

## REVIEW

# Romanian interventional cardiology centers, 2014-2015: *an overview*

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**Abstract:** The article summarizes the activity of interventional cardiology centers of Romania during the 2014-2015 periods. Data collection was based on the direct reports from the centers, representing all geographic regions of the country.

**Keywords:** interventional cardiology, reports, percutaneous coronary interventions

**Rezumat:** Articolul prezent sintetizează activitatea centrelor de cardiologie intervențională din România la începutul anului 2015. Datele prezentate sunt cumulate din raportările directe ale acestor centre, existând o reprezentare de la nivelul tuturor regiunilor geografice.

Interventional cardiology specialty in Romania was implemented relatively recently, and it became an area of dynamic development in the last few years. The introduction of the National Program for Interventional Treatment of Acute Myocardial Infarction, and the increasing number of procedures, requires new centers and interventional cardiologists.

This report summarizes the data from 2014 to 2015 provided, at the request of the Interventional Cardiology Working Group (ICWG), by 29 out of 35 public and private interventional cardiology centers of Romania (**Figure 1**). This is a prospective observational registry study, which enrolls all consecutive patients in cardiac catheterization laboratories in Romania since 2014 to 2015. All public and private interventional cardiology centers have received from ICWG a questionnaire to answer specific questions about the activity in the local cath lab. The focus of the requested elements was to determine the status of the logistics (number of departments, cath labs and interventional cardiologists), the volume of the procedures and the type of percutaneous interventions (elective or urgent, coronary or peripheral). The results collected from each center are presented in **Table 1** and are summarized in **Table 2**.

Currently, there are 35 public and private centers in Romania. In 29 centers that provided the reports, work 86 independent interventional cardiologists and

54 specialists in training. During 2014-2015, in these laboratories were performed a total of 40,594 diagnostic and therapeutic percutaneous procedures, including 13,110 Percutaneous Coronary Interventions (PCI) (total number probably would have been about 15,000, if all the centers have reported the data); 5,983 cases of primary PCI (pPCI) were performed on patients with ST segment elevation myocardial infarction (STEMI) (total number probably about 6500 cases). Thus, estimated number of PCI procedures per million people in Romania is approximately 750 cases and pPCI in STEMI of 325 cases.

The data presented in **Table 3** show that over time the number of angioplasties increased by 26%, from 11876 cases in 2013 to about 15000 cases in 2014. However, when compared to the figures from the neighboring countries, the number of procedures in Romania is significantly lower. Thus, in 2011 the number of pPCI per million population in Bulgaria was 650<sup>1</sup>, while in 2014 in Romania there were only 325; the number of angioplasties per million population in 2011 in Poland was 2550<sup>2,3</sup>, while in 2014 in Romania - 750. In these countries, a sound evidence-based approach using National Registry data is applied to monitor and improve interventional cardiology services<sup>4</sup>.

The data analysis in this study is limited to those centers that actively responded to the request from the ICWG; 6 centers did not participate or provided poor

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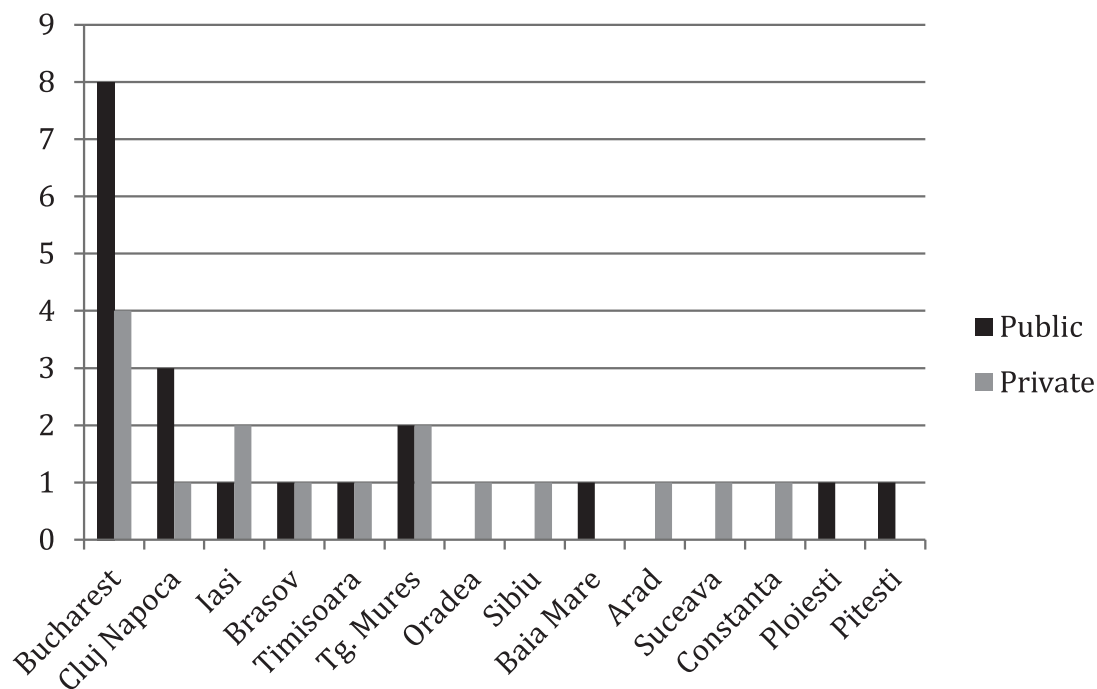
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**Figure 1.** Interventional Cardiology Centers in Romania (the number of public and private cath labs available in each city).

