



HEALTH CARE  
COST INSTITUTE

# **2020 Healthy Marketplace Index**

## **Frequently Asked Questions**

June 2020

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## General Questions

### **How is a metro area defined?**

We used Core Based Statistical Areas (CBSAs), as identified by the Office of Management and Budget, to define our metro areas.

### **How were the sample metro areas chosen? For example, why are there so many data points in areas like Florida but so few in New York?**

To be included in the HMI, a CBSA had to have a minimum average of 25,000 member years and 10% coverage of the ESI population within the HCCI data. See the [methodology document](#) for greater detail.

### **What constitutes an inpatient, outpatient, or professional service?**

Inpatient services are rendered to patients who are kept in a health care facility overnight for treatment but not for observation.

Outpatient services are rendered to patients by sections of a hospital that provide medical services not requiring an overnight stay or hospitalization (e.g., emergency room [ER], outpatient surgery, observation room).

Professional services are rendered to patients by a health care professional. Service claims with no valid revenue code are assumed to be professional services (e.g., office and preventative visits, administered drugs).



## Spending Index Questions

### **What does per person “spend” mean?**

We define spending as the sum of all dollars spent per person on our set of 1,100 common medical services in a given year – across inpatient, outpatient, and professional services. We measure spending using allowed amounts – that is the sum of any insurer and individual out-of-pocket spending. Note that our measure of spending does not include any prescription spending. Our measure of spending also does not account for any premium spending or direct spending between a provider and patient (i.e., balance bills).

### **How does overall spending relate to spending by service category?**

Overall spending is the summation of spending per person across all three service categories in a given year.

### **How does per person spending relate to per person price, use, and service mix indices?**

Within each service category (inpatient, outpatient, and professional), per person spending can be expressed as the product of our average price and use measures summed with our service mix measure. For a more comprehensive description of how we calculate the measures used in our report, see our methodology document.

### **Does the per person spending measure capture spending on all services?**

No, we only capture spending per person on our sample set of services. This omits spending on all services not in our sample.

Our sample services capture a consistently large proportion of our analytic sample of claims as seen in the table below. To understand how our analysis may be impacted by omitting spending on claims for services not included in our sample set of services, we compared the per person spending index values we computed with those we would have computed if we had included spending all services observed in our analytic sample. As seen below, both sets of metrics were highly correlated and produced similar distributions of spending indices. Consequently, we do not believe that limiting spending to our sample set of services qualitatively impacted the per person spending indices we report. For a more complete discussion, please see our methodology document.



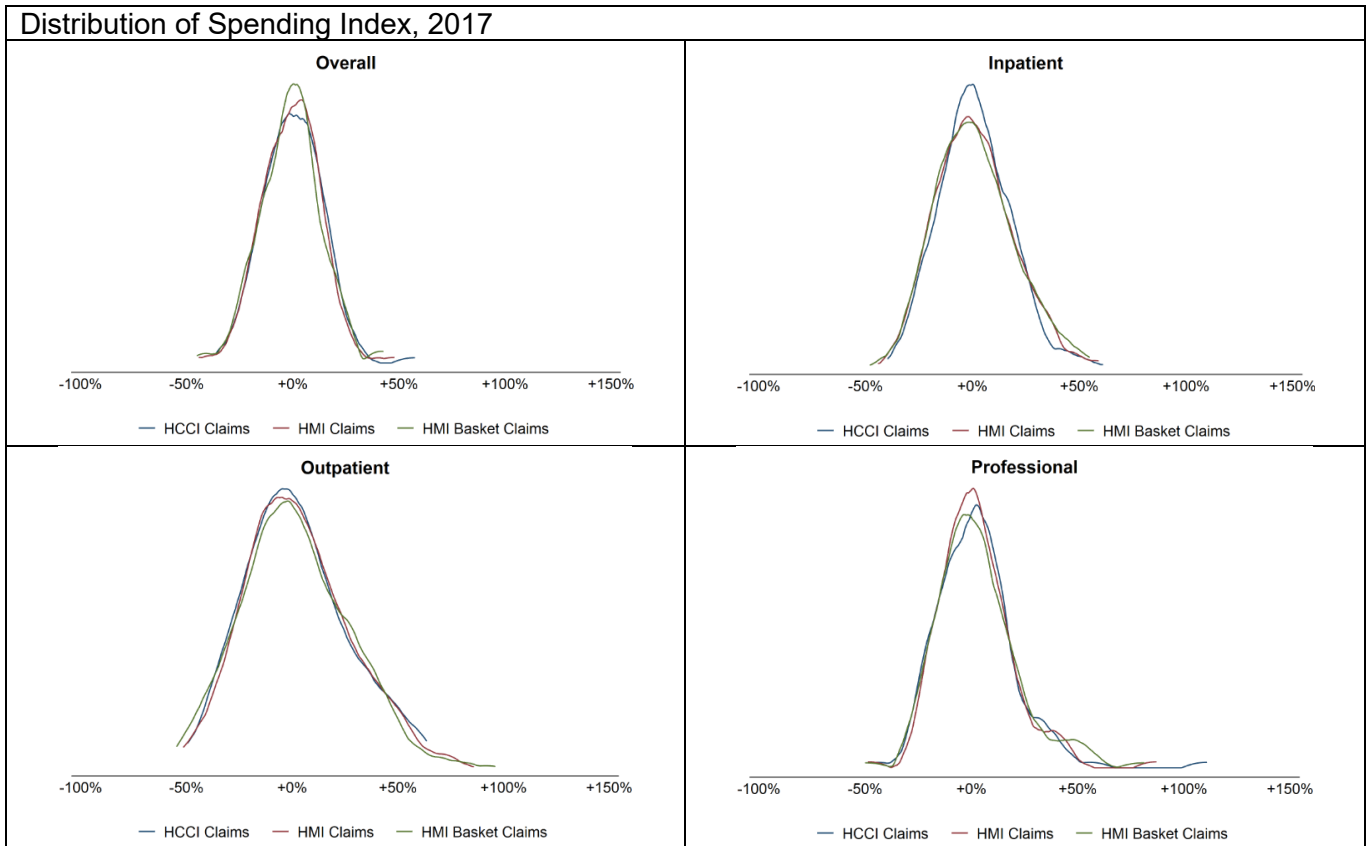
**Table 1. Share of Analytic Sample Claims, Spending Included in Set of Basket Services by Year**

