RSNA Press Release

Study Analyzes a Decade of Cardiac Imaging Trends

Released: September 30, 2021

At A Glance

- Rate of cCTA by radiologists in hospital outpatient departments increased by 355%.
- Researchers studied data from the 2010-2019 Physician Supplier Procedure Summary files.
- The increased rate of cCTAs performed by radiologists represents a growing opportunity for collaboration in cardiac imaging.

OAK BROOK, Ill. — A new study published in *Radiology: Cardiothoracic Imaging* on cardiac imaging trends over a decade reports that the rate of coronary computed tomography angiography (cCTA) exams by radiologists in hospital outpatient departments increased markedly from 2010 to 2019, suggesting a bright future for the technology. The study also found that reimbursement cuts and advances in technology have helped shift much of the imaging done by cardiologists from the office to hospital outpatient department.

download photo



Russell A. Reeves, M.D.

Imaging has long played a critical role in the diagnosis of cardiovascular disease, the leading killer in the world. Both radiologists and cardiologists perform noninvasive cardiac imaging, but over time two of the most common cardiac imaging methods, echocardiography and myocardial perfusion imaging, became almost exclusively the domain of cardiologists.

The dominance was partly due to a cardiologist's unique position as a provider who both orders and performs diagnostic cardiac imaging. However, reimbursement cuts from the Deficit Reduction Act (DRA) of 2005 had a major impact on in-office cardiac imaging.

"In the early 2000s, cardiology office imaging utilization was skyrocketing," said study lead author Russell A. Reeves, M.D., from the Center for Research on Utilization of Imaging Service (CRUISE) and diagnostic radiology resident in the Department of Radiology at Thomas Jefferson University in Philadelphia. "The changes brought by DRA reversed that trend to where it no longer was lucrative or even feasible for a lot of cardiologists to do imaging in their offices."

During that same period, technological advances made competing imaging exams traditionally performed by radiologists, such as cCTA, appealing options.

Dr. Reeves and colleagues studied data from the 2010-2019 Physician Supplier Procedure Summary files to assess the impact of these developments on utilization of different types of cardiac imaging.

They found that cardiologist in-office myocardial perfusion imaging rates per 100,000 Medicare beneficiaries dropped by 52%, from 4,426 to 2,119, over the 10-year period. Correspondingly, imaging rates per 100,000 beneficiaries at hospital outpatient departments rose 71%, from 935 to 1,598.

"Cardiologists are not performing nearly as many myocardial perfusion scans as they were, and most are now being done at hospital outpatient imaging departments," Dr. Reeves said.

Over the same period, the rates of cCTA by radiologists in hospital outpatient departments increased by 355%. Overall rates, however, remained low compared to myocardial perfusion imaging, despite the fact that some studies have shown cCTA to be more accurate. The technology's uptake may be limited, Dr. Reeves said, by its complexity and the cost of equipment, in addition to the fact that it requires a dedicated technologist.

Still, he said, the increasing rate of cCTAs performed by radiologists represents a growing opportunity for collaboration in cardiac imaging. Recently at Thomas Jefferson, cardiologists have shown interest in reading cCTA exams side-by-side with radiologists to enhance patient care.

"Coronary CTA is a useful screening tool for coronary artery disease that obviates the need for invasive coronary angiography," Dr. Reeves said. "I think the future is looking favorably on it."

Rates of cardiac PET (cPET) in cardiologist offices increased by 193% over the 10-year period, but cardiac PET performed by radiologists in offices and hospital outpatient departments saw little change. The increase in in-office cPET is likely due to a combination of technological advances, interpretation familiarity and financial incentives, according to Dr. Reeves.

Dr. Reeves plans to continue following the trends to study the impact of regulatory, economic and other factors on imaging utilization.

"Ultimately, we as radiologists need to be self-regulators and also do the research to support change, to help the specialty and help medical practices overall in the future," he said.

The research is also a way of honoring the legacy of Dr. Reeves' mentor, David Levin, M.D., professor and chairman emeritus at Thomas Jefferson University. Dr. Levin, a former fighter pilot who became a leading researcher in imaging utilization trends and founded CRUISE, died in 2020.

