

# Cost Analysis of an Office-based Surgical Suite

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**Introduction:** Operating costs are a significant part of delivering surgical care. Having a system to analyze these costs is imperative for decision making and efficiency. We present an analysis of surgical supply, labor and administrative costs, and remuneration of procedures as a means for a practice to analyze their cost effectiveness; this affects the quality of care based on the ability to provide services. The costs of surgical care cannot be estimated blindly as reconstructive and cosmetic procedures have different percentages of overhead.

**Methods:** A detailed financial analysis of office-based surgical suite costs for surgical procedures was determined based on company contract prices and average use of supplies. The average time spent on scheduling, prepping, and doing the surgery was factored using employee rates.

**Results:** The most expensive, minor procedure supplies are suture needles. The 4 most common procedures from the most expensive to the least are abdominoplasty, breast augmentation, facelift, and lipectomy.

**Conclusions:** Reconstructive procedures require a greater portion of collection to cover costs. Without the adjustment of both patient and insurance remuneration in the practice, the ability to provide quality care will be increasingly difficult. (*Plast Reconstr Surg Glob Open* 2016;4:e803; doi: 10.1097/GOX.0000000000000831; Published online 19 July 2016.)

**B**ecause the reimbursements for surgical services stagnate or decrease, the costs of doing business continue to rise. These rising costs include space, insurance, staffing, and supplies, all of which reduce the margin of profit on services. A 1988 study that broke down the percentage of physician income related to various practice costs—labor, supplies, and rent—to a total of 15%, did not look at plastic surgery.<sup>1</sup> After their systematic review of plastic surgery, Ziolkowski et al<sup>2</sup> concluded that specific cost-effective analyses within the specialty are necessary and advantageous to the plastic surgeon.

The old adage that “I lose money on every one, but I make it up in volume” is becoming a reality. In its March 2013 report to Congress, Medicare estimated a 2% increase in volume per beneficiary.<sup>3</sup> This suggests that because of inadequate reimbursements, physicians are taking on a larger patient load as compensation. An objective analysis of office-based surgical services for both mi-

nor clinical suite procedures and for office-based surgical suite (OBSS) is overdue.

Dr. Janevicius<sup>4</sup> did the first objective analysis of costs in coding guidelines for minor procedures for *Plastic Surgery News*. We employ this technique to evaluate current costs and extrapolate it to an OBSS. We add in new expenses that are now federally mandated (but unreimbursed), such as the cost of maintenance of electronic medical records, meaningful use, and facility certification.<sup>5</sup> It is an important safety and quality standard to perform surgery in a certified facility, but it too adds costs. Costs that are specific to cosmetic surgery are complementary revision rates and the discrepancy in profit margin when compared with reconstructive surgery.

Costs can be defined as fixed, fixed variable, and variable.<sup>6,7</sup> Fixed costs are those that remain at the same price, independent of the volume, for example, rent, space, and insurance, which are the same each month. These expenses do not change, no matter how much work is done. Fixed variable costs require a basic minimum—a nurse or a desk receptionist—but are dependent on volume. These costs can increase in increments and are a per-case costs (ie, adding another recovery nurse on busy days). Variable costs depend directly on volume—supplies, medications,

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Received for publication November 6, 2015; accepted May 27, 2016.

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DOI: 10.1097/GOX.0000000000000831

**Disclosures:** The authors have no financial interest to declare in relation to the content of this article. The authors have no conflicts of interest. The Article Processing Charge was paid for by the authors.

and per-case contract labor. The amount of these costs varies with demand. The sum of fixed and fixed variable costs is also called overhead.<sup>6</sup>

The Institute of Medicine estimates 750 billion dollars of wasted resources in the health care budget in 2009.<sup>8</sup> Little information is available on individual practice costs and their contribution to this. The purpose of this article is a long overdue analysis of costs to assist practices in making fiscal, rather than emotional, decisions in provision of care.

### METHODS

We based our analysis on the specific schedule of the office. We calculated 700 office procedures (local anesthesia) and 200 major procedures (general anesthesia) that were performed in the OBSS in the past year. We analyzed 4 core cosmetic procedures most routinely performed in our OBSS—abdominoplasty, facelift, breast augmentation, and liposuction.

For minor procedures, we evaluated costs that were used in every case, or fixed, and those that were incidental, or variable. We estimated using these incidentals, like special dressing supplies, about 25% of the time in the office procedures. For surgical suite procedures, the additional costs of packs, sutures, and consumables, such as drains, were included. The number of sutures used per case—a major consumable cost—was averaged from supply orders. Simple calculations were used to find the unit cost for each supply based on contract prices with our suppliers. The setting of the office also dictated the calculation of costs, based on square footage, quantity of rooms, and time used for each surgery.

