

ORIGINAL ARTICLE

The activity of the Interventional Cardiology Centers in Romania: a 2017 overview and 2014-2017 trends

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Abstract: This article summarizes the activity of the interventional cardiology centers of Romania during 2017. Data was collected from all interventional cardiology centers from Romania using a standard reporting model. The report highlights the total number of coronary interventions, peripheral interventions and other procedures like TAVI, mitraclip, aortic endoprosthesis, interventions in structural heart diseases, that were performed in 2017 in Romania. A comparison of the activity of the interventional cardiology centers in Romania between 2014 to 2017 was done.

Keywords: interventional cardiology, percutaneous coronary interventions, stents

Rezumat: Acest articol sintetizează activitatea centrelor de cardiologie intervențională din România în anul 2017. Datele au fost colectate de la toate centrele de cardiologie intervențională din România, utilizând un model standard de raportare. Raportul evidențiază numărul total de intervenții coronariene, intervenții periferice și alte proceduri precum TAVI, mitraclip, endoproză aortică, intervenții în bolile cardiace structurale, care au fost efectuate în 2017 în România. A fost comparată activitatea centrelor de cardiologie intervențională în România între anii 2014 și 2017.

Cuvinte cheie: cardiologie intervențională, intervenții coronariene percutane, stenturi

This article summarizes the activity of the interventional cardiology centers of Romania during 2017 and it highlights the trends in different coronary or peripheral interventions between 2014 and 2017¹⁻³.

Data was collected from all interventional cardiology centers from Romania using a standard reporting model at the initiative of the interventional cardiology working group of Romanian Society of Cardiology. The purpose of this initiative was to have a clear picture of the magnitude of the activity of interventional cardiologists at a national level, to know the total number of different types of procedures, and to identify any trends.

Table 1 summarizes the data from 2017 provided by 34 public and private interventional cardiology centers of Romania. Currently, there are 34 interventional cardiology centers in Romania, of which 13 are private centers and 21 public centers with 53 functional angiographs. In 2017, in Romania were 117 independent interventional cardiologists and 52 interventional cardiologists in training.

A direct comparison of 2014 with 2015 and 2016 was done, that highlights the continuous increase in

the activity of the interventional cardiology centers in Romania. The total number of PCIs in 2015 increased with 35% compared to 2014, in 2016 increased with only 5% compared to 2015 and in 2017 increased with 12% compared to the previous year (Figure 1, 2). In 2017, in Romania, were made 20773 coronary interventions.

We see the same trend in the total number of implanted stents (Figure 3). The number of implanted stents per patient in 2017 was 1.46. The activity increased in both public and private hospitals (Figure 4).

The total number of STEMI increased by 16% in 2016 compared to 2015 and remained almost unchanged in 2017 (Figure 5).

The utilization of intracoronary imaging (OCT and IVUS) and of invasive coronary hemodynamic measurements like IFR and FFR increased in 2017 with 68% compared to 2016 (Figure 6).

An important progress was made in peripheral angioplasty. The total number of peripheral angioplasty slightly increased from 2014 to 2016, but in 2017 there was a substantial increase with 27% compared with 2016 (Figure 7).

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In 2017 the number of other types of procedures, like TAV (were reported 144 cases), mitralclip (were reported 10 cases) and aortic endoprosthesis (were reported 89 cases) increased.

There is a continuous need of implementing a Mandatory Interventional Cardiology National Registry, capable of monitoring objectively these key health care services in a standard manner. This national registry can guide further development of the interventional cardiology in Romania.

