

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

Updated Results Using Calendar Year 2019 Data

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## Preface

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The Centers for Medicare & Medicaid Services (CMS) currently bundles payment for post-operative care within 10 or 90 days after many surgical procedures. Historically, CMS had 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 on 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 for procedures furnished during calendar year 2019. The following two previous reports summarized patterns of post-operative visits for procedures furnished from July 1, 2017, through June 30, 2018, and for the entire 2018 calendar year:

- Ashley M. Kranz, Teague Ruder, Ateev Mehrotra, and Andrew W. Mulcahy, *Claims-Based Reporting of Post-Operative Visits for Procedures with 10- or 90-Day Global Periods: Final Report*, Santa Monica, Calif.: RAND Corporation, RR-2846-CMS, 2019
- Daniel J. Crespin, Ashley M. Kranz, Teague Ruder, Ateev Mehrotra, and Andrew W. Mulcahy, *Claims-Based Reporting of Post-Operative Visits for Procedures with 10- or 90-Day Global Periods: Updated Results Using Calendar Year 2018 Data*, Santa Monica, Calif.: RAND Corporation, RR-A203-1, 2021.

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## Summary

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The Centers for Medicare & Medicaid Services (CMS) currently bundles payment for post-operative care within 10 or 90 days after most surgical procedures. To inform the valuation of this bundled payment by the American Medical Association Relative Value Scale 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. The RUC, supported by specialty society committees, also makes recommendations on the total work relative value units (RVUs) to be assigned for a procedure. CMS uses the RUC input, among other data, to assign RVUs to a procedure. RVUs and the number of visits that were used to set valuation are reported in the Medicare Physician Fee Schedule.

Historically, CMS had 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 Children's Health Insurance Plan (CHIP) Reauthorization Act of 2015 mandated CMS to collect data on the number and level of post-operative visits to enable CMS to assess the accuracy of global surgical package valuation. Beginning on July 1, 2017, CMS required select practitioners in nine states (Florida, Kentucky, Louisiana, Nevada, New Jersey, North Dakota, Ohio, Oregon, and Rhode Island) 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 (HCPCS) code 99024 (this code has no associated payment).

This report provides results on the reporting of these post-operative visits based on analysis of Medicare fee-for-service claims data for procedures furnished during calendar year 2019. The report describes the share of procedures with any reported post-operative visits and the ratio of the number of reported visits to the number of expected post-operative visits. Prior reports provided results for procedures furnished during (1) the first 12 months of reporting, from July 1, 2017, to June 30, 2018 (Kranz et al., 2019); and (2) January 1, 2018, to December 31, 2018 (Crespin et al., 2021). The substantive results and findings in this report and the prior reports are very similar.

### *In Procedure-Focused Specialties, Most Practitioners Are Reporting Post-Operative Visits*

Although practitioners were required to report post-operative visits, not all practitioners who furnished procedures may have had post-operative visits, and it is possible that others had post-operative visits but did not report them. We determined the percentage of practitioners who reported one or more post-operative visits during the study period among those who performed any procedures with 10- or 90-day global periods. Across the nine states in which CMS required

reporting of post-operative visits, more than 90 percent of hand surgeons, orthopedic surgeons, clinical pathologists, vascular surgeons, neurosurgeons, and ophthalmologists reported one or more post-operative visits. The reporting rate among *all* practitioners required to report was lower (47.1 percent) because of low rates for nonprocedure-focused physicians, such as primary care practitioners, who perform relatively few procedures.

### *A Small Percentage of Procedures with 10-Day Global Periods Have Any Post-Operative Visits*

Our analyses focused on *clean procedures*, which are procedures that do not occur during the global period of any prior procedures with a 10- or 90- day global period on a different date of service. Of the 1.1 million clean procedures with a 10-day global period, 3.5 percent had any post-operative visits reported.<sup>1</sup> We then 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. CMS uses the RUC survey and other inputs to determine the number of expected post-operative visits, which is used by CMS when they value the procedure.<sup>2</sup> Overall, the ratio of observed to expected post-operative visits provided was only 0.04 for procedures with 10-day global periods. These results imply that the vast majority of expected post-operative visits for procedures with 10-day global periods are not delivered.

There is variation across specialties in these rates and, therefore, we also calculated the rate of post-operative visits among specialties that perform a higher percentage of 10-day global procedures. Dermatologists performed more procedures with 10-day global periods than any other specialty (47.3 percent of all procedures with 10-day global periods). Among 10-day procedures performed by dermatologists, the observed to expected ratio was 0.03. Among other specialties performing at least 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 (0.10), and ophthalmology (0.08).

### *Most Procedures with a 90-Day Global Period Have at Least One Post-Operative Visit, but Fewer Total Visits Are Provided as Compared with What Is Expected*

Of the 469,074 procedures with 90-day global periods, 70.0 percent had one or more associated post-operative visits reported.<sup>3</sup> Among procedures with 90-day global periods,

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<sup>1</sup> The percentage of procedures with any post-operative visits was the same compared with procedures furnished between January 1, 2018, and December 31, 2018, when 3.5 percent of procedures with 10-day global periods had any post-operative visits (Crespin et al., 2021).

<sup>2</sup> CMS reports the number of expected post-operative visits in the Physician Time File posted alongside the Medicare Physician Fee Schedule.

<sup>3</sup> The percentage of procedures with any post-operative visits increased slightly compared with procedures furnished between January 1, 2018, and December 31, 2018, when 69.1 percent of procedures with 90-day global periods had any post-operative visits (Crespin et al., 2021).

reporting of post-operative visits was greatest among procedures furnished in inpatient (74.0 percent) and off-campus hospital outpatient (82.0 percent) settings.<sup>4</sup> Overall, the ratio of observed to expected post-operative visits provided was 0.38 for procedures with 90-day global periods. Orthopedic surgeons performed the plurality of procedures with 90-day global periods (32.7 percent) and had an observed to expected ratio of 0.32. Among other specialties performing more than 10,000 procedures with 90-day global periods, the highest ratios were observed for ophthalmology (0.53), general surgery (0.43), and urology (0.41). These results imply that although most procedures with 90-day global periods have at least one post-operative visit, the majority of expected post-operative visits are not delivered.

### *Sensitivity Analyses*

We further examined the low rate of post-operative visits through sensitivity analyses to determine potential reasons why so few post-operative visits are reported. First, it is possible that additional post-operative visits *are* provided but in the form of another separately billed procedure or service. To test for this possibility, we performed a sensitivity analysis using a more expansive definition of post-operative care that included evaluation and management (E&M) services and other procedures performed during the global period. Using this more expansive definition of post-operative care did not have a substantive impact on the patterns we observed.

Underreporting of post-operative visits that do occur might be contributing to the low rate of post-operative visits. Specialty societies have raised the concern that some practitioners were unaware of the reporting requirement. Additionally, some practitioners may be less apt to report post-operative visits because the post-operative visit HCPCS code has no associated payment, even though reporting post-operative visits is required by CMS. However, in a second sensitivity analysis in which we focused only on procedures performed by practitioners who regularly report post-operative visits, we found modestly higher rates of post-operative visits that were still lower than expected.

Our definition of *clean procedures*, which was used to determine the procedures analyzed in this report, may have not been adequately restrictive, and this might have biased our findings. In a third sensitivity analysis, we compared two different definitions of clean procedures: the primary definition used in this report and an alternative definition that excludes any procedures that overlap with global periods of subsequent procedures. Although the alternative definition reduced the number of included procedures, overall, we did not find substantive differences in our results on the use of post-operative visits under the two definitions.<sup>5</sup>

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<sup>4</sup> The site of procedures was determined by place of service codes.

<sup>5</sup> Details about the two definitions are available in Appendix E.

## *Summary and Policy Implications*

During calendar year 2019, we found that 96.5 percent 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 0.38.

Underreporting of post-operative visits might be contributing to 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 is 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 that included E&M visits and subsequent procedures performed during global periods, and our results again were largely similar. Collectively, 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 observed to expected post-operative visits provided.

Given these findings, we recommend that CMS consider one or more of the following policy options:

- **Revalue 10-day global procedures as 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 should consider revaluing 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 E&M codes when needed. Procedures with little (or negative) work remaining after revaluation could be flagged as potentially misvalued codes and addressed by the RUC.
- **Revalue 90-day global procedures using the number of post-operative visits reported:** Using the information on post-operative visits collected in the nine states, CMS could consider revaluing procedures with 90-day global periods for which post-operative visit data are available. Procedures with little (or negative) work remaining after revaluation could be flagged as potentially misvalued codes and addressed by the RUC.
- **Obtain new recommendations from the RUC:** If CMS decided to not revalue global procedures to 0-day global procedures or revalue procedures based on reported post-operative visits, then CMS could address the potential overvaluation of global surgical packages by adding procedures with large discrepancies between expected and observed post-operative visits as potentially misvalued codes. The RUC could then reassess these codes, giving consideration to the results on post-operative visits presented in this report. Visit counts and valuations could be outdated for individual procedures. After receiving the RUC's recommendations, CMS could decide on the final valuation using the survey responses and other inputs.

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## Abbreviations

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AMA	American Medical Association
ASC	ambulatory surgery center
CMS	Centers for Medicare & Medicaid Services
COVID-19	coronavirus disease 2019
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 [Children’s Health Insurance Plan] Reauthorization Act of 2015
NP	nurse practitioner
NPI	National Provider Identifier
PA	physician assistant
PCP	primary care provider
RUC	American Medical Association Relative Value Scale Update Committee
RVS	relative value scale
RVU	relative value unit
TIN	taxpayer identification number





# 1. Background

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The Centers for Medicare & Medicaid Services (CMS) and most private insurers currently provide a bundled payment to practitioners for most surgical procedures.<sup>6</sup> This bundled payment includes some pre-operative care, the procedure itself, and post-operative care within either 10 or 90 days after a surgical procedure. CMS spending on surgical procedures is sizable because procedures with 10- and 90-day global periods reflect nearly 10 percent of all Medicare fee-for-service (FFS) spending in 2019.<sup>7</sup>

Since CMS adopted the resource-based relative value scale (RVS) in 1992, it had not routinely collected data on how many post-operative visits are actually performed to inform the valuation of bundled payments for procedures. Instead, to inform the valuation of procedures with 10- and 90-day global periods, the American Medical Association (AMA) RVS Update Committee (RUC) surveys relevant 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 Terminology® (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.<sup>8</sup>

The primary mechanism used by the RUC to establish new or revised physician work RVUs is physician surveys conducted by specialty societies on behalf of the RUC. 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 procedures that are considered typical. 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 (AMA, undated; Wynn et al., 2015).

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 based in part on the survey responses. The number and type of visits are not used by

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<sup>6</sup> *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.

<sup>7</sup> Procedures with 10- and 90-day global periods reflected 2.4 percent and 7.1 percent, respectively, of all Medicare FFS spending in 2019. Percentages were generated using information from the 2021 Proposed Physician Fee Schedule.

<sup>8</sup> The RUC includes representation across the medical profession from physician and nonphysician specialty societies.

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.

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 could result in over- or underpayment 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 might not reflect the number of post-operative visits provided in clinical practice (HHS, Office of Inspector General, 2007; HHS, Office of Inspector General, 2012a; HHS, Office of Inspector General, 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 because of reporting burden and potential negative financial impact on patients (American Society of Plastic Surgeons, 2015; DiVenere, 2015; Ollapally, 2015),<sup>9</sup> Congress, as part of the Medicare Access and CHIP [Children's Health Insurance Program] 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 Medicare FFS beneficiaries beginning on July 1, 2017. Specifically, reporting of post-operative visits was required for practitioners who practice in groups with ten or more practitioners in nine randomly selected states (Florida, Kentucky, Louisiana, Nevada, New Jersey, North Dakota, Ohio, Oregon, and Rhode Island). Reporting was required for procedures with procedure codes that had a 10- or 90-day global period, procedures that were performed by more than 100 practitioners, and procedures that either were performed more than 10,000 times or had allowed charges greater than \$10 million (CMS, 2020a). These thresholds were chosen by CMS to decrease reporting burden and to focus data collection. The 299 HCPCS codes for which CMS required reporting of post-operative visits in 2017 included 96.5 percent of all procedures furnished with 10-day global periods and 85.3 percent of all procedures furnished with 90-day global periods. Because they correspond to

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<sup>9</sup> Beneficiaries would be responsible for copayments on each post-operative visit billed by practitioners if CMS transitioned all 10- and 90-day global periods to 0-day global periods.

higher-volume or more-costly procedures, the selected HCPCS codes represent 94.3 percent of allowed charges for all procedures with 10-day global periods and 72.3 percent of allowed charges for all procedures with 90-day global periods.<sup>10</sup> This reporting of post-operative visits is ongoing, with no specified end date.

This report provides results of claims-based reporting regarding the number of post-operative visits provided, using HCPCS code 99024, for procedures furnished in calendar year 2019. This report is structured as follows:

- 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 visits and report the share of procedures with any post-operative visits and the ratio of observed to expected post-operative visits.
- Chapter 8 provides results of sensitivity analyses conducted in response to concerns raised by the RUC, surgical specialty societies, and other organizations regarding the results and methods of the analyses presented in this report.
- Chapter 9 summarizes the results of this report, describes study limitations, and describes the policy implications of our findings.

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<sup>10</sup> In the nine-state sample, these HCPCS codes included 96.9 percent of all procedures with 10-day global periods furnished and 72.2 percent of all procedures with 90-day global periods furnished. These procedures represented 94.8 percent of allowed charges for all procedures with 10-day global periods and 72.8 percent of allowed charges for all procedures with 90-day global periods.

## 2. Data and Methods

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### Reporting Requirement from CMS

In November 2016, CMS announced that it would require 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 using HCPCS code 99024 (CMS, 2014b).<sup>11</sup> Initially, CMS selected 299 procedures for reporting, although the number of procedures requiring reporting declined to 291 in calendar year 2019 because of coding changes. These nine states were randomly selected after states were stratified 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, post-operative visits, or both.

### Data Sources

We used Medicare FFS 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 (DM); clinical research trial (00, 01); assisted at surgery (AS, 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.<sup>12</sup> We identified claims for post-operative visits that were associated with procedures with service dates between January 1, 2019, and December 31, 2019. Thus, we examined post-operative visits with service dates up to January 10, 2020, for procedures with 10-

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<sup>11</sup> The list of codes for which reporting is required is updated each year to address, for example, codes that are eliminated or codes that have been split into two different codes. There were 291 codes with reporting requirements during calendar year 2019.

<sup>12</sup> Unlike inpatient hospital care, for which the facility submits claims under Medicare Part A and the practitioner submits professional claims under Medicare Part B, ASC facilities and practitioners providing care at ASCs submit claims under Part B.

day global periods and up to March 31, 2020, for procedures with 90-day global periods.<sup>13</sup> The analyses in this report used available claims in the IDR as of October 14, 2020, or later.

We used the Physician Time File from the 2019 Physician Fee Schedule to obtain the number of expected post-operative visits for each procedure code (CMS, 2018). CMS bases the number of post-operative visits in part on the RUC physician surveys. CMS reports 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 291 procedures for which reporting was required in calendar year 2019, procedures with 10-day global periods have up to three expected post-operative visits and procedures with 90-day global periods have up to 15.5 visits.<sup>14</sup>

## Identifying Procedures for Which Reporting Is Expected

We analyzed procedures that met the following inclusion criteria: one of the procedure codes for which reporting was required; performed between January 1, 2019, and December 31, 2019, 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, 2017). 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, undated), 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 might 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-

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<sup>13</sup> The coronavirus disease 2019 (COVID-19) pandemic, which began in the United States in March 2020, could have resulted in fewer reported post-operative visits for 90-day global periods. However, the pandemic would primarily affect post-operative visits in the last two to three weeks of a 90-day global period for procedures furnished in late December 2019. For 90-day global periods furnished in 2019, more than 90 percent of reported post-operative visits occurred in the first 70 days after the procedure.

<sup>14</sup> Roughly 30 percent of the 291 procedure codes with 10- or 90-day global periods are assigned “half post-operative visits” during the RUC’s survey process. The RUC’s rationale for a half post-operative visit is that the work for discharging a beneficiary would not be the same as that for a full discharge visit. When practitioners report post-operative visits using HCPCS code 99024, they cannot indicate that they performed a half visit; they must report single visits.

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 they were in a practice that met these criteria. CMS used broad language to define *practice* in the context of the reporting requirement, defining it as “a group of practitioners whose business or financial operations, clinical facilities, records, or personnel are shared by two or more practitioners” (CMS, 2016). This definition of a practice includes “practitioners [that] practice in separate locations but are part of the same delivery system that shares business or financial operations, clinical facilities, records, or personnel.” It 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 January 1, 2019, might be included in these data multiple times.

Ideally, each post-operative visit would be linked to a specific procedure in the claims data. This indexing would make clear which visits relate to a procedure. However, Medicare did not require practitioners to indicate, when reporting visits, which procedure or procedures prompted the post-operative visit. Because beneficiaries might 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, the arm fracture, or both.

For analyses using post-operative visits linked to procedures, we limited our analysis to *clean procedures*—defined as billed procedures with one billed unit of service—that did not occur during the global period of another procedure with a 10- or 90-day global period.<sup>15</sup> This made it

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<sup>15</sup> In circumstances in which a subsequent procedure occurred during the global period of a first procedure (e.g., 15 days into a 90-day global period), we included the first procedure and dropped subsequent procedures. A post-operative visit solely dedicated to a subsequent procedure could be attributed to the first procedure. We chose this

easier to link a given procedure and post-operative visit. To allow readers to understand the generalizability of clean procedures, we compared the characteristics of procedures in four groups:

- **Clean procedures** are procedures with 10- or 90-day global periods that do not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service
- **Multiple procedures on the same day with global periods of the same length**
  - **Multiple procedures with 10-day global periods** share the same date of service only with other procedures with 10-day global periods and do not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service
  - **Multiple procedures with 90-day global periods** share the same date of service only with other procedures with 90-day global periods and do not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service
- **Multiple procedures on the same day with global periods of different lengths** share the same date of service with procedures that have global periods of different lengths and do not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service
- **Subsequent procedures on a different day occurring during the global period of a prior procedure** are procedures with 10- or 90-day global periods that occur within the global period but not on the same date of service as a prior procedure with a 10- or 90-day global period.

In the nine states where reporting of post-operative visits was required, 59.4 percent of procedures were clean procedures, 26.3 percent were multiple procedures on the same day with global periods of the same length, 1.3 percent were multiple procedures on the same day with global periods of different lengths, and 13.0 percent were subsequent procedures on a different day occurring within the global period of a prior procedure.<sup>16</sup> Although most procedures were clean procedures, if only a small percentage of procedures for a given code or group of codes is clean, then this may raise concerns about the generalizability of results that use only clean procedures. To ensure that the results of our analysis of clean procedures reflect all types of procedures, we examined the volume of these procedure categories by specialty, HCPCS codes, and HCPCS codes organized by CPT book headings in Appendix A. Across most high-volume specialties, HCPCS codes, and CPT book headings as measured by the number of procedures

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more-conservative approach because the potential bias would lead us to overestimate the observed to expected ratio. The impact of this potential bias is discussed in more detail in Appendix E.

<sup>16</sup> These percentages are restricted to procedures furnished between January 1, 2019, and December 31, 2019, for which reporting was required and exclude procedures on ASC facility records and procedures with HCPCS modifier codes, which may have unusual patterns of post-operative care as described above, but do not exclude procedures in small practices with fewer than ten practitioners, as we do with results presented in subsequent chapters of this report.

with 10- or 90-day global periods furnished that required reporting of post-operative visits, we found that the majority of procedures were clean procedures.

The exclusion of multiple procedures on the same day from the analyses in this report potentially produces an upward bias on the number of post-operative visits reported compared with the number of expected visits. For example, in some cases, a beneficiary who has two or more procedures on the same day may subsequently have singular visits for post-operative care related to some or all of those procedures.

In Appendix E, we performed a sensitivity analysis using an alternative definition of *clean procedures* that excludes any procedures with overlapping global periods. We report our main results using this alternative definition, including by practice size, by place of service of the procedure, and for the top 20 highest-volume specialties.

We included all post-operative visits performed by the practitioner who furnished the procedure, someone other than the practitioner who furnished the procedure from the same practice, and by practitioners in another practice. Medicare's global payment policy covers services provided by the practitioner furnishing the procedure and other practitioners in the same practice and specialty. Our linking approach did not consider provider or practice IDs. As a result, we linked some post-operative visits that may not qualify as a bundled post-operative visit under Medicare's global payment policy. Our approach is conservative in the sense that it gives the benefit of the doubt that all reported post-operative visits matching the beneficiary ID and date of service would have contributed to the global period.<sup>17</sup> Because we limited our analysis to clean procedures, we are more confident that all post-operative visits reported during the global period are correctly linked to their associated procedure. As we describe 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.

## Calculating Outcomes

Although practitioners were required to report post-operative visits, not all practitioners who furnished procedures may have had post-operative visits, and it is possible that others had post-operative visits but did not report them. To describe practitioners reporting post-operative visits, we calculated the percentage of practitioners who reported any post-operative visits among those expected to report overall and by practice size, place of service of the procedure, and specialty.

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<sup>17</sup> For procedures with 10-day global periods, 12.4 percent of post-operative visits were billed by a practitioner in a different practice (determined by TIN) than that of the practitioner who performed the original procedure, 20.7 percent were billed by a practitioner in the same practice as the practitioner who performed the original procedure, and 66.9 percent were provided by the practitioner who performed the original procedure. For procedures with 90-day global periods, 5.8 percent of post-operative visits were billed by a practitioner in a different practice than that of the practitioner who performed the original procedure, 29.3 percent were billed by a practitioner in the same practice as the practitioner who performed the original procedure, and 65.0 percent were provided by the practitioner who performed the original procedure.



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. We also calculated the observed to expected ratio of post-operative visits delivered by dividing the total number of observed post-operative claims by the total number of expected post-operative visits. This ratio explains how many post-operative visits are actually delivered across all procedures for which reporting was required.

Our estimates of observed to expected ratios of post-operative visits might be too high for some procedures. Roughly 30 percent of the 291 procedure codes with 10- or 90-day global periods are assigned “half post-operative visits” (i.e., 0.5 visits) during the CMS valuation process. The *half visit* is often a discharge visit for procedures performed primarily in hospital outpatient departments. In this case, the half 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 a half visit in the denominator. However, when physicians report on post-operative visits using HCPCS code 99024, they cannot indicate that they performed a half visit; they must report single visits. Therefore, our estimate of the proportion of expected post-operative visits provided may actually be an overestimate, although, in a sensitivity analysis, we found only a minimal difference when we excluded half visits from the denominator.

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 their 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 that was 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 (American College of Surgeons, undated; CMS and Medicare Learning Network, 2017; Society of Thoracic Surgeons, 2017), it is possible that some practitioners may be unaware that they were required to report post-operative visits. This would lead to an underestimate of the observed to expected ratio. Because of concerns around 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 both

- performed ten or more clean procedures with 90-day global periods beginning January 1, 2019
- 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 and among practitioners who billed ten or more procedures with 90-day global periods (i.e., *high-volume practitioners*, defined as practitioners who performed ten or more procedures with 90-day global periods regardless of whether they reported any post-operative visits). Robust reporters are a subset of high-volume practitioners.

## Identifying Other Services and Procedures Occurring During Global Periods

As mentioned previously, post-operative visits might not be reported using HCPCS code 99024 after 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 are being reported using codes other than HCPCS code 99024, such as other evaluation and management (E&M) service codes (which are billed and reimbursed separately from the bundled global package), 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. In addition, we 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 rather than the total number of visits to prevent double-counting of visits.

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 procedures. We began by including only procedures performed by the same practitioner who furnished the original procedure.<sup>18</sup> We then counted the aforementioned E&M visits plus the procedures occurring during global periods provided by any practitioner in the same practice with the same specialty as the practitioner who furnished the procedure. We did not examine these expanded definitions of post-operative visits using practitioners of a different specialty or in a different practice from that of the practitioner who furnished the procedure with the 10- or 90-day global period because of the concern that those visits would be for care that was unrelated to the procedure.

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<sup>18</sup> As described previously, we exclude procedures that occur within the global period of another procedure with a 10- or 90-day global period when we identify clean procedures. Therefore, these other procedures are those without a global period.

### 3. Examining the Number of Post-Operative Visits Reported

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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

Although this report is focused on claims-based reporting of post-operative visits for procedures furnished during calendar year 2019, in this chapter, we present weekly counts of reported post-operative visits dating back to January 1, 2017, to convey trends in visits, including how visits have stabilized over time. We calculated weekly counts of claim lines for post-operative visits reported using HCPCS code 99024 from January 1, 2017, to December 31, 2019,<sup>19</sup> for the nine states required to report post-operative visits. Although there is no Medicare payment associated with code 99024, CMS allowed practitioners to report post-operative visits using HCPCS code 99024 starting on January 1, 2017, 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.

