

IE585- IE RESEARCH IN HEALTHCARE

Analysis of Medicare in hospitals

Comparing New York and Ohio states based on Medicare scores and revenue.

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‘Medicare loses more money to improper payments than any other program government wide’.

— Kristin Walter, spokesperson for the Council for Medicare Integrity

Short Abstract

Medicare scores will give us a basic idea on how much a particular hospital is spending under Medicare. Here, we analyse the states of NY and OH under the basis of those scores, to rate their performance. Study shows that OH is performing better than NY in this aspect, though the number of hospitals are less comparatively.

Abstract

Medicare is a national social insurance program, which deals with the health insurance of Americans of age 65 and older. This report shows us how Medicare is performing in New York and Ohio states based on their Medicare scores and we will also have a look at how much they are spending on certain services under Medicare. We performed an analysis on the Medicare score of all the hospitals in both the states and found out which state is doing well in the Medicare program. However, New York spends more on Medicare than Ohio, the average Medicare score of NY is slightly less than 1. We also considered 5 services under Medicare and performed analysis on top 10 hospitals in both the states based on their revenue per annum to get an idea on which service a state is generally spending money on.

Introduction

Medicare is a single player national social insurance program administered by the US federal government. It started in 1966. It is funded by a payroll tax, premiums and surtaxes from beneficiaries, and general revenue. Not only for the elders aged above 65 but also provides health insurance to younger people with some disabilities status as determined by the Social Security Administration, as well as younger people with end stage renal disease and amyotrophic lateral sclerosis. The New York state is 4th highest state spending on Medicare, whereas Ohio stands at 9th position according to the 2014 Medicare data. The average HCC (Hierarchical Condition Category) score was nearly same for both the states, which assesses potential fee-for-service program payments. The main reason to consider New York and Ohio are firstly they are neighbouring states, so they are in the same time zone and similar weather conditions. Secondly, they spend almost equal amount on Medicare per capita. We considered the Medicare scores of all the hospitals in both the states and performed a detailed analysis on them. Based on the analysis Ohio is spending slightly more efficiently than the New York state. These scores are generally identified by the amount of money a hospital is spending on Medicare. It is usually lies somewhere between 0.85-1.15. Additionally, based on the revenue of the hospitals, top 10 in both the states were selected and looked on what services the hospitals are spending more. Both the states are spending more on surgeries. It is also important to find out the frauds happening in Medicare to spend more wisely on the services. There are lot improper payment complaints every year, which needs to be rectified by the federal government.

Data used and method of analysis

The information about the Medicare scores of the hospitals in New York and Ohio was available in the governments Medicare site. Hospital wise, State wise and National wise data is given in the website. We considered the score of the hospital in both the states and did our further analysis. We also used the data of American Hospital Directory to get the hospital wise data on the total revenue of the hospitals. We also used the total number of inpatient for Medicare and average cost in different medical service and compared it.

On the first part of our analysis, we considered the Medicare scores of all the hospitals in New York and Ohio. We used Minitab 17 for our analysis with this data. After entering, the data and we did two-sample t test to check how much percentage of data is lying outside the variance limits. We go the mean and variance of the scores of New York and Ohio in the process. Further details of the score and its variation like upper and lower quartiles were also calculated and box plot was done. We further selected the data of the hospitals with its total revenue and first cleaned the data. Cleaning the data involved removing the hospitals having no data. After cleaning the data, we sorted the list of hospitals from highest to lowest revenue. As we wanted to focus our study on the hospitals having highest revenue, we selected the top 10 hospitals having high revenue. We found the net income for each of these hospitals and found some interesting conclusions. In each hospitals, we considered the number of inpatients and the total charge for the five most popular service (Cardiology, Medicine, Surgery, Orthopaedics and Gynaecology). Hence, we calculated the average charge in each of this service for both the states and compared them to find some interesting insights.

Results of the analysis

Two sample t-test of the scores of New York and Ohio.

