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MATHEMATICA
Policy Research, Inc.

Part B Drug Payment Reform: Lower Expenditures without Signs of Adverse Effects

Final Report

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EXECUTIVE SUMMARY

Medicare expenditures for Part B–covered drugs were increasing rapidly prior to 2004: annual growth rates for 2001 through 2003 were 26, 32, and 22 percent, respectively (MedPAC 2005). Faced with this situation, the federal government funded several studies in an attempt to identify why drug expenditures were rising so rapidly. The research found that physicians were being reimbursed far in excess of what they were paying for Part B drugs and that there was little incentive in the Medicare payment system to contain drug expenditures (General Accounting Office 2001; Office of the Inspector General 2001). Furthermore, it found that physicians were also typically being under-reimbursed for their drug administration services. In an attempt to align reimbursements more closely with actual costs and rein in spending, Congress passed legislative reforms under the Medicare Prescription Drug Improvement and Modernization Act of 2003 (MMA).

The payment reforms implemented by the MMA had two major components. First, they lowered the payment rates for Part B drugs and biologicals in 2004 from 95 percent of the Average Wholesale Price (AWP) to 85 percent of the AWP; and in 2005, lowered payment further by implementing a new basis for payment—the Average Sales Price (ASP). Second, they allowed for increases in the rates paid to physicians for drug administration, both in 2004 and 2005. CMS also substantially increased the inhalation drug dispensing fees paid to pharmacy-suppliers in 2004 from those paid in 2003. These fees were lowered in 2005 and 2006, but still remained considerably above their 2003 levels.

Whenever Medicare payment rates are reduced, it raises concern that there may be unintended consequences. To monitor the implementation of the policy, this report addressed the following questions:

- Have the payment reforms coincided with changes in the willingness of physicians to serve new Medicare beneficiaries, the number of beneficiaries actually served, or the types or numbers of Medicare-covered services provided?
- Has physician revenue from Medicare increased or decreased with implementation of the payment reforms?
- Did the payment reforms coincide with changes in where beneficiaries received their drugs? Are more patients being seen in hospital outpatient departments (OPDs) or emergency rooms?
- Did the payment reforms coincide with increased or decreased out-of-pocket liabilities for Part B–covered drugs or, more generally, Medicare-covered services?
- Has Medicare drug spending per Part B drug user increased or decreased with implementation of the payment reforms? How has per-user spending on drug administration, dispensing, or supplying changed? Has total Medicare spending per user increased or decreased?

- Did vulnerable patient subgroups' (low-income beneficiaries, rural beneficiaries) utilization change differently? Did beneficiaries with Part D coverage have the same experience as those without Part D coverage?

We used Medicare claims data for 2000 through 2007 to address these questions. Since each of the Part B drug and biological payment reforms became effective nationwide on a single day (January 1 of 2004, 2005 and 2006), the only practical approach possible for evaluating the effects of the reforms is a pre-post design without a comparison group, in which we infer changes associated with the reforms by comparing the outcomes of interest in the period before the reforms (the baseline) with those after the reforms. As a result, we cannot say how much (if any) of the observed changes between the baseline and follow-up periods are due specifically to the policy reforms of interest. Instead, we demonstrate what has changed, and examine whether those changes are likely to be related to the payment reforms.

To understand how physicians might have changed, we constructed a longitudinal file of physicians who provided Part B drugs for at least two years in the pre-reform period, and followed their performance in the post-reform period. Our analysis focuses on four specialties for whom Part B drugs represents a significant part (from 8 to 77 percent) of their Medicare revenues: (1) allergy-immunology and infectious diseases; (2) urology; (3) rheumatology; (4) hematology, medical oncology, and hematology-oncology. We also examined the experience of a sample of physicians representing all other specialties.

To understand how beneficiaries may have changed, we compared the outcomes of Part B drug users before the payment changes with the outcomes of Part B drug users observed after the payment changes. We analyze the changes separately for those who received physician-administered drugs and those who received inhaled or oral drugs from pharmacies, since physicians could conceivably change their practice patterns in several ways in response to payment reform (such as change the site of care or the drugs prescribed), whereas pharmacists have more limited options.

We focus on three groups of beneficiaries: (1) all Part B drug users, (2) those who used drugs usually administered by physicians in one of the above specialties, and (3) those who used drugs that underwent a reduction in their payment limit of 33 percent or greater.

A. FINDINGS

We find little evidence that physicians made major changes in their treatment behavior in response to the payment reforms. Physicians were just as willing to treat Medicare beneficiaries, and none appeared to make large shifts in the types of services they provided. This was true both for the heterogeneous "all other specialties" group of physicians who provide few Part B drugs and for the four physician specialties that provide substantial amounts of Part B drugs. In general, physicians who were in a solo practice were just as willing to treat Medicare beneficiaries as those in group practice. However, the payment reforms appeared to coincide with sizable changes in the Medicare drug and overall revenues of several specialties. Urology specialists experienced large reductions in overall Medicare revenues at the same time as the reforms. For allergy-immunology, rheumatology, and hematology-oncology specialists, abrupt

blunting or cessation of previous sharp increases in payments occurred in conjunction with the new payment system.

Our analysis of Medicare beneficiaries is generally consistent with our findings for physicians. After accounting for underlying secular trends, there were no statistically significant changes from 2003 to the ASP period (2005–2007) in the proportion of beneficiaries receiving all or at least one Part B drug in a physician's office, while the proportion receiving one or more such drugs in a hospital emergency room in a given quarter was slightly higher (about 4 percent) in the ASP period. When beneficiaries using specific drug types were examined, those using urology, rheumatology, or allergy-immunology drugs experienced little change in the site of care for drug administration. Hematology-oncology drug users were somewhat less likely to receive at least one drug in a physician's office and to receive all drugs in a physician's office in the ASP period than in 2003 (by about 8 and 9 percent, respectively).

The payment reforms were also associated with lower drug payments and out-of-pocket liabilities for patients who receive physician-supplied drugs. These measures declined for users of hematology-oncology drugs and urology drugs. In contrast, while drug expenditures fell after payment reforms for users of rheumatology drugs, out-of-pocket liabilities rose slightly; both drug spending and out-of-pocket liabilities were unchanged for users of allergy-immunology drugs, after adjusting for underlying trends.

We found that compared to before the payment reforms, users of inhalation and oral drugs after the payment reforms had either lower or similar drug expenditures, out-of-pocket liabilities, and Part B expenditures, although supplying/dispensing fees increased for beneficiaries using inhalation drugs.[1] For users of inhalation drugs, drug expenditures declined substantially, by 47.9 percent, from 2003 to the ASP period, after accounting for trends. However, outcomes for oral-drug users in the ASP period were comparable to outcomes in 2003, with the exception of Part B drug spending, which was 7.3 percent lower on a trend-adjusted basis.

Two populations that may be especially vulnerable to the payment reforms are rural beneficiaries and dually eligible beneficiaries. However, while we consistently observe disparities in the study outcomes between these subgroups, these disparities generally existed prior to the introduction of ASP-based pricing, and there is little evidence that they were significantly exacerbated by payment reform. We also explored whether Part D enrollment influenced these results. We found that the likelihood of receiving Part B drugs in a physician's office is lower for those with Part D coverage than for those without it, and that out-of-pocket liabilities and Medicare expenditures are generally higher for Part D enrollees. But since Part D was introduced after the Part B payment reforms were already in place, we cannot draw implications from these differences.

[1] Our previous analysis of pharmacy suppliers had found no discernible adverse effects of the payment reforms. The number of suppliers, which had been gradually declining since the beginning of the decade, did not accelerate after the payment reforms. Total Medicare revenues for suppliers decreased slightly relative to their expected trend in 2004 (about 3 percent per quarter) but have since been increasing at a higher-than-expected-rate. The early decrease in Medicare revenues was due in part to a decline in inhalation drug revenues, a major component of pharmacy-suppliers' drug revenues. The reduction in inhalation drug revenues was offset by increases in the number of beneficiaries served and in revenues for non-drug supplies.

We also examined the site-of-care measures for beneficiaries receiving 14 commonly used drugs that experienced large declines in their payment allowances (33 percent or greater) as a result of the new payment policy. If access to care was affected by the payment reforms, these are the drugs with which we would most likely expect to find problems. In analyzing those trends, we find for 2 of the 14 drugs—granisetron hydrochloride and dolasetron mesylate (both anti-emetic drugs)—some evidence that they are being provided less often in physician's offices. However, because the decline in the number of injections administered in a physician's office was so large relative to the increase in hospital injections, it is not evident that these changes reflect simply large-scale shifts in the site of care. Moreover, these changes could also be consistent with changes in practice patterns due to the introduction of yet more anti-emetic drugs to the many currently available ones. Drug costs and Medicare expenditures were generally lower for the set of 14 drugs.

B. LIMITATIONS

The study has a number of important limitations. First is the lack of a good "counterfactual," that is, what would have happened in the absence of the reforms or policy changes. As a result, we can neither isolate the effects of the policy changes of interest nor attribute the changes that we observe to them with any certainty, as opposed to other policy or secular changes.

Second, our analysis is based on the measures that could be identified using claims data. While claims data have the benefit of allowing the examination of a large number of physicians and beneficiaries, the outcomes we are able to measure are limited, and may not be refined enough to detect certain clinical or behavioral effects.

Third, in our analysis of physicians, the trends we measure are for those physicians who were already providing Medicare Part B drugs. If the policy changes deterred new physicians from providing Part B–covered drugs to Medicare beneficiaries, our analysis would not have captured that effect.

Similarly, our analysis focused on beneficiaries who actually received Part B drugs. If the payment reforms in fact prevented beneficiaries from obtaining treatment with Part B drugs that they would otherwise have received, our study would not have included them. However, it is highly unlikely that the policy changes led to complete denial of medically necessary treatment for substantial numbers of beneficiaries.

C. CONCLUSIONS

Our findings are generally encouraging for Medicare's change to an ASP-based payment system for Part B–covered drugs. The payment reforms appear to have controlled Medicare expenditures for Part B drugs and to have reduced beneficiaries' out-of-pocket liabilities for these drugs. Certain physician specialties saw reductions in their Medicare revenues, and users of specific types of drugs experienced modest shifts in where they received their drugs, but there were no large-scale or broad-based changes in sites of drug administration.

I. INTRODUCTION

Medicare expenditures for Part B–covered drugs were increasing rapidly prior to 2004: annual growth rates for 2001 through 2003 were 26, 32, and 22 percent, respectively (MedPAC 2005). Faced with this situation, the federal government funded several studies in an attempt to identify why drug expenditures were rising so rapidly. The research found that physicians were being reimbursed far in excess of what they were paying for Part B drugs and that there was little incentive in the Medicare payment system to contain drug expenditures (General Accounting Office 2001[1]; Office of the Inspector General 2001). Furthermore, it found that physicians were also typically being under-reimbursed for their drug administration services. In an attempt to align reimbursements more closely with actual costs and rein in spending, Congress passed legislative reforms under the Medicare Prescription Drug Improvement and Modernization Act of 2003 (MMA).

The Centers for Medicare & Medicaid Services (CMS) contracted with Mathematica Policy Research, Inc. (MPR) to examine, using Medicare claims data, the effects of these reforms on providers and beneficiaries. This report presents the findings from the third and final year of the project and focuses on physician and beneficiary outcomes. The report answers the following questions:

- Have the payment reforms coincided with changes in the willingness of physicians to serve new Medicare beneficiaries, the number of beneficiaries actually served, or the types or numbers of Medicare-covered services provided?
- Has physician revenue from Medicare increased or decreased with implementation of the payment reforms?

[1] Prior to July 7, 2004, the Government Accountability Office was called the General Accounting Office.

- Did the payment reforms coincide with changes in where beneficiaries received their drugs? Are more patients being seen in hospital outpatient departments (OPDs) or emergency rooms?
- Did the payment reforms coincide with increased or decreased out-of-pocket liabilities for Part B–covered drugs or, more generally, Medicare-covered services?
- Has Medicare drug spending per user increased or decreased with implementation of the payment reforms? How has per-user spending on drug administration, dispensing, or supplying changed? Has total Medicare spending per user increased or decreased?
- Did vulnerable patient subgroups' (low-income beneficiaries, rural beneficiaries) utilization change differently after the reforms? Did beneficiaries with Part D coverage have the same experience as those without Part D coverage?

A. LEGISLATIVE AND POLICY BACKGROUND

We begin with a brief description of the MMA and other policies that had the potential to affect providers and patient access to Part B drugs and biologicals. (A detailed description of the specific reforms affecting physician-administered drugs and other Part B–covered drugs appears in the chapters on those topics.)

1. Part B Drug Coverage and Expenditures

Under Part B, the Medicare fee-for-service (FFS) program currently covers a limited set of outpatient drugs: (1) those furnished "incident to" a physician's service (usually drugs that require a physician's direct supervision, such as those injected intramuscularly or administered intravenously); (2) those used in conjunction with durable medical equipment (DME), such as inhaled drugs used with nebulizers; and (3) those mandated by various statutes. This last category includes immunosuppressives for recipients of organ transplants; oral anti-cancer drugs (only those for which an injectable form was available in 1993, when the law was passed); oral anti-emetic drugs; blood-clotting factors; erythropoietin for patients with end-stage renal disease; vaccines for influenza, pneumococcal pneumonia, and hepatitis; home infusion of immune globulin; and injectable osteoporosis drugs administered by home health agencies.

Beneficiaries receive Part B–covered drugs mainly from (1) physicians, (2) pharmacy suppliers,[2] and (3) hospital OPDs. About 80 percent of Medicare Part B spending for drugs is for injectables, primarily cancer chemotherapeutic agents supplied or ordered by oncologists, hematologist-oncologists, and urologists. Although Part B also covers some oral drugs, nearly all the remaining expenditures for Part B–covered drugs are for inhaled drugs for pulmonary conditions, administered through home nebulizers or dispensed by suppliers of DME (MedPAC 2003).

Despite the limits to coverage, Medicare expenditures on Part B drugs are substantial. Prior to the reforms in 2003 Medicare paid $10.3 billion on Part B drugs, and expenditures were growing rapidly.[3] Since the reforms, annual drug expenditures have remained over $10 billion, but their growth has slowed considerably. Medicare drug expenditures reached a high of $10.9 billion in 2004, fell to $10.1 billion in 2005, and rose to $10.6 billion in 2006 (MedPAC 2008).

2. Medicare Payment Systems for Outpatient Drugs

For physicians and pharmacy suppliers, Medicare provides two different reimbursements for Part B–covered drugs. The first is a payment for the drug itself. The second is for the labor and overhead associated with administering the drugs (in the case of physicians) or supplying or dispensing the drugs (in the case of pharmacy suppliers).[4]

[2] Under the term *pharmacy suppliers,* we include suppliers of inhalation drugs and pharmacies that supply immunosuppressive and oral cancer drugs. By law, suppliers of inhalation drugs must be licensed pharmacies, and most inhalation drug suppliers are also Medicare DME suppliers.

[3] This total does not include drugs provided through hospital OPDs or in dialysis facilities.

[4] Medicare's reimbursements to hospital OPDs for administration of Part B drugs follow the Hospital Outpatient Prospective Payment System (HOPPS), which is different from the system for physicians and pharmacy suppliers. The amount Medicare reimburses a hospital for OPD care depends on which of several hundred ambulatory payment classifications (APCs) the services and procedures provided fall into. For 51 percent of the 612 covered drugs and biologicals, the costs are bundled into the overall APC payments, but the remaining drugs are paid separately. Drugs that cost more than $50 per day in 2004 (raised to $55 in 2007) often have their own APC.

Prior to the MMA, Medicare reimbursed providers at some percentage of the average wholesale price (AWP). For example, reimbursement for most covered drugs in 2003 was set at 95 percent of the AWP. However, the AWP reflects drug manufacturers' *published* wholesale prices, not actual transaction prices paid for obtaining these medications. Federally funded studies conducted before the MMA found that most physicians and suppliers were able to purchase many Part B drugs at prices far below the AWP, only to be reimbursed by Medicare at the higher rate (General Accounting Office 2001; Office of the Inspector General 2001). By inflating the published prices of their drugs relative to transaction prices—thereby increasing providers' profit margins, or "spreads"—drug manufacturers increased the attractiveness of their products and hence their market shares (MedPAC 2003; Scanlon 2001).

Additional studies found that the Medicare payments to physicians and pharmacy suppliers for the administration and dispensing of Part B drugs fell short of providers' costs of furnishing these services (Government Accountability Office 2004; MedPAC 2003). Therefore, many providers argued that the large margins from Medicare drug reimbursements were necessary as compensation for the inadequate Medicare payments for drug administration and dispensing services.

Out-of-pocket liabilities for beneficiaries who receive Part B–covered drugs from physicians and pharmacy suppliers follow usual Part B coinsurance rules. After their annual Part B deductible,[5] they are responsible for unlimited 20 percent copayments on the provider charges both for the costs of the drug and for administering or dispensing the drugs.[6]

[5] The annual deductible has varied; for 2007 it was $131.

[6] Beneficiary coinsurance for hospital OPD services, including visits for Part B drugs, is being lowered through a complicated set of statutes and regulations. Prior to the implementation of the HOPPS in August 2000, beneficiaries' coinsurance for hospital OPD services often exceeded 50 percent of the total payment to the hospital. The Balanced Budget Act of 1997 specified new beneficiary coinsurance amounts for each APC based on the

3. Policy Reforms That Are the Focus of This Study

Sections 303, 304, and 305 of the MMA addressed the widely acknowledged shortcomings in Medicare's payment system to physicians and pharmacy suppliers for Part B–covered drugs. First, the law sought to make Part B drug payments to providers for drug acquisition more reflective of actual market prices. In 2004, payments for most Part B drugs were lowered to 85 percent of the AWP from the previous 95 percent.[7] Effective January 1, 2005, providers of many Part B–covered drugs were reimbursed at 106 percent of the average sales price (ASP), a new measure established by the MMA.[8] The ASP is based on manufacturers' sales to all purchasers (other than sales exempt from best price and sales at nominal charge) and is net of volume discounts, prompt pay discounts, cash discounts, free goods, charge backs, and rebates (other than those under the Medicaid drug rebate program). The ASP is updated quarterly, based on data from the quarter before the one that just ended. The ASP for the first quarter of 2005, for example, was based on data submitted by manufacturers for the third quarter of 2004.

(continued)
national median charge for services in the APC and mandated a gradual decline in the coinsurance rate until it reached 20 percent of the total payment to the hospital. The Balanced Budget Refinement Act of 1999 further limited the annual hospital OPD coinsurance amount to the annual inpatient deductible in a given year. In late 2005, CMS issued a ruling that added 31 more APCs at the 20 percent coinsurance level to the roughly 26 already at that level, and that reduced the maximum coinsurance rate for any OPD service from 45 percent to 40 percent of the total payment to the hospital. The ruling anticipated a fall in the overall beneficiary coinsurance rate for hospital OPD services from 33 percent of total payments in 2005 to 29 percent in 2006, which represents a drop of more than $400 million in beneficiary out-of-pocket liabilities (Centers for Medicare & Medicaid Services 2006a).

[7] Some drugs—for example, covered vaccines and self-administered drugs furnished using an infusion pump—continued to be reimbursed at 95 percent of the AWP. A limited number of additional drugs were reimbursed at rates specified in the *Federal Register* (2003), which may be either higher or lower than 85 percent of the AWP; in no case was a drug reimbursed at less than 80 percent of the AWP.

[8] The MMA also required changes in the HOPPS, including how hospital OPDs are reimbursed for their costs of (1) acquiring Part B–covered drugs and biologicals, and (2) delivering pharmacy services necessary to provide such drugs in the OPD setting. In January 2006, the basis for Medicare's reimbursements for drug costs changed from the AWP (most recently, 83 percent of the AWP) to quarterly determinations of the ASP (106 percent of the ASP, the same as for physicians and pharmacy suppliers). Medicare also started reimbursing OPDs an additional 2 percent of the drug payment to cover hospital pharmacy costs.

Manufacturers are required to provide quarterly reports of their average sales prices to CMS so that the ASP rate can be updated in a timely fashion.[9]

Second, the MMA offset the projected reductions in payments for purchasing the drugs by temporarily increasing provider reimbursements for administering them. It mandated transitional increases in payments (in addition to the amounts that would otherwise have been payable under the Medicare physician fee schedule) for physicians' drug administration services by 32 percent in 2004 and 3 percent in 2005. Starting in 2005, CMS began paying physicians for drug administration under a new set of codes, in order to align those payments more accurately with their actual costs. These codes allowed payment for nonchemotherapy therapeutic or diagnostic injections and IV infusions (other than hydration services) to permit providers to report additional hours (after the first hour) of sequential infusions and additional drugs (after the initial drug) within a single day of treatment.

For calendar year 2005, CMS also increased the fees Medicare pays to pharmacy suppliers for dispensing Part B inhalation drugs to a patient from the previous level of $5 per month to $57 per month. It also introduced a new 90-day supply-dispensing fee of $80. In 2006, CMS adjusted the 30-day inhalation drug-dispensing fees to $57 for the first 30-day prescription and $33 for each subsequent 30-day supply. The 90-day dispensing fee was lowered to $66.

CMS also established supplying fees for immunosuppressive, oral anti-cancer, and oral anti-emetic drugs. In 2005, CMS paid $50 for the first immunosuppressive prescription within one month of a covered transplant and $24 for all other prescriptions; in 2006 and 2007, CMS

[9] Not all drugs are reimbursed according to the ASP. Certain classes of drugs, including statutorily covered vaccines, home infusion drugs, and blood products, continue to be reimbursed at 95 percent of the AWP. Moreover, new drugs (for which ASP data are not yet available) and single-source drugs are reimbursed at 106 percent of the wholesaler acquisition cost, rather than the ASP. Payment allowance limits are reduced for drugs with an ASP exceeding the widely available market price and the average manufacturer price by a specified percentage, which varies annually. The specified percentage for the years 2005–2007 was 5 percent. Throughout 2004–2007, radiopharmaceuticals continued to be reimbursed as they were prior to the passage of the MMA.

replaced the $24 payment with two separate payments: $24 for the first prescription in a 30-day period and $16 for all subsequent prescriptions to the same beneficiary in the same 30-day period.[10]

4. Other Policy Changes Affecting Part B Drugs

These MMA shifts in reimbursement for Part B drugs and drug administration occurred simultaneously with several additional MMA- and non-MMA-related policy and regulatory changes that affect providers of Part B drugs.

a. Competitive Acquisition Program

Section 303(d) of the MMA requires the implementation of a new Competitive Acquisition Program (CAP) for physicians who administer Medicare Part B drugs and biologicals in their offices. This CAP started in July 2006 and as of 2007, had enrolled 3,972 physician specialists.[11] Physicians have a choice between continuing to buy and bill for Part B drugs as they have been doing under the current ASP system or obtaining these drugs from BioScrip (the CAP vendor CMS selected through a competitive bidding process). Under the CAP program, physicians no longer have to purchase the drugs and bill Medicare; BioScrip delivers the drugs ordered by physicians and bills Medicare. Physicians continue to bill for the fees for administering the drugs, however.

b. Medicare Replacement Drug Demonstration Project

Section 641 of the MMA required a demonstration project covering certain prescription drugs and biologicals that were not yet covered under Medicare and that could serve as

[10] CMS also paid furnishing fees for blood-clotting factor during 2005–2007. Blood-clotting factor is not subject to ASP-based reimbursement and is not a focus of this study.

[11] Since a physician could report more than one specialty, the actual number of physicians enrolled is fewer than 3,972. The program continued through 2008, but has been postponed for 2009.

replacements for drugs and biologicals that were covered under Part B. The demonstration, which began in August 2004 and ended on December 31, 2005 (when Part D started), was restricted to patients with a limited set of diagnoses[12] and eventually enrolled 42,200 beneficiaries. A survey of Medicare Replacement Drug Demonstration (MRDD) enrollees revealed that barely 5 percent had been taking a Part B drug prior to participation in the demonstration; most (75 percent) were taking a demonstration-covered drug that did not qualify for Part B coverage (Chen et al. 2006). Therefore, the MRDD affected use of Part B–covered drugs for only a handful of enrollees.

c. Medicare 2005 and 2006 Oncology Demonstrations

Under its demonstration authority and independent of any MMA requirements, CMS initiated a one-year chemotherapy demonstration project in January 2005. The project provided an extra reimbursement of $130 to any office-based physician (or physician-supervised non-physician clinician) who submitted a claim for chemotherapy administration with special demonstration Healthcare Common Procedure Coding System (HCPCS) codes indicating the severity of patient-reported pain, nausea and vomiting, and fatigue. There were four levels of severity (from "none at all" to "severe") for each of the three symptoms, which resulted in 12 different codes. The clinician had to submit a chemotherapy administration claim with a full set of three codes (one for each symptom) to receive the extra demonstration payment. Normal Part B patient coinsurance applied to these extra payments.

Rather than extend the chemotherapy demonstration an additional year, CMS replaced it with the 2006 oncology demonstration. This new one-year program was intended to identify and

[12] These diseases were acromegaly, ankylosing spondylitis, certain cancers, cytomegalovirus retinitis, Gaucher disease (Type 1), hepatitis C, multiple sclerosis, Paget's disease, postmenopausal osteoporosis, psoriasis, psoriatic arthritis, pulmonary hypertension, rheumatoid arthritis, and secondary hyperparathyroidism.

assess, in office-based oncology practices, physician evaluation and management visits for established patients with cancer.[13] It used practice guidelines to define standards of care in evaluation and management visits for service levels 2, 3, 4, and 5 and includes billing codes for three new reporting categories: (1) the primary focus of the evaluation and management visit, (2) whether management adheres to practice guidelines, and (3) the disease state. For each of these new billing categories, physicians would receive the lesser of 80 percent of the actual charge or a payment allowance, determined by the billing code, of up to $7.67. (The usual Part B coinsurance and deductible still apply.)

d. Medicare Physician Fee Schedule

Changes in the Medicare physician fee schedule could affect providers' willingness to accept Medicare patients. Lower fees could lead to reductions in the number of physicians willing to see Medicare beneficiaries, while higher fees could lead to increases in the number of Medicare-participating physicians. The MMA overrode the reductions in physician fees that should have taken place in 2004 and 2005 under the sustainable growth rate (SGR) system[14] and instead stipulated increases of at least 1.5 percent for those two years. Because the MMA set aside the SGR system only for 2004 and 2005, it was slated to take over again in 2006, with even larger reductions than would have occurred without the MMA. However, under the Deficit Reduction Act (DRA), signed into law on February 8, 2006, the cut was reversed, and physician payments were frozen at their 2005 levels. SGR-mandated cuts to physician payments were

[13] Patients must have a primary diagnosis from one of the following major diagnostic categories: (1) head and neck cancer, (2) esophageal cancer, (3) gastric cancer, (4) colon cancer, (5) rectal cancer, (6) pancreatic cancer, (7) lung cancer (both non-small and small cell), (8) female breast cancer (invasive), (9) ovarian cancer, (10) prostate cancer, (11) non-Hodgkin's lymphoma, (12) multiple myeloma, or (13) chronic myelogenous leukemia.

[14] The SGR system, established in the Balanced Budget Act of 1997, applies "financial brakes whenever spending for physician services exceeds predefined spending targets" (Government Accountability Office 2005a).

similarly reversed in 2007 with the enactment of the Tax Relief and Health Care Act of 2006. The small increases in the fee schedule suggest that these effects are likely to be minimal.

e. Medicare Drug Discount Card and Part D

The MMA provided assistance for beneficiaries purchasing prescription medication, first through the Medicare Prescription Drug Discount Card and Transition Assistance Program (which operated from May 2004 through December 2005), and ultimately through the implementation of Medicare Part D on January 1, 2006. For an enrollment fee of up to $30 per year, the drug discount card program offered eligible beneficiaries the opportunity to obtain discounts on prescription medications negotiated by Medicare-approved sponsors of the cards; competition among sponsors for enrollees provided sponsors with an incentive to negotiate the lowest possible prices. Medicare Part D affords beneficiaries the opportunity to enroll in privately-operated drug plans that provide partial coverage for prescription medications. The plans—which may be either stand-alone prescription drug plans or Medicare Advantage prescription drug plans—are obligated to offer either a statutorily defined standard benefit or a benefit that is actuarially equivalent to the standard benefit.[15]

The introduction of prescription drug coverage through Medicare may have implications for both users of Part B–covered drugs and their physicians. If ASP-based reimbursements for Part B drugs are insufficient, the availability of Part D coverage may induce physicians to require that their beneficiary patients purchase injectable drugs at a pharmacy and bring them to the physician's office for injection. If adopted, this practice (known as "brown-bagging") would reduce spending attributable to Part B and increase spending attributable to Part D. Brown-

[15] Some plans offer enhanced benefits that exceed the minimum benefits required by law.

bagging could also compromise quality of care if beneficiaries do not properly store or transport their drugs.

f. Hospital Outpatient Payment

In 2007, CMS revised the APC system, which is used to pay hospital OPDs, in ways that could affect the provision of Part B drugs. First, CMS allowed hospitals to report the same codes for drug administration used by physicians and other providers. This change permitted hospitals to be paid separately for additional hours of drug infusion. Second, while CMS has always paid separately for hospital OPD drugs and biologicals that cost more than $50 per day, this level was increased to $55 in CY 2007.[16]

5. Summary of Policy Changes

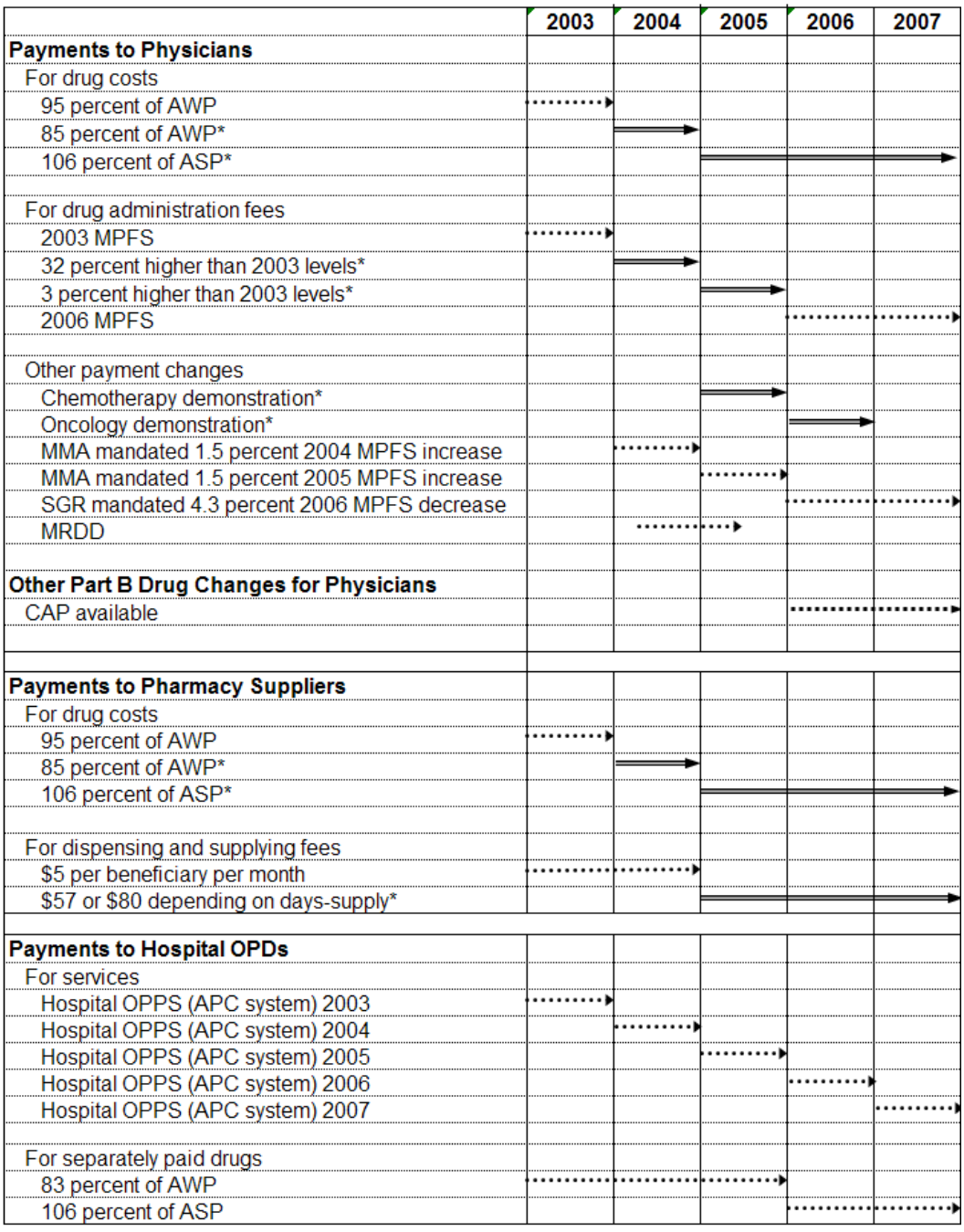
Figure I.1 summarizes each of the policy changes previously discussed and identifies the years covered by each.

B. HYPOTHESIZED EFFECTS OF THE PART B PAYMENT REFORMS

How the Part B drug and biological payment reforms could affect providers, and in turn beneficiaries, depends upon whether the drug is provided by a physician or by a pharmacy supplier. For drugs provided by a physician, the reforms increased payment rates for physician administration but lowered the rates paid for the actual drug. In response to the change in financial incentives, physicians could (1) stop or reduce office-supplied drugs and send more beneficiaries to hospital OPDs, (2) change their prescribing behavior (for example, prescribe an

[16] CMS considered lowering the payment for separately paid drugs and biologicals from ASP plus 6 percent to ASP plus 5 percent in 2007, but did not make that change until 2008, which is beyond the period of this study.

Figure I.1. Policy Changes Affecting Medicare Part B-Covered Drugs



Policy reform that is a focus of this study.

Other concurrent policy changes.

* Policy reform that is a focus of this study.

APC = Ambulatory Payment Category

ASP = Average Sales Price

AWP = Average Wholesale Price

CAP = Competitive Acquisition Program

MMA = Medicare Prescription Drug Improvement and Modernization Act of 2003

MPFS = Medicare Physician Fee Schedule

MRDD = Medicare Replacement Drug Demonstration

OPPS = Outpatient Prospective Payment System

SGR = Sustainable Growth Rate System for Medicare Physician Fee Schedule

oral medication instead of an infused medication), or (3) change their practice pattern (for example, recommend surgery in lieu of drug therapy). These responses could in turn require beneficiaries to use OPDs more often, delay their drug receipt, or alter the services they received, which could affect their health care expenditures and out-of-pocket costs.

For drugs provided by pharmacy suppliers, we expect fewer types of responses, because pharmacy suppliers lack the authority to prescribe medications or alternative therapies. As a result, they can stop providing drugs to Medicare beneficiaries in response to the payment reforms, which could delay when the beneficiary receives the drug and adversely affect the beneficiary's well-being. But pharmacy suppliers cannot directly affect the patient's treatment.

C. SUMMARY OF PREVIOUS REPORTS

This third, and final, report under this project covers the period from 2003 through 2007. The previous reports focused on identifying the impacts of the Part B payment reforms on physicians, suppliers, and Medicare beneficiaries who used Part B drugs and biologicals (Chen et al. 2006; Ballou et al. 2007; Chen 2007). For physicians, we found evidence that the payment reforms affected Medicare revenues of some specialists, but only weak evidence that their behavior changed in response to the reforms. In particular, the chemotherapy reimbursements of urologists and hematologist-oncologists sharply declined after the reforms, but while urologists experienced an overall decline in Medicare payments, the chemotherapy demonstration and the new chemotherapy infusion administration codes appear to have greatly blunted the effects of the Part B drug payment for hematologist-oncologists. The payment reforms did not appear to affect the revenues of allergist-immunologists/infectious-disease specialists, rheumatologists, or other types of physicians. Furthermore, we found no association between the introduction of the new payment schedules for Part B drugs and any of these specialists' continued treatment of Medicare beneficiaries, provision of new office visits, or provision of initial hospital visits.