#### Results

Claims-based reporting of post-operative visits increased during 2017 and, in particular, after the start of required reporting on 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. The volume of post-operative visits increased throughout 2017 and through January 2018 to a peak of nearly 55,000 visits, before declining and reaching a plateau at approximately 40,000 to 45,000 visits per week by mid-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 procedures with 10- or 90-day global periods were lowest in Nevada, followed by Florida and New Jersey, and highest in North Dakota, followed by Ohio, Kentucky, and Oregon. The weekly counts of post-operative visits per 10,000 procedures with 10- or 90-day global periods were approximately four times greater in North Dakota than in Nevada. Although there was wide

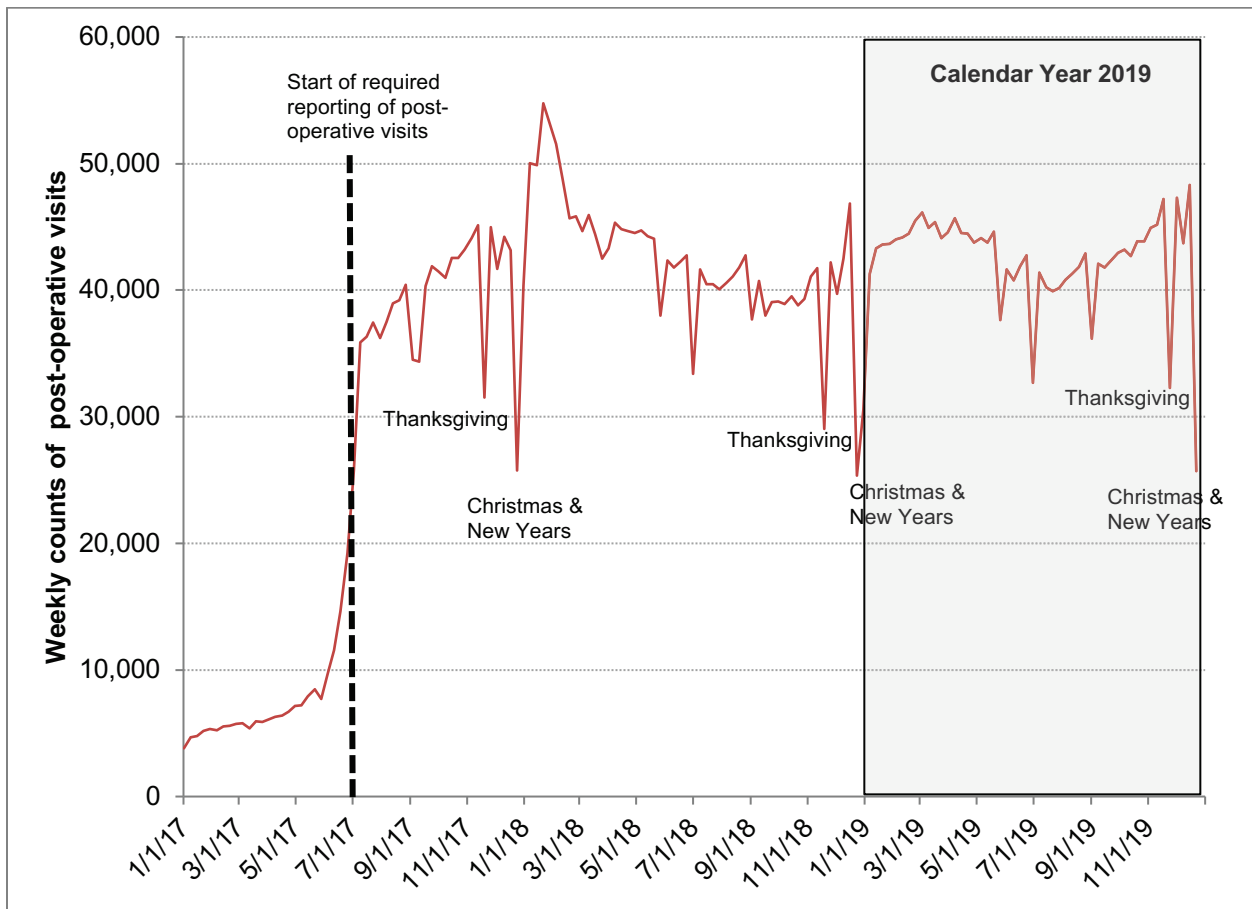
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<sup>19</sup> Unlike other analyses presented in this report, the analyses in this chapter are limited to post-operative visits reported through December 31, 2019. We do this so as not to suggest a decline in reporting of post-operative visits during the period after December 31, 2019, when we stop including procedures in our study sample.

variation in the weekly counts of post-operative visits per 10,000 procedures, there was less variation in the percentage of practitioners reporting at least one post-operative visit across the nine states (data presented in Chapter 4). It is not clear which specific factors influence this variation.

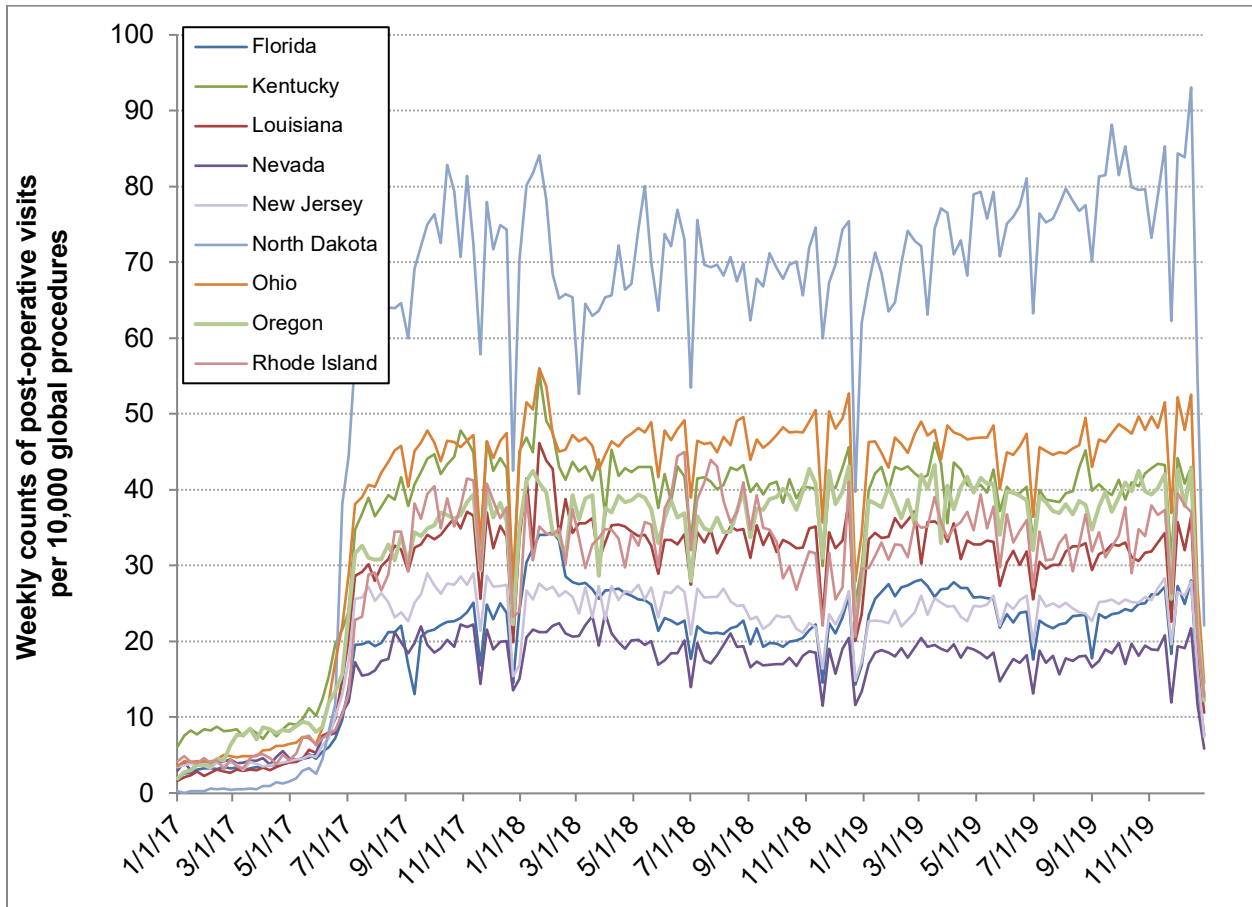
Table 3.1 presents the settings where post-operative visits were furnished between January 1, 2019, and December 31, 2019. During this required reporting period, the majority of post-operative visits reported were furnished in the office setting.

**Figure 3.1. Weekly Counts of Post-Operative Visits Among States Required to Report Post-Operative Visits, Calendar Years 2017, 2018, and 2019**



SOURCE: Data from CMS IDR, downloaded on October 14, 2020.  
 NOTE: The claims for HCPCS code 99024 listed in this figure occurred, were reported, and were uploaded from January 1, 2017, through December 31, 2019.

**Figure 3.2. Weekly Counts of Post-Operative Visits per 10,000 Claims for Global Procedures, Calendar Years 2017, 2018, and 2019**



SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 listed in this figure occurred, were reported, and were uploaded between January 1, 2017, and (including) December 31, 2019, in the nine states with mandatory reporting.

**Table 3.1. Reported Post-Operative Visits for Calendar Year 2019 Procedures, by Place of Service**

Place of Service of Post-Operative Visit	Nine States with Required Reporting <sup>a</sup>	
	Number of Post-Operative Visits	Percentage
Office	1,572,900	71.3
Outpatient hospital	153,898	7.0
Off-campus hospital outpatient	77,741	3.5
Emergency or urgent care	3,037	0.1
Ambulatory surgical center	328	0.0
Inpatient	395,102	17.9
Other	1,958	0.1

SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTES: The claims for HCPCS code 99024 listed in this table occurred, were reported, and were uploaded between January 1, 2019, and (including) December 31, 2019, in the nine states with mandatory reporting. *Other* includes federally qualified health centers, rural health clinics, and retail clinics.

<sup>a</sup> The nine states that required reporting of post-operative visits were Florida, Kentucky, Louisiana, Nevada, New Jersey, North Dakota, Ohio, Oregon, and Rhode Island.

## Conclusions

After the July 1, 2017, implementation of required reporting, the volume of post-operative visit reporting increased in the nine states where reporting is required, and the number of post-operative visits was relatively stable between mid-2018 and December 2019. There was wide variation in the counts of post-operative visits per 10,000 procedures across states required to report post-operative visits, although it is unclear which specific factors drive these differences.

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

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In Chapter 3, 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. Although practitioners were required to report post-operative visits, not all practitioners who furnished procedures may have performed post-operative visits, and it is possible that others performed post-operative visits but did not report them. In this chapter, we describe the share of practices and practitioners reporting code 99024 overall among those who performed any procedures with 10- or 90-day global periods and for subgroups of practice size, specialty, and state. These results help inform the level of reporting engagement across different types of practitioners.

### Methods Overview

In this section, 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 January 1, 2019, and December 31, 2019, for a Medicare FFS beneficiary; and performed by an expected reporter. We examined post-operative visits between January 1, 2019, and December 31, 2019. We included post-operative visits up to January 10, 2020, if they were linked to a procedure with a 10-day global period and up to March 31, 2020, if they were 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 specialty, state, and practice size.

### Results

During 2019, 47.1 percent of 42,097 practitioners who were expected to report post-operative visits reported one or more post-operative visits using HCPCS code 99024.<sup>20</sup> Practitioners who did not report any post-operative visits across their procedures were typically in specialties that perform relatively few procedures, such as primary care. For select procedure-based specialties,<sup>21</sup> 91.1 percent of 8,312 practitioners reported one or more post-operative visits. Practitioners who

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<sup>20</sup> Expected reporters include practitioners who furnished one of the procedure codes for which CMS requires reporting and performed the procedure in one of the nine states in a practice with ten or more practitioners between January 1, 2019, and December 31, 2019.

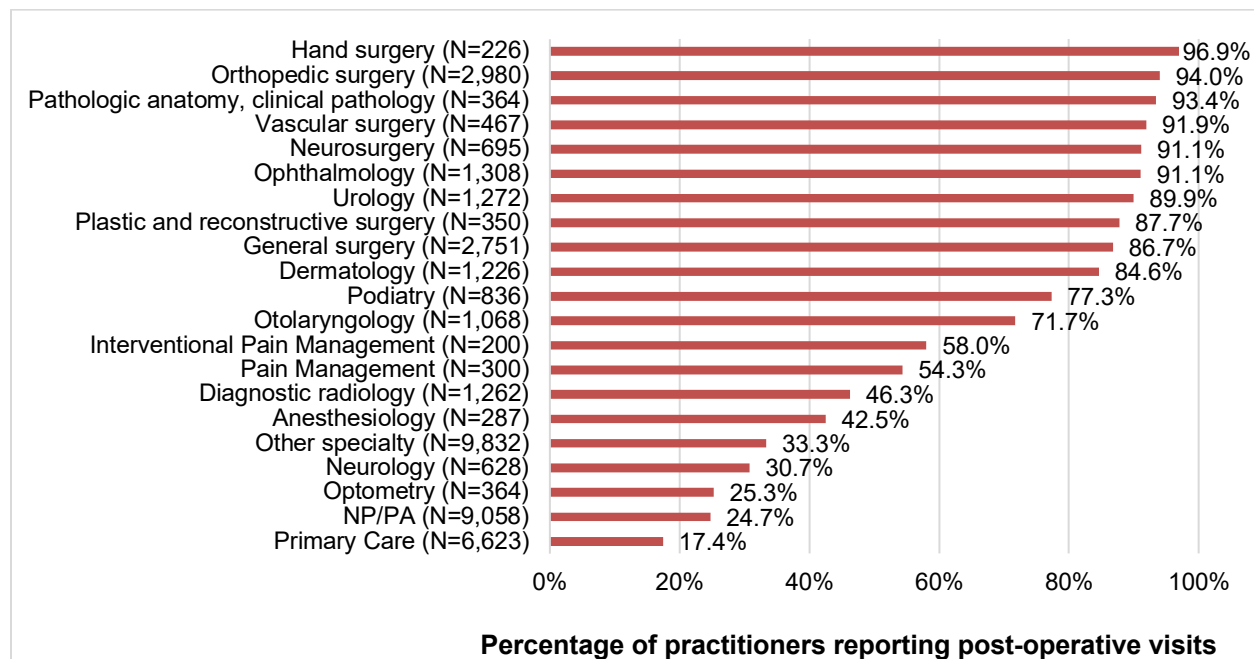
<sup>21</sup> Select procedure-based specialties include orthopedic surgery, vascular surgery, ophthalmology, plastic and reconstructive surgery, neurosurgery, urology, and dermatology.



reported at least one post-operative visit performed 95.7 percent of all procedures requiring reporting.

Figure 4.1 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 83.5 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. Nurse practitioners (NPs) and physician assistants (PAs) (9,058 NPIs) and primary care providers (PCPs) (6,623 NPIs) had the most practitioners expected to report, although, on average, they each performed relatively few procedures compared with practitioners in other specialties. Twenty-five percent or less of NPs/PAs and PCPs, as well as optometrists, reported post-operative visits. For ten of the specialties furnishing the most procedures with global periods, more than 80 percent of practitioners reported post-operative visits.

**Figure 4.1. Share of Practitioners Reporting Post-Operative Visits for Calendar Year 2019  
Procedures, by Specialty**



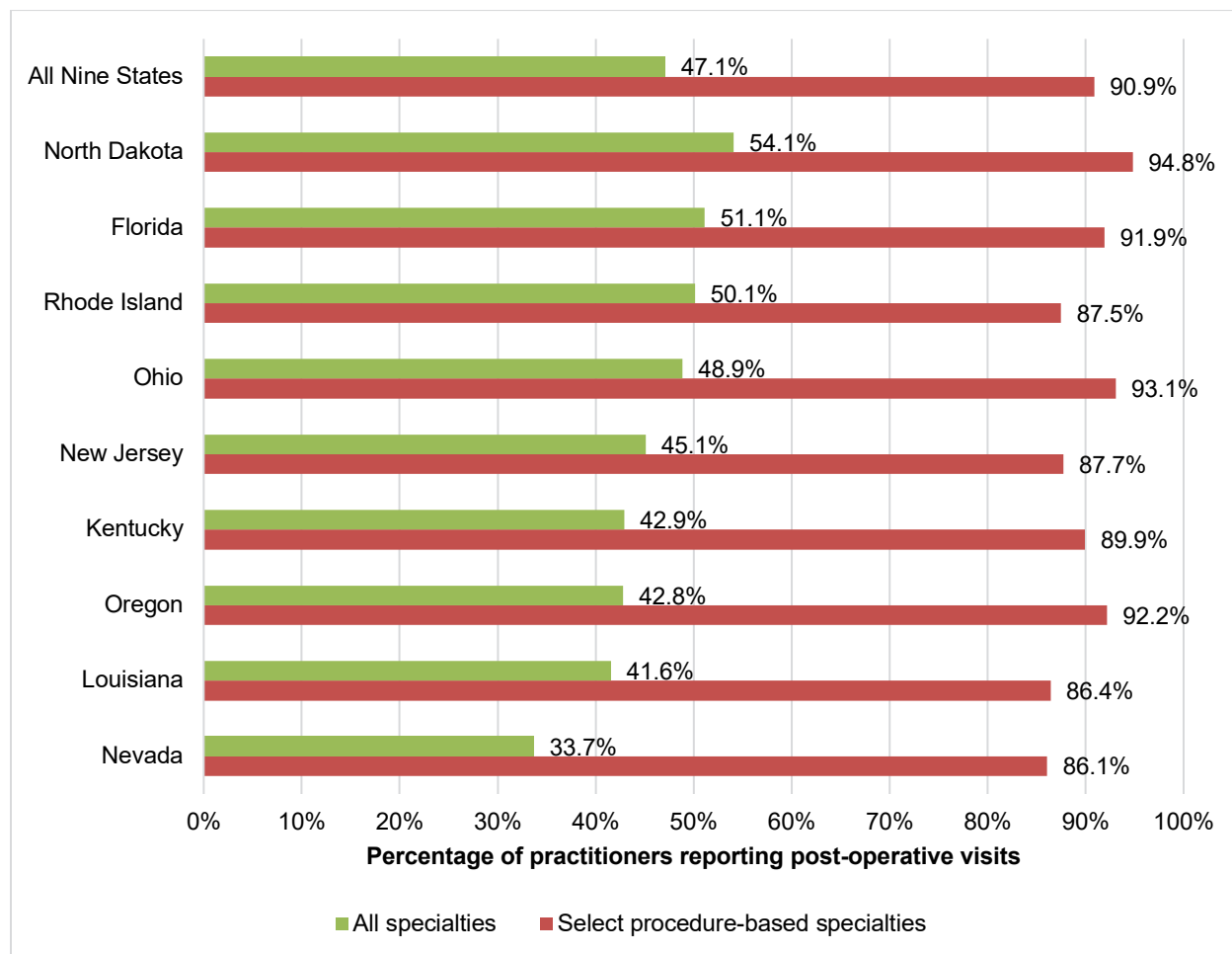
SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 were reported and uploaded from January 1, 2019, through December 31, 2019. We also included 99024-coded claims up to January 10, 2020, if they were linked to a procedure with a 10-day global period and up to March 31, 2020, if they were linked to a procedure with a 90-day global period. The number of expected reporters is listed in parentheses following the specialty name.

The share of practitioners reporting post-operative visits varied by state (Figure 4.2). The highest share of practitioners reporting post-operative visits among expected reporters was observed in North Dakota (54.1 percent). The lowest rate of practitioners reporting post-operative visits among expected reporters was observed in Nevada (33.7 percent). Similarly,

when we examine select procedure-based specialties, the highest share of practitioners reporting post-operative visits among expected reporters was observed in North Dakota (94.8 percent) and the lowest rate was observed in Nevada (86.1 percent).

**Figure 4.2. Share of Practitioners Reporting Post-Operative Visits (HCPCS Code 99024) for Calendar Year 2019 Procedures, by State**

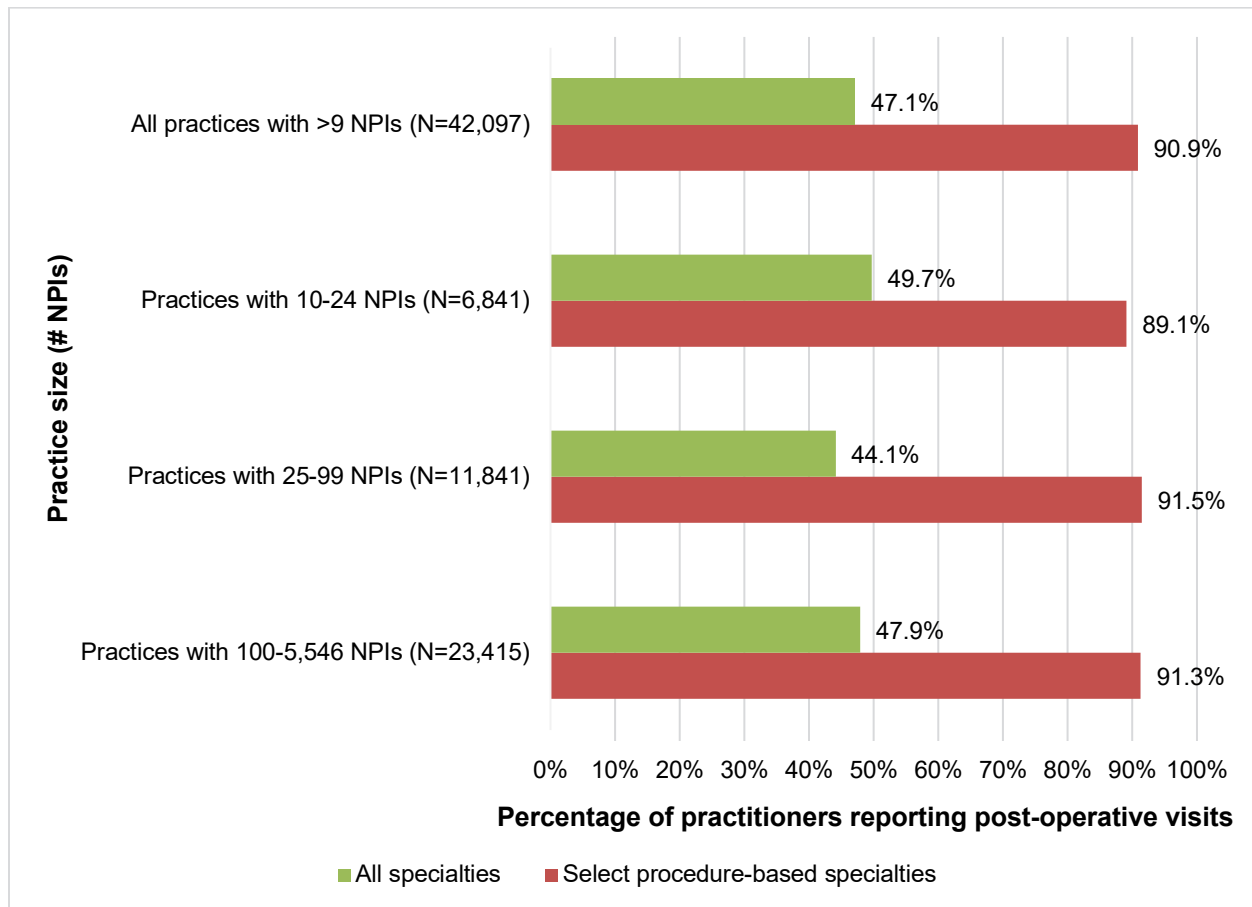


SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 were reported and uploaded from January 1, 2019, through December 31, 2019. We also included 99024-coded claims up to January 10, 2020, if they were linked to a procedure with a 10-day global period, and up to March 31, 2020, if they were linked to a procedure with a 90-day global period. Select procedure-based specialties include orthopedic surgery, vascular surgery, ophthalmology, plastic and reconstructive surgery, neurosurgery, urology, and dermatology.

In Figure 4.3, we describe the share of practitioners reporting post-operative visits following calendar year 2019 procedures 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). The share of practitioners reporting post-operative visits for select procedure-based specialties was higher compared with the share for practitioners from all specialties, at approximately 90 percent across all practice sizes.

