiple services at one time from the direct cost inputs
82.	8/2/01	40380-	Staff types and wages	Data	• Various changes made
83.	11/1/00	65384	Weight averaging of supplemental survey data	Methodology	CMS calculated the weighted average of supplemental data and SMS data
84.	11/1/00	65385	Supplemental Data	Data	Accepted supplemental information from the American Association of Vascular Surgery and the Society for Vascular Surgery
85.	11/1/00	65391-8	CPEP	Data	• Proposed to eliminate self-administered drugs from CPEP supply data as they are not covered • Various other changes • Removed estimates of all clinical staff time allotted to the use of clinical staff in the facility setting • Reinstated clinical staff time for office based tasks for 0-day global services • Combined both procedure specific and overhead equipment into one category, assuming an average 50 percent utilization for all equipment • Deleted standby equipment
86.	11/1/00	65398-9	Mid-level providers	Data	Removed services provided by mid-level providers from the practice expense computation
87.	11/1/00	65399-400	“Pool Leakage”	Discussion	• CMS argues against leakage claim — data contains mid-level providers and thus pools should be smaller. • See CMS proposal to remove services provided by mid-level providers

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
88.	11/1/00	65400	Zero Work Pool	Methodology	In removing services from the ZPWP, CMS subtracted the dollars for the utilization associated with the removed services
89.	7/17/00	44180-5	SMS Refinement	Discussion	• Various recommendations • CMS proposed to use 4 year average • Data to be standardized • Lewin proposal to use edits and trims is declined • Lewin proposal to account for non-response is put off
90.	7/17/00	44188-9	Utilization Data	Discussion	• CMS reported on a study to determine whether potential errors in the claims data have an adverse impact on any specialty or is merely noise. • The answer is that incorrect specialty utilization data has minimal impact
91.	7/17/00	44189	Site of service	Discussion	• Clarifies that for outpatient therapy services (physical, occupational and speech) non-facility PE RVUs apply
92.	11/2/99	59388	Methodological Issues	Discussion	A listing of various issues to be addressed
93.	11/2/99	59389-90	Scaling Factor	Discussion	• The pool and scaling factor methodology is explained • Imposed the average scaling factor in place of specialty specific scaling factor if the specialty specific factor exceeds the average by more than 3 standard deviations

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
94.	11/2/99	59391	PEHR	Methodology	• Accepted Society of Thoracic Surgeons supplemental data. Calculated PEHR by weight-averaging the new data with SMS. Used number of survey responses adjusted for non-response as the weights • Excluded data from vascular surgeons in calculations for thoracic and cardiac surgery • Crosswalked vascular surgery to "all physician" PEHR
95.	11/2/99	59392-403	CPEP	Data and methodology	Various changes including • Deleted from the supply lists all those drugs that would be billed separately • Deleted self—administrable drugs that are not payable under Medicare • Extensive discussion of "Egregious Errors and anomalies" • Deleted all administrative staff types from current database since these costs are in the indirect pool • First RUC recommendations reviewed and largely accepted • For 85060 and 85097: As these are PC only, deleted all clinical staff time, supplies and equipment • For 93320: This is an add-on code. RUC eliminated the equipment as it should be reflected in the base-code • Implemented earlier proposal to exclude from the raw CPEP data all clinical staff time in the facility setting

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
96.	11/2/99	59405-6	Zero Work Pool - removals	Methodology	• For services with zero work RVUs, "all physician" PEHR were used instead of CPEP • CMS accepted the American Academy of Sleep Medicine recommendations to move the TC of 95805-95811 back to specialty pools • CMS accepted the American Society of Electroneurodiagnostic Technologist recommendation to remove neurology codes 95808-95956 from the ZPWP • CMS accepted the National Association of Epilepsy Centers and American Academy of Neurology request to remove 95950, 95951, 95954 and 95956 from ZPWP • CMS accepted the American Academy of Neurology recommendation to remove codes 95805-95956 from ZPWP • CMS accepted the American College of Chest Physicians to remove sleep codes and pulmonary codes 94010-94799 from ZPWP • CMS accepted the American Academy of Ophthalmology request to remove codes 76511-76529 and 92081-92499 from ZPWP • CMS accepted the American Optometric Association request to remove 92060 and 92065 from ZPWP • CMS accepted the College of American Pathologist request that CPEP data be used to calculate all pathology TC RVUs rather than historical charge data

