Read all three of our prestigious publications, each offering high-quality content to keep you informed with the latest developments in the field.

**The Laryngoscope**

*Founded in 1896*

Editor-in-Chief: Michael G. Stewart, MD, MPH

The leading source for information in head and neck disorders.

[Laryngoscope.com](http://Laryngoscope.com)

---

**Laryngoscope Investigative Otolaryngology**

Editor-in-Chief: D. Bradley Welling, MD, PhD, FACS

Rapid dissemination of the science and practice of otolaryngology-head and neck surgery.

[InvestigativeOto.com](http://InvestigativeOto.com)

---

**ENTtoday**

A publication of the Triological Society

Editor-in-Chief: Alexander Chiu, MD

Must-have timely information that Otolaryngologist-head and neck surgeons can use in daily practice.

[Enttoday.org](http://Enttoday.org)
Utilization and Reimbursements for Sinus Procedures: A Five-Year Analysis

Lindsey K. Koester, MD ● Parul Goyal, MD, MBA

**Objectives/Hypothesis:** Balloon sinuplasty has become an increasingly popular option for patients undergoing surgical treatment of sinusitis. This study analyzes utilization and growth of these procedures across a large cohort of patients over a 5-year period.

**Study Design:** Retrospective data review.

**Methods:** This was a retrospective review of Medicare utilization and billing data. Utilization and payment values were obtained from Medicare claims data using Centers for Medicare and Medicaid Services datasets. All Medicare claims were analyzed from 2012 to 2016. Data were extracted for balloon sinuplasty and endoscopic sinus surgery claims. Procedure location, total submitted claims, charges, and payments were compared.

**Results:** From 2012 to 2016, the number of balloon procedures increased from 5,603 to 25,640. Traditional endoscopic sinus surgery procedures increased from 15,509 to 18,164. Aggregate Medicare payments to otolaryngologists for endoscopic sinus surgery have remained relatively stable, whereas there has been a 450% increase in total payments to providers of balloon sinuplasty. In 2016, total payments to providers of balloon procedures ($40.5 million) were substantially higher than payments to providers of non-balloon-based endoscopic sinus surgery ($4.7 million). The number of providers performing balloon procedures has increased 277% versus 17% for traditional sinus surgery.

**Conclusions:** There has been a rapid expansion in the number of sinus procedures in the Medicare population from 2012 to 2016. Office-based balloon procedures account for the overwhelming majority of the increases in procedures and payments. Per procedure and aggregate payments are now higher for sinuplasty procedures than for traditional sinus surgery.

**Key Words:** Sinus surgery, balloon sinuplasty, Medicare, rhinology, utilization, cost-effectiveness, reimbursement, outcomes.

**Level of Evidence:** NA

---

**INTRODUCTION**

Patients with chronic rhinosinusitis have an expanding array of treatment options available. Endoscopic sinus surgical procedures have become the mainstay of surgical treatment of chronic rhinosinusitis. Over the years, various surgical instruments and tools have been used to perform endoscopic procedures. Balloon sinuplasty has become an increasingly popular procedure since its 510(k) marketing clearance by the US Food and Drug Administration in 2005. There has been a significant increase in the utilization of these procedures since the approval of Current Procedure Terminology (CPT) codes specific for sinus balloon dilation in 2011.

A small body of research suggests that these procedures result in comparable symptoms improvement and revision rates when compared to endoscopic procedures. On the other hand, systematic reviews of literature on balloon procedures indicate that clinical outcomes data remain uncertain due to limited disease severity in the aforementioned studies.

Although clinical outcomes continue to be debated and studied, balloon sinuplasty has gained popularity. Advantages cited include that it can be performed in the office setting, does not require general anesthesia, avoids additional cost and time associated with operating room procedures, and reimburses individual surgeons at significantly higher rates. In their analysis of claims data from 2000 to 2014, Calixto et al. found a significant spike in the number of balloon sinus procedures and balloon providers, adjusting for number of Medicare beneficiaries by state. The number of balloon procedures increased disproportionately to the total number of sinus procedures, and Calixto’s group found that new providers performing balloon dilation procedures accounted for the vast majority of this asymmetry.

In 2014, the Centers for Medicare and Medicaid Services (CMS) made Medicare charges, payment, utilization, and physician data from 2012 publicly available. This action came about after numerous lawsuits argued that access to these data was part of the taxpayer’s right as part of the Freedom of Information Act. Since then, additional years of...
data have been released by CMS. Multiple studies have used these data to describe specific practice patterns across the specialty and within subspecialties. This study analyzes utilization and growth of sinus and nasal procedures across a large cohort of patients over a 5-year period.