Share of Spending (Total Allowed Amounts)	Number of Services	2013	2014	2015	2016	2017
Overall	1100	63%	63%	64%	64%	64%
Inpatient	100	64%	65%	65%	66%	66%
Outpatient	500	60%	61%	61%	61%	60%
Professional	500	65%	65%	65%	66%	65%

**Table 2. Correlations between CBSA Level Per Person Spending Metrics by Sample - Percent of National Median, 2017**

Service Category	Claim Sample	All HCCI Claims	Analytic Sample	HMI Basket Claims
<i>Overall</i>				
	All HCCI Claims	1.000		
	Analytic Sample	0.903	1.000	
	HMI Basket Claims	0.804	0.901	1.000
<i>Inpatient</i>				
	All HCCI Claims	1.000		
	Analytic Sample	0.783	1.000	
	HMI Basket Claims	0.704	0.913	1.000
<i>Outpatient</i>				
	All HCCI Claims	1.000		
	Analytic Sample	0.892	1.000	
	HMI Basket Claims	0.724	0.863	1.000
<i>Professional</i>				
	All HCCI Claims	1.000		
	Analytic Sample	0.956	1.000	
	HMI Basket Claims	0.891	0.941	1.000

**Figure 1. The Distribution of Per Capita Spending Level (2017) by Sample**



### Do changes in per person spending account for changes in which services people use?

Changes in our per person spending index only capture changes in spending on our sample set of services. For example, if a new service was introduced between 2013 and 2017 that is not included in our sample set of services, the resulting change in spending would not be captured by changes in our per person spending measure.

To understand how our analysis is impacted by limiting our per person spending measure to only capturing spending on our sample set of services in our analytic sample of claims, we compare spending measures computed using different samples. We measured per person spending using all services in the HCCI universe of claims, all services in our analytic sample, and our sample set of common services within our analytic sample. As seen below, the 2013-2017 changes computed using each of the spending measures computed are highly correlated and similarly distributed. We believe that limiting our spending measure to include only our sample services within our analytic sample of claims does not result in qualitatively different indices.