However, there were some suggestions from time trends in drug claims per 100 beneficiaries that specialists in allergy-immunology/infectious diseases, urology, and hematology-oncology provided somewhat fewer Part B drugs following the implementation of the payment reforms. The goal for this report is to identify whether behavior trends developed in the later years after the chemotherapy demonstration, which was put in place to cushion the impact of the reforms on physicians, ended.

Turning to Medicare Part B pharmacy suppliers, we found little evidence that the payment reforms appreciably affected them. The number of suppliers had been gradually declining since the beginning of the decade, and the rate of decline did not accelerate after the payment reforms. Total Medicare revenues for suppliers decreased slightly relative to their expected trend in 2004, (about 3 percent per quarter) but began increasing again in 2005. The decline in inhalation drug revenues, which is a major part of pharmacy supplier Medicare drug revenues, was a key contributor to the decline, but it was mitigated by an increase in the number of beneficiaries served and changes in revenues for non-drug supplies.

One policy concern is whether pharmacy suppliers in rural areas were adversely affected, since it may be more difficult to find a substitute supplier in a rural area. Although the trends in outcomes differed between suppliers located in rural versus urban areas, there were no negative or unfavorable trends for the rural suppliers. In this report, we do not pursue the matter, since it is unlikely that further changes would be the result of the earlier reforms.

Finally, the previous reports examined the effects of the payment reforms on two groups of Medicare beneficiaries: (1) all beneficiaries who received Part B drugs, and (2) a subset of users who received drugs that could be consistently identified in all provider claims, thus providing us with the most rigorous analysis of whether beneficiaries were being shifted among different provider settings after the reforms. In these analyses, we found little evidence to suggest that

beneficiaries were adversely affected by the payment reforms. Beneficiaries were just as likely to receive Part B drugs in physicians' offices after the payment reform as before it. Furthermore, we found no increases in their rates of death, hospitalization, or emergency room visits. While Part B drug expenditures were lower for these beneficiaries with the policy than without it, overall Medicare expenditures were higher, and beneficiaries' out-of-pocket liabilities were correspondingly higher.

In this report, we use the most recent data to establish whether any further changes occurred now that physicians have had time to learn the new payment system and focus on whether vulnerable populations had different experiences.

II. EVALUATION DATA AND METHODOLOGY

This chapter describes the analysis approach, the identification of the analysis samples, and the outcomes of interest for the physician analysis and the beneficiary analysis.

A. OVERVIEW OF THE PRE-POST DESIGN

Each of the Part B drug and biological payment reforms became effective nationwide on a single day (January 1 of 2004, 2005, and 2006, and July 1, 2006). The only practical approach possible in such a circumstance for evaluating the effects of the reforms is a pre-post design without a comparison group, in which we infer changes associated with the reforms by comparing the outcomes of interest in the period before the reforms (the baseline) with those after the reforms.

This analysis cannot attribute the observed changes to the policy reforms. It lacks a good characterization of the "counterfactual": what would have happened in the absence of the reforms or policy changes. We use the baseline period to represent the counterfactual, whereas a variety of intervening events unrelated to the policy reforms of interest (such as the other policy changes described in Chapter I or advances in medical diagnosis or treatment) could have led to changes in the outcome variables over time even if none of the policy changes of interest had occurred. We cannot say how much (if any) of the observed changes between the baseline and follow-up periods are due specifically to the policy reforms of interest. Instead, we demonstrate what has changed, and reason whether those changes are likely to be related to the payment reforms.

Although many factors besides the payment reforms will influence the changes we observe, we try to minimize the changes introduced by certain non-policy factors in order to improve our

ability to identify changes associated with the policy. For the study of the effects of payment reforms on physicians, we mitigate the changes introduced by individual physician practice patterns by identifying a fixed cohort over time of physicians who had been providing Part B drugs for at least two years prior to the payment reforms. By using the cohort of physicians whose prescribing behavior was established, we eliminate the variation that could be attributed to the practice of physicians who were new to Medicare and never worked under the AWP system.

We would have used the same approach in analyzing beneficiary changes, but we concluded that identifying a cohort of beneficiaries who used Part B drugs in the baseline period to follow longitudinally into the post-period covered by the policy reforms would result in a highly atypical group of Part B drug users. Only a small number of Part B–covered drugs, making up a tiny proportion of total Part B drug use, are intended for long-term use, primarily those for uncommon conditions such as multiple sclerosis, rheumatoid arthritis, and inflammatory bowel disease. The vast majority of drugs paid for under Part B are drugs prescribed for only limited periods (such as chemotherapy, antibiotics, and corticosteroids), and thus few beneficiaries using a typical Part B drug at any time would continue using the drug over subsequent periods. In addition, many Part B–covered drugs are used to treat life-threatening illnesses such as cancer, and short-term mortality rates for Part B drug users are high.

Our beneficiary analyses thus included repeated cross-sections of beneficiaries using Part B drugs in each study period. However, studying different samples of beneficiaries across the different study time periods introduces the possibility that any observed changes in study outcomes between the pre- and post-reform periods could be due to advances in medical care or evolution in practice patterns, rather than to any effects of the payment reforms themselves. New treatments could come into use and old treatments fall into disuse, with consequent changes in the beneficiaries treated, including their diagnosis, age, gender, stage of disease, health status,

and prognosis. Clearly, changes like these could affect such study outcomes as Medicare expenditures. In previous reports, we addressed this issue by focusing on a selected set of drugs that were available and used both before and after the payment reforms. However, over time, this subset of drugs becomes less relevant for current policy as the drugs fall into disuse. This analysis focuses on every drug provided in each period, regardless whether the drug was newly introduced after the reform or eventually disappeared from use during the study period. While including these new drugs makes it less likely that the observed changes will be due to the payment reforms, it does allows us observe changes in study outcomes due to all causes, which may be more relevant for monitoring beneficiaries' access to care.

Our study period for the physician analysis extended over eight years, from the beginning of 2000 to the end of 2007, when the latest Medicare claims data were available.[1] We divided the study period into 32 quarters and compared trends in the baseline period (the 16 quarters of years 2000 through 2003), to the post-period (the 16 quarters from the implementation of the first payment reform in January 2004 through the end of 2007).

Our study period extends over five years for the beneficiary analysis—from the beginning of 2003 to the end of 2007, when the latest Medicare claims data were available. We divided the study period into 20 quarters and compared trends in the baseline period (the 4 quarters of 2003), to the post-period (the 16 quarters from the implementation of the first payment reform in January 2004 through the end of 2007).

[1] As explained in Section B.2, due to the switch to the National Provider Identification (NPI) system, the last two quarters of 2007 are estimated.

B. FILE CONSTRUCTION AND ANALYSIS

1. Identification of Part B Drugs

To start, we had to identify the drugs of interest for the study. Since there is no "list" of drugs that are reimbursed under the new payment reforms, we developed one. We began with the list of "Drugs Administered Other than Oral Method" (J codes, from the American Medical Association's published list of HCPCS codes) in each year from 2000 to 2005. We identified from the list the Level II codes (also called the alpha-numeric HCPCS or simply HCPCS codes) whose presence on a claim indicated the provision of a Part B–covered drug. These codes were primarily J codes, but they also include C codes, A codes, W codes and temporary Q codes. Because the HCPCS system generally assigns each year's temporary Q codes to permanent J codes in subsequent years, we cross-walked the Q codes across years to match them to their ultimate J codes. For 2006 and 2007, we added to the initial file any new Q codes and J codes published by the AMA, and we reconciled these as well.

From this list of codes, we excluded parenteral nutritional products because they are covered only in limited circumstances by Medicare; diagnostic drugs that are unlikely to also have therapeutic uses[2]; and radiopharmaceuticals, vaccines, and blood-clotting factors because of their exclusion from the ASP pricing system.

2. Physician Data File Construction and Analysis

a. Identifying Physicians

To identify a cohort of physicians who had provided Part B drugs prior to the implementation of the reforms and had been treating Medicare beneficiaries for at least a year,

[2] Low osmolar contrast media are examples of such drugs. Examples of drugs that have both diagnostic and therapeutic uses—and were consequently retained for analysis—are adenosine and dobutamine, which are probably most often used for cardiac imaging but may also be used to treat cardiac arrhythmias and congestive heart failure, respectively.

we searched the Carrier file for all line item records that included codes for any Part B drugs or drug administration services during the 2000–2002 pre-period. From these, we extracted the Medicare Unique Physician Identification Numbers (UPINs) that identify the physicians rendering the services.[3]

There are two UPIN fields in Carrier claims (one for the "performing/rendering physician" and the other for the "referring/ordering physician"), and these are not always accurately coded (Caldwell 2003). To capture the greatest number of physicians (while limiting the inclusion of irrelevant or incorrect ones) who might be billing for Part B drugs, we developed a simple algorithm (described in the Appendix A) for deciding which UPIN value in a claim to extract.

We merged the resulting set of (unduplicated) UPINs with the Medicare Physician Identification and Eligibility Registry (MPIER) file, which lists physician characteristics by UPIN. This provided basic demographic information on physicians, such as primary self-reported specialty, date of birth, and address. Omitting UPINs of providers lacking MD or DO degrees or with practice addresses in United States territories resulted in a list of 832,361 UPINs.[4,5]

During our study period, CMS changed its use of UPINs on physician claims by introducing the National Provider Identifier (NPI) system, and starting in May 2007, physicians could bill for services using solely an NPI rather than a UPIN. Medicare also allowed the joint use of both NPIs and UPINs, as well as sole use of UPINs on physician claims throughout our study period and into 2008.

[3] Although in May 2007 the new National Provider Identifier system superseded the UPIN system for physicians, the UPIN system was still in effect during the 2000–2006 period of the study. After May 2007, providers had to use the NPI number, which we cross-walked to the UPIN.

[4] The Carrier files also include claims submitted by many non-physician providers, such as chiropractors, dentists, podiatrists, nurse anesthetists, registered dieticians, and clinical social workers.

[5] Please see Appendix A for a discussion of the possible limitations of the UPIN.

Unfortunately, there is not a one-to-one mapping of UPINs to NPIs—a single UPIN can match to multiple NPIs, and vice versa. To understand how this would affect our analysis, we merged our study sample of 63,827 sampled UPINs (described below) with CMS's NPIDATA file. Of those, 17,181 (or 27 percent) did not have a matching UPIN in the data set. Of the remaining UPINs, 12,240 (or 26 percent) matched to multiple NPIs.

In light of the measurement errors that could be introduced by the use of NPIs (the result of the 12,240 matching to multiple NPIs) and the resources necessary to develop a definitive cross-walk between UPINs and NPIs, we used two approaches to address the UPIN-NPI switch. First, we used the values from the first and second quarters of 2007 (when the UPIN had to be on the claim) to estimate the outcomes for the third and fourth quarters. This is the analysis presented here. Second, we estimated the results using only physicians who used UPINs continuously for the entire analysis period.[6] We found no material differences between the two analyses.

b. Study Sample

Obtaining and processing all Part B claims submitted by this entire group of physicians from 2000 to 2007 would have exceeded the capacity of the CMS Data Center, but the Data Center indicated that it would be able to handle a sample up to 10 percent of the total, or roughly 83,000 physicians. To ensure adequate representation of the physician specialties of interest, we pursued a sampling strategy using five strata: (1) allergy-immunology and infectious diseases (n=8,545); (2) urology (n=12,800); (3) rheumatology (n=3,665); (4) hematology, medical oncology, and hematology-oncology (n=9,709); and (5) all other specialties (n=797,642). (Appendix A includes a table with a detailed distribution of physician specialties.)

[6] Note that to the extent that a physician combined billing practices—submitting claims in some cases using only NPIs and in other cases using UPINs and NPIs—an unknown portion of the physician's claims would be missing.

Given our interest in the stratum-specific estimates for the first four strata, we included in our sample 100 percent of the four smaller strata (combined size of 34,719), and a random 4 percent fraction of the fifth stratum (31,870), for a total sample of 66,589.[7] Parameter estimates for the fifth stratum were thus subject to sampling error (estimated using sampling weights), but parameter values for the other four had zero sampling error.

Using the list of the sampled physicians' UPINs as a finder file, we extracted all Carrier claims for the entire study period (2000 through 2007) in which the physicians on our list had served as performing or rendering physician (see the Appendix A for details). Of the 66,589 UPINs submitted, 10,603 did not match any line item records in the 2000–2007 period, most likely because of invalid and irrelevant UPINs extracted by our UPIN algorithm. Because the experiences of physicians newly entering practice just before the payment reforms might be different from the experiences of physicians in established practice, we dropped 8,122 physicians whose first claims did not appear until after the second quarter of 2002 (6 quarters, or 18 months, before the first payment reform). Finally, we excluded 2,762 physicians because of death or implausible age.[8] Table II.1 shows the final composition of the resulting analysis file:

TABLE II.1

NUMBER OF PHYSICIANS IN ANALYTIC COHORT

Physician Specialty	Number
Allergy-Immunology/Infectious Disease	6,053
Urology	8,820
Rheumatology	2,890
Hematology-Oncology	7,416
All Other	19,885

Source: CMS MPIER File.

[7] We selected the random sample from the fifth stratum using the technique of hierarchical serpentine sorting (also known as Chromy's technique), in which, prior to drawing the sample, we sorted the sampling frame by characteristics of interest (such as years since graduation from medical school, graduate of foreign or U.S. medical school, region of country). The sorting results in an implicit stratification and avoids the possibility of extreme concentrations of characteristic values among the selected sample.

[8] Physicians who had died or had implausible ages should have been excluded from the sampling frame but were not, so we dropped them after drawing the sample (1,481 who had died before December 31, 2003, and 1,281 with ages under 20 or over 80). This resulted in a sample of 63,827.

c. Physician Characteristics

We constructed variables of physician characteristics using information available from the MPIER file, and grouped the states of physicians' practices into the 10 U.S. Department of Health and Human Services Regions. Table II.2 shows the mean characteristics of the physicians present in the data for the first quarter of 2002.

We also quantified the importance of Part B drugs to physicians in the five specialty categories in terms of volume and Medicare payments at a time period late in the middle of the baseline period (Table II.3):

TABLE II.2

PHYSICIAN CHARACTERISTICS

	Allergy-Immunology/ Infectious Diseases	Urology	Rheuma-tology	Hema-tology-Oncology	All Other Specialties
Mean Age in Years (Standard Deviation)	48.2 (10.1)	49.7 (10.8)	48.4 (9.2)	47.4 (9.3)	46.9 (10.7)
Mean Years Since Graduation from Medical School (Standard Deviation)	22.6 (10.5)	24.1 (11.3)	22.9 (9.6)	22.0 (9.7)	20.5 (11.2)
Whether Graduated from U.S. Medical School (Percentage)	76.6	82.3	80.1	72.3	77.9
Belongs to a Group Practice (Percentage)	63.6	66.8	66.4	75.0	68.1
Participates in Medicare (Percentage)	88.5	91.0	88.8	92.9	88.3
Specialty Board Certification (Percentage)					
Yes	48.0	42.3	49.5	47.3	40.6
No	17.9	24.3	16.4	16.9	24.8
Unknown	34.1	33.4	34.2	35.8	34.7
U.S. HHS Region (Percentage)					
I (CT, ME, MA, NH, RI, VT)	7.4	5.3	7.0	7.0	6.8
II (NJ, NY)	14.6	12.2	7.0	13.5	11.3
III (DE, DC, MD, PA, VA, WV)	11.6	11.5	13.8	11.7	10.9
IV (AL, FL, GA, KY, MS, NC, SC, TN)	16.8	20.3	18.8	17.8	17.6
V (IL, IN, MI, MN, OH, WI)	18.4	17.4	18.3	18.4	18.5
VI (AR, LA, NM, OK, TX)	9.7	10.7	9.1	10.7	10.0
VII (IA, KS, MO, NE)	4.3	3.8	3.8	4.0	4.3
VIII (CO, MT, ND, SD, UT, WY)	2.9	2.9	2.9	2.4	2.9
IX (AZ, CA, HI, NV)	11.3	12.0	10.9	10.5	13.4
X (AK, ID, OR, WA)	3.1	3.9	3.6	4.1	4.2

Source: CMS MPIER File.

Note: Percentages and means as of start of study period, January 2000.

TABLE II.3

PART B DRUGS AS A PERCENTAGE OF TOTAL SERVICES RENDERED AND OF TOTAL MEDICARE PAYMENTS IN THE MIDDLE OF THE BASELINE PERIOD (FOURTH QUARTER OF 2002)

	Number of Drug Services as Percentage of Total Services	Drug Payments as Percentage of Total Medicare Payments
Allergy-Immunology/Infectious Disease	1.4	2.3
Urology	4.7	35.7
Rheumatology	8.8	24.6
Hematology-Oncology	18.9	49.5
All Other Specialties	1.2	1.0

Source: Medicare Carrier Claims Data.

As expected, Part B drugs represented a substantial proportion of Medicare revenues (from 2.3 to 49.5 percent) for the four selected specialties, but a much smaller proportion (1.0 percent) for all remaining specialties.

d. Study Outcomes

The purpose of this study is to understand whether physicians changed their practice in response to the Part B payment policy changes, and to understand how the payment reforms affected physician revenue. Using Medicare Carrier data, we constructed the following study outcomes for the cohort of physicians through December of 2007.

i. Willingness to Continue Serving Medicare Beneficiaries

As an indicator of willingness to serve Medicare beneficiaries, we measured whether a physician provided specific types of services over time. We examined the numbers of physicians in each specialty cohort over time who had submitted any Medicare claims for (1) any services, (2) office visits for new patients, (3) initial hospital visits, and (4) chemotherapy and other drugs. We also looked at the number of new patient office visits and initial hospital visits per physician as a function of time.

ii. Numbers and Types of Physician Services and Numbers of Beneficiaries Served

We computed quarterly and annual totals for all services rendered, and quarterly and annual numbers of specific types of services delivered. To describe the types of services provided, we used the Berenson-Eggers Type of Service (BETOS) classification system to create seven subcategories of services[9]:

1. Visits and Miscellaneous
2. Consultations/specialist services
3. Imaging
4. Procedures
5. Laboratory tests
6. Chemotherapy
7. Other drugs

We determined quarterly and annual numbers of unique beneficiaries seen by cohort physicians. For a measure of the volume of services rendered that takes into account the numbers of beneficiaries treated, we also computed physician-level ratios of the numbers of various services provided to the numbers of beneficiaries served and calculated average values of these ratios for each time period.

iii. Medicare Revenues

Finally, we computed the amounts the Medicare program paid to cohort physicians per quarter and per year, both in total and within the seven subcategories of services listed above.[10]

[9] Procedure codes are used on Medicare claims to identify the services provided. The BETOS coding system classifies the thousands of procedure codes into 106 mutually exclusive, readily understood clinical (as opposed to statistical or financial) categories. The BETOS system is stable over time and relatively immune to minor changes in technology or practice patterns (Centers for Medicare & Medicaid Services 2008; Berenson and Holahan 1992). Appendix A contains a table showing how the 7 subcategories were created from the BETOS categories.

[10] We also examined physicians' submitted charges, but these analyses provided no additional information beyond that of the analyses of Medicare revenues and are not presented.

We used the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers (CPI-U) to adjust all revenues to 2007 dollars.[11]

e. Analysis Approach

To assess the relationship between the Part B payment reforms and physician outcomes, we calculated the numbers of physicians, mean values per cohort physician, or services per beneficiary averaged over physicians, on a yearly basis. We then compared the trends in the pre-reform period with those in the post-reform period, analyzing the trends separately for each of the four different physician-specialty groups. In previous reports, we presented explicit statistical testing of the change in trends using the exact same sample; rather than repeat that here, we focus instead on the cumulative period after the reforms, and after the two CMS demonstrations have been completed.

3. Beneficiary Analysis and File Construction

The beneficiary analysis consisted of examining trends over the study period (2003–2007) in measures of access, out-of-pocket liabilities, and Medicare expenditures for users of Part B–covered drugs, with a focus on statistically significant changes in the levels of those measures following the implementation of the ASP reimbursement methodology on January 1, 2005. In addition to assessing beneficiaries using Part B drugs generally, we also examined users of specialty-specific drugs, who might be differentially affected by payment reform because they see different types of specialists. Finally, we analyzed users of "policy-sensitive" drugs (described below), as potential changes in measures of access and spending might be greatest for users of widely prescribed drugs that experienced steep reductions in payment allowance limits entering 2005.

[11] Specifically, we multiplied revenues from year *T* by the CPI-U for 2007 divided by the CPI-U for year *T*.

a. Study Sample

Our initial task was to identify all beneficiaries receiving at least one Part B–covered drug or biological during the study period in one or more of the following settings: physician's office, OPD, or pharmacy supplier. We used the same drug list that we used to develop the physician sample. However, Medicare hospital outpatient payment policy does not reimburse separately for drugs that cost less than a certain amount per day.[12] As a result, we cannot be confident that these drugs would be individually identified on the claim. Hence, in addition to the drug codes, we also identified outpatient claims that contained one of 15 revenues codes that indicate a patient received drugs. (These codes are listed in Appendix B.)

We identified all claims from the 2003–2007 Medicare Carrier, Outpatient Durable Medical Equipment Regional Carrier (DMERC) claims files using the drug code list and revenue codes. From the identified claims, we extracted the health insurance claim (HIC) numbers of beneficiaries receiving at least one Part B drug in a calendar year. Combining the HIC numbers for each year and unduplicating them yielded populations of between 9.6 and 13.1 million beneficiaries per year. We excluded beneficiaries who had Medicare as a secondary payer or were in the Medicare Replacement Drug Demonstration, a Medicare managed care plan, or hospice, since it was likely that these beneficiaries would have unobserved expenditures for drugs. We also excluded beneficiaries with end-stage renal disease, whose payment system is such that we would likely be unable to observe changes in receipt of care.

Because the CMS data center did not have the capacity to conduct this analysis for the universe of beneficiaries, we analyzed a random sample of 500,000 beneficiaries per year

[12] This amount was $50 per day through 2006, and it increased to $55 per day in 2007.

instead.[13] Sampled beneficiaries were selected to be representative of the full population of Medicare beneficiaries receiving Part B drugs. The randomness in the selection process ensured that the estimators used to analyze the data were unbiased when weighted to account for differential sampling, producing averages for the sampled population that are expected to match population averages up to a sampling error.

To make our estimates more precise, we stratified the sample, dividing each of the annual lists of beneficiaries receiving Part B drugs into three strata according to the number of Part B drugs received in the year: one drug only, two to five drugs, or six or more drugs. We determined the size of the sample to draw from each stratum using Neyman allocation, a method that samples strata with larger populations or larger standard deviations more heavily.[14] Normally, one would oversample based on the stratum-specific standard deviations of the primary variable of interest. However, the standard deviations of the primary variables of interest (Medicare costs) were unknown, and we would have had to sum the individual's claims to obtain the information. This process again would strain the capacity at the CMS data center, the very problem we were trying to avoid by using a sample. Instead, we first calculated the allocation based on the number of drugs paid by Medicare (the count of the number of line items), which we thought would be correlated with the outcomes of interest. This approach resulted in a sample allocation that would have allocated the vast majority of observations to the top stratum and very few observations to the two lower stratums, raising concerns that our analysis would be severely hampered if such an extreme distribution for this variable did not adequately reflect the true distribution of the underlying outcome of interest. Consequently, we conservatively assumed the

[13] While the same beneficiary may appear in more than one year of the sample, not all sampled beneficiaries appear in the sample for each year studied.

[14] See Cochran (1977). Neyman allocation defines the size of each stratum h as $n_h = n \cdot \left(N_h s_h / \sum N_h s_h\right)$, where n is the total sample size, N_h is the population of stratum h, s_h is the standard deviation, and the summation is taken over all strata.

ratio of the variances was 1:2:4, and sampled from the three strata proportional to their square roots, allowing us to improve the precision of the estimates without taking the risk of having an extreme allocation.[15] All sampling was done without replacement. The combination of stratification and a large sample size yielded estimates with a high degree of precision.

For each sampled beneficiary, we calculated weights that were inversely proportional to the sample member's probability of being sampled. We applied these weights to yield estimates that are representative of the underlying population of beneficiaries, correcting the standard errors of our estimated effects to account for the complex sampling design and weights.[16] Thus, sampled beneficiaries within a given stratum are representative of the population of beneficiaries in that stratum, and the overall sample is representative of the full population of beneficiaries using Part B drugs.

Table II.4 shows the numbers of beneficiaries originally identified and the number sampled from each stratum. We pulled all claims for each sampled beneficiary and constructed quarterly data for each sampled beneficiary receiving a Part B drug in that quarter.

b. Beneficiary Characteristics

As Table II.5 shows, the characteristics of beneficiaries in the sample are generally stable over time. The average age is slightly lower in the ASP reimbursement period (2005–2007) than in the base period (2003) or the reduced-AWP reimbursement period (2004), as indicated by the increasing percentage of beneficiaries under 65 and the declining percentage older than 75. The values of other characteristic variables—particularly the percentage of beneficiaries eligible for Medicaid and the percentage living in rural locations—changed little over the sample period.

[15] There was no specific clinical significance to the strata definitions beyond making sure that we had an adequate representation of beneficiaries most likely to be affected by the policy changes, that is, those using many Part B drugs, while still being able to make inferences about the overall universe of Part B drug users.

[16] We used the SAS SURVEYMEANS and SURVEYREG procedures to make these corrections.

TABLE II.4

ANNUAL NUMBERS OF PART B DRUG-USING BENEFICIARIES IDENTIFIED AND SAMPLED, BY STRATUM OF NUMBER OF DRUGS USED

Study Year	Stratum—Number of Drugs Received in the Year	Number of Beneficiaries Identified	Number of Beneficiaries Sampled
2003	One drug	3,071,795	109,558
	Two to five drugs	3,913,759	197,427
	Six or more drugs	2,705,262	192,995
	Total	**9,690,816**	**499,980**
2004	One drug	2,977,944	95,972
	Two to five drugs	4,309,322	196,411
	Six or more drugs	3,220,640	207,602
	Total	**10,507,906**	**499,985**
2005	One drug	3,127,840	90,579
	Two to five drugs	4,891,799	200,487
	Six or more drugs	3,598,605	208,628
	Total	**11,618,244**	**499,694**
2006	One drug	3,428,860	86,950
	Two to five drugs	5,461,280	195,844
	Six or more drugs	4,222,067	214,467
	Total	**13,112,207**	**497,261**
2007	One drug	3,406,111	86,842
	Two to five drugs	5,485,123	197,684
	Six or more drugs	4,171,950	213,020
	Total	**13,063,184**	**497,546**

Source: Mathematica Policy Research.

TABLE II.5

CHARACTERISTICS OF BENEFICIARIES IN THE RANDOM SAMPLE

	2003	2004	2005–2007
Percentage under 65 years old	13.7	14.5	15.4
Percentage over 75 years old	44.8	44.3	43.6
Percentage male	59.2	58.9	58.9
Percentage non-Hispanic white	86.9	86.3	86.3
Percentage black	8.6	9.0	8.9
Percentage Hispanic	2.2	2.1	2.0
Percentage eligible for Part A or B Buy-In	18.2	18.1	18.5
Percentage living in an urban area	63.8	63.4	63.7

Source: Medicare Claims Data.

Note: 2005–2007 numbers are unweighted averages of 2005, 2006, and 2007 numbers.

c. Study Outcomes

We analyzed nine distinct study outcomes designed to answer the beneficiary-related research questions posed at the outset of Chapter I. Using Medicare Carrier, Outpatient and DMERC data, we constructed measures of beneficiary access to physician-administered drugs, beneficiary out-of-pocket spending, and Medicare spending. We created outcome variables based upon all claims for each person in each quarter. If an individual claim overlapped a quarter (for example, a hospital stay started in one quarter and ended in another), we allocated the costs of that stay in proportion to the days included in each of the quarters. While we show quarterly outcomes in the figures that follow, the tables report the corresponding average quarterly outcomes by year for ease of presentation.

i. Site of Receipt of Physician-Administered Drugs

To assess how access to care may have changed in the wake of payment reform, we analyzed four dichotomous measures of beneficiary access to physician-administered drugs: (1) whether all physician-administered drugs prescribed to a given beneficiary in a given quarter were administered in a physician's office; (2) whether at least one drug was administered in a

physician's office; (3) whether at least one drug was administered in a hospital OPD; and (4) whether at least one drug was administered in an emergency room.

ii. Beneficiary Liabilities

We examined two measures of beneficiary liabilities to assess how out-of-pocket spending varied with the implementation of payment reform: out-of-pocket spending on Part B–covered drugs and total out-of-pocket spending on Medicare-covered services.

iii. Medicare Expenditures

To assess how Medicare spending changed following payment reform, we analyzed three separate measures: (1) spending on Part B–covered drugs; (2) spending on fees for administration in a physician's office, dispensing or supplying associated with Part B drugs[17]; and (3) total per-beneficiary spending.

The set of measured outcomes and their relationship to the research questions of interest is summarized in Table II.6.

4. Analysis Approach

As with the physician analysis, the analysis of beneficiaries using Part B drugs focuses on measuring changes over time in outcomes of interest. However, since we were examining results for groups of beneficiaries different from those we have examined in the past, we measured changes in two ways. First, we compared for each outcome variable the mean outcome in 2003 (the "base period") with the mean outcome in 2005–2007 (the "ASP period") and determined whether the difference was statistically significant. Second, to account for any underlying trend

[17] The codes used to define fees for administration, supplying, or dispensing are in Appendix E.

TABLE II.6

DESCRIPTION OF OUTCOME VARIABLES

Research Question	Outcome Variables
Did beneficiaries receive drugs in different settings after payment reform?	Beneficiary received at least one Part B drug in a physician's office during the quarter.
	Beneficiary received all his or her Part B drugs in a physician's office during the quarter.
	Beneficiary received at least one Part B drug in a hospital OPD during the quarter.
	Beneficiary received at least one Part B drug in an emergency room during the quarter.
Did out-of-pocket liabilities for Medicare-covered services change after payment reform?	Out-of-pocket liabilities for Part B–covered services in the quarter
	Total out-of-pocket liabilities for Medicare-covered services in the quarter
Did Medicare spending for users of Part B drugs change after payment reform?	Medicare payments for Part B drugs in the quarter
	Medicare payments for Part B drug administration in a physician's office, dispensing, and/or supplying in the quarter
	Total Medicare payments for covered services in the quarter

we regressed outcomes on a time trend and an indicator variable equal to 1 in the ASP period and 0 otherwise. Specifically, we estimated:

$$y_t = \alpha + \beta x\, TIME\_TREND + \gamma\, x\, POST\_ASP + \varepsilon_t$$

where *y* is the outcome of interest, *TIME_TREND* is the quarter of the outcome (taking values of 1 to 20), *POST_ASP* is an indicator variable equal to 1 for all quarters from 2005–2007 and 0 otherwise, and ε is an error term. The coefficient γ indicates how far above or below the trend the outcome was, on average, after the implementation of the policy. That is, β is an estimate of the time trend, but $(\beta + \gamma)$ estimates the actual trend after the reforms, with γ indicating the trend difference in the post reform period. To standardize findings (different outcomes were measured in different units), we expressed the coefficient value as a percentage of the average quarterly outcome in 2003 (by dividing γ by y_{2003}).

Using these two analysis approaches permits us to comment on whether observed changes in outcomes simply reflected a preexisting trend and therefore might have occurred even in the absence of payment reform. For example, we frequently observed higher overall Medicare expenditures for beneficiaries using Part B drugs in 2007 than we did in 2003. A simple comparison of mean outcomes early and late in the sample period (our first approach) typically indicated that Medicare spending was indeed higher late in the sample period—that is, after payment reform. But the regression estimator frequently revealed that the increased spending was part of a secular trend and that, after accounting for the presence of that trend (β), Medicare spending was no higher or lower in the ASP-pricing era than would have been predicted in the absence of payment reform (that is, γ was not significantly different from zero). As in the physician analysis, dollar-denominated outcome variables were adjusted for inflation using the CPI-U, and outcomes are measured in 2007 dollars.

In reporting summary statistics, we generally provide two numbers: a "percent change" and a "percent change after accounting for underlying trend." The former is the (percentage) difference between the mean outcome in the base period (2003) and the mean outcome in the ASP period (2005–2007). The latter is the increase or decrease in the outcome entering the ASP period after accounting for any underlying trend, expressed as a percentage of the outcome's mean value in 2003.

We also analyzed groups of beneficiaries who received physician-administered drugs that are provided by particular specialists: hematology-oncology, urology, rheumatology, and allergy-immunology/infectious diseases.[18] We also analyzed users of inhalation and oral drugs that are

[18] A list of the specialty-specific drugs, by drug category, is in Appendix C.

subject to Part B payment reform separately. The list of drugs that defined these groups is in Appendix D.

Finally, we analyze users of "policy-sensitive drugs," which we define as any Part B drug that had over $10 million in allowed charges in 2004 and that had its payment allowance limit cut by 33 percent or more entering 2005. The list of these drugs, and the changes in payment limits, are listed in Table II.7.

In addition to analyzing sampled beneficiaries as a single group or based on which specific drugs they used, we also conduct two subpopulation analyses. The first analyzes outcome measures separately for beneficiaries with buy-in benefits and those without; we compare the results to determine whether outcomes for the two groups are statistically different. The second compares beneficiaries living in urban areas to those living in rural areas. In addition, we describe the post-reform outcomes for those beneficiaries who have Part D drug coverage.

TABLE II.7

POLICY-SENSITIVE DRUGS

Drug	HCPCS Code	Users in Sample	2004 ASP Payment Allowance Limit	2005 ASP Payment Allowance Limit	% Change
Ipratropium bromide	J7644	137,588	$2.82	$0.29	-90%
Milrinone lactate	J2260	753	$46.15	$4.77	-90%
Paclitaxel	J9265	18,677	$138.28	$15.93	-88%
Albuterol	J7611–14,18–19	218,034	$0.39[a]	$0.07[b]	-82%
Pamidronate disodium	J2430	10,159	$237.88	$59.01	-75%
Metaproterenol sulfate	J7669	1,454	$0.96	$0.26	-73%
Leucovorin calcium	J0640	12,192	$3.00	$1.30	-57%
Granisetron hydrochloride	J1626	27,129	$15.62	$7.09	-55%
Leuprolide acetate implant	J9219	2,735	$4,831.40	$2,206.27	-54%
Dolasetron mesylate	J1260	38,652	$13.85	$6.61	-52%
Ceftriaxone sodium	J0696	104,932	$13.35	$6.57	-51%
Goserelin acetate implant	J9202	26,591	$375.99	$189.79	-50%
Leuprolide acetate suspension	J9217	41,760	$500.58	$253.13	-49%
Nesiritide	J2324	1,569	$135.66	$73.62	-46%

Source: Centers for Medicare & Medicaid Statistics.

Note: Policy-sensitive drugs are drugs with reductions of payment allowance limits in excess of 33 percent in 2005 among those drugs with over $10 million in allowed charges in 2004. Payment allowance limits are reported from the fourth quarter of 2004 and the first quarter of 2005. Drugs may be reimbursed at rates other than the stated payment allowance limits (for example, under least-costly alternative provisions or when they are administered via DME infusion).

[a]Payment allowance limit for HCPCS code J7619 (albuterol, all formulations including separated isomers, inhalation solution administered through DME, unit dose, per 1 mg [albuterol] or per 0.5 mg [levalbuterol]).

[b]Payment allowance limit for HCPCS code J7613 (albuterol, inhalation solution, administered through DME, unit dose, 1 mg).

III. CHANGES FOR PHYSICIANS AFTER PAYMENT REFORMS

As discussed in Chapter I, if the payment reforms affected physicians' income, they might induce physicians to alter the volume and mix of services directly affected by the payment changes, the volume and mix of other Medicare-covered services not directly affected, and the volume and mix of services covered by non-Medicare payers (Hadley and Reschovsky 2006; Mitchell et al. 2000; Tai-Seale et al. 1998). Some physicians could decide to stop billing the Medicare program, or even to stop treating Medicare beneficiaries.

We expect responses in physicians' behavior, if any, to depend on the amount of Medicare revenue they derive from Part B drugs, which in turn depends on the types of disease they treat, and thus their specialty. We focus on four physician specialties that administer substantial amounts of Part B drugs in their offices (1) allergy-immunology/infectious diseases, (2) urology, (3) rheumatology, and (4) hematology-oncology (MedPAC 2006, 2007). We first present results for a comparison group of physicians who do *not* belong to one of these four specialties; these physicians administer few Part B drugs and should experience few effects from the payment changes.

