

LESION CHARACTERISTICS

Sridhar Ganiga Srinivasaiah, Ahmad Syadi Mahmood, Chee Kok Han and Wan Azman Wan Ahmad
University Malaya Medical Centre, Kuala Lumpur

Summary

1. LAD remains the most commonly treated lesion, as reported in previous years.
2. Complex lesions (B2 and C) made up 59% of all PCIs with an increase in the rate of type C lesions compared to the previous years.
3. DES is the most commonly used stent (69.7%); its use increased compared to the previous years.
4. Most of ISR lesions were treated with drug-eluting balloon (DEB).
5. The rate of procedural complications remained low.
6. A significant increase in the number of LMS intervention (541 lesions) was reported in the 2013 – 2014 cohort compared to 2007–2012. Majority of the lesions were treated with DES (84.3%), and were interestingly followed by DEB (3.8%) and BMS (3.4%). The success rate was 98.5%.
7. Most of the graft PCIs was performed on SVG. When compared to the previous registry, the incidence of in-stent restenosis was slightly higher (10.8% vs. 9.0%), and the use of DEB in PCI to grafts had significantly increased in this cohort compared to the 2007 – 2012 cohort (15.7% vs. 9.8%).
8. Majority of CTO lesions were de novo lesions. Approximately half of the CTO PCI was performed via radial approach, however in the past radial approach was only 34.2%.

Anatomical location of lesions

A total of 19,392 lesions were treated from the years 2013 to 2014. LAD remained the most common location (48.1%) followed by RCA (31.2%) and left circumflex (16.9%). The proximal segment of each vessel (LAD/RCA/LCx) was the most frequently treated. [Table 4.1]

There was a slight increase in LMS lesion (2.8%), but a reduction in graft PCI (0.9%) compared to the previous years. The saphenous vein graft was the most commonly treated graft (0.8%). The comparison in lesion location between 2013 to 2014 and 2007 to 2012 did not show any significant difference. [Table 4.1.1]

Table 4.1 Summary of location of lesions treated with percutaneous coronary intervention, NCVD-PCI Registry, 2007 – 2014

Location of lesion	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
None	3	0.0	0	0	5	0	5	0
Left main stem	749	2.2	223	2.6	318	2.9	541	2.8
Left anterior descending artery (LAD)	16631	47.7	4120	48.4	5184	47.9	9304	48.1
LAD proximal	11604	33.3	2910	34.3	3567	33.0	6477	33.5
LAD mid	3626	10.4	895	10.5	1203	11.1	2098	10.9
LAD distal	520	1.5	148	1.7	202	1.9	350	1.8
D1	798	2.3	144	1.7	181	1.7	325	1.7
D2	72	0.2	20	0.2	26	0.2	46	0.2
D3	11	0.0	3	0	5	0	8	0
Right coronary artery (RCA)	10472	30.0	2722	31.9	3289	30.6	6011	31.2
RCA proximal	4655	13.3	1194	14.0	1513	14.1	2707	14.0
RCA mid	3351	9.6	845	9.9	984	9.1	1829	9.5
RCA distal	1848	5.3	512	6.0	568	5.3	1080	5.6
PDA	297	0.9	83	1.0	125	1.2	208	1.1
PLV	321	0.9	88	1.0	99	0.9	187	1.0
Left circumflex artery (LCx)	6370	18.3	1372	16.1	1915	17.7	3287	16.9
LCX proximal	2882	8.3	681	8.0	967	8.9	1648	8.5
LCX distal	2135	6.1	408	4.8	577	5.4	985	5.1
OM1	1060	3.0	229	2.7	299	2.8	528	2.7
OM2	229	0.7	42	0.5	58	0.5	100	0.5
OM3	64	0.2	12	0.1	14	0.1	26	0.1
Graft	481	1.3	75	0.9	91	0.8	166	0.9
Saphenous vein graft	423	1.2	68	0.8	81	0.7	149	0.8
Left internal mammary artery graft	51	0.1	5	0.1	10	0.1	15	0.1
Right internal mammary artery graft	3	0.0	0	0	0	0	0	0
Radial artery graft	4	0.0	2	0	0	0	2	0
Missing	167	0.5	5	0.1	10	0.1	15	0.1

Table 4.1.1 Comparison between 2007 – 2012 and 2013 – 2014 results

Location of lesion	2007 – 2012 Total no. of lesions = 34873		2013 – 2014 Total no. of lesions = 19329		p-value
	No.	%	No.	%	
Left main stem	749	2.2	541	2.8	0.492
Left anterior descending artery (LAD)	16631	47.7	9304	48.1	0.536
Right coronary artery (RCA)	10472	30.0	6011	31.2	0.107
Left circumflex artery (LCx)	6370	18.3	3287	16.9	0.089
Graft	481	1.3	166	0.9	0.683

Lesion characteristics

Of all lesions treated with PCI, 87.5% achieved TIMI III flow. [Table 4.5] A large majority of lesions treated were the de novo type (94.9%). The rate of PCI due to stent thrombosis remained low at 0.4% from 2007 – 2014. [Table 4.2] There was a reducing trend for in-stent restenosis intervention (4.2% in 2013 – 2014 vs. 4.7% in 2007 – 2012).

Complex lesions (Type B2 and C) made up 59.0% of all PCIs. There is an increase in the rate of Type C lesions compared to years 2007 to 2012. [Table 4.3]

Among the high-risk lesions, there appeared to be an increase in ostial and thrombotic PCIs and decrease in bifurcation and CTO PCIs. [Table 4.4] Calcified lesion PCI made up 6.0% of high risk PCI. [Table 4.4] There was an increase in LMS PCI. (2.8% vs. 2.2%). [Table 4.1]

Types of stents and devices used

Drug-eluting stent remained as the most used stent (69.7%), and its use increased compared to the previous years, 2007 to 2012 (58.8%). The use of bare-metal stents showed a gradual decrease in trend, however, they were still the second most used device (11.9%). There was also an increased use of bio-absorbable stents, combo stents, and drug-eluting balloons in 2013 – 2014. The use of bifurcated and covered stents were rare and combined constituted < 0.5% of stents. [Table 4.6]

POBA was only done in 12.9% of lesions treated and this was interestingly higher than years 2007 to 2012 (7.1%). Cutting balloon/scoring balloon and rotablator use were low at 1.4% and 0.9%, respectively. [Table 4.8]

The use of intravascular guided imaging PCI and physiological assessment (FFR) were low. The IVUS study was 2.7%, OCT was 0.8%, and FFR was 1.2%. [Table 4.8].

Lesion complication during PCI

The rate of complication was low with dissection occurring in 1.7% (non-flow limiting in 85.6%), no reflow in 0.6% (69.6% transient), and perforation in 0.3% of all treated lesions. The rate of dissection and no reflow, both showed decreasing trends compared to years 2007 to 2012, but perforation rate remained constant. [Table 4.9]

Table 4.2 Characteristics of lesions treated by PCI, NCVD-PCI Registry, 2007 – 2014

Types of lesions	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
De novo	32543	93.3	8066	94.7	10281	95.0	18347	94.9
Restenosis (no prior stent)	65	0.2	8	0.1	11	0.1	19	0.1
Stent thrombosis	147	0.4	45	0.5	40	0.4	85	0.4
In-stent restenosis	1618	4.7	366	4.3	438	4.1	804	4.2
Not available	284	0.8	32	0.4	42	0.4	74	0.4
Missing	216	0.6	0	0	0	0	0	0
Total	34873	100.0	8517	100.0	10812	100.0	19329	100.0

Table 4.3 Prevalence of lesions according to the American College of Cardiology (ACC) classifications, NCVD-PCI Registry, 2007 – 2014

Types of lesions	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
A	3926	11.2	991	11.6	1188	11.0	2179	11.2
B1	9102	26.1	2276	26.7	3215	29.7	5491	28.4
B2	8199	23.5	1299	15.3	1464	13.5	2763	14.3
C	12855	36.9	3846	45.2	4788	44.3	8634	44.7
Not available	591	1.7	105	1.2	157	1.5	262	1.4
Missing	200	0.6	0	0	0	0	0	0
Total	34873	100.0	8517	100.0	10812	100.0	19329	100.0

Table 4.4 Prevalence of high risk lesion type, NCVD-PCI Registry, 2007 – 2014

#Types of lesions	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Ostial	2361	6.8	604	7.1	831	7.7	1435	7.4
Bifurcation	3285	9.4	560	6.6	699	6.5	1259	6.5
Total occlusion	1617	4.6	523	6.1	617	5.7	1140	5.9
CTO > 3 mo	2626	7.5	550	6.5	735	6.8	1285	6.6
Thrombus	1080	3.1	467	5.5	618	5.7	1085	5.6
Calcified lesion			293	3.4	867	8.0	1160	6.0
LMS			162	1.9	263	2.4	425	2.2

