

KAROLINSKA HOSPITAL
DEPARTMENT OF CARDIOLOGY
SWEDEN

ANNUAL STATISTICAL REPORT 2016



**SWEDISH ICD &
PACEMAKER REGISTRY**

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Foreword

We are proud to present the annual report for 2016 regarding Pacemaker and ICD treatment in Sweden. We have over the last years focused on longevity of devices, leads and complications triggered by the current events.

Complications are shown for each type of implantation for the country, for the region and hospital. There is also an ongoing discussion regarding concentration of therapy to fewer centers to improve outcomes by increasing the numbers of procedures per operator. We publish data on all individual implanters for all centers except two, Danderyd and St Görans hospital, who choose to have anonymous statistics.

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 in some cases only the number of procedures is 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 in an annual validation process.

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 densely 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.

Age and Gender distribution of pacemaker treatment

The average age for females receiving pacemaker treatment is 77 y and males 76 y and eight patients over 100 years of age received primary implants. There is a male predominance with 60% of the new implants going to male patients but generator changes are more common in females due to the higher average survival of females in the country. There is no change in this distribution compared to previous years.

Pacemakers and leads

The manufacturers' shares of the market show only slight redistribution and all regions are bound by tenders for 1-3 years. St Jude medical is now again largest with 41%, and Medtronic with the brand Vitatron is now down to second place with 28% market share. The smaller brands of Sorin and Biotronik are still at low market shares and Boston has increased its market shares to 19% in brady segment. Pacemaker leads are now solely bipolar. Active fixation is used to 99% in the atrium but only to 88% in the ventricle where passive leads are used more commonly than in the US for example. We have now active fixation LV leads and 17% of the LV leads were active fixation, an increase from 14% in 2015. Quadripolar lead technology for CRT has rapidly increased and 65% of the LV leads are now quadripolar, an increase from 57% 2015.

15313 leads were implanted all together.

Only a small number of epicardial systems are implanted in small children and 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 puncture which has increased as access route. The leadless pacemaker systems are new in clinical use and Medtronic Micras were implanted in 15 patients in 2016.

Pacemakers

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

The rate of MRI safe systems has increased rapidly approximately 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 correct track of the percentage.

The most common aetiology for pacemaker treatment is still the "conductive tissue fibrosis" 81% and ischaemic disease is more common in males, 9 vs 5%. 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 and in 2016 a total of 239 patients were upgraded from normal brady pacing to CRT compared to 2015.

The most common symptom is syncope followed closely by dizziness and dyspnea. ECG indications are in 2016 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.

Generators, used to ERI criteria, are fulfilled in 65% of the cases and 1% exhibit premature EOL. Lead failures are uncommon and survival rates are very good with a 10 year survival of all types of leads.

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 is not routinely followed, especially regarding CRT implantation. A recommendation to implant volumes were made by the Swedish Cardiology Society's Arrhythmia Group in 2016 and it will be followed up in 2017.

Implant rates ICD

There are 10529 active ICD patients in Sweden 2016 and this is a >2% increase over 2015. The number of centers implanting ICD's is 32 and represents roughly 2/3 of the PM implanting centers although 8 centers do <20 implants per year, well below recommendations by ESC and the Swedish national society. The national implant rate is the same 2016 as 2015, 149 vs 151. Implant rates show the same regional differences as in pacemakers with the highest rates in the north, 254 in Västerbotten and the lowest in the western region 112 per million. Two regions show a decrease, Uppsala/Örebro and South Eastern region. The highest and lowest implant rates for primary preventive ICDs are in South Eastern region and Western region, both well below the national average of 99 per million. Clear explanations for this are not at hand. About 36% of the ICD procedures are replacements, in 2016 increased by the SJM alert, but could be expected to go down with generators now showing increased longevity.

As with PM the regions are bound by ICD purchasing tenders and manufacturers' share show only slight variations over previous years. SJM is the largest with 44% market share, Medtronic second with 40%, a decrease from 47% and first place in 2015. Boston Scientific has increased its share to 11% in 2016 and Biotronik is smallest with 5% market share. A small number of Cameron Health devices were implanted but the numbers are not increasing.

ICD Patients

The average age for ICD implants is stable at 65 years in males and 62 years in females for all types of implants, unchanged from previous years. 62 patients in the age group 80-89 received their first ICD implant, among which 38 were primary prevention.

Clinical indication for all ICD implants was secondary prevention in 30% and primary 70%. Primary prevention is showing a slight increase.

Aetiology was ischaemic heart disease in 46% of all patients but more common in males, 50% vs 29% males vs females.

Medication at the start of therapy is displayed in tables.

ICD Subtypes and leads

83% of the leads are now single coil and 98% were active fixation. An increase in single coil use from 74% in 2015. Venous access is comparable to PM implants with an equal distribution between cephalic cut-down and direct subclavian puncture. Subtypes are 37% DDDR devices, 38% CRT-D, an increase from 35% in 2015, and 24% were VVI-R devices.

Only 59% of the ICD's are used until normal EOL/ERI, 8% are changed due to system upgrade, CRT. Technical recalls stand for 1,2% of all box changes and premature EOL is 2,4%.

ICD leads display larger failure rates compared to pacemaker leads but overall longevity is still good. Specific statistics for Sprint Fidelis and Durata leads are displayed in the quality section.

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 rate of CRT systems is only increasing slowly in Sweden, 66 per million CRT-D and 48 per million CRT-P new implants which is up slightly from 2015.

The number of centers performing CRT implantations is less than the number doing ICDs, 22 vs 32. The number of CRT procedures per implanter range from 1-87 and only 1 implanter performed >50 implants and 15 implanters out of 72 perform > 20 implants per year which is the recommended minimum.

The distribution between CRT-D and CRT-P systems shows 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 years 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.

ILR

827 ILRs were implanted in Sweden 2016 which is up by 5% since 2015 with the main indications being dizzy spells and syncope. At the end of the ILR investigation period 49% of the patients were found to have a PM indication and 5% an ICD indication. The rest 46% showed no pathological rhythm during the FU. In 4% 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, 11%, in small hospitals.

The use of pacing mode in sinus node disease show the same tendency with 6% VVI-R systems on average but 17% in small hospitals.

Lead extraction

The number of lead extractions is increasing and there are now 5 centers performing regular assisted lead extraction. Karolinska 158 leads, Sahlgrenska 106 leads, Uppsala 69 leads, Linköping 31 leads and Lund 19 leads. The numbers are expected to increase in 2017.

The most common reason is infection. Preventive extraction of leads with problems such as Medtronic Sprint Fidelis and SJM Riata are 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 5,5% vs 5.0% in 2015 with lead dislodgement being the most common. Passive atrial leads show the highest dislodgement rate with 4% vs 1.7 for active fix atrial leads. SC leads show the same tendency with 2% dislodgements for all passive types and 0.8 % for the Medtronic screw type SC lead.

There is a variation among the operating hospitals and lead types. Hospitals that have registered <3% in total complication rate 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 8.1% and is down slightly from 9,1% in 2015. The most common complication is lead dislodgement 2.8% followed by infection with 1.0%.

The rate between hospitals is also given in tables and as with pacemaker treatment %lt;3% is considered incomplete registration.

Complications CRT

This is presented as a both CRT-D and CRT-P complications. Both figures 7.8% and 7,4% are very low and do not compare well with literature findings of up to 15% complications. Most common is as with ICDs and PMs lead dislodgement 3,1% vs 3,6 CRT-P, CRT-D. Most commonly it is the SC lead that dislodges.

Procedures

Duration of fluoroscopy and procedure times are 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 39-48 minutes to implant VVI-AAI, and a dual chamber device 49 min and a CRT system 83 min.

Device longevity ICD and PM

Generators generally have very good longevity with an average for pacemakers of 99.4% after 5 years but there are large differences between models and manufacturers. Each model is given in the tables.

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 over the previous years.

ICD generator survival is more heterogeneous than PM generator survival with larger differences between manufacturers and models and an average of 95,6% after 5 years.

SJM Fortify and Unify were identified as problem generators in 2014 in our registry, long before the SJM alert and survival curves were given for each model.

ICD lead survival is also shorter than pacemaker lead survival, 95% vs 99% after 10 years.

The Medtronic Sprint Fidelis models were implanted in 826 cases in Sweden and the survival rate is 81% after 10 years and decreased as expected from previous years.

In the St Jude Riata models failures are increasing and 10 year survival is now down to 76%, down from 82% in 2015.

Patients

The ICD patient survival is 70% after 5 years for ICD patients and 69% for pacemaker patients.

The heart failure patients, treated with CRT, also have the shortest expected survival rate among the PM and ICD patients. The 5-year survival rate is 62 % for CRT-P patients vs 34 % for CRT-D patients.

One year mortality is 9% in PM patients, 5% in ICD patients 13% in CRT-P patients and 6% in CRT-D patients

STATISTICAL REPORT SWEDISH ICD- AND PACEMAKER REGISTRY 2016

Fredrik Gadler
Manager Swedish National ICD and Pacemaker Registry

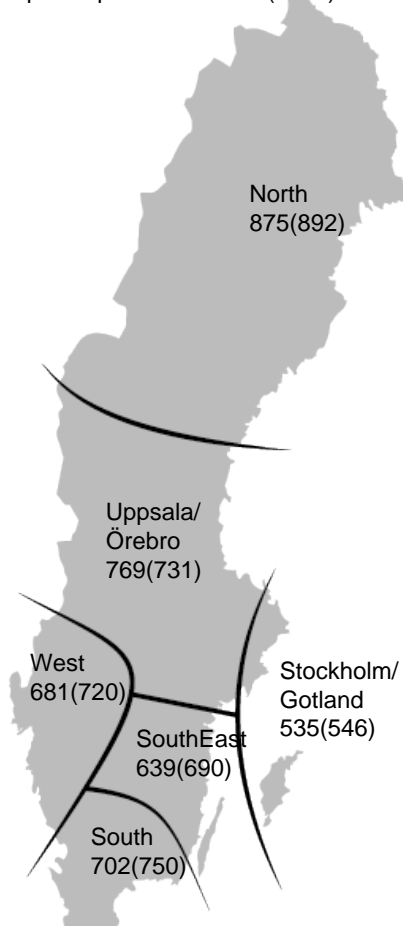
STATISTICS – PACEMAKER

STATISTICS – PACEMAKER – IMPLANTS PER REGION

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	2327063	1244	535	11168
Uppsala/Örebro	2060491	1585	769	12189
South-East Sweden	1047141	669	639	5231
Southern Sweden	1811802	1272	702	10324
Western Sweden	1857960	1265	681	10202
Northern Sweden	890696	779	875	5754
Total	9995153	6814	682	54868

Implants per million 2016(2015)



STATISTICS – PACEMAKER – IMPLANTING HOSPITALS

First implants per hospital

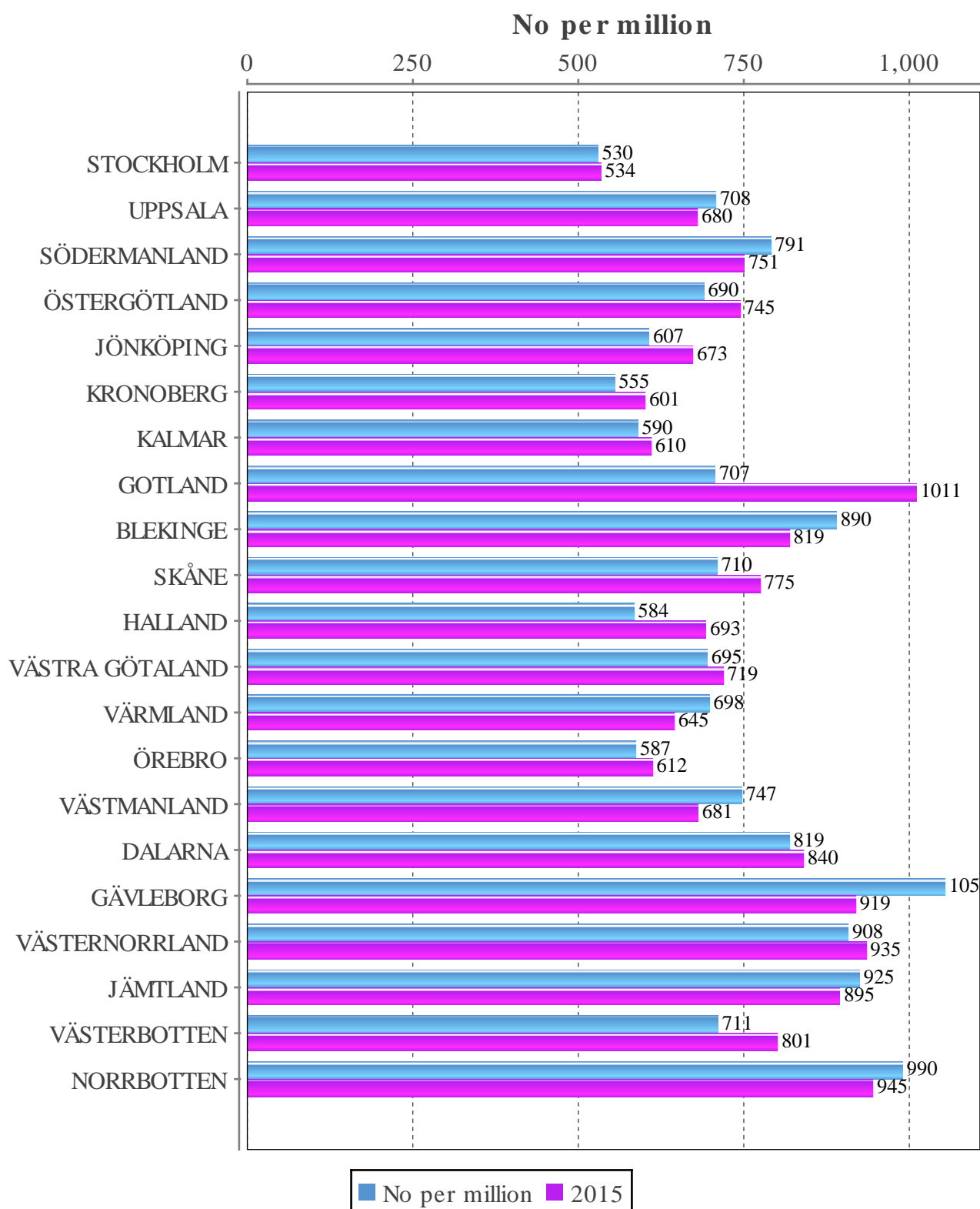
Region	Hospital	2016	2015
Northern Sweden	Norrlands Universitetssjukhus	151	183
	Skellefteå lasarett	63	56
	Sollefteå sjukhus	17	15
	Sunderby sjukhus	233	221
	Sundsvalls sjukhus	151	151
	Örnsköldsviks sjukhus	48	50
	Östersunds sjukhus	124	114
Southern Sweden	Blekingesjukhuset	141	144
	Centrallasarettet Växjö	105	109
	Centralsjukhuset Kristianstad	233	206
	Länssjukhuset Halmstad	84	112
	Skånes universitetssjukhus, Lund	503	531
	Skånes universitetssjukhus, Malmö	236	273
	Varbergs sjukhus	90	96
South-East Sweden	Linköpings Universitetssjukhus	277	252
	Länssjukhuset Kalmar	73	68
	Länssjukhuset Ryhov	198	224
	Oskarshamns sjukhus	36	29
	Vrinnevisjukhuset	65	101
	Västerviks sjukhus	29	37
Stockholm/Gotland	Danderyds sjukhus	386	388
	Karolinska Universitetssjukhuset	324	367
	St Görans sjukhus	255	217
	Södersjukhuset	281	251
	Visby lasarett	27	46
	Uppsala/Örebro	Akademiska sjukhuset	301
Arvika sjukhus		8	3
Centralsjukhuset Karlstad		170	147
Centralsjukhuset Västerås		172	158
Falu lasarett		227	231
Hudiksvalls sjukhus		51	51
Länssjukhuset Gävle		244	203
Mälarsjukhuset		206	191
Torsby sjukhus		25	26
Universitetssjukhuset Örebro		180	183
Western Sweden	Alingsås lasarett	71	79
	Drottning Silvias Bus	10	13
	Kungälv's sjukhus	55	10
	Sahlgrenska Universitetssjukhuset	449	461
	Sahlgrenska Universitetssjukhuset /Östra	29	36
	Skaraborgs sjukhus Skövde	188	218
	Södra Älvsborgs sjukhus	148	172
	Trollhättan, NÄL	231	227

STATISTICS – PACEMAKER – IMPLANTS PER COUNTY

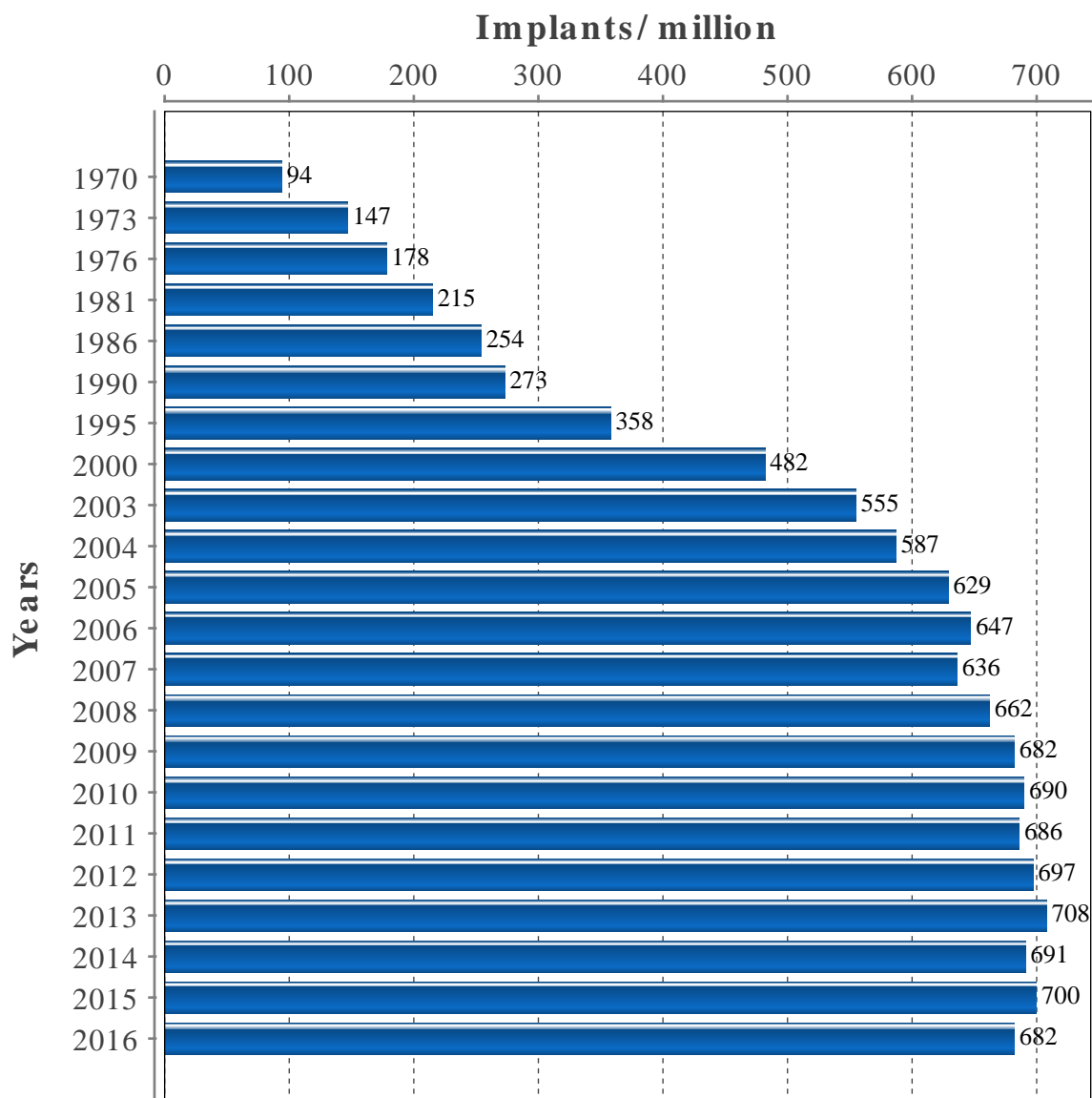
The regions are based on where the patients live, not where they are treated

County	Population	No of first	No per million	Active patients
STOCKHOLM	2269060	1203	530	10733
UPPSALA	361373	256	708	2056
SÖDERMANLAND	288097	228	791	1646
ÖSTERGÖTLAND	452105	312	690	2334
JÖNKÖPING	352735	214	607	1841
KRONOBERG	194628	108	555	915
KALMAR	242301	143	590	1056
GOTLAND	58003	41	707	435
BLEKINGE	158453	141	890	1099
SKÅNE	1324565	940	710	7659
HALLAND	320333	187	584	1589
VÄSTRA GÖTALAND	1671783	1162	695	9264
VÄRMLAND	279334	195	698	1581
ÖREBRO	294941	173	587	1444
VÄSTMANLAND	267629	200	747	1501
DALARNA	284531	233	819	1753
GÄVLEBORG	284586	300	1054	2208
VÄSTERNORRLAND	245572	223	908	1619
JÄMTLAND	128673	119	925	727
VÄSTERBOTTEN	265881	189	711	1569
NORRBOTTEN	250570	248	990	1839
Total	9995153	6815	682	54868

STATISTICS – PACEMAKER – IMPLANTS PER COUNTY



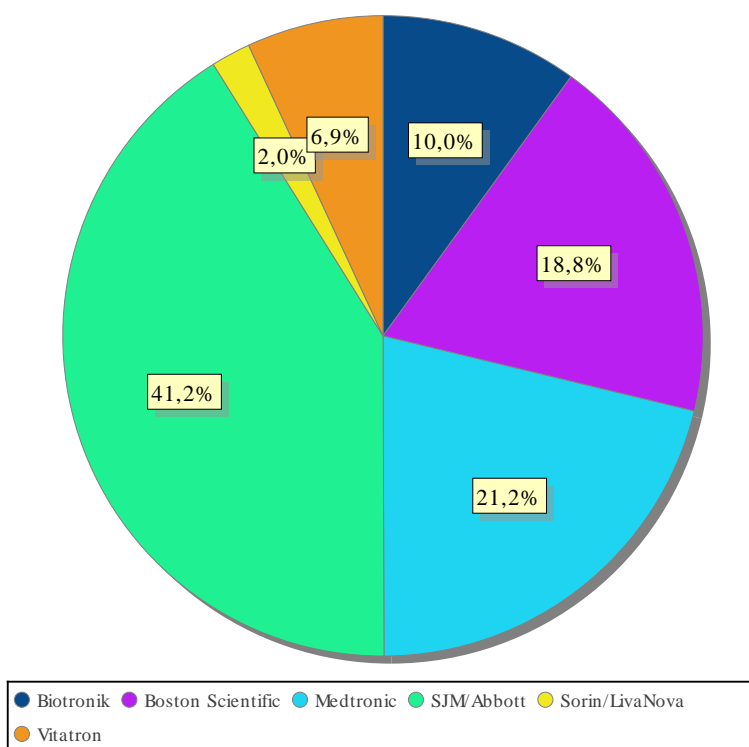
STATISTICS – PACEMAKER – HISTORICAL IMPLANTATION RATES



STATISTICS – PACEMAKER – PACEMAKERS PER MANUFACTURER

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

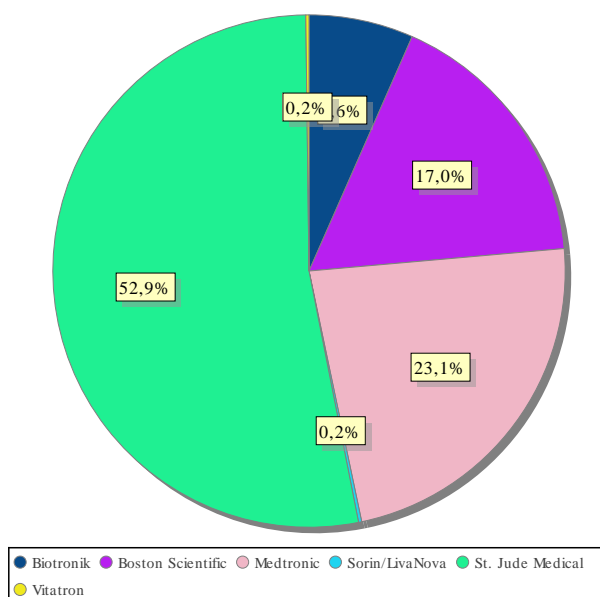
Manufacturer	2013 %	2014 %	2015 %	2016 %
Biotronik	7.6	5.0	6.5	10.0
Boston Scientific	7.7	8.4	14.8	18.8
Medtronic	20.2	21.0	22.0	21.2
Sorin/LivaNova	5.0	5.7	4.4	2.0
St. Jude Medical	37.0	34.2	36.2	41.2
Vitatron	23.9	25.5	15.9	6.9
Nayamed International	0.1	0.1	0.1	-
Impulse Dynamics	-	-	-	-



STATISTICS – PACEMAKER – LEADS PER MANUFACTURER

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

Manufacturer	2013 %	2014 %	2015 %	2016 %
Biotronik	4.6	4.7	5.7	6.6
Boston Scientific	9.3	11.1	14.2	17.0
Medtronic	33.0	34.6	30.4	23.1
St. Jude Medical	51.2	48.7	49.5	52.9
Vitatron	1.9	0.8	0.1	0.2
Sorin/LivaNova	-	0.1	0.1	0.2

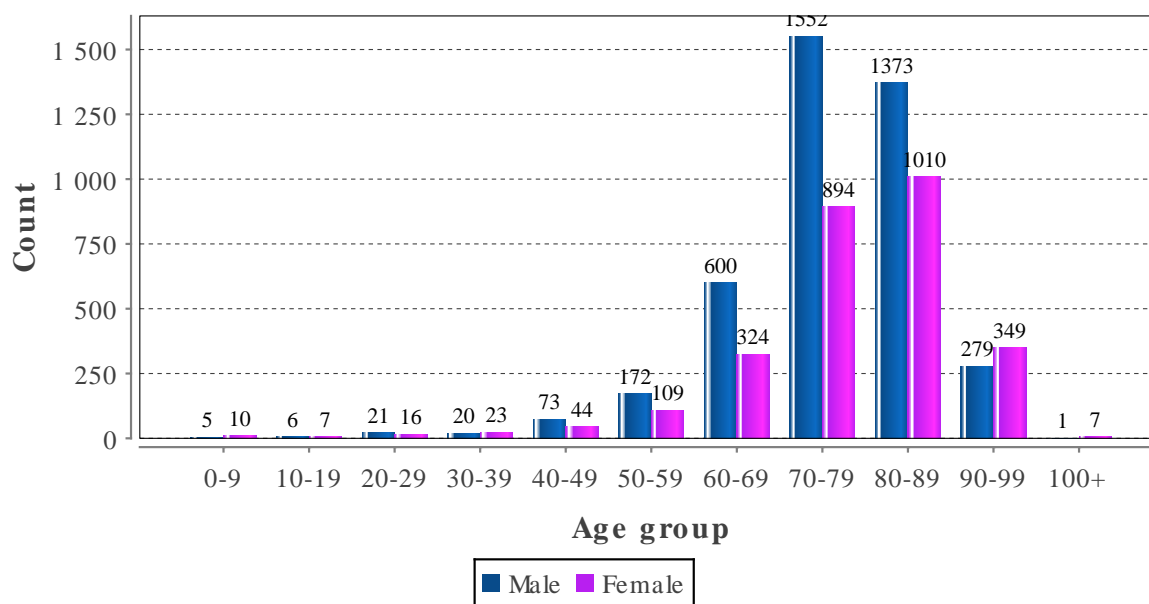


STATISTICS – PACEMAKER – AGE DISTRIBUTION MALES/FEMALES

Age and gender distribution for new implants, total numbers

Age (years)	Total no	%	Male	Female
0-9	15	0.2	5	10
10-19	13	0.2	6	7
20-29	37	0.5	21	16
30-39	43	0.6	20	23
40-49	117	1.7	73	44
50-59	281	4.1	172	109
60-69	924	13.4	600	324
70-79	2446	35.5	1552	894
80-89	2383	34.6	1373	1010
90-99	628	9.1	279	349
100+	8	0.1	1	7
Average age	76	0.0	76	77

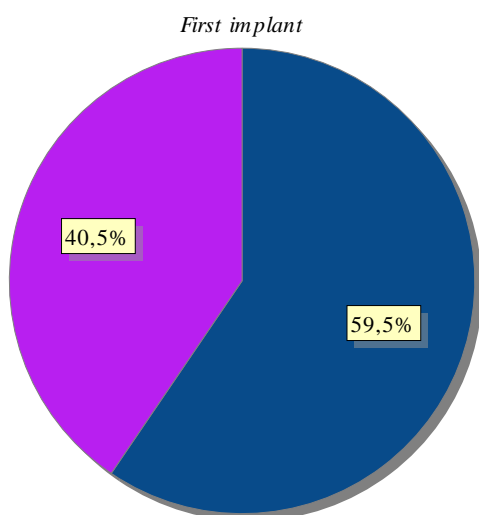
Total number of implants: 6895



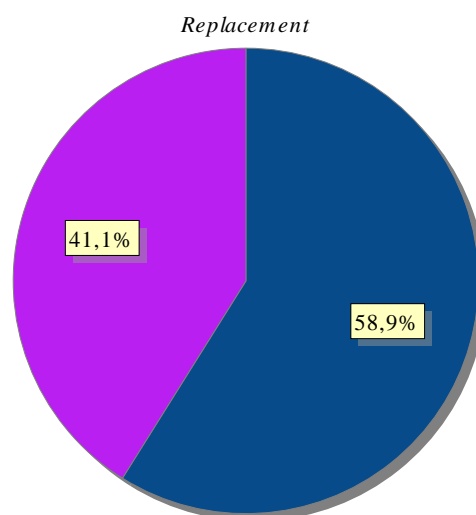
STATISTICS – PACEMAKER – TYPE OF IMPLANTS

Ratio of new implants versus generator changes

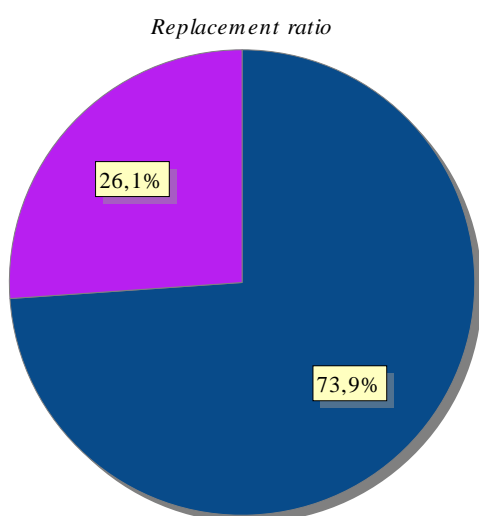
	Total		Male		Female	
	no	%	no	%	no	%
First implant	6895	73.9	4102	59.5	2793	40.5
Replacement	2429	26.1	1431	58.9	998	41.1
Total	9324	100.0	5533	59.3	3791	40.7



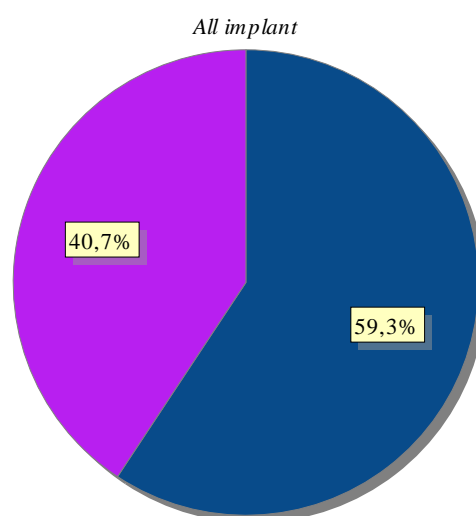
● male ● female



● male ● female



● First implant ● Replacement



● male ● female

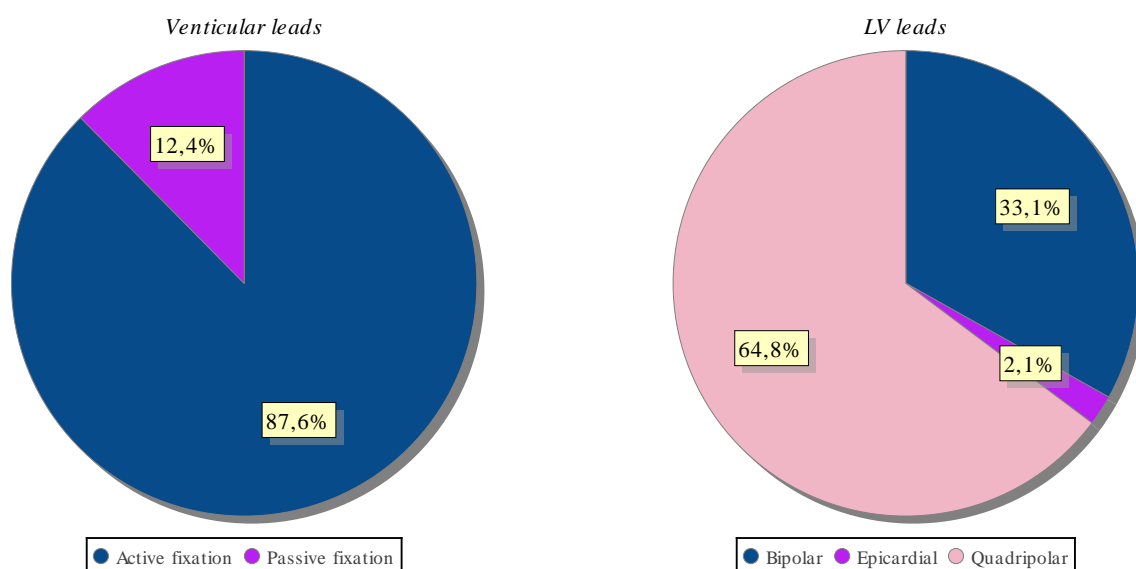
STATISTICS – PACEMAKER – LEAD TYPES

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

	Atrial		Ventricular		LV-lead	
	no	%	no	%	no	%
Bipolar	6819	99.7	7224	99.5	402	33.1
Epicardial	20	0.3	36	0.5	26	2.1
Quadripolar	-	-	-	-	786	64.7

	Atrial		Ventricular		LV-lead	
	no	%	no	%	no	%
Active fixation	6781	99.2	6359	87.6	205	16.9
Passive fixation	58	0.8	901	12.4	1009	83.1