Minor kits were valued based on the costs and divided by the estimated number of cases they last before having to be repaired or replaced—300 cases. A similar depreciation for 1,000 cases was estimated for the higher quality surgical trays; in addition, yearly sharpening costs were computed. This calculation estimates the instrument cost per case.

Staff costs were computed at an hourly rate. Pre/post-operative tasks included patient intake, ordering supplies, sterilizing, scheduling, etc. Perioperative tasks include the cost based on hourly rates for a scrub tech and circulating RN/MA. Indirect costs, like retirement, increase the staff costs by 25%; this was added as an indirect surcharge. We estimate initial training as dedicated 2 weeks followed by 40 hours maintenance per year. This reflects productivity versus training of 97%:3% on an average.

The time spent supporting new office technologies—Web site design and meaningful use—was factored. Software support is a yearly fee; 20% of this cost was assigned to the surgical procedures. Medical waste pickup occurs weekly. The cost of the 3-year Accreditation Association for Ambulatory Health Care certification cycle was calculated based on 200 cases per year. Biomedical visits are required for equipment maintenance. The malpractice insurance cost was found based on its monthly cost and divided by 500 total surgeries per year. Weekly laundry delivery was factored into cost based on unit price per quantity used.

A fixed variable cost not reflected in our practice is hidden advertising. The practice growth is predominantly by word-of-mouth; other than Web site optimization, there was no direct advertising. A cost of Web site development is appropriated as a percentage of site remuneration versus total clinical income (see the below equation). Indirect advertising costs were divided by the number of annual cases; we approximate \$1.65 a procedure for web cost. Aesthetic surgery is singular in that revisions are commonly at no cost to the patient. In our practice, any major revisions incur additional facility fees (ie, implant exchange for size). Therefore, some form of estimation of this practice cost is necessary. A prospective analysis of over 6 months to assess revision rates identified costs and the most common procedures requiring touch-up.

$$\text{Blogging, site development, Web cost} \times \frac{\text{facility fee}}{\text{total remuneration of cases}}$$

### RESULTS

Table 1 summarizes the most frequently used supplies for a minor procedure by unit cost and quantity. Similar costs per unit were generated for all supplies. A standout price is that of sutures. It is one of the most expensive but also frequently wasted surgical supplies.

Table 2 summarizes the abstract costs that were explained in the Methods section. These are costs that had to factor in labor contributions and other fixed variables that depend on the caseload and type. For example, pre- and perioperative time and cost include the labor time of the nurse and office staff who went into educating the patient before surgery; the administration cost includes the amount to insure the practice for that day. The results shown here for major procedures are for fixed costs. The average major procedure base cost of fixed and fixed variable cost without variable supplies was \$951. The total cost of a minor procedure was \$64.

The last table ranks the four most common major surgeries in our practice, from the most expensive to the least expensive. The length of procedure and sutures affect the

**Table 1. Sample Supply Costs**

Procedure Supplies			
Item	Unit Price	Amount	Cost (\$)
Table paper	0.56933	1/6	0.09
#15 blade	0.2463	1	0.25
18-G needle	0.0738	1	0.07
1 mL 1% lidocaine with epinephrine	0.06295	5	0.31
Disposable gloves	0.00708	6	0.04
4×4 gauze	0.0349	15	0.52
5-0 or 4-0 monocryl (average)	5.625	1	5.63
5-0 or 4-0 prolene (average)	8.625	1	8.63
Steri strips .5"	1.2938	1	1.29
Sterile gloves	1.88	2	3.76
Marking pen	1.0028	1	1.00
EZ-kill wipes	0.04375	3	0.13
instrument cleaning solution	0.1125	2	0.23

This outlines the average cost of sample supplies used in our office. Unit amounts are based on contract prices.

**Table 2. Summary of Additional Major and Minor Procedure Costs**

	Cost per Case (\$)
Minor procedure item and task break down	
Minor procedure supplies	25.71
Variables	0.66
Staff	21.63
Room	5.83
Instrument depreciation	0.53
Blogging/Web site	9.50
Total	63.86
Major procedure item and task break down	
Preoperative time	90.60
Perioperative time	265.80
Postoperative recovery supplies	2.88
Sterilization supplies	3.68
Anesthesia administration	312.22
Office administration	156.94
Laundry	11.35
Room cost	98.00
Blogging/Web site	9.50
Total	950.97

This table summarizes total office costs for minor and major procedures, taking into account factors like administration time, Web site development, and rent per square foot of the rooms used.

cost. The cost of lipectomy (\$1,075) is the least, whereas that of abdominoplasty (\$1,279) is the most, reflecting the use of more supplies—specifically suture. The cost of providing a breast augmentation is surprisingly high at \$1,256. The office-based facility charge for augmentation was \$1,000; this is used in each major procedure, irrelevant of what packs, supplies, or sutures are used.

