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Office of Evaluation and Inspections

DATA SNAPSHOT

May 2026 | OEI-01-24-00250

Utilization Trends and Medicare Part B Billing for Office-Based Peripheral Vascular Procedures Raise Questions About Program Integrity

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Why OIG Did This Review

- Medicare Part B paid over \$1 billion in 2022 for peripheral vascular procedures (i.e., angioplasty, stenting, and atherectomy) that are intended to relieve leg pain due to the narrowing or blockage of arteries.
- For years, interest holders have raised concerns about potential overuse of these procedures when professional guidelines recommend that conservative treatments, such as medication and lifestyle changes, be tried first.^{1, 2, 3, 4}
- Medicare Part B payments to physicians are higher when they perform peripheral vascular procedures in office-based laboratories (OBLs) compared to other settings.
- Overuse of these procedures may lead to Medicare paying for medically unnecessary services and risks for patients, such as amputation.^{5, 6}
- This data snapshot describes utilization trends for these procedures and flags billing patterns that warrant further scrutiny.

What OIG Found

From 2019 through 2023:

- While the overall rate and Medicare Part B payment for peripheral vascular procedures decreased, physicians' use of these procedures shifted from hospital outpatient departments to OBLs.

In 2023:

- Despite routine use of atherectomy and tibial artery procedures being controversial due to potential complication risks and poor outcomes, physicians used these procedures often in OBLs (75 percent and 47 percent of procedures, respectively).
- Of payments made to physicians for peripheral vascular procedures performed in OBLs, \$105 million may indicate billing for medically unnecessary procedures.
- 26 OBL physicians accounted for 61 percent of the concerning payments we identified.

What OIG Recommends

OIG recommends that [CMS](#):

1. Monitor billing to identify peripheral vascular procedures that may be medically unnecessary, which may indicate fraud, waste, or abuse.
2. Follow up on the physicians OIG identified with concerning billing for peripheral vascular procedures.

CMS concurred with both recommendations.

Background

Peripheral vascular procedures (i.e., angioplasties, stents, and atherectomies) are used to relieve pain and improve blood flow in the legs of patients with Peripheral Artery Disease (PAD).⁷ PAD is the narrowing or blockage of arteries that carry oxygenated blood from the heart to the legs and is caused by the buildup of fatty plaque.⁸ Physicians bill Medicare for any combination of these procedures on the iliac, femoral, and tibial arterial regions (Current Procedural Terminology (CPT®) codes 37220-37235).^{9, a, b}

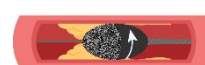
Angioplasty uses a “balloon” to widen the blocked artery.



A **stent** is a mesh tube inserted into the artery to keep it open.



Atherectomy uses rotating blades to remove plaque.



Physicians perform procedures in a variety of settings, including office-based laboratories (OBLs).

Physicians in several specialties perform peripheral vascular procedures in various settings including inpatient hospitals, hospital outpatient departments (OPDs), ambulatory surgical centers (ASCs), and OBLs.¹⁰ Medicare Part B payments to physicians are higher when they perform peripheral vascular procedures in OBLs compared to OPDs, ASCs, and inpatient hospitals.¹¹ OBLs are generally owned by a physician or physician group, and facility costs are included in the physician payment.^{12, 13} Facility costs for OPDs, ASCs, and inpatient hospitals are paid separately and go to hospitals and other entities that own these facilities.^{14, 15, 16} Medicare Part B pays facility costs to OPDs and ASCs, while Medicare Part A pays facility costs to inpatient hospitals.¹⁷

Professional societies and clinical researchers have raised concerns about overuse of atherectomies in the legs and any procedure in the tibial arterial region.

Peripheral vascular procedures are not without risk. Professional guidelines, issued in 2015 and 2024, recommend trying conservative treatment first through medications and life-style changes (e.g., exercising, quitting smoking) because treating early stages of PAD with surgical procedures may cause harm.^{18, 19} In addition, some interest holders and clinical researchers have specific concerns with the use of atherectomies and procedures in the tibial artery.^{20, 21, 22} Routine use of atherectomies is controversial because, when compared to angioplasties and stents, atherectomies may not be more effective and may have a higher risk of complications.^{23, 24} Similarly, tibial artery procedures should be rare because of a lack of relationship between PAD symptoms and tibial disease (2015 guidelines) and poor outcomes when compared to procedures in other arteries (2024 guidelines).^{25, 26}

Whistleblower fraud cases also suggest that vulnerabilities exist for peripheral vascular procedures.