**Figure 4.3. Share of Practitioners Reporting Post-Operative Visits for Calendar Year 2019 Procedures, by Practice Size**



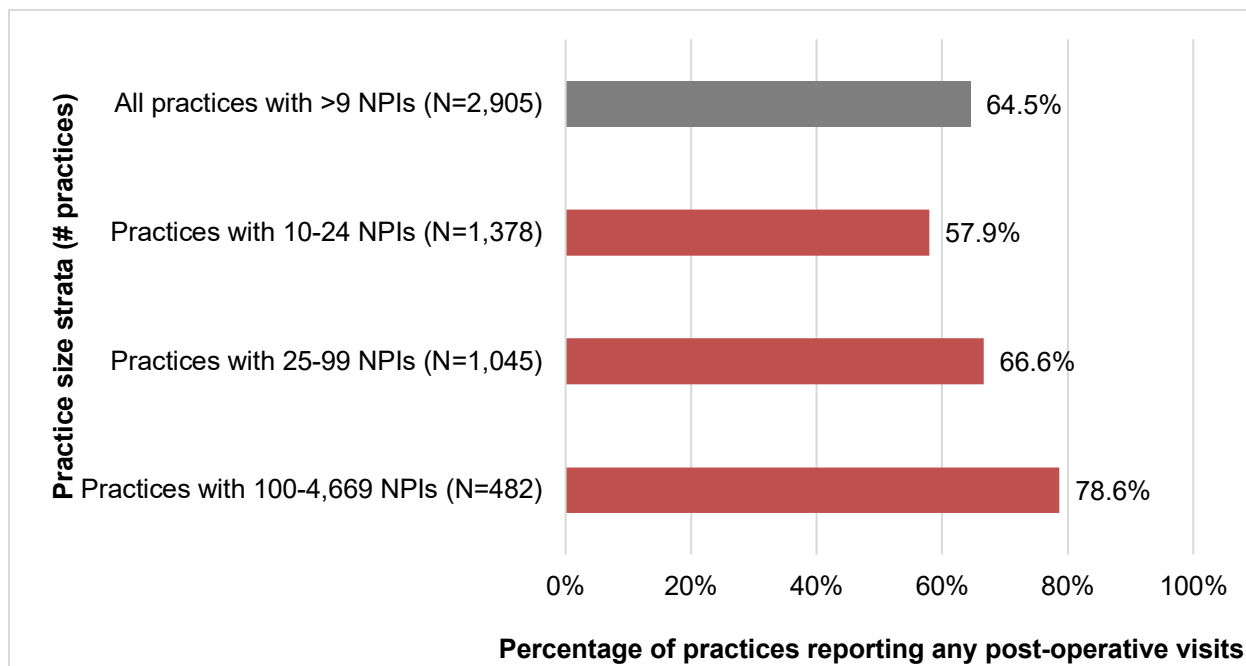
SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 were reported and uploaded from January 1, 2019, through December 31, 2019. We also included 99024-coded claims up to January 10, 2020, if they were linked to a procedure with a 10-day global period, and up to March 31, 2020, if they were linked to a procedure with a 90-day global period. Select procedure-based specialties include orthopedic surgery, vascular surgery, ophthalmology, plastic and reconstructive surgery, neurosurgery, urology, and dermatology.

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 2,905 practices. About 64.5 percent of these practices had one or more practitioners report a post-operative visit during the study period (Figure 4.4). The largest practices were most likely to report post-operative visits. Among practices with 100 or more practitioners, 78.6 percent of practices reported at least one post-operative visit since January 1, 2019. Smaller practices were less likely to report post-operative visits (10–24 practitioners, 57.9 percent; 25–99 practitioners, 66.6 percent). This variation by practice size might not be surprising given that larger practices have more practitioners and therefore more people who can report at least one post-operative visit. Because practices might consist of

practitioners from multiple specialties, we do not show results for select procedure-based specialties at the practice level.

**Figure 4.4. Share of Practices Reporting Post-Operative Visits (HCPCS Code 99024) for Calendar Year 2019 Procedures, by Practice Size**



SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 were reported and uploaded between January 1, 2019, and (including) December 31, 2019. We also included 99024-coded claims up to January 10, 2020, if they were linked to a procedure with a 10-day global period, and up to March 31, 2020, if they were linked to a procedure with a 90-day global period.

## Conclusions

Although the share of practitioners who reported at least one post-operative visit was about 50 percent, more than 90 percent of practitioners in select procedure-based specialties reported one or more post-operative visits. When examining post-operative visits among expected reporters, we found that more than 60 percent of practitioners in most specialties reported at least one visit; however, 25 percent or fewer practitioners reported post-operative visits among optometrists, NPs and PAs, and PCPs. The share of post-operative visit reporting by expected reporters varied by state and specialty.

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

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In this chapter, we report the percentage of procedures with at least one post-operative visit and the ratio of observed to expected post-operative visits. The former provides further information about the types of practitioners engaging in reporting post-operative visits based on the volume of procedures delivered by practitioners, including by practice size, setting of procedures, and specialty. The latter explains how many post-operative visits are actually delivered across all procedures for which reporting is required and most directly informs the valuation of procedures.

This analysis 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 does not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service. This approach allowed us to more easily link a given procedure and post-operative visit.

### Methods Overview

We analyzed clean procedures that met the following inclusion criteria: one of the procedure codes for which reporting was required; performed between January 1, 2019, and December 31, 2019, for a Medicare FFS beneficiary; and performed by an expected reporter. During the study period, there were 1,547,182 clean procedures linked to 933,049 post-operative visits in our study sample.<sup>22</sup> (See Appendix A for a comparison of the volume and characteristics of clean procedures with those of non-clean procedures.) 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 based on the mix of procedures performed. 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.

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<sup>22</sup> For procedures with 10-day global periods, 12.4 percent of post-operative visits were billed by a practitioner in a different practice (determined by TIN). For procedures with 90-day global periods, 5.8 percent of post-operative visits were billed by a practitioner in a different practice.

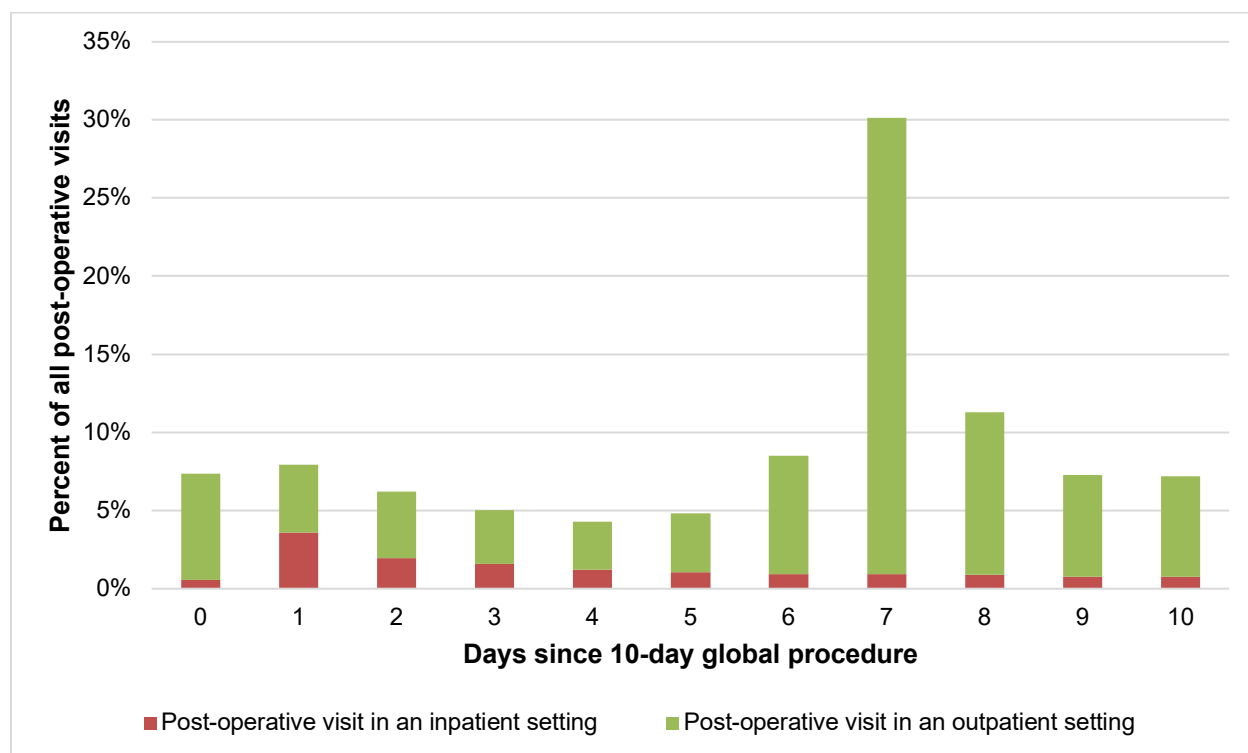
## Results for Procedures with 10-Day Global Periods

Among the procedures for which reporting was required, 59.5 percent of procedures with 10-day global periods met our criteria for a clean procedure. Among procedures with 10-day global periods, 82.2 percent were performed in an office setting. Across specialties, dermatologists performed 47.3 percent of procedures with 10-day global periods and NPs and PAs performed 26.3 percent.

### *Timing of Post-Operative Visits*

Of the post-operative visits reported for 10-day global procedures, 74.3 percent were performed in the first seven days after the procedure. The largest percentage of post-operative visits occurred on day seven of the global period (30.1 percent) (Figure 5.1).

**Figure 5.1. Distribution of Post-Operative Visits Across Days in the Global Period, Calendar Year 2019 Procedures with 10-Day Global Periods**



SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 included in this figure were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Post-operative visits 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.

### *Share of Procedures with Any Post-Operative Visits*

Overall, 3.5 percent of procedures with 10-day global periods had one or more post-operative visits (Table 5.1). Among procedures with 10-day global periods, the percentage with post-operative visits was similar across practice size (10–24 NPIs, 3.0 percent; 25–99 NPIs, 3.5 percent; 100 or more NPIs, 3.9 percent). When we examined the place of service of the procedure, the share of 10-day global procedures with any post-operative visits was greatest in the inpatient setting (10.6 percent). Among specialties performing more than 10,000 procedures with 10-day global periods, the highest percentage of procedures with post-operative visits was observed for the following specialties: general surgery (18.5 percent), otolaryngology (7.9 percent), and ophthalmology (7.4 percent).

### *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 (Table 5.2). The number of expected post-operative visits (in Table 5.2) exceeds the number of procedures (in Table 5.1) with 10-day global periods because some procedures have more than one expected post-operative visit. Ratios of observed to expected post-operative visits were similar across practice sizes for procedures with 10-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 share (less than 10 percent) of procedures with a 10-day global period were performed in inpatient 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 (0.10), and ophthalmology (0.08). Interventional pain management, NP and PA, and pain management had an observed to expected ratio of post-operative visits of just 0.02.

Table 5.3 lists the ratios of observed to expected post-operative visits provided for the ten highest-volume procedures with 10-day global periods during 2019. The three most-frequent procedures were dermatological procedures that account for 66.3 percent of all procedures with 10-day global periods.<sup>23</sup> The volume of these three procedures (699,517) exceeds the number of procedures performed by dermatologists (510,258) and suggests that NPs and PAs, who performed 26.3 percent of procedures with 10-day global periods, were likely to have furnished a large share of these three procedures. The ratio for the top four procedures was 0.01, while the fifth through tenth highest-volume procedures had ratios between 0.03 and 0.29. There was wide variation in these proportions across all procedures with 10-day global periods (Appendix C).

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<sup>23</sup> In Chapter 8, we provide results excluding dermatological procedures because of the concern that their high volume could bias the overall results. Excluding these procedures had minimal impact on the ratio of observed to expected post-operative visits provided for procedures with 10-day global periods.

**Table 5.1. Share of Calendar Year 2019 Procedures with 10-Day Global Periods with Any Post-Operative Visits**

	Procedures with 10-Day Global Periods		
	Total Procedures	Total Procedures with Any Post-Operative Visits	Share of Procedures with Any Post-Operative Visits (%)
Total	1,078,108	37,434	3.5
Practice size			
10–24 practitioners	382,371	11,513	3.0
25–99 practitioners	351,336	12,459	3.5
100 or more practitioners	344,401	13,462	3.9
Procedure place of service			
Ambulatory surgical center	28,633	2,246	7.8
Emergency or urgent care	21,979	930	4.2
Inpatient	25,656	2,712	10.6
Off-campus hospital outpatient	30,689	905	2.9
Office	886,124	25,903	2.9
Outpatient hospital	70,648	4,719	6.7
Other	14,379	19	0.1
Specialty <sup>a</sup>			
Anesthesiology	9,229	204	2.2
Dermatology	510,258	15,783	3.1
Diagnostic radiology	23,996	601	2.5
General surgery	22,298	4,117	18.5
Hand surgery	283	90	31.8
Interventional pain management	13,660	278	2.0
Neurology	19,319	130	0.7
Neurosurgery	2,356	542	23.0
NP/PA	283,985	3,786	1.3
Ophthalmology	34,558	2,567	7.4
Optometry	2,921	68	2.3
Orthopedic surgery	3,948	762	19.3
Otolaryngology	10,932	866	7.9
Pain management	16,387	415	2.5
Pathologic anatomy, clinical pathology	12	3	25.0
Plastic and reconstructive surgery	4,418	1,009	22.8
Podiatry	25,726	1,454	5.7
Primary care	38,713	1,609	4.2
Urology	2,439	650	26.7
Vascular surgery	5,289	572	10.8
All other specialties	47,381	1,928	4.1

SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTES: The claims for HCPCS code 99024 claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. 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.

<sup>a</sup> Lists the top 20 specialties by procedure volume.



**Table 5.2. Ratios of Observed to Expected Post-Operative Visits Provided for Calendar Year 2019  
Procedures with 10-Day Global Periods**

	Procedures with 10-Day Global Periods		
	Total Expected Post-Operative Visits	Total Reported Post-Operative Visits	Ratio of Observed to Expected Visits
Total	1,121,254	45,107	0.04
Practice size			
10–24 practitioners	396,096	13,022	0.03
25–99 practitioners	370,138	14,755	0.04
100 or more practitioners	355,020	17,330	0.05
Procedure place of service			
Ambulatory surgical center	39,962	2,503	0.06
Emergency or urgent care	28,887	1,372	0.05
Inpatient	36,572	5,657	0.15
Off-campus hospital outpatient	30,250	1,018	0.03
Office	886,123	29,000	0.03
Outpatient hospital	84,896	5,535	0.07
Other	14,565	22	0.00
Specialty <sup>a</sup>			
Anesthesiology	12,863	227	0.02
Dermatology	510,972	17,118	0.03
Diagnostic radiology	34,498	1,162	0.03
General surgery	28,688	5,817	0.20
Hand surgery	315	120	0.38
Interventional pain management	19,180	301	0.02
Neurology	3,697	139	0.04
Neurosurgery	3,463	716	0.21
NP/PA	287,103	4,677	0.02
Ophthalmology	37,935	2,897	0.08
Optometry	2,973	77	0.03
Orthopedic surgery	5,414	1,015	0.19
Otolaryngology	9,711	965	0.10
Pain management	23,362	448	0.02
Pathologic anatomy, clinical pathology	14	4	0.29
Plastic and reconstructive surgery	4,446	1,152	0.26
Podiatry	27,000	1,676	0.06
Primary care	40,046	2,137	0.05
Urology	2,509	756	0.30
Vascular surgery	7,762	890	0.11
All other specialties	59,307	2,813	0.05

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTES: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. 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 2019 Physician Time File.

<sup>a</sup> Lists top 20 specialties by volume between January 1, 2019, and December 31, 2019.

**Table 5.3. Highest-Volume Calendar Year 2019 Procedures with 10-Day Global Periods in Study Sample**

<b>HCPCS Code</b>	<b>Description</b>	<b>Procedure Volume</b>	<b>Share of All Clean Procedures with 10-Day Global Periods (%)</b>	<b>Total Expected Visits per Procedure</b>	<b>Observed to Expected Ratios of Post-Operative Visits</b>
17000	Destruction of premalignant lesions, first lesion	501,590	47.6	1	0.01
17110	Destruction of benign lesions other than skin tags or cutaneous vascular proliferative lesions, up to 14 lesions	130,138	12.3	1	0.01
17004	Destruction of premalignant lesions, 15 or more lesions	67,789	6.4	1	0.01
64635	Destruction by neurolytic agent, paravertebral facet joint nerve(s), with imaging guidance; lumbar or sacral, single facet joint	34,579	3.3	1.5	0.01
10060	Incision and drainage of abscess, simple or single	26,075	2.5	1	0.14
13132	Repair of wound (2.6 to 7.5 centimeters) of forehead, cheeks, chin, mouth, neck, underarms, genitals, hands, and/or feet	23,756	2.3	1	0.29
17262	Destruction of malignant growth (1.1 to 2.0 centimeters) of trunk, arms, or legs	16,294	1.5	1	0.03
36561	Insertion of central venous catheter and implanted device for infusion beneath the skin, patient 5 years or older	14,615	1.4	1.5	0.04
36558	Insertion of central venous catheter for infusion, patient 5 years or older	13,095	1.2	1.5	0.06
10061	Drainage of multiple abscess	12,394	1.2	2	0.11

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTE: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. 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 2019 Physician Time File. A list of all procedures with global periods and their observed to expected ratio of post-operative visits is available in Appendix C.

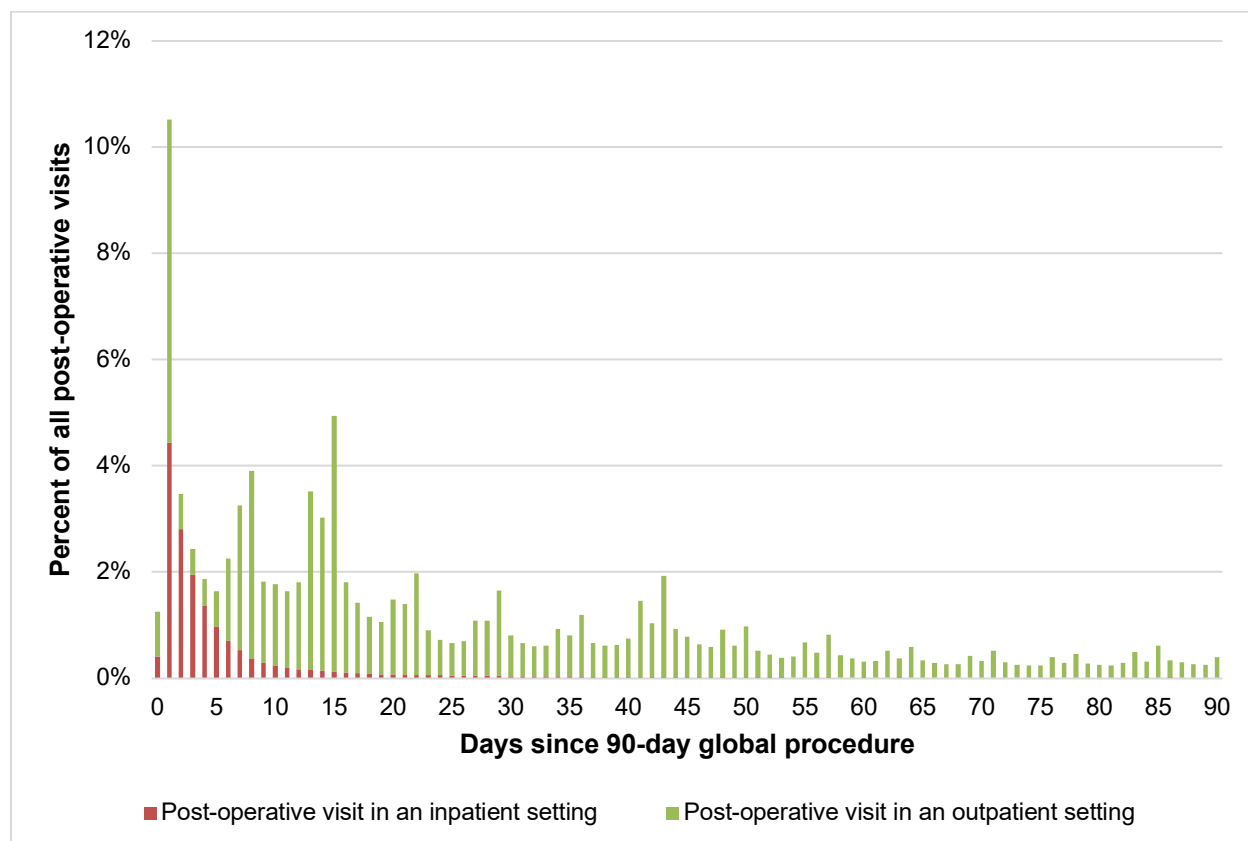
## Results for Procedures with 90-Day Global Periods

Among the procedures for which reporting was required, 59.3 percent of procedures with 90-day global periods met our criteria for a clean procedure. Among procedures with 90-day global periods, 34.5 percent were performed in an inpatient setting. Across specialties, orthopedic surgeons performed 32.7 percent of procedures with 90-day global periods, and ophthalmologists performed 25.6 percent.

### *Timing of Post-Operative Visits*

Of the post-operative visits reported for 90-day global procedures, 26.7 percent were performed in the first seven days after the procedure. Of the post-operative visits reported for 90-day global procedures, the largest percentage occurred on day one of the global period (10.5 percent) (Figure 5.2).

**Figure 5.2. Distribution of Post-Operative Visits Across Days in the Global Period, Calendar Year 2019 Procedures with 90-Day Global Periods**



SOURCE: Data are from CMS-IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 included in this figure were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Post-operative visits 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.

### *Share of Procedures with Any Post-Operative Visits*

Overall, 70.0 percent of procedures with 90-day global periods had one or more post-operative visits (Table 5.4). Reporting of post-operative visits differed by practice size for procedures with 90-day global periods, with percentages of 59.1 percent for practices with 10–24 NPIs, 73.7 percent for practices with 25–99 NPIs, and 74.4 percent for practices with 100 or more NPIs. Among procedures with 90-day global periods, reporting of post-operative visits was greatest among procedures furnished in inpatient (74.0 percent) and off-campus hospital outpatient settings (82.0 percent). Among specialties performing more than 10,000 procedures with 90-day global periods, the highest reporting rates were observed for the following specialties: hand surgery (78.3 percent), orthopedic surgery (76.9 percent), general surgery (74.3 percent), and neurosurgery (73.9 percent).

### *Ratios of Observed to Expected Post-Operative Visits Provided*

The ratio of observed to expected post-operative visits provided was 0.38 for procedures with 90-day global periods (Table 5.5). Ratios of observed to expected post-operative visits were similar across practice sizes for procedures with 90-day global periods. 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 (0.57) was higher than other settings. Among specialties performing more than 10,000 procedures with 90-day global periods, the highest ratios were observed for ophthalmology (0.53), general surgery (0.43), and urology (0.41). Dermatology (0.20) had the lowest ratio among specialties performing more than 10,000 procedures. Table 5.6 lists the ratios of observed to expected post-operative visits provided for the ten highest-volume procedures with 90-day global periods during our study period. There was wide variation in these proportions across the relevant procedure codes (Appendix C).

**Table 5.4. Share of Calendar Year 2019 Procedures with 90-Day Global Periods with Any Post-Operative Visits**

	Procedures with 90-Day Global Periods		
	Total Procedures	Total Procedures with Any Post-Operative Visits	Share of Procedures with Any Post-Operative Visits (%)
Total	469,074	328,502	70.0
Practice size			
10–24 practitioners	128,186	75,753	59.1
25–99 practitioners	129,214	95,211	73.7
100 or more practitioners	211,674	157,538	74.4
Procedure place of service			
Ambulatory surgical center	109,692	76,381	69.6
Emergency or urgent care	1,063	520	48.9
Inpatient	161,759	119,749	74.0
Off-campus hospital outpatient	9,965	8,174	82.0
Office	55,789	29,727	53.3
Outpatient hospital	130,769	93,937	71.8
Other	37	14	37.8
Specialty <sup>a</sup>			
Anesthesiology	32	17	53.1
Dermatology	18,202	8,980	49.3
Diagnostic radiology	49	11	22.4
General surgery	52,966	39,349	74.3
Hand surgery	11,058	8,657	78.3
Interventional pain management	4	2	50.0
Neurology	158	128	81.0
Neurosurgery	14,549	10,751	73.9
NP/PA	3,826	2,493	65.2
Ophthalmology	119,946	81,736	68.1
Optometry	1,093	595	54.4
Orthopedic surgery	153,446	118,055	76.9
Otolaryngology	4,185	2,701	64.5
Pain management	41	19	46.3
Pathologic anatomy, clinical pathology	15,509	7,685	49.6
Plastic and reconstructive surgery	4,605	2,673	58.0
Podiatry	4,858	3,044	62.7
Primary care	1,303	708	54.3
Urology	16,766	10,491	62.6
Vascular surgery	12,118	7,897	65.2
All other specialties	34,360	22,510	65.5

SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTES: The claims for HCPCS code 99024 included in this figure were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Post-operative visits 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.

<sup>a</sup> Lists the top 20 specialties by volume between January 1, 2019, and December 31, 2019.