[#]Patients were allowed to be in more than one type of category

Table 4.5 Comparison of TIMI flow grade by pre- and post-procedure, NCVD-PCI Registry, 2007 – 2014

TIMI Flow Grade	2007 – 2012 Total no. of lesions = 34873				2013 Total no. of lesions = 8517				2014 Total no. of lesions = 10812				2013 – 2014 Total no. of lesions = 19329			
	Pre-procedure		Post-procedure		Pre-procedure		Post-procedure		Pre-procedure		Post-procedure		Pre-procedure		Post-procedure	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
TIMI-0	4296	12.3	656	1.9	1177	13.8	154	1.9	1418	13.2	190	1.8	2595	13.4	344	1.8
TIMI-1	2493	7.2	129	0.4	928	10.9	45	0.5	625	5.8	40	0.4	1553	8.0	85	0.4
TIMI-2	6657	19.1	351	1.0	2386	28.0	149	1.7	2360	21.8	177	1.6	4746	24.6	326	1.7
TIMI-3	18770	53.8	31050	89.0	3260	38.3	7546	88.6	5147	47.6	9361	86.6	8407	43.5	16907	87.5
Not available	383	1.1	354	1.0	317	3.7	199	2.3	273	2.5	189	1.7	590	3.1	388	2.0
Missing	2274	6.5	2333	6.7	449	5.3	424	5.0	989	9.1	855	7.9	1438	7.4	1279	6.6
Total	34873	100.0	34873	100.0	8517	100.0	8517	100.0	10812	100.0	10812	100.0	19329	100.0	19329	100.0

Table 4.6 Types of stents used, NCVD-PCI Registry, 2007 – 2014

Types of stents	2007 – 2012 Total no. of stents used = 43839		2013 Total no. of stents used = 10415		2014 Total no. of stents used = 13123		2013 – 2014 Total no. of stents used = 23538	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent	25786	58.8	7229	69.4	9183	69.9	16412	69.7
Bare metal stent	10354	23.6	1613	15.5	1189	9.1	2802	11.9
Bio-absorbable stent	37	0.1	90	0.9	204	1.6	294	1.2
Antibody-coated stent	629	1.5	28	0.3	20	0.2	48	0.2
Others	2812	6.4	160	1.5	130	0.9	290	1.2
Drug-eluting balloon	0	0	518	4.9	1054	8	1572	6.7
Bifurcated stent	0	0	42	0.4	28	0.2	70	0.3
Covered stent	13	0.0	0	0	23	0.2	23	0.1
Combo stent	0	0	226	2.2	665	5.1	891	3.9
Missing	4208	9.6	509	4.9	627	4.8	1136	4.8
Total	43839	100.0	10415	100.0	13123	100.0	23538	100.0

Table 4.7 Lesion characteristics for patients who underwent PCI, NCVD-PCI Registry, 2007 – 2014

	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Pre-procedure stenosis, %								
N	32953		8039		10386		18425	
Mean (SD)	84.8 (12.2)		86.7 (12.0)		86.5 (11.4)		86.6 (11.7)	
Median (min, max)	90.0 (0.0, 100.0)		90.0 (0.0, 100.0)		90.0 (0.0, 100.0)		90.0 (0.0, 100.0)	
Missing, No. (%)	1920	5.5	478	5.6	426	3.9	904	4.7
Post-procedure stenosis, %								
N	31566		8070		10459		18529	
Mean (SD)	4.3 (18.4)		4.2 (18.0)		4.2 (17.8)		4.2 (17.9)	
Median (min, max)	0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)	
Missing, No. (%)	3307	9.5	447	5.2	353	3.3	800	4.1
Estimated lesion length, mm								
N	31733		7845		10029		17874	
Mean (SD)	23.6 (14.2)		24.7 (15.7)		25.9 (15.8)		25.4 (15.7)	
Median (min, max)	20.0 (1.0, 142.0)		20.0 (1.0, 129.0)		21.0 (2.0, 131.0)		20.0 (1.0, 131.0)	
Missing, No. (%)	3140	9.0	672	7.9	783	7.2	1455	7.5
Lesion result, No. (%)								
Successful	33515	96.1	8245	96.8	10424	96.4	18669	96.6
Unsuccessful	1094	3.1	256	3.0	344	3.2	600	3.1
Not available	37	0.1	16	0.2	44	0.4	60	0.3
Missing	227	0.7	0	0	0	0	0	0
*Stent length, mm								
N	30445		7699		9879		17578	
Mean (SD)	29.4 (16.7)		29.8 (17.0)		30.5 (16.9)		30.2 (16.9)	
Median (min, max)	24.0 (8.0, 166.0)		24.0 (8.0, 140.0)		26.0 (8.0, 167.0)		25.0 (8.0, 167.0)	
Not available, No. (%)	4428	12.7	818	9.6	933	8.6	1751	9.1
**Stent diameter, mm								
N	30329		7695		9867		17562	
Mean (SD)	3.0 (0.4)		2.9 (0.4)		2.9 (0.4)		2.9 (0.4)	
Median (min, max)	3.0 (2.0, 7.0)		3.0 (2.0, 5.8)		3.0 (2.0, 5.0)		3.0 (2.0, 5.8)	
Not available, No. (%)	4544	13.0	822	9.7	945	8.7	1767	9.1

	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Maximum balloon size used, mm								
N	31663		7729		10029		17758	
Mean (SD)	3.1 (0.6)		3.0 (0.6)		3.1 (0.6)		3.0 (0.6)	
Median (min, max)	3.0 (1.0, 6.0)		3.0 (1.0, 6.0)		3.0 (1.0, 5.2)		3.0 (1.0, 6.0)	
Missing, No. (%)	3210	9.2	788	9.3	783	7.2	1571	8.1
Maximum stent/balloon deploy pressure, atm								
N	31552		7662		9909		17571	
Mean (SD)	15.7 (4.0)		15.8 (4.2)		15.7 (4.5)		15.7 (4.4)	
Median (min, max)	16.0 (1.0, 30.0)		16.0 (1.0, 40.0)		16.0 (1.0, 40.0)		16.0 (1.0, 40.0)	
Missing, No. (%)	3321	9.5	855	10.0	903	8.4	1758	9.1
Direct stenting, No. (%)								
Yes	4147	11.9	650	7.6	752	7.0	1402	7.3
No	29149	83.6	7453	87.5	9932	91.9	17385	89.9
Not applicable	1375	3.9	414	4.9	128	1.2	542	2.8
Missing	202	0.6	0	0	0	0	0	0
Other adjunctive procedure, No. (%)								
Yes			171	2.0	233	2.2	404	2.1
IABP								
Ventilator			42	24.6	90	38.6	132	32.7
Temporary cardiac pacing wire			36	21.1	43	18.5	79	19.6
No			6135	72.0	10367	95.8	16502	85.3
Not applicable			272	3.2	30	0.3	302	1.6
Missing			1939	22.8	182	1.7	2121	11.0

*Summation of stent length was used for lesions which were treated with more than one stent

**Average of stent diameter was used for lesions which were treated with more than one stent

Table 4.8 Types of devices used during percutaneous coronary intervention, NCVI-PCI Registry, 2007 – 2014

#Intracoronary devices	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Aspiration/aspiration catheter	523	1.5	478	5.6	628	5.8	1106	5.7
Balloon only/POBA	2490	7.1	884	10.4	1608	14.9	2492	12.9
Drug-eluting balloon	1674	4.8	528	6.2	929	8.6	1457	7.5
Drug-eluting stent	20370	58.4	5677	66.7	7321	67.7	12998	67.2
Cutting balloon/scoring balloon	645	1.8	120	1.4	159	1.5	279	1.4
Coil			15	0.2	4	0	19	0.1
OCT			51	0.6	110	1.0	161	0.8
Mother and child			8	0.1	15	0.1	23	0.1
Micro catheter			348	4.1	536	5.0	884	4.6
Angiojet			7	0.1	19	0.2	26	0.1
IVUS	1248	3.6	258	3.0	258	2.4	516	2.7
Flowire/FFR	78	0.2	100	1.2	132	1.2	232	1.2
Rotablator	309	0.9	81	1.0	101	0.9	182	0.9
Bare metal stent	9716	27.9	1420	16.7	1034	9.6	2454	12.7
Embolic protection	140	0.4	22	0.3	9	0.1	31	0.2
Filter			5	83.3	5	100	10	90.9
Balloon/distal			0	0	0	0	0	0
Proximal			1	16.7	0	0	1	9.1
Missing			16		4		20	
Others	1795	5.1	1260	14.8	482	4.5	1742	9.0