Recent fraud cases have alleged physicians fraudulently billing for services never rendered and billing for unnecessary procedures. For example, a vascular surgeon fraudulently billed Medicare, Medicaid, and private insurers for stents he did not implant.²⁷ In another case, a whistleblower alleged that a cardiologist performed unnecessary atherectomy procedures to remove minor artery blockages in the legs of patients.²⁸

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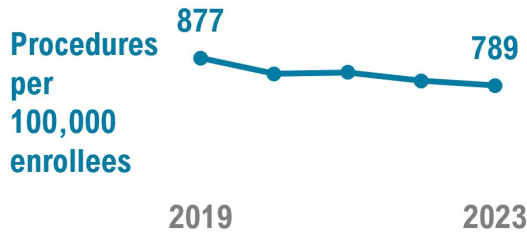
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Peripheral Vascular Procedure Trends from 2019 to 2023

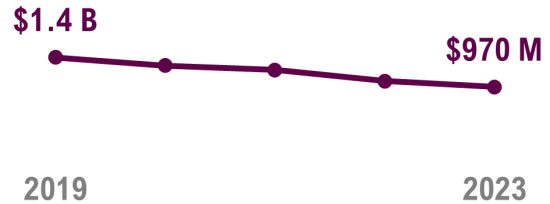
Decrease in Procedure Rate

The rate at which Medicare Part B enrollees received peripheral vascular procedures decreased 10 percent from 2019 through 2023.



Decrease in Overall Payment

Medicare Part B payments for peripheral vascular procedures decreased 33 percent from 2019 through 2023.



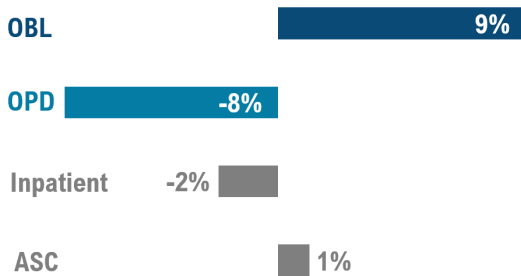
CMS Payment Changes Between 2019 and 2023



CMS lowered the average national Medicare reimbursement rate to physicians performing peripheral vascular procedures.³⁰ The declining rate of procedures paired with CMS's lowering physician reimbursement for these procedures contributed to an overall decrease in Medicare Part B payments during this time.

Shift of Procedures to OBLs

The percentage of procedures performed in OBLs increased from 2019 through 2023.

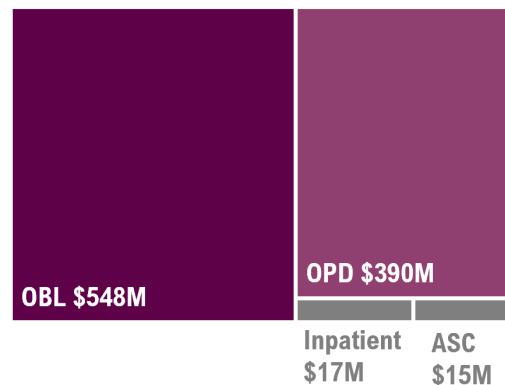


The percentage of procedures performed in OBLs increased 9 percent, from 37.8 to 46.5 percent between 2019 and 2023. In contrast, the percentages of procedures performed in OPDs and inpatient hospitals decreased from 35.1 to 27.6 percent and 26.7 to 24.6 percent, respectively. The percentage of procedures performed in ASCs increased from 0.2 to 1.3 percent.

The percentage of payments to OBLs increased from 52 to 57 percent from 2019 to 2023. In contrast, the percentage of payments to OPDs decreased from 46 to 40 percent during this time.

Most Payment to OBLs

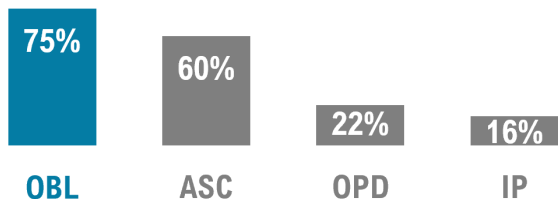
In 2023, over half of Medicare Part B payments went to physicians performing procedures in OBLs.



