

# **A Comparison of 2013 Medicare Payments in Massachusetts and Tennessee**

By Liam Abbott

## **Introduction:**

In this report, I compare 2013 Medicare payment data between Massachusetts and Tennessee.<sup>1</sup> To conduct this analysis, I use the public Medicare physician 2013 payment data found on the Centers for Medicare & Medicaid Services website. I also use 2013 population estimate data from the US Census Bureau.<sup>2</sup>

## **Data Preparation:**

Data preparation involved processing two different datasets: the Medicare payment dataset and the Census population dataset. Each observation in the raw Medicare payment dataset is a unique combination of provider, HCPCS procedure code, and place of service (facility versus non-facility). Variables in the dataset include various provider data, as well as Medicare submitted charge and payment data.

My first steps in processing the Medicare data were to select only the variables I would be using in the analysis and to filter the rows to include only data from Massachusetts and Tennessee. I was not interested in data at the granular level of provider/procedure code/place of service, so my next step was to aggregate across place of service to the provider/HCPCS code level.

Before aggregating, I calculated the gross Medicare payment amount for each row by multiplying the provided 'avg\_medicare\_payment\_amt' variable by 'line\_srvc\_cnt'. Then to aggregate, I summed the gross Medicare payment amounts for each provider/HCPCS code across both place of service levels. I also aggregated the line service count and total beneficiary count by summation.

For each provider/code record in the aggregated dataset, I also included the state and specialty of that provider. A sample of 5 rows from the aggregated dataset is shown below:

provider	hcpcs_code	gross_medicare_amt_prov_code	state	specialty	beneficiary_count_prov_code
1508851510	78452	203630.96	Tennessee	Cardiology	585
1114910981	99213	10639.62	Tennessee	Optometry	203
1922123744	93000	7332.36	Tennessee	Cardiology	440
1285721316	77003	575.03	Tennessee	Diagnostic Radiology	22
1346217155	99213	7167.26	Massachusetts	Endocrinology	90

---

<sup>1</sup> Medicare data found here: <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/Physician-and-Other-Supplier2013.html>

<sup>2</sup> Population data found here:

<http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>

The next step was to process and filter the population data from the US Census Bureau. This took a bit more effort to reformat than the Medicare dataset. The details are provided in the comments to the code included with this report. At a high level, the processing involved converting the raw dataset from wide to long format, extracting year and age values from a single raw value, and filtering to include only 2013 population numbers for Massachusetts and Tennessee.

Each record in the resulting dataset is a unique combination of state and age, where age goes from 0 to 85 in increments of 1 year (age 85 in the dataset is really an aggregate of 85 and over). A sample of 5 rows from the processed population dataset is shown below:

	state	age	population
	Tennessee	45	42163
	Massachusetts	0	37597
	Massachusetts	56	46996
	Tennessee	62	40422
	Tennessee	74	21910

With the two necessary datasets processed and filtered, I proceeded to the comparison analysis of the two states.

### **Comparison of Total Medicare Payments:**

With the processed and filtered Medicare and population datasets, a comparison of total Medicare payments between Massachusetts and Tennessee is relatively straightforward. I aggregated the Medicare dataset to the state level (so aggregating over providers and codes) to get the total gross Medicare payments made to providers in that state in 2013. I then aggregated the population dataset to the state level as well, calculating the total 65 years-old and above population for each state.

After aggregating each to the state level, I combined the two datasets on state values and calculated the Medicare payment amount per eligible resident for each state, where eligible residents were defined as anyone aged 65 or above. Total 2013 Medicare payments to providers in Massachusetts were about \$1.845bn while payments to providers in Tennessee were about about \$1.856bn. The total 65 and above population in Massachusetts in 2013 was about about 989,000 and in Tennessee it was about 952,000.