#Patients were allowed to be in more than one type of category

Table 4.9 Types of post-procedure complications, NCVD-PCI Registry, 2007 – 2014

*Types of post-procedure complications	2007 – 2012 Total no. of lesions = 34873		2013 Total no. of lesions = 8517		2014 Total no. of lesions = 10812		2013 – 2014 Total no. of lesions = 19329	
	No.	%	No.	%	No.	%	No.	%
Dissection	1102	3.2	155	1.8	169	1.6	324	1.7
Flow limiting			22	16.3	20	12.8	42	14.4
Non-flow limiting			113	83.7	136	87.2	249	85.6
Not available			9		13		22	
Missing			11		0		11	
No reflow	368	1.1	64	0.8	56	0.5	120	0.6
Transient	265	78.2	43	69.4	35	70.0	78	69.6
Persistent	74	21.8	19	30.6	15	30.0	34	30.4
Not available	20		2		6		8	
Missing	9		0		0		0	
Acute closure	95	0.3						
Perforation	94	0.3	23	0.3	26	0.2	49	0.3

*Results are only showed for patients who were reported to have the complications

In-stent restenosis (ISR)

A total of 804 ISR lesions were treated in 2013 to 2014. [Table 4.2] Of these, 24.1% were presented with acute coronary syndrome (ACS). [Table 4.10]

Drug-eluting balloon was the most frequently used treatment (57.6%), followed by drug-eluting stents (31%), POBA (23.6%), and cutting/scoring balloon (12.6%). [Table 4.11 and Table 4.12] The IVUS was used in 10.4% when treating ISR. The use of other types of treatment modalities were infrequent. There was a gradual decrease in DES used in ISR. [Table 4.11]

The complication rate during the treatment of ISR was very low. Dissection occurred in 1.4% and no-reflow in 0.1%. [Table 4.13]

Table 4.10 Acute coronary syndrome status of in-stent restenosis percutaneous coronary intervention, NCVD-PCI Registry, 2007 – 2014

Types of prior stents used in ISR	2007 – 2012 Total no. of lesions = 1618		2013 Total no. of lesions = 366		2014 Total no. of lesions = 438		2013 – 2014 Total no. of lesions = 804	
	No.	%	No.	%	No.	%	No.	%
Acute coronary syndrome, No. (%)								
Yes	541	33.5	85	23.2	109	24.9	194	24.1
No	1070	66.1	281	76.8	329	75.1	610	75.9
Missing	7	0.4	0	0	0	0	0	0
ACS type, No. (%)								
STEMI	203	37.6	23	27.7	36	33.4	59	30.9
NSTEMI	236	43.7	22	26.5	36	33.3	58	30.4
UA	101	18.7	38	45.8	36	33.3	74	38.7
Not available	1		2		1		3	
Missing	0		0		0		0	
STEMI, No. (%)								
Anterior			16	76.2	23	67.6	39	70.9
Non-anterior			5	23.8	11	32.4	16	29.1
Not available			2		2		4	
Missing			0		0		0	
Total	1618	100.0	366	100.0	438	100.0	804	100.0

Table 4.11 Types of stents used in the in-stent restenosis, NCVD-PCI Registry, 2007 – 2014

Types of stents used in the ISR	2007 – 2012 Total no. of stents used = 1859		2013 Total no. of stents used = 360		2014 Total no. of stents used = 507		2013 – 2014 Total no. of stents used = 867	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent	804	43.2	142	39.4	159	31.4	301	34.7
Bare metal stent	128	6.9	12	3.4	10	2	22	2.5
Bio-absorbable stent	1	0.1	0	0	1	0.2	1	0.1
Antibody-coated stent	5	0.3	0	0	0	0	0	0
Others	84	4.5	1	0.3	3	0.6	4	0.5
Drug-eluting balloon	0	0	197	54.7	314	61.9	511	59.0
Bifurcated stent	0	0	0	0	1	0.2	1	0.1
Covered stent	2	0.1	0	0	0	0	0	0
Combo stent	0	0	3	0.8	8	1.5	11	1.3
Missing	835	44.9	5	1.4	11	2.2	16	1.8
Total	1859	100.0	360	100.0	507	100.0	867	100.0

Table 4.12 Types of devices used in the in-stent restenosis, NCVD-PCI Registry, 2007 – 2014

#Intracoronary devices used in ISR	2007 – 2012 Total no. of lesions = 1618		2013 Total no. of lesions = 366		2014 Total no. of lesions = 438		2013 – 2014 Total no. of lesions = 804	
	No.	%	No.	%	No.	%	No.	%
Aspiration/aspiration catheter	17	1.1	10	2.7	14	3.2	24	3.0
Balloon only/POBA	382	23.6	92	25.1	98	22.4	190	23.6
Drug-eluting balloon	483	29.9	195	53.3	268	61.2	463	57.6
Drug-eluting stent	613	37.9	120	32.8	129	29.5	249	31.0
Cutting balloon/scoring balloon	290	17.9	46	12.6	55	12.6	101	12.6
Coil			1	0.3	0	0	1	0.1
OCT			10	2.7	10	2.3	20	2.5
Mother and child			0	0	0	0	0	0
Micro catheter			21	5.7	33	7.5	54	6.7
Angiojet			0	0	0	0	0	0
IVUS	315	19.5	45	12.3	39	8.9	84	10.4
Flowire/FFR	4	0.2	3	0.8	9	2.1	12	1.5
Rotablator	10	0.6	3	0.8	0	0	3	0.4
Bare metal stent	107	6.6	10	2.7	10	2.3	20	2.5
Embolic protection	7	0.4	0	0	1	0.2	1	0.1
Filter			0	0	0	0	0	0
Balloon/distal			0	0	0	0	0	0
Proximal			0	0	0	0	0	0
Missing			0		1		1	
Others	68	4.2	39	10.7	17	3.9	56	7.0

*Patients were allowed to be in more than one type of category

Table 4.13 Types of complications in post in-stent restenosis, NCVD-PCI Registry, 2007 – 2014

*Types of complications in ISR	2007 – 2012 Total no. of lesions = 1618		2013 Total no. of lesions = 366		2014 Total no. of lesions = 438		2013 – 2014 Total no. of lesions = 804	
	No.	%	No.	%	No.	%	No.	%
Dissection	36	2.2	1	0.3	10	2.3	11	1.4
Flow limiting			0	0	1	10.0	1	9.1
Non-flow limiting			1	100	9	90.0	10	90.9
Not available			0		0		0	
Missing			0		0		0	
No reflow	11	0.7	0	0	1	0.2	1	0.1
Transient	10	90.9	0	0	0	0	0	0
Persistent	1	9.1	0	0	0	0	0	0
Not available	0		0		1		1	
Missing	0		0		0		0	
Acute closure	2	0.1						
Perforation	9	0.6	0	0	0	0	0	0

*Results are only showed for patients with the complications

PCI of left main stem (LMS)

From 2013 to 2014, a total of 541 LMS interventions were performed. [Table 4.1] Most were de novo lesions and 5.2% were in-stent restenosis. [Table 4.14] From 2007 – 2012, the number of LMS PCI performed were 749, however in this 2013 – 2014 cohort, there was a significant increase in the number of LMS PCIs. [Table 4.1.1]

Majority of LMS interventions were performed on unprotected LMS, and this was almost similar to the 2007 – 2012 cohort; only 12.8% had history of previous coronary artery bypass (CABG) surgery. [Table 4.15]

For LMS PCI, the use of femoral artery route was more common (70.4%) than non LMS intervention. [Table 4.15]

Majority of LMS interventions were elective cases (77.3%), followed by NSTEMI/UA (11.8%) and STEMI (10.9%). [Table 4.15] Among the STEMI group, 46% had primary PCI, followed by 41.1% rescue PCI and the rest were delayed PCI. There was an increasing trend of LMS PCI in the ACS setting compared to the 2007 – 2012 cohort. [Table 4.15]

In 2007 – 2012, the mean pre-procedure stenosis was 80.9% with TIMI III flow in 57.8%; the mean lesion length was 27.1 mm. The present cohort (2013 – 2014) shows that we were treating more complex lesions (severe stenosis and longer lesions) with mean pre-procedure stenosis of 83% (SD 13.2) with TIMI III flow in only 39.9% cases; the mean lesion length was 28.7 mm. Post procedure results were excellent showing 91.6% achieving TIMI III flow and less than 1% with TIMI 0 to TIMI I flow. [Table 4.15 and Table 4.16]