When analyzing the practice's revision rates and expenditure, there was \$5,915 in supplies, manpower, and costs used for touch-ups of 30 minor procedures and four operating room cases performed at no charge to the patient. The four most common surgeries requiring revision are gynecomastia, rhinoplasty, blepharoplasty, and liposuction.

## DISCUSSION

This updated practice analysis offers compelling data. These costs are raw costs to a practice with no mark-up or physician fees. They have two implications—what can you afford to do in an office and what should you charge for facility fees. Discussion of cost and responsibility for fees is a sensitive topic in medicine. A survey by Ginsburg et al<sup>9</sup> showed that on an average, 45% of patients got angry if cost was mentioned but that 49% accepted the explanation for costs once they understood the resources involved.

In a cosmetic practice, revision as re-do surgery is handled differently from reconstructive surgery. In reconstructive surgery, it is a potential remuneration and in cosmetic surgery, purely a cost item.<sup>10</sup> Certain elective procedures are at higher risk than others, with elevated revision rates. We analyzed the practice over a 6-month period creating a “dummy code” for no-cost revision surgery. Preliminary analysis indicates higher risk operations in descending order: (1) gynecomastia, as the patients gain weight postoperatively; (2) rhinoplasty, particularly for areas that were not a concern preoperatively (ie, ala po-

sition);<sup>11</sup> (3) lower lid blepharoplasties for scar/flap thickness/canthal position; and (4) liposuction irregularities. Planning what these additional practice costs are, irrelevant of subsequent surgeon time, is an ongoing project.

The methodology used allows an OBSS to set a price based on real costs, not just market costs from hospital out-patient surgery centers. There will be cost variations based on location,<sup>12</sup> rent, salary, and insurance. The cost of supplies should be universal, but these numbers represent central urban costs that can be extrapolated to other areas. The ideal pricing of procedures should reflect, at minimum, a 22.7% profit margin, an average value calculated from physician-owned freestanding ambulatory surgical centers (ASCs) in California; this margin increased to 31.2% after a law that stopped physician ownership of ASCs was passed. Interestingly, this regulation increased the cost of delivering care under corporate, rather than physician, directorship.<sup>13</sup>

To isolate costs, we did not extrapolate multiple procedure cases. As the initial case costs are greatest at opening packs, gowns, etc., we would have expected greater profit margin for multiple procedures. However, this may be offset by lower charged costs for subsequent minutes after the first hour.

A 1997 study by Rosenblatt et al<sup>14</sup> referred to wasted supplies in hospitals that were opened, but not used, as “overage” and estimated these costs to be on average \$5–\$13 per case. In 2013, this would be \$7–\$19 of unused supplies per case.<sup>15</sup> Anecdotal experience would suggest this as a significant underestimation—particularly if sutures are opened. Just one extra gown and gloves or an unused suture are approximately \$15 in waste. This effect was shown where reconstructive procedures at an ASC over a hospital had more profitability based on lower variable direct expenses alone.<sup>6</sup> The goal of providing cost-efficient care without sacrificing efficacy begins with not wasting supplies.

Sutures are a major consumable and greatly affect the price of surgery, as seen in Table 1 and in the comparison of cost of the surgeries highlighted from the practice, as seen in Table 3. Abdominoplasty used the most sutures, 10, and is the most expensive, whereas lipectomy cost was the least, using one suture. Our suture usage is conservative, as sutures are opened when they are needed to ensure that there is no waste intraoperatively. Wasting sutures can drive cost up and profit down. Breast augmentation surgery is slightly more expensive than facelift surgery, despite using half the number of sutures; this is mainly due to the addition of a surgical bra and extra precautions for sterility when dealing with implants—extra gloves, no touch technique with a Keller funnel, and antibiotic irrigation.

An internal analysis of our facility pricing shows the financial risk of setting costs on market norms for price-sensitive procedures such as breast augmentation. At our locality, the surgeon's fees were fiscally subsidizing the cost for breast augmentation. At the end of this analysis, we raised the facility fee for this procedure by \$250 to reflect the actual cost of quality care, taking into account the Keller funnel for no-touch surgery.

**Table 3. Rank of Major Procedure by Cost**

Procedure	Cost of Specific Supplies (\$)	Added Fixed and Fixed Variable Expenses (\$)	Total (\$)
Abdominoplasty	327.53	950.97	1,278.50
Breast augmentation	304.67	950.97	1,255.64
Facelift	289.06	950.97	1240.03
Lipectomy	124.05	950.97	1074.82

This summarizes the 4 most common major surgeries in our practice, ranked from greatest-to-least expensive and resource intensive to coordinate and perform. A multiple procedure saving in the realm of 50% that could be anticipated as the opening cost of a case is the greatest expense.

