

Claims-Based Reporting of Post-Operative Visits for Procedures with 10- or 90-Day Global Periods

Final Report

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Preface

The Centers for Medicare and Medicaid Services (CMS) currently bundles payment for post-operative care within ten or 90 days after many surgical procedures. Historically, CMS has not collected data on whether post-operative visits are actually performed. Congress mandated that CMS collect data on the number and level of post-operative visits to enable CMS to assess the accuracy of global surgical package valuation. Beginning July 1, 2017, CMS required select practitioners to report when they perform post-operative visits after procedures with 10- or 90-day global periods. This report summarizes patterns of post-operative visits in the first year of reporting.

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Summary

The Centers for Medicare and Medicaid Services (CMS) currently bundles payment for post-operative care within ten or 90 days after most surgical procedures. To inform the valuation of this bundled payment by the American Medical Association's relative value scale (RVS) Update Committee (RUC), surgeons are surveyed on the typical number of post-operative visits provided after a given procedure during the 10- or 90-day global period. Historically, CMS has not collected data on how many post-operative visits are actually performed in the surgical global periods and how this number compares with the number of visits considered during the valuation process. The Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) mandated that CMS collect data on the number and level of post-operative visits to enable CMS to assess the accuracy of global surgical package valuation. Beginning July 1, 2017, CMS required select practitioners in nine states to report on post-operative visits after select procedures with 10- or 90-day global periods. These post-operative visits were reported using Healthcare Common Procedure Coding System code 99024 (this code had no associated payment). This report provides results on the reporting of these post-operative visits based on analysis of fee-for-service Medicare claims data for procedures furnished from July 1, 2017, to June 30, 2018. This report describes the share of procedures with any post-operative visits and the ratio of observed to expected post-operative visits provided. The key findings on reporting of post-operative visits are reported below.

In Some Specialties, Most Practitioners Are Reporting Post-Operative Visits

Across the nine states in which CMS required reporting of post-operative visits, only 46 percent of practitioners expected to report post-operative visits did so. This included more than 18,000 practitioners working in more than 1,700 practices reported one or more post-operative visits during the study period. More than 90 percent of hand surgeons, orthopedic surgeons, vascular surgeons, ophthalmologists, neurosurgeons, clinical pathologists, and urologists reported one or more post-operative visits. Roughly three-quarters of post-operative visits occurred in office settings.

The Share of Procedures with Any Post-Operative Visits Is Low

When examining single, nonoverlapping procedures linked to post-operative visits, we found that 3.7 percent of the 961,006 procedures with 10-day global periods had any post-operative visits reported. Of the 457,256 procedures with 90-day global periods, 70.9 percent had one or more associated post-operative visits reported. Among procedures with 90-day global periods, reporting of post-operative visits was greatest among procedures furnished in inpatient (74.5

percent) and off-campus hospital outpatient settings (78.5 percent). In a sensitivity analysis to capture post-operative care provided in the context of other clinical encounters, we used a more expansive definition of post-operative care, which beyond post-operative visits also included other evaluation and management (E&M) services and other procedures. Using this more expansive definition of post-operative care did not have a substantive impact on the patterns we observed. In a second sensitivity analysis, we identified a set of practitioners who appeared to be actively engaged in reporting post-operative care. Among this subset of practitioners, we found modestly higher rates of post-operative visits that were still lower than expected.

Fewer Total Visits Are Provided, as Compared with What Is Expected

We compared the number of post-operative visits for each procedure reported in the claims data with the number of expected post-operative visits for each procedure. The number of post-operative visits expected comes from the RUC physician surveys, which are used to inform valuation of the procedures and are reported in the Medicare Physician Fee Schedule. Overall, the ratio of observed to expected post-operative visits provided was 0.04 for procedures with 10-day global periods and 0.39 for procedures with 90-day global periods. Dermatologists performed 45.5 percent of procedures with 10-day global periods. Among 10-day procedures performed by dermatologists, the observed to expected ratio was 0.04. Among other specialties performing 10,000 procedures with 10-day global periods, the highest ratios of observed to expected post-operative visits were observed for general surgery (0.20), otolaryngology (0.12), and ophthalmology (0.08). Orthopedic surgeons performed 32.3 percent of procedures with 90-day global periods and had an observed to expected ratio of 0.34. Among other specialties performing more than 10,000 procedures with 90-day global periods, the highest ratios were observed for ophthalmology (0.57), general surgery (0.41), and hand surgery (0.39). In sensitivity analyses, these ratios increased only modestly when we used a more expansive definition of post-operative care or focused on the subset of practitioners actively reporting post-operative visits.

Summary and Policy Implications

During the first 12 months of reporting post-operative visits, we found that the vast majority of procedures with 10-day global periods did not have an associated post-operative visit. Approximately two-thirds of procedures with 90-day global periods had an associated post-operative visit; however, the ratio of observed to expected post-operative visits provided for 90-day global period procedures was only 0.39.

Underreporting of post-operative visits may be driving these low rates. However, in sensitivity analyses limited to practitioners who were actively reporting their post-operative visits, post-operative patterns were largely similar to our main analysis. Another potential way to explain the low rates of post-operative visits was that post-operative care is occurring during

E&M visits or included with appointments for subsequent procedures. In a second sensitivity analysis, we used a more expansive definition of post-operative care and our results again were largely similar. Collectively, these findings suggest that of expected post-operative visits, a large share are not delivered, and that underreporting is unlikely to fully explain the low ratio of expected post-operative visits provided.

Given these findings, CMS could consider one or more of these proposed policy options:

- **Obtain new recommendations from the RUC:** CMS could address the potential overvaluation of global surgical packages by asking the RUC to revalue select or all global procedures. The RUC currently surveys physicians to obtain expected counts of post-operative visits, which are used to inform valuation of the procedures. The RUC could use the data in this report to inform those revaluations or conduct new surveys on the typical number of post-operative visits. These survey responses are used by the RUC as part of the process to provide CMS with valuation recommendations. After receiving the RUC's recommendations, CMS could decide on the final valuation in part based on the survey responses.
- **Convert 10-day global procedures to 0-day global procedures:** Although the share of post-operative visits reported was low for all procedures, it was particularly low for procedures with 10-day global periods. CMS could consider converting some or all procedures with 10-day global periods to 0-day global periods. Practitioners who furnish post-operative visits for such procedures would be paid separately by billing typical E&M codes.
- **Revalue all procedures based on the number of post-operative visits reported:** Using the information on post-operative visits collected in the nine states, CMS could consider revaluing all procedures with 10- and 90-day global periods using the number of post-operative visits reported in the claims data.

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Abbreviations

ASC	ambulatory surgery center
CMS	Centers for Medicare and Medicaid Services
CPT	Current Procedural Terminology [®]
E&M	evaluation and management
FFS	fee for service
HCPCS	Healthcare Common Procedure Coding System
HHS	U.S. Department of Health and Human Services
IDR	Integrated Data Repository
MACRA	Medicare Access and CHIP Reauthorization Act of 2015
NP	nurse practitioner
NPI	National Provider Identifier
PA	physician assistant
PCP	primary care provider
RUC	RVS Update Committee
RVS	relative value scale
RVU	relative value unit
TIN	taxpayer identification number

1. Background

The Centers for Medicare and Medicaid Services (CMS) and most private insurers currently provide a bundled payment to practitioners for most surgical procedures.¹ This bundled payment includes some pre-operative care, the procedure itself, and post-operative care within either ten or 90 days after a surgical procedure. CMS spending on surgical procedures is sizable, as procedures with 10- and 90-day global periods reflect nearly 10 percent of all Medicare fee-for-service (FFS) spending in 2017, respectively.² Historically, CMS has not collected data on how many post-operative visits included in surgical global periods are actually performed.

To inform the valuation of procedures with 10- and 90-day global periods, the American Medical Association's RVS (relative value scale) Update Committee (RUC) surveys practitioners on the typical number of post-operative visits provided after a given procedure during the 10- or 90-day global period. The RUC meets three times per year to consider new and revised Current Procedural Technology® (CPT) codes and potentially misvalued services that were identified either through its Relativity Assessment Workgroup or by CMS. The RUC is supported by an advisory committee of 123 specialty societies that collect data and make recommendations on the work relative value units (RVUs), physician time, and practice expenses for the codes that the RUC has referred to them. The primary mechanism used by the RUC to establish new or revised physician work RVUs is physician surveys conducted by specialty societies. Surveys are implemented by specialty societies, and therefore typically completed by practitioners in these specialties who perform the procedures under consideration for revaluation. The RUC surveys and the valuation process focus on the "typical" procedure. This process recognizes whether a given procedure will require more or less work compared with what is typical for that procedure. Further details about the RUC process are available elsewhere (Wynn et al., 2015; American Medical Association, 2019). Survey responses are used by the RUC as part of the process to provide CMS with valuation recommendations. After receiving the RUC's recommendations, CMS decides on the final valuation in part based on the survey responses. The number and type of visits are not used by the RUC or CMS to directly value a given procedure in RVUs. Instead, this information is used to inform the discussion. The valuation is made for the entire procedure as a whole, including pre-operative care, the procedure itself, immediate post-operative care, and post-operative visits in the global period.

¹ Surgical procedures are invasive procedures involving incisions or destruction of tissues that can be performed in a variety of settings, including offices, clinics, surgical centers, or hospitals. Procedures include invasive cardiology procedures, such as catheterizations and radiology procedures.

² Procedures with 10- and 90-day global periods reflected 2.2 percent and 7.8 percent of all Medicare FFS spending in 2017, respectively. Percentages were generated using information from the 2018 Physician Fee Schedule (CMS, 2019).

Because post-operative visits make up about 22 percent of the total work of surgical global bundles (Mulcahy et al., 2015), inaccurate counts of post-operative visits may result in over or underpayment on average to practitioners for specific procedures with global periods. Prior medical chart reviews conducted by the U.S. Department of Health and Human Services (HHS) Office of Inspector General of select surgical procedures with global periods, most recently in 2012, raised concern that the number of post-operative visits used for valuation may not reflect the number of post-operative visits provided in clinical practice (HHS, 2007, 2012a, 2012b).

In response to concerns about inaccurate payment, in 2014 CMS planned to transition all 10-day and 90-day global periods to 0-day global periods, which would have practitioners bill for post-operative visits separately (CMS, 2014a). In response to objections from the surgical community due to reporting burden and potential negative financial impact on patients (Ollapally, 2015; DiVenere, 2015; American Society of Plastic Surgeons, 2015), Congress, as part of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) (Pub. L. 114-10), halted the proposed change to 0-day global periods and instead mandated that CMS collect data on the number and level of post-operative visits delivered to Medicare beneficiaries and use these data to assess accuracy of payment and potentially revalue misvalued procedure codes (CMS, 2014b).

To collect data on the number of post-operative visits, CMS announced that it would begin requiring select practitioners in nine states to use the no-pay Healthcare Common Procedure Coding System (HCPCS) code 99024 to report post-operative visits associated with select procedures with 10- or 90-day global periods furnished to FFS Medicare beneficiaries beginning on July 1, 2017 (CMS and Medicare Learning Network, 2017). Specifically, reporting of post-operative visits was required for practitioners in groups with ten or more in nine randomly selected states (Florida, Kentucky, Louisiana, Nevada, New Jersey, North Dakota, Ohio, Oregon, and Rhode Island). Reporting was required on procedure codes that had a 10- or 90-day global period, were performed by more than 100 practitioners, and were either performed more than 10,000 times or had allowed charges greater than \$10 million (CMS, 2018). These thresholds were chosen by CMS to decrease reporting burden and to focus data collection. The HCPCS codes for which CMS required reporting of post-operative visits in 2017 included 96.5 percent of all the procedures furnished with 10-day global periods and 85.3 percent of all procedures with 90-day global periods. Because they are higher-volume or more-costly procedures, the selected HCPCS codes represent 93.7 percent of allowed charges for all procedures with 10-day global periods and 78.5 percent of allowed charges for all procedures with 90-day global periods.³ This reporting of post-operative visits is ongoing, with no specified end date. CMS is using other data

³ In the nine-state sample, these HCPCS codes included 96.7 percent of all procedures with 10-day global periods furnished, and 86.6 percent of all procedures with 90-day global periods furnished. These procedures represented 94.1 percent of allowed charges for all procedures with 10-day global periods and 78.9 percent of allowed charges for all procedures with 90-day global periods.

collection activities to describe the level of post-operative visits furnished, and those findings will be summarized in other reports.

This report provides final results on one year of claims-based reporting regarding the number of post-operative visits provided, using HCPCS code 99024, for procedures furnished from July 1, 2017, to June 30, 2018. This final report is structured in the following way:

- Chapter 2 describes the data and methods used to conduct these analyses.
- Chapter 3 describes the volume of post-operative visits reported.
- Chapter 4 describes the share of practices and practitioners reporting post-operative visits overall and for subgroups of practice size, specialty, and state.
- Chapter 5 includes our main results and describes the share of post-operative visits provided and the ratio of observed to expected post-operative visits provided.
- Chapter 6 presents results of a sensitivity analysis. We conducted a subanalysis on a set of practitioners who appeared to be regularly reporting post-operative visits to address concerns that potential underreporting of claims for post-operative visits may be driving our main results.
- Chapter 7 presents results of a sensitivity analysis in which we use a more expansive definition of post-operative care and report the share of procedures with any post-operative visits and the ratio of observed to expected post-operative visits.
- Chapter 8 summarizes the results of this report, describes study limitations, and describes policy implications of our findings.

2. Data and Methods

Reporting Requirement from CMS

In November 2016, CMS announced that it would begin requiring all practitioners who practice in groups with ten or more practitioners in nine states (Florida, Kentucky, Louisiana, Nevada, New Jersey, North Dakota, Ohio, Oregon, and Rhode Island) to report post-operative visits associated with 299 common procedure codes using HCPCS code 99024 (CMS, 2014b).⁴ These nine states were randomly selected based on size and region. Reporting began on July 1, 2017.

We refer to post-operative visits reported using HCPCS code 99024 during the global period as “post-operative visits.” We use the term “practitioner” to describe physicians and nonphysicians who are permitted to bill Medicare and provide surgical procedures and/or post-operative visits.

Data Sources

We used FFS Medicare final action professional claims included in the CMS Integrated Data Repository (IDR). The IDR provides real-time access to Medicare FFS claims data. We excluded procedures with the following modifiers, which may have unusual patterns of post-operative care: demonstration claim, clinical research trial (00, 01), assisted at surgery (80, 81, 82), discontinued procedure (53), surgery only (54), post-operative only (55), and pre-operative only (56). We also excluded Ambulatory Surgery Center (ASC) facility records, but retained claims from practitioners furnishing procedures and services in ASCs, to prevent double-counting of procedures. We identified claims for post-operative visits in the first year that were associated with procedures with service dates between July 1, 2017, and June 30, 2018. Thus, we examined post-operative visits with service dates up to July 10, 2018, for procedures with 10-day global periods and up to September 30, 2018, for procedures with 90-day global periods.

We used the Physician Time File from the 2017 Physician Fee Schedule and 2018 Physician Fee Schedule to obtain the number of expected post-operative visits for each procedure code (CMS, 2016 and 2017b). The number of post-operative visits expected comes from the RVS RUC physician surveys, which are used to inform CMS’s valuation of the procedures and are reported in the Medicare Physician Fee Schedule. The Physician Time File is released annually with the Physician Fee Schedule and used by CMS as part of the valuation process. CMS reports

⁴ The list of codes for which reporting is required is updated each year to address for example codes that are eliminated or codes which have been split into two different codes. There were 299 codes with required reporting during 2017 and 2018.

the number and type (e.g., inpatient, discharge, outpatient) of visits that it considered in its valuation of each surgical procedure in the Physician Time File. For the 299 procedures for which reporting is required, the number of expected post-operative visits ranges from zero to three visits for procedures with 10-day global periods and from 1 to 15.5 visits for procedures with 90-day global periods.⁵

Identifying Procedures Where Reporting Is Expected

We analyzed procedures that met the following inclusion criteria: one of the procedure codes for which reporting was required, performed between July 1, 2017, to June 30, 2018, for a Medicare FFS beneficiary, and performed by an expected reporter. Per CMS guidance, expected reporters were practitioners in one of the nine states and in practices with ten or more practitioners (CMS, 2017a). Practitioners were identified using National Provider Identifiers (NPIs). When a practitioner cared for beneficiaries in more than one state, we assigned the practitioner to the state with the most claims submitted by that NPI. Practice size was calculated by summing the total number of practitioners (as identified by an NPI) of any specialty under a given taxpayer identification number (TIN). Consistent with prior work (Research Data Assistance Center, 2018), practitioners billing under more than one TIN were attributed to up to two TINs for our counts of practice size, these being the two TINs with the highest billing volume for each practitioner.

There is no publicly available database of physician practices in the United States, and TINs are often used to define practices in research. We acknowledge, however, that they are imperfect proxies: Multiple practices within a larger health system may use a single TIN to bill their services, and within some practices, individual practitioners may use their own TIN instead of a practice TIN. Additionally, it is important to note that our definition of a practice does not match the guidance provided by CMS in the final rule regarding who is required to report post-operative visits using HCPCS code 99024. CMS required practitioners in practices with ten or more practitioners to report post-operative visits; however, CMS did not specifically identify these practitioners by NPI or TIN. Thus, practitioners had to make their own determination as to whether or not they were in a practice that met these criteria. CMS used broad language to define “practice” in the context of the reporting requirement, defining practices as “a group of practitioners whose business or financial operations, clinical facilities, records, or personnel are shared by two or more practitioners” (CMS, 2017a). This definition of a practice includes “practitioners [who] practice in separate locations but are part of the same delivery system that shares business or financial operations, clinical facilities, records, or personnel. (CMS, 2017a)” It

⁵ Roughly 36 percent of the 299 procedure codes with 10- or 90-day global periods are assigned “0.5 post-operative visits” during the RUC’s survey process. The RUC’s rationale for a 0.5-day post-operative visit is the work for discharging a beneficiary would not be the same as a full discharge visit. When practitioners report post-operative visits using HCPCS code 99024, they cannot indicate they performed a 0.5 visit; they report single visits.

is likely that some practitioners billing under different TINs (and therefore under separate practices for the purposes of our estimates of practice size) would meet CMS’s broader definition of practice size; thus our approach to identifying who is an expected reporter may understate the true number of expected reporters.

Linking Procedures and Post-Operative Visits

For our main results, we linked procedures and post-operative visits at the procedure level based on dates of service, beneficiary ID, and global period length. For example, we linked a reported post-operative visit to a procedure if the date of service for the post-operative visit was during the global period of the procedure. Thus, a beneficiary with more than one procedure since July 1, 2017, may be included in these data multiple times. Because the linkage was based on the beneficiary and dates, we included all post-operative visits, including those performed by the practitioner who furnished the procedure, someone other than the practitioner who furnished the procedure, and by a practitioner in another practice.⁶ As described in more detail later in this chapter and in Appendix B, we conducted sensitivity analyses in which we used a different method of identifying post-operative care.

Ideally, each post-operative visit would be linked to a specific procedure in the claims data. This indexing would make it clear which visits relate to a procedure. However, Medicare did not require practitioners to indicate which procedure or procedures prompted the post-operative visit when reporting post-operative visits. Because beneficiaries may receive multiple procedures on the same day or over a short period of time, in some circumstances it is unclear how to attribute post-operative visits to specific procedures. For example, a beneficiary could receive a hip replacement (90-day global period) from an orthopedic surgeon and then one month later require fracture care for an unrelated arm injury (90-day global period) from the same orthopedic surgeon. In this case, it would be difficult to know whether a visit reported with HCPCS code 99024 following the second procedure was related to the hip replacement, arm fracture, or both.

For analyses utilizing post-operative visits linked to procedures, we limited our analysis to “clean” procedures, defined as billed procedures with one billed unit of service, that do not overlap with the 10- or 90-day global period for any of the beneficiary’s other procedures. This allowed us to link a given procedure and post-operative visit unambiguously. Among the procedure codes for which reporting was required, 59.7 percent of procedures were clean. To

⁶ For procedures with 10-day global periods, 93.4 percent of post-operative visits were billed by a practitioner in a different practice (determined by TIN) from the practitioner who performed the original procedure, 22.4 percent were billed by a practitioner in the same practice as the practitioner who performed the original procedure, and 68.4 percent were provided by the practitioner who performed the original procedure. For procedures with 90-day global periods, 3.1 percent of post-operative visits were billed by a practitioner in a different practice from the practitioner who performed the original procedure, 28.7 percent were billed by a practitioner in the same practice as the practitioner who performed the original procedure, and 68 percent were provided by the practitioner who performed the original procedure.

allow readers to understand the generalizability of clean procedures, we compared the characteristics of procedures in four groups:

- **“clean” procedures:** do not have overlapping global periods with other procedures with a 10- or 90-day global period
- **multiple procedures with the same length of global periods:**
 - multiple procedures with 10-day global periods: share the same date of service with only other procedures with 10-day global periods
 - multiple procedures with 90-day global periods: share the same date of service with only other procedures with 90-day global periods
- **combination of 10- and 90-day on same day:** share the same date of service with procedures that have global periods of different lengths (or with procedures without 10- or 90-day global periods)
- **overlapping global procedures:** have different dates of service and procedures with overlapping global periods.