For each specialty, we examine indicators of willingness to treat Medicare patients—the proportion of physicians continuing to submit Medicare claims over time, the numbers of beneficiaries treated, and the volume of new patient and total office visits.[1] We then describe changes in Part B drug volume (the numbers of drug claim line items submitted) and in physicians' Part B drug revenues. Finally, we examine the overall mix of services provided and

[1] We also examined the numbers of physicians providing new patient hospital visits and providing Part B drugs—results were similar to those presented in this chapter and are contained in Appendix A.

Medicare revenues received over time as measured by numbers of claims and Medicare payments for broad categories of services, including for Part B drugs.

A. ALL OTHER SPECIALTIES

The number of physicians in this group submitting Medicare claims gradually declines over the study period, as would be expected in a cohort of physicians followed over time. A fraction of the cohort is expected to leave practice every year as a result of retirement, illness, death, or other reasons. The average number of beneficiaries per physician increases slowly over time. New-patient visits remain more or less steady, and there is a slow rise in the total number office visits (first four columns of Table III.1)

As anticipated, the physicians in this group do not use many Part B drugs. They have 5 to 6 Part B drug claims per 100 beneficiaries and roughly 3 to 7 dollars of Part B drug revenue per beneficiary per year (columns 5 through 8 of Table III.1). As described further below, physicians in the other specialties have much larger (by a factor of 10 to 100) Part B drug claims per 100 beneficiaries and revenues per beneficiary. Columns 5 through 8 of Table III.1 also show a gradual increase in the number of drug claims and drug revenue over time.

There is slight growth in total services and services per beneficiary, and in total Medicare revenue, although revenue drops slightly in the last year (columns 9 through 12 of Table III.1). Drugs constitute only about 2 percent of all services provided and from 2 to 5 percent of overall Medicare revenue (columns 5 and 9, and 7 and 11 of Table III.1; Figure III.1). Of note is the growth in revenue from imaging services, which has been identified as a major contributor to rising health care costs (Hackbarth 2006)

.

TABLE III.1

EXPERIENCES OF PHYSICIANS OF ALL OTHER SPECIALTIES IN THE COHORT

	Percentage of Cohort Physicians Submitting Medicare Claims (Number)[a]	Annual Number of Unique Beneficiaries Served	Annual Number of New-Patient Office Visits	Annual Total Number of Office Visits	Annual Number of Part B Drug Claims	Annual Number of Part B Drug Claims per 100 Beneficiaries	Annual Medicare Part B Drug Revenue	Annual Medicare Part B Drug Revenue per Beneficiary	Annual Number of Services	Annual Number of Services per Beneficiary	Annual Medicare Revenue	Annual Medicare Revenue per Beneficiary
2000	100.0 (18,902)	609.6	21.4	358.4	28.0	4.6	$1,728	$2.80	1,590	2.5	$93,025	$185.80
2001	100.0 (18,902)	638.6	21.8	372.6	30.2	4.7	$2,288	$3.60	1,668	2.5	$100,343	$187.50
2002	100.0 (18,902)	679.7	22.9	393.8	32.9	4.6	$2,816	$4.10	1,790	2.5	$102,951	$178.90
2003	97.6 (18,443)	707.1	22.6	413.4	37.5	5.1	$3,884	$5.50	1,885	2.6	$109,940	$181.20
2004	94.9 (17,936)	724.0	22.8	427.0	41.9	5.7	$4,781	$6.60	1,944	2.6	$116,599	$184.90
2005	92.0 (17,392)	735.8	22.6	431.1	45.0	6.1	$5,041	$6.90	2,005	2.6	$118,952	$188.10
2006	88.4 (16,716)	731.4	22.5	429.9	45.5	6.1	$4,397	$6.00	2,005	2.6	$116,180	$182.10
2007[b]	84.0 (15,884)	724.4	22.9	439.0	46.7	6.2	$5,018	$6.90	1,985	2.6	$110,806	$178.90

Source: CMS MPIER file and Medicare Carrier claims data.

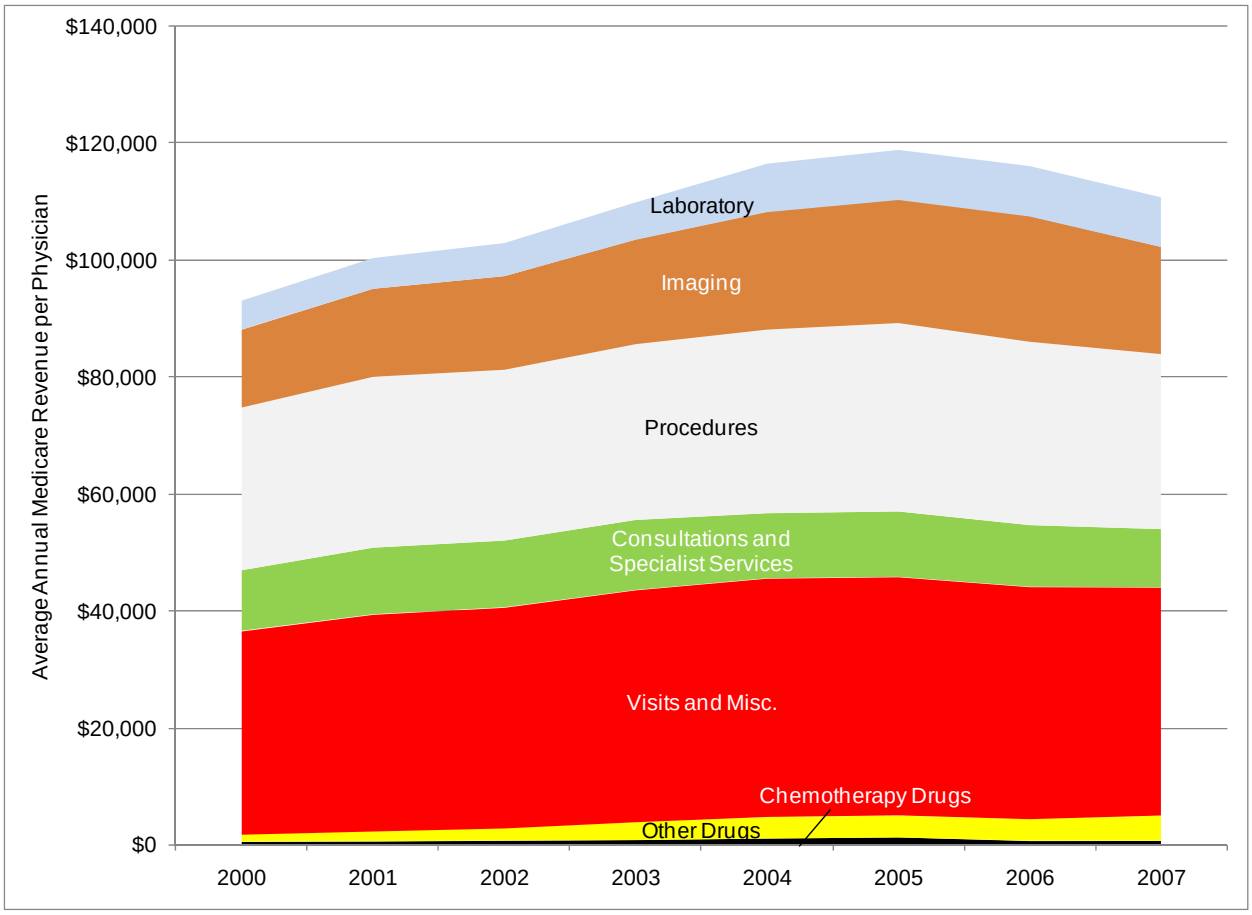
Note: "All Other Specialties" includes a random sample of physicians from CMS's MPIER file who are not specialists in allergy-immunology/infectious diseases, urology, rheumatology, or hematology/oncology. These annual results were calculated from quarterly data. Physicians who did not have claims in all four quarters of a year were weighted by the fraction of quarters for which they were present; for example, a physician present for one quarter was weighted by 0.25, and a physician present for three quarters was weighted by 0.75. Annual averages were calculated over all physicians who had not dropped out by that year. Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

[a]The starting cohort of physicians includes all those active (continuing to submit claims) from the first quarter of 2000 through the second quarter of 2002. Dropouts were counted starting the third quarter of 2002. A physician was counted as having dropped out in a given quarter if he or she had a continuous absence from that quarter until the end of the study period (the second quarter of 2007), as long as the absence of claims lasted three or more quarters (that is, physicians who ceased submitting claims the third quarter of 2006 or earlier were considered dropouts, but not ones who ceased submitting claims the fourth quarter of 2006 or later). Physicians who dropped out were counted as present during the year they dropped out, but as having dropped out the following year.

[b]As explained in Chapter II, results for 2007 are only from the first two quarters of 2007 and are annualized (that is, for physicians with claims in both quarters of 2007, the average for these two quarters was multiplied by 2, and for physicians with claims in only one quarter, the quarterly results were multiplied by 4).

FIGURE III.1

PHYSICIANS OF ALL OTHER SPECIALTIES: AVERAGE ANNUAL TOTAL MEDICARE REVENUES PER PHYSICIAN AND SUBCATEGORIES OF REVENUES



Source: Medicare claims data from Carrier files.

Note: Consultations and Specialist Services includes BETOS classes M5A-M5D (pathologist, psychiatry, ophthalmology, and other services) and M6 (consultations). Visits and Misc. includes BETOS classes M1 (office visits), M2 (hospital visits), M3 (emergency room visits), and M4 (home and nursing home visits), D1 (durable medical equipment), O1 (ambulance, chiropractic, enteral/parenteral nutrition, vision/hearing/speech services, and influenza immunization), and Y and Z (other services, local codes, and undefined codes). Other Drugs is BETOS class O1E and includes Part B covered non-chemotherapy drugs. Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

B. ALLERGY-IMMUNOLOGY/INFECTIOUS DISEASES

There is no evidence of any sharp declines in the willingness of allergy-immunology/ infectious-disease physicians to treat Medicare patients (first four columns of Table III.2). As with physicians in all other specialties, the percentage of physicians in the cohort billing Medicare begins to decline gradually before the first change in payment at the beginning of 2004 (from 95 to 85 percent of AWP), with no acceleration of the decline with the institution of ASP-based payment in 2005. Similarly, there is no obvious association between the timing of the payment changes and (1) a gradual increase in the annual total number of unique beneficiaries served per physician, (2) a gradual decline in the annual number of new patient visits, and (3) a gradual increase in total office visits per physician.

However, the introduction of ASP-based reimbursement in 2005 may be associated with allergy-immunology/infectious-disease specialists' provision of Part B drugs, as the number of Part B drugs provided both in total and per 100 beneficiaries grew steadily until a peak in 2004, after which the numbers began declining (columns 5 and 6 of Table III.2). Medicare Part B drug revenues also peaked in 2004, with lower revenues in 2005 and 2006 that level off in 2007 (columns 7 and 8 of Table III.2).

Despite the shifts in Medicare Part B drug revenues, there were no major changes in physicians' overall Medicare service provision and revenues, because Part B drugs constituted only a small proportion of these quantities (6 to 9 percent) (Table III.2). Overall, allergy-immunology/infectious-disease physicians provided more total services (although services per beneficiary remained unchanged) and earned more Medicare revenue over the study period (columns 9 through 12 of Table III.2). Total revenues dropped slightly in 2005 and 2006 from their high in 2004 (by 4 and 3.5 percent respectively) but then regained most of the decrease in 2007. Figure III.2 shows that although Medicare drug payments fell somewhat in 2005, this

TABLE III.2

EXPERIENCES OF ALLERGY-IMMUNOLOGY/INFECTIOUS DISEASE PHYSICIANS IN THE COHORT

	Percentage of Cohort Physicians Submitting Medicare Claims (Number)[a]	Annual Number of Unique Beneficiaries Served	Annual Number of New-Patient Office Visits	Annual Total Number of Office Visits	Annual Number of Part B Drug Claims	Annual Number of Part B Drug Claims per 100 Beneficiaries	Annual Medicare Part B Drug Revenue	Annual Medicare Part B Drug Revenue per Beneficiary	Annual Number of Services	Annual Number of Services per Beneficiary	Annual Medicare Revenue	Annual Medicare Revenue per Beneficiary
2000	--	327.7	12.1	499.6	56.2	9.6	$4,435	$13.50	1443.2	3.9	$74,549	$214.10
2001	--	339.4	11.9	508.8	69.3	10.6	$5,419	$16.00	1486.6	3.8	$79,421	$215.60
2002	100.0 (5,832)	359.3	11.7	523.4	86.0	12.5	$6,475	$18.00	1576.5	3.8	$80,758	$207.20
2003	97.6 (5,691)	375.5	11.7	537.4	99.9	13.9	$7,022	$18.70	1654.5	3.8	$85,366	$206.80
2004	95.6 (5,573)	390.0	11.9	543.8	121.3	16.2	$8,686	$22.30	1719.4	3.8	$92,465	$211.40
2005	93.8 (5,468)	398.0	11.7	545.8	119.8	15.8	$5,505	$13.80	1742.5	3.8	$88,775	$201.00
2006	91.4 (5,329)	396.0	12.2	544.3	110.5	15.1	$5,835	$14.70	1723.3	3.8	$85,664	$196.70
2007	87.9 (5,127)	392.9	12.2	552.3	112.7	15.6	$5,631	$14.30	1703.9	3.8	$88,308	$204.40

Source: CMS MPIER file and Medicare Carrier claims data

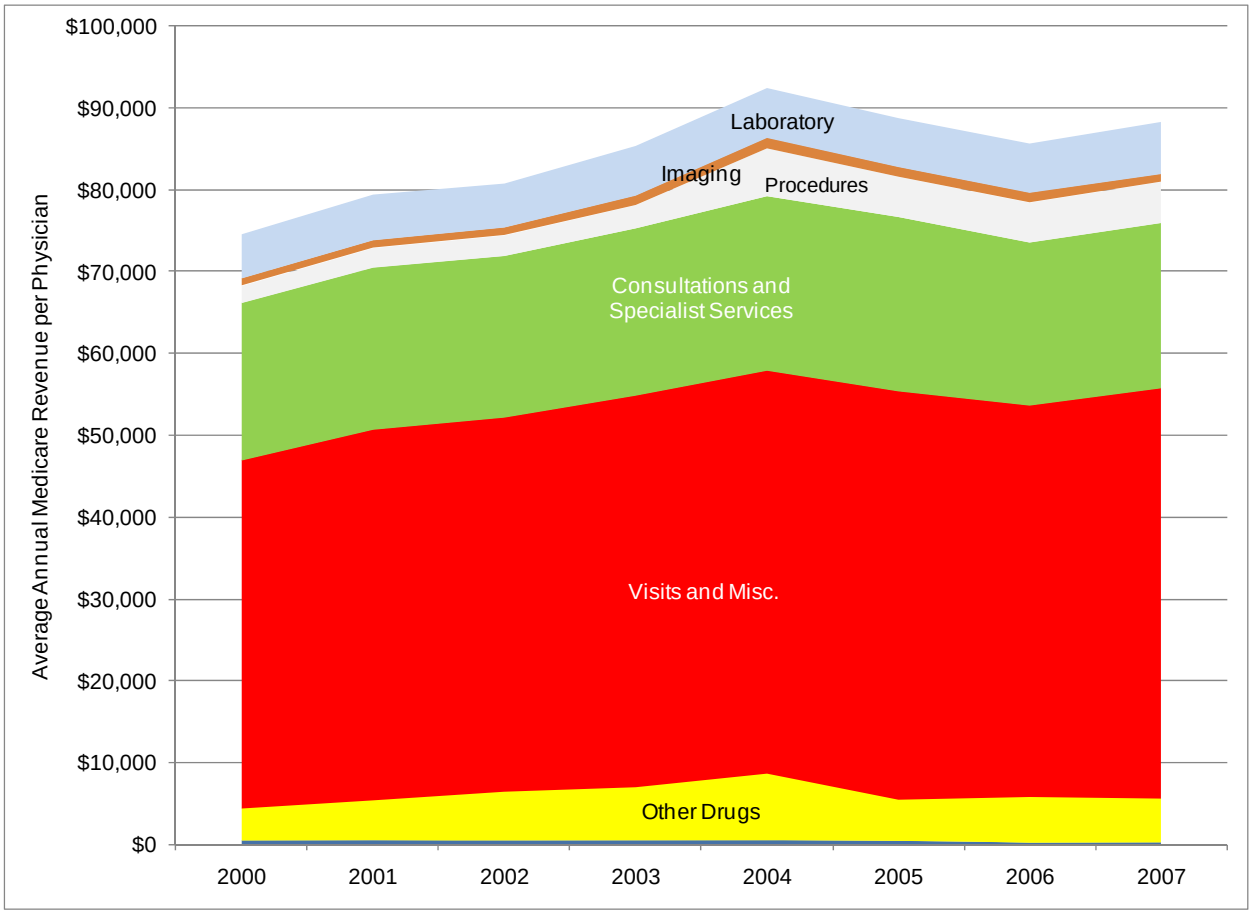
Note: These annual results were calculated from quarterly data. Physicians who did not have claims in all four quarters of a year were weighted by the fraction of quarters for which they were present; for example, a physician present for one quarter was weighted by 0.25, and a physician present for three quarters was weighted by 0.75. Annual averages were calculated over all physicians who had not dropped out by that year. Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

[a]The starting cohort of physicians includes all those active (continuing to submit claims) from the first quarter of 2000 through the second quarter of 2002. Dropouts were counted starting the third quarter of 2002. A physician was counted as having dropped out in a given quarter if he or she had a continuous absence from that quarter until the end of the study period (the second quarter of 2007), as long as the absence of claims lasted three or more quarters (that is, physicians who ceased submitting claims the third quarter of 2006 or earlier were considered dropouts, but not ones who ceased submitting claims the fourth quarter of 2006 or later). Physicians who dropped out were counted as present during the year they dropped out, but as having dropped out the following year.

[b]As explained in Chapter II, results for 2007 are only from the first two quarters of 2007 and are annualized (that is, for physicians with claims in both quarters of 2007, the average for these two quarters was multiplied by 2, and for physicians with claims in only one quarter, the quarterly results were multiplied by four).

FIGURE III.2

ALLERGY-IMMUNOLOGY/INFECTIOUS DISEASES PHYSICIANS: AVERAGE ANNUAL TOTAL MEDICARE REVENUES PER PHYSICIAN AND SUBCATEGORIES OF REVENUES



Source: Medicare claims data from Carrier files.

Note: Consultations and Specialist Services includes BETOS classes M5A-M5D (pathologist, psychiatry, ophthalmology, and other services) and M6 (consultations). Visits & Misc.=Visits and Misc. includes BETOS classes M1 (office visits), M2 (hospital visits), M3 (emergency room visits), and M4 (home and nursing home visits), D1 (durable medical equipment), O1 (ambulance, chiropractic, enteral/parenteral nutrition, vision/hearing/speech services, and influenza immunization), and Y and Z (other services, local codes, and undefined codes). Other Drugs is BETOS class O1E and includes Part B covered non-chemotherapy drugs. Medicare revenues have been adjusted to 2007 dollars using the Bureau of labor Statistics' Consumer Price Index for All Urban Consumers.

decline contributed only slightly to the overall leveling off of Medicare revenues in 2005 and 2006.

C. UROLOGY

Although, like the previous two specialty groups, urologists showed no evidence of an abrupt decrease in treatment of Medicare beneficiaries (columns 1 through 4 of Table III.3), the payment changes were associated with a dramatic effect on their Part B drug revenues. Drug revenues, which had been rising until 2004, fell steeply afterwards (column 7 of Table III.3 and Figure III.3). Average annual drug revenues per physician fell by roughly $21,000 between 2003 and 2004 (about a 16 percent drop from 2003), and by nearly $58,000 between 2004 and 2005 (a reduction of about 53 percent from 2004). From 2003 to 2007, Part B drug revenues fell 72 percent. Results for drug revenues per beneficiary were very similar (column 8 of Table III.3). Reduced reimbursements for hormonal drugs and implants used in the treatment of prostate cancer (such as leuprolide implants, J9217, and leuprolide injection, J9280) were the main reasons for the falls in revenue (data not shown). Drug revenues represented 44 percent of urologists' total Medicare revenues in 2000 but were only 15 percent by 2007.

Urologists' provision of Part B drugs diminished as well, although the declines were much smaller than the dramatic drops in Part B drug revenues. The annual number of drug claims in 2004 was 2.5 percent lower than in 2003, and 9 percent lower in 2005 than in 2004 (declines of 4 and 10.5 percent when expressed as drug claims per 100 beneficiaries). There was a 17 percent fall in the number of Part B drug claims from 2003 to 2007 (18 percent for drug claims per 100 beneficiaries) (columns 5 and 6, Table III.3).

TABLE III.3

EXPERIENCES OF UROLOGY PHYSICIANS IN THE COHORT

	Percentage of Cohort Physicians Submitting Medicare Claims (Number)[a]	Annual Number of Unique Beneficiaries Served	Annual Number of New-Patient Office Visits	Annual Total Number of Office Visits	Annual Number of Part B Drug Claims	Annual Number of Part B Drug Claims per 100 Beneficiaries	Annual Medicare Part B Drug Revenue	Annual Medicare Part B Drug Revenue per Beneficiary	Annual Number of Services	Annual Number of Services per Beneficiary	Annual Medicare Revenue	Annual Medicare Revenue per Beneficiary
2000	--	853	40.3	793.7	137.6	14.7	$113,086	$133	2,750	3.0	$255,215	$296
2001	--	883	36.9	814.0	143.7	14.8	$120,073	$136	2,844	3.0	$276,981	$310
2002	100.0 (8,432)	926	36.3	849.3	149.4	14.8	$127,835	$138	2,996	3.1	$295,478	$317
2003	97.8 (8,242)	950	34.3	879.8	153.2	14.9	$130,687	$138	3,111	3.1	$303,435	$318
2004	95.7 (8,073)	979	34.5	891.8	149.4	14.3	$109,890	$112	3,236	3.1	$299,344	$306
2005	93.5 (7,883)	1,002	34.0	919.5	136.3	12.8	$52,034	$52	3,404	3.2	$253,045	$257
2006	90.4 (7,622)	1,016	34.9	938.9	129.7	12.0	$45,040	$44	3,511	3.3	$247,954	$248
2007	86.9 (7,330)	1,011	35.3	947.9	127.5	12.2	$35,798	$35	3,535	3.3	$231,655	$235

Source: CMS MPIER file and Medicare Carrier claims data.

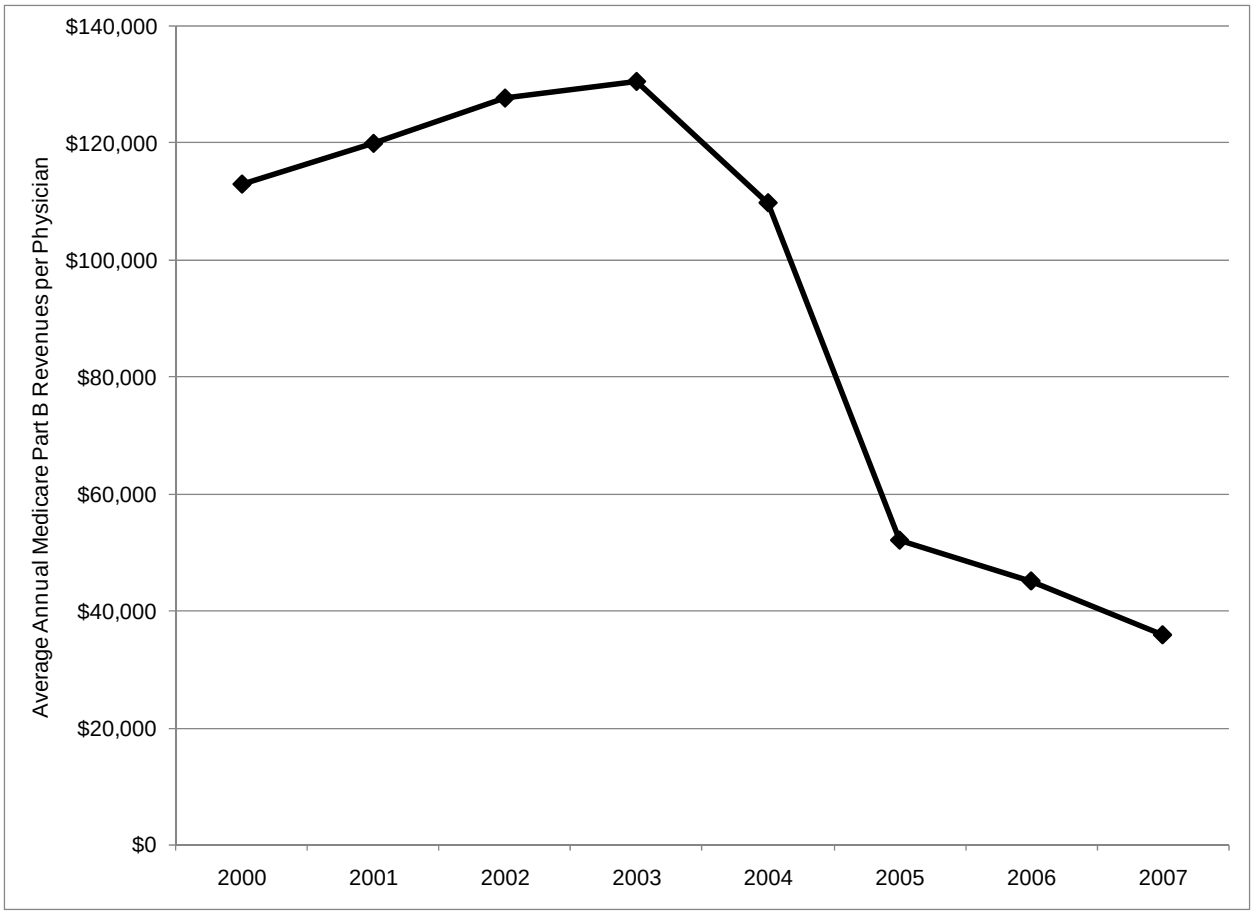
Note: These annual results were calculated from quarterly data. Physicians who did not have claims in all four quarters of a year were weighted by the fraction of quarters for which they were present; for example, a physician present for one quarter was weighted by 0.25, and a physician present for three quarters was weighted by 0.75. Annual averages were calculated over all physicians who had not dropped out by that year. Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

[a]The starting cohort of physicians includes all those active (continuing to submit claims) from the first quarter of 2000 through the second quarter of 2002. Dropouts were counted starting the third quarter of 2002. A physician was counted as having dropped out in a given quarter if he or she had a continuous absence from that quarter until the end of the study period (the second quarter of 2007), as long as the absence of claims lasted three or more quarters (that is, physicians who ceased submitting claims the third quarter of 2006 or earlier were considered dropouts, but not ones who ceased submitting claims the fourth quarter of 2006 or later). Physicians who dropped out were counted as present during the year they dropped out, but as having dropped out the following year.

[b]As explained in Chapter II, results for 2007 are only from the first two quarters of 2007 and are annualized (that is, for physicians with claims in both quarters of 2007, the average for these two quarters was multiplied by 2, and for physicians with claims in only one quarter, the quarterly results were multiplied by 4).

FIGURE III.3

UROLOGY PHYSICIANS: AVERAGE ANNUAL MEDICARE PART B
DRUG REVENUES PER PHYSICIAN



Source: Medicare claims data from Carrier files.

Note: Consists of Medicare payments for BETOS classes O1D (Chemotherapy Drugs) and O1E (Other Drugs). Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

The sharp drop in drug revenues led to a substantial reduction in total Medicare revenues (columns 11 and 12 of Table III.3). There was a gradual increase in the total number of services provided (column 9 of Table III.3), but the mix of services was broadly unchanged (data not shown). Figure III.4 shows how the decline in Medicare drug payments was the major driver in the overall fall in revenues.

D. RHEUMATOLOGY

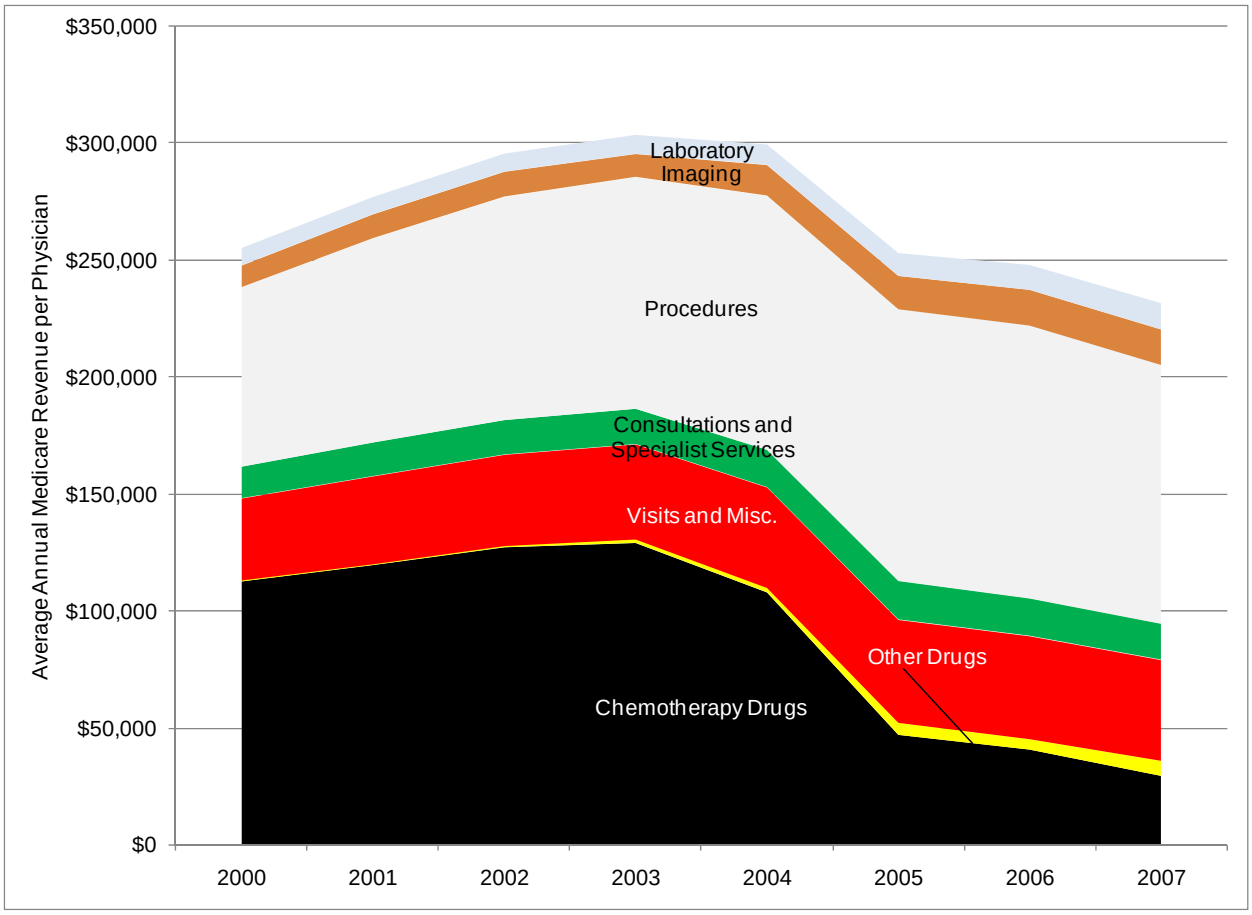
Rheumatologists showed no slowing of provision of services to Medicare beneficiaries associated with the payment reforms (columns 1 through 4, Table III.4) and in fact steadily increased the total number of drugs furnished from 2000 through 2007 at an average rate of 24 more Part B drug claims per year, or 1.7 more Part B drug claims per 100 beneficiaries per year (columns 5 and 6, Table III.4). This translated into a 54 percent increase in annual Part B drug claims from 2000 to 2007, and a 40 percent increase in drug claims per 100 beneficiaries.

Rheumatologists' drug revenue grew tremendously. The average annual drug revenue per physician grew from about $21,600 in 2000 to $134,536 in 2004, an increase of roughly 520 percent (457 percent when expressed as drug revenue per beneficiary) (columns 5 and 6 of Table III.4 and Figure III.5). Medicare drug revenues leveled off temporarily in 2005, then resumed growth in 2006 and 2007 at roughly the same rate as before (increasing by $13,500 from 2005 to 2006, and by $11,300 from 2006 to 2007), for an overall change from 2000 to 2007 of $132,000 (610 percent from 2000, 537 percent for drug revenues per beneficiary).

Rheumatologists' *total* Medicare revenues also grew over this period, nearly doubling from slightly less than $130,000 in 2000 to about $263,000 in 2004, and then increasing an additional 6 percent from 2004 to 2007 (column 11 of Table III.4). Medicare Part B drug payments steadily increased for rheumatologists, from about 16 percent of total revenues in 2000 to 55 percent by mid-2007 (Figure III.6).

FIGURE III.4

UROLOGY PHYSICIANS: AVERAGE ANNUAL TOTAL MEDICARE REVENUES
PER PHYSICIAN AND SUBCATEGORIES OF REVENUES



Source: Medicare claims data from Carrier files.

Note: Consultations and Specialist Services includes BETOS classes M5A-M5D (pathologist, psychiatry, ophthalmology, and other services) and M6 (consultations). Visits & Misc. includes BETOS classes M1 (office visits), M2 (hospital visits), M3 (emergency room visits), and M4 (home and nursing home visits), D1 (durable medical equipment), O1 (ambulance, chiropractic, enteral/parenteral nutrition, vision/hearing/speech services, and influenza immunization), and Y and Z (other services, local codes, and undefined codes). Other Drugs is BETOS class O1E and includes Part B covered non-chemotherapy drugs. Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

TABLE III.4

EXPERIENCES OF RHEUMATOLOGY PHYSICIANS IN THE COHORT

	Percentage of Cohort Physicians Submitting Medicare Claims (Number)[a]	Annual Number of Unique Beneficiaries Served	Annual Number of New-Patient Office Visits	Annual Total Number of Office Visits	Annual Number of Part B Drug Claims	Annual Number of Part B Drug Claims per 100 Beneficiaries	Annual Medicare Part B Drug Revenue	Annual Medicare Part B Drug Revenue per Beneficiary	Annual Number of Services	Annual Number of Services per Beneficiary	Annual Medicare Revenue	Annual Medicare Revenue per Beneficiary
2000	--	796.8	23.7	974.7	310.1	30.1	$21,590	$27	3,419.1	3.6	$129,487	$151
2001	--	812.3	21.6	980.3	348.8	33.2	$54,740	$67	3,512.4	3.6	$172,040	$190
2002	100.0 (2,813)	836.8	20.9	1,006.6	365.5	33.5	$88,702	$106	3,631.2	3.6	$201,516	$211
2003	98.7 (2,775)	864.6	20.7	1,041.2	398.2	35.8	$124,541	$144	3,796.0	3.6	$241,984	$242
2004	97.1 (2,730)	892.0	19.9	1,042.9	433.5	38.1	$134,536	$151	3,905.4	3.6	$263,356	$257
2005	95.0 (2,671)	924.0	19.4	1,040.4	451.3	38.6	$128,463	$139	4,074.1	3.7	$265,958	$254
2006	92.4 (2,599)	912.4	18.7	1,034.3	455.5	39.2	$141,974	$156	4,033.1	3.7	$274,608	$264
2007	89.6 (2,520)	888.7	18.6	1,036.0	476.4	42.2	$153,271	$173	3,968.7	3.7	$277,816	$274

Source: CMS MPIER file and Medicare Carrier claims data.