Index	Date	Page	Topic/Codes	Data Or Methodology	Adjustment
97.	11/2/99	59407-8	Site of Service	Methodology	• CPT codes 90918-90921 should always be reported as a non-facility service. These are monthly codes. • Implemented proposal that facility PE RVUs never are higher than non-facility • Clarified that non-facility PE RVUs are to be applied when a service not on the ASC list is provided in an ASC
	7/22/99	39620-	Zero Work Pool	Data	• Proposed removal of codes from ZPWP. See table on 64 FR 39620-22

Selected Acronyms in Appendix 3.1

CPEP Clinical Practice Expense Expert Panel
NPWP Non-physician Work Pool
PC Practice Component
PE Practice Expense
PEAC Practice Expense Advisory Committee
PEHR Practice Expense Per Hour
RUC Relative Value Update Committee
RVU Relative Value Unit
TC Technical Component
ZPWP Zero Physician Work Pool

Appendix 3.2 Technical Detail –Replication of 2004 Interim Final Rule Practice Expense Relative Value Units

There is no single source that provides a complete set of technical details on how CMS calculates the practice expense relative value units (PE RVUs). Our replication of this methodology, therefore, relies on numerous sources of information including:

- the complete Federal Register history, as reflected in Appendix 3.1;
- the February 1999 GAO report titled "Medicare Physician Payments: Need to Refine Practice Expense Values During Transition and Long Term";
- the June 2001 The Lewin Group draft report titled "The Resource-Based Practice Expense Methodology: An Analysis of Selected Topics;
- the August 2001 The Lewin Group report titled "Recommendations Regarding Supplemental Practice Expense Data Submitted for 2002—Evaluation of Survey Data for: Physical Therapy, Optometry, Pediatrics"; and
- Verbal and written communication with The Lewin Group and CMS staff.

There are some technical issues related with available data which complicate the replication of the PE RVU methodology. The data files available on the CMS website often, but not always, contain the most updated information and perhaps more importantly, are not necessarily "input", but alternatively, "output" data. In other words, CMS has not published data in a form conducive to replicating their methodology, or in the form that they use to calculate the PE RVUs, but instead, publish the data as intermediate "outputs" after completing the methodology.

Another complication in simulating the methodology is that although published sources provide an accurate description of the "macro" view of the methodology, they are often lacking in underlying detail. The Lewin Group and CMS staff were able to provide guidance on many of these details; however, there is still some detail that is not yet fully understood.

The following section describes, step by step, our attempt to replicate the CMS methodology for computing PE RVUs with the data CMS provides on its website.

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I. Input Data

A. Publicly Available Data Resources

- Pools File

  CMS provides an Excel workbook with two worksheets that contain the SMS and CPEP pools, direct scaling factors and total time (in millions of minutes) by CMS/HCFA specialty.
- SMS Table

  CMS provides an Excel workbook that contains practice expense per hour (PEHR) for the following categories by AMA specialty: clinical, clerical, office, supplies, equipment, other, and total.
- Utilization File

The utilization file is an Access database that contains over 380,000 records. It contains the allowed services frequency for each unique combination of CPT code, first modifier (TC, 26, or global), utility modifier, and place of service (facility or non-facility).

- Time File

The time file is an 8866 record Access database which contains the total time (and if available, the breakdown of total time between staff, pre, intra, and post time) by CPT code and first modifier. This file also contains a flag indicating whether or not a CPT code is in the NPWP.