In Appendix A, we describe the number of procedures within each of the aforementioned categories and the characteristics of those procedure groups. We examined the volume of these procedure categories by specialty, HCPCS codes, and HCPCS codes organized by CPT book headings. When examining procedures by specialty, if more than one procedure was performed on the same day by providers from different specialties, then the procedure was counted under both of the specialties. We report results for the top 20 highest-volume specialties, as measured by the number of procedures furnished, for which reporting of post-operative visits was required.

Calculating Outcomes

We reported the share of procedures with any reported post-operative visits, calculated by dividing the number of procedures linked to one or more post-operative visits by the total number of procedures. To calculate observed to expected ratios of post-operative visits, we divided the total number of observed post-operative claims by the total number of expected post-operative visits.

Our estimates of observed to expected ratios of post-operative visits may be too high for some procedures. Roughly 36 percent of the 299 procedure codes with 10- or 90-day global periods are assigned “0.5 post-operative visits” during the RUC’s survey process. The 0.5 visit is often an inpatient hospital discharge visit for procedures performed primarily in hospital outpatient departments. In this case, the 0.5 visit signifies that the work involved when transitioning to the home after a procedure in a hospital outpatient department is less than the work assigned to an inpatient hospital discharge visit. When we calculate the proportion of expected post-operative visits provided, we include 0.5 days in the denominator. However, when physicians report on post-operative visits using HCPCS code 99024, they cannot indicate they

performed a 0.5 visit; they report single visits. Therefore, our estimate of the proportion of expected post-operative visits provided may actually be an overestimate.

We reported outcomes separately for procedure codes with 10- and 90-day global periods and by practice size, place of service, and specialty of the practitioner performing the procedure. The location of a procedure or post-operative visit was based on the place of service code (office; outpatient hospital; off-campus hospital outpatient; emergency or urgent care; ambulatory surgical center; inpatient; or other, which includes federally qualified health centers, rural health clinics, and retail clinics). Specialty was reported on claims. If a practitioner had more than one specialty on claims, we used the most commonly reported specialty. Primary-care physicians were defined by the specialties of general practice, family practice, and internal medicine. Hospitalists were defined through the use of a hospitalist-specific specialty code introduced in April 2017, or as practitioners trained in primary care who billed at least 90 percent of their total charges in a year for Medicare in inpatient settings (Welch et al., 2014).

Identifying Practitioners Who Frequently Report Post-Operative Visits

Despite communication from CMS and specialty societies (CMS and Medicare Learning Network, 2017; Society of Thoracic Surgeons, 2017; American College of Surgeons, undated), it is possible that some practitioners may be unaware they were required to report post-operative visits. This would lead to an underestimate of the observed to expected ratio. Because of concerns for potential underreporting of claims for post-operative visits, we conducted a subanalysis on a set of “robust reporters” who appeared to be regularly reporting post-operative visits. Practitioners were defined as robust reporters if they

- performed ten or more clean procedures with 90-day global periods beginning July 1, 2017
- reported at least one post-operative visit for at least half of these procedures.

We identified robust reporters based on the share of post-operative visits furnished after procedures with 90-day global periods, as opposed to all procedures with global periods, because of the small share of procedures with 10-day global periods and any post-operative visits. Additionally, there was face validity that most 90-day procedures would require at least one post-operative visit. For example, clinically, it is difficult to envision that a patient with a cataract surgery, hip replacement, or prostatectomy did not have at least one post-operative visit during the global period.

In Appendix B, we describe our approach to defining robust reporters. Appendix B also includes the number of procedures and practitioners furnishing procedures that are included in our definition of robust reporters and the number of procedures and practitioners furnishing procedures that would be included had we selected different definitions of robust reporters.

We compared, separately for procedures with 10- and 90-day global periods, the share of procedures with any post-operative visits and the observed to expected ratios of post-operative

visits among robust reporters to practitioners who billed 10 or more procedures with 90-day global periods (i.e., “high-volume reporters”).

Identifying Other Services and Procedures Occurring During Global Periods

As mentioned above, post-operative visits may not be reported using HCPCS code 99024 following procedures (where reporting is required) if practitioners are not aware of the reporting requirement. Other potential explanations for low reporting of post-operative visits include the possibility that these visits are being furnished, but reported using codes other than 99024, such as other evaluation and management (E&M) services codes, or that the post-operative care is provided during the performance of another procedure. To explore this possibility, we counted E&M visits and other procedures furnished during global periods and calculated the share of procedures with any E&M visits and other procedures during global periods and calculated the observed to expected ratios of these visits during global periods. When examining E&M visits, we counted the total number of days with selected E&M visit codes provided to the beneficiary by the practitioner who furnished the original procedure.

We included the following E&M visit codes for outpatient, inpatient, critical care, and discharge services: HCPCS codes 99201–99205, 99211–99215, 99221–99223, 99231–99233, 99238, 99239, and 99291–99292. We also examined procedures with HCPCS codes 10021–69990, excluding procedures with 10- or 90-day global periods to preserve our sample of clean, nonoverlapping single procedures. We began by including only procedures performed by the same practitioner who furnished the original procedure.⁷ We then explored an expanded definition in which we counted the aforementioned E&M visits plus the aforementioned procedures occurring during global periods provided by any practitioner in the same practice with the same specialty as the practitioner who furnished the procedure.

⁷ As described above, we exclude procedures in which there is overlap in global periods when we identify clean procedures. Therefore, these other procedures are those without a global period.

3. Examining Number of Post-Operative Visits Reported

In this chapter, we describe the number of post-operative visits reported using HCPCS code 99024 in the nine states that were required by CMS to report post-operative visits.

Methods Overview

We calculated weekly counts of claim lines for post-operative visits reported using HCPCS code 99024 from January 1, 2017, to June 30, 2018,⁸ for the nine states required to report post-operative visits. Although there is no Medicare payment associated with HCPCS code 99024, some practitioners already reported HCPCS code 99024 prior to the onset of required reporting in July 2017. We compared the number of post-operative visits reported before July 1, 2017, with the number of post-operative visits reported since July 1, 2017, to determine whether claims-based reporting of post-operative visits increased after the change in CMS reporting requirements.

We also reported weekly counts of post-operative visits during the required reporting period, July 1, 2017, to June 30, 2018.

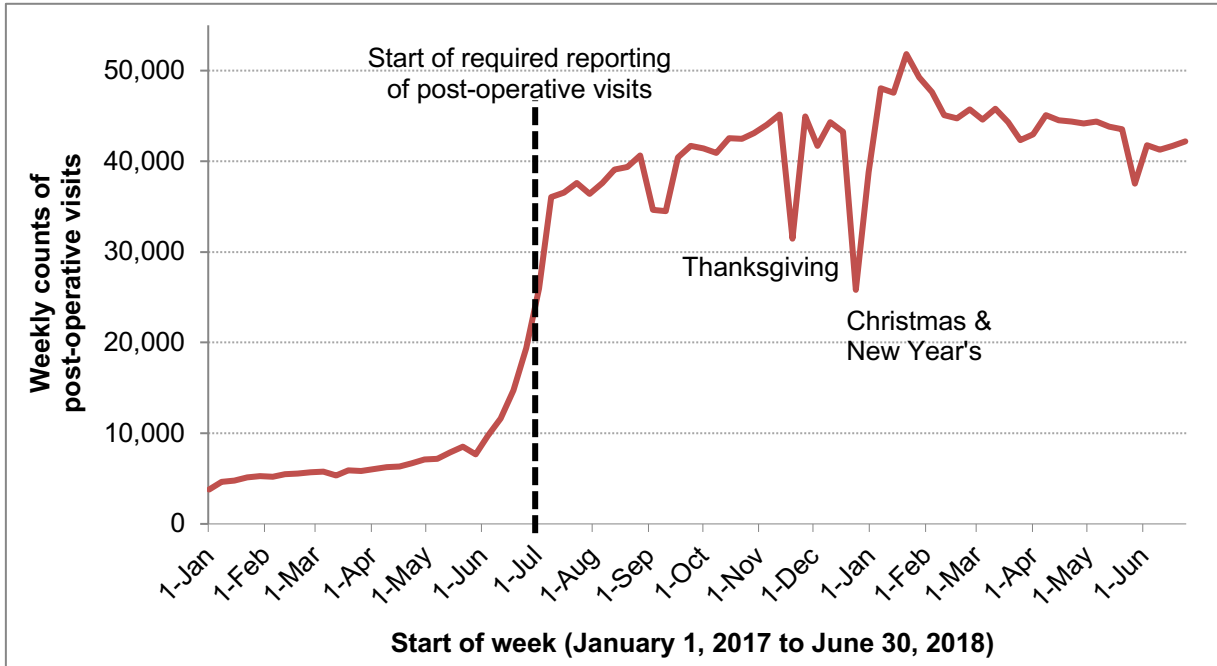
Results

Claims-based reporting of post-operative visits increased during 2017 and, in particular, after the start of required reporting in July 1, 2017 (Figure 3.1). We observed a large increase in the volume of post-operative visits in 2017 in the nine states required to report since July 1, 2017. This increase then plateaued at approximately 40,000 visits per week by end of June 2018.

Figure 3.2 demonstrates the variation in reporting by state across the nine states required to report post-operative visits. The weekly counts of post-operative visits per 10,000 claims for procedures with 10- or 90-day global periods were lowest in Florida, Nevada, and New Jersey and highest in North Dakota, Ohio, and Kentucky. During the required reporting period, the majority of post-operative visits reported were furnished in the office setting (Table 3.1).

⁸ Unlike other analyses presented in this report, the analyses in this chapter are limited to post-operative visits reported from July 1, 2017, to June 30, 2018. We do this so as not to suggest a decline in reporting of post-operative visits during the time period after June 30, 2018, when we stop including procedures in our study sample.

Figure 3.1. Weekly Counts of Post-Operative Visits Among States Required to Report Post-Operative Visits



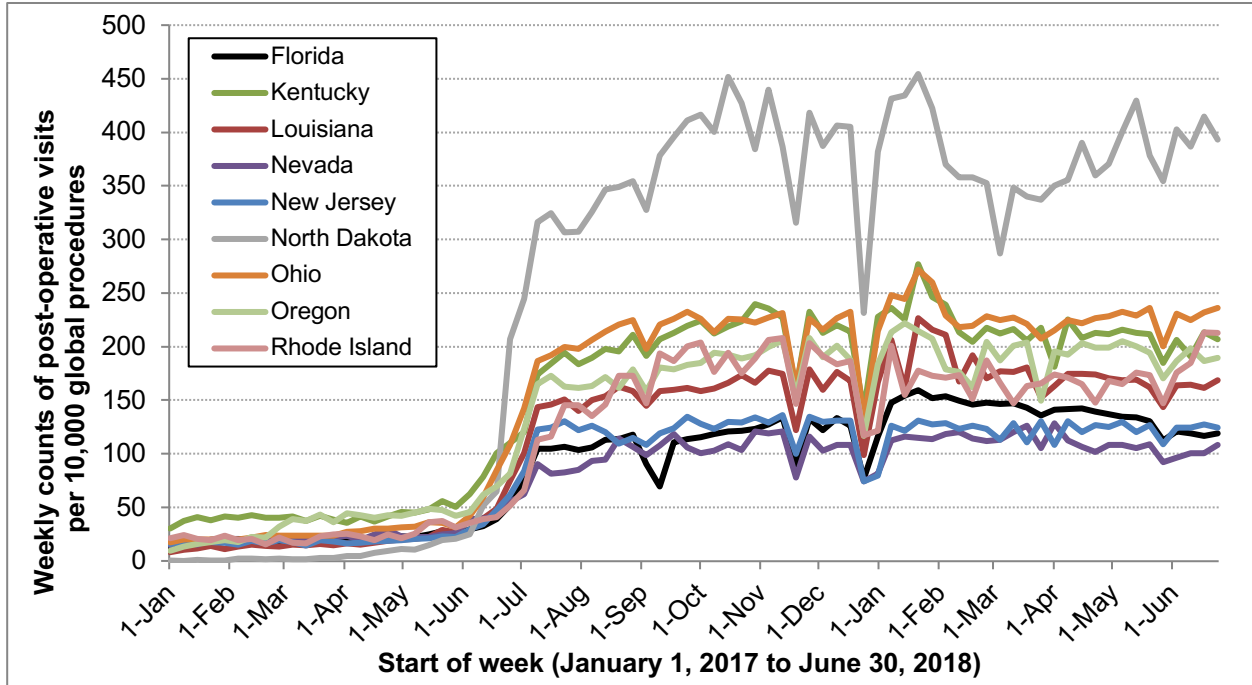
SOURCE: CMS-IDR (December 13, 2018).

NOTE: The claims for HCPCS code 99024 listed in this table occurred, were reported, and were uploaded from January 1, 2017, through June 30, 2018.

Conclusions

After the July 1, 2017, implementation of required reporting, the volume of post-operative visit reporting increased in states where reporting is required and the number of post-operative visits has now plateaued.

Figure 3.2. Weekly Counts of Post-Operative Visits per 10,000 Claims for Global Procedures



SOURCE: CMS-IDR (December 13, 2018).

NOTE: The claims for HCPCS code 99024 listed in this figure occurred, were reported, and were uploaded from January 1, 2017, through June 30, 2018, in the nine states with mandatory reporting.

Table 3.1. Reported Post-Operative Visits, by Place of Service

Place of Service of Post-Operative Visit	Nine States with Required Reporting ^a	
	# of Post-Operative Visits	Percentage
Office	1,582,648	73.1
Outpatient Hospital	141,776	6.5
Off-Campus Hospital Outpatient	77,299	3.6
Emergency or Urgent Care	3,235	0.1
Ambulatory Surgical Center	324	0.0
Inpatient	357,548	16.5
Other	2,457	0.1

SOURCE: CMS-IDR (January 1, 2019).

NOTES: The claims for HCPCS code 99024 listed in this table occurred, were reported, and were uploaded from January 1, 2017, through June 30, 2018, in the nine states with mandatory reporting.

“Other” includes federally qualified health centers, rural health clinics, and retail clinics.

^a Nine states with requiring reporting of post-operative visits are Florida, Kentucky, Louisiana, Nevada, New Jersey, North Dakota, Ohio, Oregon, and Rhode Island.

4. Examining the Share of Practitioners Engaged in Claims-Based Reporting of Post-Operative Visits

In the prior chapter, we showed the rapid rise in reporting of post-operative visits in states required by CMS to report post-operative visits using HCPCS code 99024. In this chapter, we describe the share of practices and practitioners reporting HCPCS code 99024 overall and for subgroups of practice size, specialty, and state.

Methods Overview

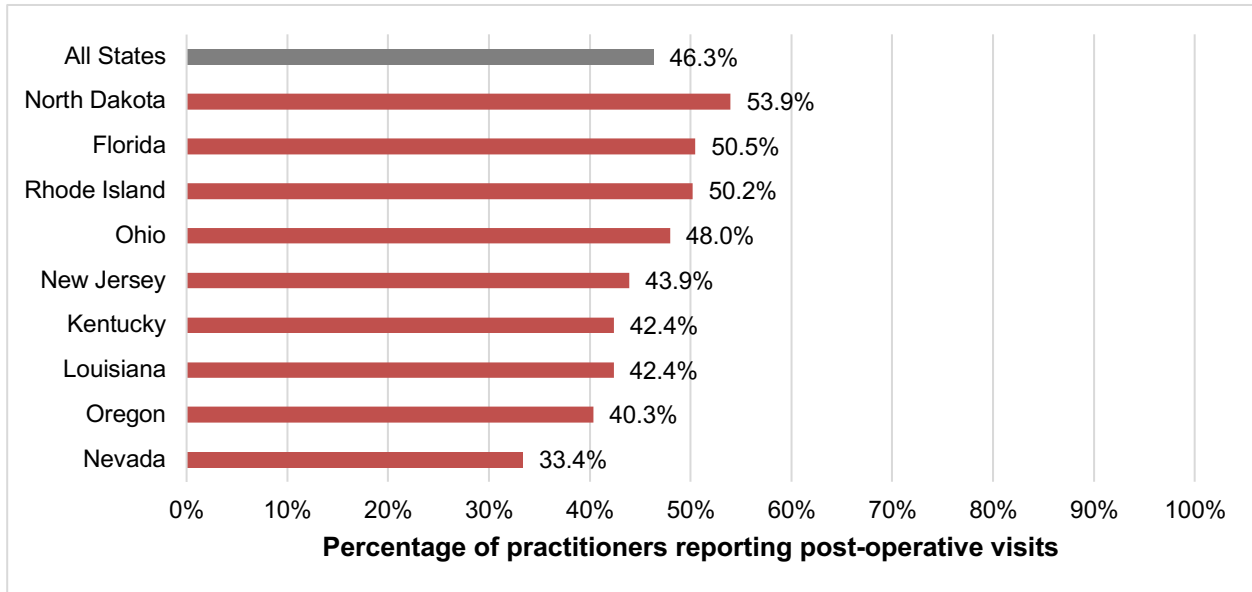
In this chapter, we focus only on the nine states with required reporting of post-operative visits. We analyzed procedures that met the following inclusion criteria: one of the procedure codes for which reporting was required; performed between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; and performed by an expected reporter. We examined post-operative visits between July 1, 2017, and June 30, 2018. We included post-operative visits up to July 10, 2018, if linked to a procedure with a 10-day global period and up to September 30, 2018, if linked to a procedure with a 90-day global period. We included any post-operative visit regardless of who performed the post-operative visit. We examined reporting rates by practice size, state, and specialty.

Results

During the study period, 46.3 percent of 40,017 practitioners expected to report post-operative visits reported one or more post-operative visits using HCPCS code 99024. The share of practitioners reporting post-operative visits varied by state (Figure 4.1). The highest share of post-operative visits among expected reporters was observed in North Dakota (53.9 percent). The lowest rates of post-operative visits among expected reporters was observed in Nevada (33.4 percent).

In Figure 4.2, we describe the share of practitioners reporting post-operative visits by practice size strata. The share of practitioners reporting post-operative visits was similar across practice size strata among practices expected to report post-operative visits (e.g., those with ten or more practitioners).

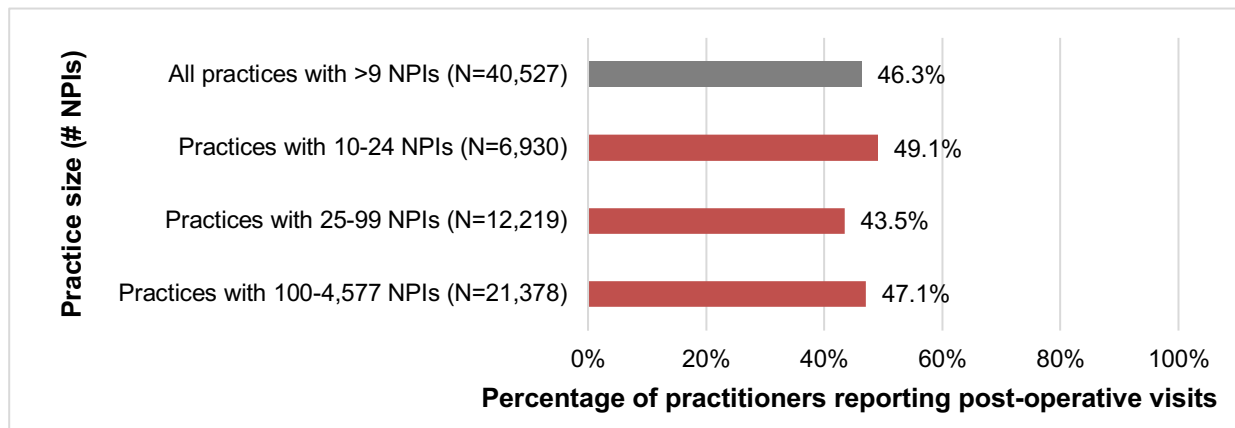
Figure 4.1. Share of Practitioners Reporting Post-Operative Visits (HCPCS Code 99024), by State



SOURCE: CMS-IDR (December 13, 2018).

