KAROLINSKA HOSPITAL
DEPARTMENT OF CARDIOLOGY
SWEDEN

ANNUAL STATISTICAL REPORT 2015

SWEDISH ICD & PACEMAKER REGISTRY

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Foreword

We are proud to present the annual report for 2015 with expanded data regarding quality and device longevity together with implant rates and usage of device therapy in Sweden.
The quality section has expanded data regarding longevity of devices, leads and complications.
Complications are shown for each type of implantation for the country, region and hospital.
Lead extractions are reported per hospital using the definition by ACC, the removal of a lead with an implant duration of > one year regardless of the method and leads of < than one year if tools are used. All hospitals performing lead extractions are not sending complete data yet and only then the numbers are shown.
The report contains data from all implanting hospitals and > 95% of all procedures are reported when validated against the Patient care registry from Socialstyrelsen.

Implant rates Pacemaker

There are 52593 active pacemaker patients in Sweden at the end of 2015, a decrease by almost 3000 patients. There are regional differences with the highest implant rates in the regions of Gotland and the larger northern region of Västernorrland. Lowest are Örebro and Stockholm who are densly populated areas but with a younger population.
The overall implant rate has increased somewhat from 2014, 691 to 700 implants per million and the population has also increased and thereby the total number of first implants to an all time high of 6892 new implants.
No new centers have started and the number of implanting hospitals is 43.
(p 8-12)
The manufacturers shares of the market show slight redistribution and all regions are bound by tenders for 1-3 years. Medtronic with the brand Vitatron is largest with 38%, a reduction from 46% in 2014, with St Jude second with 36%.The smaller brands of Sorin and Biotronik are still at low market shares and Boston has increased its market shares to 14% in brady segment.

Age and Gender distribution of pacemaker treatment

The average age for females receiving pacemaker treatment is 77 y and males 75 y and 6 patients over 100 years of age received primary implants. There is a male predominance with 59% of the new implants going to male patients. There is no change in this distribution compared to previous years.
The manufacturers shares of the market show slight redistribution and all regions are bound by tenders for 1-3 years. Medtronic with the brand Vitatron is largest with 38%, a reduction from 46% in 2014, St Jude second with 36%. The smaller brands of Sorin and Biotronik are still at low market shares and Boston has increased its market shares to 14% in brady segment.

Pacemakers and leads

Pacemaker leads are now solely bipolar with one unipolar transvenous LV lead implanted. Active fixation is used to 99% in the atrium but only to 87% in the ventricle where passive leads are used more commonly than in the US for example. We now have active fixation LV leads and 13% of the LV leads were active fixation, an increase from 9% 2014. Quadripolar lead technology for CRT has rapidly increased and 57% of the LV leads are now quadripolar, an increase from 50% in 2014.
15266 leads were implanted all together.
Only a small number of epicardial systems are implanted in small children, patients without venous access and in some CRT patients. Venous access is almost equal between cephalic cut-down technique, 52%, and direct subclavian puncture 39% and 8% axillary punction which has increased as access route.

Pacemakers

All pacemakers implanted have RR capability and DDD-R is the most common subtype, 78%. CRT-P are used in small numbers, 5,4% of all PM implants which is slightly more than previous year.

The rate of MRI safe systems have increased rapidly and 90% of the systems implanted are MRI safe. The trend from the manufacturers to label older leads together with new pulse generators as MRI safe have made it difficult to keep the percentage correct.
The most common aethiology for pacemaker treatment is still the “conductive tissue fibrosis” 80% and ischaemic disease is more common in males, 9 vs 4%. The usage of the term “conductive tissue fibrosis” is most probably too high and only represents a lack of proper diagnosis when entering registry data.
System upgrade is increasing, especially in brady-paced patients with heart failure in 2015. A total of 216 patients were upgraded from normal brady pacing to CRT compared to 142 in 2014.
The most common symptom is syncope followed closely by dizziness and dyspne. ECG indications are 2015 as before mainly related to sinus node disease with AV conduction disorders second. Sinus node disease is slightly more common as an indication in women than in men.
Smaller hospitals tend to use VVI-R pacing more often than larger hospitals for AV-block and SSS.
68% of the generators are used until normal EOL/ERI and 1% exhibit premature EOL. Lead failures are uncommon and survival rates are very good.

Implanting organisation

The number of procedures for each implanter vary to a large extent between hospitals. Recommendations as to minimum number of procedures from EHRA are not routinely followed especially regarding CRT implantation.

Implant rates ICD

There are 9483 active ICD patients in Sweden 2015 and this is a >2% increase over 2014. The number centers implanting ICD’s is 22 and represents roughly half of the PM implanting centers. The national implant rate is the same 2015 as 2014, 151 vs 152. Implant rates show the same regional differences as in pacemakers with the highest rates in the north, 308 in Norrbotten and the lowest in the western region 90 per million. It has even decreased in the western region compared to 2014. Dalarna and Sörmland are regions that have large increases in implant rates with almost 100% increase in Sörmland which is now up to 240 implants per million.
The highest differences are in primary prevention between the same regions, 176 vs 49 per million in northern and western region. Clear explanations for this are not at hand. The national average is 94 per million and is slightly lower than 98 in 2014.
About 32% of the ICD procedures are replacements but could be expected to go down with generators now showing increased longevity.
Compared to other Nordic or European countries the national implant rate is low but some regions come up to good implant rates such as Sörmland and Västernorrland
As with PM the regions are bound by ICD purchasing tenders and manufacturers share show only slight variations over previous year. A small number of subcutaneous devices were implanted but is rapidly increasing.

ICD Patients

The average age for ICD implant is stable at 64 yearsof age in males and 62 years in females for all types of implants. 48 patients in the age group 80-89 received first ICD implants of which 17 were primary prevention.
Clinical indication for all ICD implants was secondary prevention in 35% and primary 65%. Primary prevention is at a stable level.
Aethiology was ischaemic heart disease in 47% of all patients but more common in males, 51% vs 31% males vs females.
Medication at the start of therapy is displayed in tables.

ICD Subtypes and leads

74% of the leads are single coil and 97% were active fixation. Venous access is comparable to PM implants with an equal distribution between cephalic cut-down and direct subclavian puncture. Subtypes are 40% DDR devices, 35% CRT-D and 23% VVI-R devices.

Only 62% of the ICD's are used until normal EOL/ERI, 9% are changed due to system upgrade CRT. Technical recalls stand for 0.4% of all box changes and premature EOL is 3%. ICD leads display larger failure rates but overall longevity is still good.
The number of procedures display the same large variation in volumes as with pacemaker procedures at different hospitals and some are clearly below recommended volumes.

CRT implant rates

Implant rates of CRT systems are only increasing slowly in Sweden, 61 per million CRT-D's and 45 per million CRT-P's new implants which is up from 2014. The number of centers performing CRT implantations is less than the number doing ICD's. The distribution between CRT-D and CRT-P systems show regional differences with some regions doing almost exclusively CRT-D systems. The failure rate at implant is according to the registry 5% but this is most likely an underestimation when compared to the literature.

CRT patients

The average age of CRT-P patients at first implant is 76 y and CRT-D patients 67 years with a large male predominance, the same as last year. Medication for patients receiving CRT for the first time is given in tables.

CRT organisation

The number of procedures display the same large variation in volumes as with pacemaker procedures at different hospitals and some are clearly below recommended volumes per operator and also per hospital. This could have a clear influence on quality.

ILR

795 ILR's were implanted in Sweden 2015 which is up by 5% since 2014 with the main indication being dizzy spells and syncope. At the end of the ILR investigation period 47% of the patients were found to have a PM indication and 4% an ICD indication, the rest 49% showed no pathological rhythm during the FU. In 2% a new ILR was implanted to extend the monitoring period. The most common finding during regular FU was however normal sinus rhythm in 81% of the registered FU events.

Quality of device treatment, pacemakers, pacing modes

In high degree AV block only 5% of the patients receive VVI-R systems on average but to a higher degree, 14%, in small hospitals.
The use of pacing mode in sinus node disease show the same tendency with 5% VVI-R systems on average but 12% in small hospitals which is better than 2014 which was 7 vs 16% large and small hospitals.

Lead extraction

For the first time we have included lead extractions in the registry. The definition used is base on ACC and EHRA documents. A lead extraction is a removal of a lead older than 1 years or any lead removal requiring the use of a specific tool. Leads less than one year old that are removed without a tool are lead removals and not lead extractions.
The numbers from each hospital are presented. The most common reason is infection. Preventive extraction of leads with problems such as Medtronic Sprint Fidelis and SJM Riata is also performed in a number of cases.
Methods and success rates are displayed for those hospitals that have complete reporting.

Complications Pacemaker

The total complication rate for pacemaker procedures is 5.0% vs 5.4% in 2014 with lead displacement being the most common. There is a variation among the operating hospitals and lead types. Hospitals that have registered <3% in total complication can be regarded as not having complete registration. This is based on literature regarding pacemaker procedure complications with a common rate of 5-15%.

Complications ICD

The overall complication rate to ICD treatment is 9.1% vs 9.3% in 2014. The most common complication is lead dislodgement 2.9% followed by infection with 1.7%. The rate between hospitals is also given in tables and as with pacemaker treatment <3% is considered incomplete registration.

Complications CRT

Both CRT-D and CRT-P complications are presented. Both figures, 4% and 8% are very low and do not compare well with literature findings of up to 15% complications. Reasons for this are unknown.

Procedures

Duration of fluoroscopy and procedure time is given for all types and hospitals in tables. The procedures that have been performed in less than 10 at different sites are marked as not reliable for comparison.
A single chamber device as a mean takes 36 minutes to implant, a dual chamber device 48 min and a CRT system 86 min.

Device longevity ICD and PM

Generators have generally very good longevity with an average for pacemakers of 99.4% after 5 years but there are large differences between models and manufacturers.
Pacemaker lead survival is very good with a survival rate of 98,3% after 10 years with very little difference between models and manufacturers and slightly up.
ICD generator survival is more heterogenous than PM generator survival with larger differences between manufacturers and models and an average of 96.1% after 5 years which is up 3% since 2014.
SJM Fortify and Unify were identified as problem generators in 2014 in our registry long before the SJM alert.
ICD lead survival is also shorter than pacemaker lead survival, 94% vs 98% after 10 years (p 150)
The Medtronic Sprint Fidelis models were implanted in 830 cases in Sweden and the survival rate is 84.9% after 10 years which is stable.
In the St Jude Riata models failures are increasing and 10 year survival is now down to 82.2%

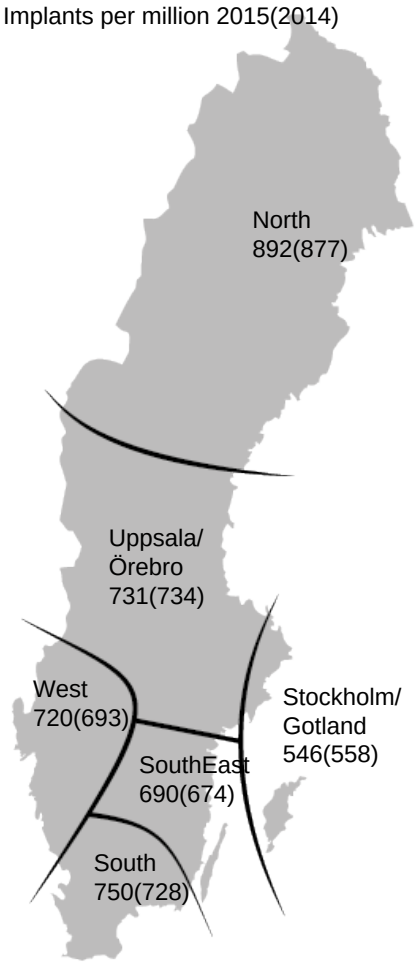
Patients

The difference between ICD-and pacemaker patient survival after 5 years has decreased since 2014, 71% for ICD patients and 70% for pacemaker patients. The heart failure patients have the shortest expected survival rate among the PM and ICD patients. The difference between CRT-P and CRT-D patients is however surprisingly small in an unadjusted comparison (p 162-163).

Fredrik Gadler
Manager Swedish National ICD and Pacemaker Registry

The regions are based on where the patients live, not where they are treated

Region	Population	No of first impl	No per million	Active patients
Stockholm/Gotland	2288830	1250	546	10532
Uppsala/Örebro	2031911	1485	731	11570
South-East Sweden	1031177	711	690	5201
Southern Sweden	1782910	1338	750	9731
Western Sweden	1831805	1318	720	10018
Northern Sweden	884384	789	892	5541
Total	9851017	6891	700	52593



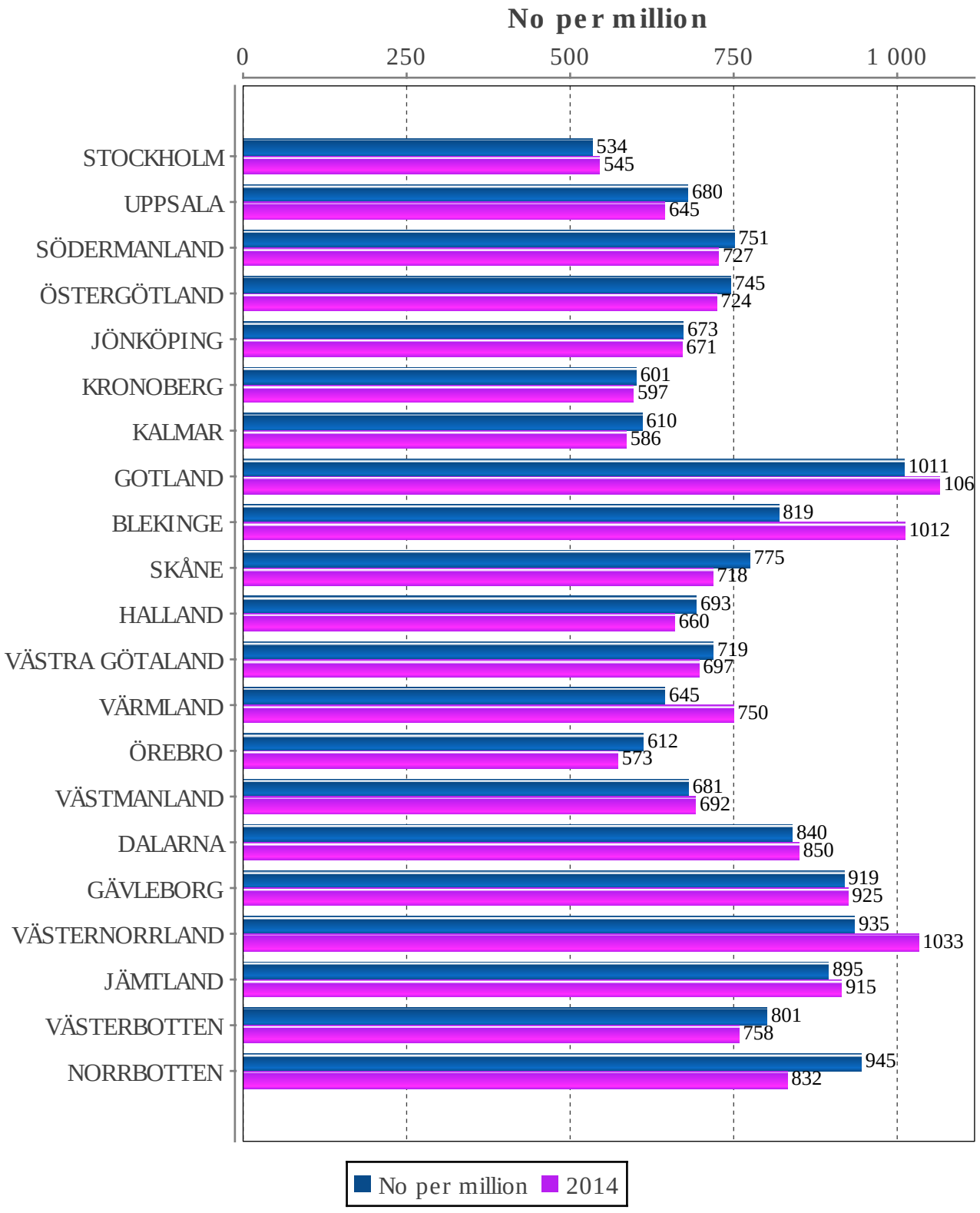
First implants per hospital

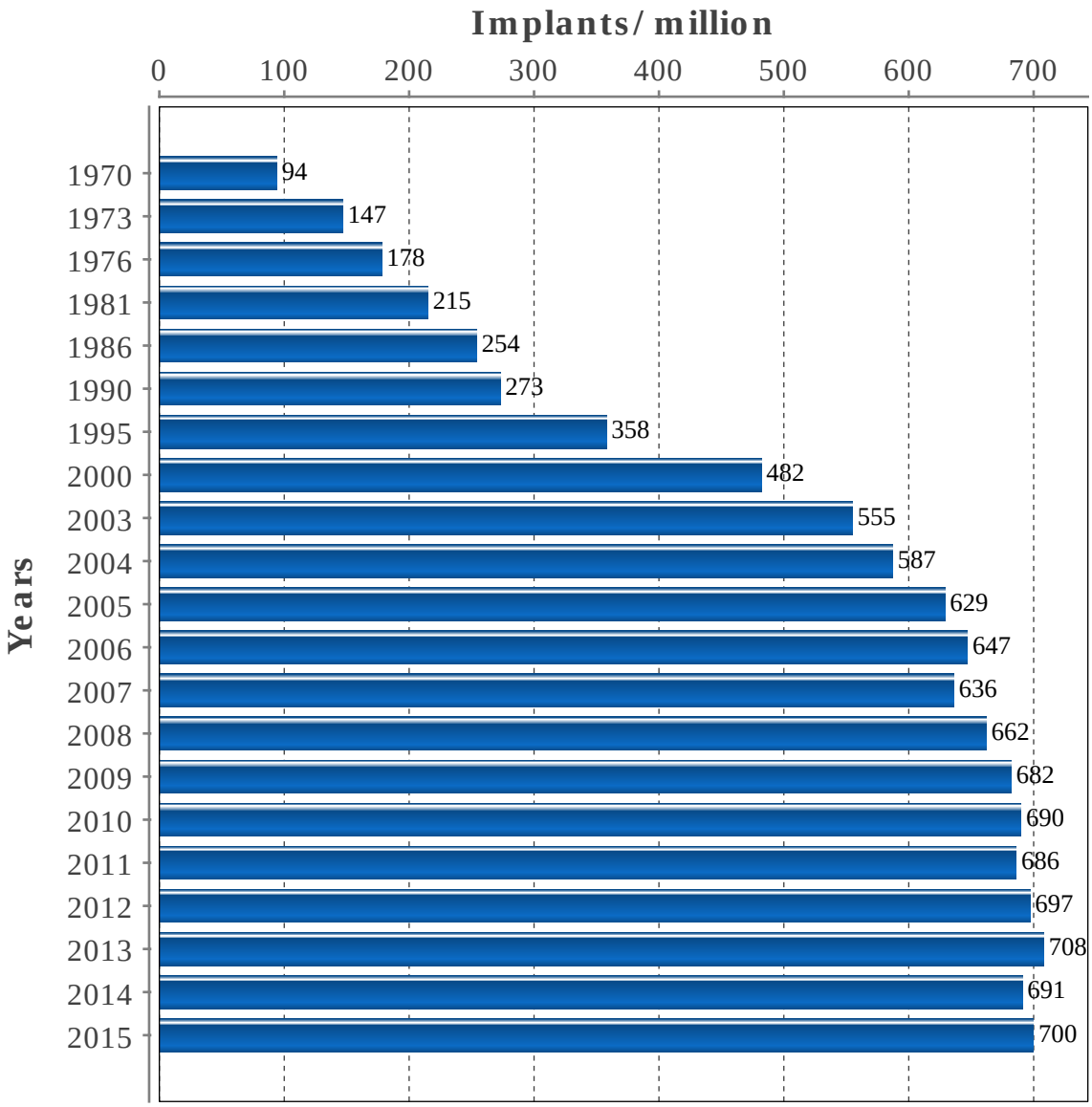
Region	Hospital	2015	2014
Northern Sweden	Norrlands Universitetssjukhus	183	168
	Skellefteå lasarett	56	53
	Sollefteå sjukhus	15	25
	Sunderby sjukhus	221	200
	Sundsvalls sjukhus	151	154
	Örnsköldsviks sjukhus	50	59
	Östersunds sjukhus	114	120
Southern Sweden	Blekingesjukhuset	144	202
	Centrallasarettet Växjö	109	108
	Centralsjukhuset Kristianstad	206	1
	Länssjukhuset Halmstad	112	98
	Skånes universitetssjukhus, Lund	531	642
	Skånes universitetssjukhus, Malmö	273	245
	Varbergs sjukhus	96	98
South-East Sweden	Linköpings Universitetssjukhus	252	238
	Länssjukhuset Kalmar	68	71
	Länssjukhuset Ryhov	224	220
	Oskarshamns sjukhus	29	27
	Vrinnevisjukhuset	101	105
	Västerviks sjukhus	37	33
Stockholm/Gotland	Danderyds sjukhus	388	345
	Karolinska Universitetssjukhuset	367	410
	St Görans sjukhus	217	202
	Södersjukhuset	251	280
	Visby lasarett	46	43
Uppsala/Örebro	Akademiska sjukhuset	285	268
	Arvika sjukhus	3	13
	Centralsjukhuset Karlstad	147	145
	Centralsjukhuset Västerås	158	166
	Falu lasarett	231	227
	Hudiksvalls sjukhus	51	49
	Länssjukhuset Gävle	203	201
	Mälarsjukhuset	191	189
	Torsby sjukhus	26	37
	Universitetssjukhuset Örebro	183	169
Western Sweden	Alingsås lasarett	79	79
	Drottning Silvias Bus	13	7
	Kungälvs sjukhus	10	72
	Sahlgrenska Universitetssjukhuset	461	325
	Sahlgrenska Universitetssjukhuset /Östra	36	80
	Skaraborgs sjukhus Skövde	218	212
	Södra Älvsborgs sjukhus	172	156
	Trollhättan, NÄL	227	235

STATISTICS – PACEMAKER – IMPLANTS PER COUNTY

The regions are based on where the patients live, not where they are treated

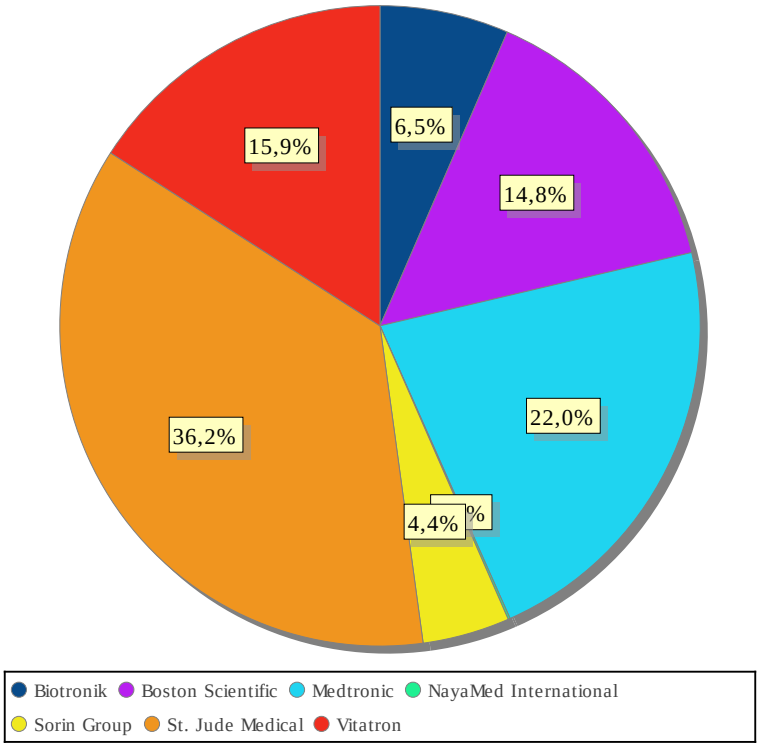
County	Population	No of first	No per million	Active patients
STOCKHOLM	2231439	1192	534	10124
UPPSALA	354164	241	680	1897
SÖDERMANLAND	283712	213	751	1515
ÖSTERGÖTLAND	445661	332	745	2337
JÖNKÖPING	347837	234	673	1771
KRONOBERG	191369	115	601	880
KALMAR	237679	145	610	1093
GOTLAND	57391	58	1011	408
BLEKINGE	156253	128	819	1032
SKÅNE	1303627	1010	775	7174
HALLAND	314784	218	693	1575
VÄSTRA GÖTALAND	1648682	1186	719	9088
VÄRMLAND	275904	178	645	1533
ÖREBRO	291012	178	612	1437
VÄSTMANLAND	264276	180	681	1425
DALARNA	281028	236	840	1653
GÄVLEBORG	281815	259	919	2110
VÄSTERNORRLAND	243897	228	935	1596
JÄMTLAND	127376	114	895	713
VÄSTERBOTTEN	263378	211	801	1504
NORRBOTTEN	249733	236	945	1728
Total	9851017	6892	700	52593


No per million
0
250
500
750
1 000
STOCKHOLM
534
545
UPPSALA
680
645
SÖDERMANLAND
751
727
ÖSTERGÖTLAND
745
724
JÖNKÖPING
673
671
KRONOBERG
601
597
KALMAR
610
586
GOTLAND
1011
106
BLEKINGE
819
1012
SKÅNE
775
718
HALLAND
693
660
VÄSTRA GÖTALAND
719
697
VÄRMLAND
645
750
ÖREBRO
612
573
VÄSTMANLAND
681
692
DALARNA
840
850
GÄVLEBORG
919
925
VÄSTERNORRLAND
935
1033
JÄMTLAND
895
915
VÄSTERBOTTEN
801
758
NORRBOTTEN
945
832
No per million
2014


Implants/ million
0
100
200
300
400
500
600
700
Years
1970
1973
1976
1981
1986
1990
1995
2000
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
94
147
178
215
254
273
358
482
555
587
629
647
636
662
682
690
686
697
708
691
700

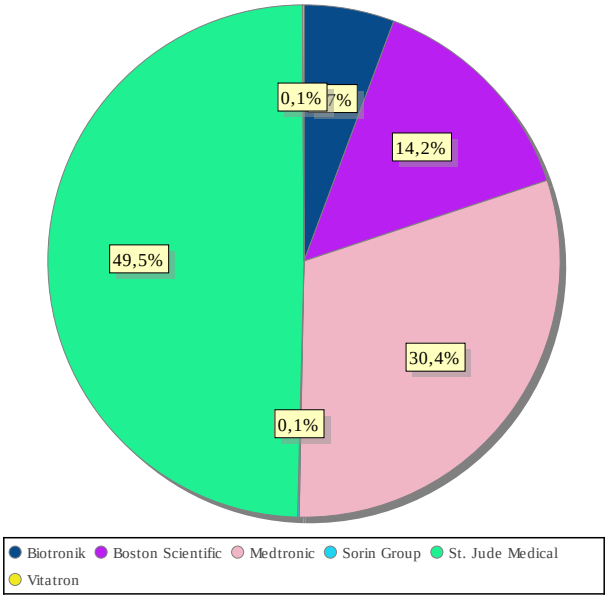
Market share per manufacturer in Sweden. Medtronic and Vitatron regarded as separat companies

Manufacturer	2012 %	2013 %	2014 %	2015 %
Biotronik	6.0	7.6	5.0	6.5
Boston Scientific	6.7	7.7	8.4	14.8
Medtronic	26.1	20.2	21.0	22.0
Sorin Group	5.3	5.0	5.7	4.4
St. Jude Medical	36.2	37.0	34.2	36.2
Vitatron	18.2	23.9	25.5	15.9
Nayamed International	-	0.1	0.1	0.1
Impulse Dynamics	-	-	-	-



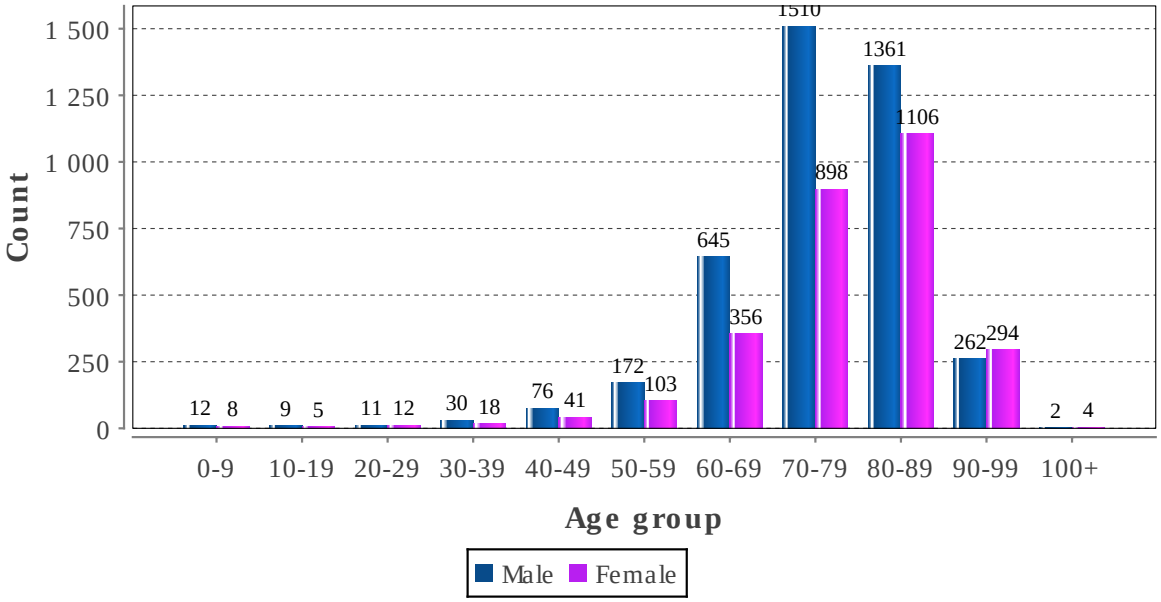
Market share per manufacturer in Sweden. Medtronic and Vitatron regarded as separat companies. From 2011 even including leads implanted in ICD systems.

Manufacturer	2012 %	2013 %	2014 %	2015 %
Biotronik	2.1	4.6	4.7	5.7
Boston Scientific	10.0	9.3	11.1	14.2
Medtronic	31.0	33.0	34.6	30.4
St. Jude Medical	53.2	51.2	48.7	49.5
Vitatron	3.7	1.9	0.8	0.1
Sorin Group	-	-	0.1	0.1



Age and gender distribution for new implants, total numbers

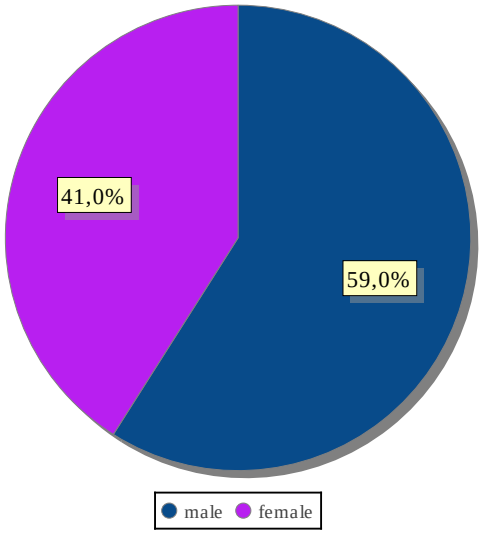
Age (years)	Total no	%	Male	Female
0-9	20	0.3	12	8
10-19	14	0.2	9	5
20-29	23	0.3	11	12
30-39	48	0.7	30	18
40-49	117	1.7	76	41
50-59	275	4.0	172	103
60-69	1001	14.4	645	356
70-79	2408	34.7	1510	898
80-89	2467	35.6	1361	1106
90-99	556	8.0	262	294
100+	6	0.1	2	4
Average age	76	0.0	75	77
				Total number of implants: 6935



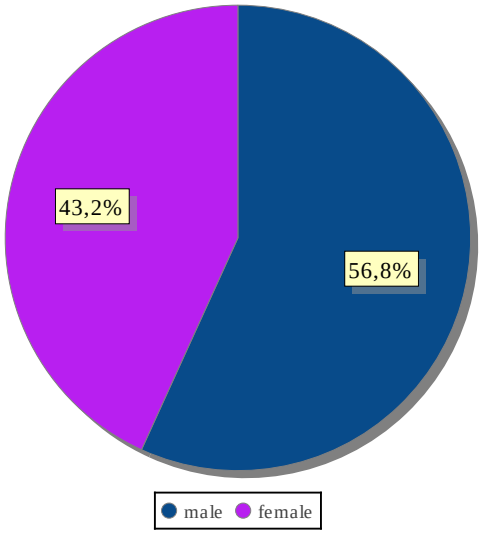
Ratio of new implants versus generator changes

	Total		Male		Female	
	no	%	no	%	no	%
First implant	6935	74.7	4090	59.0	2845	41.0
Replacement	2346	25.3	1333	56.8	1013	43.2
Total	9281	100.0	5423	58.4	3858	41.6

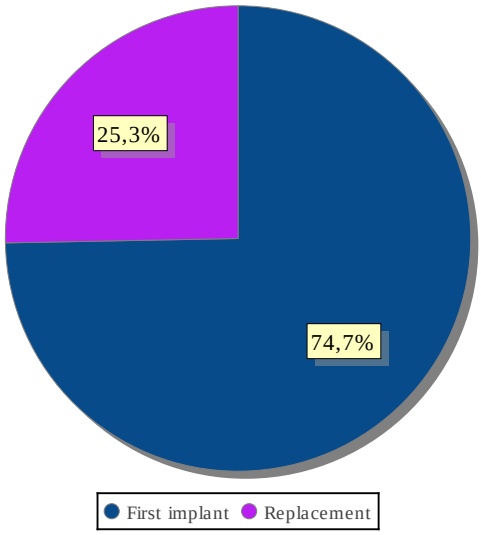
First implant



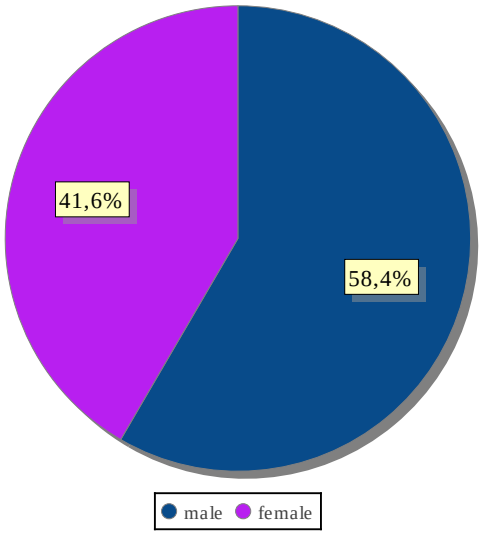
Replacement



Replacement ratio



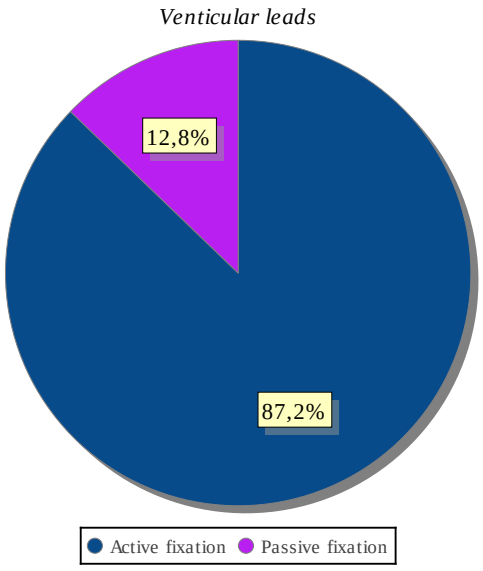
All implant

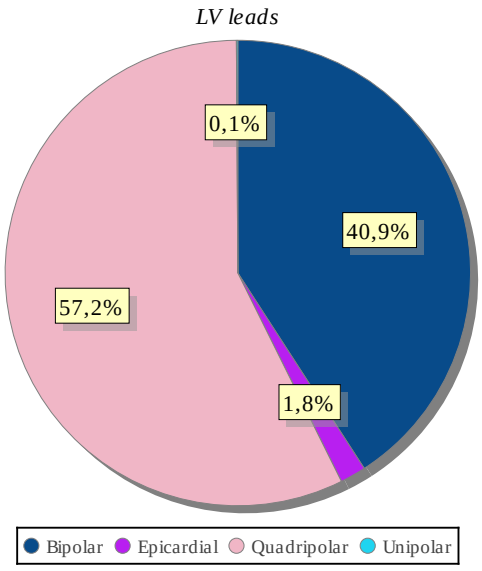


Lead type distribution for atrial and venticular use for first implants and replacements including all pace leads, pace and ICD systems

	Atrial		Venticular		LV-lead	
	no	%	no	%	no	%
Bipolar	6882	99.6	7195	99.6	461	40.9
Epicardial	27	0.4	31	0.4	20	1.8
Quadripolar	-	-	-	-	646	57.3
Unipolar	-	-	-	-	1	0.1

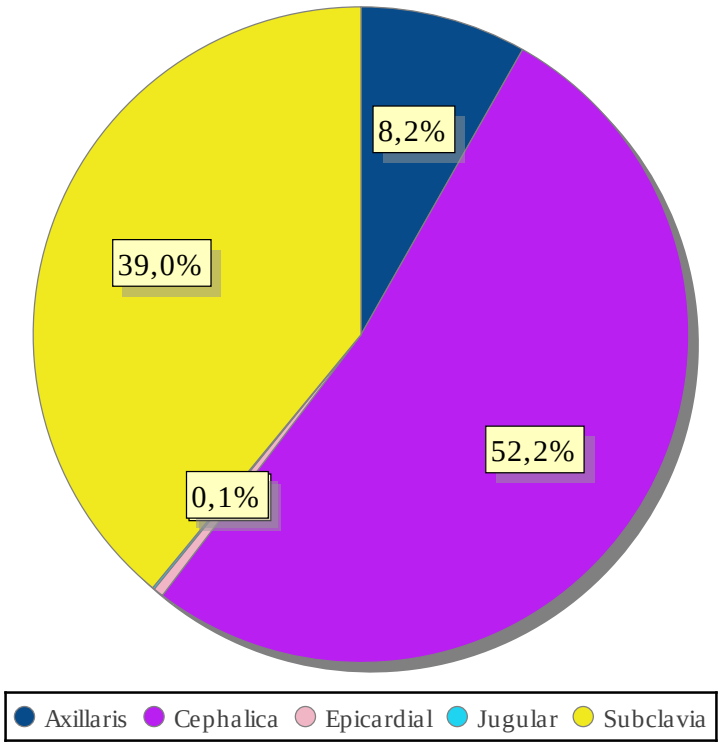
	Atrial		Venticular		LV-lead	
	no	%	no	%	no	%
Active fixation	6871	99.4	6303	87.2	143	12.7
Passive fixation	39	0.6	925	12.8	985	87.3
						Total number of leads: 15266





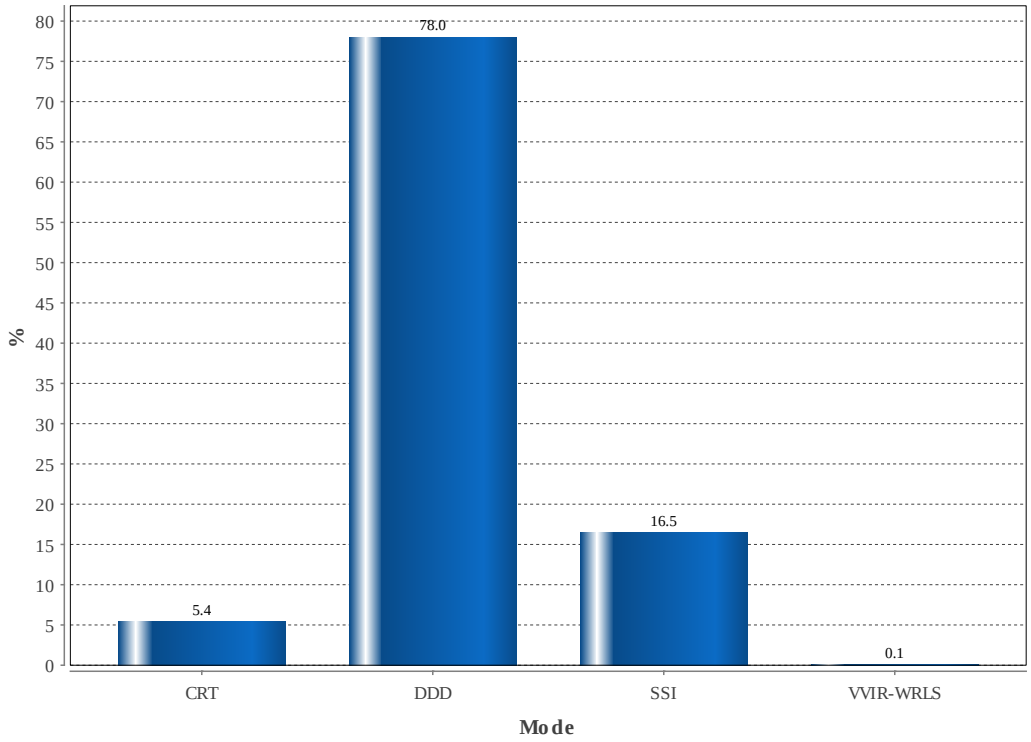
Venous access for first implants and replacements, all types of pace leads.

Lead access	No	%
Axillaris	1255	8.2
Cephalica	7958	52.1
Epicardial	83	0.5
Jugular	12	0.1
N/A	1	0.0
Subclavia	5957	39.0



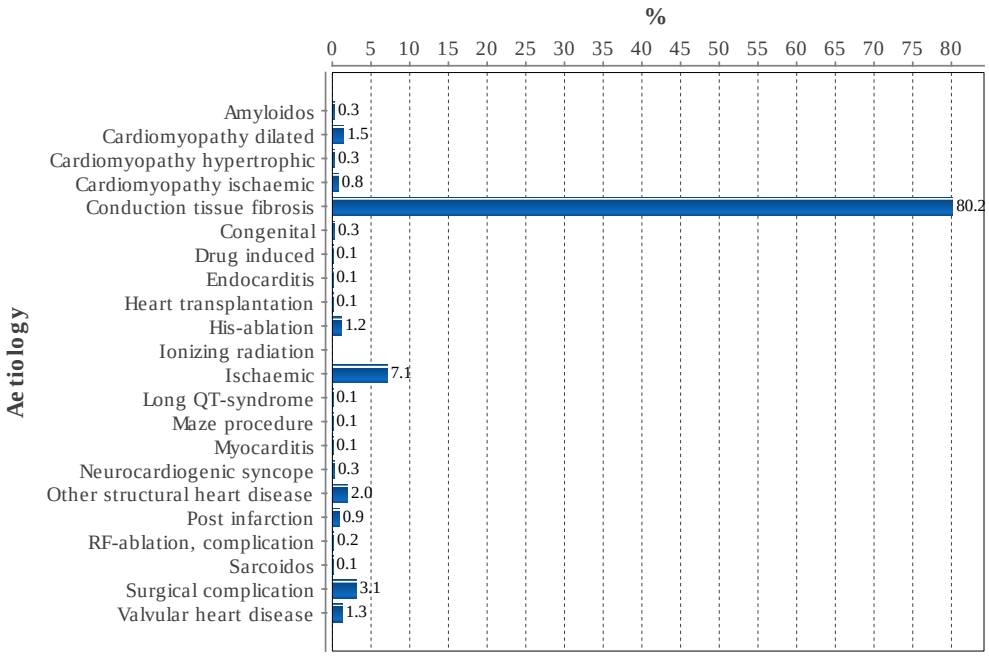
Implants by subtype (WRLS: wireless)

Mode	%	No
CRT	5.4	374
DDD	78.0	5410
SSI	16.5	1147
VVIR-WRLS	0.1	4
Total number of first implants 6935		



Main aetiology for implanting pacemakers

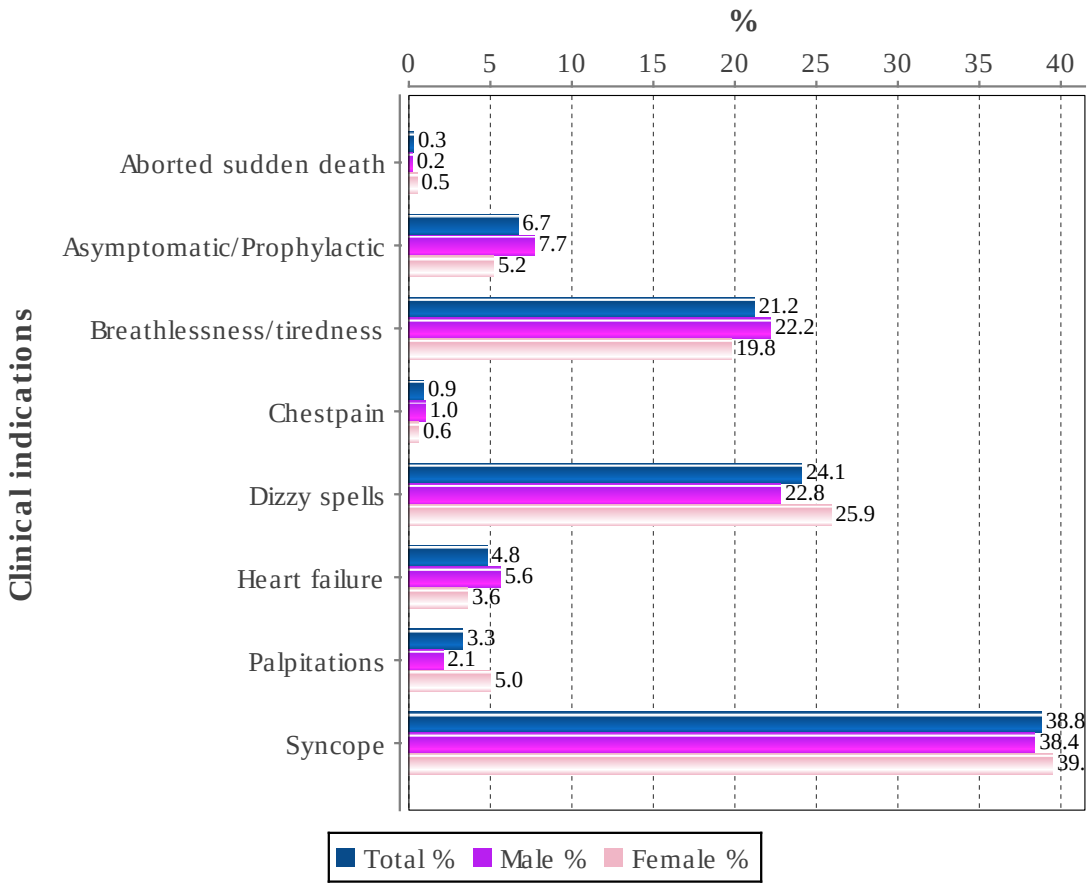
Aetiology	Total %	Male %	Female %
Amyloidos	0.3	0.3	0.2
Cardiomyopathy dilated	1.5	1.8	0.9
Cardiomyopathy hypertrophic	0.3	0.2	0.3
Cardiomyopathy ischaemic	0.8	1.0	0.5
Conduction tissue fibrosis	80.2	77.8	83.6
Congenital	0.3	0.4	0.2
Drug induced	0.1	0.1	0.1
Endocarditis	0.1	0.1	0.0
Heart transplantation	0.1	0.1	0.0
His-ablation	1.2	1.0	1.6
Ionizing radiation	0.0	0.0	0.0
Ischaemic	7.1	9.0	4.4
Long QT-syndrome	0.1	0.0	0.1
Maze procedure	0.1	0.0	0.1
Myocarditis	0.1	0.1	0.1
Neurocardiogenic syncope	0.3	0.2	0.4
Other structural heart disease	2.0	1.7	2.3
Post infarction	0.9	1.0	0.9
RF-ablation, complication	0.2	0.1	0.3
Sarcoidos	0.1	0.1	0.1
Surgical complication	3.1	3.4	2.6
Valvular heart disease	1.3	1.5	1.1

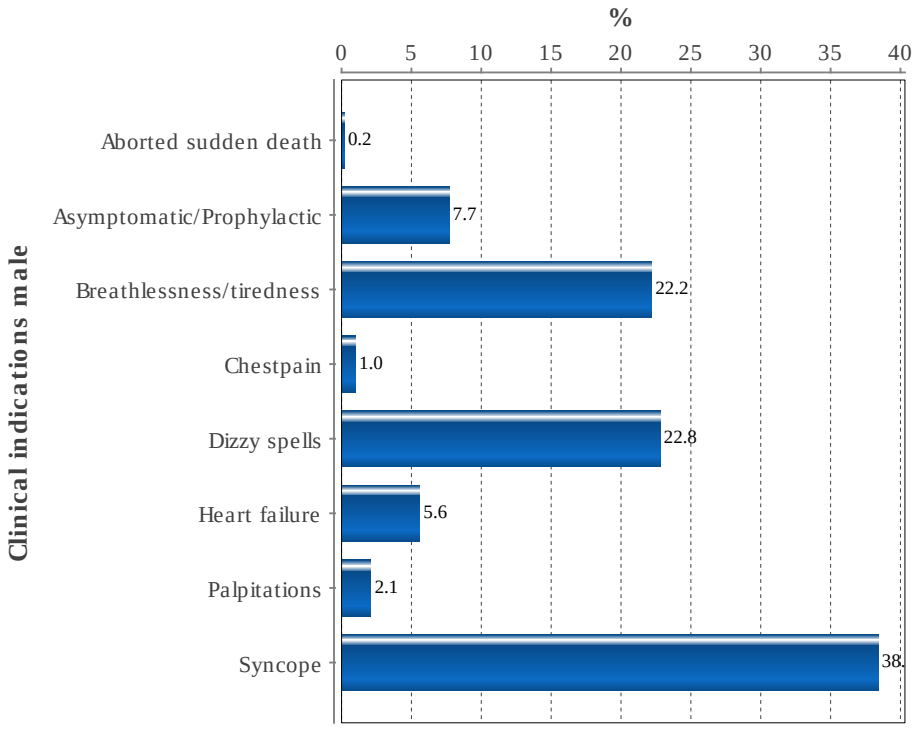


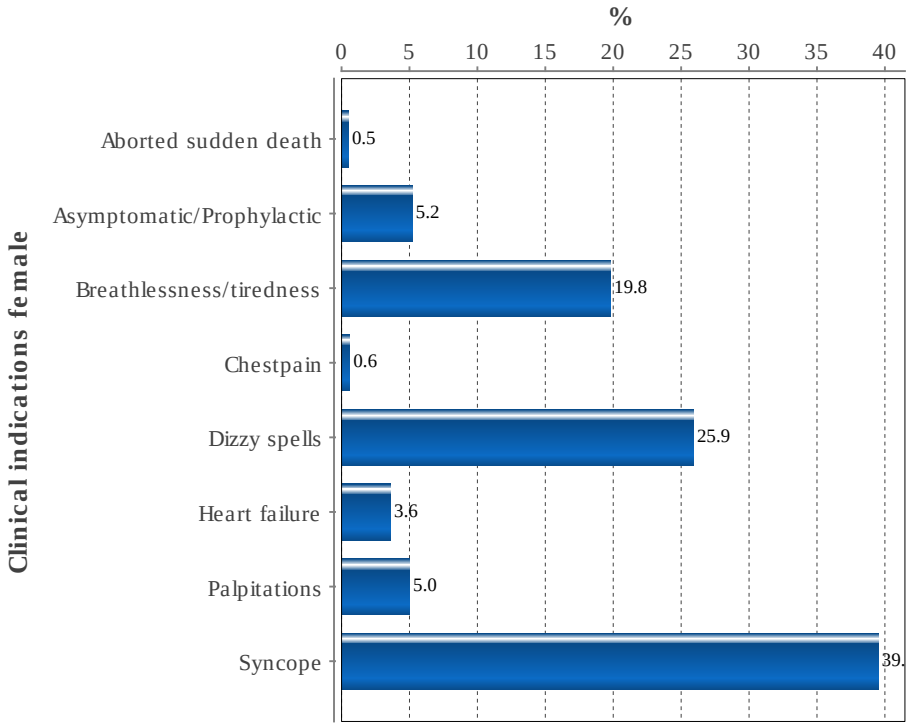
	2015	2014	2013	2012	2011	2010
VVI to VVIR	5	5	8	33	13	24
AAI/AAIR to DDD/DDDR	21	20	54	68	39	26
VVI/VVIR to DDD/DDDR	22	43	85	108	53	39
VVI/VVIR/DDD/DDDR to CRT	216	142	185	300	127	79

Main symptom for implanting pacemakers

Indication	Total %	Male %	Female %
Aborted sudden death	0.3	0.2	0.5
Asymptomatic/Prophylactic	6.7	7.7	5.2
Breathlessness/tiredness	21.2	22.2	19.8
Chestpain	0.9	1.0	0.6
Dizzy spells	24.1	22.8	25.9
Heart failure	4.8	5.6	3.6
Palpitations	3.3	2.1	5.0
Syncope	38.8	38.4	39.5

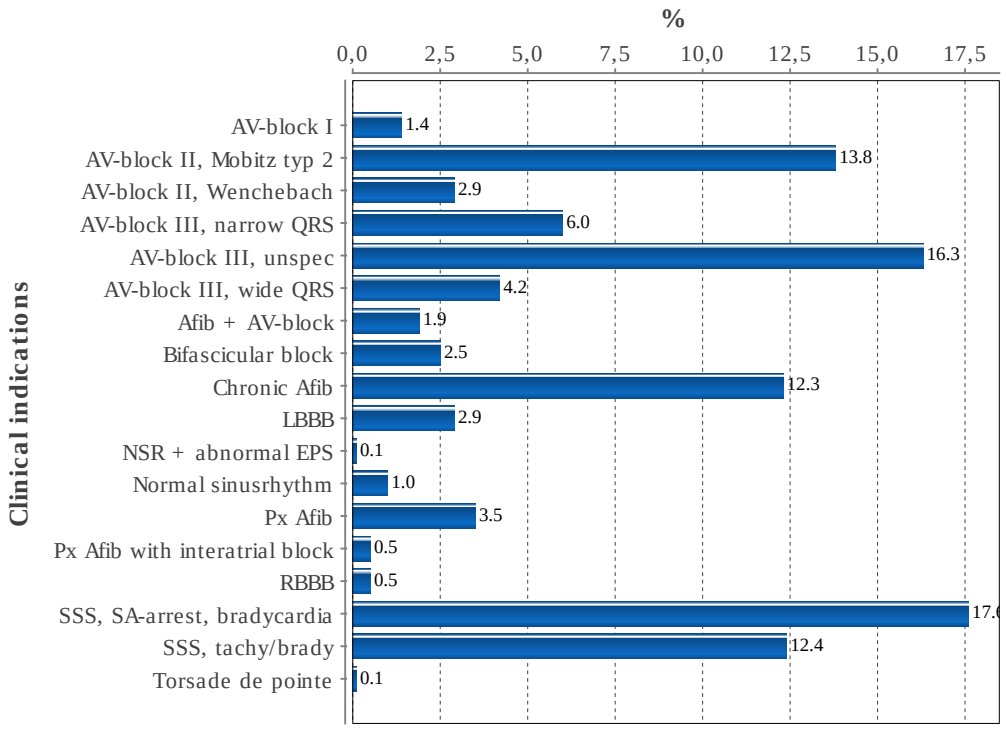



%
0
5
10
15
20
25
30
35
40
Clinical indications male
Aborted sudden death
0.2
Asymptomatic/Prophylactic
7.7
Breathlessness/tiredness
22.2
Chestpain
1.0
Dizzy spells
22.8
Heart failure
5.6
Palpitations
2.1
Syncope
38.