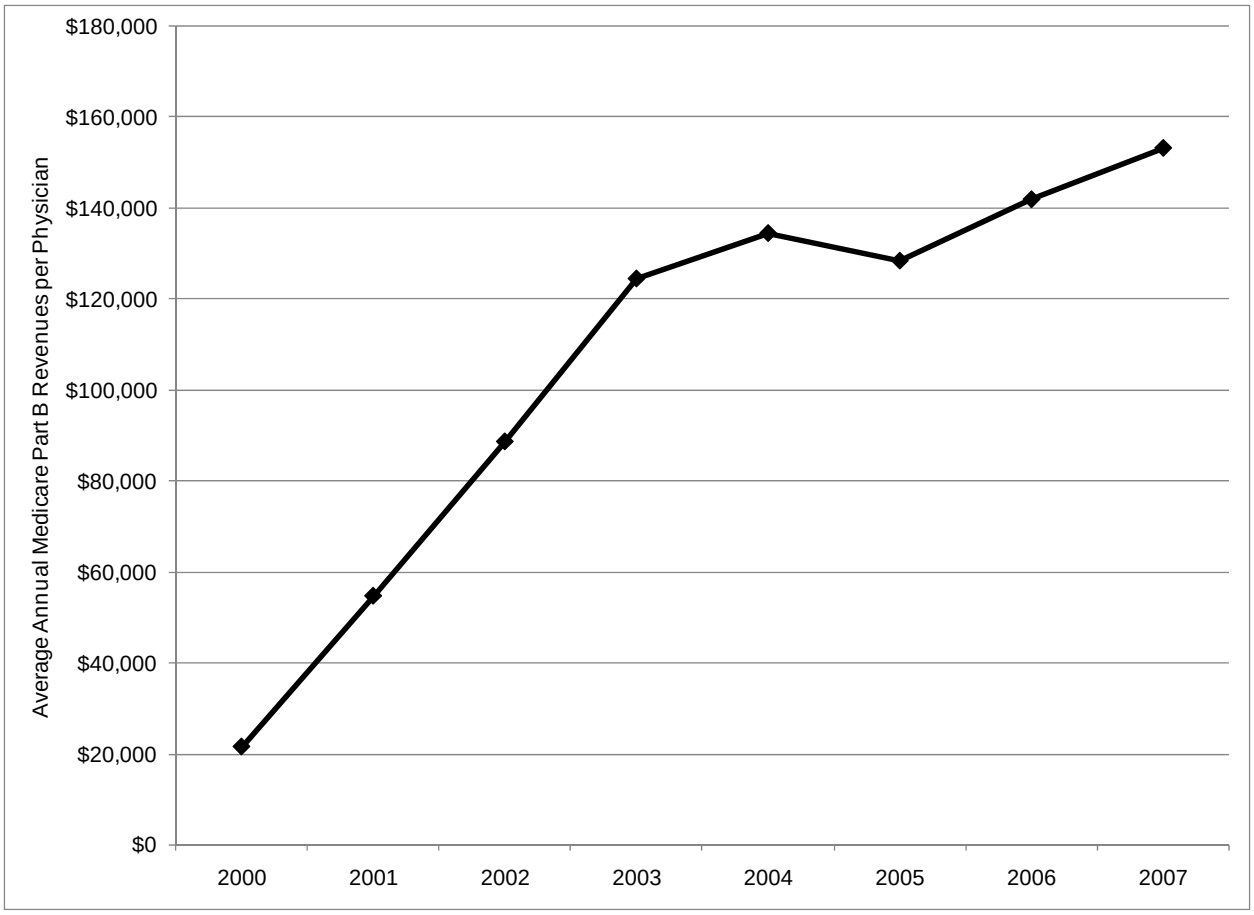
Note: These annual results were calculated from quarterly data. Physicians who did not have claims in all four quarters of a year were weighted by the fraction of quarters for which they were present; for example, a physician present for one quarter was weighted by 0.25, and a physician present for three quarters was weighted by 0.75. Annual averages were calculated over all physicians who had not dropped out by that year. Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

[a]The starting cohort of physicians includes all those active (continuing to submit claims) from the first quarter of 2000 through the second quarter of 2002. Dropouts were counted starting the third quarter of 2002. A physician was counted as having dropped out in a given quarter if he or she had a continuous absence from that quarter until the end of the study period (the second quarter of 2007), as long as the absence of claims lasted three or more quarters (that is, physicians who ceased submitting claims the third quarter of 2006 or earlier were considered dropouts, but not ones who ceased submitting claims the fourth quarter of 2006 or later). Physicians who dropped out were counted as present during the year they dropped out, but as having dropped out the following year.

[b]As explained in Chapter II, results for 2007 are only from the first two quarters of 2007 and are annualized (that is, for physicians with claims in both quarters of 2007, the average for these two quarters was multiplied by 2, and for physicians with claims in only one quarter, the quarterly results were multiplied by 4).

FIGURE III.5

RHEUMATOLOGY PHYSICIANS: AVERAGE ANNUAL MEDICARE PART B DRUG REVENUES PER PHYSICIAN

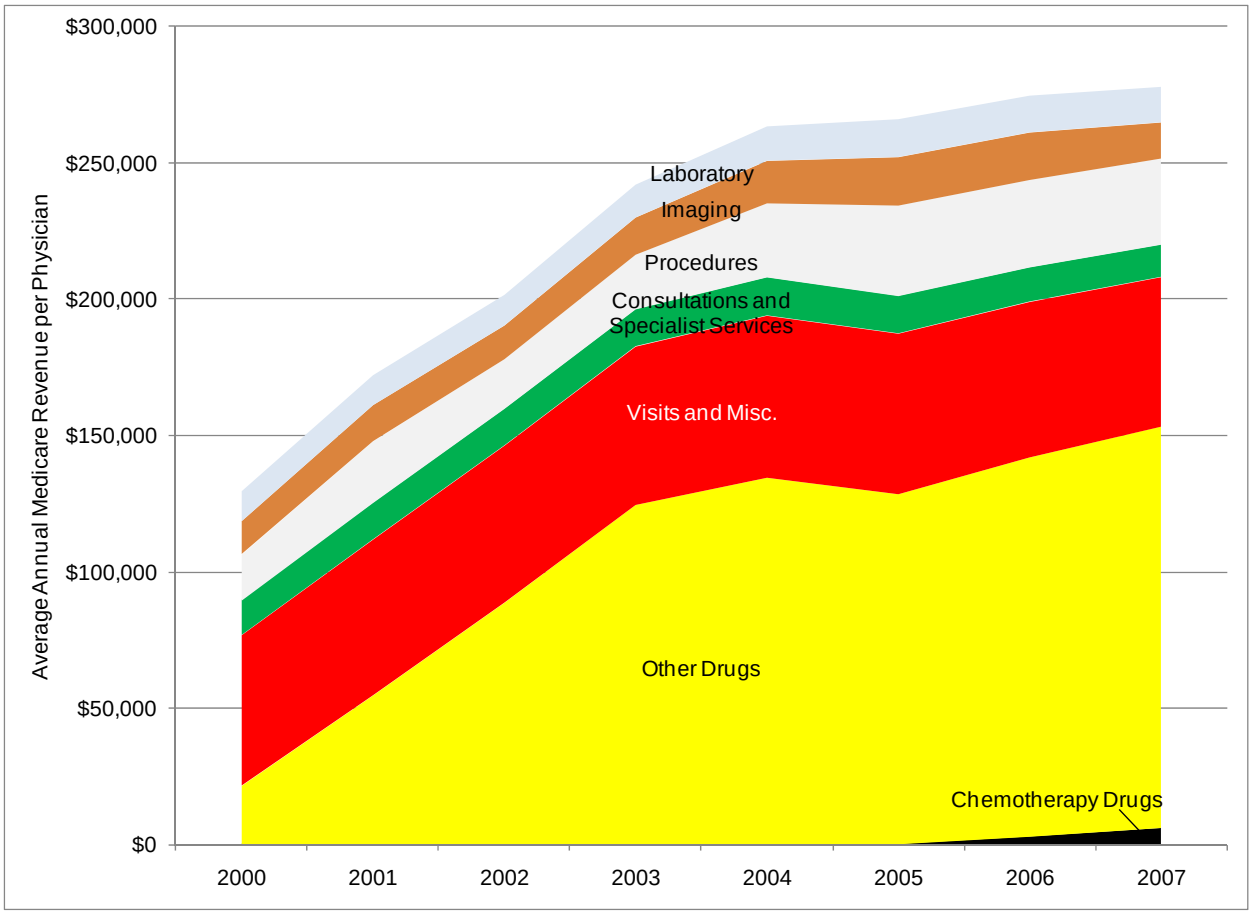


Source: Medicare claims data from Carrier files.

Note: Consists of Medicare payments for BETOS classes O1D (Chemotherapy Drugs) and O1E (Other Drugs). Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

FIGURE III.6

RHEUMATOLOGY PHYSICIANS: AVERAGE ANNUAL TOTAL MEDICARE REVENUES PER PHYSICIAN AND SUBCATEGORIES OF REVENUES



Source: Medicare claims data from Carrier files.

Note: Consultations and Specialist Services includes BETOS classes M5A-M5D (pathologist, psychiatry, ophthalmology, and other services) and M6 (consultations). Visits & Misc. includes BETOS classes M1 (office visits), M2 (hospital visits), M3 (emergency room visits), and M4 (home and nursing home visits), D1 (durable medical equipment), O1 (ambulance, chiropractic, enteral/parenteral nutrition, vision/hearing/speech services, and influenza immunization), and Y and Z (other services, local codes, and undefined codes). Other Drugs is BETOS class O1E and includes Part B covered non-chemotherapy drugs. Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

E. HEMATOLOGY-ONCOLOGY

As with all the other specialty groups, there was no evidence that the payment reforms caused hematologist-oncologists to avoid Medicare beneficiaries (first four columns of Table III.5). It does appear however, that the payment reforms, in conjunction with other payment policies aimed at oncologists, may have resulted in a flattening of oncologists' Medicare drug revenues and total Medicare revenues.

Part B drug services and revenues constituted a large proportion of total Medicare services and revenues for hematologist-oncologists (with Medicare drug revenues ranging from 69 to 74 percent of all Medicare revenue) (columns 5 and 9, and 7 and 12, Table III.5). Drug claims per 100 beneficiaries by hematologist-oncologists increased slightly from 2000 to 2004 (from 209 to 215), after which they began to decline gradually in 2005, 2006, and 2007 (but only by between 8 and 12 drug claims per 100 beneficiaries per year) (column 6, Table III.5). Hematologist-oncologists' Medicare drug revenues climbed steadily from $310,684 in 2000 to a peak of $612,443 in 2004 (nearly doubling), then declined in 2005 and leveled off in 2006 and 2007 (column 7 of Table III.5 and Figure III.7). The pattern was unchanged when Medicare drug revenues were expressed as per 100 beneficiaries (column 8 of Table III.5).

Total Medicare services provided by hematologist-oncologists grew steadily from 2000 through 2004, but then had a marked bump in 2005 and 2006 before falling back to roughly 2004 levels in 2007 (with a similar picture for services per beneficiary) (column 9 of Table III.5 and Figure III.8). This bump was due to several new HCPCS and CPT codes introduced in 2005 and 2006 primarily for use by hematology-oncology specialists. These included new codes in 2005 for oncologists to report patients' symptoms in the chemotherapy demonstration, and more detailed codes for intravenous infusions. In 2006, a separate oncology demonstration took place

TABLE III.5

EXPERIENCES OF HEMATOLOGY/ONCOLOGY PHYSICIANS IN THE COHORT

	Percentage of Cohort Physicians Submitting Medicare Claims (Number)[a]	Annual Number of Unique Beneficiaries Served	Annual Number of New-Patient Office Visits	Annual Total Number of Office Visits	Annual Number of Part B Drug Claims	Annual Number of Part B Drug Claims per 100 Beneficiaries	Annual Medicare Part B Drug Revenue	Annual Medicare Part B Drug Revenue per Beneficiary	Annual Number of Services	Annual Number of Services per Beneficiary	Annual Medicare Revenue	Annual Medicare Revenue per Beneficiary
2000	--	566.9	8.9	1,057.4	1,485	208.7	$310,684	$548	5,420.0	7.9	$449,318	$674
2001	--	597.3	8.6	1,116.0	1,595	210.6	$373,191	$625	5,789.1	7.9	$521,187	$732
2002	100.0 (7,224)	646.4	8.3	1,187.6	1,737	213.1	$476,721	$737	6,272.9	8.0	$627,195	$822
2003	98.2 (7,097)	688.6	8.0	1,236.2	1,825	213.3	$568,451	$826	6,662.8	8.0	$747,803	$926
2004	96.3 (6,956)	730.5	7.8	1,050.1	1,945	215.3	$612,443	$838	6,911.2	7.9	$845,563	$988
2005	94.6 (6,830)	750.7	7.4	1,039.1	1,924	207.5	$549,334	$732	8,024.0	8.8	$792,111	$905
2006	92.1 (6,650)	750.0	7.8	1,047.4	1,828	195.3	$566,077	$755	8,205.2	9.0	$778,773	$875
2007	89.1 (6,439)	747.2	7.9	1,051.6	1,748	187.6	$568,396	$761	6,892.2	7.6	$766,502	$866

Source: CMS MPIER file and Medicare Carrier claims data.

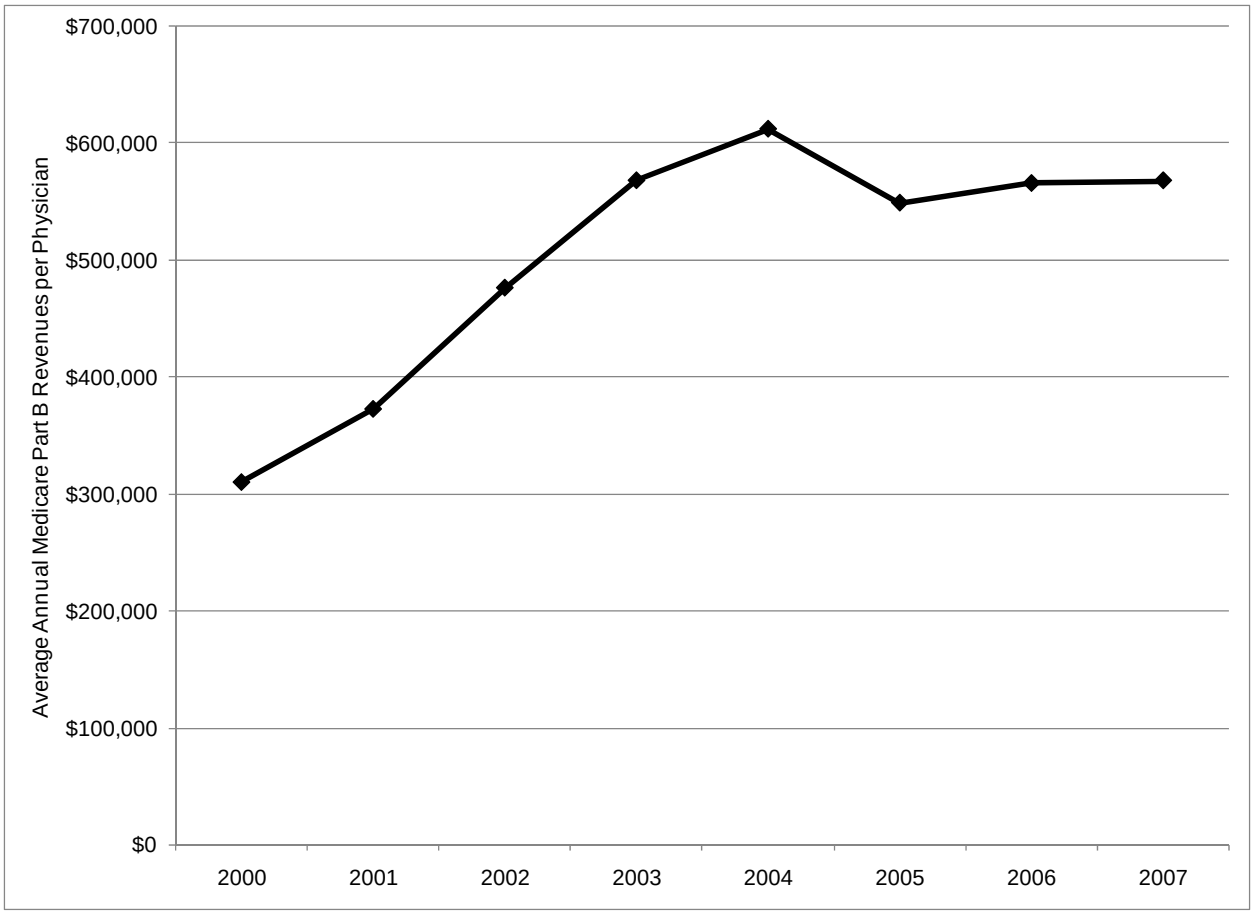
Note: These annual results were calculated from quarterly data. Physicians who did not have claims in all four quarters of a year were weighted by the fraction of quarters for which they were present; for example, a physician present for one quarter was weighted by 0.25, and a physician present for three quarters was weighted by 0.75. Annual averages were calculated over all physicians who had not dropped out by that year. Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

[a]The starting cohort of physicians includes all those active (continuing to submit claims) from the first quarter of 2000 through the second quarter of 2002. Dropouts were counted starting the third quarter of 2002. A physician was counted as having dropped out in a given quarter if he or she had a continuous absence from that quarter until the end of the study period (the second quarter of 2007), as long as the absence of claims lasted three or more quarters (that is, physicians who ceased submitting claims the third quarter of 2006 or earlier were considered dropouts, but not ones who ceased submitting claims the fourth quarter of 2006 or later). Physicians who dropped out were counted as present during the year they dropped out, but as having dropped out the following year.

[b]As explained in Chapter II, results for 2007 are only from the first two quarters of 2007 and are annualized (that is, for physicians with claims in both quarters of 2007, the average for these two quarters was multiplied by 2, and for physicians with claims in only one quarter, the quarterly results were multiplied by 4).

FIGURE III.7

HEMATOLOGY-ONCOLOGY PHYSICIANS: AVERAGE ANNUAL MEDICARE PART B DRUG REVENUES PER PHYSICIAN

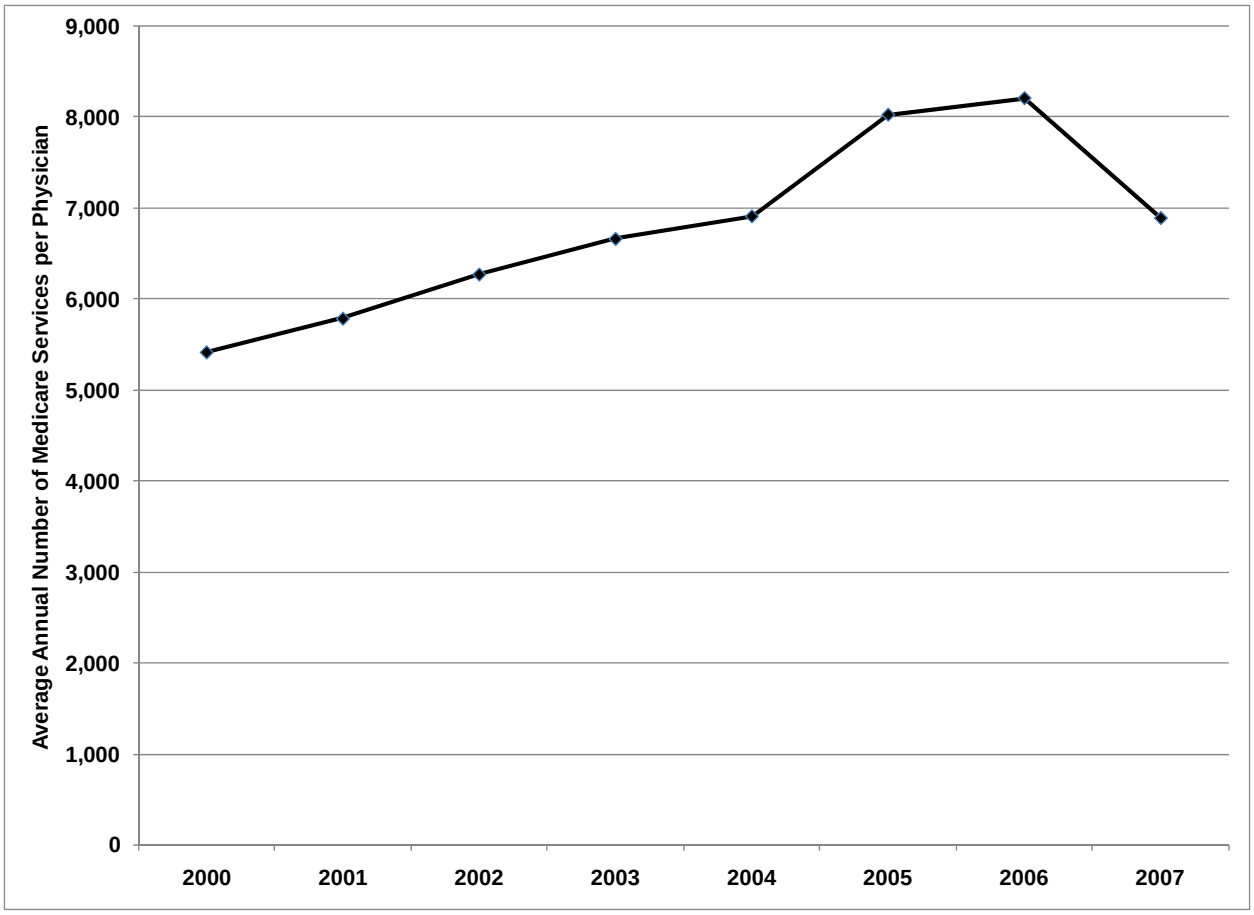


Source: Medicare claims data from Carrier files.

Note: Consists of Medicare payments for BETOS classes O1D (Chemotherapy Drugs) and O1E (Other Drugs). Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

FIGURE III.8

HEMATOLOGY-ONCOLOGY PHYSICIANS: AVERAGE TOTAL NUMBER OF MEDICARE SERVICES PER PHYSICIAN



Source: Medicare claims data from Carrier files.

Note: Numbers of separate Medicare claim line items.

in which oncologists could use special demonstration codes to report information on the clinical stage of patients' cancers and information on planned treatment. Submission of these new codes greatly increased the numbers of claim line items.

Total annual Medicare revenues for hematologist-oncologists climbed sharply from $449,318 in 2000 to reach their maximum in 2004, at $845,563. They then dropped to $792,111 in 2005, to $778,773 in 2006, and $766,502 in 2007 (column 11, Table III.5). Examination of the components of the Medicare revenues suggests that the reversal in the previous steep rise in Medicare payments was due to the abrupt flattening of payments for Part B drugs (Figure III.9). It is unclear whether the end of the chemotherapy demonstration in 2005 contributed to the modest drop in revenues from 2005 to 2006, or whether the end of the oncology demonstration of 2006 played any role in the further small decline in revenues from 2006 to 2007.

F. SIZE OF GROUP PRACTICE

Recently, MedPAC reported interview evidence that found that large practices were better able to adapt to the Part B payment changes than smaller practices (MedPAC 2007). To empirically address this issue, our ideal approach would be to examine whether there were subgroup differences by group practice size, based on physicians' group size at the time the reforms were implemented. However we had only a binary indicator of group practice membership in the MPIER file; that is, our data is limited to whether the physician was a solo practice or in a group practice. In addition, MPIER measures group practice at the last time the file was updated; thus, we do not know the physician's status at the time of the reforms. With these limitations in mind, we examined whether membership in a group practice versus solo practice affected willingness to treat Medicare beneficiaries. We found that solo practicing physicians were somewhat more likely to stop submitting Medicare claims relative to those practicing in a group throughout the time period (See Table III.6). However, the differences

TABLE III.6

YEARLY PERCENTAGE CHANGE OF COHORT PHYSICIANS SUBMITTING MEDICARE CLAIMS OVER STUDY PERIOD

	All Other Specialties[a]		Allergy-Immunology		Urology		Rheumatology		Hematology-Oncology	
	Percent Change of Cohort Physicians Submitting Medicare Claims—Group Practice	Percent Change of Cohort Physicians Submitting Medicare Claims—Solo Practice	Percent Change of Cohort Physicians Submitting Medicare Claims—Group Practice	Percent Change of Cohort Physicians Submitting Medicare Claims—Solo Practice	Percent Change of Cohort Physicians Submitting Medicare Claims Group Practice	Percent Change of Cohort Physicians Submitting Medicare Claims Solo Practice	Percent Change of Cohort Physicians Submitting Medicare Claims—Group Practice	Percent Change of Cohort Physicians Submitting Medicare Claims—Solo Practice	Percent Change of Cohort Physicians Submitting Medicare Claims—Group Practice	Percent Change of Cohort Physicians Submitting Medicare Claims—Solo Practice
2000-2001	0	0	0	0	0	0	0	0	0	0
2001-2002	0	0	0	0	0	0	0	0	0	0
2002-2003	-2.2%	-2.9%	-2.5%	-2.3%	-1.9%	-2.9%	-1.1%	-1.9%	-1.7%	-1.8%
2003-2004	-2.5%	-3.3%	-1.6%	-2.9%	-1.9%	-2.3%	-1.6%	-1.7%	-1.9%	-2.2%
2004-2005	-2.6%	-3.9%	-1.7%	-2.1%	-2.0%	-3.1%	-2.4%	-1.8%	-1.7%	-2.2%
2005-2006	-3.4%	-4.9%	-2.4%	-2.8%	-3.0%	-4.0%	-2.6%	-2.8%	-2.5%	-3.0%
2006-2007	-4.8%	-5.4%	-4.1%	-3.3%	-3.2%	-5.1%	-2.7%	-3.8%	-2.9%	-3.9%

Source: CMS MPIER file and Medicare Carrier claims data.

Note: "All Other Specialties" includes a random sample of physicians from CMS' MPIER file who are not specialists in allergy-immunology/infectious diseases, urology, rheumatology, or hematology/oncology. These annual results were calculated from quarterly data.

The starting cohort of physicians includes all those active (continuing to submit claims) from the first quarter of 2000 through the second quarter of 2002. Dropouts were counted starting the third quarter of 2002. A physician was counted as having dropped out in a given quarter if he or she had a continuous absence of from that quarter until the end of the study period (the second quarter of 2007), as long as the absence of claims lasted three or more quarters (that is, physicians who ceased submitting claims the third quarter of 2006 or earlier were considered dropouts, but not ones who ceased submitting claims the fourth quarter of 2006 or later). Physicians who dropped out were counted as present during the year they dropped out, but as having dropped out the following year.

[a]The number of group and solo physicians may not sum to the totals in Table III.1 because a few physicians were missing information on the group practice indicator variable.

[b]As explained in Chapter II, results for 2007 are only from the first two quarters of 2007.

between solo practitioners and group practice were established before the payment reforms and did not change after the reforms were implemented. The only possible exception is for urologists. Prior to the reforms, urologists practicing in a group setting left Medicare at a 1.9 percentage rate whereas solo practitioners left a 2.6 percent rate (these are averages of the 2002-2003 and 2003-2004 annual rates). In 2004, this rate rose to 2.0 percent for group practitioners, and 3.1 percent for solo practitioners. This difference persisted into 2005 and 2006, suggesting it could be related to the reform. However, among the other specialties, we find no evidence that solo practitioners relative to those in a group setting stopped serving Medicare beneficiaries at an accelerated rate in the post reform period.

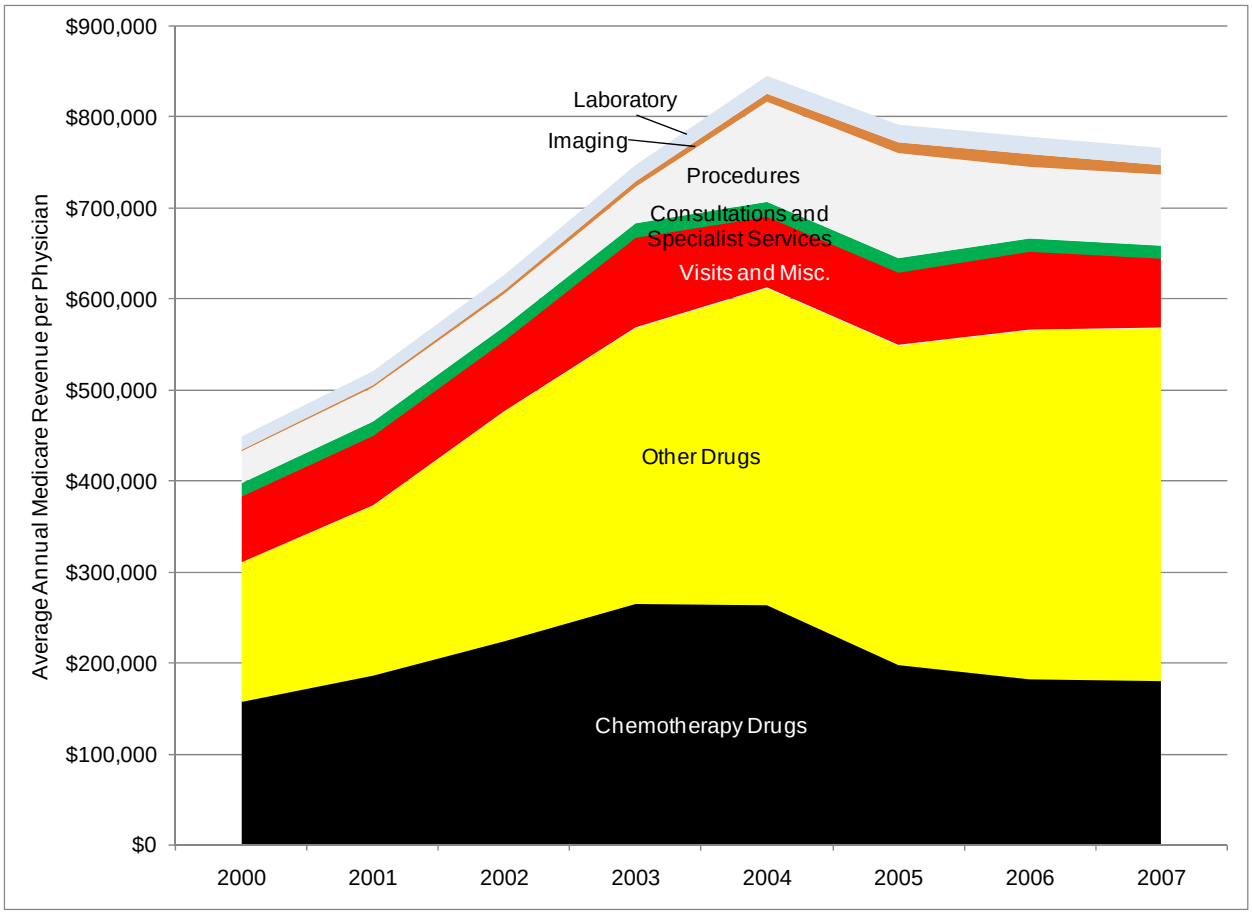
G. CONCLUSIONS

Most of the specialties for which Part B drugs play an important role saw substantial shifts in 2005 (the year of implementation of ASP-based reimbursement) from previous trends in both Part B drug-related and overall Medicare services and revenues. Changes in Medicare service provision and revenues during the study period varied greatly depending on physician specialty. However, we cannot say for certain from our data that these shifts were caused by the new payment system.

Allergy-immunology/infectious-disease specialists saw a decline in Medicare Part B drug revenues, but because these revenues did not make up a large proportion of their Medicare revenues, effects on their total Medicare reimbursements were limited. Rheumatologists derived an increasing proportion of their Medicare revenues from Part B drugs. For both Medicare drug and total revenues, rheumatologists experienced sharp increases up to 2004, a temporary flattening or pause in 2005, then a resumption of the increases in 2006. For hematologist-oncologists, however, the reforms may have put an end to the steep rise in both their drug and

FIGURE III.9

HEMATOLOGY-ONCOLOGY PHYSICIANS: AVERAGE ANNUAL TOTAL MEDICARE REVENUES PER PHYSICIAN AND SUBCATEGORIES OF REVENUES



Source: Medicare claims data from Carrier files.

Note: Consultations and Specialist Services includes BETOS classes M5A-M5D (pathologist, psychiatry, ophthalmology, and other services) and M6 (consultations). Visits & Misc. includes BETOS classes M1 (office visits), M2 (hospital visits), M3 (emergency room visits), and M4 (home and nursing home visits), D1 (durable medical equipment), O1 (ambulance, chiropractic, enteral/parenteral nutrition, vision/hearing/speech services, and influenza immunization), and Y and Z (other services, local codes, and undefined codes). Other Drugs is BETOS class O1E and includes Part B covered non-chemotherapy drugs. Medicare revenues have been adjusted to 2007 dollars using the Bureau of Labor Statistics' Consumer Price Index for All Urban Consumers.

total Medicare reimbursements; after 2005 their Medicare revenues abruptly flattened or declined slightly. Urologists had a substantial cut in their Medicare revenues. Overall we found little evidence that solo practitioners left Medicare more frequently than group practitioners after the reforms. Table III.7 summarizes these results. The following chapter examines whether there were any consequences for Medicare beneficiaries receiving Part B drugs in general, and for beneficiaries likely to be treated by physicians in one of the specialty groups studied here in particular.

TABLE III.7

SUMMARY OF TRENDS IN MEDICARE SERVICE PROVISION AND REVENUES, BY PHYSICIAN SPECIALTY GROUP

	Willingness to Serve Medicare Beneficiaries[a]	Part B Drug Claims and Revenue	Total Medicare Services and Revenues
All Other Specialties	No evidence for decline	Slow growth in claims and revenue.	Slight growth in total services and revenue.
Allergy-Immunology/ Infectious Diseases	No evidence for decline No difference for solo practitioners	Drug claims peak in 2004 then decline. Revenues peak in 2004, decline by roughly 37 percent in 2005, and level off in 2006 and 2007.	Revenues increase from 2000 through 2004; modest declines in 2005 and 2006 (2 to 4 percent), then slight increase in 2007.
Urology	No evidence for decline Possible difference for solo practitioners	Rising number of drug claims until 2004, then modest decline (average decrease of 7 percent per year). Rising drug revenues until 2004, then very large reductions (average of 23 percent per year).	Gradual increase in services, substantial reduction in total revenue (nearly 24 percent drop between 2003 to 2007).
Rheumatology	No evidence for decline No difference for solo practitioners	Steady increase in numbers of drug claims throughout study period. Large increase in drug revenues 2000 through 2004 (520 percent), temporary leveling off in growth in 2005, resumption of increase 2006 and 2007.	Large growth in total revenues from 2000 to mid-2007 (more than double). As with drug revenues, large increase 2000 through 2004, leveling off in 2005, resumption in 2006 and 2007.
Hematology-Oncology	No evidence for decline No difference for solo practitioners	Slight increase in drug claims 2000 through 2004, then modest gradual decline 2005 through 2007. Steady climb in revenues through 2004, then decline in 2005 and leveling off in 2006 and 2007.	Steady growth in services 2000 through 2004 (about 7 percent per year from 2000 to 2004), a “bump” in 2005 and 2006, then a decline in 2007. Total revenues increase to peak in 2004, then decrease in 2005, 2006, and 2007 (decline of about 7 percent per year).

Source: CMS MPIER file and Medicare Carrier claims data. Study period includes first quarter of 2000 through the second quarter of 2007.

[a]Measures of willingness to serve Medicare beneficiaries include percentage of cohort physicians continuing to submit Medicare claims over the study period (2000 through mid-2007), annual numbers of unique beneficiaries served, annual numbers of new-Medicare-patient office visits, and annual numbers of total Medicare office visits.

IV. CHANGES IN OUTCOMES FOR MEDICARE BENEFICIARIES FOLLOWING PAYMENT REFORM

The Medicare Part B payment reforms directly affect provider reimbursements. If providers change their behavior in response to the new reimbursement systems, then the important questions are whether and how Medicare beneficiaries are affected.

As noted in Chapter I, the impact of payment reform on a beneficiary depends on whether a physician or a pharmacy is supplying the drug. Physicians could conceivably change their practice patterns in several ways in response to payment reform, including favoring more profitable drugs, prescribing fewer drugs, or recommending surgery over medical treatment more often. They could also refuse to treat Medicare beneficiaries or encourage them to obtain physician-administered drugs in hospital settings. Pharmacies, in contrast, cannot change which drugs are prescribed or influence sites of care. Some may, however, decide to stop serving Medicare beneficiaries, which could limit access to care.

The possible provider responses to payment reform imply that reform has the potential to influence the site of care for beneficiaries using physician-administered injected drugs, beneficiaries' out-of-pocket liabilities for Medicare-covered services, and Medicare spending on Part B drug recipients.