"Cardiac Imaging Trends from 2010 to 2019 in the Medicare Population." Collaborating with Dr. Reeves were Ethan J. Halpern, M.D., and Vijay M. Rao,

Copyright ©2026 Radiological Society of North America (RSNA)

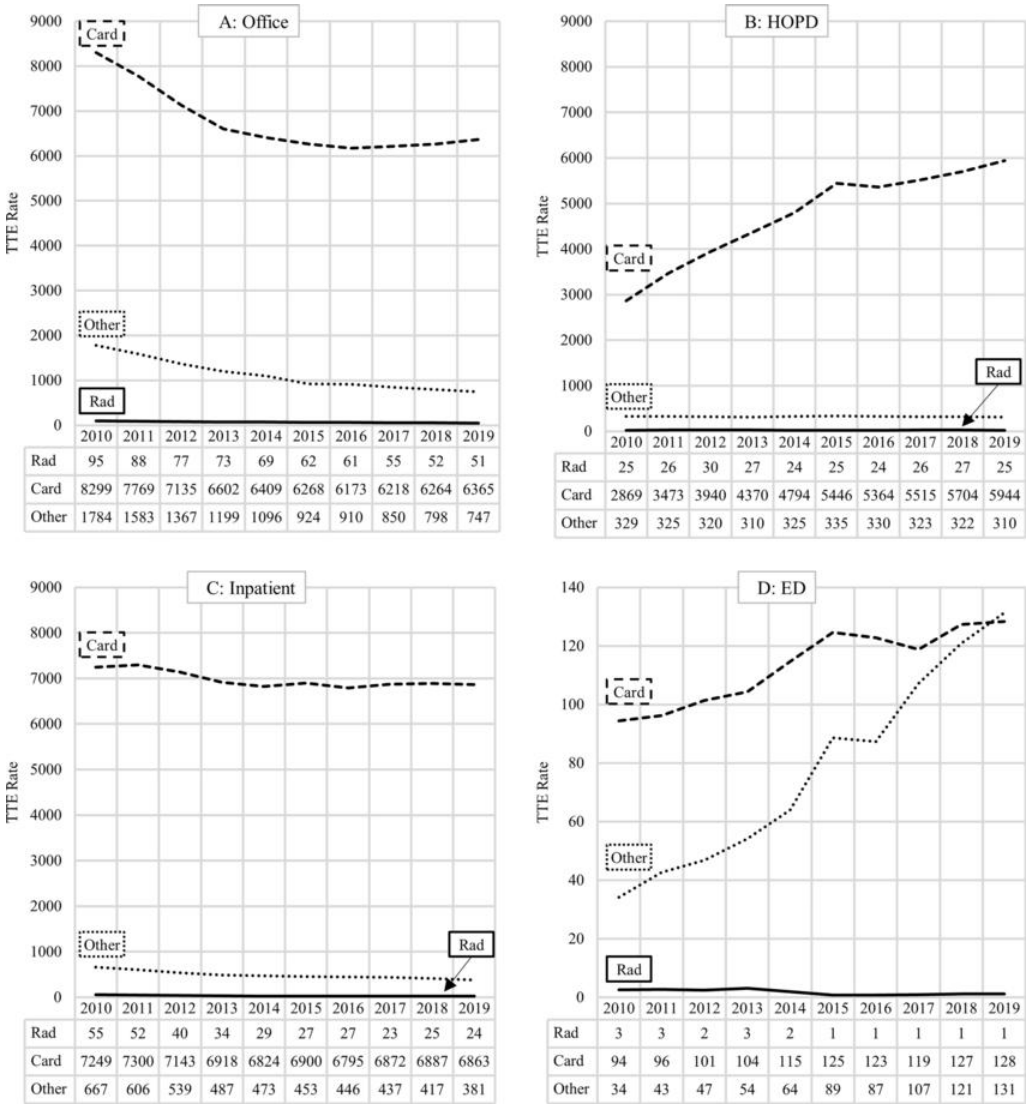
M.D., FACR.