%
0
5
10
15
20
25
30
35
40
Clinical indications female
Aborted sudden death
0.5
Asymptomatic/Prophylactic
5.2
Breathlessness/tiredness
19.8
Chestpain
0.6
Dizzy spells
25.9
Heart failure
3.6
Palpitations
5.0
Syncope
39.

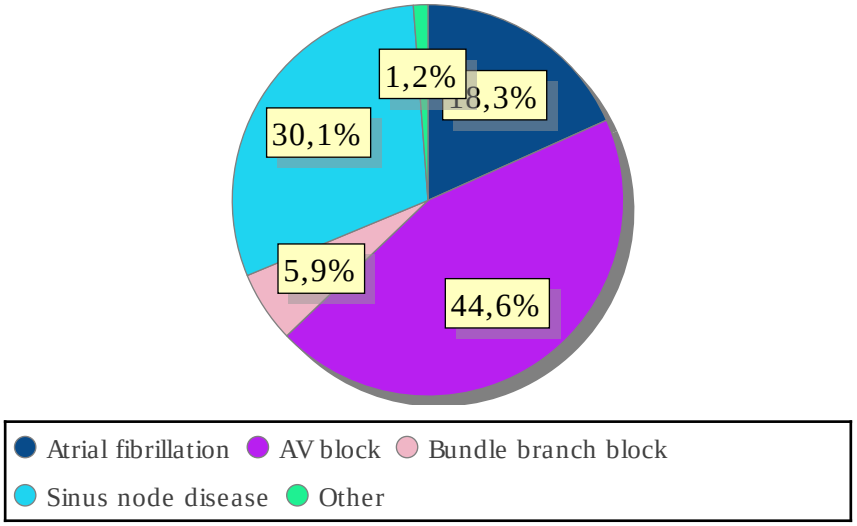
Main ECG indication, total

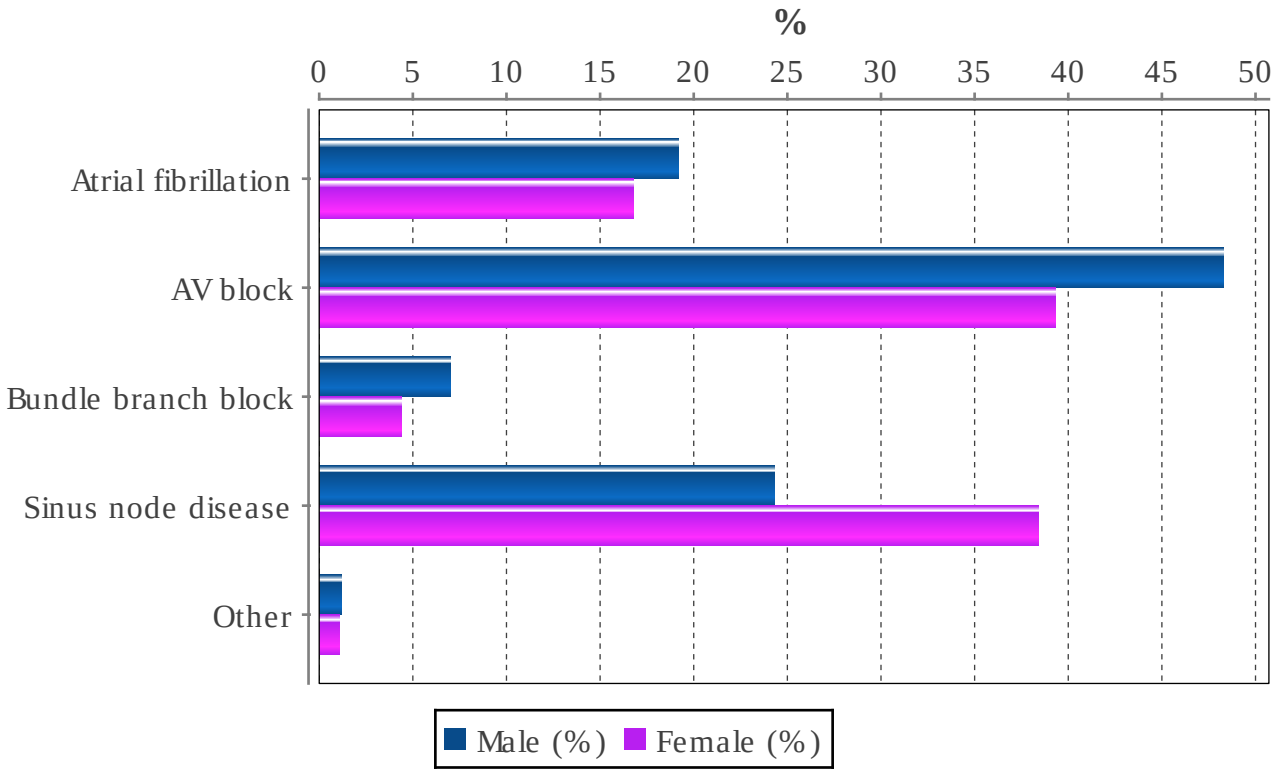
Indication	%
AV-block I	1.4
AV-block II, Mobitz typ 2	13.8
AV-block II, Wenchebach	2.9
AV-block III, narrow QRS	6.0
AV-block III, unspec	16.3
AV-block III, wide QRS	4.2
Afib + AV-block	1.9
Bifascicular block	2.5
Chronic Afib	12.3
LBBB	2.9
NSR + abnormal EPS	0.1
Normal sinusrhythm	1.0
Px Afib	3.5
Px Afib with interatrial block	0.5
RBBB	0.5
SSS, SA-arrest, bradycardia	17.6
SSS, tachy/brady	12.4
Torsade de pointe	0.1



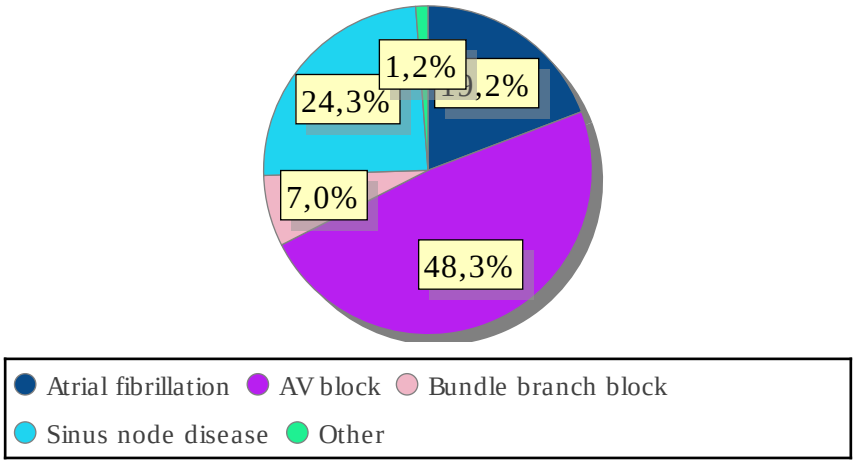
Main ECG indication by gender and for patients < 18 years of age

Indication	No	%	Male (%)	Female (%)	Younger than 18 (%)
Atrial fibrillation	1266	18.3	19.2	16.8	3.8
AV block	3092	44.6	48.3	39.3	53.8
Bundle branch block	409	5.9	7.0	4.4	3.8
Sinus node disease	2087	30.1	24.3	38.4	30.8
Other	81	1.2	1.2	1.1	7.7
					Total number of implants 6935

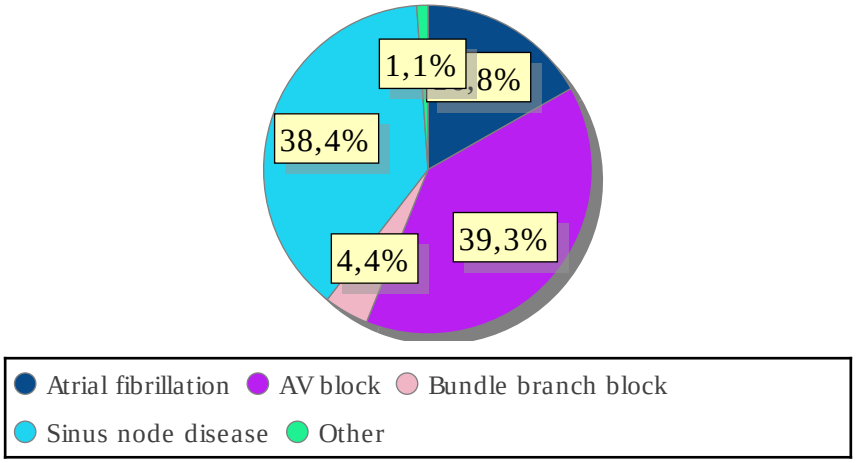




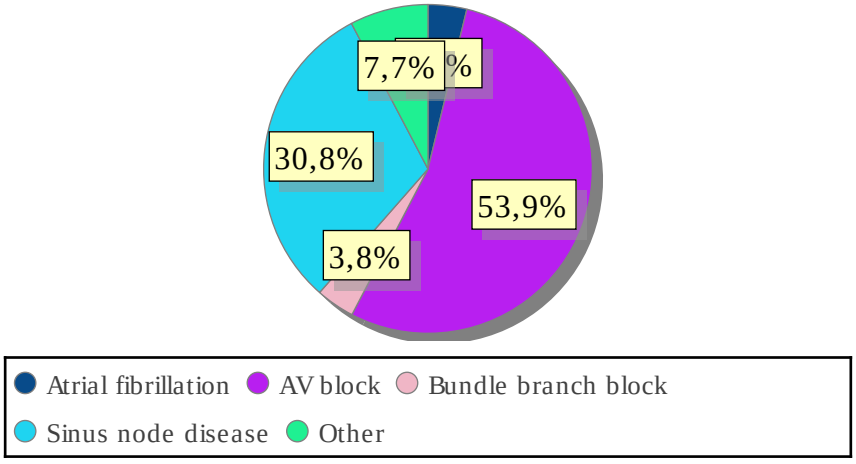
Male



Female



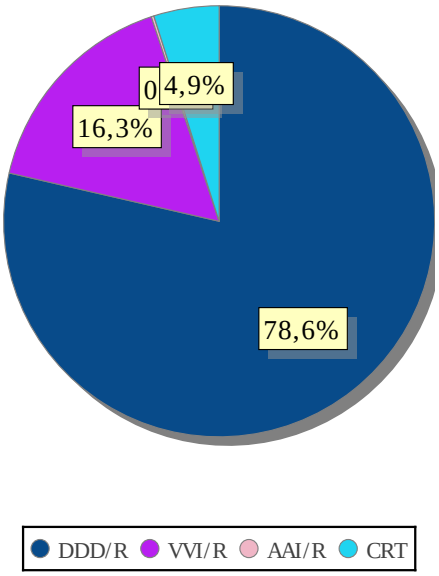
< 18



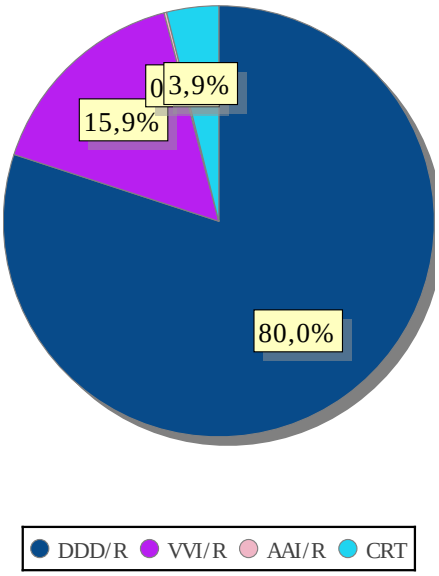
Use of pacemaker subtype for all indications per hospital size (number of new implants/year and hospital)

Size	Hospitals	DDD %	VVI %	AAI %	CRT %
Large	15	78.0	15.9	0.2	5.9
Medium	16	80.1	15.9	0.2	3.9
Small	13	76.1	23.0	0.5	0.5
Total	44	78.6	16.3	0.2	4.9

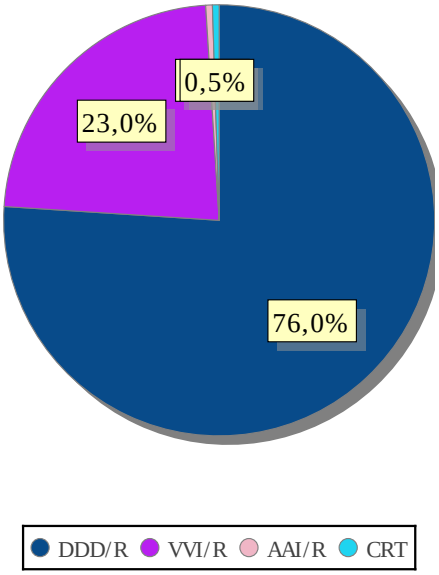
All hospitals



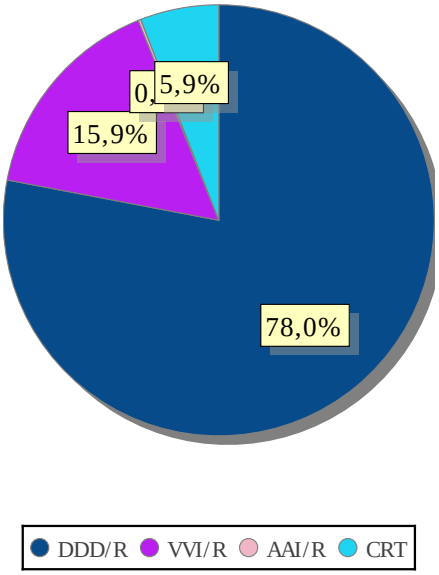
Medium hospitals



Small hospitals



Large hospitals



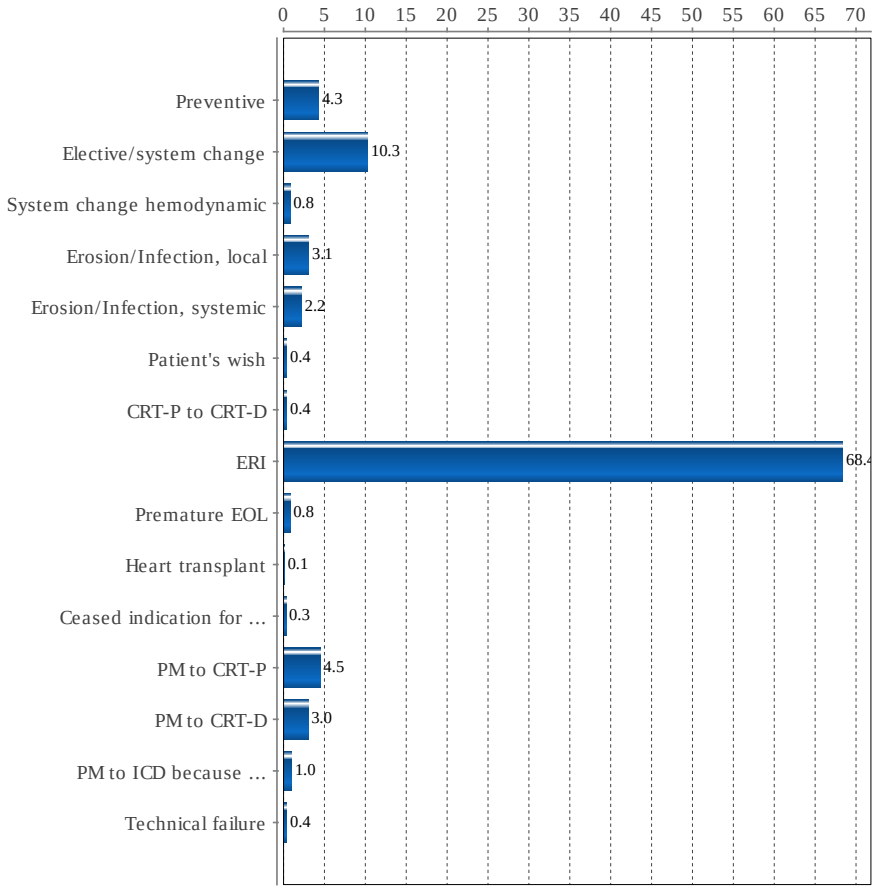
STATISTICS – PACEMAKER – USE OF PACING
MODES FIRST IMPLANT PER HOSPITAL

Use of pacemaker sub type for all indications per hospital (number of new implants / year and hospital))

Hospital	Number	DDD %	VVI %	AAI %	CRT %
Akademiska sjukhuset	281	78.3	16.4	0.4	5.0
Alingsås lasarett	79	79.7	19.0	1.3	0.0
Arvika sjukhus	3	66.7	33.3	0.0	0.0
Blekingesjukhuset	144	86.8	9.0	0.7	3.5
Centrallasarettet Växjö	109	82.6	14.7	0.0	2.8
Centralsjukhuset Karlstad	147	81.6	15.6	0.0	2.7
Centralsjukhuset Kristianstad	206	83.0	17.0	0.0	0.0
Centralsjukhuset Västerås	158	81.0	17.7	0.0	1.3
Danderyds sjukhus	388	80.4	14.2	0.0	5.4
Drottning Silvias Bus	12	91.7	8.3	0.0	0.0
Falu lasarett	231	71.4	20.8	0.4	7.4
Hudiksvalls sjukhus	51	84.3	15.7	0.0	0.0
Karolinska Universitetssjukhuset	367	75.5	12.3	0.3	12.0
Kungälvs sjukhus	10	90.0	10.0	0.0	0.0
Linköpings Universitetssjukhus	252	74.6	11.1	0.0	14.3
Länssjukhuset Gävle	203	77.3	18.2	0.0	4.4
Länssjukhuset Halmstad	112	80.4	19.6	0.0	0.0
Länssjukhuset Kalmar	68	61.8	35.3	0.0	2.9
Länssjukhuset Ryhov	223	78.9	21.1	0.0	0.0
Mälarsjukhuset	191	86.4	12.0	0.0	1.6
Norrlands Universitetssjukhus	183	71.6	16.4	0.0	12.0
Oskarshamns sjukhus	29	75.9	17.2	6.9	0.0
Sahlgrenska Universitetssjukhuset	461	80.0	11.9	0.4	7.6
Sahlgrenska Universitetssjukhuset /Östra	36	86.1	13.9	0.0	0.0
Skaraborgs sjukhus Skövde	218	75.7	12.4	0.0	11.9
Skellefteå lasarett	56	80.4	19.6	0.0	0.0
Skånes universitetssjukhus, Lund	531	79.8	15.1	0.4	4.7
Skånes universitetssjukhus, Malmö	273	77.7	22.3	0.0	0.0
Sollefteå sjukhus	15	53.3	46.7	0.0	0.0
St Görans sjukhus	217	84.3	10.1	0.5	5.1
Sunderby sjukhus	221	69.7	28.1	0.0	2.3
Sundsvalls sjukhus	151	82.1	16.6	0.0	1.3
Södersjukhuset	251	81.3	15.1	0.0	3.6
Södra Älvsborgs sjukhus	172	82.6	12.2	0.0	5.2
Torsby sjukhus	26	38.5	61.5	0.0	0.0
Trollhättan, NÄL	227	78.9	17.6	0.0	3.5
Universitetssjukhuset Örebro	183	72.7	16.9	1.1	9.3
Varbergs sjukhus	96	72.9	20.8	0.0	6.3
Visby lasarett	46	87.0	13.0	0.0	0.0
Vrinnevisjukhuset	101	86.1	13.9	0.0	0.0
Västerviks sjukhus	37	78.4	21.6	0.0	0.0
Örnsköldsviks sjukhus	50	84.0	16.0	0.0	0.0
Östersunds sjukhus	114	74.6	21.1	0.0	4.4

Reason for generator explant. Elective used for changes performed before reached ERI/EOL.

Reason	All hospitals %	(large) %	(medium) %	(small) %
Preventive	4.3	2.3	8.6	3.0
Elective/system change	10.3	12.4	6.6	7.1
System change hemodynamic	0.8	0.7	1.1	0.0
Erosion/Infection, local	3.1	4.3	1.1	1.2
Erosion/Infection, systemic	2.2	3.0	0.9	0.6
Patient's wish	0.4	0.5	0.1	0.0
CRT-P to CRT-D	0.4	0.3	0.6	0.6
ERI	68.4	64.5	73.3	82.1
Premature EOL	0.8	0.9	0.1	3.0
Heart transplant	0.1	0.2	0.0	0.0
Ceased indication for PM therapy	0.3	0.4	0.1	0.6
PM to CRT-P	4.5	5.3	3.6	0.6
PM to CRT-D	3.0	3.6	2.1	0.6
PM to ICD because of arrhythmia	1.0	1.3	0.8	0.0
Technical failure	0.4	0.3	0.8	0.6

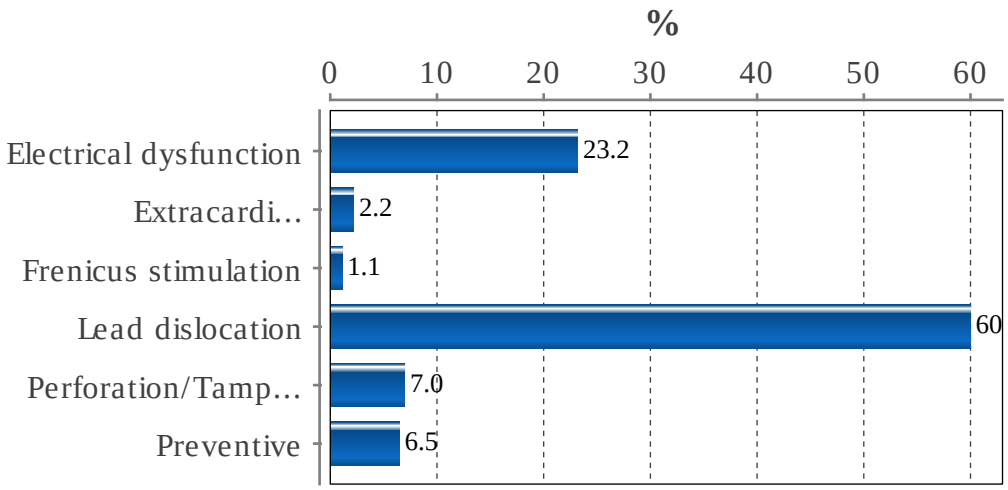


Historical explant indications

Reason	2011 %	2012 %	2013 %	2014 %	2015 %
Preventive	3.7	6.2	6.8	5.4	4.3
System change hemodynamic	4.5	2.4	0.9	0.8	0.8
Recall/Alert	0.0	0.1	0.0	0.0	0.0
Erosion/Infection, local	4.9	5.1	3.4	3.3	3.1
Patient's wish	0.1	0.1	0.3	0.3	0.4
ERI	77.7	75.7	74.8	73.1	68.4
Premature EOL	4.3	2.8	2.8	2.3	0.8
Heart transplant	0.0	0.1	0.0	0.0	0.1
Ceased indication for PM therapy	0.4	0.4	0.8	0.3	0.3
PM to CRT-P	0.2	4.1	3.3	3.8	4.5
PM to ICD because of arrhythmia	0.2	2.5	1.1	1.7	1.0
System change arrhythmia	3.3	0.0	0.0	0.0	0.0
Technical failure	0.6	0.3	0.4	0.9	0.4
Elective/system change	0.0	0.0	2.6	3.8	10.3
Erosion/Infection, systemic	0.0	0.0	1.5	1.9	2.2
PM to CRT-D	0.0	0.0	1.4	2.4	3.0
CRT-P to CRT-D	0.0	0.0	0.0	0.0	0.4

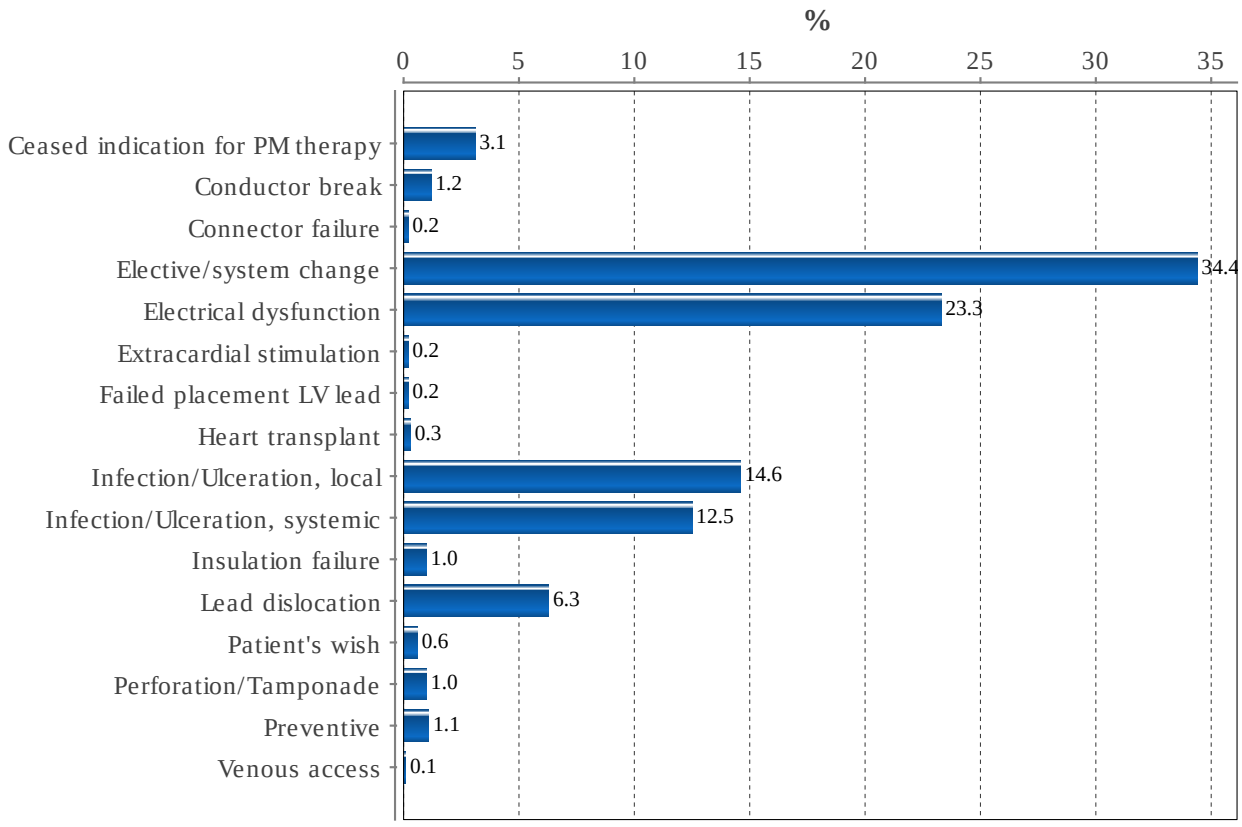
Reason for lead correction/reoperation by hospital size (number of new implants/ year and hospital) Electrical dysfunction including undersense and threshold increase.

Reason	All hospital (%)	Small (%)	Medium (%)	Large (%)
Electrical dysfunction	23.2	0.0	35.9	17.1
Extracardial stimulation	2.2	0.0	1.6	2.6
Frenicus stimulation	1.1	0.0	0.0	1.7
Lead dislocation	60.0	100.0	57.8	59.8
Perforation/Tamponade	7.0	0.0	4.7	8.5
Preventive	6.5	0.0	0.0	10.3
				Total no 185



Reason for lead explants by hospital size. (number of new implants/year and hospital)

Reason	All hospitals(%)	Small (%)	Medium (%)	Large (%)
Ceased indication for PM therapy	3.1	3.8	2.9	3.1
Conductor break	1.2	-	0.7	1.5
Connector failure	0.2	-	0.7	-
Elective/system change	34.4	38.5	49.6	27.8
Electrical dysfunction	23.3	34.6	23.6	22.3
Extracardial stimulation	0.2	-	-	0.3
Failed placement LV lead	0.2	-	-	0.3
Heart transplant	0.3	-	-	0.4
Infection/Ulceration, local	14.6	3.8	4.6	19.5
Infection/Ulceration, systemic	12.5	3.8	5.0	16.3
Insulation failure	1.0	3.8	1.4	0.6
Lead dislocation	6.3	7.7	8.9	5.1
Patient's wish	0.6	-	0.7	0.6
Perforation/Tamponade	1.0	1.9	0.7	1.0
Preventive	1.1	1.9	1.1	1.0
Venous access	0.1	-	-	0.1
				Total no 1013



Procedures per operator (exclusive CRT)

Hospital	Operator	No
Akademiska sjukhuset	Arvanitis	65
	Dimberg	16
	Hellgren	4
	Janiec	5
	Jidéus	18
	Landelius	2
	Lindblom	5
	Melki	19
	Mörtsell	72
	N/A	10
	Schiller	9
	Sciaraffia	24
	Teder	88
	Thorén	8
	Zemgulis	9
Alingsås lasarett	Kennergren	24
	Sivik	14
	Watsfeldt	18
	Westerberg	42
Arvika sjukhus	Brunmark	9
	Westbom	4
Ålands centralsjukhus	Ove Carlström	2
	Slotte	16
Blekingesjukhuset	Borg	69
	Ericsson	43
	Ghaidan, Haider	23
	Ringborn, Michael	55
Centrallasarettet Växjö	Johansson P	45
	Jonasson	26
	Kir. allm	2
	Rosén Helena	19
	Strandberg	41
	Weber	2
Centralsjukhuset Karlstad	Khalili	54
	Niklas Aldergård	52
	Saidi	60
	Venizelos Georgius	5
Centralsjukhuset Kristianstad	Babiak	80
	Borg	18
	Carlström	15
	Gadler	54
	Hörnsten	10
	Östenson	58
	Westholm	15
Centralsjukhuset Västerås	Dilan	67
	SkoglundAndersson	51
	Täckström	8
	Wiberg	79
Danderyds sjukhus	2	69
	3	124
	4	184
	6	121
Drottning Silvias Bus	Hallhagen	2
	Nilsson B	1
	Oskar Väärt	10
	Synnergren	7
Falu lasarett	Monheim	2
	Berglund	52
	Forsgren	116
	Guggi	97
	MFO	1
Hudiksvalls sjukhus	Roussinne	60
	Thomas Andrews	6
Karolinska Universitetssjukhus	Gadler	101
	Hörnsten	97
	Reistam	118
	Reistam/Gadler	1
	Reistam/ Westholm	1
	Westholm	144
Kungälvs sjukhus	Annan	2
	Fogelqvist	5
	Hellström	5
	Norström	3
Länssjukhuset Gävle	Falck	7
	Johansson Staffan	44
	Kastberg	104
	Larsson Anders	1
	Magnusson Peter	62
	Mati Jalakas	53
Länssjukhuset Halmstad	Johan Engdahl	65
	Martin Löfgren	2
	Rikard Berggren	76
Länssjukhuset Kalmar	Anja Fagerström	1
	Carlström	9
	David Olsson	31
	Hendrik Schreyer	7
	Michael Lindstaedt	39
Länssjukhuset Ryhov	Annan	1
	Asking	46
	Jakobsson S	107
	Lagerberg	124

Hospital	Operator	No
Linköpings universitetssjukhus	Jönsson A	9
	Säfström K	87
	Sonesson L	95
	Svenson A	37
	Szymanowski A	41
Mälarsjukhuset	Andreas Pikwer	56
	Axel Nyberg	47
	Bozena Ostrowska	22
	Gabriele Backers	19
	Hanan Alwan	11
	Jan Haapaniemi	3
	Krister Blomberg	5
	Peter Spetz	38
	Sijal Namdar	3
	Ulla Lindblad	35
Norrlands Universitetssjukhus	Annan	3
	Höglund	30
	Jensen	12
	Kesek	39
	Landström	55
	Rönn	59
	Tossavainen	2
Oskarshamns sjukhus	Van Der Wal	17
	Verstraaten	13
Örnsköldsviks sjukhus	Ehlin	64
Östersunds sjukhus	Björklund	20
	Friberg	60
	Hansson	52
Sahlgrenska universitetssjukhuset	Annan	7
	Gäbel	8
	Jamaly	82
	Javid	82
	Kennergren	26
	Konstantinos Liakatsidas	34
	Piotr Szamlewski	184
	Schultz	135
	Westbom	18
Sahlgrenska universitetssjukhuset / Östra	Javid	50
	Piotr Szamlewski	10
	Schultz	1
Skaraborgs sjukhus Skövde	Annan	1
	Falmer	36
	Heberlein	1
	Lorentzen	86
	Paulsson	43
	Winterfeldt	86
Skånes universitetssjukhus, Lund	Annan	19
	Fredrik Slotte	58
	Ingrid Litterfeldt	5
	Johan Brandt	297
	LingWei Wang	69
	Maiwand Farouq	111
	Peter Lindell	12
	Pyotr Platonov	9
	Rasmus Borgquist	3
	Rorsman-Söderström	23
	Steen Jensen	51
Skånes universitetssjukhus, Malmö	Annan	6
	Ingrid Litterfeldt	17
	Johan Brandt	29
	Lingwei Wang	62
	Maiwand Farouq	111
	Rasmus Borgquist	19
	Torbjörn Persson	142
Skellefteå lasarett	Boström	9
	Bygdén	16
	Lindqvist	39
Sollefteå sjukhus	Åström	9
	Kramarz	11
	Rudenstam	3
Södersjukhuset	Jonsson J-E	58
	Kjellman B	90
	Olson J	66
	Rydlund K	104
Södra Älvsborgs sjukhus	Almqvist	46
	Friedemann	59
	Litzén	1
	Lodin	60
	Rindner	1
	Sandgren	36
	Widfeldt	44
St Görans sjukhus	1	107
	1+2	1
	2	94
	3	85
Sunderby sjukhus	Baas	54
	Haupt	78
	Johansson A	43

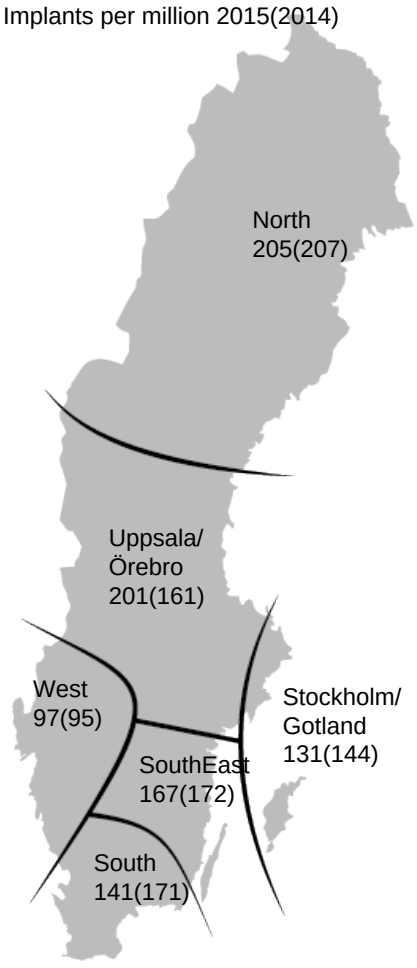
Hospital	Operator	No
	Johansson P	52
	Lundblad	9
	Peter Ragnsson	5
	Wennberg	29
Sundsvalls sjukhus	Annan	29
	Khadhim	114
	Rudenholm	1
	Sundelin	33
Torsby sjukhus	Bentjerodt	21
	Brunmark	3
	Venizelos	5
Trollhättan, NÄL	Csaba Herczku	29
	Dinu Dusceac	26
	Jabbar	17
	Lennander	2
	Petersen P	32
	Söderbergh	53
	Wetterling	75
	Wiberg Dennis	51
Universitetssjukhuset Örebro	Anna Björkenheim	61
	Friberg	2
	Johan Brandt	14
	Lindell	79
	Tommy Andersson	65
Varbergs sjukhus	Emma Sandgren	21
	Rorsman	100
Västerviks sjukhus	Bengt Arvidsson	16
	Joachim Starck	32
Visby lasarett	Jacobsson L	37
	Litorell	21
Vrinnevisjukhuset	Engström	21
	Lindberget	26
	Schiöler	48
	Svensson	44

First implants per hospital (inclusive CRT)

Region	Hospital	2015	2014
Northern Sweden	Norrlands Universitetssjukhus	50	61
	Skellefteå lasarett	2	6
	Sunderby sjukhus	71	41
	Sundsvalls sjukhus	27	31
	Örnsköldsviks sjukhus	2	11
	Östersunds sjukhus	25	34
Southern Sweden	Blekingesjukhuset	38	35
	Centrallasarettet Växjö	19	33
	Skånes universitetssjukhus, Lund	187	200
	Varbergs sjukhus	45	50
South-East Sweden	Linköpings Universitetssjukhus	86	98
	Länssjukhuset Kalmar	43	52
	Länssjukhuset Ryhov	45	39
Stockholm/Gotland	Danderyds sjukhus	70	80
	Karolinska Universitetssjukhuset	182	157
	St Görans sjukhus	39	33
	Södersjukhuset	48	68
Uppsala/Örebro	Akademiska sjukhuset	78	70
	Centralsjukhuset Karlstad	38	32
	Centralsjukhuset Västerås	43	37
	Falu lasarett	75	50
	Hudiksvalls sjukhus	6	4
	Länssjukhuset Gävle	49	50
	Mälarsjukhuset	29	27
	Universitetssjukhuset Örebro	59	44
Western Sweden	Drottning Silvias Bus	1	2
	Sahlgrenska Universitetssjukhuset	60	69
	Skaraborgs sjukhus Skövde	40	40
	Södra Älvsborgs sjukhus	24	15
	Trollhättan, NÄL	27	27

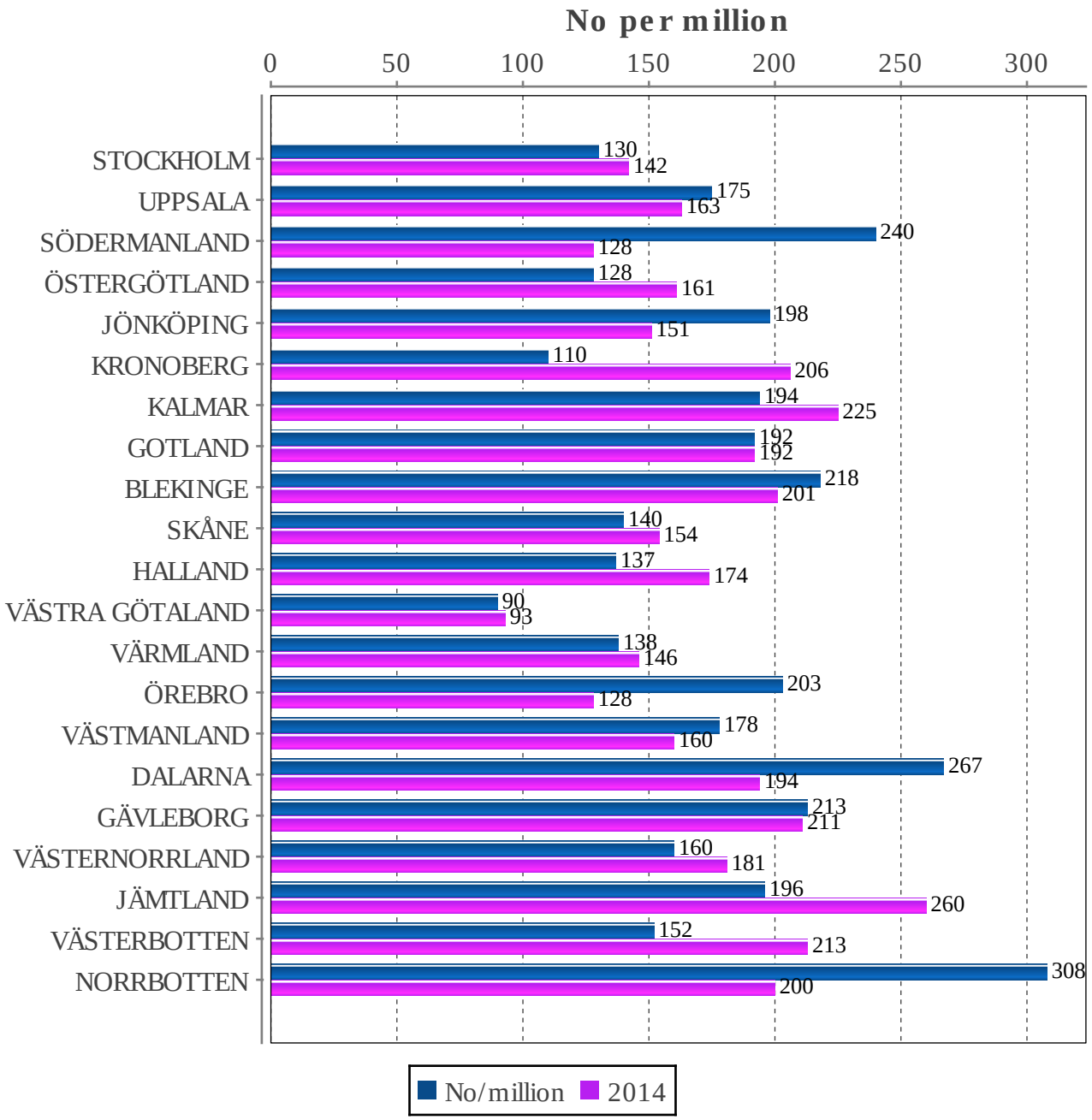
The regions are based on where the patients live, not where they are treated

Region	Population	No of first impl	No per million	Active patients
Stockholm/Gotland	2288830	300	131	2168
Uppsala/Örebro	2031911	409	201	2158
South-East Sweden	1031177	172	167	1042
Southern Sweden	1782910	252	141	1795
Western Sweden	1831805	178	97	1312
Northern Sweden	884384	181	205	1008
Total	9851017	1492	151	9483



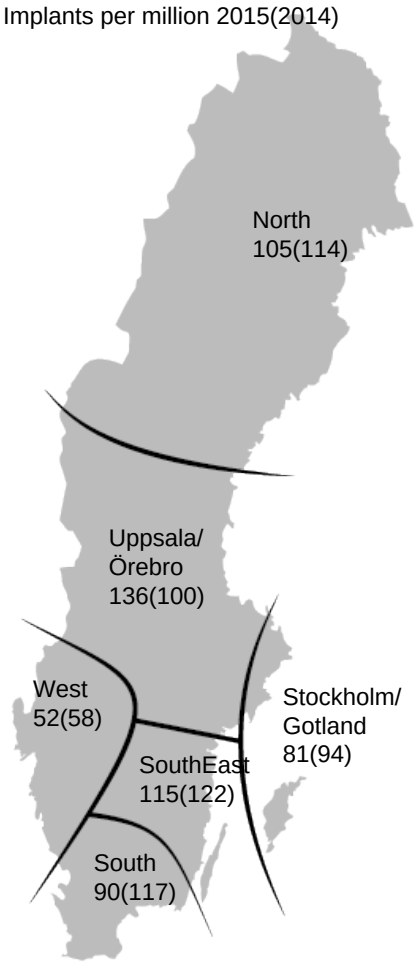
The regions are based on where the patients live, not where they are treated

County	Population	No of first	No/million	Active patients
STOCKHOLM	2231439	289	130	2088
UPPSALA	354164	62	175	389
SÖDERMANLAND	283712	68	240	298
ÖSTERGÖTLAND	445661	57	128	408
JÖNKÖPING	347837	69	198	339
KRONOBERG	191369	21	110	208
KALMAR	237679	46	194	295
GOTLAND	57391	11	192	80
BLEKINGE	156253	34	218	184
SKÅNE	1303627	182	140	1247
HALLAND	314784	43	137	325
VÄSTRA GÖTALAND	1648682	149	90	1143
VÄRMLAND	275904	38	138	229
ÖREBRO	291012	59	203	288
VÄSTMANLAND	264276	47	178	256
DALARNA	281028	75	267	317
GÄVLEBORG	281815	60	213	381
VÄSTERNORRLAND	243897	39	160	237
JÄMTLAND	127376	25	196	140
VÄSTERBOTTEN	263378	40	152	282
NORRBOTTEN	249733	77	308	349
Total	9851017	1491	151	9483


No per million
0
50
100
150
200
250
300
STOCKHOLM
130
142
UPPSALA
175
163
SÖDERMANLAND
240
128
ÖSTERGÖTLAND
128
161
JÖNKÖPING
198
151
KRONOBERG
110
206
KALMAR
194
225
GOTLAND
192
192
BLEKINGE
218
201
SKÅNE
140
154
HALLAND
137
174
VÄSTRA GÖTALAND
90
93
VÄRMLAND
138
146
ÖREBRO
203
128
VÄSTMANLAND
178
160
DALARNA
267
194
GÄVLEBORG
213
211
VÄSTERNORRLAND
160
181
JÄMTLAND
196
260
VÄSTERBOTTEN
152
213
NORRBOTTEN
308
200
No/million
2014

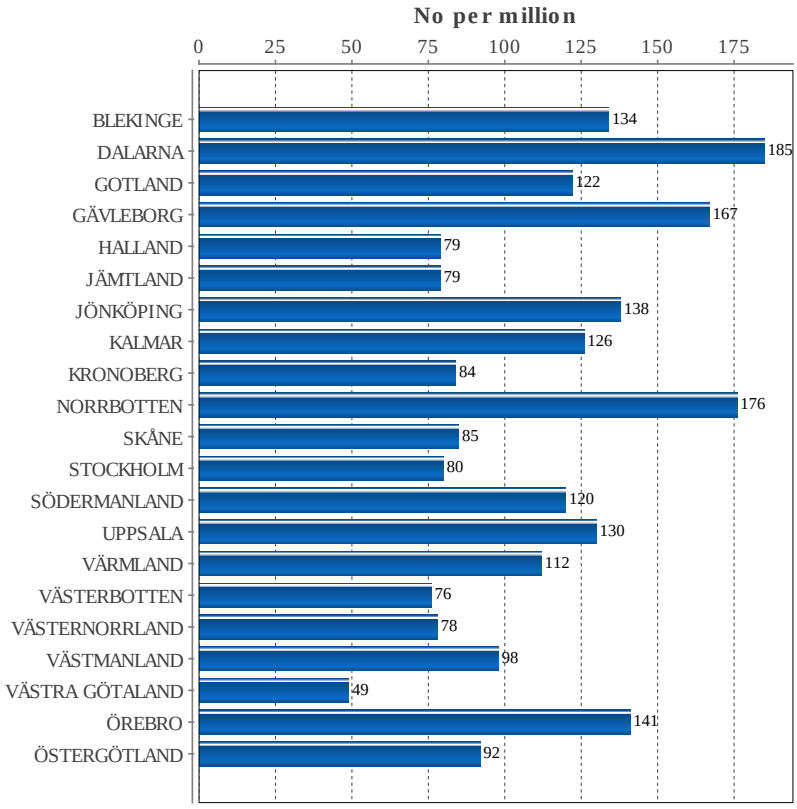
The regions are based on where the patients live, not where they are treated