Two-Sample T-Test and CI: Score NY, Score OH

Two-sample T for Score NY vs Score OH

	N	Mean	StDev	SE Mean
Score NY	172	0.9802	0.0663	0.0051
Score OH	168	1.0081	0.0645	0.0050

Difference = μ (Score NY) - μ (Score OH)

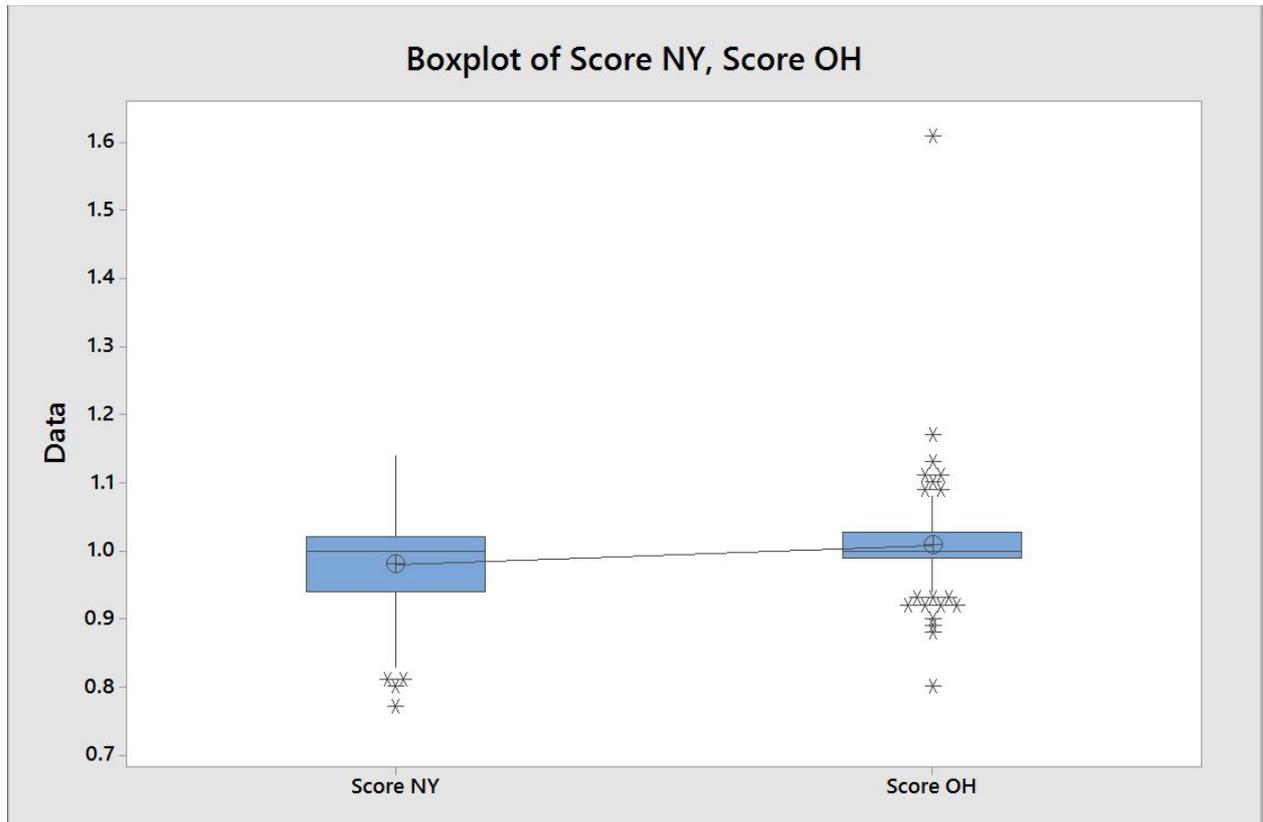
Estimate for difference: -0.02786

95% CI for difference: (-0.04181, -0.01391)