- PE RVU Inputs File

CMS provides an access database with 4 tables. Their contents are described in tables 1-4 below:

Table 1. Clinical Staff

HCPCS	CPT Procedure Code.
Source	Identifies the source of the resource inputs: the PEAC, RUC, a clinical judgment by CMS, a crosswalk by CMS or a medical specialty society.
CPEP	Identifies the number of the CPEP that valued the service. If the service has been refined, the source will indicate “PEAC” or “RUC” and the value for CPEP will indicate “RUC.”
Staff Type	The code for type of clinical staff.
Rate	Rate per minute for the clinical staff type.
Description	A description of the clinical staff type.
Pre-Time NF	Clinical staff time associated with pre-service period when the service is performed in a non-facility setting.
Intra-Time NF	Clinical staff time associated with the intra-service period when the service performed in a non-facility setting.
Post-Time NF	Clinical staff time associated with the post-service period when the service is performed in a non-facility setting.
Pre-Time F	Clinical staff time associated with pre-service period when the service is performed in a facility setting.
Intra-Time F	Clinical staff time associated with the intra-service period when the service performed in a facility setting.
Post-Time F	Clinical staff time associated with the post-service period when the service is performed in a facility setting.
Valued NF	Indicates whether the service was valued in non-facility settings.
Valued F	Indicates whether the service was valued in facility settings.
Source for Xwalk	Identifies a source or reference code that was used to determine the resource inputs for crosswalked codes.
Global Period	The global period associated with the service.

Table 2. Equipment

HCPCS	CPT Procedure Code
SOURCE	Identifies the source of the resource inputs: the PEAC, RUC, a clinical judgment by CMS, a crosswalk by CMS or a medical specialty society.
Valued NF	Indicates whether the service was valued in non-facility settings.
Valued F	Indicates whether the service was valued in facility settings.
Time NF	The time associated with use of the equipment in non-facility settings.
Time F	The time associated with use of the equipment in facility settings.
Cost-NF	The product of the time associated with use of the equipment and the cost per minute in non-facility settings.
Cost-F	The product of the time associated with use of the equipment and the cost per minute in facility settings.
EQP_CODE	The equipment code identifying the type of equipment.
Description	Description of the Equipment.
Life	Useful life of the equipment.
PRICE	Purchase price of the equipment.
CPEP	Identifies the number of the CPEP that valued the service. If the service has been refined, the source will indicate "PEAC" or "RUC" and the value for CPEP will indicate "RUC."
COST_MIN	Cost per minute. Calculated using the following formula: (1/(mins_yr*usage))*price*((intrate/(1-(1/((1+intrate)**life))))+maint) where mins_yr=150,000, usage=0.5, maint=.05 and intrate=0.11.
Source for Xwalk	Identifies a source or reference code that was used to determine the resource inputs for crosswalked codes.
Global Period	The global period associated with the service.

Table 3. Medical Supplies

HCPCS	CPT Procedure Code
SOURCE	Identifies the source of the resource inputs: the PEAC, RUC, a clinical judgment by CMS, a crosswalk by CMS or a medical specialty society.
CPEP	Identifies the number of the CPEP that valued the service. If the service has been refined, the source will indicate "PEAC" or "RUC" and the value for CPEP will indicate "RUC."
Sup_Code	The supply code identifying the type of supply.
Description	Description of the supply.
Unit	Unit measure.
Quantity	Invoice quantity.
PRICE	Invoice price.
Quantity-NF	Quantity used for the procedure in the non-facility setting.
Quantity-F	Quantity used for the procedure in the facility setting.
Cost–NF	Cost of the item associated with the procedure in the nonfacility setting. This equals Invoice Quantity * Invoice Price / Invoice Quantity * Quantity-In.
Cost-F	Cost of the item associated with the procedure in the facility setting. This

	equals Invoice Quantity * Invoice Price / Invoice Quantity * Quantity-Out.
Source for Xwalk	Identifies a source or reference code that was used to determine the resource inputs for crosswalked codes.
Global period	The global period associated with the service.
Category	Supply Category
Post-Op Visits	Post-Operative Visits. Used to determine the number of supply cost packages for each code. In the facility setting, the number of packages equals the number of post-op visits. In the non-facility setting, the number of packages equals the number of post-op visits plus 1.