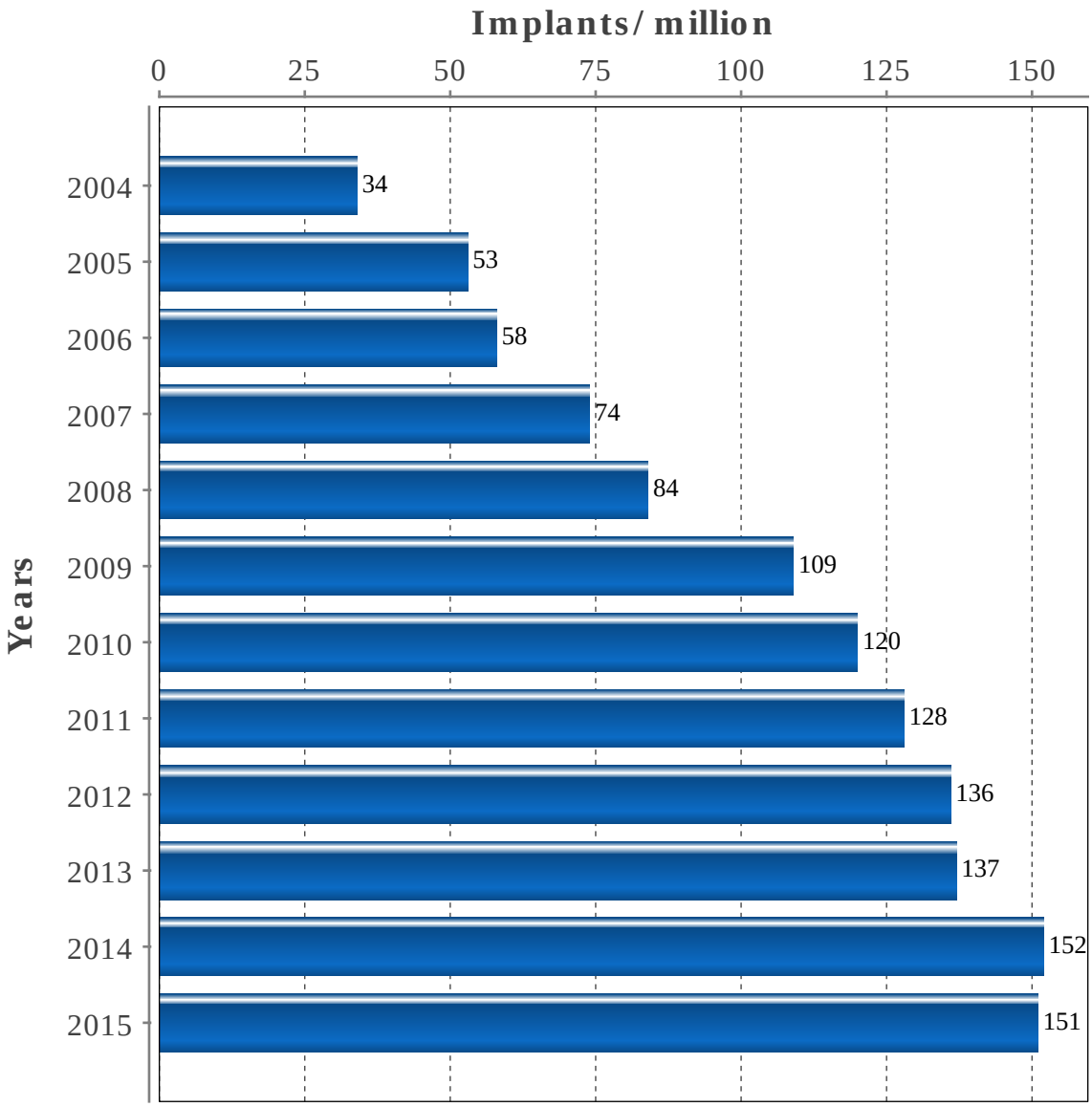
Region	Population	No of first impl	No per million	Active patients
Stockholm/Gotland	2288830	185	81	1334
Uppsala/Örebro	2031911	277	136	1109
South-East Sweden	1031177	119	115	608
Southern Sweden	1782910	160	90	1001
Western Sweden	1831805	96	52	593
Northern Sweden	884384	93	105	481
Total	9851017	930	94	5126



The regions are based on where the patients live, not where they are treated

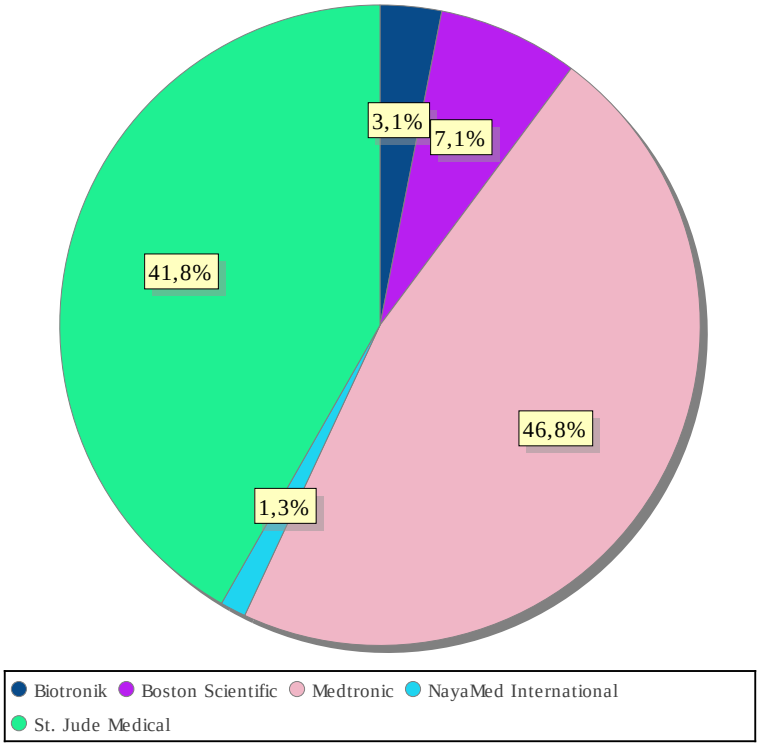
County	Population	No of first	No/million
BLEKINGE	156253	21	134
DALARNA	281028	52	185
GOTLAND	57391	7	122
GÄVLEBORG	281815	47	167
HALLAND	314784	25	79
JÄMTLAND	127376	10	79
JÖNKÖPING	347837	48	138
KALMAR	237679	30	126
KRONOBERG	191369	16	84
NORRBOTTEN	249733	44	176
SKÅNE	1303627	111	85
STOCKHOLM	2231439	178	80
SÖDERMANLAND	283712	34	120
UPPSALA	354164	46	130
VÄRMLAND	275904	31	112
VÄSTERBOTTEN	263378	20	76
VÄSTERNORRLAND	243897	19	78
VÄSTMANLAND	264276	26	98
VÄSTRA GÖTALAND	1648682	81	49
ÖREBRO	291012	41	141
ÖSTERGÖTLAND	445661	41	92
Total	9851017	928	94




Implants/ million
0
25
50
75
100
125
150
Years
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
34
53
58
74
84
109
120
128
136
137
152
151

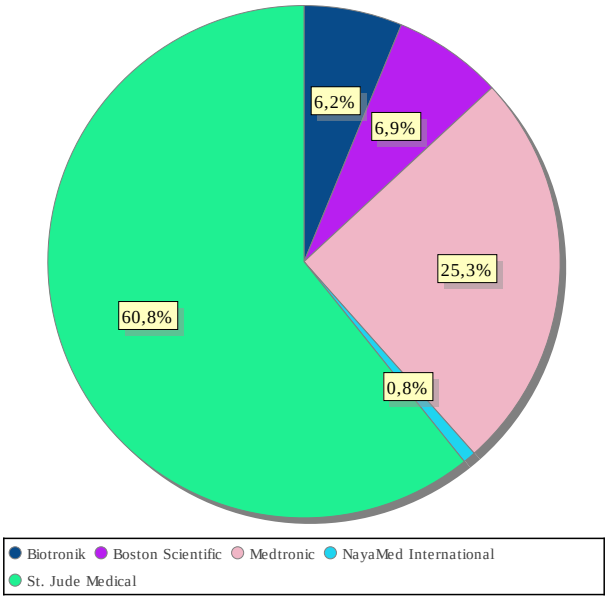
Market share per manufacturer in Sweden

Manufacturer	2012 %	2013 %	2014 %	2015 %
Biotronik	6.2	4.8	3.7	3.1
Boston Scientific	7.0	10.4	7.9	7.1
Medtronic	42.8	36.8	43.2	46.8
St. Jude Medical	43.7	47.8	44.6	41.8
Cameron Health	0.1	0.1	0.1	-
NayaMed International	-	-	0.5	1.3
Boston Scientific includes Cameron Health from 2015				



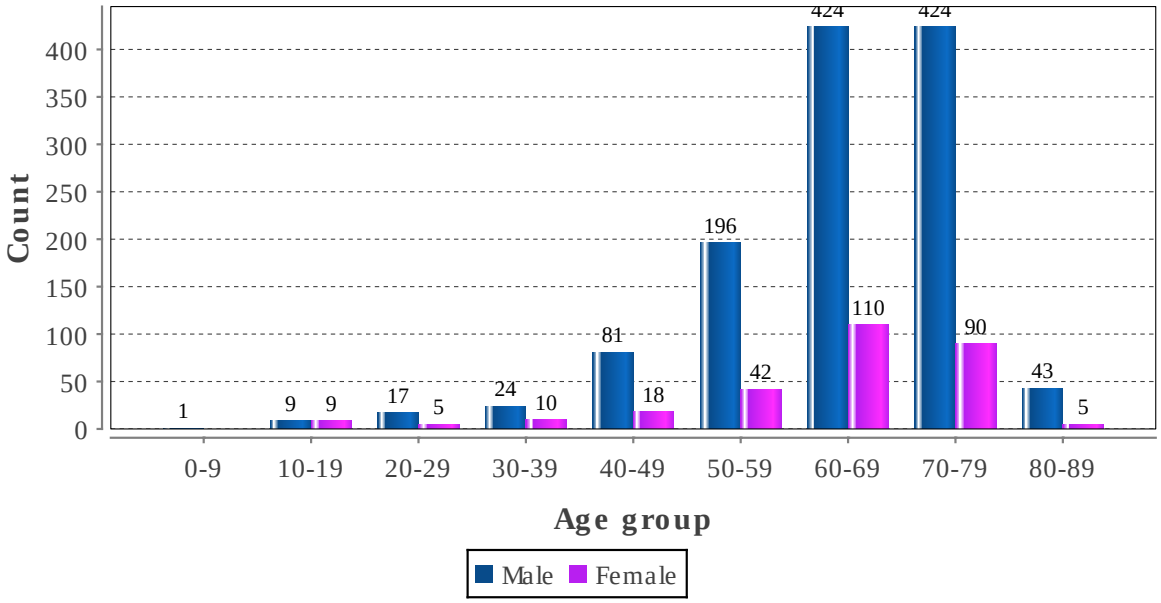
Market share per manufacturer in Sweden

Manufacturer	2012 %	2013 %	2014 %	2015 %
Biotronik	16.1	11.5	10.3	6.2
Boston Scientific	13.4	7.7	11.0	6.9
Medtronic	23.5	24.9	23.7	25.3
St. Jude Medical	46.8	55.7	54.3	60.7
NayaMed International	-	-	0.6	0.8
CameronHealth	-	-	0.1	-
Boston Scientific includes Cameron Health from 2015				



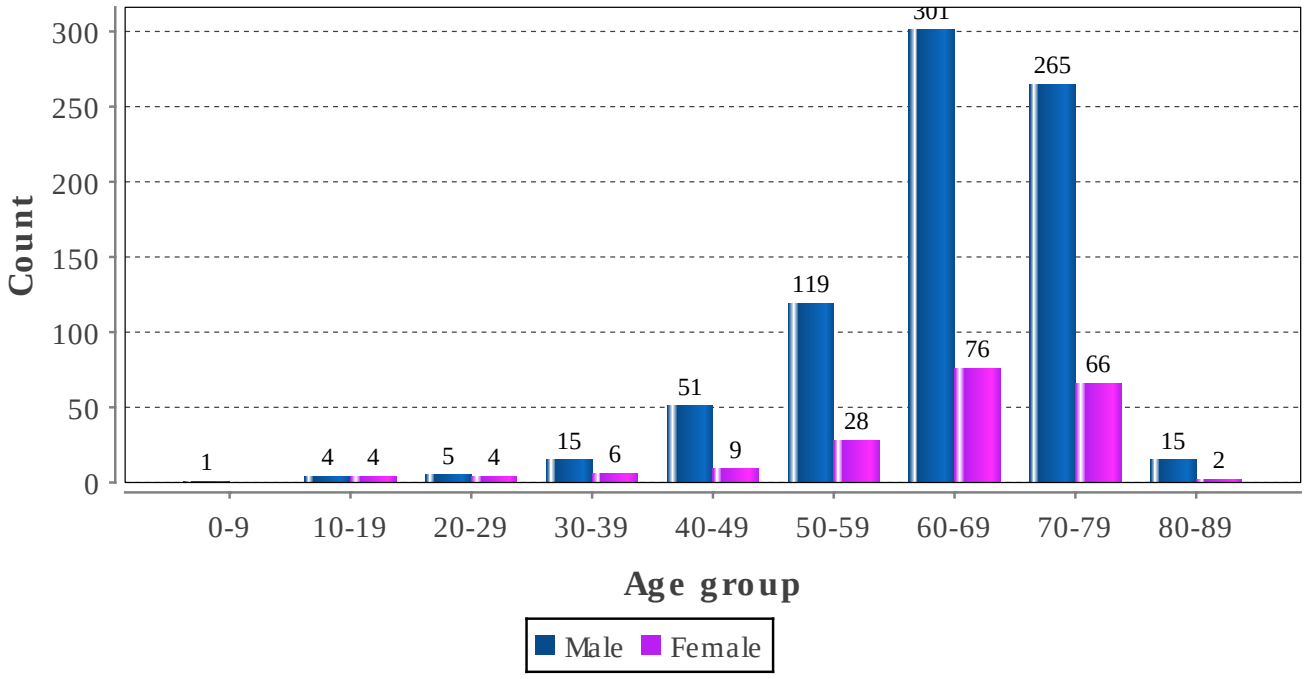
Age and gender distribution for new implants, total numbers

Age (years)	Total no	%	Male	Female
0-9	1	0.1	1	0
10-19	18	1.2	9	9
20-29	22	1.5	17	5
30-39	34	2.3	24	10
40-49	99	6.6	81	18
50-59	238	15.8	196	42
60-69	534	35.4	424	110
70-79	514	34.1	424	90
80-89	48	3.2	43	5
Average age	64	-	64	62
				Total number of implants: 1508



Primary prevention divided by gender and age.

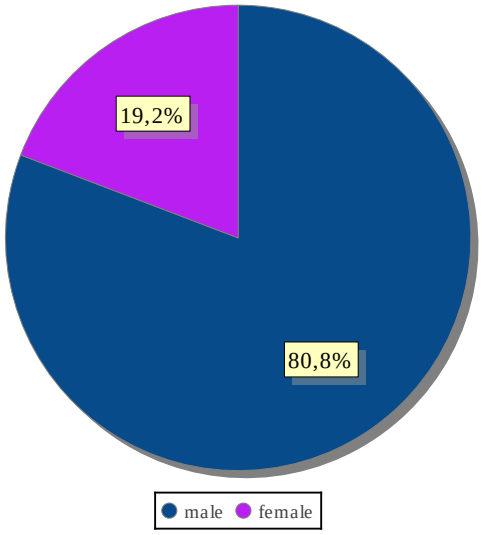
Age (years)	Total no	%	Male	Female
0-9	1	0.1	1	0
10-19	8	0.8	4	4
20-29	9	0.9	5	4
30-39	21	2.2	15	6
40-49	60	6.2	51	9
50-59	147	15.1	119	28
60-69	377	38.8	301	76
70-79	331	34.1	265	66
80-89	17	1.8	15	2
Average age	64	-	64	63
				Total number of implants: 971



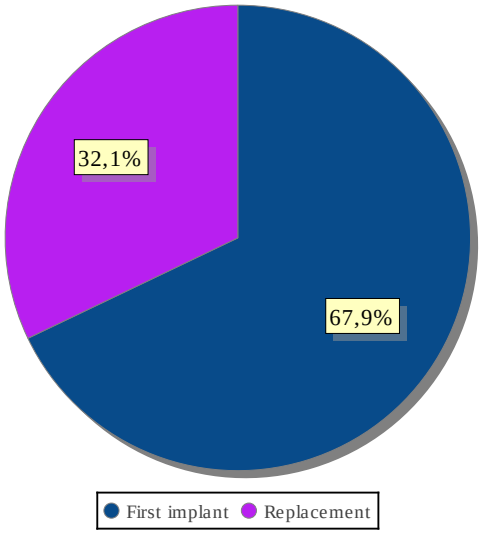
Ratio of new implants versus generator changes

	Total		Male		Female	
	no	%	no	%	no	%
First implant	1508	67.9	1219	80.8	289	19.2
Replacement	714	32.1	593	83.1	121	16.9
Total	2222	100.0	1812	81.5	410	18.5

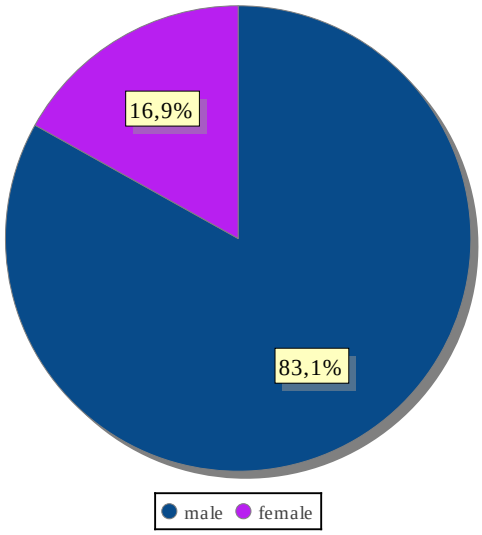
First implant



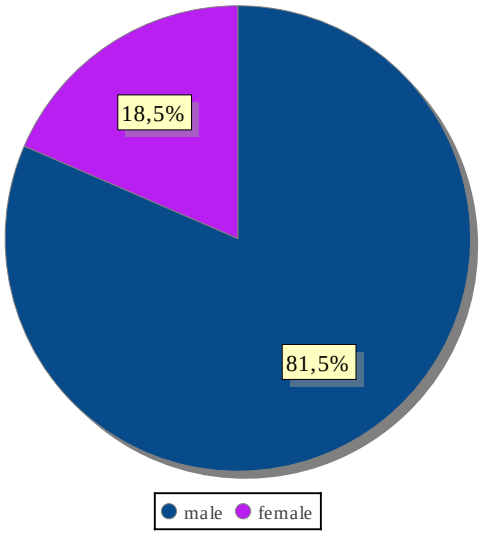
Replacement ratio



Replacement

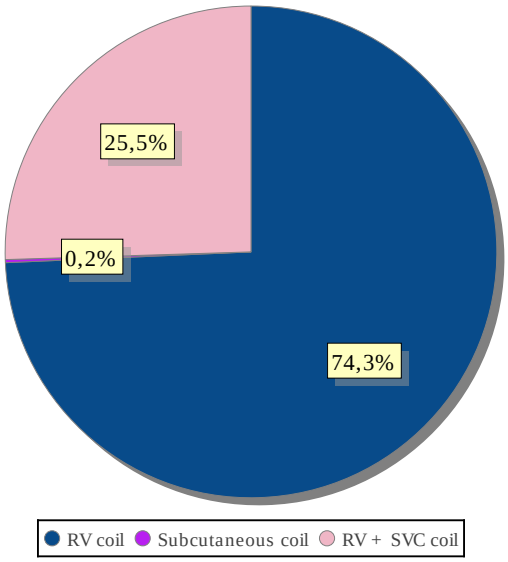


All implant



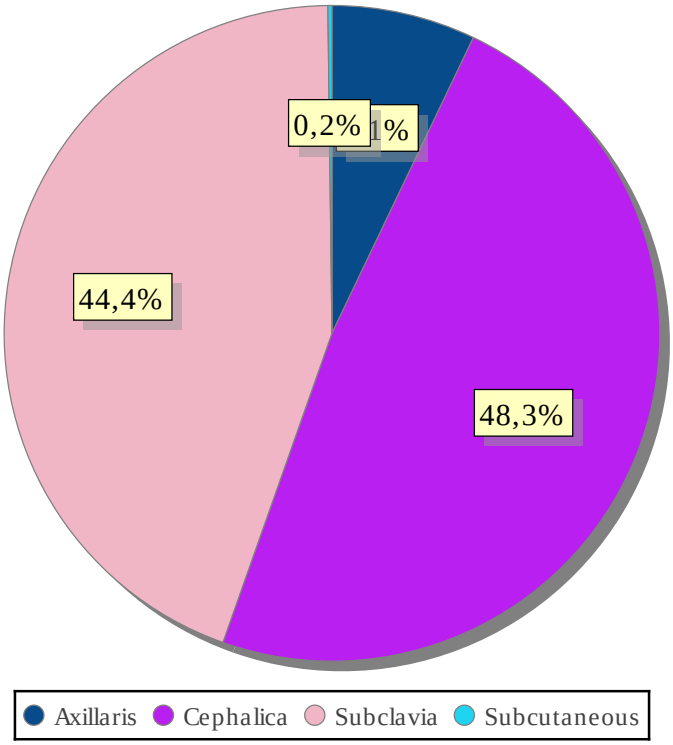
Lead type distribution for atrial and venticular use for new implants and replacements.

	2015		2014	
	no	**%**	**no**	**%**
RV coil	1239	74.3	1077	65.4
Subcutaneous coil	3	0.2	4	0.2
RV + SVC coil	426	25.5	566	34.4
Active fixation	1609	96.5	1602	97.3
Passive fixation	59	3.5	34	2.1
Total number of leads - 2015: 1668, 2014: 1636				



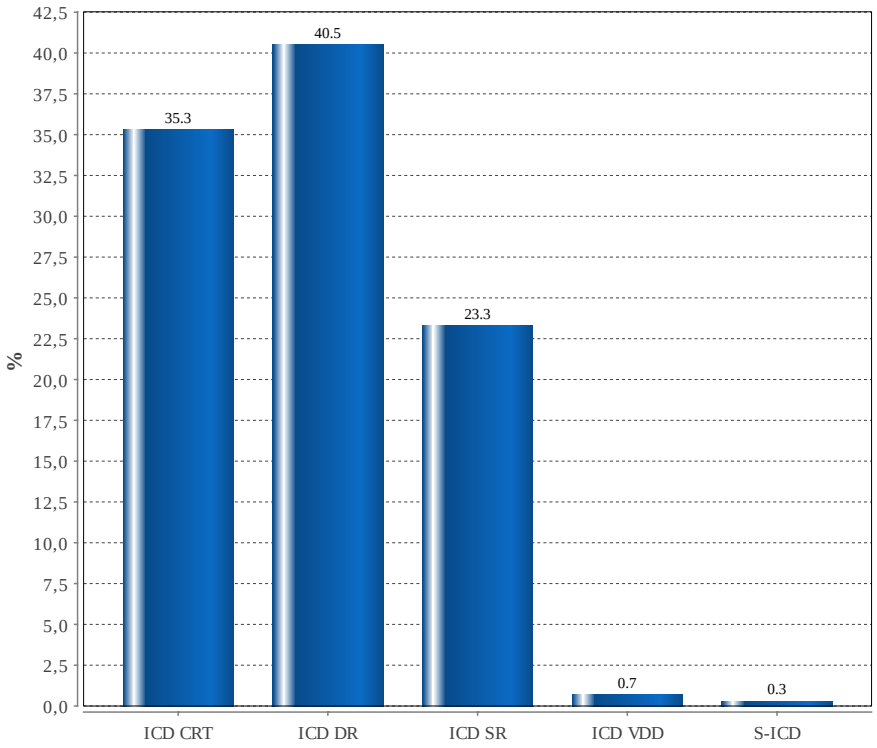
Venous access for new implants and replacements, all type of pacemakers

Lead access	No	%
Axillaris	119	7.1
Cephalica	805	48.3
Subclavia	741	44.4
Subcutaneous	3	0.2



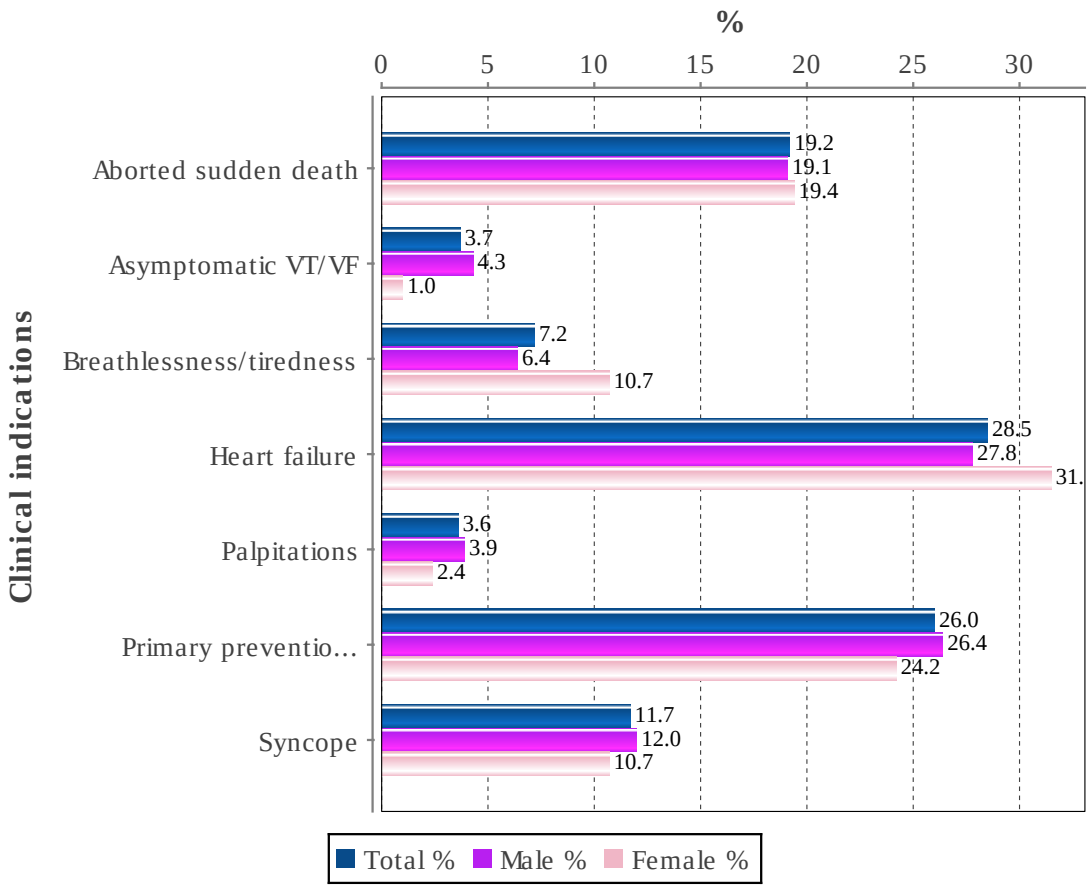
ICD subtype for new implants

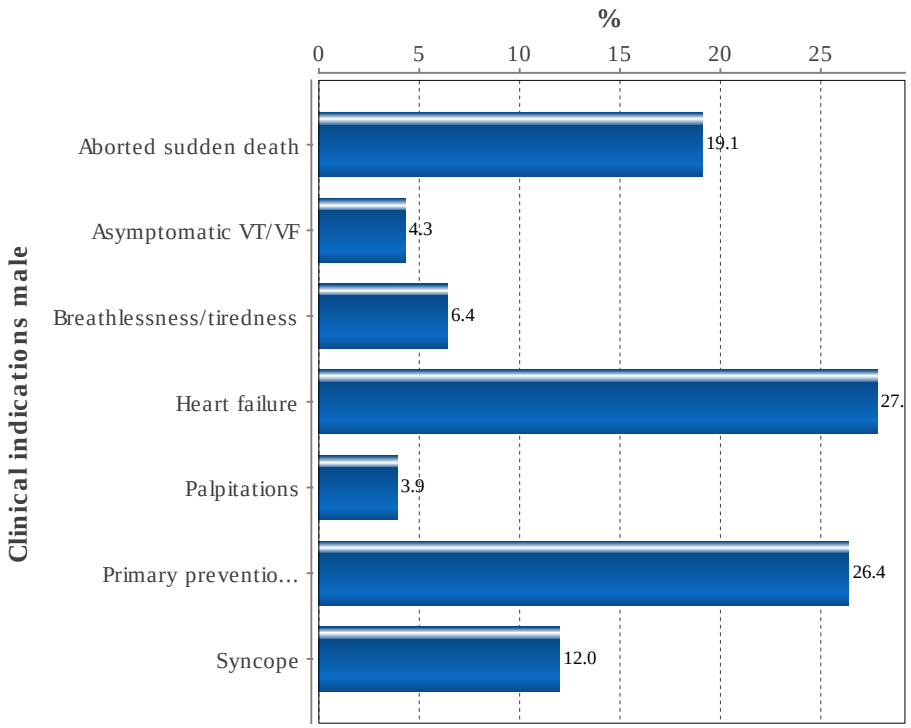
Mode	%	No
ICD CRT	35.3	533
ICD DR	40.5	610
ICD SR	23.3	351
ICD VDD	0.7	10
S-ICD	0.3	4

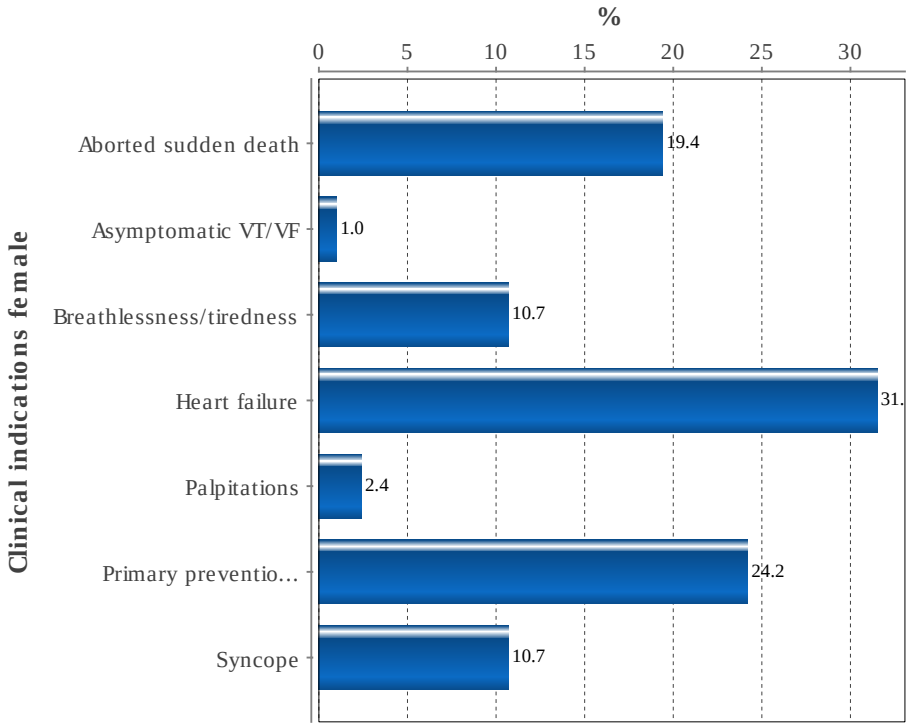


Main symptom for implanting ICDs

Indication	Total %	Male %	Female %
Aborted sudden death	19.2	19.1	19.4
Asymptomatic VT/VF	3.7	4.3	1.0
Breathlessness/tiredness	7.2	6.4	10.7
Heart failure	28.5	27.8	31.5
Palpitations	3.6	3.9	2.4
Primary prevention, asymptomatic	26.0	26.4	24.2
Syncope	11.7	12.0	10.7




%
0
5
10
15
20
25
Clinical indications male
Aborted sudden death
19.1
Asymptomatic VT/VF
4.3
Breathlessness/tiredness
6.4
Heart failure
27.
Palpitations
3.9
Primary preventio...
26.4
Syncope
12.0

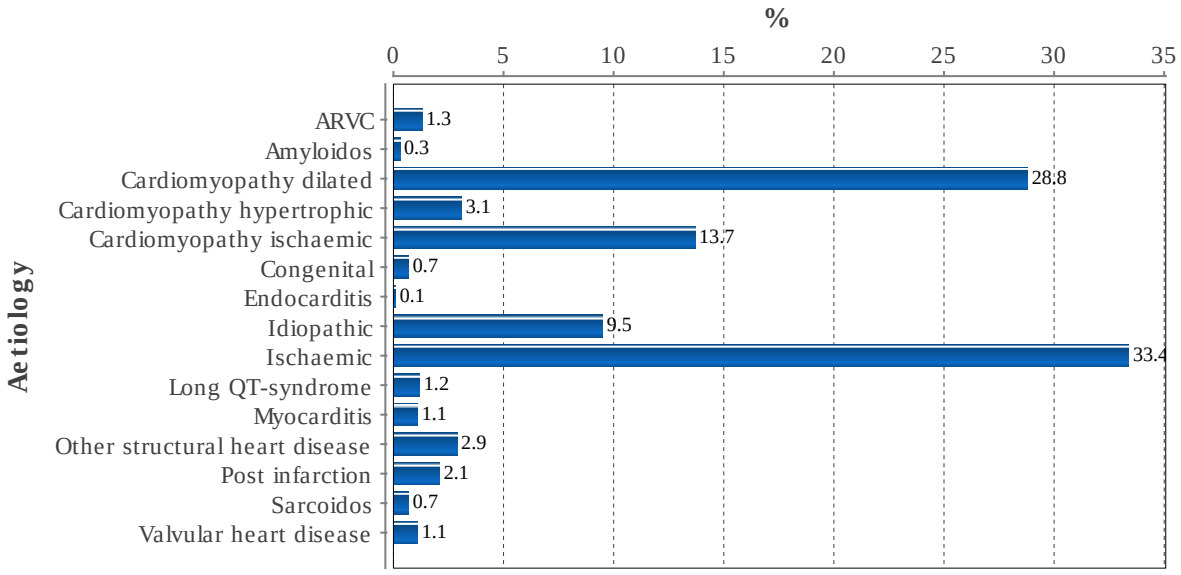

%
0
5
10
15
20
25
30
Clinical indications female
Aborted sudden death
19.4
Asymptomatic VT/VF
1.0
Breathlessness/tiredness
10.7
Heart failure
31.
Palpitations
2.4
Primary preventio...
24.2
Syncope
10.7

Main symptom for implanting ICDs, historical distribution

Indication	2013 %	2014 %	2015 %
Aborted sudden death	13.8	17.7	19.2
Asymptomatic VT/VF	3.6	3.0	3.7
Primary prevention	66.2	68.5	65.4
Syncope	16.3	10.9	11.7

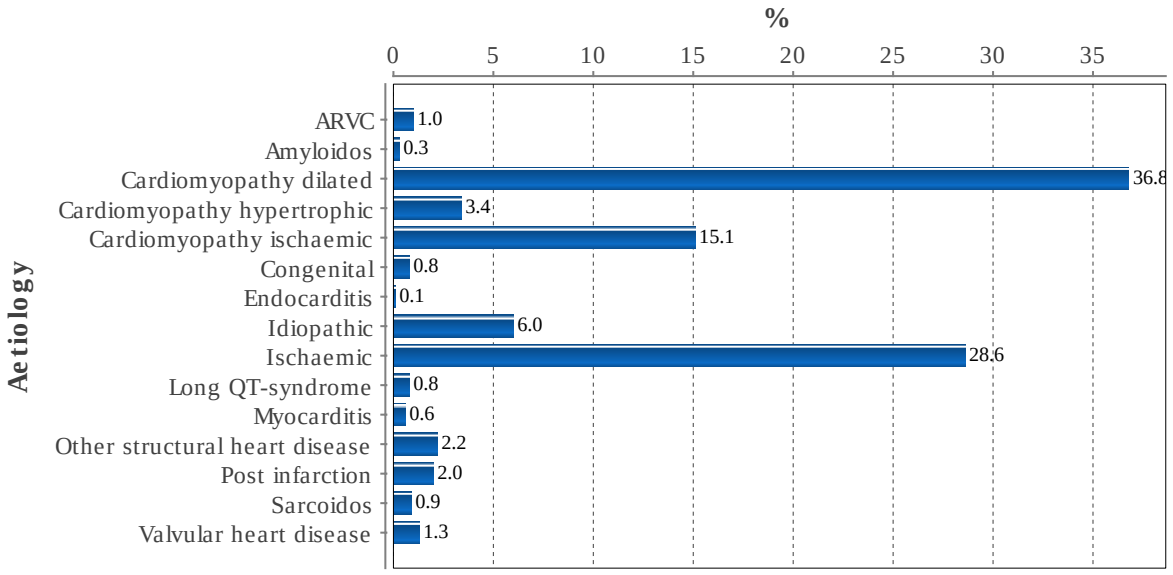
Main aetiology for implanting pacemakers

Aetiology	Total %	Male %	Female %
ARVC	1.3	1.2	1.4
Amyloidos	0.3	0.2	0.3
Cardiomyopathy dilated	28.8	27.2	35.6
Cardiomyopathy hypertrophic	3.1	2.8	4.5
Cardiomyopathy ischaemic	13.7	14.4	10.4
Congenital	0.7	0.7	0.7
Endocarditis	0.1	0.2	0.0
Idiopathic	9.5	8.2	14.9
Ischaemic	33.4	36.4	20.8
Long QT-syndrome	1.2	0.4	4.5
Myocarditis	1.1	1.2	0.7
Other structural heart disease	2.9	2.8	3.1
Post infarction	2.1	2.1	2.1
Sarcoidos	0.7	0.8	0.3
Valvular heart disease	1.1	1.2	0.7



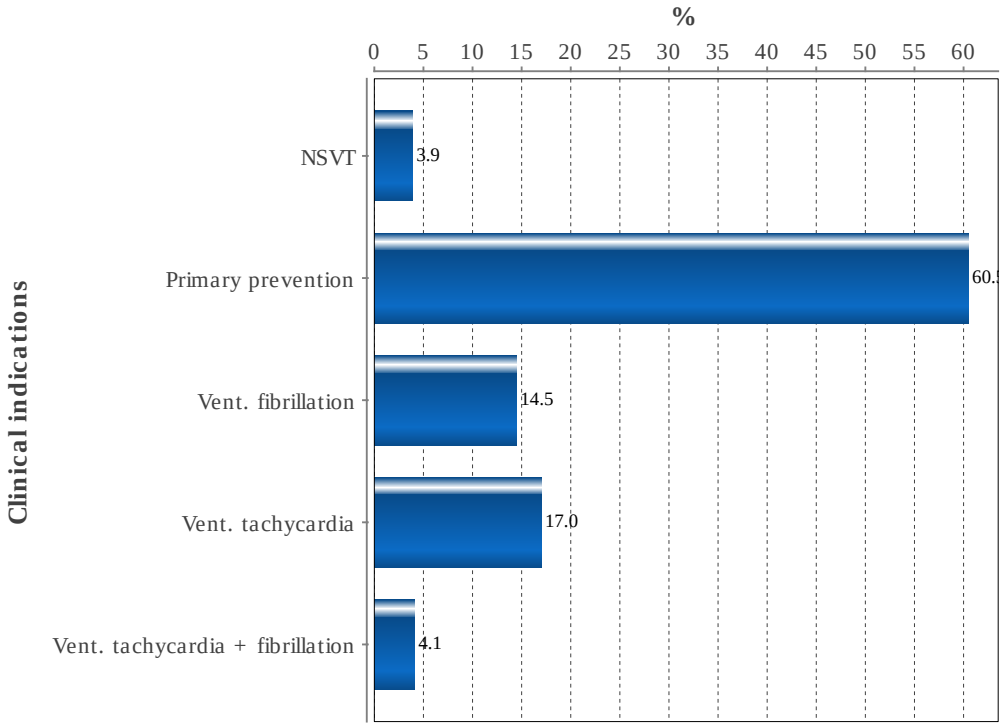
Main aetiology for implanting ICDs due to primary prevention

Aetiology	Total %	Male %	Female %
ARVC	1.0	1.0	1.0
Amyloidos	0.3	0.3	0.5
Cardiomyopathy dilated	36.8	35.1	43.6
Cardiomyopathy hypertrophic	3.4	3.0	5.1
Cardiomyopathy ischaemic	15.1	15.9	12.3
Congenital	0.8	0.9	0.5
Endocarditis	0.1	0.1	0.0
Idiopathic	6.0	5.0	9.7
Ischaemic	28.6	30.9	19.5
Long QT-syndrome	0.8	0.4	2.6
Myocarditis	0.6	0.8	0.0
Other structural heart disease	2.2	2.3	1.5
Post infarction	2.0	1.8	2.6
Sarcoidos	0.9	1.0	0.5
Valvular heart disease	1.3	1.5	0.5



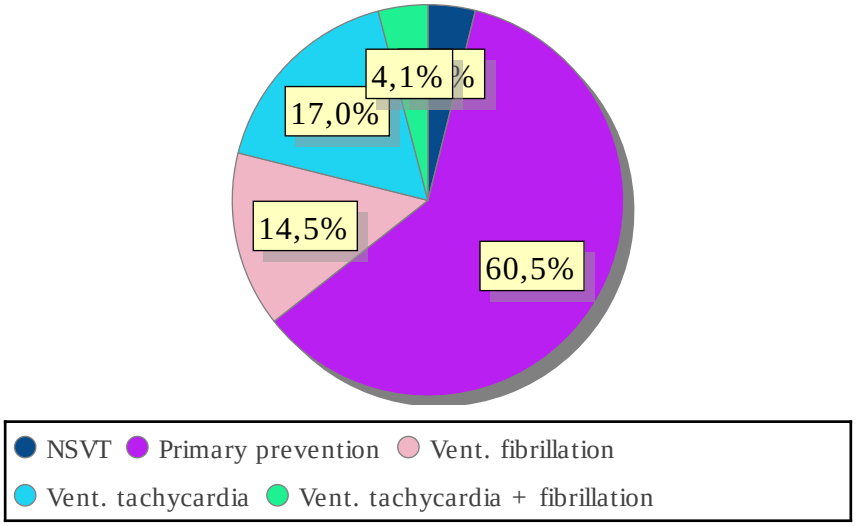
Documented ECG leading to ICD implant. (NSVT=non sustained VT)

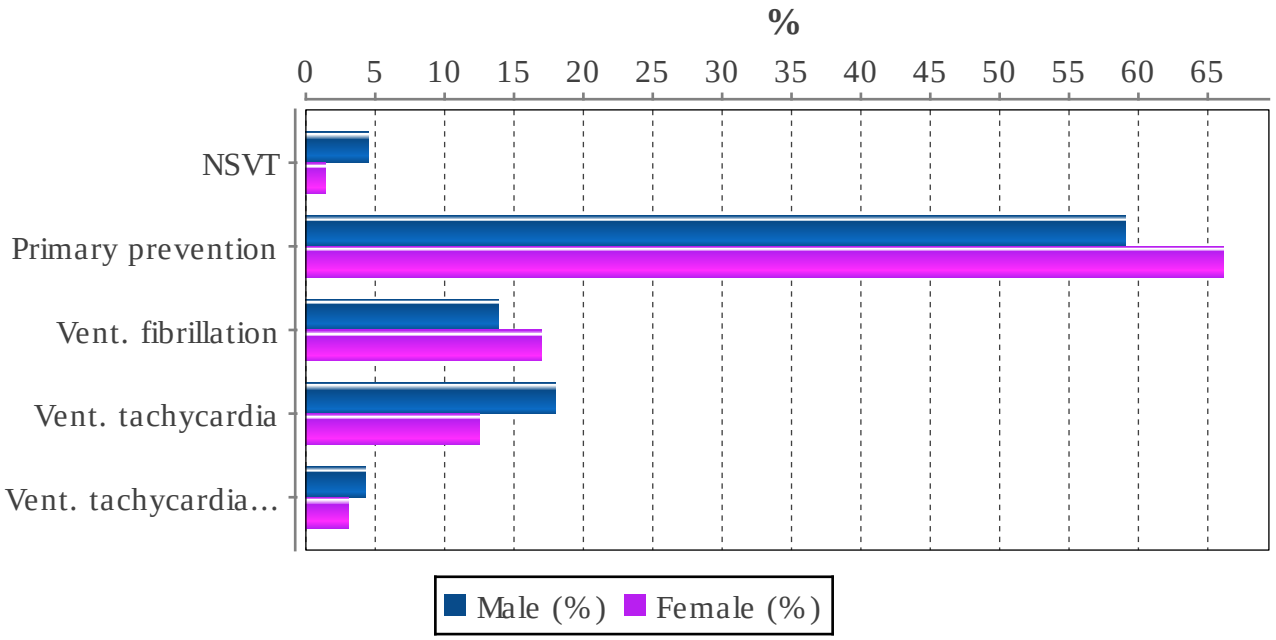
Indication	%
NSVT	3.9
Primary prevention	60.5
Vent. fibrillation	14.5
Vent. tachycardia	17.0
Vent. tachycardia + fibrillation	4.1



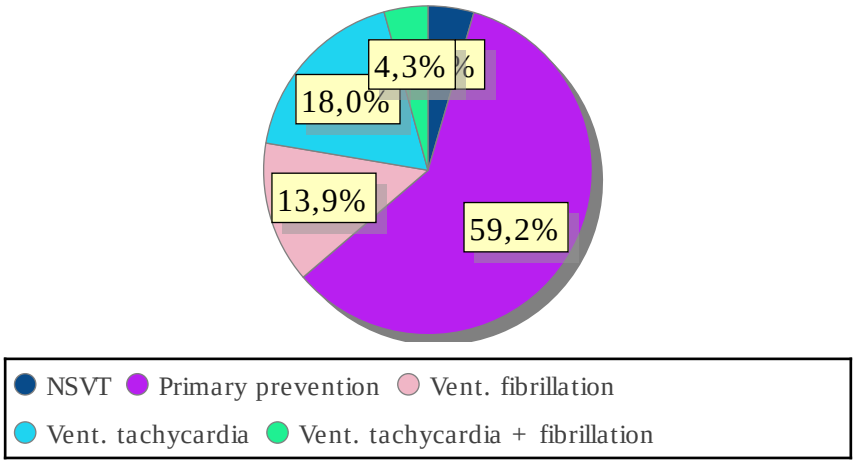
Documented ECG leading to ICD implant.(NSVT = non sustained VT) by gender and patients < 18 years

Indication	No	Total %	Male (%)	Female (%)	lt 18 (%)
NSVT	59	3.9	4.5	1.4	8.3
Primary prevention	912	60.5	59.1	66.1	33.3
Vent. fibrillation	219	14.5	13.9	17.0	33.3
Vent. tachycardia	256	17.0	18.0	12.5	25.0
Vent. tachycardia + fibrillation	62	4.1	4.3	3.1	0.0
					Total number of implants 1508

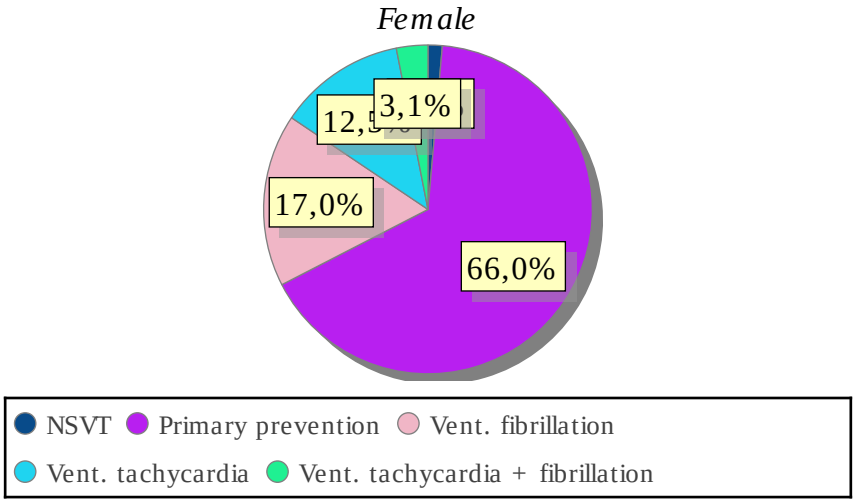




Male



Female



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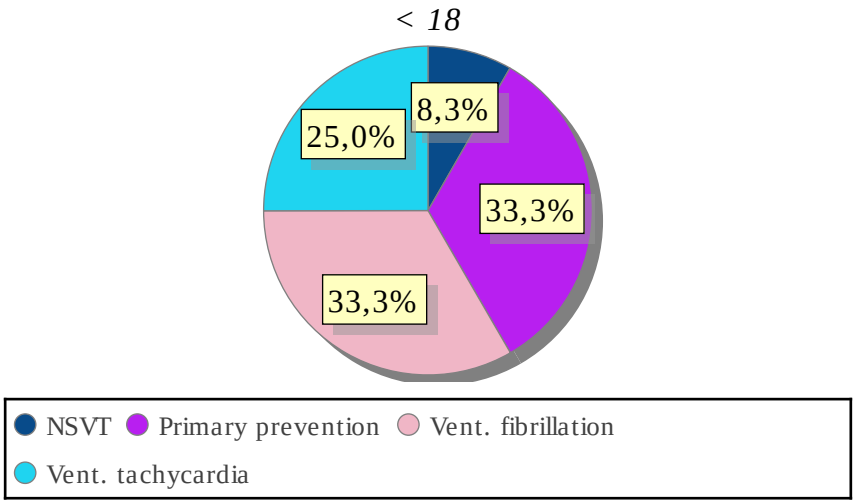
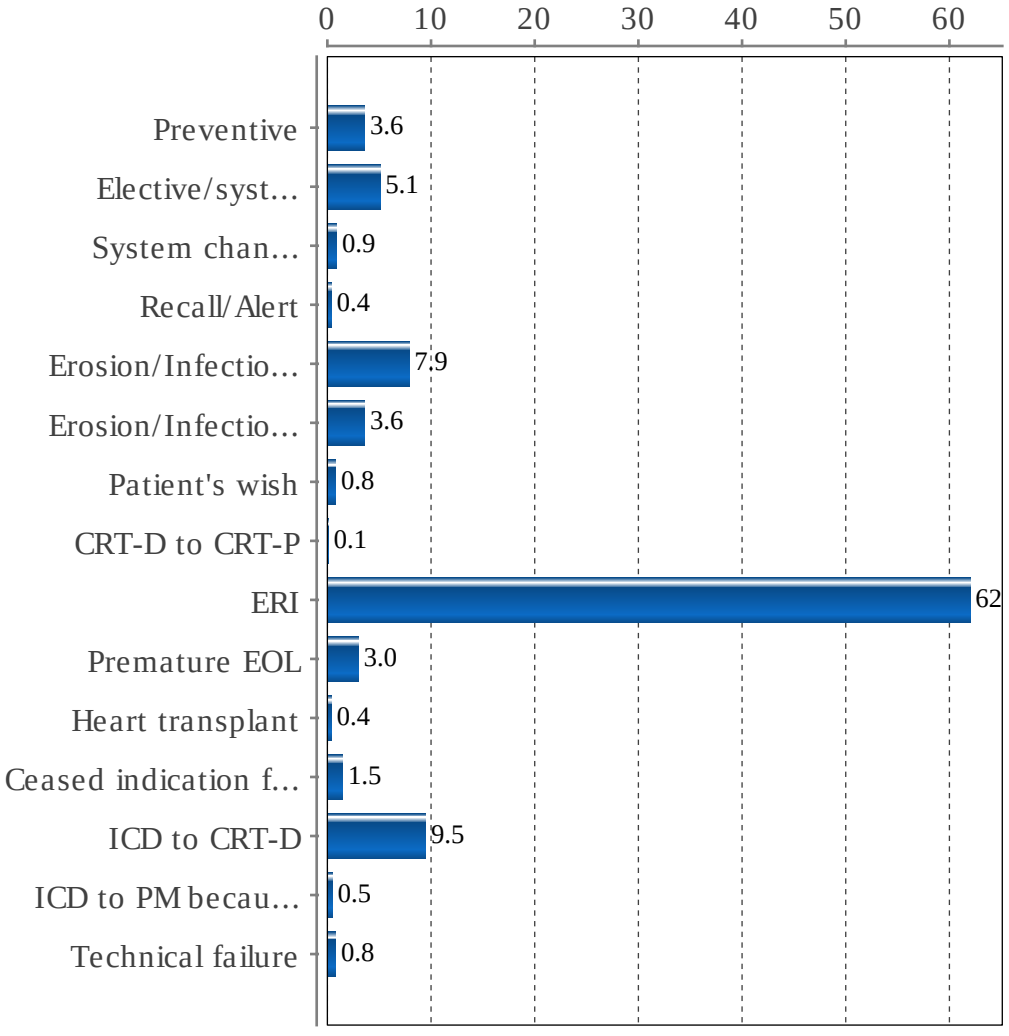


Use of ICD sub type for all indications per hospital (number of new implants / year and hospital))