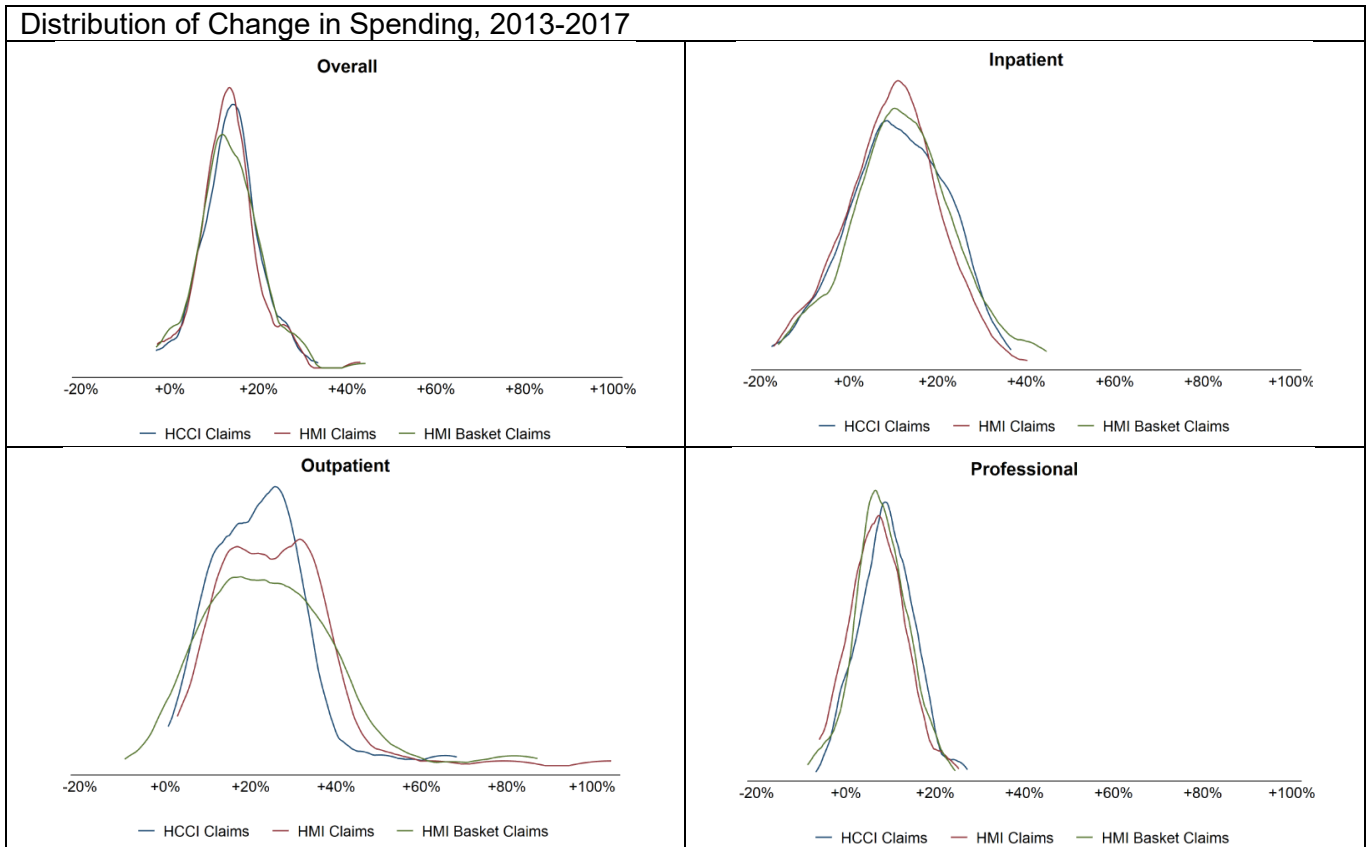


**Table 3. Correlations between CBSA Change in Per Person Spending Metrics by Sample - Percent of Change, 2013-2017**

Service Category	Claim Sample	All HCCI Claims	Analytic Sample	HMI Basket Claims
<b>Overall</b>				
	All HCCI Claims	1.000		
	Analytic Sample	0.928	1.000	
	HMI Basket Claims	0.766	0.874	1.000
<b>Inpatient</b>				
	All HCCI Claims	1.000		
	Analytic Sample	0.837	1.000	
	HMI Basket Claims	0.772	0.938	1.000
<b>Outpatient</b>				
	All HCCI Claims	1.000		
	Analytic Sample	0.894	1.000	
	HMI Basket Claims	0.685	0.836	1.000
<b>Professional</b>				
	All HCCI Claims	1.000		
	Analytic Sample	0.953	1.000	
	HMI Basket Claims	0.889	0.946	1.000



**Figure 2. The Distribution of Per Capita Changes in Spending Level (2013-2017)  
by Sample**





## Price Index Questions

### **What does “prices” mean?**

We define “prices” as the allowed amount paid for a health care service. The allowed amount is the total payment from both the insurer and the patient to a health care provider.

### **How are “prices” used to compute the “price level”?**

Using the prices paid for health care services by patients who live in each CBSA, we calculate a measure of the average price paid for a representative health care service within each service category. We then calculate the “price level” by comparing this measure to the national average.

For a more comprehensive description of how we calculate the measures used in our report, see [our methodology document](#).

### **Are differences in prices due to people receiving different services across areas?**

When calculating our measure of the average price paid for a representative health care service, we hold the set of services and the amount of each service used constant across areas. In other words, our measure is designed to compare the prices an individual would face for the same basket of health care services in each metro area.

### **Are differences in prices due to the fact that people may be sicker and therefore requiring more expensive procedures in different areas?**

We standardized our sample across areas in several ways to limit the degree to which differences in CBSA populations were influencing the computed price measures. First, we studied the same population in each area: individuals under the age of 65 with employer sponsored insurance, non-individual coverage with one of the following plan types: Health Maintenance Organization, Preferred Provider Organization, Point of Service Plan, or Exclusive Provider Organization. We also standardized the service basket for which we calculated our average price measure across areas (see above). Further, we excluded claims with extreme costs or lengths of stay from our analysis.

Consequently, our analysis compared the prices paid for the same set of services for largely similar populations across areas. That said, it is possible that underlying health differences of different CBSAs are one among many local factors that affect variation in health care prices. To explore this possibility further, we also calculated a “service mix” index which shows how much of a CBSAs spending is due to the use of more intensive or expensive services compared to the national average.





**Are the prices based on where I live or where I receive care?**

Prices are based on where patients live.

**Health care prices in my metro area were above the national average. Why might this have been the case?**

Health care prices are dependent on a number of local factors (e.g., cost of living, demand for health care services, health care provider market structure, health insurer provider market structure, etc.). Our price index is not meant to explain why prices may be high or low. Subsequent releases will provide more information on commercial health care markets that can help unpack the factors which may be influencing price.

**Health care prices in my metro area were below the national average. Does this mean there were low health care prices in my area?**

Not necessarily. Comparing a metro to the national average simply tells you how high (or how low) that metro's prices were on the distribution of prices at that time. It could be the case that all prices across all metros were high (or low).

Diving further into our Price Index data, we found that, regardless of their relation to the national average, health care prices were dramatically more expensive in 2017 than in they were in 2013 almost everywhere. While an area might have below average prices in 2017, those prices were on average 16% higher than they were just a few years before.

**Price levels and growth rates are often compared in this report. What is the difference between these two measures?**

Price levels compare the prices of different CBSAs within one year, in this case 2017. Growth rates compare the price level of the same CBSA over time; most often we report the growth rate between the first and last year of our study (2013 and 2017).



## Use Index Questions

### **What does per person “use” mean?**

We define use as the total number of services used per person.

### **How are “use” rates used to compute “use levels”?**

Using data on how many services are performed for each type of service in each CBSA, we calculate the use index as a weighted average of per person use rates across a common set of services. We define the weights based on the share of total spending accounted for by each service in our base year, 2013. For a more complete description see the methodology document.