T-Test of difference = 0 (vs \neq): T-Value = -3.93 P-Value = 0.000 DF = 337

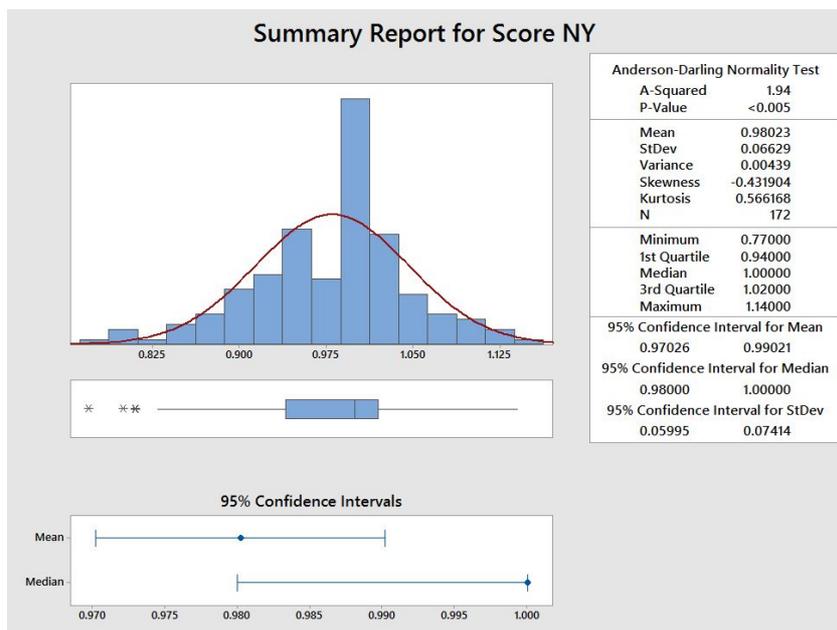
From T-test, we can see the critical values of the T-Test as the limits. We also get the value of P less than 0.05 and hence the difference in score is significant. There is a difference in the mean of both the data as we can see in the values.

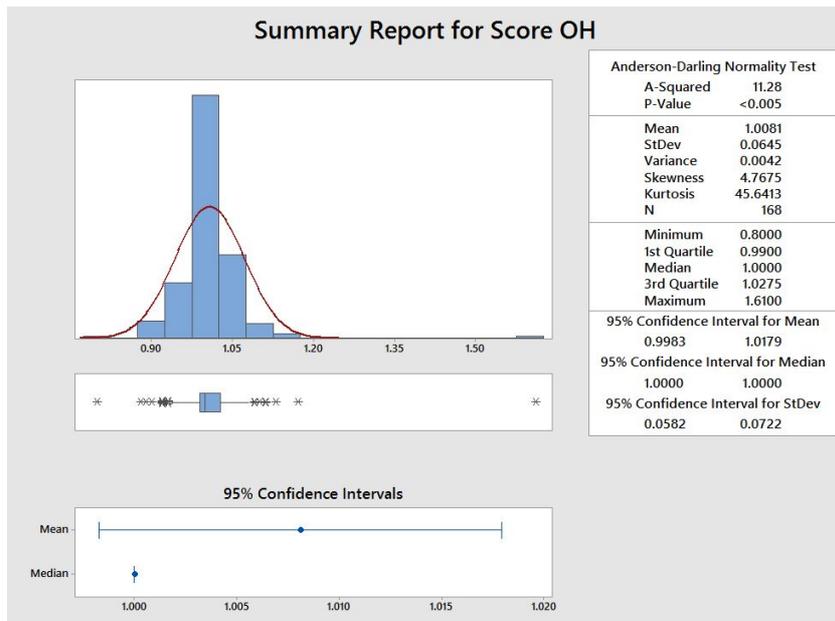
Boxplot of the Scores comparing the New York Scores and Ohio Scores.



In the above boxplot, we can see the median scores of New York is lesser than the median scores of Ohio. We also see that in New York the score has more variance than the score in Ohio. We can also observe many outliers in the Ohio data though the variance of New York score is more.

Then the detailed summary of the scores of New York and Ohio.





In the data summary we can observe that the Medicare scores in New York is more spread than Ohio. The most significant difference between the scores of the two states are that the mean score of New York is 0.98023 and the mean score of Ohio is 1.0081. This shows that Ohio spends more than the National Medicaid average and New York spends less than the National Medicaid average.

The data with the details of hospitals in both the states according to the revenue were selected. **The list of hospitals and its location with no data are listed below.**