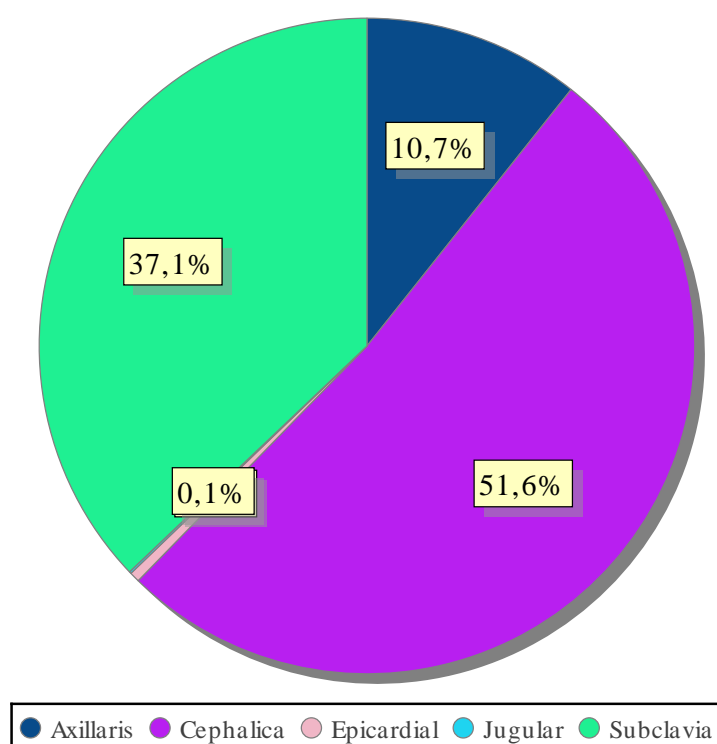
Total number of leads: 15313



STATISTICS – PACEMAKER – LEAD ACCESS

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

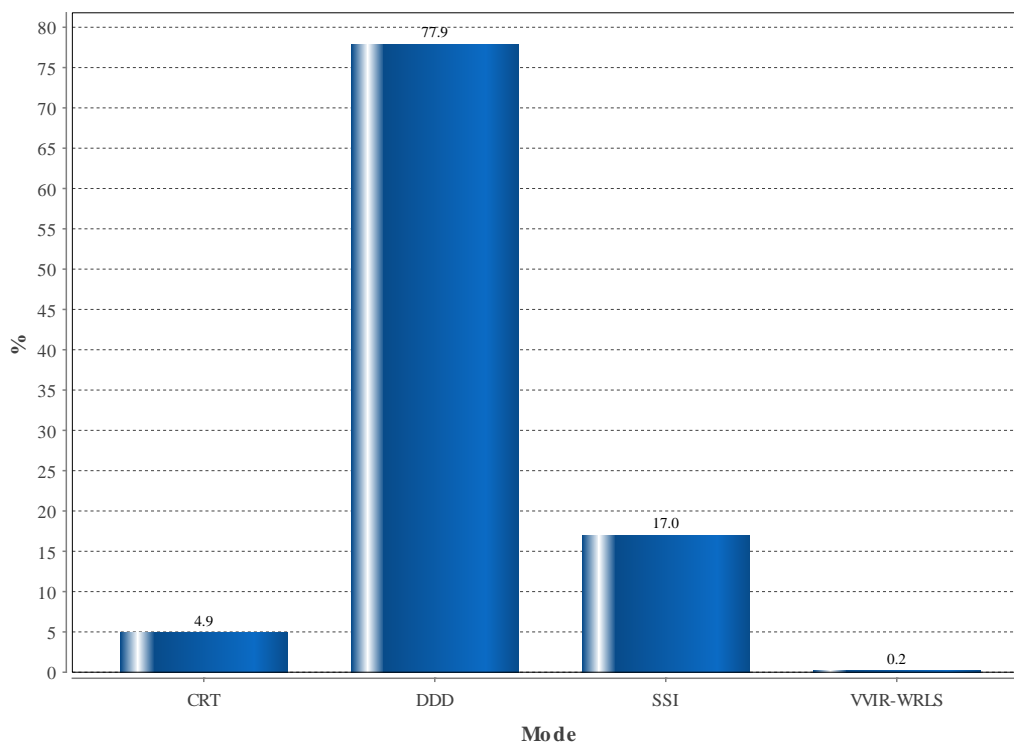
Lead access	No	%
Axillaris	1631	10.7
Cephalica	7908	51.6
Epicardial	82	0.5
Jugular	15	0.1
Subclavia	5677	37.1



STATISTICS – PACEMAKER – SUB TYPE

Implants by subtype (WRLS: wireless)

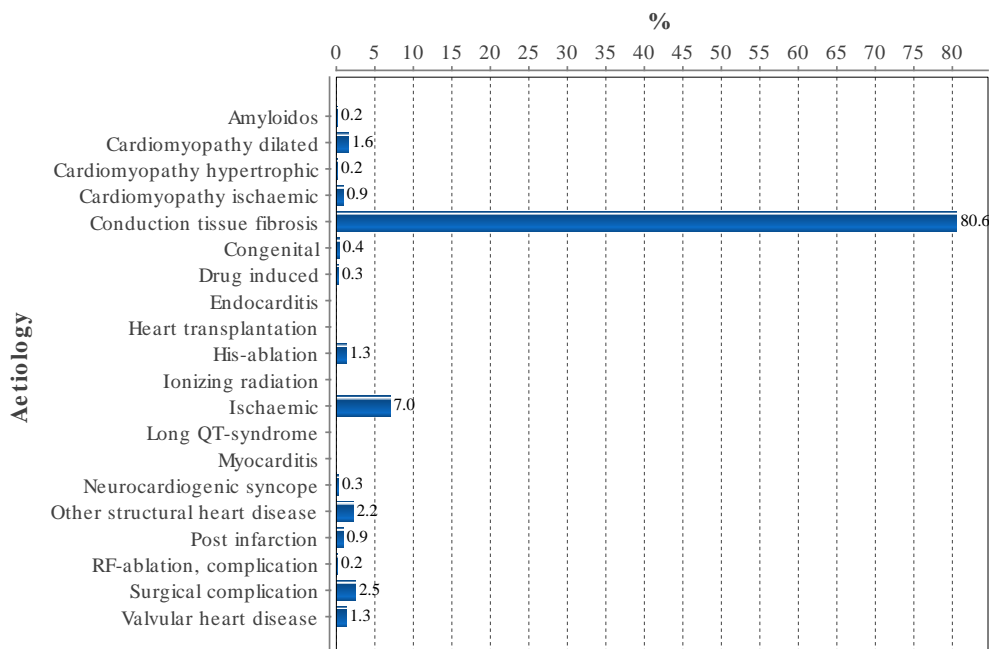
Mode	%	No
CRT	4.9	335
DDD	77.9	5374
SSI	17.0	1171
VVIR-WRLS	0.2	15
Total number of first implants 6895		



STATISTICS – PACEMAKER - AETIOLOGY FIRST IMPLANT

Main aetiology for implanting pacemakers

Aetiology	Total %	Male %	Female %
Amyloidosis	0.2	0.3	0.1
Cardiomyopathy dilated	1.6	1.8	1.1
Cardiomyopathy hypertrophic	0.2	0.2	0.2
Cardiomyopathy ischaemic	0.9	1.1	0.5
Conduction tissue fibrosis	80.6	78.7	83.4
Congenital	0.4	0.2	0.6
Drug induced	0.3	0.3	0.4
Endocarditis	0.0	0.0	0.0
Heart transplantation	0.0	0.1	0.0
His-ablation	1.3	0.9	2.0
Ionizing radiation	0.0	0.0	0.1
Ischaemic	7.0	8.6	4.6
Long QT-syndrome	0.0	0.0	0.0
Myocarditis	0.0	0.0	0.0
Neurocardiogenic syncope	0.3	0.3	0.4
Other structural heart disease	2.2	2.2	2.0
Post infarction	0.9	0.9	0.9
RF-ablation, complication	0.2	0.2	0.2
Surgical complication	2.5	2.7	2.1
Valvular heart disease	1.3	1.4	1.3



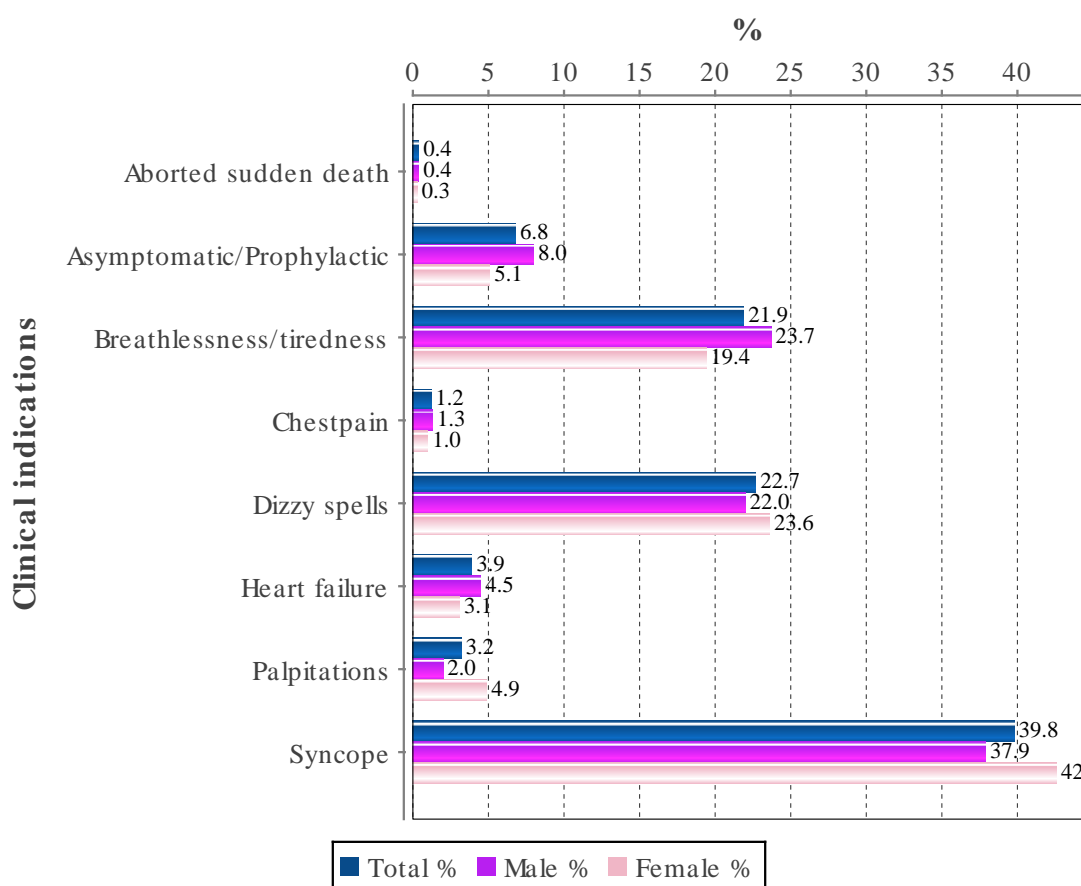
STATISTICS – PACEMAKER – SYSTEM UPGRADE

	2016	2015	2014	2013	2012	2011
VVI to VVIR	5	5	5	8	33	13
AAI/AAIR to DDD/DDDR	21	21	20	54	68	39
VVI/VVIR to DDD/DDDR	22	22	43	85	108	53
VVI/VVIR/DDD/DDDR to CRT	239	216	142	185	300	127

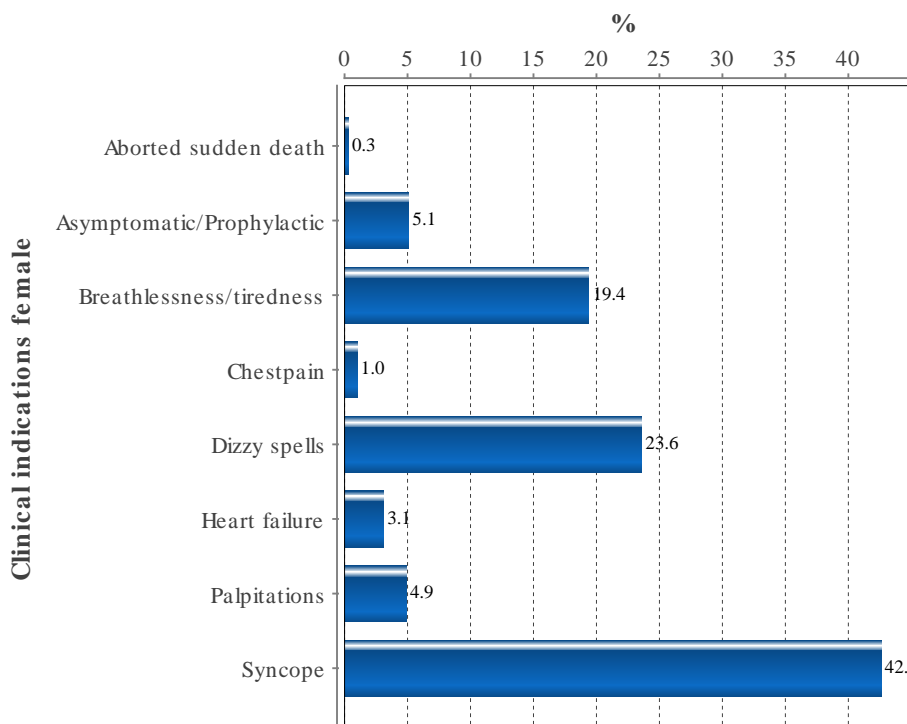
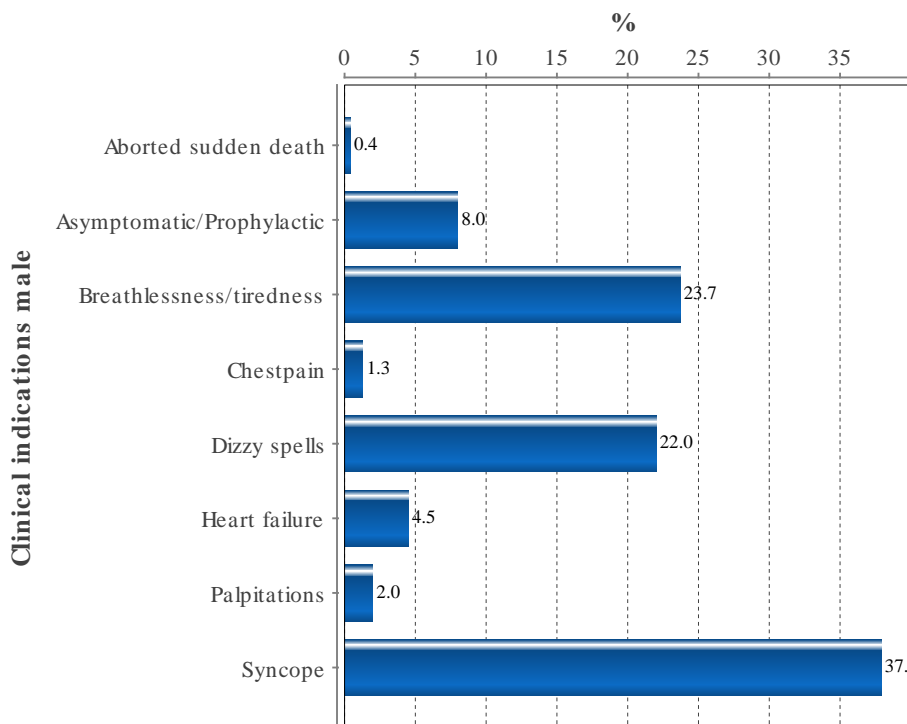
STATISTICS – PACEMAKER – CLINICAL INDICATIONS FIRST IMPLANT

Main symptom for implanting pacemakers

Indication	Total %	Male %	Female %
Aborted sudden death	0.4	0.4	0.3
Asymptomatic/Prophylactic	6.8	8.0	5.1
Breathlessness/tiredness	21.9	23.7	19.4
Chestpain	1.2	1.3	1.0
Dizzy spells	22.7	22.0	23.6
Heart failure	3.9	4.5	3.1
Palpitations	3.2	2.0	4.9
Syncope	39.8	37.9	42.6



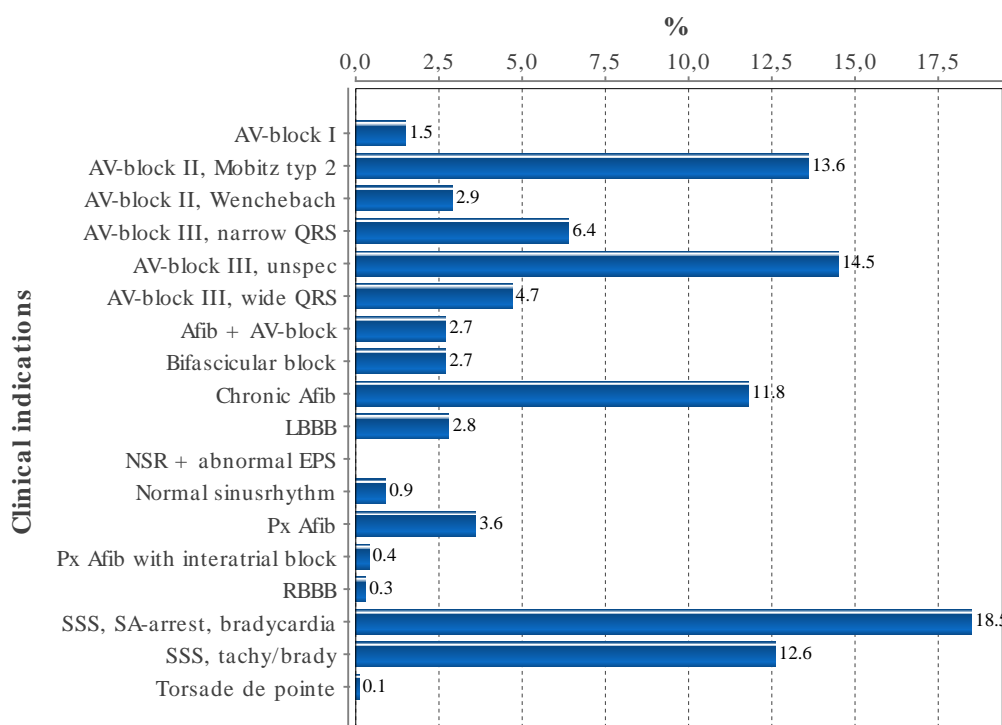
STATISTICS – PACEMAKER – CLINICAL INDICATIONS FIRST IMPLANT



STATISTICS – PACEMAKER – ECG INDICATION FIRST IMPLANT

Main ECG indication, total

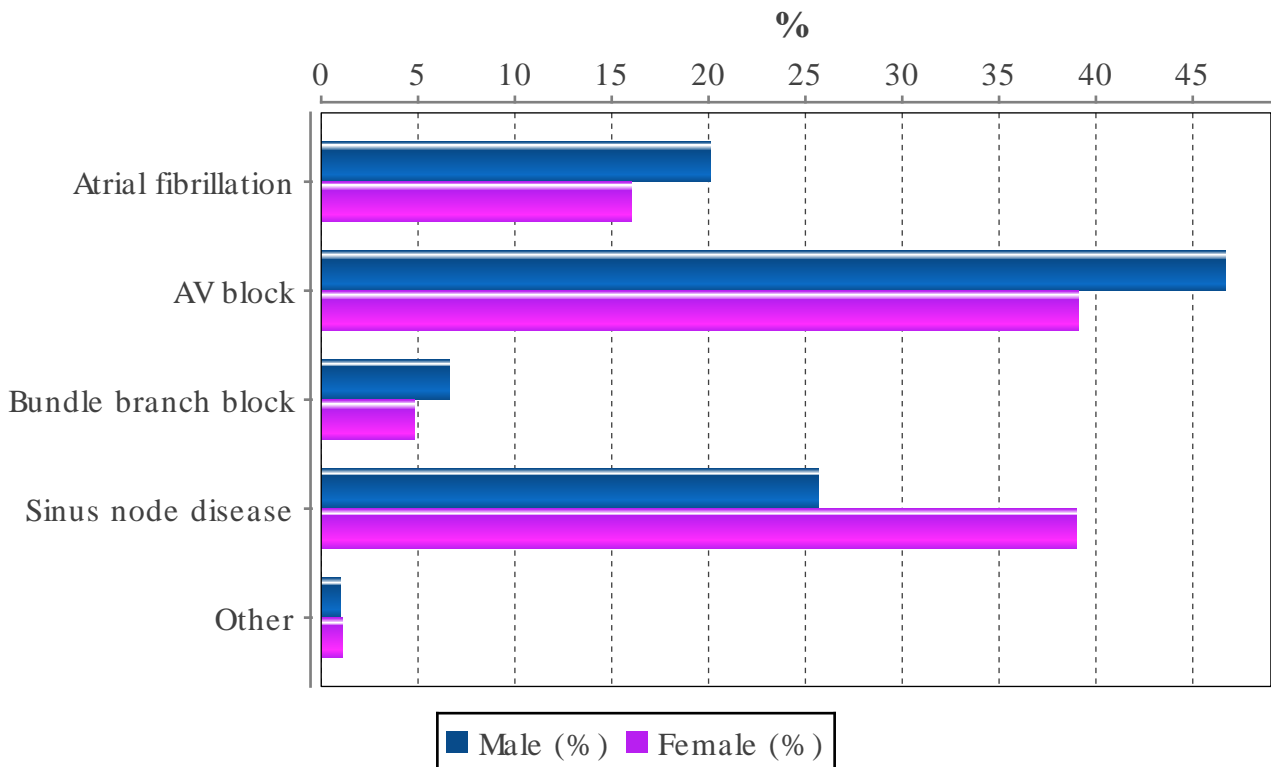
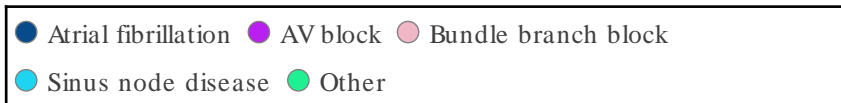
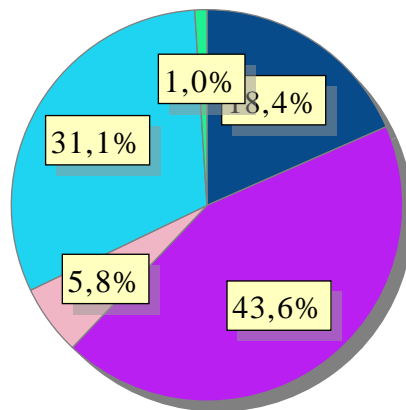
Indication	%
AV-block I	1.5
AV-block II, Mobitz typ 2	13.6
AV-block II, Wenchebach	2.9
AV-block III, narrow QRS	6.4
AV-block III, unspec	14.5
AV-block III, wide QRS	4.7
Afib + AV-block	2.7
Bifascicular block	2.7
Chronic Afib	11.8
LBBB	2.8
NSR + abnormal EPS	0.0
Normal sinusrhythm	0.9
Px Afib	3.6
Px Afib with interatrial block	0.4
RBBB	0.3
SSS, SA-arrest, bradycardia	18.5
SSS, tachy/brady	12.6
Torsade de pointe	0.1



STATISTICS – PACEMAKER - PREPACING ECG FIRST IMPLANT

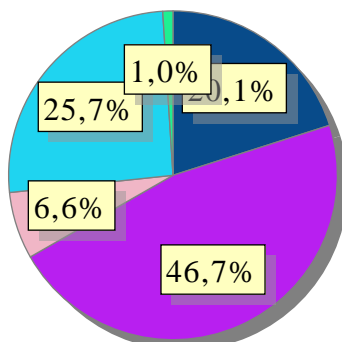
Main ECG indication by gender and for patients < 18 years of age

Indication	No	%	Male (%)	Female (%)	Younger than 18 (%)
Atrial fibrillation	1271	18.4	20.1	16.0	0.0
AV block	3008	43.6	46.7	39.1	81.0
Bundle branch block	402	5.8	6.6	4.8	0.0
Sinus node disease	2143	31.1	25.7	39.0	19.0
Other	71	1.0	1.0	1.1	0.0
Total number of implants					6895

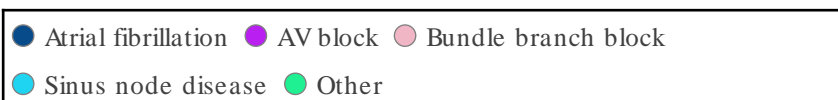
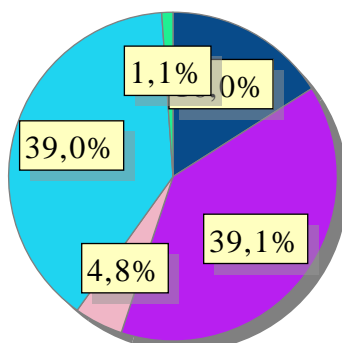


STATISTICS – PACEMAKER - PREPACING ECG FIRST IMPLANT

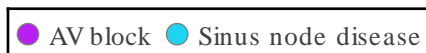
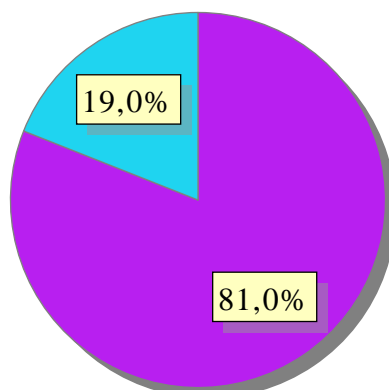
Male



Female



< 18

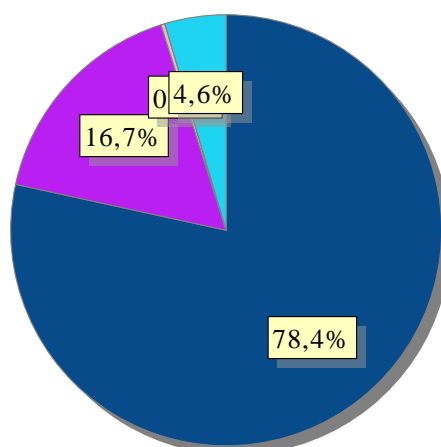


STATISTICS – PACEMAKER – USE OF PACING MODES FIRST IMPLANT

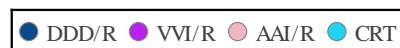
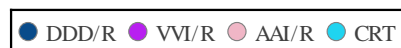
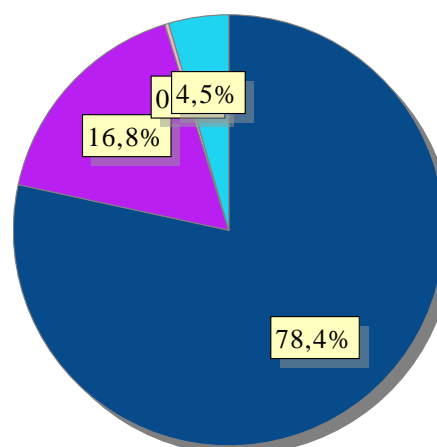
Use of pacemaker subtype for all indications per hospital size (number of new implants/year and hospital)

Size	Hospitals	DDD %	VVI %	AAI %	CRT %
Large	14	79.0	15.6	0.2	5.2
Medium	16	78.4	16.8	0.3	4.5
Small	14	75.2	23.9	0.9	0.0
Total	44	78.5	16.7	0.3	4.6

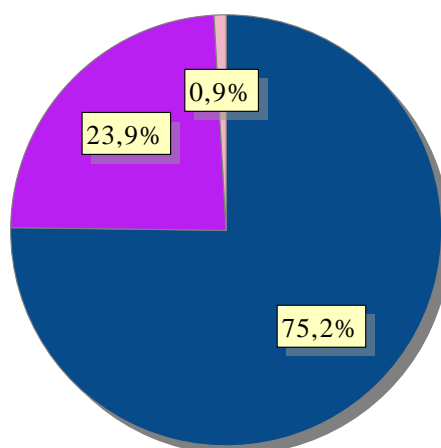
All hospitals



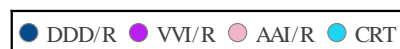
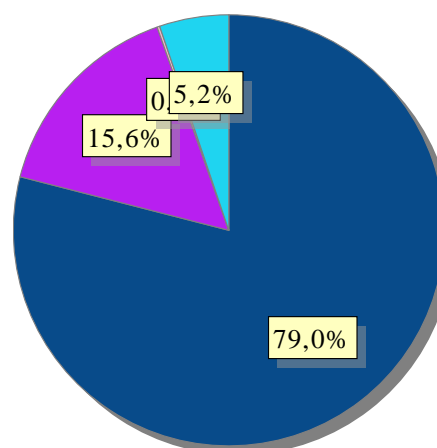
Medium hospitals



Small hospitals



Large hospitals



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

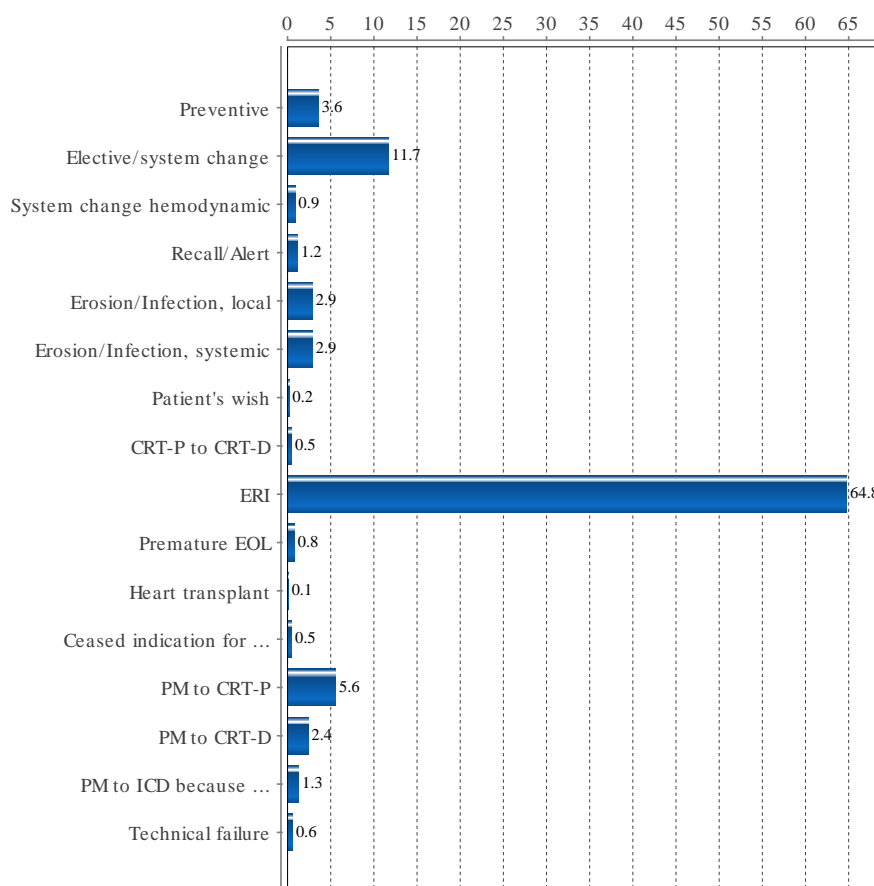
Use of pacemaker sub type for all indications per hospital (number of new implants / year and hospital))

Hospital	Number	DDD %	VVI %	AAI %	CRT %
Akademiska sjukhuset	295	80.3	12.9	0.0	6.8
Alingsås lasarett	71	70.4	28.2	1.4	0.0
Arvika sjukhus	8	62.5	37.5	0.0	0.0
Blekingesjukhuset	141	76.6	16.3	0.7	6.4
Centrallasarettet Växjö	105	81.0	10.5	0.0	8.6
Centralsjukhuset Karlstad	170	87.6	10.6	0.6	1.2
Centralsjukhuset Kristianstad	233	80.7	19.3	0.0	0.0
Centralsjukhuset Västerås	172	77.3	20.9	0.0	1.7
Danderyds sjukhus	386	78.8	14.8	0.0	6.5
Drottning Silvias Bus	8	100.0	0.0	0.0	0.0
Falu lasarett	227	74.0	21.1	0.0	4.8
Hudiksvalls sjukhus	51	84.3	15.7	0.0	0.0
Karolinska Universitetssjukhuset	324	73.1	12.3	0.0	14.5
Kungälv sjukhus	55	69.1	27.3	3.6	0.0
Linköpings Universitetssjukhus	277	77.3	10.1	0.4	12.3
Länssjukhuset Gävle	244	78.3	17.6	0.0	4.1
Länssjukhuset Halmstad	84	79.8	20.2	0.0	0.0
Länssjukhuset Kalmar	73	75.3	24.7	0.0	0.0
Länssjukhuset Ryhov	198	75.8	24.2	0.0	0.0
Mälarsjukhuset	206	86.4	13.1	0.0	0.5
Norrlands Universitetssjukhus	150	69.3	15.3	0.0	15.3
Oskarshamns sjukhus	36	75.0	22.2	2.8	0.0
Sahlgrenska Universitetssjukhuset	449	76.2	16.7	0.9	6.2
Sahlgrenska Universitetssjukhuset /Östra	29	86.2	13.8	0.0	0.0
Skaraborgs sjukhus Skövde	188	76.6	12.8	1.6	9.0
Skellefteå lasarett	63	69.8	30.2	0.0	0.0
Skånes universitetssjukhus, Lund	496	81.3	16.3	0.8	1.6
Skånes universitetssjukhus, Malmö	236	87.7	12.3	0.0	0.0
Sollefteå sjukhus	17	29.4	64.7	5.9	0.0
St Görans sjukhus	255	86.3	10.6	0.0	3.1
Sunderby sjukhus	233	70.0	28.3	0.0	1.7
Sundsvalls sjukhus	151	82.1	14.6	0.7	2.6
Södersjukhuset	281	76.9	16.7	0.4	6.0
Södra Älvsborgs sjukhus	148	79.7	14.9	0.0	5.4
Torsby sjukhus	25	60.0	40.0	0.0	0.0
Trollhättan, NÄL	231	81.4	14.7	0.0	3.9
Universitetssjukhuset Örebro	180	80.6	16.1	0.0	3.3
Varbergs sjukhus	88	71.6	23.9	0.0	4.5
Visby lasarett	27	81.5	18.5	0.0	0.0
Vrinnevisjukhuset	65	89.2	9.2	1.5	0.0
Västerviks sjukhus	29	86.2	13.8	0.0	0.0
Örnsköldsviks sjukhus	48	91.7	8.3	0.0	0.0
Östersunds sjukhus	124	69.4	25.8	0.0	4.8

STATISTICS – PACEMAKER – REASON FOR GENERATOR EXPLANT

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

Reason	All hospitals %	(large) %	(medium) %	(small) %
Preventive	3.6	1.8	7.5	0.5
Elective/system change	11.7	15.4	5.2	12.6
System change hemodynamic	0.9	0.8	1.1	1.0
Recall/Alert	1.2	0.7	2.4	0.0
Erosion/Infection, local	2.9	4.0	1.4	1.0
Erosion/Infection, systemic	2.9	3.9	1.5	2.0
Patient's wish	0.2	0.0	0.2	1.0
CRT-P to CRT-D	0.5	0.4	0.8	0.0
ERI	64.8	60.4	69.4	78.4
Premature EOL	0.8	0.9	0.5	1.0
Heart transplant	0.1	0.1	0.1	0.0
Ceased indication for PM therapy	0.5	0.5	0.3	0.5
PM to CRT-P	5.6	6.2	5.8	0.5
PM to CRT-D	2.4	2.8	1.9	1.0
PM to ICD because of arrhythmia	1.3	1.3	1.6	0.5
Technical failure	0.6	0.9	0.2	0.0