Majority of the lesions were treated with DES (84.3%), and interestingly were followed by DEB (3.8%) and BMS (3.4%); the rest were treated with various other stents (Combo, Bio-absorbable etc). [Table 4.17] The mean stent length and diameter were 34.0 mm (SD 20.5 mm) and 3.3 mm (SD 0.4 mm), respectively. Conventional pre-dilatation followed by stenting was the preferred choice, however, direct stenting was also observed in 6.7%. [Table 4.15]

Despite dealing with more complex lesions compared to the past, the use of IVUS had become increasingly uncommon (27.1%, 2007 – 2012 vs. 20%, 2013 – 2014). [Table 4.18] However, the success rate was 98.5%, with very few complications like dissection (3%). Most of the dissections were non-flow limiting, and no reflow was observed in 0.9%. [Table 4.15 and Table 4.19]

About 84.5% of patients received DAPT for 12 months. The use of DAPT for more than 12 months was observed in only 4.8% vs. 25.2% (2007 – 2012); this significant reduction could be due to newer generation stents with more promising evidence. [Table 4.20]

Table 4.14 Types of lesions in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

Types of lesion in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
De novo	693	92.5	208	93.4	298	93.7	506	93.5
Restenosis (no prior stent)	3	0.4	1	0.4	0	0	1	0.2
Stent thrombosis	2	0.3	1	0.4	4	1.3	5	0.9
In-stent restenosis	48	6.4	13	5.8	15	4.7	28	5.2
Previous DES	31	75.6	6	85.7	7	87.5	13	86.7
Previous BMS	10	24.4	1	14.3	1	12.5	2	13.3
Previous others	0	0	0	0	0	0	0	0
Not available	6		6		7		13	
Missing	1		0		0		0	
Not available	1	0.1	0	0	1	0.3	1	0.2
Missing	2	0.3	0	0	0	0	0	0
Total	749	100.0	223	100.0	318	100.0	541	100.0

Table 4.15 Clinical presentation of left main stem, NCVD-PCI Registry, 2007 – 2014

Clinical presentation in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
Acute coronary syndrome, No. (%)								
Total	241	100	59	100	98	100	157	100
STEMI	116	48.1	24	40.7	48	49.0	72	45.9
NSTEMI	95	39.4	19	32.2	27	27.6	46	29.3
UA	28	11.6	16	27.1	22	22.4	38	24.2
Not available	2	0.9	0	0	1	1.0	1	0.6
Missing								
Previous PCI, No. (%)								
Yes	210	28.0	74	33.2	111	34.9	185	34.2
No	539	72.0	149	66.8	207	65.1	356	65.8
Missing	0	0	0	0	0	0	0	0
Not available								
Previous CABG, No. (%)								
Yes	94	12.6	36	16.1	33	10.4	69	12.8
No	655	87.4	187	83.9	285	89.6	472	87.2
Missing	0	0	0	0	0	0	0	0
Not available								

Clinical presentation in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
PCI status, No. (%)								
Elective	666	88.9	179	80.2	239	75.1	418	77.3
NSTEMI/UA	40	5.4	24	10.8	40	12.6	64	11.8
AMI/STEMI	42	5.6	20	9.0	39	12.3	59	10.9
Not available	1	0.1	0	0	0	0	0	0
Missing	0	0	0	0	0	0	0	0
Elective, No. (%)								
Staged PCI			77	43.3	121	50.8	198	47.6
Ad hoc			101	56.7	117	49.2	218	52.4
Not available			1		1		2	
Missing			0		0		0	
NSTEMI/UA, No. (%)								
Urgent			4	16.7	14	35.9	18	28.6
Non-urgent			20	83.3	25	64.1	45	71.4
Not available			0		1		1	
Missing			0		0		0	
STEMI, No. (%)								
Rescue			7	41.2	16	41.0	23	41.1
Primary			7	41.2	19	48.7	26	46.3
Facilitated			0	0	0	0	0	0
Delayed PCI			0	0	0	0	0	0
Delayed routine PCI			1	5.9	2	5.1	3	5.4
Delayed selective PCI			2	11.7	1	2.6	3	5.4
Pharmacoinvasive			0	0	1	2.6	1	1.8
Not available			3		0		3	
#Percutaneous entry, No. (%)								
Brachial	3	0.4	1	0.4	0	0	1	0.2
Radial	184	24.6	79	35.4	107	33.6	186	34.4
Femoral	539	72.0	149	66.8	232	73.0	381	70.4
Pre-procedure % of stenosis								
N	693		202		302		504	
Mean (SD)	80.9 (14.6)		81.9 (14.4)		83.7 (12.3)		83.0 (13.2)	
Median (min, max)	80.0 (0.0, 100.0)		80.0 (0.0, 100.0)		85.0 (30.0, 100.0)		85.0 (0.0, 100.0)	
Missing, No. (%)	56	7.5	21	9.4	16	5.0	37	6.8

Clinical presentation in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
Pre-procedure TIMI flow, No. (%)								
TIMI-0	67	8.9	15	6.7	24	7.5	39	7.2
TIMI-1	44	5.9	25	11.2	16	5.0	41	7.6
TIMI-2	149	19.9	87	39.1	99	31.1	186	34.4
TIMI-3	433	57.8	73	32.7	143	45.1	216	39.9
Not available	4	0.5	10	4.5	5	1.6	15	2.8
Missing	52	7.0	13	5.8	31	9.7	44	8.1
Post-procedure % of stenosis								
N	660		205		311		516	
Mean (SD)	2.0 (10.6)		3.2 (14.8)		2.2 (12.4)		2.6 (13.4)	
Median (min, max)	0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)	
Missing, No. (%)	89	11.9	18	8.1	7	2.2	25	4.6
Post-procedure TIMI flow, No. (%)								
TIMI-0	7	0.9	1	0.4	1	0.3	2	0.4
TIMI-1	4	0.5	1	0.4	1	0.3	2	0.4
TIMI-2	7	0.9	4	1.8	5	1.6	9	1.7
TIMI-3	672	89.7	206	92.5	290	91.2	496	91.6
Not available	5	0.7	4	1.8	0	0	4	0.7
Missing	54	7.3	7	3.1	21	6.6	28	5.2
Estimated lesion length, mm								
N	673		210		302		512	
Mean (SD)	27.1 (17.5)		26.9 (20.1)		29.9 (19.6)		28.7 (19.8)	
Median (min, max)	20.0 (4.0, 90.0)		20.0 (3.0, 98.0)		24.0 (4.0, 100.0)		21.0 (3.0, 100.0)	
Missing, No. (%)	76	10.1	13	5.8	16	5.0	29	5.4
Lesion result, No. (%)								
Successful	737	98.4	220	98.7	313	98.4	533	98.5
Unsuccessful	11	1.5	3	1.3	5	1.6	8	1.5
Not available	0	0	0	0	0	0	0	0
Missing	1	0.1	0	0	0	0	0	0
*Stent length, mm								
N	692		209		307		516	
Mean (SD)	33.6 (20.1)		32.6 (21.0)		35.0 (20.2)		34.0 (20.5)	
Median (min, max)	28.0 (8.0, 108.0)		24.0 (8.0, 107.0)		29.0 (8.0, 102.0)		28.0 (8.0, 107.0)	
Not available, No. (%)	76	10.1	13	5.8	16	5.0	29	5.4

Clinical presentation in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
**Stent diameter, mm								
N	693		210		307		517	
Mean (SD)	3.3 (0.5)		3.3 (0.4)		3.3 (0.4)		3.3 (0.4)	
Median (min, max)	3.4 (2.3, 4.5)		3.3 (2.4, 4.5)		3.3 (2.3, 4.5)		3.3 (2.3, 4.5)	
Not available, No. (%)	56	7.5	13	5.8	11	3.5	24	4.4
Direct stenting, No. (%)								
Yes	60	8.0	17	7.6	19	6.0	36	6.7
No	674	90.0	195	87.5	297	93.4	492	90.9
Not applicable	15	2.0	11	4.9	2	0.6	13	2.4
Missing	0	0	0	0	0	0	0	0

*Patients were allowed to be in more than one type of category

*Summation of stent length was used for lesions which were treated with more than one stent

**Average of stent diameter was used for lesions which were treated with more than one stent

Table 4.16 TIMI flow prior to intervention in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

TIMI flow prior to intervention in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
TIMI-0	67	8.9	15	6.7	24	7.5	39	7.2
TIMI-1	44	5.9	25	11.2	16	5.0	41	7.6
TIMI-2	149	19.9	87	39.1	99	31.1	186	34.4
TIMI-3	433	57.8	73	32.7	143	45.1	216	39.9
Not available	4	0.5	10	4.5	5	1.6	15	2.8
Missing	52	7.0	13	5.8	31	9.7	44	8.1
Total	749	100.0	223	100.0	318	100.0	541	100.0