A. POTENTIAL BENEFICIARY EFFECTS

1. Changes in Site of Care

One of the key concerns regarding the payment reforms was that physicians would stop administering drugs to Medicare patients in their offices and instead refer them to hospital OPDs

or emergency rooms.[1] Prior to the payment reforms, the large margin afforded by the generous Medicare drug reimbursements provided physicians with a financial incentive to purchase drugs for administration to Medicare beneficiaries in their own offices (General Accounting Office 1992). If the payment changes made in-office administration of Part B drugs financially unattractive or unsustainable, some physicians might refer Medicare beneficiaries elsewhere.

2. Changes in Out-of-pocket Liabilities

Any changes in provider behavior induced by payment reform that cause beneficiaries to receive different drugs or receive drugs at a different site of care will affect beneficiaries' cost-sharing liabilities for Medicare-covered services. Beneficiaries treated with Part B–covered physician-administered drugs have coinsurance payments for both the drug cost and the drug administration services. Total reimbursements for the average beneficiary could either increase or decrease depending on (1) the amount of the decrease in drug reimbursements and the change in administration fees, (2) the actual drugs used, and (3) the relative frequency of use. Also, beneficiary cost sharing for drug treatments would change if providers substituted drugs or procedures that were either more or less expensive. Changes in the site of drug administration could also affect beneficiaries' coinsurance liabilities. Medicare's cost-sharing provisions vary considerably among covered services, depending on the health care setting in which they are provided. For instance, the average coinsurance liability for hospital OPD services (33 percent in 2005) is often substantially higher than the 20 percent coinsurance that applies to physician office services (Hackbarth 2003).

[1] While we are unable to observe some shifts that might have occurred in sites of drug administration, such as to hospital inpatient settings or to home care, we believe such shifts should be infrequent. Coverage regulations prohibit an inpatient admission solely for the obtaining of drugs, and in order to receive home health care, a patient must be deemed homebound.

3. Changes in Medicare Expenditures

Finally, changes in the site of drug administration or the use of Medicare-covered health services will affect Medicare spending, which could either increase or decrease as a result of payment reform. If providers respond to reforms in ways that limit beneficiary access to Part B drugs and patients become sicker as a result, or if providers begin to recommend more expensive procedures in lieu of medication, overall Medicare expenditures could rise. In contrast, if reforms blunted incentives to prescribe drugs on the basis of their profitability, physicians might ultimately provide better care, and spending could decline. Finally, if the reforms did not induce any behavioral responses from physicians, a decline in Part B drug spending would lead directly to a decline in overall spending.

B. ANALYTIC APPROACH

To assess the overall relationship between payment reform and beneficiary outcomes, we start by examining the outcomes for all Part B drug users, including beneficiaries receiving physician-administered, inhalation, or oral Part B drugs.[2] MPR's previous analysis of physician responsiveness to payment reform revealed, however, that certain specialties were affected more than others, which suggests that beneficiaries seeing different types of specialists might be affected differentially. Consequently, we also separately analyze beneficiaries receiving (1) hematology-oncology drugs, (2) urology drugs, (3) rheumatology drugs, and (4) allergy-immunology/infectious-disease drugs. Finally, because beneficiaries using Part B drugs that experienced large reductions in payment allowance limits might be especially susceptible to any adverse consequences of payment reform, we analyze beneficiaries using commonly prescribed

[2] We analyzed the three groups separately because different types of drugs were differentially affected by payment reform, as described in Chapter I.

Part B drugs that had their payment limits reduced by 33 percent or more from 2004 to 2005. The chapter is organized according to these three beneficiary groupings, with the initial section reporting findings for Part B drug users overall, the second section reporting findings for users of specialty-specific drugs, and the third reporting findings for users of policy-sensitive drugs.

We address changes in site of care, out-of-pocket liabilities, and Medicare spending by examining changes in outcomes for quarterly data from 2003 through 2007 for random samples of beneficiaries receiving at least one Part B drug. As discussed in Chapter II, we compute changes in mean outcomes from the base year (2003) to the ASP period (2005–2007) and assess whether the changes were statistically significant and practically meaningful. We also estimate trends in outcomes and determine whether outcomes in the ASP period depart meaningfully from those predicted by the trend. When comparing subgroup populations—for example, urban beneficiaries and rural beneficiaries—we measure whether changes in outcomes over time were significantly different for the two subgroups.

One of the limitations of trend analyses is that they can only document associations between payment reforms and beneficiary outcomes; they cannot establish causality. In addition to payment reforms, the initiation of demonstration projects such as CMS's 2005 chemotherapy demonstration,[3] the introduction of new drugs during the sample period, general changes in practice patterns, and changes in average beneficiary characteristics over time might have affected the outcomes measured here.

[3] In 2005, CMS conducted a demonstration that provided an extra reimbursement of $130 to any office-based physician who submitted a claim for chemotherapy administration with special demonstration HCPCS codes indicating the severity of patient-reported pain, nausea and vomiting, and fatigue. These additional payments may have mitigated the effects of the Part B drug payment reforms. MPR specifically addressed this possibility previously and found no evidence that such mitigation occurred (Ballou et al. 2007). Nonetheless, it is impossible to account explicitly for all potentially relevant contemporaneous policy changes that may have affected beneficiary outcomes.

The results reported here might differ from those reported previously, for at least two reasons. First, the previous report covered a shorter period of time (extending only through the third quarter of 2006). If provider adjustments to payment reforms occurred with a lag, changes in outcomes that were not apparent with the shorter time series might begin to reveal themselves. Second, this report measures not only differences in outcomes before and after reform, but also whether these differences are statistically meaningful after accounting for any underlying trend.

C. TRENDS FOR ALL BENEFICIARIES WHO USED PART B DRUGS

1. Changes in the Site of Care for Users of Physician-Administered Drugs

Over time, beneficiaries have become somewhat less likely to receive injected drugs in a physician's office and more likely to receive them in a hospital. Estimates of the proportion of beneficiaries receiving injected drugs who received at least one drug in a physician's office in a given quarter changed little over the sample period, rising from 96.8 percent in the first quarter of 2003 to 97.8 percent in the fourth quarter of 2007 (Figure IV.1a). The proportion receiving all drugs in a physician's office declined from 75.5 percent to 71.8 percent over the same period, which corresponds to an average decline of 1 percentage point per year.

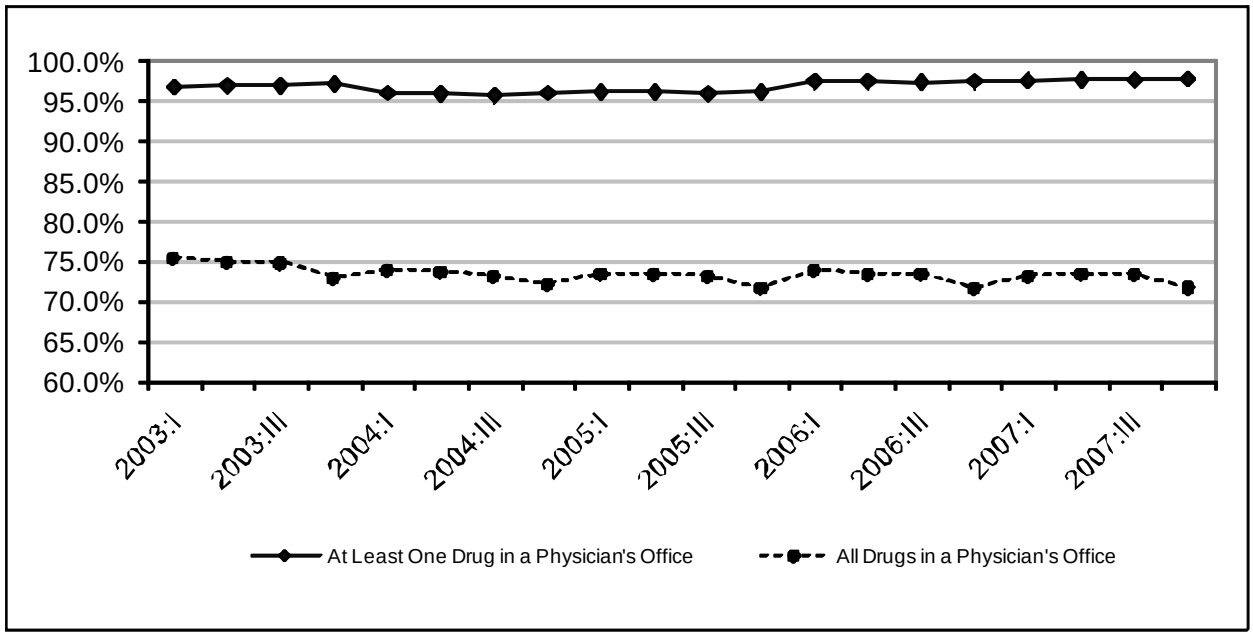
The percentages of beneficiaries receiving at least one of their drugs in an emergency room or an OPD both increased over the sample period, although the change was significant only for those receiving at least one drug in an OPD. From the beginning of 2003 through the end of 2007, the percentage receiving at least one drug in an emergency room rose from 6.5 percent to 7.9 percent, while the percentage receiving at least one drug in an OPD increased from 16.5 percent to 19.6 percent (Figure IV.1b).

Changes in the site of care over time for beneficiaries receiving injected drugs might be related to payment reforms—most specifically, the adoption of ASP-based reimbursement—but they also might simply reflect trends that would have prevailed even in the absence of reform. To

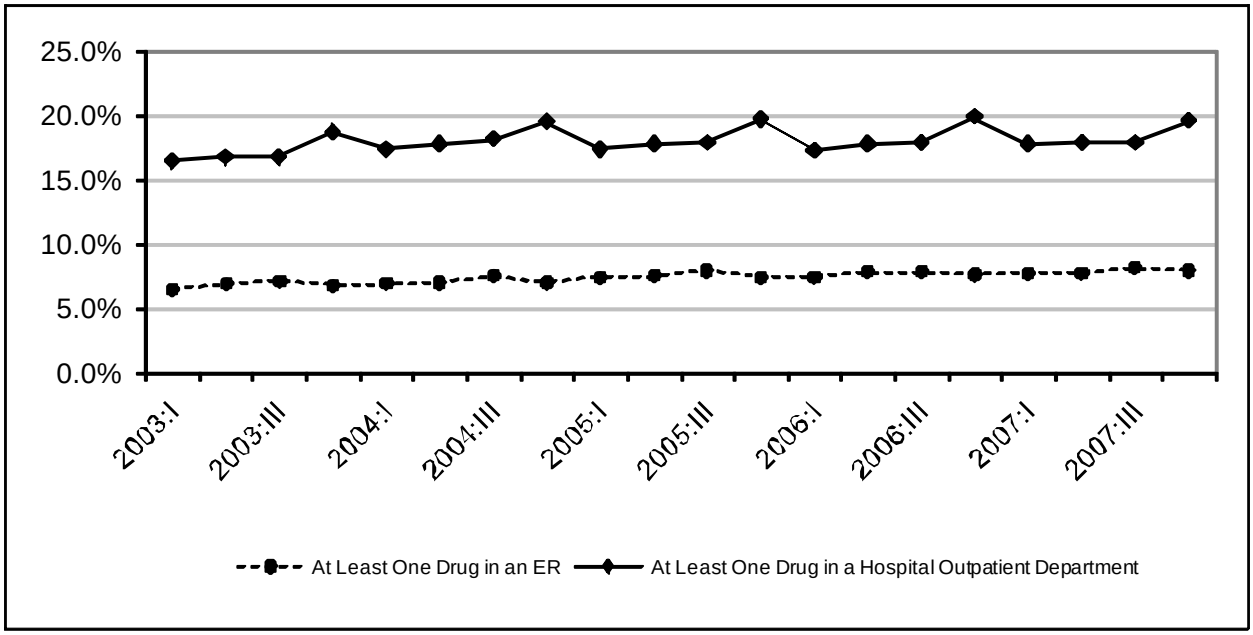
FIGURES IV.1a and IV.b

BENEFICIARIES RECEIVING PHYSICIAN-ADMINISTERED DRUGS: PROPORTIONS RECEIVING PHYSICIAN-ADMINISTERED DRUGS

Receiving in a Physician's Office



Receiving in an Emergency Room or Outpatient Department



Source: Medicare claims data.

account for this possibility, we computed not only changes in mean outcomes from the base year of 2003 through the ASP period (2005–2007) but also changes in outcomes after accounting for the presence of any underlying trend. After adjusting for trends, changes in proportions of beneficiaries receiving injected drugs in a physician's office from 2003 to the ASP period were modest. Specifically, the proportion receiving at least one drug in a physician's office decreased 0.5 percent, while the proportion receiving all drugs in a physician's office increased 0.5 percent (Table IV.1).[4] While the proportion of beneficiaries receiving at least one drug in an emergency room rose 3.8 percent, such events remain unlikely: because only 6.8 percent of sampled beneficiaries received at least one injected drug in an emergency room in a typical quarter in 2003, a 3.8 percent increase in the ASP period corresponds to roughly one quarter of a percentage point. Moreover, the proportion receiving one or more drugs in an OPD fell 4.9 percent after adjusting for trends.

The analyses of Part B injected-drug users, taken together, provide little evidence that these beneficiaries were substantially less likely to receive drugs in a physician's office or more likely to receive them in a hospital setting as a result of payment reform. This was especially true after controlling for the effects of preexisting underlying trends. These findings suggest that physicians did not increasingly refer Medicare patients to hospitals for care following the introduction of ASP-based reimbursement.

[4] We report changes in outcomes in percentage terms—with the changes in each outcome in 2005–2007 measured relative to the outcome's 2003 quarterly mean—in order to standardize changes across outcomes and across drug categories. As noted in Chapter II, the relevant change after accounting for an underlying trend the deviation from the value for 2005–2007 predicted by the trend. Thus, it is possible that the mean value for an outcome in the ASP period could exceed the mean value in 2003 and yet fall *below* the value for the ASP period predicted by the trend, in which case we would report a positive percentage change before accounting for the trend but a *negative* percentage change after accounting for the trend. Moreover, because changes are standardized by dividing by the mean 2003 outcome, it is also possible that percentage declines after adjusting for trends will be larger than -100 percent whenever a deviation from the trend is large relative to the 2003 mean outcome.

TABLE IV.1

BENEFICIARIES RECEIVING PHYSICIAN-ADMINISTERED DRUGS: PROPORTIONS RECEIVING PHYSICIAN-ADMINISTERED DRUGS IN A TYPICAL QUARTER, BY SITE OF CARE, 2003–2007

	Users of Administered Drugs
At least one drug in a physician's office	
Base period (2003)	97.0%
ASP period (2005–2007)	97.1%
Percent change	0.1%
Percent change after accounting for underlying trend	-0.5%
All drugs in a physician's office	
Base period (2003)	74.6%
ASP period (2005–2007)	73.0%
Percent change	-2.1%
Percent change after accounting for underlying trend	0.5%
At least one drug in an emergency room	
Base period (2003)	6.8%
ASP period (2005–2007)	7.7%
Percent change	12.3%
Percent change after accounting for underlying trend	3.8%
At least one drug in a hospital OPD	
Base period (2003)	17.2%
ASP period (2005–2007)	18.2%
Percent change	6.0%
Percent change after accounting for underlying trend	-4.9%

Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars. All changes are statistically different from zero ($p<0.01$).

2. Changes in Beneficiary Out-of-Pocket Liabilities and Medicare Spending for Users of Physician-Administered Drugs

For the typical beneficiary receiving physician-administered drugs, out-of-pocket liabilities and Medicare spending on Part B drugs and drug administration fees fell over time, while total Medicare spending per beneficiary rose slightly. Estimated out-of-pocket costs due to coinsurance for Part B–covered services fell over the sample period from $449 to $397 per

beneficiary per quarter, attaining a high of $490 in the third quarter of 2004 (Figure IV.2).[5] Total out-of-pocket costs per beneficiary decreased from $581 to $522 over the study period, also peaking (at $623) in the third quarter of 2004.

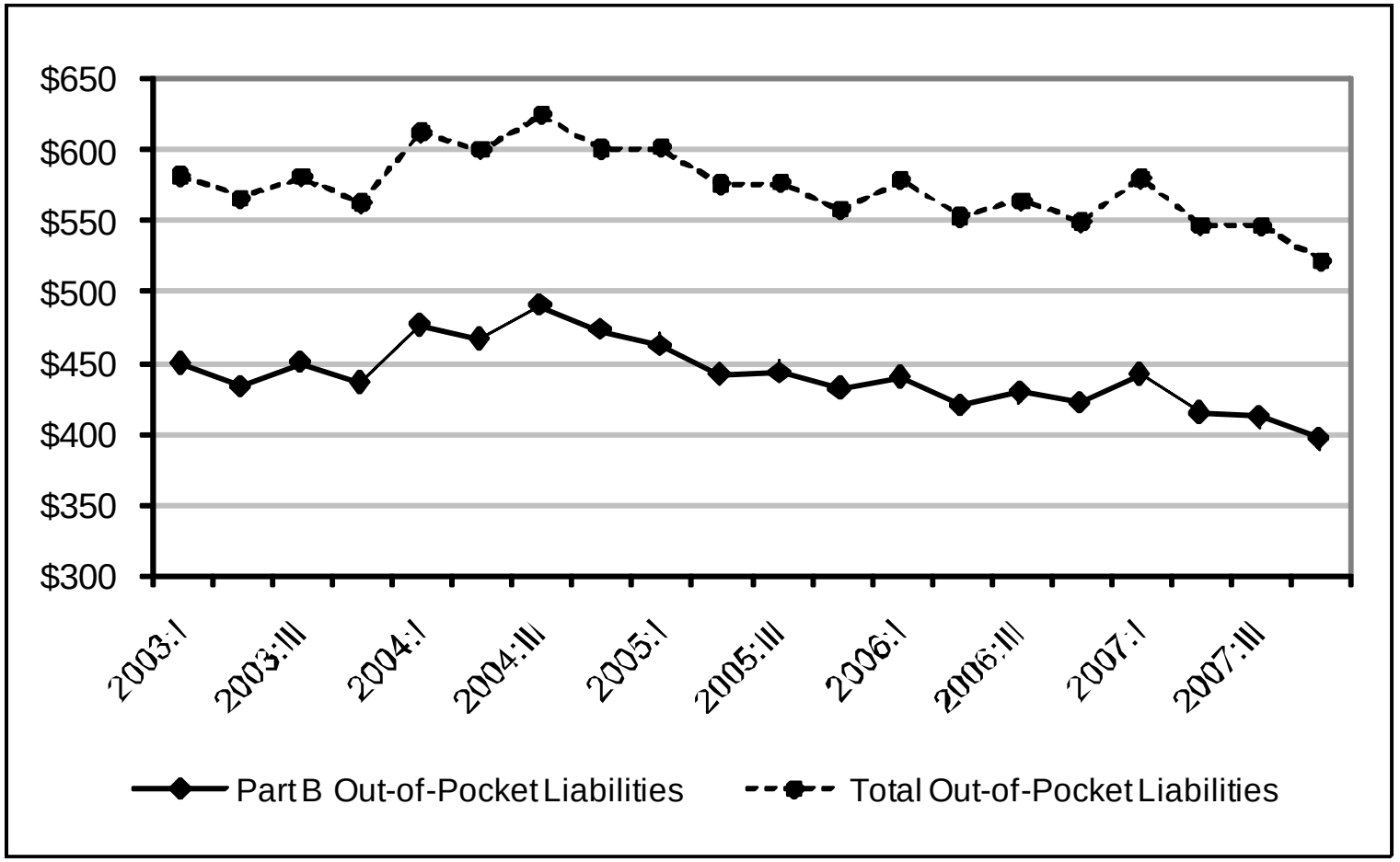
Over the period analyzed, Medicare Part B drug spending for beneficiaries receiving physician-administered drugs decreased slightly, initially rising from $729 per beneficiary per quarter to a high of $897 in the fourth quarter of 2004 before declining to $700 at the end of the study period (Figure IV.3). During the same period, fees for drug administration in a doctor's office increased from $251 per beneficiary per quarter to $347 in the third quarter of 2004 before declining sharply in the first quarter of 2005 and again in the first quarter of 2006, ultimately ending 2007 at $167. Total quarterly Medicare spending for beneficiaries using physician-administered Part B drugs followed a similar pattern of rising and then falling.

After accounting for underlying trends, out-of-pocket liabilities for Part B–covered services and Medicare spending on Part B drugs and administration fees all declined from 2003 to the ASP period for users of physician-administered drugs. Changes in Medicare spending reflected the influence of policy changes with respect to Part B drug reimbursement and the drug administration fee schedule, with per-beneficiary quarterly Part B drug spending falling 12.1 percent and spending on drug administration fees declining 19.3 percent (Table IV.2). The decrease in out-of-pocket liabilities for Part B–covered services was smaller but still statistically significant, at 2.4 percent.

[5] All spending statistics are measured in 2007 dollars.

FIGURE IV.2

OUT-OF-POCKET LIABILITIES PER BENEFICIARY USING PHYSICIAN-ADMINISTERED DRUGS, 2003–2007

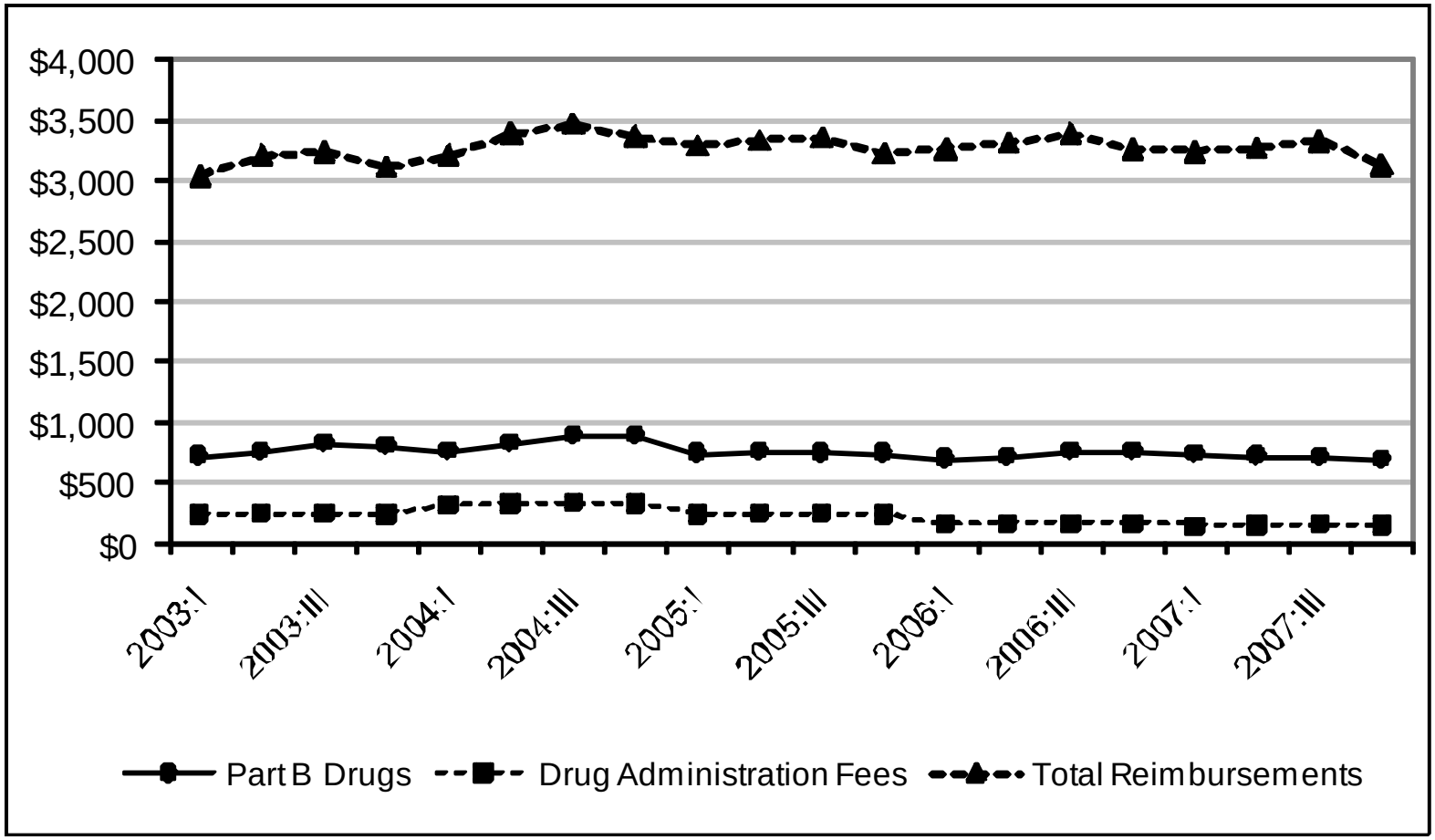


Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars.

FIGURE IV.3

MEDICARE SPENDING PER BENEFICIARY USING PHYSICIAN-ADMINISTERED DRUGS, 2003–2007



Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars.

TABLE IV.2

AVERAGE QUARTERLY OUT-OF-POCKET LIABILITIES AND MEDICARE SPENDING PER BENEFICIARY USING PHYSICIAN-ADMINISTERED DRUGS, 2003–2007

	Users of Administered Drugs
Medicare Part B out-of-pocket liabilities	
Base period (2003)	$442
ASP period (2005–2007)	$430
Percent change	-2.8%
Percent change after accounting for underlying trend	-2.4%
Total Medicare out-of-pocket liabilities	
Base period (2003)	$572
ASP period (2005–2007)	$562
Percent change	-1.7%
Percent change after accounting for underlying trend	-
Medicare Part B drug spending	
Base period (2003)	$786
ASP period (2005–2007)	$740
Percent change	-5.9%
Percent change after accounting for underlying trend	-12.1%
Medicare Part B drug administration fee spending	
Base period (2003)	$257
ASP period (2005–2007)	$201
Percent change	-22.0%
Percent change after accounting for underlying trend	-19.3%
Total Medicare spending	
Base period (2003)	$3,137
ASP period (2005–2007)	$3,267
Percent change	4.1%
Percent change after accounting for underlying trend	-

Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars. Changes that are not statistically different from zero ($p>0.01$) are denoted with a dash (-).

Total out-of-pocket liabilities and Medicare spending changed little from 2003 to the ASP period. Average quarterly out-of-pocket liabilities declined slightly, but after accounting for the underlying trend, the decline was not statistically significant. Total quarterly Medicare spending per beneficiary increased 4.1 percent over the study period, but this increase reflected a

preexisting upward trend. After accounting for the trend, total spending was statistically unchanged over time.[6]

Because out-of-pocket liabilities and Medicare spending for beneficiaries receiving physician-administered drugs either decreased or were statistically unchanged over the sample period, it is unlikely that beneficiaries experienced access problems in the ASP period that forced them to defer care until they were sicker and facing higher costs of treatment. Indeed, the patterns observed suggest that at least a part the decrease in out-of-pocket liabilities for Part B–covered services and Medicare Part B drug spending is directly attributable to lower drug costs.

3. Changes in Beneficiary Out-of-Pocket Liabilities and Medicare Spending for Users of Pharmacy-Supplied Drugs

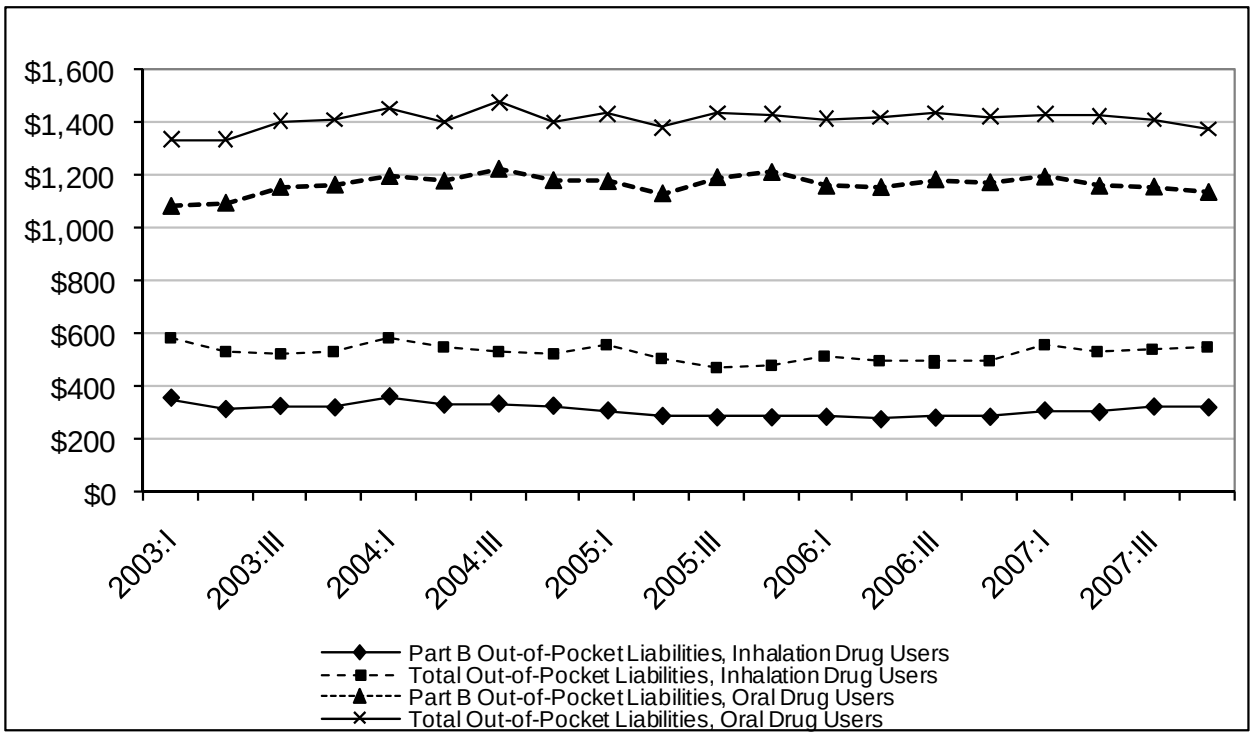
As noted above, Part B drug payment reform is likely to affect those who receive their drugs from a physician differently from those who receive their drugs from a pharmacist. While pharmacists cannot change prescribing patterns, they can cease serving Medicare beneficiaries, potentially delaying access to drugs and exacerbating health problems. If so, out-of-pocket liabilities and Medicare spending could increase in the ASP period—both relative to the base year of 2003 and relative to any preexisting trend—for beneficiaries whose conditions worsened and treatment became costlier because they could not obtain medication in a timely fashion.

Average quarterly out-of-pocket spending by beneficiaries using Part B–covered inhalation drugs decreased modestly over the sample period while rising slightly for users of oral drugs. Out-of-pocket liabilities for Part B–covered services declined 9.8 percent from $356 per beneficiary in the first quarter of 2003 to $321 in the fourth quarter of 2007, with a low of $278 in the second quarter of 2006 (Figure IV.4). Similarly, out-of-pocket spending on all Medicare

[6] Because all spending outcomes are measured in 2007 dollars, the secular trend measures real—or inflation-adjusted—changes in spending over time.

FIGURE IV.4

OUT-OF-POCKET LIABILITIES PER BENEFICIARY USING PHARMACY-SUPPLIED DRUGS, 2003–2007



services decreased from $580 to $548 over the sample period, with an intra-period high and low of $583 (first quarter of 2004) and $474 (third quarter of 2005), respectively. For users of Part B–covered oral drugs, out-of-pocket liabilities rose from $1,086 per beneficiary to $1,138 (4.8 percent) over the sample period, peaking in the third quarter of 2004; total out-of-pocket liabilities followed the same pattern, rising 3.1 percent from $1,336 to $1,377.

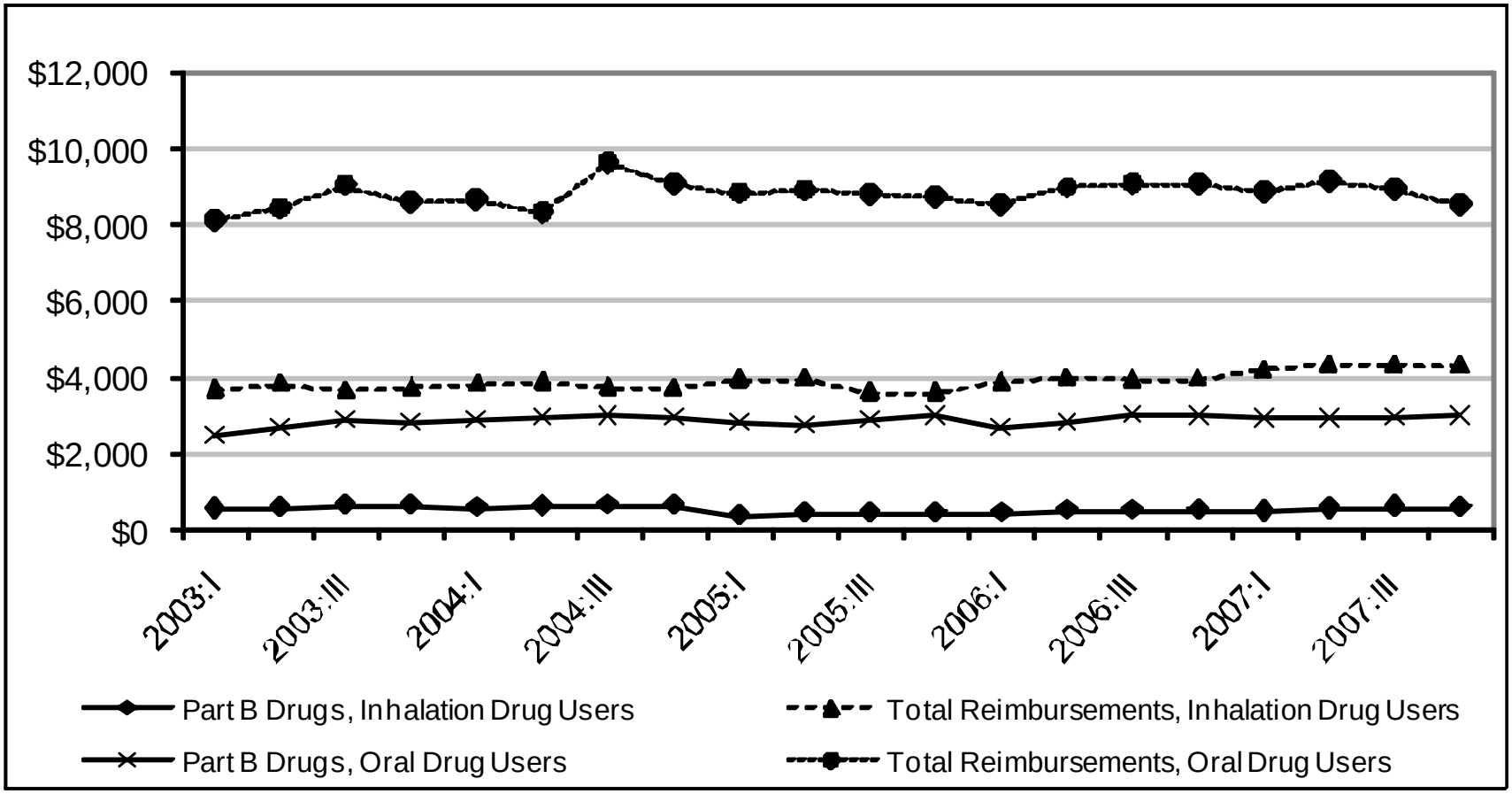
Medicare spending on Part B–covered drugs for inhalation drug users dropped sharply from late 2004 to early 2005 but rose over the full sample period. Spending increased from $540 per beneficiary per quarter to $648 in 2004 before falling sharply (by 46 percent) in the first quarter of 2005 before beginning to rise again to $574 at the end of the sample period (Figure IV.5). Total Medicare spending for inhalation drug users increased steadily over the entire sample period, from $3,662 to $4,277.

Spending for oral-drug users, both on Part B drugs and more generally, rose over the sample period. Part B drug spending increased from $2,490 per beneficiary per quarter to $3,002. In contrast with Part B spending for users of inhalation drugs, drug spending for oral-drug users dipped only slightly (about 6 percent) entering the ASP period.