MATERIALS AND METHODS
Detailed provider and Medicare payment data from 2012 to 2016 were obtained through the Medicare Provider Utilization and Payment Data: Physician and Other Supplier Public Use File from the CMS. Data were extracted for balloon sinuplasty, endoscopic sinus surgery, and septoplasty claims. National Provider Identification (NPI) data, procedure location, total submitted claims, charges, and payments were compared. Total number of procedures for balloon dilation and for traditional endoscopic sinus surgery was calculated for each calendar year for which data were available. Total number of procedures for each sinus was then extracted and compared between the two procedure types. Number of unique facility and nonfacility NPI data and number of procedures by location type were also extracted from the dataset.

Provider reimbursements and total procedure reimbursements were also analyzed. Total reimbursements per provider for each procedure type, known as Healthcare Common Procedure Coding System (HCPCS), were directly extracted from the dataset. To approximate total costs for procedures performed in the operating room, facility fees and surgeon fees were combined for each HCPCS code. Anesthesia costs were not able to be included in the study. Anesthesia fees are primarily calculated according to time spent in the operating room and were not available for individual sinus procedures. Total costs for office-based procedures were approximated using only proceduralist fees. Total procedure costs were then compared between balloon and traditional sinus surgery. To determine trends in adjunct nonballoon nasal procedures, HCPCS codes for partial ethmoidectomy, total ethmoidectomy, and septoplasty were extracted and analyzed by procedure location.

RESULTS

Trends in Number of Procedures
Between 2012 and 2016, the total number of sinus procedures in Medicare patients increased from 21,112 to 43,804. Table 1 shows the total numbers of procedures based on procedure type. The number of traditional sinus procedures in the Medicare population has remained stable. There has been a significant and steady increase in the number of balloon procedures. In 2012, balloon sinuplasty accounted for 26.5% of all procedures. The first year in which balloon sinus procedures outnumbered traditional endoscopic sinus surgery procedures was 2014. In 2016, balloon sinuplasty accounted for over 58% of all sinus procedures.

Reimbursement Trends
Total Medicare reimbursements to surgeons for traditional sinus surgery have remained stable, whereas there has been a significant increase in payments for balloon sinus procedures (Fig. 1). Medicare payments to surgeons for traditional sinus surgery increased from $3.6 million in 2012 to $4.5 million in 2016. For balloon sinus procedures, the aggregate payments increased from $9.1 million in 2012 to $40.5 million in 2016.

To better estimate overall costs to Medicare for sinus surgical procedures, reimbursement trends were also analyzed by incorporating Medicare facility payments for sinus procedures. With facility fees accounted for, balloon procedures comprised 44.8% of Medicare reimbursements for sinus procedures in 2012. That value grew to approximately 71.5% by 2016 (Table II). These data show that total reimbursement for balloon procedures still account for the majority of Medicare spending for sinus surgical procedures, even when taking into consideration facility fees.

Table 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>Traditional</th>
<th>Balloon</th>
<th>Balloon % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>15,509</td>
<td>5,603</td>
<td>26.5%</td>
</tr>
<tr>
<td>2013</td>
<td>16,020</td>
<td>12,774</td>
<td>44.4%</td>
</tr>
<tr>
<td>2014</td>
<td>16,168</td>
<td>19,363</td>
<td>54.5%</td>
</tr>
<tr>
<td>2015</td>
<td>17,287</td>
<td>24,066</td>
<td>58.2%</td>
</tr>
<tr>
<td>2016</td>
<td>18,164</td>
<td>25,640</td>
<td>58.5%</td>
</tr>
</tbody>
</table>
Provider reimbursements by individual sinuses are summarized in Table III. As ethmoidectomy procedures are not performed using balloon dilation, ethmoid payments for traditional sinus procedures were not included in this table, though they were accounted for in the total payments described earlier. Balloon reimbursements have outpaced traditional reimbursements in every individual category since 2012.

Reimbursements for balloon procedures were also analyzed further to determine trends in overall payments to individual providers (Table IV). Minimum payments per provider have remained stable over the 5-year time period, whereas the median payments demonstrate an overall increase by 18%. Maximum payments to individual providers have increased by 85% over the same time period. Providers with the highest reimbursement for balloon sinusplasty codes have collected in excess of $1.2 million in the most recent years.