Radiology: Cardiothoracic Imaging is edited by Suhny Abbara, M.D., University of Texas Southwestern Medical Center, Dallas, and owned and published by the Radiological Society of North America, Inc. (https://pubs.rsna.org/cardiothoracic-imaging)

RSNA is an association of radiologists, radiation oncologists, medical physicists and related scientists promoting excellence in patient care and health care delivery through education, research and technologic innovation. The Society is based in Oak Brook, Illinois. (RSNA.org)

For more information about cCTA, visit *RadiologyInfo.org*.

Images (JPG, TIF):



A: Office	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	95	88	77	73	69	62	61	55	52	51
Card	8299	7769	7135	6602	6409	6268	6173	6218	6264	6365
Other	1784	1583	1367	1199	1096	924	910	850	798	747

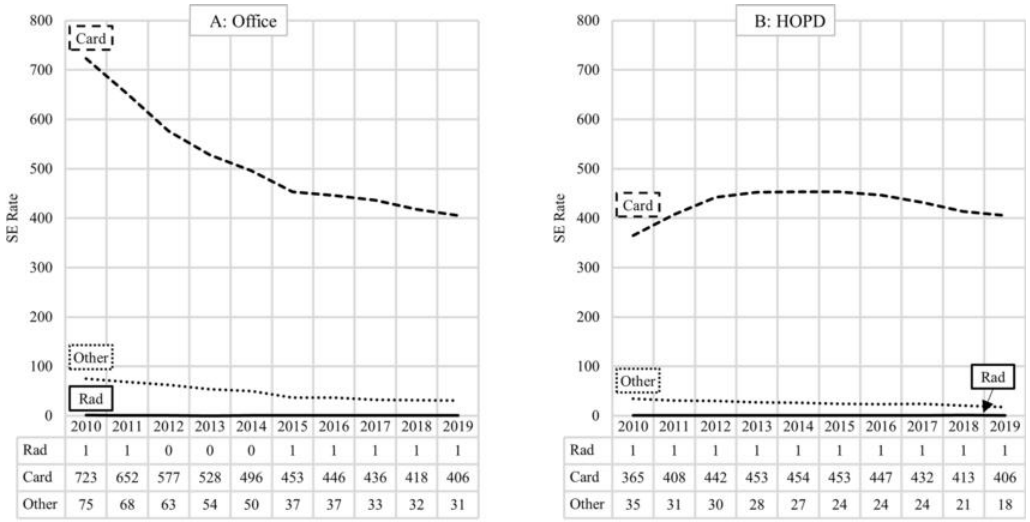
B: HOPD	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	25	26	30	27	24	25	24	26	27	25
Card	2869	3473	3940	4370	4794	5446	5364	5515	5704	5944
Other	329	325	320	310	325	335	330	323	322	310

C: Inpatient	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	55	52	40	34	29	27	27	23	25	24
Card	7249	7300	7143	6918	6824	6900	6795	6872	6887	6863
Other	667	606	539	487	473	453	446	437	417	381

D: ED	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	3	3	2	3	2	1	1	1	1	1
Card	94	96	101	104	115	125	123	119	127	128
Other	34	43	47	54	64	89	87	107	121	131

Figure 1. Transthoracic echocardiography (TTE) rates per 100,000 Medicare beneficiaries by specialty and place of service. Card = cardiologist, ED = emergency department, HOPD = hospital outpatient department, Rad = radiologist.
High-res (TIF) version

Copyright ©2026 Radiological Society of North America (RSNA)



A: Office	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	1	1	0	0	0	1	1	1	1	1
Card	723	652	577	528	496	453	446	436	418	406
Other	75	68	63	54	50	37	37	33	32	31