OBLs are generally standalone physician offices, so the shift of procedures to OBLs may have benefits for patients including increased convenience, comfort, and potentially better access to peripheral vascular procedures.³¹ However, some research suggests that higher physician payments in the OBL may incentivize overuse of these procedures.³²

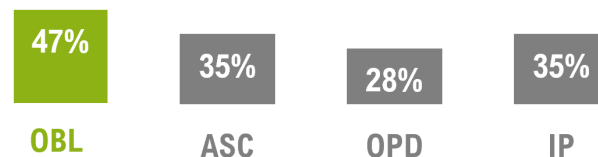
In 2023, physicians used atherectomy and tibial artery procedures more in OBLs than in other settings

Three-quarters of procedures in OBLs included an atherectomy in 2023.



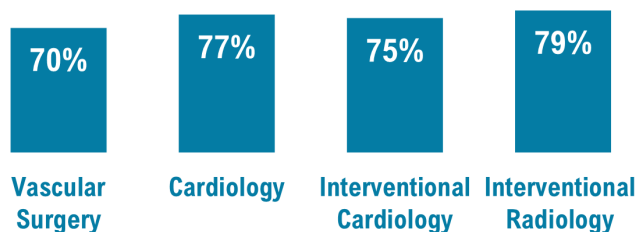
The high percentage of atherectomy procedures indicates that they are common and routine in OBLs. However, this raises concerns because when compared to angioplasties and stents, some research indicates, atherectomy may not be more effective and has a higher risk of complications.^{33, 34}

Almost half of procedures in OBLs involved tibial arteries in 2023.

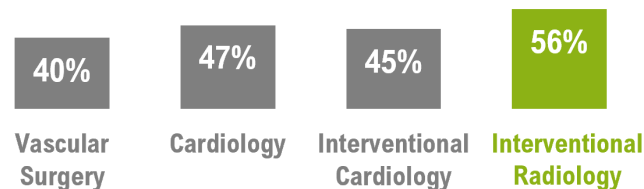


This is concerning because 2015 professional guidelines questioned the relationship between PAD symptoms and tibial disease.³⁵ Updated 2024 guidelines also state that tibial procedures have poor outcomes compared to procedures in other arteries.³⁶ An expert told us that procedures in the tibial artery should be rare and are generally performed to avoid a foot amputation.

The top four physician specialties had a similar pattern of atherectomy use in OBLs.



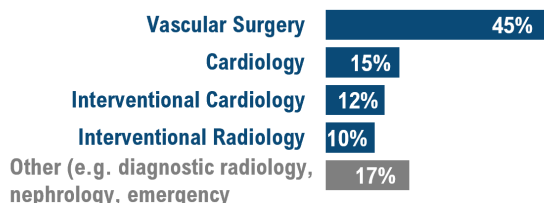
Interventional radiologists used tibial artery procedures in OBLs more than the other top physician specialties.



Top Four Physician Specialties



Physicians in 35 specialties performed peripheral vascular procedures in 2023, with physicians in four specialties performing most procedures.



Related CMS Coverage Determinations



CMS has had a national coverage policy for angioplasties since at least 2001, and since 2004 for stents in the iliac, femoral, and popliteal arteries, but it does not mention tibial arteries or atherectomies.³⁷

In 2023, 19 percent of payments (\$105M of \$548M) to physicians for peripheral vascular procedures performed in OBLs were concerning

Overall, we identified \$105 million in concerning payments to physicians for peripheral vascular procedures performed in OBLs in 2023. These payments went to 7 percent (139 of 2,069) of billing physicians. We identified these physicians and payments using four measures that may indicate billing for more procedures than medically necessary: (1) billing a tibial procedure for at least 95 percent of Medicare patients; (2) billing a high average number of peripheral vascular procedures per Medicare patient; (3) frequently billing for more complex peripheral vascular procedures per surgical session; and (4) billing a high percentage of patients with early-stage PAD. See the Methodology section on page 8 for how we selected the measures and related thresholds. Although determining whether these physicians engaged in abusive or fraudulent practices was not within the scope of this study, their billing patterns warrant further scrutiny.

Note: The numbers below do not sum to the overall total because a physician and their payments could be included in more than one measure.