The Rise of Office-Based Nasal Procedures

The overwhelming majority of balloon dilation procedures are now performed in the office (Table V). In 2016, office-based procedures represented 99.2% of all balloon procedures reimbursed by Medicare.

Interestingly, no such trend has been seen in terms of shift of traditional sinus surgical procedures to an office setting. Maxillary, sphenoid, and frontal sinus surgery values have remained relatively stable. In congregate, 0.2% to 1% of traditional maxillary, sphenoid, and frontal procedures take place in the office.

On the other hand, there has been a significant increase in office-based ethmoidectomy and septoplasty. These values are shown in Table VI. The number of in-office ethmoidectomy procedures has grown by 3,307% from 2012 to 2016. The number of operating room ethmoidectomy procedures has grown by only 6%. Office ethmoidectomy procedures accounted for only 0.6% of all ethmoidectomy procedures in 2012. In 2016, that percentage had increased to 15.6%.

Septoplasty was analyzed in a similar fashion. Between 2012 and 2016, the number of in-office septoplasty procedures grew by 423%. Operating room septoplasty procedures have remained stable, growing by less than 1% over the 5-year period.

The number of providers performing office septoplasty are shown in Table VII. Increasing numbers of providers are performing in-office septoplasty, and this trend is consistent across all years under review. The performance of office-based balloon procedures appears to be driving the shift of septoplasty procedures to the office setting. Cross-reference of providers of in-office septoplasty with those performing balloon sinusplasty confirms that 100% of in-office septoplasty providers are also performing balloon sinusplasty in an office-based setting.

TABLE II.
Aggregate Reimbursements (Provider + Facility Fees) for Traditional Endoscopic Sinus Procedures and Balloon Sinuplasty, 2012–2016.

<table>
<thead>
<tr>
<th>Year</th>
<th>Traditional Maxillary</th>
<th>Traditional Frontal</th>
<th>Balloon Maxillary</th>
<th>Balloon Frontal</th>
<th>Balloon % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>$11,223,258.93</td>
<td>$9,094,282.51</td>
<td>$4,094,593.13</td>
<td>$3,520,406.67</td>
<td>44.8%</td>
</tr>
<tr>
<td>2013</td>
<td>$11,100,684.76</td>
<td>$21,866,091.75</td>
<td>$4,094,593.13</td>
<td>$3,520,406.67</td>
<td>66.3%</td>
</tr>
<tr>
<td>2014</td>
<td>$13,691,317.91</td>
<td>$31,378,849.21</td>
<td>$4,094,593.13</td>
<td>$3,520,406.67</td>
<td>69.6%</td>
</tr>
<tr>
<td>2015</td>
<td>$16,170,535.67</td>
<td>$40,590,153.14</td>
<td>$4,094,593.13</td>
<td>$3,520,406.67</td>
<td>71.5%</td>
</tr>
</tbody>
</table>

TABLE IV.
Reimbursements for Individuals—Balloon Procedures.

<table>
<thead>
<tr>
<th>Year</th>
<th>Minimum</th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>$1,184</td>
<td>$87,445</td>
<td>$62,913</td>
<td>$702,292</td>
</tr>
<tr>
<td>2013</td>
<td>$1,322</td>
<td>$94,658</td>
<td>$69,728</td>
<td>$911,268</td>
</tr>
<tr>
<td>2014</td>
<td>$1,486</td>
<td>$102,211</td>
<td>$72,693</td>
<td>$1,233,913</td>
</tr>
<tr>
<td>2015</td>
<td>$920</td>
<td>$103,101</td>
<td>$74,228</td>
<td>$1,568,757</td>
</tr>
<tr>
<td>2016</td>
<td>$1,068</td>
<td>$103,283</td>
<td>$73,933</td>
<td>$1,298,860</td>
</tr>
</tbody>
</table>

TABLE III.
Reimbursements by Individual Sinus—Traditional Endoscopic Sinus Surgery Versus Balloon Sinus Procedures.