### **How should we interpret the use level of a metro?**

Let’s say the overall use level of a metro is 20% above the national median. This means that on average, patients who lived in that metro utilized 20% more health care services than the patients who lived in the median market.

### **Is use measured based on a member’s residence or site of care?**

We measure use based on where the patient receiving care resides.

### **What factors may relate to high use?**

High use may result from a variety of factors relating to both the supply of and demand for health care services. For example, a place may have high use due to underlying population health characteristics, a large number of providers, or aggressive provider practice patterns to name a few.

### **Can overall use levels reflect the fact that some metros use different services than others across categories of services?**

Yes, overall use levels in our study are the result of different use levels within metros across service categories. We also see that metros can have different changes in use levels by service category over time. You can explore these trends and more using the dashboard in our interactive report comparing use levels across metros.

### **Does the use index account for which services metros are using within categories of services?**

No, the use index only accounts for the volume of basket services used by patients within a given metro. It does not account for different metros using different proportions of the set group of services. However, we calculated a “service mix” index to explore



this possibility which examines how much of a metro's spending is due to the specific services provided.

**Do changes in the use index account for changes in which services metros are using over time?**

Changes in the use index only account for changes in the volume of basket services used by patients within a given metro over time. It does not account for a metro using different proportions of the same basket of services across years. It also does not account for new services being introduced as well as potentially accounting for old service codes no longer being used as declines in use. However, the service mix index does capture some of these changes.

**Does the fixed basket of services capture a representative of all services performed in a given year? Does it change over time?**

While our basket of 1,100 services does not capture everything within the expansive HCCI commercial claims data set, it does capture a majority of overall service use in any given year and a largely constant share of service use over time as well. This largely holds true across service categories. Below is the share of total claims in the HCCI data set (Table 4.1) and share of claims used in the HMI analysis (Table X2) made up by the 1,100 common basket services by service category and year. As shown, the common basket of services made up between 57 and 59 percent of all HCCI service use in every year. Further, it made up over 85 percent of all claims used in the HMI analysis in every year.



**Table 4. Share of Universe of HCCI Claims, Spending Included in Set of Basket Services by Year**

Share of Claims	Number of Services	2013	2014	2015	2016	2017
Overall	1100	59%	58%	57%	58%	57%
Inpatient	100	56%	56%	57%	58%	59%
Outpatient	500	47%	47%	46%	46%	46%
Professional	500	61%	61%	60%	61%	59%

**Table 5. Share of Analytic Sample Claims, Spending Included in Set of Basket Services by Year**

Share of Claims	Number of Services	2013	2014	2015	2016	2017
Overall	1100	86%	86%	86%	87%	86%
Inpatient	100	76%	77%	78%	78%	80%
Outpatient	500	88%	88%	87%	87%	88%
Professional	500	86%	86%	86%	87%	86%

The basket services capturing a large share of HCCI services also held true across our sample CBSAs. Below are the distributions of use per capita relative to the national median for each of the 124 CBSAs across the three different claim samples: HMI basket service claims, all HMI service claims, all HCCI service claims. As seen in Figure 3, the distributions of 2017 use per capita levels were similar across samples suggesting the basket of services was proportionally representative of all services. The distribution of CBSA use of basket services per capita had correlation values of 0.7394 to all HCCI claims and 0.9691 to all HMI claims.