\$61.2 Million

- 1) **We identified 82 physicians who billed a tibial procedure for at least 95 percent of their Medicare patients.** In contrast, on average, all other physicians treated 57 percent of their patients with a procedure on a tibial artery. Tibial procedures should be rare, as 2015 professional guidelines state no clear relationship between PAD symptoms and tibial disease.³⁸ Furthermore, 2024 guidelines state that tibial procedures have poor outcomes compared to procedures in other arteries.³⁹



Medicare paid a physician over \$5M for treating about 100 Medicare patients in 2023. All but one patient had a tibial procedure, and most patients had two tibial procedures.

\$42.2 Million

- 2) **We identified 43 physicians who billed a high average number of peripheral vascular procedures per Medicare patient.** These physicians billed for an average of 5.7 procedures per Medicare patient compared to 2.3 procedures for all other physicians. Although it is not uncommon for patients to have multiple procedures over time, each procedure carries risks, such as the need for amputation in the future.^{40, 41}



Medicare paid a physician almost \$4M in 2023 for 7 procedures per Medicare patient, on average. One patient had 24 procedures.

\$20.7 Million

- 3) **We identified 26 physicians who frequently billed for more complex procedures in a surgical session.** On average, 84 percent of surgical sessions for these physicians included an atherectomy in both femoral and tibial arteries compared to 27 percent of the surgical sessions for all other physicians. Routine use of atherectomy is controversial, and whistleblower fraud cases have alleged providers billing for unnecessary atherectomies.^{42, 43}



Medicare paid a physician over \$4M for 304 surgical sessions in 2023. This physician included at least one of the two most complex procedures in 82 percent of their surgical sessions.

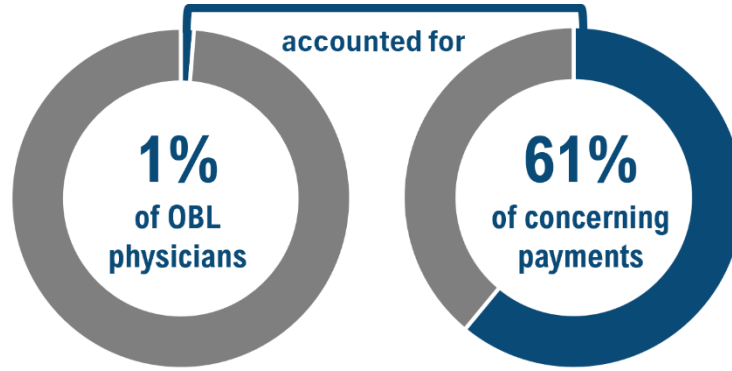
\$18.2 Million

- 4) **We identified 38 physicians who treated at least 94 percent of their Medicare patients for early-stage PAD.** All other physicians, on average, treated 21 percent of their patients for early-stage PAD. Research indicates that treating early stages of PAD with peripheral vascular procedures can increase an individual's risk for amputation. Therefore, professional guidelines recommend first trying medications and lifestyle changes such as exercise and quitting smoking.^{44, 45}



Medicare paid a physician over \$3M in 2023 for treating all of their Medicare patients for early-stage PAD. Ninety-three percent of patients had symptoms only in the left leg and 7 percent of patients had symptoms in both legs.

One percent of physicians who performed procedures in OBLs (26 of 2,069) accounted for almost two-thirds of the concerning payments (\$64M of \$105M) we identified

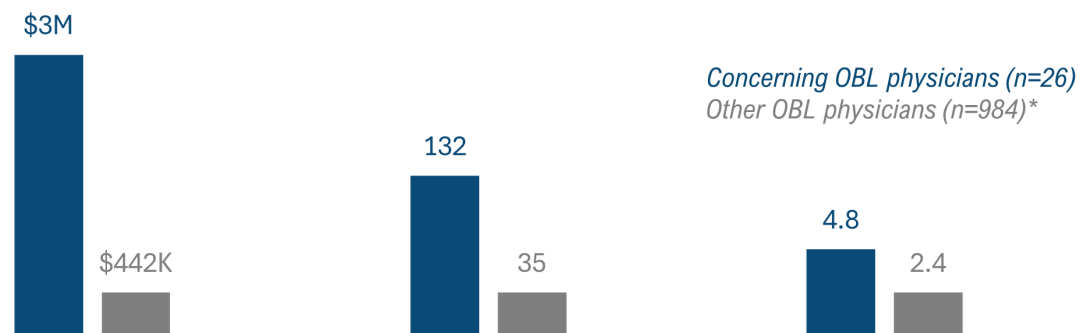


The 26 physicians responsible for most of the concerning payments we identified were high-volume providers when compared to other physicians performing peripheral vascular procedures in OBLs.