Table IV.3 summarizes the experience of inhalation and oral-drug users over the sample period. As suggested by the previous figures, the experiences of the two groups were different, with greater savings associated with the inhalation group. Inhalation drug users saw declines in out-of-pocket liabilities for Part B–covered drugs (15.8 percent) and overall (8.1 percent) after accounting for underlying trends. In contrast, oral-drug users' out-of-pocket liabilities, which rose slightly from 2003 to the ASP period, were statistically unchanged on a trend-adjusted basis.

FIGURE IV.5

MEDICARE SPENDING PER BENEFICIARY USING PHARMACY-SUPPLIED DRUGS, 2003–2007



Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars.

TABLE IV.3

AVERAGE QUARTERLY OUT-OF-POCKET LIABILITIES AND MEDICARE SPENDING PER BENEFICIARY USING PHARMACY-SUPPLIED DRUGS, 2003–2007

	Users of Inhalation Drugs	Users of Oral Drugs
Medicare Part B out-of-pocket liabilities		
Base period (2003)	$329	$1,129
ASP period (2005–2007)	$297	$1,171
Percent change	-	3.7%
Percent change after accounting for underlying trend	-15.8%	-
Total Medicare out-of-pocket liabilities		
Base period (2003)	$542	$1,377
ASP period (2005–2007)	$517	$1,419
Percent change	-4.6%	3.0%
Percent change after accounting for underlying trend	-8.1%	-
Medicare Part B drug spending		
Base period (2003)	$602	$2,743
ASP period (2005–2007)	$475	$2,915
Percent change	-21.2%	6.2%
Percent change after accounting for underlying trend	-47.9%	-7.3%
Medicare Part B supplying/dispensing fee spending		
Base period (2003)	$12	$1
ASP period (2005–2007)	$66	$65
Percent change	462.3%	n.m.
Percent change after accounting for underlying trend	725.3%	n.m.
Total Medicare spending		
Base period (2003)	$3,707	$8,554
ASP period (2005–2007)	$3,980	$8,853
Percent change	7.4%	3.5%
Percent change after accounting for underlying trend	-4.3%	-

Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars. Changes that are not statistically different from zero ($p>0.01$) are denoted with a dash (-). The percentage change for supplying/dispensing fees is not meaningful for oral-drug users, as there were no supplying fees for oral drugs in the base period.

n.m. = not meaningful.

Medicare spending on Part B–covered inhalation drugs declined dramatically from 2003 to the ASP period, while the associated dispensing fees increased sharply. Part B drug spending for inhalation drug users declined 47.9 percent after accounting for the underlying trend. In dollar terms, Medicare drug spending per beneficiary per quarter in the ASP period was $288 lower

than it would have been on the prevailing trend. At the same time, supplying/dispensing fees increased from $12 to $66 per beneficiary per quarter, which reflects changes to the schedule of dispensing fees in 2005 and 2006. Drug spending for oral-drug users also declined by a more modest 7.3 percent. (The increase in supplying/dispensing fees for oral-drug users is not particularly meaningful, as the 2003 figure reflects dispensing fees attributable to the occasional oral drug user who also received an inhalation drug.)

Medicare spending on all covered services after accounting for the underlying trend decreased from the base year to the ASP period by 4.3 percent for inhalation drug users and was unchanged for oral-drug users.

As with users of physician-administered drugs, out-of-pocket liabilities and Medicare spending generally declined or remained statistically unchanged for users of inhalation or oral drugs from 2003 to the ASP period. The most salient result, likely a direct consequence of payment reform, was a sharp drop in Medicare Part B spending and (for inhalation drug users) out-of-pocket liabilities for Part B–covered services upon the introduction of ASP-based reimbursement in the first quarter of 2005. The falling or unchanged spending measures entering the ASP period suggest that it is unlikely that recipients of pharmacy-supplied drugs experienced major disruptions in access to medication that led to worsening health conditions as a result of payment reform.

4. Subgroup Analyses

In addition to our analysis of the aggregated beneficiary claims data, we also compared three sets of subpopulations that may have been affected differently by the reforms: beneficiaries with either Part A or Part B state buy-in coverage versus beneficiaries without buy-in coverage, rural beneficiaries versus urban beneficiaries, and beneficiaries with Part D coverage versus those without it.

a. Beneficiaries with Buy-In Versus Beneficiaries without Buy-In

As noted in Chapter I, many Part B injected drugs and biologicals are extremely expensive; for some, the 20 percent patient coinsurance can be several thousand dollars. When physicians were being paid generously for drug costs (at 95 percent of AWP), many were reportedly willing to help Medicare patients struggling to pay the coinsurance amounts by offering extended payment plans or simply forgiving debt (Cohen 2006; Schnell 2006). With the diminished margins under the new payment system, however, physicians might be less able or willing to continue such assistance, and low-income beneficiaries might experience a differential effect of the payment reforms. In fact, in the recent study by the Medicare Payment Advisory Commission (MedPAC) on the effects of the payment changes on oncology services, interview respondents reported that physician offices in some areas were now referring beneficiaries without private supplemental insurance to hospital OPDs for chemotherapy. Overall, however, "the Commission found no evidence of access problems for Medicare beneficiaries needing chemotherapy in any part of the country" (MedPAC 2006; Miller 2006). Because Medicare claims data contain no information on private supplemental insurance, we have no means of identifying beneficiaries who might have difficulty paying the Part B coinsurance. However, the claims data do allow us to mostly identify beneficiaries with Medicaid coverage from whom physicians typically do not collect the full 20 percent Medicare Part B coinsurance and who might be more prone to encountering access problems. State Medicaid programs need not pay the full Medicare Part B 20 percent coinsurance if the *Medicaid* payment for the services rendered by the physician is below the amount that Medicare pays, and they can pay a 20 percent coinsurance amount calculated from the Medicaid fee schedule. To the extent that dual-eligible beneficiaries are less lucrative for providers than other beneficiaries and are in jeopardy of being denied access, they are an important subgroup of beneficiaries for policymakers.

It is worth noting the distinction between beneficiaries with state buy-in benefits (which is what we can measure in the CMS Denominator data) and dual eligible beneficiaries. Specifically, the buy-in beneficiaries that we analyze are not identical to dual eligibles, which CMS defines as "individuals who are entitled to Medicare Part A and/or Part B and are eligible for some form of Medicaid benefit".[7] As described in ResDAC (2006), it is not possible to identify all dual eligibles directly from the Denominator files alone. Dual eligibles not captured in our analysis would include, for example, those enrolled in both Medicare and Medicaid but without state Medicaid buy-in.

Users of physician-administered drugs. There is some evidence that beneficiaries with buy-in coverage found it more difficult than beneficiaries without to gain access to injected drugs during the ASP period. Those with buy-in coverage during the ASP reimbursement period were less likely to receive all Part B drugs in a physician's office (66.4 percent for those with buy-in coverage versus 74.2 percent for those without buy-in) and more likely to receive at least one drug in a hospital emergency room (12.8 percent versus 6.1 percent) (Table IV.4). Proportions receiving at least one drug in a hospital OPD were comparable for the two groups.

Out-of-pocket liabilities for Part B–covered services and all Medicare services in the ASP period for those with buy-in coverage were both higher than out-of-pocket liabilities for beneficiaries without state buy-in. While Medicare spending on Part B drugs was lower for those with buy-in coverage ($683 per beneficiary per quarter, compared with $750 for those without buy-in coverage), overall Medicare spending was higher ($3,661 versus $3,195).

While the differences between beneficiaries with and without state buy-in coverage in the ASP period were statistically significant even after incorporating a time trend, the differences in

[7] See http://www.cms.hhs.gov/DualEligible/01_Overview.asp (accessed July 9, 2009).

TABLE IV.4

DIFFERENCES IN ACCESS AND MEDICARE SPENDING FOR BENEFICIARIES WITH AND WITHOUT STATE BUY-IN, 2003–2007

	Beneficiaries Without State Buy-In Using Physician-Administered Drugs	Beneficiaries With State Buy-In Using Physician-Administered Drugs	Beneficiaries Without State Buy-In Using Inhalation Drugs	Beneficiaries With State Buy-In Using Inhalation Drugs	Beneficiaries Without State Buy-In Using Oral Drugs	Beneficiaries With State Buy-In Using Oral Drugs
At least one drug in a physician's office						
ASP period (2005–2007)	97.2%	96.8%*				
Percent change after accounting for underlying trend	-0.5%	-0.4%				
All drugs in a physician's office						
ASP period (2005–2007)	74.2%	66.4%*				
Percent change after accounting for underlying trend	0.6%	-0.5*				
At least one drug in an emergency room						
ASP period (2005–2007)	6.7%	12.8%*				
Percent change after accounting for underlying trend	3.5%	4.1%				
At least one drug in a hospital outpatient dept.						
ASP period (2005–2007)	18.2%	18.7%*				
Percent change after accounting for underlying trend	-5.2%	-3.6%				
Medicare Part B out-of-pocket liabilities						
ASP period (2005–2007)	$427	$441*	$281	$335*	$1,266	$954*
Percent change after accounting for underlying trend	-2.6%	-0.9%	-13.1%	-21.4%*	-0.9%	-0.6%
Total Medicare out-of-pocket liabilities						
ASP period (2005–2007)	$555	$601*	$497	$567*	$1,512	$1,207*
Percent change after accounting for underlying trend	-1.2%	0.4%	-6.2%	-12.2%*	0.0%	-0.1%
Medicare Part B drug spending						
ASP period (2005–2007)	$750	$683*	$463	$504*	$3,149	$2,381*
Percent change after accounting for underlying trend	-11.7%	-14.3%	-43.7%	-57.8%*	-6.8%	-9.3%
Medicare Part B drug fee spending						
ASP period (2005–2007)	$203	$189*	$66	$67	$61	$76*
Percent change after accounting for underlying trend	-19.4%	-17.8%*	753.1%	697.3%*	n.m.	n.m.

TABLE IV.4 *(continued)*

	Beneficiaries Without State Buy-In Using Physician-Administered Drugs	Beneficiaries With State Buy-In Using Physician-Administered Drugs	Beneficiaries Without State Buy-In Using Inhalation Drugs	Beneficiaries With State Buy-In Using Inhalation Drugs	Beneficiaries Without State Buy-In Using Oral Drugs	Beneficiaries With State Buy-In Using Oral Drugs
Total Medicare Spending						
ASP period (2005–2007)	$3,195	$3,661*	$3,783	$4,451*	$9,091	$8,310*
Percent change after accounting for underlying trend	-0.9%	2.4%*	-4.2%	-4.1%	-1.5%	-2.3%

Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars. The percent change is computed for the ASP period relative to the based period (2003). The percent change for supplying/dispensing fees is not meaningful for oral drug users, as t here were no supplying fees for oral drugs in the base period.

*The with state buy-in value is significantly different ($p<0.01$) from the corresponding without state buy-in value after adjusting for the presence of an underlying secular trend.

n.m. = not meaningful.

changes over time generally were not, which suggests that the implementation of payment reform did not differentially affect the two groups in substantive ways. Only the changes in the proportion receiving all drugs in a physician's office, spending on drug administration fees, and total Medicare spending were statistically distinct for the two groups of beneficiaries. Specifically, while the proportion of beneficiaries without buy-in coverage receiving all physician-administered drugs in a physician's office increased slightly over time, the corresponding proportion of those without decreased by 0.5 percent. Spending on drug administration fell somewhat less for beneficiaries with state buy-in than for beneficiaries without it. A 2.4 percent jump in overall Medicare spending entering the ASP period characterized beneficiaries with buy-in coverage, while total spending on beneficiaries without buy-in coverage fell slightly after accounting for the underlying trend.

Users of inhalation or oral drugs. On average, both out-of-pocket liabilities and Medicare spending for those with buy-in coverage and using inhalation drugs were higher in the ASP period than for those without buy-in coverage. Specifically, the former group had out-of-pocket liabilities for Part B services of $335 per quarter, 19 percent higher than the corresponding figure of $281 for beneficiaries without buy-in (Table IV.4). Total out-of-pocket liabilities for dual-eligibles are $567 (compared with $497), Part B drug spending is $504 (compared with $463), and total Medicare spending is $4,451 (compared with $3,783). While spending levels were significantly higher for those with buy-in coverage, the declines in out-of-pocket liabilities and Part B drug spending from the base period were significantly greater for this subgroup, even after accounting for the underlying trend: Part B out-of-pocket liabilities fell 21.4 percent in the ASP period (compared with 13.1 percent for beneficiaries without buy-in), total out-of-pocket liabilities decreased 12.2 percent (versus 6.2 percent), and Part B drug spending fell 57.8 percent (versus 43.7 percent).

In contrast to beneficiaries with buy-in coverage using inhalation drugs, those using oral drugs have lower out-of-pocket liabilities and lower Medicare spending. The differences are substantial. Part B out-of-pocket liabilities, at $954 per beneficiary per quarter, are 25 percent lower than for beneficiaries without buy-in coverage, and total out-of-pocket liabilities, at $1,207, are 20 percent lower. Quarterly Medicare Part B drug spending for the typical beneficiary with buy-in coverage ($2,381) is 24 percent lower. However, changes in all spending outcomes from 2003 to the ASP period were statistically comparable for the two subgroups, which implies that the observed differences in the ASP period were not brought about by the implementation of payment reform.

In summary, while we consistently observe disparities in outcomes between beneficiaries with and without state buy-in coverage, these disparities generally existed prior to the introduction of ASP-based pricing, and there is little evidence that they were significantly exacerbated by payment reform. For some outcomes, there is evidence of a reduction of disparities from 2003 to the ASP period. For example, out-of-pocket liabilities and Medicare Part B drug spending, while higher throughout the sample period for those with buy-in coverage, also declined more sharply in the ASP period for that subgroup than for beneficiaries without buy-in. Furthermore, other research has shown that dual eligible beneficiaries are more likely to use more services, regardless of their Part B Medicare drug use, which suggests this is unrelated to the Part B payment reforms. (Coughlin, Theresa et al., 2009) The persistence of disparities in the ASP period suggests that the experience of beneficiaries with buy-in coverage should be watched in the future, but to date it is not evident that payment reform decreased access for them relative to beneficiaries without buy-in coverage.

b. Urban Versus Rural Beneficiaries

We also compared outcomes for urban versus rural residents. Rural beneficiaries tend to be both poorer and sicker, on average, than urban ones (MedPAC 2007). Reschovsky and Staiti (2005) report that there are fewer physicians per capita in rural areas, which suggests that care options for beneficiaries are limited. If rural physicians are more likely than their urban counterparts to be self-employed or in a solo practice (Miller and Zuckerman 1991), they may be unable to negotiate volume discounts for Part B–covered drugs. Taken together, these facts suggest that any problems of access arising as a result of payment reform may be more severe for rural people.

Users of physician-administered drugs. Rural beneficiaries receiving physician-administered drugs were less likely than urban beneficiaries to receive their drugs in a physician's office in the ASP period, and more likely to receive them in a hospital. Rural beneficiaries were 5 percentage points less likely to receive all Part B drugs in a physician's office in a given quarter (69.4 percent versus 74.3 percent) but more likely to receive at least one drug in an emergency room or hospital OPD (Table IV.5). Moreover, the 5.4 percent increase from 2003 in the proportion of rural beneficiaries receiving at least one drug in an emergency room was significantly larger than the 3.0 percent increase for urban beneficiaries.

Out-of-pocket liabilities for rural beneficiaries were slightly higher than for their urban counterparts and grew over time, while urban beneficiary out-of-pocket liabilities fell. In contrast, Medicare spending on Part B drugs was lower for rural beneficiaries ($724 per beneficiary per quarter versus $745 for urban beneficiaries), as was spending on drug administration fees ($179 versus $208) and total Medicare spending ($3,130 versus $3,313).

TABLE IV.5

DIFFERENCES IN ACCESS AND MEDICARE SPENDING FOR URBAN AND RURAL BENEFICIARIES, 2003–2007

	Urban Beneficiaries Using Physician-Administered Drugs	Rural Beneficiaries Using Physician-Administered Drugs	Urban Beneficiaries Using Inhalation Drugs	Rural Beneficiaries Using Inhalation Drugs	Urban Beneficiaries Using Oral Drugs	Rural Beneficiaries Using Oral Drugs
At least one drug in a physician's office						
ASP period (2005–2007)	97.3%	96.6%*				
Percent change after accounting for underlying trend	-0.5%	-0.5%				
All drugs in a physician's office						
ASP period (2005–2007)	74.3%	69.4%*				
Percent change after accounting for underlying trend	0.6%	0.1*				
At least one drug in an emergency room						
ASP period (2005–2007)	7.1%	9.4%*				
Percent change after accounting for underlying trend	3.0%	5.4%				
At least one drug in a hospital outpatient dept.						
ASP period (2005–2007)	17.6%	20.1%*				
Percent change after accounting for underlying trend	-5.3%	-4.1%				
Medicare Part B out-of-pocket liabilities						
ASP period (2005–2007)	$426	$440*	$268	$348*	$1,156	$1,217*
Percent change after accounting for underlying trend	-3.4%	0.5%	-17.6%	-12.1%	-1.0%	0.0%
Total Medicare out-of-pocket liabilities						
ASP period (2005–2007)	$558	$572*	$497	$554*	$1,404	$1,464*
Percent change after accounting for underlying trend	-1.5%	0.8%*	-8.5%	-7.2%	-0.2%	0.9%
Medicare Part B drug spending						
ASP period (2005–2007)	$745	$724*	$440	$538*	$2,914	$2,919
Percent change after accounting for underlying trend	-12.2%	-11.6%	-49.8%	-44.1%	-6.1%	-10.9%
Medicare Part B drug fee spending						
ASP period (2005–2007)	$208	$179*	$66	$68	$65	$66
Percent change after accounting for underlying trend	-21.2%	-12.1%*	758.3%	701.5%*	n.m.	n.m.

TABLE IV.5 *(continued)*

	Urban Beneficiaries Using Physician-Administered Drugs	Rural Beneficiaries Using Physician-Administered Drugs	Urban Beneficiaries Using Inhalation Drugs	Rural Beneficiaries Using Inhalation Drugs	Urban Beneficiaries Using Oral Drugs	Rural Beneficiaries Using Oral Drugs
Total Medicare Spending						
ASP period (2005–2007)	$3,313	$3,130*	$4,023	$3,901*	$8,939	$8,575
Percent change after accounting for underlying trend	-0.6%	0.6%	-4.4%	-4.4%	-1.7%	-1.4%

Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars. The percent change is computed for the ASP period relative to the based period (2003). The percent change for supplying/dispensing fees is not meaningful for oral drug users, as there were no supplying fees for oral drugs in the base period.

*The rural value is significantly different ($p<0.01$) from the corresponding urban value after adjusting for the presence of an underlying secular trend.

n.m. = not meaningful.

Users of inhalation or oral drugs. In the ASP period, rural beneficiaries using inhalation drugs incurred higher out-of-pocket liabilities—both for Part B services ($338 per quarter) and overall ($554)—than did urban beneficiaries ($268 and $497 for Part B and total out-of-pocket liabilities, respectively). While spending on Part B drugs was significantly higher for rural beneficiaries ($538, compared with $440), total Medicare spending was comparable for the two subgroups.

Outcomes for rural and urban oral-drug users in the ASP period are generally comparable: for no outcome do they vary by more than 5 percent.

As with the comparison between beneficiaries with and without state buy-in, disparities in outcomes exist in the ASP period between rural and urban beneficiaries, but these disparities existed prior to payment reform and did not grow (or shrink) appreciably following the introduction of ASP pricing. As a result, it is likely that any changes in access to Part B drugs were comparable for rural and urban beneficiaries.

c. Beneficiaries With Versus Without Part D Prescription Drug Coverage

A third set of subpopulation comparisons measured outcomes for beneficiaries with Part D prescription drug coverage and those without it. The Part D benefit covers the vast majority of oral or self-administered drugs not covered by Part B. Moreover, some drugs that are covered by Part B under certain circumstances are payable under Part D in other circumstances.[8]

Part D coverage could affect outcomes for Part B drug users in at least two ways. First, because the drug benefit makes Part D drugs more affordable, Part B drug users with Part D coverage might be more likely (relative to those without Part D) to use other drugs that are both covered under Part D and complement or enhance the therapeutic effect of the Part B drugs.

[8] See Centers for Medicare & Medicaid Services (2005) for a detailed discussion of this issue.

Second, where Part D substitutes for Part B drugs exist, the implementation of Part D might have prompted some beneficiaries to switch from a Part B drug to its Part D counterpart. For example, there is evidence that, prior to Part D, some physicians preferentially treated Medicare beneficiaries with rheumatoid arthritis with the physician-administered drug infliximab rather than with the self-administered drug etanercept because the former was covered by Part B and the latter was not covered by Medicare at all (DeWitt et al. 2006).

Because Part D coverage was introduced in 2006—after the Part B payment reforms were already in place—it is not possible to observe how the experience of beneficiaries with Part D coverage changed following the implementation of payment reform, relative to the experience of those without Part D coverage. We can observe differences only in the post-reform period. Moreover, our data do not enable us to compare beneficiaries with Part D coverage against those without *any* creditable drug coverage.[9] Instead we can only make comparisons to beneficiaries without Part D coverage, many of whom do have other drug coverage.[10] Finally, if beneficiaries choose to enroll in a Part D plan on the basis of their underlying health status and anticipated need for prescription medications, it will not be possible to attribute differences in outcomes between beneficiaries with and without Part D coverage to Part D enrollment itself. Owing to the significance of these limitations, the results that we summarize here should be viewed as exploratory.

[9] Creditable drug coverage is coverage that is at least as good as the standard Part D coverage plan.

[10] As of January 2007, about 17 million beneficiaries in the fee-for-service (FFS) program were enrolled in stand-alone (non-Medicare Advantage) Part D plans. Of the remaining 19 million FFS beneficiaries without Part D coverage, about 15 million had drug coverage through other sources (such as retiree, union, and TRICARE plans), and the remaining 4 million beneficiaries lacked drug coverage (Kaiser Family Foundation 2007). Other sources of drug coverage include the Federal Employee Health Benefits program, the Veterans Administration, and the Indian Health Service. Thus, only about 20 percent of beneficiaries without Part D coverage actually lack drug coverage.

In both 2006 and 2007, beneficiaries with Part D coverage who used physician-administered Part B drugs were somewhat less likely to receive all of their Part B drugs in physicians' offices, relative to beneficiaries without Part D coverage, and somewhat more likely to receive at least one drug in a hospital setting. Moreover, Part D beneficiaries' spending was higher than for those without Part D whether measured in terms of out-of-pocket liabilities (Part B and overall) or Medicare reimbursements (on Part B drugs, drug administration fees, and overall). Across all five spending measures, spending in 2007 was roughly five percent higher for beneficiaries with Part D coverage than for those without it. These results are presented in detail in Appendix F.

As with beneficiaries receiving physician-administered drugs, spending for beneficiaries receiving inhalation drugs with Part D coverage was higher than for beneficiaries without Part D, by approximately five percent across all five spending measures in 2007. In contrast, spending for Part D-covered beneficiaries receiving oral drugs *was* lower—by approximately two percent, on average, in 2007—than for beneficiaries without Part D.[11]

Because the Medicare program automatically enrolled dual-eligible beneficiaries into Part D and offered substantial Part D premium and cost-sharing assistance to other low-income beneficiaries, low-income beneficiaries make up a significant proportion of Part D enrollees.[12] We investigated the extent to which the differences in outcomes described above were driven by the low-income population by replicating our analysis with beneficiaries with state buy-in excluded. (Detailed results are in Appendix F.) We found that the differences between Part D

[11] The results were similar for 2006 for both users of inhalation and oral drugs. The differences between injected and oral drug users might reflect a different interaction of Part D coverage with the mix of clinical conditions among users of Part B oral drugs than among users of Part B injected and inhalation drugs, as well as differences in health status between Part D enrollees and non-enrollees among users of Part B oral drugs.

[12] For example, in our sample of patients who received a physician-injected Part B drug in 2006, 26 percent were in a state buy-in program, compared with fewer than 7 percent of those not enrolled in Part D.

enrollees and non-enrollees were substantially smaller but still persisted when only beneficiaries without buy-in were considered.

In summary, injected Part B drug users with Part D coverage were less likely to receive all of their drugs in a physician's office than those without Part D coverage. Part B out-of-pocket liabilities and Medicare spending were higher for injected or inhalation drug users with Part D coverage than for those without Part D in 2006 and 2007 but lower for oral drug users with Part D coverage; the same pattern held when beneficiaries with buy-in were excluded. While our analysis does not permit firm conclusions on the cause of these differences, one explanation that is consistent with our findings is that enrollees in Part D have poorer health than non-enrollees.

5. Summary of Findings for Beneficiaries Receiving Physician-Administered, Inhalation, or Oral Drugs

Overall, there is little evidence of meaningful shifts in the site of care (for physician-administered drugs) when all Part B drug users are considered together. Moreover, increases in spending (either by Medicare or beneficiaries) that could signal worsening health conditions as a result of delayed care were not observed; on the contrary, spending declined or remained steady from 2003 through the ASP period after accounting for underlying trends. While disparities for vulnerable groups such as beneficiaries with state buy-in or those living in rural areas persisted following the implementation of ASP-based pricing, these disparities also existed prior to payment reform and did not increase or decrease markedly over the study period.

For beneficiaries receiving physician-administered drugs, there has been little change over time in where they received their drugs. While we observed a slight decrease in the proportion receiving at least one drug in a physician's office after accounting for underlying trends, we also observed a slight increase in the proportion receiving all drugs at a physician's office. Similarly,

a small increase in the proportion of beneficiaries receiving at least one injected drug in an emergency room was observed alongside a 4.9 percent decrease in the proportion receiving at least one drug in a hospital OPD.

Medicare spending on physician-administered drugs declined 12.1 percent from 2003 to the ASP period (2005–2007), accompanied by a 17.0 percent decline in drug administration fees for drugs administered in physicians' offices; total spending, however, was unchanged after accounting for the underlying trend. Part B out-of-pocket liabilities for injected-drug users declined slightly during the study period.

In contrast with injected-drug users, statistically significant declines in all spending measures except supplying/dispensing fees were observed for beneficiaries using inhalation drugs. Part B drug spending declined substantially, by 47.9 percent, from 2003 to the ASP period, after accounting for trends. Outcomes for oral-drug users in the ASP period were comparable to outcomes in 2003, however, with the exception of Part B drug spending, which was 7.3 percent lower on a trend-adjusted basis.

While the proportion of beneficiaries receiving all physician-administered drugs in a physician's office in a given quarter increased for Medicare-only beneficiaries over the sample period, it decreased slightly for beneficiaries with buy-in coverage, and buy-ins in both 2003 and the ASP period were more likely to receive at least one drug in a hospital. While out-of-pocket liabilities, Medicare reimbursements for Part B drugs, and total per-beneficiary Medicare reimbursements were higher for those with buy-in coverage in the ASP period for both users of injected drugs and users of inhalation drugs, these spending measures were all *lower* for buy-ins using oral drugs than for their counterparts without buy-in coverage.

A similar pattern prevailed for rural relative to urban beneficiaries, with rural beneficiaries receiving physician-administered drugs more likely to receive at least one drug in a hospital and incurring higher out-of-pocket liabilities. Medicare spending both for Part B drugs and overall was lower for rural than urban beneficiaries. Rural inhalation drug users had higher out-of-pocket liabilities and Medicare Part B drug spending but lower Medicare total spending than urban inhalation drug users.

Regarding the possible influence of Part D enrollment, we find that the likelihood of receiving Part B drugs in a physician's office is lower for those with Part D coverage than for those without it, and that out-of-pocket liabilities and Medicare expenditures are generally higher for Part D enrollees. However, these are just noted differences. Limitations in the data, including the inability to control for any crediable drug coverage or for the acuity level of illness, and the fact that Part D was introduced after the Part B reforms were already in place, limits the ability to draw implications from these differences.

D. TRENDS FOR BENEFICIARIES WHO USED SPECIALTY-SPECIFIC DRUGS

Physician specialists were not all affected equally by the drug policy change. As discussed in Chapter III, some specialists derive larger portions of their revenues from the provision of Part B drugs. As a result, they might be more aware of the changes in policies, their revenues might be more sensitive to drug payment reform, and they might therefore be more likely to change their practices. In the previous chapter, we did not find evidence that practice patterns changed for different specialists, but revenues did decline for hematologist/oncologists and urologists. These revenue declines could induce specialists to change their behaviors in ways we did not identify with our claims analysis, such as referring less-profitable patients to generalists.

Consequently, beneficiaries served by these specialists might be especially vulnerable to providers' behavioral responses to reform. If generalists provide these beneficiaries with the same treatment that specialists would have, increasing referrals to generalists need not represent a problem of access to care and could result in lower spending (to the extent that generalists are less expensive than specialists). To examine whether potential shifts from specialists to generalists influence outcomes, we examine the experience of beneficiaries using drugs prescribed by specialists in hematology-oncology, urology, rheumatology, or allergy-immunology/infectious diseases.

1. Changes in the Site of Care for Users of Specialty-Specific Drugs

The relative stability over time of the proportions of beneficiaries receiving all or at least one of their physician-administered drugs in a doctor's office masked substantial variation in the experience of users of different classes of Part B drugs, with users of hematology-oncology drugs showing the greatest decline in the likelihood of receiving one or more injected drugs in a physician's office and the greatest increase in the likelihood of receiving drugs at a hospital. After accounting for underlying trends, there was little change from 2003 to the ASP period in the proportions of urology, rheumatology, or allergy-immunology drug users who received at least one drug or all physician-administered drugs in a doctor's office. In contrast, the proportions of users of hematology-oncology drugs who received at least one drug or all drugs in a physician's office were 8.0 and 9.4 percent lower, respectively, than they were in 2003 (Table IV.6). In similar fashion, the proportions of beneficiaries receiving at least one drug in an emergency room was statistically unchanged for users of urology, rheumatology, and allergy-immunology drugs, but rose 5.4 percent for users of hematology-oncology drugs.

TABLE IV.6

BENEFICIARIES RECEIVING PHYSICIAN-ADMINISTERED DRUGS: PROPORTIONS RECEIVING PHYSICIAN-ADMINISTERED DRUGS IN A TYPICAL QUARTER, BY SITE OF CARE AND SPECIALTY, 2003-2007

	Users of Hematology-Oncology Drugs	Users of Urology Drugs	Users of Rheumatology Drugs	Users of Allergy-Immunology/Infectious Diseases Drugs
At least one drug in a physician's office				
Base period (2003)	90.5%	94.8%	99.2%	98.8%
ASP period (2005–2007)	91.8%	92.3%	99.2%	97.5%
Percent change	1.4%	-2.7%	0.1%	-1.3%
Percent change after accounting for underlying trend	-8.0%	-	0.2%	-1.9%
All drugs in a physician's office				
Base period (2003)	56.1%	73.3%	79.0%	64.7%
ASP period (2005–2007)	53.8%	70.1%	77.7%	55.5%
Percent change	-4.0%	-4.4%	-1.5%	-14.2%
Percent change after accounting for underlying trend	-9.4%	-	1.0%	-
At least one drug in an emergency room				
Base period (2003)	10.0%	4.8%	6.4%	10.7%
ASP period (2005–2007)	12.5%	5.4%	7.1%	13.7%
Percent change	25.2%	14.3%	11.5%	27.2%
Percent change after accounting for underlying trend	5.4%	-	-	-
At least one drug in a hospital outpatient dept.				
Base period (2003)	34.2%	21.1%	12.6%	22.1%
ASP period (2005–2007)	34.9%	24.1%	13.4%	30.6%
Percent change	2.3%	14.6%	6.2%	38.4%
Percent change after accounting for underlying trend	14.5%	-4.9%	-10.6%	-

Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars. Changes that are not statistically different from zero (p>0.01) are denoted with a dash (-).

The proportion of injected-drug users receiving at least one drug in a hospital OPD fell significantly for urology drug users and rheumatology drug users (by 4.9 and 10.6 percent, respectively) but increased 14.5 percent for users of hematology-oncology drugs.

2. Changes in Beneficiary Out-of-Pocket Liabilities and Medicare Spending for Users of Specialty-Specific Drugs

Out-of-pocket liabilities declined for both users of hematology-oncology drugs and users of urology drugs. Specifically, out-of-pocket liabilities for Part B–covered services decreased from 2003 to the ASP period for users of hematology-drugs (a 2.6 percent decline after accounting for the underlying trend) and urology drugs (16.0 percent); total out-of-pocket liabilities also decreased 2.5 and 13.6 percent for users of hematology-oncology and urology drugs, respectively (Table IV.7). In contrast, beneficiary coinsurance rose for both Part B services (3.9 percent) and all Medicare services (4.2 percent) for users of rheumatology drugs. Out-of-pocket liabilities were statistically unchanged for users of immunology drugs in spite of sharp increases in both categories—29.6 percent and 24.8 percent for Part B and total liabilities, respectively—prior to correcting for the presence of an underlying trend.

After accounting for underlying trends, Part B drug spending was significantly lower in the ASP period than in 2003 for users of all classes of drugs except allergy-immunology, with the bulk of the declines occurring in the first quarter of 2005, when ASP-based reimbursement took effect. Drug spending for users of hematology-oncology, urology, or rheumatology drugs declined 9.1, 30.2, and 13.1 percent, respectively. Spending on drug administration fees declined for users of all types of specialty-specific drugs, with decreases ranging from 8.3 percent (rheumatology) to 30.1 percent (allergy-immunology).

TABLE IV.7

AVERAGE QUARTERLY OUT-OF-POCKET LIABILITIES AND MEDICARE SPENDING PER BENEFICIARY USING PHYSICIAN-ADMINISTERED DRUGS, BY SPECIALTY, 2003–2007

	Users of Hematology-Oncology Drugs	Users of Urology Drugs	Users of Rheumatology Drugs	Users of Allergy-Immunology/Infectious Diseases Drugs
Medicare Part B out-of-pocket liabilities				
Base period (2003)	$1,224	$630	$225	$436
ASP period (2005–2007)	$1,114	$480	$234	$565
Percent change	-	-23.8%	4.1%	29.6%
Percent change after accounting for underlying trend	-2.6%	-16.0%	3.9%	-
Total Medicare out-of-pocket liabilities				
Base period (2003)	$1,419	$737	$315	$599
ASP period (2005–2007)	$1,309	$585	$326	$747
Percent change	-7.8%	-20.6%	3.3%	24.8%
Percent change after accounting for underlying trend	-2.5%	-13.6%	4.2%	-
Medicare Part B drug spending				
Base period (2003)	$2,932	$1,522	$230	$550
ASP period (2005–2007)	$2,683	$892	$254	$718
Percent change	-8.5%	-41.4%	10.3%	30.5%
Percent change after accounting for underlying trend	-9.1%	-30.2%	-13.1%	-
Medicare Part B drug administration fee spending				
Base period (2003)	$796	$142	$103	$334
ASP period (2005–2007)	$542	$134	$98	$246
Percent change	-32.0%	-5.8%	-4.5%	-26.4%
Percent change after accounting for underlying trend	-22.1%	-23.6%	-8.3%	-30.1%
Total Medicare spending				
Base period (2003)	$6,989	$3,406	$1,692	$3,373
ASP period (2005–2007)	$6,855	$2,953	$1,840	$4,376
Percent change	-1.9%	-13.3%	8.7%	29.7%
Percent change after accounting for underlying trend	-4.6%	-14.1%	-	-5.4%

Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars. Changes that are not statistically different from zero (p>0.01) are denoted with a dash (-).

Total per-beneficiary quarterly Medicare spending for users of physician-administered drugs decreased over the study period for users of hematology-oncology, urology, or immunology drugs while remaining statistically unchanged for users of rheumatology drugs, after adjusting for trends. As with spending on Part B drugs, the decrease was largest for urology drugs (14.1 percent). Spending for oncology drug users decreased less (4.6 percent), but from the largest base: per-beneficiary quarterly spending was $6,989 in 2003, more than twice as great as for urology, the specialty with the second-highest amount of spending. Total Medicare spending for immunology drugs decreased 5.4 percent from a 2003 base of $3,373 per beneficiary per quarter.

