



## Trends in the use of echocardiography, 2007 to 2011

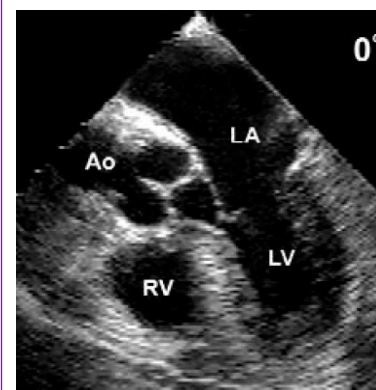
# *Echocardiography Trends*

## Data Points #20

Heart disease is the leading cause of death for men and women in the United States.<sup>1</sup> In 2010, heart disease caused more than one in four, or 27 percent, of deaths among individuals age 65 or older.<sup>1</sup> Echocardiography is a noninvasive test that uses ultrasound waves to create pictures of the heart.<sup>2</sup> An echocardiogram allows clinicians to see the structures of the heart and to see the motion of blood through the heart.<sup>3</sup> It is often used by clinicians to assess, diagnose, and manage heart problems such as abnormal valves, atrial fibrillation, heart disease, heart murmurs, and other issues.<sup>2,3</sup>

Use of echocardiography increased dramatically in the United States from the 1990s to early 2000s. This increase occurred at a higher rate than non-cardiac imaging services, and was greater than might be expected relative to the aging of the population.<sup>4,5</sup> Between 2000 and 2010, the volume of imaging services increased by 81 percent within Medicare.<sup>6</sup> Also by 2010, echocardiography services made up 11 percent of Medicare spending on imaging services, accounting for approximately \$1.2 billion in spending.<sup>6</sup> The growth in use of echocardiography may have slowed in the late 2000s, but it remains an often used procedure.<sup>7,8</sup>

Efforts have been made to slow the increase in use of echocardiography through both payment and practice. The Deficit Reduction Act of 2005 reduced the Medicare payment for the technical component of echocardiography.<sup>9-11</sup> In 2007, the Centers for Medicare & Medicaid Services (CMS) further reduced the amount paid for procedures beyond the index procedure on contiguous body parts during the same session.<sup>9</sup> To address the possible overuse of echocardiography due to patterns of health care practice, a task force led by the American College of Cardiology Foundation (ACCF), American Society of Echocardiography (ASE), and specialty and subspecialty societies set out criteria for the appropriate use of echocardiography.<sup>12</sup>



Echocardiography is a widely used procedure among the Medicare-enrolled population. Each year approximately 20% of enrollees in the fee-for-service (FFS) system receive at least one cardiac echocardiogram.

The percentage of enrollees who receive echocardiography services varies widely by geography. Use of echocardiography rises with age until age 85, where it plateaus.

Allowed health care charges for echocardiography decreased from 2007 through 2011 while the number of procedures rose slightly and the average number of procedures per beneficiary per year remained stable.



They concluded that “appropriate echocardiograms are those that are likely to contribute to improving patients’ clinical outcomes, and importantly, inappropriate use of echocardiography may be potentially harmful to patients and generate unwarranted costs to the health care system.”<sup>12</sup> The criteria vary by previous service and clinical indication, but in general echocardiography testing is viewed as appropriate to assess conditions that have an indication of being cardiac in nature or to reassess diagnosed cardiac conditions when patients’ symptoms have changed. Retesting to monitor a condition is considered inappropriate when patients’ symptoms have not changed, there is no planned change in clinical management, and/or when fewer than one to three years have passed since the initial echocardiogram.<sup>12</sup> One study estimates that the Deficit Reduction Act and the implementation of appropriateness criteria are two of multiple factors that have slowed the growth of echocardiography since 2005.<sup>8</sup> However, the effect of these initiatives has not yet been quantified.

Understanding trends in the use of echocardiography remains complex (see Figures 1-3). It appears that the growth may be due to primary care providers who are increasingly ordering echocardiograms using equipment in their own offices rather than an increase in use by specialty providers such as cardiologists.<sup>6</sup> The presence of testing equipment for echocardiography in primary care offices has been hypothesized to be a possible driver of this increase in use by primary care physicians. This relationship is still unclear - in the case of stress echocardiography, the relationship between the office location of testing material and increased cost of care after testing is modest.<sup>13</sup> However, evidence indicates that physicians of various specialties tend to increase their use of tests when they are able to self-refer.<sup>14</sup>

Figure 1: Echocardiography services performed annually for the Medicare fee-for-service program, 2007-2011

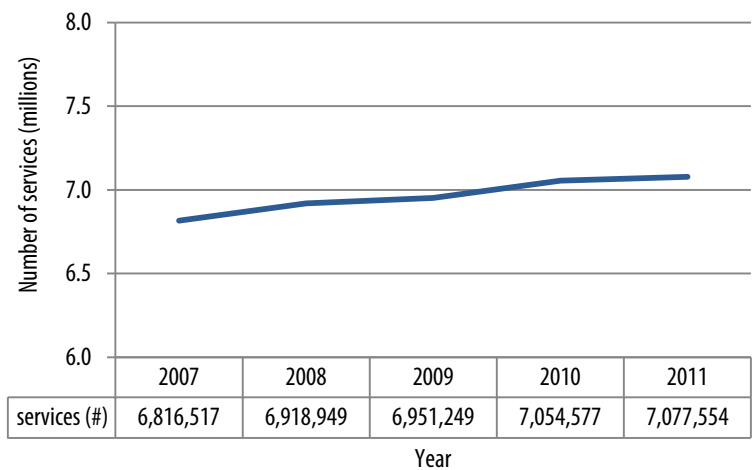
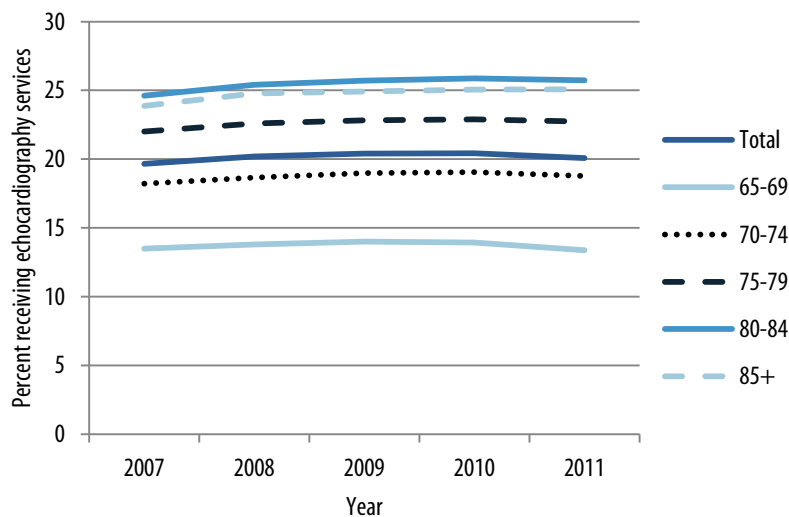
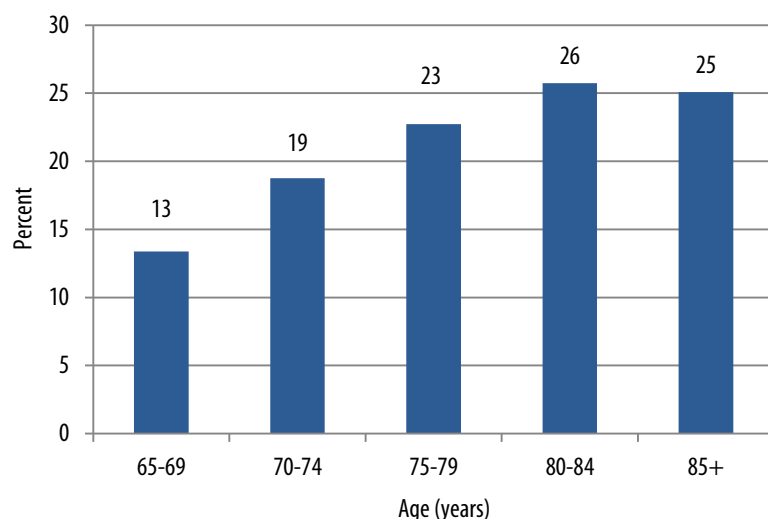


Figure 2: Eligible Medicare beneficiaries receiving one or more echocardiography services, by age, 2007-2011



**Figure 3:** Eligible Medicare beneficiaries receiving one or more echocardiography service, by age, 2011



**Table 1:** Echocardiography service category codes

Service categories	BETOS and HCPCS codes	Code definitions
Base services	BETOS code I3C	Echocardiography-Heart
	exclude HCPCS code 93299	Interrogation device evaluation
	include HCPCS code 93350	Real-time transthoracic echocardiography with 2D image documentation
	include HCPCS code 93662	Intracardiac echocardiography during therapeutic or diagnostic intervention
Add-on services	HCPCS code 92978	Intravascular ultrasound on initial vessel
	HCPCS code 92979	Intravascular ultrasound on additional vessel
	HCPCS code 93320	Complete Doppler echocardiography
	HCPCS code 93321	Follow-up or limited Doppler echocardiography
	HCPCS code 93325	Doppler echocardiography color flow velocity mapping
	HCPCS code 93352	Use of echocardiographic contrast agent during stress echocardiography
	HCPCS code 93571	Intravascular Doppler velocity and/or pressure derived coronary flow reserve measurement during coronary angiography on initial vessel
	HCPCS code 93572	Intravascular Doppler during coronary angiography on additional vessel
Associated services*	HCPCS codes 93016-93016	Exercise portion of echocardiography stress test
	HCPCS codes Q9955-Q9963	Echocardiography contrast agent
	HCPCS codes 76376-76377	3D rendering of ultrasound on an independent work-station

\*Associated services only included if present on the same day as their associated base service.