Table 1. Reported data from Interventional Cardiology Centers in Romania in 2017

City	Bucharest							
Hospital	CC Iliescu	SUUB	Floreasca	Agrippa Ionescu	Militar	Bagdasar	Elias	Sf Ioan
Nr. of Cathlabs	3	3	1	1	2	1	2	1
Nr. Independent operators	8	5	3	3	3	1	5	2
Nr. of in training operators	9	8	5	0	0	1	1	0
Total number of procedures (diagnostic + PCI) ¹	6238	2120		1761	2228		1458	829
Coronary Interventions								
Coronarography	4359	872	2522	1216	1138	670	601	597
Total nr. of PCI	1854	1248	1437	203	501	191	749	117
PCI without stents	147	64	25	16	9	3	20	7
PCI with stents	1707	1184	1412	187	492	188	729	110
STEMI	994	811	983	11	204	14	371	7
Stents per patient ²	1.5	1.48	1.22	1.32	1.6	1.88	1.26	1.22
Total nr. of stents	2638	1642	1729	269	802	360	920	143
Nr. of DES	2543	1347	1492	261	650	311	820	115
DES/stents ratio (%)	95%	82%	86%	97%	81%	86%	89%	80%
BVS	0	0	0	0	0	0	0	0
Cutting, Scoring	10	4	15	3	18	3	1	0
Rotablation	18	0	2	2	0	0	0	0
FFR/IFR	36	4	37	8	0	0	0	0
IVUS	27	2	11	4	0	0	0	0
OCT	0	4	19	5	0	0	0	10
Peripheral interventions								
Peripheral PTA ³	334	0	0	38	220	2	10	34
Renal PTA	10	1	3	1	4	0	0	11
Carotid PTA	20	0	0	33	36	0	0	0
Total nr. of stents in peripheral PTA	150	0	0	28	414	1	2	27
Peripheral angiography	904	20		453	320	95	98	232
Other interventions								
TAVI	62	2	0	0	4	0	0	0
MitraClip	0	0	0	0	0	0	0	0
Aortic endoprosthesis	9	0	0	0	2	0	0	0
Interventions in structural heart disease ⁴	11	0	0	0	0	0	0	0

City	Bucharest			
Hospital	Sanador	Ares – Ponderas - Monza	Colentina	Medlife
Nr. of Cathlabs	2	3	1	1
Nr. Independent operators	7	4	0	2
Nr. of in training operators	0	1	1	0
Total number of procedures (diagnostic + PCI) ¹	2108	2353		
Coronary Interventions				
Coronarography	1141	1322	78	325
Total nr. of PCI	169	502		145

City	Bucharest			
PCI without stents	0	0		12
PCI with stents	169	502		133
STEMI	7	0		3
Stents per patient ²	1.4	1.7		1.35
Total nr. of stents	236	890		180
Nr. of DES	236	890		178
DES/stents ratio (%)	100%	100%		98%
BVS	0	6		0
Cutting, Scoring	0	9		4
Rotablation	0	22		0
FFR/IFR	0	0		0
IVUS	0	0		0
OCT	0	0		0
Peripheral interventions				
Peripheral PTA ³	54	55		24
Renal PTA	1	3		6
Carotid PTA	5	22		17
Total nr. of stents in peripheral PTA	13	35		68
Peripheral angiography	366	372	11	130
Other interventions				
TAVI	5	15		0
MitraClip	0	10		0
Aortic endoprosthesis	4	11		0
Interventions in structural heart disease ⁴	0	38		22

City	Cluj Napoca				Iasi	
Hospital	Institutul Inimii Cluj	SCJU Cluj	Cardioteam	Recuperare	IBCV Iasi	Arcadia
Nr. of Cathlabs	2	1	1	1	2	1
Nr. Independent operators	9	3	1	1	7	2
Nr. of in training operators	3	5	2	1	1	0
Total number of procedures (diagnostic + PCI) ¹		1429		829		739
Coronary Interventions						
Coronarography	3385	1114	248	679	3262	659
Total nr. of PCI	1727	637	159	267	1711	80
PCI without stents	176	37	2	30		4
PCI with stents	1551	600	157	237		76
STEMI	624	207	1	9	1082	
Stents per patient ²	1.51	1.66	1.46	1.4	1.2	1.23
Total nr. of stents	2347	1061	229	346	1573	94
Nr. of DES	1872	670	229	326		93
DES/stents ratio (%)	79%	63%	100%	94%		99%
BVS	0	0	12	0	0	1
Cutting, Scoring	12	0	4	0	0	0
Rotablation	1	0	0	0	0	0
FFR/IFR	24	0	0	0	0	0
IVUS	47	0	0	0	0	0
OCT	3	22	0	0	0	0
Peripheral interventions						
Peripheral PTA ³	92	88	21	93	120	16
Renal PTA	21	3	5	4	14	0
Carotid PTA	27	4	20	0	41	9
Total nr. of stents in peripheral PTA	99	69	61	40	100	
Peripheral angiography	345	312	61	150	1234	63
Other interventions						
TAVI	15	0	0	0	24	0
MitraClip	0	0	0	0	0	0