STATISTICS – PACEMAKER – REASON FOR GENERATOR CHANGE HISTORICAL

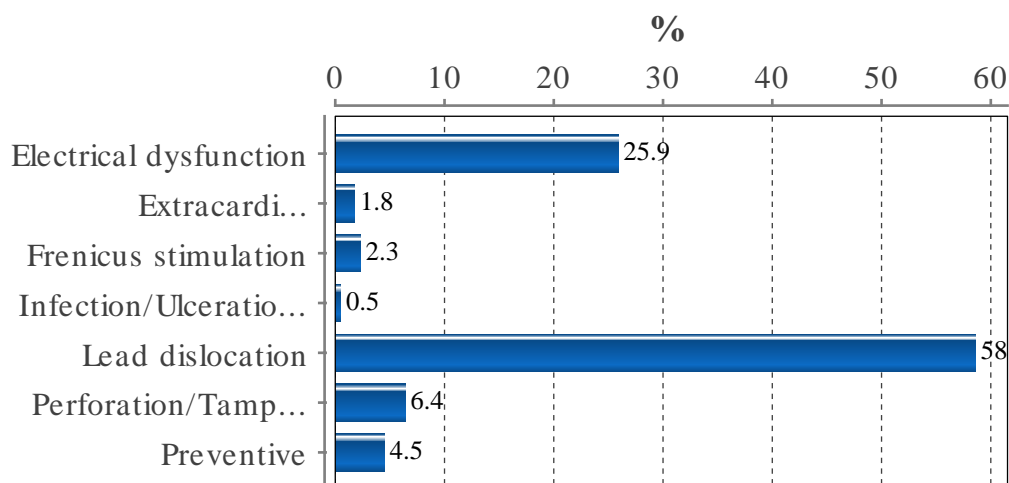
Historical explant indications

Reason	2012 %	2013 %	2014 %	2015 %	2016 %
Preventive	6.2	6.8	5.4	4.3	3.6
System change hemodynamic	2.4	0.9	0.8	0.8	0.9
Recall/Alert	0.1	0.0	0.0	0.0	1.2
Erosion/Infection, local	5.1	3.4	3.3	3.1	2.9
Patient's wish	0.1	0.3	0.3	0.4	0.2
ERI	75.7	74.8	73.1	68.4	64.8
Premature EOL	2.8	2.8	2.3	0.8	0.8
Heart transplant	0.1	0.0	0.0	0.1	0.1
Ceased indication for PM therapy	0.4	0.8	0.3	0.3	0.5
PM to CRT-P	4.1	3.3	3.8	4.5	5.6
PM to ICD because of arrhythmia	2.5	1.1	1.7	1.0	1.3
Technical failure	0.3	0.4	0.9	0.4	0.6
Elective/system change	0.0	2.6	3.8	10.3	11.7
Erosion/Infection, systemic	0.0	1.5	1.9	2.2	2.9
PM to CRT-D	0.0	1.4	2.4	3.0	2.4
CRT-P to CRT-D	0.0	0.0	0.0	0.4	0.5

STATISTICS – PACEMAKER – REASON FOR LEAD CORRECTION

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

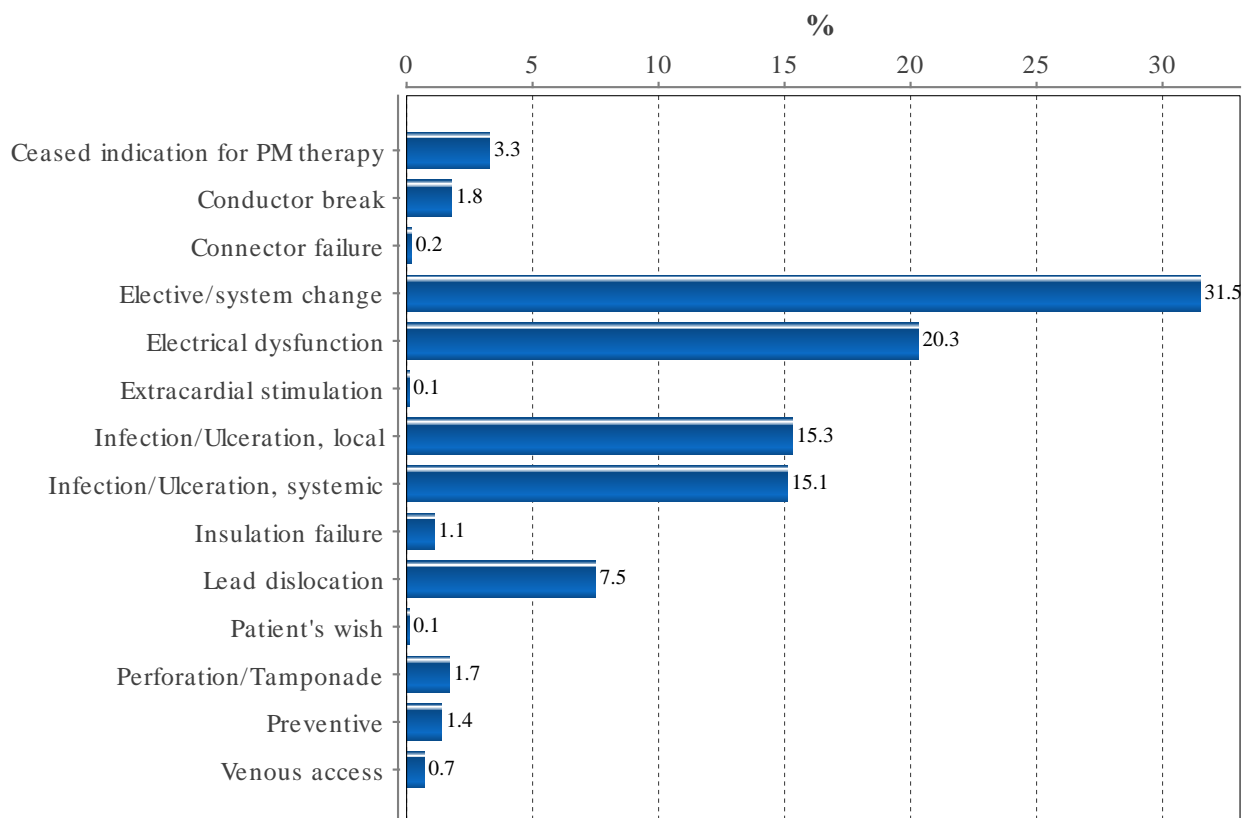
Reason	All hospital (%)	Small (%)	Medium (%)	Large (%)
Electrical dysfunction	25.9	30.8	24.7	26.1
Extracardial stimulation	1.8	7.7	0.0	2.2
Frenicus stimulation	2.3	0.0	2.7	2.2
Infection/Ulceration, local	0.5	0.0	0.0	0.7
Lead dislocation	58.6	61.5	69.9	52.2
Perforation/Tamponade	6.4	0.0	2.7	9.0
Preventive	4.5	0.0	0.0	7.5
Total no 220				



STATISTICS – PACEMAKER – REASON FOR LEAD EXPLANT

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	3.3	9.2	3.2	2.7
Conductor break	1.8	3.1	1.8	1.6
Connector failure	0.2	-	-	0.3
Elective/system change	31.5	35.4	39.2	28.3
Electrical dysfunction	20.3	23.1	22.3	19.3
Extracardial stimulation	0.1	-	-	0.1
Infection/Ulceration, local	15.3	3.1	7.9	19.2
Infection/Ulceration, systemic	15.1	9.2	8.6	18.1
Insulation failure	1.1	1.5	0.4	1.4
Lead dislocation	7.5	15.4	11.9	5.1
Patient's wish	0.1	-	0.4	-
Perforation/Tamponade	1.7	-	1.1	2.1
Preventive	1.4	-	2.9	1.0
Venous access	0.7	-	0.4	0.8
Total no 1072				



STATISTICS – PACEMAKER – OPERATORCODE FOR IMPLANTS

Procedures per operator (exclusive CRT)

Hospital	Operator	No	
Akademiska sjukhuset	Arvanitis	78	
	Dimberg	22	
	Janiec	5	
	Jidéus	14	
	Landelius	1	
	Lindblom	12	
	Melki	7	
	Mörtsell	46	
	Myrdahl	2	
	N/A	15	
	Ostrowska	45	
	Schiller	3	
	Teder	85	
	Thorén	8	
	Vali	5	
	Vikholm	12	
	Viklund	1	
	Zemgulis	14	
	Alingsås lasarett	Kennergren	30
		Watsfeldt	12
Westerberg		60	
Arvika sjukhus	Brunmark	2	
	Westbom	19	
Ålands centralsjukhus	Ove Carlström	9	
	Slotte	16	
Blekingesjukhuset	Borg	67	
	Ericsson	25	
	Ghaidan, Haider	41	
	Ringborn, Michael	52	
Centrallasarettet Växjö	Gunnar Persson	7	
	Johansson P	33	
	Jonasson	31	
	Rosén Helena	17	
	Strandberg	41	
	Strandberg-Jonasson	1	
Centralsjukhuset Karlstad	Annan	1	
	Khalili	58	
	Kjellberg	1	
	Niklas Aldergård	36	
	Saidi	94	
	Schönberg	1	
	Centralsjukhuset Kristianstad	Babiak	111
Carlström		11	
Gadler		13	
Hörnsten		2	
Östenson		139	

Hospital	Operator	No	
	Westholm	5	
Centralsjukhuset Västerås	Dilan	65	
	SkoglundAndersson	50	
	Wiberg	78	
Danderyds sjukhus	2	120	
	3	107	
	4	122	
	6	134	
Drottning Silvias Bus	Berggren	3	
	Hallhagen	6	
	Nilsson B	4	
	Oskar Väårt	6	
	Synergren	3	
Falu lasarett	Monheim	18	
	Berglund	95	
	Forsgren	81	
	Guggi	83	
	MFO	1	
	Hudiksvalls sjukhus	Roussinne	70
	Thomas Andrews	2	
Karolinska Universitetssjukhus	Annan	2	
	Gadler	115	
	Hörnsten	97	
	Reistam	103	
	Reistam/Hörnsten	2	
	Westholm	98	
	Kungälv's sjukhus	Annan	7
		Schultz	68
Länssjukhuset Gävle	Falck	5	
	Jakobsson Stefan	18	
	Johansson Staffan	46	
	Kastberg	88	
	Magnusson Bo	1	
	Magnusson Peter	72	
	Mati Jalakas	76	
	Länssjukhuset Halmstad	Johan Engdahl	23
		Martin Löfgren	61
		Rikard Berggren	41
Länssjukhuset Kalmar	Anja Fagerström	3	
	Carlström	4	
	David Olsson	36	
	Hendrik Schreyer	22	
	Michael Lindstaedt	24	
Länssjukhuset Ryhov	Annan	28	
	Asking	27	

STATISTICS – PACEMAKER – OPERATORCODE FOR IMPLANTS

Hospital	Operator	No
	Jakobsson S	59
	Lagerberg	130
Linköpings universitetssjukhus	Pinna C	3
	Säfström K	97
	Sonesson L	67
	Svenson A	53
	Szymanowski A	84
Mälarsjukhuset	Andreas Pikwer	35
	Axel Nyberg	54
	Gabriele Backers	17
	Georgios Matthaïou	6
	Jan Haapaniemi	34
	Krister Blomberg	3
	Peter Spetz	32
	Sijal Namdar	57
	Ulla Lindblad	24
Norrlands Universitetssjukhus	Andersson	7
	Forsgren	15
	Höglund	12
	Jensen	23
	Kesek	45
	Kesek/Rönn	2
	Landström	49
	Rönn	15
Oskarshamns sjukhus	Verstraaten	37
Örnköldsviks sjukhus	Ehlin	65
Östersunds sjukhus	Björklund	10
	Ekström	3
	Friberg	51
	Hansson	83
	Magnusson Daniel	1
Sahlgrenska universitetssjukhuset	Annan	127
	Gäbel	7
	Jamaly	96
	Javid	87
	Kennergren	13
	Konstantinos Liakatsidas	76
	Piotr Szamlewski	131
	Schultz	7
Sahlgrenska universitetssjukhuset / Östra	Jamaly	1
	Javid	2
	Johansson B	36
	Schultz	2

Hospital	Operator	No
Skaraborgs sjukhus Skövde	Anna Widunder	23
	Annan	7
	Daniel Hellner	3
	Falmer	11
	Lorentzen	78
	Paulsson	39
	Winterfeldt	71
Skånes universitetssjukhus, Lund	Annan	15
	Erik Ljungström	3
	Fredrik Slotte	9
	Ingrid Litterfeldt	49
	Jesper van der Pals	35
	Johan Brandt	344
	LingWei Wang	62
	Maiwand Farouq	59
	Pyotr Platonov	16
	Rasmus Borgquist	14
	Rorsman-Söderström	15
	Steen Jensen	17
	Tina Tahna	12
Skånes universitetssjukhus, Malmö	Annan	29
	Ingrid Litterfeldt	27
	Johan Brandt	48
	Lingwei Wang	30
	Maiwand Farouq	47
	Rasmus Borgquist	5
	Torbjörn Persson	171
Skellefteå lasarett	Annan	1
	Boström	16
	Bygdén	23
	Lindqvist	35
Sollefteå sjukhus	Åström	21
	Kramarz	5
Södersjukhuset	Jonsson J-E	74
	Kjellman B	92
	Olson J	77
	Rydlund K	98
Södra Älvsborgs sjukhus	Almqvist	40
	Annan	1
	Haupt	2
	Litzén	1
	Lodin	39

STATISTICS – PACEMAKER – OPERATORCODE FOR IMPLANTS

Hospital	Operator	No
	Riemer	50
	Sandgren	1
	Widfeldt	66
St Görans sjukhus	1	118
	1+2	1
	2	102
	3	105
Sunderby sjukhus	Baas	59
	Haupt	33
	Johansson A	87
	Johansson P	38
	Lundblad	19
	Peter Ragnsson	15
	Wennberg	30
Sundsvalls sjukhus	Annan	30
	Ciubine	59
	Khadhim	53
	Sundelin	34
Torsby sjukhus	Bentjerodt	26
	Venizelos	4
Trollhättan, NÄL	Alice David	54
	Csaba Herczku	27
	Dinu Dusceac	44
	Jabbar	45
	Petersen P	12
	Söderbergh	41
	Wetterling	59
	Wiberg Dennis	12
Universitetssjukhuset Örebro	Anna Björkenheim	77
	Friberg	1
	Georgios Matthaïou	5
	Lindell	86
	Tommy Andersson	66
Varbergs sjukhus	Emma Sandgren	47
	Rorsman	77
Västerviks sjukhus	Bengt Arvidsson	20
	Emil Tomov	9
	Joachim Starck	3
Visby lasarett	Jacobsson L	26
	Litorell	11
Vrinnevisjukhuset	Engström	11
	Lindberget	17
	Schiöler	6
	Svensson	22
	Szamlewski	33

STATISTICS – ICD

STATISTICS – ICD – IMPLANTING HOSPITALS

First implants per hospital (inclusive CRT)

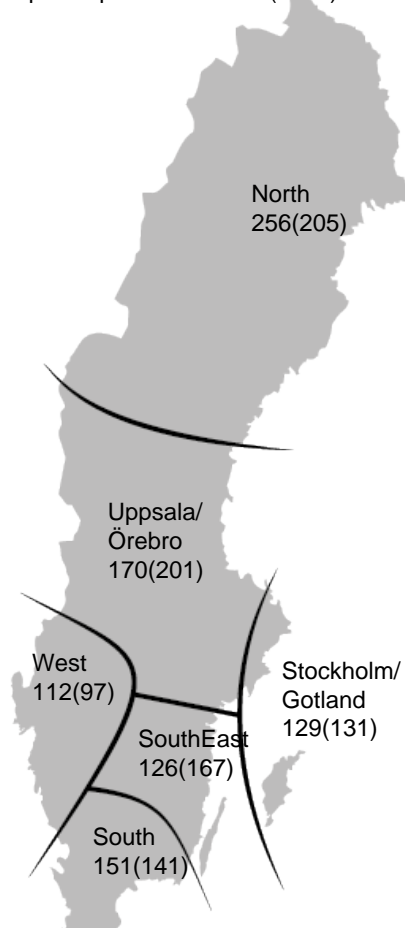
Region	Hospital	2016	2015
Northern Sweden	Norrlands Universitetssjukhus	63	50
	Skellefteå lasarett	4	2
	Sunderby sjukhus	66	71
	Sundsvalls sjukhus	54	27
	Örnsköldsviks sjukhus	12	2
	Östersunds sjukhus	23	25
Southern Sweden	Blekingesjukhuset	35	38
	Centrallasarettet Växjö	27	19
	Skånes universitetssjukhus, Lund	204	187
	Varbergs sjukhus	33	45
South-East Sweden	Linköpings Universitetssjukhus	78	86
	Länssjukhuset Kalmar	42	43
	Länssjukhuset Ryhov	19	45
Stockholm/Gotland	Danderyds sjukhus	64	70
	Karolinska Universitetssjukhuset	168	182
	St Görans sjukhus	47	39
	Södersjukhuset	63	48
	Visby lasarett	2	0
Uppsala/Örebro	Akademiska sjukhuset	71	78
	Centralsjukhuset Karlstad	39	38
	Centralsjukhuset Västerås	42	43
	Falu lasarett	59	75
	Hudiksvalls sjukhus	4	6
	Länssjukhuset Gävle	55	49
	Mälarsjukhuset	3	29
	Universitetssjukhuset Örebro	44	59
Western Sweden	Drottning Silvias Bus	1	1
	Sahlgrenska Universitetssjukhuset	67	60
	Sahlgrenska Universitetssjukhuset /Östra	1	0
	Skaraborgs sjukhus Skövde	25	40
	Södra Älvsborgs sjukhus	43	24
	Trollhättan, NÄL	49	27

STATISTICS – ICD – IMPLANTS PER REGION

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	2327063	301	129	2430
Uppsala/Örebro	2060491	350	170	2398
South-East Sweden	1047141	132	126	1052
Southern Sweden	1811802	273	151	2000
Western Sweden	1857960	209	112	1461
Northern Sweden	890696	228	256	1188
Total	9995153	1493	149	10529

Implants per million 2016(2015)

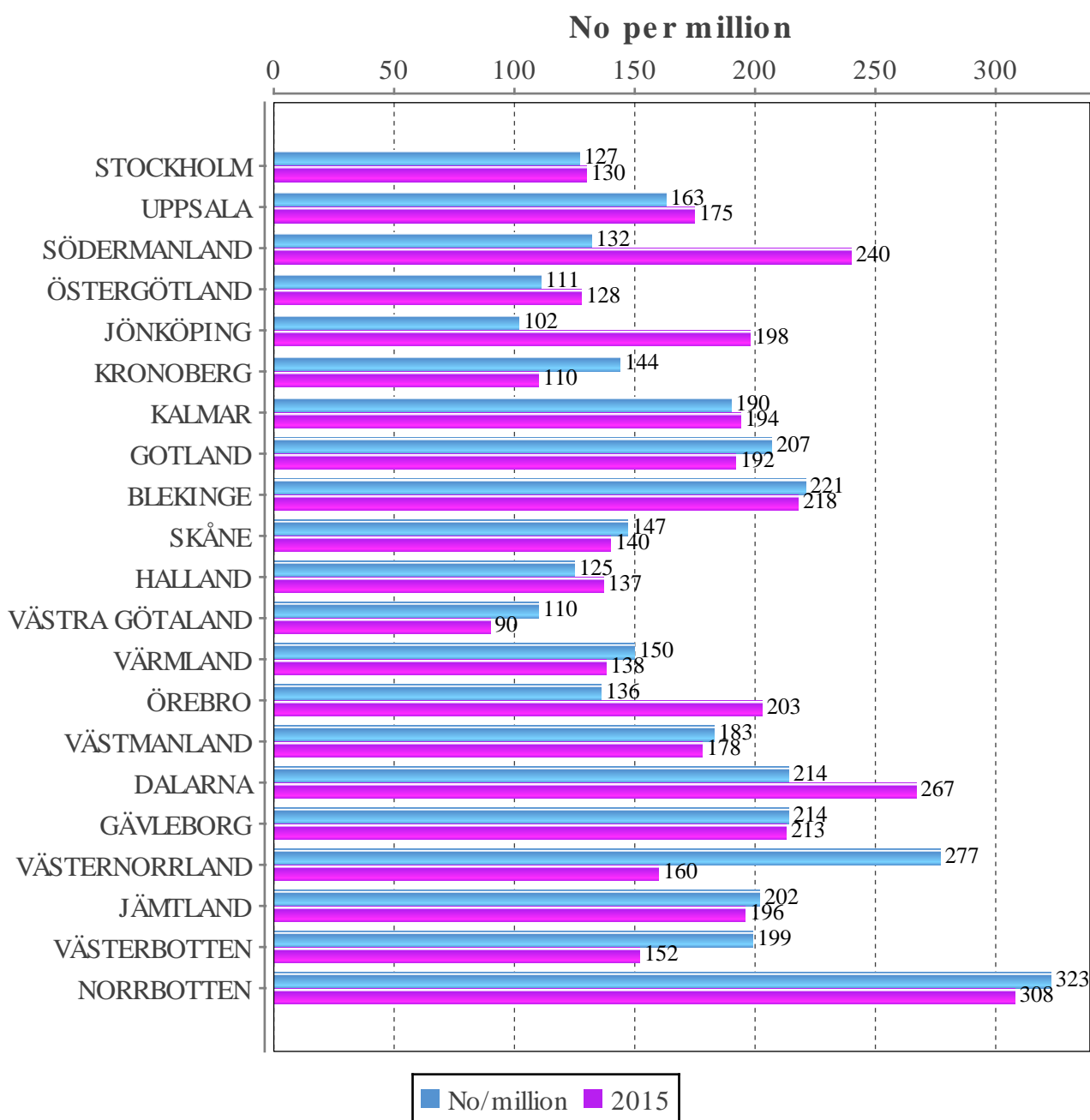


STATISTICS – ICD – IMPLANTS PER COUNTY

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

County	Population	No of first	No/million	Active patients
STOCKHOLM	2269060	289	127	2342
UPPSALA	361373	59	163	442
SÖDERMANLAND	288097	38	132	316
ÖSTERGÖTLAND	452105	50	111	384
JÖNKÖPING	352735	36	102	362
KRONOBERG	194628	28	144	228
KALMAR	242301	46	190	306
GOTLAND	58003	12	207	88
BLEKINGE	158453	35	221	211
SKÅNE	1324565	195	147	1408
HALLAND	320333	40	125	335
VÄSTRA GÖTALAND	1671783	184	110	1278
VÄRMLAND	279334	42	150	253
ÖREBRO	294941	40	136	317
VÄSTMANLAND	267629	49	183	288
DALARNA	284531	61	214	364
GÄVLEBORG	284586	61	214	418
VÄSTERNORRLAND	245572	68	277	299
JÄMTLAND	128673	26	202	152
VÄSTERBOTTEN	265881	53	199	328
NORRBOTTEN	250570	81	323	409
Total	9995153	1493	149	10528

STATISTICS – ICD – IMPLANTS PER COUNTY

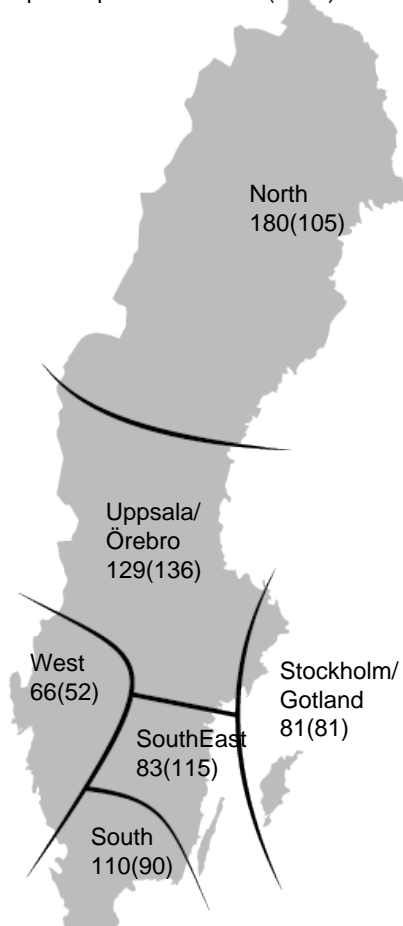


STATISTICS – ICD – PRIMARY PREVENTION PER REGION

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	2327063	189	81	1422
Uppsala/Örebro	2060491	266	129	1280
South-East Sweden	1047141	87	83	625
Southern Sweden	1811802	199	110	1118
Western Sweden	1857960	122	66	662
Northern Sweden	890696	160	180	590
Total	9995153	1023	102	5697

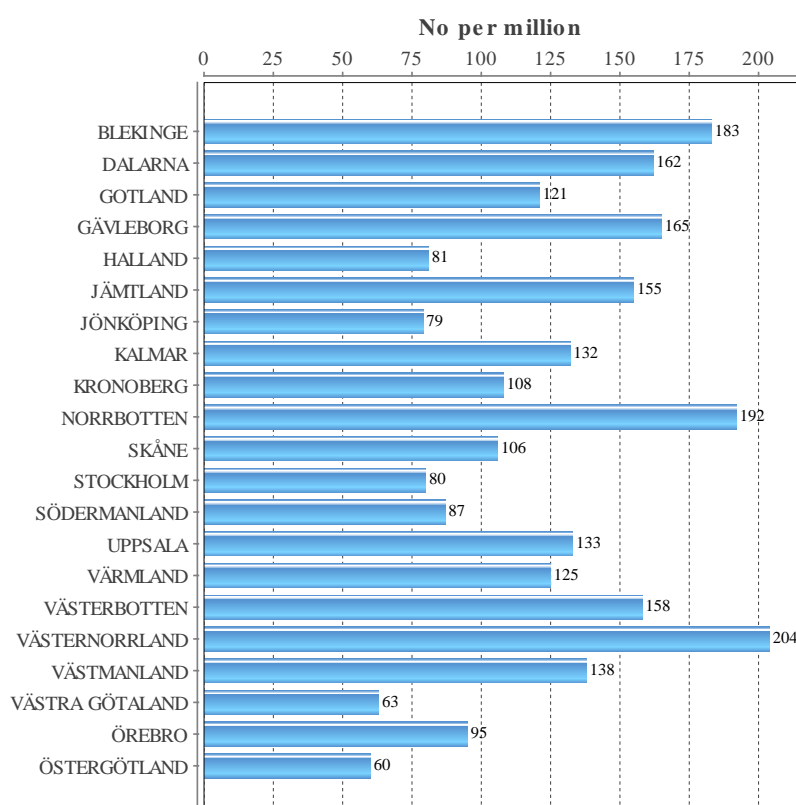
Implants per million 2016(2015)



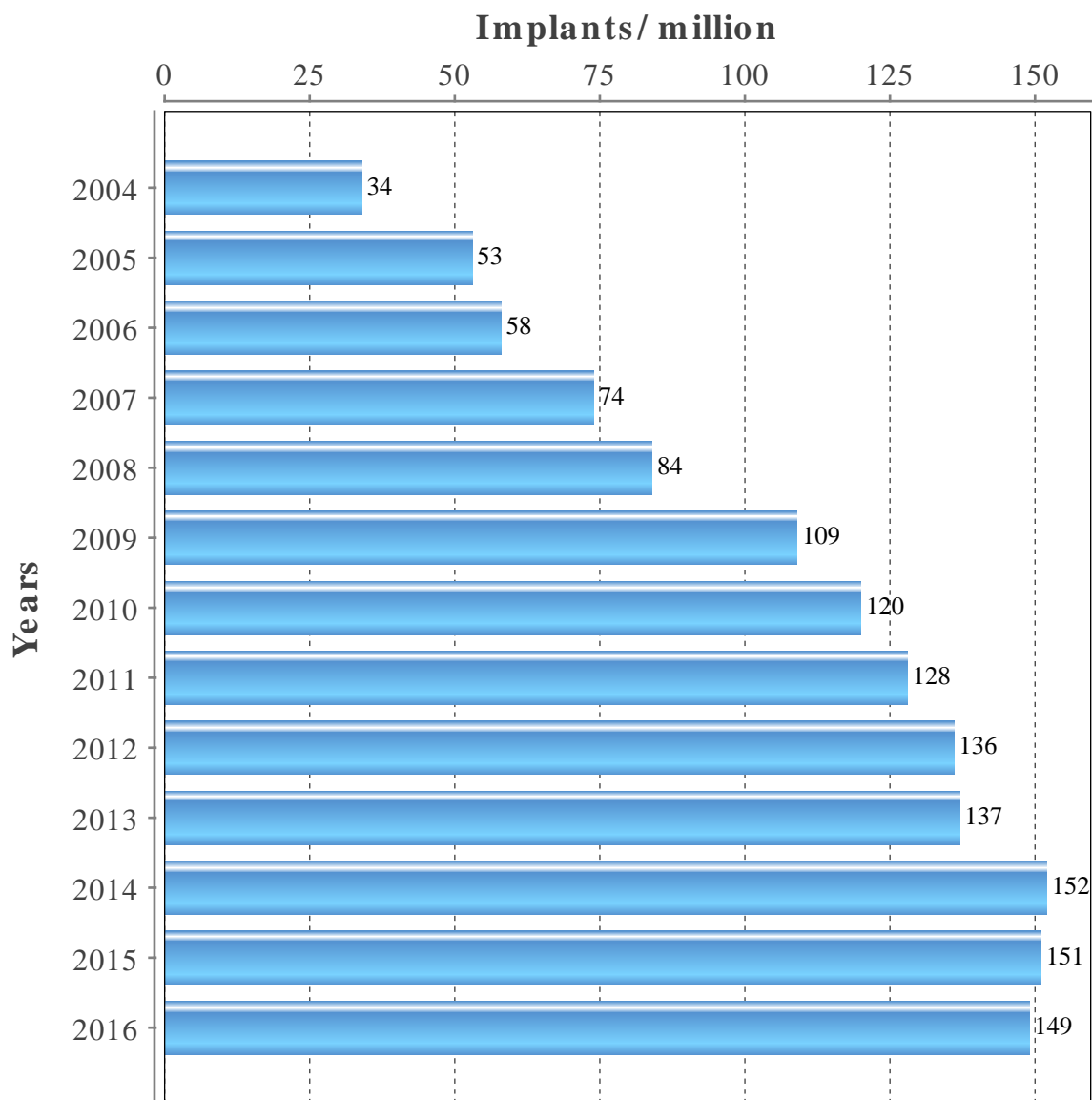
STATISTICS – ICD – PRIMARY PREVENTION PER COUNTY

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

County	Population	No of first	No/million
BLEKINGE	158453	29	183
DALARNA	284531	46	162
GOTLAND	58003	7	121
GÄVLEBORG	284586	47	165
HALLAND	320333	26	81
JÄMTLAND	128673	20	155
JÖNKÖPING	352735	28	79
KALMAR	242301	32	132
KRONOBERG	194628	21	108
NORRBOTTEN	250570	48	192
SKÅNE	1324565	140	106
STOCKHOLM	2269060	182	80
SÖDERMANLAND	288097	25	87
UPPSALA	361373	48	133
VÄRMLAND	279334	35	125
VÄSTERBOTTEN	265881	42	158
VÄSTERNORRLAND	245572	50	204
VÄSTMANLAND	267629	37	138
VÄSTRA GÖTALAND	1671783	105	63
ÖREBRO	294941	28	95
ÖSTERGÖTLAND	452105	27	60
Total	9995153	1023	102



STATISTICS – ICD – HISTORICAL IMPLANTATION RATES

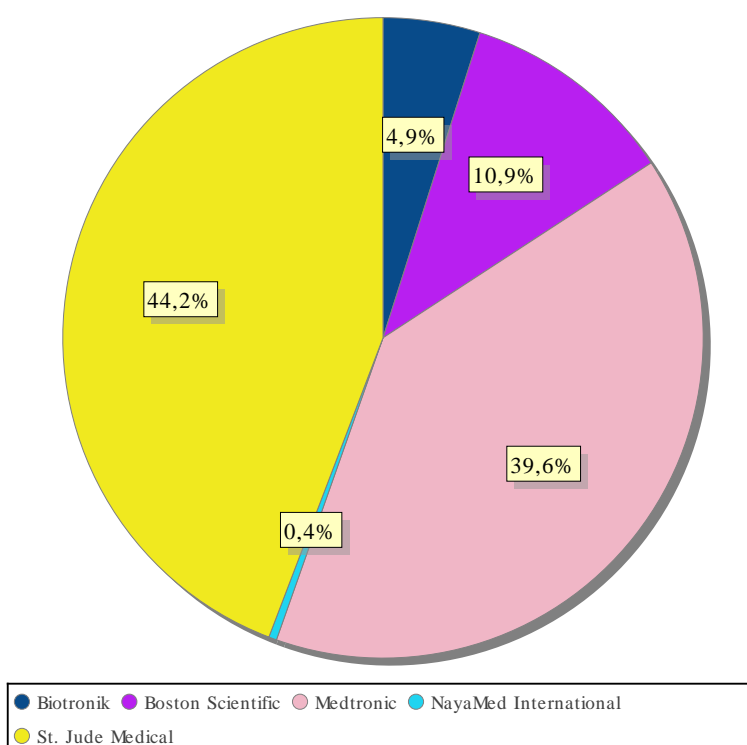


STATISTICS – ICD – ICDS PER MANUFACTURER

Market share per manufacturer in Sweden

Manufacturer	2013 %	2014 %	2015 %	2016 %
Biotronik	4.8	3.7	3.1	4.9
Boston Scientific	10.4	7.9	7.1	10.9
Medtronic	36.8	43.2	46.8	39.6
St. Jude Medical	47.8	44.6	41.8	44.2
Cameron Health	0.1	0.1	-	-
NayaMed International	-	0.5	1.3	0.4
Sorin/LivaNova	-	-	-	-

Boston Scientific includes Cameron Health from 2015

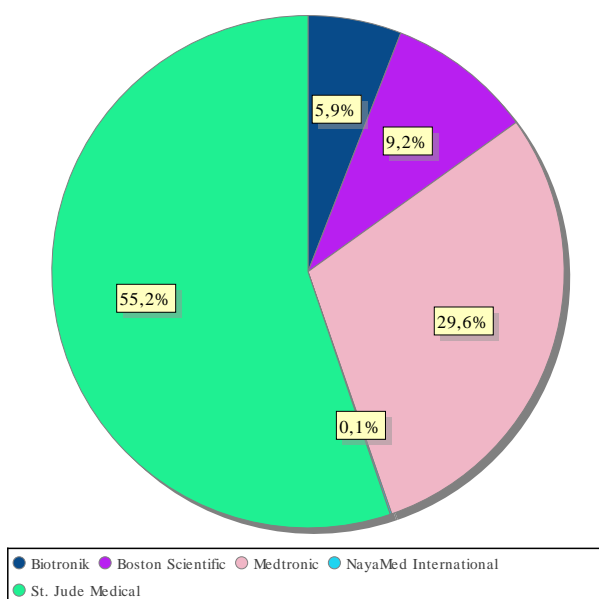


STATISTICS – ICD – LEADS PER MANUFACTURER

Market share per manufacturer in Sweden

Manufacturer	2013 %	2014 %	2015 %	2016 %
Biotronik	11.5	10.3	6.2	5.9
Boston Scientific	7.7	11.0	6.9	9.2
Medtronic	24.9	23.7	25.3	29.6
St. Jude Medical	55.7	54.3	60.7	55.2
NayaMed International	-	0.6	0.8	0.1
CameronHealth	-	0.1	-	-

