Objective: To describe the geographic and temporal trends in cosmetic facial plastic surgery procedure costs and frequency during the last decade and to evaluate factors that may influence changes in the demand for cosmetic procedures.

Methods: A survey sent to every (N=1727) active fellow, member, or associate of the American Academy of Facial Plastic and Reconstructive Surgery assessing the costs and frequency of 4 common cosmetic facial plastic surgery procedures (ie, face-lift, brow lift, blepharoplasty, and rhinoplasty) for 1999 and 1989.

Results: The annual frequency of the aging-face procedures (ie, face-lift, brow lift, and blepharoplasty) have increased 41% over the last decade while rhinoplasties have declined slightly (18%). Each of the procedures studied have increased in cost since 1989; however, only face-lift has increased at a rate greater than inflation during this period (average surgeon’s fees, $3154-$4582). Although the average cost of each of these procedures is stable across US geographic areas, there seem to be fewer aging-face procedures being performed in the East (represented largely by New England and the northeastern states) compared with the Midwest, South, and West (P≤.03), while rhinoplasty frequency across these regions is essentially unchanged. In addition to variables such as age, years in practice, and degree of marketing, the strongest correlates with increased cosmetic procedure frequency were the costs of these procedures (P≤.008).

Conclusions: Although the cost and frequency of cosmetic facial plastic surgery procedures continues to rise across the United States, there are interesting differences in these trends between different regions and procedure type during the last decade. There also seems to be an association between increased cost and increased frequency of these cosmetic procedures.
MATERIALS AND METHODS

A survey was mailed to every active member of the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS), including fellows, members, and associates (N=1727). Members were queried as to the surgeon's fees, total patient charges, and annual frequency of 4 common cosmetic facial plastic surgery procedures for both 1999 and 1989: facelift, brow lift, blepharoplasty, and rhinoplasty. A total of 264 surveys (15.3%) were returned and included in this study.

Analysis was conducted using the SPSS (Statistical Package for the Social Sciences; SPSS, Chicago, Ill) computer software program. Demographic variables, procedure frequency, and cost data were evaluated for the 2 periods surveyed as well as based on 4 US geographic regions (East [represented largely by New England and the northeastern states], South, Midwest, and West) to assess significant trends. Statistical significance was analyzed using independent and paired t tests where appropriate, and significance levels are provided in the tables.

RESULTS

The study population was relatively homogeneous, with most respondents being male and approximately 46 years old, with an average of almost 15 years in practice (Table 1). Most respondents (81.1%) work in private practice and about half (45.5%) had completed AAFPRS fellowship training. Although there was a wide range for the cosmetic nature of each practice, the average respondent's practice was approximately 40% cosmetic in nature. Most of those surveyed used some form of marketing (69.3%); however, this represented only a small fraction (5.1%) of most respondents' annual overhead. Most AAFPRS members (53.8%) in this study, as asked by our survey, felt that there is a current surplus of facial plastic surgeons in their given community, in addition to plastic surgeons in general. This perception of excess surgeons was present for most respondents in all 4 US regions studied except the Midwest, where most respondents (61.5%) felt that there was no such excess.

There was significant geographic variation noted in procedure frequency for both periods analyzed. Specifically, the East was found to have significantly lower annual rates of face-lifts (11.7 vs 24.7), brow lifts (7.6 vs 18.2), and blepharoplasty (19.5 vs 39.8) when compared with the West (Table 2). In contrast, respondents from the West, Midwest, and South reported similar frequencies of these aging-face procedures for both 1999 and 1989 (Table 2). Costs, measured as both surgeon's fees and total patient charges, were not significantly different across all 4 regions. Unlike the aging-face procedures, rhinoplasties were equally as frequent in the East (35.5 vs 35.1) compared with the West and, again, costs were essentially unchanged.

Comparing the results from 1989 and 1999 revealed a significant increase in the aging-face procedure frequency (P<.004) in contrast with an actual slight decline in rhinoplasties during this same period (44.0-36.0) (Table 3). Although a relatively high percentage of our study population had completed AAFPRS fellowship training (45%), there was no difference in these trends comparing fellowship-trained and nonfellowship-trained respondents, with aging-face procedures significantly increased in frequency and rhinoplasty frequency declined for both groups during the last decade. Costs for all procedures increased from 1989 to 1999 (average total charges, $3345-$4670). After correcting for inflation to 1989 dollars, however, only face-lift costs (both surgeon's fees and total charges) increased at a rate greater than inflation during the last decade.