**Table 5.5. Ratios of Observed to Expected Post-Operative Visits Provided for Calendar Year 2019  
Procedures with 90-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	2,330,916	887,942	0.38
Practice size			
10–24 practitioners	575,786	200,117	0.35
25–99 practitioners	677,198	249,615	0.37
100 or more practitioners	1,077,933	438,210	0.41
Procedure place of service			
Ambulatory surgical center	432,549	210,520	0.49
Emergency or urgent care	5,099	1,699	0.33
Inpatient	1,139,959	385,488	0.34
Off-campus hospital outpatient	37,698	21,501	0.57
Office	193,423	55,816	0.29
Outpatient hospital	522,017	212,896	0.41
Other	172	22	0.13
Specialty <sup>a</sup>			
Anesthesiology	131	34	0.26
Dermatology	78,489	15,650	0.20
Diagnostic radiology	165	19	0.12
General surgery	227,327	96,718	0.43
Hand surgery	46,283	18,254	0.39
Interventional pain management	20	5	0.26
Neurology	1,087	444	0.41
Neurosurgery	100,313	29,626	0.30
NP/PA	15,088	6,002	0.40
Ophthalmology	457,594	241,327	0.53
Optometry	2,189	751	0.34
Orthopedic surgery	1,008,521	318,773	0.32
Otolaryngology	17,547	5,447	0.31
Pain management	303	29	0.10
Pathologic anatomy, clinical pathology	40,939	14,823	0.36
Plastic and reconstructive surgery	19,863	5,915	0.30
Podiatry	18,591	10,004	0.54
Primary care	4,924	1,856	0.38
Urology	52,499	21,482	0.41
Vascular surgery	55,770	19,943	0.36
All other specialties	183,279	80,840	0.44

SOURCE: Data are from CMS-IDR, downloaded on October 14, 2020.

NOTES: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. 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 2019 Physician Time File.

<sup>a</sup> Lists top 20 specialties by volume between January 1, 2019, and December 31, 2019.

**Table 5.6. Highest-Volume Calendar Year 2019 Procedures with 90-Day Global Periods in Study Sample**

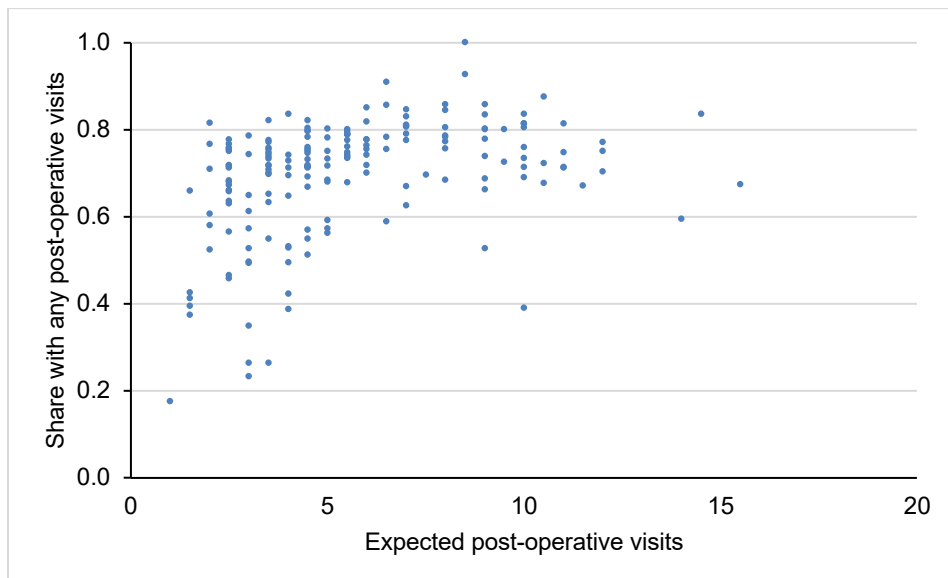
<b>HCPCS Code</b>	<b>Description</b>	<b>Procedure Volume</b>	<b>Share of All Clean Procedures with 90-Day Global Periods (%)</b>	<b>Total Expected Visits per Procedure</b>	<b>Observed to Expected Ratios of Post-Operative Visits</b>
66984	Extracapsular cataract removal with insertion of intraocular lens prosthesis, manual or mechanical technique	61,325	13.1	4.5	0.60
27447	Total knee arthroplasty	41,769	8.9	7	0.32
66821	Discission of secondary membranous cataract; stab incision technique; laser surgery	35,613	7.6	2	0.34
27130	Total hip arthroplasty, with or without autograft or allograft	24,544	5.2	7	0.30
33208	Insertion of new or replacement of permanent pacemaker with transvenous electrode(s); atrial and ventricular	13,545	2.9	3	0.36
27245	Surgical treatment of broken thigh bone	12,306	2.6	9	0.25
47562	Removal of gallbladder using an endoscope	12,017	2.6	3.5	0.37
64721	Release and/or relocation of median nerve of hand	9,604	2.0	3.5	0.39
33533	Heart artery bypass to repair one artery	8,276	1.8	8	0.51
27236	Open treatment of broken thigh bone with insertion of hardware or prosthetic replacement	8,158	1.7	8	0.27

SOURCE: Data are from CMS-IDR, downloaded on October 14, 2020.

NOTE: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. 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 2019 Physician Time File. A list of all procedures with global periods and their observed to expected ratios of post-operative visits is available in Appendix C.

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 = 0.38). 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 = -0.37). 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 Calendar Year 2019 Procedures with 90-Day Global Periods**

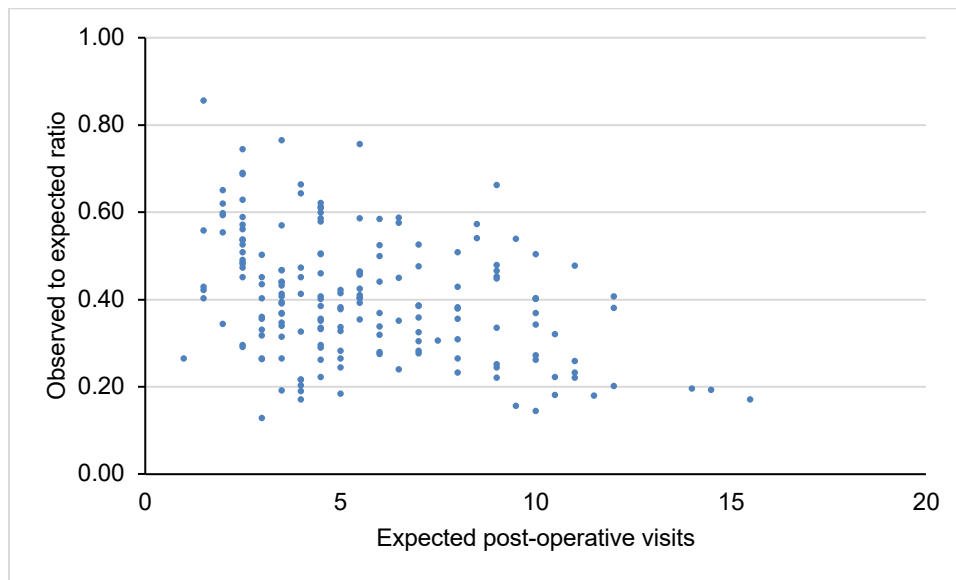


SOURCE: Data are from CMS-IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 that are included in these figures were linked to procedures that were furnished from January 1, 2019, through December 31, 2019.



**Figure 5.4. Relationship Between the Ratio of Observed to Expected Post-Operative Visits and the Number of Expected Post-Operative Visits for Calendar Year 2019 Procedures with 90-Day Global Periods**



SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 that are included in these figures were linked to procedures that were furnished from January 1, 2019, through December 31, 2019.

## Conclusions

There were 1,078,108 clean procedures with 10-day global periods. Of post-operative visits reported for 10-day global procedures, 74.3 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. The ratio of observed to expected post-operative visits provided for procedures with 10-day global periods was only 0.04.

For procedures with 90-day global periods, there were 469,074 clean procedures. Of post-operative visits reported for 90-day global procedures, 26.7 percent were performed in the first seven days after the procedure. Seventy percent had an associated post-operative visit. Among specialties performing more than 10,000 procedures, procedures with a 90-day global period performed by hand surgeons, orthopedic surgeons, general surgeons, and neurosurgeons were most likely to have a post-operative visit. Fewer post-operative visits were reported than the expected number of visits listed in the 2019 Physician Time File. The ratio of observed to expected post-operative visits provided for procedures with 90-day global periods was only 0.38.

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

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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 the concern that potential underreporting of claims for post-operative visits is 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 robust reporters 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 since January 1, 2019. 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. Although we selected robust reporters on the basis of reporting post-operative visits for procedures with 90-day global periods, specialties that perform procedures with 10-day global periods are well represented in this group of practitioners.

We also assessed patterns of care among robust reporters with other practitioners who also billed ten or more clean procedures with 90-day global periods regardless of whether they reported any post-operative visits; we refer to these practitioners as *high-volume practitioners*. Robust reporters are therefore a subset of high-volume practitioners. We report 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, 15.8 percent were classified as robust reporters and 20.7 percent were classified as high-volume practitioners. Appendix B provides details about the characteristics of procedures furnished by these practitioners.

### *Share of Procedures with Any Post-Operative Visits*

The share of procedures delivered by robust reporters having one or more post-operative visits for procedures with 90-day global periods was 87.8 percent, which was higher than the share among all expected reporters (70.0 percent), while high-volume practitioners (70.4 percent) had a similar share compared with all expected reporters (Table 6.1). For procedures with 10-day global periods, robust reporters (15.7 percent) and high-volume practitioners (11.0 percent) had a higher but still small share of procedures with any post-operative visits than all expected reporters (3.5 percent).

The share of procedures with any post-operative visits was 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 ( $N = 68,701$ ), of which 16.1 percent of procedures had any post-operative visits. Orthopedic surgeons performed the most procedures with 90-day global periods among robust reporters ( $N = 124,646$ ), of which 90.8 percent of procedures had any post-operative visits. Procedures were similarly distributed across specialties for high-volume practitioners.

For all but a few low-volume procedures with 10- or 90-day global periods, the share of procedures delivered by robust reporters having one or more post-operative visits was higher than the share among all expected reporters. For high-volume practitioners, the share of procedures delivered by robust reporters having one or more post-operative visits was higher than the share among all expected reporters for approximately two-thirds of procedures.

### *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 practitioners for both procedures with 10-day global periods (0.17 versus 0.12) and procedures with 90-day global periods (0.47 versus 0.38) (Table 6.2). For procedures with 10-day global periods, ratios for robust reporters and high-volume practitioners were higher than the ratio among all expected reporters (0.04). For procedures with 90-day global periods, robust reporters (0.47) had a higher ratio than the ratio among all expected reporters (0.38), but the ratio was the same for high-volume practitioners (0.38) and all expected reporters (0.38). Dermatologists performed the most procedures with 10-day global periods among robust reporters ( $N = 68,701$ ) and had a ratio of 0.17. Orthopedic surgeons performed the most procedures with 90-day global periods among robust reporters ( $N = 124,646$ ) and had a ratio of 0.38.

**Table 6.1. Share of Calendar Year 2019 Procedures with Any Post-Operative Visits**

	High-Volume Practitioners <sup>a</sup>		Robust Reporters <sup>b</sup>	
	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	11.0	70.4	15.7	87.8
Practice size				
10–24 practitioners	9.4	59.5	14.4	86.1
25–99 practitioners	11.4	74.3	15.9	88.5
100 or more practitioners	12.6	74.8	17.1	88.1
Procedure place of service				
Ambulatory surgical center	18.8	69.8	24.2	90.2
Emergency or urgent care	24.6	64.7	33.7	79.7
Inpatient	22.6	74.4	28.5	89.5
Off-campus hospital outpatient	9.1	82.1	14.1	87.8
Office	9.6	53.4	14.1	76.2
Outpatient hospital	15.1	72.4	18.9	87.8
Other	0.4	44.0	0.4	72.7
Specialty <sup>c</sup>				
Anesthesiology	N/A	84.6	N/A	84.6
Dermatology	10.1	49.5	16.1	81.5
Diagnostic radiology	0.0	36.4	N/A	N/A
General surgery	18.7	74.9	21.8	87.0
Hand surgery	31.9	78.4	41.1	91.8
Interventional pain management	N/A	N/A	N/A	N/A
Neurology	20.0	81.5	25.0	93.0
Neurosurgery	23.5	74.1	26.1	89.9
NP/PA	6.0	66.8	11.9	86.2
Ophthalmology	7.6	68.2	9.4	86.2
Optometry	5.0	57.1	5.8	82.8
Orthopedic surgery	22.0	77.1	27.1	90.8
Otolaryngology	15.5	66.8	15.8	87.2
Pain management	8.3	21.4	N/A	N/A
Pathologic anatomy, clinical pathology	27.3	49.7	37.5	76.5
Plastic and reconstructive surgery	20.7	59.2	29.5	82.2
Podiatry	6.7	54.8	7.2	86.3
Primary care	10.2	62.1	10.6	83.6
Urology	26.2	62.5	34.6	80.3
Vascular surgery	11.0	65.1	14.8	84.2
All other specialties	12.8	66.5	15.4	87.9

SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

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 January 1, 2019, through December 31, 2019.

<sup>a</sup> *High-volume practitioners* includes practitioners who performed 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 January 1, 2019, and December 31, 2019.

<sup>b</sup> *Robust reporters* includes practitioners who performed 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 January 1, 2019, and December 31, 2019; and reported at least one claim for a post-operative visit for at least 50 percent of procedures performed during the study period.

<sup>c</sup> Lists the top 20 specialties by volume between January 1, 2019, and December 31, 2019.

**Table 6.2. Ratio of Observed to Expected Post-Operative Visits Provided for Calendar Year 2019 Procedures**

	High-Volume Practitioners <sup>a</sup>		Robust Reporters <sup>b</sup>	
	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	0.38	0.17	0.47
Practice size				
10–24 practitioners	0.10	0.35	0.15	0.51
25–99 practitioners	0.12	0.37	0.17	0.44
100 or more practitioners	0.14	0.41	0.19	0.48
Procedure place of service				
Ambulatory surgical center	0.17	0.49	0.21	0.64
Emergency or urgent care	0.34	0.39	0.45	0.49
Inpatient	0.31	0.34	0.39	0.40
Off-campus hospital outpatient	0.10	0.57	0.15	0.61
Office	0.10	0.29	0.15	0.42
Outpatient hospital	0.14	0.41	0.17	0.49
Other	0.00	0.13	0.00	0.27
Specialty <sup>c</sup>				
Anesthesiology	N/A	0.54	N/A	0.54
Dermatology	0.11	0.20	0.17	0.33
Diagnostic radiology	0.00	0.16	N/A	N/A
General surgery	0.20	0.43	0.23	0.50
Hand surgery	0.38	0.39	0.49	0.46
Interventional pain management	N/A	N/A	N/A	N/A
Neurology	0.13	0.40	0.17	0.47
Neurosurgery	0.21	0.30	0.23	0.37
NP/PA	0.07	0.40	0.14	0.52
Ophthalmology	0.08	0.53	0.10	0.67
Optometry	0.06	0.36	0.06	0.52
Orthopedic surgery	0.22	0.32	0.27	0.38
Otolaryngology	0.17	0.31	0.18	0.40
Pain management	0.06	0.04	N/A	N/A
Pathologic anatomy, clinical pathology	0.32	0.36	0.42	0.57
Plastic and reconstructive surgery	0.24	0.40	0.34	0.58
Podiatry	0.07	0.27	0.08	0.44
Primary care	0.12	0.54	0.13	0.72
Urology	0.29	0.40	0.38	0.53
Vascular surgery	0.12	0.36	0.16	0.46
All other specialties	0.16	0.45	0.19	0.56

SOURCE: Data from CMS IDR, downloaded on October 14, 2020.

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 between January 1, 2019, and (including) December 31, 2019.

<sup>a</sup> *High-volume practitioners* includes practitioners who performed 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 January 1, 2019, and December 31, 2019.

<sup>b</sup> *Robust reporters* includes practitioners who performed 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 January 1, 2019, and December 31, 2019; and reported at least one claim for a post-operative visit for at least 50 percent of procedures performed during the study period.

<sup>c</sup> Lists the top 20 specialties by volume between January 1, 2019, and December 31, 2019.

## Conclusions

To address concerns about underreporting of post-operative visits, we conducted a sensitivity analysis limited to robust reporters, who were practitioners actively reporting their post-operative visits. Reporting of post-operative visits was modestly higher for robust reporters compared with all expected 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- and 90-day global periods. We found a similar pattern when comparing high-volume practitioners, regardless of whether they were actively reporting post-operative visits, with all expected reporters. It is possible that the patterns of care observed among robust reporters may not be generalizable to the broader population of practitioners required to report post-operative visits. For instance, 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

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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 are provided during E&M visits (raising concern about duplicative payment) 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 January 1, 2019, and December 31, 2019, 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 from January 1, 2019, through December 31, 2019.

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

1. **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.
2. **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 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 single procedures.
3. **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 earlier 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.*<sup>24</sup>

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 to prevent double-counting of services. 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 1,547,182 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 percentage of 10-day global procedures with any post-operative visits (4.3 percent versus 3.5 percent) compared with the results from our usual study sample. There was also a small increase in the observed to expected post-operative visit ratio (0.05 versus 0.04). For 90-day global periods, there was an increase in the share of procedures with any post-operative visits (72.1 percent versus 70.0 percent) and an increase in the ratio of observed to expected post-operative visits compared with our study sample (0.40 versus 0.38).

### *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 an increase in the percentage of 10-day global procedures with any post-operative visits (6.0 percent versus 3.5 percent) and 90-day global procedures with any post-operative visits (76.9 percent versus 70.0 percent). For procedures with 10- and 90-day global periods, there was an 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 0.38).

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<sup>24</sup> NPs and PAs were not included; we could not distinguish their clinical focus, because such information is not typically available on Medicare claims.



*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, 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*, but these increases were not large enough to reject our main result that most expected post-operative visits are not occurring. Compared with the results from our usual study sample, we found a small increase in the percentage of 10-day global procedures with any post-operative visits (6.5 percent versus 3.5 percent) and 90-day global procedures with any post-operative visits (77.5 percent versus 70.0 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 = 0.44 versus 0.38).

Given the low rate for reporting of post-operative visits when using the expanded definition of post-operative visits, we examined whether post-operative visits may be occurring after global periods end (Appendix D). We examined whether including post-operative visits (reported only with HCPCS code 99024) provided during the first five days after the end of global periods would substantively affect our results and also examined the timing of post-operative visits during the first 15 days after the end of global periods. We found that some post-operative visits occurred after the end of global periods, particularly for procedures with 10-day global periods; however, they did not occur frequently enough to have a substantive effect on our results.

**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, Calendar Year 2019 Procedures**

	Procedures with 10-Day Global Periods (N = 1,043,039)		Procedures with 90-Day Global Periods (N = 477,085)	
	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 <sup>a</sup>	3.5	0.04	70.0	0.38
Adding E&M visits, other than those coded with 99024, provided by the practitioner who furnished the original procedure <sup>b,c</sup>	4.3	0.05	72.1	0.40
Adding E&M visits, other than those coded with 99024, and procedures provided by the practitioner who furnished the original procedure <sup>d</sup>	6.0	0.07	76.9	0.43
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 <sup>e</sup>	6.5	0.07	77.5	0.44

SOURCE: Data are from CMS-IDR, downloaded on October 20, 2020.

<sup>a</sup> Includes procedures that met the following inclusion criteria: one of the clean procedure codes; performed between January 1, 2019, and December 31, 2019, 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.

<sup>b</sup> Includes procedures in the study sample, post-operative visits occurring during the global periods, and 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 coded with HCPCS code 99024, even if multiple visits 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 an HCPCS code 99024, then we counted only the 99024 code(s).

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

<sup>d</sup> Follows the same inclusion criteria as described in notes *b* and *c*, 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 procedures.

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

## 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. Although both the share of procedures with any post-operative visits and the ratio of observed to

expected post-operative visits were slightly higher in this sensitivity analysis, the patterns are similar to what we observed in the main analysis.

## 8. Additional Sensitivity Analyses

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In July 2019, the RAND Corporation published a report summarizing patterns of post-operative visits for procedures furnished during the first 12 months of required reporting of post-operative visits from July 1, 2017, through June 30, 2018 (Kranz et al., 2019). A second report included the same analyses, updated using source data from procedures with calendar year 2018 service dates (Crespin et al., 2021). CMS invited comments on the first report in the calendar year 2020 Physician Fee Schedule Proposed Rule, and several organizations criticized the findings. RAND published a response to those comments that included sensitivity analyses supporting the findings of the report (Mulcahy, Mehrotra, et al., 2019). In this chapter, we provide updated results from several of these sensitivity analyses for which calendar year 2019 data could further inform findings. These new results are similar to the results published in RAND's response report and support the methods and findings presented in this report.

### Responses

#### *Concerns That the Results Are Outdated*

CMS revalued several procedures in the calendar year 2020 Physician Fee Schedule Final Rules. These recent revaluations were not included in our analyses, because we used the Physician Time File from the calendar year 2019 final rule. Therefore, the observed to expected ratios for post-operative visits presented in this report could be over- or underestimates compared with results using the updated valuations, depending on the direction of the change. In response, we conducted a sensitivity analysis using the same observed number of post-operative visits but using the number of expected visits from the 2020 Physician Time File. We find that there is no change in the ratio of observed to expected visits for 10-day procedures and only a slight increase for 90-day procedures (Table 8.1).

**Table 8.1. Sensitivity Analysis of the Observed to Expected Ratio for Post-Operative Visits Using the 2020 Physician Time File, Calendar Year 2019 Procedures**

<b>Specific Analysis</b>	<b>10-Day Ratio of Observed to Expected Visits</b>	<b>90-Day Ratio of Observed to Expected Visits</b>
Results reported using 2019 Physician Time File valuations for all procedures	0.04	0.38
Sensitivity analysis using 2020 Physician Time File valuations for all procedures	0.04	0.40

SOURCE: Data are from CMS-IDR, downloaded on October 14, 2020.

NOTE: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. 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.

### *Concerns About Potential Underreporting of Visits*

Some practitioners simply might not have been aware of the requirement to report post-operative visits using code 99024. In addition, some suggested that because code 99024 is a no-payment code, health care facilities and billing companies might have rejected the code, causing it not to be reported to CMS. However, we found that a large percentage of practitioners in procedure-based specialties did report post-operative visits (Table 8.2) and that the overall low reporting rate (47.1 percent when including all practitioners) was driven largely by specialties that perform relatively few procedures per practitioner but make up a large percentage of all eligible practitioners.

**Table 8.2. Share of Practitioners Reporting Post-Operative Visits for Calendar Year 2019 Procedures, Select Procedure-Based Specialties**

<b>Specialty</b>	<b>Percentage Reporting</b>
Orthopedic surgery (N = 2,980)	94.0
Vascular surgery (N = 467)	91.9
Neurosurgery (N = 695)	91.1
Ophthalmology (N = 1,308)	91.1
Urology (N = 1,272)	89.9
Plastic and reconstructive surgery (N = 350)	87.7
Dermatology (N = 1,226)	84.6

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 were reported and uploaded from January 1, 2019, through December 31, 2019. We also included 99024-coded claims up to January 10, 2020, if they were linked to a procedure with a 10-day global period and up to March 31, 2020, if they were linked to a procedure with a 90-day global period. The number of expected reporters is listed in parentheses following the specialty name.

To further address concerns about underreporting, we conducted a sensitivity analysis in which we excluded *never reporters*, or practitioners who performed ten or more 90-day procedures and did not report any post-operative visits for 90-day procedures. If our main results are largely influenced by never reporters, then our results may not be representative of practitioners who were aware of the reporting requirement. We did not include 10-day procedures in the determination of never reporters, because only a small share of procedures with 10-day global periods had any post-operative visits. These practitioners might not have been aware of the reporting requirement or might have had colleagues perform their post-operative care. Consistent with other sensitivity analyses conducted in this report, we focus on high-volume practitioners. Less than 20 percent of high-volume practitioners were never reporters. In addition, the observed to expected post-operative visit ratios were similar between all high-volume practitioners and high-volume practitioners when excluding never reporters (Table 8.3). These results do not support the idea that there was no awareness of the reporting requirement.

**Table 8.3. Sensitivity Analysis Among High-Volume Practitioners Versus Never Reporters, Calendar Year 2019 Procedures**

<b>Practitioners</b>	<b>10-Day Ratio of Observed to Expected Visits</b>	<b>90-Day Ratio of Observed to Expected Visits</b>
All high-volume practitioners	0.12	0.38
High-volume practitioners excluding never reporters	0.13	0.39

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTE: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. 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 for the claims-based report are from the 2019 Physician Time File. *High-volume practitioners* are practitioners who performed ten or more procedures with a 90-day global period during the first 12 months of reporting. *Never reporters* are high-volume practitioners who never submitted a code 99024 visit during these 12 months.