7x the average paid amount per physician

4x the average number of Medicare patients

2x the average number of procedures per patient



**We excluded OBL physicians with fewer than 20 claim lines for these procedures in 2023.*

A few physician specialties and one State were represented more frequently than others among these 26 physicians. Specifically, most of these physicians were interventional radiologists, vascular surgeons, or cardiologists. In addition, 11 of these physicians practiced in California, while 4 practiced in Texas and 1 to 3 physicians practiced in each of 8 other States. In addition, more than half of these physicians (17 of 25) practiced in Medicare Fraud Strike Force areas, which are known to be common high-fraud, metropolitan areas.

Related CMS Program Integrity Activities



In 2019 and 2020, CMS issued two Comparative Billing Reports (CBRs) regarding peripheral vascular procedures to 3,068 physicians. Each year, CMS selects two CBRs to repeat and evaluate their impact, and neither of these CBRs were selected since issued.^{46, 47}

Since 2019, CMS and its contractors conducted 46 Targeted Probe and Educate Reviews, 11 of which resulted in about \$350,000 of recoupment from improperly billed claims. They also conducted 7 Medical Record Reviews and identified 15 providers with overpayments in 44 completed investigations. Lastly, they initiated a claims analysis project to identify physicians excessively billing atherectomies and other procedures for PAD.

Conclusion and Recommendations

This data snapshot identified utilization trends and patterns in Medicare Part B claims for peripheral vascular procedures that have implications for Medicare and its enrollees. Although the overall use of these procedures has declined since 2019, physicians performed more of these procedures in OBLs.

We found that physicians used these procedures differently in OBLs in ways that raise concerns. These physicians performed more procedures whose routine use is controversial. Specifically, 75 percent of procedures in OBLs included an atherectomy and almost half of procedures were performed in the tibial arterial region. Such a high volume of procedures that lack clinical consensus on routine use raises questions.

We also found that in 2023, 19 percent of payments for peripheral vascular procedures performed in OBLs were concerning on the basis of four OIG-developed measures that may indicate billing for more procedures than medically necessary. Especially concerning is that just 26 physicians who performed procedures in OBLs accounted for almost two-thirds of the concerning payments we identified. Although we did not determine whether payments were in fact fraudulent or improper, the concentration of payments among this small number of physicians warrants further scrutiny.

Therefore, we recommend that CMS:

- 1. Monitor billing to identify peripheral vascular procedures that may be medically unnecessary, which may indicate fraud, waste, or abuse.** CMS should conduct analyses on a periodic basis to identify physicians' billing for peripheral vascular procedures that poses a risk to the Medicare program and its enrollees. To do this, CMS should use the measures in this report and others, as it deems appropriate, to identify claims or billing patterns for peripheral vascular procedures with anomalies that may indicate fraud, waste, or abuse. CMS should then take action, as appropriate. Identifying billing that poses a risk on an ongoing basis will help ensure that CMS's oversight is timely and responsive to evolving fraud, waste, and abuse concerns.
- 2. Follow up on the physicians OIG identified with concerning billing for peripheral vascular procedures.** We found a small number of physicians who had concerning billing for peripheral vascular procedures in 2023. OIG will separately provide information on these physicians to CMS. CMS should work with its program integrity contractors to review the physicians' billing and take action, if appropriate.

Agency Comments and OIG Response

CMS concurred with both of our recommendations.

CMS concurred with our first recommendation that it monitor billing to identify peripheral vascular procedures that may be medically unnecessary, which may indicate fraud, waste, or abuse. CMS stated that it will consider OIG's findings and determine appropriate next steps. We look forward to CMS's Final Management Decision with the steps it plans to take to implement this recommendation. Specifically, we ask CMS to provide detail on how it will analyze and monitor billing to identify peripheral vascular procedures that may be medically unnecessary. We also note that ongoing monitoring in this space is important so that CMS's oversight is timely and responsive to evolving fraud, waste, and abuse concerns.