The changes in out-of-pocket liabilities and Medicare spending that were especially evident for users of urology drugs related to a substantial decrease in the use of such drugs generally, and leuprolide acetate suspension (Lupron or Eligard) and goserelin acetate implant (Zoladex) in particular. Over the sample period, claims for sampled beneficiaries for drugs on our urology drugs list fell 29.2 percent. Claims for leuprolide acetate suspension and goserelin acetate implant fell 43.9 and 80.1 percent, respectively.[13] While the reason for these declines is not clear, they could be related to a change in overall practice from aggressively treating prostate cancer to increasingly relying on "watchful waiting." While Albertsen et al. (2005) published findings supportive of watchful waiting during this period, its effectiveness as a general approach to treating prostate cancer remains unclear (Bailey 2007). However, MedPAC (2007) found that the largest reduction in utilization of urology drugs occurred in the practices and regions where utilization had previously been highest. Their report suggests that articles linking the use of hormone-suppressing drugs to diabetes, cardiovascular disease, and hip fracture (Keating et al.

[13] The frequency of allowed services for our set of urology drugs in 2004, 2005, 2006, and 2007 fell 4.4 percent, 6.0 percent, 5.8 percent, and 16.4 percent, respectively. Leuprolide acetate suspension was the most prescribed urology drug on our list in 2003, representing 16.1 percent of urology drug claims. Goserelin acetate implant constituted 12.7 percent of claims.

2006; Shahinian 2005), combined with the implementation of ASP pricing, might have induced physicians who had previously prescribed the drugs heavily to prescribe them less frequently, especially to low-risk patients.

3. Summary of Findings for Beneficiaries Receiving Specialty-Specific Drugs

Significant changes in access-related outcomes occurred for users of hematology-oncology drugs, where proportions receiving at least one drug or all drugs in a physician's office fell by 8.0 and 9.4 percent, respectively, while proportions receiving one or more drugs in a hospital setting both increased. Medicare spending on physician-administered drugs declined 12.1 percent from 2003 to the ASP period (2005–2007) after accounting for the trend, a result attributable to declines in drug spending for users all specialty-specific drug classes except allergy-immunology. Medicare spending on fees for drug administration in a physician's office declined for each drug category and also overall. Total Medicare spending declined in the hematology-oncology, urology, and allergy-immunology categories. Out-of-pocket liabilities were lower in the ASP period for users of urology and hematology-oncology drugs but higher for users of rheumatology drugs.

The evidence does not clearly indicate whether access to specialty-specific drugs has diminished in the wake of payment reform. To the extent that access problems have increased for any class of specialty-specific drugs, the effect to date has been quite modest. For no class of specialty-specific drugs do observed changes in spending outcomes indicate potential access problems. Moreover, while it is true that users of hematology-oncology drugs were less likely to receive drugs in a physician's office in the ASP period after accounting for the underlying trend, the actual changes in sites of care for these beneficiaries from the beginning to the end of the sample period were relatively small. For example, the proportion of beneficiaries receiving all drugs in a physician's office fell slightly under 3 percentage points over the sample period, from

56.8 percent in the first quarter of 2003 to 54.0 percent in the final quarter of 2007. These small changes might or might not grow larger over time. Instead of having identified certain groups of beneficiaries who are likely to be having difficulty obtaining access to needed Part B drugs, it is more likely that we have identified the groups that are most vulnerable to access problems and therefore should be watched most closely for adverse effects.

E. TRENDS FOR BENEFICIARIES WHO USED POLICY-SENSITIVE SPECIFIC DRUGS

The analysis presented so far and in previous reports suggests that many beneficiaries have not been adversely affected by the policy change. However, as the experience of users of specialty-specific drugs showed, beneficiaries receiving certain types of drugs might have been affected more than others. To investigate this further, this section examines what happened to beneficiaries who used drugs that experienced the most significant declines in price. If physicians did change their behavior in response to the payment reforms, they would most likely change in response to the largest price decreases.

To assess the possible impact of payment reform for users of specific drugs, we first examine whether commonly prescribed Part B drugs in the year prior to the introduction of ASP-based reimbursement (2004) remained commonly prescribed in the final year of our sample (2007). Large changes in the set of Part B drugs most heavily prescribed could indicate changes in prescribing behavior that are associated with the adoption of ASP-based reimbursement. We then analyze the experience of users of one or more "policy-sensitive" drugs, which we define as drugs that had over $10 million in allowed charges in 2004 and that experienced price cuts in excess of 33 percent entering 2005. These are commonly prescribed drugs, and beneficiaries using them could be particularly vulnerable to the effects of payment reform in ways not captured by earlier analyses. We examine users of each policy-sensitive drug separately to

ascertain whether patterns of access and spending for these users depart meaningfully from the more general patterns that we have already documented. If, for example, physicians stopped prescribing a particular policy-sensitive drug in response to reductions in payment limits, the effect on outcomes for more general populations—for example, all Part B drug users or all users of specialty-specific drugs—might be difficult to detect, whereas changes in outcomes for beneficiaries using that drug could be dramatic, especially if a close substitute was not available.

The most commonly prescribed drugs were generally the same in 2007 as in 2004, which suggests that prescribing patterns for common Part B drugs have not changed markedly in response to payment reform. Considering physician-administered, inhalation, and oral drugs separately, 8 of the 10 most commonly prescribed physician-administered drugs in our sample for 2004 were also among the most prescribed in 2007; nine of the top 10 oral drugs in 2004 also remained heavily prescribed in 2007 (Table IV.8). For inhalation drugs, the comparison is less straightforward, as variants of albuterol/levalbuterol, ipratropium bromide, and budesonide all appear multiple times on one or both lists. Nonetheless, these drugs, along with metaproterenol sulfate, cromolyn sodium, and acetylcysteine, were among the most commonly prescribed drugs in both 2004 and 2007.

The policy-sensitive drugs described in Chapter II are of particular interest because they are heavily reimbursed drugs that experienced large reductions in reimbursement rates entering 2005. Even so, analyzing trends for specific drugs presents special challenges, as clinical findings (for example, establishing new uses for a drug or identifying harmful effects), the entry of generic competition, and changes in regulation specific to particular drugs all could drive changes in utilization during the ASP period. For example, Medicare Part B drug spending for users of nesiritide declined to zero in 2006 and 2007 following the publication of two studies

TABLE IV.8

PART B DRUGS WITH THE HIGHEST MEDICARE ALLOWED SERVICES
IN THE 2004 AND 2007 RANDOM SAMPLES

2004	2007
Physician-Administered Drugs	
1. Dexamethasone sodium phosphate	1. Vitamin B-12 cyanocobalamin
2. Vitamin B-12 cyanocobalamin	2. Dexamethasone sodium phosphate
3. Triamcinolone acetonide	3. Triamcinolone acetonide
4. Methylprednisolone acetate (J1030)	4. Methylprednisolone acetate (J1030)
5. Methylprednisolone acetate (J1040)	5. Epoetin alfa
6. Darbepoetin alfa	6. Methylprednisolone acetate (J1040)
7. Diphenhydramine HCl	7. Darbepoetin alfa
8. Heparin sodium	8. Diphenhydramine HCl
9. Ceftriaxone sodium	9. Ceftriaxone sodium
10. Fluorouracil	10. Betamethasone acetate and betamethasone sodium phosphate
Inhalation Drugs	
1. Albuterol (J7611-J7614, J7618-J7619)	1. Albuterol (J7620)
2. Ipratropium bromide	2. Albuterol (J7611-J7614, J7618-J7619)
3. Budesonide	3. Ipratropium bromide (J7644)
4. Albuterol (J7621)	4. Budesonide (J7626)
5. Triamcinolone	5. Ipratropium bromide (J7645)
6. Metaproterenol sulfate	6. Budesonide (J7627)
7. Cromolyn sodium	7. Acetylcysteine
8. Dexamethasone	8. Levalbuterol (J7615)
9. Acetylcysteine	9. Cromolyn sodium
10. Betamethasone	10. Metaproterenol sulfate
Oral Drugs	
1. Mycophenolate mofetil	1. Tacrolimus
2. Tacrolimus	2. Mycophenolate mofetil
3. Prednisone	3. Prednisone
4. Cyclosporine (J7515)	4. Cyclosporine (J7515)
5. Cyclosporine (J7502)	5. Cyclosporine (J7502)
6. Sirolimus	6. Sirolimus
7. Azathioprine	7. Mycophenolic acid
8. Ondansetron HCl	8. Ondansetron HCl
9. Diphenhydramine HCl	9. Azathioprine
10. Dolasetron mesylate	10. Dexamethasone

Source: Medicare claims data.

linking the drug to renal failure (Sackner-Bernstein et al. 2005a) and increased mortality (Sackner-Bernstein et al. 2005b). Spending for users of metaproterenol sulfate fell sharply in 2006 (before recovering somewhat in 2007) after a study linked the class of drugs to which it belongs to a heightened risk of respiratory death (Salpeter et al. 2006). Thus, special care should be taken in interpreting the association between changes in outcomes over time and payment reform for the drug-specific analyses.

In general, we do not find access problems for policy-sensitive drug users in our sample. Only 2 of 11 physician-administered, policy-sensitive drugs—granisetron hydrochloride and dolasetron mesylate, both anti-emetic drugs that are also available in oral form—show substantial changes in proportions of beneficiaries receiving drugs in a physician's office relative to a hospital. After accounting for the underlying trend, the proportion of granisetron users receiving all or at least one drug from a physician's office fell by 27.0 and 5.1 percent, respectively, from the base period to the ASP period; at the same time, proportions receiving at least one drug in an emergency room or OPD rose 21.9 and 6.6 percent, respectively (Table IV.9). The changes for dolasetron were even greater, with the proportions of dolasetron users receiving all or at least one drug in a doctor's office falling 90.9 and 19.6 percent, respectively, while the proportions receiving at least one drug in an emergency room or OPD rose 49.4 and 24.1 percent, respectively. The changes for granisetron and dolasetron cannot be accounted for by beneficiaries being sent from doctors' offices to hospitals for treatment, as the decline in claims in physicians' offices was extremely large compared to the increase in claims at hospitals; nor did we find evidence that physicians changed prescribing patterns to favor the oral forms over the injected forms.[14] Part of the change could be due to the increasing popularity of a

[14] Prescriptions for the oral version were far outnumbered by prescriptions for the injected version.

TABLE IV.9

CHANGES IN ACCESS AND MEDICARE SPENDING MEASURES FOR USERS OF POLICY-SENSITIVE DRUGS

Users of:	Percent Receiving All Part B Drugs in a Physician's Office*	Percent Receiving At Least 1 Part B Drug in a Physician's Office*	Percent Receiving At Least 1 Part B Drug in an ER*	Percent Receiving At Least 1 Part B Drug in a Hospital OPD*	Part B Beneficiary OOP Liabilities	Total Beneficiary OOP Liabilities	Part B Drug Medicare Spending	Part B Drug Fee Medicare Spending	Total Medicare Spending
Ipratropium bromide (N=356,466)									
Base period (2003)					$360	$579	$714	$13	$3,944
ASP period (2005–2007)					$286	$525	$447	$68	$4,177
Percent change					-20.4%	-9.3%	-37.3%	423.1%	5.9%
Percent change after accounting for underlying trend					-21.2%	-10.0%	-56.4%	650.7%	-4.6%
Milrinone lactate (N=1,535)									
Base period (2003)	13.7%	26.5%	10.3%	68.5%	$2,309	$2,711	$5,847	$1,141	$16,675
ASP period (2005–2007)	12.5%	28.6%	14.0%	72.1%	$1,964	$2,424	$5,742	$1,138	$18,634
Percent change	-	-	-	-	-	-	-	-	-
Percent change after accounting for underlying trend	-	-	-	-	-75.2%	-70.8%	-97.1%	-	-
Paclitaxel (N=29,402)									
Base period (2003)	34.5%	77.9%	11.3%	58.2%	$2,961	$3,306	$7,793	$1,408	$15,597
ASP period (2005–2007)	30.8%	78.5%	12.2%	62.7%	$2,317	$2,658	$5,199	$1,458	$13,490
Percent change	-10.8%	-	-	7.8%	-21.8%	-19.6%	-33.3%	3.6%	-13.5%
Percent change after accounting for underlying trend	-	-	-	-	-21.0%	-19.4%	-29.9%	-8.0%	-16.7%
Albuterol (N=539,485)									
Base period (2003)					$322	$541	$589	$12	$3,750
ASP period (2005–2007)					$289	$517	$439	$64	$4,004
Percent change					-10.2%	-4.5%	-25.4%	433.3%	6.8%
Percent change after accounting for underlying trend					-13.3%	-5.3%	-48.3%	703.3%	-
Pamidronate disodium (N=25,826)									
Base period (2003)	49.5%	77.5%	7.6%	44.8%	$1,276	$1,457	$3,343	$791	$7,174
ASP period (2005–2007)	48.6%	76.2%	6.9%	45.3%	$917	$1,090	$2,204	$520	$5,864
Percent change	-	-	-	-	-28.1%	-25.2%	-34.1%	-34.3%	-18.3%
Percent change after accounting for underlying trend	-	-	-	-	-22.8%	-21.0%	-29.0%	-28.9%	-16.3%
Metaproterenol sulfate (N=3,457)									
Base period (2003)					$1,060	$1,196	$2,727	$18	$6,283
ASP period (2005–2007)					$458	$622	$854	$68	$4,095
Percent change					-56.8%	-48.0%	-68.7%	277.8%	-34.8%
Percent change after accounting for underlying trend					-160.4%	-143.2%	-183.4%	378.3%	-101.8%

TABLE IV.9 *(continued)*

Users of:	Percent Receiving All Part B Drugs in a Physician's Office*	Percent Receiving At Least 1 Part B Drug in a Physician's Office*	Percent Receiving At Least 1 Part B Drug in an ER*	Percent Receiving At Least 1 Part B Drug in a Hospital OPD*	Part B Beneficiary OOP Liabilities	Total Beneficiary OOP Liabilities	Part B Drug Medicare Spending	Part B Drug Fee Medicare Spending	Total Medicare Spending
Leucovorin calcium (N=24,024)									
Base period (2003)	47.9%	85.0%	8.3%	43.8%	$1,985	$2,281	$4,990	$1,344	$12,242
ASP period (2005–2007)	32.8%	84.0%	10.3%	54.6%	$3,514	$3,809	$10,523	$1,995	$18,352
Percent change	-31.6%	-	24.2%	24.7%	77.0%	67.0%	110.9%	48.4%	49.9%
Percent change after accounting for underlying trend	-	-4.1%	-	-	17.3%	15.2%	34.3%	-23.0%	8.1%
Granisetron hydrochloride (N=41,198)									
Base period (2003)	41.5%	88.5%	10.5%	51.0%	$2,839	$3,158	$7,575	$1,467	$14,827
ASP period (2005–2007)	25.4%	68.1%	16.4%	64.3%	$2,358	$2,649	$5,924	$1,273	$12,906
Percent change	-38.7%	-23.1%	55.7%	26.2%	-16.9%	-16.1%	-21.8%	-13.2%	-13.0%
Percent change after accounting for underlying trend	-27.0%	-5.1%	21.9%	6.6%	-16.2%	-15.5%	-21.3%	-37.6%	-17.6%
Leuprolide acetate implant (N=2,847)									
Base period (2003)	69.4%	93.7%	5.2%	23.1%	$1,507	$1,644	$5,184	$146	$7,099
ASP period (2005–2007)	75.8%	97.8%	5.3%	16.9%	$688	$805	$1,865	$176	$4,030
Percent change	9.1%	4.4%	-	-26.6%	-54.3%	-51.1%	-64.0%	-	-43.2%
Percent change after accounting for underlying trend	-5.8%	-	-	-	-33.7%	-31.0%	-37.9%	-	-23.5%
Dolasetron mesylate (N=55,392)									
Base period (2003)	36.4%	82.8%	13.3%	54.3%	$2,553	$2,848	$6,696	$1,245	$13,284
ASP period (2005–2007)	18.0%	53.4%	23.1%	67.9%	$1,911	$2,176	$4,030	$1,162	$10,424
Percent change	-50.7%	-35.5%	74.2%	25.1%	-25.2%	-23.6%	-39.8%	-6.7%	-21.5%
Percent change after accounting for underlying trend	-90.9%	-19.6%	49.4%	24.1%	-33.7%	-31.9%	-46.1%	-41.8%	-33.0%
Ceftriaxone sodium (N=124,207)									
Base period (2003)	59.9%	86.7%	19.5%	18.2%	$362	$572	$452	$281	$3,477
ASP period (2005–2007)	52.5%	79.6%	25.5%	20.9%	$359	$597	$375	$162	$3,928
Percent change	-12.3%	-8.1%	31.0%	14.9%	-	4.4%	-17.0%	-42.3%	13.0%
Percent change after accounting for underlying trend	-3.2%	-	-	-8.3%	-	-	-	-42.4%	-
Goserelin acetate implant (N=66,860)									
Base period (2003)	76.1%	96.7%	4.7%	18.3%	$630	$739	$1,519	$102	$3,479
ASP period (2005–2007)	70.1%	91.3%	5.3%	24.2%	$504	$610	$942	$111	$3,035
Percent change	-7.9%	-5.6%	13.2%	32.2%	-20.0%	-17.5%	-38.0%	8.8%	-12.8%
Percent change after accounting for underlying trend	3.1%	4.5%	-	-25.1%	-19.7%	-17.2%	-34.2%	-40.8%	-14.1%

TABLE IV.9 *(continued)*

Users of:	Percent Receiving All Part B Drugs in a Physician's Office*	Percent Receiving At Least 1 Part B Drug in a Physician's Office*	Percent Receiving At Least 1 Part B Drug in an ER*	Percent Receiving At Least 1 Part B Drug in a Hospital OPD*	Part B Beneficiary OOP Liabilities	Total Beneficiary OOP Liabilities	Part B Drug Medicare Spending	Part B Drug Fee Medicare Spending	Total Medicare Spending
Leuprolide acetate suspension (N=101,438)									
Base period (2003)	74.6%	95.5%	4.5%	19.8%	$695	$801	$1,817	$106	$3,642
ASP period (2005–2007)	71.6%	93.2%	5.2%	22.7%	$498	$605	$1,015	$100	$3,050
Percent change	-4.1%	-2.4%	16.3%	14.9%	-28.4%	-24.5%	-44.2%	-	-16.2%
Percent change after accounting for underlying trend	-	1.5%	-	-9.3%	-19.0%	-16.4%	-31.0%	-35.1%	-15.9%
Nesiritide (N=2,994)									
Base period (2003)	17.1%	32.2%	18.0%	74.7%	$1,195	$1,633	$3,356	$1,223	$11,621
ASP period (2005–2007)	14.0%	30.9%	19.0%	79.5%	$1,053	$1,497	$2,324	$557	$10,866
Percent change	-	-	-	6.5%	-11.8%	-8.4%	-30.8%	-54.5%	-
Percent change after accounting for underlying trend	-	-	-	-	-25.9%	-25.4%	-25.2%	-17.5%	-27.9%

Source: Medicare claims data.

Notes: Spending outcomes are measured in 2007 dollars. Changes that are not statistically different from zero (p>0.01) are denoted with a dash (-).

*Users of injected drugs only.

competing medication, palonosetron hydrochloride (Aloxi), in the middle of the decade. While the changes in site of care were larger for granisetron and dolasetron than for other policy-sensitive drugs, changes in spending outcomes for these two drugs were largely similar to changes for other drugs, with statistically significant and practically meaningful declines in all spending measures (after accounting for underlying trends) over the sample period.

In contrast, users of two urology drugs—goserelin acetate and leuprolide acetate suspension—were *more* likely to receive drugs at a physician's office in the ASP period and less likely to receive them in a hospital. There was no clear evidence that beneficiaries shifted sites of care for the other drugs: although proportions receiving all or at least one drug in a physician's office fell modestly for users of leuprolide acetate implant, ceftriaxone sodium, or leucovorin calcium, there was no corresponding rise in the proportions receiving at least one drug in a hospital.

Regarding spending outcomes for users of policy-sensitive drugs, out-of-pocket liabilities—both for Part B–covered services and overall—declined for users of all drugs except leucovorin and ceftriaxone after accounting for the underlying trend. (Part B and total out-of-pocket liabilities for users of leucovorin increased 17.3 and 15.2 percent, respectively, while liabilities for ceftriaxone were statistically unchanged.) Focusing on Part B liabilities, which include coinsurance for Part B drugs, the smallest decline after accounting for underlying trends occurred for users of albuterol (down 13.3 percent), while the largest decline occurred for users of milrinone lactate (down 75.2 percent).

Mirroring the results for out-of-pocket liabilities, Medicare Part B drug spending declined between 21.3 percent and 97.1 percent for users of all drugs except leucovorin (up 34.3 percent)

and ceftriaxone (statistically unchanged).[15] For users of any policy-sensitive drug, mean Medicare Part B spending rose 4.0 percent, from $1,372 per beneficiary per quarter in 2003 to $1,426 in the ASP period. However, after accounting for the underlying trend—drug spending was increasing through the sample period—per-beneficiary quarterly Part B drug spending was 30.1 percent lower in the ASP period than in the base period. Overall Medicare spending for policy-sensitive drug users was 6.1 percent lower after accounting for the underlying trend.

Drug fees (primarily dispensing fees) were sharply higher in the ASP period than in the base period for ipratropium bromide (651.7 percent), albuterol (703.3 percent), and metaproterenol sulfate (378.3 percent), consistent with changes to the schedule of dispensing fees for inhalation drugs adopted in 2005. In contrast, fees were generally lower in the ASP period for users of injected drugs, which reflects a decline from relatively high 2004 levels and is also consistent with changes in drug payment policy during this time.

Changes in outcome levels from the base period (2003) to the ASP period (2005–2007) are "long-term" effects in the sense that they capture changes in physician behavior that occur not only at the time reform is implemented but also with a lag. When post-reform outcomes are considered over longer periods, however, the likelihood that events unrelated to payment reform will influence outcomes increases, as the cases of nesiritide and metaproterenol sulfate discussed above illustrate. An alternative approach is to examine changes in outcomes over a narrower window that includes only the periods immediately before and after payment reform; doing so increases the likelihood that payment reform, rather than other events, drives any significant changes in outcome. The disadvantage of this alternative approach is that it captures only

[15] Leucovorin is generally provided as part of a more general chemotherapy regimen. While we do not have a definitive explanation for the rise in spending, a significant increase in the use of chemotherapy to treat, for example, colon cancer during the sample period could explain the increased utilization of—and hence spending on—leucovorin in the ASP period.

immediate responses to payment reform and not longer-term adjustments, while still not ruling out the possibility that confounding events could occur even in the shorter time period. To determine the sensitivity of our findings to the length of window chosen, we look at changes over time for one primary outcome of interest—Medicare spending on Part B–covered drugs—using two different windows: from 2004 to 2005 and from 2003 to 2007.

Changes in Medicare Part B drug spending were qualitatively similar for both windows, which suggests that the impact of confounding events on outcomes during the study period were modest (Table IV.10).[16] With a few exceptions, the more immediate changes (2004–2005) are of the same order of magnitude as the longer-term changes. For the broader classes of drugs (left side of table), the immediate declines were generally steeper than the longer-term changes, a consequence of the upward trend in drug spending over the full sample period. For the individual policy-specific drugs, however, the short-term changes were not uniformly more dramatic than the longer-term ones. While metaproterenol sulfate showed the steepest declines in both the short term and the longer term and leucovorin spending increased in both cases (with the 111 percent longer-term increase driving the 4 percent increase for policy-sensitive drugs overall), milrinone lactate declined sharply in the short run but relatively little in the longer run; in contrast, the longer-term decline for granisetron hydrochloride was more than 50 percent higher than the short-term decline (22 percent versus 14 percent).

[16] These are changes in mean outcomes and are not adjusted to account for the underlying trend.

TABLE IV.10

PERCENT CHANGES IN AVERAGE QUARTERLY PART B MEDICARE DRUG SPENDING FROM 2004 TO 2005

Users of	Percent Change from 2004 to 2005	Percent Change from 2003 to 2005–2007	Users of	Percent Change from 2004 to 2005	Percent Change from 2003 to 2005–2007
Part B Drugs	-15%	-11%	Ipratropium bromide	-47%	-37%
			Milrinone lactate	-49%	-2%
Physician-Administered Drugs	-11%	-6%	Paclitaxel	-28%	-33%
Hematology-oncology	-13%	-5%	Albuterol	-38%	-25%
Urology	-5%	-8%	Pamidronate disodium	-28%	-34%
Rheumatology	-34%	-41%	Metaproterenol sulfate	-60%	-69%
Allergy-immunology/ infectious diseases	-8%	10%	Leucovorin calcium	37%	111%
			Granisetron hydrochloride	-14%	-22%
			Leuprolide acetate implant	-50%	-64%
Pharmacy-Supplied Drugs	-20%	-2%	Dolasetron mesylate	-36%	-40%
Inhalation	-41%	-27%	Ceftriaxone sodium	-16%	-17%
Oral	-33%	-21%	Goserelin acetate implant	-36%	-38%
			Leuprolide acetate suspension	-36%	-44%
Policy-Sensitive Drugs	-12%	4%	Nesiritide	-29%	-31%

Source: Medicare claims data.

F. CONCLUSIONS

The results of our analysis of Medicare beneficiaries indicate that Medicare spending on Part B drugs has declined significantly between the base year of 2003 and the ASP period (2005–2007), while the sites of care for users of physician-administered drugs as a group have not changed dramatically.

After accounting for underlying trends, proportions of beneficiaries using physician-administered drugs who received all or at least one such drug in a physician's office changed little from 2003 to the ASP period. However, the proportion of beneficiaries receiving one or more such drugs in a hospital emergency room in a given quarter was about 4 percent higher in the ASP period. Moreover, while users of urology, rheumatology, or allergy-immunology drugs experienced little change in the site of care for drug administration, hematology-oncology drug

users were less likely as a group to receive all or at least one of their injected drugs in a physician's office in the ASP period than in 2003.

For nearly all classes of drugs considered, Medicare Part B drug spending was lower in the ASP period than in 2003 after accounting for underlying trends. Spending on inhalation and urology drugs fell most substantially. Correspondingly, out-of-pocket liabilities for Part B–covered services—including coinsurance for Part B drugs—also fell for users of all classes of drugs except oral drugs (no statistical change) and rheumatology drugs (a slight increase). Total Medicare spending for sampled beneficiaries, while trending upward through the sample period, fell on a trend-adjusted basis for users of inhalation drugs, hematology-oncology drugs, urology drugs, and allergy-immunology drugs. Changes in outcomes of at least 5 percent of outcome values in 2003 for beneficiaries receiving physician-administered, inhalation, or oral drugs are summarized in Table IV.11.

Our analysis of subgroups showed little change in disparities over time, even though previously existing disparities persisted through the ASP period.[17] The few changes that occurred, however, are noteworthy. For beneficiaries with state buy-in coverage using physician-administered drugs, the (trend-adjusted) proportion receiving all drugs in a physician's office declined slightly over the sample period while increasing for beneficiaries without buy-in coverage. Overall Medicare spending for those with buy-in coverage also increased during this period even as it decreased for those without buy-in after accounting for underlying trends. For users of inhalation drugs, out-of-pocket liabilities and Medicare spending on Part B drugs declined faster for beneficiaries who had buy-in coverage than for those who did not; even so, spending on all three outcomes remained higher for the former group.

[17] For those with Part D coverage, we could not measure disparities over time since Part D was implemented after payment reform.

TABLE IV.11

CHANGES IN OUTCOMES EXCEEDING 5 PERCENT OF 2003 MEAN VALUES, BY DRUG TYPE

Outcome	Physician-Administered Drug Users	Inhalation Drug Users	Oral-Drug Users
Beneficiary received at least one Part B drug in a physician's office	↔		
Beneficiary received all Part B drugs in a physician's office	↔		
Beneficiary received at least one Part B drug in an emergency room	↔		
Beneficiary received at least one Part B drug in a hospital OPD	↔		
Out-of-pocket liabilities for Part B–covered services	↔	↓	↔
Total out-of-pocket liabilities for Medicare-covered services	↔	↓	↔
Medicare spending on Part B drugs	↓	↓	↓
Medicare spending on Part B drug fees	↓	↑	n.m.
Total Medicare payments for covered services	↔	↔	↔

Source: Mathematica Policy Research.

Note: The percentage change for drug fees is not meaningful for oral-drug users, as there were no supplying fees for oral drugs in the base period.

↑ = increase of at least 5 percent from 2003 to 2005–2007 after accounting for trend.
↓ = decrease of at least 5 percent from 2003 to 2005–2007 after accounting for trend.
↔ = any increase or decrease from 2003 to 2005–2007 was less than 5 percent, statistically insignificant, or both after accounting for trend.
n.m. = not meaningful.

As stated previously, a significant limitation of an analysis of trends is its inability to establish causal relationships. While this analysis has consistently documented statistically significant and practically meaningful departures from trends in both access and spending outcome variables beginning in the first quarter of 2005 (when ASP-based reimbursement was implemented), we cannot conclusively determine whether payment reform actually *caused,* for example, the observed decline in Medicare spending on Part B drugs. While the effects of unmeasured variables that grew or declined relatively smoothly over the sample period were captured by the measured time trend, the influence of one-time events or confounding variables

that did not vary smoothly were not. Moreover, to the extent that analyzed outcomes do not adequately measure the true outcomes of interest, our reported results could overstate or understate the true relationship between payment reform and access or spending. For example, our data do not permit us to analyze whether payment reform has discouraged new physicians from entering certain specializations such as oncology; if so, these decisions could influence beneficiary access to injected drugs in a doctor's office in the long run.

The limitations of the analysis notwithstanding, our results are largely consistent with the results of other investigations. Friedman et al. (2007) compared waiting times and sites of care for two cohorts of cancer patients receiving treatment before and after the implementation of the MMA. The cohorts were determined by a convenience sample drawn over the internet. The authors found that neither waiting times until treatment nor the fraction receiving drugs in either a private practice or hospital OPD was statistically different when the pre-MMA and post-MMA cohorts were compared. In a separate study, Shea et al. (2008) analyzed waiting times and the distance patients traveled for chemotherapy services, concluding that neither variable increased substantially from 2003 through 2006.

MedPAC (2007) reported declines in Medicare outlays for Part B–covered drugs for urology, rheumatology, infectious diseases, and medical oncology, with urology experiencing the steepest decline in Part B drug reimbursements as a percentage of urologists' total allowed Medicare charges. MedPAC also reported that many interviewed practices reported little change in where beneficiaries received physician-administered drugs. However, some practices indicated that beneficiaries without supplemental insurance were particularly likely to be referred to hospitals for treatment, which suggests the value of continuing to monitor where beneficiaries receive their physician-administered drugs.

Taken together with earlier studies, the results reported here suggest that payment reform is likely to have been effective at lowering Medicare spending on Part B drugs below their prevailing trend and, for many classes of drugs (the exceptions are injected rheumatology, injected allergy-immunology, and oral), lowering Part B drug spending in absolute terms from 2003 through 2007. Moreover, we do not find strong evidence that beneficiaries were sent to hospitals on a regular basis to receive injected drugs. However, because we found evidence that certain groups of beneficiaries—such as those receiving hematology-oncology drugs, those with state buy-in coverage, those living in rural areas and those with Part D coverage—are less likely to receive their drugs in a physician's office, more likely to receive their drugs in a hospital setting (emergency room or OPD), or both, the issue of beneficiary access to physician-administered in the wake of payment reform warrants continued monitoring.

V. CONCLUSIONS

This report uses analyses of Medicare claims data to assess the effects of the MMA-mandated changes to the Medicare Part B drug reimbursement system. Consistent with our earlier results, the results from the current report continue to be encouraging. While particular drugs and physician specialties may warrant further monitoring, we find little evidence that the payment reforms were associated with adverse outcomes for Medicare beneficiaries, and the reforms appear to have stemmed the rising costs of Part B drugs.

A. SUMMARY

We find little evidence that physicians made major changes in their treatment behavior associated with the payment reforms. Physicians were just as willing to treat Medicare beneficiaries, and none appeared to make large shifts in the types of services they provided. This was true both for the heterogeneous "all other specialties" group of physicians who provide few Part B drugs and for the four physician specialties that provide substantial amounts of Part B drugs. In general, physicians who were in a solo practice were just as willing to treat Medicare beneficiaries as those in group practice. However, the payment reforms appeared to coincide with sizable changes in the Medicare drug and overall revenues of several specialties. Urology specialists experienced large reductions in overall Medicare revenues at the same time as the reforms. For allergy-immunology, rheumatology, and hematology-oncology specialists, abrupt blunting or cessation of previous sharp increases in copayments occurred in conjunction with the new payment system.

Our analysis of Medicare beneficiaries is generally consistent with our findings for physicians. After accounting for underlying secular trends, there were no statistically significant

changes from 2003 to the ASP period (2005–2007) in the proportion of beneficiaries receiving all or at least one Part B drug in a physician's office, while the proportion receiving one or more such drugs in a hospital emergency room in a given quarter was slightly higher (about 4 percent) in the ASP period. When beneficiaries using specific drug types were examined, those using urology, rheumatology, or allergy-immunology drugs experienced little change in the site of care for drug administration. Hematology-oncology drug users were somewhat less likely to receive at least one drug in a physician's office and to receive all drugs in a physician's office in the ASP period than in 2003 (by about 8 and 9 percent, respectively).

The payment reforms were also associated with lower drug payments and out-of-pocket liabilities for patients who receive physician-supplied drugs. These measures declined for users of hematology-oncology drugs and urology drugs. In contrast, while drug expenditures fell after payment reforms for users of rheumatology drugs, out-of-pocket liabilities rose slightly; both drug spending and out-of-pocket liabilities were unchanged for users of allergy-immunology drugs, after adjusting for underlying trends.

We found that users of inhalation and oral drugs had either lower or similar drug expenditures, out-of-pocket liabilities, and Part B expenditures before and after the payment reforms, although supplying/dispensing fees increased for beneficiaries using inhalation drugs.[1] For users of inhalation drugs, drug expenditures declined substantially, by 47.9 percent, from 2003 to the ASP period, after accounting for trends. However, outcomes for oral-drug users in

[1] Our previous analysis of pharmacy suppliers had found no discernible adverse effects of the payment reforms. The number of suppliers, which had been gradually declining since the beginning of the decade, did not accelerate after the payment reforms. Total Medicare revenues for suppliers decreased slightly relative to their expected trend in 2004 (about 3 percent per quarter) but have since been increasing at a higher-than-expected-rate. The early decrease in Medicare revenues was due in part to a decline in inhalation drug revenues, a major component of pharmacy-suppliers' drug revenues. The reduction in inhalation drug revenues was offset by increases in the number of beneficiaries served and in revenues for non-drug supplies.

the ASP period were comparable to outcomes in 2003, with the exception of Part B drug spending, which was 7.3 percent lower on a trend-adjusted basis.

Two populations that may be especially vulnerable to the payment reforms are rural beneficiaries and dually eligible beneficiaries. However, while we consistently observe disparities in the study outcomes between these subgroups, these disparities generally existed prior to the introduction of ASP-based pricing, and there is little evidence that they were significantly exacerbated by payment reform. We also explored whether Part D enrollment influenced these results. We found that the likelihood of receiving Part B drugs in a physician's office is lower for those with Part D coverage than for those without it, and that out-of-pocket liabilities and Medicare expenditures are generally higher for Part D enrollees. Limitations in the data, including the inability to control for any creditable drug coverage or for the acuity level of illness, and the fact that Part D was introduced after the Part B reforms were already in place, limits the ability to draw implications from these differences.

We also examined the site-of-care measures for beneficiaries receiving specific drugs that were commonly used and experienced large (33 percent or greater) payment allowance declines as a result of the new payment policy. If access to care was affected by the payment reforms, these are the drugs with which we would most likely expect to find problems. In analyzing those trends, we find for 2 of the 14 drugs—granisetron hydrochloride and dolasetron mesylate—some evidence that they are being provided less often in physician's offices. However, because the decline in the number of injections administered in a physician's office was so large relative to the increase in hospital injections, it is not evident that these changes reflect simply large-scale shifts in the site of care. Moreover, these changes could also be consistent with changes in practice patterns due to the introduction of another anti-emetic drug. Drug costs and Medicare expenditures were generally lower for the set of 14 drugs.