Table 4. Summary table

HCPCS	CPT Procedure Code
Pre-Time NF	Estimated clinical staff costs to the physician associated with pre-service period when the service is performed in a non-facility setting.
Intra-Time NF	Estimated clinical staff costs to the physician associated with the intra-service period when the service is performed in a non-facility setting.
Post-Time NF	Estimated clinical staff costs to the physician associated with the post-service period when the service is performed in a non-facility setting.
Pre-Time F	Estimated clinical staff costs to the physician associated with pre-service period when the service is performed in a facility setting.
Intra-Time F	Estimated clinical staff costs to the physician associated with the intra-service period when the service performed in a facility setting.
Post-Time F	Estimated clinical staff costs to the physician associated with the post-service period when the service performed in a facility setting.
Supply Cost NF	Estimated medical supply costs to the physician for the procedure in the non-facility setting.
Supply Cost F	Estimated medical supply costs to the physician for the procedure in the facility setting.
Equip Cost NF	Estimated equipment costs to the physician associated with the procedure in the non-facility setting.
Equip Cost F	Estimated equipment costs to the physician associated with the procedure in the facility setting.

B. Changes to the Input Data Sets Prior to Replicating Methodology

Table 5. Description of Changes Made to Input Files During Moran Analysis

File	**Description of Change**	**Reference**
Pools File	Converted Total Time in millions of minutes to hours by m multiplying by 1 million and then dividing by 60	n/a

SMS File	Eliminate special pool for Maxillofacial Prosthetic services and use otolaryngology PEHR for oral surgeons and maxillofacial surgeons	November 7, 2003 Final Rule Page 81
	Updated the PEHR for Physical Therapy (specialty code 65) and Occupational Therapy (specialty cod 67)	December 31, 2002 Final Rule FR/Vol. 67, No. 251 Table 1. (page 79973)
	Updated the PEHR for Cardiac Thoracic Surgery and Oncology	May 7, 2004 Interim Final CMS1372IFC Table 2 (page 32)
	Updated NPWP PEHR	May 7, 2004 Interim Final CMS1372IFC Table 3 (page 39)
	Mapped PEHR values from "all physicians" to Portable X-ray to Radiology	Per CMS staff
Utilization File	Converted Flag for Facility and Non-Facility into Record Level Totals	n/a
All Files	Converted from either excel or access into SAS data files	n/a

C. Creation of Master File

- Merged Utilization File with Time File
- Removed NPWP (see description below)
- The 97000 series of CPT codes were cross-walked to Physical Therapy (PT), specialty 65.[49]

D. Creation of the Non-Physician Work Pool (NPWP)

- The flag contained in the time file was used to designate CPT codes into the NPWP.
- The following CPT codes were also added based on rule references: 77418 "Intensity Modulated Radiation Therapy, 90471, 90472 Immunization Services—put back after removal in 2003, and Holter Monitoring Codes: 93225, 93226, 93231, and 93232.[50]

[49] **Technical Note:** The original utilization file had the 97000 series of CPT codes cross-walked to the various specialties where they were performed. As each record is a unique combination of specialty, CPT code, and if applicable, first (global, technical, and professional) and second (i.e., utility) modifier, cross-walking to the PT reduces the number of specialties (i.e., unique records), and therefore they were unduplicated by summing frequency over the new PT specialty.

[50] **Technical Note:** The original utilization file had the NPWP CPT codes cross-walked to the various specialties where they were performed. As each record is a unique combination of specialty, CPT code, and if applicable, first (global, technical, and professional) and second (i.e., utility) modifier, cross-walking to the NPWP reduces the number of specialties and additionally, the need for utility modifiers (i.e., unique records), and therefore they were unduplicated by summing frequency over the new NPWP specialty.

II. Cost Allocation

A. Calculate SMS Pools by CMS/HCFA Specialty

- Calculated SMS pools by multiplying the practice expense per hour (PEHR) by total physician time by specialty, by category [51,52].