**Table 1. Reported data from Interventional Cardiology Centers**

City	Bucharest									
Hospital	CC Iliescu	Universitar	Floreasca	Agrippa Ionescu	SMC Bucuresti	Bagdasar	Elias	Sf Ioan	Sanador	Ares
Nr. Of Cathlabs	3	1	2	1	2	1	1	1	1	1
Nr. Independent operators	7	5	4	2	2	2	3	1	5	10
Nr. of in training operators	10	8	4	0	3	1	2	1	0	0
Total nr. of coronary procedures	5545	1963	2100	1563	3000	198	549	583	356	384
Total nr. of PCI	1588	1117	906	143		29	163	119	170	282
PCI without stents	132	31	50	17		2	5	7	1	7
PCI with stents	1456	1086	856	126		27	158	112	169	275
Nr. of stents	2050	1325	1462	176		42	201	178	275	493
Multiple stenting	647	196	520	67		15	61	25	92	165
Multivascular	471	75	630	36		21	142	20	62	186
pPCI	700	719	585	10	264	0	31	17	3	3
IIb/IIIa GpI	253	75	240	0		0	0	13	8	0
Elective procedures	888	398	321	133	642	29	132	102	167	279
Nr. of DES	366	70	260	26		5	82	9	276	490
Cutting, rotablation	0	0	0	2	0	0	0	0	0	0
PTA	218	0	3	170	115	0	12	34	39	34
Peripheral angiography	983		0	334	336	35	65	259	390	55
Other percutaneous procedures (ASD, VSD, PFO)	0		0	0		0	0	0	173	65
MACE										
Death	39	50	22	0		0	1	0	0	0
AMI	3	0	3	0		0	0	0	0	0
Stroke	1	3	1	0		0	0	0	0	0
Acute Stent Thrombosis	4	1	1	0		0	0	0	0	0
Major bleeding	5	0	1	1		0	0	0	0	0

City	Cluj Napoca			Iasi			Timisoara	
Hospital	Institutul Inimii Cluj	SCJU Cluj	Cardioteam	IBCV Iasi	Arcadia	Cardiopraxis	IBCV Timisoara	Cardiolife
Nr. of Cathlabs	1	1	1	3	1	1	1	1
Nr. Independent operators	5	3	1	4	2	1	4	3
Nr. of in training operators	4	7	2	3	0	0	3	1
Total nr. of coronary procedures	2765	1563	434	4560	521	274	3308	473
Total nr. of PCI	1101	560	264	1416	180	187	1237	137
PCI without stents	118	48	4	184	1	0	87	7
PCI with stents	983	512	258	1232	179	187	1150	130
Nr. of stents	1560	763	358	1554	210	301	1524	211
Multiple stenting	368	180	132	205	14	114	328	40
Multivascular	420	121	117	102	10	141	73	33
pPCI	583	302	2	754	2	6	704	0
IIb/IIIa GpI	5	0	0	63	0	1	70	0
Elective procedures	518	258	262	662	178	181	533	137
Nr. of DES	186	226	350	883	208	276	199	189
Cutting, rotablation	2	0	2	15	0	0	8	0
PTA		55		63	10		69	31
Peripheral angiography		279		679	54		1380	79
Other percutaneous procedures (ASD, VSD, PFO)	12	0	4	0	2	1	0	0
MACE						1		
Death	34	23	0	47	0	0	22	0
AMI	22	0	2	0	0	0	5	0
Stroke	4	5	0	2	0	0	9	0
Acute Stent Thrombosis	8	2	2	5	0	0	6	0
Major bleeding	16	0	1	3	0	1	29	0