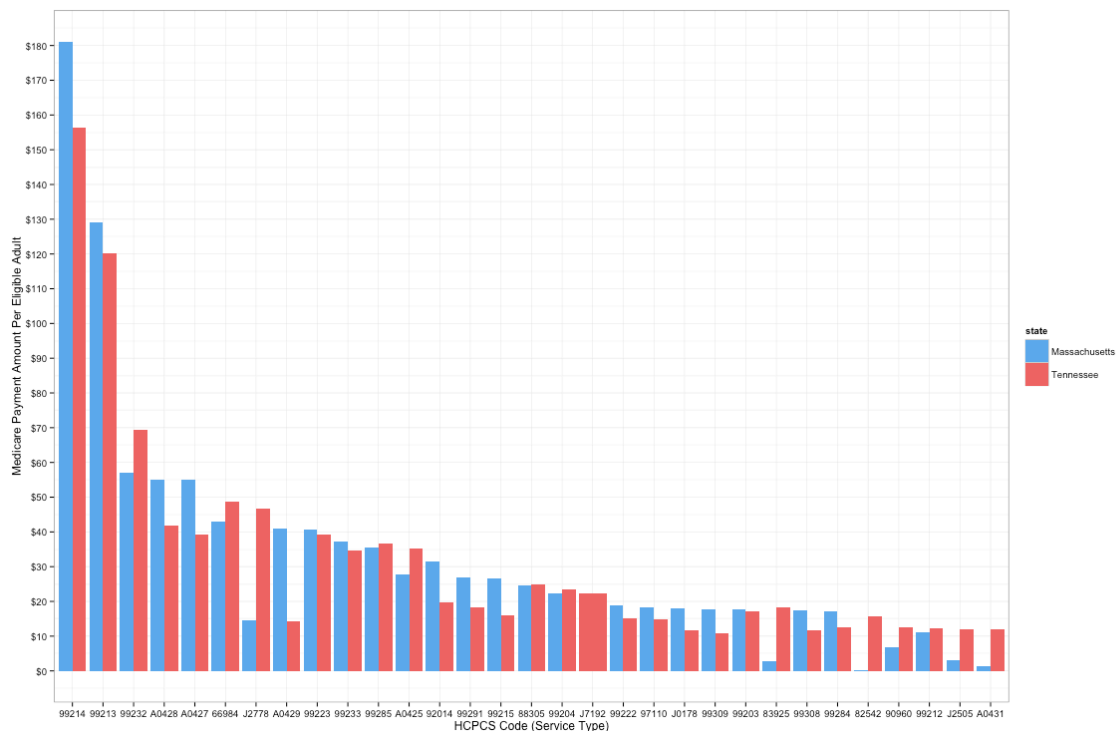
As the gross Medicare payment and eligible population numbers for the two states were very similar in 2013, the per capita Medicare payment figures were very close as well. In Massachusetts, total 2013 Medicare payments per eligible resident were about \$1,864.89, while in Tennessee they were about \$1,948.68.

## Comparison of Medicare Payments by Service Type and Specialty:

The next step was to compare Medicare payments between Massachusetts and Tennessee by service type and then by provider specialty. I began with the comparison by service type. Here, I used the HCPCS procedure code to distinguish between different service types. The first step was to aggregate the Medicare dataset to the level of state and service type, and to calculate the gross 2013 Medicare payments at the state/service type level.

There were a total of 2,809 unique service types with Medicare payments in Massachusetts, 2,969 unique service types in Tennessee, and 3,387 unique service types across the two states. However, there were just 21 unique service types that accounted for 50% of all gross Medicare payments in Massachusetts and 30 unique service types that accounted for 50% of all gross Medicare payments in Tennessee. Across these two sub-groups, there were 31 unique service types.