City	Cluj Napoca				Iasi	
Aortic endoprosthesis	9	0	0	0	10	0
Interventions in structural heart disease ⁴	17	0	4	0	10	0

City	Târgu Mureș				Timișoara	
Hospital	IBCV Tg Mureș	Cardio Med	SCJU Tg Mureș	Nova Vita	IBCV Timișoara	Cordismed
Nr. of cathlabs	2	2	2	1	1	1
Nr. independent operators	6	3	4	7	7	3
Nr. of in training operators	2	1	3	0	2	3
Total number of procedures (diagnostic + PCI) ¹	4104	615	1013	1300	3105	
Coronary Interventions						
Coronarography	3116	251	276	1105	2971	899
Total nr. of PCI	1537	304	656	71	1709	236
PCI without stents	145	6	35	0	80	1
PCI with stents	1392	298	621	71	1629	235
STEMI	353	0	462	0	1110	0
Stents per patient ²	1.5	1.33	1.27	1.3	1.61	1.59
Total nr. of stents	2102	371	794	98	2765	375
Nr. of DES	2061	338	150	96	2187	372
DES/stents ratio (%)	98%	93%	19%	98%	79%	99%
BVS	25	4	0	0	0	0
Cutting, scoring	40	0	0	0	0	1
Rotablation	21	0	0	0	0	12
FFR/IFR	72	1	3	0	2	0
IVUS	0	3	3	0	0	0
OCT	65	3	13	0	2	0
Peripheral interventions						
Peripheral PTA ³	90	56	21	7	4	24
Renal PTA	5	0	0	1	7	13
Carotid PTA	44	1	0	2	19	24
Total nr. of stents in peripheral PTA	90	13	1	5	30	44
Peripheral angiography	700	4	81	97	531	276
Other interventions						
TAVI	11	0	0	0	0	0
MitraClip	0	0	0	0	0	0
Aortic endoprosthesis	19	0	0	0	2	0
Interventions in structural heart disease ⁴	34	1	0	0	0	2

City	Brașov		Oradea	Arad	Suceava
Hospital	Clinicco	Sp. Județean	Sp. Județean	Cardiolife	Med New Life
Nr. of cathlabs	1	2	2	1	2
Nr. independent operators	2	3	4	1	2
Nr. of in training operators	0	0	0	1	0
Total number of procedures (diagnostic + PCI) ¹	2214		1673	557	930
Coronary Interventions					
Coronarography	2033	1274	1539	466	340
Total nr. of PCI	527	812	717	100	324
PCI without stents	8	212	5	6	26
PCI with stents	519	600	712	94	298
STEMI	12	437	331	6	295
Stents per patient ²	1.44	1.65	1.62	1.65	1.2
Total nr. of stents	762	993	1156	165	361
Nr. of DES	741	993	944	155	140
DES/stents ratio (%)	97%	100%	81%	94%	38%

City	Braşov		Oradea	Arad	Suceava
BVS	6	0	0	0	0
Cutting, scoring	0	22		0	0
Rotablation	12	0		0	0
FFR/IFR	0	131		0	0
IVUS	0	0		0	0
OCT	0	8		0	0
Peripheral Interventions					
Peripheral PTA ³	7		1	32	150
Renal PTA	2		0	1	1
Carotid PTA	5	8	0	4	10
Total nr. of stents in peripheral PTA	9		0	38	100
Peripheral angiography	31		134	65	5
Other Interventions					
TAVI	1	0	0	0	0
MitraClip	0	0	0	0	0
Aortic endoprosthesis	4	0	0	0	0
Interventions in structural heart disease ⁴	0	0	0	0	0