B. CPEP Direct Cost Pools, Direct Cost Category Scalars, and Direct Cost Allocation

- Adjusted direct costs per procedure (CPP) Based on Utility Modifiers

Table 6. Description of Utility Modifier Adjustments[53]

Utility Modifier	Description	Utility Adjustment
80	Assistant Surgeon	16% of CPEP
50	Bilateral Surgery	50% of CPEP
51	Multiple Procedures	50% of CPEP
52	Reduced Services	50% of CPEP
QX	CRNA is medically directed	50% of CPEP
QK	Anesthesiologist medical directs	50% of CPEP
62	Two Surgeons	62.5 % of CPEP
54	Surgical Care Only	% of CPEP associated with Intra Portion of Total Clinical Labor for all categories
55	Postoperative management only	% of CPEP associated with Post Portion of Total Clinical Labor for all categories
56	Preoperative management only	% of CPEP associated with Pre Portion of Total Clinical Labor for all categories

[51] **Technical Note:** The following HFCA specialties appear in the utilization file but do not appear in the crosswalk or in proposed, final, or interim final rules and therefore were assigned the "all physician" PEHR values: 00,45, 60, 62, 79, 86, 88, 88, 95, 99. CMS staff confirmed that pools are created for these specialties (which include an apparent erroneously coded specialty (00) and deleted or general "unknown" specialties.

[52] **Technical Note:** According to CMS staff, the inputs in the time file used to produce the total physician time by specialty were adjusted to reflect some of the utility modifiers associated with each specialties mix of services similar to those described in Table 6. The exact nature of these adjustments, with regard to physician time as opposed to CPEP inputs, was not fully disclosed and as a further complication, older CPT codes do not contain the granularity of newer codes needed to make these adjustments. Per CMS staff, CMS uses algorithms to adjust the older codes affected; these algorithms were not fully disclosed and not possible to replicate exactly and therefore, in order to avoid introducing additional error, the total physician time provided in the pools file was used. For those specialties with no cross-walk, hours was calculated without adjusting the time to account for utility modifiers, and therefore, may have overestimated these pools by a negligible amount.

[53] The changes were described by CMS staff and to our knowledge not described specifically in any proposed, final, or interim final rules.

- Removed the utilization for the professional component of all CPT codes.
- Calculated CPEP cost pools by summing the CPPs, weighted by volume, by specialty.
- Calculated direct cost category scalars by dividing the SMS pools by the sum of the specialty-specific CPEP cost pools.
- Scaled direct CPPs by multiplying the CPEP input values by the direct cost category scalars.[54]

C. CPEP Indirect Cost Pools, Indirect Cost Category Scalars, and Indirect Cost Allocation

- Indirect costs per procedure were calculated by multiplying the sum of the three direct cost categories by the 2004 interim final rule physician work values and the 1995 conversion factor.[55]
- Calculated the CPEP indirect cost pools by taking the sum of the volume weighted costs per procedure, by specialty.
- Calculated indirect cost category scalars by dividing the SMS pools by the sum of the specialty-specific CPEP cost pools.[56]
- Scaled the indirect cost per procedures (CPP) to the SMS cost pools by multiplying the indirect cost per procedures input values by the direct cost category scalars.

D. Computed Volume Weighted Average Cost per Procedure

- Volume weighted CPPs by specialty, category, and place of service.
- Summed these weighted volumes by specialty, category, and place of service.
- Calculated average by dividing the sum by the total frequency by category and place of service.
- Calculated volume weighted average CPP by CPT by summing the averages (from step above) over the three direct and one indirect categories.

E. Radiology Cost Allocation[57]

- Removed the 70000 CPT code series after weighting by specialty.

