

Plastic Surgery Utilization and Access in the Elderly

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Background

Plastic surgery has an important role in treating elderly patients. This includes various operations such as breast reconstruction post-mastectomy, cosmetic procedures, and hand surgery. Previous studies have examined the anatomical changes the body goes through as we age.

As the aging population of the United States increases, it is important to investigate the accessibility of plastic surgery for the elderly. Some studies have shown that plastic surgeons are asymmetrically distributed across the United States. Plastic surgeons are more likely to be concentrated in populations with younger than 65 years, female, and residing in urban areas.⁽¹⁾ Furthermore, it studies show that race and insurance status can affect reconstruction rates across populations. ^(2, 3)

Although studies show distribution of plastic surgeons, there have been few studies evaluating access and utilization of plastic surgery in the elderly.

The availability of CMS Medicare data by US county represents a valuable resource to investigate the demographics of elderly patients with respect to plastic surgery.

Objectives

1. Assess geographic trends in access to plastic surgery in the elderly
2. Assess the characteristics of regions that had a mismatch between access and utilization
3. Analyze socioeconomic factors that correlated with utilization of plastic surgeons.

Methods

We reviewed multiple county-level national databases:

- CMS Demographic Data
- Medicare billing data
- CMS chronic disease data, US Census demographics,
- USDA Atlas of Rural and Small-Town America

The analysis was conducted using the average of all Medicare billing information from 2014-2018.

Office visit billing was tracked to determine access. Specifically, *CPT billing codes 99202, 99203, 99204, 99205, 99212, 99213, 99214, and 99215* were aggregated to obtain the total number of plastic surgery office visits per county.

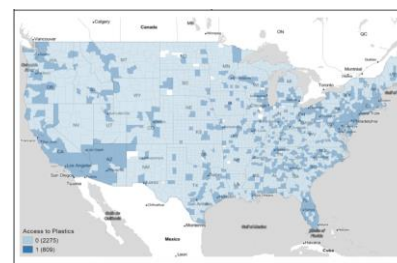
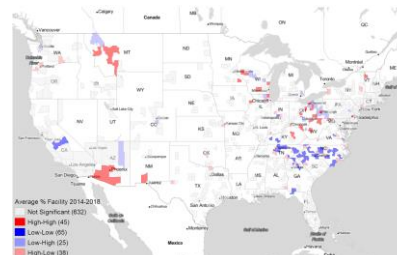
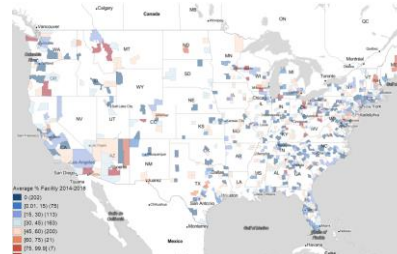
We utilized a Python-based script for database building and GeoDa (a statistical map-based graphing software) to chart demographic, geographic, and socioeconomic trends.

We used Moran's I clustering coefficient for the statistical evaluation of geospatial clusters.

We used factorial ANOVA to evaluate statistically significant demographic components that contributed to the formation of these clusters.

ANOVA Analysis Between Plastic Surgery Office Visit Clusters									
Cluster	High-High		Low-Low		Low-High		High-Low		P-value
Counties per Cluster	227		4		100		407		
Demographic Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Average Medicare Age	71.78	1.48	70.75	2.58	71.08	1.17	70.9	1.38	3.38E-12
% Male	44.61	1.69	46.66	2.92	46.34	1.69	45.40	1.75	3.35E-16
% White	79.98	15.05	82.62	9.66	87.56	10.05	85.05	12.29	6.86E-07
% Black	9.62	10.91	10.28	12.05	5.96	7.51	8.21	9.71	0.019847
% Hispanic	5.7	9.3	4.27	4.81	3.42	6.24	3.56	8.09	0.013251
% Other Race	4.7	3.98	2.63	1.07	3.06	3.62	3.18	4.13	3.38E-05
Medicare Population Density	225.71	491.72	19.98	24.87	36.76	91.24	41.81	46.29	1.81E-14
Total Population Density	1617.92	3954.93	117.94	143.68	218.09	749.14	252.93	313.82	1.87E-12
HCC Score	1	0.09	0.93	0.19	0.97	0.09	0.97	0.08	5.73E-06
Standardized Medicare Cost/Enrollee	9882.14	1116.25	9388.46	3063.8	9194.06	1133.79	9276.13	1224.58	0.000192
Metropolitan value (0, 1)	0.88	0.32	0.5	0.58	0.51	0.5	0.71	0.45	7.25E-12
Unemployment	4.98	1.91	4.8	1.83	5.36	1.33	4.79	1.31	0.009443
Uninsured	9.82	4.42	13.87	3.29	11.35	5	11.45	4.57	0.000121
% Without GED	10.95	4.99	12.65	4.92	13.31	5.59	11.28	4.97	0.000099
% With Only GED	27.59	7.19	31.5	3.91	35.33	7.91	30.08	6.8	5.00E-17
% Some College	28.1	4.84	32.22	5.41	29.66	4.89	31.1	4.33	2.55E-13
% College Degree	33.37	11.83	23.62	3.58	21.7	9.81	27.54	9.72	1.53E-19
% Medicare Breast Cancer	3.08	0.45	2.05	0.72	2.81	0.47	3.73	0.49	1.52E-18

Results



High utilization clusters were found in the **Northeast and Southwest regions** of the United States, as well as throughout Florida. There were relatively few low utilization clusters identified, and they did not adhere to any particular geographic distribution.

Further evaluation of these clusters demonstrates that the majority of plastic surgery utilization was in **urban centers surrounded by rural counties**. Factorial ANOVA revealed that plastic surgery office visits were higher in patients with a GED and/or college degrees. A small portion of the population was unemployed (5%) or uninsured (9-14%). A small fraction (2-3%) had a history of breast cancer.

Conclusions

- Statistically significant geographic trends in access and utilization of plastic surgery in the elderly are present
- Socioeconomic factors remain key considerations in the utilization of plastic surgery.
- There are statistically significant geospatial clusters in the utilization of plastic surgery by the elderly in the United States
- These are high-utilization clusters that appear in the Northeast, Southwest, and Florida
- There are relatively few low-utilization clusters that do not conform to a particular geographic distribution
- Educational background, employment, and medical history are statistically significant contributors to the formation of these clusters.

References

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None to report.