**Figure 3. Distribution of CBSA Use Per Capita as a Percent of the National Median by Claim Sample**

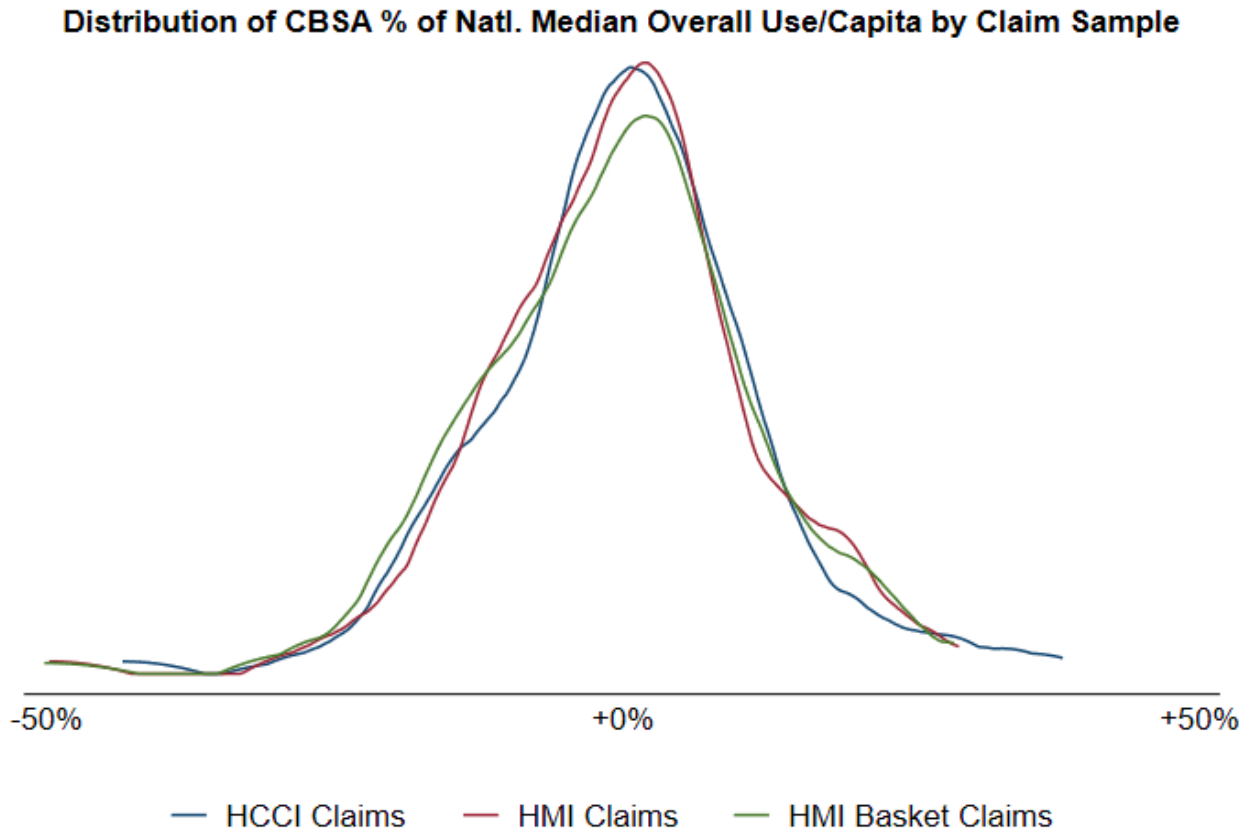
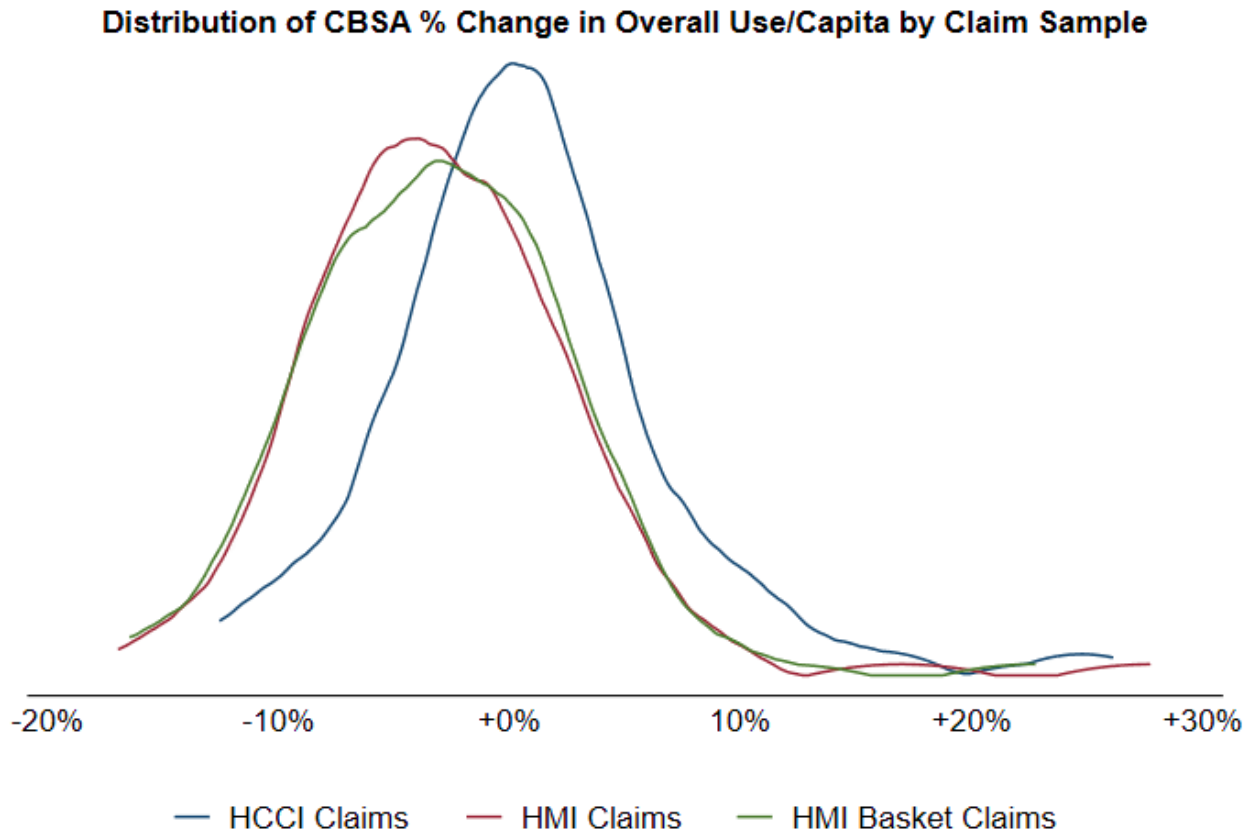


Figure 4 makes a similar comparison across claim samples but explores changes in CBSA use per capita from 2013 to 2017. We found that the distributions of these changes were similar across the three claims samples. This suggests that the basket of services was not only proportionally representative of all services in 2017, but was so in all 5 sample years. The distribution of CBSA change in use of basket services per capita over time had correlation values of 0.8344 to all HCCI claims and 0.9434 to all HMI claims.



**Figure 4. Distribution of Change in CBSA Use Per Capita as a Percent of the National Median by Claim Sample**



**How correlated were price and use levels?**

Overall, we observed a slight negative correlation between price and use index values. That is areas with higher price levels tended to have lower use levels more so than areas with lower price levels. There was some variation in the correlation between price and use index values across service categories, though, as seen below. Inpatient and outpatient services experienced a greater negative correlation between price and use. However, for professional services, price and use were slightly positively correlated.