B. LIMITATIONS

The study has a number of important limitations. First is the lack of a good "counterfactual," that is, what would have happened in the absence of the reforms or policy changes. As a result, we can neither isolate the effects of the policy changes of interest nor attribute the changes that we observe to them with any certainty, as opposed to other policy or secular changes.

Second, our analysis is based on the measures that could be identified using claims data. While claims data have the benefit of allowing the examination of a large number of physicians and beneficiaries, the outcomes we are able to measure are limited, and may not be refined enough to detect certain clinical or behavioral effects.

Third, in our analysis of physicians, the trends we measure are for those physicians who were already providing Medicare Part B drugs. If the policy changes deterred new physicians from providing Part B–covered drugs to Medicare beneficiaries, our analysis would not have captured that effect.

Similarly, our analysis focused on beneficiaries who actually received Part B drugs. If the payment reforms in fact prevented beneficiaries from obtaining treatment with Part B drugs that they would otherwise have received, our study would not have included them. However, it is highly unlikely that the policy changes led to complete denial of medically necessary treatment for substantial numbers of beneficiaries.

C. CONCLUSIONS

Our findings are generally encouraging for Medicare's change to an ASP-based payment system for Part B–covered drugs. The payment reforms appear to have controlled Medicare expenditures for Part B drugs and to have reduced beneficiaries' out-of-pocket liabilities for these drugs. Certain physician specialties saw reductions in their Medicare revenues, and users of

specific types of drugs experienced modest shifts in where they received their drugs, but there were no large-scale or broad-based changes in sites of drug administration.

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APPENDIX A

APPENDIX TO EFFECTS OF PAYMENT REFORMS ON PHYSICIANS

A. CONSTRUCTION OF THE ANALYSIS FILE

1. Algorithm for Extracting UPINs from Carrier Claims

Our goal was to use the Carrier claims to identify the Unique Physician Identification Numbers (UPINs) of physicians who had furnished and administered Part B drugs. However, there are two distinct UPIN fields in Carrier claims—one for the "Ordering/Referring Physician" and the other for the "Performing Physician"—either or both of which could be used by a physician furnishing and administering Part B drugs.[1] Furthermore, there would likely be claims in which one or the other UPIN was missing or invalid.

For several reasons, we used the following simple algorithm to extract UPINs—(1) extract the referring/ordering UPIN if present and valid,[2] (2) otherwise extract the performing/rendering UPIN if present and valid. First, in claims for "incident to" services (which include furnishing and administering Part B covered drugs), the Medicare Claims Processing Manual (Centers for Medicare & Medicaid Services 2008) states that the UPIN of the physician who orders the services must appear in the ordering/referring physician field. The Manual further specifies that the ordering physician should be the one performing the "initial service." In the case of Part B drugs, this would be the physician making the initial decisions about the necessity, selection, and dosing of the drugs.

Second, UPINs in the ordering/referring physician field may be more accurate than those in the performing/rendering physician field. Ordering/referring UPINs are entered directly by physicians' billing staff into claims forms. In contrast, billers enter Provider Identification Numbers (PIN) into the performing/rendering field. PINs are carrier-specific numbers assigned

[1] Although the new National Provider Identifier system (NPI) superseded the UPIN and PIN system for physicians starting in May 2007, the UPIN system was still in effect during the 2000-2006 period of the study.

[2] A valid UPIN is a six character string—a single letter followed by five numbers.

to all physicians in the jurisdictions of each local Medicare Carrier. Carriers later crosswalk the PINs to physicians UPINs during claims processing. This crosswalking process often introduces errors because unlike UPINs, which are unique, physicians may have multiple PINs (one for each practice setting) and Carriers' crosswalk files are not regularly updated. The end result is the random insertion into the performing/rendering UPIN field of UPINs of other physicians in the same group, blanks, or invalid UPINs (ResDAC 2003).

Third, it seems reasonable to assume that, in most cases, the ordering/referring and performing physician will be the same person, anyway. For "incident to" services to be covered, a physician must be physically present in the office suite to provide direct personal supervision to non-physician auxiliary personnel, and the supervising physician's PIN must be entered into the performing physician field (CMS 2008). It seems plausible that the physician ordering Part B drugs would be the one most often present to supervise their administration. On occasion, the ordering physician might be out of the office, with another physician in the group supervising drug administration. In those instances, the Manual states that the supervising physician's PIN should be entered into the performing field but that the original ordering physician's UPIN should still be entered in the ordering/physician field. Our algorithm would thus select the incorrect physician from the performing UPIN field only for the small minority of cases in which (1) the ordering physician was absent and covered by a colleague in the group, *and* (2) the ordering/referring physician UPIN was missing or invalid, causing the algorithm to then use the performing physician UPIN.

2. Algorithm Application and Subsequent Claims Pull

First, the algorithm was applied to our collection of Carrier line item records for Part B drug administration in order to create a finder file of UPINs of physicians who had administered Part B drugs during the baseline period. Eighty-nine percent of the Part B drug line item records

yielded a UPIN from the referring/ordering field and 11 percent provided a UPIN from the performing field because of a missing or invalid referring/ordering UPIN. Among the line item records yielding a UPIN from the referring/ordering field, the referring/ordering UPIN and the performing/rendering UPIN were the same 60 percent of the time and different in the rest (but as explained, we always took the UPIN from the referring/ordering field).

The distribution of the specialties of interest within the resulting file of UPINs was as follows:

TABLE A.1

DISTRIBUTION OF SPECIALTIES OF INTEREST AMONG PHYSICIANS WHO HAD ADMINISTERED AT LEAST ONE PART B COVERED DRUG DURING THE BASELINE PERIOD

Specialty	Frequency	Percent
Allergy/immunology	4,388	0.53
Infectious disease	4,157	0.50
Urology	12,800	1.54
Rheumatology	3,665	0.44
Hematology	761	0.09
Hematology/oncology	6,509	0.78
Medical oncology	2,439	0.29
All Other	797,642	95.8
Total	**832,361**	**100.0**

Source: Medicare Carrier claims data

As described in the report, we created a finder file of 66,589 UPINs from this larger list. The next step was to submit this UPIN finder file to the CMS Data Center to pull all Medicare claims submitted by physicians in the finder file during the study period. The CMS Data Center had already advised us that a request for all line item records with *either* a referring/ordering *or* a performing UPIN that matched a UPIN from our finder file would exceed the processing capacity of the Data Center. Since the goal of the claims pull was to identify Medicare services *directly* rendered by the physicians in the finder file, we decided to restrict our subsequent pull of Carrier claims to those in which the performing physician UPINs matched those in our finder file, thus excluding the large numbers of claims for laboratory, radiology, and ancillary services ordered but not performed by cohort physicians or their practices.

B. NUMBER OF PHYSICIANS SUBMITTING CLAIMS FOR INITIAL HOSPITAL VISITS AND PART B DRUGS

As mentioned in the text, curves in Figures A.1 and A.2 parallel the first columns of Tables III.1 through III.5, the numbers of physicians providing any Medicare services. There were no abrupt changes suggesting decreased willingness to treat medicare beneficiaries.

C. GROUPING BETOS CLASSES INTO SUBCATEGORIES

Table A.2 shows how we grouped the 106 BETOS categories into the seven subcategories.

FIGURE A.1

NUMBER OF PHYSICIANS PROVIDING INITIAL HOSPITAL VISITS, BY SPECIALTY

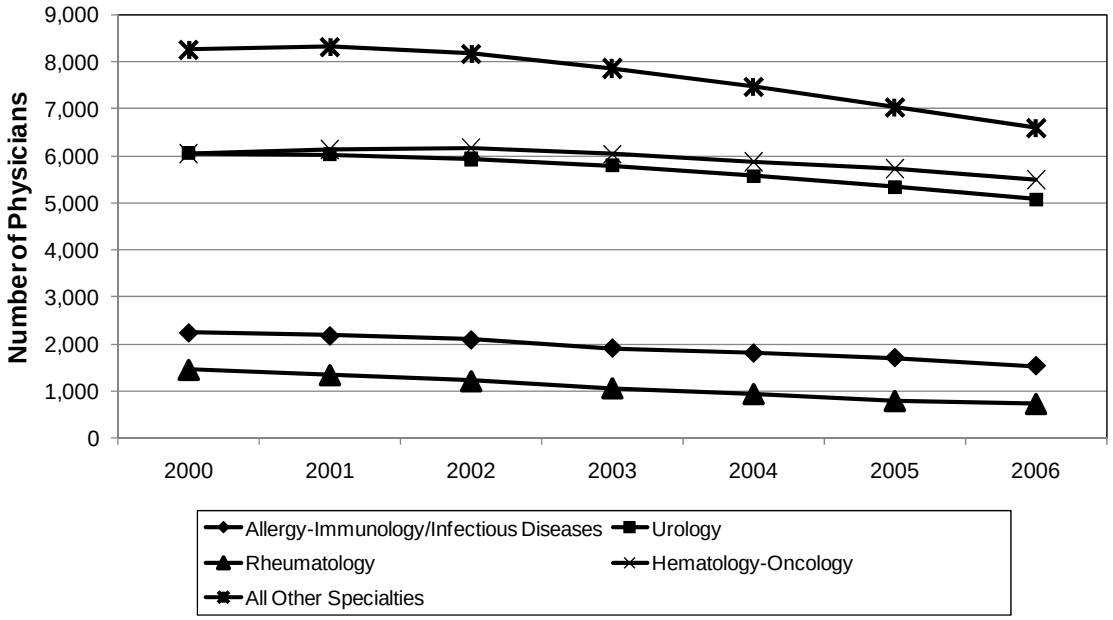

FIGURE A.2

NUMBER OF PHYSICIANS PROVIDING PART B DRUGS, BY SPECIALTY

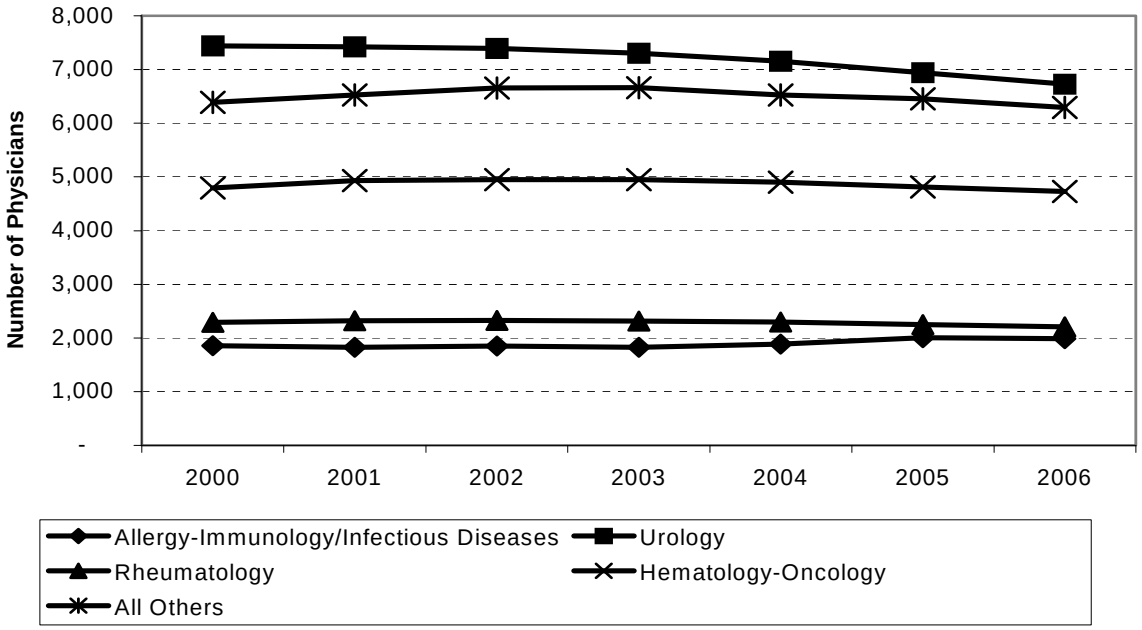

TABLE A.2

GROUPING OF BETOS CLASSES

BETOS Class	Description of BETOS Class	Grouping
O1D	Chemotherapy	Chemotherapy
O1E	Other drugs	Other drugs
M1A	Office visits – new	Visits and Miscellaneous
M1B	Office visits – established	
M2A	Hospital visit – initial	
M2B	Hospital visit – subsequent	
M2C	Hospital visit – critical care	
M3	Emergency room visit	
M4A	Home visit	
M4B	Nursing home visit	
P4A	Eye procedure – corneal transplant	
P4B	Eye procedure – cataract removal/lens insertion	
P4C	Eye procedure – retinal detachment	
P4D	Eye procedure – treatment	
P4E	Eye procedure – other	
D1A	Medical/surgical supplies	
D1B	Hospital beds	
D1C	Oxygen and supplies	
D1D	Wheelchairs	
D1E	Other DME	
D1F	Orthotic devices	
O1A	Ambulance	
O1B	Chiropractic	
O1C	Enteral and parenteral	
O1F	Vision, hearing and speech services	
O1G	Influenza immunization	
Y1	Other – Medicare fee schedule	
Y2	Other – non-Medicare fee schedule	
Z1	Local codes	
Z2	Undefined codes	
M6	Consultations	Consultations and Specialist Evaluation and Management
M5A	Specialist – pathology	
M5B	Specialist – psychiatry	
M5C	Specialist – opthamology	
M5D	Specialist – other	

TABLE A.2 *(continued)*

BETOS Class	Description of BETOS Class	Grouping
P0	Anesthesia	
P1A	Major procedure – breast	
P1B	Major procedure – colectomy	
P1C	Major procedure – cholecystectomy	
P1D	Major procedure – turp	
P1E	Major procedure – hysterctomy	
P1F	Major procedure – explor/decompr/excisdisc	
P1G	Major procedure – other	
P2A	Major procedure, cardiovascular – CABG	
P2B	Major procedure, cardiovascular – aneurysm repair	
P2C	Major Procedure, cardiovascular – thromboendarterectomy	
P2D	Major procedure, cardiovascular – coronary angioplasty (PTCA)	
P2E	Major procedure, cardiovascular – pacemaker insertion	
P2F	Major procedure, cardiovascular – other	
P3A	Major procedure, orthopedic – hip fracture repair	
P3B	Major procedure, orthopedic – hip replacement	
P3C	Major procedure, orthopedic – knee replacement	
P3D	Major procedure, orthopedic – other	
P5A	Ambulatory procedures – skin	
P5B	Ambulatory procedures – musculoskeletal	Procedures
P5C	Ambulatory procedures – inguinal hernia repair	
P5D	Ambulatory procedures – lithotripsy	
P5E	Ambulatory procedures – other	
P6A	Minor procedures – skin	
P6B	Minor procedures – musculoskeletal	
P6C	Minor procedures – other (Medicare fee schedule)	
P6D	Minor procedures – other (non-Medicare fee schedule)	
P7A	Oncology – radiation therapy	
P7B	Oncology – other	
P8A	Endoscopy – arthroscopy	
P8B	Endoscopy – upper gastrointestinal	
P8C	Endoscopy – sigmoidoscopy	
P8D	Endoscopy – colonoscopy	
P8E	Endoscopy – cystoscopy	
P8F	Endoscopy – bronchoscopy	
P8G	Endoscopy – laparoscopic cholecystectomy	
P8H	Endoscopy – laryngoscopy	
P8I	Endoscopy – other	
P9A	Dialysis services	

TABLE A.2 *(continued)*

BETOS Class	Description of BETOS Class	Grouping
I1A	Standard imaging – chest	
I1B	Standard imaging – musculoskeletal	
I1C	Standard imaging – breast	
I1D	Standard imaging – contrast gastrointestinal	
I1E	Standard imaging – nuclear medicine	
I1F	Standard imaging – other	
I2A	Advanced imaging – CAT: head	
I2B	Advanced imaging – CAT: other	
I2C	Advanced imaging – MRI: brain	Imaging
I2D	Advanced imaging – MRI: other	
I3A	Echography – eye	
I3B	Echography – abdomen/pelvis	
I3C	Echography – heart	
I3D	Echography – carotid arteries	
I3E	Echography – prostate, transrectal	
I3F	Echography – other	
I4A	Imaging/procedure – heart including cardiac catheter	
I4B	Imaging/procedure – other	
T1A	Lab tests – routine venipuncture (non Medicare fee schedule)	
T1B	Lab tests – automated general profiles	
T1C	Lab tests – urinalysis	
T1D	Lab tests – blood counts	
T1E	Lab tests – glucose	
T1F	Lab tests – bacterial cultures	
T1G	Lab tests – other (Medicare fee schedule)	Lab
T1H	Lab tests – other (non-Medicare fee schedule)	
T2A	Other tests – electrocardiograms	
T2B	Other tests – cardiovascular stress tests	
T2C	Other tests – EKG monitoring	
T2D	Other tests – other	

APPENDIX B

REVENUE CODES USED IN BENEFICIARY SEARCH

TABLE B.1

OUTPATIENT REVENUE CODES USED TO IDENTIFY BENEFICIARIES WHO USED PART B DRUGS

0630
0631
0632
0633
0634
0635
0636
0250
0252
0253
0259
0260
0264
0269
0258

APPENDIX C

CODES USED TO IDENTIFY BENEFICIARIES WHO USED PHYSICIAN SPECIALTY DRUGS

TABLE C.1

SPECIALTY-SPECIFIC DRUGS: HEMATOLOGY-ONCOLOGY

HCPCS Code	Drug Name	HCPCS Code	Drug Name	HCPCS Code	Drug Name
J0207	Amifostine	J9041	Bortezomib injection	J9250	Methotrexate sodium inj
J0594	Busulfan, inj	J9045	Carboplatin injection	J9260	Methotrexate sodium inj
J0640	Leucovorin calcium injection	J9050	Carmus bischl nitro inj	J9261	Nelarabine injection
J0780	Prochlorperazine injection	J9055	Cetuximab injection	J9263	Oxaliplatin
J0881	Darbepoetin alfa, non-esrd	J9060	Cisplatin 10 MG injection	J9264	Paclitaxel protein bound
J0885	Epoetin alfa, non-esrd	J9062	Cisplatin 50 MG injection	J9265	Paclitaxel injection
J0894	Decitabine, inj	J9065	Inj cladribine per 1 MG	J9266	Pegaspargase/singl dose vial
J1100	Dexamethasone sodium phos	J9070	Cyclophosphamide 100 MG inj	J9268	Pentostatin injection
J1190	Dexrazoxane HCl injection	J9080	Cyclophosphamide 200 MG inj	J9280	Mitomycin 5 MG inj
J1200	Diphenhydramine hcl injectio	J9090	Cyclophosphamide 500 MG inj	J9290	Mitomycin 20 MG inj
J1260	Dolasetron mesylate	J9091	Cyclophosphamide 1.0 grm inj	J9291	Mitomycin 40 MG inj
J1440	Filgrastim 300 mcg injection	J9092	Cyclophosphamide 2.0 grm inj	J9293	Mitoxantrone hydrochl / 5 MG
J1441	Filgrastim 480 mcg injection	J9093	Cyclophosphamide lyophilized	J9300	Gemtuzumab ozogamicin
J1457	Gallium nitrate injection	J9094	Cyclophosphamide lyophilized	J9305	Pemetrexed injection
J1626	Granisetron HCl injection	J9095	Cyclophosphamide lyophilized	J9310	Rituximab cancer treatment
J2353	Octreotide injection, depot	J9096	Cyclophosphamide lyophilized	J9320	Streptozocin injection
J2354	Octreotide inj, non-depot	J9097	Cyclophosphamide lyophilized	J9340	Thiotepa injection
J2355	Oprelvekin injection	J9098	Cytarabine liposome	J9350	Topotecan
J2405	Ondansetron hcl injection	J9100	Cytarabine hcl 100 MG inj	J9355	Trastuzumab
J2425	Palifermin injection	J9110	Cytarabine hcl 500 MG inj	J9360	Vinblastine sulfate inj
J2430	Pamidronate disodium /30 MG	J9120	Dactinomycin actinomycin d	J9370	Vincristine sulfate 1 MG inj
J2469	Palonosetron HCl	J9130	Dacarbazine 100 mg inj	J9375	Vincristine sulfate 2 MG inj
J2505	Injection, pegfilgrastim 6mg	J9140	Dacarbazine 200 MG inj	J9380	Vincristine sulfate 5 MG inj
J2765	Metoclopramide hcl injection	J9150	Daunorubicin	J9390	Vinorelbine tartrate/10 mg
J2820	Sargramostim injection	J9151	Daunorubicin citrate liposom	J9395	Injection, Fulvestrant
J3487	Zoledronic acid	J9160	Denileukin diftitox, 300 mcg	Q0163	Diphenhydramine HCl 50mg
J8501	Oral aprepitant	J9170	Docetaxel	Q0164	Prochlorperazine maleate 5mg
J8510	Oral busulfan	J9175	Elliotts b solution per ml	Q0165	Prochlorperazine maleate10mg
J8520	Capecitabine, oral, 150 mg	J9178	Inj, epirubicin hcl, 2 mg	Q0166	Granisetron HCl 1 mg oral
J8521	Capecitabine, oral, 500 mg	J9181	Etoposide 10 MG inj	Q0167	Dronabinol 2.5mg oral
J8530	Cyclophosphamide oral 25 MG	J9182	Etoposide 100 MG inj	Q0168	Dronabinol 5mg oral
J8540	Oral dexamethasone	J9185	Fludarabine phosphate inj	Q0169	Promethazine HCl oral
J8560	Etoposide oral 50 MG	J9190	Fluorouracil injection	Q0170	Promethazine HCl 25 mg oral

TABLE C.1 *(continued)*

HCPCS Code	Drug Name	HCPCS Code	Drug Name	HCPCS Code	Drug Name
J8700	Temozolomide	J9200	Floxuridine injection	Q0171	Chlorpromazine HCl 10mg oral
J9000	Doxorubic hcl 10 MG vl chemo	J9201	Gemcitabine HCl	Q0172	Chlorpromazine HCl 25mg oral
J9001	Doxorubicin hcl liposome inj	J9206	Irinotecan injection	Q0173	Trimethobenzamide HCl 250mg
J9010	Alemtuzumab injection	J9208	Ifosfomide injection	Q0175	Perphenazine 4mg oral
J9015	Aldesleukin/single use vial	J9209	Mesna injection	Q0176	Perphenazine 8mg oral
J9017	Arsenic trioxide	J9211	Idarubicin hcl injection	Q0177	Hydroxyzine pamoate 25mg
J9020	Asparaginase injection	J9213	Interferon alfa-2a inj	Q0178	Hydroxyzine pamoate 50mg
J9025	Azacitidine injection	J9214	Interferon alfa-2b inj	Q0179	Ondansetron HCl 8mg oral
J9027	Clofarabine injection	J9230	Mechlorethamine hcl inj	Q0180	Dolasetron mesylate oral
J9035	Bevacizumab injection	J9245	Inj melphalan hydrochl 50 MG	Q2017	Teniposide, 50 mg
J9040	Bleomycin sulfate injection				

TABLE C.2

SPECIALTY-SPECIFIC DRUGS: UROLOGY, RHEUMATOLOGY, AND ALLERGY-IMMUNOLOGY/INFECTIOUS DISEASES

HCPCS Code	Drug Name	HCPCS Code	Drug Name	HCPCS Code	Drug Name
Urology		**Rheumatology (continued)**		**Allergy-Immunology/Infectious Diseases (cont.)**	
90586	Bcg vaccine, intravesical	J3301	Triamcinolone acetonide inj	J0720	Chloramphenicol sodium injec
J0270	Alprostadil for injection	J3302	Triamcinolone diacetate inj	J0740	Cidofovir injection
J0275	Alprostadil urethral suppos	J3303	Triamcinolone hexacetonl inj	J0743	Cilastatin sodium injection
J1060	Testosterone cypionate 1 ML	J8610	Methotrexate oral 2.5 MG	J0744	Ciprofloxacin iv
J1070	Testosterone cypionat 100 MG	Q4083	Hyalgan or Supartz, inj	J0770	Colistimethate sodium inj
J1080	Testosterone cypionat 200 MG	Q4084	Synvisc, inj	J0850	Cytomegalovirus imm IV /vial
J1212	Dimethyl sulfoxide 50% 50 ML	Q4085	Euflexxa, inj	J0878	Daptomycin injection
J1950	Leuprolide acetate /3.75 MG	Q4085	Orthovisc, inj	J1335	Ertapenem injection
J3315	Triptorelin pamoate	Q4095	Reclast injection	J1364	Erythro lactobionate /500 MG
J9031	Bcg live intravesical vac			J1450	Fluconazole
J9202	Goserelin acetate implant	**Allergy-Immunology/Infectious Diseases**		J1455	Foscarnet sodium injection
J9214	Interferon alfa-2b inj	J0133	Acyclovir injection	J1570	Ganciclovir sodium injection
J9217	Leuprolide acetate suspnsion	J0278	Amikacin sulfate injection	J1580	Garamycin gentamicin inj
J9218	Leuprolide acetate injeciton	J0285	Amphotericin B	J1590	Gatifloxacin injection
J9219	Leuprolide acetate implant	J0287	Amphotericin b lipid complex	J1835	Itraconazole injection
J9225	Histrelin implant	J0288	Ampho b cholesteryl sulfate	J1840	Kanamycin sulfate 500 MG inj
J9280	Mitomycin 5 MG inj	J0289	Amphotericin b liposome inj	J1850	Kanamycin sulfate 75 MG inj
J9290	Mitomycin 20 MG inj	J0290	Ampicillin 500 MG inj	J1956	Levofloxacin injection
J9291	Mitomycin 40 MG inj	J0295	Ampicillin sodium per 1.5 gm	J2010	Lincomycin injection
J9340	Thiotepa injection	J0348	Anadulafungin injection	J2020	Linezolid injection
		J0456	Azithromycin	J2185	Meropenem
Rheumatology		J0530	Penicillin g benzathine inj	J2248	Micafungin sodium, inj
J0129	Abatacept, inj	J0540	Penicillin g benzathine inj	J2280	Inj, moxifloxacin 100 mg
J0135	Adalimumab injection	J0550	Penicillin g benzathine inj	J2510	Penicillin g procaine inj
J0630	Calcitonin salmon injection	J0560	Penicillin g benzathine inj	J2540	Penicillin g potassium inj
J0702	Betamethasone acet&sod phosp	J0570	Penicillin g benzathine inj	J2543	Piperacillin/tazobactam
J0704	Betamethasone sod phosp/4 MG	J0580	Penicillin g benzathine inj	J2545	Pentamidine isethionte/300mg
J0760	Colchicine injection	J0637	Caspofungin acetate	J2770	Quinupristin/dalfopristin
J1020	Methylprednisolone 20 MG inj	J0690	Cefazolin sodium injection	J3000	Streptomycin injection
J1030	Methylprednisolone 40 MG inj	J0692	Cefepime HCl for injection	J3243	Tigecycline, inj
J1040	Methylprednisolone 80 MG inj	J0694	Cefoxitin sodium injection	J3260	Tobramycin sulfate injection
J1094	Inj dexamethasone acetate	J0696	Ceftriaxone sodium injection	J3305	Inj trimetrexate glucoronate
J1438	Etanercept injection	J0697	Sterile cefuroxime injection	J3320	Spectinomycn di-hcl inj
J1600	Gold sodium thiomaleate inj	J0698	Cefotaxime sodium injection	J3370	Vancomycin hcl injection
J1740	Ibandronate sodium, inj	J0713	Inj ceftazidime per 500 mg	J3465	Injection, voriconazole
J1745	Infliximab injection	J0715	Ceftizoxime sodium / 500 MG	J3485	Zidovudine
J2650	Prednisolone acetate inj				

APPENDIX D

HCPCS CODES FOR INHALATION AND ORAL DRUGS INCLUDED IN THE ANALYSIS OF BENEFICIARIES

TABLE D.1

HCPCS CODES FOR INHALATION AND ORAL DRUGS INCLUDED IN THE ANALYSIS OF BENEFICIARIES

Inhalation Drug Codes			Oral Drug Codes			
A4216	J7624	J7644	J7500	Q0165	WW004	WW054
A4217	J7625	J7645	J7502	Q0167	WW005	WW060
A4218	J7626	J7648	J7506	Q0168	WW006	WW080
J7608	J7627	J7649	J7507	Q0169	WW007	WW081
J7610	J7628	J7655	J7509	Q0170	WW008	WW089
J7611	J7629	J7658	J7510	Q0171	WW009	WW090
J7612	J7631	J7659	J7515	Q0172	WW010	WW091
J7613	J7633	J7668	J7517	Q0173	WW011	WW092
J7614	J7635	J7669	J7518	Q0174	WW013	WW093
J7615	J7636	J7674	J7520	Q0175	WW014	WW094
J7616	J7637	J7680	J8501	Q0177	WW015	WW096
J7617	J7638	J7681	J8530	Q0178	WW020	WW100
J7618	J7639	J7682	J8540	Q0179	WW030	
J7619	J7640	J7683	J8610	Q0180	WW031	
J7620	J7641	J7684	K0415	Q0181	WW032	
J7621	J7642	J7699	Q0163	WW002	WW040	
J7622	J7643		Q0164	WW003	WW053	

APPENDIX E

ADMINISTRATION FEES AND SUPPLYING/DISPENSING FEE CODES

HCPCS Drug Administration Codes	CPT Drug Administration Codes	Dispensing/Supplying Fee Codes	
C1725	11900	E0590	Dispensing
C8950	11901	G0333	Dispensing
C8951	20526	G0369	Supplying
C8952	20550	G0370	Supplying
C8953	20551	G0371	Dispensing
C8954	20600	G0374	Dispensing
C8955	20605	Q0510	Supplying
C9704	20610	Q0511	Supplying
C9718	20612	Q0512	Supplying
C9719	32005	Q0513	Dispensing
G0259	46500	Q0514	Dispensing
G0260	51720		
G0263	52283		
G0292	66030		
G0332	67500		
G0341	67515		
G0345	68200		
G0346	90772		
G0347	90773		
G0348	90779		
G0349	90780		
G0350	90781		
G0351	90782		
G0352	90783		
G0353	90784		
G0354	90788		
G0355	90799		
G0356	96400		
G0357	96401		
G0358	96402		
G0359	96405		
G0360	96406		
G0361	96408		
G0362	96410		
G0363	96412		
G3001	96414		
Q0081	96416		
Q0083	96420		
Q0084	96422		
Q0085	96423		
Q0136	96425		
	96440		
	96445		
	96450		
	96520		
	96521		
	96522		

HCPCS Drug Administration Codes	CPT Drug Administration Codes	Dispensing/Supplying Fee Codes
	96523	
	96524	
	96525	
	96526	
	96527	
	96528	
	96529	
	96530	
	96542	
	96545	
	96549	

APPENDIX F

RESULTS FOR PART D BENEFICIARIES WITH PART D COVERAGE

TABLE F.1

DIFFERENCES IN ACCESS AND MEDICARE SPENDING FOR BENEFICIARIES WITH AND WITHOUT PART D PRESCRIPTION DRUG COVERAGE

	Beneficiaries With Part D Coverage Using Physician-Administered Drugs	Beneficiaries Without Part D Coverage Using Physician-Administered Drugs	Beneficiaries With Part D Coverage Using Inhalation Drugs	Beneficiaries Without Part D Coverage Using Inhalation Drugs	Beneficiaries With Part D Coverage Using Oral Drugs	Beneficiaries Without Part D Coverage Using Oral Drugs
At Least One Part B Drug in a Physician's Office						
2006	97.2%	97.7%*				
2007	97.4%	97.9%*				
All Part B Drugs in a Physician's Office						
2006	69.8%	75.3%*				
2007	70.1%	75.4%*				
At Least One Part B Drug in an Emergency Room						
2006	9.3%	6.5%*				
2007	9.2%	6.8*%				
At Least One Part B Drug in a Hospital Outpatient Dept.						
2006	19.5%	17.4%*				
2007	19.3%	17.5%*				
Medicare Part B Out-Of-Pocket Liabilities						
2006	$450	$413*	$293	$273*	$1,094	$1,271*
2007	$433	$403*	$324	$298*	$1,108	$1,257*
Total Medicare Out-Of-Pocket Liabilities						
2006	$591	$540*	$508	$495	$1,344	$1,531*
2007	$571	$530*	$558	$525*	$1,349	$1,518*
Medicare Part B Drug Spending						
2006	$779	$712*	$485	$471	$2,752	$3,080*
2007	$741	$710*	$549	$518*	$2,875	$3,138*

TABLE F.1 (*continued*)

	Beneficiaries With Part D Coverage Using Physician-Administered Drugs	Beneficiaries Without Part D Coverage Using Physician-Administered Drugs	Beneficiaries With Part D Coverage Using Inhalation Drugs	Beneficiaries Without Part D Coverage Using Inhalation Drugs	Beneficiaries With Part D Coverage Using Oral Drugs	Beneficiaries Without Part D Coverage Using Oral Drugs
Medicare Part B Drug Administration Spending						
2006	$180	$176*	$55	$54*	$65	$54*
2007	$168	$167	$53	$52*	$67	$54*
Total Medicare Spending						
2006	$3,456	$3,178*	$3,941	$3,887	$8,915	$8,874
2007	$3,350	$3,128*	$4,312	$4,168*	$8,696	$9,111

Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars.

*The value for beneficiaries without Part D coverage is significantly different ($p<0.01$) from the corresponding value for beneficiaries with Part D coverage.

TABLE F.2

DIFFERENCES IN ACCESS AND MEDICARE SPENDING FOR NON-BUY-IN BENEFICIARIES WITH AND WITHOUT PART D PRESCRIPTION DRUG COVERAGE

	Non-Buy-In Beneficiaries With Part D Coverage Using Physician-Administered Drugs	Non-Buy-In Beneficiaries Without Part D Coverage Using Physician-Administered Drugs	Non-Buy-In Beneficiaries With Part D Coverage Using Inhalation Drugs	Non-Buy-In Beneficiaries Without Part D Coverage Using Inhalation Drugs	Non-Buy-In Beneficiaries With Part D Coverage Using Oral Drugs	Non-Buy-In Beneficiaries Without Part D Coverage Using Oral Drugs
At Least One Part B Drug in a Physician's Office						
2006	97.2%	97.6%*				
2007	97.5%	97.9%*				
All Part B Drugs in a Physician's Office						
2006	71.8%	75.6%*				
2007	72.3%	75.7%*				
At Least One Part B Drug In An Emergency Room						
2006	7.5%	6.3%*				
2007	7.4%	6.5%*				
At Least One Part B Drug I a Hospital Outpatient Department						
2006	19.3%	17.6%*				
2007	19.0%	17.6%*				
Medicare Part B Out-Of-Pocket Liabilities						
2006	$448	$415*	$280	$262*	$1,218	$1,323*
2007	$433	$405*	$313	$281*	$1,212	$1,296*
Total Medicare Out-Of-Pocket Liabilities						
2006	$580	$541*	$485	$482	$1,474	$1,576*
2007	$563	$530*	$538	$506*	$1,442	$1,552*
Medicare Part B Drug Spending						
2006	$802	$725*	$484	$456*	$3,087	$3,201
2007	$775	$722*	$563	$500*	$3,128	$3,212

TABLE F.2 (*continued*)

	Non-Buy-In Beneficiaries With Part D Coverage Using Physician-Administered Drugs	Non-Buy-In Beneficiaries Without Part D Coverage Using Physician-Administered Drugs	Non-Buy-In Beneficiaries With Part D Coverage Using Inhalation Drugs	Non-Buy-In Beneficiaries Without Part D Coverage Using Inhalation Drugs	Non-Buy-In Beneficiaries With Part D Coverage Using Oral Drugs	Non-Buy-In Beneficiaries Without Part D Coverage Using Oral Drugs
Medicare Part B Drug Administration Spending						
2006	$184	$177*	$55	$53*	$61	$51*
2007	$170	$168	$53	$52*	$63	$49*
Total Medicare Spending						
2006	$3,352	$3,156*	$3,739	$3,725	$9,474	$8,933
2007	$3,245	$3,100*	$4,068	$3,935	$9,056	$9,106

Source: Medicare claims data.

Note: Spending outcomes are measured in 2007 dollars.

*The value for beneficiaries without Part D coverage is significantly different ($p<0.01$) from the corresponding value for beneficiaries with Part D coverage.