There is significant geographic variation in the use of echocardiography. Rates of echocardiography and noninvasive diagnostic imaging are lower in the Northern U.S. and higher in the Southeastern U.S.<sup>15, 16</sup> Use of echocardiography is higher in urban areas than for patients in rural areas. This may be due to greater distance for those in rural areas to facilities offering echocardiography, suggesting that greater patient volume may be associated with the decision to invest in echocardiography equipment.<sup>16-18</sup> Variations in the prevalence of heart disease also appear to contribute to geographic variations in use of echocardiography.<sup>6</sup> Among patients who receive echocardiography tests, most receive approximately one test a year.<sup>7, 18</sup> Patients living in higher population areas are more likely to have a test repeated.<sup>18</sup>

This report examines trends in echocardiography between 2007 and 2011. For these years, we describe trends in echocardiography services (see Table 1 for service codes) by numbers of services performed, place of service, and population characteristics. We also describe geographic variation in use of echocardiography. We would like to acknowledge the leadership of the DEcIDE Cardiovascular Consortium in establishing the scope and objectives of this report.

## METHODS

The analysis was performed using Medicare enrollment data and 100 percent fee-for-service (FFS) Parts A and B institutional/noninstitutional claims data for years 2007 through 2011. The source of the claims and enrollment data was the CMS Chronic Conditions Warehouse (CCW).

We identified Medicare beneficiaries age 65 or older who had Part A and Part B Medicare coverage with no Medicare Advantage (i.e., managed care enrollment) during their period of eligibility and who received echocardiography services during the reference year. Receipt of service was identified by Berenson-Eggers type of service (BETOS) code I3C, excluding Health Care Common Procedure Coding System (HCPCS) code 93299, and including HCPCS codes 93350 and 93662.<sup>19</sup> Multiple procedures for the same beneficiary in a day were coded as a single event.

We assessed trends in procedures across years and demographic factors, including age and gender (identified in the beneficiary summary file during the year the procedure took place), as well as race/ethnicity, region, and urbanicity as defined below (see Table 2).

### Beneficiary demographic and geographic characteristics

**Race/ethnicity:** Race and ethnicity were defined using the Research Triangle Institute Race Code, which applies a surname algorithm to assign Hispanic ethnicity.<sup>20, 21</sup>

**Age:** The age categories were defined using the age of the beneficiary at the end of each reference year.

**Urban/Rural:** We used the Core Based Statistical Area (CBSA) of the beneficiary to identify the urban region in which the beneficiary resides. Beneficiaries who do not reside in a CBSA are considered to be rural.<sup>22</sup>

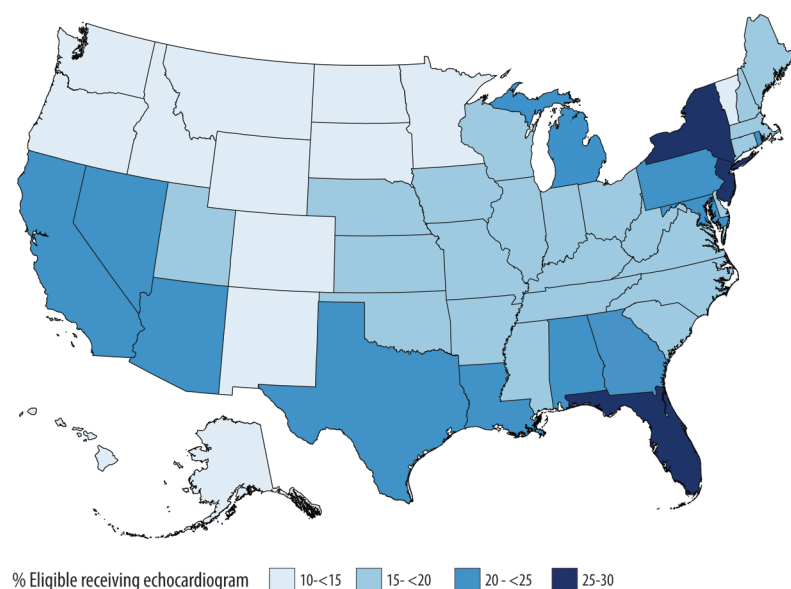
**Dual Status:** CMS has an established algorithm for defining the annual dual eligibility status of each beneficiary using the monthly State Reported Dual Eligibility Status Codes.

**Table 2:** Distribution of echocardiography services by population characteristics, 2011

Variable		Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
Overall		27,573,766	5,532,382	20.1	7,077,554
Age	65-69	7,713,925	1,032,162	13.4	1,314,172
	70-74	6,209,355	1,165,316	18.8	1,490,963
	75-79	4,942,090	1,123,662	22.7	1,451,375
	80-84	4,074,441	1,048,791	25.7	1,354,254
	85+	4,633,955	1,162,451	25.1	1,466,790
Race or ethnicity	Non-Hispanic White	22,979,360	4,589,608	20.0	5,844,857
	African American	2,094,435	459,306	21.9	608,894
	Hispanic	1,464,107	299,060	20.4	390,346
	Asian or Pacific Islander	652,955	122,650	18.8	154,283
	American Indian / Alaska Native	113,320	18,635	16.4	24,228
	Other / Unknown	269,589	43,123	16.0	54,946
Gender	Female	15,728,969	3,048,878	19.4	3,845,793
	Male	11,844,797	2,483,504	21.0	3,231,761
Urbanicity	Urban	24,794,198	5,061,675	20.4	6,469,682
	Rural	2,700,357	465,500	17.2	601,408
	Unknown	79,211	5,207	6.6	6,464
Medicare Status	Full dual	3,054,680	761,650	23.9	1,018,969
	Nondual	23,146,402	4,566,276	19.7	5,771,201
	Partial dual	483,067	109,052	22.6	143,341
	QMB	454,752	103,624	22.8	136,002

QMB = qualified Medicare beneficiary.

The algorithm categorizes beneficiaries into four groups: Full Duals had full Medicare and Medicaid coverage (including prescription drugs) during the most recent month of dual eligibility for the reference year; QMB beneficiaries had Medicaid and participated in the Qualified Medicare Beneficiary Program during the most recent month of dual eligibility for the reference year; Other/Partial Duals had Medicaid and participated in the Specified Low-Income Medicare Beneficiary Program during the most recent month of dual eligibility for the reference year, the Qualifying Individual Program, or the Qualified Disabled and Working Individuals Program; and Nonduals had Medicare coverage only for the reference year.<sup>23</sup>

**Figure 4A:** Eligible beneficiaries receiving echocardiography services, by State, 2011

Costs of echocardiography services were computed as Medicare allowed costs, which include the costs paid by Medicare and the beneficiary contribution, coinsurance, and deductible. Costs were split into several service categories defined below.

## Service categories

**Base, Add-on, and Associated Services:** Service category codes and definitions are displayed in **Table 1**.

**Physician Specialty:** Part B institutional echocardiography services were classified Outpatient Facility specialty services.

For Part B noninstitutional echocardiography services, the specialty of the physician is identified on the service line item of the claim using HCFA specialty code. We classified the specialty as follows: Cardiology = 06; Internal Medicine = 11; General/family practice = 01 or 08; Diagnostic Radiology = 30; Independent diagnostic testing facility = 47; and other for any other designation. Multiple physician specialties could be included for each echocardiography service.

**Place of Service:** The place of service is Outpatient and ER for Part B institutional echocardiography services. For Part B noninstitutional echocardiography services, the place of service is identified on the service line item of the claim using HCFA place of service code.

We classified the place of service as follows: Inpatient = 21; Outpatient and ER = 22 or 23; Office and Independent Diagnostic Testing Facility (IDTF) = 11, or if physician specialty = 47; and other for any other designation.<sup>24</sup> Only one place of service is included per echocardiography service.

Although we examined data from 2007 to 2011, results from 2011 only are presented in the main body of this report. Results for earlier years appear in the Appendixes.

## RESULTS

From 2007 through 2011, approximately 34 million echocardiography procedures were performed on Medicare beneficiaries. The number of beneficiaries receiving echocardiography procedures was relatively constant between 6.8 million in 2007 and 7 million in 2011 (**Figure 1**). Of all Medicare beneficiaries, about 20 percent received an echocardiography service in 2011 (**Figure 2**). This proportion remained fairly constant, increasing only slightly between 2007 and 2011 (from 19.7% in 2007 to 20.1% in 2011).

The proportion of beneficiaries receiving echocardiography services varied with age, increasing between ages 65 and 84 from 13.4 percent to 25.7 percent, and decreasing slightly at age 85 and older to 25.1 percent in 2011 (**Figure 3**).