City	Baia Mare	Sibiu	Constanţa	Ploieşti	Piteşti
Hospital	Sp. Judeţean	Polisano	Monza-Ares	Ploieşti	Piteşti
Nr. of cathlabs	2	1	1	2	1
Nr. independent operators	2	1	2	2	2
Nr. of in training operators	0	1	1	0	0
Total number of procedures (diagnostic + PCI)¹	1172	1631		1270	1036
Coronary Interventions					
Coronarography	891	1039	189	810	486
Total nr. of PCI	643	455	243	410	332
PCI without stents	48	10	20	41	31
PCI with stents	595	445	223	369	301
STEMI	306	30	90	188	68
Stents per patient ²	1.38	1.54	1.16	1.33	1.17
Total nr. of stents	891	702	283	490	390
Nr. of DES	459	451	200	289	349
DES/stents ratio (%)	51%	64%	70%	59%	89%
BVS	0	0	0	0	0
Cutting, Scoring	4	45	1	0	11
Rotablation	4	0	0	0	0
FFR/IFR	0	50	0	0	0
IVUS	0	0	0	0	0
OCT	0	0	0	0	0
Peripheral Interventions					
Peripheral PTA ³	16	10	0	18	106
Renal PTA	0	1	0	1	0
Carotid PTA	0	2	0	0	0
Total nr. of stents in peripheral PTA	7	14	0	1	63
Peripheral angiography	137	21	1	234	187
Other Interventions					
TAVI	0	5	0	0	0
MitraClip	0	0	0	0	0
Aortic endoprosthesis	1	18	0	0	0
Interventions in structural heart disease ⁴	0	5	0	0	0

¹ All procedures performed in the intervention center, both diagnostic and therapeutic, coronary and peripheral, will be introduced. If in the same procedure the patient is diagnosed with coronary angiogram followed by angioplasty, it will be described as a procedure. If a patient performs coronary angiogram, and in a subsequent session will perform angioplasty, two procedures will be considered.

² It will represent the ratio between the total number of implanted stents and the total number of patients undergoing PCI.

³ Number of peripheral angioplasty (lower and upper limbs artery, not including carotid arteries).

⁴ Interventions in cardiac structural diseases: percutaneous closures of DSA, DSV, PFO, arterial duct, balloon valvulotomies, left atrial appendage closure.

⁵ Major bleeding: fatal bleeding, intracranial hemorrhage, bleeding with hypovolemic shock (SBP <90 mmHg), hemoglobin decreased by >3 g/dl).

PCI - percutaneous coronary intervention, STEMI - ST segment elevation myocardial infarction, DES - drug eluting stent, BVS - bioresorbable vascular scaffold, FFR - fractional flow reserve, IFR - instantaneous wave-free ratio, IVUS - intravascular ultrasound, OCT - optical coherence tomography, PTA - percutaneous transluminal angioplasty, TAVI - transcatheter aortic valve implantation.

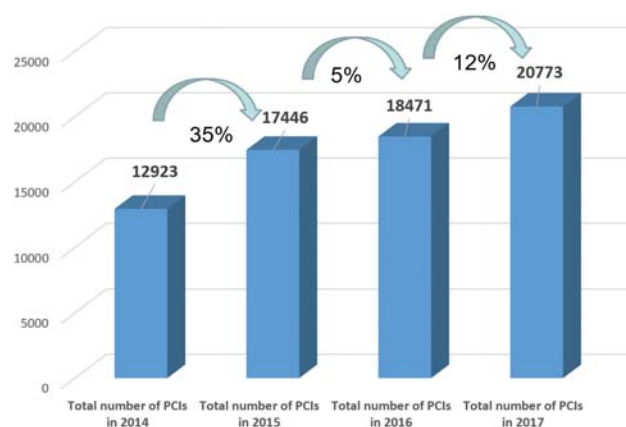


Figure 1. Total number of PCIs from 2014 to 2017 in Romania (PCI - percutaneous coronary intervention).