Table 4.17 Types of stents used in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

Types of stent used in left main stem procedure	2007 – 2012 Total no. of stents used = 1095		2013 Total no. of stents used = 300		2014 Total no. of stents used = 459		2013 – 2014 Total no. of stents used = 759	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent	882	80.5	259	86.3	380	82.9	639	84.3
Bare metal stent	93	8.5	8	2.7	18	3.9	26	3.4
Bio-absorbable stent	0	0	0	0	1	0.2	1	0.1
Antibody-coated	15	1.4	0	0	1	0.2	1	0.1
Others	46	4.2	2	0.7	2	0.4	4	0.5
Drug-eluting balloon	0	0	10	3.3	19	4.1	29	3.8
Bifurcated stent	0	0	2	0.6	0	0	2	0.3
Covered stent	4	0.4	0	0	1	0.2	1	0.1
Combo stent	0	0	14	4.7	31	6.8	45	6.0
Missing	55	5.0	5	1.7	6	1.3	11	1.4
Total	1095	100.0	300	100.0	459	100.0	759	100.0

*Stents which were not listed in the NCVD-PCI Stent List

Table 4.18 Types of devices used in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

# Intracoronary devices used in left main stem procedure	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
Aspiration/aspiration catheter	5	0.7	4	1.8	17	5.3	21	3.9
Balloon only/POBA	29	3.9	17	7.6	27	8.5	44	8.1
Drug-eluting balloon	49	6.5	13	5.8	16	5.0	29	5.4
Drug-eluting stent	613	81.8	187	83.9	257	80.8	444	82.1
Cutting balloon/scoring balloon	23	3.1	5	2.2	5	1.6	10	1.8
Coil			0	0	1	0.3	1	0.2
OCT			9	4.0	14	4.4	23	4.3
Mother and child			2	0.9	0	0	2	0.4
Micro catheter			15	6.7	21	6.6	36	6.7
Angiojet			0	0	0	0	0	0
IVUS	203	27.1	53	23.8	55	17.3	108	20.0
Flowire/FFR	1	0.1	5	2.2	2	0.6	7	1.3
Rotablator	36	4.8	14	6.3	16	5.0	30	5.5
Bare metal stent	78	10.4	8	3.6	14	4.4	22	4.1
Embolic protection	3	0.4	1	0.4	0	0	1	0.2
Others	30	4.0	16	7.2	16	5.0	32	5.9

#Patients were allowed to be in more than one type of category

Table 4.19 Types of complications in post left main stem, NCVD-PCI Registry, 2007 – 2014

Types of complications	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
#Types of complications								
Dissection	56	7.5	9	4.0	7	2.2	16	3.0
<i>Flow limiting</i>			2	28.6	2	28.6	4	28.6
<i>Non-flow limiting</i>			5	71.4	5	71.4	10	71.4
<i>Not available</i>			1		0		1	
<i>Missing</i>			1		0		1	
No reflow	11	1.5	2	0.9	3	0.9	5	0.9
<i>Transient</i>	8	72.7	1	50.0	0	0	1	20.0
<i>Persistent</i>	3	27.3	1	50.0	3	100	4	80.0
<i>Not available</i>	0		0		0		0	
<i>Missing</i>	0		0		0		0	
Acute closure	2	0.3						
Perforation	6	0.8	1	0.4	0	0	1	0.2

#Patients were allowed to be in more than one type of category

Table 4.20 Planned duration of dual antiplatelet therapy in left main stem procedure, NCVD-PCI Registry, 2007 – 2014

Planned duration of dual antiplatelet therapy in left main stem procedure (months)	2007 – 2012 Total no. of lesions = 749		2013 Total no. of lesions = 223		2014 Total no. of lesions = 318		2013 – 2014 Total no. of lesions = 541	
	No.	%	No.	%	No.	%	No.	%
1	29	3.9	4	1.9	13	4.2	17	3.1
3	23	3.1	3	1.3	3	0.9	6	1.1
6	23	3.1	3	1.3	9	2.8	12	2.2
12	442	59.0	179	80.3	278	87.4	457	84.5
> 12	189	25.2	25	11.2	1	0.3	26	4.8
Not available	31	4.1	8	3.6	13	4.1	21	3.9
Missing	12	1.6	1	0.4	1	0.3	2	0.4
Total	749	100.0	223	100.0	318	100.0	541	100.0

PCI to the grafts

From 2013 to 2014, a total of 166 bypass graft PCIs were performed; 89.7% were on SVG, 9.1% on LIMA and the rest were on radial grafts. [Table 4.22] Most graft PCIs were de novo lesions (89.2%), but there was a slightly higher incidence of in-stent restenosis (10.8% in 2013 – 2014 vs. 9.0% in 2007 – 2012). [Table 4.21]

The mean lesion length was 20.1 mm with a TIMI III flow in only 25.9% of lesions. [Table 4.22] Most of the lesions were stented with a DES (63.9%), followed by DEB (15.7%), BMS (12.0%), and POBA only (6%); embolic protection device was used in only 8.4%. [Table 4.22 and Table 4.23]

When compared to the 2007 – 2012 cohort, the use of DEB in graft PCI had significantly increased in 2013 – 2014 (9.8% vs. 15.7%); however, the use of embolic protection device reduced (20.0% vs. 8.4%). [Table 4.22 and Table 4.23] Successful PCI with TIMI III flow was achieved in 92.2%, with a mean stent length and diameter of 24.5 mm (SD 13.3 mm) and 3.0 mm (SD 0.6 mm), respectively. [Table 4.22] No major complications were reported. [Table 4.24]

Long term DAPT was still the preferred choice, with 83.1% receiving DAPT for 12 months. [Table 4.25]

Table 4.21 Lesion types in graft PCI, NCVVD-PCI Registry, 2007 – 2014

Lesion type in graft PCI	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
De novo	428	89.0	66	88.0	82	90.1	148	89.2
Restenosis (no prior stent)	4	0.8	0	0	0	0	0	0
Stent thrombosis	0	0	0	0	0	0	0	0
In-stent restenosis	43	9.0	9	12.0	9	9.9	18	10.8
Not available	3	0.6	0	0	0	0	0	0
Missing	3	0.6	0	0	0	0	0	0
Total	481	100.0	75	100.0	91	100.0	166	100.0

Table 4.22 Clinical presentation of graft PCI, NCVD-PCI Registry, 2007 – 2014

	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
Graft, No. (%)								
18 LIMA	51	10.6	5	6.7	10	11.0	15	9.1
19 RIMA	3	0.6	0	0	0	0	0	0
20 SVG1	343	71.3	63	84.1	72	79.1	135	81.3
21 SVG2	61	12.7	4	5.3	7	7.7	11	6.6
22 SVG3	19	4.0	1	1.3	2	2.2	3	1.8
23 RAD1	3	0.6	1	1.3	0	0	1	0.6
24 RAD2	0	0	0	0	0	0	0	0
25 RAD3	1	0.2	1	1.3	0	0	1	0.6
Pre-procedure stenosis %								
N	445		67		83		150	
Mean (SD)	84.0 (12.4)		87.4 (11.3)		85.2 (11.0)		86.2 (11.1)	
Median (min, max)	90.0 (20.0, 100.0)		90.0 (50.0, 100.0)		85.0 (60.0, 100.0)		90.0 (50.0, 100.0)	
Missing, No. (%)	36	7.5	8	10.7	8	8.8	16	9.6
Post-procedure stenosis %								
N	418		68		86		154	
Mean (SD)	2.7 (13.0)		2.1 (12.3)		5.3 (20.5)		3.9 (17.4)	
Median (min, max)	0.0 (0.0, 100.0)		0.0 (0.0, 99.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)	
Missing, No. (%)	63	13.1	7	9.3	5	5.5	12	7.2
Estimated lesion length, mm								
N	436		71		83		154	
Mean (SD)	19.8 (12.0)		19.6 (14.7)		20.5 (10.9)		20.1 (12.7)	
Median (min, max)	16.0 (5.0, 90.0)		14.0 (5.0, 90.0)		17.0 (5.0, 72.0)		16.0 (5.0, 90.0)	
Missing, No. (%)	45	9.4	4	5.3	8	8.8	12	7.2
Lesion result, No. (%)								
Successful	469	97.5	74	98.7	87	95.6	161	97.0
Unsuccessful	10	2.1	1	1.3	4	4.4	5	3.0
Not available	0	0	0	0	0	0	0	0
Missing	2	0.4	0	0	0	0	0	0