### *Concerns About the Methodology for Addressing Half Visits*

For many procedures, the number of expected post-operative visits valuation includes a half (i.e., 0.5) post-operative visit. Our understanding is that half visits are often used for discharges that typically are done in the outpatient facility setting and indicate that the amount of work required is half of the work required for a discharge from an inpatient setting. However, practitioners cannot report a half visit and therefore may either report no visit or a whole visit. Several commenters expressed concern regarding the inclusion of half visits in the denominator of observed to expected post-operative visit ratios. However, when we excluded all half visits from the denominator of the observed to expected post-operative visit ratio, we found that the ratio for 10-day procedures remained the same and the ratio for 90-day procedures increased

only slightly (Table 8.4). These differences were minimal, in part because half visits account for only 5 percent of aggregate expected post-operative visits for procedures with 10-day global periods and 4 percent of aggregate expected post-operative visits for procedures with 90-day global periods. This suggests that the inclusion of expected half visits only minimally affects our results.

**Table 8.4. Sensitivity Analysis of Observed to Expected Ratios for Post-Operative Visits Including and Excluding Half Visits, Calendar Year 2019 Procedures**

<b>Specific Analysis</b>	<b>10-Day Ratio of Observed to Expected Visits</b>	<b>90-Day Ratio of Observed to Expected Visits</b>
Main analysis results	0.04	0.38
Results excluding half visits from expected visits	0.04	0.40

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTE: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. 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 for the claims-based report are from the 2019 Physician Time File.

### *Concerns That a Small Number of Codes Drove the Findings*

Three dermatology procedures with 10-day global periods (17000, 17004, and 17110) account for 65 percent of all 10-day visits reported. These procedures may largely influence our 10-day global findings. To address this concern, we conducted a sensitivity analysis in which we excluded these three codes and all other dermatological codes with a global period (Table 8.5). Although we find that both the 10-day and 90-day ratio of observed to expected post-operative visits increased slightly when excluding these procedures, the overall pattern remains similar, suggesting that these codes are not driving our findings.

**Table 8.5. Sensitivity Analysis Excluding Dermatology Codes with a Global Period, Calendar Year 2019 Procedures**

<b>Specific Analysis</b>	<b>10-Day Ratio of Observed to Expected Visits</b>	<b>90-Day Ratio of Observed to Expected Visits</b>
Main analysis results	0.04	0.38
Sensitivity analysis excluding all dermatological procedures with a global period (codes that are in the 10021–19499 range)	0.05	0.39

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTE: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. 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 for the claims-based report are from the 2019 Physician Time File.

## Conclusions

Several organizations expressed concern regarding the methodology used in this report in an invited response to earlier reports. We conducted several sensitivity analyses, presented in this chapter, that support our findings that most expected post-operative visits did not occur. In particular, our results do not support the idea that there was no awareness of the reporting requirement.



## 9. Conclusions

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### 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 the 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 Medicare FFS beneficiaries. We found that, during calendar year 2019, few procedures with 10-day global periods had 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 0.38. Two prior reports provided results for procedures furnished during (1) the first 12 months of reporting, from July 1, 2017, to June 30, 2018 (Kranz et al., 2019); and (2) calendar year 2018 (Crespin et al., 2021). The main results in this report and the prior reports are largely similar.

The extent to which low rates of post-operative visits represent visits that were not provided or visits that were provided—but in the context of another service or procedure and not reported using HCPCS code 99024—is not definitive. Despite communication from CMS and specialty societies (American College of Surgeons, undated; CMS and Medicare Learning Network, 2017; Society of Thoracic Surgeons, 2017), some practitioners may be unaware of this reporting requirement. This could help explain why practitioners in some specialties who 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 are reported using codes other than code 99024 (such as E&M visit codes) or included with appointments for subsequent procedures. Even when 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 our analysis of practitioners who were actively reporting their post-operative visits, this suggests that the low ratio of observed to expected visits is primarily because of substantially fewer post-operative visits being delivered.

We also examined whether using an alternative definition of clean procedures would affect our results. Under an alternative definition that excluded any procedures with overlapping global periods, we did not find substantive differences in our results. The results from both the primary definition used in the main results of this report and the alternative definition support our major finding that practitioners are providing substantively fewer post-operative visits for procedures with 10- or 90-day global periods than expected.

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. The RAND Corporation developed and implemented a practitioner survey to collect information on the level of post-operative visits for three procedures—cataract surgery, hip arthroplasty, and complex wound repair (Gidengil et al., 2019). We found that the reported physician time and work for cataract surgery and hip replacement post-operative visits were generally similar—although slightly lower—than the levels that CMS used when valuing these procedures. Reported physician time and work for complex wound repair post-operative visits were higher than the levels that CMS used when valuing these procedures.

## Policy Implications

The disconnect between the number of post-operative visits used in the valuation process and those observed in our data implies that there is potential overvaluation of at least some of these procedures. In this section, we describe, at a broad level, what we recommend CMS consider in response to these findings. In a separate report (Mulcahy, Liu, et al., 2019), we described several strategies for revaluation, quantified the findings' potential impact, and examined the strengths and weaknesses of strategies for revaluation.

As stated in the following sections, policies to revalue procedures with global periods could distinctly differ for procedures with 10-day global periods and those with 90-day global periods, especially given that expected post-operative visits were most likely to occur for procedures with 90-day global periods. For example, revaluing all procedures to 0-day global periods could have greater cost-sharing implications for beneficiaries undergoing procedures with 90-day global periods because they are likely to receive at least some post-operative care. If CMS were to employ separate revaluing approaches for procedures with 10- and 90-day global periods, then they should consider how these changes would differentially affect practitioners across specialties. For instance, the majority of procedures with 10-day global periods that required reporting were dermatological procedures.

### *Revalue 10-Day Global Procedures as 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 an overvaluation of procedures with 10-day global periods. CMS should consider revaluing 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 standard E&M codes. However, CMS previously announced plans to transition all 10- 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 (American Society of Plastic Surgeons, 2015; CMS, 2014b; DiVenere, 2015; Ollapally, 2015).<sup>25</sup> 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 the accuracy of payment and potentially revalue misvalued procedure codes. CMS could revisit the idea of revaluing some procedures with global periods to 0-day global periods. 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 small (or negative) valuations. Procedures with little (or negative) work remaining after revaluation could be flagged as potentially misvalued codes and addressed by the RUC.

### *Revalue Procedures with 90-Day Global Periods Using the Number of Post-Operative Visits Reported*

Using the information on post-operative visits collected in nine states from July 1, 2017, through December 31, 2019, CMS could consider revaluing procedures with 90-day global periods for which post-operative visit data are available. This approach builds on the patterns of care observed. RAND researchers have explored using a “reverse building block approach” to revalue procedures by adjusting work RVUs, physician time, and direct expenses based on the difference between the number of post-operative visits observed via claims-based reporting and the expected number of post-operative visits (Mulcahy, Liu, et al., 2019). This approach resulted in large total RVU reductions among proceduralist specialties and small increases for some other specialties. The greatest reductions in payment would be to specialties that perform a large number of procedures with 90-day global periods. CMS could phase in these reductions over several years to ease the transition to valuations that are consistent with the number of post-operative visits reported in the claims. Procedures with little (or negative) work remaining after revaluation could be flagged as potentially misvalued codes and addressed by the RUC. In future

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<sup>25</sup> Beneficiaries would be responsible for copayments on each post-operative visit billed by practitioners if CMS transitioned all 10- and 90-day global periods to 0-day global periods.

work, we will continue to explore several different strategies for using these data to revalue procedures.

### *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 on 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 RVUs). Instead, they are used to facilitate discussion around the appropriate valuation for the procedure overall.

If CMS decided to not revalue global procedures to 0-day global procedures or revalue procedures based on reported post-operative visits, then one strategy to address the potential overvaluation of global surgical packages would be to add procedures with substantial differences between expected and reported post-operative visit counts to CMS's list of potentially misvalued services. This may prompt the RUC and specialty societies to conduct new surveys for select procedures that appear to be misvalued based on reported post-operative visits and to provide CMS with recommendations for updated valuations. It is possible that some surveys are now out of date because of changing practice patterns. In other cases, survey respondents may have overestimated post-operative visit counts. Instead of a new survey, CMS could ask the RUC to revalue procedures using the number of post-operative visits reported through claims-based reporting rather than by survey respondents.

## Limitations

We restricted most analyses to only clean single procedures; therefore, 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 might not be generalizable to the broader population of practitioners who are required to report post-operative visits.

Our analysis does not capture separately billed or unbilled post-operative care provided outside a visit or via phone, and we analyzed data only for procedures paid by traditional Medicare FFS. Therefore, our results might not be generalizable to the entire population of procedures. This analysis predates the surge in telehealth use associated with the COVID-19

pandemic (Mehrotra et al., 2020). Interest in expanding payment flexibilities for telehealth services initiated for the public health emergency (CMS, 2020b) could lead to telehealth playing a larger role in providing post-operative care in 2020 and beyond.

Our estimates of the ratio of observed to expected post-operative visits provided might be an overestimate for some procedures. Roughly 30 percent of procedures with 10- or 90-day global periods are assigned “half post-operative visits” during the CMS valuation process. The RUC’s rationale for a half 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 included half visits in the denominator. However, when practitioners report on post-operative visits using HCPCS code 99024, they cannot indicate that they performed a half visit; they report single visits. Therefore, our estimate of the ratio of expected post-operative visits provided may be an overestimate, although in a sensitivity analysis we found only a minimal difference when we excluded half visits from the denominator.

After publishing our initial report summarizing patterns of post-operative visits for procedures furnished from July 1, 2017, through June 30, 2018 (Kranz et al., 2019), we conducted and published analyses to address many of these limitations, as well as others received in response to comments invited in the 2020 Physician Fee Schedule Proposed Rule (Mulcahy, Mehrotra, et al., 2019). We included updates to several of these analyses using procedures furnished between January 1, 2019, and December 31, 2019, in Chapter 8 of this report. These results support the methods and findings presented in this report.

## 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 30 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 revaluation of surgical procedures that are bundled with post-operative visits.

## Appendix A. Examining Characteristics of Clean Procedures

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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 such cases, it was difficult to know whether a visit reported with code 99024 following the second procedure was related to the hip replacement, the arm fracture, or both.

To inform our analyses, we described the percentage 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 percentage of procedures that are clean. If only a small percentage of procedures for a given code or group of codes is clean, then this could raise concerns 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 January 1, 2019, through December 31, 2019. 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, 2020a). 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 the ten days following the day of the procedure; we calculated the 90-day global periods to include the day of the procedure and the 90 days following the day of the 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** are procedures with 10- or 90-day global periods that do not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service

- **Multiple procedures on the same day with global periods of the same length**
  - **Multiple procedures with 10-day global periods** share the same date of service only with other procedures with 10-day global periods and do not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service
  - **Multiple procedures with 90-day global periods** share the same date of service only with other procedures with 90-day global periods and do not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service
- **Multiple procedures on the same day with global periods of different lengths** share the same date of service with procedures that have global periods of different lengths and do not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service
- **Subsequent procedures on a different day occurring during the global period of a prior procedure** are procedures with 10- or 90-day global periods that occur within the global period but not on the same date of service as a prior procedure with a 10- or 90-day global period.

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 a beneficiary had more than one procedure on the same day by practitioners from different specialties, then each procedure was counted under its appropriate specialty.

## Results

During the study period, we observed 27.9 million procedures with 10- or 90-day global periods furnished between January 1, 2019, and December 31, 2019, for which reporting was required. These counts exclude procedures from ASC facility records and procedures with HCPCS modifier codes which may have unusual patterns of post-operative care, as described in Chapter 2 of this report, but do not exclude procedures in small practices with fewer than ten practitioners, as is done in the results presented in the main text of this report. Among these, 22.0 percent were furnished in the nine-state subsample where reporting of post-operative visits was required (Table A.1). In these nine states, 59.4 percent ( $N = 2,995,352$ ) of procedures were defined as clean.

**Table A.1. Summary of Grouping of Calendar Year 2019 Procedures with 10- or 90-Day Global Periods**

	Procedures (41 states and Washington, D.C.)		Procedures (nine-state subsample)	
	Total Procedures After Exclusions	Share of Total Procedures	Total Procedures After Exclusions	Share of Total Procedures
Clean procedures	13,848,857	60.6	2,995,352	59.4
Multiple procedures on the same day with global periods of the same length	5,880,083	25.7	1,324,985	26.3
Multiple procedures on the same day with global periods of different lengths	302,293	1.3	64,229	1.3
Subsequent procedures on a different day occurring during the global period of a prior procedure	2,839,135	12.4	654,499	13.0
Total	22,870,368	100.0	5,039,065	100.0

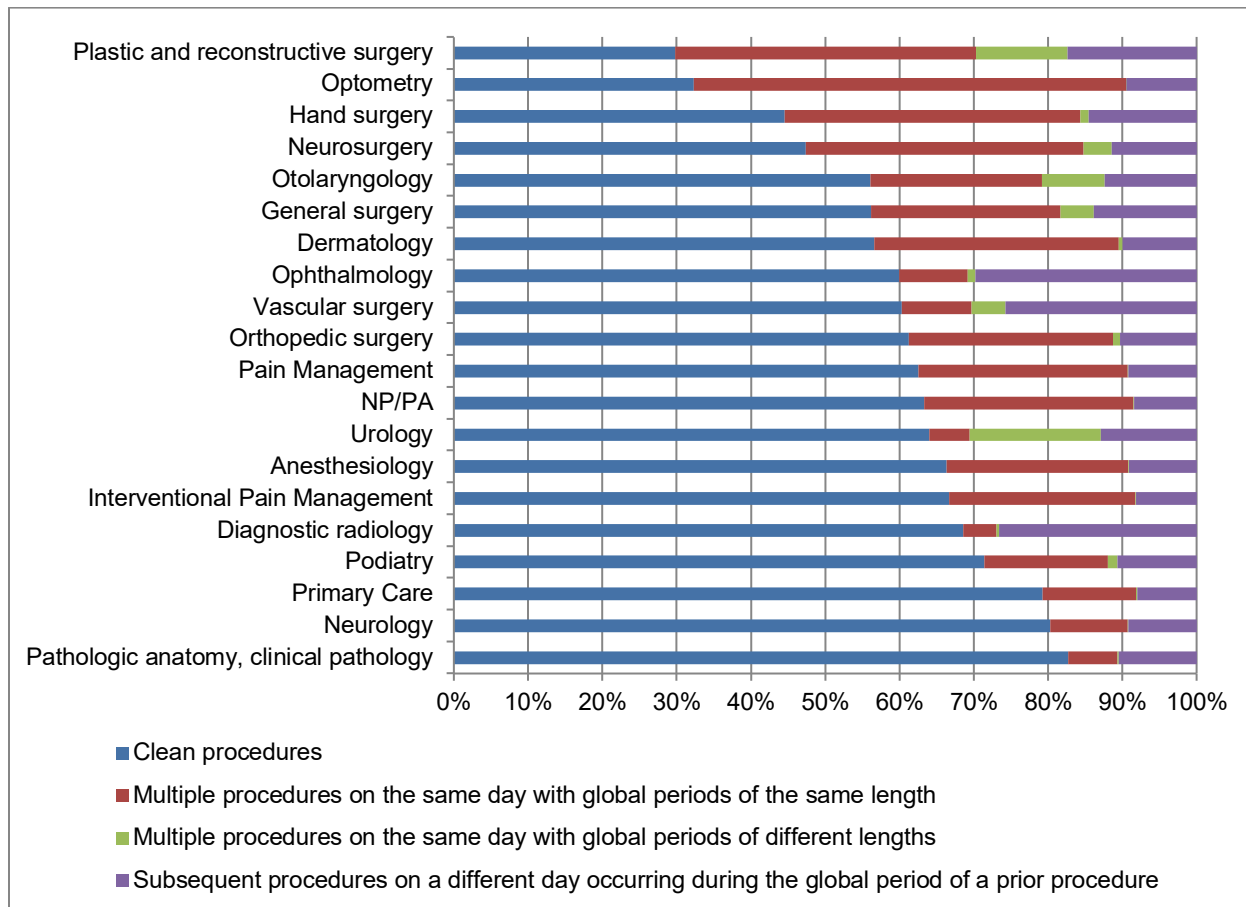
SOURCE: Data are from CMS IDR, downloaded on October 20, 2020.

NOTE: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and that were furnished from January 1, 2019, through December 31, 2019. 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. Excludes procedures on ASC facility records and procedures with HCPCS modifier codes, which may have unusual patterns of post-operative care, as described elsewhere in this report, but does not exclude procedures in small practices with fewer than ten practitioners, as is done in the results presented in the main text of this report.

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 20 specialties listed in Figure A.1 accounted for 96.7 percent of all procedures examined with 10- or 90-day global periods during the study period, and all furnished at least 20,000 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 20 specialties had fewer than 50 percent of procedures classified as clean procedures: plastic and reconstructive surgery, optometry, hand surgery, and neurosurgery.



**Figure A.1. Summary of Grouping of Calendar Year 2019 Procedures with 10- or 90-Day Global Periods by Specialty, Nine-State Subsample**

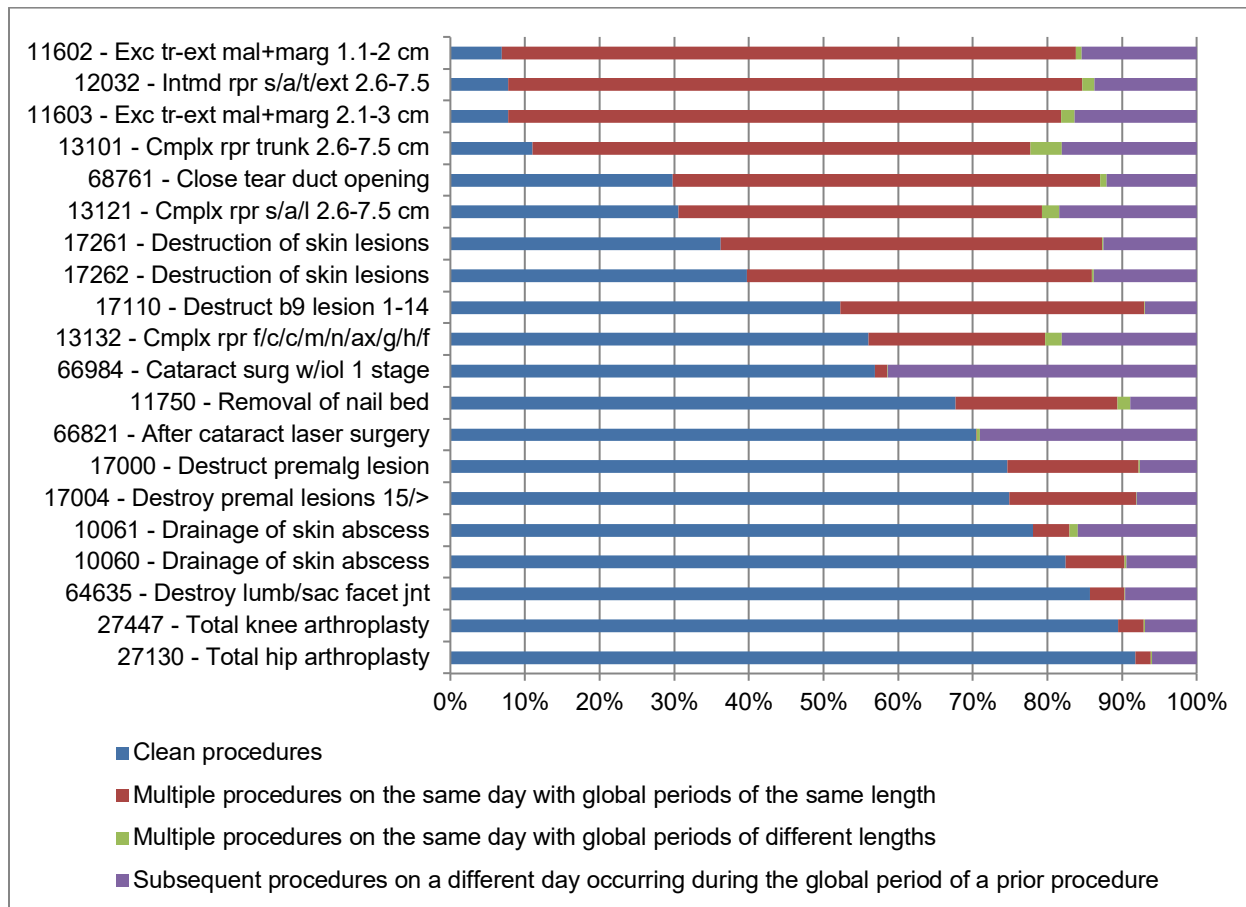


SOURCE: Data are from CMS IDR, downloaded on October 20, 2020.

NOTE: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and that were furnished from January 1, 2019, through December 31, 2019. Excludes procedures on ASC facility records and procedures with HCPCS modifier codes, which may have unusual patterns of post-operative care, as described elsewhere in this report, but does not exclude procedures in small practices with fewer than ten practitioners, as is done in the results presented in the main text of this report.

Figure A.2 reports the 20 HCPCS codes with 10- or 90-day global periods with the highest procedure volume in the nine-state subsample. These 20 codes represent 67.3 percent of all procedures with global periods in these states. For 12 of the 20 HCPCS codes, more than 50 percent of procedures classified were clean. The other eight HCPCS codes were more likely to be furnished as multiple procedures 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 Calendar Year 2019 Procedures with 10- or 90-Day Global Periods by HCPCS Codes, Nine-State Subsample**



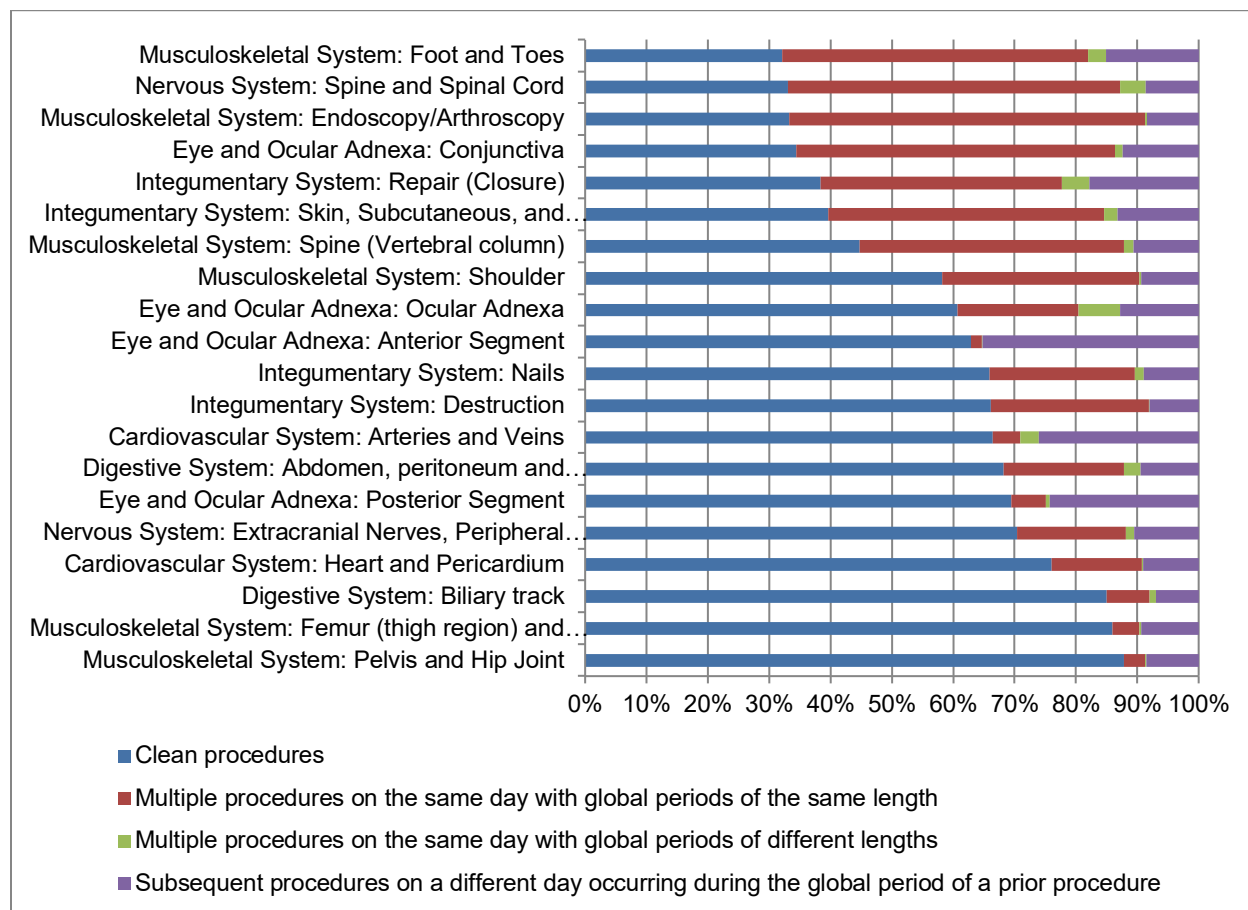
SOURCE: Data are from CMS IDR, downloaded on October 20, 2020.