Boston Scientific includes Cameron Health from 2015

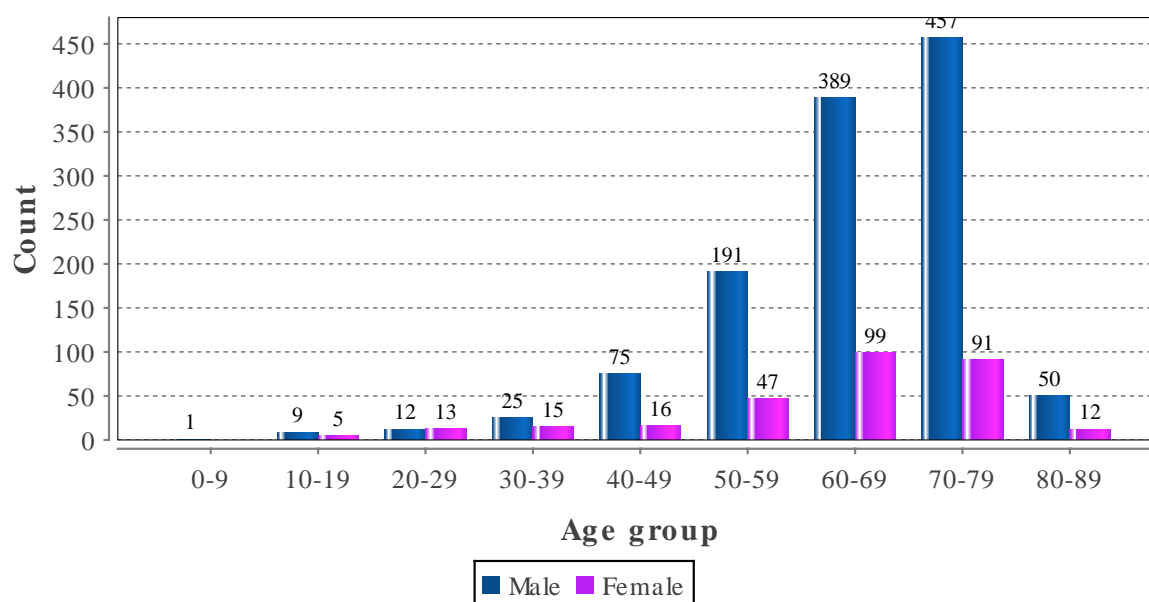


STATISTICS – ICD – AGE DISTRIBUTION MALES/FEMALES

Age and gender distribution for new implants, total numbers

Age (years)	Total no	%	Male	Female
0-9	1	0.1	1	0
10-19	14	0.9	9	5
20-29	25	1.7	12	13
30-39	40	2.7	25	15
40-49	91	6.0	75	16
50-59	238	15.8	191	47
60-69	488	32.4	389	99
70-79	548	36.4	457	91
80-89	62	4.1	50	12
Average age	64	-	65	62

Total number of implants: 1507

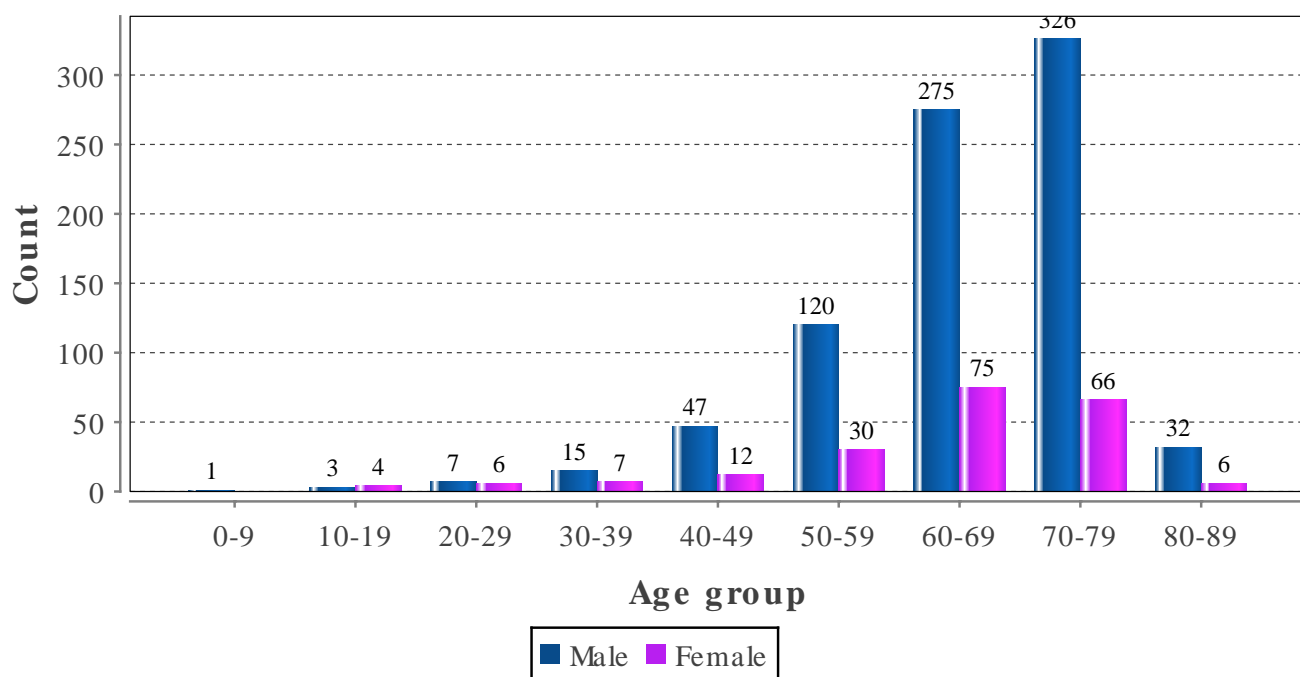


STATISTICS – ICD – AGE DISTRIBUTION PRIMARY PREVENTION

Primary prevention divided by gender and age.

Age (years)	Total no	%	Male	Female
0-9	1	0.1	1	0
10-19	7	0.7	3	4
20-29	13	1.3	7	6
30-39	22	2.1	15	7
40-49	59	5.7	47	12
50-59	150	14.5	120	30
60-69	350	33.9	275	75
70-79	392	38.0	326	66
80-89	38	3.7	32	6
Average age	65	-	65	63

Total number of implants: 1032

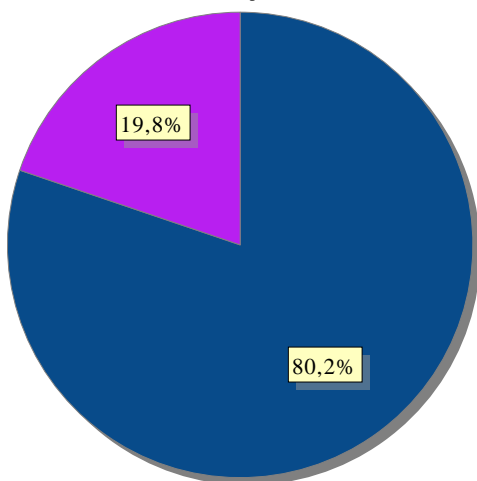


STATISTICS – ICD – TYPE OF IMPLANTS

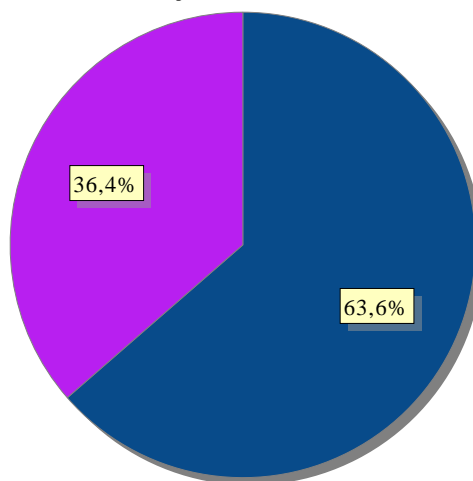
Ratio of new implants versus generator changes

	Total		Male		Female	
	no	%	no	%	no	%
First implant	1507	63.6	1209	80.2	298	19.8
Replacement	863	36.4	675	78.2	188	21.8
Total	2370	100.0	1884	79.5	486	20.5

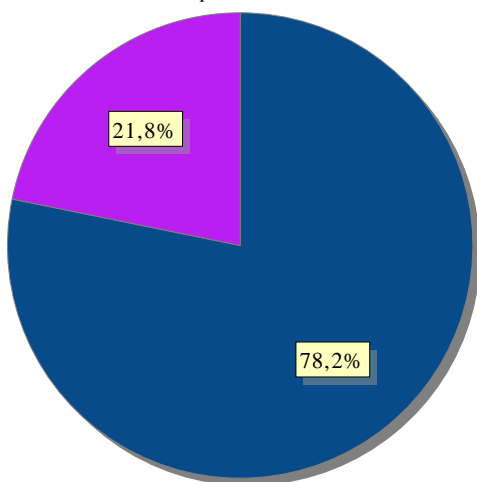
First implant



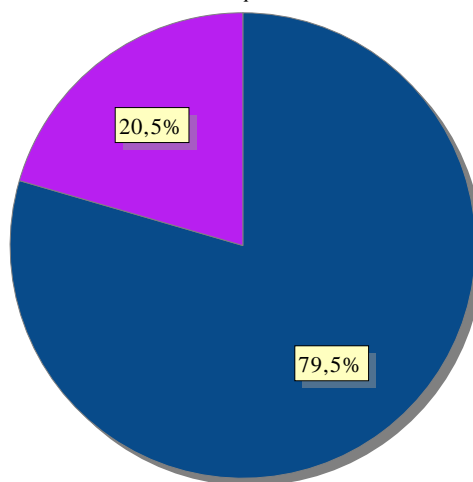
Replacement ratio



Replacement



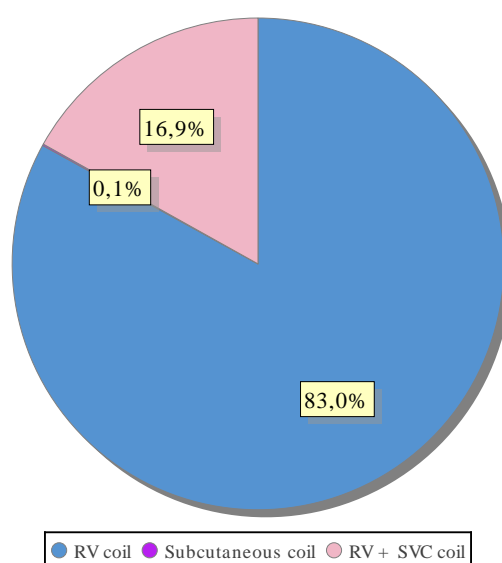
All implant



STATISTICS – ICD – LEAD TYPES

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

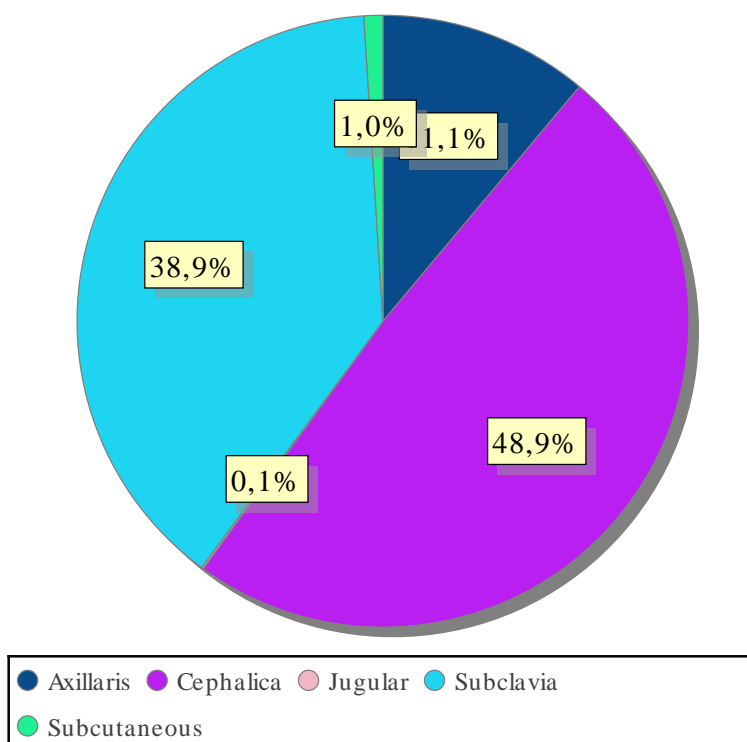
	2016		2015	
	no	%	no	%
RV coil	1369	83.0	1239	74.3
Subcutaneous coil	2	0.1	3	0.2
RV + SVC coil	279	16.9	426	25.5
Active fixation	1619	98.1	1609	96.5
Passive fixation	31	1.9	59	3.5
Total number of leads - 2016: 1650, 2015: 1668				



STATISTICS – ICD – LEAD ACCESS

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

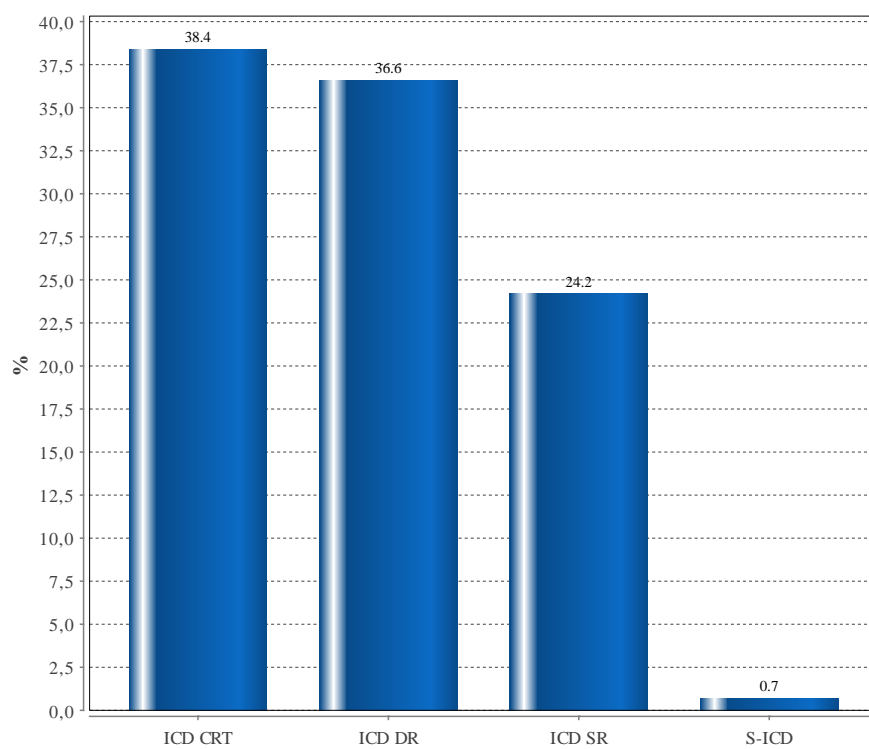
Lead access	No	%
Axillaris	185	11.1
Cephalica	814	48.9
Jugular	1	0.1
Subclavia	648	38.9
Subcutaneous	16	1.0



STATISTICS – ICD – SUB TYPE

ICD subtype for new implants

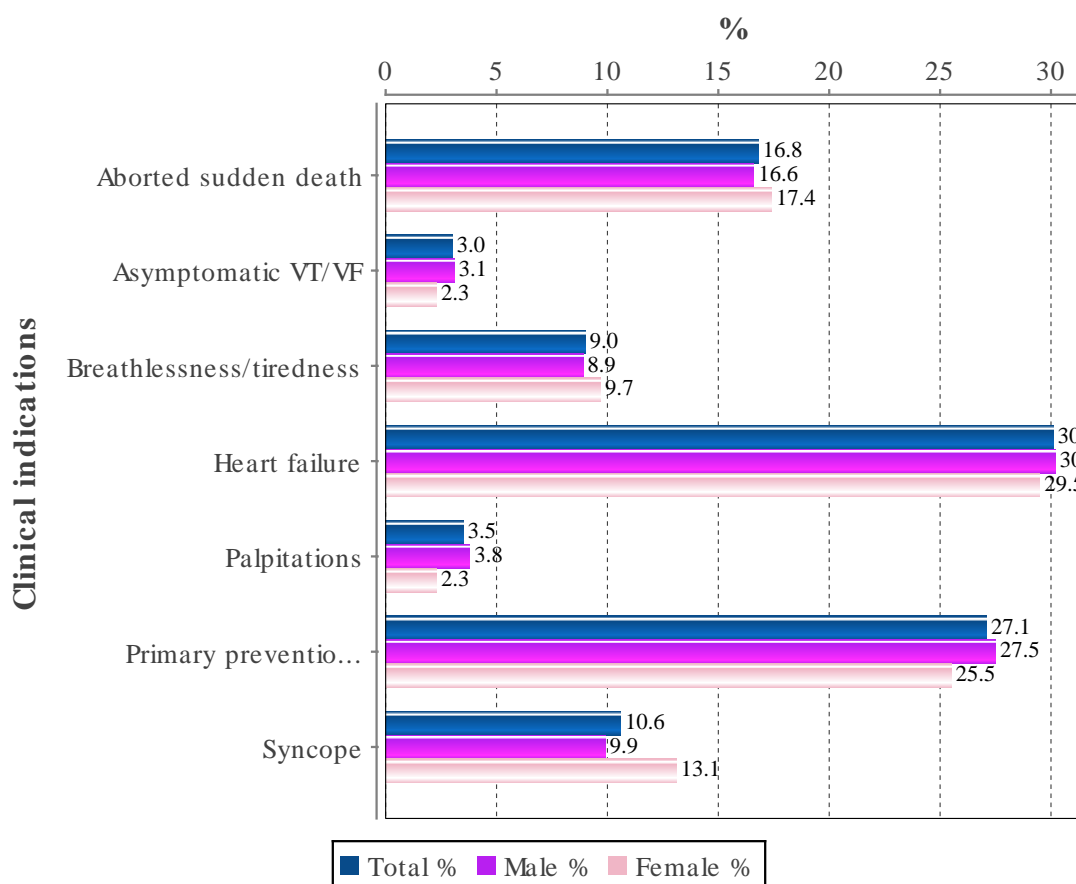
Mode	%	No
ICD CRT	38.4	579
ICD DR	36.6	552
ICD SR	24.2	365
S-ICD	0.7	11



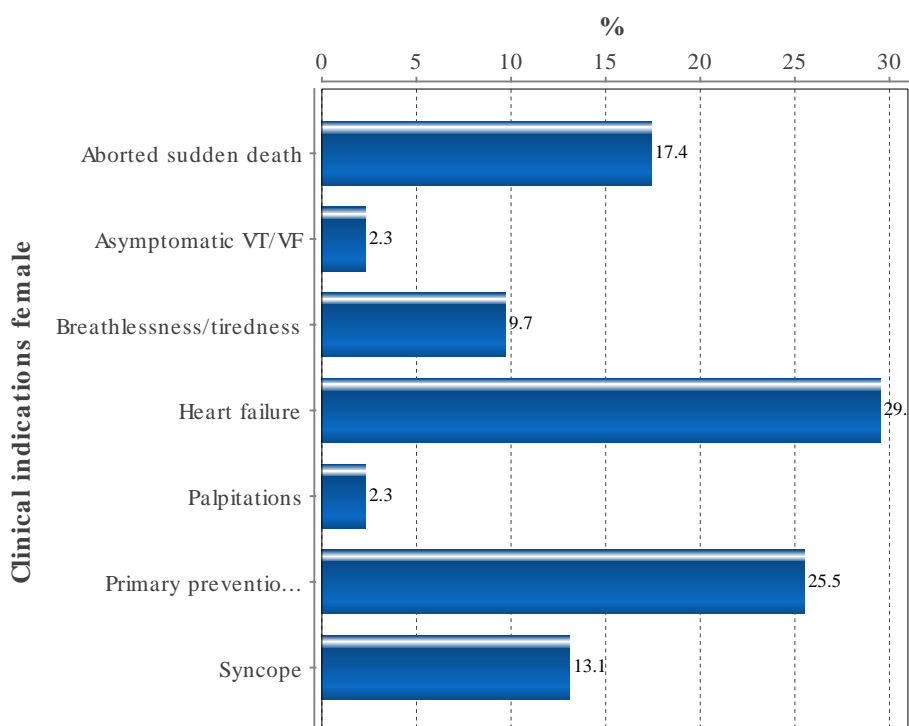
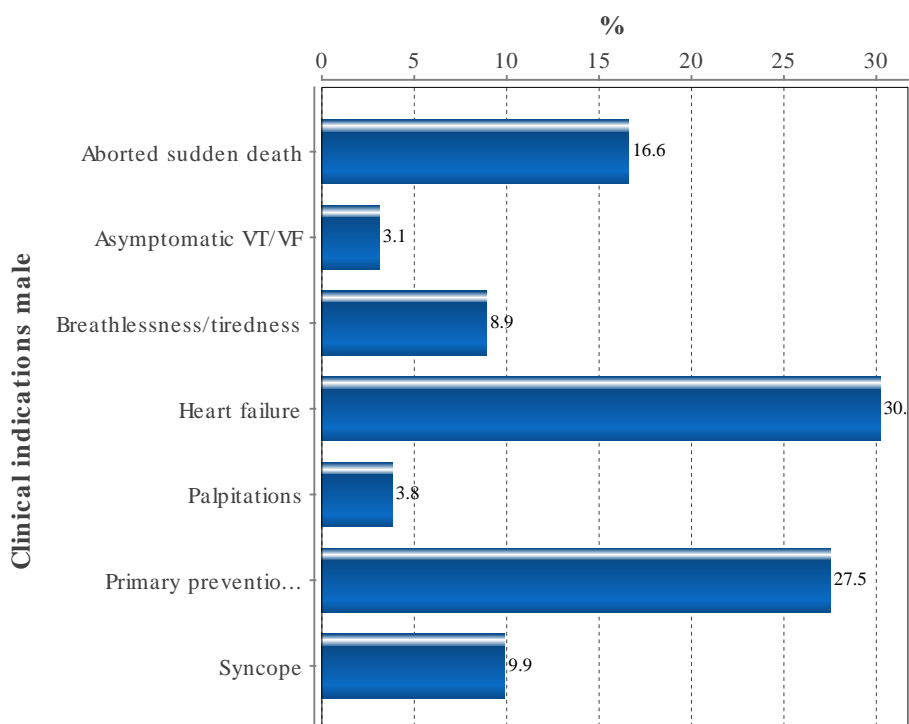
STATISTICS – ICD – CLINICAL INDICATIONS FIRST IMPLANT

Main symptom for implanting ICDs

Indication	Total %	Male %	Female %
Aborted sudden death	16.8	16.6	17.4
Asymptomatic VT/VF	3.0	3.1	2.3
Breathlessness/tiredness	9.0	8.9	9.7
Heart failure	30.1	30.2	29.5
Palpitations	3.5	3.8	2.3
Primary prevention, asymptomatic	27.1	27.5	25.5
Syncope	10.6	9.9	13.1



STATISTICS – ICD – CLINICAL INDICATIONS FIRST IMPLANT



STATISTICS – ICD – CLINICAL INDICATIONS

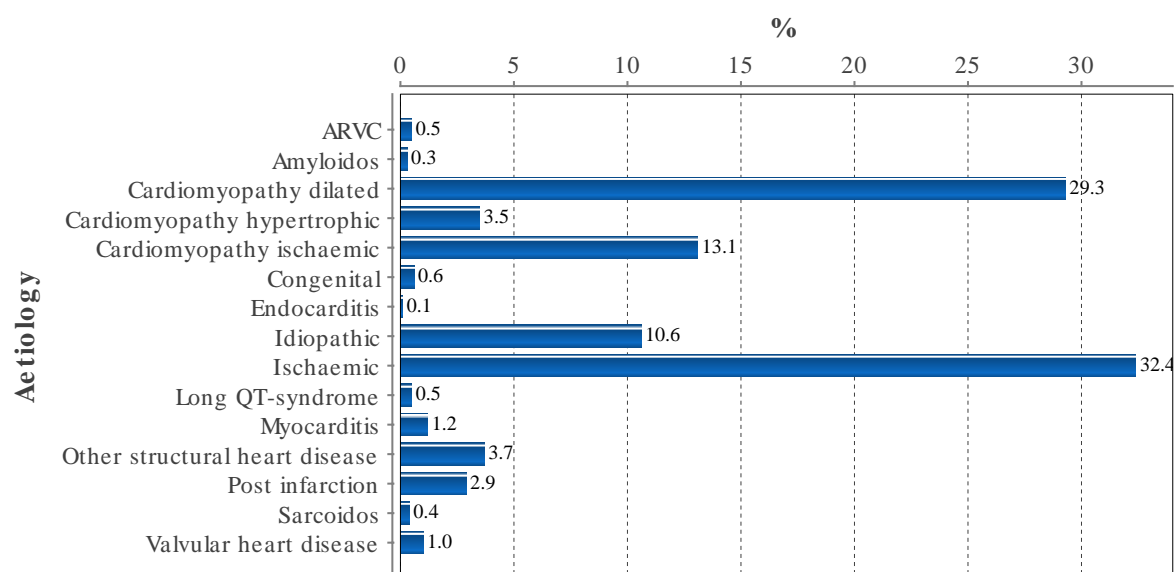
Main symptom for implanting ICDs, historical distribution

Indication	2015 %	2016 %
Aborted sudden death	19.2	16.8
Asymptomatic VT/VF	3.7	3.0
Primary prevention	65.4	69.7
Syncope	11.7	10.6

STATISTICS – ICD - AETIOLOGY FIRST IMPLANT

Main aetiology for implanting pacemakers

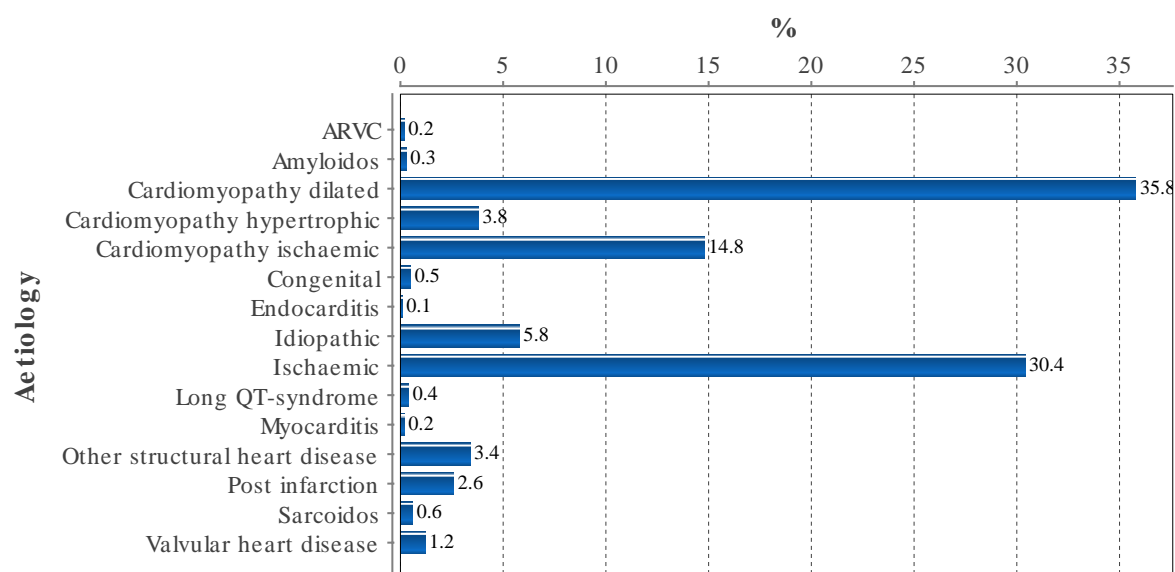
Aetiology	Total %	Male %	Female %
ARVC	0.5	0.3	1.0
Amyloidosis	0.3	0.2	1.0
Cardiomyopathy dilated	29.3	28.0	34.6
Cardiomyopathy hypertrophic	3.5	2.8	6.4
Cardiomyopathy ischaemic	13.1	14.3	8.1
Congenital	0.6	0.5	1.0
Endocarditis	0.1	0.0	0.3
Idiopathic	10.6	9.8	13.4
Ischaemic	32.4	35.3	20.8
Long QT-syndrome	0.5	0.3	1.3
Myocarditis	1.2	1.1	1.7
Other structural heart disease	3.7	3.2	5.7
Post infarction	2.9	2.8	3.0
Sarcoidosis	0.4	0.2	1.0
Valvular heart disease	1.0	1.1	0.7



STATISTICS – ICD - AETIOLOGY PRIMARY PREVENTION

Main aetiology for implanting ICDs due to primary prevention

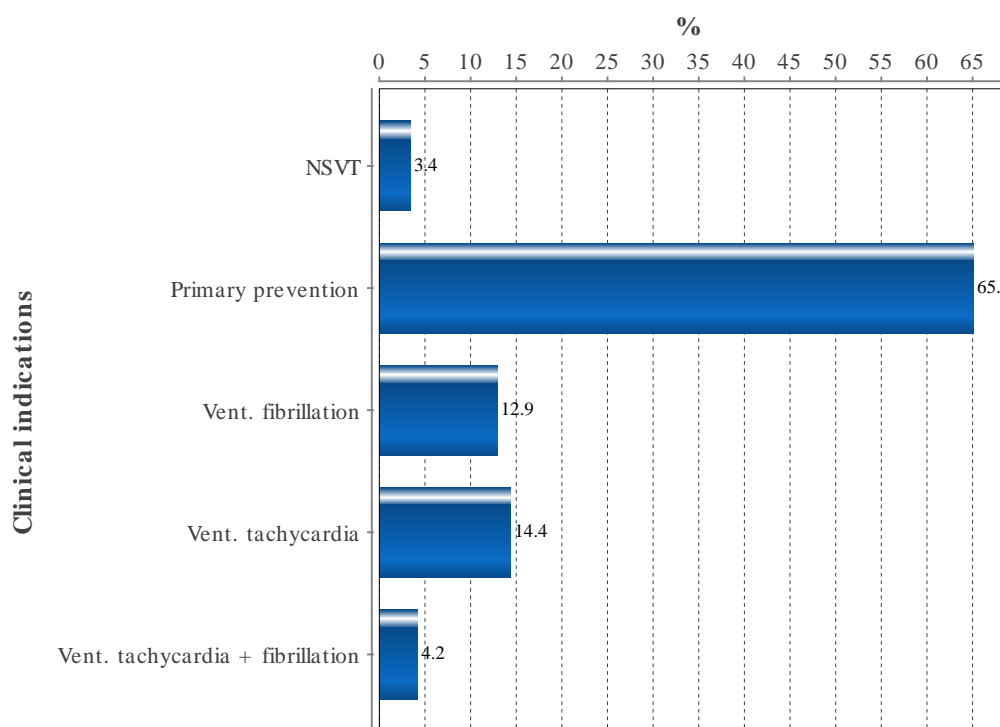
Aetiology	Total %	Male %	Female %
ARVC	0.2	0.2	0.0
Amyloidosis	0.3	0.2	0.5
Cardiomyopathy dilated	35.8	34.0	42.7
Cardiomyopathy hypertrophic	3.8	3.1	6.3
Cardiomyopathy ischaemic	14.8	16.0	10.2
Congenital	0.5	0.4	1.0
Endocarditis	0.1	0.0	0.5
Idiopathic	5.8	5.4	7.3
Ischaemic	30.4	33.1	19.9
Long QT-syndrome	0.4	0.1	1.5
Myocarditis	0.2	0.0	1.0
Other structural heart disease	3.4	3.0	4.9
Post infarction	2.6	2.7	2.4
Sarcoidosis	0.6	0.4	1.5
Valvular heart disease	1.2	1.3	0.5



STATISTICS – ICD – ECG INDICATIONS (TACHY) FIRST IMPLANT

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

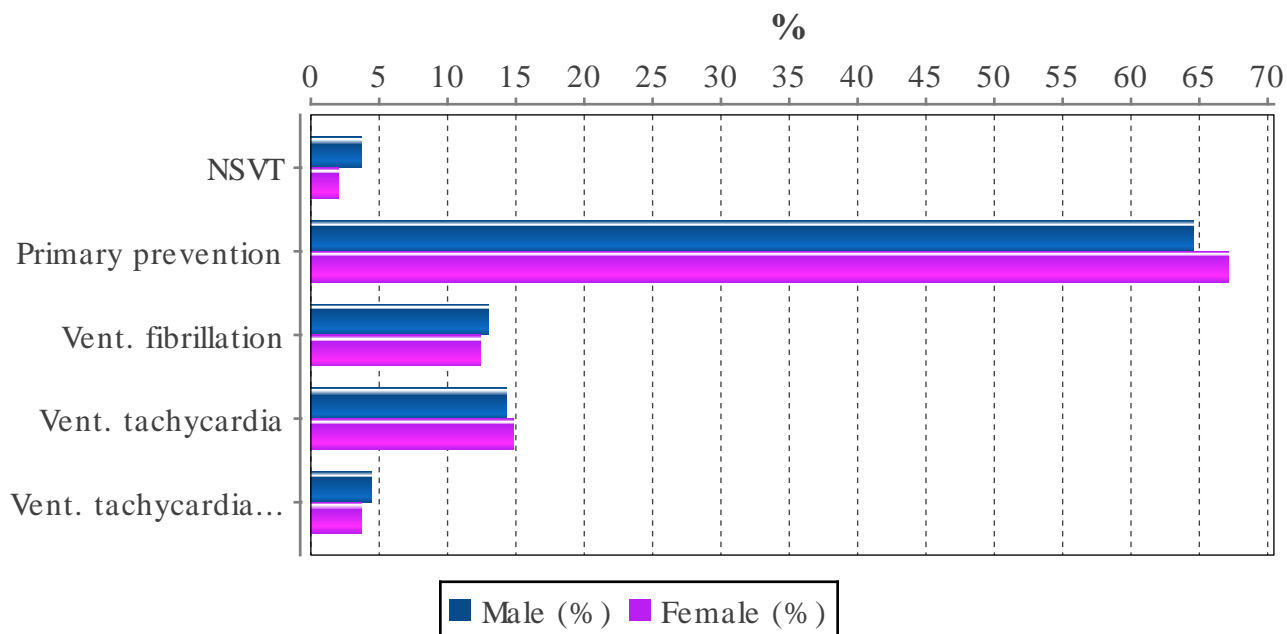
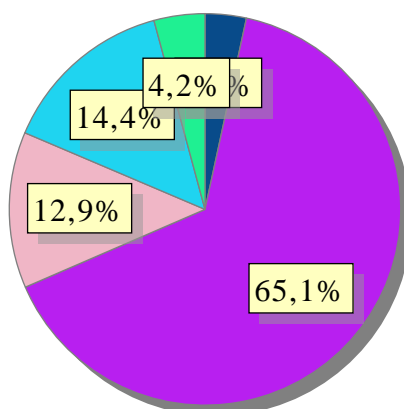
Indication	%
NSVT	3.4
Primary prevention	65.1
Vent. fibrillation	12.9
Vent. tachycardia	14.4
Vent. tachycardia + fibrillation	4.2