	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
*Stent length, mm								
N	408		70		85		155	
Mean (SD)	25.5 (15.3)		23.8 (14.9)		25.2 (11.9)		24.5 (13.3)	
Median (min, max)	18.0 (8.0, 127.0)		18.0 (9.0, 98.0)		22.0 (10.0, 80.0)		20.0 (9.0, 98.0)	
Not available, No. (%)	73	15.2	5	6.7	6	6.6	11	6.6
**Stent diameter, mm								
N	406		70		85		155	
Mean (SD)	3.1 (0.6)		3.0 (0.6)		3.1 (0.6)		3.0 (0.6)	
Median (min, max)	3.0 (2.3, 7.0)		3.0 (2.3, 4.5)		3.0 (2.0, 4.5)		3.0 (2.0, 4.5)	
Not available, No. (%)	75	15.6	5	6.7	6	6.6	11	6.6
#Other intracoronary devices used, No. (%)								
Aspiration/aspiration catheter	17	3.5	6	8.0	3	3.3	9	5.4
Balloon only/POBA	32	6.7	6	8.0	4	4.4	10	6.0
Drug-eluting balloon	47	9.8	8	10.7	18	19.8	26	15.7
Drug-eluting stent	278	57.8	48	64.0	58	63.7	106	63.9
Cutting balloon/scoring balloon	6	1.2	1	1.3	1	1.1	2	1.2
Coil			0	0	0	0	0	0
OCT			1	1.3	0	0	1	0.6
Mother and child			0	0	1	1.1	1	0.6
Micro catheter			2	2.7	2	2.2	4	2.4
Angiojet			0	0	0	0	0	0
IVUS	9	1.9	2	2.7	0	0	2	1.2
Flowire/FFR	2	0.4	0	0	0	0	0	0
Rotablator	0	0	1	1.3	0	0	1	0.6
Bare metal stent	119	24.7	15	20.0	5	5.5	20	12.0
Embolic protection	96	20.0	8	10.7	6	6.6	14	8.4
Others	25	5.2	4	5.3	0	0	4	2.4
Embolic protection status, No. (%)								
Filter	91	97.8	1	100	5	100	6	100
Balloon/distal	2	2.2	0	0	0	0	0	0
Proximal	0	0	0	0	0	0	0	0
Not available	0		7		1		8	
Missing	3		0		0		0	

	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
Direct stenting, No. (%)								
Yes	78	16.2	10	13.3	9	9.9	19	11.4
No	392	81.5	64	85.4	82	90.1	146	88.0
Not applicable	10	2.1	1	1.3	0	0	1	0.6
Missing	1	0.2	0	0	0	0	0	0

#Patients were allowed to be in more than one type of category

**Summation of stent length was used for lesions which were treated with more than one stent*

***Average of stent diameter was used for lesions which were treated with more than one stent*

Table 4.23 Types of stents used in graft PCI, NCVD-PCI Registry, 2007 – 2014

Types of stent used in graft PCI	2007 – 2012 Total no. of stents used = 579		2013 Total no. of stents used = 450		2014 Total no. of stents used = 546		2013 – 2014 Total no. of stents used = 996	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent (DES)	348	60.1	57	12.7	69	12.6	126	12.7
Bare metal stent (BMS)	143	24.7	18	4.0	6	1.1	24	2.4
Bio-absorbable stent	0	0	1	0.2	0	0	1	0.1
Antibody-coated stent	10	1.7	0	0	0	0	0	0
Others	6	1.0	0	0	0	0	0	0
Drug-eluting balloon	0	0	8	1.8	18	3.3	26	2.6
Bifurcated stent	0	0	0	0	0	0	0	0
Covered stent	0	0	0	0	2	0.4	2	0.2
Combo stent	0	0	4	0.9	7	1.3	11	1.1
Missing	72	12.5	362	80.4	444	81.3	806	80.9
Total	579	100.0	450	100.0	546	100.0	996	100.0

**Stents which were not listed in the NCVD-PCI Stent List*

Table 4.24 Types of complications in graft PCI, NCVD-PCI Registry, 2007 – 2014

Types of complications	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
Dissection	8	1.7	1	1.3	0	0	1	0.6
<i>Flow limiting</i>			0	0	0	0	0	0
<i>Non-flow limiting</i>			1	100	0	0	1	100
<i>Not available</i>			0		0		0	
<i>Missing</i>			0		0		0	
No reflow	4	0.8	0		0		0	
<i>Transient</i>	3	75.0						
<i>Persistent</i>	1	25.0						
<i>Not available</i>	0							
<i>Missing</i>	0							
Acute closure	1	0.2						
Perforation	1	0.2	0		0		0	

#Patients were allowed to be in more than one type of category

Table 4.25 Planned duration of dual antiplatelet therapy in graft PCI, NCVD-PCI Registry, 2007 – 2014

Planned duration of dual antiplatelet therapy in graft PCI (months)	2007 – 2012 Total no. of lesions = 481		2013 Total no. of lesions = 75		2014 Total no. of lesions = 91		2013 – 2014 Total no. of lesions = 166	
	No.	%	No.	%	No.	%	No.	%
1	52	10.8	6	8.1	1	1.1	7	4.2
3	24	5.0	4	5.3	4	4.4	8	4.8
6	36	7.5	2	2.7	3	3.3	5	3.1
12	301	62.6	58	77.3	80	87.9	138	83.1
> 12	30	6.2	4	5.3	0	0	4	2.4
Not available	20	4.2	0	0	3	3.3	3	1.8
Missing	18	3.7	1	1.3	0	0	1	0.6
Total	481	100	75	100	91	100	166	100

PCI of chronic total occlusion (> 3 months)

From 2013 – 2014, a total of 1285 chronic total occlusions > 3 months were noted; out of which 90.5% were elective and 9.5% presented with ACS (STEMI-3.0%, NSTEMI/UA-6.5%). [Table 4.27]

Majority of the CTO lesions involved left anterior descending artery (42.6%), followed by right coronary artery (40.6%), and left circumflex artery (14.9%); 95.3% were de novo lesions and 4.0% were in-stent restenosis CTO. [Table 4.26]

Entry site, guide catheter size and closure device

Approximately half of the CTO PCI was performed via radial approach. However, in the past, only 34.2% used the radial approach. [Table 4.27] A 6 French guide catheter was used in 83% of cases, 7 French in 15.7% and 8 French in 1%. Around 25% of access was closed using closure devices. [Table 4.27]

Types of stents and devices used

Drug-eluting stents were used more frequently in CTO lesions (65.8%), followed by POBA in only 13.8%, DEB in 9.2% and BMS in 4.6%. [Table 4.28 and Table 4.29] The use of adjunctive devices such as IVUS (5.1%), Rotablator (1.5%), cutting balloon (1.2%), and OCT (0.9%) were uncommon. [Table 4.29]

Results and complications

Out of 1285 lesions, the mean length of the CTO was 42 mm (SD 23.6), and 78.1% of lesions were successfully treated with PCI. The mean stent length and diameter were 49 mm (SD 25.6) and 2.8 mm (SD 0.4%), respectively. [Table 4.28] No major complications were observed; dissection was noted in 4.3% and perforation in 0.9%. [Table 4.30] Majority of them received standard DAPT for 12 months. There was no significant difference observed when compared to the 2007 – 2012 data. [Table 4.31]

Table 4.26 Summary of location of lesions treated with percutaneous coronary intervention and for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

Location of lesion with CTO > 3 mo	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
None	0	0	0	0	0	0	0	0
Left main stem	32	1.2	12	2.2	9	1.2	21	1.7
Left anterior descending artery (LAD)	1207	46.0	242	44.0	305	41.5	547	42.6
LAD proximal	940	35.8	177	32.2	236	32.1	413	32.2
LAD mid	239	9.1	61	11.1	64	8.7	125	9.7
LAD distal	13	0.5	3	0.5	3	0.4	6	0.5
D1	15	0.6	1	0.2	2	0.3	3	0.2
D2	0	0	0	0	0	0	0	0
D3	0	0	0	0	0	0	0	0
Right coronary artery (RCA)	1024	39.0	219	39.7	303	41.2	522	40.6
RCA proximal	591	22.5	112	20.4	168	22.9	280	21.9
RCA mid	288	11.0	75	13.6	87	11.8	162	12.6
RCA distal	113	4.3	25	4.5	41	5.6	66	5.1
PDA	15	0.6	4	0.7	3	0.4	7	0.5
PLV	17	0.6	3	0.5	4	0.5	7	0.5
Left circumflex artery (LCx)	340	12.9	76	13.9	116	15.8	192	14.9
LCX proximal	183	7.0	40	7.3	69	9.4	109	8.5
LCX distal	102	3.9	24	4.4	29	3.9	53	4.1
OM1	43	1.6	11	2.0	16	2.2	27	2.1
OM2	9	0.3	1	0.2	2	0.3	3	0.2
OM3	3	0.1	0	0	0	0	0	0
Graft	23	0.9	1	0.2	2	0.3	3	0.2
LIMA	3	0.1	0	0	0	0	0	0
RIMA	0	0	0	0	0	0	0	0
SVG1	15	0.6	1	0.2	2	0.3	3	0.2
SVG2	3	0.1	0	0	0	0	0	0
SVG3	2	0.1	0	0	0	0	0	0
RAD1	0	0	0	0	0	0	0	0
RAD2	0	0	0	0	0	0	0	0
RAD3	0	0	0	0	0	0	0	0
Missing			0	0	0	0	0	0