NOTE: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and that were furnished from January 1, 2019, through December 31, 2019. Excludes procedures on ASC facility records and procedures with HCPCS modifier codes, which may have unusual patterns of post-operative care, as described elsewhere in this report, but does not exclude procedures in small practices with fewer than ten practitioners, as is done in the results presented in the main text of this report. 11602 = excision of malignant lesion including margins, trunk, arms, or legs (1.1–2.0 cm). 12032 = intermediate repair of wounds of scalp, axillae, trunk, and/or extremities (2.6–7.5 cm). 11603 = excision of malignant lesion including margins, trunk, arms, or legs (2.1–3.0 cm). 13101 = repair of wound of trunk (2.6–7.5 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 (2.6–7.5 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 = dissection of secondary membranous cataract; stab incision technique; laser surgery. 17000 = Destruction, premalignant lesions; first lesion. 17004 = destruction, premalignant lesions, 15 or more lesions. 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. 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 multiple procedures with the same global period on the same day was most common for six of these seven heading groups.

**Figure A.3. Summary of Grouping of Calendar Year 2019 Procedures with 10- or 90-Day Global Periods by CPT Book Heading, Nine-State Subsample**



SOURCE: Data are from CMS IDR, downloaded on October 20, 2020.

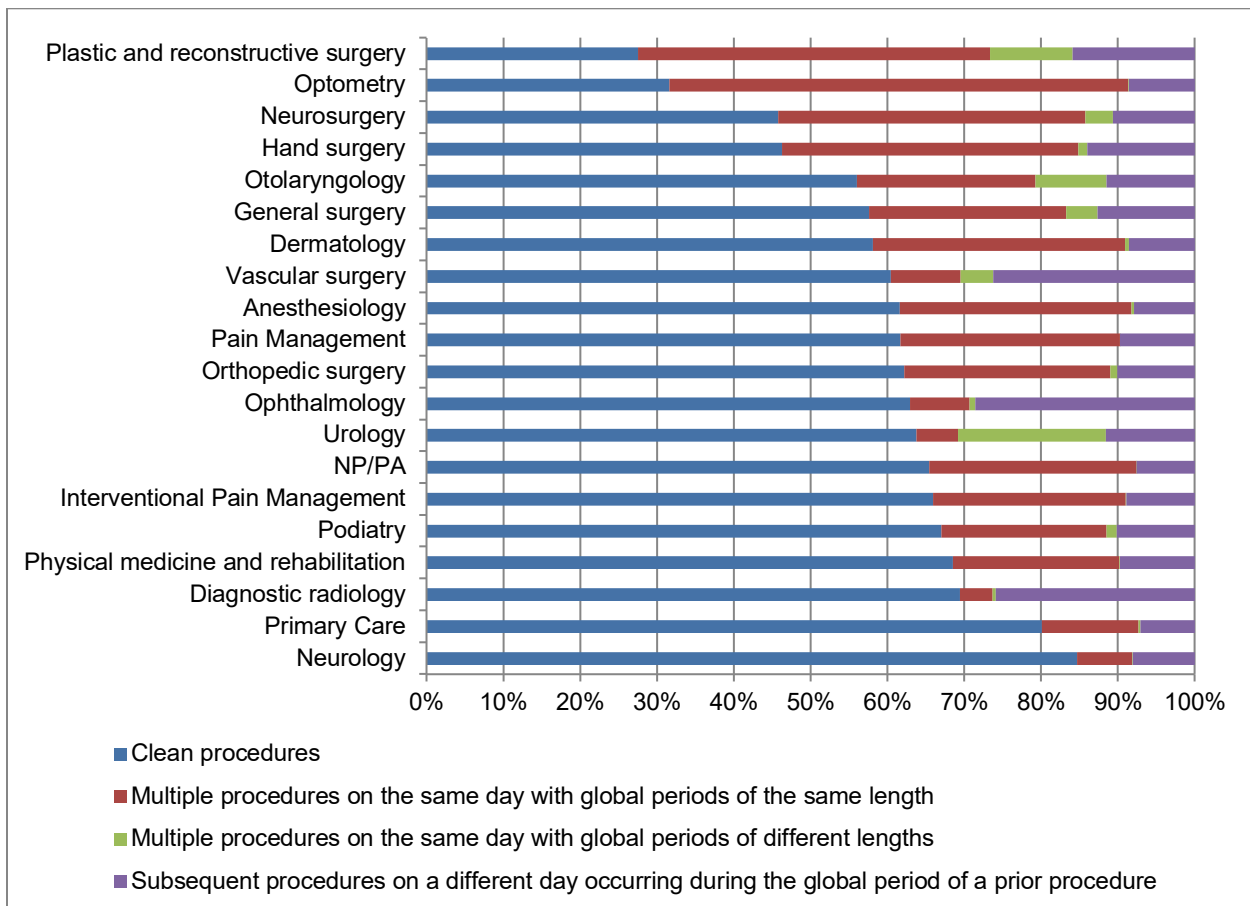
NOTE: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and that were furnished from January 1, 2019, through December 31, 2019. Excludes procedures on ASC facility records and procedures with HCPCS modifier codes, which may have unusual patterns of post-operative care, as described elsewhere in this report, but does not exclude procedures in small practices with fewer than ten practitioners, as is done in the results presented in the main text of this report.

## Examining the Representativeness of the Nine-State Subsample

The share of procedures by type of procedure was similar in the national sample and the nine-state subsample across specialties, HCPCS codes, and CPT book headings. We observed a similar percentage of procedures with 10- or 90-day global periods categorized as clean in both samples (nine states = 59.4 percent; national = 60.6 percent) (Table A.1). All specialties that

furnished more than 10,000 procedures with global periods are listed in Table A.3. Nineteen of 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). For the national sample, physical medicine and rehabilitation were included, while clinical pathology dropped out. Slightly more procedures were categorized as overlapping procedures in the nine-state subsample (13.0 percent) compared with the national sample (12.4 percent) and having the same type of global period on the same day (nine states = 26.3 percent; national = 25.7 percent). The same percentage of procedures in the national sample were categorized as having a combination of 10- and 90-day global periods on the same day in the nine-state subsample compared with the national sample (1.3 percent). We also provide these data by HCPCS codes (Figure A.5) and by CPT book heading (Figure A.6).

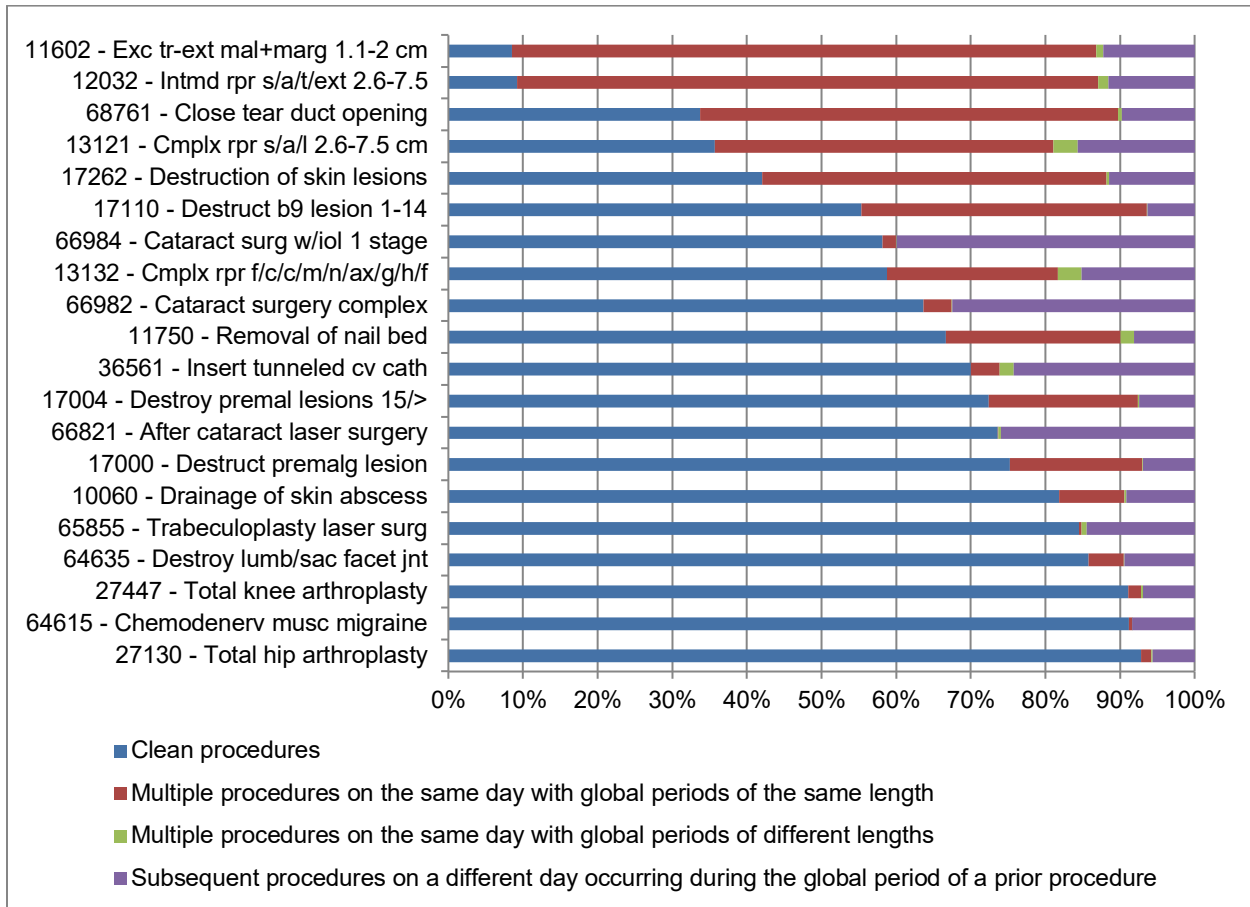
**Figure A.4. Summary of Grouping of Calendar Year 2019 Procedures with 10- or 90-Day Global Periods by Specialty, National Sample of Nonreporting States**



SOURCE: Data are from CMS IDR, downloaded on October 20, 2020.

NOTE: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and that were furnished from January 1, 2019, through December 31, 2019. Excludes procedures on ASC facility records and procedures with HCPCS modifier codes, which may have unusual patterns of post-operative care, as described elsewhere in this report, but does not exclude procedures in small practices with fewer than ten practitioners, as is done in the results presented in the main text of this report.

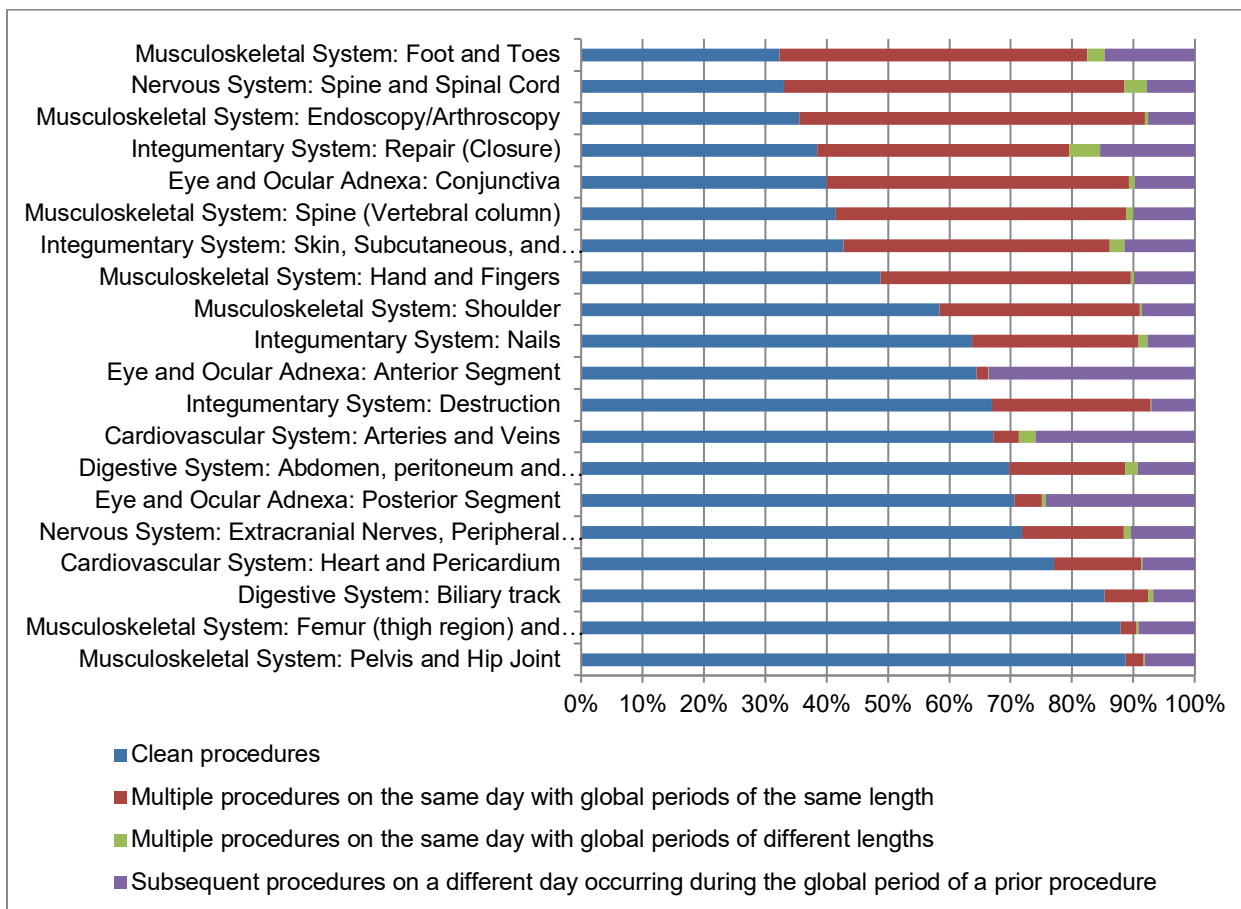
**Figure A.5. Summary of Grouping of Calendar Year 2019 Procedures with 10- or 90-Day Global Periods by HCPCS Codes, National Sample of Nonreporting States**



SOURCE: Data are from CMS IDR, downloaded on October 20, 2020.

NOTE: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and that were furnished from January 1, 2019, through December 31, 2019. Excludes procedures on ASC facility records and procedures with HCPCS modifier codes, which may have unusual patterns of post-operative care, as described elsewhere in this report, but does not exclude procedures in small practices with fewer than ten practitioners, as is done in the results presented in the main text of this report. 11602 = excision of malignant lesion, including margins, trunk, arms, or legs (1.1–2.0 cm). 12032 = intermediate repair of wounds of scalp, axillae, trunk, and/or extremities (2.6–7.5 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. 66984 = extracapsular cataract removal with insertion of intraocular lens prosthesis, manual or mechanical technique. 13132 = reconstructive procedures, complicated wound closure: forehead, cheeks, chin, mouth, neck, axillae, genitalia, hands, and/or feet (2.6–7.5 cm). 66982 = extracapsular cataract removal with insertion of intraocular lens prosthesis (one-stage procedure). 11750 = excision of nail and nail matrix, partial or complete, for permanent removal. 36561 = insertion of central venous catheter and implanted device for infusion beneath the skin, patient 5 years or older. 17004 = destruction, premalignant lesions, 15 or more lesions. 66821 = dissection of secondary membranous cataract; stab incision technique; laser surgery. 17000 = destruction, premalignant lesions; first lesion. 10060 = drainage of abscess. 65855 = trabeculoplasty by laser surgery. 64635 = destruction by neurolytic agent, paravertebral facet joint nerve(s), with imaging guidance; lumbar or sacral, single facet joint. 27447 = total knee arthroplasty. 64615 = chemodeneration of muscle(s). 27130 = total hip arthroplasty, with or without autograft or allograft.

**Figure A.6. Summary of Grouping of Calendar Year 2019 Procedures with 10- or 90-Day Global Periods by CPT Book Heading, National Sample of Nonreporting States**



SOURCE: Data are from CMS-IDR, downloaded on October 20, 2020.

NOTE: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and that were furnished from January 1, 2019, through December 31, 2019. Excludes procedures on ASC facility records and procedures with HCPCS modifier codes, which may have unusual patterns of post-operative care, as described elsewhere in this report, but does not exclude procedures in small practices with fewer than ten practitioners, as is done in the results presented in the main text of this report.

### *Describing the Characteristics of Clean Procedures*

Among procedures for which reporting was required, 59.5 percent of procedures with 10-day global periods and 59.3 percent of procedures with 90-day global periods met our criteria for clean procedures. During the study period, there were 1,547,182 clean procedures linked to 933,049 post-operative visits in our study sample. Among clean procedures with 10-day global periods, 82.2 percent were performed in office settings and 47.3 percent were performed by dermatologists (Table A.2). Among clean procedures with 90-day global periods, 34.5 percent were performed in inpatient settings and 32.7 percent were performed by orthopedic surgeons.

**Table A.2. Characteristics of Clean Procedures with 10- and 90-Day Global Periods, Calendar Year 2019 Procedures**

	Study Sample <sup>a</sup>			
	Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods	
	N	Percentage	N	Percentage
Total	1,078,108	100.0	469,074	100.0
Practice size				
10–24 practitioners	382,371	35.5	128,186	27.3
25–99 practitioners	351,336	32.6	129,214	27.5
100 or more practitioners	344,401	31.9	211,674	45.1
Procedure place of service				
Ambulatory surgical center	28,633	2.7	109,692	23.4
Emergency or urgent care	21,979	2.0	1,063	0.2
Inpatient	25,656	2.4	161,759	34.5
Off-campus hospital outpatient	30,689	2.8	9,965	2.1
Office	886,124	82.2	55,789	11.9
Outpatient hospital	70,648	6.6	130,769	27.9
Other	14,379	1.3	37	0.0
Specialty <sup>b</sup>				
Anesthesiology	9,229	0.9	32	0.0
Dermatology	510,258	47.3	18,202	3.9
Diagnostic radiology	23,996	2.2	49	0.0
General surgery	22,298	2.1	52,966	11.3
Hand surgery	283	0.0	11,058	2.4
Interventional pain management	13,660	1.3	4	0.0
Neurology	19,319	1.8	158	0.0
Neurosurgery	2,356	0.2	14,549	3.1
NP/PA	283,985	26.3	3,826	0.8
Ophthalmology	34,558	3.2	119,946	25.6
Optometry	2,921	0.3	1,093	0.2
Orthopedic surgery	3,948	0.4	153,446	32.7
Otolaryngology	10,932	1.0	4,185	0.9
Pain management	16,387	1.5	41	0.0
Pathologic anatomy, clinical pathology	12	0.0	15,509	3.3
Plastic and reconstructive surgery	4,418	0.4	4,605	1.0
Podiatry	25,726	2.4	4,858	1.0
Primary care	38,713	3.6	1,303	0.3
Urology	2,439	0.2	16,766	3.6
Vascular surgery	5,289	0.5	12,118	2.6
All other specialties	47,381	4.4	34,360	7.3

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTES: Includes procedures with 10- or 90-day global periods for which reporting of post-operative visits was required and that were furnished from January 1, 2019, through December 31, 2019.

<sup>a</sup> *Study sample* includes procedures that met the following inclusion criteria: one of the clean procedure codes; performed between January 1, 2019, and December 31, 2019, for a Medicare FFS beneficiary; and performed in one of the nine states in a practice with ten or more practitioners.

<sup>b</sup> Lists only those specialties that performed 15,000 or more procedures.

## Conclusions

Our main analysis of post-operative visits reported using HCPCS code 99024 is focused on clean procedures because 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 procedure did not occur during the global period of another procedure with a 10- or 90-day global period. 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. 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 with the U.S. sample, with few exceptions.



**Table A.3. Summary of Grouping of Calendar Year 2019 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 Washington, D.C.				
	TOTAL	Clean Procedures	Multiple Procedures on the Same Day with Global Periods of the Same Length	Multiple Procedures on the Same Day with Global Periods of Different Lengths	Subsequent Procedures on a Different Day Occurring During the Global Period of a Prior Procedure	TOTAL	Clean Procedures	Multiple Procedures on the Same Day with Global Periods of the Same Length	Multiple Procedures on the Same Day with Global Periods of Different Lengths	Subsequent Procedures on a Different Day Occurring During the Global Period of a Prior Procedure
Anesthesiology	25,249	16,737	6,184	22	2,306	126,500	77,956	38,074	413	10,057
Cardiac surgery	11,339	6,860	3,090	169	1,220	47,795	28,598	13,606	538	5,053
Cardiology	14,777	12,218	942	61	1,556	62,192	52,833	3,476	143	5,740
Colorectal surgery	13,802	10,428	1,631	389	1,354	52,416	40,179	5,513	1,200	5,524
Dermatology	2,181,461	1,234,328	717,353	11,090	218,690	7,331,004	4,257,487	2,406,524	39,708	627,285
Diagnostic radiology	38,052	26,082	1,706	145	10,119	162,401	112,778	6,918	616	42,089
Emergency medicine	14,084	12,181	488	76	1,339	70,450	58,075	5,017	287	7,071
Gastroenterology	10,137	9,439	47	3	648	25,404	23,603	149	83	1,569
General surgery	189,110	106,215	48,224	8,405	26,266	797,716	459,090	204,907	32,460	101,259
Gynecologist/oncologist	4,090	1,461	553	1,719	357	16,808	5,844	2,375	7,288	1,301
Hand surgery	32,517	14,485	12,933	348	4,751	121,891	56,349	47,066	1,434	17,042
Interventional pain management	38,752	25,834	9,705	29	3,184	98,680	65,076	24,694	99	8,811
Interventional radiology	15,069	10,270	726	44	4,029	75,570	51,957	3,327	261	20,025
Nephrology	4,450	3,026	98	7	1,319	26,013	17,049	776	88	8,100
Neurology	35,949	28,857	3,731	37	3,324	156,525	132,472	11,279	89	12,685
Neurosurgery	46,159	21,862	17,261	1,755	5,281	181,939	83,326	72,610	6,577	19,426
NP/PA	688,138	435,662	193,754	503	58,219	1,926,165	1,260,167	519,102	1,251	145,645
Ob/gyn	10,578	4,192	4,033	1,494	859	47,683	19,646	17,490	6,448	4,099
Ophthalmology	637,812	381,991	59,268	6,133	190,420	2,459,394	1,546,517	191,268	19,622	701,987
Optometry	41,098	13,285	23,900	14	3,899	113,415	35,817	67,801	70	9,727

Specialty of Practitioner Who Furnished the Original Procedure	Among Nine-State Subsample					Among 41 States and Washington, D.C.				
	TOTAL	Clean Procedures	Multiple Procedures on the Same Day with Global Periods of the Same Length	Multiple Procedures on the Same Day with Global Periods of Different Lengths	Subsequent Procedures on a Different Day Occurring During the Global Period of a Prior Procedure	TOTAL	Clean Procedures	Multiple Procedures on the Same Day with Global Periods of the Same Length	Multiple Procedures on the Same Day with Global Periods of Different Lengths	Subsequent Procedures on a Different Day Occurring During the Global Period of a Prior Procedure
Orthopedic surgery	315,738	193,221	86,835	2,914	32,768	1,338,093	831,472	359,013	12,335	135,273
Otolaryngology	44,350	24,865	10,237	3,754	5,494	189,374	106,083	43,936	17,555	21,800
Pain management	41,022	25,648	11,562	37	3,775	118,014	72,748	33,708	80	11,478
Pathologic anatomy, clinical pathology	22,508	18,615	1,485	41	2,367	88,972	74,175	5,680	162	8,955
Pathology	2,824	1,414	1,102	22	286	12,250	7,168	4,089	86	907
Peripheral vascular disease, medical or surgical	4,345	2,249	1,633	15	448	24,427	12,806	9,547	75	1,999
Physical medicine and rehabilitation	22,163	14,627	5,275	16	2,245	89,987	61,640	19,500	61	8,786
Plastic and reconstructive surgery	84,518	25,186	34,200	10,441	14,691	311,603	85,892	142,607	33,502	49,602
Podiatry	224,444	160,238	37,283	2,833	24,090	736,287	493,593	158,231	9,599	74,864
Primary care	102,790	81,402	12,962	190	8,236	556,171	445,338	70,131	1,087	39,615
Surgical oncology	11,290	3,150	4,733	1,926	1,481	44,734	13,976	19,562	5,622	5,574
Thoracic surgery	15,835	10,051	3,841	202	1,741	60,079	37,981	14,172	1,035	6,891
Urology	40,795	26,110	2,191	7,218	5,276	158,587	101,070	8,648	30,511	18,358
Vascular surgery	41,546	25,039	3,919	1,895	10,693	149,583	90,396	13,620	6,295	39,272

SOURCE: Data are from CMS IDR, downloaded on October 20, 2020.