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[54] **Technical Note:** In order to adjust the CPEP values based on utility modifiers that are used to create the CPEP pools, each record contained unique volume information for each combination of specialty, CPT code, first and second modifier. Allocation of this cost however, is done by specialty, CPT code, and first modifier only and therefore, the volume associated with unique second modifiers was summed into the global component of the CPT code.
[55] The 2004 work and 1995 conversion factor were used based on guidance from CMS staff. For services in specialty 05 – "Anesthesiology", the anesthesiology conversion factor, provided by CMS, was used.
[56] If the specialty-specific indirect scalar was three standard deviations greater or less than the average indirect scalar, then the average indirect scalar was used.
[57] According to the August 15, 2003 NPRM, pages 49032-3, for radiology services with assigned work RVUs, used the adjusted 1998 practice expense RVUs to allocate the direct practice expenses cost pool

- Summed the volume weighted procedures to create total facility and non-facility pools.
- For the codes appearing above, used the 2003 PE RVUs to calculate a cost allocator for each code equal to the quotient of the volume weighted, CPT specific PE RVU and the total, volume weighted, PE RVUs.[58]
- The costs were then allocated to the CPTs by multiplying the total pools by the "cost allocators" calculated above.
- The resulting CPPs for these CPT codes were then merged and replaced the values calculated in the step above.

F. NPWP Allocation

- Calculated category-specific SMS cost pools by multiplying PEHR by total hours.
- Created one SMS pool by summing the category specific pools.
- For the codes appearing in the NPWP, used the 1998 PE RVUs to calculate a cost allocator for each code equal to the quotient of the volume weighted, CPT specific PE RVU and the total, volume weighted, PE RVUs.[59]
- These values were then merged with the non-NPWP.

G. Adjusting the Global Component for NPWP CPT Codes[60]

- For any CPT code that had a global, technical, and professional and where at least one of these components were in the NPWP, all three components were pulled after completing the steps above.
- The global component of these codes was set equal to the sum of the technical and professional components.

H. Adjusting the Technical Component for non-NPWP CPT Codes[61]

- For any CPT code that had a global, technical, and professional and where none one of these components were in the NPWP, all three components were pulled after completing the steps above.

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[58] We decided to use the 2003 PE RVUs to allocate the radiology codes because the 1998 PE RVUs were missing many CPT codes that appeared in the utilization file. It is likely that CMS has a cross-walk that assigns a PE RVU for these codes, but it is not provided. If we had used the 1998 PE RVUs without a cross-walk, CPT codes lacking 1998 PE values would be inappropriately assigned a zero or missing value and therefore, would not receive proper cost allocation.

[59] Like the radiology codes, there are some CPT codes in the utilization file that do not have corresponding 1998 PE RVUs. Unlike the radiology codes however, the change in the cost allocation for the NPWP codes changed significantly when using the 2003 PE RVUs, so we concluded that the 1998 values were being used to allocate cost to the CPT codes with 1998 values and for the remaining codes, another method was being used. The method to assign these codes PE RVUs is not clear and therefore, the 2003 values were imputed before budget neutralizing and if there was no corresponding 2003 value, the 2004 value was used.

[60] According to the December 31, 2002 Final Rule, 67 FR 79978, codes appearing in the NPWP, their global components were set equal to the sum of their technical and professional components.

[61] According to the December 31, 2002 Final Rule, 67 FR 79978, for codes not appearing in the NPWP, their technical components were set equal to the difference between their global and professional components.

- The technical component of these codes was set equal to the difference between the global and professional components.

I. Normalizing the Resulting CPPs to the 2003 PE RVUs
- A final file was created by merging the adjusted values (radiology and global/technical/professional) to the weighted cost per procedures.
- Anesthesia CPT codes 00100-01999 were set to zero.[62]
- Replaced codes that had no cost per procedure with the 2003 PE RVU.[63]
- Removed the following diagnostic, chemotherapy administration, and immunization CPT codes: 90780-90784, 90788, 96400, 96405-96459.
- Summed the volume weighted CPPs.
- For codes appearing in the file above, summed the volume weighted 2003 PE RVUs.
- Calculated a scalar by dividing the sum of the 2003 PE RVUs by the sum of the volume weighted CPPs.
- Merged the following CPT codes back onto the file: 90780-90784, 90788, 96400, 96405-96459.
- Created a simulated 2004 PE RVU value by multiplying the CPP by the scaling factor calculated above.[64]

J. MEI Adjusting
- The simulated 2004 PE RVUs were then multiplied by the MEI adjustment factor of 0.9868.[65]

K. Adjusting Zero PE RVUs
- Per CMS, for codes that have no PE RVU (i.e., PE RVU=0) in one place of service, but not in the other, the non-zero PE RVU is assigned to the place of service with the PE RVU value equal to zero.