This comprehensive cost analysis includes everything from the depreciation of instruments over time down to the saltines eaten in surgical recovery. Instrument cost and value was determined based on the frequency in which sharpening and maintenance is required. This is due to use and wear over time and is factored into Table 2 with “instrument depreciation.” Historically, insurance companies paid an A4550 surgical tray code to cover these instrument supply costs<sup>16</sup>; this rarely happens in current times. This practice billed A4550 code a total of 200 times in 5 years and have been paid 3–4% of the time.

The perception at a hospital is that plastic surgery loses money. In a study entitled “surgeon contribution to hospital bottom line,” Resnick et al<sup>7</sup> identified plastic surgery cases as the lowest hospital margin per case with negative contribution. Contribution margin was case number independent, so it is not, in fact, possible to make it up in volume. This study was hospital based, where the very large fixed building costs were distributed evenly. In our OBSS, fixed building costs constitute less than 10% of the case cost. The total fixed cost per case was \$950 per case. In reality, plastic surgery cases by comparison with orthopedic or spine cases are lean in direct consumables, averaging \$261. In addition, plastic surgery cases do not incur many fixed variable costs, such as specialized nursing or radiology costs.

Conversely, an analysis on hospital versus freestanding facilities by Pacella et al<sup>6</sup> found that it was statistically significantly profitable to perform plastic surgery in an ASC related to decreased fixed cost assignment. With the exception of reconstructive laser cases, aesthetic surgery cases had a greater profitability over reconstructive cases, which was only magnified at the ASC.<sup>6</sup>

The average plastic surgery case cost in our practice is \$1,202.80. This case cost can be extrapolated to most plastic surgery cases. If the facility receives remuneration above \$1,202.80 per case, it constitutes a profit margin. Surprisingly, it costs more to underwrite a breast augmentation versus a facelift, and abdominoplasty costs 20% more than liposuction, despite similar site and position. Based on the results, the surgical fees were subsidizing breast augmentation and our facility fees were raised. These estimates set a price point that must be paid by insurance companies for reconstructive/insurance cases in an OBSS and have set fees accordingly. Unburdening case costs from high fixed facility costs has an opportunity for profit margin.

The average minor procedure cost was \$63.86. As the remuneration for minor procedures decreases, the cost of

supplies and manpower may soon make provision of this office-based care impossible in a network or at Medicare rates. This fails the goal of providing cost-effective quality care. The area reimbursement for a single mole removal code 11402 for Blue Cross Blue Shield is \$114.76<sup>17</sup> and for Medicare is \$71.83.<sup>18</sup> As such, the cost of care without physician cost now constitutes 75% of remuneration. Doing multiple procedures at the same visit can reduce the high percentage ratio of costs to remuneration. The costs are fixed, yet there is more remuneration, albeit reduced by multiple procedure discounts. The intersection point at which provision of the service is too expensive is rapidly approaching.

To compensate for low reimbursement, we maximize personnel efficiency. We have moved all minor procedures to a dedicated 4-hour block. This afternoon block is sufficient for 10–12 minor procedures and can be expanded to add larger cases, such as a labiaplasty or umbilicoplasty. Experience has shown that although minor facial cutaneous surgery is a loss leader, it can be offset by “down-feeding” through facial rejuvenation consults. That is, the reconstructive aspect of a patient’s mole removal may not be profitable, but his/her curiosity about cosmetic injectable is. We have a philosophy of “turning a mole into a mountain.”

The pivotal point in downgrading surgery to “minor” procedures, which cost 10% to cover, is a success of regional analgesia. Localized areas, such as upper-lid blepharoplasties and local Mohs reconstruction, allow highly effective local analgesia. The success of tumescent local anesthesia has made procedures more cost effective.<sup>19</sup> The single best example in our practice is labiaplasty where a \$500 facility cost differential between local analgesia and sedation coupled with no need for an accompanying adult has led to an efficient low cost procedure with 9:1 local versus sedation acceptance. This is an example of cost savings being passed through to the patient while maintaining efficacy.

## CONCLUSIONS

Facility fees should be based on cost, not anecdotal norms, to avoid practice losses. Informed accounting, combined with maximization of manpower and minimization of supply costs, is important to provide cost-efficient care. The minor procedures cost an average of \$64, constituting 75% of the remuneration for insurance-covered care in our practice. A baseline rate of \$1,204 per major anesthesia case sets a cost structure for accurate costing of procedures. We outline an effective formula so that procedure and surgical suite costs can be accurately identified and factored.



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