In 2011, non-Hispanic White and Hispanic populations both received echocardiography services at a rate of about 20 percent (20.0% and 20.4%, respectively). Among African Americans the rate was slightly higher at about 21.9 percent, and Asians/Pacific Islander and American Indians/Alaska Natives had lower rates at 18.8 percent and 16.4 percent, respectively (**Table 2**).



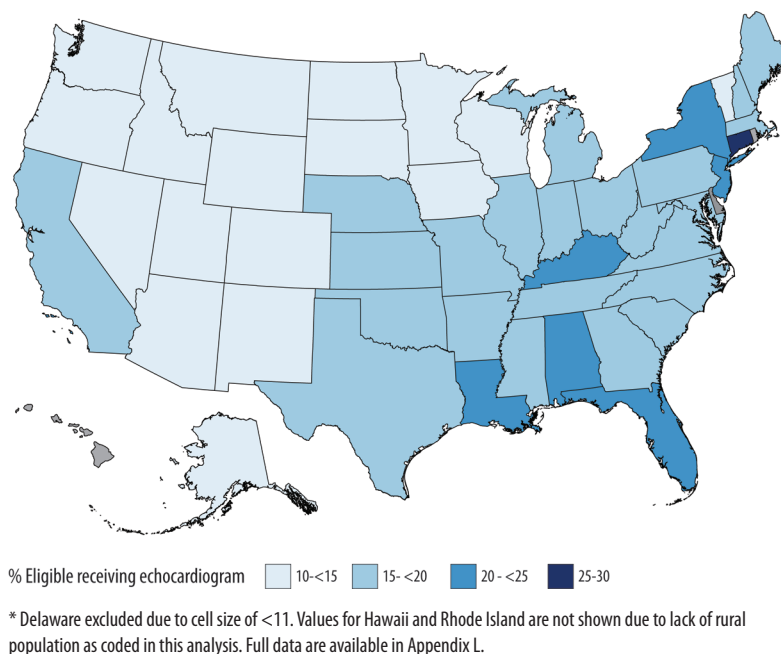
Females received echocardiography services at a lower rate than males (19.4% versus 21.0%). Full dual beneficiaries received a higher proportion of services (23.9%) than nonduals (19.7%), partial duals (22.6%), and QMBs (22.8%; **Table 2**).

The rates of echocardiography services received vary by State. In 2011, New York and New Jersey had the highest proportion of beneficiaries receiving echocardiography at 27.3 percent and 26.5 percent, followed by Florida at 25.2 percent (**Figure 4A**). Idaho and Alaska had the lowest proportion at 12.7 percent and 13.1 percent. Geographic patterns are largely similar across states for urban and rural areas (**Figures 4B-4C**). Urban beneficiaries received echocardiography services at a higher rate (20.4%) than rural beneficiaries (17.2%, **Table 2**).

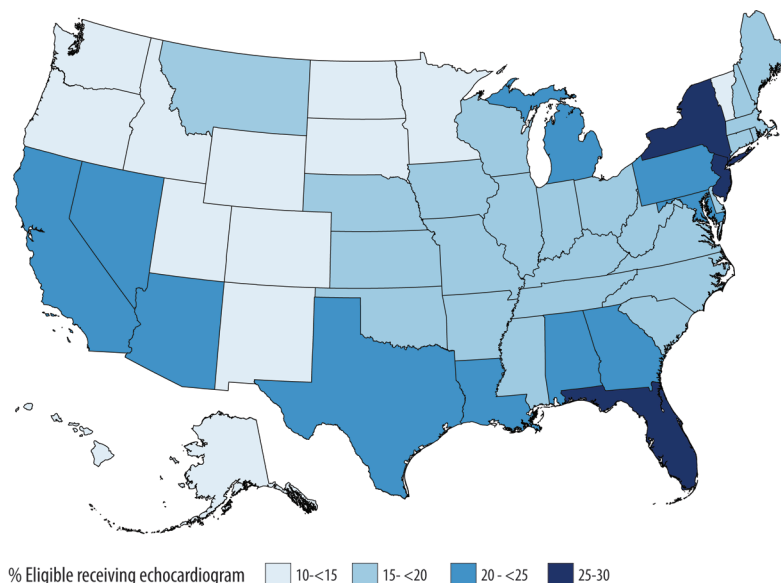
Among Medicare beneficiaries who received echocardiography services in 2011, the average number of echocardiograms per person per year was 1.3 (**Table 3**). Most beneficiaries who received echocardiography services had one service a year.

In 2011, 80.2 percent received only one service a year, 14.7 percent had two services, 3.4 percent had three services, 1.0 percent had four services, and only 0.7 percent had five or more services a year (**Figure 5**). This distribution of services was fairly constant between 2007 and 2011. There was a small increase in the percentage of beneficiaries receiving four and five or more services (from 0.9% in 2007 to 1.0% in 2011 for four services, and from 0.6% in 2007 to 0.7% in 2011 for five or more services).

**Figure 4B:** Eligible rural beneficiaries receiving echocardiography services, by State, 2011



**Figure 4C:** Eligible urban beneficiaries receiving echocardiography services, by State, 2011



**Table 3:** Echocardiography services among beneficiaries who received at least one echocardiography service by population characteristics, 2011

Variable		Beneficiaries with 1+ service (#)	Echo services received (#)	Mean services received per beneficiary (#)	Beneficiaries receiving 1 echo		Beneficiaries receiving 2+ echos	
					#	%	#	%
Overall		5,532,382	7,077,554	1.28	4,436,663	80.2	1,095,719	19.8
Age	65-69	1,032,162	1,314,172	1.27	839,076	81.3	193,086	18.7
	70-74	1,165,316	1,490,963	1.28	939,231	80.6	226,085	19.4
	75-79	1,123,662	1,451,375	1.29	894,790	79.6	228,872	20.4
	80-84	1,048,791	1,354,254	1.29	830,629	79.2	218,162	20.8
	85+	1,162,451	1,466,790	1.26	932,937	80.3	229,514	19.7
Race or ethnicity	Non-Hispanic White	4,589,608	5,844,857	1.27	3,699,087	80.6	890,521	19.4
	African American	459,306	608,894	1.33	353,982	77.1	105,324	22.9
	Hispanic	299,060	390,346	1.31	234,440	78.4	64,620	21.6
	Asian or Pacific Islander	122,650	154,283	1.26	99,702	81.3	22,948	18.7
	American Indian / Alaska Native	18,635	24,228	1.30	14,575	78.2	4,060	21.8
	Other / Unknown	43,123	54,946	1.27	34,877	80.9	8,246	19.1
Gender	Female	3,048,878	3,845,793	1.26	2,471,674	81.1	577,204	18.9
	Male	2,483,504	3,231,761	1.30	1,964,989	79.1	518,515	20.9
Urbanicity	Urban	5,061,675	6,469,682	1.28	4,063,875	80.3	997,800	19.7
	Rural	465,500	601,408	1.29	368,486	79.2	97,014	20.8
	Unknown	5,207	6,464	1.24	4,302	82.6	905	17.4
Medicare Status	Full dual	760,274	1,018,261	1.34	577,732	76.0	182,542	24.0
	Nondual	4,559,432	5,779,950	1.27	3,693,621	81.0	865,811	19.0
	Partial dual	109,052	143,341	1.31	84,817	77.8	24,235	22.2
	QMB	103,624	136,002	1.31	80,493	77.7	23,131	22.3

QMB = qualified Medicare beneficiary.

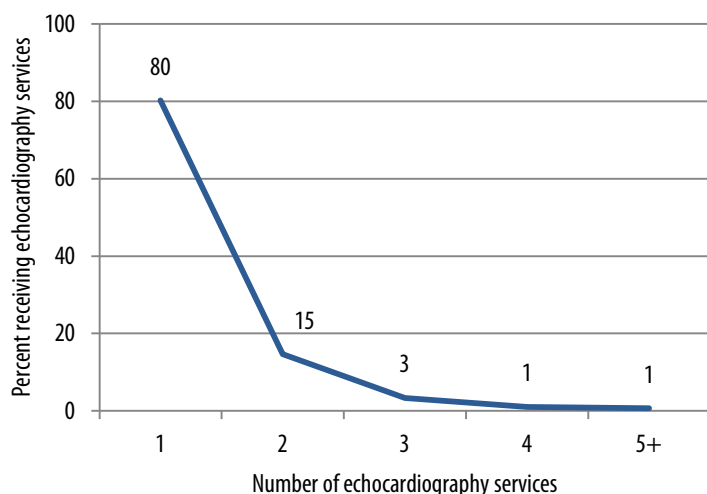
Among racial and ethnic groups, African Americans, Hispanics, and American Indians/Alaska Natives were slightly more likely to receive two or more echocardiography services a year than non-Hispanic Whites and Asians/Pacific Islanders in 2011 (**Table 3**).

Females were more likely to have only one echocardiogram per year than males, with 81.1 percent of females receiving only one service while 79.1 percent of males received one service.