STATISTICS – ICD – PREPACING ECG (TACHY)

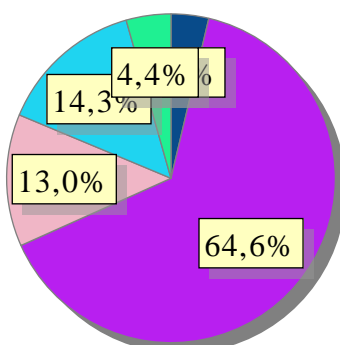
Documented ECG leading to ICD implant. (NSVT = non sustained VT) by gender and patients < 18 years

Indication	No	Total %	Male (%)	Female (%)	It 18 (%)
NSVT	51	3.4	3.7	2.0	20.0
Primary prevention	981	65.1	64.6	67.1	40.0
Vent. fibrillation	194	12.9	13.0	12.4	10.0
Vent. tachycardia	217	14.4	14.3	14.8	10.0
Vent. tachycardia + fibrillation	64	4.2	4.4	3.7	20.0
Total number of implants 1507					



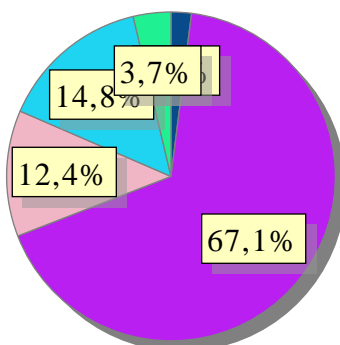
STATISTICS – ICD – PREPACING ECG (TACHY)

Male



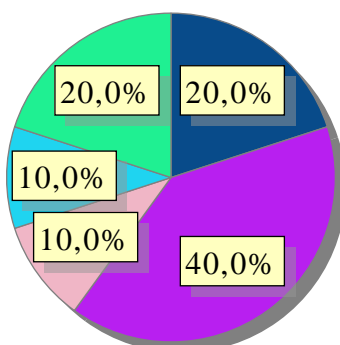
- NSVT ● Primary prevention ● Vent. fibrillation
- Vent. tachycardia ● Vent. tachycardia + fibrillation

Female



- NSVT ● Primary prevention ● Vent. fibrillation
- Vent. tachycardia ● Vent. tachycardia + fibrillation

< 18



- NSVT ● Primary prevention ● Vent. fibrillation
- Vent. tachycardia ● Vent. tachycardia + fibrillation

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

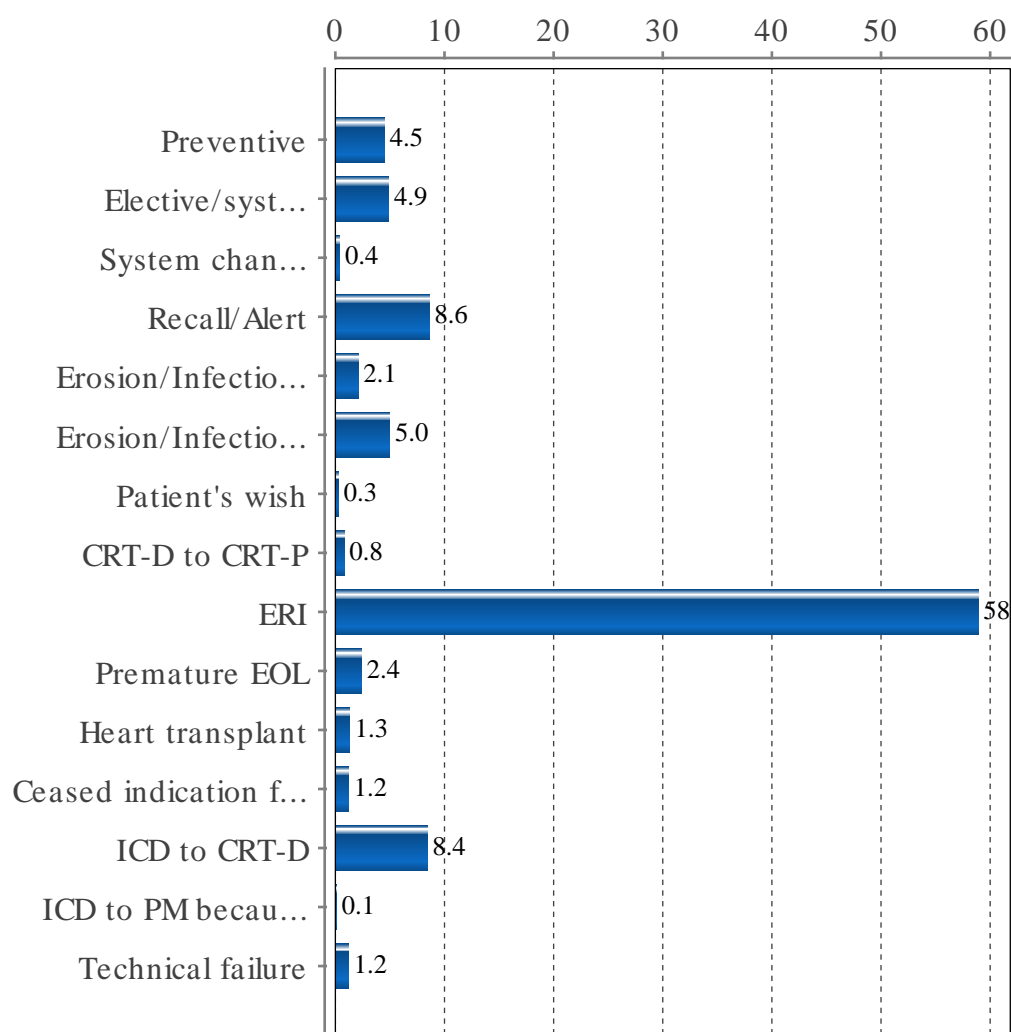
Use of ICD sub type for all indications per hospital (number of new implants / year and hospital))

Hospital	Number	ICD DR %	ICD SR %	ICD CRT %
Akademiska sjukhuset	69	31.9	37.7	30.4
Blekingesjukhuset	35	45.7	8.6	45.7
Centrallasarettet Växjö	27	59.3	14.8	25.9
Centralsjukhuset Karlstad	39	38.5	17.9	43.6
Centralsjukhuset Västerås	42	54.8	11.9	33.3
Danderyds sjukhus	62	41.9	17.7	40.3
Falu lasarett	59	20.3	40.7	39.0
Hudiksvalls sjukhus	4	100.0	0.0	0.0
Karolinska Universitetssjukhuset	168	57.7	14.9	27.4
Linköpings Universitetssjukhus	78	39.7	9.0	51.3
Länssjukhuset Gävle	55	41.8	10.9	47.3
Länssjukhuset Kalmar	41	22.0	46.3	31.7
Länssjukhuset Ryhov	19	78.9	15.8	5.3
Mälarsjukhuset	3	0.0	0.0	100.0
Norrlands Universitetssjukhus	61	13.1	34.4	52.5
Sahlgrenska Universitetssjukhuset	66	39.4	34.8	25.8
Sahlgrenska Universitetssjukhuset /Östra	1	0.0	100.0	0.0
Skaraborgs sjukhus Skövde	25	64.0	12.0	24.0
Skellefteå lasarett	4	75.0	25.0	0.0
Skånes universitetssjukhus, Lund	202	38.1	22.3	39.6
St Görans sjukhus	47	34.0	38.3	27.7
Sunderby sjukhus	66	48.5	27.3	24.2
Sundsvalls sjukhus	54	40.7	13.0	46.3
Södersjukhuset	63	30.2	49.2	20.6
Södra Älvsborgs sjukhus	43	41.9	20.9	37.2
Trollhättan, NÅL	49	30.6	16.3	53.1
Universitetssjukhuset Örebro	44	18.2	50.0	31.8
Varbergs sjukhus	33	45.5	21.2	33.3
Visby lasarett	2	50.0	50.0	0.0
Örnsköldsviks sjukhus	12	83.3	8.3	8.3
Östersunds sjukhus	23	26.1	39.1	34.8

STATISTICS – ICD – REASON FOR GENERATOR EXPLANT

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

Reason	All hospitals %	(large) %	(medium) %	(small) %
Preventive	4.5	2.2	7.5	10.8
Elective/system change	4.9	5.5	4.2	2.7
System change hemodynamic	0.4	0.4	0.6	0.0
Recall/Alert	8.6	8.4	9.9	0.0
Erosion/Infection, local	2.1	3.3	0.3	0.0
Erosion/Infection, systemic	5.0	7.1	1.8	2.7
Patient's wish	0.3	0.2	0.3	2.7
CRT-D to CRT-P	0.8	1.1	0.3	0.0
ERI	58.9	56.3	61.3	75.7
Premature EOL	2.4	2.6	2.4	0.0
Heart transplant	1.3	2.2	0.0	0.0
Ceased indication for ICD therapy	1.2	1.5	0.9	0.0
ICD to CRT-D	8.4	8.6	8.4	5.4
ICD to PM because of ceased indication	0.1	0.2	0.0	0.0
Technical failure	1.2	0.7	2.1	0.0



STATISTICS – ICD – REASON FOR GENERATOR EXPLANT

Historical explants indications

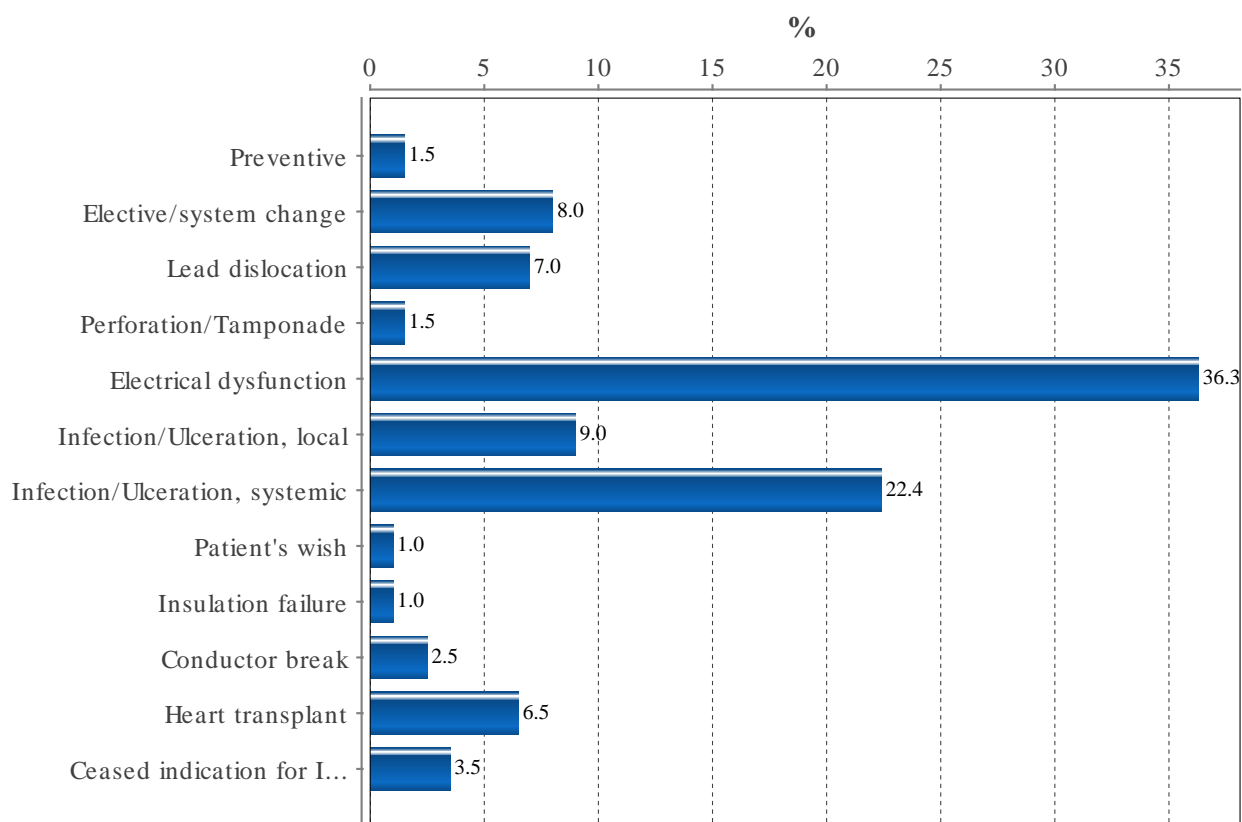
Reason	2014 %	2015 %	2016 %
Preventive	5.5	3.6	4.5
Elective/system change	3.9	5.1	4.9
System change hemodynamic	0.8	0.9	0.4
Recall/Alert	0.3	0.4	8.6
Erosion/Infection, local	5.3	7.9	2.1
Erosion/Infection, systemic	4.1	3.6	5.0
Patient's wish	0.9	0.8	0.3
CRT-D to CRT-P	0.2	0.1	0.8
ERI	63.6	62.0	58.9
Premature EOL	2.5	3.0	2.4
Heart transplant	0.9	0.4	1.3
Ceased indication for ICD therapy	0.6	1.5	1.2
ICD to CRT-D	8.0	9.5	8.4
ICD to PM because of ceased indication	1.1	0.5	0.1
Technical failure	2.2	0.8	1.2

STATISTICS – ICD – REASON FOR LEAD EXPLANT

Historical lead explants indications

Reason	2014 %	2015 %	2016 %
Preventive	3.0	1.3	1.5
Elective/system change	7.6	8.1	8.0
Lead dislocation	8.1	5.5	7.0
Extracardial stimulation	1.0	0.9	0.0
Perforation/Tamponade	2.5	1.3	1.5
Electrical dysfunction	33.0	28.5	36.3
Infection/Ulceration, local	19.3	24.7	9.0
Infection/Ulceration, systemic	14.7	14.5	22.4
Patient's wish	2.0	1.3	1.0
Insulation failure	1.5	1.3	1.0
Conductor break	1.0	3.0	2.5
Heart transplant	3.6	1.3	6.5
Ceased indication for ICD therapy	2.5	7.7	3.5
Recall/Alert	0.0	0.4	0.0
Venous access	0.0	0.4	0.0

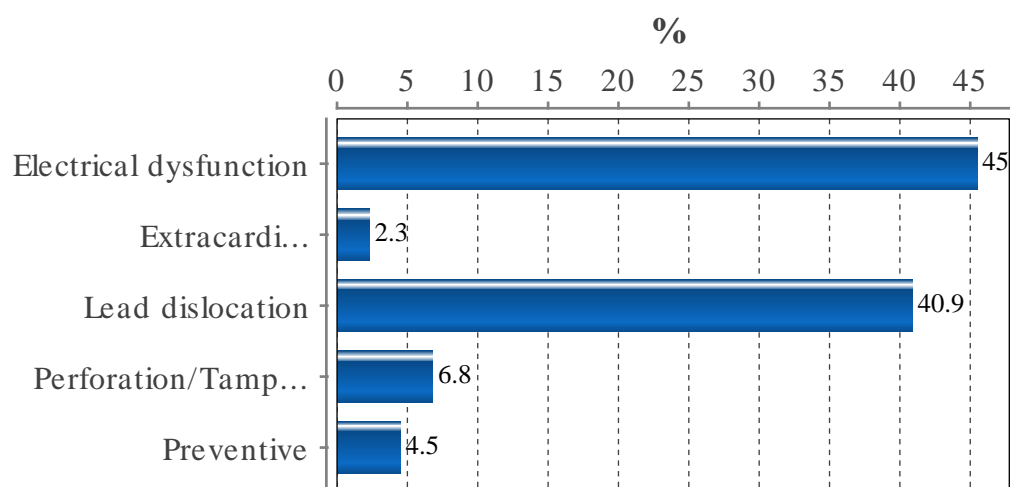
STATISTICS – ICD – REASON FOR LEAD EXPLANT



STATISTICS – ICD – REASON FOR LEAD CORRECTION

Lead correction indications

Reason	%
Electrical dysfunction	45.5
Extracardial stimulation	2.3
Lead dislocation	40.9
Perforation/Tamponade	6.8
Preventive	4.5
Total no 44	



STATISTICS – ICD – OPERATORCODE FOR IMPLANTS

Procedures per operator (exclusive CRT)

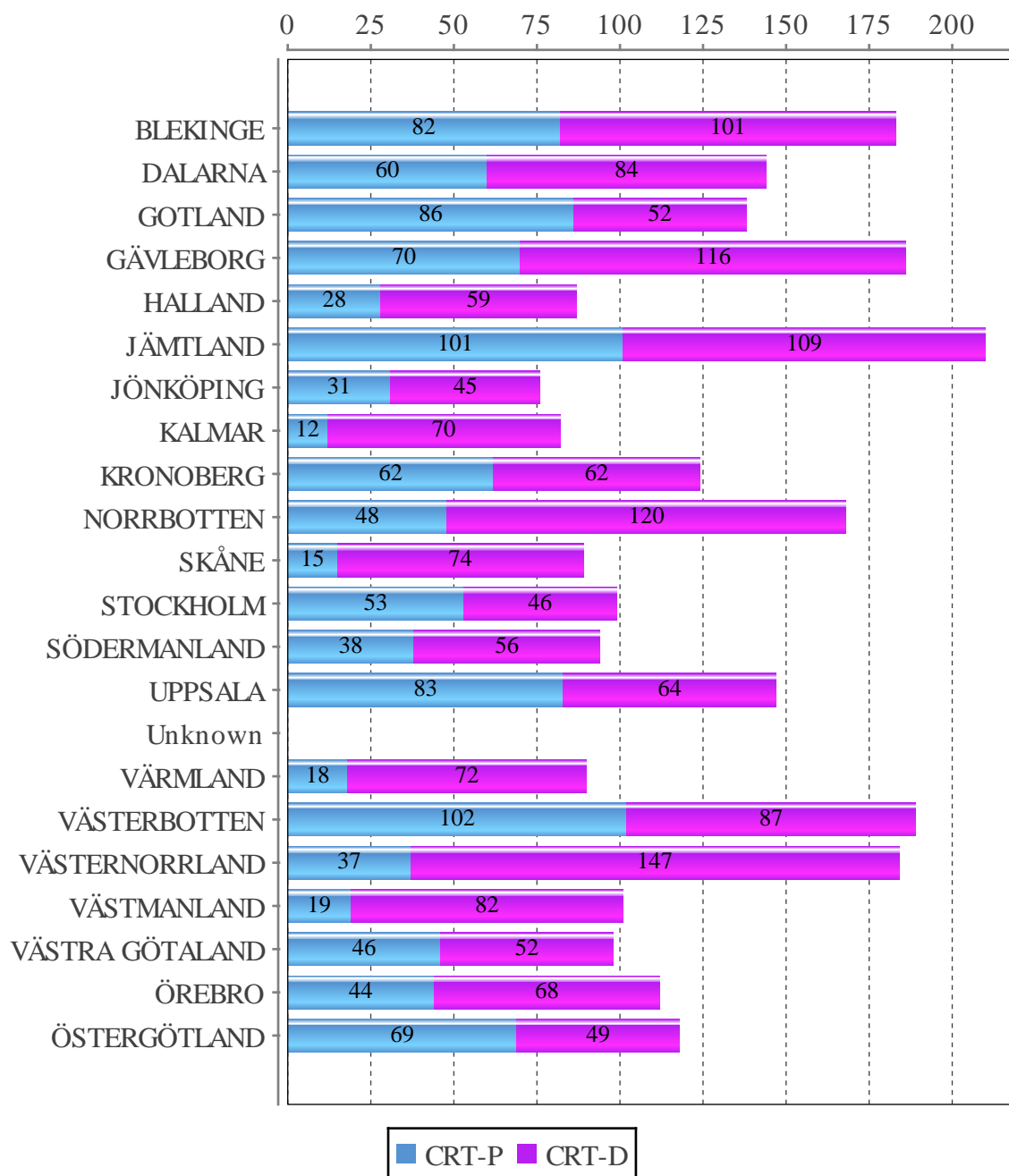
Hospital	Operator	No
Akademiska sjukhuset	Arvanitis	16
	Mörtsell	30
	Ostrowska	8
	Teder	19
Ålands centralsjukhus	Slotte	2
Blekingesjukhuset	Borg	19
	Ericsson	3
	Ghaidan, Haider	4
	Ringborn, Michael	1
Centrallasarettet Växjö	Gunnar Persson	2
	Johansson P	4
	Jonasson	8
	Rosén Helena	2
	Strandberg	16
	Weber	1
	Khaili	18
Centralsjukhuset Karlstad	Niklas Aldergård	12
	Saidi	4
	Dilan	12
Centralsjukhuset Västerås	SkoglundAndersson	8
	Wiberg	16
Danderyds sjukhus	2	10
	3	13
	4	11
	6	18
Drottning Silvias Bus	Charles Kennergren	1
Falu lasarett	Berglund	10
	Forsgren	14
	Guggi	21
Hudiksvalls sjukhus	Roussinne	8
Karolinska Universitetssjukhus	Gadler	42
	Hörnsten	45
	Reistam	40
	Reistam/Gadler	1
	Reistam/Westholm	1
	Westholm	38
	Länssjukhuset Gävle	Falck
	Jakobsson Stefan	4
	Johansson Staffan	2
	Kastberg	17
	Magnusson Peter	20
	Mati Jalakas	4

Hospital	Operator	No
Länssjukhuset Kalmar	Anja Fagerström	1
	David Olsson	10
	Hendrik Schreyer	9
	Michael Lindstaedt	18
Länssjukhuset Ryhov	Annan	3
	Jakobsson S	10
	Lagerberg	13
	Persson	1
Linköpings universitetssjukhus	Pinna C	1
	Säfström K	23
	Sonesson L	19
	Svenson A	6
	Szymanowski A	17
Mälarsjukhuset	Andreas Pikwer	3
	Axel Nyberg	5
	Peter Spetz	2
	Sijal Namdar	2
	Ulla Lindblad	1
Norrlands Universitetssjukhus	Andersson	2
	Forsgren	4
	Höglund	5
	Jensen	4
	Kesek	5
	Kesek/Höglund	1
	Landström	11
	Rönn	6
Örnsköldsviks sjukhus	Ehlin	14
Östersunds sjukhus	Friberg	12
	Hansson	9
	Annan	10
Sahlgrenska universitetssjukhuset	Jamaly	16
	Javid	16
	Kennergren	1
	Konstantinos Liakatsidas	9
	Piotr Szamlewski	23
Sahlgrenska universitetssjukhuset / Östra	Jamaly	1
Skaraborgs sjukhus Skövde	Anna Widunder	1
	Annan	1
	Lorentzen	13
	Paulsson	6
	Winterfeldt	6
Skånes universitetssjukhus, Lund	Annan	1

STATISTICS – ICD – OPERATORCODE FOR IMPLANTS

Hospital	Operator	No
	Fredrik Slotte	7
	Ingrid Litterfeldt	13
	Jesper van der Pals	5
	Johan Brandt	86
	LingWei Wang	21
	Maiwand Farouq	23
	Pyotr Platonov	9
	Rasmus Borgquist	6
	Rorsman-Söderström	9
	Steen Jensen	10
	Tina Tahna	5
Skellefteå lasarett	Lindqvist	12
Södersjukhuset	Jonsson J-E	11
	Kjellman B	13
	Olson J	13
	Rydlund K	21
Södra Älvsborgs sjukhus	Lodin	21
	Riemer	26
St Görans sjukhus	1	16
	1+2	2
	2	17
	3	10
Sunderby sjukhus	Baas	21
	Haupt	12
	Johansson A	16
	Johansson P	16
	Lundblad	1
	Peter Ragnsson	1
	Wennberg	1
Sundsvalls sjukhus	Annan	10
	Ciubine	10
	Khadhim	15
	Sundelin	6
Trollhättan, NÄL	Alice David	7
	Csaba Herczku	10
	Dinu Dusceac	10
	Jabbar	8
	Usama	1
Universitetssjukhuset Örebro	Anna Björkenheim	16
	Lindell	26
	Tommy Andersson	12
Varbergs sjukhus	Emma Sandgren	2
	Rorsman	32
Visby lasarett	Jacobsson L	2
	Litorell	1

STATISTICS – CRT – IMPLANTS PER COUNTY

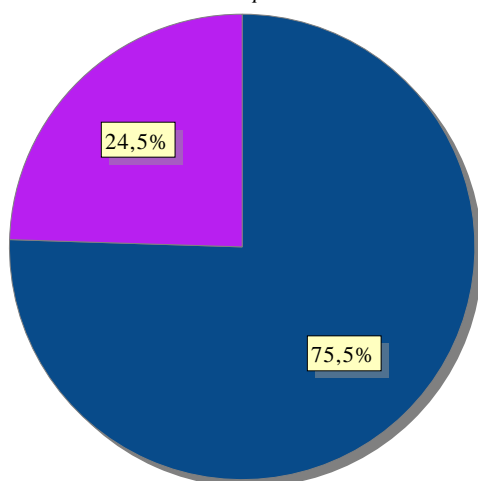


STATISTICS – CRT – TYPE OF IMPLANTS

Based on both CRT-P and CRT-D

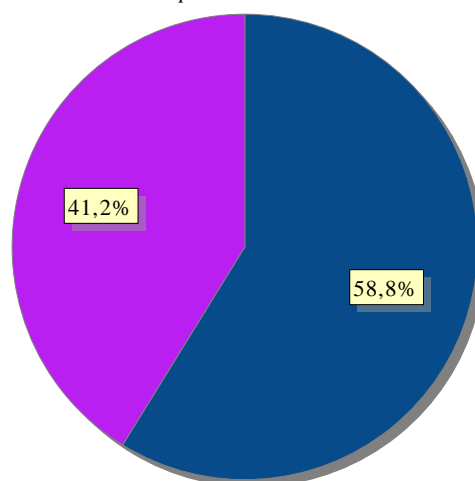
	Total		Male		Female	
	no	%	no	%	no	%
First implant	1137	58.8	858	75.5	279	24.5
Replacement	796	41.2	607	76.3	189	23.7
Total	1933	100.0	1465	75.8	468	24.2

First implant



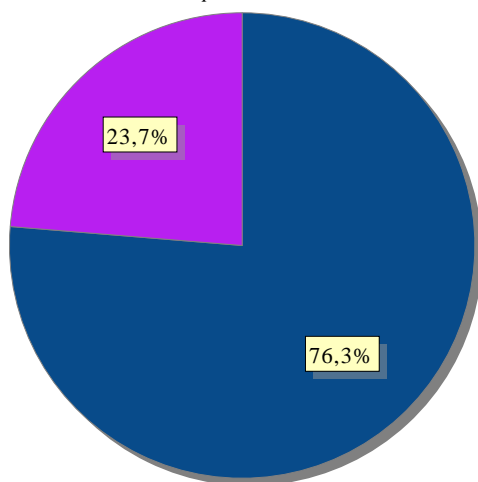
● male ● female

Replacement ratio



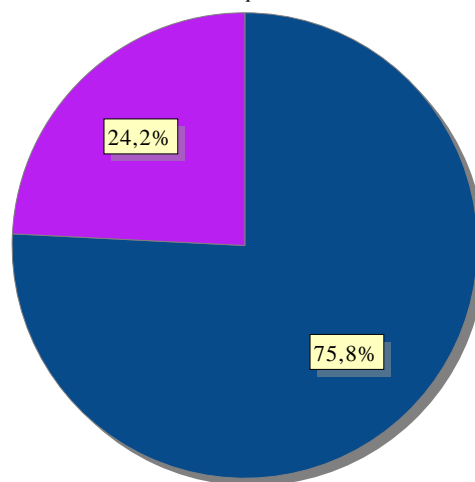
● First implant ● Replacement

Replacement



● male ● female

All implant



● male ● female

STATISTICS – CRT – HISTORICAL IMPLANT RATES

CRT Historical implant rates per hundred thousand residents

Year	Population	No First Impl	CRT-P		CRT-D	
			No	Rate	No	Rate
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
2016	9995153	1138	479	4.8	659	6.6

STATISTICS – CRT – SYSTEM STATUS

CRT-P (generator)

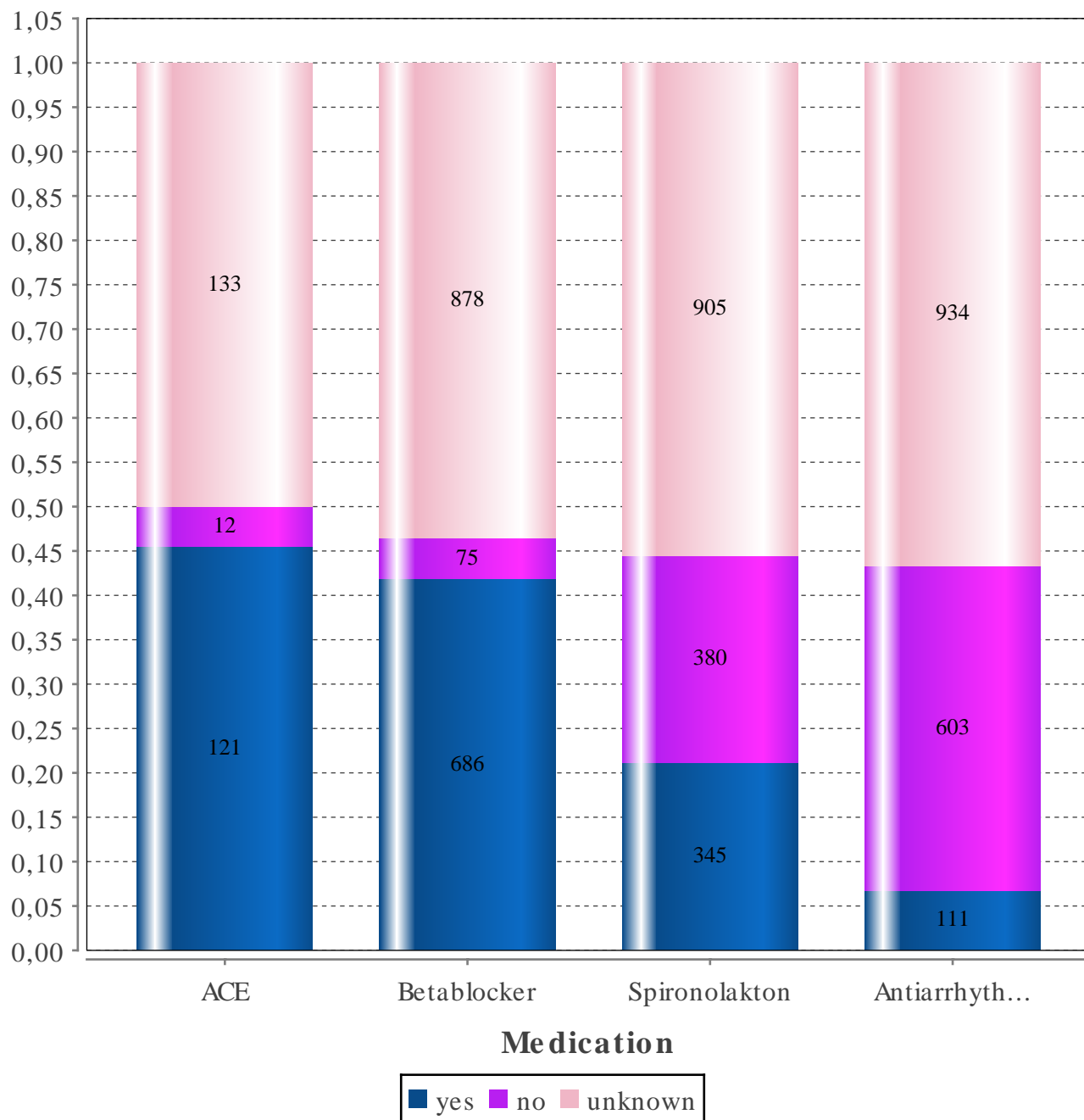
Status	First implant	Replacement
SC-lead plugged	6	7
SC-lead failed implant	9	1
SC-lead active system	494	377

CRT-D (generator)

Status	First implant	Replacement
SC-lead plugged	27	10
SC-lead failed implant	22	2
SC-lead active system	659	428