**Table 6. Correlation Coefficients between CBSA Price, Use Index Values, 2017**

Service Category	2017
Overall	-0.140
Inpatient	-0.337
Outpatient	-0.283
Professional	0.068



## Service Mix Index Questions

### What does the Service Mix Index measure?

The service mix index measures the degree to which spending in a particular metro area is higher or lower than the national median solely due to the use of more or less expensive services on average. In other words, it measures how would spending in a particular metro differ from the median metro if it faced the same prices and used the same volume of services – with the only difference being which services it used

Take, for instance, two hypothetical metro areas which faced the same prices for the same 6 sample services. Assume these metros also used the same number of total services. However, each metro area used a different mix of services. For example, Metro Area B happened to use a relatively larger amount of the more expensive services (i.e., a 60-minute doctor’s office visit as opposed to a 15-minute visit) than did Metro Area A. As a result, total spending in Metro Area B was 16.5% higher than in Metro Area A. This spending difference is despite both metro areas facing the same prices and using the same volume of services. This 16.5% difference in spending was solely the mix of services used in Metro Area B relative to Metro Area A (Table 6).

**Table 6. Hypothetical Comparison of Two CBSA’s Total Spending Broken Down by Service Mix**

Service	Metro Area A			Metro Area B		
	Price	Use	Spending	Price	Use	Spending
Vaginal Delivery	\$10,000	3	\$30,000	\$10,000	1	\$10,000
C-Section Delivery	\$15,000	2	\$30,000	\$15,000	4	\$60,000
2-view Chest X-Ray	\$200	18	\$3,600	\$200	6	\$1,200
4-view Chest X-ray with Computer Aid	\$275	7	\$1,925	\$275	19	\$5,225
15-Minute Doctors Visit	\$75	17	\$1,275	\$75	8	\$600
60 Minute Doctors Visit	\$115	13	\$1,495	\$115	22	\$2,530
<b>Total:</b>		60	\$68,295		60	\$79,555



### **What does it mean that in Akron, OH, Service Mix Index was 10%?**

In Akron, spending was 10% higher than the national median, solely due to the use of more expensive services, on average, than the nation as a whole.

**Then how is spending in Akron only 3% higher than the national median?** It is possible that the difference in spending between a particular metro area and the national median to be higher (or lower) than the value of the Service Mix Index. For example, in Akron spending was only 3% higher than the national median (the spending index value). This implies that, despite the use of more expensive services on average, relatively low price and use levels in Akron collectively lowered spending by 7% relative to the national median.

### **What does the Service Mix Index measure over time?**

A change in the service mix index measures how spending in a particular metro area has changed over time solely due to a shift to using more or less expensive services on average.

### **In Washington, DC the Service Mix Index decreased 7% from 2013 to 2017. What does that mean?**

In Washington, DC, there was a shift to using less expensive services on average. Absent changes in price and utilization, this shift would have resulted in 7% lower spending in 2017 than in 2013. **Then how did spending in Washington, DC increase 13% higher from 2013 to 2017?**

Spending overall in Washington, DC increased 13%. This implies that increases in average prices and changes in the volume of services used cumulatively resulted in a 20% increase in spending - despite a 7% decrease in spending due to using less expensive services.

### **How is the Service Mix index computed?**

Service mix is computed as the difference between observed per capita spending in a particular metro area and per capita spending as implied by the price and use levels in that metro area. Our price index measures what the average service price in a metro area would have been had each metro area used services in the same proportions as the nation as a whole. As a result, the product of our price and use indices represents what per capita spending in each metro area *would have been* had they used services in the same proportions as the nation as a whole – given the prices faced and volume of services used. We call this hypothetical spending “implied spending”. If a metro area has higher implied spending than observed spending, it suggests that it uses higher proportions of more expensive services and a lower proportion of less expensive services on average than the nation as a whole (and vice-versa).





The difference between observed spending and implied spending, therefore, measures whether spending in a particular metro area was higher (or lower) than it would have been if it had that metro area used services in the same proportions as the nation as a whole. In other words, it measures whether spending in a metro area was higher (or lower) solely due to the use of more (or less) expensive services on average.

We compute service mix metrics separately in each metro area for each category of service, and for spending overall. For a more complete discussion of how these are computed, see our comprehensive [methodology document](#).



## Hospital Concentration Index Questions

### **What does market concentration mean?**

Within a market, concentration is a measure describing the distribution of market share amongst competing firms. A highly concentrated market means that a small number of firms hold a large majority of the market share; and vice versa for an unconcentrated market. Therefore, a highly concentrated market is considered to be a less competitive market.

In the context of this report, a highly concentrated market means that a smaller number of hospital systems account for a larger share of inpatient admissions from residents in a given metro area. While markets with lower concentration can be interpreted as the admissions of patients from a given area are more evenly distributed across a higher number of hospital systems.

### **Are market concentration and competition the same thing?**

No. Competition is the act of more than one firm vying for a share of a given market against one another. Measuring the concentration of a market is a common way to measure how competitive that market is. A highly concentrated market typically signifies low competition and vice versa.

### **What is Herfindahl-Hirschman Index (HHI)? What does it measure?**

The Herfindahl-Hirschman Index (HHI) is a frequently used method of measuring concentration in a market. It is calculated, in this report, by squaring the share of all admissions for residents in a metro area that occurred at a given hospital system, for each hospital system in which those residents received care. Those resulting squares are then summed together to give a number between 0 and 10,000. That number represents the inpatient hospital system HHI for the market. A HHI of 0 means that the market is perfectly competitive, while a market with a HHI of 10,000 can be interpreted as a monopoly.