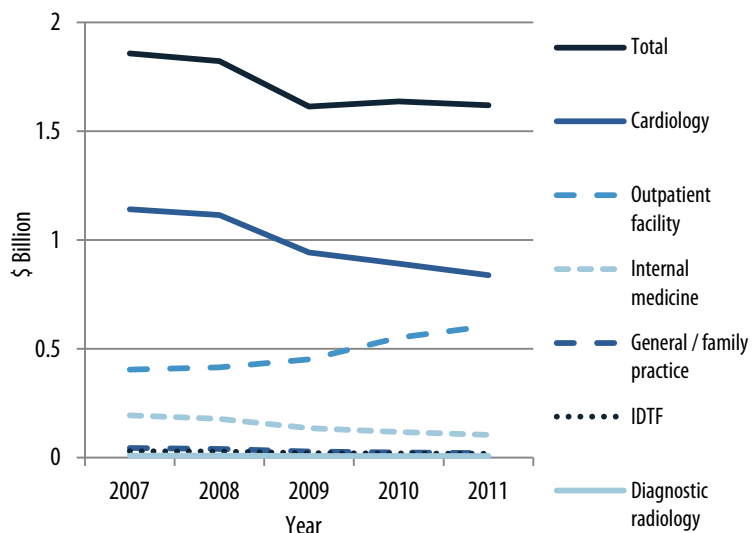
Full duals were more likely to have two or more echocardiography services than nonduals, partial duals, and QMBs (**Table 3**).

Across the different service settings where echocardiography was performed, the inpatient setting had the highest mean number of services (1.3 per beneficiary per year), followed by outpatient and emergency room (1.1), office and independent diagnostic testing facility (1.1), and all other settings (1.1; **Appendix G**).

**Figure 5:** Eligible beneficiaries receiving echocardiography services, by number of services received, 2011



**Figure 6:** Total allowed charges for echocardiography by type of health care provider, 2007-2011



IDTF = Independent Diagnostic Testing Facility.

Total allowed health care charges for echocardiography were \$1.6 billion in 2011, a decrease from \$1.85 billion in 2007 (**Figure 6**). Of practice specialties that performed echocardiography, cardiology had the highest allowed charges overall. However, the charges within cardiology decreased over time, from \$1.14 billion in 2007 to \$839 million in 2011 (**Figure 6, Appendix H**). Allowed charges in other specialties also decreased over time, with the exception of those for outpatient facilities, which increased from \$404 million in 2007 to \$604 million in 2011 (**Figure 6, Appendix H**).

## DISCUSSION

Echocardiography is a widely used service within the Medicare program. Each year approximately 20 percent of beneficiaries in the fee-for-service (FFS) Medicare program received at least one procedure. Of this group, 20 to 30 percent received more than one echocardiography service.

While a variety of efforts were undertaken in an attempt to control rising costs for cardiac echocardiograms, their success was modest at best. Total allowed charges decreased from 2007 through 2011, while the number of procedures rose slightly and the average number of procedures per beneficiary per year remained essentially unchanged. Findings indicated a very small decrease in the percentage of beneficiaries receiving echo procedures from 2009-2010 (20.4%) to 2011 (20.1%, **Appendix K**), but among those receiving services, the number of services received generally slightly increased. This suggests that, to date, changes in payments are not reducing use of the procedure.

This analysis identifies two dramatic trends. First, among age groups, the use of echocardiography rose steeply until age 85, when it plateaued. This pattern suggests that use of echocardiography will continue to rise given the aging of the Medicare population.



Second, tremendous geographic variation continues to exist in use of echocardiography. As shown in **Figures 4A-4C** and **Appendices A-F, I, and L**, State-to-State variability in echocardiography use was large, and is unlikely to be explained by differences in payment policy alone. Whether measures of health care resources such as cardiologists or echocardiography facilities explain these patterns exceeds the scope of this report. Such questions deserve further exploration.

Further variations were evident among other characteristics, including by urbanicity, reinforcing earlier findings regarding lower rates of use among rural beneficiaries. Variations in use within racial/ethnic groups also exist but appear to be stable over the period 2007-2011. Further work is needed to establish the degree to which these patterns represent intersections in health care access, groupwide differences in health status, or varying propensity for use or recommendation of use in these populations.

Over the study period, the Medicare population increased more quickly in some racial/ethnic subgroups than others. Even if the percentage of Medicare beneficiaries receiving echocardiography services remains stable over time, population increases in these subgroups within Medicare may affect the total number of echocardiography services performed. This implies that efforts to decrease echocardiography use will not just need to be sensitive to overall population trends, but also take into account trends in use in racial/ethnic subgroups within the Medicare population.

This report includes some limitations. First, we only counted one procedure per day. Thus, we may have slightly under-counted the total number of procedures if a significant number of beneficiaries had two or more procedures on the same day. However, these procedures would be captured in total allowed charges.

Second, claims data do not contain information about the indication for the procedure nor of the test result or action that may have been guided by the procedure. Thus, we cannot quantify whether the echocardiography use resulted in important information that was used to direct clinical care.

Third, we present unadjusted numbers only and do not conduct statistical testing of differences in proportions. Because our sample includes the entire Medicare FFS population for all study years, we are able to conduct analyses on the full population of interest rather than a sample. Statistical inference is needed only when evaluating the potential error of the sample, and thus is not necessary in this situation.<sup>25</sup> In addition, calculations of standard errors and standard statistical tests commonly incorporate sample size. With the large size of the full Medicare FFS population, it is likely that even small, unimportant trends would be measured as being statistically different.<sup>26</sup> Therefore, we chose to omit statistical testing and leave conclusions about the importance of patterns to the reader. In spite of these limitations, we believe that the results of this inquiry provide important insights about the use of echocardiography over time and across geographic and demographic groups.

## CONCLUSION

Echocardiography is a widely used procedure among the Medicare-enrolled population. Each year approximately 20 percent of enrollees in the FFS system receive at least one cardiac echocardiogram. There is sizable geographic variation in use of echocardiography that deserves investigation. Recent changes in reimbursement policy appear to have reduced total allowed charges but have not led to shifts in the percentage of enrollees receiving services nor in the average number of echocardiography services per recipient.

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## AUTHORS

Beth A Virnig, *PhD, MPH*<sup>1</sup>  
 Nathan D. Shippee, *PhD*<sup>1</sup>  
 Brian O'Donnell, *PhD*<sup>2</sup>  
 Jessica Zeglin, *MPH*<sup>1</sup>  
 Shriram Parashuram, *MPH*<sup>1</sup>

<sup>1</sup> University of Minnesota School of Public Health, Division of Health Policy and Management, Minneapolis, MN.

<sup>2</sup> Buccaneer, A General Dynamics Information Technology Company, Des Moines, IA.

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## Appendix A: Echocardiography services performed, by State, 2011

State	Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
AK	52,454	6,871	13.1	8,810
AL	505,303	102,130	20.2	130,153
AR	348,532	65,101	18.7	82,614
AZ	485,314	100,220	20.7	128,095
CA	2,230,097	472,433	21.2	615,128
CO	328,316	46,929	14.3	59,061
CT	363,565	71,440	19.7	89,631
DC	46,497	10,620	22.8	14,241
DE	120,051	23,398	19.5	29,053
FL	1,934,926	487,053	25.2	608,466
GA	744,747	148,972	20.0	189,598
HI	89,059	12,630	14.2	15,420
IA	382,744	60,107	15.7	75,623
ID	134,040	17,070	12.7	21,248
IL	1,361,154	261,929	19.2	341,103
IN	673,268	120,072	17.8	150,990
KS	318,583	56,628	17.8	74,431
KY	464,237	92,108	19.8	118,472
LA	388,219	86,344	22.2	109,073
MA	649,394	117,882	18.2	149,745
MD	579,806	117,269	20.2	151,812
ME	173,816	28,390	16.3	36,634
MI	986,346	230,663	23.4	299,772
MN	317,409	45,822	14.4	61,980
MO	602,310	113,844	18.9	145,413
MS	337,491	64,554	19.1	83,065
MT	122,098	18,314	15.0	22,760
NC	953,706	173,071	18.2	219,443
ND	82,523	11,952	14.5	14,542
NE	209,370	38,441	18.4	49,292
NH	167,368	28,402	17.0	36,768
NJ	932,941	246,913	26.5	309,890
NM	173,533	25,782	14.8	32,352
NV	193,673	43,310	22.4	55,913
NY	1,524,357	416,217	27.3	535,682
OH	956,047	178,781	18.7	228,927
OK	408,979	74,979	18.3	93,632
OR	288,370	37,910	13.2	48,112
PA	1,085,910	227,141	20.9	291,808
PR	70,153	13,539	19.3	15,767
RI	79,821	15,701	19.7	19,889

State	Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
SC	525,538	100,428	19.1	126,748
SD	104,675	14,612	14.0	18,314
TN	614,245	110,196	17.9	139,972
TX	1,891,046	401,334	21.2	522,605
UT	144,512	20,959	14.5	28,152
VA	795,195	136,780	17.2	172,387
VI	13,789	1,444	10.5	1,772
VT	85,025	11,612	13.7	14,483
WA	575,926	83,638	14.5	103,196
WI	513,443	79,873	15.6	104,937
WV	214,570	39,960	18.6	52,285
WY	65,318	8,747	13.4	11,338