NOTES: The claims for HCPCS code 99024 were reported and uploaded from July 1, 2017, through June 30, 2018. We also included 99024-coded claims up to July 10, 2018, if linked to a procedure with a 10-day global period, and up to September 30, 2018, if linked to a procedure with a 90-day global period.

Figure 4.2. Share of Practitioners Reporting Post-Operative Visits, by Practice Size



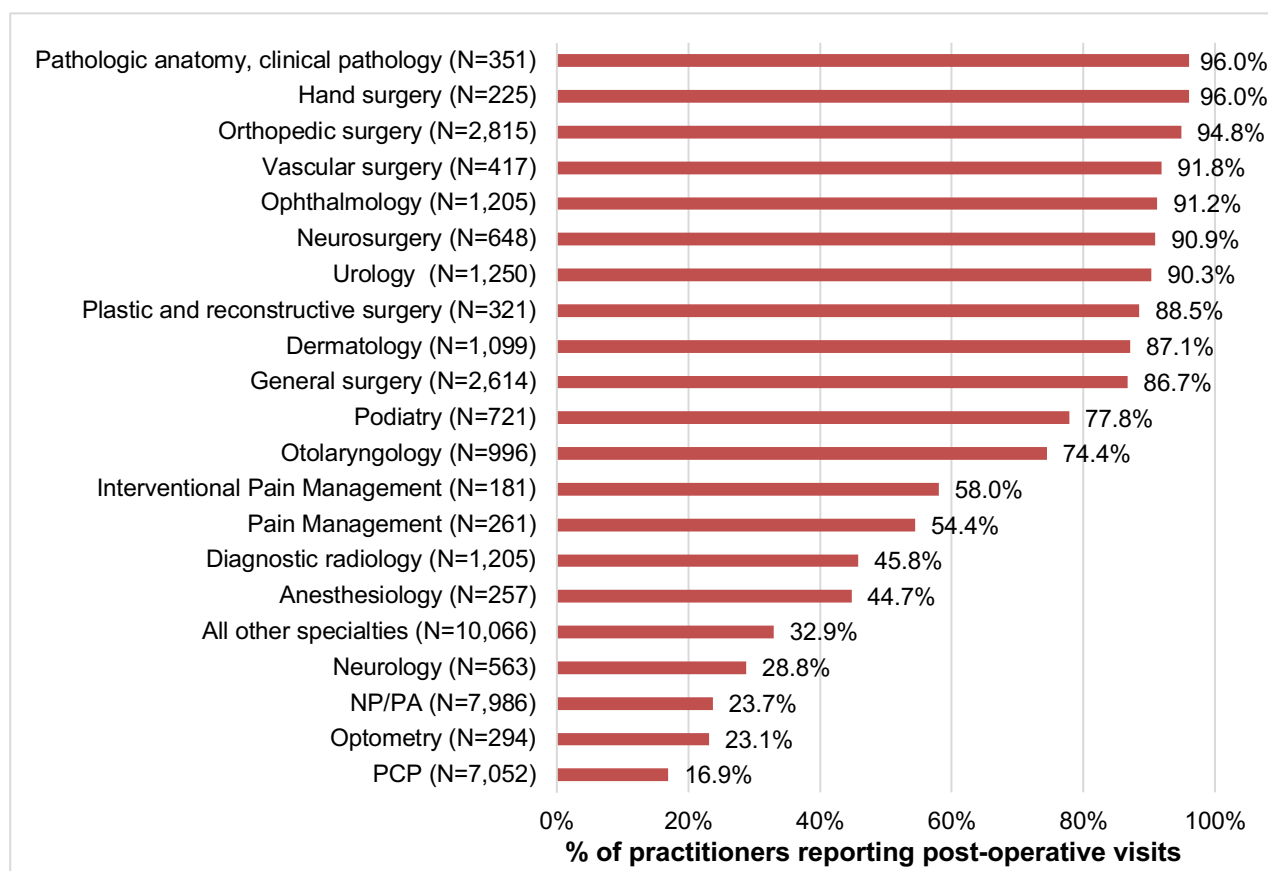
SOURCE: CMS-IDR (December 13, 2018).

NOTES: The claims for HCPCS code 99024 were reported and uploaded from July 1, 2017, through June 30, 2018. We also included 99024-coded claims up to July 10, 2018, if linked to a procedure with a 10-day global period and up to September 30, 2018, if linked to a procedure with a 90-day global period. Practice size was calculated based on all NPIs within a practice, and not limited to NPIs furnishing procedures.

Figure 4.3 reports the share of practitioners within a specialty reporting one or more post-operative visits for the top 20 specialties in terms of procedures furnished for which reporting of post-operative visits was required. These 20 specialties include 82 percent of practitioners who

ever reported a post-operative visit. The number of practitioners who were expected to report post-operative visits within each specialty is listed in parentheses.⁹ Rates of post-operative visits were greater than 80 percent for ten of the specialties furnishing the most procedures with global periods. Rates of post-operative visits were less than 25 percent for three specialties: primary care, nurse practitioners (NPs) and physician assistants (PAs), and optometry. The number of practitioners who were expected to report post-operative visits varied greatly by specialty. Primary care providers (PCPs) (7,052 NPIs) and NP/PAs (7,986 NPIs) had the most practitioners expected to report; pain management (261 NPIs) and interventional pain management (181 NPIs) had the least practitioners expected to report.

Figure 4.3. Share of Practitioners Reporting Post-Operative Visits, by Specialty



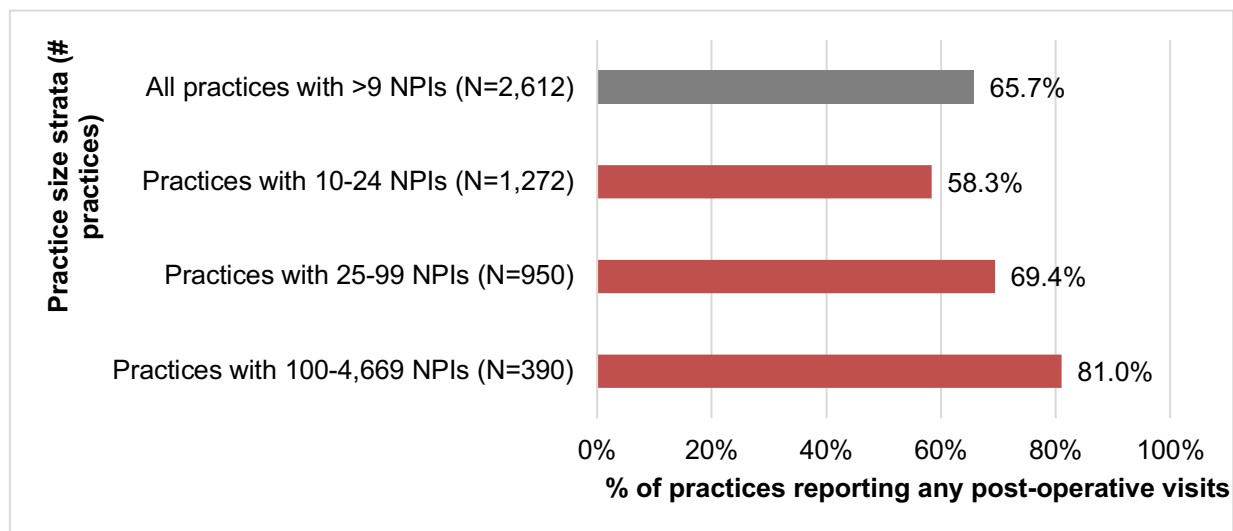
SOURCE: CMS-IDR (December 13, 2018).

NOTES: The claims for HCPCS code 99024 claims were reported and uploaded from July 1, 2017, through June 30, 2018. We also included 99024-coded claims up to July 10, 2018, if linked to a procedure with a 10-day global period and up to September 30, 2018, if linked to a procedure with a 90-day global period. The number of expected reporters is listed in parentheses following the specialty name.

⁹ Expected reporters are practitioners who furnished one of the procedure codes for which CMS requires reporting, performed in one of the nine states in a practice with ten or more practitioners between July 1, 2017, and June 30, 2017.

Next, we examined reporting of post-operative visits at the practice level. It is possible that awareness of the reporting requirement would vary across practices. Practitioners expected to report post-operative visits worked in 2,612 practices. About 66 percent of these practices had one or more practitioners report a post-operative visit during the study period (Figure 4.4). The largest practices had the highest rates of post-operative visit reporting. Among practices with 100 or more practitioners, 81.0 percent of practices reported at least one post-operative visit since July 1, 2017. Smaller practices had lower rates of reporting post-operative visits (10–24 practitioners, 58.3 percent; 25–99 practitioners, 69.4 percent). This variation by practice size may not be surprising given that larger practices have more practitioners and therefore more people who can report at least one post-operative visit.

Figure 4.4. Share of Practices Reporting Post-Operative Visits (HCPCS Code 99024), by Practice Size



SOURCE: CMS-IDR (December 13, 2018).

NOTES: The claims for HCPCS code 99024 claims were reported and uploaded from July 1, 2017, through June 30, 2018. We also included 99024-coded claims up to July 10, 2018, if linked to a procedure with a 10-day global period and up to September 30, 2018, if linked to a procedure with a 90-day global period.

Conclusions

The fraction of practitioners who reported at least one post-operative visit was about 46 percent. When examining reporting of post-operative visits at the practice level, nearly 66 percent of practices with ten or more practitioners reported post-operative visits. The share of post-operative visit reporting by expected reporters varied by state and specialty. The smallest share of practitioners reporting was observed in Nevada. When examining post-operative visits among expected reporters, most specialties had reporting rates greater than 60 percent; however, rates lower than 25 percent were observed among PCPs, NPs and PAs, and optometrists.

5. Timing of Post-Operative Visits and the Fraction of Expected Post-Operative Visits Reported

In this chapter, we report the fraction of procedures with at least one post-operative visit and report the ratio of observed to expected post-operative visits. This requires the linking of procedures to post-operative visits. Because practitioners do not indicate which procedure or procedures prompted the post-operative visit, in this chapter we limited our analysis to “clean” procedures, defined as billed procedures with one billed unit of service that do not overlap with the 10- or 90-day global period for any of the beneficiary’s other procedures. This approach allowed us to link a given procedure and post-operative visit unambiguously.

Methods Overview

Using the procedure as our unit of analysis, we analyzed clean procedures that met the following inclusion criteria: one of the procedure codes for which reporting was required; performed between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; and performed by an expected reporter. Using the procedure as our unit of analysis, we first report the timing of these post-operative visits during global periods. Next, we report the share of procedures with any reported post-operative visits, calculated by dividing the number of procedures linked to one or more post-operative visits by the total number of procedures. To calculate the ratio of observed to expected post-operative visits provided, we divided the total number of observed post-operative claims by the total number of expected post-operative visits. We report outcomes separately for procedure codes with 10- and 90-day global periods and by practice size, place of service, and specialty of the practitioner performing the procedure.

Results

Among the procedures for which reporting was required, 61.1 percent of procedures with 10-day global periods and 59.7 percent of procedures with 90-day global periods met our criteria for a clean procedure. (See Appendix A for a comparison of the volume and characteristics of clean procedures to nonclean procedures.) During the study period, there were 1,418,262 clean procedures linked to 931,640 post-operative visits in our study sample.¹⁰ Among procedures with 10-day global periods, 81 percent were performed in an office setting (Table 5.1). Among procedures with 90-day global periods, 36 percent were performed in an inpatient setting.

¹⁰ For procedures with 10-day global periods, 10.4 percent of post-operative visits were billed by a practitioner in a different practice (determined by TIN). For procedures with 90-day global periods, 4.1 percent of post-operative visits were billed by a practitioner in a different practice.

Timing of Post-Operative Visits

Of post-operative visits reported for 10- and 90-day global procedures, respectively, 73.8 percent and 26.2 percent were performed in the first seven days after the procedure (Figure 5.1 and Figure 5.2). Of post-operative visits reported for 10-day global procedures, the largest fraction occurred on day seven of the global period (29.3 percent). Of post-operative visits reported for 90-day global procedures, the largest fraction occurred on day one of the global period (10.6 percent).

Share of Procedures with Any Post-Operative Visits

Overall, 25.8 percent of procedures had one or more post-operative visits. This rate was higher for procedures with 90-day global periods (70.9 percent) than procedures with 10-day global periods (3.7 percent) (Table 5.1). Among procedures with 10-day global periods, rates of post-operative visits were similar across practice size (10–24 NPIs, 3.3 percent; 25–99 NPIs, 3.8 percent; 100 or more NPIs, 4.1 percent). Reporting of post-operative visits differed by practice size for procedures with 90-day global periods, with rates of 63.3 percent for practices with 10–24 NPIs, 76.3 percent for practices with 25–99 NPIs, and 72.1 percent for practices with 100 or more NPIs. When examining place of service of the procedure, the share of 10-day global procedures with any post-operative visits was greatest in the inpatient setting (9.9 percent). Among procedures with 90-day global periods, reporting of post-operative visits was greatest among procedures furnished in inpatient (74.5 percent) and off-campus hospital outpatient settings (78.5 percent).

Among specialties performing more than 10,000 procedures with 10-day global periods, the highest reporting rates were observed for the following specialties: general surgery (18 percent), otolaryngology (9.5 percent), and ophthalmology (8.2 percent). Rates were higher among specialties performing more than 10,000 procedures with 90-day global periods: orthopedic surgery (78.3 percent), neurosurgery (76.6 percent), and hand surgery (76.2 percent).

Table 5.1. Share of Procedures with Any Post-Operative Visits

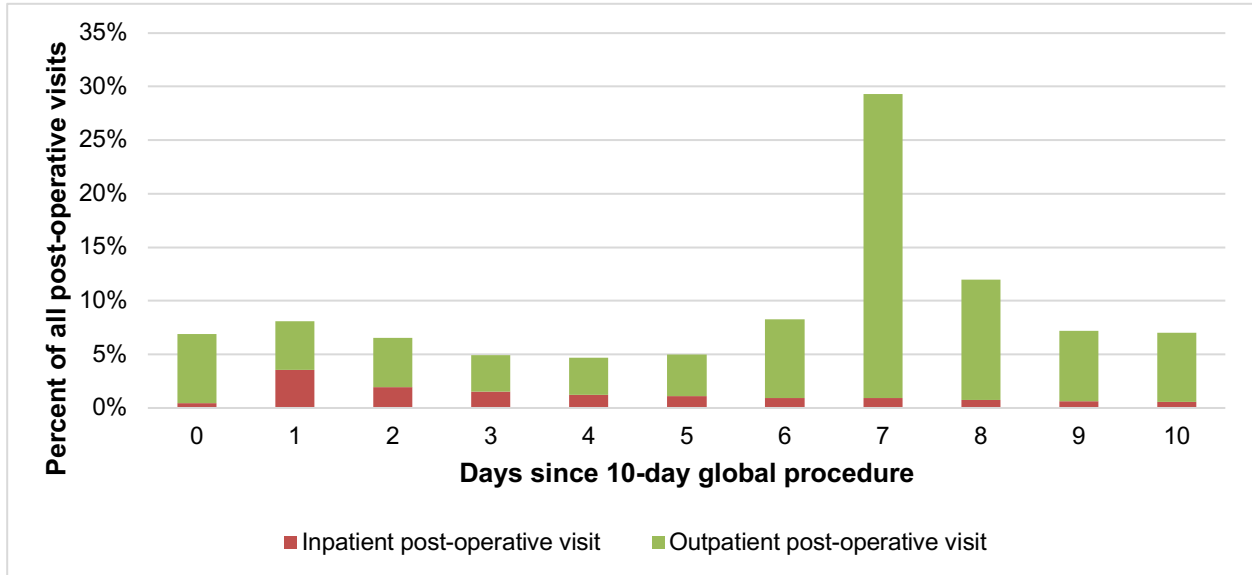
	Procedures with 10-Day Global Periods			Procedures with 90-Day Global Periods		
	Total Procedures	Total Procedures with Any Post-Operative Visits	Share of Procedures with Any Post-Operative Visits (%)	Total Procedures	Total Procedures with Any Post-Operative Visits	Share of Procedures with Any Post-Operative Visits (%)
Total	961,006	35,829	3.7	457,256	324,228	70.9
Practice size						
10–24 practitioners	334,417	11,084	3.3	128,626	81,466	63.3
25–99 practitioners	311,849	11,850	3.8	138,642	105,784	76.3
100 or more practitioners	314,740	12,895	4.1	189,988	136,978	72.1
Procedure place of service						
Ambulatory surgical center	26,211	2,161	8.2	103,460	75,855	73.3
Emergency or urgent care	23,734	950	4.0	1,302	559	42.9
Inpatient	24,770	2,442	9.9	166,027	123,742	74.5
Off-campus hospital outpatient	27,750	925	3.3	10,998	8,636	78.5
Office	777,976	24,625	3.2	51,257	30,288	59.1
Outpatient hospital	65,763	4,687	7.1	123,836	84,954	68.6
Other	14,802	39	0.3	376	194	51.6
Specialty ^a						
Anesthesiology	8,264	191	2.3	10	2	20.0
Dermatology	459,636	15,049	3.3	16,280	9,001	55.3
Diagnostic radiology	23,041	496	2.2	101	10	9.9
General surgery	23,768	4,289	18.0	53,254	37,658	70.7
Hand surgery	259	91	35.1	10,564	8,048	76.2
Interventional pain management	11,320	224	2.0	14	2	14.3
Neurology	16,992	155	0.9	159	143	89.9
Neurosurgery	2,445	519	21.2	14,476	11,083	76.6
NP/PA	225,010	3,392	1.5	3,634	2,272	62.5
Ophthalmology	33,032	2,697	8.2	112,482	81,895	72.8
Optometry	2,621	68	2.6	800	512	64.0
Orthopedic surgery	3,642	636	17.5	147,845	115,832	78.3
Otolaryngology	10,564	1,006	9.5	3,556	2,262	63.6
Pain management	14,305	406	2.8	18	13	72.2
Pathologic anatomy, clinical pathology	28	2	7.1	19,155	8,453	44.1
Plastic and reconstructive surgery	3,706	893	24.1	4,656	3,065	65.8
Podiatry	22,732	1,035	4.6	4,394	2,792	63.5
Primary care	45,015	1,681	3.7	1,363	736	54.0
Urology	2,491	613	24.6	16,799	10,207	60.8
Vascular surgery	5,639	488	8.7	10,686	7,332	68.6
All other specialties	46,496	1,898	4.1	37,010	22,910	61.9

SOURCE: CMS-IDR (December 13, 2018).

NOTES: The claims for HCPCS code 99024 claims listed in this table were linked to procedures that were furnished from July 1, 2017, through June 30, 2018. Procedure counts included in this table are limited to the procedure codes for clean procedures that were linked to post-operative visits for practitioners in practices with ten or more practitioners in the nine states where reporting of post-operative visits was required.

^a Lists top 20 specialties by procedure volume.

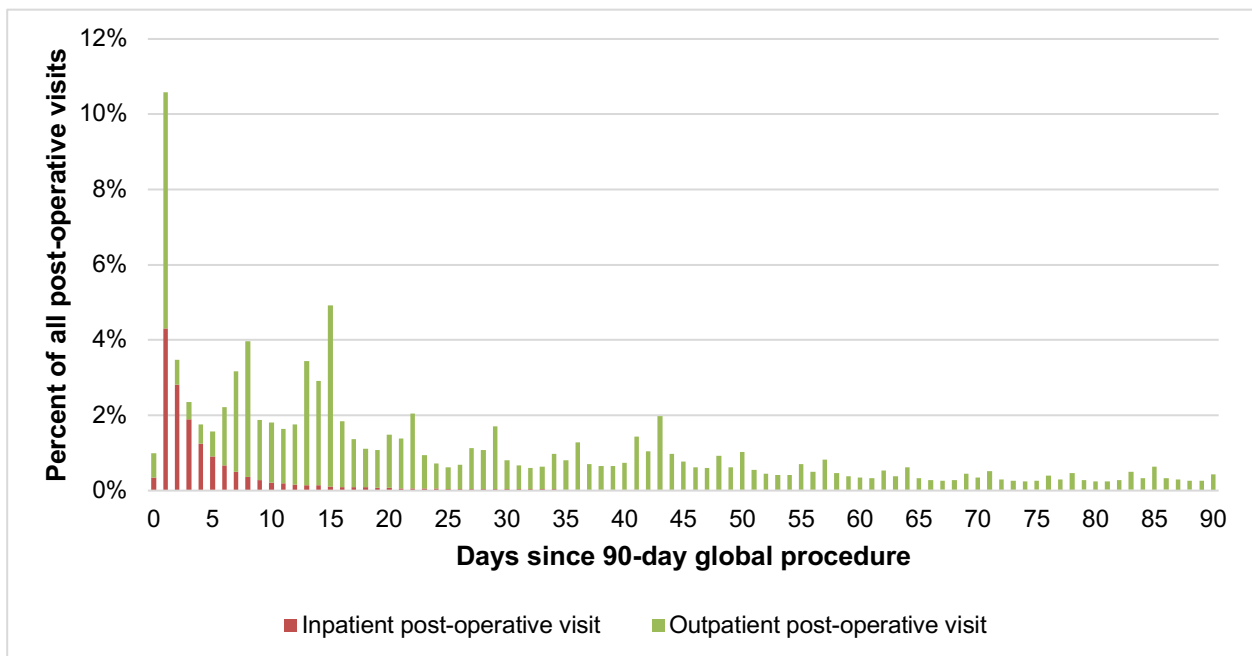
Figure 5.1. Distribution of Post-Operative Visits Across Days in the Global Period, Procedures with 10-Day Global Periods



SOURCE: CMS-IDR (December 13, 2018).