New York

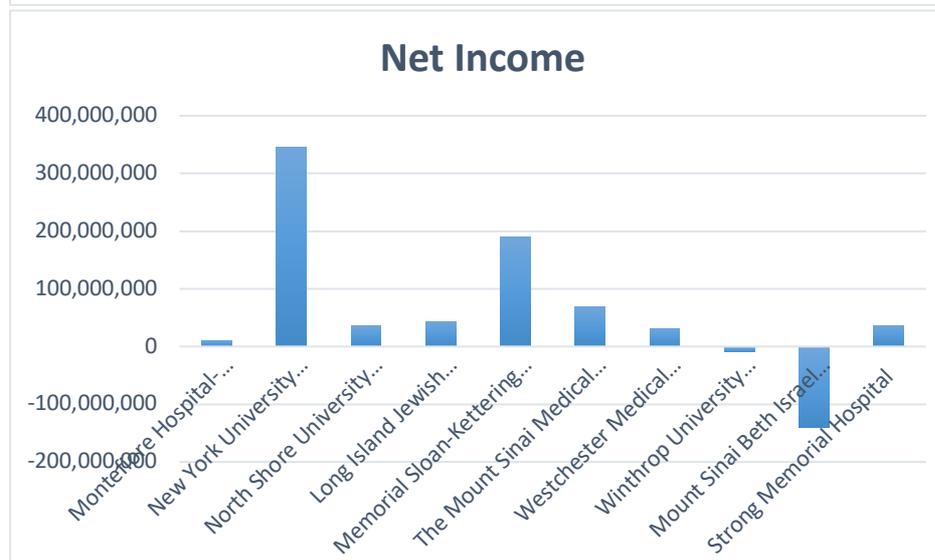
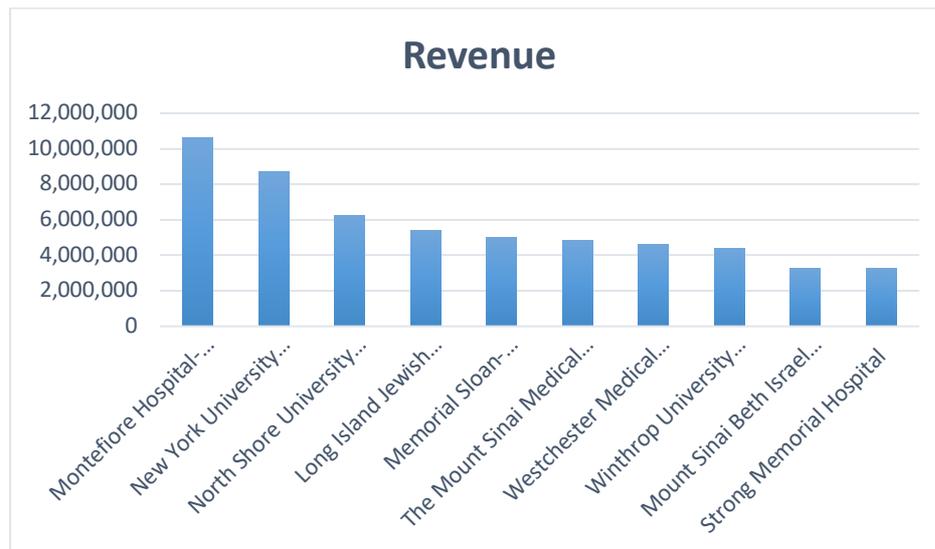
177	Albany Stratton VA Medical Center	Albany	0	0	0	0
178	Batavia VA Medical Center	Batavia	0	0	0	0
179	Bath VA Medical Center	Bath	0	0	0	0
180	Bronx-Lebanon Hospital Center - Concourse Division	Bronx	0	0	0	0
181	Buffalo VA Medical Center	Buffalo	0	0	0	0
182	Burdett Birth Center	Troy	0	0	0	0
183	Canandaigua VA Medical Center	Canandaigua	0	0	0	0
184	DeGraff Memorial Hospital	North Tonawanda	0	0	0	0
185	Faxton-Saint Luke's Healthcare - Faxton Campus	Utica	0	0	0	0
186	Jack D. Weiler Hospital	Bronx	0	0	0	0
187	James J. Peters VA Medical Center	Bronx	0	0	0	0
188	Keller Army Community Hospital	West Point	0	0	0	0
189	Millard Fillmore Suburban Hospital	Williamsville	0	0	0	0
190	Mount Sinai Beth Israel Brooklyn	Brooklyn	0	0	0	0
191	Mount Sinai West	New York	0	0	0	0
192	New York-Presbyterian Allen Hospital	New York	0	0	0	0
193	New York-Presbyterian Hospital/Columbia University Medical Center	New York	0	0	0	0
194	Northport VA Medical Center	Northport	0	0	0	0
195	Rockefeller University Hospital	New York	0	0	0	0
196	Saint John's Riverside Hospital - ParkCare Pavilion	Yonkers	0	0	0	0
197	Saint Luke's Cornwall Hospital - Newburgh Campus	Newburgh	0	0	0	0
198	Staten Island University Hospital - South Site	Staten Island	0	0	0	0
199	Syracuse VA Medical Center	Syracuse	0	0	0	0
200	UHS Wilson Medical Center	Johnson City	0	0	0	0
201	VA Hudson Valley Health Care System - Montrose Campus	Montrose	0	0	0	0
202	VA New York Harbor Healthcare System - Brooklyn Campus	Brooklyn	0	0	0	0
203	VA New York Harbor Healthcare System - Manhattan Campus	New York	0	0	0	0