<table>
<thead>
<tr>
<th>Year</th>
<th>TESS Maxillary</th>
<th>BSP Maxillary</th>
<th>TESS Frontal</th>
<th>BSP Frontal</th>
<th>TESS Sphenoid</th>
<th>BSP Sphenoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>$937,104</td>
<td>$3,548,008</td>
<td>$1,478,915</td>
<td>$4,358,851</td>
<td>$185,687</td>
<td>$1,137,876</td>
</tr>
<tr>
<td>2013</td>
<td>$952,687</td>
<td>$7,246,311</td>
<td>$1,557,828</td>
<td>$11,220,380</td>
<td>$226,551</td>
<td>$3,236,259</td>
</tr>
<tr>
<td>2014</td>
<td>$925,718</td>
<td>$9,979,464</td>
<td>$1,789,261</td>
<td>$16,240,498</td>
<td>$251,232</td>
<td>$5,056,898</td>
</tr>
<tr>
<td>2015</td>
<td>$952,674</td>
<td>$11,522,641</td>
<td>$1,841,648</td>
<td>$19,607,342</td>
<td>$260,849</td>
<td>$6,782,645</td>
</tr>
<tr>
<td>2016</td>
<td>$963,318</td>
<td>$12,089,642</td>
<td>$1,955,769</td>
<td>$20,431,594</td>
<td>$277,712</td>
<td>$7,942,849</td>
</tr>
</tbody>
</table>
rapid shift of sinus procedures from the operating room setting to an office-based setting.

Over the 5-year period under analysis, there has been a rapid rise in the number of sinus procedures being performed in the Medicare population. Balloon sinuplasty procedures have accounted for the majority of this increase. Balloon sinuplasty has risen by over 350%, whereas traditional procedures have expanded 17% between 2012 and 2016. The first year in which the number of balloon procedures exceeded traditional sinus surgical procedures in the Medicare population was 2014. In 2016, balloon procedures accounted for over 58% of sinus procedures performed and approximately 90% of surgeon reimbursement.

Payments to surgeons exceeded $40 million for balloon sinuplasty in 2016 versus $4.7 million for traditional endoscopic sinus surgery. Overall, traditional payments rose by 23%, whereas overall balloon payments rose 357%.

To account for overall costs associated with sinus procedures, facility fees were also included in the analysis. Even when accounting for facility fees, traditional sinus surgery reimbursements were less than balloon procedure reimbursements. This is related to volume of procedures and reimbursement per procedure. In an analysis of Medicare Provider Utilization Data and Medicaid Services Open Payments, Gadkaree et al. cross-referenced otolaryngologists who performed balloon dilation procedures with those who received payments from balloon dilation device manufacturers. A strong positive association between receipt of consulting fees and performance of additional balloon procedures was found. This suggests that increased familiarity with these procedures as well as financial incentives may influence utilization. As a corollary, reimbursements as outlined in our data may be one factor that is driving the growth of balloon sinuplasty in the Medicare population.

The number of balloon procedures has expanded rapidly enough that these procedures may represent a new and expanding sector of healthcare spending. Although the prevalence of chronic rhinosinusitis has been difficult to estimate, recent literature suggests that overall incidence of this clinically heterogenous disease is stable overall and may have even declined in the Medicare population. Laury et al. suggest in multiple studies that there may be a growing number of indications for balloon sinuplasty. Although the data here do not allow for analysis of patient factors, further studies should continue to elucidate indications, outcomes, and cost-effectiveness for this procedure.

As an adjunct to overall Medicare spending trends, an analysis of office-based procedures was also conducted for other nonballoon nasal surgery CPT codes. Anterior and posterior ethmoidectomy and septoplasty were also analyzed according to location (office-based vs. operating room). An increasing number of providers of balloon sinuplasty

<table>
<thead>
<tr>
<th>Year</th>
<th>Ethmoid Procedures OR</th>
<th>Ethmoid Procedures In-Office</th>
<th>In-Office Percentage of Total</th>
<th>Septoplasty OR</th>
<th>Septoplasty In-Office</th>
<th>In-Office Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>5,097</td>
<td>29</td>
<td>0.6%</td>
<td>5,690</td>
<td>117</td>
<td>2.0%</td>
</tr>
<tr>
<td>2013</td>
<td>5,240</td>
<td>156</td>
<td>2.9%</td>
<td>5,969</td>
<td>264</td>
<td>4.2%</td>
</tr>
<tr>
<td>2014</td>
<td>5,039</td>
<td>345</td>
<td>6.4%</td>
<td>5,667</td>
<td>371</td>
<td>6.1%</td>
</tr>
<tr>
<td>2015</td>
<td>5,319</td>
<td>749</td>
<td>12.3%</td>
<td>5,745</td>
<td>431</td>
<td>7.0%</td>
</tr>
<tr>
<td>2016</td>
<td>5,382</td>
<td>988</td>
<td>15.5%</td>
<td>5,744</td>
<td>612</td>
<td>9.6%</td>
</tr>
</tbody>
</table>