NOTES: The claims for HCPCS code 99024 included in this figure were linked to procedures that were furnished from July 1, 2017, through June 30, 2018. Post-operative visits included in the figure are limited to visits linked to the clean procedure codes furnished by practitioners in practices with ten or more practitioners in the nine states where reporting of post-operative visits was required. Inpatient and outpatient post-operative visits are defined based on the place of service listed on the no-pay code (HCPCS code 99024) submitted for the visit.

Figure 5.2. Distribution of Post-Operative Visits Across Days in the Global Period, Procedures with 90-Day Global Periods



SOURCE: CMS-IDR (December 13, 2018).

NOTES: The claims for HCPCS code 99024 included in this figure were linked to procedures that were furnished from July 1, 2017, through June 30, 2018. Post-operative visits included in the figure are limited to visits linked to the clean procedure codes furnished by practitioners in practices with ten or more practitioners in the nine states where reporting of post-operative visits was required. Inpatient and outpatient post-operative visits are defined based on the place of service listed on the no-pay code (HCPCS code 99024) submitted for the visit.

Ratios of Observed to Expected Post-Operative Visits Provided

The ratio of observed to expected post-operative visits provided was 0.04 for procedures with 10-day global periods and 0.39 for procedures with 90-day global periods (Table 5.2). Ratios of observed to expected post-operative visits were similar across practice sizes for procedures with 10- and 90-day global periods.

For procedures with 10-day global periods, the ratio of observed to expected post-operative visits provided for procedures performed in the inpatient setting (0.15) was higher than other settings; a relatively small fraction (<5 percent) of procedures with a 10-day global period were performed in inpatient setting. For procedures with 90-day global periods, the ratio of observed to expected post-operative visits provided for procedures performed in off-campus hospital outpatient settings (0.58) was higher than other settings. Among specialties performing more than 10,000 procedures with 10-day global periods, the highest ratios of observed to expected post-operative visits were observed for the following specialties: general surgery (0.20), otolaryngology (0.12), and ophthalmology (0.08). Among specialties performing more than 10,000 procedures with 90-day global periods, the highest rates were observed for ophthalmology (0.57), general surgery (0.41), and hand surgery (0.39).

Table 5.3 lists the ratios of observed to expected post-operative visits provided for the five highest-volume procedures with 10- and 90-day global periods during our study period. There was wide variation in these proportions across the relevant procedure codes (Appendix C).

Table 5.2. Ratios of Observed to Expected Post-Operative Visits Provided

	Procedures with 10-Day Global Periods			Procedures with 90-Day Global Periods		
	Total Expected Post-Operative Visits	Total Reported Post-Operative Visits	Ratio of Observed to Expected Visits	Total Expected Post-Operative Visits	Total Reported Post-Operative Visits	Ratio of Observed to Expected Visits
Total	1,004,516	43,542	0.04	2,253,661	888,098	0.39
Practice size						
10–24 practitioners	348,897	12,807	0.04	588,044	222,078	0.38
25–99 practitioners	330,557	14,079	0.04	710,573	284,997	0.40
100 or more practitioners	325,063	16,656	0.05	955,044	381,023	0.40
Procedure place of service						
Ambulatory surgical center	36,238	2,450	0.07	407,789	212,853	0.52
Emergency or urgent care	31,480	1,384	0.04	5,945	1,772	0.30
Inpatient	35,631	5,309	0.15	1,156,117	399,068	0.35
Off-campus hospital outpatient	27,660	1,066	0.04	41,630	24,184	0.58
Office	778,752	27,770	0.04	178,919	60,022	0.34
Outpatient hospital	79,823	5,514	0.07	461,745	189,883	0.41
Other	14,934	49	0.00	1,517	316	0.21
Specialty ^a						
Anesthesiology	11,621	222	0.02	38	3	0.08
Dermatology	459,997	16,377	0.04	69,712	15,599	0.22
Diagnostic radiology	33,084	926	0.03	285	12	0.04
General surgery	31,210	6,115	0.20	224,174	92,805	0.41
Hand surgery	290	132	0.46	43,761	17,120	0.39
Interventional pain management	15,839	255	0.02	49	4	0.08
Neurology	3,485	170	0.05	1,088	551	0.51
Neurosurgery	3,606	718	0.20	99,815	30,178	0.30
NP/PA	228,488	4,125	0.02	14,313	5,547	0.39
Ophthalmology	36,724	3,081	0.08	433,329	246,338	0.57
Optometry	2,678	81	0.03	1,711	764	0.45
Orthopedic surgery	4,961	873	0.18	966,305	324,997	0.34
Otolaryngology	9,544	1,167	0.12	14,253	4,810	0.34
Pain management	20,121	444	0.02	137	26	0.19
Pathologic anatomy, clinical pathology	35	2	0.06	45,618	15,952	0.35
Plastic and reconstructive surgery	3,746	1,015	0.27	19,711	6,568	0.33
Podiatry	23,940	1,287	0.05	16,884	9,389	0.56
Primary care	46,287	2,322	0.05	4,939	1,936	0.39
Urology	2,578	753	0.29	65,320	21,311	0.33
Vascular surgery	8,028	753	0.09	48,481	17,427	0.36
All other specialties	58,260	2,724	0.05	183,741	76,761	0.42

SOURCE: CMS-IDR (December 13, 2018).

NOTES: The 99024-coded claims listed in this table were linked to procedures that were furnished from July 1, 2017, through June 30, 2018. Procedure counts included in this table are limited to the procedure codes for clean procedures that were linked to post-operative visits for practitioners in practices with ten or more practitioners in the nine states where reporting of post-operative visits was required. Expected counts of post-operative visits are from the Physician Time File.

^a Lists top 20 specialties by volume between July 1, 2017, and June 30, 2018.

Table 5.3. Highest-Volume Procedures with 10- and 90-Day Global Periods in Study Sample

HCPCS Code	Description	Length of Global Period	Procedure Volume	Total Expected Visits per Procedure	Observed to Expected Ratios of Post-Operative Visits
17000	Destruction of premalignant lesions, first lesion	10	441,547	1	0.01
17110	Destruction of benign lesions other than skin tags or cutaneous vascular proliferative lesions, up to 14 lesions	10	108,542	1	0.01
17004	Destruction of premalignant lesions, 15 or more lesions	10	60,101	1	0.01
64635	Destruction by neurolytic agent, paravertebral facet joint nerve(s), with imaging guidance; lumbar or sacral, single facet joint	10	29,631	1.5	0.01
10060	Incision and drainage of abscess, simple or single	10	26,155	1	0.15
66984	Extracapsular cataract removal with insertion of intraocular lens prosthesis, manual or mechanical technique	90	58,784	4.5	0.64
27447	Total knee arthroplasty	90	39,301	7	0.35
66821	Discission of secondary membranous cataract; stab incision technique; laser surgery	90	31,814	2	0.38
27130	Total hip arthroplasty, with or without autograft or allograft	90	22,232	7	0.33
33208	Insertion of new or replacement of permanent pacemaker with transvenous electrode(s); atrial and ventricular	90	12,241	3	0.36

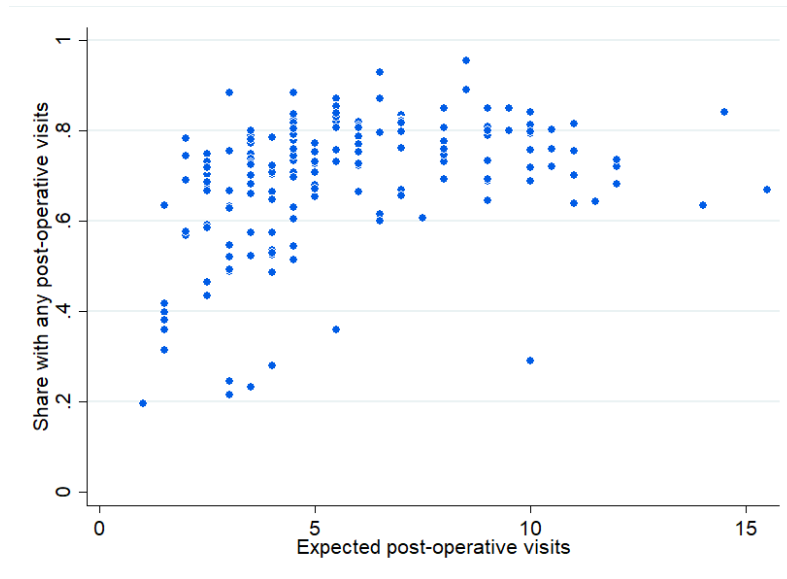
SOURCE: CMS-IDR (December 13, 2018) The claims for HCPCS code 99024 listed in this table were linked to procedures that were furnished from July 1, 2017, through June 30, 2018.

NOTE: "Study sample" includes procedures that met the following inclusion criteria: one of the procedure codes; furnished between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; and performed in one of the nine states in a practice with ten or more practitioners.

Among procedures with 90-day global periods, the share of procedures with any post-operative visits increased as the total expected number of post-operative visits increased, up to about five expected post-operative visits, at which point the share of procedures with any post-operative visits leveled off (Figure 5.3). We observed a weak positive correlation between the share of procedures with any post-operative visits and the total expected number of post-operative visits (correlation = 0.37). We observed a weak negative correlation between the number of expected post-operative visits and the ratio of observed to expected post-operative visits for procedures with 90-day global periods (Figure 5.4). The ratio of observed to expected

post-operative visits appeared to decline as the number of expected post-operative visits increased (correlation = -0.38). We did not examine these relationships among procedures with 10-day global periods because the majority of those procedures are expected to have only one post-operative visit.

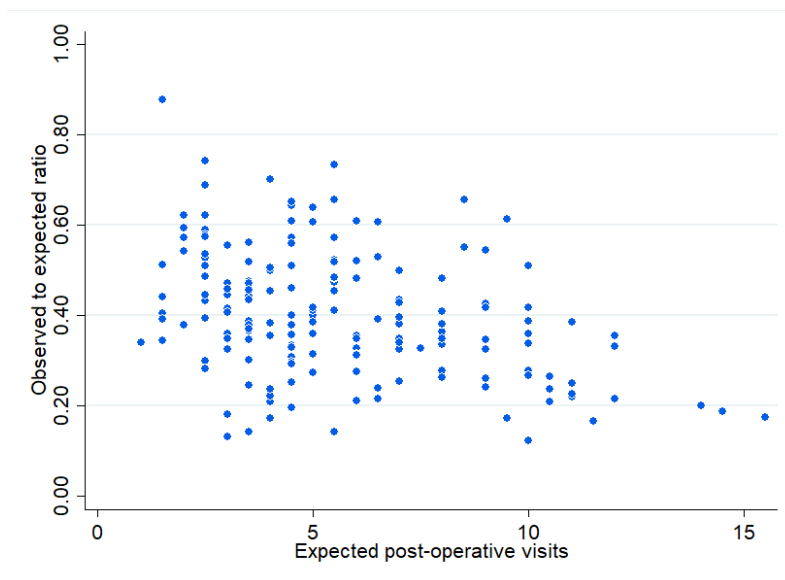
Figure 5.3. Relationship Between the Share of Procedures with Any Post-Operative Visits and the Expected Number of Post-Operative Visits for Procedures with 90-Day Global Periods



SOURCE: CMS-IDR (December 13, 2018).

NOTE: The claims for HCPCS code 99024 included in this figure were linked to procedures that were furnished from July 1, 2017, through June 30, 2018.

Figure 5.4. Relationship Between the Ratio of Observed to Expected Post-Operative Visits and the Number of Expected Post-Operative Visits for Procedures with 90-Day Global Periods



SOURCE: CMS-IDR (December 13, 2018).

NOTE: The claims for HCPCS code 99024 included in this figure were linked to procedures that were furnished from July 1, 2017, through June 30, 2018.

Examining Recent Procedures Furnished

As illustrated in Figure 3.1, the number of post-operative visits reported per week increased rapidly after the reporting requirement was put into place, and then largely plateaued. However, it is possible that the reporting of post-operative visits may increase over time as practitioners become more aware of the reporting requirement. To address this possibility, we conducted a sensitivity analysis focused on more-recent procedures (January 1, 2018, to June 30, 2018). The results of that analysis were similar to our main analysis (July 1, 2017, to June 30, 2018). By comparing recent procedures with our main analysis, we found that the share of procedures with any post-operative visits was only slightly higher for 10-day global procedures (3.8 percent versus 3.7 percent) and 90-day global procedures (71.8 percent versus 70.9 percent). The ratios of observed to expected post-operative visits were also similar for 10-day global procedures (0.04 versus 0.04) and 90-day global procedures (0.40 versus 0.39).

Conclusions

There were 961,006 clean procedures with 10-day global periods and 457,256 clean procedures with 90-day global periods during the study period. Of post-operative visits reported for 10- and 90-day global procedures, respectively, 73.8 percent and 26.2 percent were performed in the first seven days after the procedure.

The vast majority of clean procedures with 10-day global periods did not have an associated post-operative visit. For procedures with 90-day global periods, roughly two-thirds had an associated post-operative visit. Among specialties performing more than 10,000 procedures, the highest reporting rates were observed for orthopedic surgeons, neurosurgeons, and hand surgeons furnishing procedures with 90-day global periods. Fewer post-operative visits were reported than the expected number of visits listed in the Physician Time File. The ratio of observed to expected post-operative visits provided for procedures with 90-day global periods was only 0.39.

The reporting of post-operative visits was only weakly correlated with expected visit counts, in that fewer procedures with 10-day global periods had at least one reporting of a post-operative visit, and more procedures with 90-day global periods had at least one reporting of a post-operative visit. Overall, we observed that the share of procedures with any post-operative visits increased as the total expected number of post-operative visits increased, up to about five expected post-operative visits, at which point the share of procedures with any post-operative visits appeared to level off.

6. Sensitivity Analysis: Examining Procedures Performed by Practitioners Actively Reporting Post-Operative Visits

In our analysis of practitioners expected to report post-operative visits, we found a low share of procedures for which any post-operative visits were reported. The claims data may include fewer post-operative visits than expected if these visits are not occurring or if practitioners are not submitting claims for post-operative visits. To address concerns that potential underreporting of claims for post-operative visits are driving these results, we conducted a subanalysis on a set of “robust reporters” who appeared to be regularly reporting post-operative visits.

Methods Overview

We analyzed clean procedures performed by a robust reporter of post-operative visits. Practitioners were defined as robust reporters if they performed ten or more clean procedures with 90-day global periods for which CMS required reporting of post-operative visits and reported at least one claim for a post-operative visit for at least half of procedures performed from July 1, 2017, through June 30, 2018. We used procedures with 90-day global periods in our definition of robust reporters because so few procedures with 10-day global periods had any reported post-operative visits and there is face validity that most procedures with 90-day global periods will require at least one post-operative visit. For example, clinically, it is difficult to envision that a patient with a cataract surgery, hip replacement, or prostatectomy did not have at least one post-operative visit during the global period. In Appendix B, we describe our approach to defining robust reporters. We also explored different definitions of robust reporters and Appendix B includes the number of procedures and practitioners furnishing procedures that would have been included had we selected a different definition of robust reporters.

We compared patterns of care among robust reporters to other practitioners who billed ten or more procedures with 90-day global periods, hereafter referred to as “high-volume reporters.”¹¹ We reported outcomes separately for procedure codes with 10- and 90-day global periods and by practice size, place of service, and specialty of practitioner performing the procedure.

Results

Among practitioners furnishing clean procedures, 16.7 percent were classified as robust reporters and 21.9 percent were classified as high-volume reporters. Appendix B provides details about the characteristics of procedures furnished by high-volume and robust reporters.

¹¹ Robust reporters are included in the definition of high-volume reporters.

Share of Procedures with Any Post-Operative Visits

The share of procedures delivered by robust reporters having one or more post-operative visits was higher for procedures with 90-day global periods (86.8 percent) than procedures with 10-day global periods (14.7 percent) (Table 6.1). Rates for robust reporters were modestly higher than for high-volume reporters (10-day, 10.8 percent; 90-day, 71.4 percent).

The share of procedures with any post-operative visits were similar across practice size and most procedure places of service, and varied across specialty. Dermatologists performed the most procedures with 10-day global periods among robust reporters ($N = 71,293$), of which 14.2 percent of procedures had any post-operative visits. Orthopedic surgeons performed the most procedures with 90-day global periods among robust reporters ($N = 124,523$), of which 89.8 percent of procedures had any post-operative visits.

Ratio of Observed to Expected Post-Operative Visits Provided

The ratio of observed to expected post-operative visits was modestly higher among robust reporters than high-volume providers for both procedures with 10-day global periods (0.16 versus 0.10) and procedures with 90-day global period (0.47 versus 0.40) (Table 6.2). Both ratios were higher than the ratio among all expected reporters (10-day, 0.04; 90-day, 0.39). Dermatologists performed the most procedures with 10-day global periods among robust reporters ($N = 71,293$) and had a ratio of 0.15. Orthopedic surgeons performed the most procedures with 90-day global periods among robust reporters ($N = 124,523$) and had a ratio of 0.39.

Table 6.1. Share of Procedures with Any Post-Operative Visits

	High-Volume Reporters ^a		Robust Reporters ^b	
	Procedures with 10-Day Global Periods (%)	Procedures with 90-Day Global Periods (%)	Procedures with 10-Day Global Periods (%)	Procedures with 90-Day Global Periods (%)
Total	10.8	71.4	14.7	86.8
Practice size				
10–24 practitioners	10.0	63.8	13.5	85.8
25–99 practitioners	10.7	77.0	13.4	87.0
100 or more practitioners	12.0	72.5	18.0	87.3
Procedure place of service				
Ambulatory surgical center	18.5	73.5	23.8	89.9
Emergency or urgent care	25.6	62.9	34.5	77.2
Inpatient	20.5	75.0	26.3	88.6
Off-campus hospital outpatient	9.3	78.8	12.0	83.0
Office	9.4	59.5	12.9	76.2
Outpatient hospital	15.4	69.0	20.0	86.2
Other	4.5	52.2	30.8	52.3
Specialty ^c				
Anesthesiology	N/A	N/A	N/A	N/A
Dermatology	10.0	55.3	14.2	79.0
Diagnostic radiology	N/A	7.7	N/A	N/A
General surgery	18.3	71.1	22.8	86.4
Hand surgery	36.6	76.3	48.2	88.4
Interventional pain management	2.2	8.3	N/A	N/A
Neurology	50.0	96.4	50.0	96.4
Neurosurgery	21.5	77.1	24.6	89.8
NP/PA	5.2	62.5	8.1	86.6
Ophthalmology	8.2	72.9	9.8	86.5
Optometry	3.9	66.8	4.1	79.2
Orthopedic surgery	19.4	78.4	25.0	89.8
Otolaryngology	21.6	67.0	32.3	89.5
Pain management	N/A	N/A	N/A	N/A
Pathologic anatomy, clinical pathology	7.4	44.1	13.3	74.6
Plastic and reconstructive surgery	23.7	64.2	34.2	82.1
Podiatry	4.3	65.2	6.7	81.3
Primary care	15.2	57.3	18.9	82.0
Urology	23.1	60.4	32.0	79.2
Vascular surgery	9.0	68.6	10.9	82.2
All other specialties	8.3	63.0	11.9	84.5

SOURCE: CMS-IDR (December 13, 2018).