Hospital	Number	ICD DR %	ICD SR %	ICD CRT %
Akademiska sjukhuset	70	25.7	25.7	48.6
Blekingesjukhuset	38	39.5	26.3	34.2
Centrallasarettet Växjö	19	68.4	21.1	10.5
Centralsjukhuset Karlstad	38	44.7	21.1	34.2
Centralsjukhuset Västerås	43	58.1	9.3	32.6
Danderyds sjukhus	69	44.9	7.2	47.8
Falu lasarett	75	30.7	46.7	22.7
Hudiksvalls sjukhus	6	83.3	0.0	16.7
Karolinska Universitetssjukhuset	182	48.9	9.9	41.2
Linköpings Universitetssjukhus	86	38.4	2.3	59.3
Länssjukhuset Gävle	49	44.9	12.2	42.9
Länssjukhuset Kalmar	43	16.3	65.1	18.6
Länssjukhuset Ryhov	45	82.2	17.8	0.0
Mälarsjukhuset	29	37.9	37.9	24.1
Norrlands Universitetssjukhus	49	26.5	38.8	34.7
Sahlgrenska Universitetssjukhuset	60	48.3	23.3	28.3
Skaraborgs sjukhus Skövde	40	42.5	15.0	42.5
Skellefteå lasarett	2	50.0	50.0	0.0
Skånes universitetssjukhus, Lund	187	44.9	30.5	24.6
St Görans sjukhus	39	46.2	17.9	35.9
Sunderby sjukhus	71	43.7	23.9	32.4
Sundsvalls sjukhus	27	77.8	3.7	18.5
Södersjukhuset	48	37.5	54.2	8.3
Södra Älvsborgs sjukhus	23	52.2	13.0	34.8
Trollhättan, NÄL	26	50.0	15.4	34.6
Universitetssjukhuset Örebro	58	31.0	36.2	32.8
Varbergs sjukhus	45	51.1	6.7	42.2
Örnsköldsviks sjukhus	2	100.0	0.0	0.0
Östersunds sjukhus	25	32.0	56.0	12.0

Reason for generator explant. Elective used for changes performed before reached ERI/EOL

Reason	All hospitals %	(large) %	(medium) %	(small) %
Preventive	3.6	2.9	5.4	0.0
Elective/system change	5.1	4.5	6.3	5.6
System change hemodynamic	0.9	0.8	1.3	0.0
Recall/Alert	0.4	0.6	0.0	0.0
Erosion/Infection, local	7.9	10.6	2.9	2.8
Erosion/Infection, systemic	3.6	3.9	3.3	0.0
Patient's wish	0.8	1.0	0.4	0.0
CRT-D to CRT-P	0.1	0.2	0.0	0.0
ERI	62.0	58.1	67.5	80.6
Premature EOL	3.0	2.5	4.2	2.8
Heart transplant	0.4	0.6	0.0	0.0
Ceased indication for ICD therapy	1.5	1.8	0.8	2.8
ICD to CRT-D	9.5	10.8	7.5	5.6
ICD to PM because of ceased indication	0.5	0.8	0.0	0.0
Technical failure	0.8	1.0	0.4	0.0

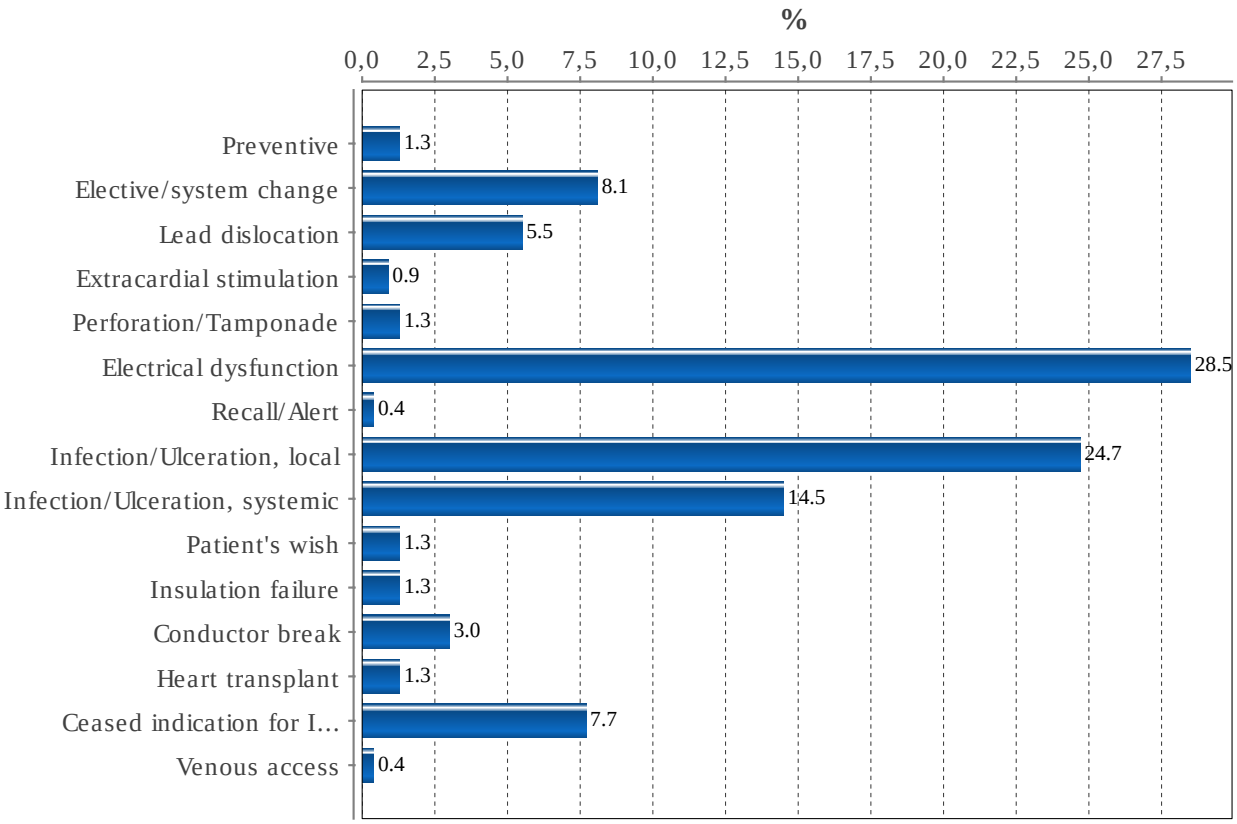


Historical explants indications

Reason	2013 %	2014 %	2015 %
Preventive	4.8	5.5	3.6
Elective/system change	2.2	3.9	5.1
System change hemodynamic	1.1	0.8	0.9
Recall/Alert	0.2	0.3	0.4
Erosion/Infection, local	10.3	5.3	7.9
Erosion/Infection, systemic	1.6	4.1	3.6
Patient's wish	0.6	0.9	0.8
ERI	64.1	63.6	62.0
Premature EOL	2.2	2.5	3.0
Heart transplant	0.6	0.9	0.4
Ceased indication for ICD therapy	1.6	0.6	1.5
ICD to CRT-D	8.9	8.0	9.5
ICD to PM because of ceased indication	1.0	1.1	0.5
Technical failure	0.8	2.2	0.8
CRT-D to CRT-P	0.0	0.2	0.1

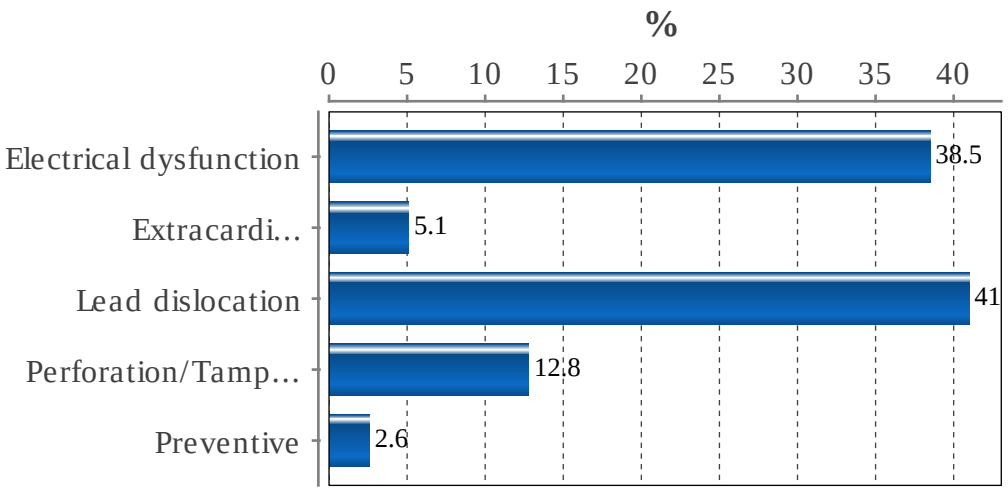
Historical lead explants indications

Reason	2013 %	2014 %	2015 %
Preventive	5.1	3.0	1.3
Elective/system change	6.1	7.6	8.1
Lead dislocation	3.0	8.1	5.5
Perforation/Tamponade	0.5	2.5	1.3
Electrical dysfunction	34.5	33.0	28.5
Recall/Alert	0.5	0.0	0.4
Infection/Ulceration, local	31.0	19.3	24.7
Infection/Ulceration, systemic	8.1	14.7	14.5
Patient's wish	1.5	2.0	1.3
Conductor break	1.0	1.0	3.0
Heart transplant	2.5	3.6	1.3
Ceased indication for ICD therapy	5.6	2.5	7.7
Venous access	0.5	0.0	0.4
Extracardial stimulation	0.0	1.0	0.9
Insulation failure	0.0	1.5	1.3


%
0,0
2,5
5,0
7,5
10,0
12,5
15,0
17,5
20,0
22,5
25,0
27,5
Preventive
1.3
Elective/system change
8.1
Lead dislocation
5.5
Extracardial stimulation
0.9
Perforation/Tamponade
1.3
Electrical dysfunction
28.5
Recall/Alert
0.4
Infection/Ulceration, local
24.7
Infection/Ulceration, systemic
14.5
Patient's wish
1.3
Insulation failure
1.3
Conductor break
3.0
Heart transplant
1.3
Ceased indication for I...
7.7
Venous access
0.4

Historical lead correction indications

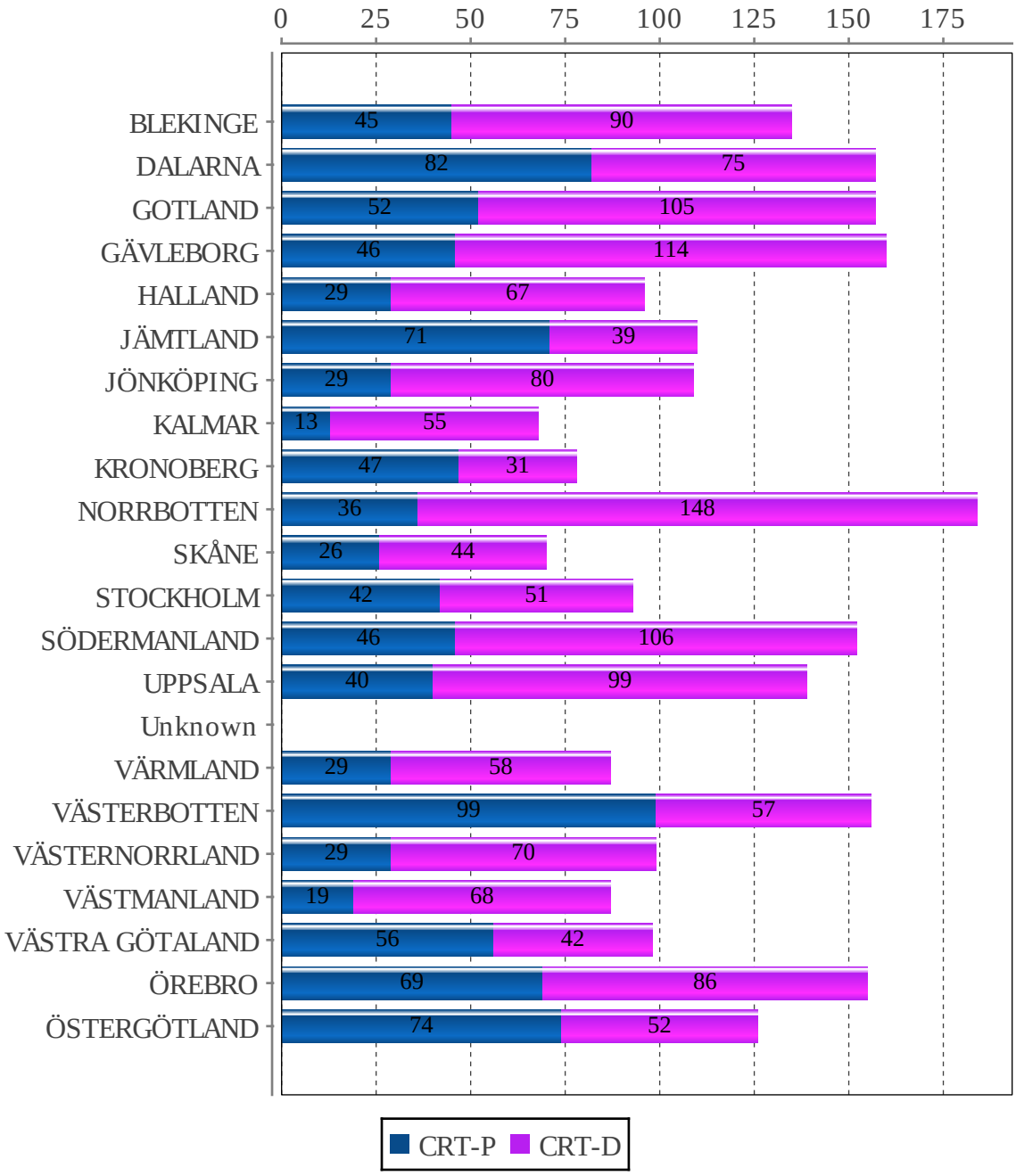
Reason	%
Electrical dysfunction	38.5
Extracardial stimulation	5.1
Lead dislocation	41.0
Perforation/Tamponade	12.8
Preventive	2.6
	Total no 39



Procedures per operator

Hospital	Operator	No
Akademiska sjukhuset	Arvanitis	15
	Mörtsell	60
	N/A	1
	Teder	45
Ålands centralsjukhus	Slotte	8
Blekingesjukhuset	Borg	53
	Ericsson	7
	Ghaidan, Haider	1
	Ringborn, Michael	3
Centrallasarettet Växjö	Johansson P	14
	Jonasson	3
	Rosén Helena	6
	Strandberg	9
Centralsjukhuset Karlstad	Khalili	14
	Mahknov	1
	Niklas Aldergård	28
	Saidi	8
	Venizelos Georgius	1
Centralsjukhuset Kristianstad	Gadler	1
Centralsjukhuset Västerås	Dilan	25
	SkoglundAndersson	2
	Wiberg	32
Danderyds sjukhus	2	5
	3	22
	4	38
	6	15
Drottning Silvias Bus	Charles Kennergren	1
Falu lasarett	Monheim	1
	Berglund	20
	Forsgren	64
	Guggi	15
Hudiksvalls sjukhus	Roussinne	8
Karolinska Universitetssjukhus	Annan	1
	Gadler	87
	Gadler/Hörnsten	1
	Hörnsten	60
	Jacobsson L	1
	Reistam	47
	Westholm	68
Länssjukhuset Gävle	Falck	17
	Johansson Staffan	16
	Kastberg	12
	Magnusson Peter	23
	Mati Jalakas	5
Länssjukhuset Kalmar	Carlström	12
	David Olsson	18
	Hendrik Schreyer	9
	Michael Lindstaedt	26
Länssjukhuset Ryhov	Asking	2
	Jakobsson S	23
	Lagerberg	33
Linköpings universitetssjukhus	Jönsson A	1
	Säfström K	42
	Sonesson L	47
	Svenson A	4
	Szymanowski A	33
Mälarsjukhuset	Andreas Pikwer	1
	Axel Nyberg	1
	Bozena Ostrowska	33
	Kåge Säfström	4
	Peter Spetz	2
	Ulla Lindblad	2
Norrlands Universitetssjukhus	Höglund	15
	Jensen	6
	Kesek	8
	Kesek/Rönn	1
	Landström	28
	Rönn	17
Örnsköldsviks sjukhus	Ehlin	7
Östersunds sjukhus	Annan	2
	Björklund	3
	Friberg	13
	Hansson	16
Sahlgrenska universitetssjukhuset	Jamaly	13
	Javid	19
	Kennergren	2
	Konstantinos Liakatsidas	1
	Piotr Szamlewski	49
	Schultz	20
	Westbom	1
Sahlgrenska universitetssjukhuset / Östra	Javid	2
Skaraborgs sjukhus Skövde	Falmer	12
	Lorentzen	24
	Paulsson	16
	Winterfeldt	9

Hospital	Operator	No
Skånes universitetssjukhus, Lund	Annan	11
	Fredrik Slotte	30
	Ingrid Litterfeldt	3
	Johan Brandt	133
	LingWei Wang	30
	Maiwand Farouq	40
	Peter Lindell	4
	Pyotr Platonov	2
	Rasmus Borgquist	2
	Rorsman-Söderström	14
	Steen Jensen	18
Skånes universitetssjukhus, Malmö	Maiwand Farouq	1
Skellefteå lasarett	Bygdén	1
	Lindqvist	6
Södersjukhuset	Jonsson J-E	13
	Kjellman B	20
	Olson J	24
	Rydlund K	8
Södra Älvsborgs sjukhus	Friedemann	13
	Lodin	2
	Petersson M	1
	Rindner	1
	Sandgren	21
St Görans sjukhus	1	20
	1+2	3
	2	19
	3	10
Sunderby sjukhus	Baas	19
	Haupt	55
	Johansson A	6
	Johansson P	11
	Wennberg	4
Sundsvalls sjukhus	Annan	11
	Khadhim	21
	Rudenholm	1
	Sundelin	7
Trollhättan, NÄL	Csaba Herczku	26
	Dinu Dusceac	13
	Jabbar	5
	Wetterling	1
Universitetssjukhuset Örebro	Anna Björkenheim	9
	Johan Brandt	5
	Lindell	46
	Tommy Andersson	21
Varbergs sjukhus	Rorsman	76
Visby lasarett	Jacobsson L	2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150
175
BLEKINGE
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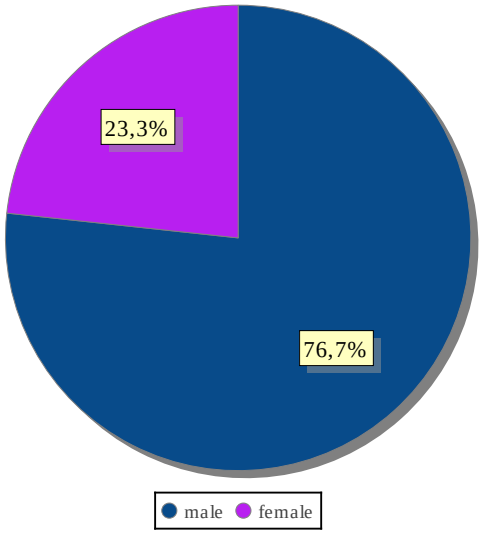
DALARNA
82
75
GOTLAND
52
105
GÄVLEBORG
46
114
HALLAND
29
67
JÄMTLAND
71
39
JÖNKÖPING
29
80
KALMAR
13
55
KRONOBERG
47
31
NORRBOTTEN
36
148
SKÅNE
26
44
STOCKHOLM
42
51
SÖDERMANLAND
46
106
UPPSALA
40
99
Unknown
VÄRMLAND
29
58
VÄSTERBOTTEN
99
57
VÄSTERNORRLAND
29
70
VÄSTMANLAND
19
68
VÄSTRA GÖTALAND
56
42
ÖREBRO
69
86
ÖSTERGÖTLAND
74
52
CRT-P
CRT-D

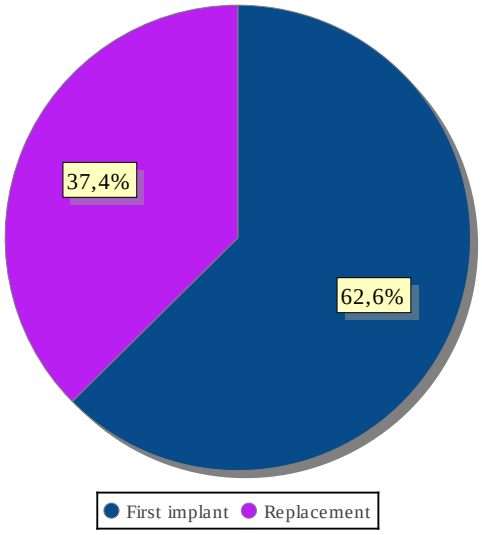
Based on both CRT-P and CRT-D

	Total		Male		Female	
	no	%	no	%	no	%
First implant	1058	62.6	812	76.7	246	23.3
Replacement	631	37.4	494	78.3	137	21.7
Total	1689	100.0	1306	77.3	383	22.7

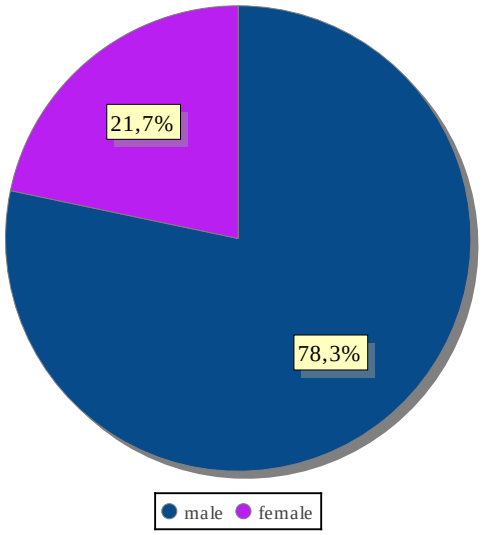
First implant



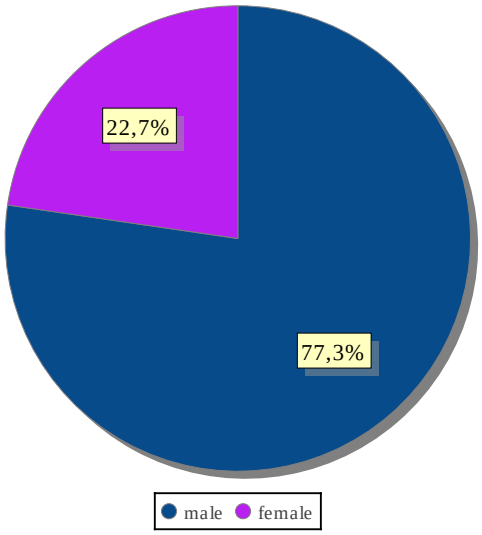
Replacement ratio



Replacement



All implant



CRT Historical implant rates per hundred thousand residents

			CRT-P		CRT-D	
Year	**Population**	**Total**	**No**	**Rate**	**No**	**Rate**
2011	9482855	795	354	3.7	441	4.7
2012	9555893	791	350	3.7	441	4.6
2013	9644864	967	417	4.3	550	5.7
2014	9747355	987	395	4.1	592	6.1
2015	9851017	1059	448	4.5	611	6.2

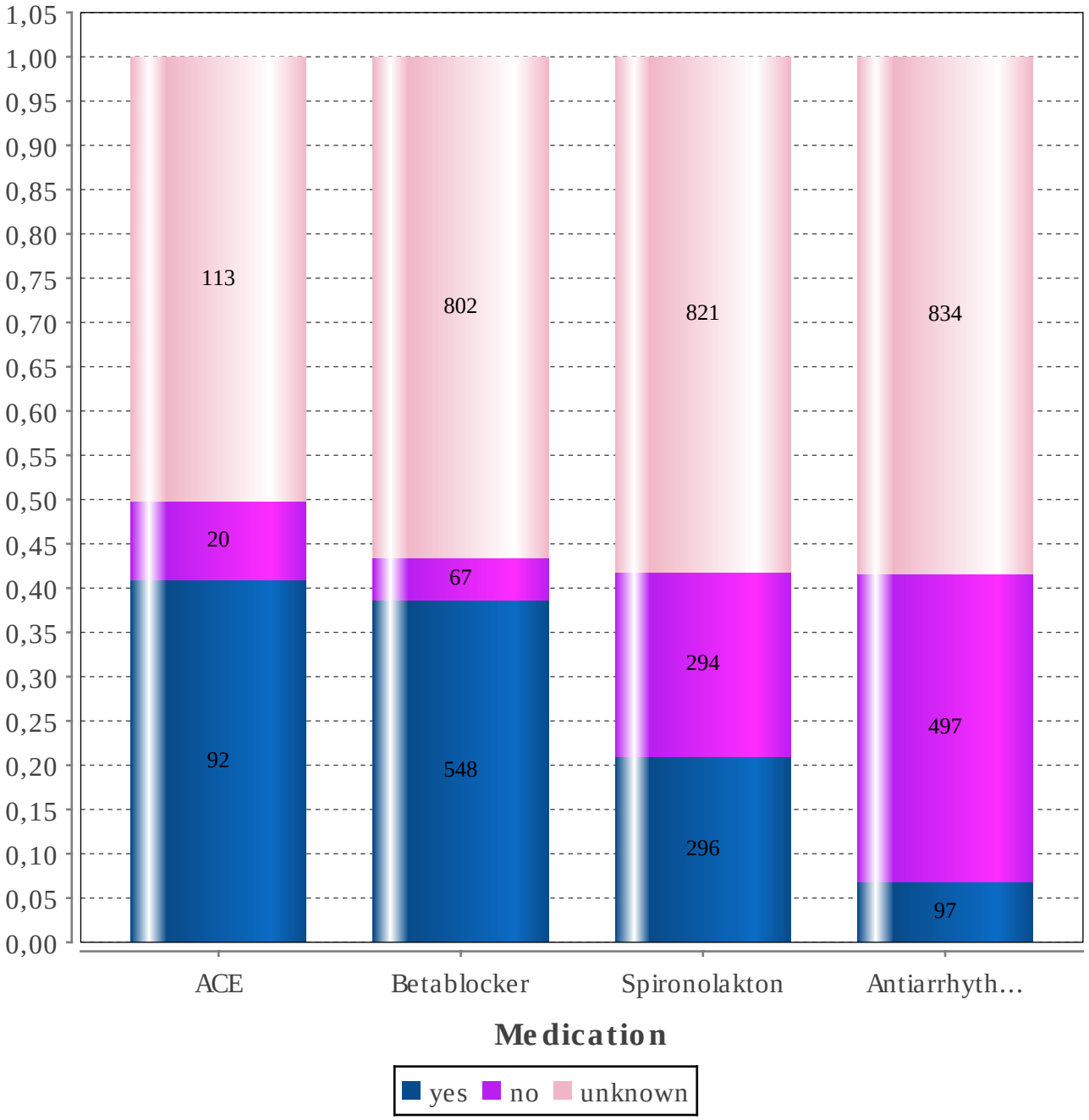
CRT-P (generator)

Status	First implant	Replacement
SC-lead plugged	17	2
SC-lead failed implant	9	2
SC-lead active system	456	283

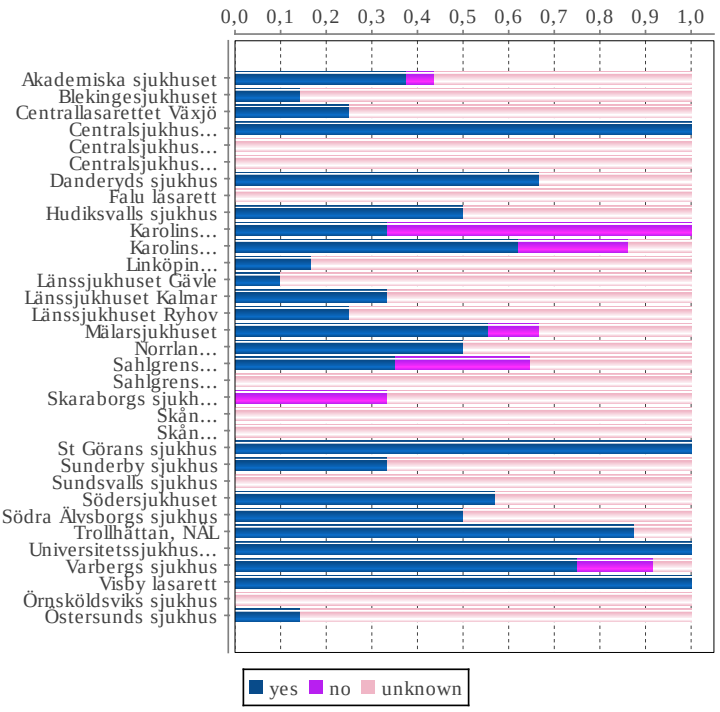
CRT-D (generator)

Status	First implant	Replacement
SC-lead plugged	21	5
SC-lead failed implant	25	2
SC-lead active system	609	345

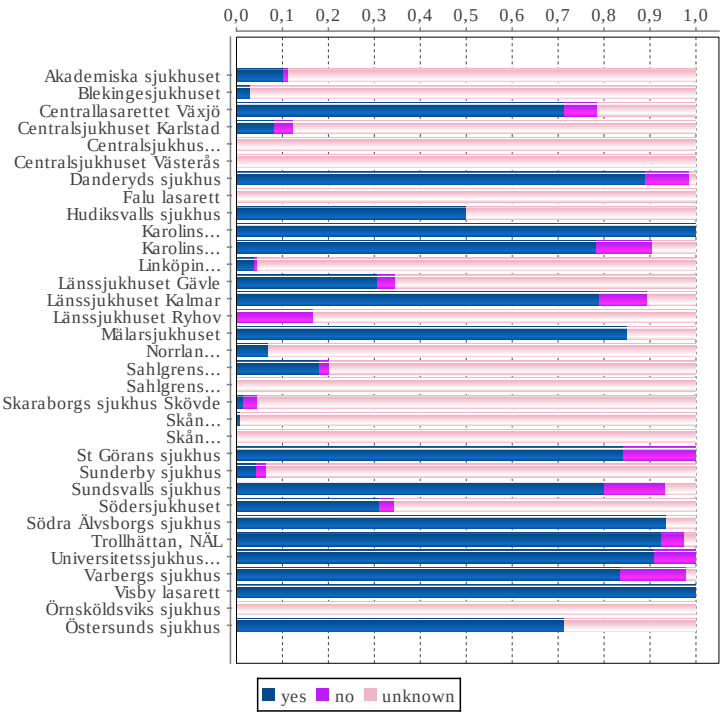
Previous medication for patients having CRT implant



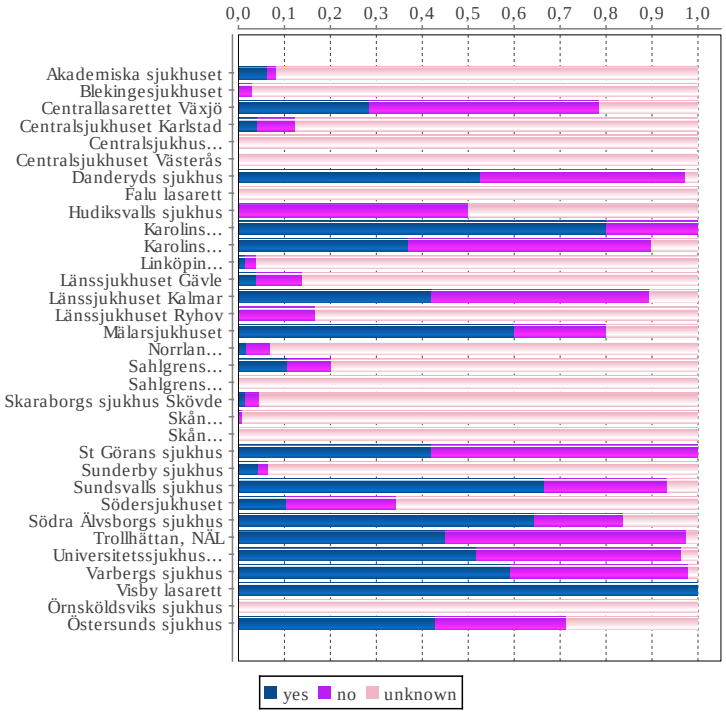
ACE



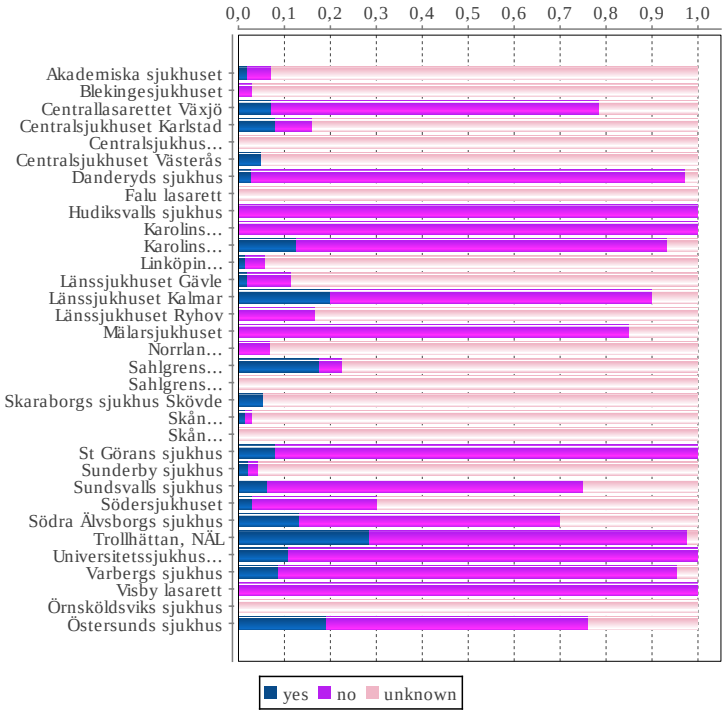
Betablocker



Spironolakton



Antiarrhythmica



Procedures per operator

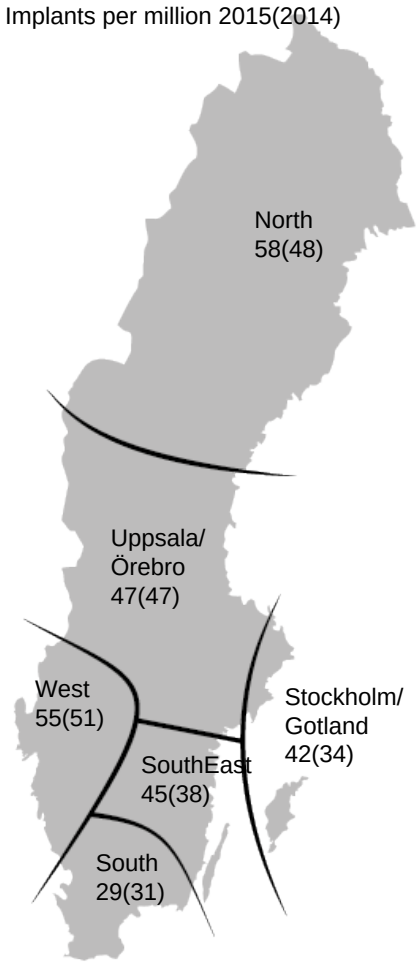
Hospital	Operator	No
Akademiska sjukhuset	Mörtsell	10
	Teder	11
Ålands centralsjukhus	Slotte	3
Blekingesjukhuset	Borg	8
Centrallasarettet Växjö	Jonasson	4
	Strandberg	1
Centralsjukhuset Karlstad	Niklas Aldergård	7
Centralsjukhuset Västerås	Dilan	3
Danderyds sjukhus	3	7
	4	17
	6	3
Falu lasarett	Forsgren	22
	Guggi	1
Karolinska Universitetssjukhus	Annan	2
	Gadler	30
	Hörnsten	10
	Westholm	11
Länssjukhuset Gävle	Annan	1
	Falck	5
	Johansson Staffan	7
	Kastberg	1
Länssjukhuset Kalmar	Carlström	3
Linköpings universitetssjukhus	Annan	1
	Jönsson A	2
	Säfström K	23
	Sonesson L	16
	Szymanowski A	8
Mälarsjukhuset	Bozena Ostrowska	4
Norrlands Universitetssjukhus	Höglund	5
	Jensen	2
	Landström	17
	Rönn	7
Östersunds sjukhus	Friberg	4
	Hansson	4
Sahlgrenska universitetssjukhuset	Jamaly	7
	Javid	16
	Kennergren	1
	Piotr Szamlewski	21
	Schultz	2
Skaraborgs sjukhus Skövde	Falmer	4
	Lorentzen	19
	Paulsson	10
Skånes universitetssjukhus, Lund	Annan	2
	Fredrik Slotte	7
	Johan Brandt	17
	LingWei Wang	2
	Maiwand Farouq	3
	Rorsman-Söderström	1
	Steen Jensen	2
Södersjukhuset	Jonsson J-E	2
	Kjellman B	1
	Olson J	9
Södra Älvsborgs sjukhus	Friedemann	3
	Sandgren	10
St Görans sjukhus	1	8
	1+2	2
	2	4
Sunderby sjukhus	Haupt	6
Sundsvalls sjukhus	Annan	1
	Khadhim	2
	Sundelin	1
Trollhättan, NÄL	Csaba Herczku	11
	Söderbergh	1
Universitetssjukhuset Örebro	Johan Brandt	1
	Lindell	10
	Tommy Andersson	10
Varbergs sjukhus	Rorsman	7

Procedures per operator

Hospital	Operator	No
Akademiska sjukhuset	Astudillo	1
	Mörtsell	41
	N/A	1
	Teder	15
Ålands centralsjukhus	Slotte	3
Blekingesjukhuset	Borg	16
Centrallasarettet Växjö	Jonasson	2
	Strandberg	1
Centralsjukhuset Karlstad	Mahknov	1
	Niklas Aldergård	13
Centralsjukhuset Västerås	Dilan	5
	Wiberg	9
Danderyds sjukhus	3	16
	4	17
	6	3
Falu lasarett	Forsgren	20
Karolinska Universitetssjukhus	Annan	1
	Gadler	51
	Hörnsten	28
	Jacobsson L	1
	Westholm	21
Länssjukhuset Gävle	Falck	11
	Johansson Staffan	10
	Kastberg	3
Länssjukhuset Kalmar	Carlström	6
	Michael Lindstaedt	4
Linköpings universitetssjukhus	Säfström K	26
	Sonesson L	25
	Szymanowski A	11
Mälarsjukhuset	Bozena Ostrowska	3
	Kåge Säfström	4
Norrlands Universitetssjukhus	Höglund	5
	Jensen	3
	Landström	11
	Rönn	5
Östersunds sjukhus	Annan	1
	Hansson	4
Sahlgrenska universitetssjukhuset	Jamaly	1
	Javid	5
	Piotr Szamlewski	20
Skaraborgs sjukhus Skövde	Falmer	1
	Lorentzen	12
	Paulsson	10
Skånes universitetssjukhus, Lund	Annan	1
	Fredrik Slotte	8
	Johan Brandt	31
	LingWei Wang	16
	Maiwand Farouq	2
	Rasmus Borgquist	1
	Rorsman-Söderström	3
Södersjukhuset	Jonsson J-E	3
	Kjellman B	1
	Olson J	4
Södra Älvsborgs sjukhus	Petersson M	1
	Sandgren	9
St Görans sjukhus	1	8
	1+2	3
	2	5
Sunderby sjukhus	Haupt	32
	Johansson A	1
Sundsvalls sjukhus	Annan	4
	Khadhim	4
Trollhättan, NÄL	Csaba Herczku	10
	Dinu Dusceac	2
Universitetssjukhuset Örebro	Johan Brandt	1
	Lindell	18
	Tommy Andersson	5
Varbergs sjukhus	Rorsman	22

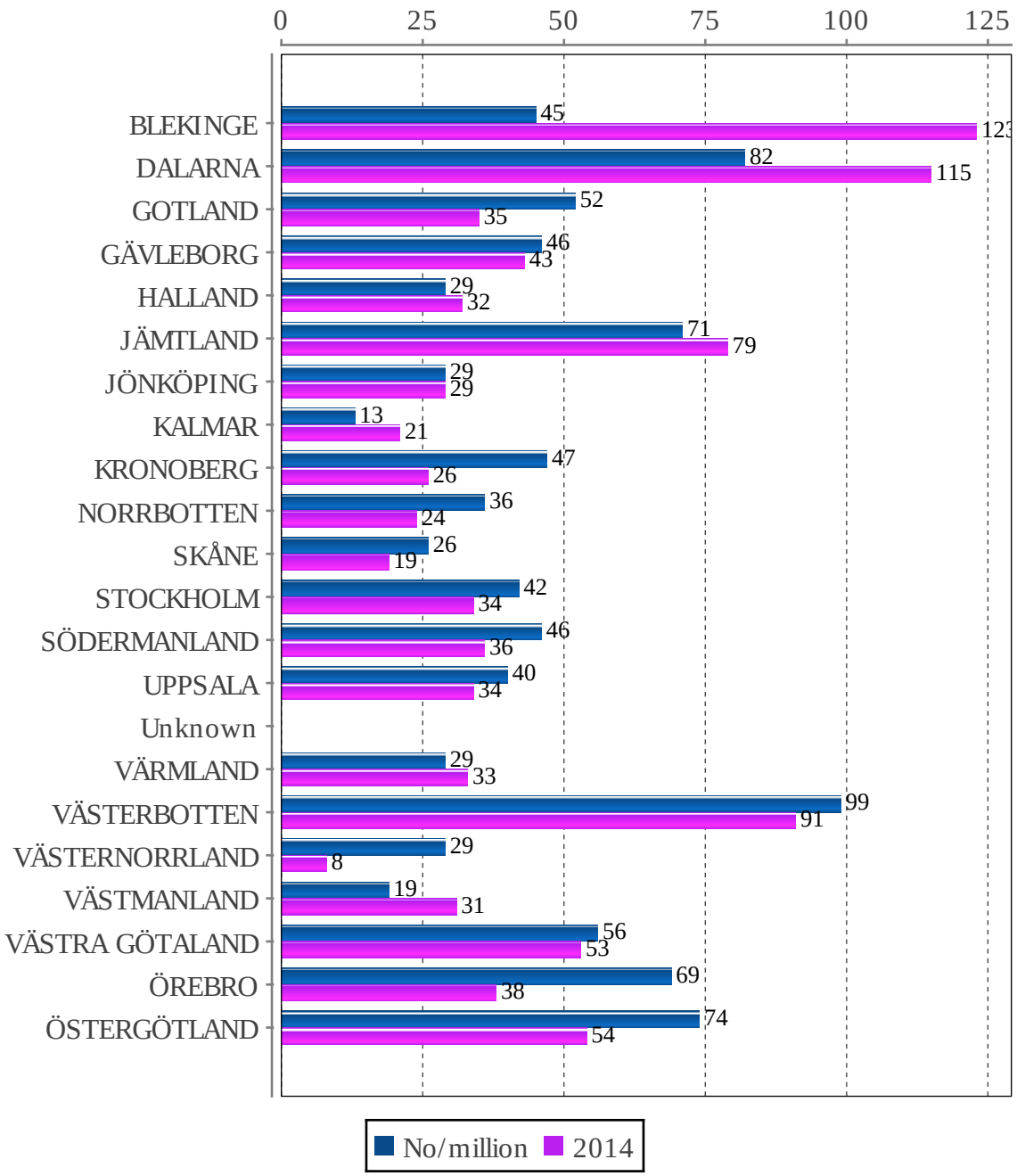
The regions are based on where the patients live, not where they are treated

Region	Population	No of first impl	No per million
Stockholm/Gotland	2288830	96	42
Uppsala/Örebro	2031911	96	47
South-East Sweden	1031177	46	45
Southern Sweden	1782910	51	29
Western Sweden	1831805	101	55
Northern Sweden	884384	51	58
Total	9851017	441	45



The regions are based on where the patients live, not where they are treated

	Population	No first impl	No/million
BLEKINGE	156253	7	45
DALARNA	281028	23	82
GOTLAND	57391	3	52
GÄVLEBORG	281815	13	46
HALLAND	314784	9	29
JÄMTLAND	127376	9	71
JÖNKÖPING	347837	10	29
KALMAR	237679	3	13
KRONOBERG	191369	9	47
NORRBOTTEN	249733	9	36
SKÅNE	1303627	34	26
STOCKHOLM	2231439	93	42
SÖDERMANLAND	283712	13	46
UPPSALA	354164	14	40
Unknown	0	2	0
VÄRMLAND	275904	8	29
VÄSTERBOTTEN	263378	26	99
VÄSTERNORRLAND	243897	7	29
VÄSTMANLAND	264276	5	19
VÄSTRA GÖTALAND	1648682	93	56
ÖREBRO	291012	20	69
ÖSTERGÖTLAND	445661	33	74
Total	9851017	443	45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75
100
125
BLEKINGE
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123
DALARNA
82
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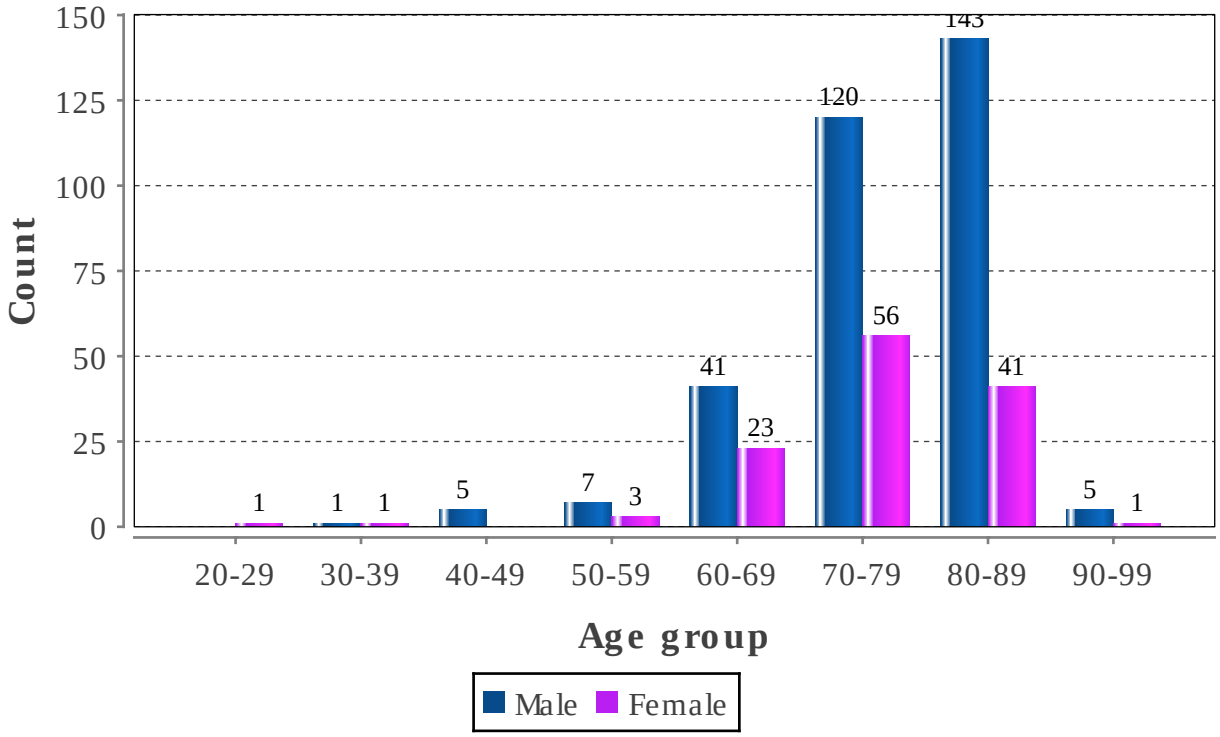
GOTLAND
52
35
GÄVLEBORG
46
43
HALLAND
29
32
JÄMTLAND
71
79
JÖNKÖPING
29
29
KALMAR
13
21
KRONOBERG
47
26
NORRBOTTEN
36
24
SKÅNE
26
19
STOCKHOLM
42
34
SÖDERMANLAND
46
36
UPPSALA
40
34
Unknown
VÄRMLAND
29
33
VÄSTERBOTTEN
99
91
VÄSTERNORRLAND
29
8
VÄSTMANLAND
19
31
VÄSTRA GÖTALAND
56
53
ÖREBRO
69
38
ÖSTERGÖTLAND
74
54
No/million
2014

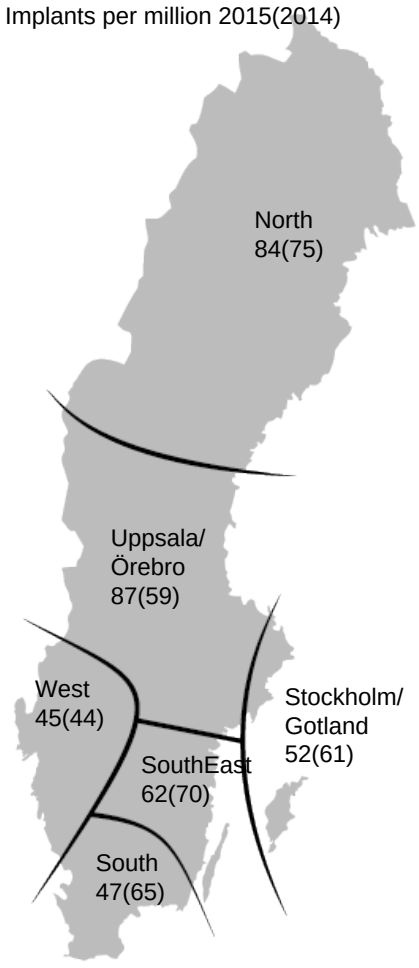
Age and gender distribution for new implants, total numbers

Age (years)	Total no	%	Male	Female
20-29	1	0.2	0	1
30-39	2	0.4	1	1
40-49	5	1.1	5	0
50-59	10	2.2	7	3
60-69	64	14.3	41	23
70-79	176	39.3	120	56
80-89	184	41.1	143	41
90-99	6	1.3	5	1
Average age	76	0.0	77	75
				Total number of implants: 448



The regions are based on where the patients live, not where they are treated

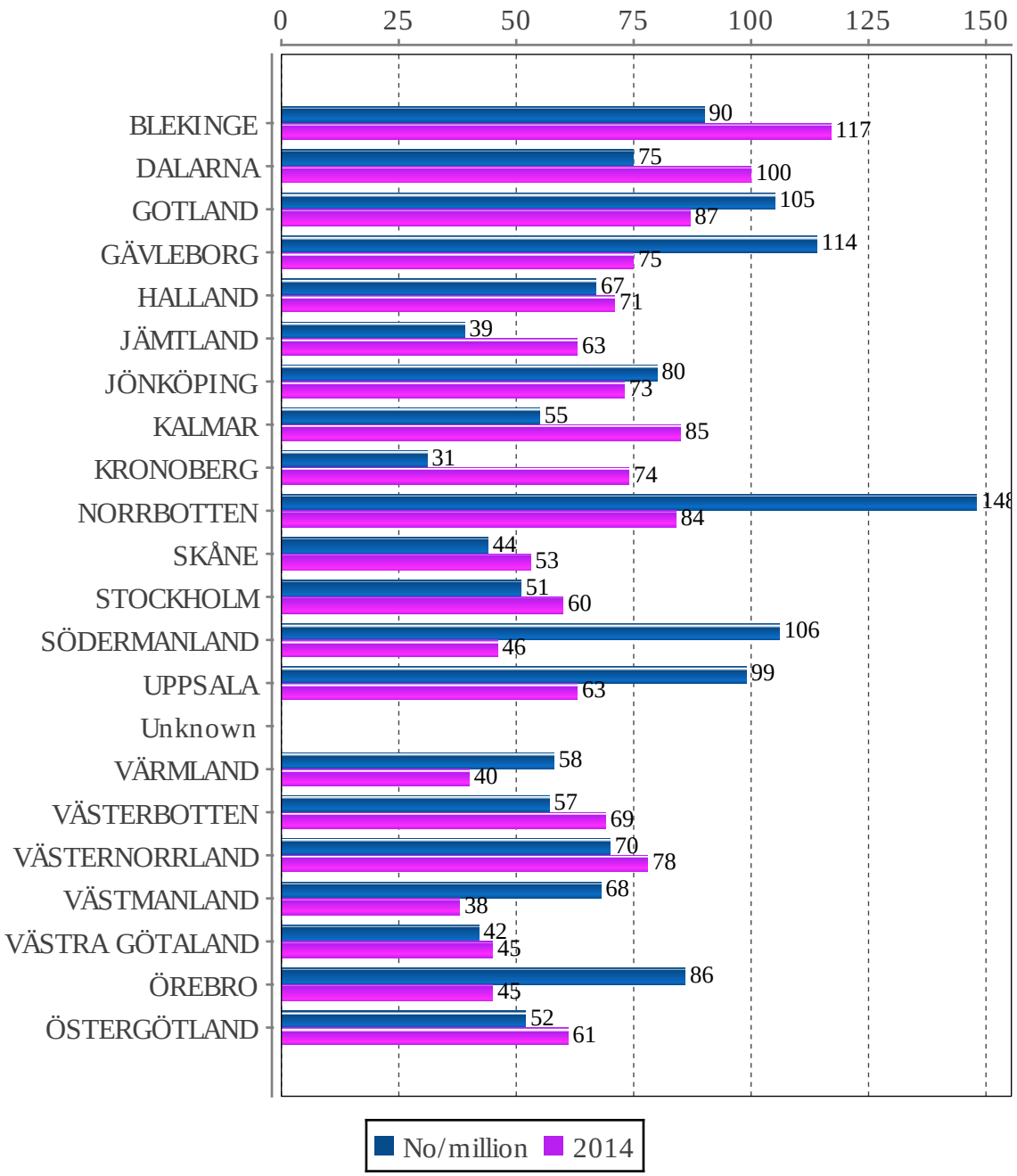
Region	Population	No of first impl	No per million
Stockholm/Gotland	2288830	120	52
Uppsala/Örebro	2031911	177	87
South-East Sweden	1031177	64	62
Southern Sweden	1782910	84	47
Western Sweden	1831805	83	45
Northern Sweden	884384	74	84
Total	9851017	602	61