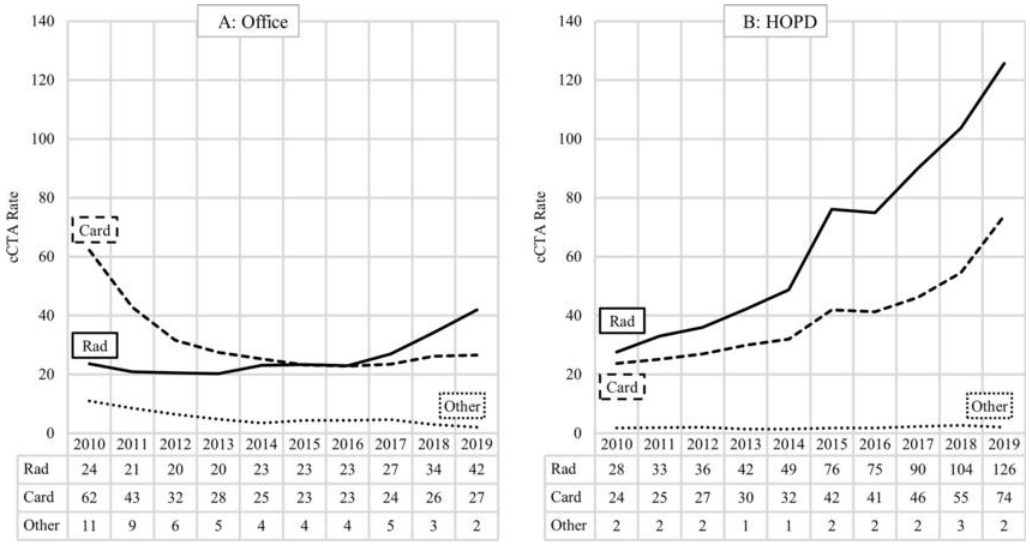
B: HOPD	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	1	1	1	1	1	1	1	1	1	1
Card	365	408	442	453	454	453	447	432	413	406
Other	35	31	30	28	27	24	24	24	21	18

C: Inpatient	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	0	0	1	1	1	0	0	0	0	0
Card	98	86	74	59	51	42	41	36	30	25
Other	8	6	5	4	3	3	3	2	2	1

D: ED	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	0	0	0	0	0	0	0	0	0	0
Card	11	10	12	11	11	10	10	9	7	5
Other	1	0	0	0	0	0	0	0	0	0

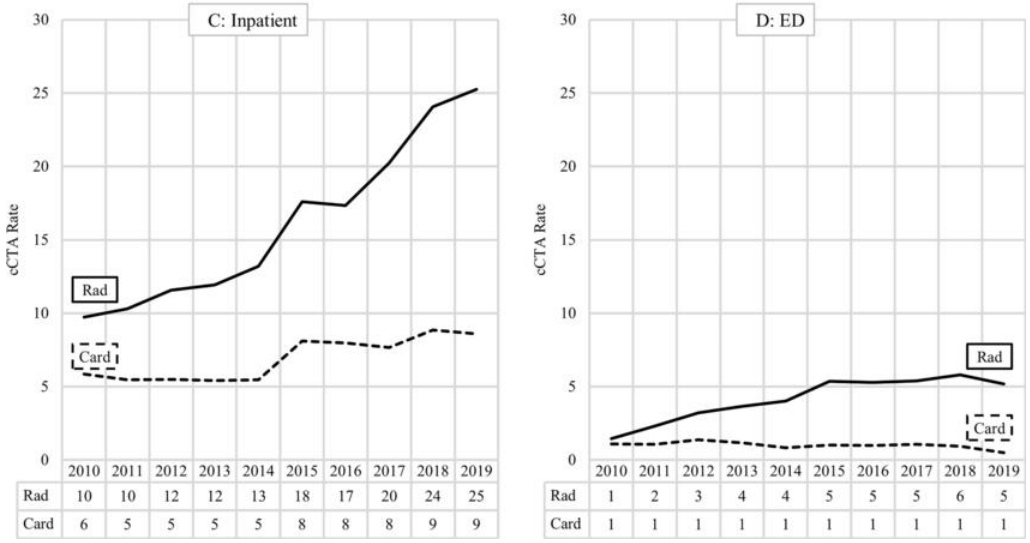
Figure 2. Stress echocardiography (SE) rates per 100,000 Medicare beneficiaries by specialty and place of service. Card = cardiologist, ED = emergency department, HOPD = hospital outpatient department, Rad = radiologist.
High-res (TIF) version

Copyright ©2026 Radiological Society of North America (RSNA)