NOTES: N/A = not applicable, because zero procedures were furnished in category. The claims for HCPCS code 99024 listed in this table were linked to procedures furnished from July 1, 2017, through June 30, 2018.

^a High-volume reporters includes procedures that met the following inclusion criteria: one of the clean procedure codes; performed in one of the nine states in a practice with ten or more practitioners; and performed by practitioners who billed ten or more procedures with 90-day global periods between July 1, 2017, and June 30, 2018.

^b Robust reporter” includes procedures that met the following inclusion criteria: one of the clean procedure codes; performed in one of the nine states in a practice with ten or more practitioners; performed by practitioners who billed ten or more procedures with 90-day global periods between July 1, 2017, and June 30, 2018; and reported at least one claim for a post-operative visit for at least 50 percent of procedures performed during the study period.

^c Lists top 20 specialties by volume between July 1, 2017, and June 30, 2018.

Table 6.2. Ratio of Observed to Expected Post-Operative Visits Provided

	High-Volume Reporters ^a		Robust Reporters ^b	
	Procedures with 10-Day Global Periods	Procedures with 90-Day Global Periods	Procedures with 10-Day Global Periods	Procedures with 90-Day Global Periods
Total	0.12	0.40	0.16	0.47
Practice size				
10–24 practitioners	0.11	0.38	0.14	0.51
25–99 practitioners	0.11	0.40	0.14	0.45
100 or more practitioners	0.14	0.40	0.20	0.47
Procedure place of service				
Ambulatory surgical center	0.17	0.52	0.21	0.64
Emergency or urgent care	0.36	0.36	0.49	0.44
Inpatient	0.30	0.34	0.38	0.40
Off-campus hospital outpatient	0.10	0.59	0.13	0.62
Office	0.10	0.33	0.14	0.44
Outpatient hospital	0.14	0.41	0.17	0.50
Other	0.04	0.21	0.30	0.21
Specialty ^c				
Anesthesiology	N/A	N/A	N/A	N/A
Dermatology	0.11	0.22	0.15	0.32
Diagnostic radiology	0.00	0.03	N/A	N/A
General surgery	0.19	0.41	0.24	0.51
Hand surgery	0.48	0.39	0.64	0.45
Interventional pain management	0.01	0.08	N/A	N/A
Neurology	0.42	0.53	0.42	0.53
Neurosurgery	0.20	0.31	0.23	0.36
NP/PA	0.06	0.36	0.09	0.50
Ophthalmology	0.08	0.57	0.10	0.68
Optometry	0.04	0.47	0.05	0.55
Orthopedic surgery	0.19	0.34	0.25	0.39
Otolaryngology	0.23	0.34	0.35	0.46
Pain management	N/A	N/A	N/A	N/A
Pathologic anatomy, clinical pathology	0.06	0.35	0.11	0.61
Plastic and reconstructive surgery	0.27	0.31	0.38	0.41
Podiatry	0.05	0.56	0.09	0.71
Primary care	0.17	0.42	0.21	0.61
Urology	0.27	0.32	0.38	0.44
Vascular surgery	0.10	0.36	0.12	0.43
All other specialties	0.11	0.43	0.16	0.53

SOURCE: CMS-IDR (December 13, 2018).

NOTES: N/A = not applicable, because zero procedures were furnished in that category. The claims for HCPCS code 99024 listed in this table were linked to procedures furnished from July 1, 2017, through June 30, 2018.

^a High-volume reporters includes procedures that met the following inclusion criteria: one of the “clean” procedure codes performed in one of the nine states in a practice with ten or more practitioners, and performed by practitioners who billed ten or more procedures with 90-day global periods between July 1, 2017, and June 30, 2018.

^b Robust reporters includes procedures that met the following inclusion criteria: one of the clean procedure codes, performed in one of the nine states in a practice with ten or more practitioners; performed by practitioners who billed ten or more procedures with 90-day global periods between July 1, 2017, and June 30, 2018; and reported at least one claim for a post-operative visit for at least 50 percent of procedures performed during the study period.

^c Lists top 20 specialties by volume between July 1, 2017, and June 30, 2018.

Conclusions

To address concerns about underreporting of post-operative visits, we conducted a sensitivity analysis limited to practitioners who were actively reporting their post-operative visits. Reporting of post-operative visits was modestly higher for robust reporters compared with practitioners who billed ten or more procedures with 90-day global periods (i.e., high-volume reporters). This was true for the share of procedures with any post-operative visits and for the ratio of observed to expected post-operative visits provided for procedures with 10-day global periods and 90-day global periods. It is possible that the patterns of care observed in this subpopulation may not be generalizable to the broader population of practitioners required to report post-operative visits. For example, if reporters of post-operative visits are indicative of a type of practitioner who closely follows rules, and therefore would also be more likely to adhere to the recommended number of post-operative visits, then our sensitivity analysis may overestimate the actual number of post-operative visits furnished on average. Moreover, this analysis does not capture post-operative care provided outside a visit or via phone. Overall, however, these observed patterns are largely similar to what was observed in the main analysis, suggesting that a large share of expected post-operative visits are not delivered.

7. Sensitivity Analysis: Using an Expanded Definition of Post-Operative Visits

As reported in prior chapters, we observed low ratios of observed to expected post-operative visits, even after restricting our sample to practitioners who often reported post-operative visits. It is possible that additional post-operative visits *are* provided, but during E&M visits or in the context of another separately billed procedure or service. In this chapter, we report on the results of a second sensitivity analysis in which we use a more expansive definition of post-operative care, and report the share of procedures with any post-operative visits and the ratio of observed to expected post-operative visits.

Methods Overview

As with our prior analyses, we used the procedure as our unit of analysis and analyzed clean procedures that met the following inclusion criteria: one of the procedure codes for which reporting was required; performed between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; and performed by an expected reporter. Also, as before, we examined post-operative visits reported using HCPCS code 99024 occurring during global periods for procedures furnished July 1, 2017, through June 30, 2018.

We then constructed counts of post-operative visits using three more-expansive definitions of post-operative visits:

- **Adding E&M visits furnished by the practitioner who furnished the original procedure:** We expanded our definition of post-operative visits to include both HCPCS code 99024 and the following HCPCS codes for outpatient, inpatient, critical care, and discharge E&M visits furnished by the practitioner who furnished the original procedure: 99201–99205, 99211–99215, 99221–99223, 99231–99233, 99238–99239, and 99291–99292.
- **Adding E&M visits and procedures furnished by the practitioner who furnished the original procedure:** In addition to counting HCPCS code 99024 and the aforementioned E&M visits, we also counted procedures (HCPCS codes 10021–69990) furnished by the practitioner who furnished the original procedure to the beneficiary during global periods, excluding procedures furnished on the same day as the original procedure and excluding procedures with 10- or 90-day global periods to preserve our sample of clean, nonoverlapping single procedures.
- **Adding E&M visits and procedures furnished by anyone in the practice with the same specialty as the practitioner who furnished the original procedure:** Like the above definition, this expanded definition of post-operative visits included HCPCS code 99024, E&M visits, and procedures provided to the beneficiary by any practitioner in the

same practice with the same specialty as the practitioner who furnished the original procedure.

For all expanded definitions of post-operative visits, we counted the total number of days with these services rather than the total number of services furnished. As in prior chapters, we report the share of procedures with any reported post-operative visits. To calculate the ratio of observed to expected post-operative visits provided, we divided the total number of days with any post-operative service by the total number of expected post-operative visits.

Results

We examined the 1,374,486 procedures furnished by expected reporters during the study period. As our definition of post-operative visits expanded, we observed a small increase in both the share of procedures with any post-operative visits and the ratio of observed to expected post-operative visits (Table 7.1).

Adding E&M Visits Furnished by the Practitioner Who Furnished the Original Procedure

In addition to HCPCS code 99024, we added E&M visits furnished during global periods from the same practitioner who performed the procedure. Using this definition, we found a small increase in the fraction of 10-day global procedures with any post-operative visits (4.7 percent versus 3.7 percent) compared with the results from our usual study sample. A small increase was also seen in the observed to expected post-operative ratio. For 90-day global periods, there was an increase in the ratio of observed to expected post-operative visits for procedures with 90-day global periods in our study sample (0.42 versus 0.39).

Adding E&M Visits and Procedures Furnished by the Practitioner Who Furnished the Original Procedure

In addition to HCPCS code 99024 and E&M visits, we added procedures furnished during global periods from the same practitioner who performed the procedure. We observed little change in either 10-day or 90-day global procedures. Compared with the results from our usual study sample, we found a small increase in the fraction of 10-day global procedures with any post-operative visits (5.5 percent versus 3.7 percent) and 90-day global procedures with any post-operative visits (74.6 percent versus 71.1 percent). For procedures with 10- and 90-day global periods, there was a small increase in the ratio of observed to expected post-operative visits compared with procedures in our study sample (10-day = 0.06 versus 0.04; 90-day = 0.42 versus 0.39).

Adding E&M Visits and Procedures Furnished by Anyone in the Practice with the Same Specialty as the Practitioner Who Furnished the Original Procedure

Similarly, only small increases were observed when we expanded our definition to include E&M visits other than those with the HCPCS code 99024 and procedures furnished during global periods from practitioners in the *same practice* with the *same specialty*. Compared with the results from our usual study sample, we found a small increase in the fraction of 10-day global procedures with any post-operative visits (5.8 percent versus 3.7 percent) and 90-day global procedures with any post-operative visits (75.0 percent versus 71.1 percent). For procedures with 10- and 90-day global periods, there was a small increase in the ratio of observed to expected post-operative visits compared with procedures in our study sample (10-day = 0.07 versus 0.04; 90-day = 0.43 versus 0.39). We also examined post-operative visits provided during the first five days after the end of global periods (Appendix D).

Conclusions

To further address concerns about potential underreporting of post-operative visits, we conducted a second sensitivity analysis that examined an expanded definition of post-operative care, including E&M visits and procedures in addition to reports of HCPCS code 99024. While both the share of procedures with any post-operative visits and for the ratio of observed to expected post-operative visits were slightly higher in this sensitivity analysis, the patterns are similar to what were observed in the main analysis.

Table 7.1. Share of Procedures with Any Post-Operative Visits and the Ratio of Observed to Expected Post-Operative Visits Provided Using Expanded Definitions of Post-Operative Visits

	Procedures with 10-Day Global Periods (N = 923,936)		Procedures with 90-Day Global Periods (N = 450,550)	
	Share of Procedures with Any Post-Operative Visits (%)	Ratio of Observed to Expected Post-Operative Visits	Share of Procedures with Any Post-Operative Visits (%)	Ratio of Observed to Expected Post-Operative Visits
Study sample ^a	3.7	0.04	71.1	0.39
Adding E&M visits other than those coded with 99024 provided by the practitioner who furnished the original procedure ^{b,c}	4.7	0.05	73.2	0.41
Adding E&M visits other than those coded with 99024 and procedures provided by the practitioner who furnished the original procedure ^d	5.5	0.06	74.6	0.42
Adding E&M visits other than those coded with 99024 and procedures provided by anyone in the practice with the same specialty as the practitioner who furnished the original procedure ^e	5.8	0.07	75.0	0.43

SOURCE: CMS-IDR (December 13, 2018).

^a Includes procedures that met the following inclusion criteria: one of the clean procedure codes; performed between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; and performed in one of the nine states in a practice with ten or more practitioners and post-operative visits occurring during the global periods. We included post-operative visits performed by the practitioner who furnished the original procedure, performed by someone other than the practitioner who furnished the original procedure, and performed by someone in another practice.

^b Includes procedures in the study sample, post-operative visits occurring during the global periods, plus E&M visits provided by the practitioner who furnished the original procedure to the beneficiary. When counting the total number of observed post-operative visits, we counted the total number of HCPCS codes for 99024, even if multiple occur on the same day. We count only the day of service for all other E&M visits. If an E&M service occurred on the same day as a HCPCS code for 99024, then we only counted the 99024 code(s).

^c We included the following E&M visit codes: HCPCS codes 99201–99205, 99211–99215, 99221–99223, 99231–99233, 99238, 99239, 99291–99292.

^d Follows the same inclusion criteria as described in note ^b, plus any procedure(s) provided by the practitioner who furnished the original procedure to the beneficiary as defined by HCPCS codes 10021–69990, excluding procedures furnished on the same day as the original procedure and procedures with 10- or 90-day global periods to preserve our sample of clean, nonoverlapping single procedures.

^e Includes procedures in the study sample and post-operative visits occurring during the global periods, plus E&M visits and procedures provided by anyone in the practice with the same specialty as the practitioner who furnished the original procedure.

8. Conclusions

Summary

As part of 2015 MACRA legislation, Congress mandated that CMS collect data on the number and level of post-operative visits delivered to Medicare beneficiaries and use these data to assess accuracy of payment and potentially revalue misvalued procedure codes (CMS, 2014b). Beginning July 1, 2017, CMS required select practitioners in nine states to use the no-pay HCPCS code 99024 to report post-operative visits associated with select high-volume procedures with 10- or 90-day global periods furnished to FFS Medicare beneficiaries. During the first 12 months of reporting, we found that most procedures with 10-day global periods did not have an associated post-operative visit. Approximately two-thirds of procedures with 90-day global periods had an associated post-operative visit. However, the ratio of observed to expected post-operative visits provided for 90-day global period procedures was only 0.39.

It remains unknown the extent to which low rates of post-operative visits represents visits that were not provided or visits that were provided but not reported using HCPCS code 99024. Despite communication from CMS and specialty societies (CMS and Medicare Learning Network, 2017; Society of Thoracic Surgeons, 2017; American College of Surgeons, undated), some practitioners may be unaware of this reporting requirement. This may help to explain why practitioners in some specialties that perform relatively fewer procedures with global periods (e.g., neurology) had lower rates of reporting. CMS could consider increasing communication to practitioners furnishing procedures by engaging in such activities as outreach to specific practitioners who are not reporting on post-operative visits. This could be done in conjunction with specialty societies.

However, in subanalyses limited to practitioners who were actively reporting their post-operative visits, we observed patterns of post-operative visit reporting that were largely similar to what was observed in our main analysis. These findings suggest that a large share of expected post-operative visits are not delivered and that underreporting is unlikely to fully explain the low ratio of expected post-operative visits provided.

Another potential way to explain the low rates of post-operative visits is that these visits are occurring during global periods, but reported using codes other than 99024 (such as E&M visit codes) or included with appointments for subsequent procedures. Despite using an expanded definition of post-operative care and an expanded global period, we found that post-operative visit rates and the ratios of observed to expected post-operative visits remained low. Taken together with the findings from our main analysis and analysis of practitioners who were actively reporting their post-operative visits, this suggests that the low ratio of observed to expected visits is primarily due to substantially fewer post-operative visits being delivered.

The results presented in this report describe the number of post-operative visits provided but do not describe the level of those visits. Level, in this context, reflects the amount of work required at an individual post-operative visit. CMS is using other means to collect data on the level of visits, and a future CMS-sponsored RAND report will describe those findings.

Policy Implications

The disconnect between the number of post-operative visits used in the valuation process and those observed in our data implies there is potential overvaluation of at least some of these procedures. A future CMS-sponsored RAND report will describe several strategies for revaluation, quantify their potential impact, and examine the strengths and weaknesses of strategies for revaluation. Here we describe, at a broad level, how CMS could respond to these findings.

Obtain New Recommendations from the RUC

To inform the valuation of procedures with 10- and 90-day global periods, the RUC surveys physicians using vignettes and asks about the typical number of post-operative visits provided after procedures, among other questions. These survey responses are used by the RUC as part of the process to provide CMS with valuation recommendations. After receiving the RUC's recommendations, CMS decides upon the final valuation, in part based on the survey responses. Visit counts are not usually used by the RUC or by CMS to value procedures directly (i.e., to calculate relative value units). Instead, they are used to facilitate discussion around the appropriate valuation for the procedure overall.

One strategy to address the potential overvaluation of global surgical packages would be to ask the RUC to conduct new surveys on the typical number of post-operative visits provided after these procedures, and provide recommendations for new valuations. Instead of a new survey, CMS could ask the RUC to revalue procedures based on the number of post-operative visits reported through claims-based reporting.

Convert 10-Day Global Procedures to 0-Day Global Procedures

Although the share of post-operative visits reported was low for all procedures, it was particularly low for procedures with 10-day global periods. These results suggest a potential overvaluation of procedures with 10-day global periods. CMS could consider converting some or all procedures with 10-day global periods to 0-day global periods. Practitioners who furnish post-operative visits for such procedures would be paid separately by billing typical E&M codes. However, CMS previously announced plans to transition all 10-day and 90-day global periods to 0-day global periods, in response to concerns about inaccurate payment (CMS, 2014a). This plan was opposed by the surgical community because of concerns about adequate payment and negative financial impacts on patients (Ollapally, 2015; DiVenere, 2015; American Society of

Plastic Surgeons, 2015; CMS, 2014b). Congress halted the proposed change to 0-day global periods and instead mandated that CMS collect data on the number and level of post-operative visits delivered to Medicare beneficiaries and use these data to assess accuracy of payment and potentially revalue misvalued procedure codes. Given the findings described in this report that came from that data collection, CMS could revisit the idea of converting some procedures with global procedures to 0-day global periods.

Revalue Procedures Based on the Number of Post-Operative Visits Reported

Using the information on post-operative visits collected in nine states from July 1, 2017, through June 30, 2018, CMS could consider revaluing all procedures with 10- and 90-day global periods by adjusting the total RVUs for a given procedure based on the number of post-operative visits reported and the number of post-operative visits that were used in the initial valuation. This approach builds off the patterns of care observed. In future work, RAND will explore several different strategies for using these data to revalue procedures. We will quantify their impact on RVUs and their strengths and weaknesses. A key concern for revaluation is that if one simply subtracts the RVUs associated with post-operative visits from the total RVUs for a procedure, then some procedures will have *negative* valuations. RAND's future work will discuss approaches to overcoming this known revaluation challenge.

Limitations

We restricted most analyses to only clean single procedures; thus, these findings may not be generalizable to situations in which multiple procedures are performed on a single day or in succession. Similarly, we sought to address concerns about underreporting of post-operative visits by conducting subanalyses limited to practitioners who were actively reporting their post-operative visits. However, we recognize that reporting of post-operative visits for these practitioners also may not be complete. Moreover, we observed differences in the characteristics of procedures performed by these robust reporters, and, as a result, their patterns of care may not be generalizable to the broader population of practitioners required to report post-operative visits.

Our analysis does not capture post-operative care provided outside a visit or via phone, and we only analyzed data for procedures paid by traditional FFS Medicare. Therefore, our results might not be generalizable to the entire population of procedures. Additionally, our estimates of the ratio of observed to expected post-operative visits provided may be an overestimate for some procedures. Roughly 36 percent of procedures with 10- or 90-day global periods are assigned "0.5 post-operative visits" during the RUC's survey process. The RUC's rationale for a 0.5-day post-operative visit is that the work for discharging a beneficiary would not be the same as that for a full discharge visit. When we calculated the ratio of observed to expected post-operative visits provided, we include 0.5 days in the denominator. However, when practitioners report on

post-operative visits using HCPCS code 99024, they cannot indicate they performed a 0.5 visit; they report single visits. Therefore, our estimate of the ratio of expected post-operative visits provided may actually be an overestimate.

Conclusions and Next Steps

In response to concerns that the number of post-operative visits provided to beneficiaries is lower than the number used in the process to value procedures, Congress required that CMS collect data on post-operative visits beginning in July 2017. During the first 12 months of reporting, we found that very few procedures with 10-day global periods had any post-operative visits, and that procedures with 90-day global periods had fewer than half the number of post-operative visits expected. These results suggest the need for reevaluation of surgical procedures bundled with post-operative visits.

Appendix A. Examining Characteristics of Clean Procedures

Overview

Ideally, each post-operative visit reported using HCPCS code 99024 would be linked to a specific procedure in the claims data. This indexing would make it clear which services relate to a procedure. We did not have such linkage. Therefore, when a beneficiary had multiple overlapping global procedures, it was unclear how to attribute post-operative visits to specific procedures. For example, a beneficiary could receive a hip replacement (a procedure with a 90-day global period) from an orthopedic surgeon, and then one month later require fracture care for an unrelated arm injury (also a procedure with a 90-day global period) from the same orthopedic surgeon. In a case like this, it was difficult to know whether a visit reported with HCPCS code 99024 following the second procedure was related to the hip replacement, arm fracture, or both.