[62] These codes are paid based on a separate fee schedule and therefore, do not have PE RVUs.
[63] This refers to those codes from the NPWP that did not have corresponding 1998 PE RVUs and therefore, were not allocated part of the cost pools.
[64] The following CPT codes did not have utilization and therefore we were unable to calculate a CPP. The CMS published 2004 PE RVUs were assigned to them at this step: 36488,36489,36491,36493,47134,47641-44.
[65] 69 Fed. Reg. 1095 (January 7, 2004).

III. Discrepancies in Simulated versus CMS calculated PE RVUs

Of the 8,425 procedure codes for which PE RVUs were replicated, 87 percent were less than 10 percent different than the CMS published PE RVU in the facility setting and 86 percent were less than 10 percent different in the non-facility setting. Those procedures that had a 10 percent difference or greater (1,122 in facility, 1,180 in non-facility), comprised a small proportion of the total frequency, two percent in the facility setting and five percent in the non-facility setting. Table 7. summarizes the results of the error analysis and provides descriptive statistics on the absolute difference in the facility and non-facility setting. Figure 1 illustrates the distribution of the difference between the replicated PE RVUs for each procedure and the CMS published PE RVUs.

Table 7. PE RVU Error Analysis

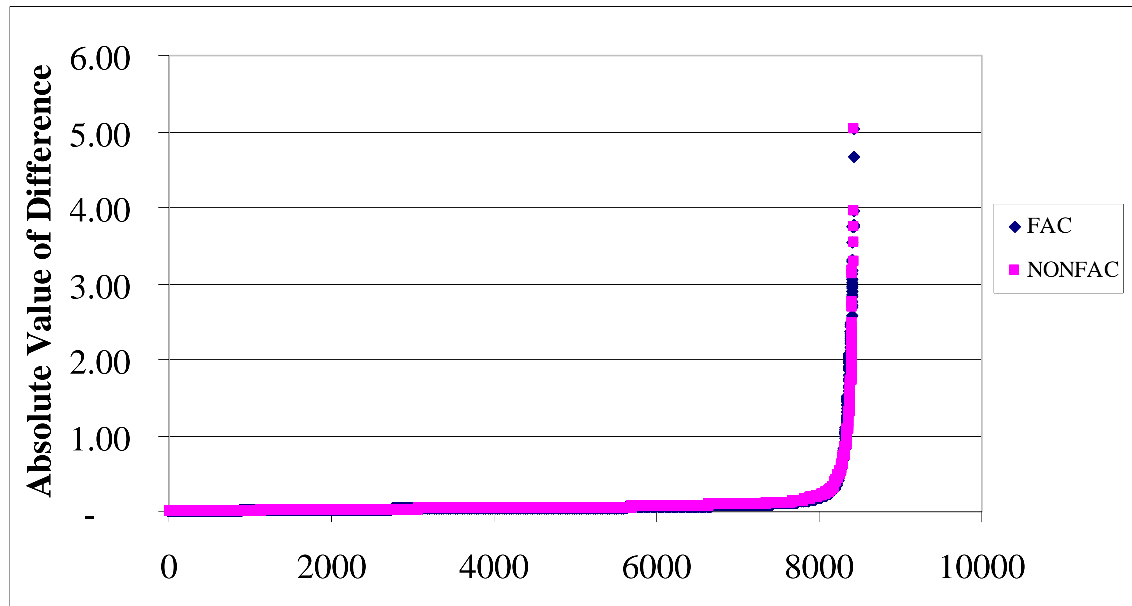
	<10% Difference		>10% Difference	
	# of procedures	utilitzation	# of procedures	utilitzation
Facility	7,303	1,116,585,581	1,122	23,811,995
NonFacility	7,245	1,569,661,900	1,180	78,822,655
Both	6,123	2,686,247,480	2,302	102,634,650