STATISTICS – CRT-D – IMPLANTS PER COUNTY

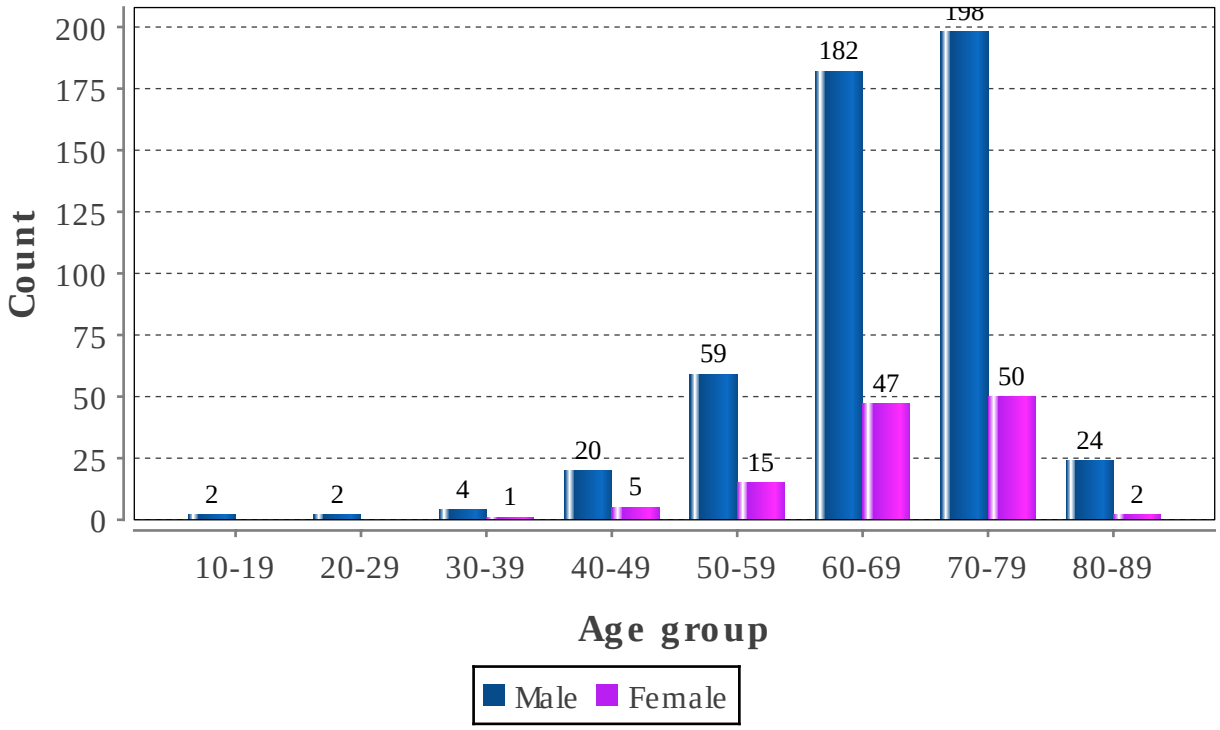
The regions are based on where the patients live, not where they are treated

	Population	No first impl	No/million
BLEKINGE	156253	14	90
DALARNA	281028	21	75
GOTLAND	57391	6	105
GÄVLEBORG	281815	32	114
HALLAND	314784	21	67
JÄMTLAND	127376	5	39
JÖNKÖPING	347837	28	80
KALMAR	237679	13	55
KRONOBERG	191369	6	31
NORRBOTTEN	249733	37	148
SKÅNE	1303627	57	44
STOCKHOLM	2231439	114	51
SÖDERMANLAND	283712	30	106
UPPSALA	354164	35	99
Unknown	0	4	0
VÄRMLAND	275904	16	58
VÄSTERBOTTEN	263378	15	57
VÄSTERNORRLAND	243897	17	70
VÄSTMANLAND	264276	18	68
VÄSTRA GÖTALAND	1648682	69	42
ÖREBRO	291012	25	86
ÖSTERGÖTLAND	445661	23	52
Total	9851017	606	62


0
25
50
75
100
125
150
BLEKINGE
90
117
DALARNA
75
100
GOTLAND
105
87
GÄVLEBORG
114
75
HALLAND
67
71
JÄMTLAND
39
63
JÖNKÖPING
80
73
KALMAR
55
85
KRONOBERG
31
74
NORRBOTTEN
148
84
SKÅNE
44
53
STOCKHOLM
51
60
SÖDERMANLAND
106
46
UPPSALA
99
63
Unknown
VÄRMLAND
58
40
VÄSTERBOTTEN
57
69
VÄSTERNORRLAND
70
78
VÄSTMANLAND
68
38
VÄSTRA GÖTALAND
42
45
ÖREBRO
86
45
ÖSTERGÖTLAND
52
61
No/million
2014

Age and gender distribution for new implants, total numbers

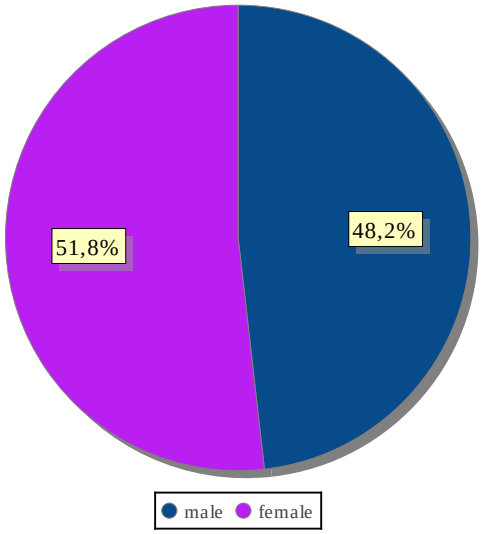
Age (years)	Total no	%	Male	Female
10-19	2	0.3	2	0
20-29	2	0.3	2	0
30-39	5	0.8	4	1
40-49	25	4.1	20	5
50-59	74	12.1	59	15
60-69	229	37.5	182	47
70-79	248	40.6	198	50
80-89	26	4.3	24	2
Average age	67	0.0	67	67
				Total number of implants: 611



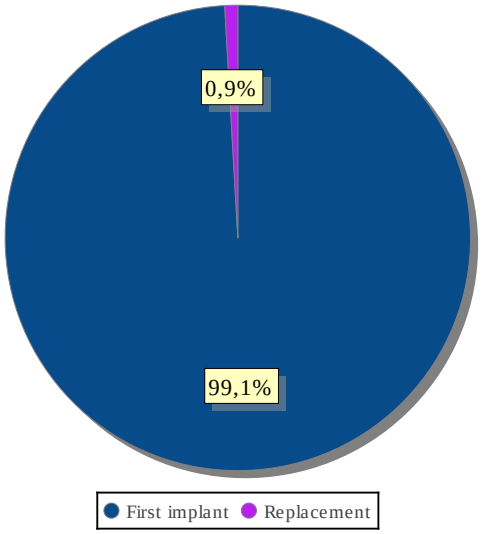
Ratio of new implants versus generator changes

	Total		Male		Female	
	no	%	no	%	no	%
First implant	795	99.1	383	48.2	412	51.8
Replacement	7	0.9	4	57.1	3	42.9
Total	802	100.0	387	48.3	415	51.7

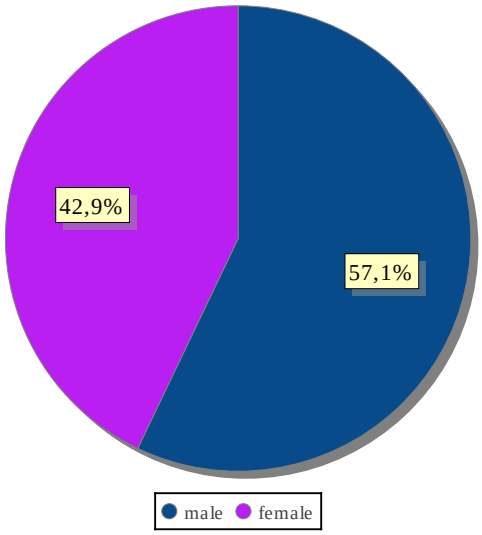
First implant



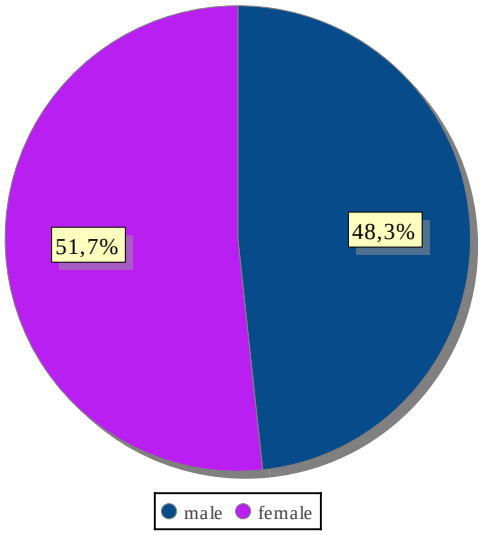
Replacement ratio



Replacement

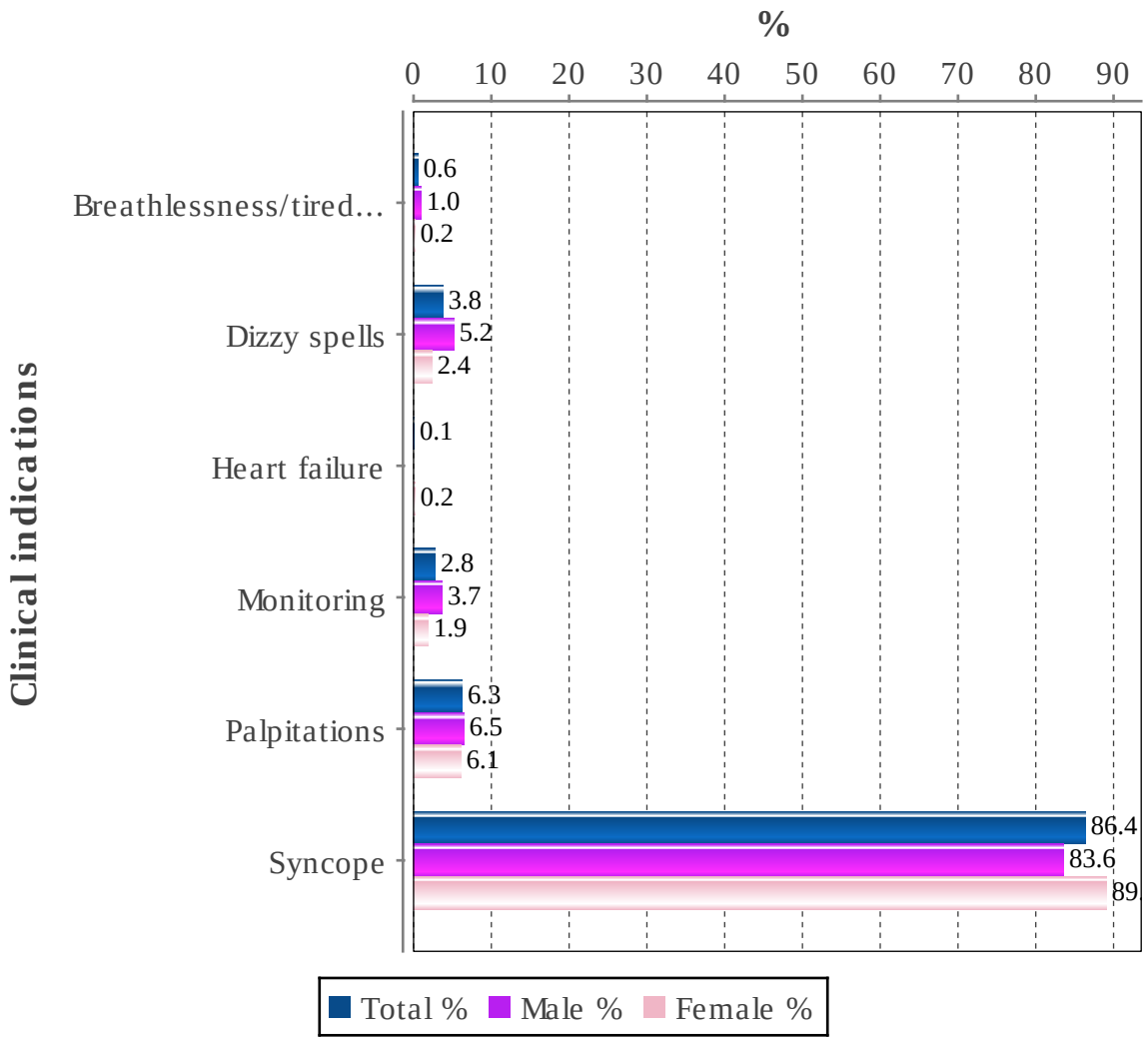


All implant



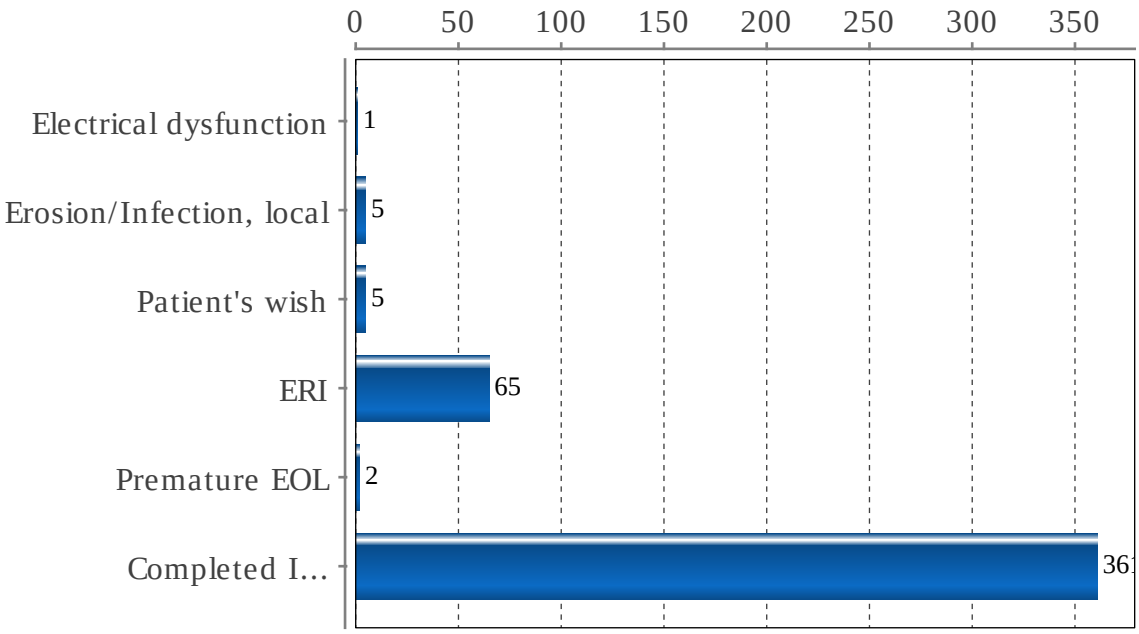
Main symptom for implanting ILR

Indication	Total %	Male %	Female %
Breathlessness/tiredness	0.6	1.0	0.2
Dizzy spells	3.8	5.2	2.4
Heart failure	0.1	0.0	0.2
Monitoring	2.8	3.7	1.9
Palpitations	6.3	6.5	6.1
Syncope	86.4	83.6	89.1



Reason for generator removal

Reason	No	%
Electrical dysfunction	1	0.2
Erosion/Infection, local	5	1.1
Patient's wish	5	1.1
ERI	65	14.8
Premature EOL	2	0.5
Completed ILR investigation	361	82.2

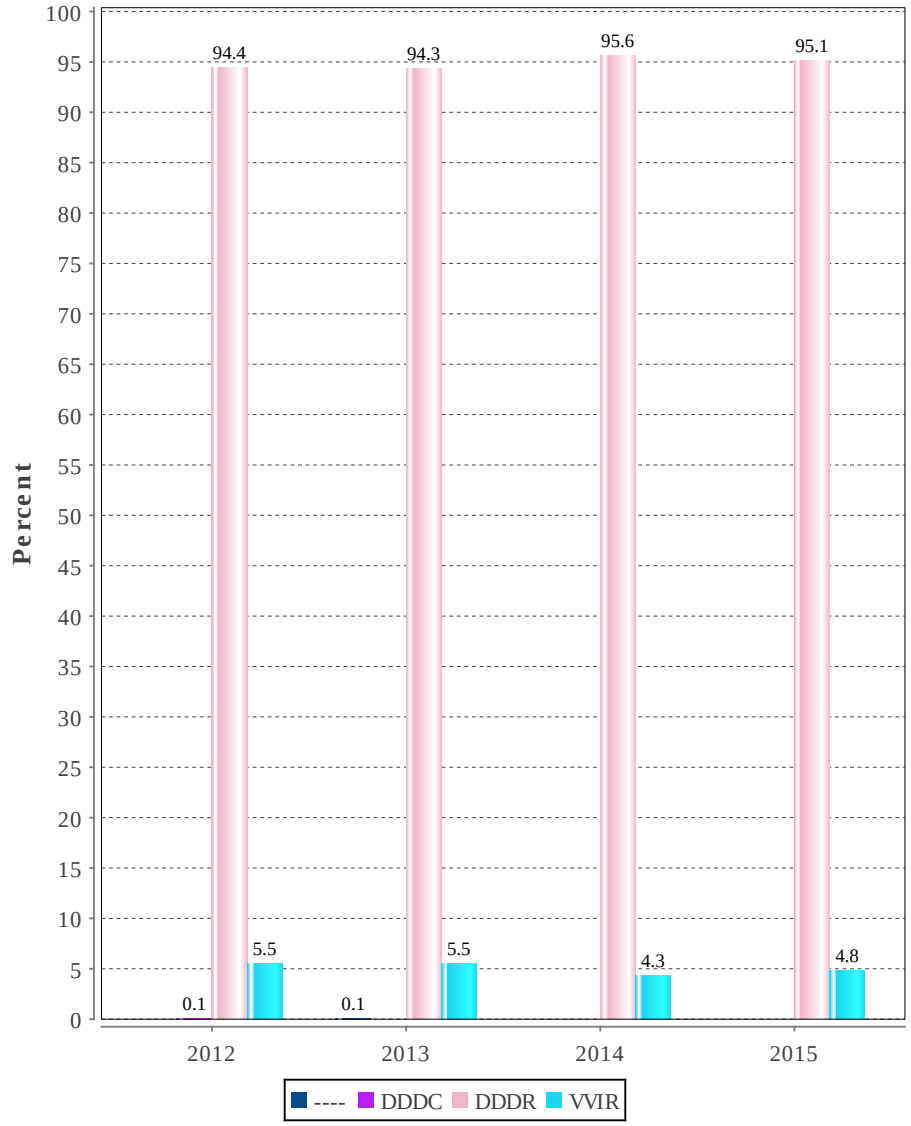


Investigation after first ILR implant in % of completed ILR investigation

Action	No	%
Pacemaker implant	170	47.1
ICD implant	15	4.2
New ILR implant	7	1.9

Use of pacing mode for total AV block indication, historical data

Mode %	2012	2013	2014	2015
----	0.0	0.1	0.0	0.0
DDDC	0.1	0.0	0.0	0.0
DDDR	94.4	94.3	95.6	95.1
VVIR	5.5	5.5	4.3	4.8



Use of pacing mode for total AV block indication per hospital (number of new implants / year)

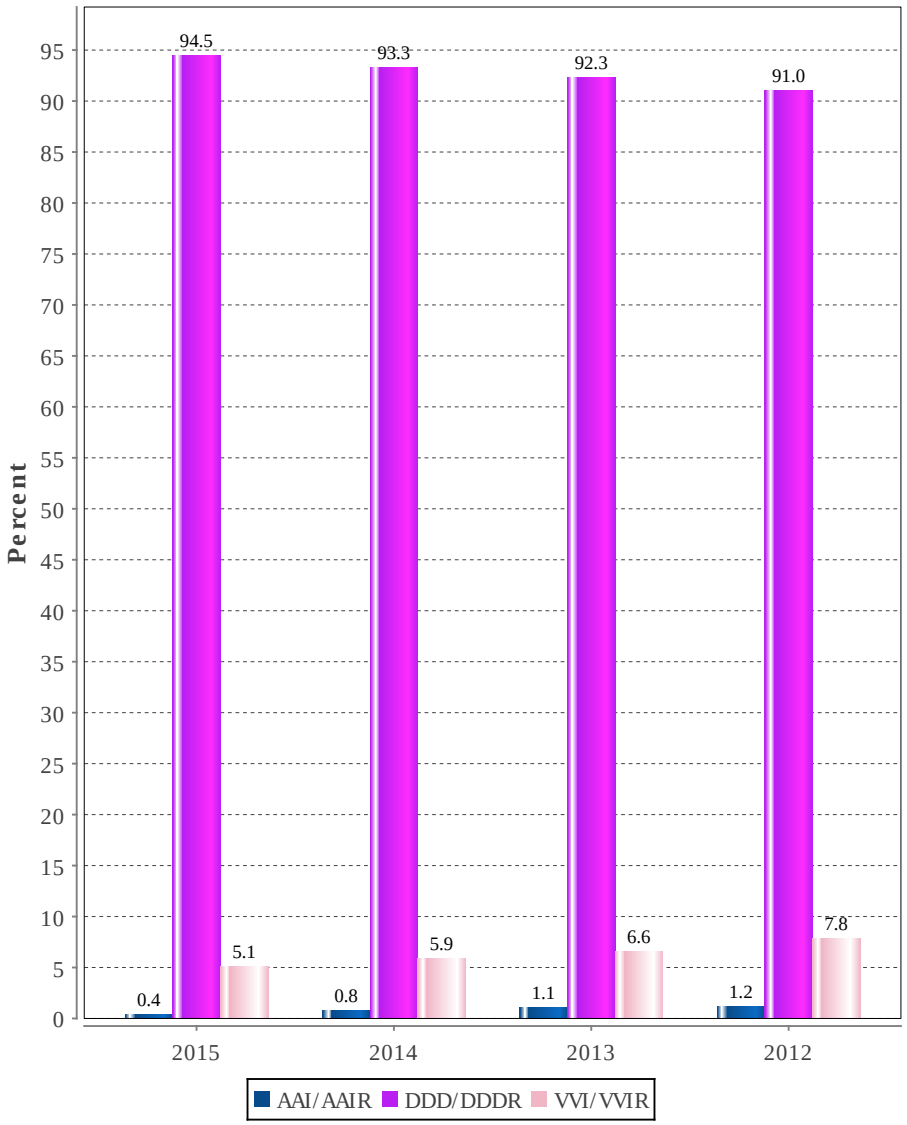
Hospital (%)	DDD	VVI
Akademiska sjukhuset	89.4	10.6
Alingsås lasarett	100.0	-
Arvika sjukhus	100.0	-
Blekingesjukhuset	95.5	4.5
Centrallasarettet Växjö	98.1	1.9
Centralsjukhuset Karlstad	93.8	6.2
Centralsjukhuset Kristianstad	98.7	1.3
Centralsjukhuset Västerås	96.6	3.4
Danderyds sjukhus	100.0	-
Drottning Silvias Bus	87.5	12.5
Falu lasarett	98.9	1.1
Hudiksvalls sjukhus	84.4	15.6
Karolinska Universitetssjukhuset Huddinge	96.6	3.4
Karolinska Universitetssjukhuset Solna	98.1	1.9
Kungälvs sjukhus	100.0	-
Linköpings Universitetssjukhus	91.4	8.6
Länssjukhuset Gävle	96.4	3.6
Länssjukhuset Halmstad	96.8	3.2
Länssjukhuset Kalmar	63.0	37.0
Länssjukhuset Ryhov	96.2	3.8
Mälarsjukhuset	100.0	-
Norrlands Universitetssjukhus	92.0	8.0
Oskarshamns sjukhus	90.0	10.0
Sahlgrenska Universitetssjukhuset	92.9	7.1
Sahlgrenska Universitetssjukhuset /Östra	88.2	11.8
Skaraborgs sjukhus Skövde	94.6	5.4
Skellefteå lasarett	95.2	4.8
Skånes universitetssjukhus, Lund	98.6	1.4
Skånes universitetssjukhus, Malmö	98.1	1.9
Sollefteå sjukhus	57.1	42.9
St Görans sjukhus	94.4	5.6
Sunderby sjukhus	95.4	4.6
Sundsvalls sjukhus	94.6	5.4
Södersjukhuset	97.6	2.4
Södra Älvsborgs sjukhus	98.5	1.5
Torsby sjukhus	100.0	-
Trollhättan, NÄL	96.0	4.0
Universitetssjukhuset Örebro	100.0	-
Varbergs sjukhus	85.7	14.3
Visby lasarett	96.2	3.8
Vrinnevisjukhuset	92.3	7.7
Västerviks sjukhus	90.3	9.7
Örnsköldsviks sjukhus	100.0	-
Östersunds sjukhus	100.0	-

Use of pacing mode for total AV block indication per hospital size

Year	Mode	All hospitals (%)	Large (%)	Medium (%)	Small (%)
2015	DDD	95.2	95.9	96.0	85.7
	VVI	4.8	4.1	4.0	14.3
2014	DDDR	95.7	97.0	94.2	89.3
	DDDC	-	-	-	-
	VVIC	-	0.1	-	-
	VVIR	4.3	2.9	5.8	10.7
2013	DDDR	94.4	95.8	92.9	90.1
	DDDC	-	0.1	-	-
	VVIC	-	-	-	-

Use of pacing mode for Sinus Node Disease, historical data

Mode (%)	2015	2014	2013	2012
AAI/AAIR	0.4	0.8	1.1	1.2
DDD/DDDR	94.5	93.3	92.3	91.0
VVI/VVIR	5.1	5.9	6.6	7.8



QUALITY – PACEMAKER – FIRST IMPLANT
SINUS NODE DYSFUNCTION PER HOSPITAL

Use of pacing mode for Sinus Node Dysfunction indication per hospital size (number of new implants / year)

Year	Mode	All hospitals	Small %	Medium %	Large %
2015	AAI	0.4	1.9	0.3	0.3
	VVI	5.1	12.3	6.5	3.8
	DDD	94.5	85.8	93.2	95.9
2014	AAIR	0.8	1.1	0.9	0.8
	VVIR	5.9	16.1	7.7	4.1
	DDDR	93.3	82.8	91.4	95.1
2013	AAIR	1.1	0.9	1.0	1.2
	VVIR	6.6	12.8	8.7	4.7
	DDDR	92.2	86.3	90.0	94.2
	DDDC	-	-	0.1	-
	VVIC	-	-	0.1	-
2012	AAIC	-	-	-	-
	DDDC	-	-	-	-
	AAIR	1.2	0.6	1.3	1.2
	VVIC	-	0.6	-	-
	VVIR	7.8	13.4	8.6	6.1
	DDDR	91.0	85.4	90.2	92.6
2011	AAIC	-	-	-	-
	AAIR	1.4	0.4	1.0	2.3
	VVIC	0.1	0.4	0.1	-
	VVIR	7.5	19.6	8.3	2.8
	DDDR	91.0	79.6	90.6	95.0
2010	AAIR	3.4	2.5	2.9	4.2
	VVIC	0.1	1.2	-	-
	VVIR	9.2	20.1	10.3	6.1
	DDDR	87.3	76.2	86.8	89.7
2009	AAIR	5.1	6.3	4.8	5.2
	VVIC	0.2	-	0.1	-
	VVIR	9.3	17.6	11.9	5.6
	DDDR	85.4	73.9	83.2	89.2

QUALITY – PACEMAKER – FIRST IMPLANT
SINUS NODE DYSFUNCTION PER HOSPITAL

Use of pacing mode for Sinus Node Dysfunction indication per hospital (number of new implants / year)

Hospital (%)	DDD	VVI	AAI
Akademiska sjukhuset	96.7	3.3	-
Alingsås lasarett	90.5	4.8	4.8
Blekingesjukhuset	100.0	-	-
Centrallasarettet Växjö	100.0	-	-
Centralsjukhuset Karlstad	91.3	8.7	-
Centralsjukhuset Kristianstad	100.0	-	-
Centralsjukhuset Västerås	100.0	-	-
Danderyds sjukhus	99.1	0.9	-
Drottning Silvias Bus	100.0	-	-
Falu lasarett	95.0	3.3	1.7
Hudiksvalls sjukhus	88.2	11.8	-
Karolinska Universitetssjukhuset	94.9	4.1	1.0
Kungälvs sjukhus	100.0	-	-
Linköpings Universitetssjukhus	98.3	1.7	-
Länssjukhuset Gävle	88.5	11.5	-
Länssjukhuset Halmstad	87.1	12.9	-
Länssjukhuset Kalmar	81.3	18.8	-
Länssjukhuset Ryhov	83.1	16.9	-
Mälarsjukhuset	100.0	-	-
Norrlands Universitetssjukhus	93.5	6.5	-
Oskarshamns sjukhus	81.8	-	18.2
Sahlgrenska Universitetssjukhuset	96.9	3.1	-
Sahlgrenska Universitetssjukhuset /Östra	100.0	-	-
Skaraborgs sjukhus Skövde	98.5	1.5	-
Skellefteå lasarett	76.9	23.1	-
Skånes universitetssjukhus, Lund	94.5	4.4	1.1
Skånes universitetssjukhus, Malmö	94.8	5.2	-
Sollefteå sjukhus	60.0	40.0	-
St Görans sjukhus	98.8	1.2	-
Sunderby sjukhus	91.7	8.3	-
Sundsvalls sjukhus	76.2	23.8	-
Södersjukhuset	98.5	1.5	-
Södra Älvsborgs sjukhus	98.4	1.6	-
Torsby sjukhus	33.3	66.7	-
Trollhättan, NÄL	97.4	2.6	-
Universitetssjukhuset Örebro	96.9	-	3.1
Varbergs sjukhus	88.9	11.1	-
Visby lasarett	100.0	-	-
Vrinnevisjukhuset	93.8	6.3	-
Västerviks sjukhus	50.0	50.0	-
Örnsköldsviks sjukhus	100.0	-	-
Östersunds sjukhus	87.9	12.1	-

Dislocation rate for different lead types in atrial or ventricular placement. Based on all implants implanted 2005 and later and explanted/corrected 2015 or earlier

Type	Right atrium %	Right ventricle %	Left ventricle %	Total %
Fixed screw	1.6	1.1	0.6	1.4
Retractable screw	1.6	1.1	0.6	1.4
Passive	3.5	1.7	2.1	1.5
All	1.7	1.3	1.9	1.5

Extractions per hospital

Hospital	No of leads
Akademiska sjukhuset	83
Blekingesjukhuset	6
Falu lasarett	6
Karolinska Solna	233
Linköpings universitetssjukhus	21
Sahlgrenska universitetssjukhuset	90
Skånes universitetssjukhus, Lund	11
Sunderby sjukhus	12
Universitetssjukhuset Örebro	6

Extractions per type

Type	Extractions
ICD lead	103
Pacemaker lead	399

Extractions per model (more then 5 extractions)

Manfacturer	Model	Extractions
Boston Scientific	4457 Fineline II Sterox EZ MRI	6
Boston Scientific	4470 Fineline II Sterox EZ MRI	13
Medtronic	4023 Capsure SP	6
Medtronic	4076 CapSureFix Novus MRI	51
Medtronic	4968 CapSure Epi	6
Medtronic	5076 CapSureFix MRI	8
Medtronic	6944 Sprint	8
Medtronic	6947 Sprint Quattro Secure MRI	12
Medtronic	6949 Sprint Fidelis	7
St. Jude Medical	1056T QuickSite	8
St. Jude Medical	1258T QuickFlex	12
St. Jude Medical	1388T Tendril DX	7
St. Jude Medical	1458Q Quartet	8
St. Jude Medical	1488T TendrilSDX	7
St. Jude Medical	1581 Riata	6
St. Jude Medical	1646T Isoflex	9
St. Jude Medical	1688T TendrilSDX	16
St. Jude Medical	1699TC OptiSense	6
St. Jude Medical	1948 Isoflex	11
St. Jude Medical	1999 Optisense	34
St. Jude Medical	2088TC Tendril	35
St. Jude Medical	7120 Durata	7
St. Jude Medical	7120Q Durata	6
St. Jude Medical	7122Q Durata	13
St. Jude Medical	LPA1200M58cm TendrilMRI	9
Vitatron	ICM09B Crystalline	8
Vitatron	ICQ09B Crystalline	9

Extractions per reason

Reason	Extractions
Ceased indication for ICD therapy	9
Ceased indication for PM therapy	6
Elective/system change	26
Electrical dysfunction	88
Heart transplant	6
Infection/Ulceration, local	186
Infection/Ulceration, systemic	135
Lead dislocation	11
Patient's wish	10
Preventive	8
Venous access	8

*Extraction positions**

Hospital	Femoral	Left superior	N/A	Right superior
Blekingesjukhuset	0	5	0	1
Falu lasarett	0	4	0	2
Karolinska Solna	2	193	0	38
Linköpings universitetssjukhus	6	15	0	0
Sahlgrenska universitetssjukhuset	11	77	0	2
Skånes universitetssjukhus, Lund	0	9	0	2
Sunderby sjukhus	0	11	0	1
Universitetssjukhuset Örebro	0	6	0	0

*Hospital Akademiska excluded

*Extraction problems**

Hospital	I	E	O	P	X	D
Blekingesjukhuset	0	0	0	0	0	0
Falu lasarett	0	0	0	0	0	0
Karolinska Solna	0	1	0	0	0	0
Linköpings universitetssjukhus	0	0	0	0	0	0
Sahlgrenska universitetssjukhuset	0	0	0	0	0	0
Skånes universitetssjukhus, Lund	0	1	0	0	0	0
Sunderby sjukhus	0	0	0	0	0	0
Universitetssjukhuset Örebro	0	0	0	0	0	0

(*Hospital Akademiska excluded), I: Insulation break, E: Conductor break, O: Unintentional extraction of another lead, P: Perforation/Tamponade, X: Pneumothorax, D: Death

*Extraction results**

Hospital	Failed	Partially successfull	Successfull
Blekingesjukhuset	0	0	6
Falu lasarett	0	0	6
Karolinska Solna	0	6	227
Linköpings universitetssjukhus	0	0	21
Sahlgrenska universitetssjukhuset	0	2	88
Skånes universitetssjukhus, Lund	0	1	10
Sunderby sjukhus	0	0	12
Universitetssjukhuset Örebro	0	0	6

*Hospital Akademiska excluded

*Extraction tools**

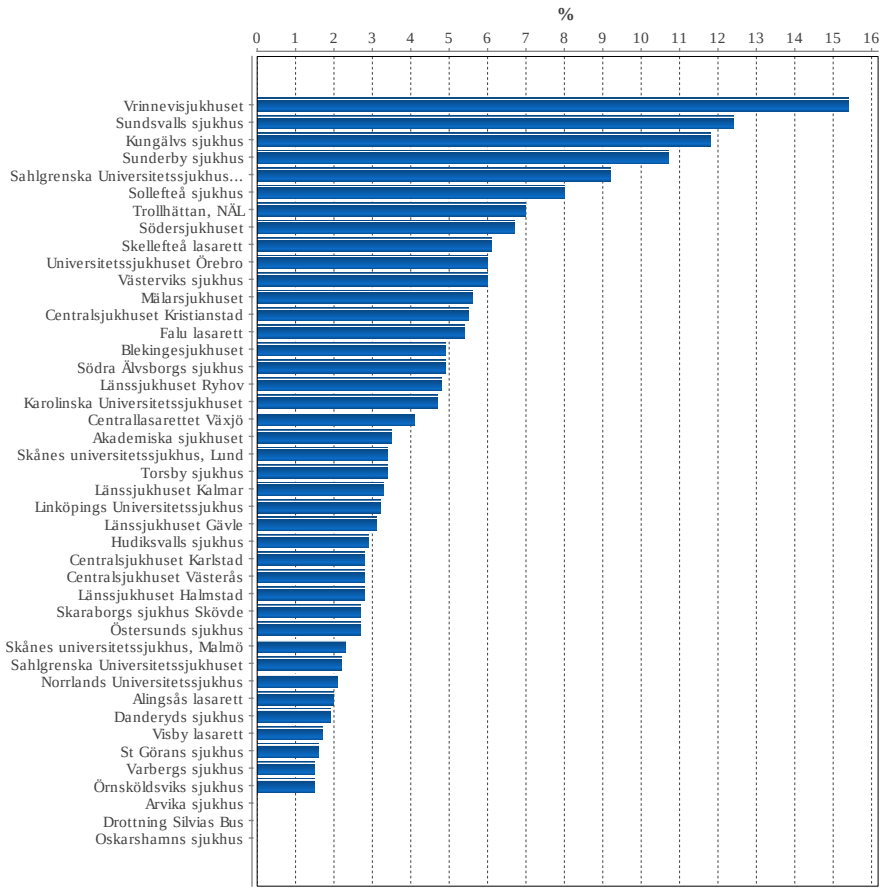
Hospital	SS	LS	PS	AM	L	S	PK	EK	AL
Blekingesjukhuset	0	0	0	0	0	0	0	0	0
Falu lasarett	0	0	0	0	0	0	0	0	0
Karolinska Solna	28	114	73	58	2	0	0	0	0
Linköpings universitetssjukhus	0	2	2	0	0	0	0	0	0
Sahlgrenska universitetssjukhuset	0	0	0	5	0	0	0	0	72
Skånes universitetssjukhus, Lund	0	0	0	0	0	0	0	0	0
Sunderby sjukhus	0	0	0	0	0	0	0	0	0
Universitetssjukhuset Örebro	2	0	0	0	0	0	0	0	0

(*Hospital Akademiska excluded), SS: Standard stylet, LS: Locking stylet, PS: Passive sheath, AM: Active mechanical sheath, L: Lasso, S: Snare, PK: Pigtail catheter, EP: EP catheter, AL: Active laser sheath

Registered complications for new implants and for bleeding, infection and other also including replacements

Complication	2014 %	2015 %	Based on
Discontinued surgery due to hemodynamic reasons	0.0	0.0	A
Pericardial fluid	0.1	0.0	A
Electrical dysfunction	1.0	0.9	B
Local bleeding	0.3	0.2	A
Perforation/tamponade	0.3	0.3	B
Pneumothorax	0.6	0.4	B
Infection/perforation	0.5	0.6	A
Electrode displacement	1.9	2.1	B
Other	0.6	0.4	A
Subclavian or other related thrombosis	0.1	0.1	B
Death	0.0	0.0	A
Stroke	0.0	0.0	A
Total	5.4	5.0	
Based on A=9281 (all implants) alternatively B=7410 (first implants + lead replacement) validated events			

QUALITY – PACEMAKER – COMPLICATIONS PER HOSPITAL



De.: Death, **Dc.**: Discontinued surgery, **Df.**: Electrical dysfunction, **Dp.**: Lead dislocation, **In.**: Infection/Perforation, **Tr.**: Subclavian or other related thrombosis

Hospital	No	De. %	Dc. %	Df. %	Dp. %	In. %	Tr. %
Akademiska sjukhuset	399	-	-	0.8	1.3	0.3	-
Alingsås lasarett	99	-	-	2.0	-	-	-
Arvika sjukhus	14	-	-	-	-	-	-
Blekingesjukhuset	205	-	-	2.0	1.5	0.5	-
Centrallasarettet Växjö	147	-	-	-	3.4	-	-
Centralsjukhuset Karlstad	181	-	-	-	2.2	0.6	-
Centralsjukhuset Kristianstad	256	-	-	-	3.5	-	-
Centralsjukhuset Västerås	211	-	0.5	-	0.9	0.5	-
Danderyds sjukhus	532	-	-	0.4	0.8	0.2	-
Drottning Silvias Bus	20	-	-	-	-	-	-
Falu lasarett	299	-	0.3	0.3	1.7	0.7	-
Hudiksvalls sjukhus	70	-	-	-	-	1.4	-
Karolinska Universitetssjukhuset	533	-	0.2	0.8	0.9	1.1	0.2
Kungälvs sjukhus	17	-	-	-	11.8	-	-
Linköpings Universitetssjukhus	339	-	-	0.6	1.8	0.3	-
Länssjukhuset Gävle	294	-	-	1.7	1.0	-	-
Länssjukhuset Halmstad	145	-	-	-	0.7	0.7	-
Länssjukhuset Kalmar	92	-	-	-	2.2	-	-
Länssjukhuset Ryhov	289	-	-	1.0	2.8	-	-
Mälarsjukhuset	250	-	-	0.8	2.4	1.2	-
Norrlands Universitetssjukhus	237	-	-	-	0.8	0.8	-
Oskarshamns sjukhus	30	-	-	-	-	-	-
Sahlgrenska Universitetssjukhuset	643	-	-	0.5	1.1	0.2	-
Sahlgrenska Universitetssjukhuset /Östra	65	-	-	1.5	1.5	1.5	-
Skaraborgs sjukhus Skövde	297	-	-	-	0.3	-	-
Skellefteå lasarett	66	-	-	1.5	3.0	-	-
Skånes universitetssjukhus, Lund	707	-	-	0.6	2.1	0.3	-
Skånes universitetssjukhus, Malmö	389	-	-	-	0.8	0.3	-
Sollefteå sjukhus	25	-	-	-	4.0	-	-
St Görans sjukhus	305	-	-	0.3	-	0.7	-
Sunderby sjukhus	281	-	-	0.7	2.5	1.1	-
Sundsvalls sjukhus	185	-	-	-	6.5	2.7	-
Södersjukhuset	343	-	-	1.5	1.7	0.6	-
Södra Älvsborgs sjukhus	267	-	-	1.9	0.7	1.1	-
Torsby sjukhus	29	-	-	-	-	-	-
Trollhättan, NÄL	316	-	-	2.2	2.8	0.9	0.3
Universitetssjukhuset Örebro	248	-	-	0.8	2.8	1.6	-
Varbergs sjukhus	134	-	-	-	0.7	-	0.7
Visby lasarett	58	-	-	-	-	-	-
Vrinnevisjukhuset	149	-	-	7.4	4.0	2.0	0.7
Västerviks sjukhus	50	-	-	-	4.0	-	-
Örnsköldsviks sjukhus	68	-	-	-	-	1.5	-
Östersunds sjukhus	147	-	-	-	1.4	0.7	-

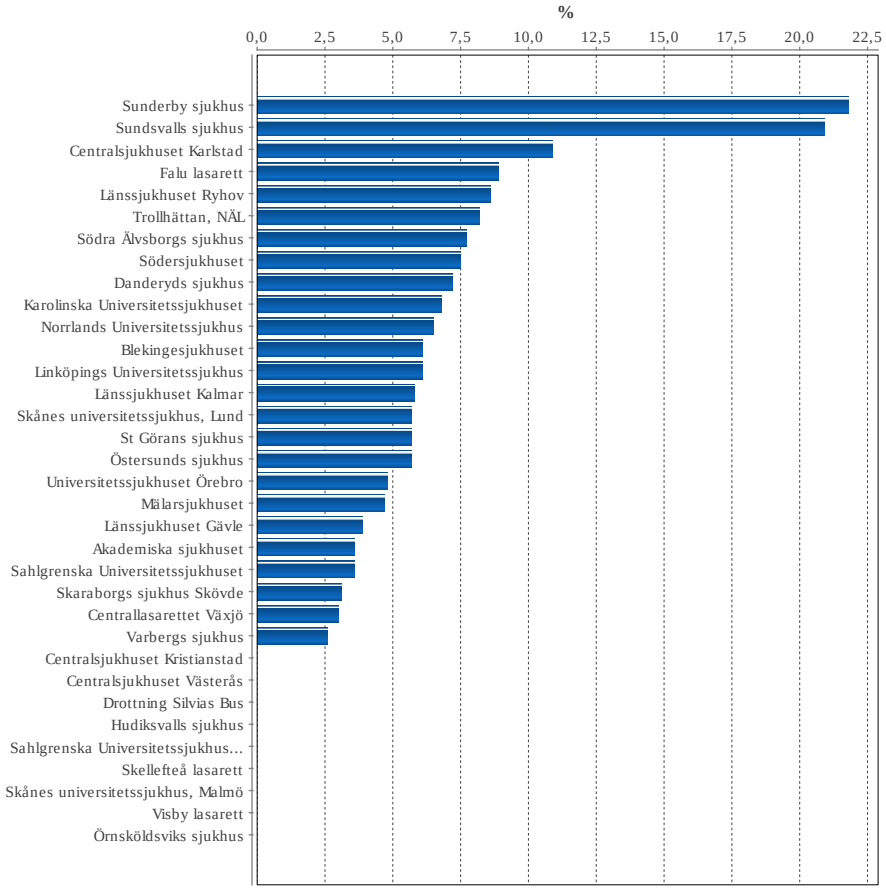
QUALITY – PACEMAKER – COMPLICATIONS PER HOSPITAL

Bl.: Bleeding, **Ot.**: Other, **Tm.**: Perforation/Tamponade, **Pn.**: Pneumothorax, **Pf.**: Pericardial fluid, **St.**: Stroke

Hospital	No	Bl. %	Ot. %	Tm. %	Pn. %	Pf. %	St. %	All %
Akademiska sjukhuset	399	0.3	0.5	-	0.5	-	-	3.5
Alingsås lasarett	99	-	-	-	-	-	-	2.0
Arvika sjukhus	14	-	-	-	-	-	-	-
Blekingesjukhuset	205	-	-	0.5	0.5	-	-	4.9
Centrallasarettet Växjö	147	-	0.7	-	-	-	-	4.1
Centralsjukhuset Karlstad	181	-	-	-	-	-	-	2.8
Centralsjukhuset Kristianstad	256	0.4	0.8	-	0.8	-	-	5.5
Centralsjukhuset Västerås	211	-	-	-	0.5	0.5	-	2.8
Danderyds sjukhus	532	0.2	0.2	0.2	-	-	-	1.9
Drottning Silvias Bus	20	-	-	-	-	-	-	-
Falu lasarett	299	0.3	1.0	-	1.0	-	-	5.4
Hudiksvalls sjukhus	70	-	1.4	-	-	-	-	2.9
Karolinska Universitetssjukhuset	533	0.8	-	0.4	0.4	-	-	4.7
Kungälvs sjukhus	17	-	-	-	-	-	-	11.8
Linköpings Universitetssjukhus	339	-	0.6	-	-	-	-	3.2
Länssjukhuset Gävle	294	0.3	-	-	-	-	-	3.1
Länssjukhuset Halmstad	145	-	0.7	0.7	-	-	-	2.8
Länssjukhuset Kalmar	92	-	-	-	1.1	-	-	3.3
Länssjukhuset Ryhov	289	-	0.7	0.3	-	-	-	4.8
Mälarsjukhuset	250	-	0.4	0.8	-	-	-	5.6
Norrlands Universitetssjukhus	237	-	-	-	0.4	-	-	2.1
Oskarshamns sjukhus	30	-	-	-	-	-	-	-
Sahlgrenska Universitetssjukhuset	643	-	0.2	0.2	0.2	-	-	2.2
Sahlgrenska Universitetssjukhuset /Östra	65	1.5	1.5	-	1.5	-	-	9.2
Skaraborgs sjukhus Skövde	297	0.7	1.3	0.3	-	-	-	2.7
Skellefteå lasarett	66	-	1.5	-	-	-	-	6.1
Skånes universitetssjukhus, Lund	707	-	0.4	-	-	-	-	3.4
Skånes universitetssjukhus, Malmö	389	-	1.3	-	-	-	-	2.3
Sollefteå sjukhus	25	4.0	-	-	-	-	-	8.0
St Görans sjukhus	305	0.3	-	-	0.3	-	-	1.6
Sunderby sjukhus	281	0.7	0.7	1.1	3.9	-	-	10.7
Sundsvalls sjukhus	185	1.6	0.5	-	1.1	-	-	12.4
Södersjukhuset	343	-	-	2.3	0.6	-	-	6.7
Södra Älvsborgs sjukhus	267	-	1.1	-	-	-	-	4.9
Torsby sjukhus	29	3.4	-	-	-	-	-	3.4
Trollhättan, NÄL	316	-	-	-	0.6	-	-	7.0
Universitetssjukhuset Örebro	248	-	-	0.4	-	0.4	-	6.0
Varbergs sjukhus	134	-	-	-	-	-	-	1.5
Visby lasarett	58	-	-	1.7	-	-	-	1.7
Vrinnevisjukhuset	149	1.3	-	-	-	-	-	15.4
Västerviks sjukhus	50	-	-	-	2.0	-	-	6.0
Örnsköldsviks sjukhus	68	-	-	-	-	-	-	1.5
Östersunds sjukhus	147	-	-	0.7	-	-	-	2.7

Registered complications for new implants and for bleeding, infection and other also including replacements

Complication	2014 %	2015 %
Discontinued surgery due to hemodynamic reasons	0.3	0.1
Electrical dysfunction	1.0	1.4
Local bleeding	0.9	0.7
Perforation/tamponade	0.7	0.7
Pneumothorax	0.5	0.7
Infection/perforation	1.7	2.1
Electrode displacement	2.9	2.3
Other	1.1	1.0
Subclavian or other related thrombosis	0.1	0.0
Death	0.0	0.0
Pericardial fluid	0.1	0.1
Stroke	0.0	0.0
Total	9.3	9.1
Based on 1508 (all implants) alternatively 1664 (first implants + lead replacements) validated events		


%
0,0
2,5
5,0
7,5
10,0
12,5
15,0
17,5
20,0
22,5
Sunderby sjukhus
Sundsvalls sjukhus
Centralsjukhuset Karlstad
Falu lasarett
Länssjukhuset Ryhov
Trollhättan, NÄL
Södra Älvsborgs sjukhus
Södersjukhuset
Danderyds sjukhus
Karolinska Universitetssjukhuset
Norrlands Universitetssjukhus
Blekingesjukhuset
Linköpings Universitetssjukhus
Länssjukhuset Kalmar
Skånes universitetssjukhus, Lund
St Görans sjukhus
Östersunds sjukhus
Universitetssjukhuset Örebro
Mälarsjukhuset
Länssjukhuset Gävle
Akademiska sjukhuset
Sahlgrenska Universitetssjukhuset
Skaraborgs sjukhus Skövde
Centrallasarettet Växjö
Varbergs sjukhus
Centralsjukhuset Kristianstad
Centralsjukhuset Västerås
Drottning Silvias Bus
Hudiksvalls sjukhus
Sahlgrenska Universitetssjukhus...
Skellefteå lasarett
Skånes universitetssjukhus, Malmö
Visby lasarett
Örnsköldsviks sjukhus

QUALITY – ICD – COMPLICATIONS PER HOSPITAL

De.: Death, **Dc.**: Discontinued surgery, **Df.**: Electrical dysfunction, **Dp.**: Lead dislocation, **In.**: Infection/Perforation, **Tr.**: Subclavian and other related trombosis, **Bl.**: Bleeding