To inform our analyses, we described the fraction of procedures with 10- or 90-day global periods that are “clean,” in the sense that post-operative visits can be linked to the specific procedure with a high degree of confidence using dates of service, beneficiary ID, and global period length. Additionally, we examined variation across specialty, HCPCS codes, and groupings of HCPCS codes (using CPT headings) in the fraction of procedures that are clean. If only a small fraction of procedures for a given code or group of codes are clean, then this may raise concern about the generalizability of results that use only clean procedures, compared with all types of procedures. To ensure that the results of our analysis of clean procedures reflect all types of procedures, we examined the volume and characteristics of all types of procedures.

Methods Overview

We examined all procedures with 10- or 90-day global periods furnished from July 1, 2017, through June 30, 2018. We included all procedures and did not limit this analysis to procedures furnished by practitioners who are likely to be required to report post-operative visits (CMS, 2018). Because the focus of the new reporting requirement is on post-operative visits, we calculated the 10-day global periods to include the day of the procedure and ten days following the day of the procedure, and the 90-day global periods to include the day of procedure and the 90 days following the day of procedure (CMS and Medicare Learning Network, 2018). Using the beneficiary ID and date of service of the procedure, we grouped beneficiary episodes of care into the following four categories:

- **“clean” procedures:** do not have overlapping global periods with other procedures with a 10- or 90-day global period
- **multiple procedures with the same length of global periods:** includes

- multiple procedures with 10-day global periods that share the same date of service with only other procedures with 10-day global periods
- multiple procedures with 90-day global periods that share the same date of service with only other procedures with 90-day global periods
- **combination of procedures with 10- and 90-day global periods on same day:** share the same date of service with procedures that have global periods of different lengths (or with procedures without 10- or 90-day global periods)
- **overlapping global procedures:** have different dates of service and procedures with overlapping global periods.

We examined the volume of these procedure categories by specialty, HCPCS codes, and HCPCS codes organized by CPT book headings. When examining procedures by specialty, if more than one procedure was performed on the same day by providers from different specialties, then the procedure was counted under both of the specialties.

Results

During the study period, we observed 27.5 million procedures with 10- or 90-day global periods. Among these, 22.2 percent of these procedures were furnished in the nine-state subsample where reporting of post-operative visits was required (Table A.1). Among these nine states, 59.7 percent ($N = 2,979,610$) of procedures were defined as clean.

Table A.1. Summary of Grouping of Procedures with 10- or 90-Day Global Periods

	Procedures (41 States and DC)		Procedures (Nine-State Subsample)	
	Total Procedures After Exclusions	% of Total Procedures	Total Procedures After Exclusions	% of Total Procedures
Clean procedures	13,718,066	61.1	2,979,610	59.7
Same type of global period on same day	5,596,722	24.9	1,276,479	25.6
Combination of 10 and 90 on same day	314,343	1.4	70,192	1.4
Overlapping global procedures	2,832,594	12.6	665,866	13.3
Total	22,461,725	100.0	4,992,147	100.0

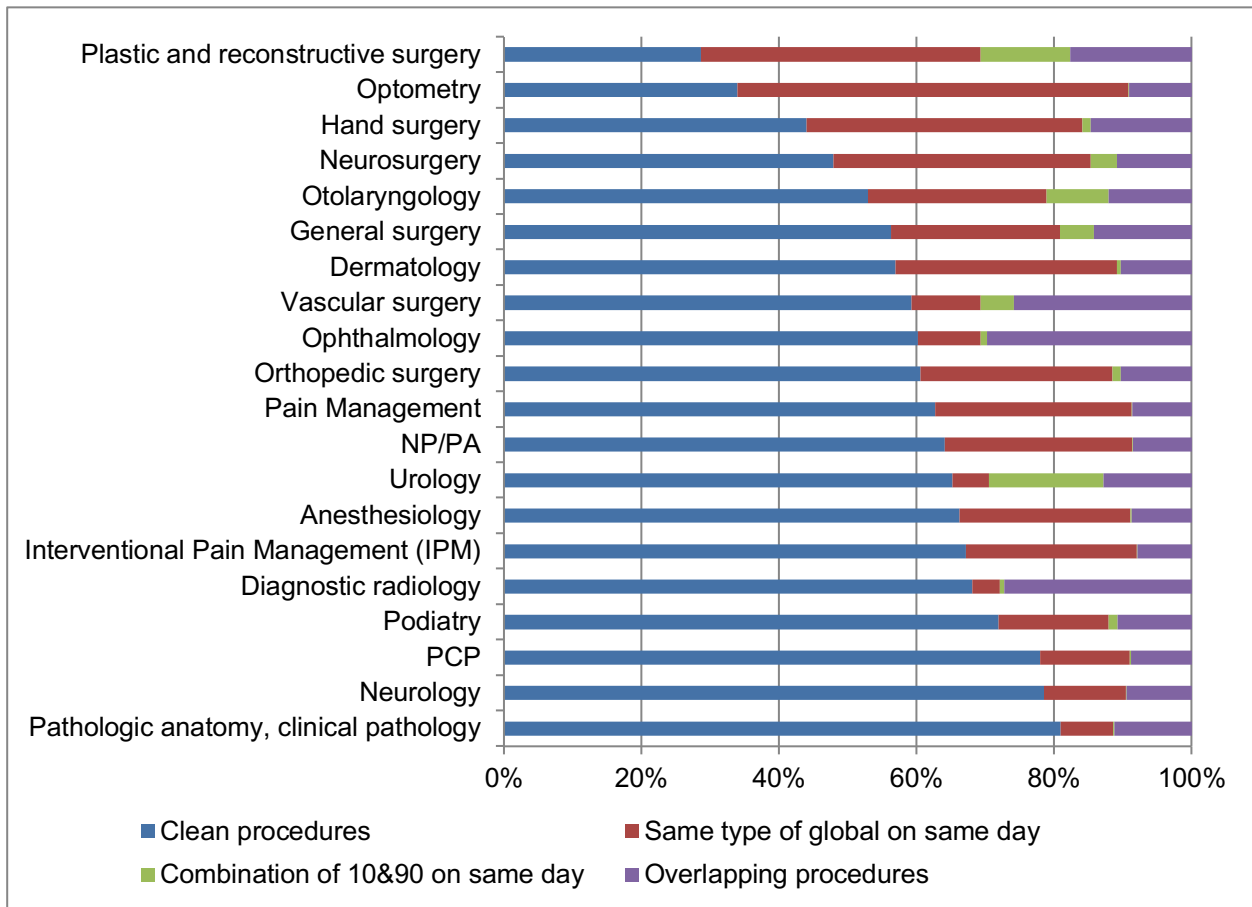
SOURCE: CMS-IDR (January 2, 2019).

NOTES: This table includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and were furnished from July 1, 2017, through June 30, 2018. This table includes all procedures with 10- or 90-day global periods for which reporting of post-operative visits is required, and is not limited to those procedures furnished by expected reporters.

Figure A.1 illustrates the breakdown across the four categories by specialty of the practitioner who furnished the original procedure for the 20 specialties with the highest

procedure volume during the study period in the nine-state subsample. The total procedure volume for each specialty is listed in parentheses. The 20 specialties listed in Figure A.1 accounted for 96.1 percent of all procedures examined with 10- or 90-day global periods during the study period, and all furnished at least 25,000 procedures. Across nearly all specialties, the majority of procedures were classified as clean. More than 75 percent of procedures furnished by PCPs, neurologists, and pathologic anatomy specialists or clinical pathologists were classified as clean procedures. Only four of these specialties had fewer than 50 percent of procedures classified as clean procedures: plastic and reconstructive surgery, optometry, hand surgery, and neurosurgery. Most procedures (56.8 percent) performed by optometrists were multiple procedures with the same type of global periods.

Figure A.1. Summary of Grouping of Procedures with 10- or 90-Day Global Periods by Specialty, Nine-State Subsample

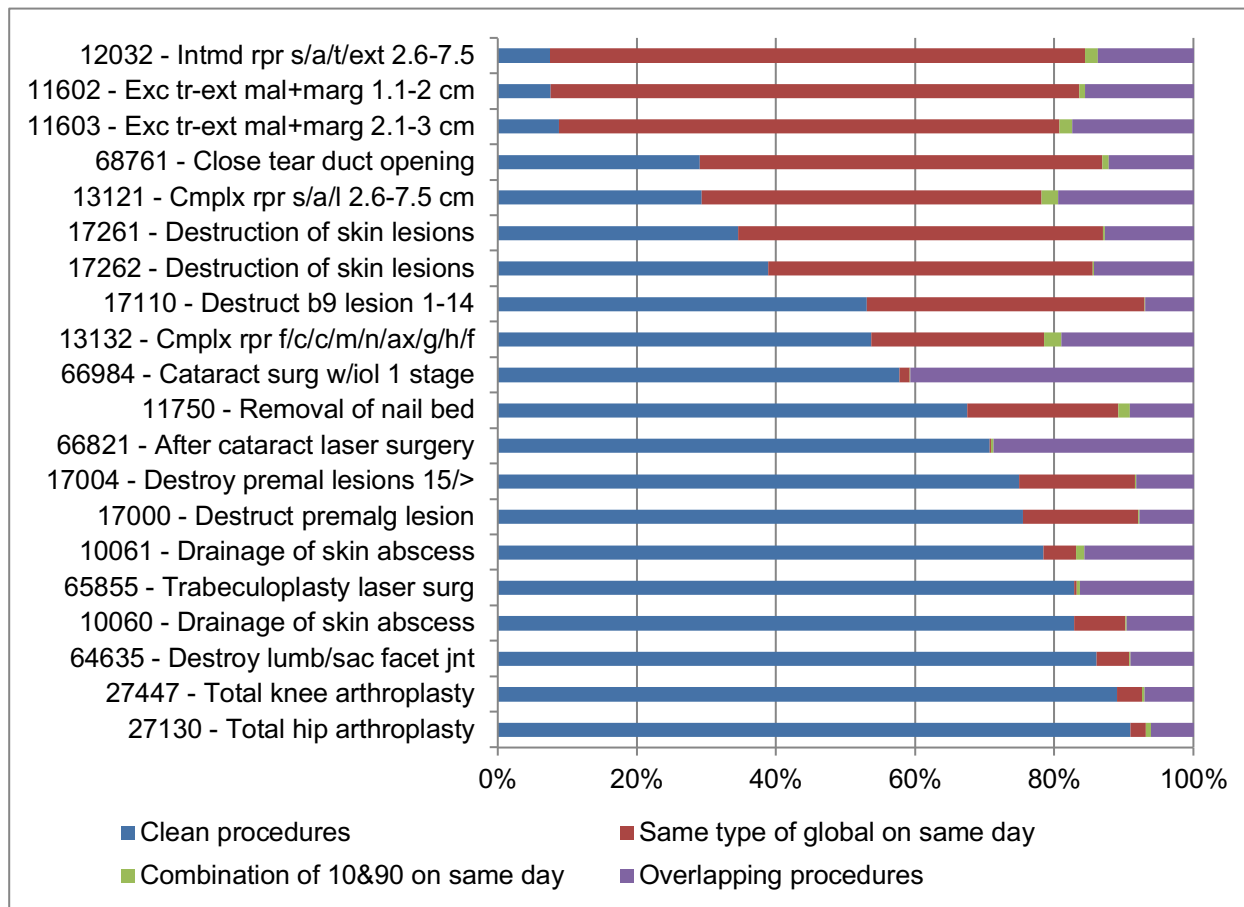


SOURCE: CMS-IDR (January 2, 2019).

NOTE: This figure includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and were furnished from July 1, 2017, through June 30, 2018.

Figure A.2 reports the 20 HCPCS codes with the highest procedure volume in the nine-state subsample. These 20 codes represent 65.9 percent of all procedures in these states. For 13 of the 20 HCPCS codes, more than 50 percent of procedures classified were clean. The other seven HCPCS codes were more likely to be furnished as a multiple procedure on the same day with the same type of global period, rather than as a single clean procedure.

Figure A.2. Summary of Grouping of Procedures with 10- or 90-Day Global Periods by HCPCS Codes, Nine-State Subsample



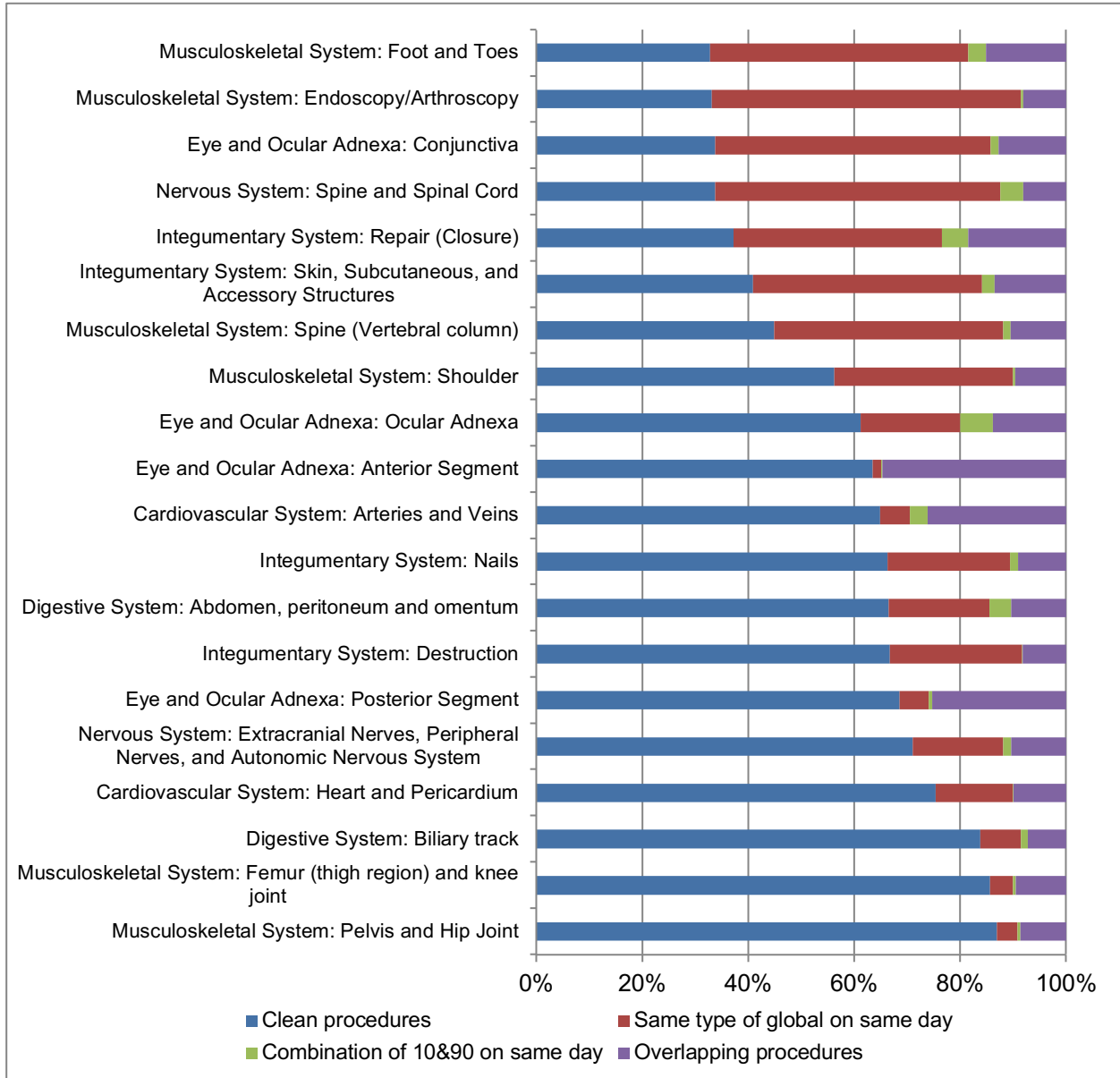
SOURCE: CMS-IDR (January 2, 2019).

NOTES: This figure includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and were furnished from July 1, 2017, through June 30, 2018. 12032 = intermediate repair of wounds of scalp, axillae, trunk and/or extremities (2.6–7.5 cm); 11602 = excision of malignant lesion including margins, trunk, arms, or legs (1.1–2.0 cm); 11603 = excision of malignant lesion including margins, trunk, arms, or legs (2.1–3.0 cm); 68761 = closure of the lacrimal punctum, each plug; 13121 = reconstructive procedures, complicated wound closure: scalp, arms, and/or legs (2.6–7.5 cm); 17261 = destruction of malignant lesion of trunk, arms, or legs (0.6–1.0 cm); 17262 = destruction of malignant lesion of trunk, arms, or legs (1.1–2.0 cm); 17110 = destruction of benign lesions other than skin tags or cutaneous vascular proliferative lesions, up to 14 lesions; 13132 = reconstructive procedures, complicated wound closure: forehead, cheeks, chin, mouth, neck, axillae, genitalia, hands and/or feet (2.6 to 7.5 cm); 66984 = extracapsular cataract removal with insertion of intraocular lens prosthesis, manual, or mechanical technique; 11750 = excision of nail and nail matrix, partial or complete, for permanent removal; 66821 = discission of secondary membranous cataract; stab incision technique—laser surgery; 17004 = destruction, premalignant lesions, 15 or more lesions; 17000, Destruction, premalignant lesions; first lesion; 10061 = incision and drainage of abscess; complicated

or multiple; 65855 = trabeculoplasty by laser surgery; 10060 = incision and drainage of abscess; simple or single; 64635 = destruction by neurolytic agent, paravertebral facet joint nerve(s), with imaging guidance; lumbar or sacral, single facet joint; 27447 = total knee arthroplasty; 27130 = total hip arthroplasty, with or without autograft or allograft.

We also examined the frequency of the global procedure categories by HCPCS codes organized by CPT headings. Figure A.3 includes the 20 CPT book headings with the highest procedure volume. The 20 highest-volume CPT headings represent 95.4 percent of all procedures examined in the nine-state subsample. Seven of the top 20 CPT headings had less than 50 percent of procedures classified as clean. Furnishing procedures with the same global period on the same day was most common for those seven heading groups.

Figure A.3. Summary of Grouping of Procedures with 10- or 90-Day Global Periods by CPT Book Heading, Nine-State Subsample



SOURCE: CMS-IDR (January 2, 2019).

NOTE: The figure includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and were furnished from July 1, 2017, through June 30, 2018.

Examining the Representativeness of the Nine-State Subsample

Findings were similar in the national sample of 41 states and the District of Columbia and the nine-state subsample. We observed a similar percentage of procedures with 10- or 90-day global periods categorized as clean in both samples (nine states = 61.1 percent; national = 59.7 percent) (Table A.2). All specialties that furnished more than 10,000 procedures with global

periods are listed in Table A.3. The top 20 specialties with the highest volume of global procedures were the same in the national sample and nine-state subsample (Figures A.1 and A.4). Slightly more procedures were categorized as having procedures with overlapping global periods in the nine-state subsample (13.3 percent) compared with the national sample (12.6 percent) and having the same type of global period on the same day (nine states = 25.6 percent; national = 24.9 percent). A similar percentage of procedures were categorized as having a combination of 10- and 90-day global periods on the same day in both samples (1.4 percent).