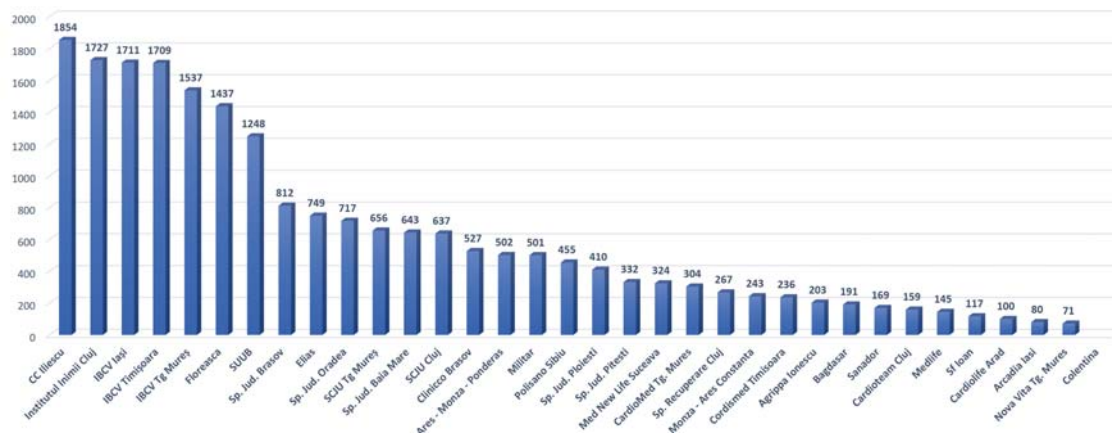


Figure 2. Total number of PCIs in 2017 in all interventional centers from Romania (PCI - percutaneous coronary intervention).

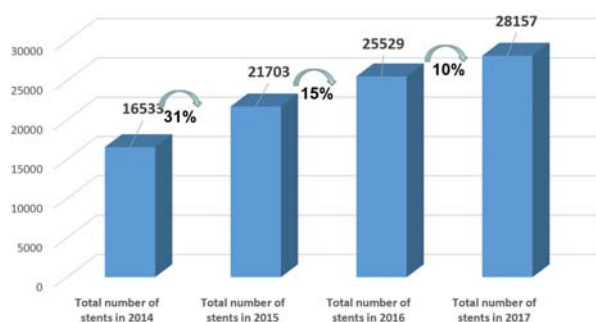


Figure 3. Total number of stents implanted from 2014 to 2017 in Romania.

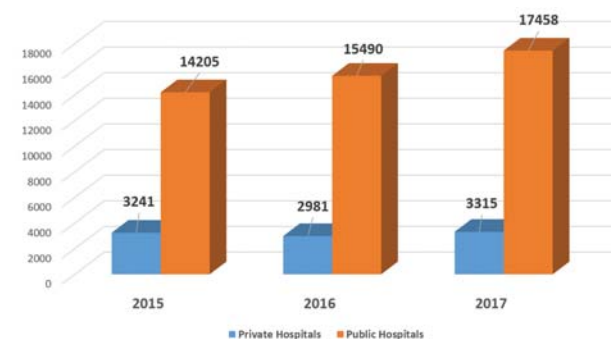


Figure 4. Total number of PCIs from 2015 to 2017 in private vs public hospitals (PCI - percutaneous coronary intervention).

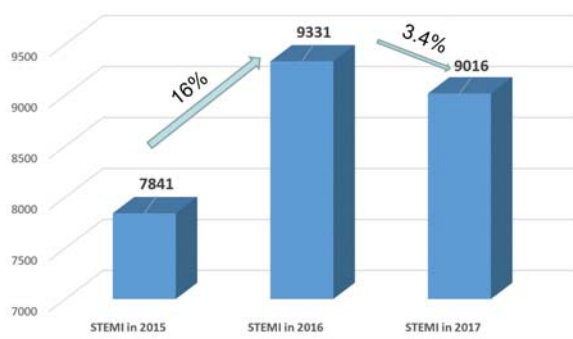


Figure 5. Total number of STEMI from 2015 to 2017 in interventional centers from Romania (STEMI - ST segment elevation myocardial infarction).

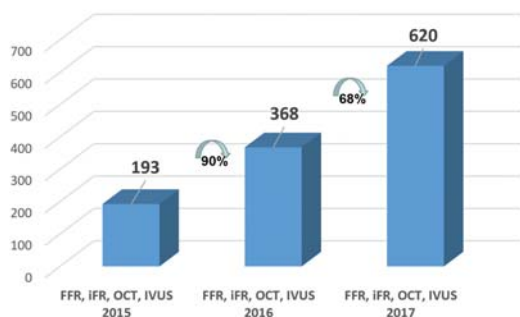


Figure 6. Invasive imaging and coronary hemodynamics testing from 2015 to 2017 (FFR - fractional flow reserve, IFR - instantaneous wave-free ratio, IVUS - intravascular ultrasound, OCT - optical coherence tomography).

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Figure 7. Total number of peripheral angioplasty from 2014 to 2017 in Romania (only in interventional cardiology centers).

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