### **What is meant by the term “market” in the report?**

We defined a market as all hospital systems at which patients residing in a particular metro area received care – regardless of whether the hospital system was located in the same metro as the patient. It is important to note that we use the term “market” primarily for notational simplicity. The goal of our report is not to analyze product markets for antitrust purposes.



**Why choose CBSAs as the geographic market rather than alternative market geographic definition (e.g., Hospital Referral Region, Hospital Service Area, Commuting Zone)? How does this impact your analysis?**

The goal of this report is to publicly produce a measure of hospital market concentration at the most local geographic level possible. We found that the CBSA (commonly referred to in our reports as a “metro area”) was the most disaggregated geographic unit that still allowed for the reporting of a substantial number of areas across the country, while maintaining our minimum data thickness requirements.

As stated, both above and explicitly in the report, this geographic market definition does not and is not intended to represent a product market for antitrust analysis.

A limitation of choosing CBSAs is that, in many cases, they may be too large to precisely represent a geographic market. As a result, using metro areas to define hospital markets may potentially understate the actual level of concentration experienced by patients in some areas. For example, in larger, more densely-populated metros, the CBSA boundaries might encapsulate multiple areas that could be considered a hospital market. As a result, it is not surprising that many of the larger metro areas (such as New York City, NY and Philadelphia, PA) appear to have some of the least concentrated hospital markets according to our HHI measure. It is possible that, by construction, our HHI measure may understate the true level of concentration in these markets.

**Given your market geographic definition - Core-Based Statistical Area - how would constructing HHIs differently impact the analysis?**

Using our market definition - a CBSA or “metro area” - we compute what is referred to as a “patient-flow” based HHI measure. That is, we consider a hospital market to be all hospital systems at which individuals from a given CBSA are admitted. We then compute our HHI measure as the sum of squared hospital system market shares. That is, we compute the sum of squared hospital system shares of total admissions for individuals from each metro area in each year in our sample.

Even given our geographic market definition, there are many other ways we could have computed HHIs. For instance, we could have computed a “geographic location” HHI where we defined the hospital market as all hospital systems physically located within our geographic market (metro area). In order to see how our measure compared to this alternative calculation, we computed a “geographic location” HHI using our sample data.

Overall, the distributions of our patient flow and geographic location HHIs were largely similar with the geographic location HHI having higher concentration levels. The correlations between the two methods of measuring concentration are shown below in Table 7.



**Table 7. Distributions of Differently Computed HHI Measures (2017)**

Summary Statistic	Patient Flow HHI	Geographic Location HHI
Mean	3,338	4,361
Standard Deviation	1,329	1,899
5 <sup>th</sup> Percentile	1,498	1,643
10 <sup>th</sup> Percentile	1,880	2,139
25 <sup>th</sup> Percentile	2,412	3,040
50 <sup>th</sup> Percentile	3,244	4,136
75 <sup>th</sup> Percentile	4,061	5,410
90 <sup>th</sup> Percentile	4,885	6,858
95 <sup>th</sup> Percentile	5,917	8,522

**Table 8. Correlations Among Differently Computed HHI Measures**

	Patient Flow HHI					
	2013	2014	2015	2016	2017	Pooled
Geographic Location HHI	0.83	0.84	0.84	0.82	0.78	0.83

All measures were very highly correlated. While there appears to be some variation within years, over time all pairwise correlation coefficients were above 0.78 (and significant positive correlations at conventional levels) in each year. In other words, areas that had relatively (un)concentrated hospital markets as measured by our patient flow” HHI, in a given year, tended to have relatively (un)concentrated hospital markets as measured by our “geographic location” HHI.

The goal of this report is to publicly produce a measure of inpatient hospital market competition that allows readers to compare metro areas across the country and over time. Due to this objective, we feel the selected method for computing HHI in this report is qualitatively similar to other alternative computation methods, despite the potential limitations. Further, we felt that the “patient flow” method presented the most straightforward way to compute HHIs. Lastly, as discussed in greater detail [here](#), the patient flow method of HHI is more robust to potentially mis-specifying geographic boundaries for markets (a potential concern with our choice of CBSAs as geographic markets - discussed above).



**Methods Note:** Our discussion of these methods draws heavily from the work John Graves and co-author(s); for a more complete discussion of these methods for computing HHIs, their similarities/differences, and more see this [working paper](#).

**Given the choice of market definition and HHI computation method, how would using an alternative market size definition or data source to compute HHI affect your analysis?**

Given our choice of geographic market (CBSA) and that we computed a patient flow HHI, we used HCCI data on inpatient hospital admissions to determine market shares. A potential concern with using HCCI data is that it is a convenience sample which may not be representative. That is, the hospitals to which commercially insured individuals are admitted in the HCCI data may be biased by factors such as insurer networks, negotiated discounts, or other such factors. For instance, we may observe market shares that overstate some hospital systems' true market share and therefore overstate that hospital market's level of concentration. Similarly, using admissions as a measure of market size, rather than a capacity-based measure such as the number of hospital beds, may result in observing a concentration measure that is biased by factors such as hospital quality that result in patients disproportionately being admitted to particular hospitals relative to their size.