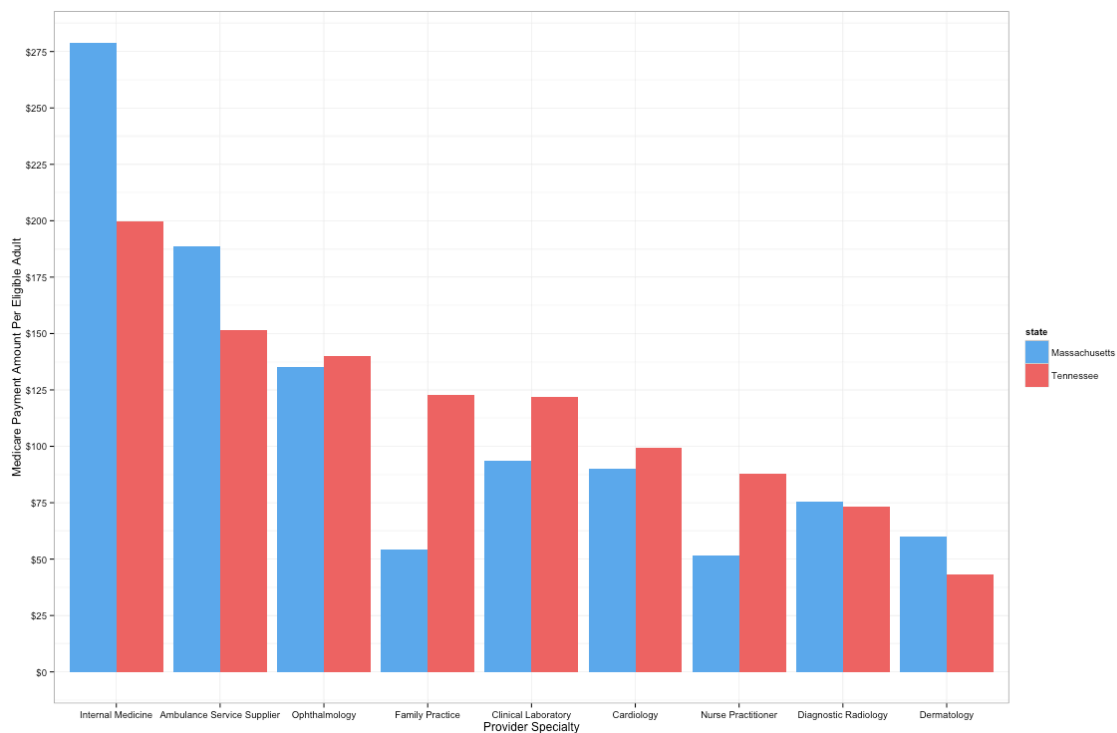
Bar charts are useful in visualizing the comparison between the two states on the basis of these 31 service types. Below, total Medicare payments per eligible adult amounts are displayed for each of the top 31 service types in both states:



We can see that there were two service types that clearly had the largest per capita Medicare payment amounts in 2013 across both states. These service types are denoted by HCPCS codes 99214 (“Established patient office or other outpatient, visit typically 25 minutes”) and 99213 (“Established patient office or other outpatient visit, typically 15 minutes”).

I followed a similar methodology to compare the states on the basis of Medicare payments by provider specialty. After aggregating Medicare payments to the state/specialty level, there were a total of 87 unique provider specialties represented in Massachusetts and 84 in Tennessee. If we focus on only largest specialties accounting for the top 50% of Medicare payments in each state, there were 7 such specialties in Massachusetts, 7 in Tennessee, and a total of 9 unique specialties across the two states.

We can again use a bar chart to compare the two states on the basis of these 9 provider specialties. Below, total Medicare payments per eligible adult amounts are displayed for each of the top 9 provider specialties in both states:



“Internal Medicine” and “Ambulance Service Provider” were the top two specialties by per capita Medicare payments for both states. Per capita Medicare payments for both of these specialties were noticeably higher in Massachusetts, while per capita payments under the “Family Practice” and “Nurse Practitioner” specialties were higher in Tennessee. In particular, “Family Practice” per capita Medicare payments were 4<sup>th</sup>-highest among all specialties in Tennessee and were more than double per capita “Family Practice” payments in Massachusetts.

### **Comparison of Services Per Beneficiary and Payment Per Beneficiary:**

To compare Massachusetts and Tennessee on the basis of services per beneficiary, I first aggregated the Medicare dataset to the state level (aggregating across

providers and HCPCS procedure codes). In particular, I summed the “line service count” and “beneficiary count” variables to find the gross values of each these at the state level. Then, I divided the gross line service count values by the gross beneficiary count values to find the services per beneficiary measure for each state.

This approach almost definitely underestimates the actual services provided per beneficiary, as identical beneficiaries are likely included in multiple rows of the original dataset, which would lead to an overestimate of the gross beneficiary count value for each state. However, making the assumption that this effect is roughly equivalent for the two states, the relative comparison between the states may still be valid. Using this approach, I found that in Massachusetts there were roughly 2.19 services provided per beneficiary in 2013, and in Tennessee there were roughly 2.72 services provided per beneficiary.

To compare the states on basis of payments per beneficiary, I use the same approach and aggregate gross Medicare payments and beneficiary counts to the state level. The comparison metric is the gross Medicare payment values divided by the gross beneficiary count values. Again, this approach likely suffers from the same overestimation of beneficiary counts described above, but I make the assumption that this effect is the same for both states and so the comparison is still valid.

I found that in Massachusetts, gross Medicare payments per beneficiary in 2013 were about \$87.93, while in Tennessee they were about \$83.91.