A: Office	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	24	21	20	20	23	23	23	27	34	42
Card	62	43	32	28	25	23	23	24	26	27
Other	11	9	6	5	4	4	4	5	3	2

B: HOPD	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	28	33	36	42	49	76	75	90	104	126
Card	24	25	27	30	32	42	41	46	55	74
Other	2	2	2	1	1	2	2	2	3	2



C: Inpatient	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	10	10	12	12	13	18	17	20	24	25
Card	6	5	5	5	5	8	8	8	9	9

D: ED	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	1	2	3	4	4	5	5	5	6	5
Card	1	1	1	1	1	1	1	1	1	1

Figure 3. Coronary CTA (cCTA) rates per 100,000 Medicare beneficiaries by specialty and place of service. Card = cardiologist, ED = emergency department, HOPD = hospital outpatient department, Rad = radiologist.
High-res (TIF) version

Copyright ©2026 Radiological Society of North America (RSNA)

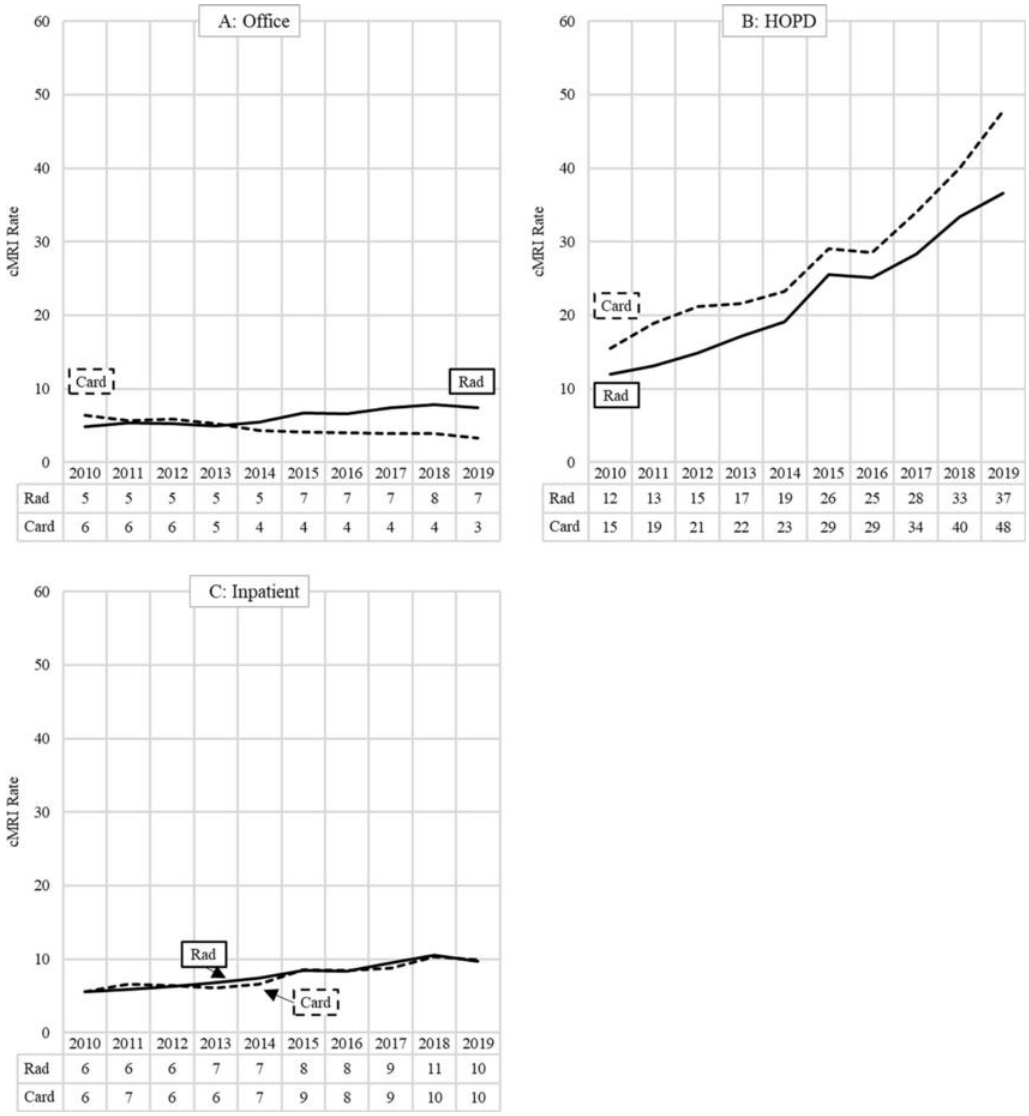
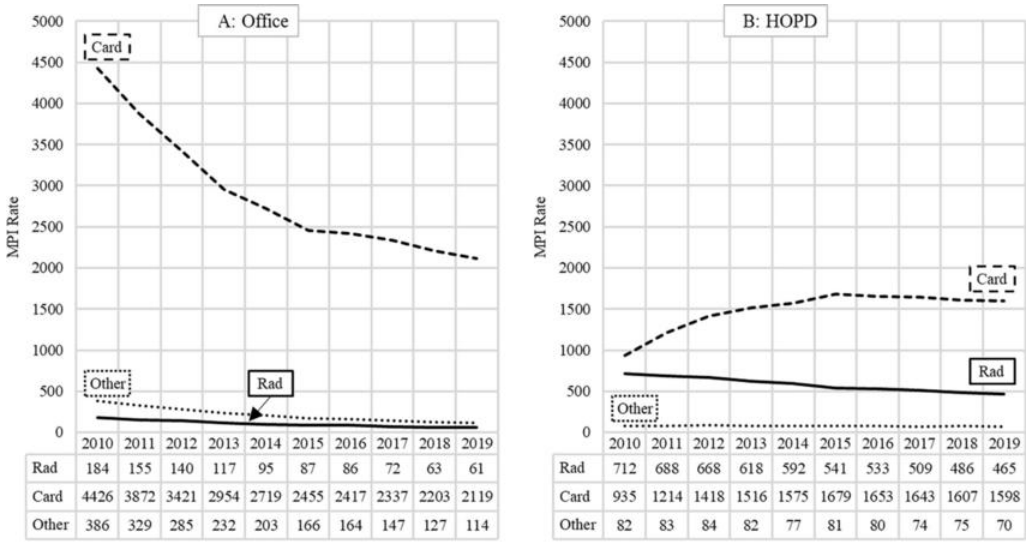