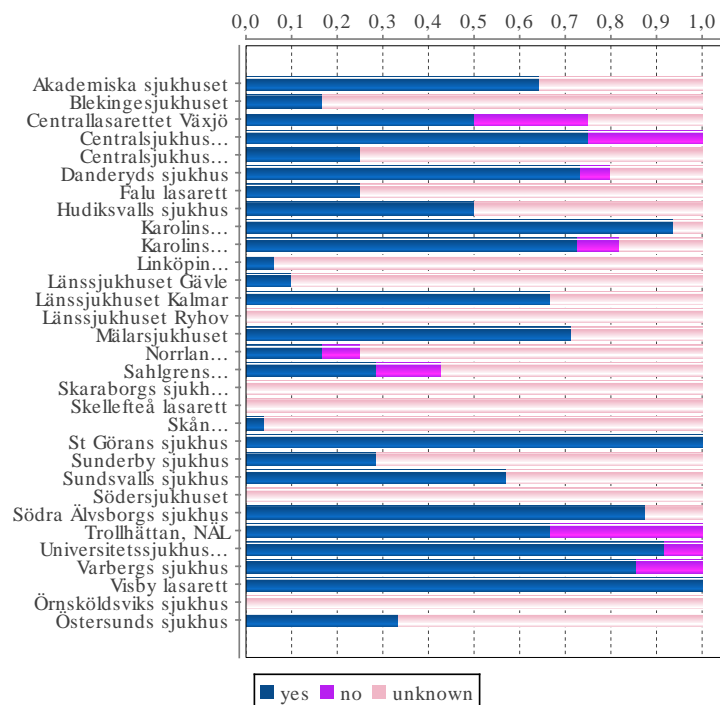
STATISTICS – CRT – MEDICATION

Previous medication for patients having CRT implant

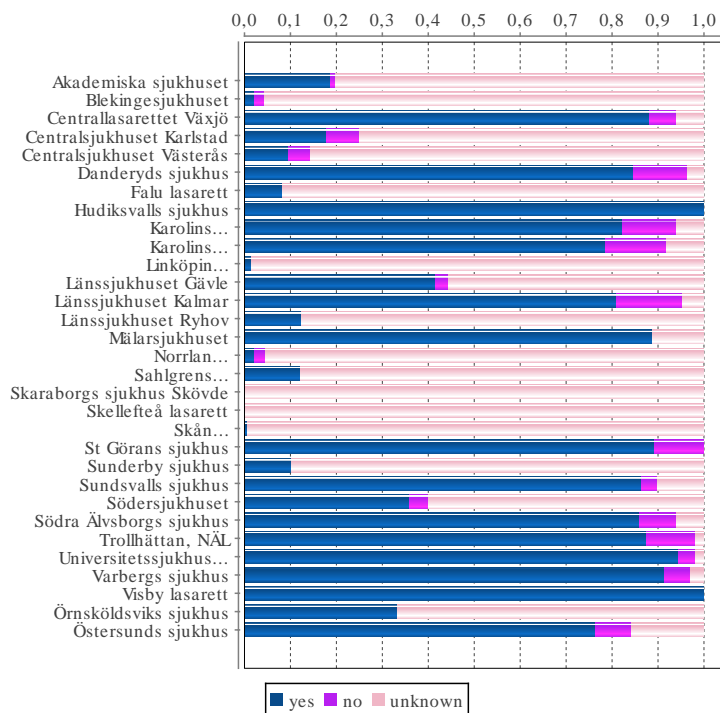


STATISTICS – CRT – MEDICATION PER HOSPITAL

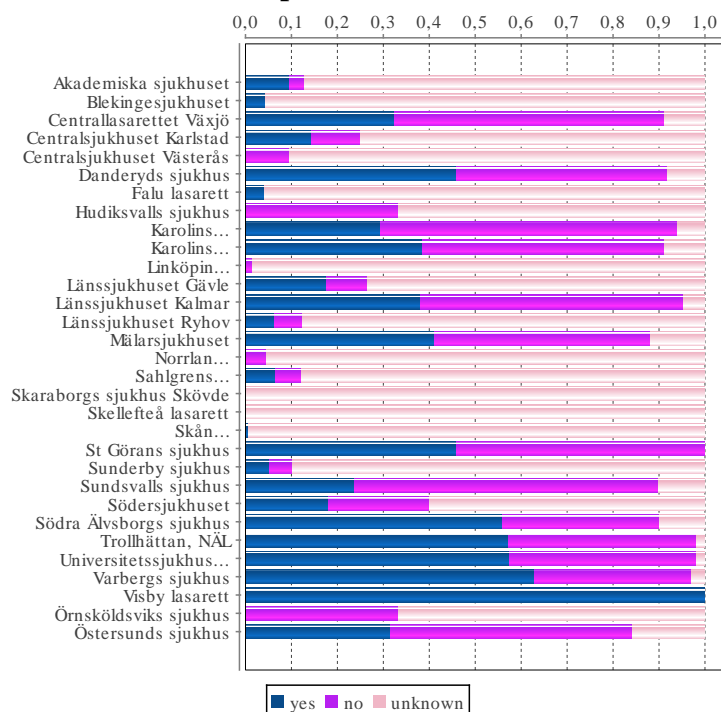
ACE



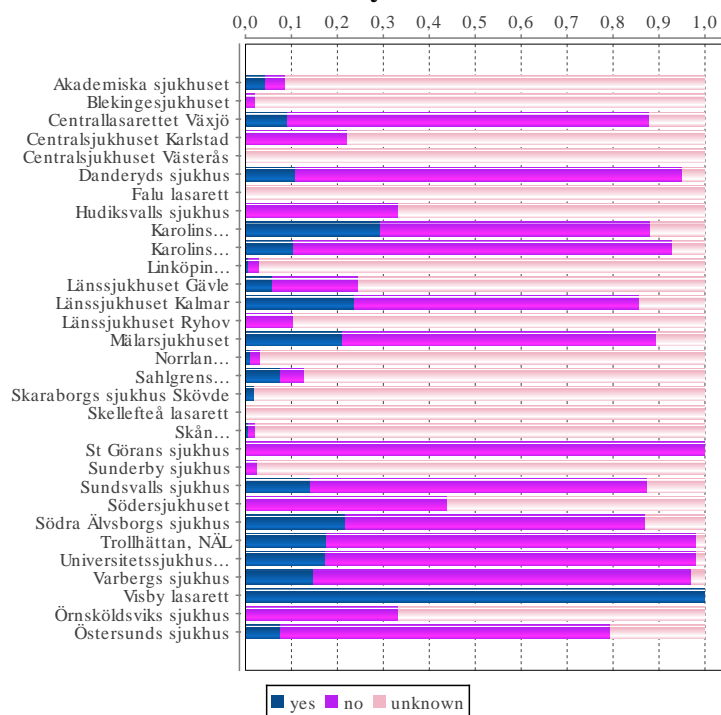
Betablocker



Spironolakton



Antiarrhythmica



STATISTICS – CRT-P – OPERATORCODE FOR IMPLANTS

Procedures per operator

Hospital	Operator	No
Akademiska sjukhuset	Arvanitis	9
	Mörtsell	12
	Teder	12
Ålands centralsjukhus	Slotte	2
Blekingesjukhuset	Borg	17
Centrallasarettet Växjö	Jonasson	8
	Strandberg	3
Centralsjukhuset Karlstad	Niklas Aldergård	3
Centralsjukhuset Västerås	Dilan	1
	Wiberg	2
Danderyds sjukhus	3	3
	4	15
	6	10
Falu lasarett	Forsgren	13
	Guggi	4
	Mörtsell	1
Karolinska Universitetssjukhus	Gadler	44
	Hörnsten	13
	Reistam/Gadler	1
	Reistam/Hörnsten	4
	Reistam/Westholm	3
	Westholm	8
Länssjukhuset Gävle	Falck	7
	Johansson Staffan	8
	Kastberg	4
Länssjukhuset Kalmar	Michael Lindstaedt	1
	Säfström K	26
Linköpings universitetssjukhus	Sonesson L	14
	Szymanowski A	22
	Kåge Säfström	5
Mälarsjukhuset	Annans	3
Norrlands Universitetssjukhus	Forsgren	9
	Höglund	2
	Jensen	5
	Landström	13
	Rönn	2
	Friberg	3
Östersunds sjukhus	Hansson	10
	Annans	9
Sahlgrenska universitetssjukhuset	Jamaly	4

Hospital	Operator	No
	Javid	11
	Piotr Szamlewski	13
Skaraborgs sjukhus Skövde	Falmer	5
	Lorentzen	15
	Paulsson	3
Skånes universitetssjukhus, Lund	Annans	1
	Johan Brandt	4
	LingWei Wang	9
	Maiwand Farouq	3
	Rorsman-Söderström	3
Södersjukhuset	Jonsson J-E	4
	Kjellman B	10
	Olson J	12
Södra Älvsborgs sjukhus	Riemer	11
	1	8
St Görans sjukhus	1+2	1
	2	2
	Baas	2
Sunderby sjukhus	Haupt	3
	Johansson P	1
Sundsvalls sjukhus	Annans	4
	Khadhim	4
Trollhättan, NÄL	Csaba Herczku	8
	Dinu Dusceac	4
Universitetssjukhuset Örebro	Lindell	8
	Tommy Andersson	7
Varbergs sjukhus	Rorsman	7

STATISTICS – CRT-D – OPERATORCODE FOR IMPLANTS

Procedures per operator

Hospital	Operator	No
Akademiska sjukhuset	Arvanitis	7
	Mörtsell	21
	Teder	4
Ålands centralsjukhus	Slotte	4
Blekingesjukhuset	Borg	18
Centrallasarettet Växjö	Jonasson	5
	Strandberg	6
Centralsjukhuset Karlstad	Niklas Aldergård	18
Centralsjukhuset Kristianstad	Gadler	1
Centralsjukhuset Västerås	Dilan	5
	Wiberg	7
Danderyds sjukhus	3	9
	4	13
	6	8
Falu lasarett	Forsgren	17
	Guggi	6
Karolinska Universitetssjukhus	Gadler	39
	Hörnsten	11
	Reistam/ Hörnsten	3
	Reistam/ Westholm	4
	Westholm	12
Länssjukhuset Gävle	Falck	16
	Johansson Staffan	7
	Kastberg	9
Länssjukhuset Kalmar	Carlström	3
	Michael Lindstaedt	13
Länssjukhuset Ryhov	Jakobsson S	1
Linköpings universitetssjukhus	Säfström K	17
	Sonesson L	15
	Svenson A	2
	Szymanowski A	11
Mälarsjukhuset	Kåge Säfström	4
Norrlands Universitetssjukhus	Forsgren	6
	Höglund	5
	Jensen	4
	Landström	18
	Rönn	5
Örnsköldsviks sjukhus	Ehlin	1
Östersunds sjukhus	Friberg	3
	Hansson	9

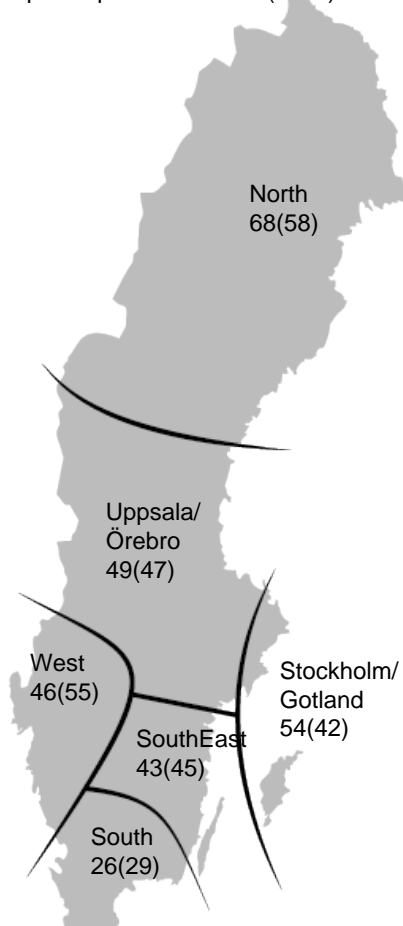
Hospital	Operator	No
Sahlgrenska universitetssjukhuset	Jamaly	6
	Javid	8
	Kennergren	1
Skaraborgs sjukhus Skövde	Piotr Szamlewski	9
	Falmer	1
	Lorentzen	7
Skånes universitetssjukhus, Lund	Paulsson	4
	Fredrik Slotte	3
	Johan Brandt	41
	LingWei Wang	28
	Maiwand Farouq	21
Södersjukhuset	Rasmus Borgquist	3
	Rorsman- Söderström	7
	Steen Jensen	4
	Kjellman B	10
Södra Älvsborgs sjukhus	Olson J	6
	Riemer	21
	1	8
St Görans sjukhus	1+2	2
	2	4
	Baas	1
Sunderby sjukhus	Haupt	20
	Johansson P	1
	Annan	18
Sundsvalls sjukhus	Ciubine	2
	Khadhim	12
	Csaba Herczku	21
Trollhättan, NÄL	Dinu Dusceac	8
	Jabbar	1
	Lindell	16
Universitetssjukhuset Örebro	Tommy Andersson	6
	Rorsman	17
Varbergs sjukhus		

STATISTICS – CRT-P – IMPLANTS PER REGION

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	2327063	126	54
Uppsala/Örebro	2060491	101	49
South-East Sweden	1047141	45	43
Southern Sweden	1811802	47	26
Western Sweden	1857960	85	46
Northern Sweden	890696	61	68
Total	9995153	465	47

Implants per million 2016(2015)

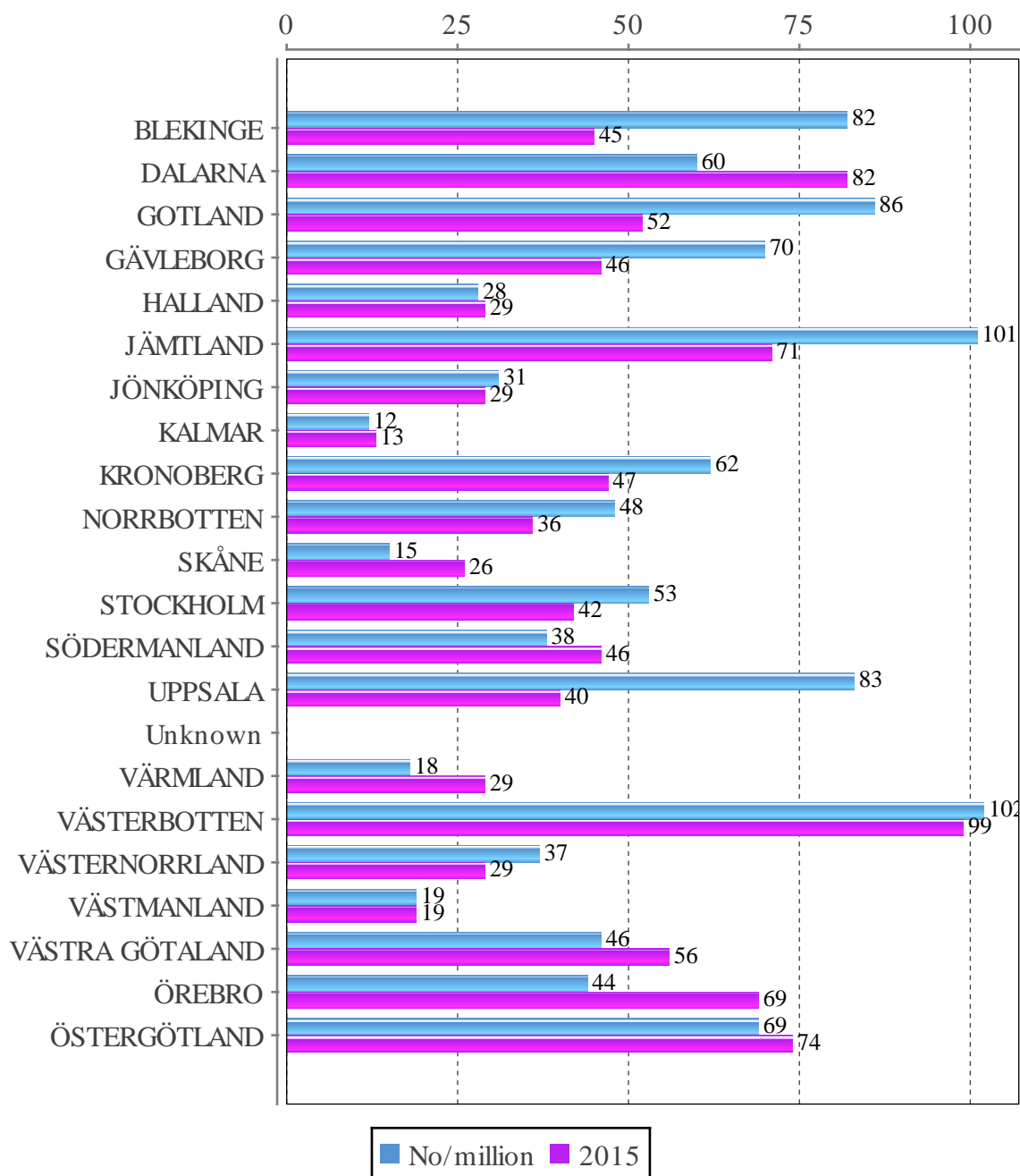


STATISTICS – CRT-P – IMPLANTS PER COUNTY

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

	Population	No first impl	No/million
BLEKINGE	158453	13	82
DALARNA	284531	17	60
GOTLAND	58003	5	86
GÄVLEBORG	284586	20	70
HALLAND	320333	9	28
JÄMTLAND	128673	13	101
JÖNKÖPING	352735	11	31
KALMAR	242301	3	12
KRONOBERG	194628	12	62
NORRBOTTEN	250570	12	48
SKÅNE	1324565	20	15
STOCKHOLM	2269060	121	53
SÖDERMANLAND	288097	11	38
UPPSALA	361373	30	83
Unknown	0	4	0
VÄRMLAND	279334	5	18
VÄSTERBOTTEN	265881	27	102
VÄSTERNORRLAND	245572	9	37
VÄSTMANLAND	267629	5	19
VÄSTRA GÖTALAND	1671783	77	46
ÖREBRO	294941	13	44
ÖSTERGÖTLAND	452105	31	69
Total	9995153	468	47

STATISTICS – CRT-P – IMPLANTS PER COUNTY

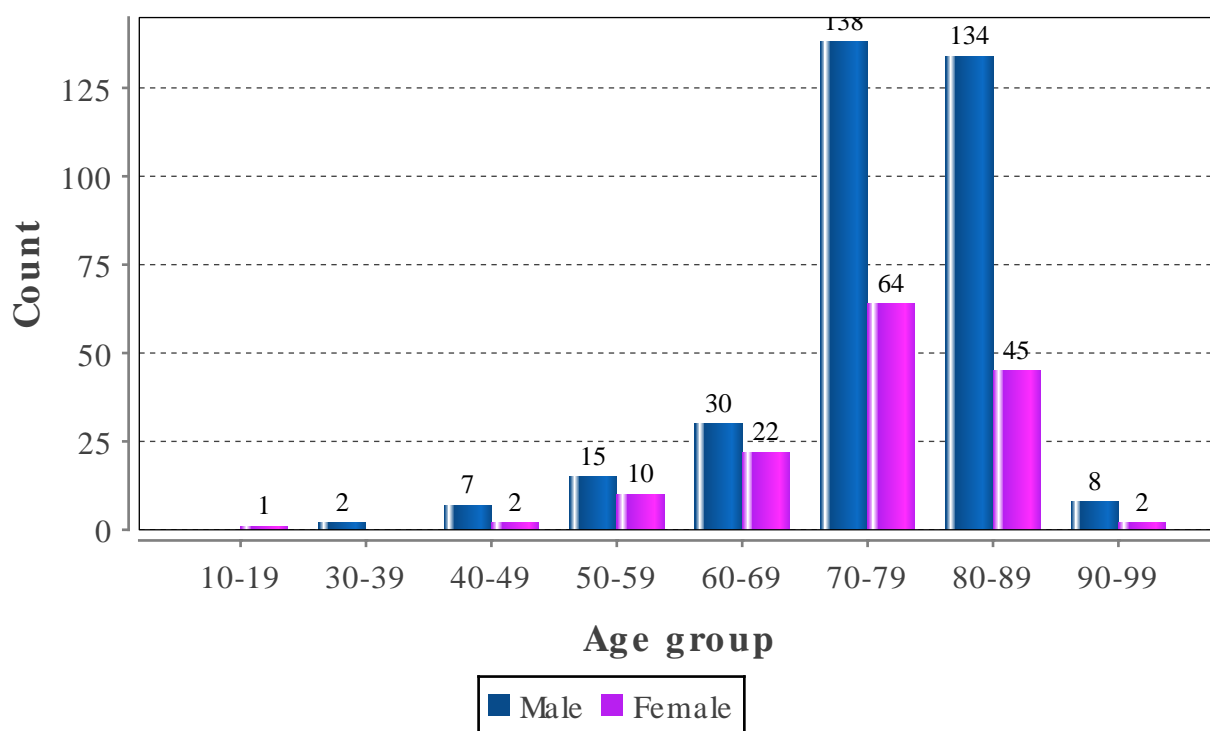


STATISTICS – CRT-P – AGE DISTRIBUTION MALES/FEMALES

Age and gender distribution for new implants, total numbers

Age (years)	Total no	%	Male	Female
10-19	1	0.2	0	1
30-39	2	0.4	2	0
40-49	9	1.9	7	2
50-59	25	5.2	15	10
60-69	52	10.8	30	22
70-79	202	42.1	138	64
80-89	179	37.3	134	45
90-99	10	2.1	8	2
Average age	76	0.0	76	74

Total number of implants: 480

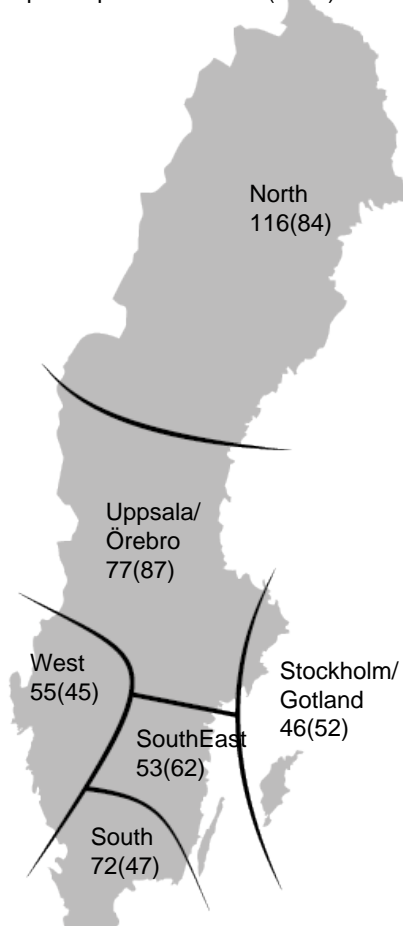


STATISTICS – CRT-D – IMPLANTS PER REGION

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	2327063	107	46
Uppsala/Örebro	2060491	158	77
South-East Sweden	1047141	55	53
Southern Sweden	1811802	131	72
Western Sweden	1857960	102	55
Northern Sweden	890696	103	116
Total	9995153	656	66

Implants per million 2016(2015)

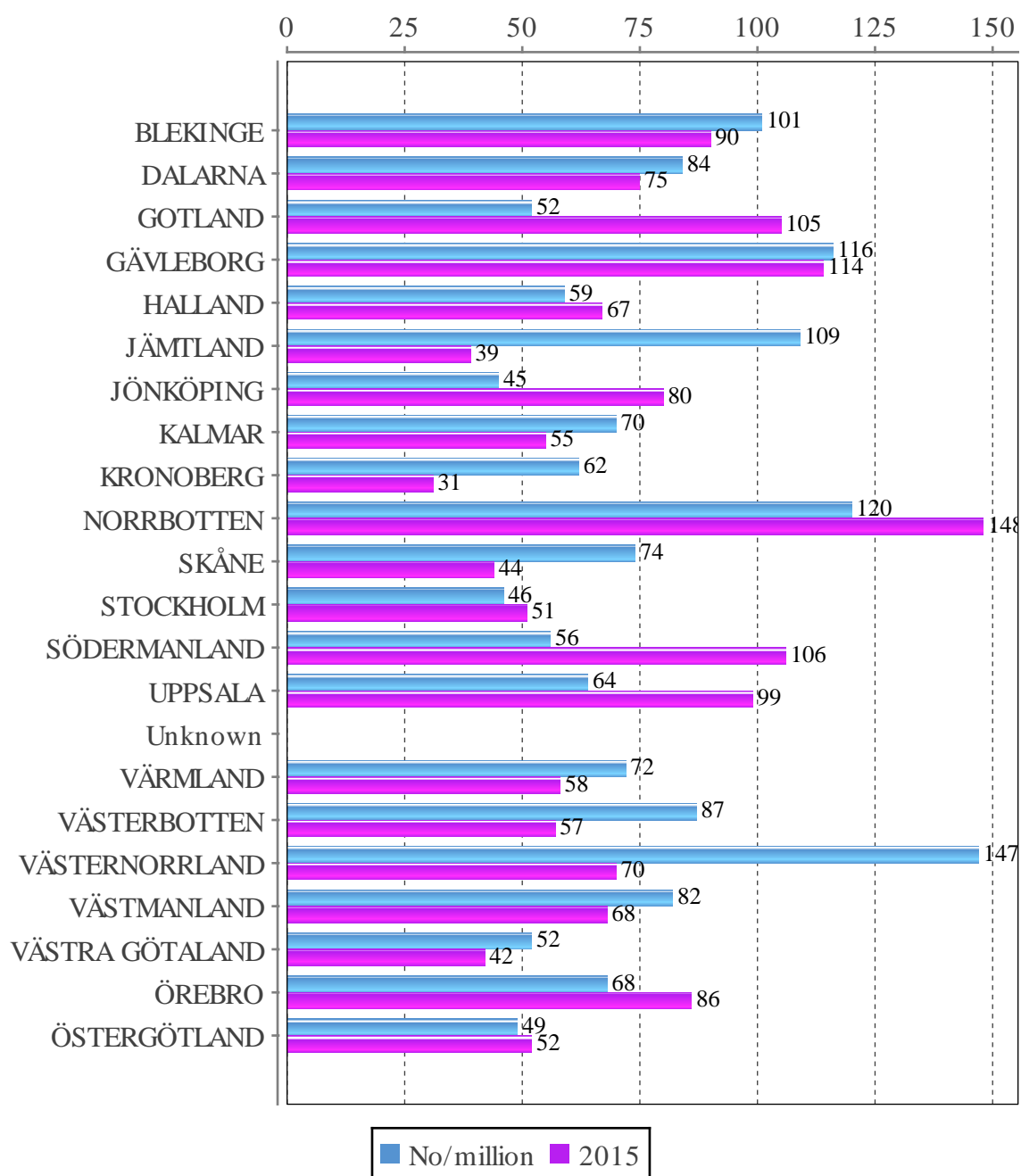


STATISTICS – CRT-D – IMPLANTS PER COUNTY

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

	Population	No first impl	No/million
BLEKINGE	158453	16	101
DALARNA	284531	24	84
GOTLAND	58003	3	52
GÄVLEBORG	284586	33	116
HALLAND	320333	19	59
JÄMTLAND	128673	14	109
JÖNKÖPING	352735	16	45
KALMAR	242301	17	70
KRONOBERG	194628	12	62
NORRBOTTEN	250570	30	120
SKÅNE	1324565	98	74
STOCKHOLM	2269060	104	46
SÖDERMANLAND	288097	16	56
UPPSALA	361373	23	64
Unknown	0	2	0
VÄRMLAND	279334	20	72
VÄSTERBOTTEN	265881	23	87
VÄSTERNORRLAND	245572	36	147
VÄSTMANLAND	267629	22	82
VÄSTRA GÖTALAND	1671783	87	52
ÖREBRO	294941	20	68
ÖSTERGÖTLAND	452105	22	49
Total	9995153	657	66

STATISTICS – CRT-D – IMPLANTS PER COUNTY

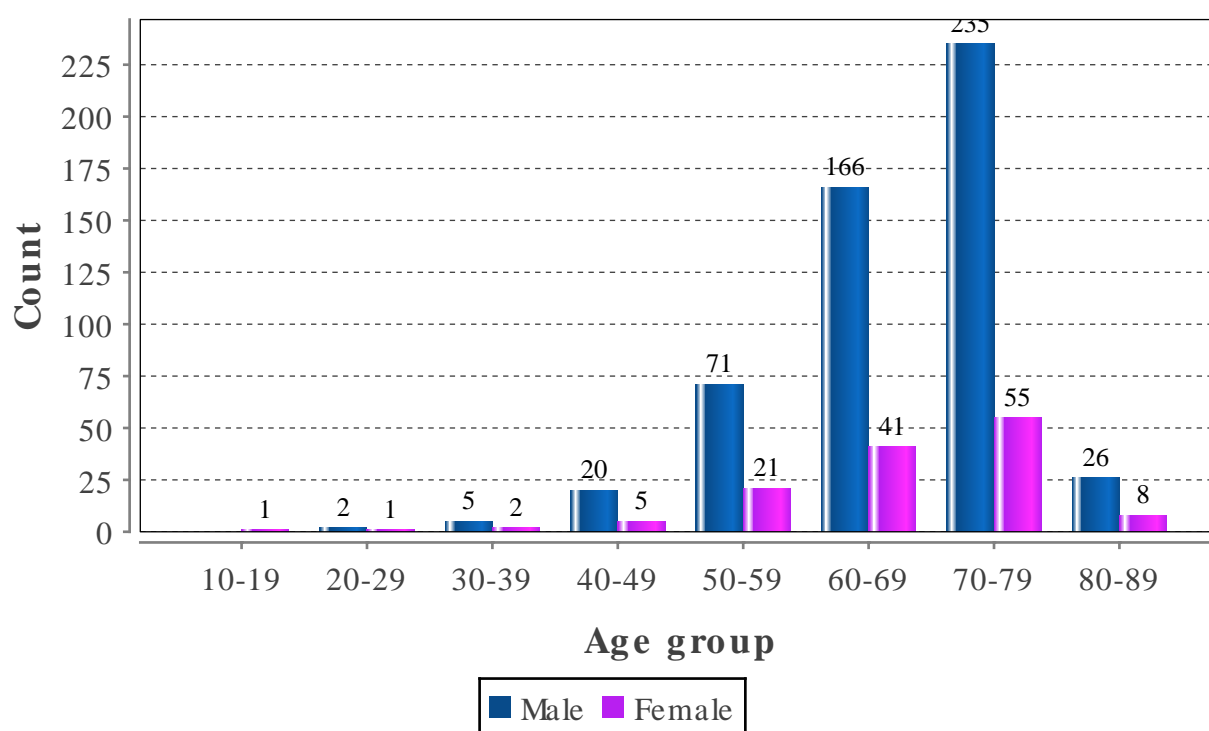


STATISTICS – CRT-D – AGE DISTRIBUTION MALES/FEMALES

Age and gender distribution for new implants, total numbers

Age (years)	Total no	%	Male	Female
10-19	1	0.2	0	1
20-29	3	0.5	2	1
30-39	7	1.1	5	2
40-49	25	3.8	20	5
50-59	92	14.0	71	21
60-69	207	31.4	166	41
70-79	290	44.0	235	55
80-89	34	5.2	26	8
Average age	67	0.0	67	66

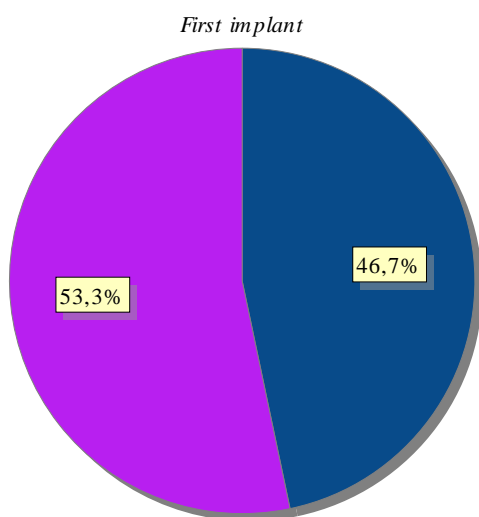
Total number of implants: 659



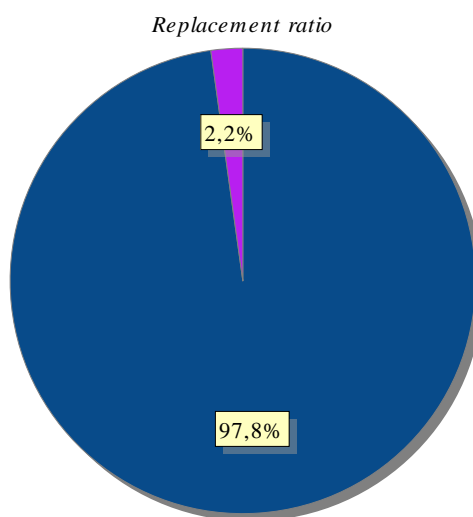
STATISTICS – ILR – TYPE OF IMPLANTS

Ratio of new implants versus generator changes

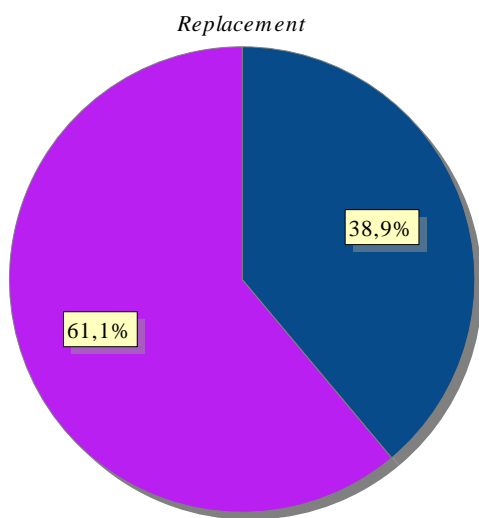
	Total		Male		Female	
	no	%	no	%	no	%
First implant	809	97.8	378	46.7	431	53.3
Replacement	18	2.2	7	38.9	11	61.1
Total	827	100.0	385	46.6	442	53.4