NOTES: This table reports the volume of the global procedure categories for all specialties with at least 10,000 procedures. Ob/gyn = obstetrician/gynecologist.

## Appendix B. Identifying Robust Reporters of Post-Operative Visits

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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 clean procedures because of the challenges of linking procedures and post-operative visits.

During the study period, 15,478 practitioners furnished one or more clean procedures with a 90-day global period, and 56.4 percent of these practitioners ( $N = 8,733$ ) 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, 6,646 practitioners (or 42.9 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, 469,074 clean procedures with a 90-day global period were furnished by 15,478 practitioners. We found that 339,467 procedures with 90-day global periods (72.4 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. We used these thresholds to define robust reporters because they allowed for a sample of practitioners who were regularly reporting post-operative visits while adequately including practitioners across specialties and those performing procedures with 10- and 90-day global periods.

**Table B.1. Number of Practitioners Who Performed Procedures with 90-Day Global Periods and Reported Post-Operative Visits, Calendar Year 2019 Procedures**

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	15,478	100.0%	8,733	56.4%	6,136	39.6%	4,516	29.2%
Practitioners with $\geq 25$ percent	11,891	76.8%	7,202	46.5%	5,083	32.8%	3,769	24.4%
Practitioners with $\geq 50$ percent	11,043	71.3%	6,646	42.9%	4,692	30.3%	3,477	22.5%
Practitioners with $\geq 75$ percent	9,172	59.3%	5,576	36.0%	4,008	25.9%	2,988	19.3%
Practitioners with $\geq 90$ percent	6,410	41.4%	3,552	22.9%	2,594	16.8%	1,969	12.7%
Practitioners with $\geq 95$ percent	4,821	31.1%	1,963	12.7%	1,499	9.7%	1,075	6.9%

SOURCE: Data are from CMS-IDR, downloaded on October 14, 2020.

NOTE: *Eligible procedures* refers to procedures that met the following inclusion criteria: one of the clean procedure codes; performed between January 1, 2019, and December 31, 2019, 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, Calendar Year 2019 Procedures**

Percentage 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	469,074	100.0%	445,063	94.9%	408,573	87.1%	369,406	78.8%
Procedures billed by practitioners with $\geq 25$ percent reporting rate	386,865	82.5%	368,656	78.6%	338,900	72.2%	307,153	65.5%
Procedures billed by practitioners with $\geq 50$ percent reporting rate	356,179	75.9%	339,467	72.4%	312,057	66.5%	282,727	60.3%
Procedures billed by practitioners with $\geq 75$ percent reporting rate	304,951	65.0%	291,637	62.2%	269,608	57.5%	245,025	52.2%
Procedures billed by practitioners with $\geq 90$ percent reporting rate	204,648	43.6%	196,087	41.8%	182,995	39.0%	168,048	35.8%
Procedures billed by practitioners with $\geq 95$ percent reporting rate	117,950	25.1%	109,389	23.3%	103,094	22.0%	92,902	19.8%

SOURCE: Data are from CMS-IDR, downloaded on October 14, 2020.

NOTES: *Eligible procedures* refers to procedures that met the following inclusion criteria: one of the clean procedure codes; performed between January 1, 2019, and December 31, 2019, for a Medicare FFS beneficiary; and performed in one of the nine states in a practice with 10 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 since January 1, 2019. Robust reporters included 15.8 percent of all practitioners who furnished clean procedures in our sample. We compared robust reporters with *high-volume practitioners*, defined as practitioners who performed ten or more procedures with 90-day global periods regardless of whether they reported any post-operative visits.

During our study period, robust reporters delivered more clean procedures with 90-day global periods (339,467) than 10-day global periods (135,498) (Table B.3). High-volume practitioners delivered 445,063 procedures with 90-day global periods and 205,490 procedures with 10-day global periods. 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 (77.7 percent) and procedures with 90-day global periods in the inpatient setting (36.2 percent). We found similar results among high-volume practitioners (80.3 percent of 10-day procedures in office settings; 34.6 percent of 90-day procedures in inpatient settings). More than half of procedures with 10-day global periods delivered by robust reporters were delivered by dermatologists (50.7 percent), while among high-volume practitioners, a slightly higher percentage of procedures were delivered by dermatologists (57.0 percent).

Procedures with 90-day global periods delivered by robust reporters were most often delivered by orthopedic surgeons (36.7 percent) and ophthalmologists (26.1 percent). Among high-volume practitioners, there was a slightly smaller percentage of procedures that were delivered by orthopedic surgeons (33.9 percent). Overall, the distribution of procedures with 90-day global periods across specialties was similar between robust reporters and high-volume practitioners.

**Table B.3. Characteristics of Calendar Year 2019 Procedures with 10- and 90-Day Global Periods**

	High-Volume Practitioners <sup>a</sup>				Robust Reporters <sup>b</sup>			
	Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods		Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods	
	<i>N</i>	Share (%)	<i>N</i>	Share (%)	<i>N</i>	Share (%)	<i>N</i>	Share (%)
Total	205,490	100.0	445,063	100.0	135,498	100.0	339,467	100.0
Practice size								
10–24 practitioners	80,269	39.1	124,367	27.9	49,920	36.8	79,437	23.4
25–99 practitioners	68,057	33.1	123,611	27.8	46,011	34.0	98,890	29.1
100 or more practitioners	57,164	27.8	197,085	44.3	39,567	29.2	161,140	47.5
Procedure place of service								
Ambulatory surgical center	8,212	4.0	107,635	24.2	6,110	4.5	78,564	23.1
Emergency or urgent care	126	0.1	476	0.1	92	0.1	374	0.1
Inpatient	7,342	3.6	154,090	34.6	5,641	4.2	122,962	36.2
Off-campus hospital outpatient	4,987	2.4	9,350	2.1	3,072	2.3	8,507	2.5
Office	164,927	80.3	52,543	11.8	105,220	77.7	33,912	10.0
Outpatient hospital	19,663	9.6	120,944	27.2	15,134	11.2	95,137	28.0
Other	233	0.1	25	0.0	229	0.2	11	0.0
Specialty <sup>c</sup>								
Anesthesiology	N/A	N/A	13	0.0	N/A	N/A	13	0.0
Dermatology	117,067	57.0	17,752	4.0	68,701	50.7	9,495	2.8
Diagnostic radiology	84	0.0	11	0.0	N/A	N/A	N/A	N/A
General surgery	19,460	9.5	48,939	11.0	16,337	12.1	41,122	12.1
Hand surgery	263	0.1	10,919	2.5	202	0.1	9,110	2.7
Interventional pain management	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Neurology	5	0.0	146	0.0	4	0.0	128	0.0
Neurosurgery	1,938	0.9	13,401	3.0	1,714	1.3	10,730	3.2
NP/PA	8,409	4.1	2,364	0.5	3,905	2.9	1,803	0.5
Ophthalmology	32,354	15.7	119,177	26.8	25,222	18.6	88,724	26.1
Optometry	576	0.3	1,018	0.2	448	0.3	656	0.2
Orthopedic surgery	3,044	1.5	151,051	33.9	2,441	1.8	124,646	36.7
Otolaryngology	1,882	0.9	2,219	0.5	1,041	0.8	1,591	0.5
Pain management	12	0.0	14	0.0	N/A	N/A	N/A	N/A
Pathologic anatomy, clinical pathology	11	0.0	15,330	3.4	8	0.0	7,670	2.3
Plastic and reconstructive surgery	3,267	1.6	996	0.2	2,208	1.6	591	0.2
Podiatry	6,735	3.3	3,896	0.9	5,407	4.0	2,083	0.6
Primary care	479	0.2	2,922	0.7	462	0.3	2,039	0.6
Urology	1,753	0.9	13,994	3.1	1,244	0.9	9,987	2.9

	High-Volume Practitioners <sup>a</sup>				Robust Reporters <sup>b</sup>			
	Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods		Procedures with 10-Day Global Periods		Procedures with 90-Day Global Periods	
	<i>N</i>	Share (%)	<i>N</i>	Share (%)	<i>N</i>	Share (%)	<i>N</i>	Share (%)
Vascular surgery	4,941	2.4	11,761	2.6	3,538	2.6	8,544	2.5
All other specialties	3,210	1.6	29,140	6.5	2,616	1.9	20,535	6.0

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTES: The claims for HCPCS code 99024 listed in this table were linked to procedures furnished from January 1, 2019, through December 31, 2019. N/A = not applicable, because no procedures were furnished in category.

<sup>a</sup> *High-volume practitioners* includes practitioners who performed procedures that met the following inclusion criteria: one of the clean procedure codes performed between January 1, 2019, and December 31, 2019, 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 January 1, 2019, through December 31, 2019.

<sup>b</sup> *Robust reporters* includes practitioners who performed procedures that met the following inclusion criteria: one of the clean procedure codes performed between January 1, 2019, and December 31, 2019, 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 January 1, 2019, and December 31, 2019, and reported at least one claim for a post-operative visit for at least 50 percent of procedures performed during the study period.

<sup>c</sup> Lists only those specialties that performed 10,000 or more procedures between January 1, 2019, and December 31, 2019.

## Conclusions

Given concerns about potential underreporting of post-operative visits, we conducted a subanalysis on a set of robust reporters who appeared to be regularly reporting post-operative visits. For a sensitivity analysis, presented in Chapter 6, we defined *robust reporters* as practitioners who performed ten or more clean procedures with 90-day global periods beginning January 1, 2019, and who reported at least one post-operative visit for at least half of these procedures. We found that this definition included a board representation of the practitioners furnishing procedures with 10- and 90-day global periods.

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

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The accompanying Microsoft Excel file (available on the webpage for this report) provides a HCPCS code-level spreadsheet with information about total procedures furnished for the 291 HCPCS codes for which CMS required reporting of post-operative visits during 2019. 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 for procedures furnished January 1, 2019, through December 31, 2019, 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 for procedures performed between January 1, 2019, and December 31, 2019, 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 January 1, 2019, through December 31, 2019.
- **Procedures furnished by robust reporters** includes clean procedure codes for procedures performed between January 1, 2019, and December 31, 2019, 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 January 1, 2019, through December 31, 2019, 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 288 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, and 64617).



## Appendix D. Exploring Visits Immediately Following Global Periods

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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 and type of post-operative visits occurring after the end of global periods.

### Approach

We examined clean procedures linked to post-operative visits during global periods. First, 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. Second, we determined the percentage of procedures with post-operative visits reported with HCPCS code 99024 and E&M codes on each of the first 15 days after the global periods ended.

A key limitation of this analysis is that some of the post-operative visits provided after global periods end might be related to other, new procedures, given that our clean period focused only on procedures that did not occur during the global period for another procedure with a 10- or 90-day global period. 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 17,313 and 7,358 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 we compared the results of this sensitivity analysis 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 included 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 observed a larger difference in the study sample (0.04) and the expanded global periods (0.06). However, as mentioned previously, many of the post-operative visits in the expanded period might 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, Calendar Year 2019 Procedures**

	<b>Procedures with 10-Day Global Periods</b>	<b>Procedures with 90-Day Global Periods</b>
Total procedures	1,078,108	469,074
Total post-operative visits during global periods	45,107	887,942
Total post-operative visits in the first five days after global periods end	17,313	7,358
Percentage of procedures with any post-operative visits		
Study sample	3.5%	70.0%
Expanded global periods	4.7%	70.1%
Ratio of observed to expected post-operative visits		
Study sample	0.04	0.38
Expanded global periods	0.06	0.38

SOURCE: Data are from CMS IDR, downloaded on October 20, 2020.

NOTE: The claims for HCPCS code 99024 that are listed in this table were linked to procedures furnished from January 1, 2019, through December 31, 2019. The study sample includes clean procedures that were performed between January 1, 2019, and December 31, 2019, 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.

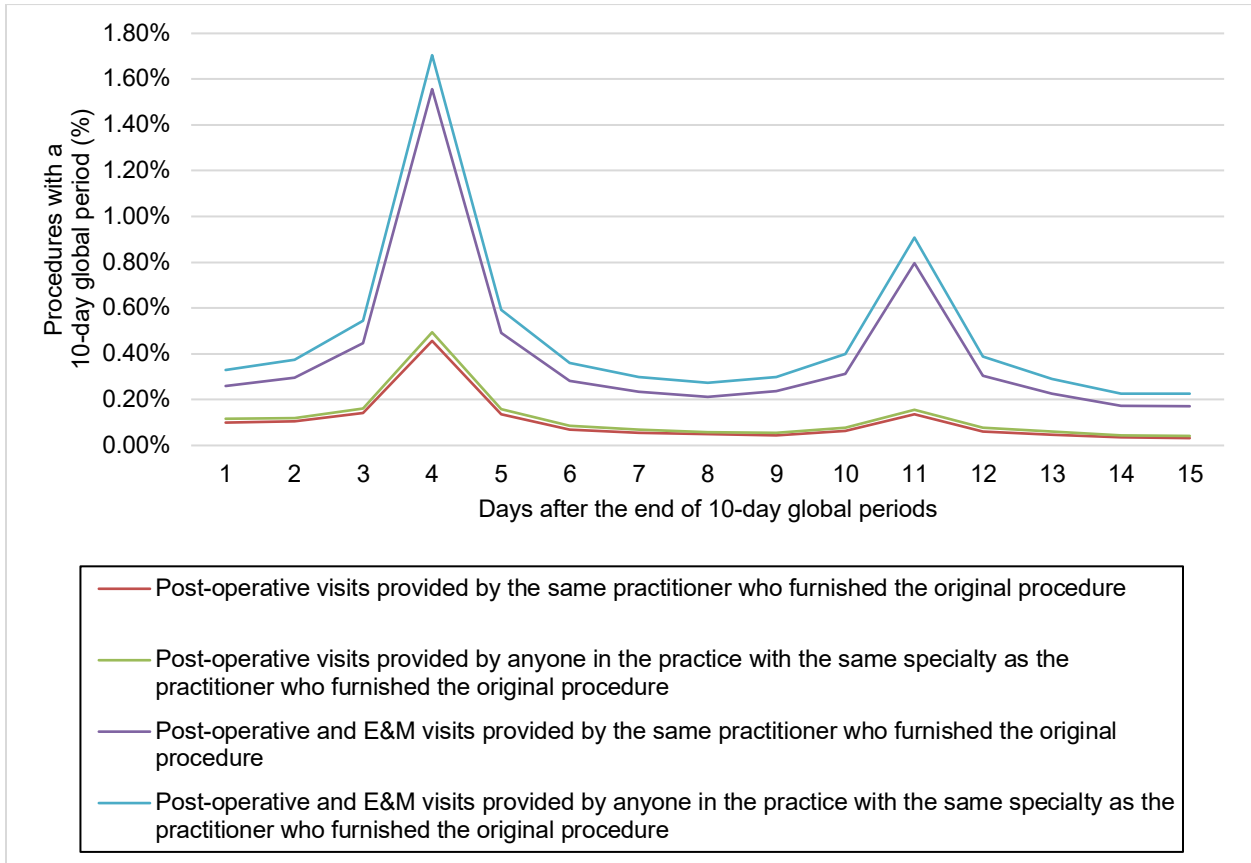
To further understand the provision of post-operative visits after the end of global periods, we determined the percentage of procedures with post-operative visits on each of the first 15 days after the end of global periods. A small percentage of procedures (less than 0.5 percent) had post-operative visits reported using HCPCS code 99024 on any of the first 15 days after the end of their global periods. The percentage of procedures with visits after the end of global periods increased slightly when we also included E&M visits.

For procedures with 10-day global periods, approximately 0.5 percent had a post-operative visit reported using HCPCS code 99024 on the fourth day after the end of the procedure's global period, which coincides with two weeks after the date of the procedure (Figure D.1). When we also included E&M visits, approximately 1.6 percent of procedures had a post-operative or E&M visit on the fourth day after the end of the global period. There was a similar, but smaller, increase in visits on the eleventh day after the end of 10-day global periods, or three weeks after the procedure.

For procedures with 90-day global periods, we observed the most post-operative visits reported using HCPCS code 99024 on the second day after the end of the global period (Figure D.2), when approximately 0.3 percent of procedures had a post-operative visit. When we also included E&M visits, the percentage of procedures with a visit increased to approximately 0.8 percent on the second day after the end of the global period. There was little difference in these

results when we included visits provided only by the practitioner who furnished the original procedure or when we also included visits provided by any practitioner in the same practice and with the same specialty.

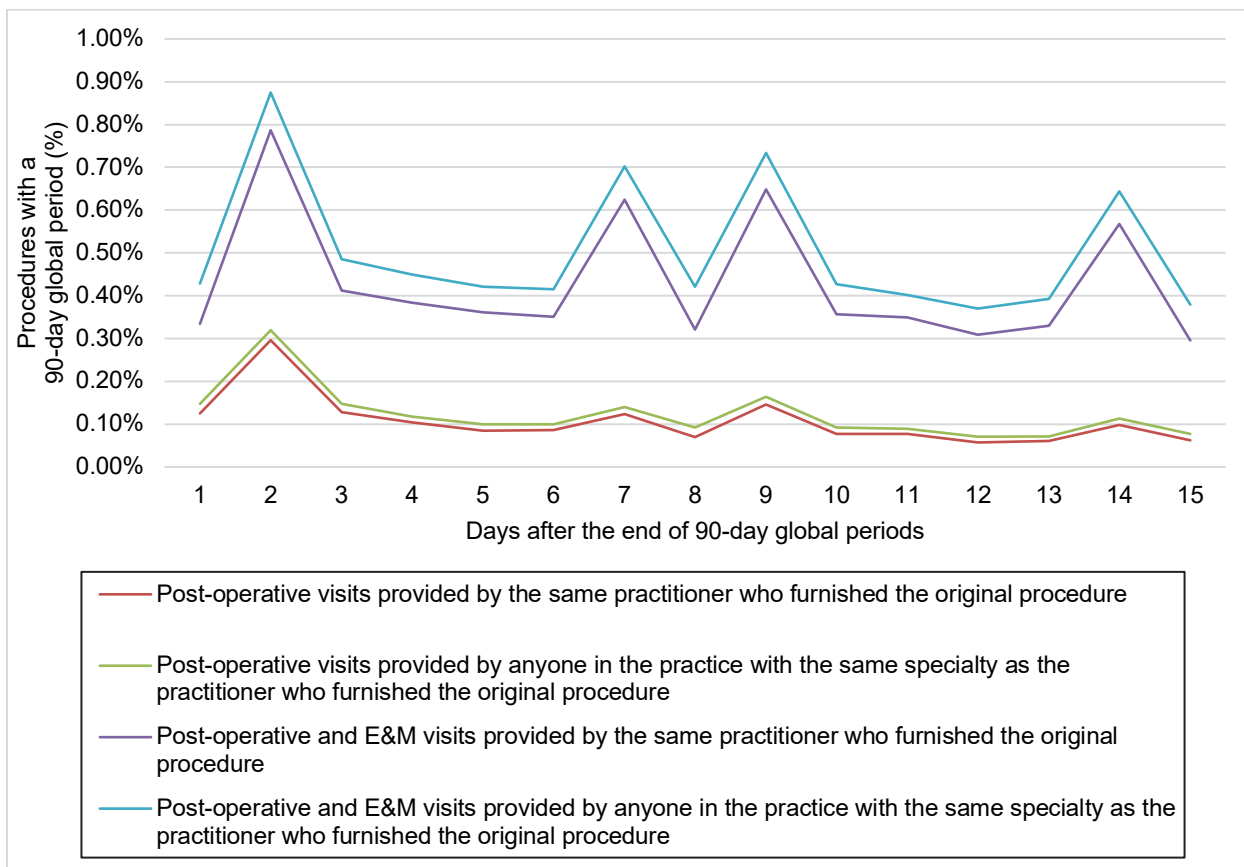
**Figure D.1. Percentage of Procedures with a 10-Day Global Period with Post-Operative Visits After the End of Global Periods by Day of Visit, Calendar Year 2019 Procedures**



SOURCE: Data are from CMS IDR, downloaded on October 22, 2020.

NOTE: The claims for HCPCS code 99024 listed in this table were linked to procedures furnished from January 1, 2019, through December 31, 2019. The study sample includes clean procedures that were performed between January 1, 2019, and December 31, 2019, in one of the nine states in a practice with ten or more practitioners and post-operative visits occurring during the global periods. For E&M visits, we include the following codes: HCPCS codes 99201–99205, 99211–99215, 99221–99223, 99231–99233, 99238, 99239, and 99291–99292.

**Figure D.2. Percentage of Procedures with a 90-Day Global Period with Post-Operative Visits After the End of Global Periods by Day of Visit, Calendar Year 2019 Procedures**



SOURCE: Data are from CMS IDR, downloaded on October 22, 2020.

NOTE: The claims for HCPCS code 99024 listed in this table were linked to procedures furnished from January 1, 2019, through December 31, 2019. The study sample includes clean procedures that were performed between January 1, 2019, and December 31, 2019, in one of the nine states in a practice with ten or more practitioners and post-operative visits occurring during the global periods. For E&M visits, we include the following codes: HCPCS codes 99201–99205, 99211–99215, 99221–99223, 99231–99233, 99238, 99239, and 99291–99292.

## Conclusions

Given the low rate for reporting of post-operative visits, we examined whether post-operative visits may be occurring after global periods. In this sensitivity analysis, we examined the number and type of post-operative visits occurring after the end of global periods. We found that some post-operative visits occurred after the end of global periods, particularly for procedures with 10-day global periods; however, they did not occur frequently enough to have a substantive effect on our results.

## Appendix E. Comparison of the Share of Post-Operative Visits Using Two Methods to Identify Clean Procedures

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In this report, we limited our analysis to *clean procedures*—defined as billed procedures with a 10- or 90-day global period with one billed unit of service—that do not occur within the global period of another procedure with a 10- or 90-day global period. This allowed us to more easily link a given procedure and post-operative visit. In this appendix, we explore the impact of a different definition of clean procedures.

The alternative definition is best illustrated with an example. Let us say that a beneficiary had two cataract surgeries (HCPCS 66984; 90-day global period) one week apart. In the definition of clean procedures used in the analyses of this report, the first procedure is included, but the second procedure is excluded from analysis because it occurs in the global period of the first procedure. An alternative method to define clean procedures excludes both the first and the second procedures. The rationale for this alternative definition is that a post-operative visit that occurred after the second procedure could involve post-operative care for both the first and the second cataract surgery. In this appendix, we compare these two definitions of clean procedures in terms of the share of procedures with one or more post-operative visits and the ratio of observed to expected post-operative visits provided.

### Methods Overview

In this appendix, we replicated several analyses from Chapter 5 using two different clean procedure definitions:

- **Primary clean procedures** are procedures with 10- or 90-day global periods that do not occur within the global period of any prior procedure with a 10- or 90-day global period on a different date of service. This is the definition of clean procedures used in the main results of this report.
- **Alternative clean procedures** are clean procedures excluding procedures that have a global period that overlaps with the global period of a subsequent procedure (i.e., this definition excludes procedures that are the first procedure in a series of procedures with overlapping 10- or 90-day global periods).

Further details pertaining to the linkage of post-operative visits to clean procedures are described in Chapter 2 and are otherwise unchanged.

### Results

The alternative definition for clean procedures resulted in 45,868, or 4.3 percent, fewer clean procedures with 10-day global periods and 140,608, or 30.0 percent, fewer clean procedures with

90-day global periods (Table E.1). The overall impact of using the alternative definition for clean procedures did not result in large differences in the share of procedures with one or more post-operative visits or the ratio of observed to expected post-operative visits provided. For clean procedures with 10-day global periods, the share of procedures with one or more post-operative visits decreased by 0.4 percentage points, from 3.5 percent to 3.1 percent, and the ratio of observed to expected post-operative visits that were provided decreased by 0.005, from 0.040 to 0.035. Likewise, for clean procedures with 90-day global periods, the share of procedures with one or more post-operative visits decreased by 1.1 percentage points, from 70.0 percent to 68.9 percent, and the ratio of observed to expected post-operative visits provided decreased by 0.055, from 0.381 to 0.326.

**Table E.1. Share of Calendar Year 2019 Procedures with Any Post-Operative Visits and Ratio of Observed to Expected Post-Operative Visits Provided, Primary and Alternative Clean Procedures**

Clean Procedure Definition	Total Procedures	Total Procedures with Any Post-Operative Visits	Share of Procedures with Any Post-Operative Visits (%)	Total Expected Post-Operative Visits	Total Reported Post-Operative Visits	Ratio of Observed to Expected Post-Operative Visits
Procedures with 10-day global periods						
Primary	1,078,108	37,434	3.5	1,121,254	45,107	0.040
Alternative	1,032,240	32,281	3.1	1,070,270	37,429	0.035
Procedures with 90-day global periods						
Primary	469,074	328,502	70.0	2,330,916	887,942	0.381
Alternative	328,466	226,352	68.9	1,694,065	552,024	0.326

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Procedure counts included in this table are limited to the procedure codes for primary clean procedures and alternative 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.