Table A.2. Characteristics of Clean Procedures with 10- and 90-Day Global Periods

	Study sample ^a			
	Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods	
	N	Percentage	N	Percentage
Total	961,006	100.0	457,256	100.0
Practice size				
10–24 practitioners	334,417	34.8	128,626	28.1
25–99 practitioners	311,849	32.5	138,642	30.3
100 or more practitioners	314,740	32.8	189,988	41.5
Procedure place of service				
Ambulatory surgical center	26,211	2.7	103,460	22.6
Emergency or urgent care	23,734	2.5	1,302	0.3
Inpatient	24,770	2.6	166,027	36.3
Off-campus hospital outpatient	27,750	2.9	10,998	2.4
Office	777,976	81.0	51,257	11.2
Outpatient hospital	65,763	6.8	123,836	27.1
Other	14,802	1.5	376	0.1
Specialty				
Anesthesiology	8,264	0.9	10	0.0
Dermatology	459,636	47.8	16,280	3.6
Diagnostic radiology	23,041	2.4	101	0.0
General surgery	23,768	2.5	53,254	11.6
Hand surgery	259	0.0	10,564	2.3
Interventional pain management	11,320	1.2	14	0.0
Neurology	16,992	1.8	159	0.0
Neurosurgery	2,445	0.3	14,476	3.2
NP/PA	225,010	23.4	3,634	0.8
Ophthalmology	33,032	3.4	112,482	24.6
Optometry	2,621	0.3	800	0.2
Orthopedic surgery	3,642	0.4	147,845	32.3
Otolaryngology	46,496	4.8	3,556	0.8
Pain Management	10,564	1.1	18	0.0
Pathologic anatomy, clinical pathology	14,305	1.5	19,155	4.2
Plastic and reconstructive surgery	45,015	4.7	4,656	1.0
Podiatry	3,706	0.4	4,394	1.0
Primary care	28	0.0	1,363	0.3
Urology	22,732	2.4	16,799	3.7
Vascular surgery	2,491	0.3	10,686	2.3
All other specialties	5,639	0.6	37,010	8.1

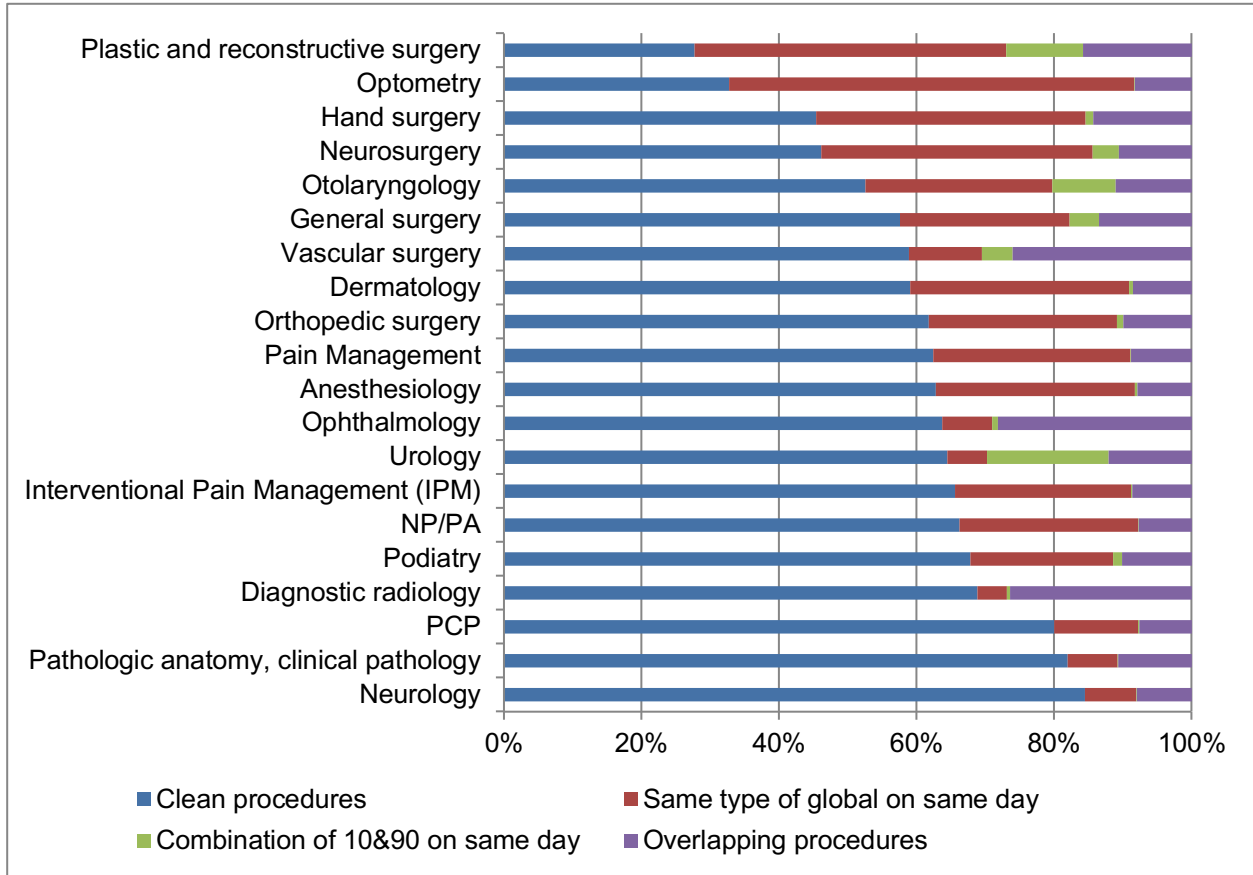
SOURCE: CMS-IDR (December 13, 2018).

NOTE: This figure includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and were furnished from July 1, 2017, through June 30, 2018.

^a “Study sample” includes procedures that met the following inclusion criteria: one of the clean procedure codes; performed between July 1, 2017, and December 31, 2017, for a Medicare FFS beneficiary; and performed in one of the nine states in a practice with ten or more practitioners.

^b Lists only those specialties that performed 15,000 or more procedures between July 1, 2017, and June 30, 2018.

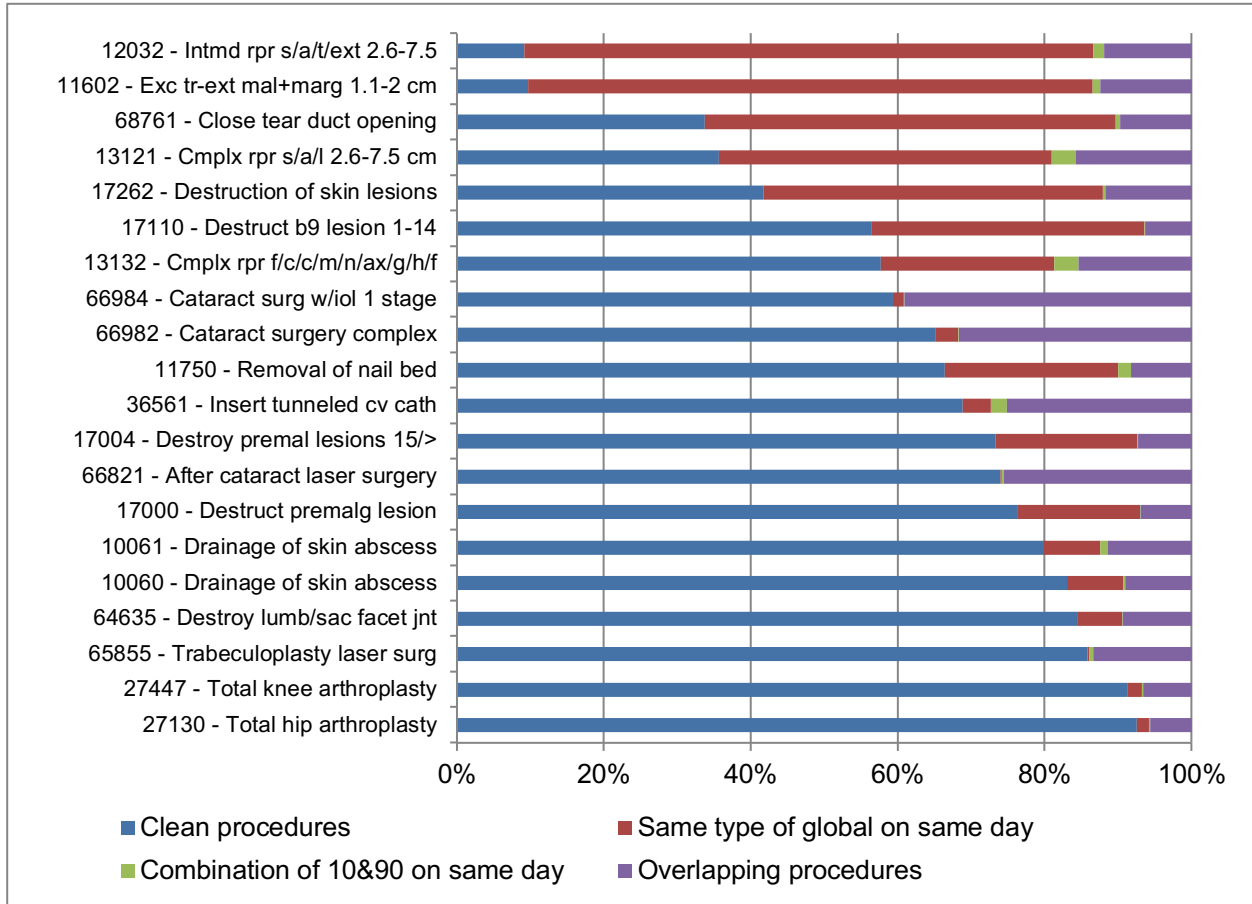
Figure A.4. Summary of Grouping of Procedures with 10- or 90-Day Global Periods by Specialty, National Sample of Nonreporting States



SOURCE: CMS-IDR (January 2, 2019).

NOTE: This figure includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and were furnished from July 1, 2017, through June 30, 2018.

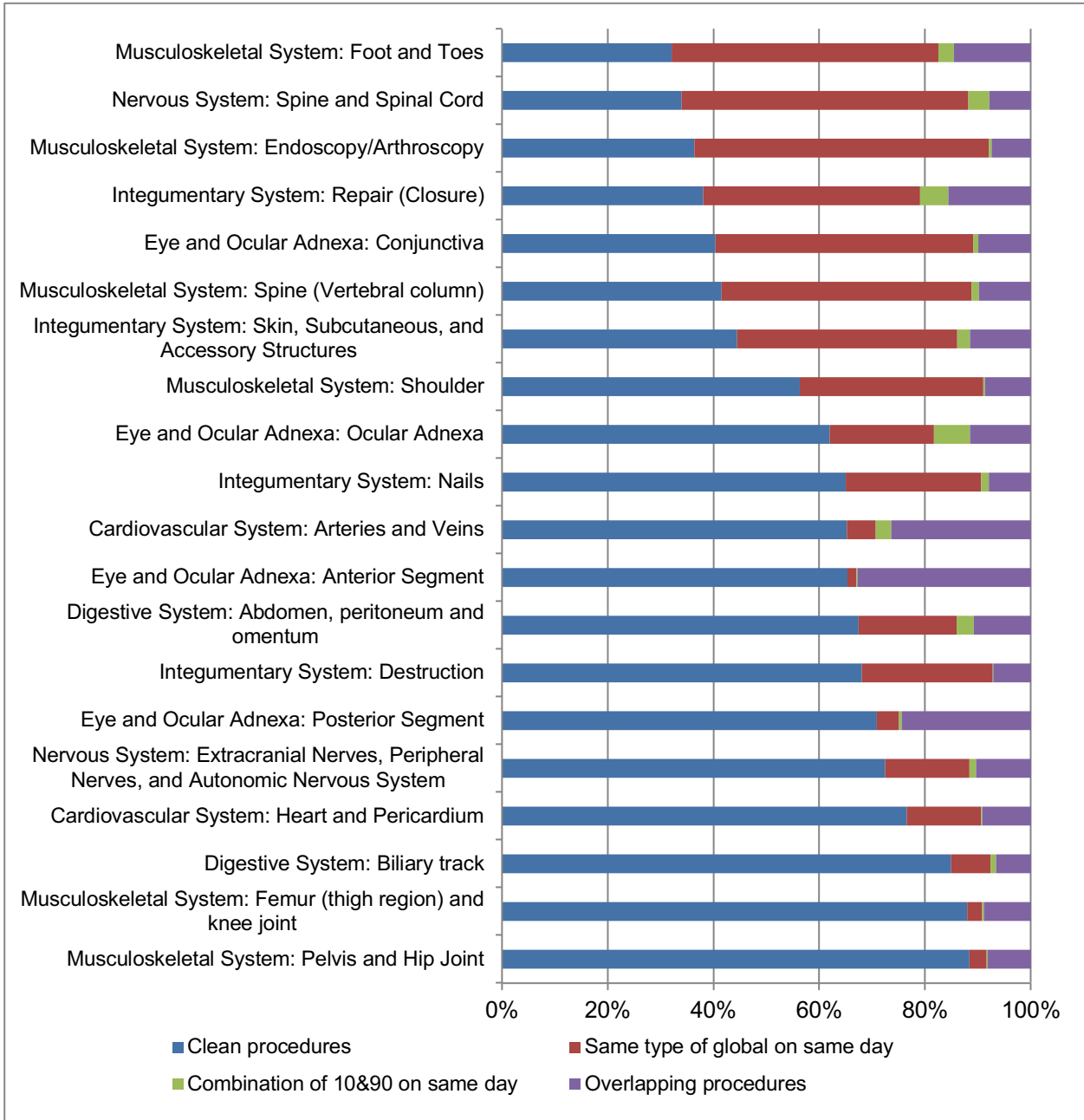
Figure A.5. Summary of Grouping of Procedures with 10- or 90-Day Global Periods by HCPCS Codes, National Sample of Nonreporting States



SOURCE: CMS-IDR (January 2, 2019).

NOTES: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and were furnished from July 1, 2017, through June 30, 2018. 12032 = intermediate repair of wounds of scalp, axillae, trunk and/or extremities (2.6–7.5 cm); 11602 = excision of malignant lesion including margins, trunk, arms, or legs (1.1–2.0 cm); 68761 = closure of the lacrimal punctum, each plug; 13121 = reconstructive procedures, complicated wound closure: scalp, arms, and/or legs (2.6–7.5 cm); 17262 = destruction of malignant lesion of trunk, arms, or legs (1.1–2.0 cm); 17110 = destruction of benign lesions other than skin tags or cutaneous vascular proliferative lesions, up to 14 lesions; 13132 = reconstructive procedures, complicated wound closure: forehead, cheeks, chin, mouth, neck, axillae, genitalia, hands and/or feet (2.6 to 7.5 cm); 66984 = extracapsular cataract removal with insertion of intraocular lens prosthesis, manual or mechanical technique; 66982 = extracapsular cataract removal with insertion of intraocular lens prosthesis (1-stage procedure); 11750 = excision of nail and nail matrix, partial or complete, for permanent removal; 35661 = harvest of upper extremity artery: femoral-femoral; 17004 = destruction, premalignant lesions, 15 or more lesions; 66821 = discission of secondary membranous cataract; stab incision technique—laser surgery; 17000 = destruction, premalignant lesions; first lesion; 10061 = incision and drainage of abscess; complicated or multiple; 10060 = incision and drainage of abscess; simple or single; 64635 = destruction by neurolytic agent, paravertebral facet joint nerve(s), with imaging guidance; lumbar or sacral, single facet joint; 65855 = trabeculoplasty by laser surgery; 27447 = total knee arthroplasty; 27130 = total hip arthroplasty, with or without autograft or allograft.

Figure A.6. Summary of Grouping of Procedures with 10- or 90-Day Global Periods by CPT Book Heading, National Sample of Nonreporting States



SOURCE: CMS-IDR (January 2, 2019).

NOTE: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and were furnished from July 1, 2017, through June 30, 2018.

Table A.3. Summary of Grouping of Procedures by Specialty, for Specialties with 10,000 Procedures or More

Specialty of Practitioner Who Furnished the Original Procedure	Among Nine-State Subsample					Among 41 States and DC				
	Total	Clean Procedures	Same Type of Global on Same Day	Combination of 10 and 90 on Same Day	Overlapping Procedures	Total	Clean Procedures	Same Type of Global on Same Day	Combination of 10 and 90 on Same Day	Overlapping Procedures
Anesthesiology	25,091	16,626	6,233	36	2,196	116,607	73,257	33,658	523	9,169
Cardiac surgery	13,666	8,085	3,774	208	1,599	54,202	31,427	15,523	707	6,545
Cardiology	21,664	17,383	1,469	264	2,548	89,502	74,775	5,512	318	8,897
Colorectal surgery	14,256	10,634	1,796	367	1,459	53,700	40,841	5,893	1,278	5,688
Dermatology	2,172,375	1,237,229	698,683	12,348	224,115	7,128,070	4,211,718	2,268,145	39,040	609,167
Diagnostic radiology	37,638	25,618	1,505	254	10,261	161,676	111,255	6,931	846	42,644
Emergency medicine	15,700	13,765	396	65	1,474	82,442	65,265	7,123	408	9,646
Gastroenterology	9,673	8,972	61	6	634	26,571	24,737	141	162	1,531
General surgery	201,706	113,450	49,657	9,836	28,763	842,448	485,181	207,321	36,659	113,287
Gynecologist/ oncologist	4,111	1,428	640	1,700	343	15,576	5,713	2,412	6,154	1,297
Hand surgery	31,787	13,993	12,728	405	4,661	113,794	51,697	44,550	1,289	16,258
Interventional cardiology	3,754	3,048	267	9	430	11,001	8,857	913	55	1,176
Interventional pain management	36,764	24,702	9,130	16	2,916	96,154	63,024	24,656	132	8,342
Interventional radiology	15,900	10,829	832	61	4,178	73,342	49,589	3,629	374	19,750
Nephrology	4,519	3,073	125	7	1,314	26,096	16,974	908	90	8,124
Neurology	33,292	26,146	3,969	32	3,145	147,376	124,432	11,022	83	11,839
Neurosurgery	47,109	22,552	17,621	1,807	5,129	182,861	84,293	72,234	6,960	19,374
NP/PA	571,130	366,160	155,790	477	48,703	1,613,167	1,069,112	418,342	1,327	124,386
Obstetrics/ gynecology	10,380	4,205	3,793	1,431	951	48,299	20,186	17,460	5,838	4,815
Ophthalmology	658,547	396,284	59,922	6,069	196,272	2,459,840	1,566,892	179,397	19,182	694,369
Optometry	36,480	12,397	20,736	17	3,330	105,777	34,642	62,266	88	8,781
Orthopedic surgery	319,299	193,417	89,083	3,804	32,995	1,323,347	817,707	361,263	12,467	131,910

Specialty of Practitioner Who Furnished the Original Procedure	Among Nine-State Subsample					Among 41 States and DC				
	Total	Clean Procedures	Same Type of Global on Same Day	Combination of 10 and 90 on Same Day	Overlapping Procedures	Total	Clean Procedures	Same Type of Global on Same Day	Combination of 10 and 90 on Same Day	Overlapping Procedures
Otolaryngology	46,518	24,638	12,077	4,176	5,627	203,562	106,900	55,480	18,743	22,439
Pain management	35,250	22,097	10,075	27	3,051	106,208	66,295	30,445	79	9,389
Pathologic anatomy, clinical pathology	29,619	23,975	2,270	49	3,325	104,748	85,822	7,583	129	11,214
Pathology	2,144	966	919	14	245	11,789	6,873	3,910	104	902
Peripheral vascular disease, medical or surgical	3,951	2,067	1,469	11	404	24,281	12,793	9,426	96	1,966
Physical medicine and rehabilitation	19,038	13,021	4,229	8	1,780	79,578	54,461	17,462	42	7,613
Plastic and reconstructive surgery	91,392	26,159	37,192	11,866	16,175	321,553	89,056	145,640	35,917	50,940
Podiatry	229,756	165,275	36,613	3,039	24,829	737,721	500,381	153,120	9,545	74,675
Primary care	126,051	98,251	16,399	269	11,132	623,460	498,603	76,312	1,230	47,315
Surgical oncology	10,289	2,742	4,397	1,847	1,303	42,544	13,112	18,930	4,843	5,659
Thoracic surgery	17,219	10,594	4,315	268	2,042	68,295	41,725	16,377	1,307	8,886
Urology	41,568	27,091	2,230	6,921	5,326	162,925	105,042	9,398	28,848	19,637
Vascular surgery	45,626	27,050	4,586	2,190	11,800	165,438	97,448	17,591	7,335	43,064

SOURCE: CMS-IDR (January 2, 2019).

NOTE: This table reports the volume of the global procedure categories for all specialties with at least 10,000 procedures.

Describing the Characteristics of Clean Procedures

Among procedures for which reporting was required, 61.1 percent of procedures with 10-day global periods and 59.7 percent of procedures with 90-day global periods met our criteria for a clean procedure. During the study period, there were 1,418,262 clean procedures linked to 931,640 post-operative visits in our study sample. Among clean procedures with 10-day global periods, 81.0 percent were performed in office settings and 47.8 percent were performed by dermatologists (Table A.3). Among clean procedures with 90-day global periods, 36.3 percent were performed in inpatient settings and 32.3 percent were performed by orthopedic surgeons.

Conclusions

Our main analysis of post-operative visits reported using HCPCS code 99024 is focused on clean procedures, as this is the most straightforward method of linking post-operative visits back to the original procedure. The majority of procedures with 10- or 90-day global periods were categorized as clean, meaning these procedures were not furnished on the same day as another procedure with a 10- or 90-day global period, and the global period of the procedure did not overlap with another global procedure. Among the 20 specialties that furnished the most procedures with 10- or 90-day global periods, only two were more likely to have multiple procedures on the same day than clean procedures. However, these specialties had more than 34,000 clean procedures, so these specialties still contribute important information to our analysis.