## Appendix B: Echocardiography services performed, by population characteristics, 2010

Variable		Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
Overall		27,073,765	5,529,233	20.4	7,054,577
Age	65-69	7,333,868	1,021,115	13.9	1,296,139
	70-74	6,079,102	1,158,197	19.1	1,478,879
	75-79	4,943,934	1,131,466	22.9	1,458,545
	80-84	4,136,721	1,070,602	25.9	1,378,020
	85+	4,580,140	1,147,853	25.1	1,442,994
Race or ethnicity	Non-Hispanic White	22,651,929	4,600,895	20.3	5,840,744
	African American	2,042,391	452,770	22.2	600,533
	Hispanic	1,419,366	298,691	21.0	389,721
	Asian or Pacific Islander	626,647	119,950	19.1	150,601
	American Indian / Alaska Native	109,991	18,217	16.6	23,607
	Other / Unknown	223,441	38,710	17.3	49,371
Gender	Female	15,522,435	3,054,957	19.7	3,844,645
	Male	11,551,330	2,474,276	21.4	3,209,932
Urbanicity	Urban	24,320,726	5,059,361	20.8	6,448,865
	Rural	2,672,089	464,365	17.4	598,944
	Unknown	80,950	5,507	6.8	6,768
Medicare Status	Full dual	3,054,680	761,650	24.9	1,018,969
	Nondual	23,146,402	4,566,276	19.7	5,771,201
	Partial dual	452,620	103,827	22.9	136,079
	QMB	420,063	97,480	23.2	128,328
State	AK	49,853	6,526	13.1	8,399
	AL	487,888	99,518	20.4	126,719
	AR	342,630	63,837	18.6	80,522
	AZ	464,529	97,653	21.0	125,374
	CA	2,167,494	466,229	21.5	606,022
	CO	312,252	46,931	15.0	59,313
	CT	363,144	73,098	20.1	91,811
	DC	45,700	10,397	22.7	13,883
	DE	116,646	22,295	19.1	27,502
	FL	1,919,716	497,403	25.9	619,044
	GA	723,319	146,756	20.3	186,326
	HI	87,956	13,369	15.2	16,524
	IA	375,488	59,928	16.0	74,734
	ID	127,868	16,857	13.2	21,024
	IL	1,323,692	258,756	19.6	336,407
	IN	667,356	122,082	18.3	153,574
	KS	314,554	57,432	18.3	75,568
	KY	455,976	90,770	19.9	116,332
	LA	378,972	85,536	22.6	108,069
	MA	618,380	113,683	18.4	144,628
Variable		Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
State (cont'd)	MD	564,176	113,376	20.1	145,459
	ME	171,849	28,236	16.4	36,594
	MI	1,088,269	256,270	23.6	329,698
	MN	330,835	48,512	14.7	64,722
	MO	610,732	111,949	18.3	143,687
	MS	329,496	63,834	19.4	81,669
	MT	113,638	17,799	15.7	22,154
	NC	953,706	173,071	18.2	219,443
	ND	83,978	11,627	13.9	14,970
	NE	204,135	38,506	18.9	49,758
	NH	159,323	27,617	17.3	35,907
	NJ	918,591	250,064	27.2	313,124
	NM	170,756	25,702	15.1	32,116
	NV	185,633	43,399	23.4	55,570
	NY	1,514,814	419,247	27.7	538,582
	OH	946,802	180,518	19.1	230,363
	OK	399,603	73,823	18.5	91,659
	OR	270,336	35,861	13.3	45,532
	PA	1,063,986	226,764	21.3	290,473
	PR	76,515	14,602	19.1	16,924
	RI	78,199	15,534	19.9	19,757
	SC	505,238	99,133	19.6	124,629
	SD	105,701	15,118	14.3	19,070
	TN	599,359	108,749	18.1	136,683
	TX	1,891,046	401,334	21.2	522,605
	UT	140,795	20,930	14.9	27,688
	VA	764,850	130,056	17.0	162,886
	VI	13,107	1,345	10.3	1,654
	VT	83,611	11,928	14.3	14,879
	WA	557,857	83,184	14.9	102,833
	WI	508,020	80,287	15.8	105,292
	WV	209,864	38,982	18.6	50,830
	WY	62,865	8,289	13.2	10,664

## Appendix C: Echocardiography services performed, by population characteristics, 2009

Variable		Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
Overall		26,828,437	5,471,903	20.4	6,951,249
Age	65-69	7,178,201	1,004,211	14.0	1,268,115
	70-74	6,024,406	1,143,243	19.0	1,449,991
	75-79	4,981,063	1,137,092	22.8	1,462,245
	80-84	4,157,162	1,068,915	25.7	1,370,300
	85+	4,487,605	1,118,442	24.9	1,400,598
Race or ethnicity	Non-Hispanic White	22,550,084	4,571,325	20.3	5,777,095
	African American	1,992,097	440,190	22.1	582,155
	Hispanic	1,378,603	291,778	21.2	379,053
	Asian or Pacific Islander	600,124	115,323	19.2	144,563
	American Indian / Alaska Native	106,644	17,448	16.4	22,710
	Other / Unknown	200,885	35,839	17.8	45,673
Gender	Female	15,443,039	3,042,810	19.7	3,814,599
	Male	11,385,398	2,429,093	21.3	3,136,650
Urbanicity	Urban	24,088,521	5,007,741	20.8	6,357,597
	Rural	2,662,179	458,741	17.2	586,857
	Unknown	77,737	5,421	4.0	6,795
Medicare Status	Full dual	3,033,006	755,642	24.9	1,009,576
	Nondual	22,977,963	4,526,258	19.7	5,693,447
	Partial dual	430,729	99,546	23.1	129,829
	QMB	386,739	90,457	23.4	118,397
State	AK	47,552	5,989	12.6	7,622
	AL	471,448	95,519	20.3	120,332
	AR	340,434	62,951	18.5	79,515
	AZ	443,653	93,684	21.1	119,838
	CA	2,134,931	457,158	21.4	592,631
	CO	302,594	45,268	15.0	57,254
	CT	365,058	74,103	20.3	92,838
	DC	44,777	9,996	22.3	13,260
	DE	111,970	21,031	18.8	25,781
	FL	1,913,328	497,380	26.0	616,112
	GA	768,685	152,335	19.8	192,294
	HI	87,646	13,544	15.5	16,499
	IA	374,055	59,389	15.9	73,808
	ID	126,279	16,472	13.0	20,487
	IL	1,302,362	252,199	19.4	327,114
	IN	666,520	123,904	18.6	155,653
	KS	312,165	56,409	18.1	73,900
	KY	454,463	91,892	20.2	117,802
	LA	378,742	85,411	22.6	107,937
	MA	609,893	113,376	18.6	145,118

Variable		Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
State (cont'd)	MD	555,026	111,715	20.1	143,422
	ME	173,394	28,530	16.4	36,755
	MI	926,814	222,191	24.0	282,908
	MN	360,443	51,786	14.4	68,992
	MO	602,844	114,274	19.0	146,049
	MS	323,191	62,547	19.4	79,906
	MT	112,337	17,302	15.4	21,423
	NC	928,373	167,157	18.0	211,344
	ND	84,070	11,408	13.6	14,065
	NE	202,579	37,447	18.5	48,421
	NH	157,327	27,540	17.5	35,707
	NJ	907,255	251,077	27.7	313,261
	NM	167,207	24,539	14.7	31,645
	NV	178,341	41,680	23.4	53,422
	NY	1,526,148	419,633	27.5	537,745
	OH	1,059,145	202,468	19.1	255,598
	OK	396,686	74,219	18.7	92,568
	OR	262,711	34,289	13.1	42,391
	PA	1,051,567	225,492	21.4	287,256
	PR	82,469	16,042	19.5	18,737
	RI	75,830	15,369	20.3	19,286
	SC	494,877	97,182	19.6	122,101
	SD	105,714	15,614	14.8	19,613
	TN	596,261	108,376	18.2	135,515
	TX	1,863,060	394,553	21.2	507,485
	UT	141,487	20,638	14.6	27,152
	VA	751,258	125,864	16.8	156,617
	VI	12,403	1,289	10.4	1,601
	VT	81,818	11,807	14.4	14,712
	WA	548,882	81,978	14.9	101,157
	WI	516,329	81,376	15.8	106,196
	WV	205,998	38,045	18.5	49,222
	WY	62,263	7,952	12.8	10,068