Ohio

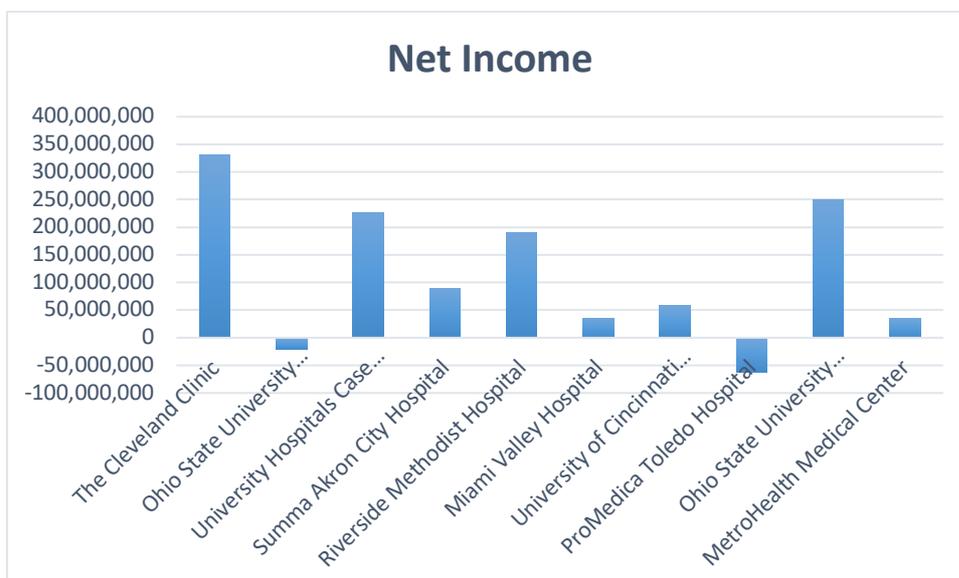
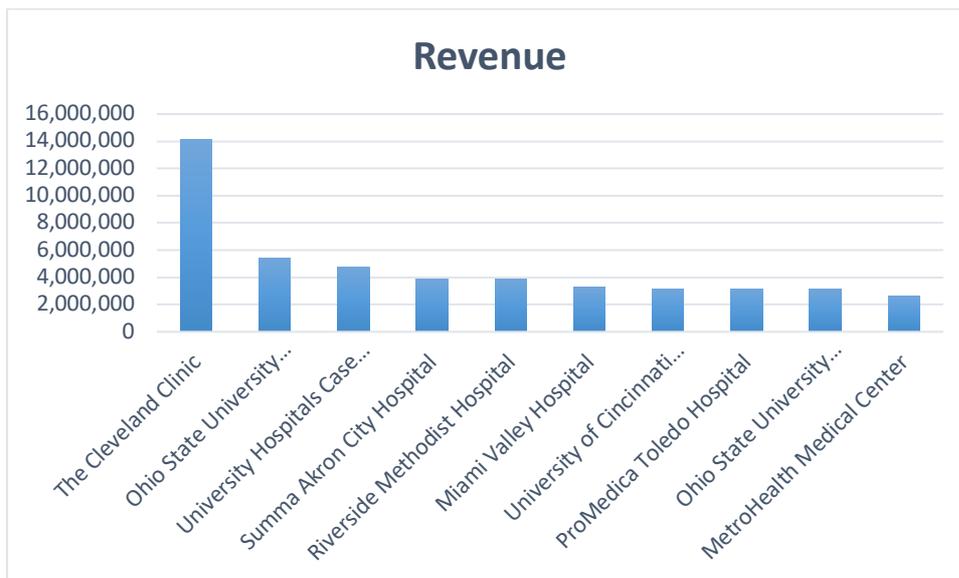
141	88th Medical Group - Wright-Patterson Air Force Base Medical Center	Wright-Patterson AirFo	0	0	0	0
142	Archbold Hospital	Archbold	0	0	0	0
143	Chillicothe VA Medical Center	Chillicothe	0	0	0	0
144	Cincinnati VA Medical Center	Cincinnati	0	0	0	0
145	Cleveland Clinic Avon Hospital	Avon	0	0	0	0
146	Dayton VA Medical Center	Dayton	0	0	0	0
147	Firelands Regional Medical Center - South Campus	Sandusky	0	0	0	0
148	Louis Stokes Cleveland VA Medical Center - Wade Park Campus	Cleveland	0	0	0	0
149	Mercy Health- Children's Hospital	Toledo	0	0	0	0
150	Mount Carmel East	Columbus	0	0	0	0
151	Southview Medical Center	Centerville	0	0	0	0
152	Summa Saint Thomas Hospital	Akron	0	0	0	0
153	Trinity Medical Center West	Steubenville	0	0	0	0
154	West Hospital	Cincinnati	0	0	0	0
155	West Medical Center	Willoughby	0	0	0	0