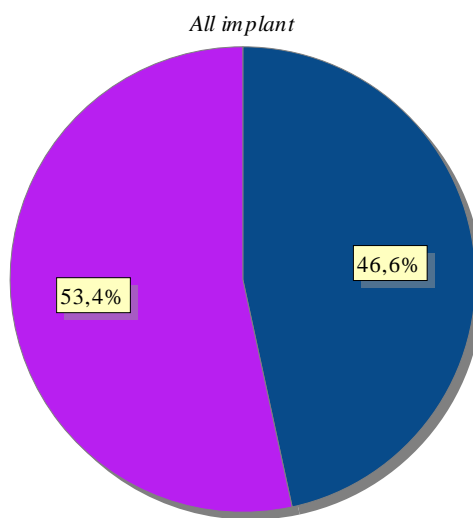
● male ● female



● First implant ● Replacement



● male ● female

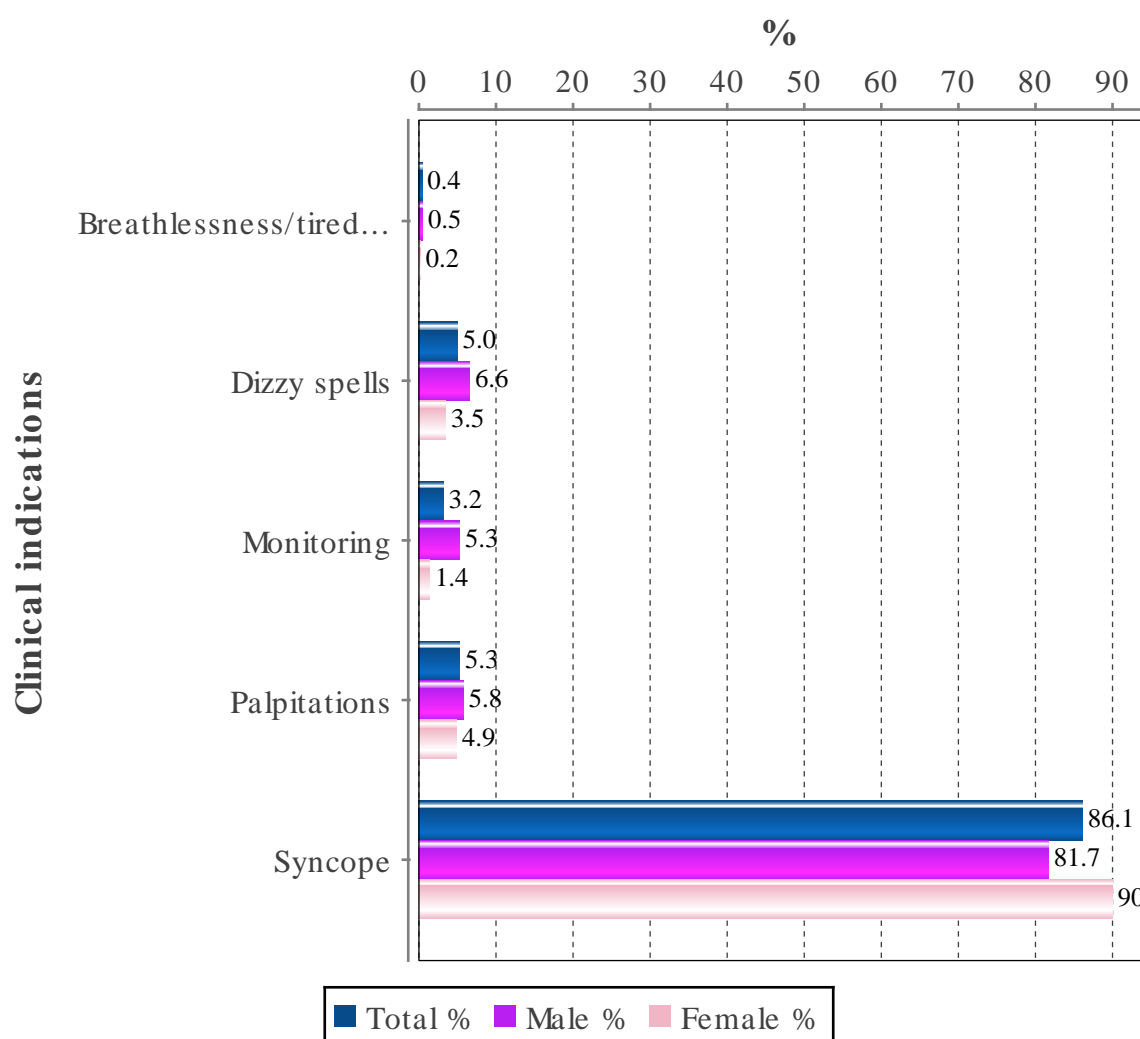


● male ● female

STATISTICS – ILR – CLINICAL INDICATIONS

Main symptom for implanting ILR

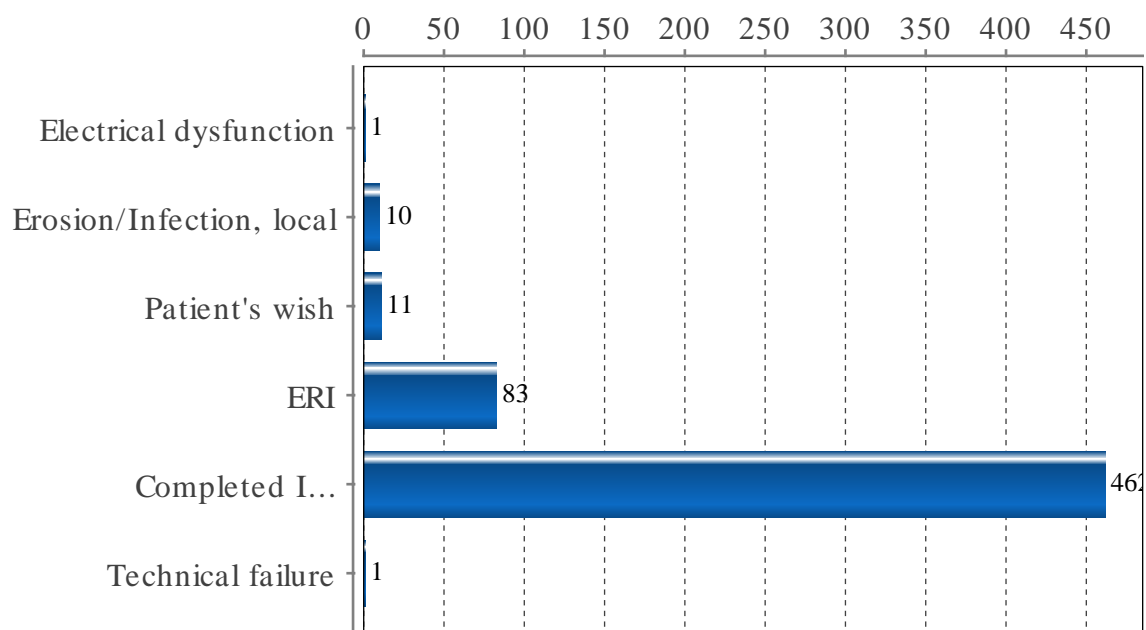
Indication	Total %	Male %	Female %
Breathlessness/tiredness	0.4	0.5	0.2
Dizzy spells	5.0	6.6	3.5
Monitoring	3.2	5.3	1.4
Palpitations	5.3	5.8	4.9
Syncope	86.1	81.7	90.0



STATISTICS – ILR – REASON FOR REMOVAL

Reason for generator removal

Reason	No	%
Electrical dysfunction	1	0.2
Erosion/Infection, local	10	1.8
Patient's wish	11	1.9
ERI	83	14.6
Completed ILR investigation	462	81.3
Technical failure	1	0.2



STATISTICS – ILR – ACTION AFTER ILR

Investigation after first ILR implant in % of completed ILR investigation

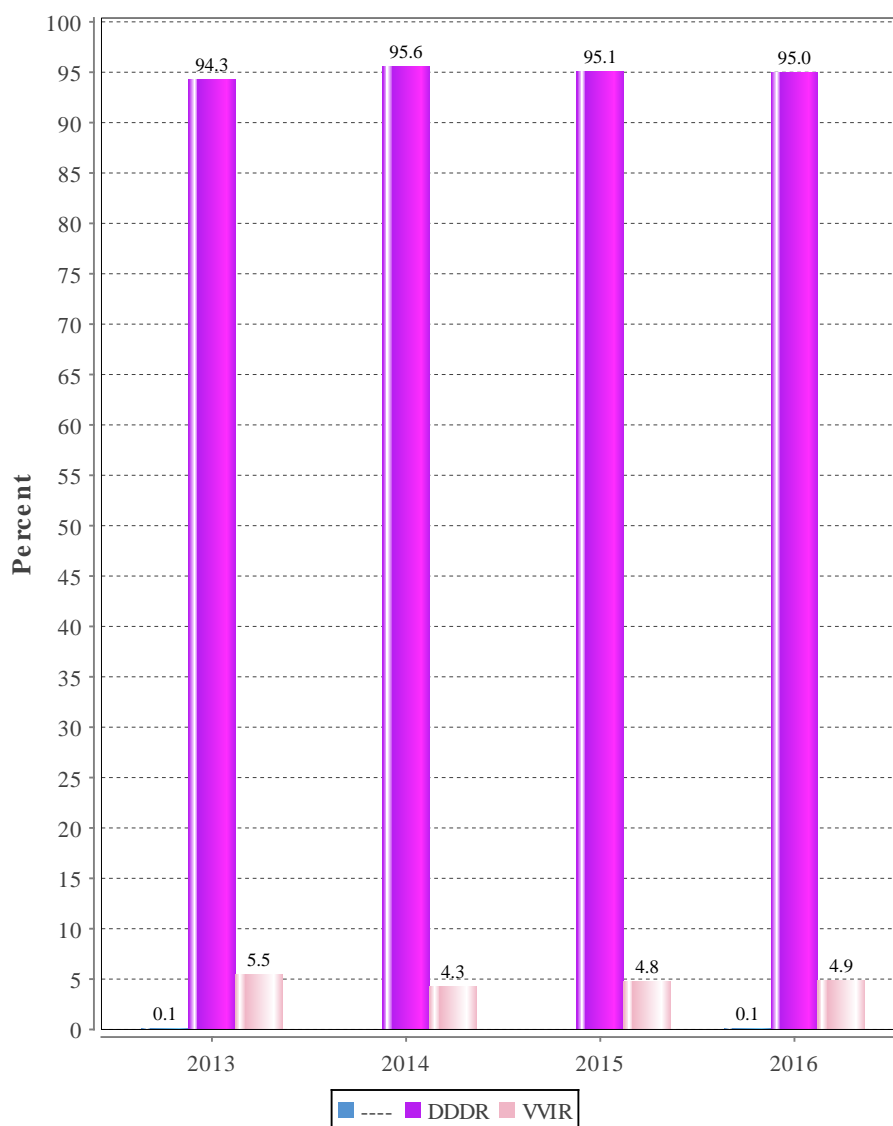
Action	No	%
Pacemaker implant	232	49.7
ICD implant	23	4.9
New ILR implant	20	4.3

QUALITY

QUALITY – PACEMAKER – FIRST IMPLANT HIGH DEGREE AV-BLOCK

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

Mode %	2013	2014	2015	2016
----	0.1	0.0	0.0	0.1
DDDR	94.3	95.6	95.1	95.0
VVIR	5.5	4.3	4.8	4.9



QUALITY – PACEMAKER – AV BLOCK MODES USED PER HOSPITAL

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

Hospital (%)	DDD	VVI
Akademiska sjukhuset	93.2	6.8
Alingsås lasarett	93.1	6.9
Arvika sjukhus	75.0	25.0
Blekingesjukhuset	94.7	5.3
Centrallasarettet Växjö	92.0	8.0
Centralsjukhuset Karlstad	96.8	3.2
Centralsjukhuset Kristianstad	100.0	-
Centralsjukhuset Västerås	97.0	3.0
Danderyds sjukhus	97.7	2.3
Drottning Silvias Bus	100.0	-
Falu lasarett	100.0	-
Hudiksvalls sjukhus	84.8	15.2
Karolinska Universitetssjukhuset	97.3	2.7
Kungälv's sjukhus	77.4	22.6
Linköpings Universitetssjukhus	97.0	3.0
Länssjukhuset Gävle	95.6	4.4
Länssjukhuset Halmstad	100.0	-
Länssjukhuset Kalmar	85.0	15.0
Länssjukhuset Ryhov	93.0	7.0
Mälarsjukhuset	98.9	1.1
Norrlands Universitetssjukhus	98.3	1.7
Oskarshamns sjukhus	93.8	6.3
Sahlgrenska Universitetssjukhuset	91.0	9.0
Sahlgrenska Universitetssjukhuset /Östra	100.0	-
Skaraborgs sjukhus Skövde	96.5	3.5
Skellefteå lasarett	87.5	12.5
Skånes universitetssjukhus, Lund	96.2	3.8
Skånes universitetssjukhus, Malmö	94.7	5.3
Sollefteå sjukhus	40.0	60.0
St Görans sjukhus	96.3	3.7
Sunderby sjukhus	94.0	6.0
Sundsvalls sjukhus	93.8	6.2
Södersjukhuset	96.1	3.9
Södra Älvsborgs sjukhus	96.8	3.2
Torsby sjukhus	91.7	8.3
Trollhättan, NÄL	95.3	4.7
Universitetssjukhuset Örebro	97.7	2.3
Varbergs sjukhus	90.2	9.8
Visby lasarett	100.0	-
Vrinnevisjukhuset	86.5	13.5
Västerviks sjukhus	100.0	-
Örnsköldsviks sjukhus	100.0	-
Östersunds sjukhus	97.7	2.3

QUALITY – PACEMAKER – AV BLOCK MODES USED PER HOSPITAL

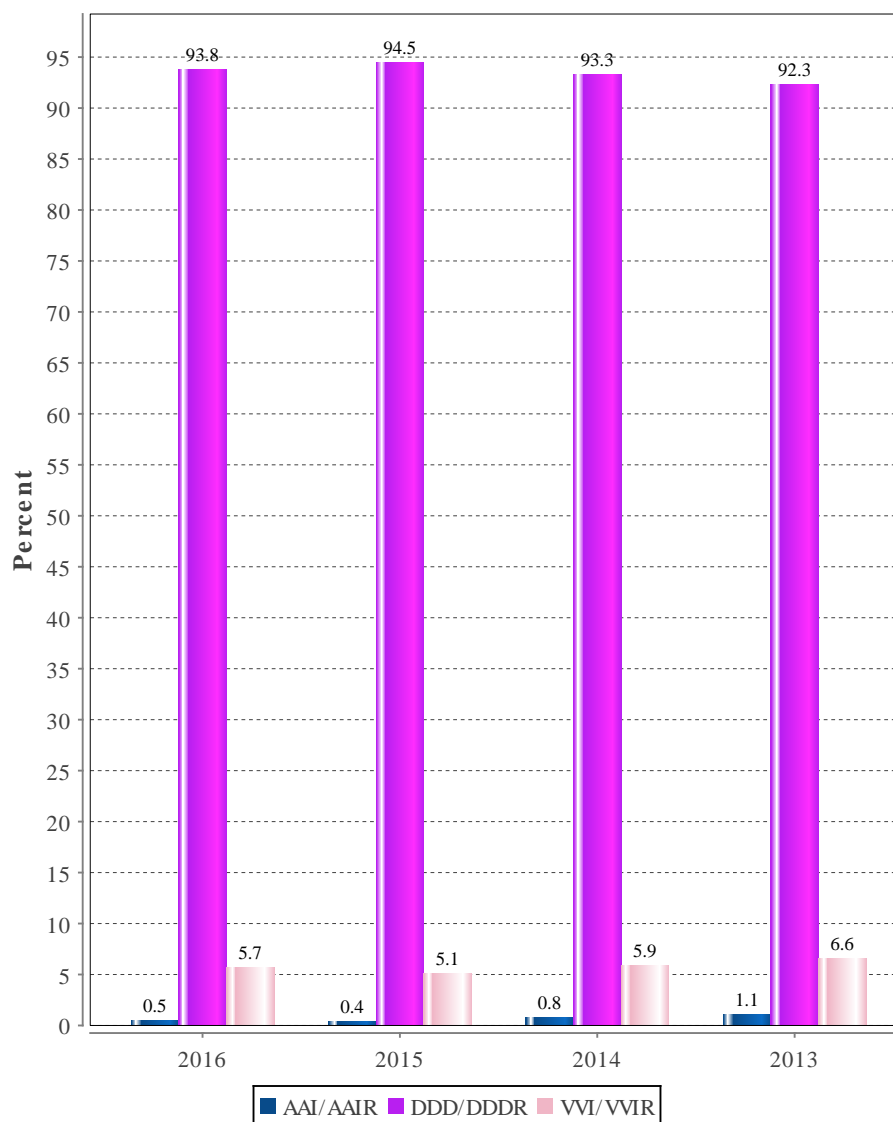
Use of pacing mode for total AV block indication per hospital size

Year	Mode	All hospitals (%)	Large (%)	Medium (%)	Small (%)
2016	DDD	95.1	95.9	95.4	88.8
	VVI	4.9	4.1	4.6	11.2
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	-	-	-	-

QUALITY – PACEMAKER – FIRST IMPLANT SINUS NODE DYSFUNCTION

Use of pacing mode for Sinus Node Disease, historical data

Mode (%)	2016	2015	2014	2013
AAI/AAIR	0.5	0.4	0.8	1.1
DDD/DDDR	93.8	94.5	93.3	92.3
VVI/VVIR	5.7	5.1	5.9	6.6



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 %
2016	AAI	0.5	2.4	0.3	0.3
	VVI	5.7	17.1	6.5	3.8
	DDD	93.8	80.6	93.2	95.9
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	93.1	6.9	-
Alingsås lasarett	95.2	4.8	-
Arvika sjukhus	100.0	-	-
Blekingesjukhuset	95.8	2.1	2.1
Centrallasarettet Växjö	100.0	-	-
Centralsjukhuset Karlstad	92.2	7.8	-
Centralsjukhuset Kristianstad	100.0	-	-
Centralsjukhuset Västerås	94.9	5.1	-
Danderyds sjukhus	97.4	2.6	-
Drottning Silvias Bus	100.0	-	-
Falu lasarett	98.3	1.7	-
Hudiksvalls sjukhus	87.5	12.5	-
Karolinska Universitetssjukhuset	96.6	3.4	-
Kungälv's sjukhus	76.9	7.7	15.4
Linköpings Universitetssjukhus	97.6	1.2	1.2
Länssjukhuset Gävle	92.4	7.6	-
Länssjukhuset Halmstad	82.9	17.1	-
Länssjukhuset Kalmar	69.6	30.4	-
Länssjukhuset Ryhov	88.5	11.5	-
Mälarsjukhuset	100.0	-	-
Norrlands Universitetssjukhus	92.7	7.3	-
Oskarshamns sjukhus	71.4	21.4	7.1
Sahlgrenska Universitetssjukhuset	88.7	9.6	1.7
Sahlgrenska Universitetssjukhuset /Östra	90.9	9.1	-
Skaraborgs sjukhus Skövde	97.7	2.3	-
Skellefteå lasarett	59.1	40.9	-
Skånes universitetssjukhus, Lund	96.6	2.8	0.6
Skånes universitetssjukhus, Malmö	96.0	4.0	-
Sollefteå sjukhus	14.3	71.4	14.3
St Görans sjukhus	98.1	1.9	-
Sunderby sjukhus	87.5	12.5	-
Sundsvalls sjukhus	88.5	11.5	-
Södersjukhuset	98.7	1.3	-
Södra Älvsborgs sjukhus	100.0	-	-
Torsby sjukhus	100.0	-	-
Trollhättan, NÄL	95.0	5.0	-
Universitetssjukhuset Örebro	100.0	-	-
Varbergs sjukhus	80.0	20.0	-
Visby lasarett	100.0	-	-
Vrinnevisjukhuset	94.7	-	5.3
Västerviks sjukhus	100.0	-	-
Örnsköldsviks sjukhus	100.0	-	-
Östersunds sjukhus	88.9	11.1	-

QUALITY – PACEMAKER – LEAD DISLOCATION

Dislocation rate for different lead types in atrial or ventricular placement. Based on all implants implanted 2006 and later and explanted/corrected 2016 or earlier

Type	Right atrium %	Right ventricle %	Left ventricle %	Total %
Fixed screw	1.7	1.1	0.8	1.4
Retractable screw	1.7	1.1	0.8	1.4
Passive	3.7	1.7	2.1	1.5
All	1.7	1.2	1.9	1.5

QUALITY – LEAD EXTRACTIONS

Extractions per hospital

Hospital	No of leads
Akademiska sjukhuset	69
Blekingesjukhuset	17
Karolinska Solna	158
Linköpings universitetssjukhus	31
Sahlgrenska universitetssjukhuset	108
Skånes universitetssjukhus, Lund	19
Sunderby sjukhus	10
Universitetssjukhuset Örebro	6

Extractions per type

Type	Extractions
ICD lead	80
Pacemaker lead	359

Extractions per model (more than 5 extractions)

Manufacturer	Model	Extractions
Boston Scientific	4470 Fineline II Sterox EZ MRI	15
Boston Scientific	4471 Fineline II Sterox EZ MRI	6
Medtronic	4074 Capsure Sense MRI	7
Medtronic	4076 CapSureFix Novus MRI	39
Medtronic	5076 CapSureFix MRI	25
Medtronic	6935 Sprint Quattro Secure S MRI	7
Medtronic	6947 Sprint Quattro Secure MRI	6
St Jude Medical/ Abbott	1258T QuickFlex	10
St Jude Medical/ Abbott	1458Q Quartet MRI	10
St Jude Medical/ Abbott	1636T Isoflex	6
St Jude Medical/ Abbott	1646T Isoflex	8
St Jude Medical/ Abbott	1688T Tendril SDX	14
St Jude Medical/ Abbott	1948 Isoflex MRI	6
St Jude Medical/ Abbott	1999 Optisense	16
St Jude Medical/ Abbott	2088TC Tendril STS MRI	33
St Jude Medical/ Abbott	7122Q Durata	17
St Jude Medical/ Abbott	LPA1200M52cm TendrilMRI	8

QUALITY – LEAD EXTRACTIONS

Manufacturer	Model	Extractions
St Jude Medical/ Abbott	LPA1200M58cm TendrilMRI	9

QUALITY – LEAD EXTRACTIONS

Extractions per reason

Reason	Extractions
Ceased indication for PM therapy	7
Elective/system change	33
Electrical dysfunction	40
Heart transplant	24
Infection/Ulceration, local	130
Infection/Ulceration, systemic	154
Lead dislocation	22
Preventive	10
Venous access	6

*Extraction positions**

Hospital	Femoral	Left superior	N/A	Right superior
Akademiska sjukhuset	18	51	0	1
Blekingesjukhuset	0	14	0	3
Karolinska Solna	1	155	0	3
Linköpings universitetssjukhus	0	31	0	0
Skånes universitetssjukhus, Lund	0	19	0	0
Universitetssjukhuset Örebro	0	6	0	0

*Hospital Sahlgrenska and Sunderby excluded

QUALITY – LEAD EXTRACTIONS

*Extraction problems**

Hospital	I	E	O	P	X	D
Akademiska sjukhuset	2	1	1	0	0	0
Blekingesjukhuset	0	0	0	0	0	0
Karolinska Solna	0	0	0	0	0	0
Linköpings universitetssjukhus	0	0	0	0	0	0
Skånes universitetssjukhus, Lund	0	0	0	0	0	0
Universitetssjukhuset Örebro	0	0	0	0	0	0

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

QUALITY – LEAD EXTRACTIONS

*Extraction results**

Hospital	Failed	Partially successfull	Successfull
Akademiska sjukhuset	0	2	68
Blekingesjukhuset	0	0	17
Karolinska Solna	0	7	152
Linköpings universitetssjukhus	0	0	31
Skånes universitetssjukhus, Lund	0	1	18
Universitetssjukhuset Örebro	0	0	6

*Hospital Sahlgrenska and Sunderby excluded

QUALITY – LEAD EXTRACTIONS

*Extraction tools**

Hospital	SS	LS	PS	AM	L	S	PK	EK	AL
Akademiska sjukhuset	14	38	33	13	0	2	0	0	16
Blekingesjukhuset	0	3	0	5	0	0	0	0	0
Karolinska Solna	17	128	121	4	1	0	0	0	0
Linköpings universitetssjukhus	10	6	3	0	0	0	0	0	0
Skånes universitetssjukhus, Lund	0	6	0	0	0	1	0	0	0
Universitetssjukhuset Örebro	5	0	0	0	0	0	0	0	0

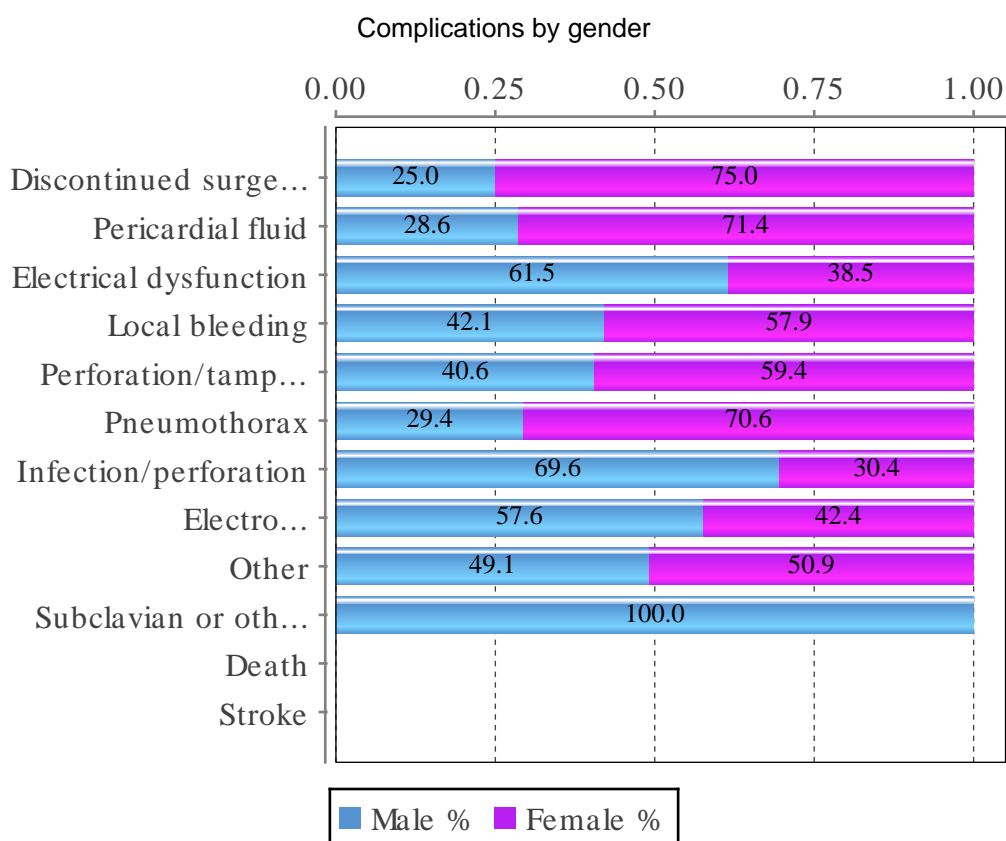
(*Hospital Sahlgrenska and Sunderby excluded), SS: Standard stylet, LS: Locking stylet, PS: Passive sheath, AM: Active mechanical sheath, L: Lasso, S: Snare, PK: Pigtail catheter, EP: EP catheter, AL: Active laser sheath

QUALITY – PACEMAKER – COMPLICATIONS

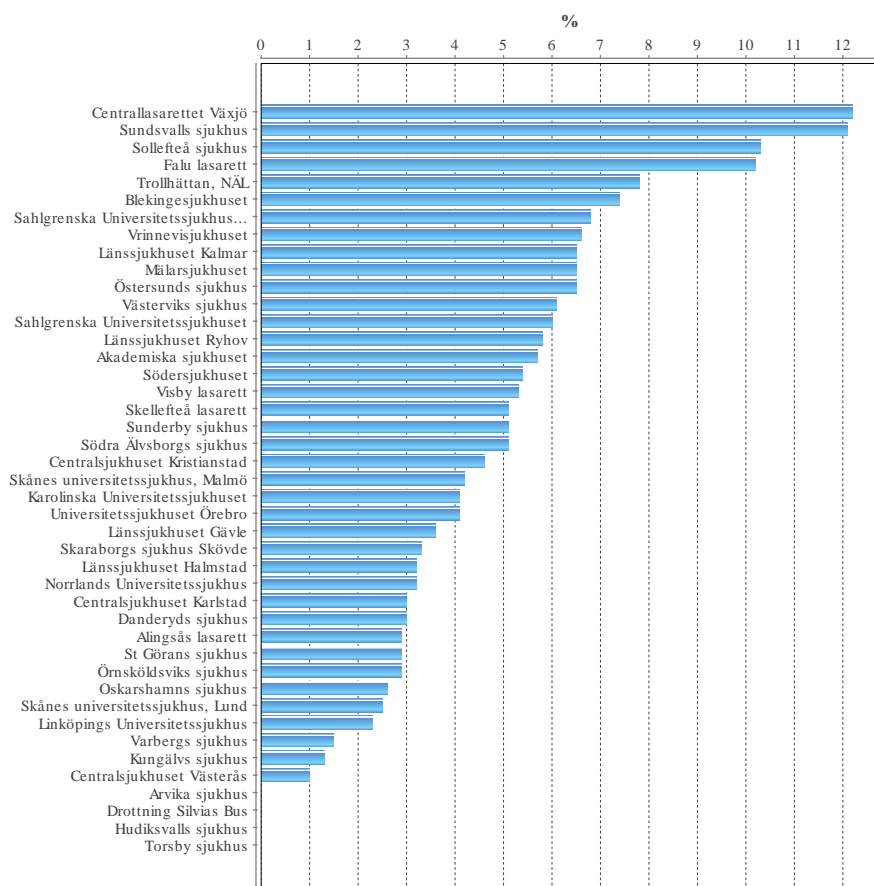
Registered complications for new implants and for bleeding, infection and other also including replacements

Complication	2015 %	2016 %	Based on
Discontinued surgery due to hemodynamic reasons	0.0	0.0	A
Pericardial fluid	0.0	0.1	A
Electrical dysfunction	0.9	0.9	B
Local bleeding	0.2	0.4	A
Perforation/tamponade	0.3	0.4	B
Pneumothorax	0.4	0.5	B
Infection/perforation	0.6	0.6	A
Electrode displacement	2.1	1.9	B
Other	0.4	0.6	A
Subclavian or other related thrombosis	0.1	0.1	B
Death	0.0	0.0	A
Stroke	0.0	0.0	A
Total	5.0	5.5	

Based on A=9330 (all implants) alternatively B=7414 (first implants + lead replacement) validated events



QUALITY – PACEMAKER – COMPLICATIONS PER HOSPITAL



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	423	-	-	1.2	1.2	0.9	-
Alingsås lasarett	102	-	-	-	-	1.0	-
Arvika sjukhus	21	-	-	-	-	-	-
Blekingesjukhuset	216	-	-	2.8	2.8	1.4	-
Centrallasarettet Växjö	147	-	-	0.7	4.8	-	-
Centralsjukhuset Karlstad	198	-	-	1.0	1.0	-	-
Centralsjukhuset Kristianstad	285	-	-	0.4	1.8	0.7	-
Centralsjukhuset Västerås	199	-	-	-	0.5	-	-
Danderyds sjukhus	528	-	-	0.8	1.3	-	-
Drottning Silvias Bus	22	-	-	-	-	-	-
Falu lasarett	313	-	-	2.2	3.5	1.0	-
Hudiksvalls sjukhus	74	-	-	-	-	-	-
Karolinska Universitetssjukhuset	509	-	-	0.8	1.0	1.0	0.2
Kungälv's sjukhus	76	-	-	-	-	-	-
Linköpings Universitetssjukhus	390	-	-	0.3	0.5	0.5	0.3
Länssjukhuset Gävle	331	-	-	1.8	0.3	-	-
Länssjukhuset Halmstad	126	-	-	-	-	0.8	-
Länssjukhuset Kalmar	93	-	-	-	2.2	1.1	-
Länssjukhuset Ryhov	260	-	-	-	4.6	-	-
Mälarsjukhuset	276	-	-	0.7	2.2	0.4	-
Norrlands Universitetssjukhus	218	-	-	-	0.5	1.4	-
Oskarshamns sjukhus	38	-	-	-	-	-	-
Sahlgrenska Universitetssjukhuset	621	-	-	1.1	1.4	0.6	0.2
Sahlgrenska Universitetssjukhuset /Östra	44	-	-	-	4.5	-	-
Skaraborgs sjukhus Skövde	271	-	0.4	-	0.4	-	-
Skellefteå lasarett	79	-	-	-	2.5	1.3	-
Skånes universitetssjukhus, Lund	692	-	-	-	1.0	0.6	-
Skånes universitetssjukhus, Malmö	360	-	-	0.6	0.3	0.8	-
Sollefteå sjukhus	29	-	-	-	6.9	-	-
St Görans sjukhus	348	-	-	-	0.6	1.1	-
Sunderby sjukhus	292	-	-	-	1.7	0.7	-
Sundsvalls sjukhus	198	-	-	0.5	6.6	-	-
Södersjukhuset	371	-	-	1.9	1.9	-	-
Södra Älvsborgs sjukhus	216	-	-	0.9	0.9	2.3	-
Torsby sjukhus	30	-	-	-	-	-	-
Trollhättan, NÄL	322	-	-	2.5	3.4	0.6	0.6
Universitetssjukhuset Örebro	269	-	-	1.1	1.1	1.5	-
Varbergs sjukhus	135	-	-	-	0.7	-	-
Visby lasarett	38	-	-	-	5.3	-	-
Vrinnevisjukhuset	91	-	-	1.1	1.1	1.1	-
Västerviks sjukhus	33	-	-	-	6.1	-	-
Örnsköldsviks sjukhus	68	-	-	-	2.9	-	-
Östersunds sjukhus	169	-	1.8	-	1.8	-	-

QUALITY – PACEMAKER – COMPLICATIONS PER HOSPITAL

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

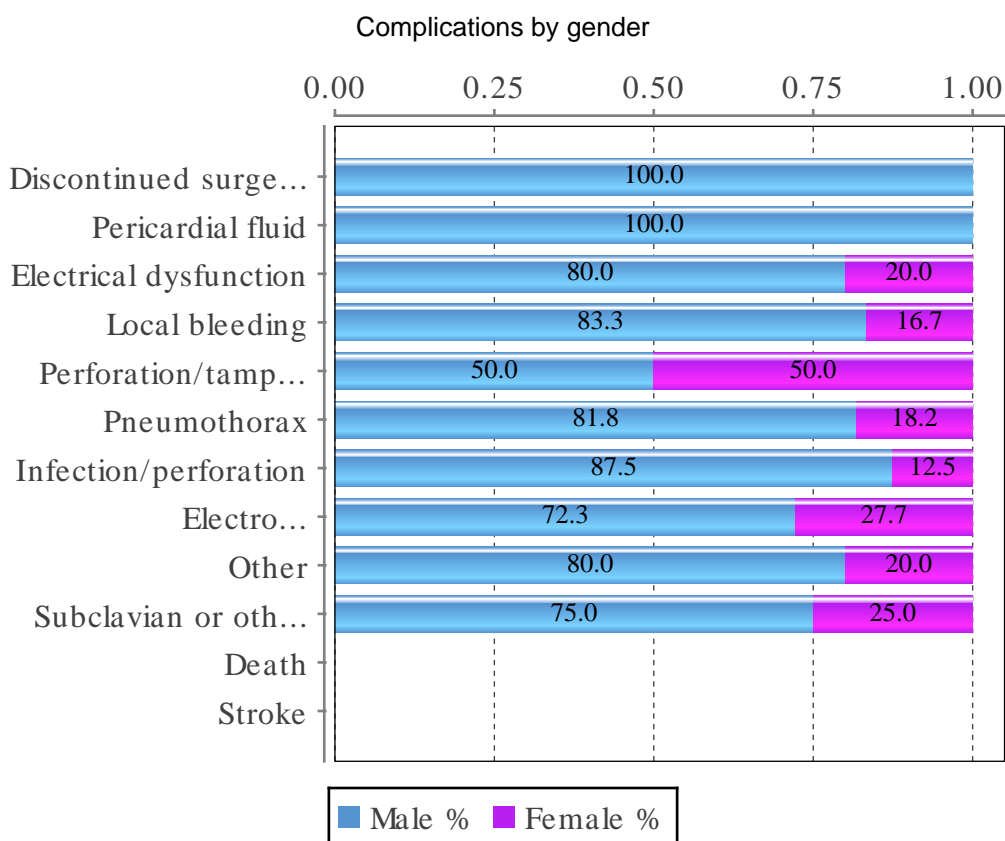
Hospital	No	Bl. %	Ot. %	Tm. %	Pn. %	Pf. %	St. %	All %
Akademiska sjukhuset	423	-	0.9	1.2	0.2	-	-	5.7
Alingsås lasarett	102	-	2.0	-	-	-	-	2.9
Arvika sjukhus	21	-	-	-	-	-	-	-
Blekingesjukhuset	216	-	0.5	-	-	-	-	7.4
Centrallasarettet Växjö	147	4.1	-	2.7	-	-	-	12.2
Centralsjukhuset Karlstad	198	-	-	1.0	-	-	-	3.0
Centralsjukhuset Kristianstad	285	-	1.1	0.4	0.4	-	-	4.6
Centralsjukhuset Västerås	199	-	-	-	-	0.5	-	1.0
Danderyds sjukhus	528	-	0.6	0.2	0.2	-	-	3.0
Drottning Silvias Bus	22	-	-	-	-	-	-	-
Falu lasarett	313	1.0	1.3	-	0.6	0.6	-	10.2
Hudiksvalls sjukhus	74	-	-	-	-	-	-	-
Karolinska Universitetssjukhuset	509	0.2	-	0.2	0.8	-	-	4.1
Kungälv's sjukhus	76	-	1.3	-	-	-	-	1.3
Linköpings Universitetssjukhus	390	-	0.3	-	0.3	0.3	-	2.3
Länssjukhuset Gävle	331	-	0.3	0.6	0.6	-	-	3.6
Länssjukhuset Halmstad	126	-	1.6	-	-	0.8	-	3.2
Länssjukhuset Kalmar	93	-	1.1	-	2.2	-	-	6.5
Länssjukhuset Ryhov	260	-	0.8	-	0.4	-	-	5.8
Mälarsjukhuset	276	0.4	-	1.1	1.4	0.4	-	6.5
Norrlands Universitetssjukhus	218	-	0.5	0.5	0.5	-	-	3.2
Oskarshamn's sjukhus	38	-	-	-	2.6	-	-	2.6
Sahlgrenska Universitetssjukhuset	621	1.3	0.6	0.3	0.2	0.2	-	6.0
Sahlgrenska Universitetssjukhuset /Östra	44	-	2.3	-	-	-	-	6.8
Skaraborgs sjukhus Skövde	271	1.1	1.1	0.4	-	-	-	3.3
Skellefteå lasarett	79	-	-	1.3	-	-	-	5.1
Skånes universitetssjukhus, Lund	692	-	0.9	-	-	-	-	2.5
Skånes universitetssjukhus, Malmö	360	0.8	1.7	-	-	-	-	4.2
Sollefteå sjukhus	29	3.4	-	-	-	-	-	10.3
St Görans sjukhus	348	-	0.6	0.3	0.3	-	-	2.9
Sunderby sjukhus	292	1.0	0.3	-	1.4	-	-	5.1
Sundsvalls sjukhus	198	1.5	0.5	0.5	2.5	-	-	12.1
Södersjukhuset	371	-	0.3	1.1	0.3	-	-	5.4
Södra Älvsborgs sjukhus	216	0.5	0.5	-	-	-	-	5.1
Torsby sjukhus	30	-	-	-	-	-	-	-
Trollhättan, NÄL	322	-	-	-	0.6	-	-	7.8
Universitetssjukhuset Örebro	269	0.4	-	-	-	-	-	4.1
Varbergs sjukhus	135	-	-	0.7	-	-	-	1.5
Visby lasarett	38	-	-	-	-	-	-	5.3
Vrinnevisjukhuset	91	-	1.1	1.1	1.1	-	-	6.6
Västerviks sjukhus	33	-	-	-	-	-	-	6.1
Örnsköldsviks sjukhus	68	-	-	-	-	-	-	2.9
Östersunds sjukhus	169	2.4	-	0.6	-	-	-	6.5