## Appendix D: Echocardiography services performed, by population characteristics, 2008

Variable		Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
Overall		27,017,354	5,455,367	20.2	6,918,949
Age	65-69	7,113,764	981,425	13.8	1,234,117
	70-74	6,078,691	1,134,214	18.7	1,436,822
	75-79	5,104,045	1,152,390	22.6	1,478,246
	80-84	4,274,722	1,085,782	25.4	1,390,695
	85+	4,446,132	1,101,556	24.8	1,379,069
Race or ethnicity	Non-Hispanic White	22,819,154	4,586,260	20.1	5,791,497
	African American	1,969,333	425,943	21.6	560,100
	Hispanic	1,355,144	282,400	20.8	364,907
	Asian or Pacific Islander	580,375	111,003	19.1	138,727
	American Indian / Alaska Native	104,707	16,461	15.7	21,384
	Other / Unknown	188,641	33,300	17.7	42,334
Gender	Female	15,594,544	3,042,059	19.5	3,807,416
	Male	11,422,810	2,413,308	21.1	3,111,533
Urbanicity	Urban	24,255,594	4,994,523	20.6	6,329,588
	Rural	2,685,046	455,466	17.0	582,748
	Unknown	76,714	5,378	7.0	6,613
Medicare Status	Full dual	3,017,506	739,728	24.5	982,558
	Nondual	23,210,226	4,535,201	19.5	5,701,268
	Partial dual	407,076	93,060	22.9	121,320
	QMB	382,546	87,378	22.8	113,803
State	AK	45,813	5,689	12.4	7,341
	AL	484,321	97,370	20.1	122,041
	AR	340,500	61,444	18.0	78,125
	AZ	435,937	91,502	21.0	117,436
	CA	2,109,297	446,097	21.1	573,609
	CO	299,036	44,354	14.8	55,985
	CT	374,748	75,052	20.0	94,401
	DC	44,509	9,881	22.2	13,139
	DE	110,317	21,456	19.4	26,935
	FL	1,929,741	495,383	25.7	612,071
	GA	764,735	148,681	19.4	188,274
	HI	90,376	13,795	15.3	16,856
	IA	377,774	60,487	16.0	75,412
	ID	129,393	16,363	12.6	20,181
	IL	1,300,249	249,542	19.2	322,490
	IN	679,191	126,307	18.6	159,333
	KS	316,121	57,208	18.1	74,676
	KY	456,858	92,183	20.2	118,092
	LA	384,869	85,360	22.2	107,033
	MA	610,815	113,752	18.6	145,461

Variable		Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
State (cont'd)	MD	549,284	111,085	20.2	141,767
	ME	182,982	29,710	16.2	38,288
	MI	965,151	229,794	23.8	290,999
	MN	376,639	53,591	14.2	71,817
	MO	609,693	114,341	18.8	147,171
	MS	321,976	59,808	18.6	75,990
	MT	114,065	17,911	15.7	22,181
	NC	917,829	161,933	17.6	204,706
	ND	84,334	11,424	13.5	13,998
	NE	203,102	37,688	18.6	49,094
	NH	157,744	27,340	17.3	35,410
	NJ	920,205	254,410	27.6	318,980
	NM	167,367	24,185	14.5	31,009
	NV	174,039	40,677	23.4	52,043
	NY	1,549,308	420,843	27.2	536,338
	OH	1,075,199	206,469	19.2	260,930
	OK	397,580	71,975	18.1	89,790
	OR	263,907	34,006	12.9	41,875
	PA	1,086,940	231,482	21.3	295,185
	PR	96,604	18,052	18.7	20,573
	RI	75,603	15,341	20.3	19,393
	SC	488,180	95,185	19.5	119,083
	SD	101,800	13,915	13.7	17,435
	TN	602,933	107,016	17.7	134,563
	TX	1,850,884	384,808	20.8	493,541
	UT	147,612	20,970	14.2	27,453
	VA	749,788	125,046	16.7	155,351
	VI	11,741	1,086	9.2	1,325
	VT	81,002	11,814	14.6	15,042
	WA	549,712	79,570	14.5	97,462
	WI	532,790	83,238	15.6	108,674
	WV	208,564	38,377	18.4	49,539
	WY	61,361	7,854	12.8	9,992

## Appendix E: Echocardiography services performed, by population characteristics, 2007

Variable		Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
Overall		27,461,960	5,400,626	19.7	6,816,517
Age	65-69	7,129,449	961,295	13.5	1,202,741
	70-74	6,120,033	1,114,190	18.2	1,405,319
	75-79	5,358,238	1,179,322	22.0	1,505,529
	80-84	4,409,005	1,085,147	24.6	1,382,968
	85+	4,445,235	1,060,672	23.9	1,319,960
Race or ethnicity	Non-Hispanic White	23,256,128	4,547,054	19.6	5,714,224
	African American	2,016,748	424,370	21.0	554,397
	Hispanic	1,347,634	278,017	20.6	358,498
	Asian or Pacific Islander	558,620	104,375	18.7	129,831
	American Indian / Alaska Native	103,254	15,788	15.3	20,484
	Other / Unknown	179,576	31,022	17.3	39,083
Gender	Female	15,910,097	3,025,762	19.0	3,770,207
	Male	11,551,863	2,374,864	20.6	3,046,310
Urbanicity	Urban	24,659,627	4,944,213	20.0	6,234,124
	Rural	2,726,689	451,234	16.5	575,969
	Unknown	75,644	5,179	6.8	6,424
Medicare Status	Full dual	3,081,855	736,700	23.9	973,092
	Nondual	23,584,588	4,486,961	19.0	5,613,769
	Partial dual	418,234	92,812	22.2	120,180
	QMB	377,283	84,153	22.3	109,476
State	AK	43,802	5,448	12.4	6,966
	AL	503,406	97,105	19.3	120,956
	AR	339,253	58,811	17.3	74,488
	AZ	430,828	86,214	20.0	111,063
	CA	2,081,916	427,703	20.5	543,307
	CO	295,162	42,825	14.5	54,231
	CT	389,222	76,187	19.6	95,476
	DC	45,797	9,836	21.5	12,894
	DE	109,108	21,090	19.3	26,090
	FL	1,948,673	490,391	25.2	604,845
	GA	755,356	141,412	18.7	179,090
	HI	90,643	13,087	14.4	15,792
	IA	376,500	58,177	15.5	72,568
	ID	132,521	16,121	12.2	19,568
	IL	1,297,879	242,404	18.7	311,207
	IN	691,325	124,940	18.1	156,000
	KS	319,567	56,256	17.6	73,617
	KY	461,926	90,246	19.5	115,599
	LA	395,708	85,569	21.6	107,415
	MA	614,508	112,194	18.3	142,916

Variable		Beneficiaries eligible for service (#)	Beneficiaries with 1+ service (#)	Beneficiaries with 1+ service (%)	Total services performed (#)
State (cont'd)	MD	546,051	106,285	19.5	135,753
	ME	186,590	29,678	15.9	38,089
	MI	1,043,116	244,036	23.4	307,874
	MN	397,599	54,975	13.8	72,393
	MO	616,147	112,555	18.3	143,971
	MS	319,540	58,257	18.2	73,375
	MT	115,605	17,825	15.4	22,019
	NC	916,899	160,195	17.5	202,280
	ND	84,489	11,318	13.4	14,028
	NE	205,534	36,575	17.8	47,522
	NH	157,630	27,099	17.2	34,815
	NJ	924,872	248,979	26.9	312,005
	NM	166,549	23,382	14.0	29,096
	NV	169,724	38,607	22.7	48,613
	NY	1,600,289	419,566	26.2	530,439
	OH	1,196,953	227,793	19.0	287,927
	OK	399,320	70,688	17.7	87,985
	OR	262,400	33,195	12.7	40,480
	PA	1,167,641	242,553	20.8	307,327
	PR	103,088	19,044	18.5	21,539
	RI	76,392	15,148	19.8	19,085
	SC	483,288	90,381	18.7	111,647
	SD	103,487	13,922	13.5	17,425
	TN	609,791	104,834	17.2	131,601
	TX	1,845,286	369,484	20.0	472,776
	UT	155,923	22,049	14.1	28,565
	VA	752,968	121,855	16.2	150,892
	VI	11,094	1,027	9.3	1,220
	VT	80,686	11,260	14.0	14,242
	WA	550,387	78,285	14.2	95,114
	WI	559,100	85,440	15.3	110,939
	WV	213,386	38,248	17.9	48,735
	WY	60,624	7,545	12.4	9,539

## Appendix F. Number of annual echocardiography services among beneficiaries with at least one echocardiography service, by State, 2011