City	Targu Mures		Brasov	Oradea	Arad	Sibiu	Constanta	Suceava	Ploiesti	Pitesti	Baia Mare
Hospital	IBCV Tg Mures	Nova Vita	ICCO Brasov	Cardiolife	Oradea	Cardiolife	Polisano	Suceava	Ploiesti	Pitesti	SJ Baia Mare
Nr. of Cathlabs	1	1	1	1	2	1	1	2	2	1	2
Nr. independent operators	4	3	2	1	3	1	2	2	0	2	2
Nr. of in training operators	1	0	0	0	1	1	0	0	0	2	
Total nr. of coronary procedures	3365	789	1483		1140	685	880	510	511	236	856
Total nr. of PCI	1096	85	262	233	442	328	332	241	111	56	325
PCI without stents	64	2	14	9	31	3	9	37	0	5	22
PCI with stents	1032	83	248	224	411	325	323	204	111	51	303
Nr. of stents	1439	128	377	288	312	461	457	144	146	71	328
Multiple stenting	222	30	180	64	112	106	112	20	25	19	29
Multivascular	62	22	162	26	30	26	70	45	3	5	20
pPCI	398	0	9	30	273	172	10	180	18	14	194
IIb/IIIa GpI	208	0	0	0	120	0	5	140	2	0	42
Elective procedures	698	85	258	194	169	156	322	61	93	42	146
Nr. of DES	421	120	352	191	29	228	315	78	42	0	30

City	Targu Mures		Brasov	Oradea	Arad	Sibiu	Constanta	Suceava	Ploiesti	Pitesti	Baia Mare
Hospital	IBCV Tg Mures	Nova Vita	ICCO Brasov	Cardiolife	Oradea	Cardiolife	Polisano	Suceava	Ploiesti	Pitesti	SJ Baia Mare
Cutting, rotablation	5	0	0	0	0	0	2	0	0	0	0
PTA	57	5	3	51	5	0	30	48	30	11	30
Peripheral angiography	680	62	35	77	111		50	122	277	62	413
Other percutaneous procedures (ASD, VSD, PFO)	0	4	1	0	0		28	76	0	0	0
MACE											
Death	10	0	0	3	25		1	9	0	0	11
AMI	6	0	0	0	4		0	0	0	0	1
Stroke	3	0	0	1	3		1	3	0	1	2
Acute Stent Thrombosis	5	0	0	0	4		1	1	0	0	3
Major bleeding	25	0	0	1	4		1	0	0	0	5

PCI – percutaneous coronary intervention, pPCI – primary PCI, Gp IIb/IIIa – IIb/IIIa glycoprotein inhibitors, DES – drug eluting stent, Cutting – cutting balloon dilatation, PTA – peripheral transluminal angioplasty, ASD – atrial septal defect, VSD – ventricular septal defect, PFO – persistent foramen ovale, MACE – major adverse cardiac events

**Table 2. Summarized data for Romania**

Nr. of Cath Labs	39
Independent operators	86
In training operators	54
Total number of coronary procedures	40594
Total number of PCI	13110
PCI without stents	897
PCI with stents	12211
Nr. of stents	16834
Multiple stenting procedures	4088
Multivascular procedures	3131
pPCI	5983
IIb/IIIa GpI	1245
Elective procedures	8044
Nr. of DES	5907
PTA	1123
Peripheral Angiography	6817
MACE	
Death	297
AMI	46
Stroke	39
Stent thrombosis	43
Major bleeding	93

PCI – percutaneous coronary intervention, pPCI – primary PCI, Gp IIb/IIIa – IIb/IIIa glycoprotein inhibitors, DES – drug eluting stent, PTA – peripheral transluminal angioplasty, MACE – major adverse cardiac events

**Table 3. Total number of PCI in Romania**

Procedures	2005	2010	2011	2012	2013	2014
PCI	5069	8065	10262	11249	11876	15000

quality data not feasible for the analysis. The improvements can be achieved through a sound evidence-based approach.

The progress of Romanian interventional cardiology from 2005 till 2015 is significant in terms of absolute number of angiography and PCI procedures as well as number of active cath lab centers. The registry can help monitor the activity of different cath labs, to identify country regions not well covered by STEMI program or with poor interventional facilities, to monitor the outcomes according to the volume of the center, number of operators and number of interventional cardiologists in training. In conclusion, implementation of a Mandatory Interventional Cardiology National Registry, capable of monitoring objectively these key health care services in a standard manner, can be the avenue

to guide further development of the interventional cardiology in Romania.

**Conflict of interest:** none declared.

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