Hospital	No	De. %	Dc. %	Df. %	Dp. %	In. %	Tr. %	Bl. %
Akademiska sjukhuset	139	-	-	0.7	1.4	-	-	-
Blekingesjukhuset	66	-	-	-	1.5	-	-	1.5
Centrallasarettet Växjö	33	-	-	-	-	-	-	3.0
Centralsjukhuset Karlstad	55	-	-	1.8	7.3	1.8	-	-
Centralsjukhuset Kristianstad	1	-	-	-	-	-	-	-
Centralsjukhuset Västerås	60	-	-	-	-	-	-	-
Danderyds sjukhus	83	-	-	2.4	3.6	1.2	-	-
Drottning Silvias Bus	2	-	-	-	-	-	-	-
Falu lasarett	101	-	-	5.0	1.0	1.0	-	-
Hudiksvalls sjukhus	8	-	-	-	-	-	-	-
Karolinska Universitetssjukhuset	279	-	0.4	0.7	1.8	1.8	-	1.1
Linköpings Universitetssjukhus	148	-	-	2.7	2.0	0.7	-	-
Länssjukhuset Gävle	77	-	-	3.9	-	-	-	-
Länssjukhuset Kalmar	69	-	1.4	1.4	-	1.4	-	-
Länssjukhuset Ryhov	58	-	-	1.7	5.2	1.7	-	-
Mälarsjukhuset	43	-	-	-	2.3	-	-	-
Norrlands Universitetssjukhus	77	-	-	-	1.3	2.6	-	1.3
Sahlgrenska Universitetssjukhuset	112	-	-	-	1.8	-	-	-
Sahlgrenska Universitetssjukhuset /Östra	2	-	-	-	-	-	-	-
Skaraborgs sjukhus Skövde	65	-	-	-	-	-	-	-
Skellefteå lasarett	8	-	-	-	-	-	-	-
Skånes universitetssjukhus, Lund	299	-	-	0.7	1.3	1.7	-	-
Skånes universitetssjukhus, Malmö	1	-	-	-	-	-	-	-
St Görans sjukhus	53	-	-	-	1.9	1.9	-	-
Sunderby sjukhus	101	-	-	4.0	3.0	5.9	-	2.0
Sundsvalls sjukhus	43	-	-	-	7.0	7.0	-	2.3
Södersjukhuset	67	-	-	3.0	-	1.5	-	-
Södra Älvsborgs sjukhus	39	-	-	-	5.1	2.6	-	-
Trollhättan, NÄL	49	-	-	-	4.1	-	-	-
Universitetssjukhuset Örebro	83	-	-	1.2	1.2	-	-	1.2
Varbergs sjukhus	78	-	-	-	-	-	-	-
Visby lasarett	2	-	-	-	-	-	-	-
Örnsköldsviks sjukhus	8	-	-	-	-	-	-	-
Östersunds sjukhus	35	-	-	-	-	5.7	-	-

QUALITY – ICD – COMPLICATIONS PER HOSPITAL

Ot.: Other, **Pa.**: Perioperative arrhythmia, **Tm.**: Perforation/Tamponade, **Pn.**: Pneumothorax, **Pf.**: Pericardial fluid, **St.**: Stroke

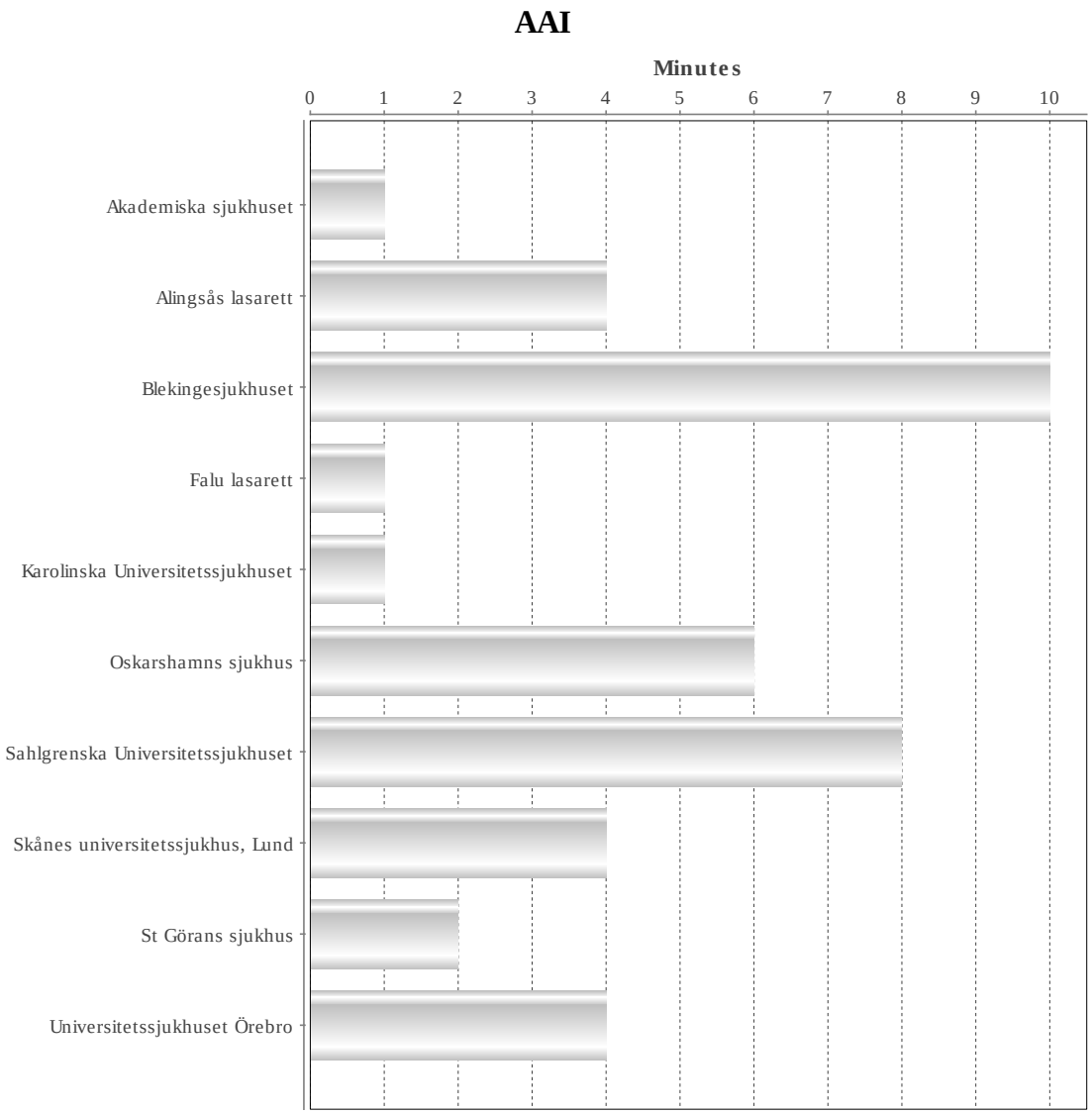
Hospital	No	Ot. %	Pa. %	Tm. %	Pn. %	Pf. %	St. %	All %
Akademiska sjukhuset	139	-	-	-	1.4	-	-	3.6
Blekingesjukhuset	66	1.5	-	-	1.5	-	-	6.1
Centrallasarettet Växjö	33	-	-	-	-	-	-	3.0
Centralsjukhuset Karlstad	55	-	-	-	-	-	-	10.9
Centralsjukhuset Kristianstad	1	-	-	-	-	-	-	-
Centralsjukhuset Västerås	60	-	-	-	-	-	-	-
Danderyds sjukhus	83	-	-	-	-	-	-	7.2
Drottning Silvias Bus	2	-	-	-	-	-	-	-
Falu lasarett	101	-	-	2.0	-	-	-	8.9
Hudiksvalls sjukhus	8	-	-	-	-	-	-	-
Karolinska Universitetssjukhuset	279	0.4	-	0.4	0.4	-	-	6.8
Linköpings Universitetssjukhus	148	0.7	-	-	-	-	-	6.1
Länssjukhuset Gävle	77	-	-	-	-	-	-	3.9
Länssjukhuset Kalmar	69	-	-	1.4	-	-	-	5.8
Länssjukhuset Ryhov	58	-	-	-	-	-	-	8.6
Mälarsjukhuset	43	2.3	-	-	-	-	-	4.7
Norrlands Universitetssjukhus	77	-	-	-	1.3	-	-	6.5
Sahlgrenska Universitetssjukhuset	112	0.9	-	0.9	-	-	-	3.6
Sahlgrenska Universitetssjukhuset /Östra	2	-	-	-	-	-	-	-
Skaraborgs sjukhus Skövde	65	3.1	-	-	-	-	-	3.1
Skellefteå lasarett	8	-	-	-	-	-	-	-
Skånes universitetssjukhus, Lund	299	2.0	-	-	-	-	-	5.7
Skånes universitetssjukhus, Malmö	1	-	-	-	-	-	-	-
St Görans sjukhus	53	-	-	-	1.9	-	-	5.7
Sunderby sjukhus	101	1.0	-	-	5.0	1.0	-	21.8
Sundsvalls sjukhus	43	-	-	-	4.7	-	-	20.9
Södersjukhuset	67	-	-	3.0	-	-	-	7.5
Södra Älvsborgs sjukhus	39	-	-	-	-	-	-	7.7
Trollhättan, NÄL	49	-	-	4.1	-	-	-	8.2
Universitetssjukhuset Örebro	83	-	-	1.2	-	-	-	4.8
Varbergs sjukhus	78	1.3	-	1.3	-	-	-	2.6
Visby lasarett	2	-	-	-	-	-	-	-
Örnsköldsviks sjukhus	8	-	-	-	-	-	-	-
Östersunds sjukhus	35	-	-	-	-	-	-	5.7

Registered complications for new implants and for bleeding, infection and other also including replacements.

CRT-P Complication	%
Death	-
Discontinued surgery due to hemodynamic reasons	-
Electrical dysfunction	1.1
Electrode displacement	1.1
Infection/perforation	0.4
Local bleeding	0.2
Other	0.7
Perforation/tamponade	0.2
Pericardial fluid	-
Peroperative arrhythmia requiring acute medication	-
Pneumothorax	0.7
Stroke	-
Subclavian or other related thrombosis	-
Total	4.4
Total no of implants	453

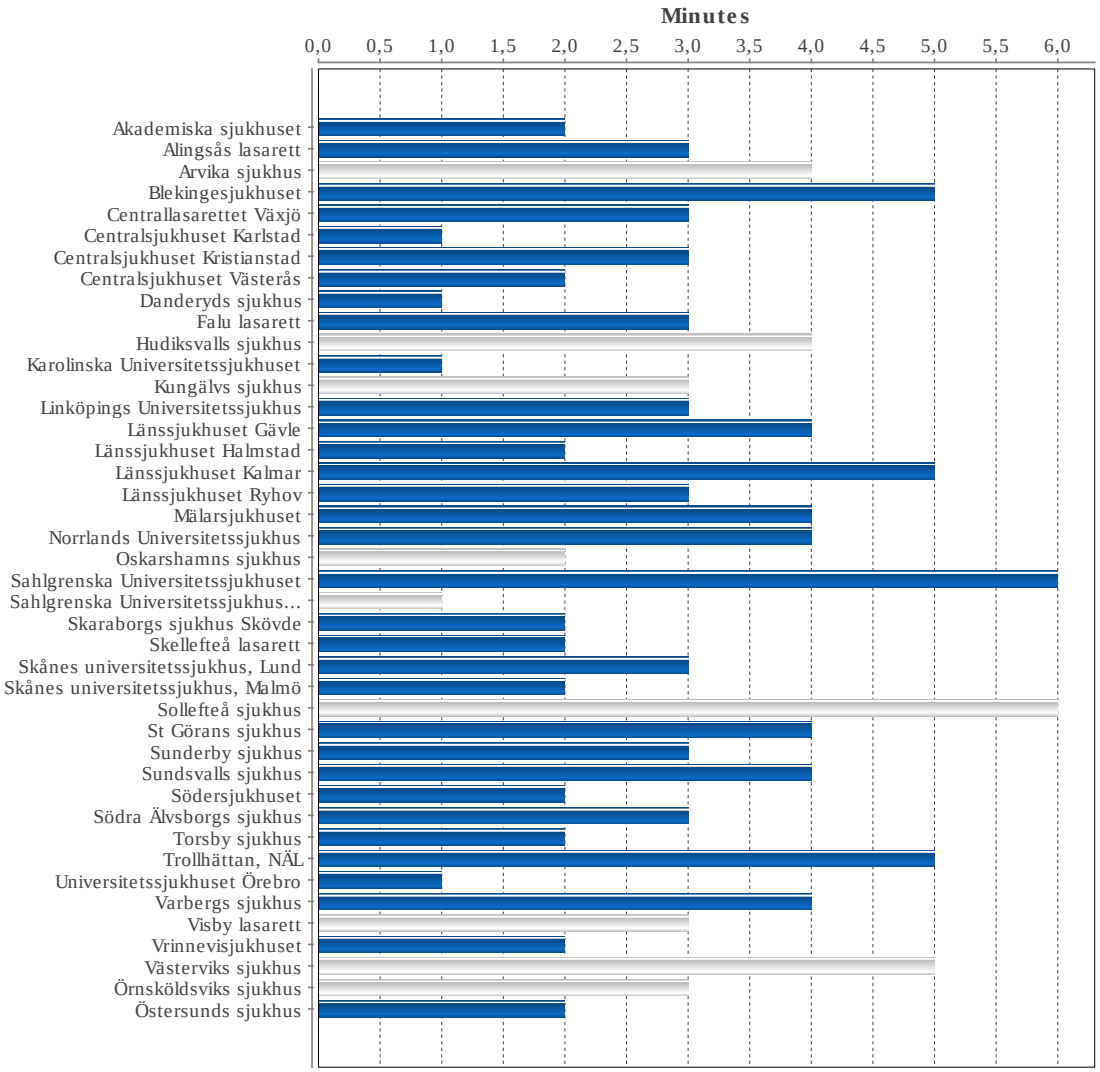
CRT-D Complication	%
Death	-
Discontinued surgery due to hemodynamic reasons	-
Electrical dysfunction	1.6
Electrode displacement	1.9
Infection/perforation	1.9
Local bleeding	0.6
Other	1.0
Perforation/tamponade	0.5
Pericardial fluid	0.2
Peroperative arrhythmia requiring acute medication	-
Pneumothorax	1.0
Stroke	-
Subclavian or other related thrombosis	-
Total	8.6
Total no of implants	626

Mean fluoroscopy duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

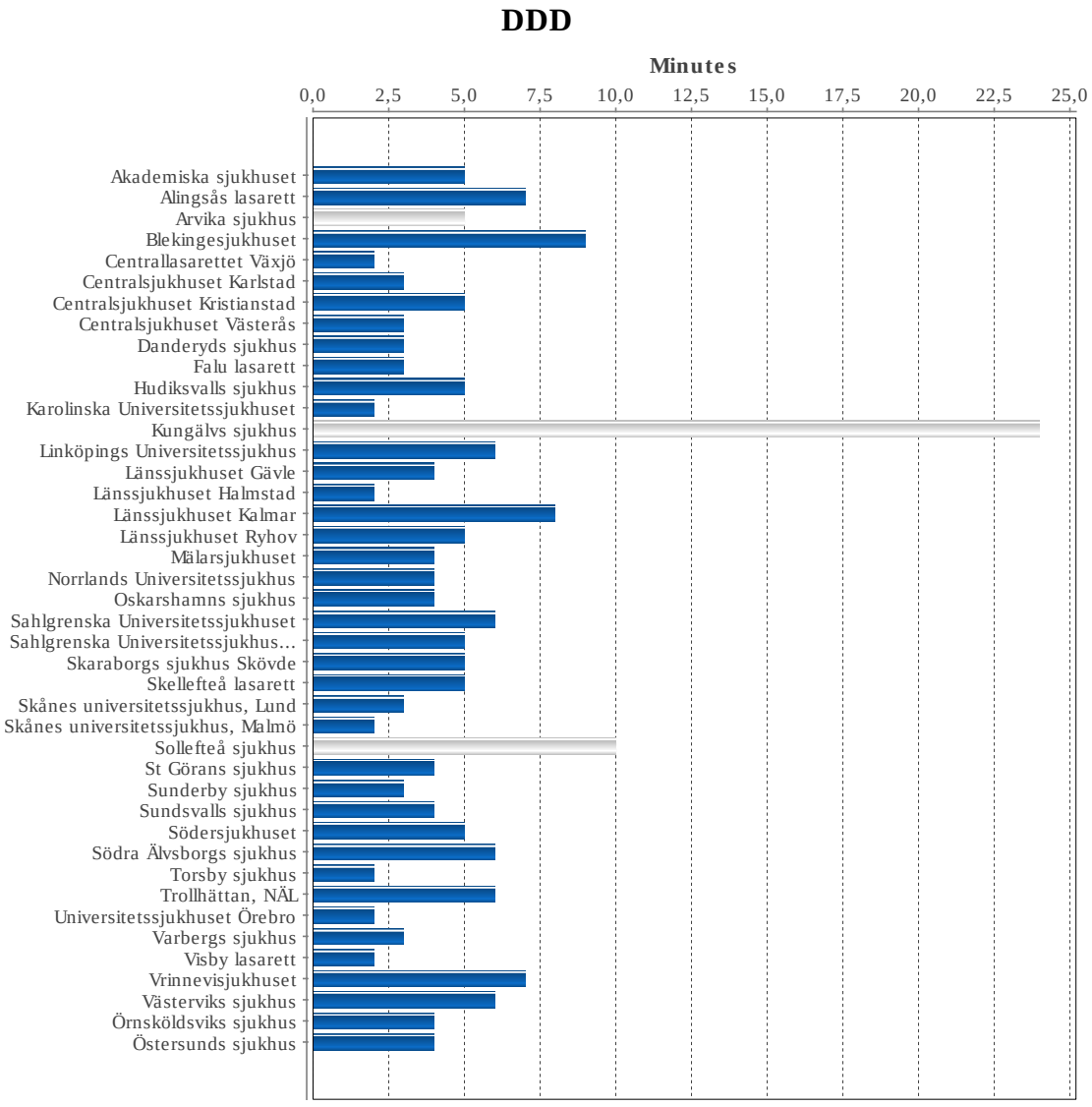


Mean fluoroscopy duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

VVI

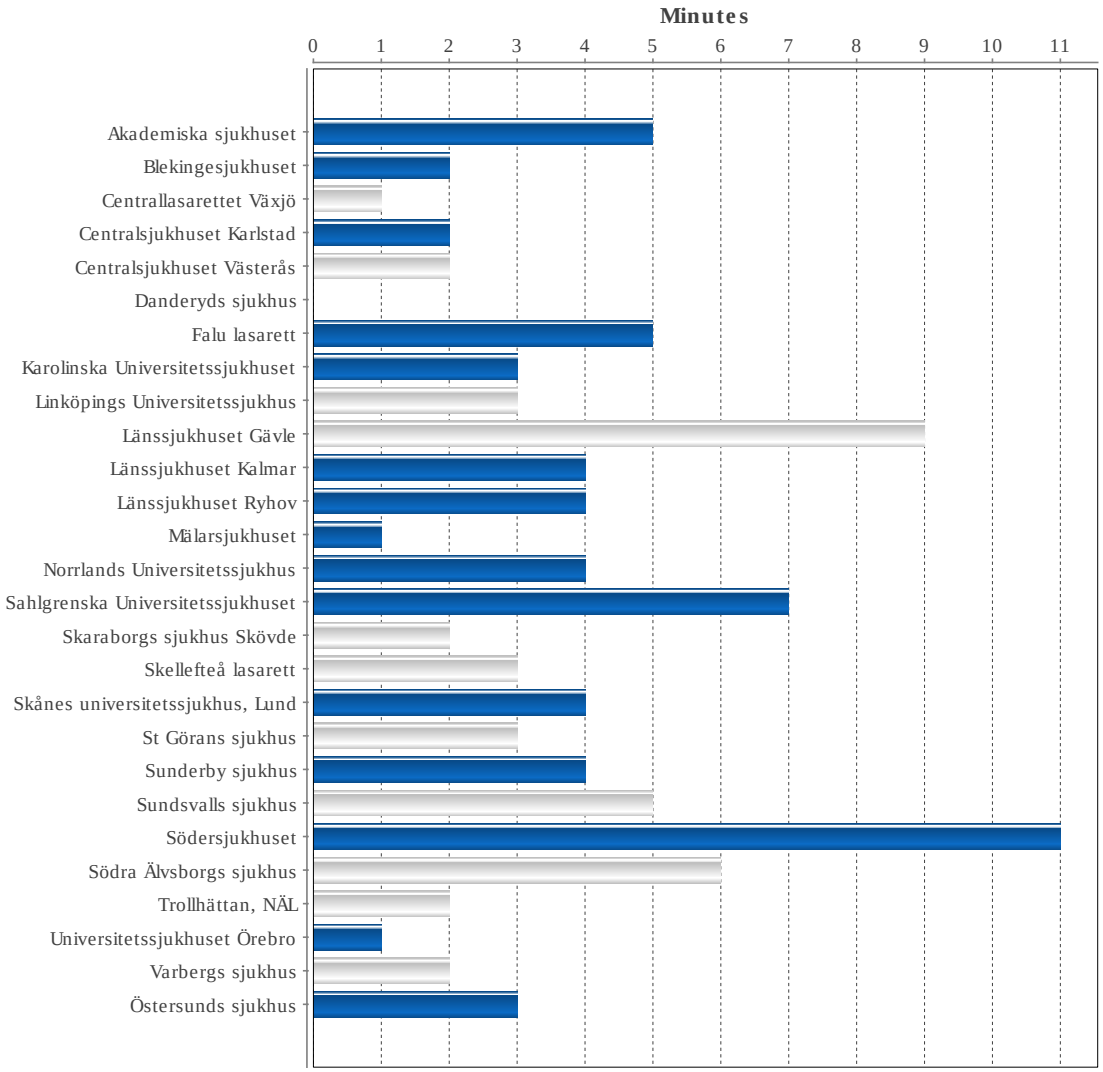


Mean fluoroscopy duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.



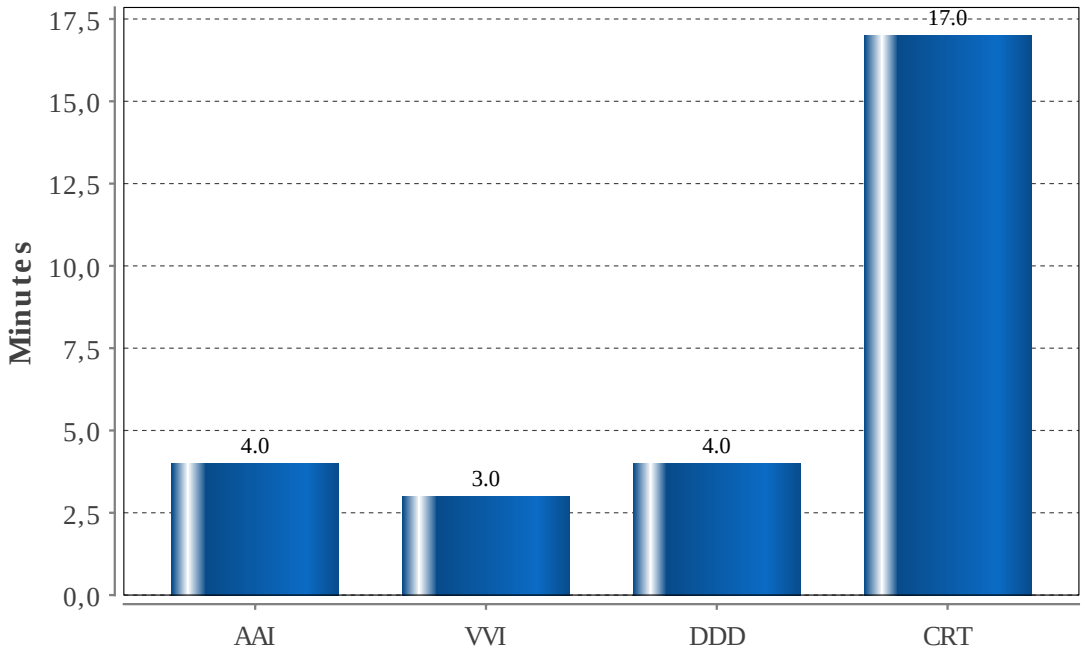
Mean fluoroscopy duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

CRT

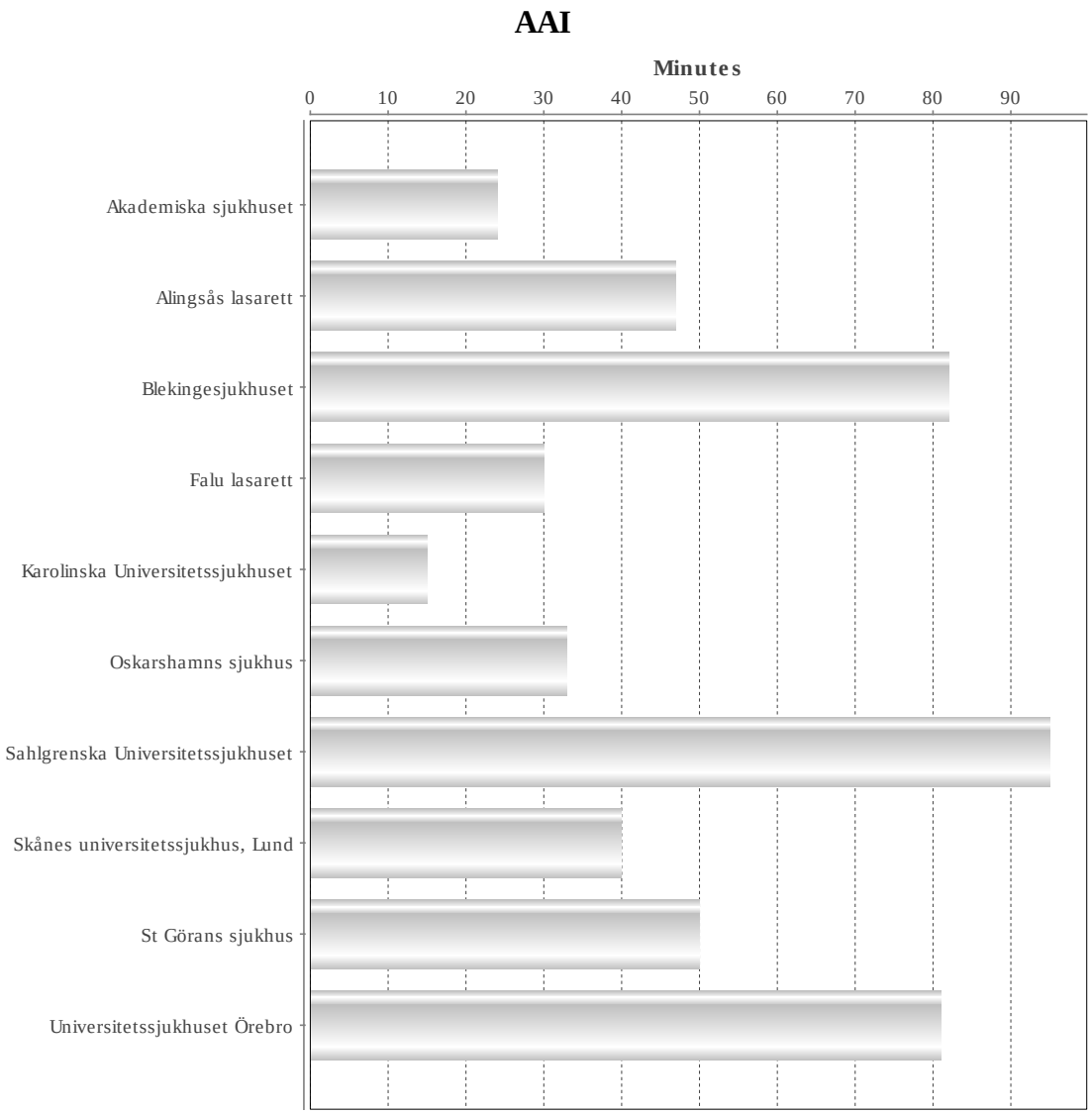


National mean skin to skin duration for a new implant of different subtypes

Knife time	Average	Standard deviation
AAI	4.0	4.2
VVI	3.0	5.3
DDD	4.0	7.6
CRT	17.0	15.4

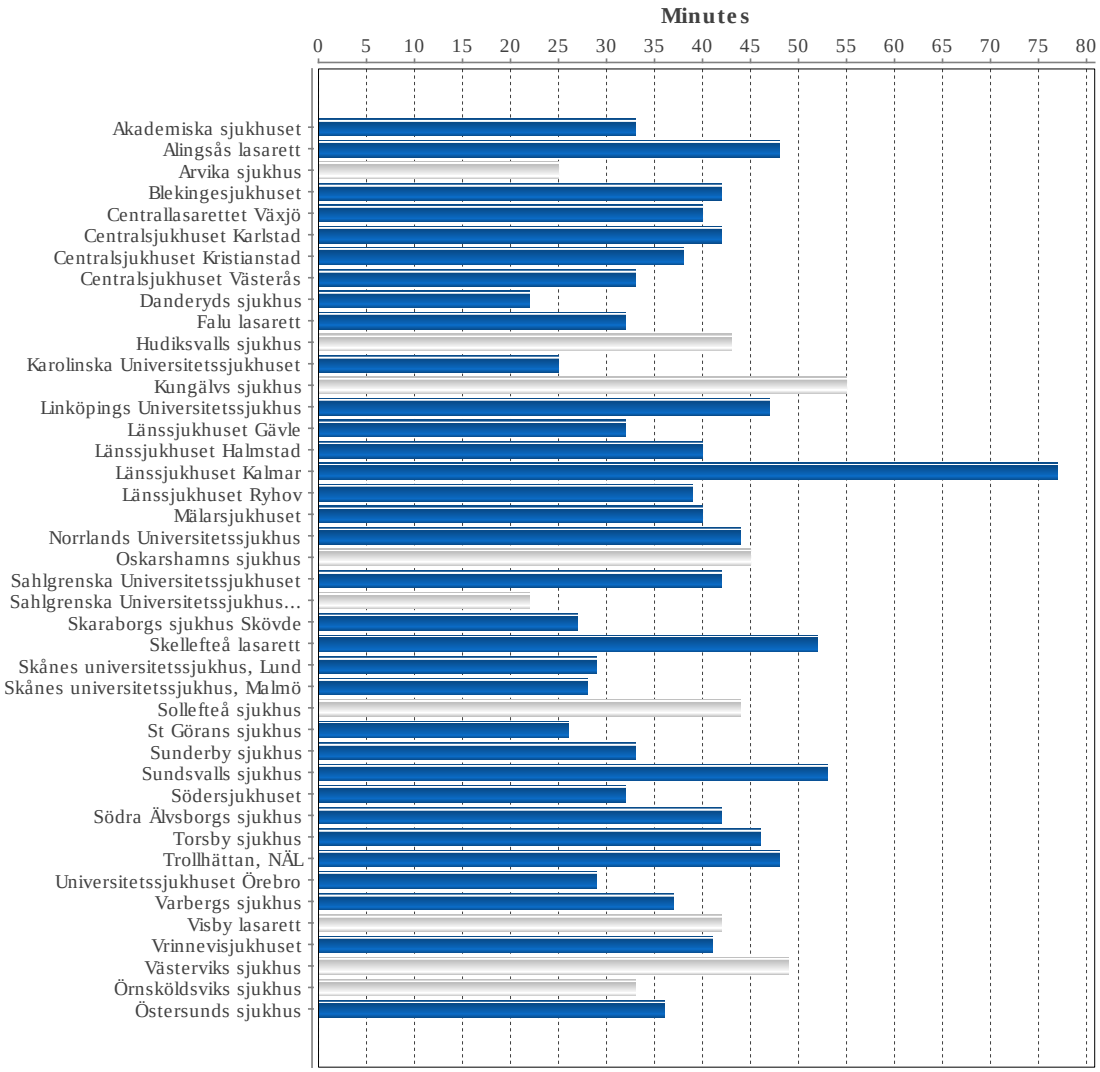


Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

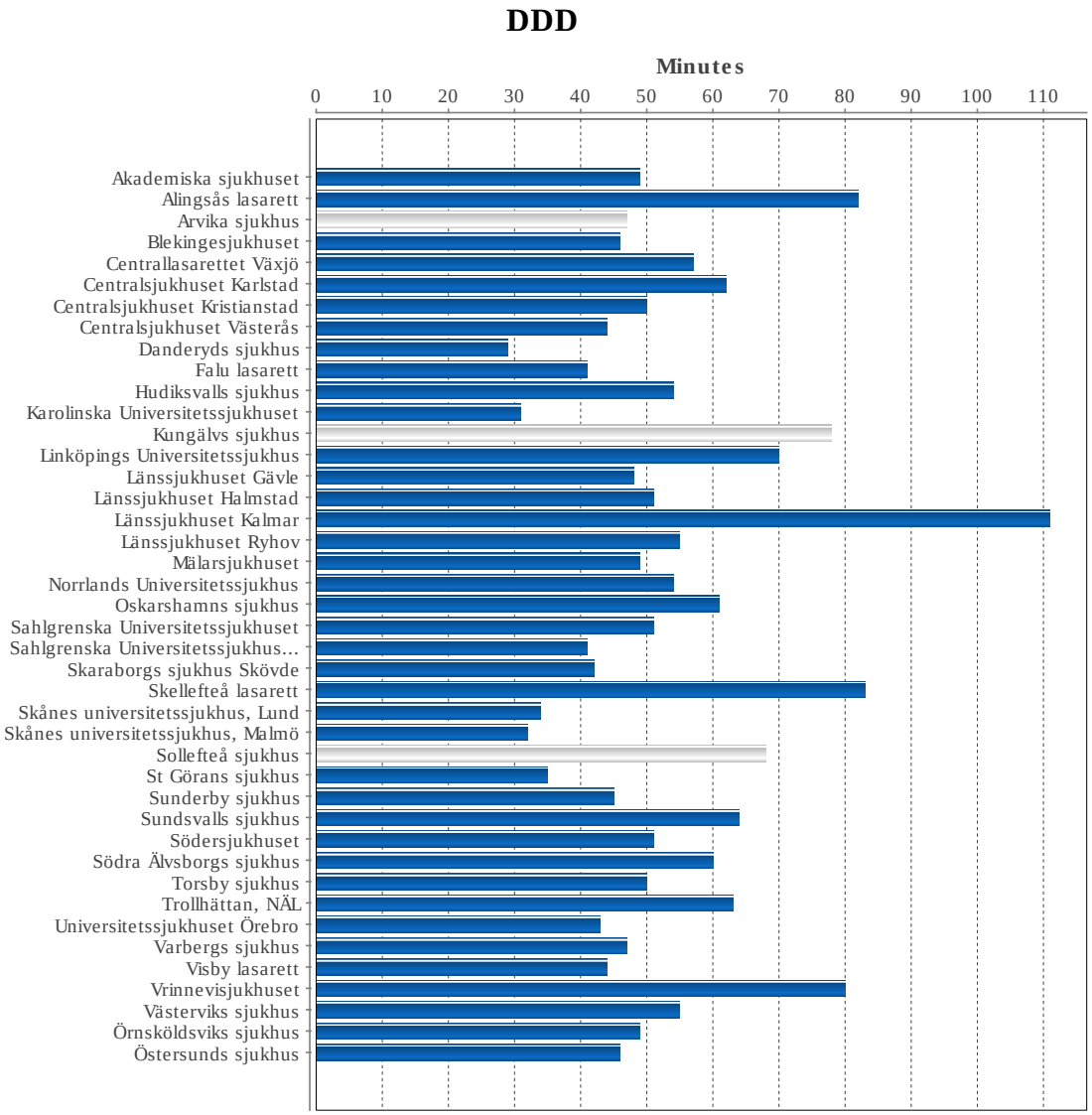


Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

VVI

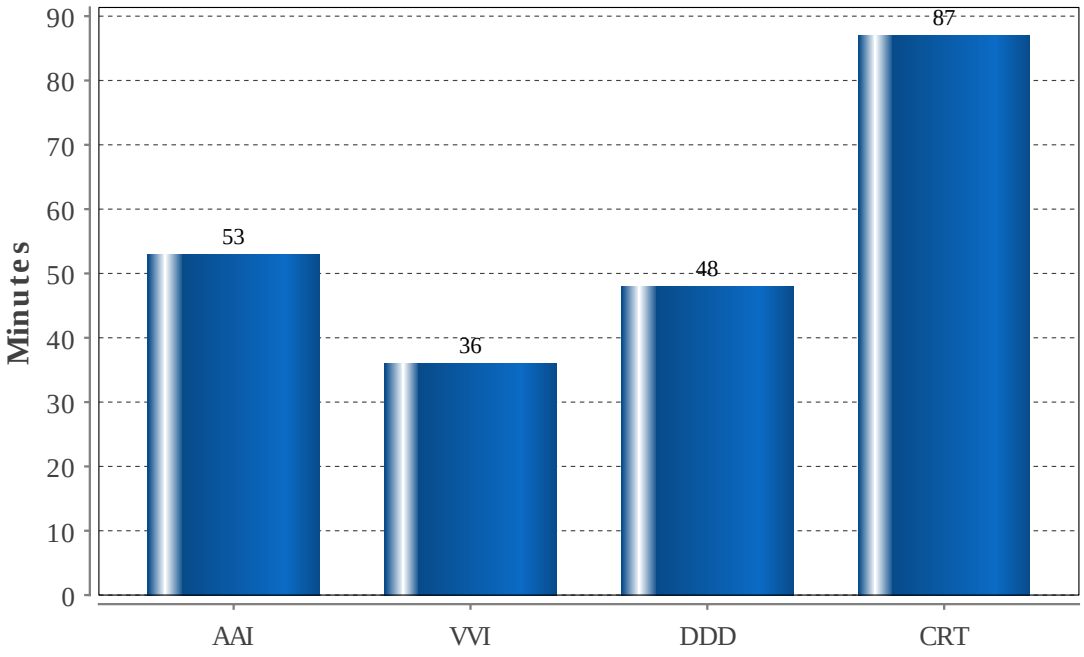


Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.



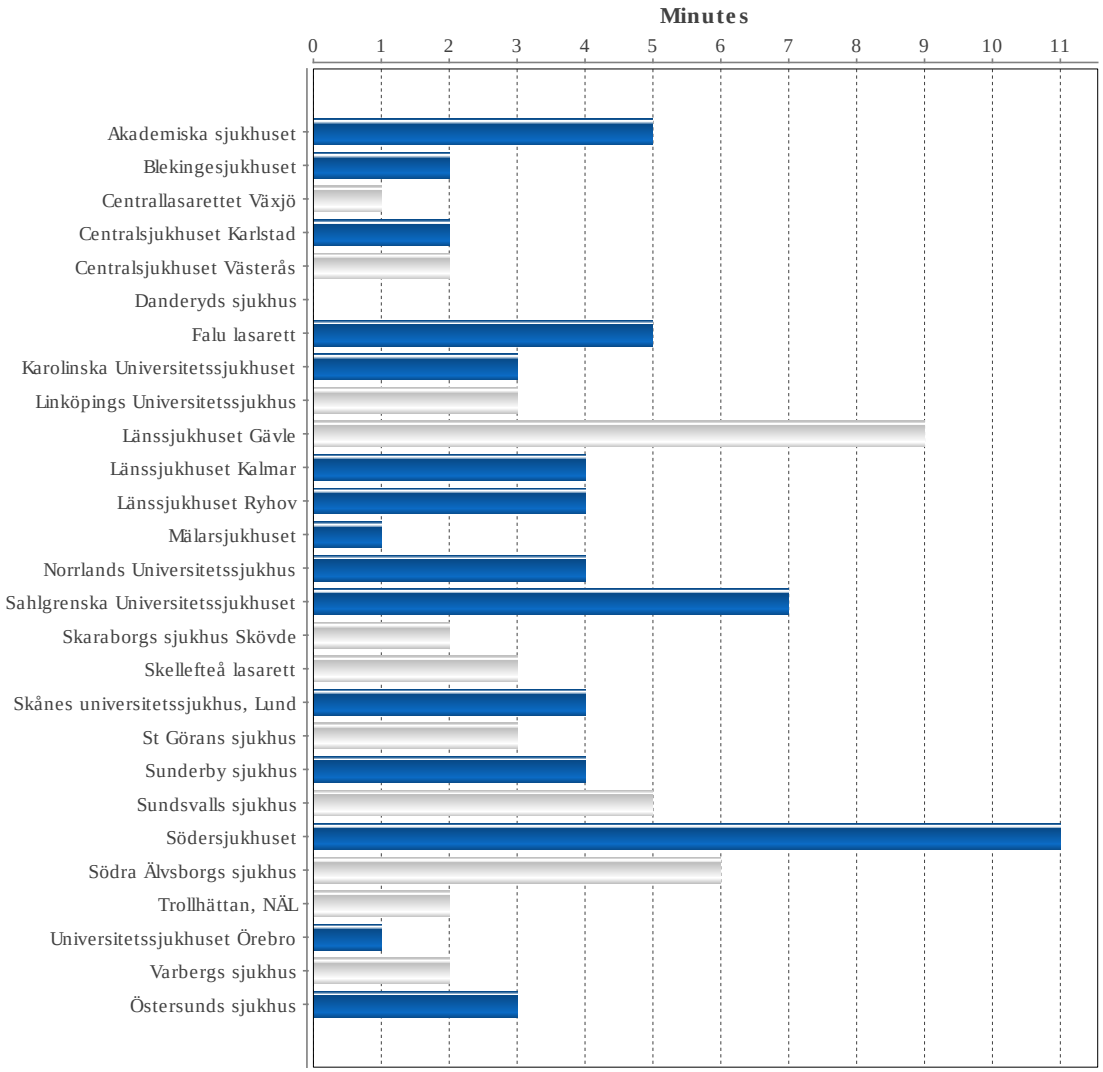
National mean skin to skin duration for a new implant of different subtypes

Knife time	Average	Standard deviation
AAI	53	34.2
VVI	36	19.6
DDD	48	24.5
CRT	87	37.4



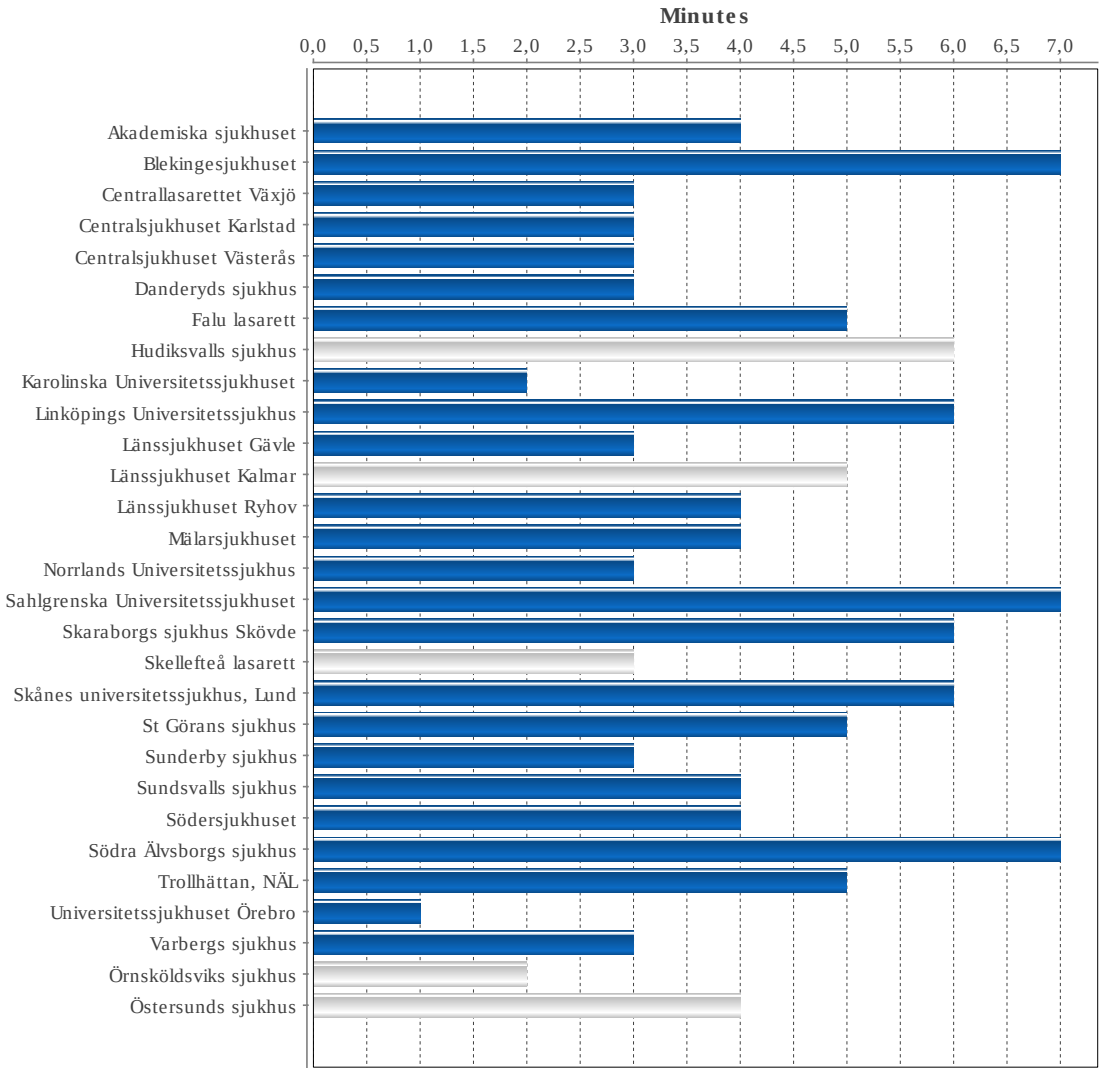
Mean fluoroscopy duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

VVI



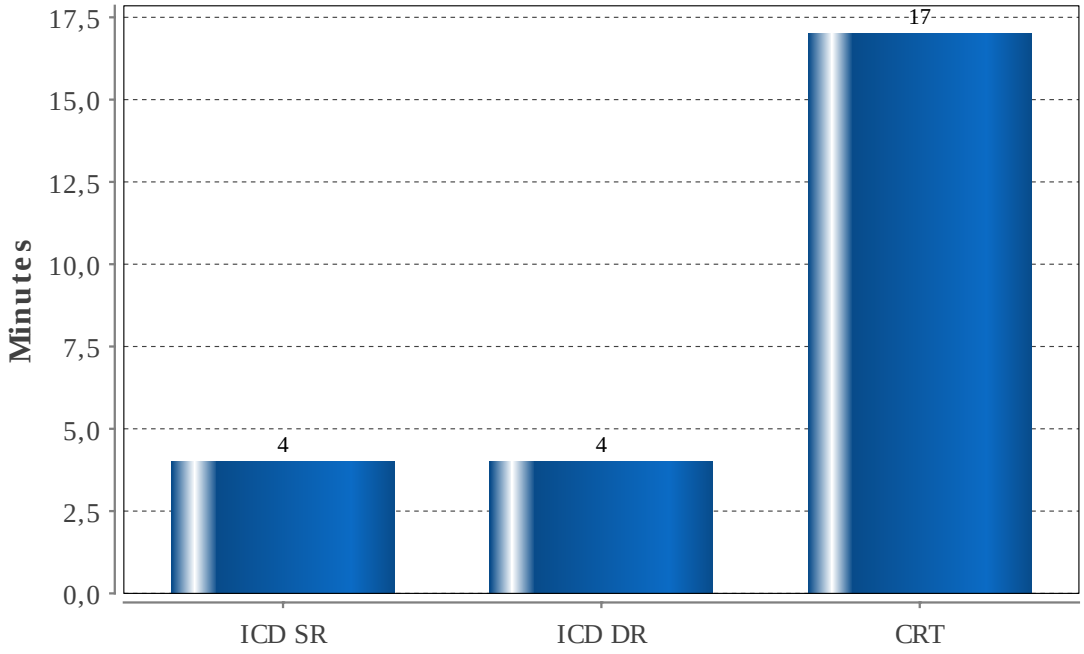
Mean fluoroscopy duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

DDD



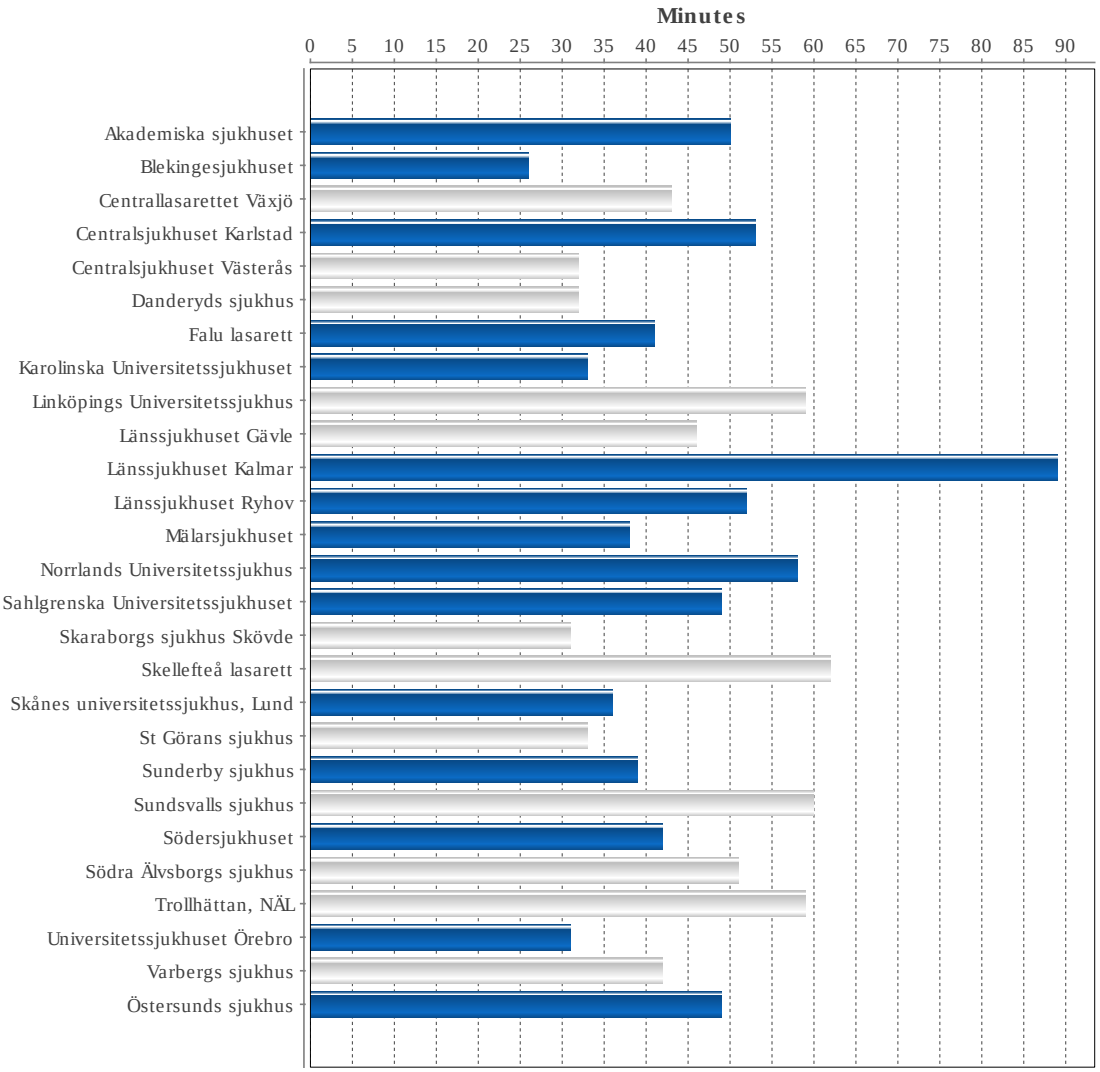
National mean skin to skin duration for a new implant of different subtypes