CMS concurred with our second recommendation that it follow up on the physicians OIG identified with concerning billing for peripheral vascular procedures. CMS stated that it will review the information on the physicians OIG identified to determine whether additional action is appropriate. In a separate memorandum, OIG will provide details on the physicians we identified as having concerning billing for peripheral vascular procedures in 2023. We look forward to CMS's review of this information.

Methodology

Data Sources

We based this analysis on Medicare fee-for-service (FFS, or traditional Medicare) Part B claims from the National Claims History file. We identified claims for peripheral vascular procedures (i.e., CPT codes 37220-37235) with dates of service from January 1, 2019, through December 31, 2023.^c We also used data from the Medicare Provider Enrollment, Chain, and Ownership System; the National Plan and Provider Enumeration System; and the Medicare Enrollment Database. Finally, we received written answers from CMS officials in response to questions about its and its contractors' program integrity activities regarding peripheral vascular procedures.

Scope

We analyzed these data to determine national trends of Medicare Part B billing for peripheral vascular procedures from 2019 through 2023. Because of the prominent role of OBLs in peripheral vascular surgery, we then narrowed the scope of our analysis to examine 2023 physician claims for procedures performed in OBLs (i.e., Place of Service Code=11).⁴⁸ Additionally, we used rendering provider identification numbers to identify physicians.

Trends

We determined (1) total billing nationally and by place of service; (2) number and rate of procedures nationally and by place of service; (3) percentage of procedures by each physician specialty and place of service; and (4) percentage of procedures by arterial region and procedure type by place of service and physician specialty.

Concerning Billing Measures

We examined physician billing for peripheral vascular procedures performed in OBLs in calendar year 2023. We excluded physicians with fewer than 20 paid claim lines. We developed four measures to identify physicians with billing practices in OBLs that vary from those of their peers in a way that may pose a fraud, waste, or abuse risk to Medicare as well as a patient safety risk to Medicare enrollees. We devised these measures and set thresholds that indicate possible misuse based on information we learned from CMS's comparative billing reports, literature research, fraud investigations, clinical practice guidelines, and our own analysis of Medicare claims data.

Furthermore, we received input from clinical experts. Specifically, we interviewed four physicians with experience in vascular surgery, radiology, clinical research, public health, and patient safety. These experts maintain membership in a variety of professional organizations and have authored and edited over a hundred publications including books, scientific articles, op-eds, and textbook chapters. We also had a listening session with members of three professional societies whose members perform vascular procedures. These experts enhanced our contextual understanding of the prevalence of PAD, how physicians use peripheral vascular procedures to treat PAD, and the potential risks of these procedures. These conversations helped confirm for us that clinical appropriateness of atherectomies is controversial, tibial procedures should be rare, and treatment for early-stage PAD can be appropriate but only after physicians first treat conservatively with medication and lifestyle changes.

For the second through fourth measures below, the threshold we set to identify physicians was equal to or higher than thresholds based on a standard statistical technique to identify outliers,

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known as the Tukey method.^d There may be additional physicians with concerning billing that fell below our thresholds. We calculated the number of physicians and amount of concerning payments for each measure individually and across all measures.

1) Billing a tibial procedure for almost all Medicare patients

For each rendering physician, we determined the percentage of the Medicare Part B FFS enrollees they treated who received at least one primary tibial procedure (i.e., CPT code 37228, 37229, 37230, or 37231).^e We determined a physician's billing to be concerning if 95 percent of their enrollees had at least one primary tibial procedure. We considered all tibial procedure claims for these physicians as concerning.

2) Billing a high average number of vascular procedures per Medicare patient

For each rendering physician, we determined the average number of peripheral vascular procedures they billed per Medicare Part B FFS enrollee. Using the Tukey method, we determined a physician's billing to be concerning if their average number of procedures per enrollee was five or more procedures. We considered claims for enrollees with five or more procedures for these physicians as concerning.