The top 10 hospitals based on revenue were selected and the analysis done are depicted below.

New York

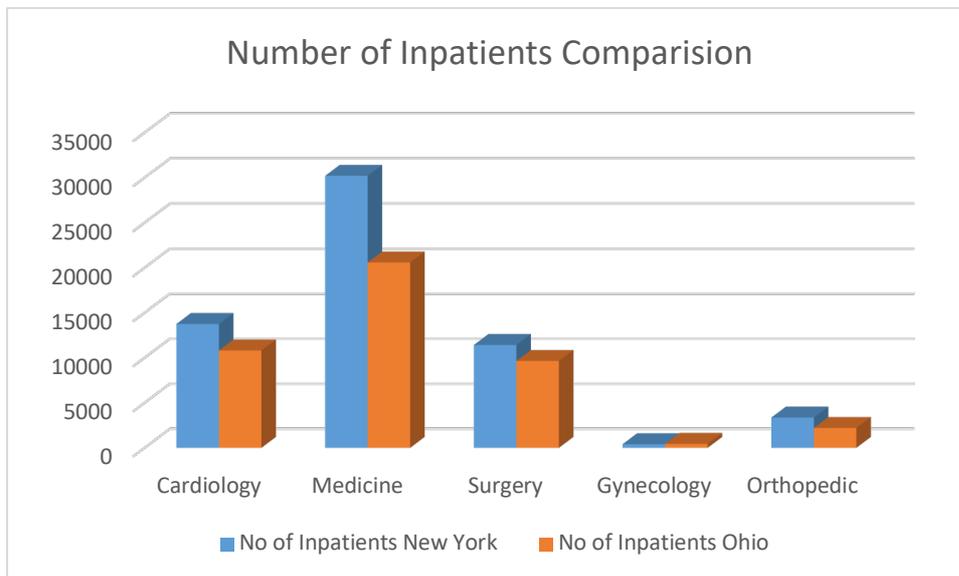


Ohio

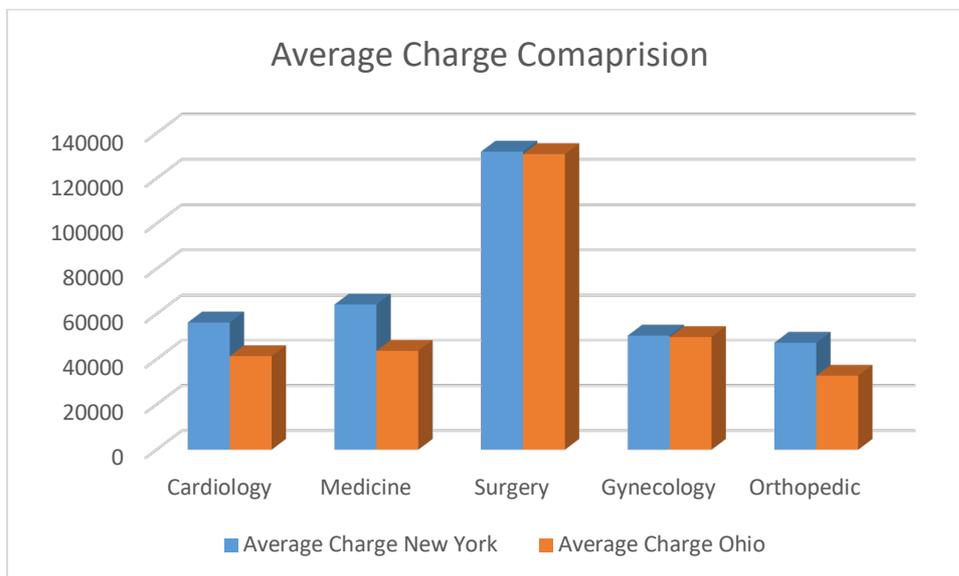


The graphs show the trends of the hospitals having high revenues in both the states. We compared the revenue with the Net Income of each and we found an important conclusion that high revenue does not mean high income. In the state of New York, we observe that hospitals like “New York University Langone Medical Center” and “Memorial Sloan-Kettering Cancer Center” have high Income along with high revenue. In contrast to that, hospitals like “Mount Sinai Beth Israel Medical Center” and “Winthrop University Hospital” are having loss as their Income value is in negative, though their revenue is high. In the state of Ohio, we also see similar trends. Hospitals like “The Cleveland Clinic” and “Ohio State University Comprehensive Cancer Center - Arthur G. James Cancer Hospital” are the ones with high income along with high revenue while hospitals like “ProMedica Toledo Hospital” and “Ohio State University Wexner Medical Center” incur loss even having high revenue.

We took the data based on the 5 popular medical services in the top 10 hospitals of both the states and we calculated the average charge in each category. **The comparison between the number of inpatients and the average charge by the hospital is depicted below.**



From the above graph, we can see that the number of inpatients in the medical service of Medicine is greater in New York as compared to Ohio. In the medical service of Cardiology, Surgery and Orthopaedic the number of inpatients is slightly more in New York while in Gynaecology the number of inpatients is almost the same in both the states. We can say that the number of inpatients in New York is much more than Ohio.



From the above graph, we can see that the average charge for the medical service Cardiology, Medicine and Orthopaedic is large in New York as compared to Ohio. In the medical service of Surgery and Gynaecology the average charge in both the states are almost the same.

Conclusions