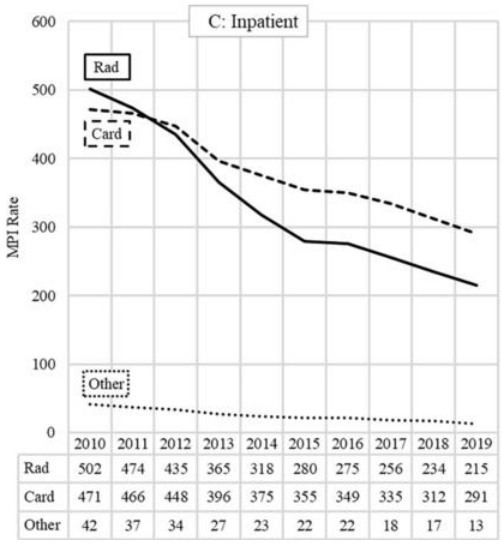
Figure 4. Cardiac MRI (cMRI) rates per 100,000 Medicare beneficiaries by specialty and place of service. Card = cardiologist, ED = emergency department, HOPD = hospital outpatient department, Rad = radiologist.
High-res (TIF) version

Copyright ©2026 Radiological Society of North America (RSNA)

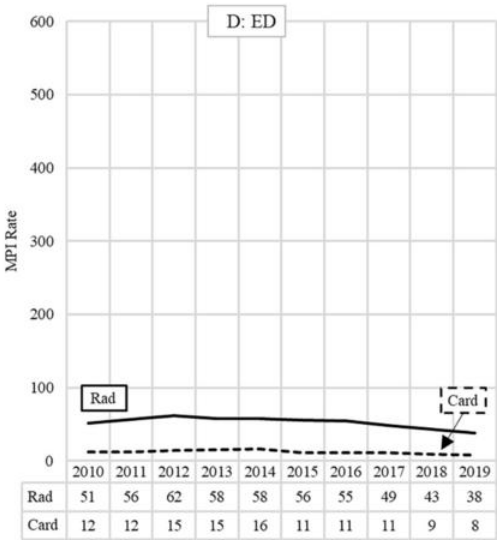


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	184	155	140	117	95	87	86	72	63	61
Card	4426	3872	3421	2954	2719	2455	2417	2337	2203	2119
Other	386	329	285	232	203	166	164	147	127	114

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	712	688	668	618	592	541	533	509	486	465
Card	935	1214	1418	1516	1575	1679	1653	1643	1607	1598
Other	82	83	84	82	77	81	80	74	75	70

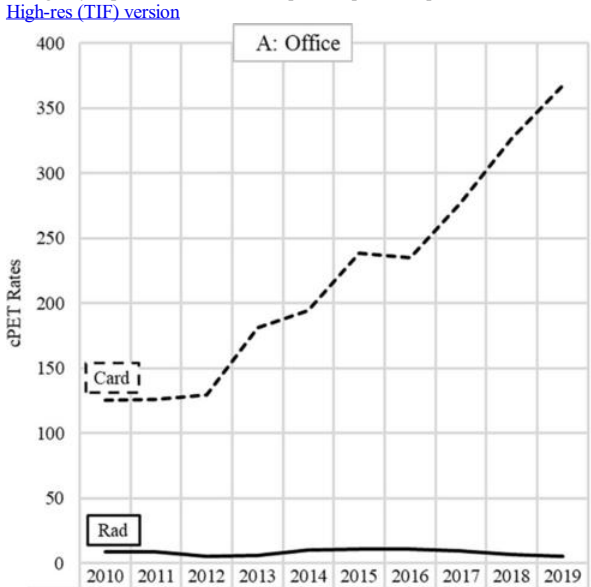


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	502	474	435	365	318	280	275	256	234	215
Card	471	466	448	396	375	355	349	335	312	291
Other	42	37	34	27	23	22	22	18	17	13

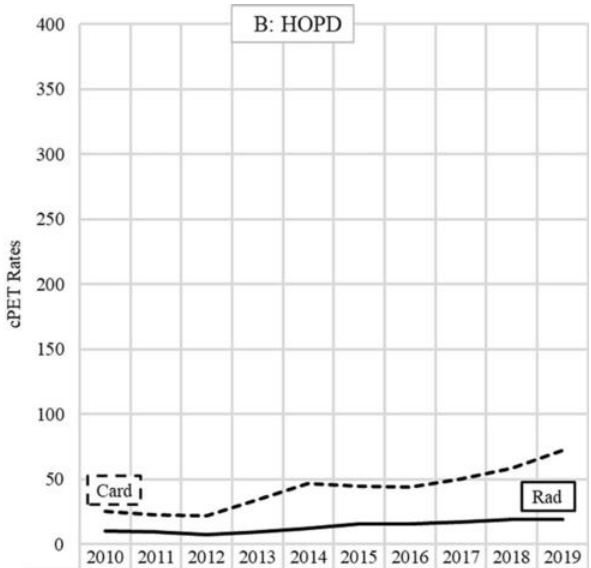


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	51	56	62	58	58	56	55	49	43	38
Card	12	12	15	15	16	11	11	11	9	8

Figure 5. Myocardial perfusion imaging (MPI) rates per 100,000 Medicare beneficiaries by specialty and place of service. Card = cardiologist, ED = emergency department, HOPD = hospital outpatient department, Rad = radiologist.
High-res (TIF) version



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	8	9	5	6	10	11	11	10	7	5
Card	125	126	129	181	194	238	235	277	327	367