	<10% Difference		>10% Difference	
	% procedures	% utilization	% procedures	% utilization
Facility	87%	98%	13%	2%
NonFacility	86%	95%	14%	5%
Both	73%	96%	27%	4%

	Total	
	# of procedures	utilitzation
Facility	8,425	1,140,397,576
NonFacility	8,425	1,648,484,554
Both	8,425	2,788,882,130

	Descriptive Statistics	
	FACILITY	NON-FACILITY
MIN	0.00	0.00
MAX	5.04	5.04
MEAN	0.09	0.09
MEDIAN	0.04	0.04
SD	0.26	0.26

Figure 1 Distribution of Absolute Difference between Replicated and Published PE RVUs



Every effort was made to minimize the introduction of error to the replication of the PE RVUs. There were, however, some potential sources for which it was difficult to control—which may account for the observed error.

The potential sources of error include:

- Adjustments to PEHR and HOURS inputs
- Adjustment to CPEP inputs
- Adjustments to AMA to CMS Specialty Crosswalk
- Indirect Cost Allocation Issues
- Radiology Allocation
- General Rounding Issues
- General Process Issues

The first three sources of error involve adjusting published CMS data files to reflect updates or changes discovered either in reviewing the federal register history or in discussion with CMS staff. It was possible, using data published by CMS, to compare the replicated intermediate outputs (i.e., direct cost category SMS cost pools, CPEP cost pools, and scaling factors). These comparisons facilitated the identification of aberrant data and enabled refining updates or adjustments to the data used in the replication.

It is important to note that because the CMS values are rounded, it was not possible to evaluate the specificity of the replicated values, only general accuracy. Despite being

able to use various comparisons to improve the input data, for some specialties, discrepancies in the replicated compared to CMS published values remain unexplained and certainly contribute to some of the error observed in the resulting PE RVU values.

One particular source of error is the “HOURS” input. It became clear that calculating HOURS was not prudent because CMS had not published the complicated algorithms used to adjust the underlying data in the presence of modifiers—although for some codes the underlying data were published, older codes were not collected with that granularity and CMS internally made adjustments based on logic that was not provided. CMS did provide a rounded estimate of HOURS for each specialty that was used in the replication. The rounding of this value certainly contributed in part, to the observed error.

The next two potential sources of error involved the indirect and radiology allocation. Unlike the first three sources discussed, there were no comparison figures available to assess the accuracy of the outputs of these processes. Moreover, in the absence of published guidance, some assumptions were made that may have introduced error.

It is also important to note that any error present in the direct allocation process (described above) would also carry into the indirect allocation because elements of the direct cost allocation are used to calculate the indirect cost allocation. The other issue that could introduce error during this process is the choice of what published RVUs, work values, and/or conversion factor will be used during the indirect and radiology allocations. What was ultimately chosen depended on advice from CMS staff. Changing these factors may affect the resulting PE RVUs. Because there is no published guidance on this issue, the choices made for these values must be considered a potential source of error.

The final two sources of error are general in nature, but their impact cannot be underestimated. It is not clear how CMS handles rounding during any stage of this methodology. The replication did not make any rounding decisions and allowed the computations to occur on the default decimal length of the data processing software. Moreover, the actual order and nature of the specific code can affect the resulting PE RVUs and because it is not made public, it is not possible to compare with the replicated version.

Selected Acronyms in Appendix 3.2

CPEP	Clinical Practice Expense Expert Panel
CPP	Cost-per-procedure
MEI	Medical Economic Index
NPWP	Non-physician Work Pool
PC	Practice Component
PE	Practice Expense
PEHR	Practice Expense Per Hour
RVU	Relative Value Unit
SMS	Socioeconomic Monitoring Survey