Knife time	Average	Standard deviation
ICD SR	4	12.0
ICD DR	4	5.3
CRT	17	14.5



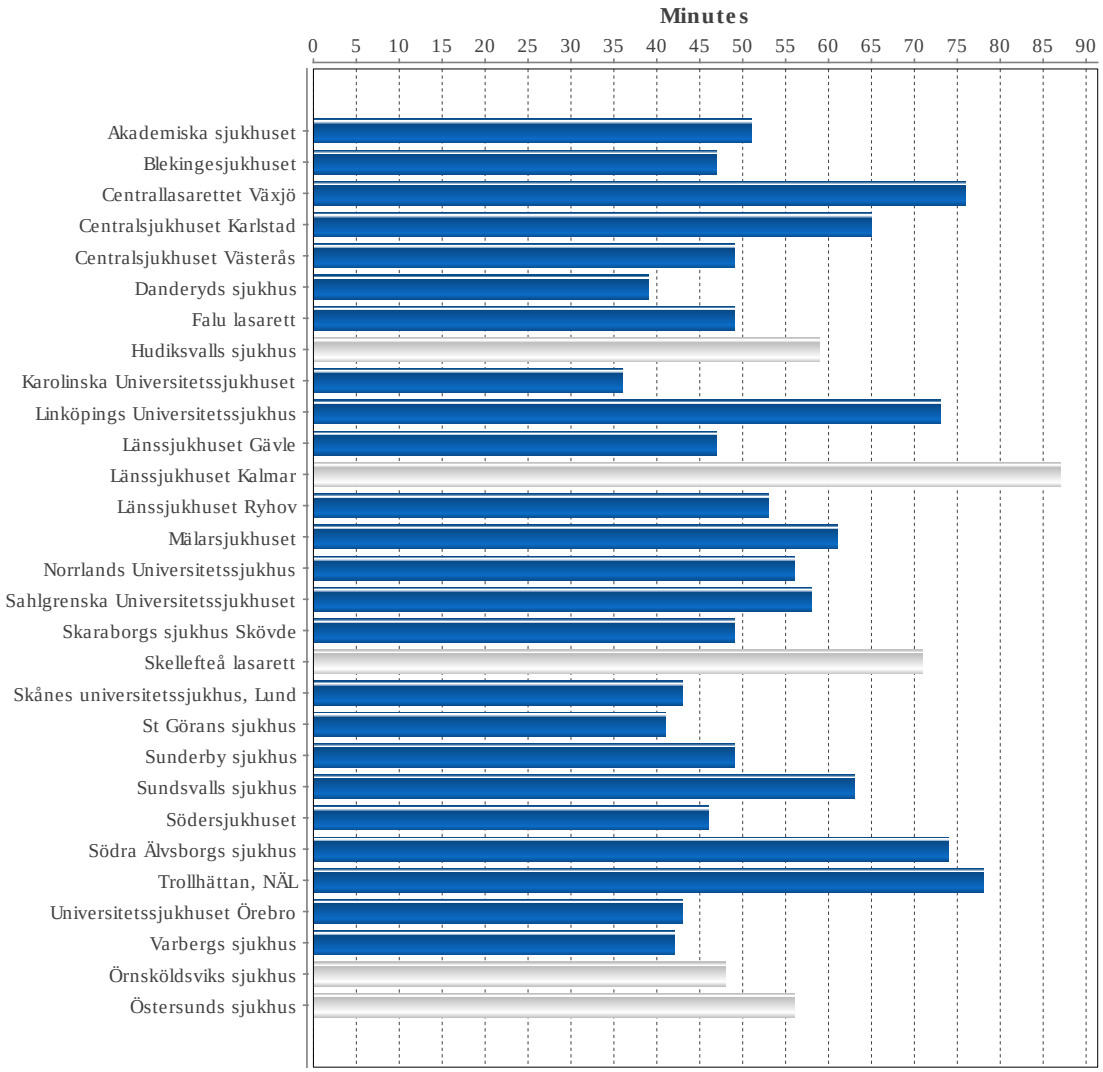
Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

VVI



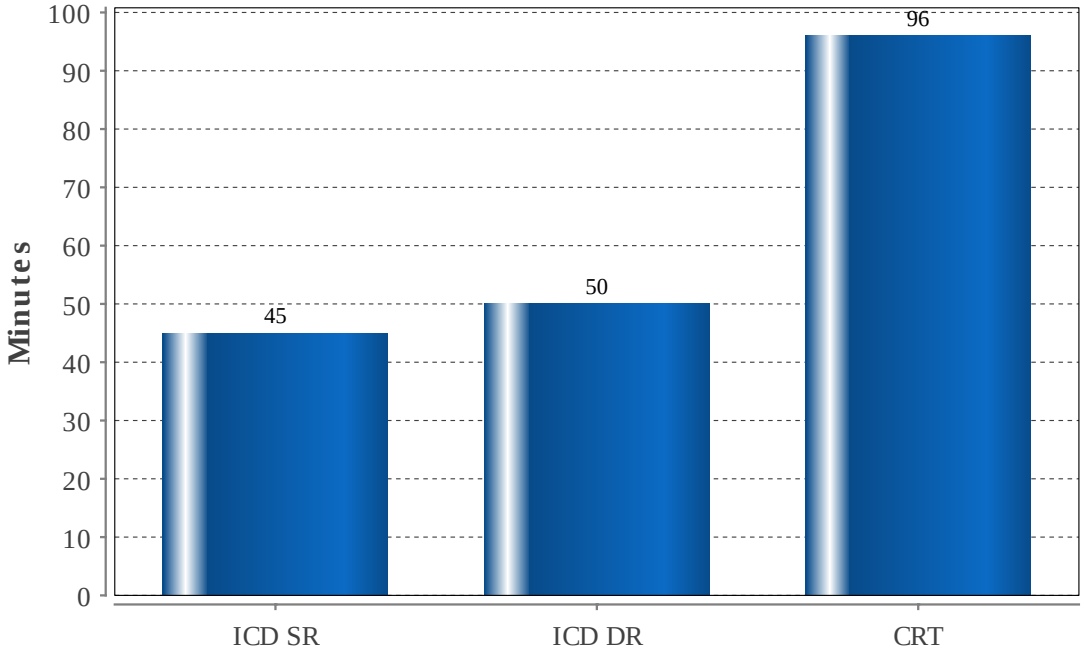
Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

DDD

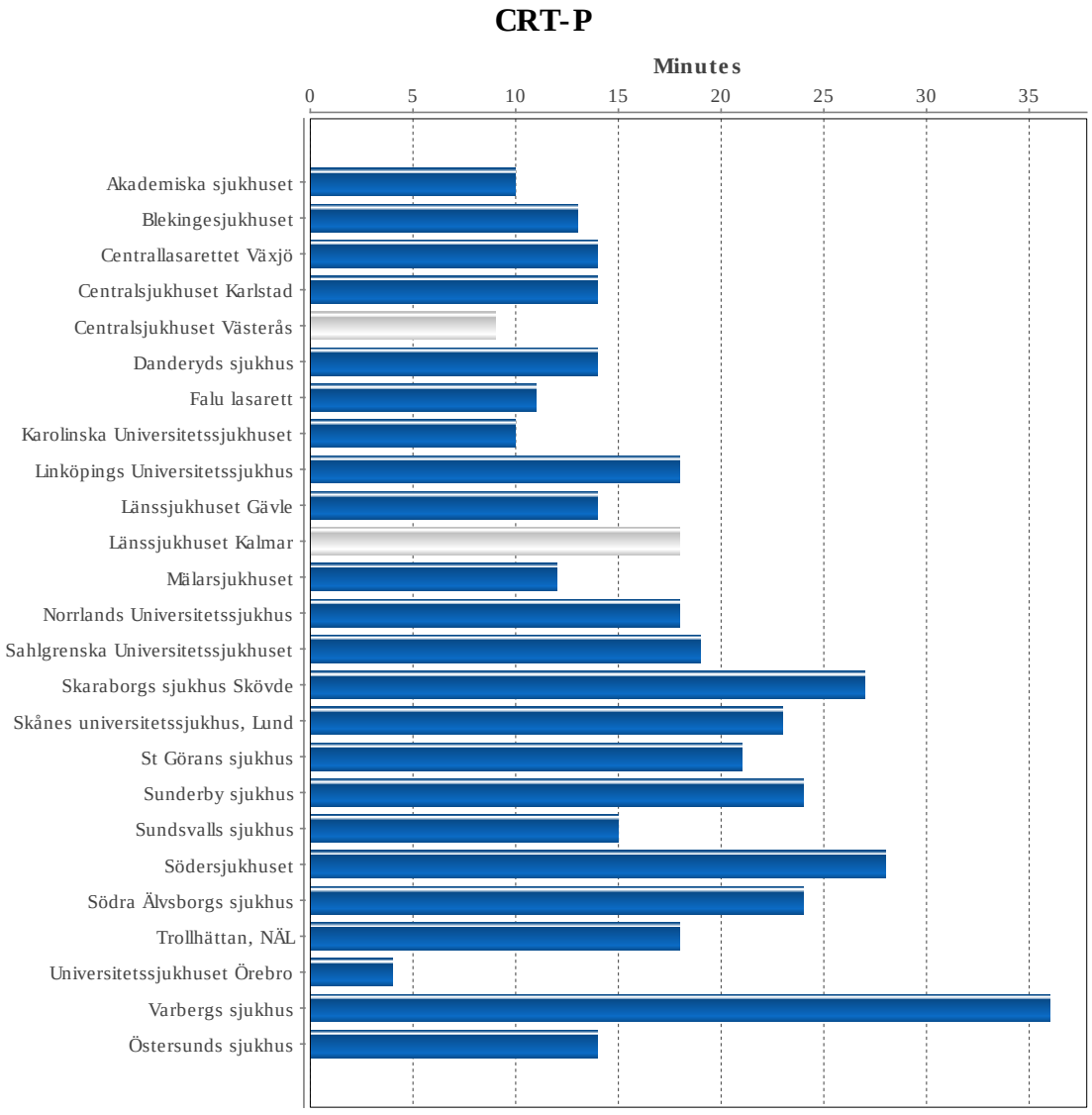


National mean skin to skin duration for a new implant of different subtypes

Knife time	Average	Standard deviation
ICD SR	45	24.1
ICD DR	50	21.5
CRT	96	44.3

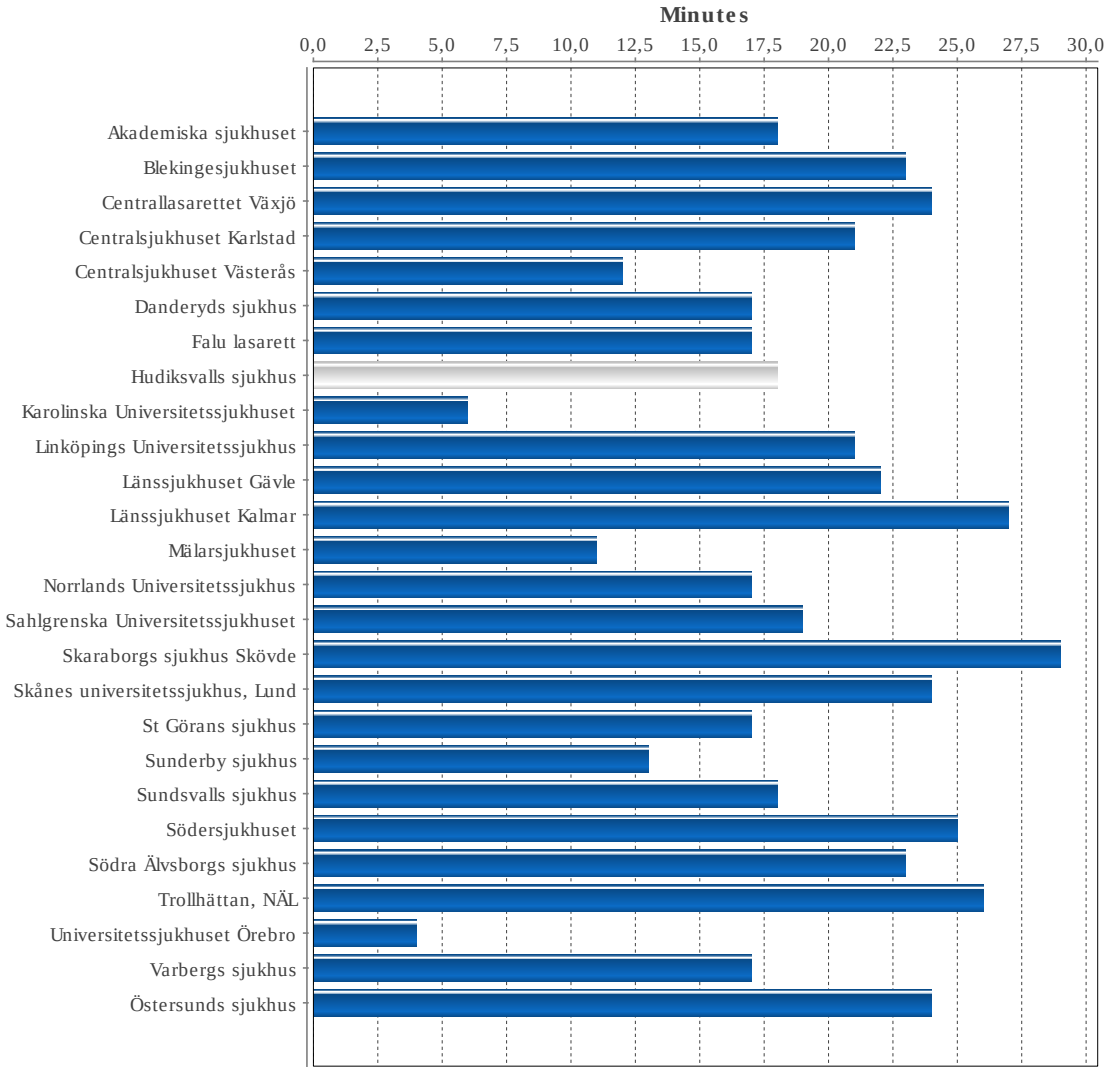


Mean fluoroscopy duration per different CRT implantation per hospital. Bars colored in grey are based on less then 10 observations

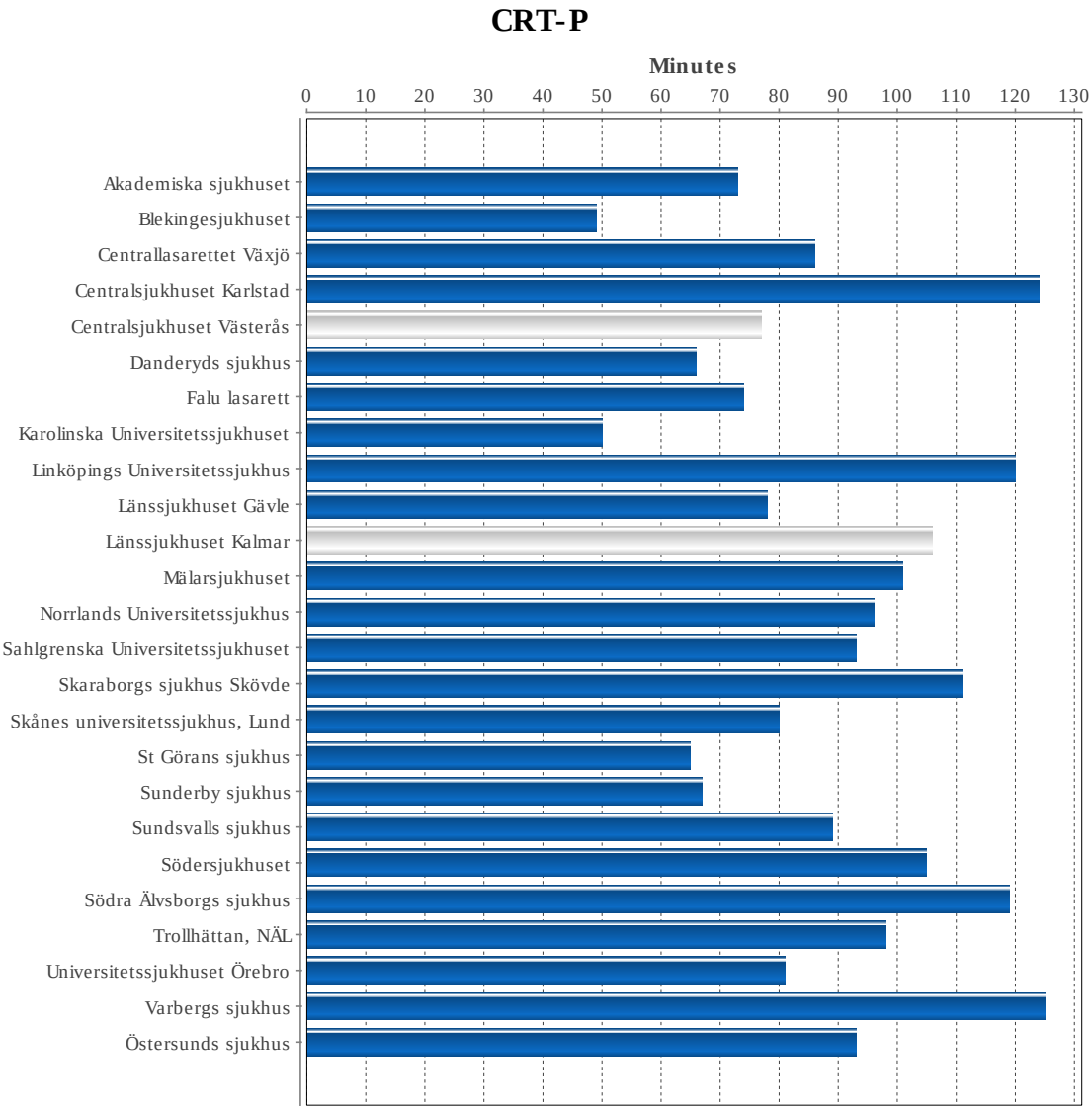


Mean fluoroscopy duration per different CRT implantation per hospital. Bars colored in grey are based on less then 10 observations

CRT-D

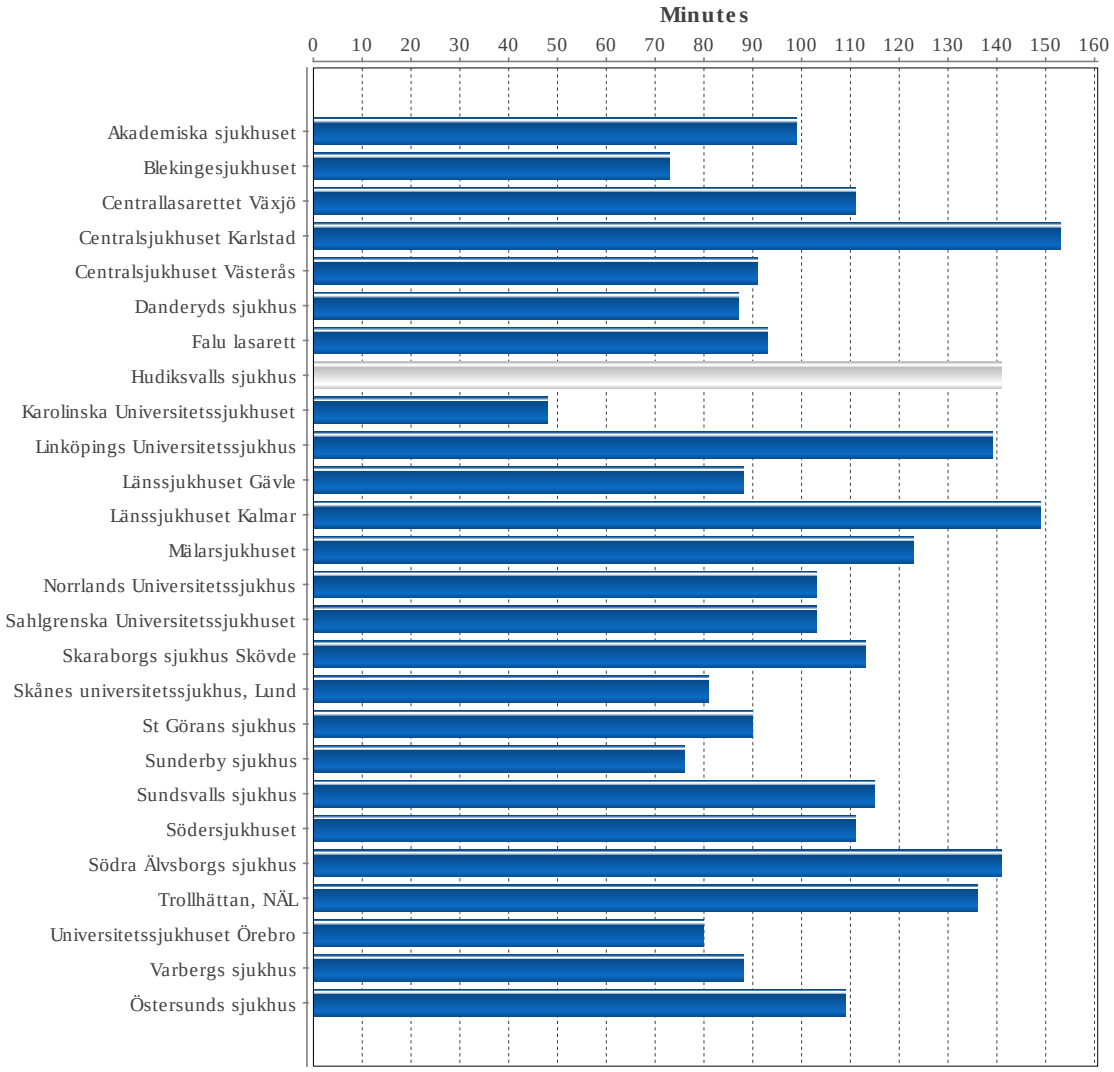


Mean skin to skin duration per subtype and hospital. Bars colored in grey are based on less then 10 observations



Mean skin to skin duration per subtype and hospital. Bars colored in grey are based on less then 10 observations

CRT-D

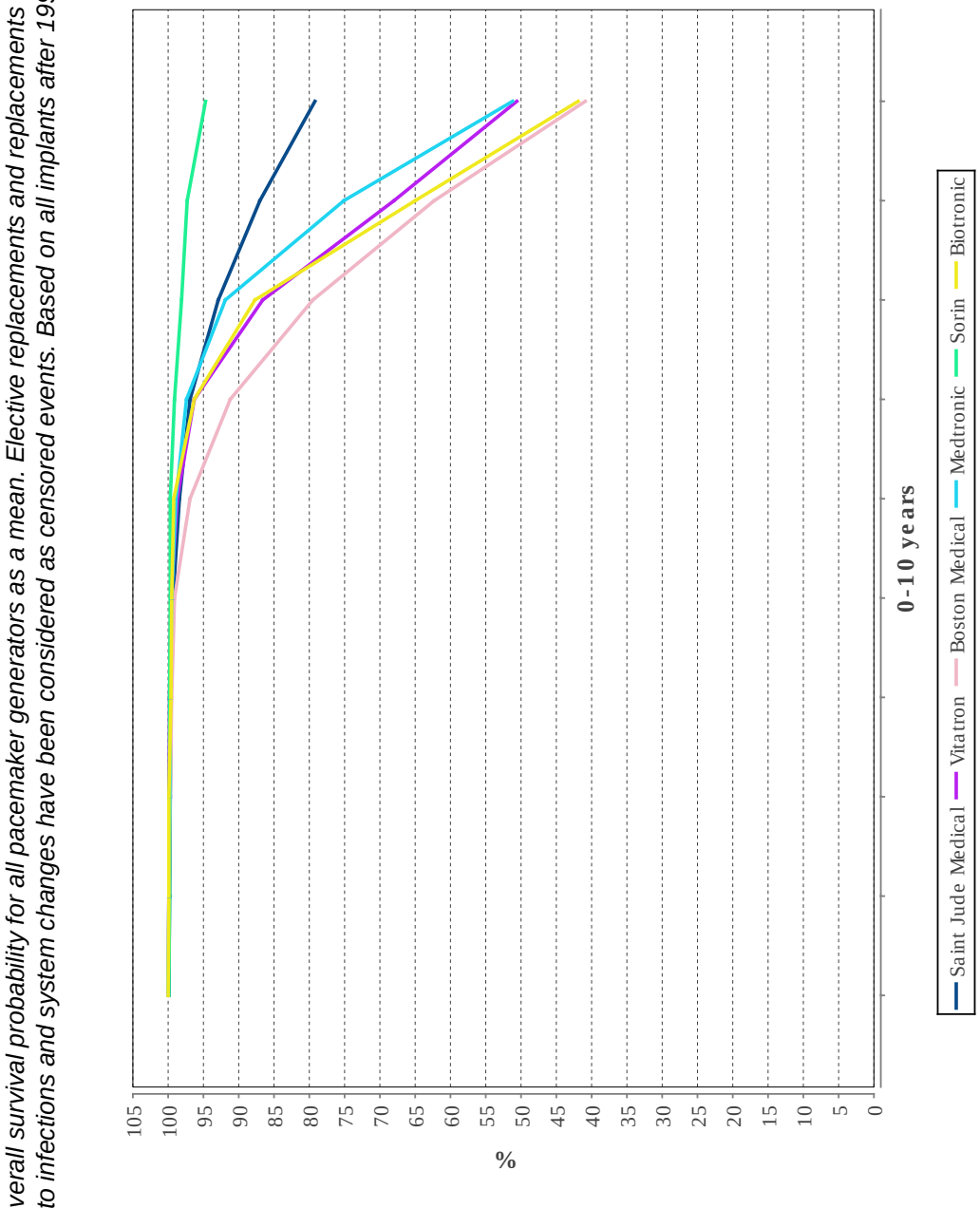


Year	At risk	Survival probability %
1	84879	100.0
2	74139	99.9
3	60113	99.8
4	47411	99.7
5	36300	99.4
6	26747	98.5
7	18669	96.3
8	11305	89.4
9	5328	75.3
10	1579	59.2

Overall survival probability for all PM generators as a mean. Elective replacements and replacements due to infections and system changes have been considered as censored events. Based on all implants after 2006

Year	Total		Biotronic		Boston Scient		Medtronic		St Jude Medical		Vitatron		Sorin	
	At risk	Surv. prob. %	At risk	Surv. prob. %	At risk	Surv. prob. %	At risk	Surv. prob. %	At risk	Surv. prob. %	At risk	Surv. prob. %	At risk	Surv. prob. %
1	84852	100.0	4298	100.0	10159	100.0	24608	100.0	25330	99.9	16036	100.0	4421	99.9
2	74116	99.9	3555	99.9	8692	99.9	21776	99.9	22019	99.8	14051	99.9	4023	99.8
3	60099	99.8	2824	99.9	7046	99.7	18120	99.8	17587	99.7	11154	99.9	3368	99.8
4	47410	99.7	2131	99.6	5650	99.5	14934	99.7	13391	99.6	8532	99.8	2772	99.8
5	36300	99.4	1468	99.5	4532	99.1	12140	99.5	9823	99.3	6139	99.6	2198	99.7
6	26747	98.6	928	99.2	3631	96.9	9188	98.9	6615	98.4	4667	98.7	1718	99.7
7	18669	96.2	526	96.3	2590	91.2	6040	97.4	4519	96.9	3844	96.3	1150	99.1
8	11305	89.5	230	87.7	1563	79.5	3198	91.9	2944	92.9	2794	86.6	576	98.1
9	5328	75.8	92	65.0	582	62.3	1304	75.1	1679	87.0	1452	68.0	219	97.3
10	1579	59.8	22	41.9	113	40.9	310	51.2	712	79.2	379	50.6	43	94.7

Overall survival probability for all pacemaker generators as a mean. Elective replacements and replacements due to infections and system changes have been considered as censored events. Based on all implants after 1990



Models that have at least 100 implants and 50 explants

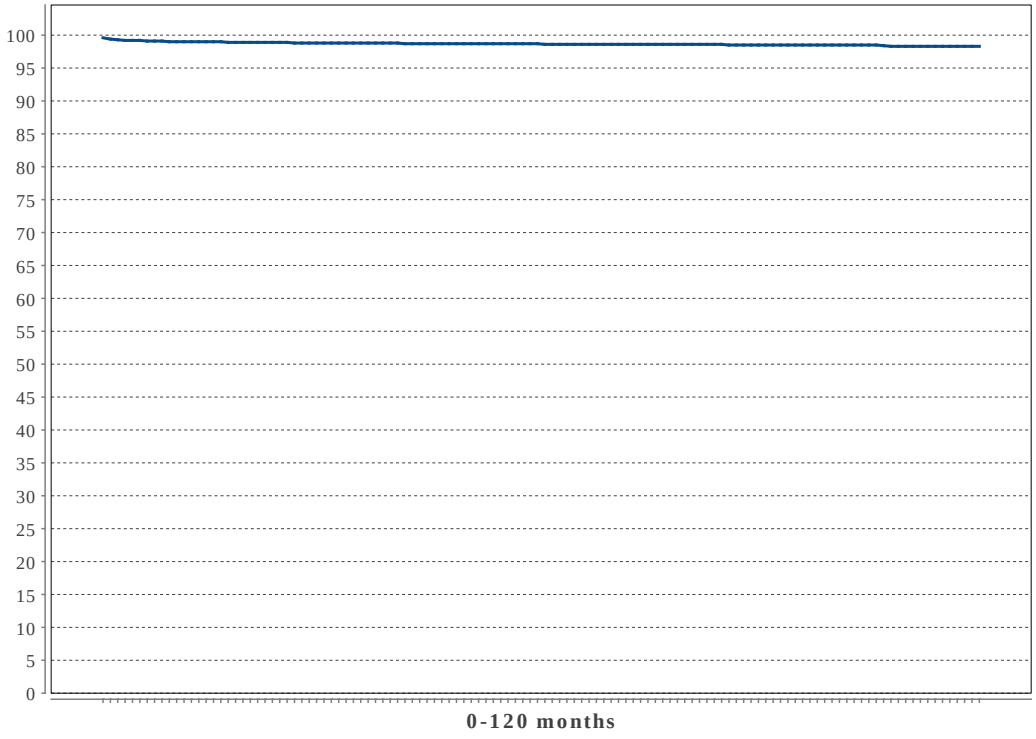
Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
Biotronik	Axios SR	100.0	100.0	100.0	100.0	100.0	95.2	79.6	74.3	66.0
Biotronik	Philos II DR-T	99.7	99.7	99.3	99.3	99.3	97.9	97.9	97.9	NaN
Biotronik	Philos II DR	100.0	100.0	99.6	99.1	98.7	96.9	84.7	57.8	34.9
Biotronik	Effecta DR	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN	NaN
Biotronik	Talos SR	99.8	99.8	99.8	99.8	99.8	99.2	99.2	NaN	NaN
Biotronik	Effecta SR	99.9	99.9	99.9	99.9	NaN	NaN	NaN	NaN	NaN
Boston Scientific	1294 Insignia I	97.9	97.9	97.9	97.9	97.9	97.9	97.9	97.9	73.4
Boston Scientific	1297 Insignia I	100.0	100.0	100.0	100.0	96.9	96.9	92.7	92.7	NaN
Boston Scientific	J172 Ingenio	98.5	98.5	98.5	NaN	NaN	NaN	NaN	NaN	NaN
Boston Scientific	J174 Ingenio EL	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN	NaN
Boston Scientific	W173 Invive CRT	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN	NaN
Boston Scientific	S601 Altrua 60	100.0	99.5	99.0	99.0	99.0	96.9	94.6	NaN	NaN
Boston Scientific	S603 Altrua 60	100.0	100.0	99.4	98.2	96.8	87.0	61.6	NaN	NaN
Boston Scientific	S402 Altrua 40	99.7	99.7	99.7	99.7	99.2	99.2	97.2	97.2	NaN
Boston Scientific	S606 Altrua 60	99.8	99.8	99.8	99.8	99.4	99.4	NaN	NaN	NaN
Boston Scientific	J064 Adventio EL	99.8	99.8	99.8	99.8	NaN	NaN	NaN	NaN	NaN
Boston Scientific	H140 Contak Renewal TR2	100.0	100.0	99.3	98.5	95.3	84.3	57.8	21.9	10.2
Boston Scientific	S602 Altrua 60	100.0	99.6	99.6	99.3	98.8	97.4	96.1	95.6	NaN
Boston Scientific	1291 Insignia I	99.5	99.5	99.5	99.5	98.7	97.0	95.2	89.9	83.3
Boston Scientific	S501 Altrua 50	100.0	100.0	99.2	99.2	99.2	97.9	94.0	94.0	NaN
Boston Scientific	J277 Vitalio MRI	99.6	99.4	99.4	NaN	NaN	NaN	NaN	NaN	NaN
Boston Scientific	S404 EL Altrua 40	100.0	99.9	99.8	99.5	99.1	98.9	98.9	NaN	NaN
Boston Scientific	1190 Insignia	99.9	99.1	98.6	98.4	96.9	93.6	86.2	72.4	56.7
Boston Scientific	L231 Proponent MRI EL DR	100.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Boston Scientific	1290 Insignia I	99.9	99.8	99.6	98.6	92.7	78.4	55.6	30.4	12.9
Medtronic	KDR931 Kappa DR	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.4	64.4
Medtronic	SS303 Sigma S	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	37.5
Medtronic	ADSR01 Adapta	100.0	99.0	99.0	99.0	99.0	99.0	73.7	28.4	NaN

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
Medtronic	P1501DR EnRhythm	100.0	100.0	100.0	100.0	97.0	79.2	43.9	21.0	12.6
Medtronic	KSR703 Kappa SR	100.0	100.0	100.0	97.0	93.5	78.2	45.0	26.2	26.2
Medtronic	E2DR31 EnPulse	100.0	100.0	100.0	98.8	98.8	98.8	97.1	91.8	75.4
Medtronic	E2SR01 EnPulse	100.0	100.0	100.0	99.3	96.6	91.4	52.8	11.8	2.5
Medtronic	A3DR01 Advisa DR MRI	100.0	100.0	100.0	100.0	100.0	100.0	NaN	NaN	NaN
Medtronic	KSR901 Kappa SR	98.6	98.6	98.6	98.6	98.6	89.6	45.9	19.4	12.3
Medtronic	SEDR01 Sensia	100.0	100.0	100.0	100.0	99.6	99.1	97.7	81.2	48.4
Medtronic	C2TR01 Syncra CRT	99.8	99.8	99.8	99.8	96.7	96.7	NaN	NaN	NaN
Medtronic	ADDR01 Adapta	100.0	99.8	99.5	99.3	98.4	98.2	94.6	78.9	45.2
Medtronic	VEDR01 Versa	100.0	99.7	99.5	99.3	99.3	97.4	94.0	75.6	71.3
Medtronic	8042 InSync III	100.0	99.7	98.8	97.6	95.0	86.8	67.6	38.2	11.6
Medtronic	EN1DR01 Ensura DR MRI	99.9	99.7	99.6	99.6	99.6	99.6	NaN	NaN	NaN
Medtronic	ADDRL1 Adapta	99.9	99.8	99.8	99.8	99.7	99.4	99.3	98.4	97.0
Medtronic	SESR01 Sensia	99.9	99.9	99.7	99.5	98.5	95.1	92.0	81.0	NaN
Medtronic	RESR01 Relia SR	99.7	99.7	99.7	99.3	98.7	98.2	96.8	96.8	NaN
Medtronic	E2DR01 EnPulse	100.0	99.8	99.7	99.1	98.4	96.3	88.5	57.1	15.2
Medtronic	SEDRL1 Sensia	99.9	99.9	99.8	99.8	99.6	99.4	99.0	97.3	97.3
Medtronic	REDR01 Relia DR	99.9	99.8	99.7	99.6	99.5	99.0	98.5	NaN	NaN
Sorin Group	2530 Rhapsody	100.0	100.0	100.0	100.0	100.0	99.0	98.0	98.0	NaN
Sorin Group	Reply SR	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	NaN
Sorin Group	Esprit DR	100.0	100.0	100.0	99.7	99.7	98.6	97.3	NaN	NaN
Sorin Group	2550 Symphony DR	100.0	100.0	100.0	100.0	99.8	99.5	98.5	97.7	95.6
Sorin Group	Reply 200 DR	99.9	99.9	99.9	NaN	NaN	NaN	NaN	NaN	NaN
Sorin Group	Reply DR	99.7	99.6	99.6	99.6	99.6	98.9	97.8	95.4	NaN
St. Jude Medical	5157 M/S Verity ADx XL SR	100.0	100.0	100.0	100.0	100.0	94.4	94.4	94.4	94.4
St. Jude Medical	5610 Victory	100.0	100.0	100.0	100.0	97.0	82.9	44.3	21.2	3.5

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
St. Jude Medical	2525T Microny II	98.4	98.4	98.4	93.1	83.8	78.5	78.5	69.8	0.0
St. Jude Medical	5180 Identity ADx SR	100.0	100.0	97.8	97.8	87.8	76.9	49.0	8.2	0.0
St. Jude Medical	5810 Victory DR	100.0	100.0	95.3	87.7	71.0	50.3	32.3	23.1	23.1
St. Jude Medical	5356 Verity ADx XL DR	100.0	100.0	100.0	99.2	97.2	97.2	97.2	94.5	91.4
St. Jude Medical	2136 Sustain XL DR	99.5	99.5	99.5	99.5	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3242 Allure RF	99.8	99.8	99.8	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	5596 Frontier II	100.0	100.0	99.3	97.3	89.6	78.7	61.2	45.5	28.6
St. Jude Medical	2212 Accent DR	99.8	99.6	99.6	99.0	98.4	98.4	NaN	NaN	NaN
St. Jude Medical	2224 Accent DR MRI	99.8	99.8	99.8	99.8	99.8	NaN	NaN	NaN	NaN
St. Jude Medical	2160 Endurity	99.5	99.5	99.5	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3222 Allure RF	100.0	100.0	100.0	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	1160 Endurity SR	99.9	99.9	99.9	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3212 Anthem	99.6	99.1	98.3	97.1	94.4	89.4	87.7	NaN	NaN
St. Jude Medical	5386 Identity ADx XL DR	99.0	98.6	98.2	98.2	95.6	95.1	92.2	79.5	64.0
St. Jude Medical	5626 Zephyr XL	99.9	99.6	99.6	99.5	99.3	99.3	99.3	99.3	99.3
St. Jude Medical	2112 Accent DR	99.9	99.9	99.9	99.7	99.4	0.0	NaN	NaN	NaN
St. Jude Medical	2260 Assurity + DR	99.7	99.7	99.7	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	5156 Verity ADx XL SR	100.0	100.0	100.0	99.7	99.6	99.4	99.3	98.9	98.4
St. Jude Medical	2272 Assurity MRI DR	99.9	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	5826 Zephyr XL	99.8	99.7	99.6	99.6	99.4	99.0	97.5	93.5	93.2
St. Jude Medical	5816 Victory XL	99.8	99.7	99.6	99.5	99.1	98.1	93.0	85.6	75.0
Vitatron	T20SR	99.8	99.8	99.8	99.3	98.3	96.5	95.1	93.1	89.2
Vitatron	C10S	99.9	99.9	99.7	99.5	99.2	98.8	98.3	97.6	96.5
Vitatron	C70DR	100.0	100.0	100.0	100.0	99.8	97.7	87.3	60.6	33.7
Vitatron	T70DR	99.5	99.3	99.3	99.0	97.0	92.0	73.1	46.1	26.3
Vitatron	E60A1	100.0	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN
Vitatron	C20SR	100.0	99.9	99.9	99.9	99.4	98.5	97.1	96.2	90.1
Vitatron	T60DR	100.0	100.0	99.6	99.3	98.2	95.8	84.0	63.4	42.3
Vitatron	G20A1	99.9	99.9	99.9	99.9	99.9	NaN	NaN	NaN	NaN
Vitatron	C60DR	99.9	99.8	99.6	99.4	98.3	95.7	84.2	60.8	36.0
Vitatron	G70A1	99.9	99.9	99.8	99.8	99.8	NaN	NaN	NaN	NaN

Based on all implants after 1990

Year	At risk	Survival probabilty %
1	127820	99.6
2	112737	99.0
3	92076	98.9
4	73339	98.8
5	56632	98.7
6	42205	98.6
7	30217	98.6
8	19910	98.6
9	11667	98.5
10	5260	98.3



Models that have at least 50 implants and 10 explants

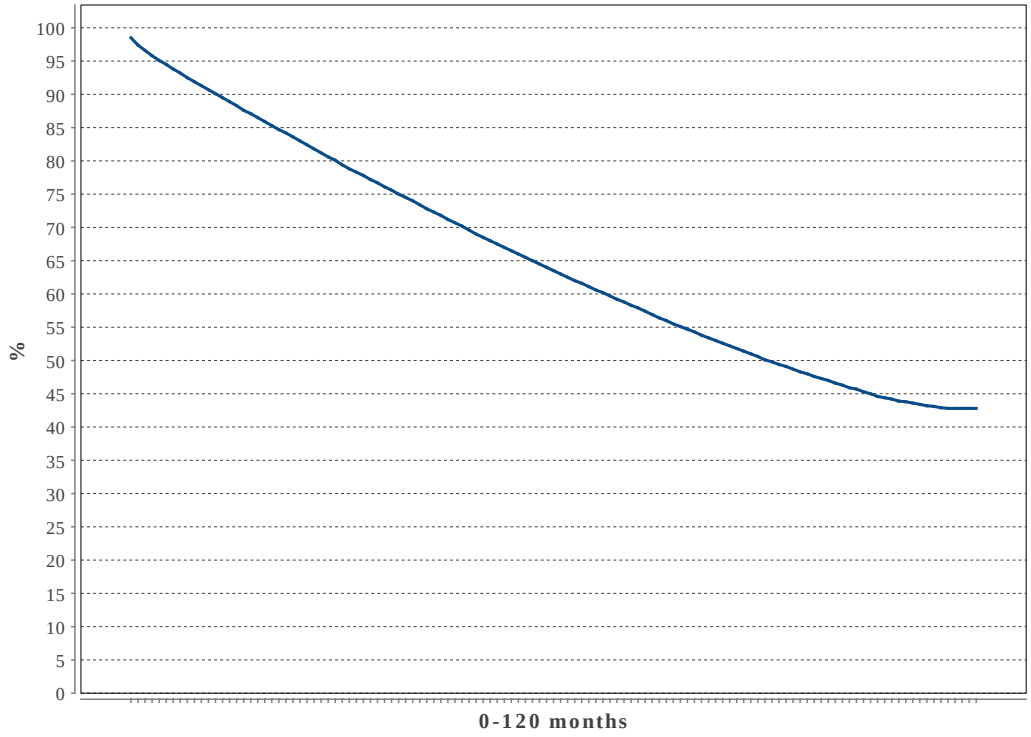
Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
Biotronik	PX60-UP	99.9	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7
Biotronik	Safio ProMRI S53	98.9	98.2	98.2	98.2	98.2	NaN	NaN	NaN	NaN
Biotronik	Selox ST 60	100.0	100.0	100.0	99.5	99.5	99.5	99.5	99.5	99.5
Biotronik	Safio ProMRI S60	99.1	99.1	99.1	99.1	99.1	NaN	NaN	NaN	NaN
Biotronik	Y60-BP	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7
Biotronik	PX60-BP	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8
Biotronik	Siello S60	98.4	98.4	98.4	98.4	98.4	98.4	NaN	NaN	NaN
Biotronik	Solia S60 MRI	98.5	98.5	98.5	98.5	98.5	98.5	NaN	NaN	NaN
Biotronik	Solia S53 MRI	99.3	99.3	99.3	99.3	99.3	NaN	NaN	NaN	NaN
Biotronik	Siello S53	98.6	98.4	98.2	98.2	98.2	98.2	NaN	NaN	NaN
Boston Scientific	4480	96.1	96.1	95.5	94.9	94.9	94.9	94.9	94.9	94.9
Boston Scientific	4542 Easytrak	96.1	95.0	93.7	92.3	92.3	89.8	89.8	89.8	89.8
Boston Scientific	4474	99.6	99.0	98.7	98.4	98.2	98.0	97.9	97.6	97.6
Boston Scientific	4471	97.7	97.5	97.5	97.5	97.5	97.2	97.2	97.2	96.0
Boston Scientific	7741 Ingevity MRI	98.5	98.5	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Boston Scientific	7742 Ingevity MRI	98.5	98.5	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Boston Scientific	4457	99.4	99.2	99.1	98.9	98.9	98.9	98.9	98.9	98.9
Boston Scientific	4473	99.2	99.1	99.0	99.0	98.9	98.9	98.9	98.7	98.7
Boston Scientific	4470	99.4	99.3	99.2	99.2	99.2	99.1	99.1	99.0	98.6
Medtronic	4396 Attain Ability	98.6	98.6	98.6	98.6	98.6	98.6	NaN	NaN	NaN
Medtronic	4965 CapSure Epi	98.8	98.8	98.8	98.0	96.9	94.7	94.7	94.7	94.7
Medtronic	4196 Attain Ability	97.7	96.1	96.1	96.1	96.1	96.1	96.1	96.1	NaN
Medtronic	4194 Attain OTW	95.1	94.6	94.6	93.9	93.9	93.9	93.9	93.9	93.9
Medtronic	4193 Attain OTW	94.9	94.1	93.7	93.4	92.7	92.2	91.7	90.7	90.7
Medtronic	5092 Capsure SP Novus	98.8	98.6	98.6	98.4	98.2	98.2	98.0	97.6	97.6
Medtronic	5086 CapSureFix MRI	99.0	99.0	99.0	99.0	99.0	99.0	99.0	NaN	NaN
Medtronic	4296 Attain Ability	97.4	97.0	97.0	97.0	97.0	97.0	NaN	NaN	NaN
Medtronic	4968 CapSure Epi	99.7	99.2	98.8	98.8	98.2	98.2	97.7	97.0	93.1
Medtronic	5054 CapSure Z Novus	99.1	98.9	98.7	98.7	98.5	98.4	98.4	97.6	97.6
Medtronic	4074 Capsure Sense	99.2	99.1	99.1	99.0	99.0	98.9	98.9	98.9	98.9
Medtronic	5076 CapSureFix MRI	99.1	99.0	98.9	98.7	98.7	98.5	98.5	98.3	97.8

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
Medtronic	4076 CapSureFix Novus	99.4	99.4	99.4	99.3	99.3	99.2	99.1	99.1	99.0
N/A	N/A	99.5	99.4	99.4	99.0	98.9	98.9	97.9	97.4	97.4
Osypka	KY-5	95.7	92.8	91.5	89.5	88.8	88.8	87.8	87.8	87.8
St. Jude Medical	1699T OptiSense	98.7	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0
St. Jude Medical	1056K QuickSite	97.3	96.8	96.2	95.4	95.4	95.4	94.3	94.3	94.3
St. Jude Medical	1084T Myodex	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9	98.9
St. Jude Medical	1480T	98.8	98.3	98.2	98.2	98.1	97.9	97.7	97.7	97.7
St. Jude Medical	1488T TendrilSDX	98.6	98.2	97.9	97.7	97.6	97.2	97.0	96.1	95.2
St. Jude Medical	1156T Quickflex	97.4	96.9	96.3	96.3	95.9	95.9	95.9	95.9	NaN
St. Jude Medical	1056T QuickSite	96.7	96.2	95.5	95.0	94.7	94.5	94.5	94.5	92.6
St. Jude Medical	1699TC OptiSense	99.0	98.7	98.6	98.5	98.5	98.4	98.3	98.3	NaN
St. Jude Medical	LPA1200M52cm TendrilMRI	98.0	98.0	97.7	97.7	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	LPA1200M58cm TendrilMRI	99.2	98.7	98.5	98.5	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	1458Q Quartet J	98.2	97.5	97.3	97.3	97.3	97.3	NaN	NaN	NaN
St. Jude Medical	1636T Isoflex	98.1	97.9	97.7	97.6	97.5	97.2	97.2	97.0	96.4
St. Jude Medical	1788TC Tendril ST	97.9	97.8	97.8	97.7	97.6	97.6	97.6	97.6	NaN
St. Jude Medical	1888TC Tendril ST	98.7	98.6	98.6	98.6	98.6	98.6	98.6	98.6	98.6
St. Jude Medical	1788T Tendril ST	98.5	98.1	97.9	97.7	97.7	97.7	97.7	97.7	97.7
St. Jude Medical	1258T QuickFlex	98.3	98.1	98.0	97.8	97.4	97.2	97.2	NaN	NaN
St. Jude Medical	1688T TendrilSDX	97.4	97.0	96.7	96.4	96.1	95.7	95.7	95.4	95.1
St. Jude Medical	1646T Isoflex	98.6	98.4	98.2	98.2	98.1	98.1	98.0	97.9	97.8
St. Jude Medical	1948 Isoflex	99.0	98.9	98.8	98.7	98.6	98.6	98.6	NaN	NaN
St. Jude Medical	1999 Optisense	99.2	99.0	98.8	98.8	98.8	98.7	98.7	NaN	NaN
St. Jude Medical	2088TC Tendril	99.3	99.2	99.1	99.1	99.1	99.1	NaN	NaN	NaN
Vitatron	ICL08 Crystalline	97.4	97.0	97.0	97.0	97.0	96.2	95.1	95.1	95.1
Vitatron	ICF09 Crystalline	97.5	97.2	97.2	97.1	96.9	96.7	96.3	96.3	95.7
Vitatron	IHP09B	98.3	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2
Vitatron	ICF09B Crystalline	98.7	98.6	98.6	98.6	98.6	98.6	98.6	98.6	98.6
Vitatron	ICM09B Crystalline	98.9	98.8	98.8	98.8	98.7	98.5	98.5	98.5	98.3

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
Vitatron	ICQ09B Crystalline	99.3	99.2	99.2	99.2	99.1	99.1	99.1	99.1	99.1

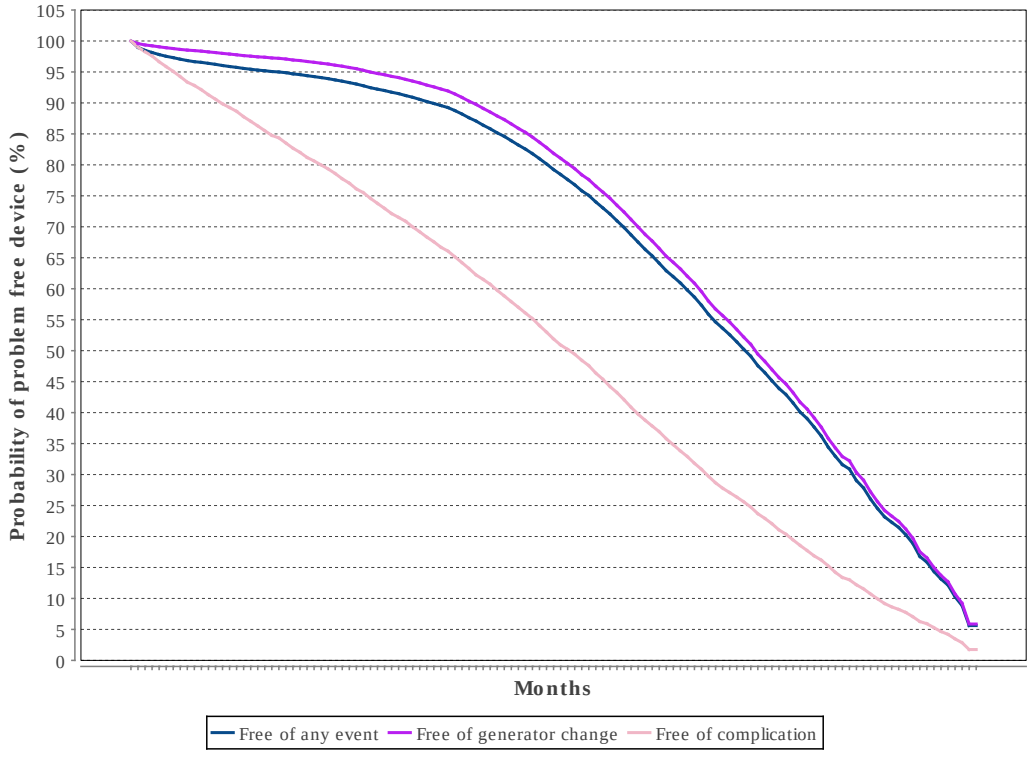
Based on all implants after 1990

Year	At risk	Survival probability %
1	85670	98.5
2	74181	90.1
3	60122	83.0
4	47414	76.1
5	36353	69.6
6	26898	63.5
7	18912	57.9
8	11586	52.6
9	5627	48.0
10	2011	44.2