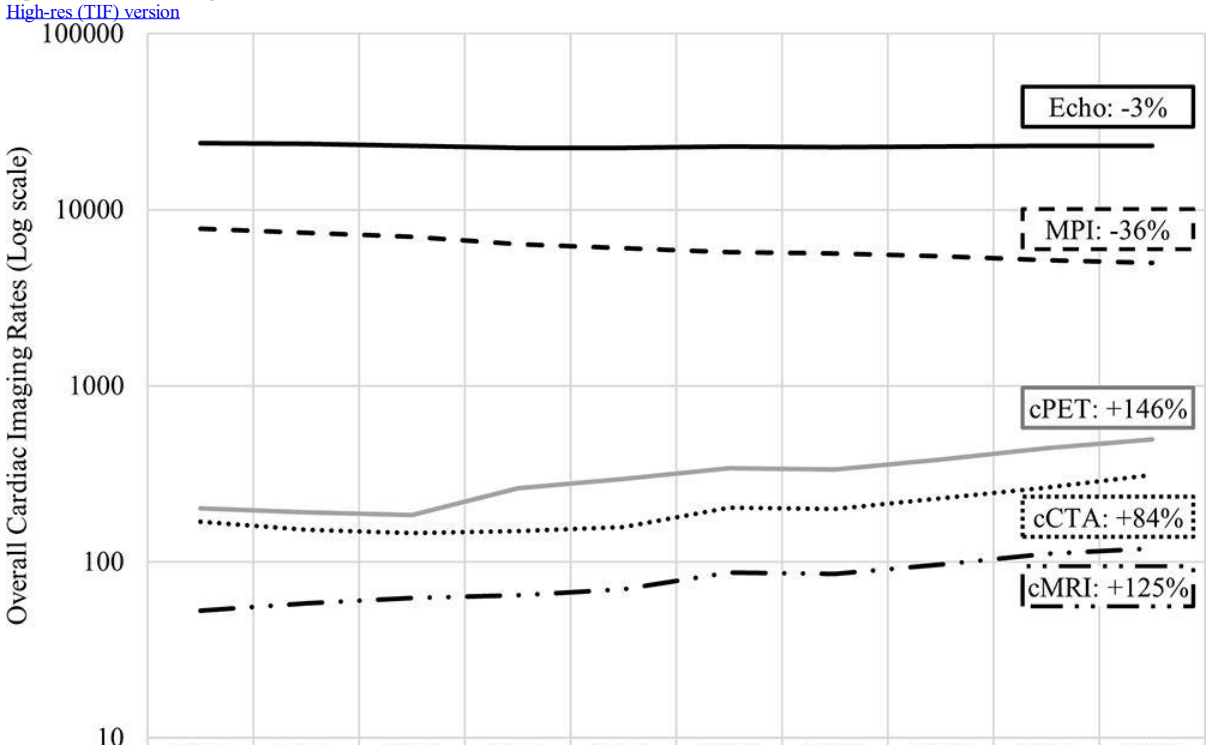


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rad	10	9	7	10	12	16	16	17	19	19
Card	25	22	22	34	47	44	44	50	58	72

Figure 6. Cardiac PET (cPET) rates per 100,000 Medicare beneficiaries by specialty and place of service. Card = cardiologist, HOPD = hospital outpatient

Copyright ©2026 Radiological Society of North America (RSNA)

department, Rad = radiologist.
High-res (TIF) version



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Echo	23911	23730	23067	22543	22531	22958	22610	22807	23008	23188
MPI	7817	7395	7019	6390	6058	5739	5652	5455	5182	4996
cPET	202	191	184	263	295	341	335	381	442	496
cCTA	169	153	146	149	158	203	200	229	264	312
cMRI	53	58	63	65	70	87	85	97	112	119

Figure 7. Overall cardiac imaging rates per 100,000 Medicare beneficiaries by noninvasive imaging modality. A log10 scale was used for rates to separate the differences between the cPET, cCTA, and cMRI trendlines. TTE, TEE, and SE were combined (Echo) given the small numbers of TEE and SE. The 2010 to 2019 percentage changes per modality are listed. SE = stress echocardiography, TEE = transesophageal echocardiography, TTE = transthoracic echocardiography.
High-res (TIF) version

Resources:

Study abstract

Copyright ©2026 Radiological Society of North America (RSNA)