State	Beneficiaries (#)	Echo services received (#)	Mean services received per beneficiary (#)	Beneficiaries receiving 1 echo (#)	Beneficiaries receiving 1 echo (%)	Beneficiaries receiving 2+ echos (#)	Beneficiaries receiving 2+ echos (%)	State	Beneficiaries (#)	Echo services received (#)	Mean services received per beneficiary (#)	Beneficiaries receiving 1 echo (#)	Beneficiaries receiving 1 echo (%)	Beneficiaries receiving 2+ echos (#)	Beneficiaries receiving 2+ echos (%)
AK	6,871	8,810	1.28	5,558	80.9	1,313	19.1	RI	15,701	19,889	1.27	12,638	80.5	3,063	19.5
AL	102,130	130,153	1.27	81,515	79.8	20,615	20.2	SC	100,428	126,748	1.26	81,155	80.8	19,273	19.2
AR	65,101	82,614	1.27	52,187	80.2	12,914	19.8	SD	14,612	18,314	1.25	12,030	82.3	2,582	17.7
AZ	100,220	128,095	1.28	80,635	80.5	19,585	19.5	TN	110,196	139,972	1.27	88,483	80.3	21,713	19.7
CA	472,433	615,128	1.30	372,321	78.8	100,112	21.2	TX	408,363	532,606	1.30	320,581	78.5	87,782	21.5
CO	46,929	59,061	1.26	38,218	81.4	8,711	18.6	UT	20,959	28,152	1.34	16,375	78.1	4,584	21.9
CT	71,440	89,631	1.25	58,570	82.0	12,870	18.0	VA	136,780	172,387	1.26	111,470	81.5	25,310	18.5
DC	10,620	14,241	1.34	8,081	76.1	2,539	23.9	VI	1,444	1,772	1.23	1,201	83.2	243	16.8
DE	23,398	29,053	1.24	19,342	82.7	4,056	17.3	VT	11,612	14,483	1.25	9,551	82.3	2,061	17.8
FL	487,053	608,466	1.25	398,576	81.8	88,477	18.2	WA	83,638	103,196	1.23	69,520	83.1	14,118	16.9
GA	148,972	189,598	1.27	119,862	80.5	29,110	19.5	WI	79,873	104,937	1.31	62,306	78.0	17,567	22.0
HI	12,630	15,420	1.22	10,522	83.3	2,108	16.7	WV	39,960	52,285	1.31	31,289	78.3	8,671	21.7
IA	60,107	75,623	1.26	49,149	81.8	10,958	18.2	WY	8,747	11,338	1.30	6,940	79.3	1,807	20.7
ID	17,070	21,248	1.24	14,129	82.8	2,941	17.2								
IL	261,929	341,103	1.30	206,820	79.0	55,109	21.0								
IN	120,072	150,990	1.26	97,688	81.4	22,384	18.6								
KS	56,628	74,431	1.31	43,698	77.2	12,930	22.8								
KY	92,108	118,472	1.29	73,179	79.4	18,929	20.6								
LA	86,344	109,073	1.26	70,108	81.2	16,236	18.8								
MA	117,882	149,745	1.27	95,743	81.2	22,139	18.8								
MD	117,269	151,812	1.29	93,635	79.8	23,634	20.2								
ME	28,390	36,634	1.29	22,780	80.2	5,610	19.8								
MI	230,663	299,772	1.30	181,246	78.6	49,417	21.4								
MN	45,822	61,980	1.35	35,094	76.6	10,728	23.4								
MO	111,949	143,687	1.28	89,286	79.8	22,663	20.2								
MS	64,554	83,065	1.29	51,041	79.1	13,513	20.9								
MT	18,314	22,760	1.24	15,167	82.8	3,147	17.2								
NC	177,345	225,084	1.27	143,150	80.7	34,195	19.3								
ND	11,952	14,542	1.22	10,086	84.4	1,866	15.6								
NE	38,441	49,292	1.28	30,877	80.3	7,564	19.7								
NH	28,402	36,768	1.29	22,732	80.0	5,670	20.0								
NJ	246,913	309,890	1.26	202,576	82.0	44,337	18.0								
NM	25,782	32,352	1.25	21,050	81.6	4,732	18.4								
NV	43,310	55,913	1.29	34,725	80.2	8,585	19.8								
NY	416,217	535,682	1.29	332,898	80.0	83,319	20.0								
OH	178,781	228,927	1.28	143,000	80.0	35,781	20.0								
OK	74,979	93,632	1.25	61,298	81.8	13,681	18.2								
OR	37,910	48,112	1.27	30,694	81.0	7,216	19.0								
PA	227,141	291,808	1.28	182,041	80.1	45,100	19.9								
PR	13,539	15,767	1.16	11,806	87.2	1,733	12.8								

## Appendix G. Echocardiography services performed, by site and type of service, 2007-2011

Variable		All Echocardiography Services			Base Services			Add-on Services			Associated Services		
		Services received (#)	Beneficiaries with 1+ services (#)	Mean services received per beneficiary (#)	Services received (#)	Beneficiaries with 1+ services (#)	Mean services received per beneficiary (#)	Services received (#)	Beneficiaries with 1+ services (#)	Mean services received per beneficiary (#)	Services received (#)	Beneficiaries with 1+ services (#)	Mean services received per beneficiary (#)
Total	2011	7,077,554	5,532,382	1.28	7,019,351	5,514,853	1.27	516,041	462,081	1.12	198,967	192,669	1.03
	2010	7,054,577	5,529,233	1.28	6,997,267	5,511,090	1.27	523,349	471,284	1.11	190,377	184,290	1.03
	2009	6,951,249	5,471,903	1.27	6,898,789	5,455,124	1.26	593,684	539,884	1.10	179,913	174,510	1.03
	2008	6,918,949	5,455,367	1.27	6,862,597	5,436,820	1.26	6,599,687	5,297,553	1.25	169,065	164,178	1.03
	2007	6,816,517	5,400,626	1.26	6,762,239	5,381,879	1.26	6,483,873	5,230,268	1.24	176,065	171,260	1.03
	Total	34,818,846	27,389,511	1.27	34,540,243	27,299,766	1.27	14,716,634	12,001,070	1.23	914,387	886,907	1.03
Inpatient	2011	2,444,146	1,936,816	1.26	2,417,293	1,923,691	1.26	188,118	167,544	1.12	25,075	24,678	1.02
	2010	2,442,218	1,937,771	1.26	2,414,389	1,923,328	1.26	188,443	168,832	1.12	27,589	27,234	1.01
	2009	2,428,626	1,926,228	1.26	2,400,794	1,911,314	1.26	196,717	177,241	1.11	28,568	28,187	1.01
	2008	2,494,105	1,975,441	1.26	2,462,507	1,958,705	1.26	2,382,184	1,924,379	1.24	31,186	30,749	1.01
	2007	2,473,342	1,964,976	1.26	2,441,742	1,947,717	1.25	2,357,959	1,910,967	1.23	34,249	33,871	1.01
	Total	12,282,437	9,741,232	1.26	12,136,725	9,664,755	1.26	5,313,421	4,348,963	1.22	146,667	144,719	1.01
Outpatient and ER	2011	1,513,258	1,329,610	1.14	1,482,362	1,305,942	1.14	182,347	170,954	1.07	132,614	129,385	1.02
	2010	1,278,120	1,130,033	1.13	1,249,504	1,107,313	1.13	171,064	161,097	1.06	119,257	116,535	1.02
	2009	1,128,888	1,007,489	1.12	1,105,360	988,373	1.12	221,024	210,944	1.05	105,914	103,774	1.02
	2008	1,070,251	957,812	1.12	1,050,684	942,214	1.12	989,914	894,376	1.11	103,898	101,748	1.02
	2007	1,065,625	956,215	1.11	1,049,649	943,834	1.11	980,927	888,446	1.10	108,842	106,522	1.02
	Total	6,056,142	5,381,159	1.13	5,937,559	5,287,676	1.12	2,545,276	2,325,817	1.09	570,525	557,964	1.02
Office and IDTF	2011	3,101,120	2,838,309	1.09	3,100,680	2,838,001	1.09	145,457	141,124	1.03	41,243	39,565	1.04
	2010	3,317,268	3,032,933	1.09	3,316,437	3,032,398	1.09	163,521	158,347	1.03	43,484	41,460	1.05
	2009	3,373,363	3,087,072	1.09	3,372,290	3,086,517	1.09	175,529	169,671	1.03	45,392	43,334	1.05
	2008	3,331,861	3,055,641	1.09	3,326,741	3,053,055	1.09	3,205,296	2,968,430	1.08	33,939	32,415	1.05
	2007	3,252,664	2,990,042	1.09	3,246,015	2,986,118	1.09	3,120,621	2,896,904	1.08	32,928	31,595	1.04
	Total	16,376,276	15,003,997	1.09	16,362,163	14,996,089	1.09	6,810,424	6,334,476	1.08	196,986	188,369	1.05
Other	2011	19,030	17,960	1.06	19,016	17,946	1.06	119	119	1.00	35	35	1.00
	2010	16,971	15,952	1.06	16,937	15,918	1.06	321	298	1.08	47	47	1.00
	2009	20,372	19,260	1.06	20,345	19,234	1.06	414	395	1.05	39	39	1.00
	2008	22,732	21,369	1.06	22,665	21,314	1.06	22,293	20,994	1.06	42	42	1.00
	2007	24,886	23,314	1.07	24,833	23,267	1.07	24,366	22,842	1.07	46	46	1.00
	Total	103,991	97,855	1.06	103,796	97,679	1.06	47,513	44,648	1.06	209	209	1.00

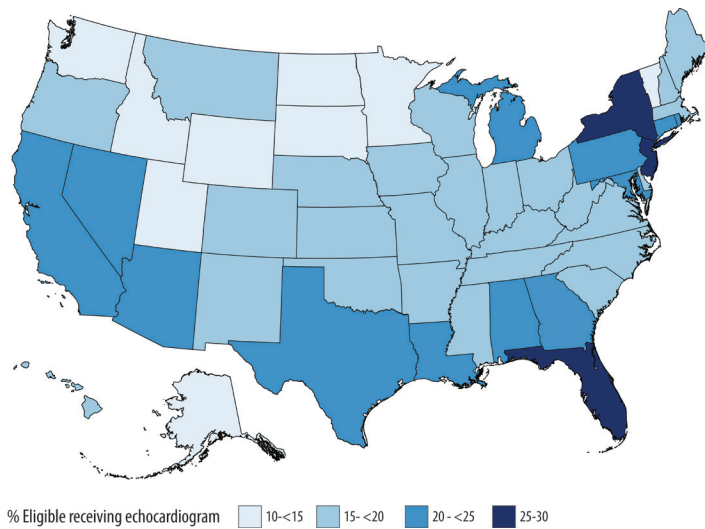
## Appendix H. Total allowed charges for echocardiography services, by specialty, 2007-2011