After doing the analysis on the collected data our focal finding was about the Medicare score of the states New York and Ohio. We found that the mean score of New York was less than 1 (0.98023) while the means score of Ohio was more than 1(1.0081). The score in New York, which is less than 1, states that the total money spent by Medicare in New York per patient is less than the national average amount of money spent in United States. Thus the score of Ohio being more than 1 shows that the money spent by Medicare per patient is more than the national average amount. Thus, we can conclude that the Medicare spends more money efficiently in the state Ohio as compared to the State New York.

The second analysis is a continuation of the first analysis comparing the gross revenue and net income of the top hospitals having highest revenue in the states of New York and Ohio. The comparison gave us the conclusion that the high gross revenue does not guarantee high net income and it applies to both the states. We observed that in the state New York hospitals like “New York University Langone Medical Center” and “Memorial Sloan-Kettering Cancer Center” and in the state Ohio hospitals like “The Cleveland Clinic” and “Ohio State University Comprehensive Cancer Center - Arthur G. James Cancer Hospital” have high income along with high revenue. While in the state New York hospitals like “Mount Sinai Beth Israel Medical Center” and “Winthrop University Hospital” and in the state Ohio hospitals like “ProMedica Toledo Hospital” and “Ohio State University Wexner Medical Center” have loss though they have a high revenue.

In the final analysis we selected five most popular medical services provided by all the hospitals and compared the number of inpatients and average charge of Medicare patients. We found that the number of inpatients in Medicine is very large in New York as compared to that in Ohio; it is slightly greater in Cardiology, Surgery and Orthopaedics and almost equal in Gynaecology. The average charge is slightly greater in Cardiology, Medicine and Orthopaedics in the state of New York as compared to Ohio and it is almost equal in Surgery and Gynaecology.

References

1. Craig M Douglas (2017). New York State 4th in Medicare waste. Web- <http://www.bizjournals.com/buffalo/news/2017/01/26/new-york-state-fourth-in-medicare-waste.html>
2. Total Medicare Spending by Date (2009) Web- <http://kff.org/medicare/state-indicator/medicare-spending-by-residence/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>
3. Annual Medicare Usage and Spending by Location Web- <http://medicare-usage.healthgrove.com/>
4. Hospital Statistics by State. Web- https://www.ahd.com/state_statistics.html
5. Hospital Compare Datasets of Medicare. Web- <https://data.medicare.gov/data/hospital-compare>