### *Results for Procedures with 10-Day Global Periods*

We first focus on the 20 highest-volume procedures with 10-day global periods as ranked by primary clean procedure volume (Table E.2). Of the 10-day global procedures excluded by the alternative definition of clean procedures but included using the primary definition, more than half are for three dermatology procedures (HCPCS codes 17000, 17004, and 17110). Among these 20 highest-volume procedures, using the alternative clean procedure definition resulted in little or no change in the percentage of procedures with one or more post-operative visits and the ratio of observed to expected post-operative visits provided.

Across all of the procedures with 10-day global periods, the share of procedures with one or more post-operative visits was similar across the two definitions of clean procedures (3.5 percent using the primary definition, 3.1 percent using the alternative definition) (Table E.3). Across practice size, place of service, and specialty, there were similar differences between the percentages using the primary and alternative definitions for clean procedures. When we categorize the procedures by the place of service where they were performed, the largest differences were for emergency or urgent care settings (4.2 percent using the definition of primary clean procedures, 3.3 percent using the definition of alternative clean procedures) and inpatient procedures (10.6 percent using the definition of primary clean procedures, 9.4 percent using the definition of alternative clean procedures); however, these settings accounted for less than five percent of procedures with 10-day global periods. Among specialties performing at least 10,000 procedures, the largest difference was for diagnostic radiology (2.5 percent using the definition of primary clean procedures, 1.5 percent using the definition of alternative clean procedures).

Among procedures with 10-day global periods, the ratio of observed to expected post-operative visits provided was also similar using the definitions of primary and alternative clean procedures across practice size, place of service, and specialty (Table E.4). Overall, the ratio of observed to expected post-operative visits provided was 0.040 for primary clean procedures with 10-day global periods, compared with 0.035 for alternative clean procedures. In office settings, where most procedures with 10-day global periods occur, the ratio of observed to expected post-operative visits provided was 0.033 for primary clean procedures compared with 0.029 for alternative clean procedures. Among specialties performing at least 10,000 procedures, the largest difference was for diagnostic radiology (0.034 using the definition of primary clean procedures, 0.015 using the definition of alternative clean procedures).

**Table E.2. Highest-Volume Calendar Year 2019 Procedures with 10-Day Global Periods, Share of Procedures with Any Post-Operative Visits, and Ratio of Observed to Expected Post-Operative Visits Provided**

HCPCS	Short Description	Total Clean Procedures			Share of Procedures with Any Post-Operative Visits (%)		Ratio of Observed to Expected Visits	
		Primary Clean Procedures	Alternative Clean Procedures	Difference (Alternative – Primary Procedures)	Primary Clean Procedures	Alternative Clean Procedures	Primary Clean Procedures	Alternative Clean Procedures
	All procedures with 10-day global periods	1,078,108	1,032,240	-45,868	3.5	3.1	0.040	0.035
17000	Destruct premalg lesion	501,590	486,804	-14,786	0.7	0.5	0.008	0.006
17110	Destruct b9 lesion 1–14	130,138	127,079	-3,059	0.7	0.6	0.007	0.005
17004	Destroy premal lesions 15/>	67,789	65,060	-2,729	0.6	0.5	0.012	0.009
64635	Destroy lumb/sac facet jnt	34,579	32,086	-2,493	1.5	1.3	0.143	0.130
10060	Drainage of skin abscess	26,075	24,449	-1,626	9.8	9.3	0.290	0.288
13132	Cmplx rpr f/c/c/m/n/ax/g/h/f	23,756	20,872	-2,884	27.3	27.3	0.026	0.022
17262	Destruction of skin lesions	16,294	15,699	-595	2.2	1.9	0.044	0.037
36561	Insert tunneled cv cath	14,615	14,235	-380	5.0	4.7	0.063	0.035
36558	Insert tunneled cv cath	13,095	11,210	-1,885	4.7	2.9	0.113	0.098
10061	Drainage of skin abscess	12,394	11,427	-967	13.3	12.5	0.013	0.012
46221	Ligation of hemorrhoid(s)	10,498	10,112	-386	1.2	1.1	0.163	0.155
13121	Cmplx rpr s/a/l 2.6–7.5 cm	10,090	9,122	-968	14.2	13.6	0.011	0.009
64633	Destroy cerv/thor facet jnt	9,410	8,792	-618	1.5	1.3	0.108	0.111
65855	Trabeculoplasty laser surg	9,018	7,937	-1,081	9.9	10.4	0.027	0.019
68761	Close tear duct opening	8,525	8,171	-354	2.4	1.7	0.046	0.034
36589	Removal tunneled cv cath	8,306	7,297	-1,009	4.1	3.4	0.007	0.004
64612	Destroy nerve face muscle	6,909	6,710	-199	0.6	0.4	0.016	0.014
17261	Destruction of skin lesions	6,866	6,637	-229	1.6	1.4	0.130	0.128
11750	Removal of nail bed	6,731	6,500	-231	12.4	12.4	0.054	0.049
36590	Removal tunneled cv cath	6,263	6,014	-249	6.8	6.5	0.006	0.005

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Procedure counts included in this table are limited to the procedure codes for primary clean procedures and alternative 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. 17000 = destruction, premalignant lesions; first lesion. 17110 = destruction of benign lesions other than skin tags or cutaneous vascular proliferative lesions, up to 14



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lesions. 17004 = destruction, premalignant lesions, 15 or more lesions. 64635 = destruction by neurolytic agent, paravertebral facet joint nerve(s), with imaging guidance; lumbar or sacral, single facet joint. 10060 = drainage of abscess. 13132 = reconstructive procedures, complicated wound closure: forehead, cheeks, chin, mouth, neck, axillae, genitalia, hands, and/or feet (2.6–7.5 cm). 17262 = destruction of malignant lesion of trunk, arms, or legs (1.1–2.0 cm). 36561 = insertion of central venous catheter and implanted device for infusion beneath the skin, patient 5 years or older. 36558 = insertion of central venous catheter for infusion, patient 5 years or older. 10061 = incision and drainage of abscess; complicated or multiple. 13121 = reconstructive procedures, complicated wound closure: scalp, arms, and/or legs (2.6–7.5 cm). 64633 = destruction of upper or middle spinal facet joint nerves using imaging guidance. 65855 = trabeculoplasty by laser surgery. 68761 = closure of the lacrimal punctum, each plug. 36589 = removal of central venous catheter for infusion. 64612 = injection of chemical for destruction of nerve muscles on one side of face. 17261 = destruction of malignant lesion of trunk, arms, or legs (0.6–1.0 cm). 11750 = excision of nail and nail matrix, partial or complete, for permanent removal. 36590 = removal of peripheral venous catheter for infusion.

**Table E.3. Share of Calendar Year 2019 Procedures with 10-Day Global Periods with Any Post-Operative Visits**

	Primary Clean Procedures			Alternative Clean Procedures		
	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	1,078,108	37,434	3.5	1,032,240	32,281	3.1
Practice size						
10–24 practitioners	382,371	11,513	3.0	365,897	9,777	2.7
25–99 practitioners	351,336	12,459	3.5	335,699	10,645	3.2
100 or more practitioners	344,401	13,462	3.9	330,644	11,859	3.6
Procedure place of service						
Ambulatory surgical center	28,633	2,246	7.8	26,030	2,021	7.8
Emergency or urgent care	21,979	930	4.2	20,305	680	3.3
Inpatient	25,656	2,712	10.6	22,158	2,073	9.4
Off-campus hospital outpatient	30,689	905	2.9	29,791	797	2.7
Office	886,124	25,903	2.9	852,134	22,354	2.6
Outpatient hospital	70,648	4,719	6.7	67,666	4,344	6.4
Other	14,379	19	0.1	14,156	12	0.1
Specialty <sup>a</sup>						
Anesthesiology	9,229	204	2.2	8,538	184	2.2
Dermatology	510,258	15,783	3.1	490,215	13,573	2.8
Diagnostic radiology	23,996	601	2.5	21,792	328	1.5
General surgery	22,298	4,117	18.5	21,291	3,845	18.1
Hand surgery	283	90	31.8	271	87	32.1
Interventional pain management	13,660	278	2.0	12,880	255	2.0
Neurology	19,319	130	0.7	18,776	96	0.5
Neurosurgery	2,356	542	23.0	2,253	512	22.7
NP/PA	283,985	3,786	1.3	274,966	3,062	1.1
Ophthalmology	34,558	2,567	7.4	31,384	2,128	6.8
Optometry	2,921	68	2.3	2,816	52	1.8
Orthopedic surgery	3,948	762	19.3	3,780	714	18.9
Otolaryngology	10,932	866	7.9	10,437	796	7.6
Pain management	16,387	415	2.5	15,314	370	2.4
Pathologic anatomy, clinical pathology	12	3	25.0	9	3	33.3
Plastic and reconstructive surgery	4,418	1,009	22.8	4,122	920	22.3
Podiatry	25,726	1,454	5.7	24,649	1,309	5.3
Primary care	38,713	1,609	4.2	37,510	1,423	3.8
Urology	2,439	650	26.7	2,247	595	26.5
Vascular surgery	5,289	572	10.8	4,698	463	9.9
All other specialties	47,381	1,928	4.1	44,292	1,566	3.5

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTES: The claims for HCPCS code 99024 listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Procedure counts included in this table are limited to the procedure codes for clean procedures and restrictive 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.

<sup>a</sup> Lists the top 20 specialties by procedure volume.

**Table E.4. Ratios of Observed to Expected Post-Operative Visits Provided for Calendar Year 2019  
Procedures with 10-Day Global Periods**

	Primary Clean Procedures			Alternative Clean Procedures		
	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	1,121,254	45,107	0.040	1,070,270	37,429	0.035
Practice size						
10–24 practitioners	396,096	13,022	0.033	378,172	10,751	0.028
25–99 practitioners	370,138	14,755	0.040	352,418	12,060	0.034
100 or more practitioners	355,020	17,330	0.049	339,681	14,618	0.043
Procedure place of service						
Ambulatory surgical center	39,962	2,503	0.063	36,178	2,216	0.061
Emergency or urgent care	28,887	1,372	0.047	26,606	858	0.032
Inpatient	36,572	5,657	0.155	31,538	3,979	0.126
Off-campus hospital outpatient	30,250	1,018	0.034	29,298	870	0.030
Office	886,123	29,000	0.033	851,296	24,552	0.029
Outpatient hospital	84,896	5,535	0.065	81,018	4,939	0.061
Other	14,565	22	0.002	14,338	15	0.001
Specialty <sup>a</sup>						
Anesthesiology	12,863	227	0.018	11,867	199	0.017
Dermatology	510,972	17,118	0.034	490,874	14,485	0.030
Diagnostic radiology	34,498	1,162	0.034	31,338	484	0.015
General surgery	28,688	5,817	0.203	27,363	5,183	0.189
Hand surgery	315	120	0.381	301	113	0.375
Interventional pain management	19,180	301	0.016	18,055	266	0.015
Neurology	3,697	139	0.038	3,583	96	0.027
Neurosurgery	3,463	716	0.207	3,311	651	0.197
NP/PA	287,103	4,677	0.016	277,688	3,636	0.013
Ophthalmology	37,935	2,897	0.076	33,729	2,328	0.069
Optometry	2,973	77	0.026	2,857	58	0.020
Orthopedic surgery	5,414	1,015	0.187	5,185	936	0.181
Otolaryngology	9,711	965	0.099	9,245	865	0.094
Pain management	23,362	448	0.019	21,792	392	0.018
Pathologic anatomy, clinical pathology	14	4	0.286	11	4	0.381
Plastic and reconstructive surgery	4,446	1,152	0.259	4,142	1,032	0.249
Podiatry	27,000	1,676	0.062	25,817	1,454	0.056
Primary care	40,046	2,137	0.053	38,747	1,811	0.047
Urology	2,509	756	0.301	2,313	688	0.298
Vascular surgery	7,762	890	0.115	6,889	681	0.099
All other specialties	59,307	2,813	0.047	55,168	2,067	0.037

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTES: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Procedure counts included in this table are limited to the procedure codes for primary clean procedures and alternative 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 2019 Physician Time File.

<sup>a</sup> Lists the top 20 specialties by volume.

### *Results for Procedures with 90-Day Global Periods*

We next turn to the 20 highest-volume 90-day global procedures (Table E.5). Approximately 40 percent of all procedures with a 90-day global period that were excluded from the alternative clean procedures were for cataract surgery procedures (HCPCS 66984 and 66821), and another 4 percent were for total knee arthroplasty (HCPCS 27447). For cataract surgery (HCPCS 66984), the share of clean procedures with one or more post-operative visits dropped by 4.8 percentage points when using the alternative clean procedure definition (75.9 versus 71.1 percent) and the ratio of observed to expected post-operative visits that were provided decreased by 0.178 (0.600 to 0.422). The changes across other procedures with 90-day global periods in the share of procedures with one or more post-operative visits and the ratio of observed to expected post-operative visits provided were more modest.

Overall, under the alternative clean procedure definition, 68.9 percent of 90-day global period procedures had one or more post-operative visits, compared with 70.0 percent using the primary clean procedure definition. Across practice size, place of service, and specialty, there were similar differences between the primary and alternative definitions for clean procedures (Table E.6). Among specialties performing more than 10,000 procedures, ophthalmology had the largest difference between the two definitions (68.1 percent using the primary clean procedures definition, 62.8 percent using the alternative clean procedures definition).

The ratio of observed to expected post-operative visits that were provided was also generally similar across practice size, place of service, and specialty between primary and alternative clean procedures (Table E.7). Overall, the ratio of observed to expected post-operative visits provided was 0.381 for primary clean procedures with 90-day global periods, compared with 0.326 for alternative clean procedures. At practices with 10–24 NPIs, the ratio of observed to expected post-operative visits provided was 0.348 for primary clean procedures, compared with 0.263 for alternative clean procedures. Among specialties performing more than 10,000 procedures, ophthalmology had the largest difference between the two definitions (0.527 percent using the primary clean procedures definition, 0.382 percent using the alternative clean procedures definition).

**Table E.5. Highest-Volume Calendar Year 2019 Procedures with 90-Day Global Periods, Share of Procedures with Any Post-Operative Visits and Ratio of Observed to Expected Post-Operative Visits Provided**

HCPCS	Short Description	Total Clean Procedures			Share of Procedures with Any Post-Operative Visits		Ratio of Observed to Expected Visits	
		Primary Clean Procedures	Alternative Clean Procedures	Difference (Alternative – Primary Procedures)	Primary Clean Procedures	Alternative Clean Procedures	Primary Clean Procedures	Alternative Clean Procedures
	All procedures with 90-day global periods	469,074	328,466	-140,608	70.0	68.9	0.381	0.326
66984	Cataract surg w/iol 1 stage	61,325	18,308	-43,017	75.9	71.1	0.600	0.422
27447	Total knee arthroplasty	41,769	35,138	-6,631	81.0	80.6	0.325	0.310
66821	After cataract laser surgery	35,613	20,281	-15,332	52.3	49.4	0.344	0.277
27130	Total hip arthroplasty	24,544	20,708	-3,836	80.8	80.4	0.305	0.289
33208	Insrt heart pm atrial and vent	13,545	10,883	-2,662	52.8	50.5	0.356	0.316
27245	Treat thigh fracture	12,306	10,966	-1,340	68.7	67.5	0.252	0.241
47562	Laparoscopic cholecystectomy	12,017	10,241	-1,776	70.0	68.7	0.369	0.334
64721	Carpal tunnel surgery	9,604	6,901	-2,703	74.3	73.4	0.394	0.357
33533	Cabg arterial single	8,276	6,893	-1,383	78.3	77.6	0.508	0.464
27236	Treat thigh fracture	8,158	7,078	-1,080	68.4	67.5	0.265	0.249
23472	Reconstruct shoulder joint	7,832	6,549	-1,283	84.4	83.9	0.310	0.300
66982	Cataract surgery complex	6,723	2,756	-3,967	75.5	74.4	0.586	0.459
63047	Remove spine lamina 1 lmr	6,608	5,302	-1,306	76.4	75.3	0.320	0.296
14060	Tis tmfr e/n/e/l 10 sq cm/<	6,481	4,113	-2,368	52.8	51.2	0.216	0.192
50590	Fragmenting of kidney stone	6,354	4,596	-1,758	54.8	52.1	0.265	0.221
52601	Prostatectomy (turp)	6,100	4,826	-1,274	68.3	67.3	0.629	0.592
29881	Knee arthroscopy/surgery	5,820	4,798	-1,022	75.4	74.6	0.432	0.413
26055	Incise finger tendon sheath	5,641	4,363	-1,278	74.8	73.5	0.348	0.317
33249	Insj/rplcmt defib w/lead(s)	5,116	4,298	-818	49.6	47.6	0.330	0.296
49505	Prp i/hern init reduc >5 yr	5,044	4,076	-968	76.6	75.6	0.451	0.414

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTE: The claims for HCPCS code 99024 listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Procedure counts included in this table are limited to the procedure codes for primary clean procedures and alternative clean procedures that were linked to

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post-operative visits for practitioners in practices with ten or more practitioners in the nine states where reporting of post-operative visits was required. 66984 = extracapsular cataract removal with insertion of intraocular lens prosthesis, manual or mechanical technique. 27447 = total knee arthroplasty. 66821 = discission of secondary membranous cataract; stab incision technique; laser surgery. 27130 = total hip arthroplasty, with or without autograft or allograft. 33208 = insertion of new or replacement of permanent pacemaker with transvenous electrode(s); atrial and ventricular. 27245 = surgical treatment of broken thigh bone. 47562 = removal of gallbladder using an endoscope. 64721 = release and/or relocation of median nerve of hand. 33533 = heart artery bypass to repair one artery. 27236 = open treatment of broken thigh bone with insertion of hardware or prosthetic replacement. 23472 = prosthetic repair of shoulder joint. 66982 = extracapsular cataract removal with insertion of intraocular lens prosthesis (one-stage procedure). 63047 = partial removal of middle spine bone with release of spinal cord and/or nerves. 14060 = tissue transfer repair of wound (10 square centimeters or less) of eyelids, nose, ears, and/or lips. 52601 = prostatectomy (transurethral resection of the prostate). 26055 = incision of tendon covering. 33249 = insertion or replacement of single or dual chamber pacing defibrillator leads. 49505 = repair of groin hernia patient age 5 years or older.

**Table E.6. Share of Calendar Year 2019 Procedures with 90-Day Global Periods with Any Post-Operative Visits**

	Primary Clean Procedures			Alternative Clean Procedures		
	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	469,074	328,502	70.0	328,466	226,352	68.9
Practice size						
10–24 practitioners	128,186	75,753	59.1	74,616	41,820	56.0
25–99 practitioners	129,214	95,211	73.7	93,448	67,612	72.4
100 or more practitioners	211,674	157,538	74.4	160,402	116,920	72.9
Procedure place of service						
Ambulatory surgical center	109,692	76,381	69.6	53,994	36,103	66.9
Emergency or urgent care	1,063	520	48.9	678	267	39.4
Inpatient	161,759	119,749	74.0	133,059	97,294	73.1
Off-campus hospital outpatient	9,965	8,174	82.0	6,450	5,136	79.6
Office	55,789	29,727	53.3	36,143	19,043	52.7
Outpatient hospital	130,769	93,937	71.8	98,109	68,497	69.8
Other	37	14	37.8	33	12	36.4
Specialty <sup>a</sup>						
Anesthesiology	32	17	53.1	23	11	47.8
Dermatology	18,202	8,980	49.3	10,282	4,910	47.8
Diagnostic radiology	49	11	22.4	35	7	20.0
General surgery	52,966	39,349	74.3	42,068	30,812	73.2
Hand surgery	11,058	8,657	78.3	8,374	6,519	77.8
Interventional pain management	4	2	50.0	2	0	0.0
Neurology	158	128	81.0	135	106	78.5
Neurosurgery	14,549	10,751	73.9	11,675	8,498	72.8
NP/PA	3,826	2,493	65.2	2,809	1,799	64.0
Ophthalmology	119,946	81,736	68.1	53,270	33,470	62.8
Optometry	1,093	595	54.4	630	293	46.5
Orthopedic surgery	153,446	118,055	76.9	127,534	97,110	76.1
Otolaryngology	4,185	2,701	64.5	3,250	2,033	62.6
Pain management	41	19	46.3	33	13	39.4
Pathologic anatomy, clinical pathology	15,509	7,685	49.6	12,718	6,012	47.3
Plastic and reconstructive surgery	4,605	2,673	58.0	3,113	1,823	58.6
Podiatry	4,858	3,044	62.7	3,563	2,138	60.0
Primary care	1,303	708	54.3	1,076	556	51.7
Urology	16,766	10,491	62.6	12,665	7,739	61.1
Vascular surgery	12,118	7,897	65.2	7,920	5,064	63.9
All other specialties	34,360	22,510	65.5	27,291	17,439	63.9

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTES: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Procedure counts included in this table are limited to the procedure codes for primary clean procedures and alternative 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 2019 Physician Time File.

<sup>a</sup> Lists the top 20 specialties by volume.

**Table E.7. Ratios of Observed to Expected Post-Operative Visits Provided for Calendar Year 2019  
Procedures with 90-Day Global Periods**

	Primary Clean Procedures			Alternative Clean Procedures		
	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	2,330,916	887,942	0.381	1,694,065	552,024	0.326
Practice size						
10–24 practitioners	575,786	200,117	0.348	351,568	92,607	0.263
25–99 practitioners	677,198	249,615	0.369	509,104	163,752	0.322
100 or more practitioners	1,077,933	438,210	0.407	833,394	295,665	0.355
Procedure place of service						
Ambulatory surgical center	432,549	210,520	0.487	206,688	75,815	0.367
Emergency or urgent care	5,099	1,699	0.333	3,257	816	0.251
Inpatient	1,139,959	385,488	0.338	939,462	292,568	0.311
Off-campus hospital outpatient	37,698	21,501	0.570	24,030	10,491	0.437
Office	193,423	55,816	0.289	126,300	34,265	0.271
Outpatient hospital	522,017	212,896	0.408	394,174	138,050	0.350
Other	172	22	0.128	156	19	0.122
Specialty <sup>a</sup>						
Anesthesiology	131	34	0.261	95	21	0.221
Dermatology	78,489	15,650	0.199	44,235	7,755	0.175
Diagnostic radiology	165	19	0.115	124	12	0.097
General surgery	227,327	96,718	0.425	178,699	68,382	0.383
Hand surgery	46,283	18,254	0.394	35,703	12,979	0.364
Interventional pain management	20	5	0.256	7	0	0.000
Neurology	1,087	444	0.408	927	338	0.365
Neurosurgery	100,313	29,626	0.295	79,915	21,808	0.273
NP/PA	15,088	6,002	0.398	10,944	4,144	0.379
Ophthalmology	457,594	241,327	0.527	194,022	74,140	0.382
Optometry	2,189	751	0.343	1,263	321	0.254
Orthopedic surgery	1,008,521	318,773	0.316	844,667	251,540	0.298
Otolaryngology	17,547	5,447	0.310	13,465	3,807	0.283
Pain management	303	29	0.096	241	18	0.075
Pathologic anatomy, clinical pathology	40,939	14,823	0.362	33,510	10,659	0.318
Plastic and reconstructive surgery	19,863	5,915	0.298	13,422	3,763	0.280
Podiatry	18,591	10,004	0.538	13,397	6,209	0.463
Primary care	4,924	1,856	0.377	3,996	1,253	0.314
Urology	52,499	21,482	0.409	40,027	14,907	0.372
Vascular surgery	55,770	19,943	0.358	39,286	11,511	0.293
All other specialties	34,360	22,510	65.5	146,126	58,457	0.400

SOURCE: Data are from CMS IDR, downloaded on October 14, 2020.

NOTES: The 99024-coded claims listed in this table were linked to procedures that were furnished from January 1, 2019, through December 31, 2019. Procedure counts included in this table are limited to the procedure codes for primary clean procedures and alternative 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 2019 Physician Time File.

<sup>a</sup> Lists the top 20 specialties by volume.



## Conclusions

In this appendix, we compared two different definitions of clean procedures: the primary definition used in the main results of this report, and an alternative definition that excludes any procedures with overlapping global periods. Overall, across all procedures, the change in definition did not result in substantive differences in the share of procedures with one or more post-operative visits or the ratio of observed to expected post-operative visits provided. The one exception was cataract surgeries. They account for a large share of procedures that were excluded when the alternative definition of clean procedures was used, and there was a more substantive reduction in the observed to expected ratio when the alternative definition was used. However, the results from both definitions support our major finding that practitioners are providing substantively fewer post-operative visits for procedures with 10- or 90-day global periods than expected.

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