3) Frequently billing for more complex procedures per surgical session

For each rendering physician, we determined the average Relative Value Units (RVUs) they billed per surgical session. RVUs measure a physician's time and skill for a procedure they performed (e.g., more complex procedures will have higher RVUs) and are used by CMS to determine reimbursement. We defined a surgical session as one or more procedures with the same physician, enrollee, and date of service. Using the Tukey method, we determined a physician's billing to be concerning if their average RVUs were 29.3 RVUs or more per surgical session. We considered claims for surgical sessions with RVUs of 29.3 or more for these physicians as concerning.

4) Billing a high percentage of Medicare patients with early-stage PAD

For each rendering physician, we determined the percentage of their Medicare Part B FFS enrollees they treated for early-stage PAD. We defined enrollees with early-stage PAD as enrollees with no other diagnosis codes except for intermittent claudication, unspecified peripheral vascular disease, and unspecified atherosclerosis of native arteries of the extremities among their claims in 2023.⁴⁹ Using the Tukey method, we determined a physician's billing to be concerning if 94 percent or more of their enrollees had early-stage PAD. We considered all claims for enrollees with early-stage PAD for these physicians as concerning.

Analysis of Physicians with Concerning Billing

We determined the amount of concerning billing for each physician that exceeded the threshold on at least one of our four measures in 2023. We considered physicians with \$1,000,000 or more in concerning payments as having a high amount of concerning payments. We examined the characteristics of these physicians including physician specialty, total billing for peripheral vascular procedures, number of procedures per enrollee, and geographic location.

Limitations

This analysis is based on Medicare claims. We did not conduct a medical record review.

^d This is a standard exploratory method for identifying members of a population with unusually high or low values on a given statistic compared to the rest of the population when no established benchmarks exist. See J.W. Tukey, *Exploratory Data Analysis*, Addison-Wesley, 1977. The interquartile range is the value at the 75th percentile minus the value at the 25th percentile.

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Additionally, none of the measures that we analyzed confirm that a particular physician engaged in abusive or fraudulent practices. Furthermore, the measures do not identify physicians who did not meet Medicare billing requirements for peripheral vascular procedures. Any determination of fraud or an overpayment would require additional investigation.

Standards

We conducted this study in accordance with the *Quality Standards for Inspection and Evaluation* issued in 2020 by the Council of the Inspectors General on Integrity and Efficiency.

Appendix A

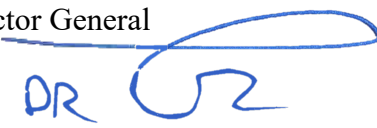
Following this page are the official comments from CMS.



Administrator
Washington, DC 20201

DATE: March 16, 2026

TO: Ann Maxwell
Deputy Inspector General for Evaluation and Inspections
Office of Inspector General

FROM: Dr. Mehmet Oz 
Administrator
Centers for Medicare & Medicaid Services

SUBJECT: Office of Inspector General (OIG) Draft Data Snapshot: Utilization Trends and Medicare Part B Billing for Office-Based Peripheral Vascular Procedures Raise Questions About Program Integrity (OEI-01-24-00250)

The Centers for Medicare & Medicaid Services (CMS) appreciates the opportunity to review and comment on the Office of Inspector General's (OIG) draft report.

CMS recognizes the importance of providing Medicare beneficiaries with access to medically necessary services, while also working to protect the Medicare Trust Funds from improper payments. CMS uses a robust program integrity strategy to reduce and prevent Medicare improper payments, including automated system edits within the claims processing systems, and conducting prepayment and post-payment reviews. As part of this strategy, CMS recovers identified overpayments in accordance with agency policies and procedures. In fiscal year 2024, CMS's program integrity activities saved Medicare an estimated \$26.3 billion.¹

The OIG's recommendations and CMS' responses are below.

OIG Recommendation

The OIG recommends that CMS monitor billing to identify peripheral vascular procedures that may be medically unnecessary, which may indicate fraud, waste, or abuse.

CMS Response

CMS concurs with this recommendation. CMS will take OIG's findings and this recommendation into consideration as we determine appropriate next steps.

OIG Recommendation

The OIG recommends that CMS follow up on the physicians OIG identified with concerning billing for peripheral vascular procedures.

CMS Response

CMS concurs with this recommendation. CMS will review the information on the physicians identified by OIG to determine whether additional action is appropriate.

¹ Fiscal Year 2024 Medicare and Medicaid Program Integrity Report to Congress (September 2025). Available at: <https://www.cms.gov/files/document/fy2024-medicare-medicaid-report-congress.pdf>

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