Probablility of event free ICD-device

Year	At risk	Free of any event %	Free of generator change %	Free of complication %
1	20908	96.2	98.1	90.6
2	17644	94.6	96.8	82.0
3	14551	92.0	94.6	73.0
4	11505	87.6	90.3	63.3
5	8149	79.2	81.9	51.9
6	5061	67.5	70.0	39.8
7	2635	53.6	55.7	27.8
8	1180	39.0	40.6	17.7
9	328	22.3	23.3	8.6
10	22	5.6	5.9	1.8

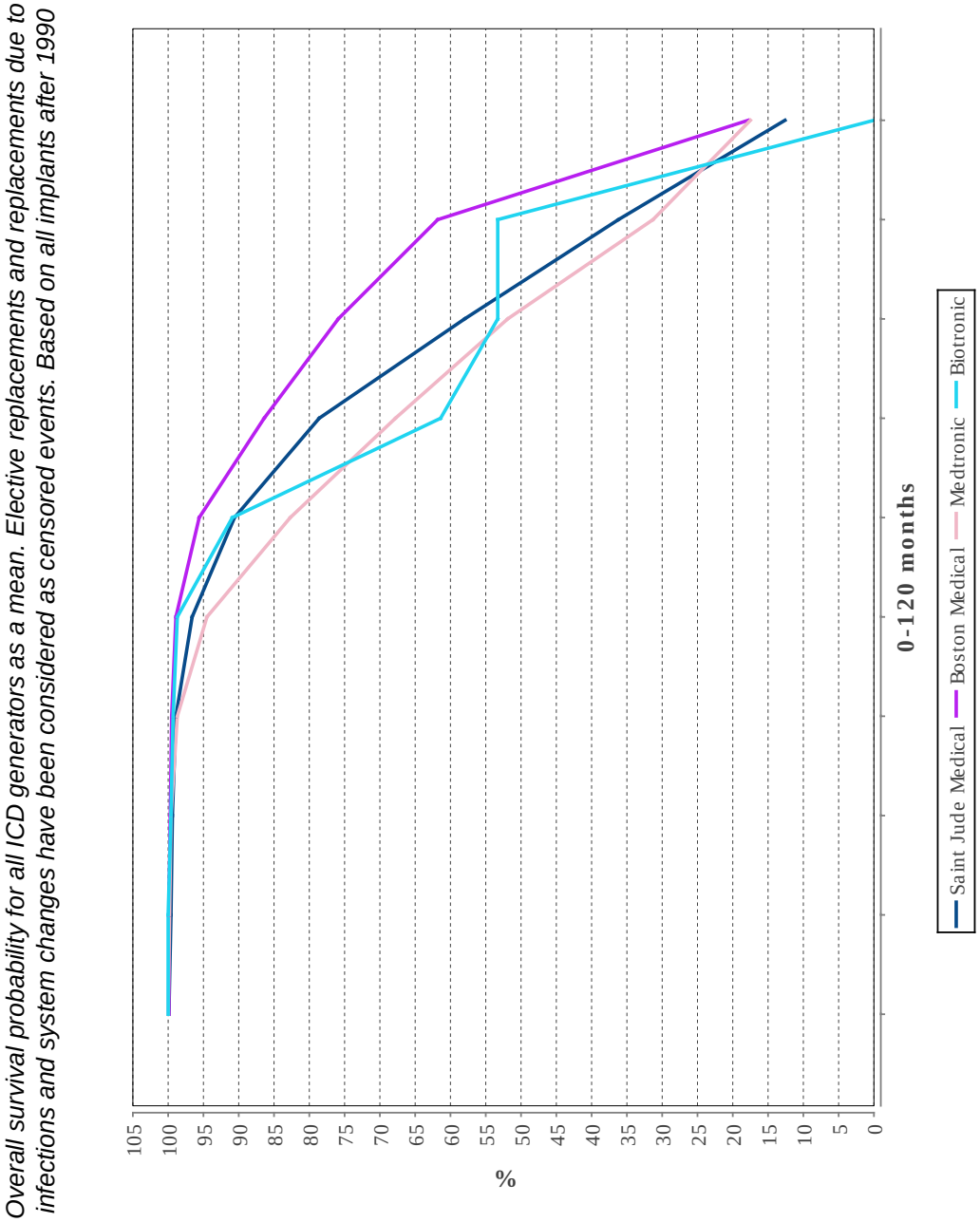


Year	At risk	Survival probability %
1	14282	99.9
2	12667	99.8
3	9965	99.5
4	7572	98.9
5	5458	96.1
6	3504	88.0
7	1918	74.7
8	847	58.3
9	273	38.4
10	41	17.5

Overall survival probability for all ICD generators as a mean. Elective replacements and replacements due to infections and system changes have been considered as censored events. Based on all implants after 2006

Year	Total		Biotronic		Boston Scientific		Medtronic		St Jude Medical	
	At risk	Surv. prob. %	At risk	Surv. prob. %	At risk	Surv. prob. %	At risk	Surv. prob. %	At risk	Surv. prob. %
1	14227	133.3	582	100.0	1520	99.9	6073	100.0	6052	99.9
2	12622	133.1	529	100.0	1360	99.9	5363	99.8	5370	99.6
3	9944	132.8	445	99.6	1176	99.7	4107	99.6	4216	99.4
4	7560	132.1	344	99.3	925	99.5	3147	98.7	3144	98.9
5	5446	129.6	247	98.7	702	98.9	2279	94.5	2218	96.6
6	3496	119.9	138	90.9	574	95.6	1380	82.7	1404	90.6
7	1915	98.1	55	61.4	369	86.4	746	67.8	745	78.6
8	846	79.7	24	53.3	178	75.9	332	51.9	312	58.0
9	273	60.9	1	53.3	53	61.8	108	31.3	111	36.2
10	41	16.0	0	0.0	4	17.8	23	17.5	14	12.6

Overall survival probability for all ICD generators as a mean. Elective replacements and replacements due to infections and system changes have been considered as censored events. Based on all implants after 1990



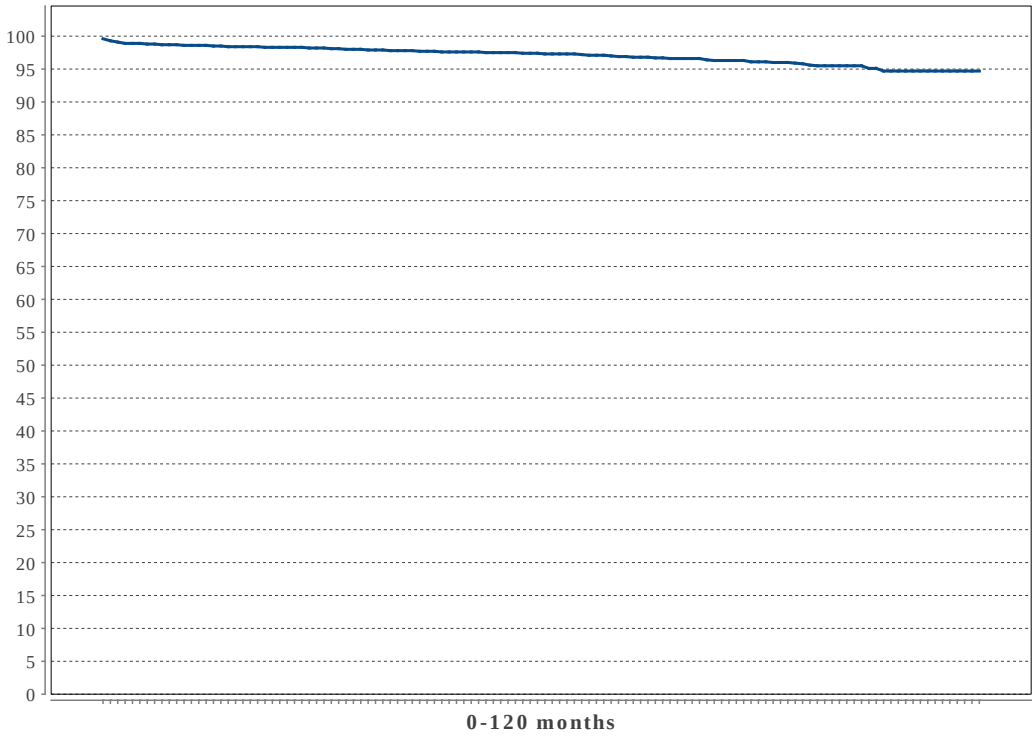
Models that have at least 50 implants and 10 explants

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
Biotronik	Lumax 340 DR-T	100.0	100.0	98.3	96.5	74.4	23.1	11.6	NaN	NaN
Biotronik	Lumax 540 DR-T	100.0	98.8	98.8	97.6	97.6	94.5	90.4	NaN	NaN
Boston Scientific	F102 Teligen	100.0	100.0	100.0	100.0	100.0	98.0	94.8	88.5	NaN
Boston Scientific	H247 Livian	100.0	100.0	100.0	100.0	90.8	62.8	44.6	NaN	NaN
Boston Scientific	P107 Cognis CRT	99.0	99.0	99.0	99.0	95.6	93.7	87.8	87.8	NaN
Boston Scientific	T167 Vitality 2	100.0	100.0	98.4	96.8	93.5	75.9	69.5	53.1	9.1
Boston Scientific	F110 Teligen	100.0	99.5	99.5	99.0	97.9	94.5	93.7	93.7	NaN
Medtronic	D264TRM Maximo II	100.0	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN
Medtronic	D164VWC Virtuoso	100.0	100.0	98.1	96.3	92.1	89.8	81.8	65.0	53.9
Medtronic	D354TRM Protecta	100.0	100.0	96.9	92.0	NaN	NaN	NaN	NaN	NaN
Medtronic	D154ATG EnTrust	100.0	100.0	100.0	98.3	86.9	58.7	23.3	7.3	5.5
Medtronic	7278 Maximo	100.0	100.0	100.0	94.0	80.6	67.4	21.3	NaN	NaN
Medtronic	7304 Maximo	100.0	98.9	97.5	75.1	35.9	11.9	8.9	8.9	8.9
Medtronic	D264DRM Maximo II	100.0	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN
Medtronic	D354DRM Protecta	100.0	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN
Medtronic	D354TRG Protecta	100.0	99.0	95.7	88.1	49.6	NaN	NaN	NaN	NaN
Medtronic	D364VRG Protecta	99.5	99.5	99.5	98.8	97.9	97.9	NaN	NaN	NaN
Medtronic	7288 Intrinsic	100.0	98.9	97.6	97.6	88.8	61.2	17.2	NaN	NaN
Medtronic	7298 Sentry	100.0	99.1	93.9	68.8	31.7	4.9	0.8	NaN	NaN
Medtronic	D364TRG Protecta	100.0	99.5	96.4	86.5	69.2	63.4	NaN	NaN	NaN
Medtronic	C174AWK Concerto	99.5	98.9	97.7	90.8	63.2	36.1	15.9	10.5	9.2
Medtronic	D164AWG Virtuoso	100.0	98.5	98.5	96.1	86.6	72.3	55.0	21.7	14.0
Medtronic	7232Cx Maximo VR	100.0	100.0	98.8	98.2	96.8	95.3	87.7	59.8	19.4
Medtronic	D284VRC Maximo II	99.7	99.7	99.4	99.4	98.0	97.3	94.7	94.7	NaN
Medtronic	D364DRG Protecta	99.5	99.5	98.9	98.9	97.3	96.4	NaN	NaN	NaN
Medtronic	D284TRK Maximo II	99.8	99.8	98.7	88.6	54.5	20.8	16.1	NaN	NaN
Medtronic	D284DRG Maximo II	99.8	99.8	99.3	98.5	94.3	78.5	58.0	NaN	NaN
St. Jude Medical	1211-36 Current VR	100.0	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN
St. Jude Medical	2233-40 Fortify DR	100.0	100.0	100.0	98.3	98.3	98.3	NaN	NaN	NaN

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
St. Jude Medical	V-341 Atlas + DR	98.5	98.5	98.5	87.9	64.2	38.0	33.8	9.8	0.0
St. Jude Medical	V-193 Atlas + VR	97.8	97.8	97.8	95.0	95.0	95.0	87.9	71.7	17.3
St. Jude Medical	1233-40Q Fortify	100.0	100.0	99.1	99.1	99.1	95.6	NaN	NaN	NaN
St. Jude Medical	1211-36Q Current VR	99.3	99.3	99.3	99.3	99.3	NaN	NaN	NaN	NaN
St. Jude Medical	1359-40QC Fortify Assura	100.0	100.0	100.0	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3211-36 Promote	99.2	99.2	98.0	96.1	96.1	NaN	NaN	NaN	NaN
St. Jude Medical	3211-36Q Promote	99.4	99.4	99.4	97.6	97.6	NaN	NaN	NaN	NaN
St. Jude Medical	2211-36 Current + DR	99.3	99.3	99.3	99.3	99.3	NaN	NaN	NaN	NaN
St. Jude Medical	3215-36 Promote HF	99.1	98.1	98.1	92.9	88.7	70.7	41.8	NaN	NaN
St. Jude Medical	V-168 Atlas 2 VR	100.0	100.0	100.0	97.1	94.1	86.7	73.0	24.8	6.0
St. Jude Medical	1207-36 Current VR	100.0	100.0	99.2	96.7	95.0	94.0	92.8	90.9	NaN
St. Jude Medical	1377-36QC Ellipse VR	100.0	100.0	100.0	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3235-40 Unify	100.0	100.0	98.7	95.5	90.6	87.4	NaN	NaN	NaN
St. Jude Medical	V-243 Atlas + DR	100.0	100.0	100.0	98.7	97.3	92.8	74.4	43.0	2.4
St. Jude Medical	3367-40QC Quadra Assura	100.0	100.0	100.0	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	2233-40Q Fortify DR	99.6	99.1	98.6	95.1	94.3	94.3	NaN	NaN	NaN
St. Jude Medical	3371-40QC Quadra Assura MP	100.0	100.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	2377-36QC Ellipse DR	99.0	99.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	2359-40QC Fortify Assura	99.6	99.6	99.6	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3251-40Q Unify Quadra	100.0	100.0	99.4	99.4	99.4	NaN	NaN	NaN	NaN
St. Jude Medical	V-367 Atlas II	99.5	98.2	94.9	83.5	55.1	31.8	17.6	4.7	4.7
St. Jude Medical	2207-36 Current DR	99.6	99.6	99.6	96.1	94.0	89.9	84.8	74.6	NaN
St. Jude Medical	V-268 Atlas II	100.0	100.0	99.1	98.0	86.9	63.7	21.5	1.9	1.9
St. Jude Medical	2211-36Q Current + DR	100.0	100.0	100.0	100.0	100.0	100.0	NaN	NaN	NaN
St. Jude Medical	3213-36 Promote HF	99.6	99.2	97.8	96.2	84.3	54.7	24.6	13.8	NaN

Overall survival probability for all ICD leads as a mean. Elective replacements and replacements due to infections and system changes have been considered as censored events. Based on all implants after 1990

Year	At risk	Survival probabilty %
1	11665	99.6
2	10451	98.6
3	8428	98.3
4	6576	97.9
5	5037	97.6
6	3656	97.3
7	2537	96.8
8	1570	96.3
9	862	95.6
10	349	94.7

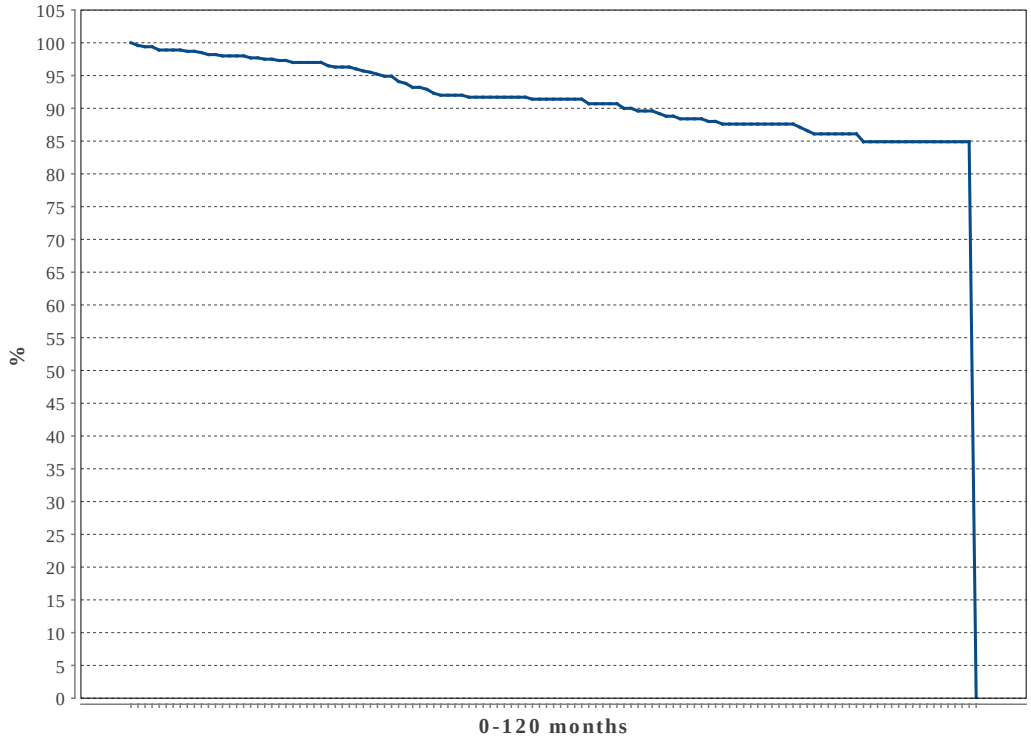


Models that have at least 50 implants and 20 explants

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
Biotronik	Linox Smart SD 65/18	97.8	97.3	95.8	95.8	95.1	95.1	93.0	93.0	93.0
Biotronik	Linox Smart S75	98.5	98.2	98.2	98.2	98.2	98.2	NaN	NaN	NaN
Boston Scientific	0692 Reliance	97.9	97.5	97.5	NaN	NaN	NaN	NaN	NaN	NaN
Medtronic	6948 Sprint Fidelis	98.5	98.5	95.9	93.0	93.0	91.8	88.9	85.3	85.3
Medtronic	6944 Sprint	98.6	98.2	97.8	97.8	96.4	95.2	94.4	94.4	NaN
Medtronic	6949 Sprint F	97.9	96.4	94.7	91.1	90.6	88.8	87.0	87.0	85.3
Medtronic	6935 Sprint Quattro Secure S	99.6	99.6	99.6	99.3	98.7	98.7	98.7	NaN	NaN
Medtronic	6935M Sprint Quattro MRI	99.3	99.3	99.3	99.3	NaN	NaN	NaN	NaN	NaN
Medtronic	6947 Sprint Quattro	99.2	99.2	99.1	98.9	98.7	98.7	98.4	98.4	98.4
St. Jude Medical	1571 Riata	97.5	97.5	97.5	94.3	94.3	94.3	94.3	94.3	87.0
St. Jude Medical	7041 Riata ST	99.0	99.0	99.0	99.0	96.5	96.5	96.5	95.0	95.0
St. Jude Medical	1581 Riata	96.7	96.7	96.7	94.6	92.4	89.9	89.9	82.8	78.0
St. Jude Medical	7001 Riata ST	97.4	97.4	97.4	97.4	97.4	96.5	95.4	95.4	95.4
St. Jude Medical	7170 Durata	98.6	97.8	97.4	96.5	96.5	96.5	96.5	96.5	NaN
St. Jude Medical	7122 Durata	99.3	99.1	98.7	98.7	98.7	98.2	98.2	98.2	NaN
St. Jude Medical	7120Q Durata	98.4	97.7	97.5	97.5	97.5	97.5	97.5	NaN	NaN
St. Jude Medical	7120 Durata	98.0	97.7	97.6	97.3	97.3	97.1	96.7	96.7	NaN
St. Jude Medical	7122Q Durata	98.4	98.1	98.0	97.8	97.8	97.8	NaN	NaN	NaN

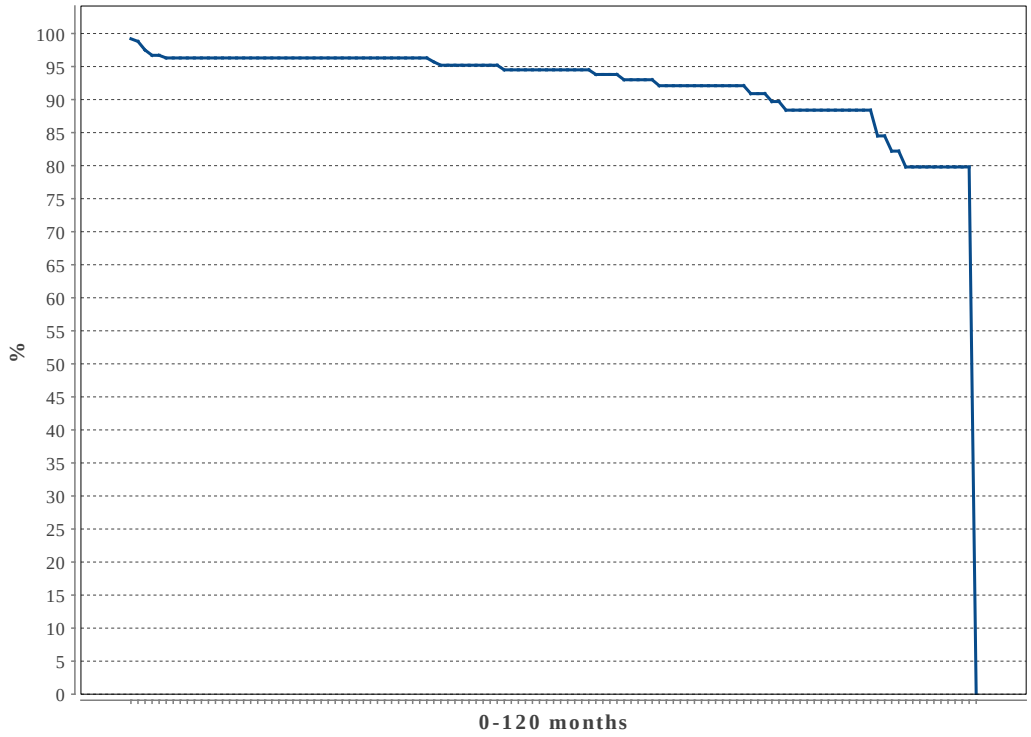
Survival probability for ICD lead Medtronic Sprint Fidelis. Elective replacement and replacements due to infections and system changes have been considered as censored events.

Year	At risk	Survival probability %
1	468	100.0
2	424	98.2
3	392	97.0
4	344	94.9
5	304	91.7
6	274	91.4
7	239	89.6
8	204	87.6
9	173	86.6
10	143	84.9



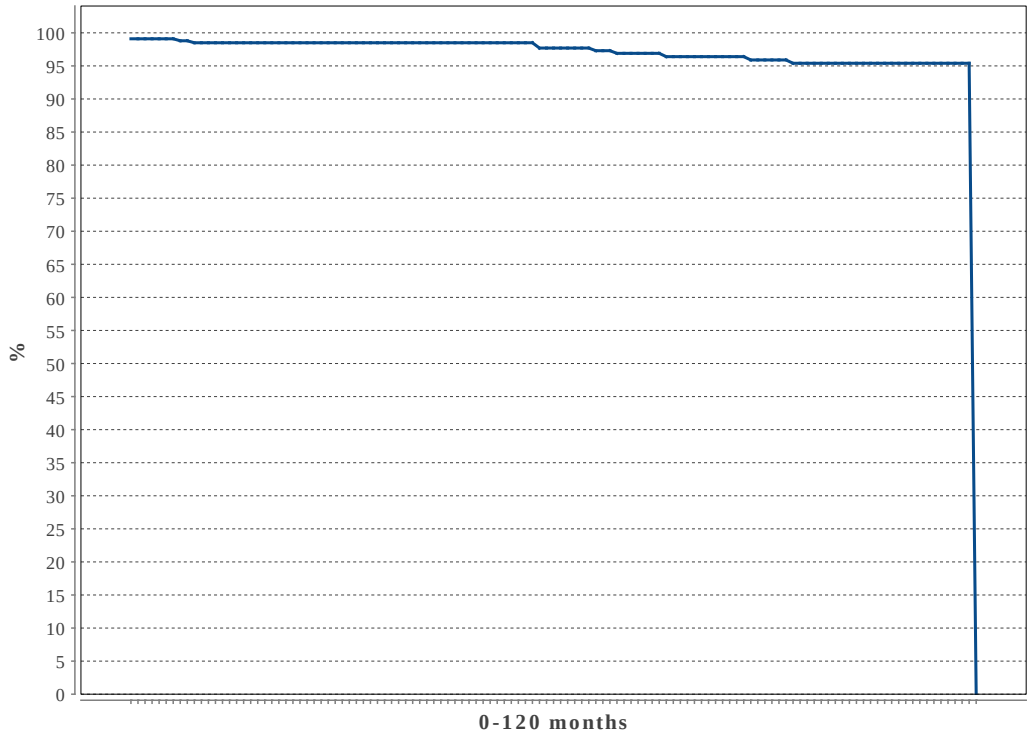
Survival probability for SJM lead type 1561,1570,1571,1572,1580,1581,1582,1591. Elective replacement and replacements due to infections and system changes have been considered as censored events.

Year	At risk	Survival probability %
1	245	99.2
2	219	96.3
3	202	96.3
4	184	96.3
5	164	95.2
6	140	94.5
7	106	93.0
8	86	92.1
9	65	88.4
10	36	82.2



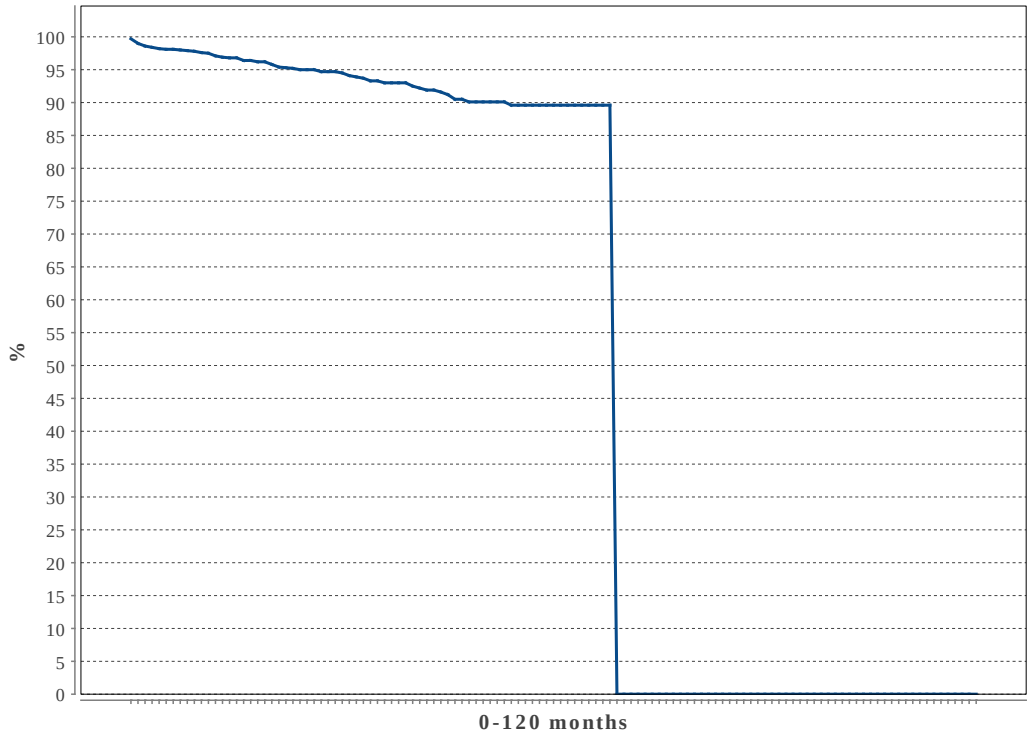
Survival probability for SJM lead type 7000,7001,7002,7040,7041,7042. Elective replacement and replacements due to infections and system changes have been considered as censored events.

Year	At risk	Survival probability %
1	348	99.1
2	312	98.5
3	300	98.5
4	285	98.5
5	263	98.5
6	241	97.7
7	224	96.9
8	207	96.4
9	183	95.4
10	124	95.4



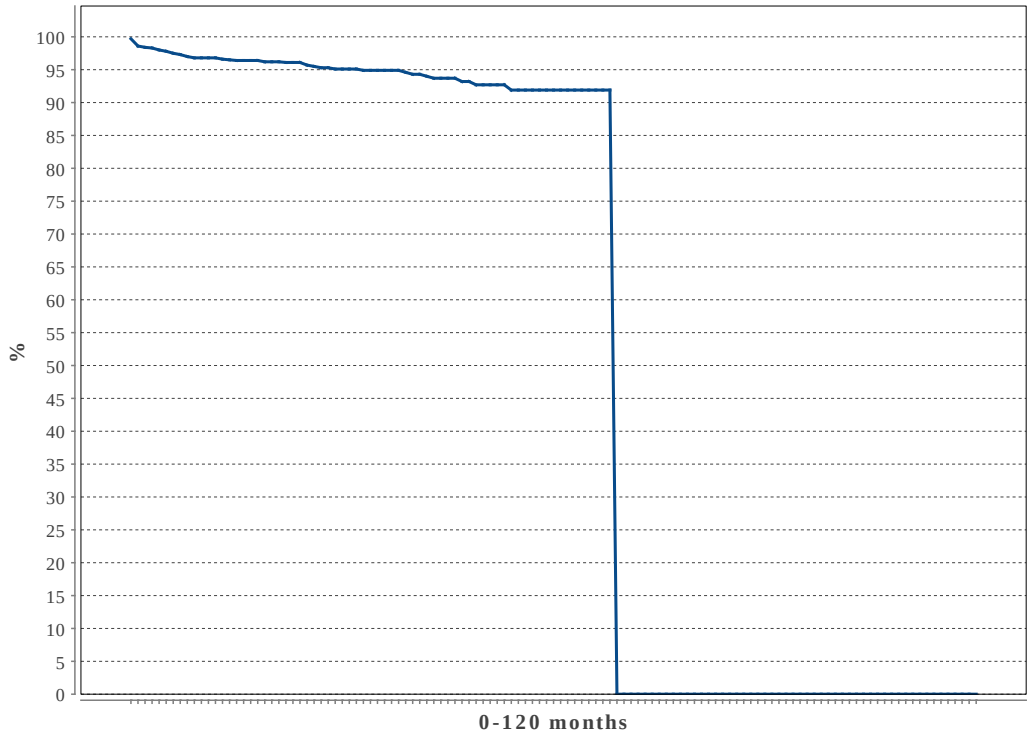
Survival probability for SJM ICD Fortify. Elective replacement and replacements due to infections and system changes have been considered as censored events.

Year	At risk	Survival probability %
1	1091	99.7
2	938	97.1
3	634	95.0
4	400	93.0
5	230	90.1
6	83	89.6
7	0	0.0
8	0	0.0
9	0	0.0
10	0	0.0



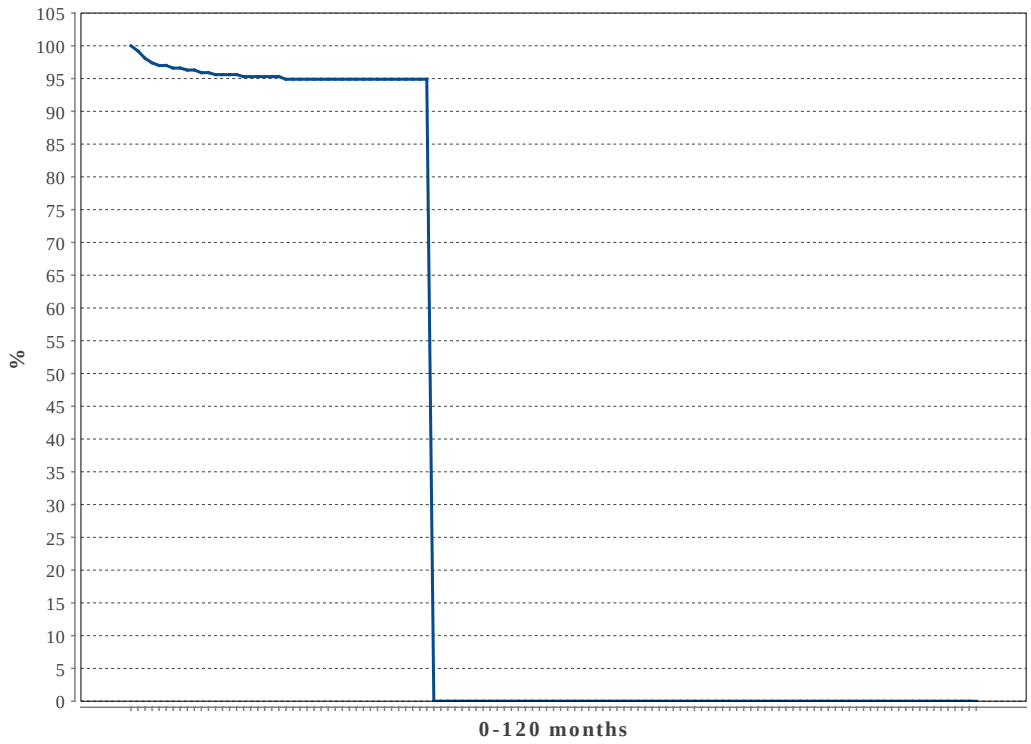
Survival probability for SJM ICD Unify. Elective replacement and replacements due to infections and system changes have been considered as censored events.

Year	At risk	Survival probability %
1	900	99.7
2	750	96.8
3	552	96.1
4	385	94.9
5	200	93.2
6	56	91.9
7	0	0.0
8	0	0.0
9	0	0.0
10	0	0.0



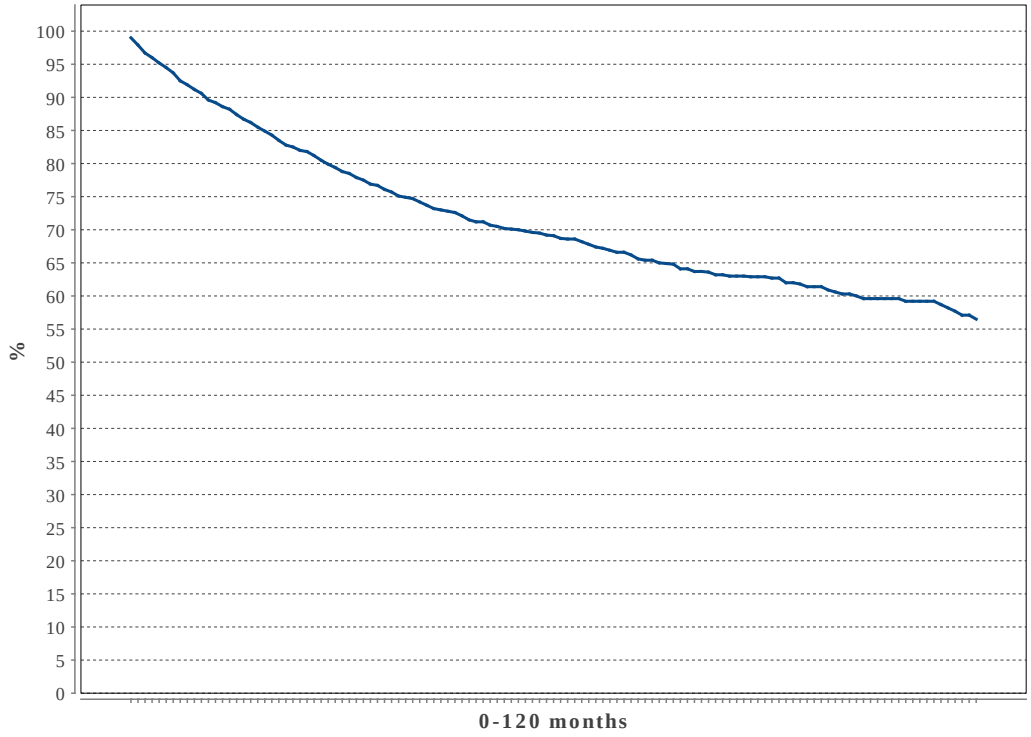
Survival probability for SJM ICD Unify. Elective replacement and replacements due to infections and system changes have been considered as censored events.

Year	At risk	Survival probability %
1	481	100.0
2	375	95.6
3	182	94.9
4	42	94.9
5	0	0.0
6	0	0.0
7	0	0.0
8	0	0.0
9	0	0.0
10	0	0.0



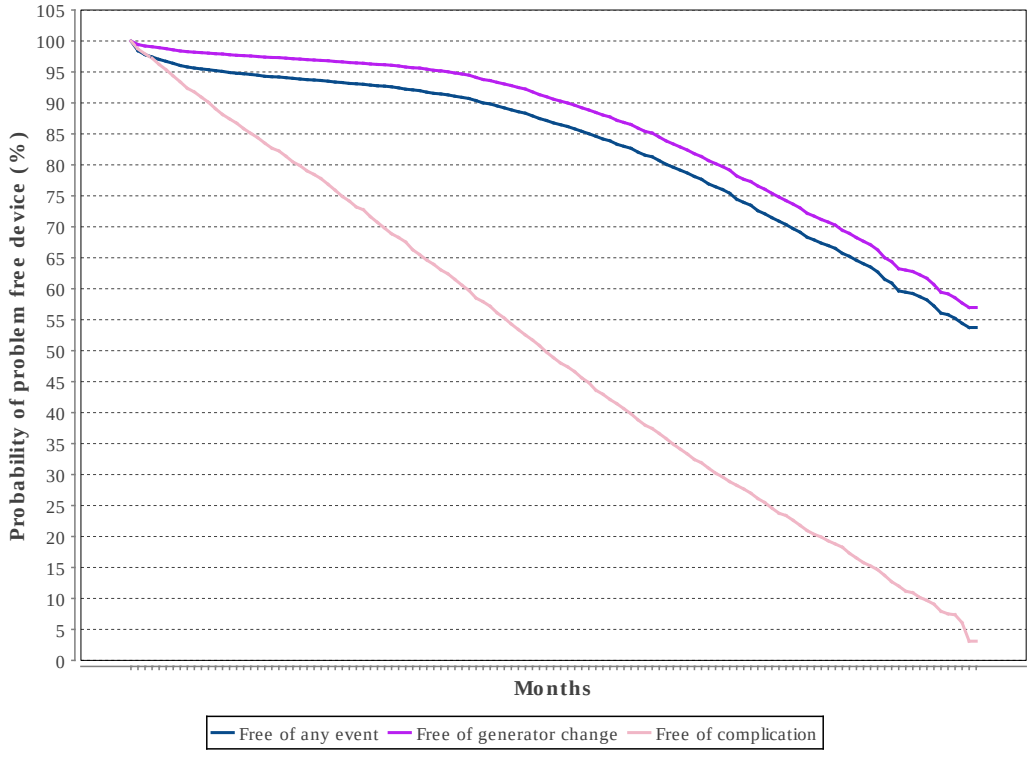
Based on all implants after 1990

Year	At risk	Survival probability %
1	2192	99.0
2	1889	89.2
3	1671	82.0
4	1386	76.1
5	1073	71.5
6	787	69.1
7	580	65.6
8	447	63.2
9	292	61.4
10	146	59.6



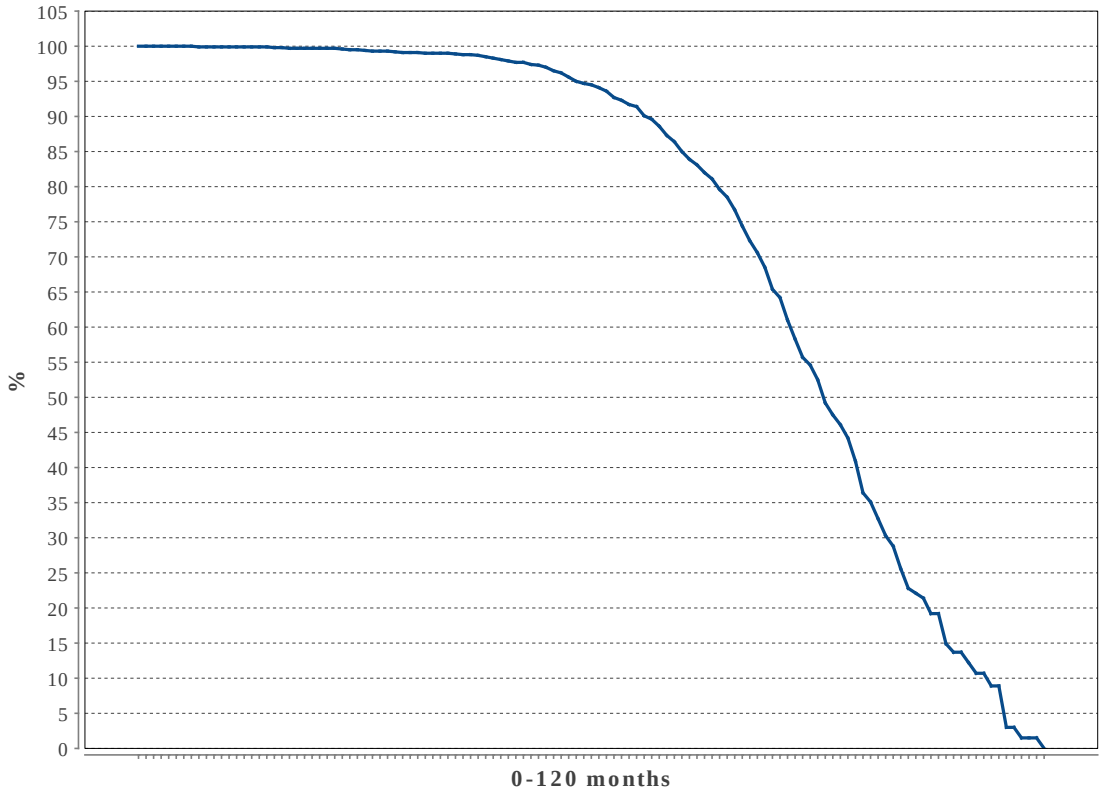
Probablility of event free CRT-device

Year	At risk	Free of any event %	Free of generator change %	Free of complication %
1	29536	95.2	98.0	89.1
2	23648	93.9	97.1	79.9
3	18467	92.7	96.2	69.8
4	13801	90.7	94.5	59.7
5	9497	86.8	90.6	48.9
6	6229	82.1	85.9	38.8
7	3663	76.0	79.7	29.6
8	1928	68.3	72.2	21.0
9	789	60.9	64.4	12.7
10	80	53.7	57.0	3.1



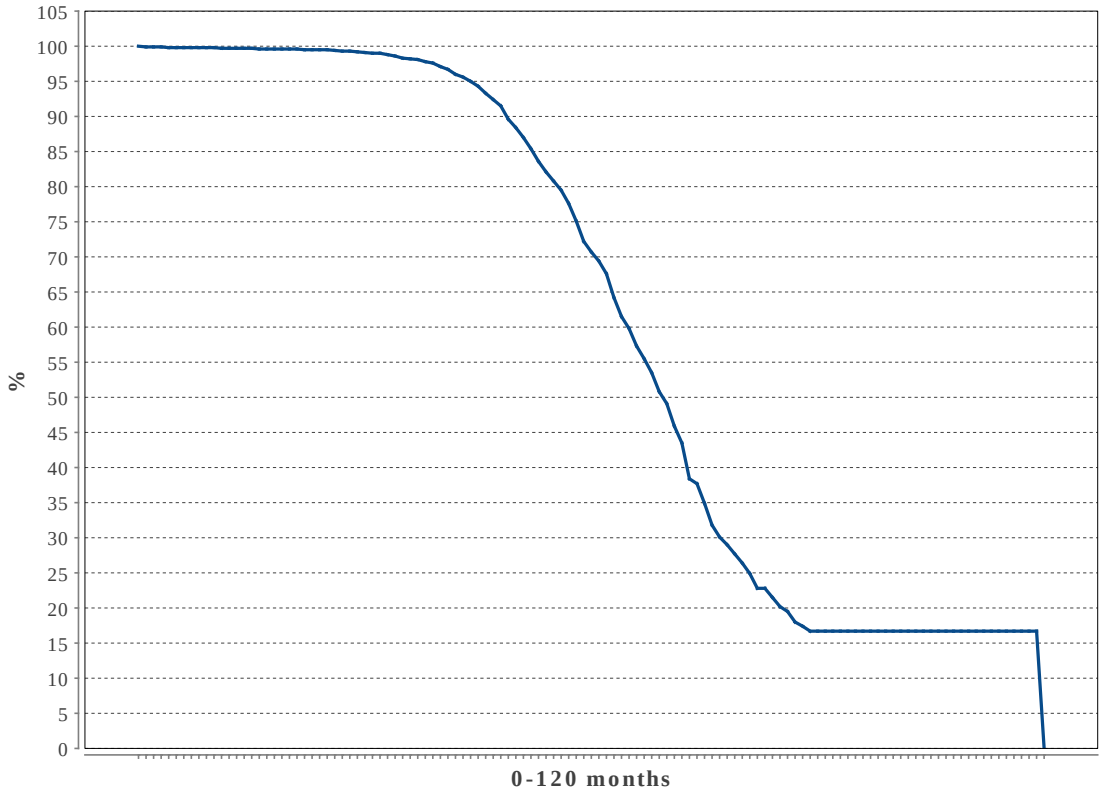
Overall CRT-P generator survival as a mean. Elective replacements and replacements due to infections and system changes have been considered as censored events. Based on all implants after 2006

Year	At risk	Survival probability %
1	4282	100.0
2	3556	99.9
3	2729	99.7
4	2005	99.1
5	1430	98.1
6	953	94.5
7	573	85.0
8	287	65.4
9	91	36.4
10	13	13.7



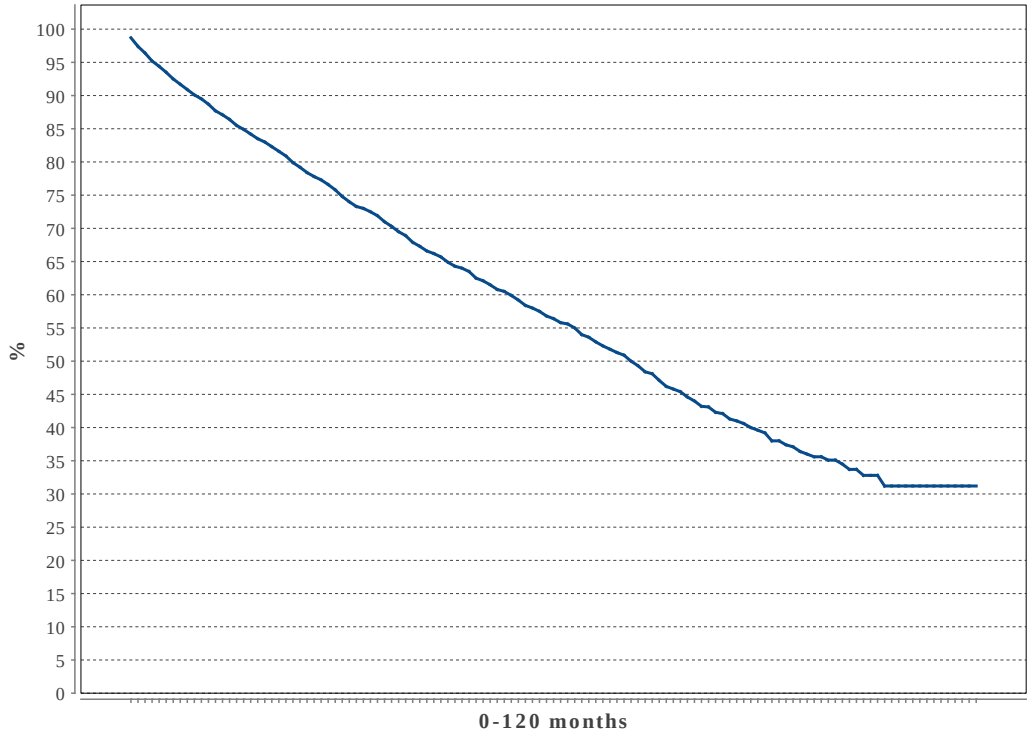
Overall CRT-D generator survival as a mean. Elective replacements and replacements due to infections and system changes have been considered as censored events. Based on all implants after 2006

Year	At risk	Survival probability %
1	4574	100.0
2	3948	99.7
3	2990	99.5
4	2098	98.2
5	1335	91.5
6	635	70.7
7	206	43.5
8	36	21.5
9	12	16.7
10	5	16.7



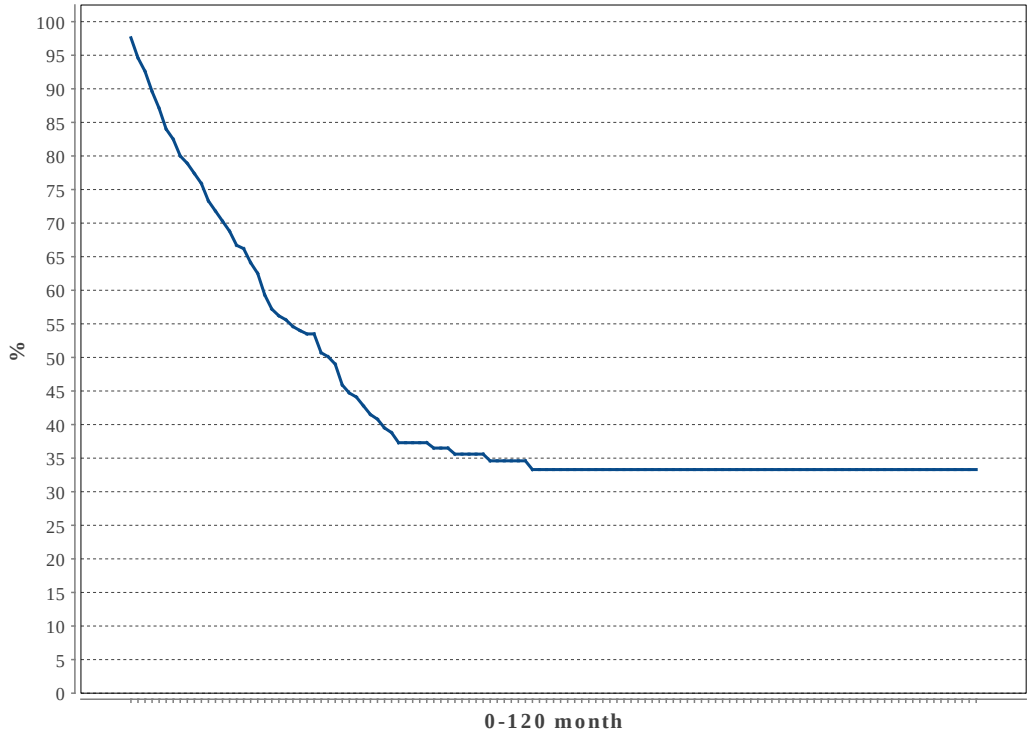
Overall patient survival probability for patients receiving CRT-P therapy. Based on all implants after 2006

Year	At risk	Survival probability %
1	4313	98.7
2	3533	87.7
3	2710	79.2
4	1993	71.0
5	1415	63.5
6	948	56.4
7	568	49.3
8	287	42.1
9	92	36.0
10	17	31.2



Overall patient survival probability for patients receiving CRT-D therapy. Based on all implants after 1990

Year	At risk	Survival probability %
1	207	97.6
2	145	71.8
3	104	54.0
4	61	39.5
5	39	35.6
6	25	33.3
7	22	33.3
8	21	33.3
9	16	33.3
10	9	33.3



QUALITY – DEAD WITHIN ONE YEAR FROM IMPLANT

Ratio of patients being dead one year after implantation

Type	Implants in 2015	Death within year	%
PM	9457	862	9.1
ICD	2105	94	4.5
CRT-P	414	42	10.1
CRT-D	582	29	5.0