To see how our measure of hospital concentration would change depending on our method for defining market size, we used alternative data sources (AHA data on admissions or beds rather than HCCI data on admissions) to calculate comparable HHI measures. Because the AHA data is aggregated at the hospital level, we used the geographic location method when computing these HHI values. For ease of comparison, we also report our geographic location HHI using HCCI data on inpatient admissions.

Below are summary statistics of the distribution of HHI values computed using the different methods and data sources in 2017. These comparisons in other years or pooled over time produced qualitatively similar results. As we can see, each HHI measure has a relatively similar. As expected, among the geographic location HHIs, the measure computed using data on HCCI admissions resulted in an HHI distribution shifted slightly to the right of the HHI measures computed using AHA data. However, the patient flow HHI measure computed using HCCI data on admissions had a very similar distribution to both measures computed with AHA data.



**Table 9. Distribution of HHI Measures Constructed with Different Measures of Market Size, Data Sources (2017)**

HHI Method:	Patient Flow	Geographic Location	Geographic Location	Geographic Location
Data Source:	HCCI Data	HCCI Data	AHA Data	AHA Data
Measure of Market Size:	Inpatient Admissions (ESI)	Inpatient Admissions (ESI)	Inpatient Admissions (All)	Total Beds (All)
<i>Summary Statistic:</i>				
Mean	3,338	4,361	3,662	3,504
Standard Deviation	1,329	1,899	1,715	1,629
5 <sup>th</sup> Percentile	1,498	1,643	1,273	1,261
10 <sup>th</sup> Percentile	1,880	2,139	1,666	1,575
25 <sup>th</sup> Percentile	2,412	3,040	2,530	2,344
50 <sup>th</sup> Percentile	3,244	4,136	3,389	3,327
75 <sup>th</sup> Percentile	4,061	5,410	4,922	4,609
90 <sup>th</sup> Percentile	4,885	6,858	5,622	5,212
95 <sup>th</sup> Percentile	5,917	8,522	6,748	5,562

In addition to all of the HHI measures having similar distributions, they were also strongly correlated. This was true both within each year and pooled over time. In other words, whether comparing across CBSAs or over time, HHIs computed using each of the different methods or data sources discussed above would rank metro area hospital market concentration levels similarly. In other words, they would provide similar relative comparisons of metro area hospital market concentration. Combining this with the previous finding that the distribution of each HHI measures are similar, each HHI measure would also provide a similar absolute comparison of metro area hospital market concentration.



**Table 10. Correlations Among HHI Measures Constructed with Different Measures of Market Size (Data Sources)**

HHI Method: Patient Flow								
Data Source: HCCI Data								
Measure of Market Size: Inpatient Admissions (ESI)								
			2013	2014	2015	2016	2017	All
HHI Method:	Data Source:	Measure of Mkt. Size:						
Geographic Location	HCCI Data	Inpatient Admissions (ESI)	0.83	0.84	0.84	0.82	0.78	0.83
Geographic Location	AHA Data	Inpatient Admissions (All)	0.60	0.63	0.61	0.62	0.62	0.60
Geographic Location	AHA Data	Total Beds (All)	0.57	0.60	0.60	0.60	0.61	0.62

While HHI measures based on HCCI admission data and AHA beds data have similar distributions and are strongly correlated both across CBSAs and over time, it is important to note that changes in each HHI measure may be driven by different factors. The HHI measure based on HCCI admission data can be related to factors such as network structure and hospital quality, among many others. As a result, changes in HHI may be related to these factors, which potentially confounds a comparison between changes in our HHI measure and changes in measures of prices, such as our price index.

**What is patient flow?**

Due to our defining the market as all residents who live in a given metro area, patients that travel outside of their resident metro area to receive inpatient care are included in the calculation of the resident market HHI. To show both how prevalent as well as where patients traveled outside their resident metro for care, we calculated the share of total inpatient admissions from residents in a given metro area that occurred at hospital systems located in all other metros. These shares for each resident metro area are considered its “patient flows”.

The patient flow shares for all resident (member) metro areas are publicly available to [download](#). All provider-based metro areas that received less than 10 admissions from the given resident metro area, as well as admissions to providers in unidentifiable rural areas were summed together and categorized as “Other”.



**Do your HHI measures take rural hospitals into account?**

Identifiable rural areas were included in the analysis, however as discussed, the markets studied were defined by patients who lived in the 112 sample metro areas. As such, rural areas infrequently factored in to our HHI calculations, as it was uncommon for patients that lived in a metro area to have sought out inpatient care at rural provider.

**What is considered a substantial change in HHI?**

A merger that causes an increase in HHI of 2,000 is sufficiently large enough to warrant further investigation within at least moderately concentrated markets and above per Department of Justice and Federal Trade Commission Horizontal Merger Guidelines. While our analysis is not intended to be interpreted as antitrust analysis, this standard provides some context to what may be considered a large change in HHI.

*Reference:*

“Horizontal Merger Guidelines: 5.3 Market Concentration,” The United States Department of Justice, last modified August 19, 2010,

<https://www.justice.gov/atr/horizontal-merger-guidelines-08192010#5c>

**How could a metro area that experienced merger activity see a decrease in concentration?**

As we describe above, we computed a patient flow HHI using HCCI data on inpatient hospital admissions. Where patients are admitted in the HCCI data can be biased by factors such as insurer networks, patient preferences, or many other factors that are both related and un-related to hospital market structure. Decreases in our HHI measures in metro areas where we identified a hospital merger could reflect changes in said factors, such as quality improvements in a hospital system attracting a larger share of patients, that were unrelated to changes in hospital market structure due to mergers.