In addition, the percentage of procedures categorized as clean was comparable in the nine-state subsample and the U.S. sample. The nine-state subsample was comparable to the U.S. sample, with few exceptions.

Appendix B. Identifying Robust Reporters of Post-Operative Visits

The claims data may include fewer post-operative visits than expected if these visits are not occurring or if practitioners are not submitting claims for post-operative visits. Given concerns of potential underreporting of claims for post-operative visits, we conducted a subanalysis on a set of “robust reporters” who appeared to be regularly reporting post-operative visits.

Defining Robust Reporters

We explored how the volume of practitioners and procedures changed with different definitions of robust reporters by examining different thresholds of total procedures furnished and shares of eligible procedures furnished with any post-operative visits. Specifically, we examined the following thresholds of total procedures furnished with 90-day global periods: one or more, ten or more, 20 or more, and 30 or more procedures. We also examined the following thresholds of percentages of procedures furnished with any post-operative visits: 25 percent or more, 50 percent or more, 75 percent or more, 90 percent or more, 95 percent or more, and all practitioners. We examined only procedure codes with 90-day global periods in our definition of robust reporters, because these procedure codes were observed to have more post-operative visits than procedures with 10-day global periods. As previously described, this analysis is limited to single, nonoverlapping, clean procedures, because of the challenges of linking procedures and post-operative visits.

During the study period, 14,940 practitioners furnished one or more clean procedures with a 90-day global period, and 57 percent of these practitioners ($N = 8,510$) furnished ten or more procedures with 90-day global periods (Table B.1). Among practitioners furnishing a procedure with a 90-day global period, 76.8 percent had 25 percent or more of billed procedures matched with post-operative visits. Among practitioners delivering ten or more procedures with 90-day global periods, 6,472 practitioners (or 43.3 percent of all practitioners expected to report post-operative visits) had 50 percent or more of billed procedures linked to post-operative visits.

Table B.2 reports the number of procedures billed with 90-day global periods. During the study period, 457,256 clean procedures with a 90-day global period were furnished by 14,940 practitioners. We found that 341,056 procedures with 90-day global periods (74.6 percent) were furnished by practitioners delivering ten or more procedures with 90-day global periods who reported post-operative visits for 50 percent or more of eligible procedures.

Table B.1. Number of Practitioners Who Performed Procedures with 90-Day Global Periods and Reported Post-Operative Visits

Share Of Billed Eligible Procedures with Any Matched Post-Operative Visits	Number of Eligible Procedures Billed with 90-Day Global Periods							
	1+ Procedures		10+ Procedures		20+ Procedures		30+ Procedures	
	<i>N</i>	Share	<i>N</i>	Share	<i>N</i>	Share	<i>N</i>	Share
All practitioners	14,940	100.0%	8,510	57.0%	6,075	40.7%	4,503	30.1%
Practitioners with ≥ 25 percent	11,470	76.8%	7,109	47.6%	5,099	34.1%	3,813	25.5%
Practitioners with ≥ 50 percent	10,496	70.3%	6,472	43.3%	4,681	31.3%	3,524	23.6%
Practitioners with ≥ 75 percent	8,479	56.8%	5,244	35.1%	3,890	26.0%	2,961	19.8%
Practitioners with ≥ 90 percent	5,769	38.6%	3,206	21.5%	2,381	15.9%	1,851	12.4%
Practitioners with ≥ 95 percent	4,283	28.7%	1,720	11.5%	1,320	8.8%	961	6.4%

SOURCE: CMS-IDR (December 13, 2018).

NOTE: Eligible procedures refers to procedures that met the following inclusion criteria: one of the “clean” procedure codes; performed between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; and performed in one of the nine states in a practice with ten or more practitioners.

Table B.2. Number of Procedures with 90-Day Global Periods Performed and Reported Post-Operative Visits

% of Eligible Procedures Billed with Any Post-Operative Visits	Number of Eligible Procedures Billed with 90-Day Global Periods							
	1+ Procedures		10+ Procedures		20+ Procedures		30+ Procedures	
	<i>N</i>	Share	<i>N</i>	Share	<i>N</i>	Share	<i>N</i>	Share
Total procedures billed by NPIs	457,256	100.0%	434,914	95.1%	400,682	87.6%	362,778	79.3%
Procedures billed by practitioners with ≥ 25 percent reporting rate	385,187	84.2%	368,252	80.5%	339,976	74.4%	309,017	67.6%
Procedures billed by practitioners with ≥ 50 percent reporting rate	356,245	77.9%	341,056	74.6%	315,801	69.1%	287,910	63.0%
Procedures billed by practitioners with ≥ 75 percent reporting rate	298,199	65.2%	286,426	62.6%	267,246	58.4%	244,838	53.5%
Procedures billed by practitioners with ≥ 90 percent reporting rate	194,387	42.5%	186,904	40.9%	175,621	38.4%	162,899	35.6%
Procedures billed by practitioners with ≥ 95 percent reporting rate	109,045	23.8%	101,562	22.2%	96,155	21.0%	87,558	19.1%

SOURCE: CMS-IDR (December 13, 2018).

NOTE: Eligible procedures refers to procedures that met the following inclusion criteria: one of the “clean” procedure codes; performed between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; and performed in one of the nine states in a practice with ten or more practitioners.

Characterizing Robust Reporters

After examining the range of total procedures furnished and percentage of practitioners reporting post-operative visits, we defined practitioners as robust reporters if they performed ten or more procedures with 90-day global periods and reported at least one claim for a post-operative visit for at least half of procedures performed from July 1, 2017, through June 30, 2018. This group of practitioners was selected for the main analysis because it includes 74.6 percent of all eligible 90-day procedures and provides a threshold of procedures with post-operative visits that is on the higher end, while still representing 43.3 percent of practitioners furnishing procedures with 90-day global periods. Robust reporters included 16.7 percent of all practitioners who furnished clean procedures in our sample.

During our study period, robust reporters delivered more clean procedures with 90-day global periods (341,056) than 10-day global periods (137,087) (Table B.3). As observed with our full sample of clean procedures, robust reporters were most likely to deliver procedures with 10-day global periods in the office setting (78.5 percent) and procedures with 90-day global periods in the inpatient setting (37.8 percent). More than half of procedures with 10-day global periods delivered by robust reporters were delivered by dermatologists (52 percent). Procedures with 90-day global periods delivered by robust reporters were most often delivered by ophthalmologists (26.7 percent) and orthopedic surgeons (36.5 percent).

Table B.3. Characteristics of Procedures with 10- and 90-Day Global Periods

	High-Volume Reporters ^a				Robust Reporters ^b			
	Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods		Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods	
	N	Share	N	Share	N	Share	N	Share
Total	197,368	100.0%	434,914	100.0%	137,087	100.0%	341,056	100.0%
Practice size								
10–24 practitioners	72,308	36.6%	125,043	28.8%	50,045	36.5%	88,076	25.8%
25–99 practitioners	66,675	33.8%	132,956	30.6%	50,046	36.5%	112,506	33.0%
100 or more practitioners	58,385	29.6%	176,915	40.7%	36,996	27.0%	140,474	41.2%
Procedure place of service								
Ambulatory surgical center	8,287	4.2%	101,795	23.4%	6,150	4.5%	79,801	23.4%
Emergency or urgent care	121	0.1%	512	0.1%	87	0.1%	377	0.1%
Inpatient	7,835	4.0%	158,792	36.5%	5,883	4.3%	128,899	37.8%
Off-campus hospital outpatient office	4,541	2.3%	10,386	2.4%	3,349	2.4%	9,553	2.8%
Outpatient hospital	157,076	79.6%	48,377	11.1%	107,657	78.5%	35,274	10.3%
Other	19,220	9.7%	114,682	26.4%	13,922	10.2%	86,783	25.4%
Other	288	0.1%	370	0.1%	39	0.0%	369	0.1%
Specialty ^c								
Anesthesiology	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dermatology	108,928	55.2%	15,930	3.7%	71,293	52.0%	9,696	2.8%
Diagnostic radiology	13	0.0%	52	0.0%	N/A	N/A	N/A	N/A
General surgery	20,684	10.5%	49,649	11.4%	15,977	11.7%	39,203	11.5%
Hand surgery	238	0.1%	10,446	2.4%	170	0.1%	8,682	2.5%
Interventional pain management	45	0.0%	12	0.0%	N/A	N/A	N/A	N/A
Neurology	8	0.0%	140	0.0%	8	0.0%	140	0.0%
Neurosurgery	2,110	1.1%	13,327	3.1%	1,802	1.3%	11,074	3.2%
NP/PA	8,456	4.3%	2,280	0.5%	5,206	3.8%	1,546	0.5%
Ophthalmology	30,815	15.6%	111,881	25.7%	25,202	18.4%	91,116	26.7%
Optometry	563	0.3%	753	0.2%	535	0.4%	612	0.2%
Orthopedic surgery	2,932	1.5%	145,951	33.6%	2,244	1.6%	124,523	36.5%
Otolaryngology	3,983	2.0%	1,692	0.4%	2,579	1.9%	1,171	0.3%
Pain management	1,508	0.8%	0	0.0%	968	0.7%	0	0.0%
Pathologic anatomy, clinical pathology	N/A	N/A	19,049	4.4%	N/A	N/A	8,084	2.4%
Plastic and reconstructive surgery	211	0.1%	3,952	0.9%	169	0.1%	2,811	0.8%
Podiatry	2,724	1.4%	2,726	0.6%	1,856	1.4%	2,067	0.6%

	High-Volume Reporters ^a				Robust Reporters ^b			
	Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods		Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods	
	N	Share	N	Share	N	Share	N	Share
Primary care	27	0.0%	1,079	0.2%	15	0.0%	688	0.2%
Urology	7,122	3.6%	14,375	3.3%	3,897	2.8%	9,898	2.9%
Vascular surgery	1,875	1.0%	10,311	2.4%	1,218	0.9%	8,281	2.4%
All other specialties	5,126	2.6%	31,309	7.2%	3,948	2.9%	21,464	6.3%

SOURCE: CMS-IDR (December 13, 2018).

NOTES: N/A = not applicable, because no procedures were furnished in category. The claims for HCPCS code 99024 listed in this table were linked to procedures furnished from July 1, 2017, through June 30, 2018.

^a High-volume reporters includes procedures that met the following inclusion criteria: one of the clean procedure codes; performed between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; performed in one of the nine states in a practice with ten or more practitioners; and performed by practitioners who billed ten or more procedures with 90-day global periods from July 1, 2017, through June 30, 2018.

^b Robust reporters includes procedures that met the following inclusion criteria: one of the clean procedure codes; performed between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; performed in one of the nine states in a practice with ten or more practitioners; and performed by practitioners who billed ten or more procedures with 90-day global periods between July 1, 2017, and June 30, 2018, and reported at least one claim for a post-operative visit for at least 50 percent of procedures performed during the study period.

^c Lists only those specialties that performed 10,000 or more procedures between July 1, 2017, and June 30, 2018.

Appendix C. Observed to Expected Ratio of Post-Operative Visits for All Procedures

The accompanying Excel file (available for download at www.rand.org/pubs/research_reports/RR2846.html) provides a HCPCS-level spreadsheet with information about total procedures furnished for the 299 HCPCS codes for which CMS required reporting of post-operative visits during 2017 and 2018. The spreadsheet also includes observed to expected ratios of post-operative visits for the following categories of procedures:

- **Procedures furnished by expected reporters:** includes clean procedure codes furnished July 1, 2017, through June 30, 2018, that were linked to post-operative visits for practitioners in practices with ten or more practitioners in the nine states where reporting of post-operative visits was required.
- **Procedures furnished by high volume practitioners:** includes clean procedure codes performed between July 1, 2017, and June 30, 2018, for a Medicare FFS beneficiary; performed in one of the nine states in a practice with ten or more practitioners; and performed by practitioners who billed ten or more procedures with 90-day global periods from July 1, 2017, through June 30, 2018.
- **Procedures furnished by robust reporters:** includes clean procedure codes, performed between July 1, 2017 and June 30, 2018 for a Medicare FFS beneficiary; performed in one of the nine states in a practice with ten or more practitioners; and performed by practitioners who billed ten or more procedures with 90-day global periods from July 1, 2017, through June 30, 2018, and reported at least one claim for a post-operative visit for at least 50 percent of procedures performed during the study period.

The spreadsheet includes information on 296 procedure codes because we excluded from the spreadsheet three procedure codes with 10-day global periods that each had zero expected visits (HCPCS codes 64615, 64616, 64617).

Appendix D. Exploring Visits Immediately Following Global Periods

We observed a low rate for reporting of post-operative visits. It is possible that post-operative visits are furnished after global periods end. In this sensitivity analysis, we examined the number of post-operative visits occurring after the end of global periods.

Approach

We examined clean procedures linked to post-operative visits during global periods. We counted the number of post-operative visits reported with HCPCS code 99024 during global periods and the number of post-operative visits reported up to and including the first five days after global periods ended.

A key limitation of this analysis is that some of the post-operative visits provided after global periods end may be related to other, new procedures, given that our clean period only focused on overlap during global periods. Because we no longer link post-operative visits and procedures with a high degree of confidence, many of the post-operative visits occurring after global periods end may be associated with other subsequent procedures.

Results

Across all clean procedures, we observed 15,955 and 7,497 post-operative visits reported using HCPCS code 99024 immediately following the end of global periods for procedures with 10- and 90-day global periods respectively (Table D.1). When compared with the results observed for our study sample, we observed only a minimal increase in the percentage of procedures with any post-operative visits when we include up to five days after the end of global periods. When comparing the ratio of observed to expected post-operative visits for procedures with 10-day global periods, we do observe a larger difference in the study sample (0.04) and the expanded global periods (0.06). However, as mentioned above, many of these post-operative visits may be actually be associated with other, new procedures.

Table D.1. Counts of Post-Operative Visits Provided After Global Periods End for Procedures with 10- and 90-Day Global Periods

	Procedures with 10-Day Global Periods	Procedures with 90-Day Global Periods
Total procedures	961,006	457,256
Total post-operative visits during global periods	43,542	888,098
Total post-operative visits in the first five days after global periods end	15,955	7,497
Percentage of procedures with any post-operative visits		
Study sample	3.7%	70.9%
Expanded global periods	5.0%	71.0%
Ratio of observed to expected post-operative visits		
Study sample	0.04	0.39
Expanded global periods	0.06	0.40

SOURCE: CMS-IDR (December 13, 2018).

NOTES: The claims for HCPCS code 99024 listed in this table were linked to procedures furnished from July 1, 2017, through June 30, 2018. The study sample includes clean procedures that were performed between July 1, 2017, and June 30, 2018, in one of the nine states in a practice with ten or more practitioners and post-operative visits occurring during the global periods. The results for expanded global periods include the study sample plus post-operative visits reported up to and including the first five days after global periods ended. For both the study sample and the expanded global periods, we included post-operative visits performed by the practitioner who furnished the original procedure, performed by someone other than the practitioner who furnished the original procedure, and performed by someone in another practice.

References

- American College of Surgeons, “Global Codes and Data Collection,” webpage, undated. As of May 22, 2018:
<https://www.facs.org/advocacy/regulatory/global-codes>
- American Medical Association, “RVS Update Committee (RUC),” webpage, 2019. As of January 20, 2019:
<https://www.ama-assn.org/about/rvs-update-committee-ruc/rvs-update-committee-ruc>
- American Society of Plastic Surgeons, “CMS Moves to Eliminate 10- and 90-Day Surgical Global Periods in Medicare,” February 1, 2015. As of October 11, 2018:
<https://www.plasticsurgery.org/for-medical-professionals/advocacy/advocacy-news/cms-moves-to-eliminate-10-and-90-day-surgical-global-periods-in-medicare>
- Centers for Medicare and Medicaid Services, “Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule, Clinical Laboratory Fee Schedule, Access to Identifiable Data for the Center for Medicare and Medicaid Innovation Models & Other Revisions to Part B for CY 2015,” CMS-1612-P, *Federal Register*, Vol. 79, No. 133, July 11, 2014a.
- , “Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule, Clinical Laboratory Fee Schedule, Access to Identifiable Data for the Center for Medicare and Medicaid Innovation Models & Other Revisions to Part B for CY 2015,” CMS-1612-FC, *Federal Register*, Vol. 79, No. 219, November 13, 2014b.
- , “Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2017; Medicare Advantage Bid Pricing Data Release; Medical Loss Ratio Data Release; Medicare Advantage Provider Network Requirements; Expansion of Medicare Diabetes Prevention program Model; Medicare Shared Savings Program Requirements,” CMS-1654-F, *Federal Register*, Vol. 80, No. 220, November 15, 2016.
- , “Claims-Based Reporting Requirements for Post-Operative Visits, Frequently Asked Questions, June 2017,” 2017a. As of June 11, 2018:
<https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched/Downloads/Global-Surgery-FAQs.pdf>
- , “Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2018; Medicare Shared Savings Program Requirements; and Medicare Diabetes Prevention Program,” CMS-1676-F, *Federal Register*, Vol. 82, No. 219, November 15, 2017b.

- , “Global Surgery Data Collection,” 2018. As of November 28, 2018:
<https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched/Global-Surgery-Data-Collection-.html>
- , “Physician Fee Schedule,” website, 2019. As of March 12, 2019:
<https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched/>
- Centers for Medicare and Medicaid Services and Medicare Learning Network, *Global Surgery: Required Data Reporting for Post-Operative Care Call*, presentation to health care providers, April 25, 2017. As of May 22, 2018:
<https://www.cms.gov/Outreach-and-Education/Outreach/NPC/Downloads/2017-04-25-Global-Surgery-Presentation.pdf>
- , *Global Surgery Booklet*, September 2018. As of November 26, 2018:
<https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/GlobalSurgery-ICN907166.pdf>
- CMS—See Centers for Medicare and Medicaid Services.
- DiVenere, Lucia, “Why CMS’ Plan to Unbundle Global Surgery Periods Should Be Scrapped,” *OBG Management*, Vol. 27, No. 5, May 2015.
- HHS—See U.S. Department of Health and Human Services.
- Mulcahy, Andrew W., Barbara Wynn, Lane Burgette, and Ateev Mehrotra, “Medicare’s Step Back from Global Payments,” *New England Journal of Medicine*, Vol. 372, No. 15, April 9, 2015, pp. 1385–1387.
- Ollapally, Vinita, “Changes on the Horizon for Global Services Payment,” *Bulletin of the American College of Surgeons*, September 1, 2015. As of January 28, 2019:
<http://bulletin.facs.org/2015/09/changes-on-the-horizon-for-global-services-payment/>
- Public Law 114-10, Medicare Access and CHIP Reauthorization Act of 2015, April 16, 2015. As of March 12, 2019:
<https://www.govinfo.gov/content/pkg/PLAW-114publ10/html/PLAW-114publ10.htm>
- Research Data Assistance Center, “Data Documentation: Medicare Data on Provider Practice and Specialty (MD-PPAS),” webpage and data set, accessed 2018. As of June 1, 2018:
<https://www.resdac.org/cms-data/files/md-ppas/data-documentation>
- Society of Thoracic Surgeons, “2017 Medicare Claims-Based Reporting Requirements for Post-Operative Visits,” 2017. As of May 22, 2018:
https://sts.org/sites/default/files/content/GlobalsDataCollection_FactSheet_FINAL062317.pdf
- U.S. Department of Health and Human Services, Office of Inspector General, *Review of Cataract Global Surgeries and Related Evaluation and Management Services, Wisconsin*

Physicians Service Insurance Corporation, Calendar Year 2003, Washington, D.C, March 2007.

———, *Cardiovascular Global Surgery Fees Often Did Not Reflect the Number of Evaluation and Management Services Provided*, Washington, D.C.: Department of Health and Human Services, May 2012a.

———, *Musculoskeletal Global Surgery Fees Often Did Not Reflect the Number of Evaluation and Management Services Provided*, Washington, D.C.: U.S. Department of Health and Human Services, May 2012b.

Welch, W. Pete, Sally C. Stearns, Alison E. Cuellar, and Andrew B. Bindman, “Use of Hospitalists by Medicare Beneficiaries: A National Picture,” *Medicare and Medicaid Research Review*, Vol. 4, No. 2, 2014.

Wynn, Barbara O., Lane F. Burgette, Andrew W. Mulcahy, Edward N. Okeke, Ian Brantley, Neema Iyer, Teague Ruder, and Ateev Mehotra, *Development of a Model for the Validation of Work Relative Value Units for the Medicare Physician Fee Schedule*, Santa Monica, Calif.: RAND Corporation, RR-662-CMS, 2015. As of March 1, 2019:
https://www.rand.org/pubs/research_reports/RR662.html