Table 4.27 Characteristics of PCI procedures performed for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
PCI status, No. (%)								
Elective	2461	93.7	510	92.7	653	88.9	1163	90.5
NSTEMI/UA	95	3.6	29	5.3	54	7.3	83	6.5
AMI/STEMI	68	2.6	11	2.0	28	3.8	39	3.0
Not available	0	0	0	0	0	0	0	0
Missing	2	0.1	0	0	0	0	0	0
Elective, No. (%)								
Staged PCI			217	42.8	329	50.5	546	47.2
Ad hoc			290	57.2	322	49.5	612	52.8
Not available			3		2		5	
Missing			0		0		0	
NSTEMI/UA, No. (%)								
Urgent			6	20.7	11	20.4	17	20.5
Non-urgent			23	79.3	43	79.6	66	79.5
Not available			0		0		0	
Missing			0		0		0	
STEMI, No. (%)								
Rescue			4	36.3	8	28.5	12	30.7
Primary			5	45.5	14	50.0	19	48.7
Facilitated			0	0	0	0	0	0
Delayed PCI			0	0	0	0	0	0
Delayed routine PCI			0	0	4	14.3	4	10.3
Delayed selective PCI			2	18.2	1	3.6	3	7.7
Pharmacoinvasive			0	0	1	3.6	1	2.6
Not available			0		0		0	
Missing			0		0		0	
[#] Percutaneous entry, No. (%)								
Brachial	29	1.1	6	1.1	5	0.7	11	0.9
Radial	899	34.2	270	49.1	367	49.9	637	49.6
Femoral	1606	61.2	324	58.9	474	64.5	798	62.1
^{S^} French size type								
Guiding catheter			521	94.8	702	95.5	1223	95.2
Guiding sheath			16	2.9	30	4.1	46	3.5
Not available			3	0.5	3	0.4	6	0.5
Missing			10	1.8	0	0	10	0.8

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
^French size (guiding catheter), No. (%)								
4			0	0	0	0	0	0
5	32	1.2	1	0.2	0	0	1	0.1
6	1863	80.0	420	80.6	595	84.8	1015	83.0
7	616	23.5	90	17.3	102	14.5	192	15.7
8	30	1.1	8	1.5	4	0.6	12	1.0
9	0	0	0	0	0	0	0	0
Others	1	0.0	0	0	0	0	0	0
Not available	30	1.1	2	0.4	1	0.1	3	0.2
Missing	54	2.1	0	0	0	0	0	0
Closure device, No. (%)								
No	2383	90.7	459	83.4	515	70.1	974	75.7
Seal	74	2.8	18	3.3	44	5.9	62	4.8
Suture	31	1.2	22	4.0	61	8.3	83	6.5
Exoseal			12	2.2	21	2.9	33	2.6
Others	4	0.2	8	1.5	39	5.3	47	3.7
Not available	27	1.0	4	0.7	5	0.7	9	0.7
Missing	107	4.1	27	4.9	50	6.8	77	6.0
#^ Extent of coronary disease, No. (%)								
Single vessel disease	1094	41.7	310	56.4	501	68.2	811	63.1
Multiple vessel disease	1329	50.6	209	38.0	204	27.8	413	32.1
Graft	24	0.9	13	2.4	21	2.8	34	2.7
Left main	12	0.5	3	0.5	8	1.1	11	0.9
Not available			15	2.7	1	0.1	16	1.2
Fluoroscopy time, min								
N	2304		469		635		1104	
Mean (SD)	31.8 (21.7)		38.2 (24.6)		34.2 (22.6)		35.9 (23.6)	
Median (min, max)	26.8 (2.0, 178.0)		32.2 (2.5, 158.0)		29.4 (2.8, 148.5)		30.4 (2.5, 158.0)	
Not available, No. (%)	214	8.1	52	9.5	68	9.3	120	9.3
Missing, No. (%)	108	4.1	29	5.3	32	4.4	61	4.7
Fluoroscopy total dose, mGy								
N	1334		243		410		653	
Mean (SD)	4639.4 (44865.7)		32789.6 (104878.4)		68879.4 (148477.4)		55449.3 (134968.9)	
Median (min, max)	280.0 (0.9, 1199417.0)		2456.0 (1.6, 710958.0)		3457.5 (5.4, 1082615.0)		2988.0 (1.6, 1082615.0)	
Not available, No. (%)	982	37.4	205	37.3	206	28.0	411	32.0
Missing, No. (%)	310	11.8	102	18.5	119	16.2	221	17.2

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Contrast type, No. (%)								
Ionic	19	0.7	0	0	0	0	0	0
Non-ionic	2391	91.1	113	20.6	0	0	113	8.8
Not available	173	6.6	5	0.9	1	0.1	6	0.5
Missing	43	1.6	432	78.5	734	99.9	1166	90.7
Contrast volume, ml								
N	2374		464		624		1088	
Mean (SD)	217.9 (85.8)		223.8 (90.1)		209.7 (90.5)		215.7 (90.6)	
Median (min, max)	200.0 (18.0, 500.0)		200.0 (27.0, 500.0)		200.0 (26.0, 500.0)		200.0 (26.0, 500.0)	
Not available, No. (%)	194	7.4	56	10.2	65	8.8	121	9.4
Missing, No. (%)	58	2.2	30	5.5	46	6.3	76	5.9
Thrombolytics prior to PCI procedure in STEMI, No. (%)								
<i>Total no. of procedures among STEMI patients</i>	479	100	18	100	61	100	79	100
Yes	35	7.3	4	22.2	16	26.2	20	25.3
No	444	92.7	14	77.8	45	73.8	59	74.7
Missing	0	0	0	0	0	0	0	0

[#]Patients are allowed to be in more than one type of category

[§]French size type was not available in the old CRF. In the old CRF, information on French size was only collected for guiding catheter.

[^]French size is reported by number of lesions instead of number of procedures. In the old CRF, French size was reported under Section 6 cath lab visit, no 6b, whereas in the new CRF, it was reported under Section 7 PCI proc details, no 11.

^{*}In the new CRF, French size 9 is not listed. However, there is one patient with guiding catheter and French size 9 and three patients with gyuiding sheath and French size 9.

^{xx}Results as presented differently in 2007 – 2012 and 2013 – 2014. In 2007 – 2012, patients are allowed to be presented in different categories. In 2013 – 2014, patients are included in a unique category.

- Single vessel disease is for patients with single vessel disease information (old CRF)/ patients with only one information of either LAD, LCx or RCA.
- Multiple vessel disease is for patients with multiple vessel disease information (old CRF)/patients with more than one information of LAD, LCx or RCA.
- Left main stem (LMS) is for patients with information of LMS (LMS alone or combination with LAD, LCx, RCA or single vessel disease)

Graft is for patients with information of graft (graft alone or combination with LAD, LCx, RCA, single vessel disease, multiple vessel disease or LMS)