		Allowed charges	Percent of total 5-year allowed charges per year			Allowed charges	Percent of total 5-year allowed charges per year
Total	2011	\$1,619,452,595	18.9	Diagnostic radiology	2011	\$7,410,844	18.5
	2010	\$1,637,364,534	19.2		2010	\$7,654,619	19.1
	2009	\$1,613,483,353	18.9		2009	\$7,391,033	18.4
	2008	\$1,823,075,944	21.3		2008	\$8,473,957	21.2
	2007	\$1,858,228,298	21.7		2007	\$9,143,776	22.8
	Total	\$ 8,551,604,723	100.0		Total	\$40,074,229	100.0
Cardiology	2011	\$839,052,343	17.0	Other	2011	\$25,678,307	17.1
	2010	\$892,044,980	18.1		2010	\$24,086,459	16.1
	2009	\$942,660,093	19.1		2009	\$27,467,684	18.3
	2008	\$1,115,013,889	22.6		2008	\$38,965,962	26.0
	2007	\$1,142,265,893	23.2		2007	\$33,573,958	22.4
	Total	\$ 4,931,037,197	100.0		Total	\$149,772,370	100.0
Outpatient facility	2011	\$604,043,330	24.9				
	2010	\$552,145,129	22.8				
	2009	\$451,741,464	18.6				
	2008	\$414,239,541	17.1				
	2007	\$404,925,688	16.7				
	Total	\$ 2,427,095,151	100.0				
Internal medicine	2011	\$104,992,715	14.4				
	2010	\$118,209,255	16.2				
	2009	\$134,980,887	18.5				
	2008	\$178,172,312	24.4				
	2007	\$193,742,365	26.5				
	Total	730,097,534	100.0				
General / fam- ily practice	2011	\$21,163,269	13.3				
	2010	\$23,999,651	15.1				
	2009	\$28,553,150	18.0				
	2008	\$40,540,819	25.5				
	2007	\$44,500,641	28.0				
	Total	158,757,530	100.0				
Independent Diagnostic Testing Facility (IDTF)	2011	\$17,111,788	14.9				
	2010	\$19,224,441	16.8				
	2009	\$20,689,041	18.0				
	2008	\$27,669,465	24.1				
	2007	\$30,075,977	26.2				
	Total	114,770,712	100.0				

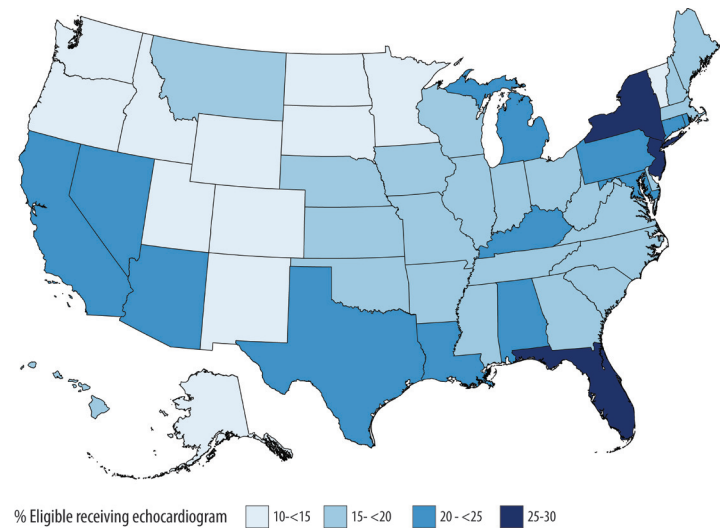


**Appendix I.** Eligible beneficiaries receiving one or more echocardiography services, by State, 2007-2010

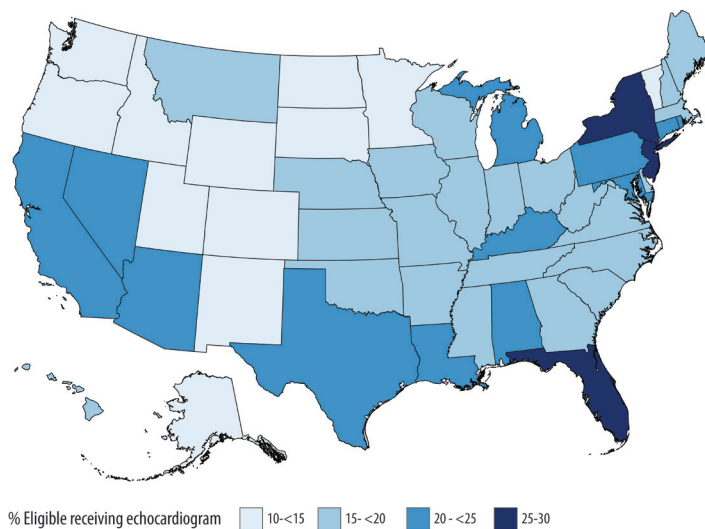
**Map I1.** Eligible beneficiaries receiving one or more echocardiography services, by State, 2010



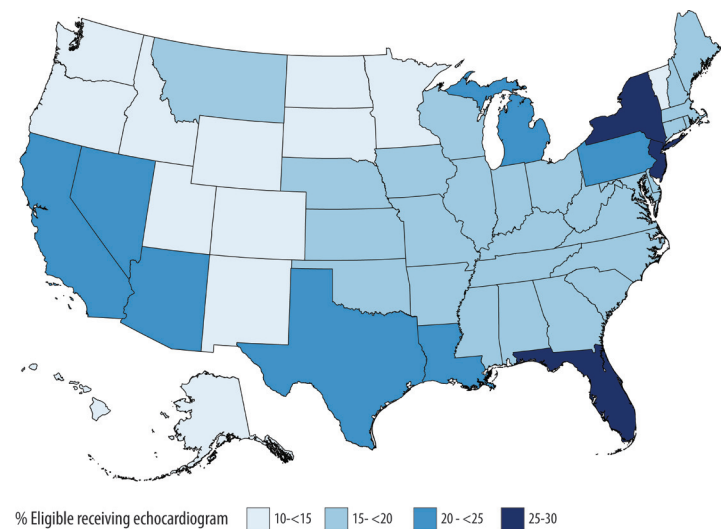
**Map I3.** Eligible beneficiaries receiving one or more echocardiography services, by State, 2008



**Map I2.** Eligible beneficiaries receiving one or more echocardiography services, by State, 2009



**Map I4.** Eligible beneficiaries receiving one or more echocardiography services, by State, 2007



**Appendix J.** Number of all eligible Medicare beneficiaries with one or more echocardiography services, by age and total, 2007-2011

	2007	2008	2009	2010	2011
Total	27,461,960	27,017,354	26,828,437	27,073,765	27,573,766
65-69	7,129,449	7,113,764	7,178,201	7,333,868	7,713,925
70-74	6,120,033	6,078,691	6,024,406	6,079,102	6,209,355
75-79	5,358,238	5,104,045	4,981,063	4,943,934	4,942,090
80-84	4,409,005	4,274,722	4,157,162	4,136,721	4,074,441
85+	4,445,235	4,446,132	4,487,605	4,580,140	4,633,955

**Appendix K.** Percent of all eligible Medicare beneficiaries with one or more echocardiography service by age and total, 2007-2011

	2007	2008	2009	2010	2011
Total	19.7	20.2	20.4	20.4	20.1
65-69	13.5	13.8	14.0	13.9	13.4
70-74	18.2	18.7	19.0	19.1	18.8
75-79	22.1	22.6	22.8	22.9	22.7
80-84	24.6	25.4	25.7	25.9	25.7
85+	23.9	24.8	24.9	25.1	25.1

## Appendix L. Eligible urban and rural beneficiaries receiving one or more echocardiography services, by State, 2011

State	% of eligible Urban beneficiaries with 1+ echo service	% of eligible Rural beneficiaries with 1+ echo service		
AK	13.6	11.9	RI	19.7 n/a
AL	20.2	20.3	SC	19.1 19.1
AR	18.7	18.5	SD	14.5 12.9
AZ	20.8	14.0	TN	17.7 19.6
CA	21.3	16.2	TX	21.1 19.2
CO	14.6	12.8	UT	14.9 11.0
CT	19.7	25.0	VA	17.2 17.0
DC	22.9	n/a	VT	14.0 12.7
DE	19.5	50.0	WA	14.6 14.1
FL	25.3	20.5	WI	16.0 13.7
GA	20.1	19.1	WV	18.3 19.5
HI	14.2	n/a	WY	13.8 12.7
IA	16.2	14.8		
ID	12.8	12.4		
IL	19.4	16.9		
IN	17.9	16.6		
KS	18.1	16.7		
KY	19.6	20.4		
LA	22.5	20.3		
MA	18.2	15.6		
MD	20.3	16.0		
ME	16.6	15.8		
MI	24.0	19.2		
MN	14.7	13.5		
MO	18.5	17.7		
MS	19.6	17.7		
MT	15.6	14.1		
NC	18.1	16.4		
ND	14.6	14.3		
NE	18.8	17.4		
NH	16.9	16.3		
NJ	26.5	23.1		
NM	15.0	13.6		
NV	22.6	14.3		
NY	27.5	20.5		
OH	18.7	18.1		
OK	18.3	18.6		
OR	13.2	12.2		
PA	21.0	19.7		
PR	19.3	14.1		