The demographic variables surveyed were also assessed for any association with increased procedure demand as measured by increased annual procedure frequency. Age, years in practice, and the percentage of overhead spent on marketing were all weakly correlated with increasing cosmetic procedure frequency (Table 4). The strongest correlates with this increased frequency were found to be both the surgeon's fees and total charges for these respective procedures. For instance, increas-
Cosmetic facial plastic surgery procedures are free from many of the confounding factors of health care economics since most are out-of-pocket expenses for the patient without third-party involvement. As others have argued, measuring cost outcomes of cosmetic procedures thus may allow one to analyze trends in pricing, supply, and demand using routine economic methods.7

This study found that, since 1989, there has been a 41% increase in aging-face procedures, while rhinoplasties have generally declined by 18%. The East did not show the similar increase in procedure frequency that was found in the West, Midwest, and South. Costs for each of these procedures have increased at about the rate of inflation during this period, with only face-lift costs increasing above this inflationary rate. There has long been anecdotal evidence that US trends during the last few decades have been away from rhinoplasty procedures while aging-face concerns continue to increase. This, in part, is due to the aging US population. In addition, however, there seems to be increased acceptance in most communities of aging-face cosmetic procedures as more Americans undergo these procedures with increasingly successful results. It is unclear if these trends will continue as the baby-boomer generation continues to age; however, this study does confirm this general trend for most regions of the country.

Analysis of variables associated with increased procedure frequency revealed that the strongest associated variables, other than factors such as age or marketing, were the cost outcomes represented by surgeon’s fees and total patient charges. As each of these factors increased, the annual number of most cosmetic facial plastic surgery procedures increased as well, a relationship that will be further evaluated in a future study.

The main limitation of this study is the low response rate (15.3%) from those AAFPRS members surveyed. Unfortunately, given the sometimes sensitive nature of price issues, this poor response may have been unavoidable. Those members who did respond, however, represented a good sampling of the AAFPRS community, with a wide range of procedure types (0%-100% cosmetic), frequency (eg, 0-275 reported face-lifts per year), and cost (eg, face-lift surgeon’s fees, $1750-$12500). Fortunately, with 264 respondents, we were able to perform most statistical analyses without limitations of study number and with enough statistical power to show statistically significant differences.

Although this study did not measure changes in (surgeon) supply during this period, our study is also limited by not accounting for the presence of other, nonfacial plastic surgery alternatives in the community, such as general plastic surgeons, dermatologists, and oculo-

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### Table 2. Geographic US Trends in Cosmetic Facial Plastic Surgery Procedure Frequency and Cost for 1999 and 1989

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<td>$4000</td>
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### Table 3. Temporal Trends in Cosmetic Facial Plastic Surgery Procedure Frequency and Cost

<table>
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<th>1989</th>
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<tbody>
<tr>
<td>Surgeon’s fee</td>
<td>$2000</td>
<td>$1500</td>
</tr>
<tr>
<td>Total charges</td>
<td>$2400</td>
<td>$2000</td>
</tr>
</tbody>
</table>

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*Real current (1999) dollars and inflation-corrected 1989 dollars (in parentheses) are provided.
†Comparison of 1999 to 1989 frequency (P = .02, t test).
‡Comparison to representative West region (P = .02, t test).
§P = .03, t test.

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increased in cost since 1989; however, only face-lifts have declined slightly. Each of the procedures studied have increased over the last decade while rhinoplasties have decreased, or in the context of general or economic US societal trends with regard to specific predictors of increased demand and future productivity.

An evaluation of the factors that may be associated with the cost and frequency of cosmetic facial plastic surgery procedures relies on an understanding of the basic geographic and temporal trends of these procedures as a starting point. From this foundation one may analyze these trends with regard to specific predictors of increased demand, correlation with demographic variables of interest, or in the context of general or economic US societal attitudes. The demand for cosmetic plastic surgery procedures is clearly tied to the social perspective of a given time and place. Future studies that attempt to analyze economic outcomes in facial plastic surgery should not overlook these important regional and temporal differences.

**CONCLUSIONS**

The annual frequency of all of the aging-face procedures (i.e., face-lift, brow lift, and blepharoplasty) have increased over the last decade while rhinoplasties have declined slightly. Each of the procedures studied have increased in cost since 1989; however, only face-lifts have increased at a rate greater than inflation during this period. Although the average cost of each of these procedures is stable across US geographic areas, there seem to be fewer aging-face procedures being performed in the East compared with the Midwest, South, and West while rhinoplasty frequency across these regions is essentially unchanged. In addition to variables such as age, years in practice, and degree of marketing, the strongest correlates with increased cosmetic procedure frequency were the costs of these procedures.

Although the cost and frequency of cosmetic facial plastic surgery procedures seem to be continuing to rise across the United States, there are interesting differences in these trends between different regions and procedure type during the last decade. Additionally, there seems to be an association of increased prices with increased procedure frequency. There should be greater efforts on our part as AAFPRS members to describe, assess, and understand these important trends in the cost outcomes of facial plastic surgery procedures, if we hope to better understand the economic factors that may predict increased demand and future productivity.

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Corresponding author: Ramsey Alsarraf, MD, MPH, Hedgewood Surgical Center, 2427 St Charles Ave, New Orleans, LA 70130 (e-mail: ralsarraf@earthlink.net).

**REFERENCES**