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Pre-procedure stenosis %								
N	2572		526		722		1248	
Mean (SD)	97.8 (9.5)		99.3 (5.3)		97.9 (9.8)		98.5 (8.2)	
Median (min, max)	100.0 (0.0, 100.0)		100.0 (9.0, 100.0)		100.0 (0.0, 100.0)		100.0 (0.0, 100.0)	
Missing, No. (%)	54	2.1	24	4.4	13	1.8	37	2.9
Post-procedure stenosis %								
N	2459		513		704		1217	
Mean (SD)	20.2 (39.1)		22.9 (41.2)		22.6 (41.2)		22.7 (41.2)	
Median (min, max)	0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)		0.0 (0.0, 100.0)	
Missing, No. (%)	167	6.4	37	6.7	31	4.2	68	5.3
Estimated lesion length, mm								
N	2221		435		600		1035	
Mean (SD)	35.1 (21.1)		43.0 (24.4)		41.3 (23.0)		42.0 (23.6)	
Median (min, max)	30.0 (5.0, 140.0)		38.0 (8.0, 128.0)		37.5 (4.0, 130.0)		38.0 (4.0, 130.0)	
Missing, No. (%)	405	15.4	115	20.9	135	18.4	250	19.5
Lesion result, No. (%)								
Successful	2107	80.2	430	78.2	573	78.0	1003	78.1
Unsuccessful	512	19.5	120	21.8	160	21.7	280	21.7
Not available	3	0.1	0	0	2	0.3	2	0.2
Missing	4	0.2	0	0	0	0	0	0
*Stent length, mm								
N	1949		407		561		968	
Mean (SD)	45.1 (24.2)		51.2 (25.3)		47.3 (25.7)		49.0 (25.6)	
Median (min, max)	38.0 (8.0, 152.0)		48.0 (12.0, 132.0)		40.0 (8.0, 167.0)		44.0 (8.0, 167.0)	
Not available, No. (%)	677	25.8	143	26.0	174	23.7	317	24.7
**Stent diameter, mm								
N	1947		407		558		965	
Mean (SD)	2.8 (0.4)		2.8 (0.4)		2.8 (0.4)		2.8 (0.4)	
Median (min, max)	2.8 (2.0, 4.7)		2.8 (2.0, 4.0)		2.8 (2.0, 4.0)		2.8 (2.0, 4.0)	
Not available, No. (%)	679	25.9	143	26.0	177	24.1	320	24.9
Maximum balloon size used, mm								
N	2132		422		583		1005	
Mean (SD)	2.9 (0.6)		2.9 (0.6)		2.9 (0.6)		2.9 (0.6)	
Median (min, max)	3.0 (1.0, 5.0)		3.0 (1.2, 4.5)		3.0 (1.0, 5.0)		3.0 (1.0, 5.0)	
Missing, No. (%)	494	18.8	128	23.3	152	20.7	280	21.8

	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Maximum stent/balloon deploy pressure, atm								
N	2051		414		572		986	
Mean (SD)	16.3 (4.1)		16.8 (4.3)		16.5 (4.8)		16.6 (4.6)	
Median (min, max)	16.0 (4.0, 30.0)		16.0 (4.0, 30.0)		16.0 (2.0, 34.0)		16.0 (2.0, 34.0)	
Missing, No. (%)	575	21.9	136	24.7	163	22.2	299	23.3

#Patients were allowed to be in more than one type of category

*Summation of stent length was used for lesions which were treated with more than one stent

**Average of stent diameter was used for lesions which were treated with more than one stent

Table 4.28 Types of stents used for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

Types of stents for lesion with CTO > 3 mo	2007 – 2012 Total no. of stents used = 4016		2013 Total no. of stents used = 757		2014 Total no. of stents used = 952		2013 – 2014 Total no. of stents = 1709	
	No.	%	No.	%	No.	%	No.	%
Drug-eluting stent	2767	68.9	638	84.3	786	82.6	1424	83.3
Bare metal stent	472	11.8	34	4.5	33	3.5	67	3.9
Bio-absorbable stent	1	0	4	0.5	9	0.9	13	0.8
Antibody-coated	35	0.9	1	0.1	0	0	1	0.1
Others	77	1.9	8	1.1	13	1.4	21	1.2
Drug-eluting balloon	0	0	60	7.9	87	9.1	147	8.6
Bifurcated stent	0	0	0	0	2	0.2	2	0.1
Covered stent	1	0	0	0	1	0.1	1	0.1
Combo stent	0	0	8	1.1	21	2.2	29	1.7
Missing	663	16.5	4	0.5	0	0	4	0.2
Total	4016	100.0	757	100.0	952	100.0	1709	100.0

*Stents which were not listed in the NCVD-PCI Stent List

Table 4.29 Types of devices used during percutaneous coronary intervention for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

#Intracoronary devices used for lesion with CTO > 3 mo	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Aspiration/aspiration catheter	50	1.9	10	1.8	10	1.4	20	1.6
Balloon only/POBA	214	8.1	69	12.5	108	14.7	177	13.8
Drug-eluting balloon	138	5.3	49	8.9	69	9.4	118	9.2
Drug-eluting stent	1626	61.9	365	66.4	480	65.3	845	65.8
Cutting balloon/scoring balloon	26	1.0	8	1.5	8	1.1	16	1.2
Coil			5	0.9	0	0	5	0.4
OCT			6	1.1	5	0.7	11	0.9
Mother and child			3	0.5	3	0.4	6	0.5
Micro catheter			188	34.2	279	38.0	467	36.3
Angiojet			0	0	0	0	0	0
IVUS	113	4.3	38	6.9	28	3.8	66	5.1
Flowire/FFR	27	1.0	4	0.7	3	0.4	7	0.5
Rotablator	24	0.9	10	1.8	9	1.2	19	1.5
Bare metal stent	338	12.9	31	5.6	28	3.8	59	4.6
Embolic protection	8	0.3	1	0.2	0	0	1	0.1
Filter			0	0	0	0	0	0
Balloon/distal			0	0	0	0	0	0
Proximal			0	0	0	0	0	0
Missing			1		0		1	
Others	504	19.2	103	18.7	42	5.7	145	11.3

#Patients were allowed to be in more than one type of category

Table 4.30 Types of post procedure complications for lesion with description of CTO > 3 months only, NCVD-PCI Registry, 2007 – 2014

*Types of complication for lesion with CTO > 3 mo	2007 – 2012 Total no. of lesions = 2626		2013 Total no. of lesions = 550		2014 Total no. of lesions = 735		2013 – 2014 Total no. of lesions = 1285	
	No.	%	No.	%	No.	%	No.	%
Dissection	159	6.1	27	4.9	28	3.8	55	4.3
Flow limiting			2	8.0	2	7.4	4	7.7
Non-flow limiting			23	92.0	25	92.6	48	92.3
Not available			1		1		2	
Missing			1		0		1	
No reflow	55	2.1	10	1.8	6	0.8	16	1.2
Transient	26	56.5	4	40.0	1	20.0	5	33.3
Persistent	20	43.5	6	60.0	4	80.0	10	66.7
Not available	6		0		1		1	
Missing	3		0		0		0	
Acute closure	8	0.3						
Perforation	22	0.8	7	1.3	5	0.7	12	0.9

*Results are only showed for patients who were reported to have the complications

Table 4.31 Duration of thienopyridine in patients who underwent PCI and lesion with description of CTO > 3 months only, NCVI-PCI Registry, 2007 – 2014

Year	Duration of clopidogrel/ticlopidine (months)	#Intracoronary devices used					
		Balloon only/POBA		Drug-eluting stent		Bare metal stent	
		No.	%	No.	%	No.	%
2007 – 2012 Total no. of lesions = 2626	1	42	19.6	16	1.0	111	32.8
	3	19	8.9	12	0.7	24	7.1
	6	15	7.0	91	5.6	41	12.1
	12	73	34.1	1273	78.3	126	37.3
	> 12	12	5.6	165	10.1	13	3.8
	Not available	50	23.4	37	2.3	10	3.1
	Missing	3	1.4	32	2.0	13	3.8
	Total	214	100.0	1626	100.0	338	100.0
2013 Total no. of lesions = 550	1	9	13.1	2	0.5	11	35.5
	3	5	7.2	1	0.3	1	3.2
	6	1	1.4	6	1.6	1	3.2
	12	42	60.9	338	92.7	14	45.2
	> 12	0	0	8	2.2	1	3.2
	Not available	10	14.5	7	1.9	2	6.5
	Missing	2	2.9	3	0.8	1	3.2
	Total	69	100.0	365	100.0	31	100.0
2014 Total no. of lesions = 735	1	15	13.8	3	0.6	4	14.3
	3	2	1.9	5	1.0	0	0
	6	4	3.7	7	1.5	2	7.1
	12	66	61.1	446	92.9	19	67.9
	> 12	5	4.6	9	1.9	1	3.6
	Not available	14	13.0	4	0.8	2	7.1
	Missing	2	1.9	6	1.3	0	0
	Total	108	100.0	480	100.0	28	100.0
2013 – 2014 Total no. of lesions = 1285	1	24	13.5	5	0.6	15	25.4
	3	7	4.0	6	0.7	1	1.7
	6	5	2.8	13	1.5	3	5.1
	12	108	61.0	784	92.8	33	55.9
	> 12	5	2.8	17	2.0	2	3.4
	Not available	24	13.6	11	1.3	4	6.8
	Missing	4	2.3	9	1.1	1	1.7
	Total	177	100.0	845	100.0	59	100.0

#Patients were allowed to be in more than one type of category