OR = operating room.
are now performing traditionally operating room–based nasal procedures in the office. Both ethmoidectomy and septoplasty are being performed with increasing frequency outside of the OR. The number of in-office ethmoidectomy procedures has grown by 3,307% from 2012 to 2016. The number of operating room ethmoidectomy procedures has grown by only 6%. Office-based septoplasty increased 423% versus 0.9% for operating room septoplasty between 2012 and 2016. A total of 25 providers in 2016 billed for office-based septoplasty and accounted for 612 procedures. Although this analysis did not allow for analysis of procedures performed together on individual patients, it was confirmed that 100% of providers of in-office septoplasty and ethmoidectomy are also performing balloon sinusplasty. One explanation for the shift of traditionally operating room–based nasal procedures toward office-based procedures may be the convenience of combining all nasal procedures into a single office-based visit.

Analysis of all otolaryngology procedures not included in this analysis was performed to determine if there has been an overall shift toward office-based procedures across the entire specialty. No consistent trend was determined, with office-based HCPCS codes accounting for 45% to 55% of all billed services.

CMS and private insurer fee schedules reimburse office-based balloon procedures more generously than facility-based ones. CMS expressed concern that “[M]arket-ing firms and sales representatives are advertising these CPT codes as a method for generating additional profits due to the payment for the procedures exceeding the resources typically needed to furnish the services, and requested that CMS investigate the use of the SA106 supply in these codes.”15 This potential for increased profit may be one additional factor responsible for the shift of sinus procedures to office settings. Although the number of office-based ethmoidectomy and septoplasty procedures has increased significantly, a similar increase has not been seen with traditional endoscopic maxillary, frontal, or sphenoid sinus surgery. In addition, a similar increase has not been seen with operating room–based balloon sinus procedures. Given the very significant increase in the overall number of balloon sinusplasty procedures, we would expect increases in all practice settings if surgeon payments were comparable between the different sites.

These factors also suggest that the reimbursement policies favoring office-based balloon procedures may be driving the shift of other concurrent sinus procedures to an office setting. In the past, patients needing septoplasty or ethmoidectomy may have been advised to have surgery under anesthesia. If these procedures are now performed in the office setting, more patients are candidates for office-based balloon sinus procedures. If surgeon reimbursement were similarly favorable for office-based traditional sinus surgical codes, we would have expected increased utilization of traditional sinus surgery codes in the office setting.

This study analyzes trends in the performance of balloon and nonballoon sinus procedures, but the data do not allow for analysis of procedure indications or outcomes. Additional data regarding patient outcomes will help better delineate the role of the various procedure types in patients with chronic rhinosinusitis.

Limitations

This study only analyzes utilization data in the Medicare population, a group that is, by definition, age 65 years and older. This study does not include a significant majority of patients undergoing sinus procedures. Furthermore, there are some physicians performing sinus procedures who may not be included in this dataset if they do not treat Medicare patients. Most significantly, this study does not assess indications or outcomes. However, with the comprehensive nature of this nationwide dataset, the power of the utilization and financial analysis is robust. The approximation of total procedure costs did not include anesthesia fees due to the limited nature of the dataset. These fees are likely substantial, and future financial analysis would ideally address these reimbursements.

CONCLUSION

There has been a rapid rise in the number of balloon procedures and number of providers performing these procedures in the Medicare population. Balloon sinusplasty has become largely an office-based procedure. Payments for balloon sinusplasty procedures overtook payments for traditional sinus surgical procedures in 2013 and continue to grow. The consistent growth of these payments is not accompanied by any decrease in payments or utilization for traditional endoscopic procedures, and may represent a new sector of healthcare spending. With limited healthcare dollars and with increasing emphasis on cost-effectiveness, it is imperative that indications and outcomes are more thoroughly studied for this procedure. There has also been an accompanying increase in office-based nasal procedures traditionally performed in the operating room. Both septoplasty and ethmoidectomy procedures are being performed in the office with increasing frequency. This shift appears to be related to the popularity of office-based balloon sinus procedures. Given the current favorable reimbursement policies for office-based balloon sinusplasty procedures, financial incentives may also play a role in utilization and practice patterns.

BIBLIOGRAPHY