QUALITY – ICD – COMPLICATIONS

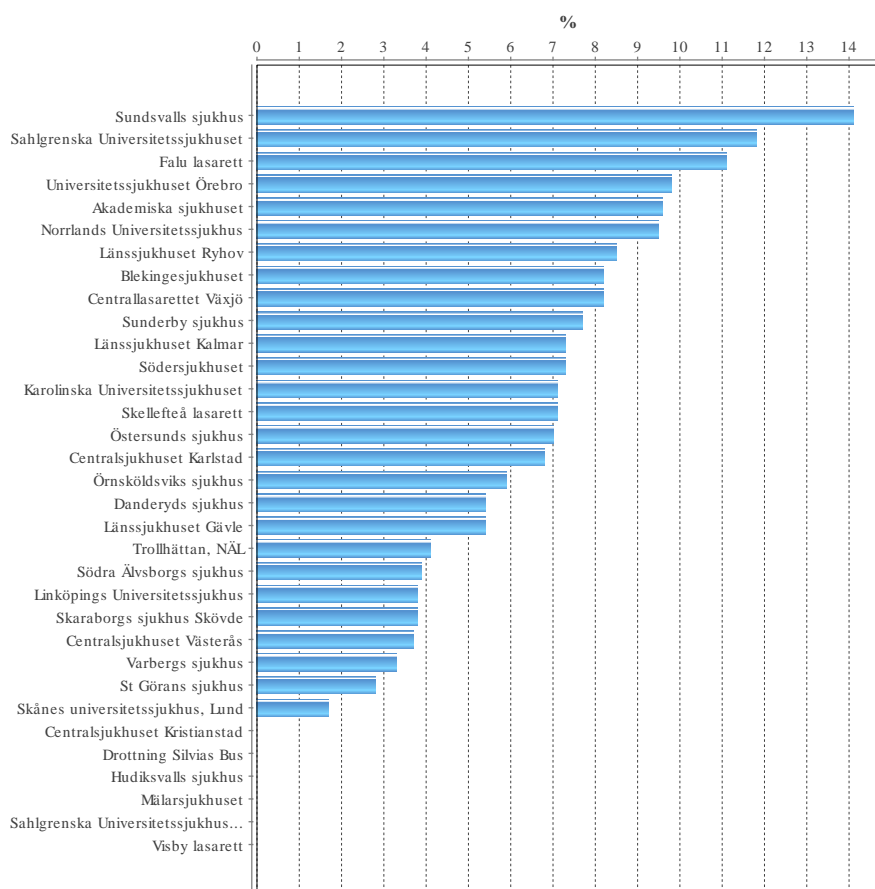
Registered complications for new implants and for bleeding, infection and other also including replacements

Complication	2015 %	2016 %
Discontinued surgery due to hemodynamic reasons	0.1	0.1
Electrical dysfunction	1.4	1.8
Local bleeding	0.7	0.5
Perforation/tamponade	0.7	0.4
Pneumothorax	0.7	0.7
Infection/perforation	2.1	1.0
Electrode displacement	2.3	2.8
Other	1.0	0.6
Subclavian or other related thrombosis	0.0	0.2
Death	0.0	0.0
Pericardial fluid	0.1	0.0
Stroke	0.0	0.0
Total	9.1	8.1

Based on 2372 (all implants) alternatively 1651 (first implants + lead replacements) validated events



QUALITY – ICD – COMPLICATIONS PER HOSPITAL



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	135	-	-	0.7	3.7	1.5	-	1.5
Blekingesjukhuset	49	-	-	4.1	2.0	-	-	2.0
Centrallasarettet Växjö	49	-	-	2.0	2.0	2.0	-	2.0
Centralsjukhuset Karlstad	59	-	-	-	1.7	1.7	-	-
Centralsjukhuset Kristianstad	1	-	-	-	-	-	-	-
Centralsjukhuset Västerås	54	-	-	-	-	1.9	-	-
Danderyds sjukhus	92	-	-	1.1	3.3	1.1	-	-
Drottning Silvias Bus	1	-	-	-	-	-	-	-
Falu lasarett	72	-	-	2.8	4.2	-	-	1.4
Hudiksvalls sjukhus	13	-	-	-	-	-	-	-
Karolinska Universitetssjukhuset	280	-	-	1.8	1.1	1.4	0.4	0.7
Linköpings Universitetssjukhus	131	-	-	0.8	0.8	-	1.5	-
Länssjukhuset Gävle	93	-	-	1.1	1.1	-	-	-
Länssjukhuset Kalmar	55	-	-	1.8	-	-	-	1.8
Länssjukhuset Ryhov	47	-	2.1	-	2.1	2.1	-	-
Mälarsjukhuset	20	-	-	-	-	-	-	-
Norrlands Universitetssjukhus	84	-	-	1.2	6.0	1.2	-	1.2
Sahlgrenska Universitetssjukhuset	127	-	-	4.7	4.7	-	0.8	-
Sahlgrenska Universitetssjukhuset /Östra	1	-	-	-	-	-	-	-
Skaraborgs sjukhus Skövde	52	-	-	-	1.9	1.9	-	-
Skellefteå lasarett	14	-	-	-	-	7.1	-	-
Skånes universitetssjukhus, Lund	349	-	-	0.6	1.1	-	-	-
St Görans sjukhus	71	-	-	-	1.4	-	-	-
Sunderby sjukhus	104	-	-	1.0	2.9	1.0	-	1.0
Sundsvalls sjukhus	92	-	-	-	5.4	2.2	-	2.2
Södersjukhuset	82	-	1.2	4.9	-	-	-	-
Södra Älvsborgs sjukhus	76	-	-	1.3	1.3	1.3	-	-
Trollhättan, NÄL	73	-	-	-	1.4	1.4	-	-
Universitetssjukhuset Örebro	82	-	-	3.7	3.7	2.4	-	-
Varbergs sjukhus	60	-	-	-	-	1.7	-	-
Visby lasarett	5	-	-	-	-	-	-	-
Örnsköldsviks sjukhus	17	-	-	-	-	5.9	-	-
Östersunds sjukhus	43	-	-	-	2.3	2.3	-	-

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	135	2.2	-	-	-	-	-	9.6
Blekingesjukhuset	49	-	-	-	-	-	-	8.2
Centrallasarettet Växjö	49	-	-	-	-	-	-	8.2
Centralsjukhuset Karlstad	59	-	-	1.7	1.7	-	-	6.8
Centralsjukhuset Kristianstad	1	-	-	-	-	-	-	-
Centralsjukhuset Västerås	54	1.9	-	-	-	-	-	3.7
Danderyds sjukhus	92	-	-	-	-	-	-	5.4
Drottning Silvias Bus	1	-	-	-	-	-	-	-
Falu lasarett	72	2.8	-	-	-	-	-	11.1
Hudiksvalls sjukhus	13	-	-	-	-	-	-	-
Karolinska Universitetssjukhuset	280	-	-	0.4	1.4	-	-	7.1
Linköpings Universitetssjukhus	131	0.8	-	-	-	-	-	3.8
Länssjukhuset Gävle	93	1.1	-	2.2	-	-	-	5.4
Länssjukhuset Kalmar	55	1.8	-	-	1.8	-	-	7.3
Länssjukhuset Ryhov	47	2.1	-	-	-	-	-	8.5
Mälarsjukhuset	20	-	-	-	-	-	-	-
Norrlands Universitetssjukhus	84	-	-	-	-	-	-	9.5
Sahlgrenska Universitetssjukhuset	127	0.8	-	-	0.8	-	-	11.8
Sahlgrenska Universitetssjukhuset /Östra	1	-	-	-	-	-	-	-
Skaraborgs sjukhus Skövde	52	-	-	-	-	-	-	3.8
Skellefteå lasarett	14	-	-	-	-	-	-	7.1
Skånes universitetssjukhus, Lund	349	-	-	-	-	-	-	1.7
St Görans sjukhus	71	-	-	-	1.4	-	-	2.8
Sunderby sjukhus	104	-	-	-	1.9	-	-	7.7
Sundsvalls sjukhus	92	1.1	-	1.1	2.2	-	-	14.1
Södersjukhuset	82	1.2	-	-	-	-	-	7.3
Södra Älvsborgs sjukhus	76	-	-	-	-	-	-	3.9
Trollhättan, NÄL	73	1.4	-	-	-	-	-	4.1
Universitetssjukhuset Örebro	82	-	-	-	-	-	-	9.8
Varbergs sjukhus	60	1.7	-	-	-	-	-	3.3
Visby lasarett	5	-	-	-	-	-	-	-
Örnsköldsviks sjukhus	17	-	-	-	-	-	-	5.9
Östersunds sjukhus	43	-	-	2.3	-	-	-	7.0

QUALITY – CRT – COMPLICATIONS

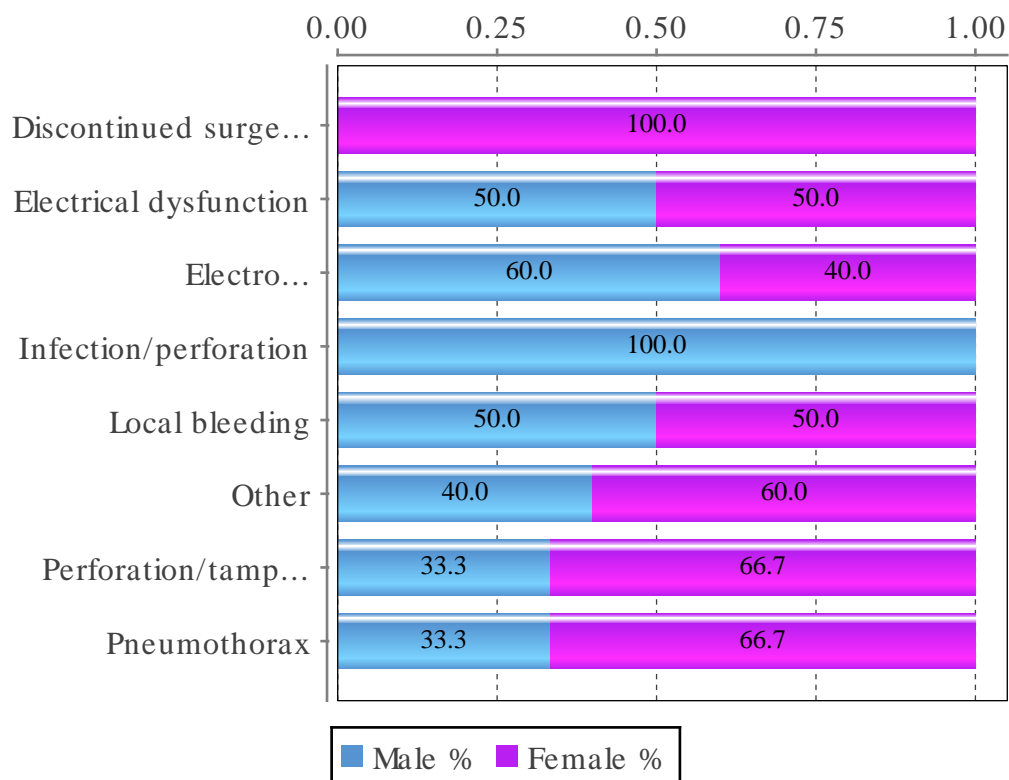
Registered complications for new implants and for bleeding, infection and other also including replacements.

CRT-P Complication	%
Death	-
Discontinued surgery due to hemodynamic reasons	0.2
Electrical dysfunction	0.8
Electrode displacement	3.1
Infection/perforation	0.6
Local bleeding	0.4
Other	1.0
Perforation/tamponade	0.6
Pericardial fluid	-
Peroperative arrhythmia requiring acute medication	-
Pneumothorax	0.6
Stroke	-
Subclavian or other related thrombosis	-
Total	7.4
Total no of implants 485	

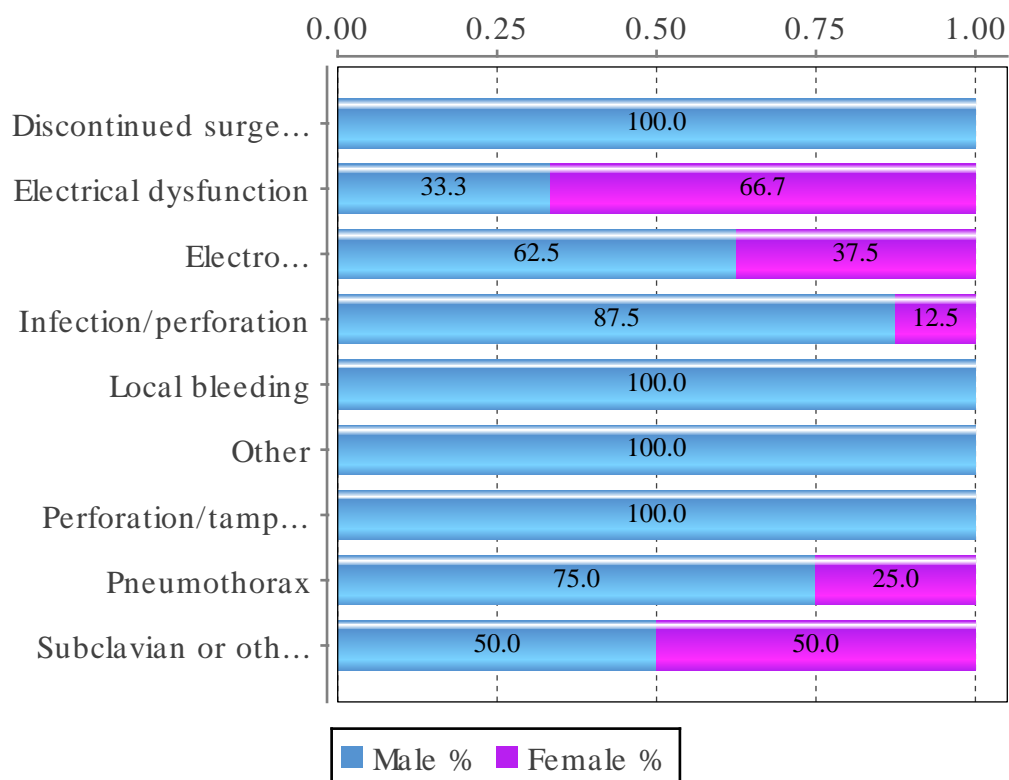
CRT-D Complication	%
Death	-
Discontinued surgery due to hemodynamic reasons	0.2
Electrical dysfunction	0.9
Electrode displacement	3.6
Infection/perforation	1.2
Local bleeding	0.6
Other	0.3
Perforation/tamponade	0.2
Pericardial fluid	-
Peroperative arrhythmia requiring acute medication	-
Pneumothorax	0.6
Stroke	-
Subclavian or other related thrombosis	0.3
Total	7.8
Total no of implants 664	

QUALITY – CRT – COMPLICATIONS

CRT-P complications by gender

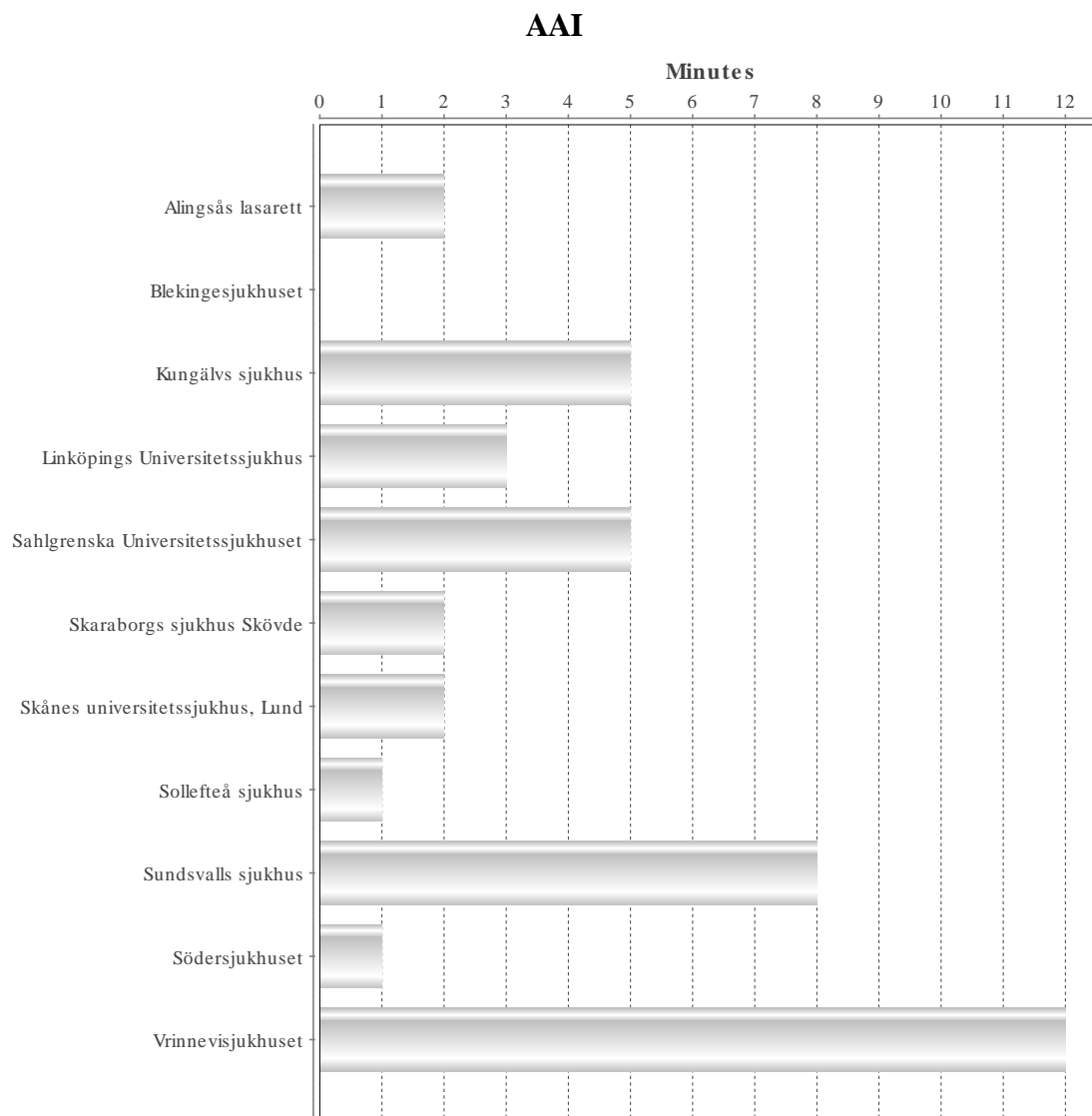


CRT-D complications by gender



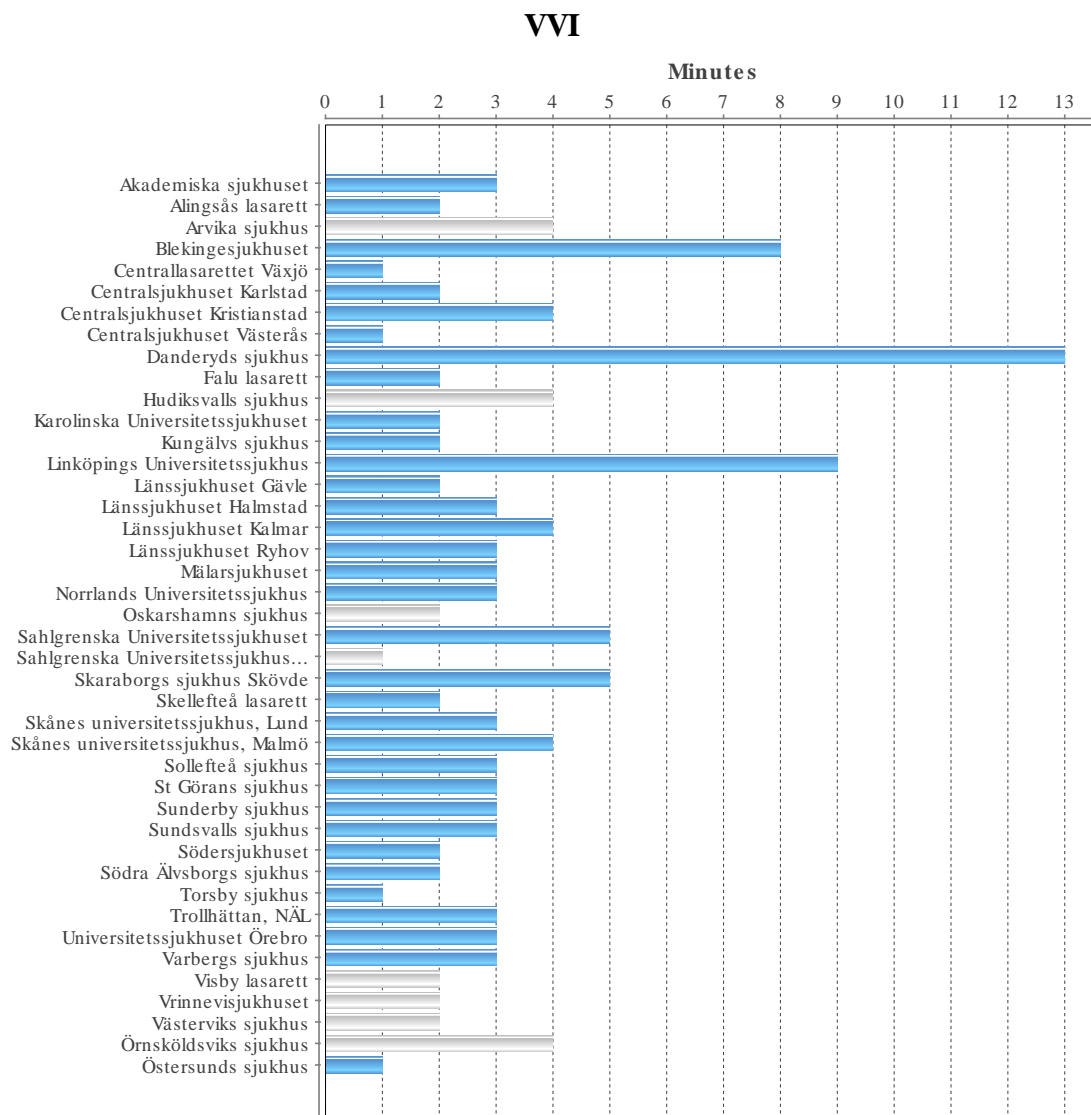
QUALITY – PACEMAKER – FLUOROSCOPY PER HOSPITAL

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.



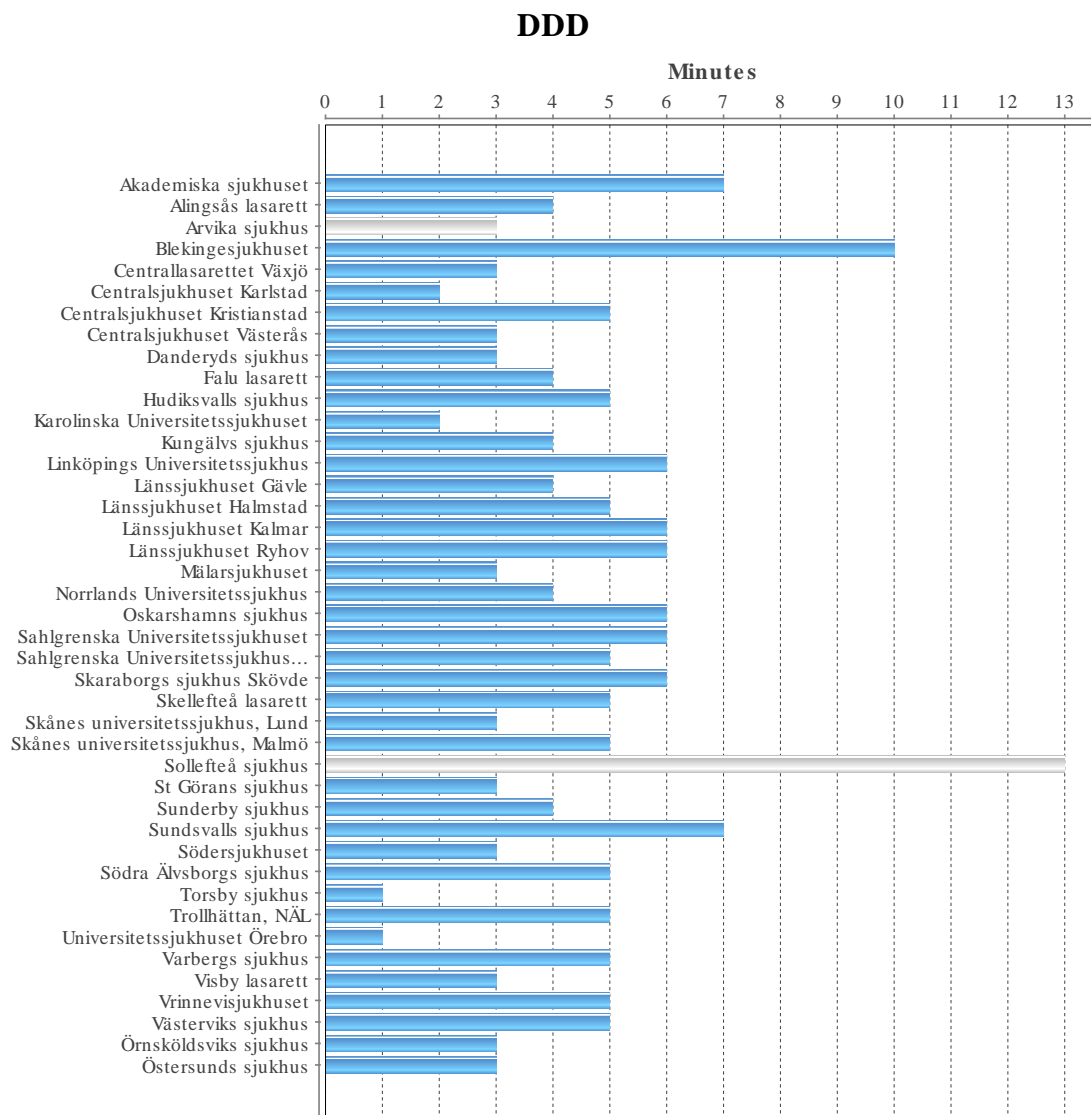
QUALITY – PACEMAKER – FLUOROSCOPY PER HOSPITAL

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.



QUALITY – PACEMAKER – FLUOROSCOPY PER HOSPITAL

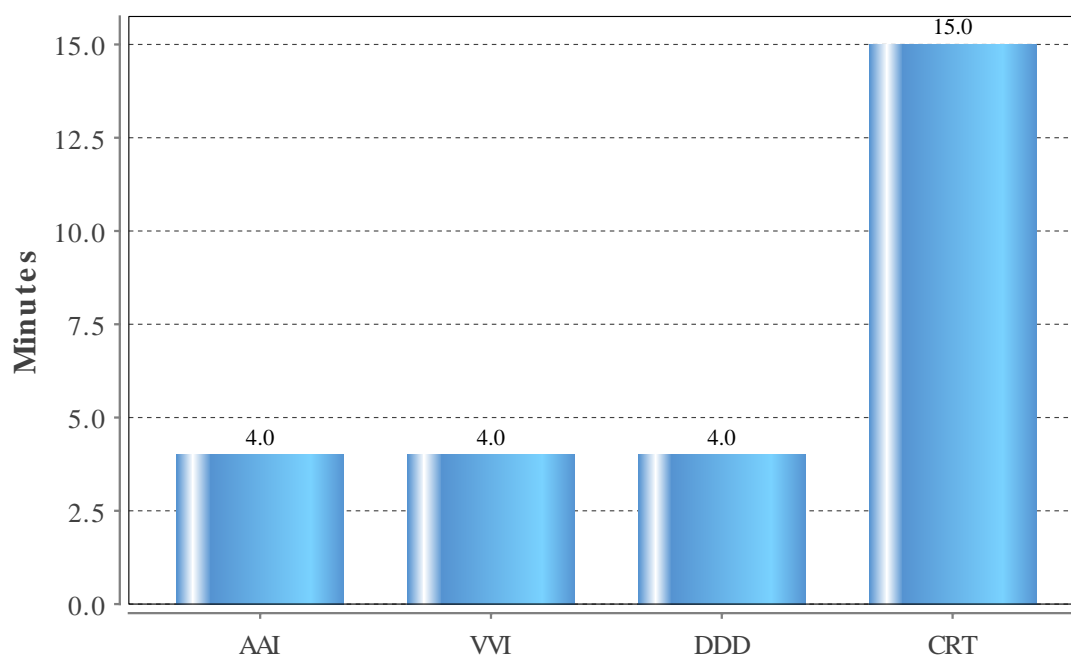
Mean fluoroscopy duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.



QUALITY – PACEMAKER – FLUOROSCOPY PER SUBTYPE

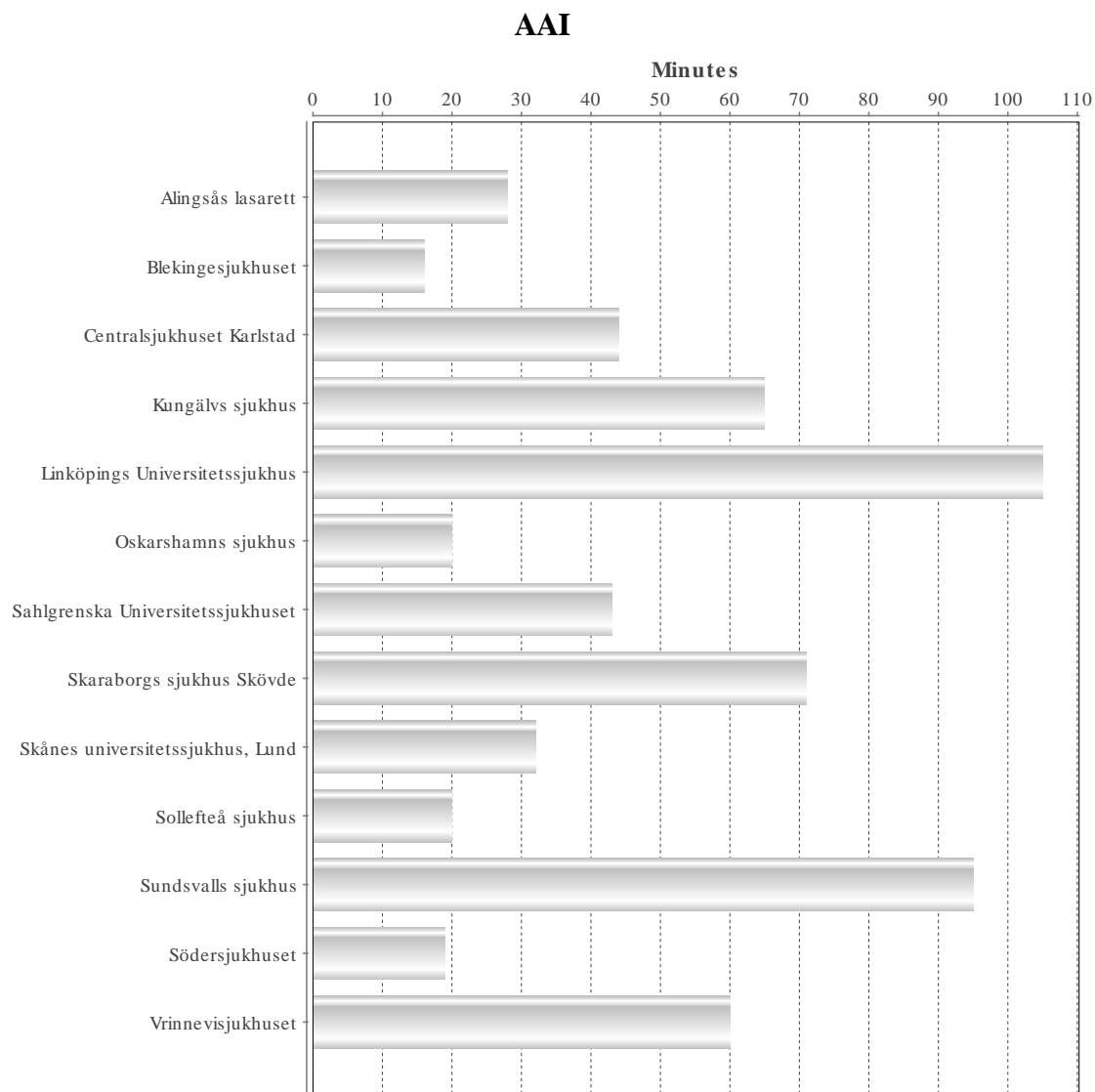
National mean skin to skin duration for a new implant of different subtypes

Knife time	Average	Standard deviation
AAI	4.0	3.6
VVI	4.0	15.7
DDD	4.0	11.2
CRT	15.0	14.4



QUALITY – PACEMAKER – KNIFE TIME PER HOSPITAL

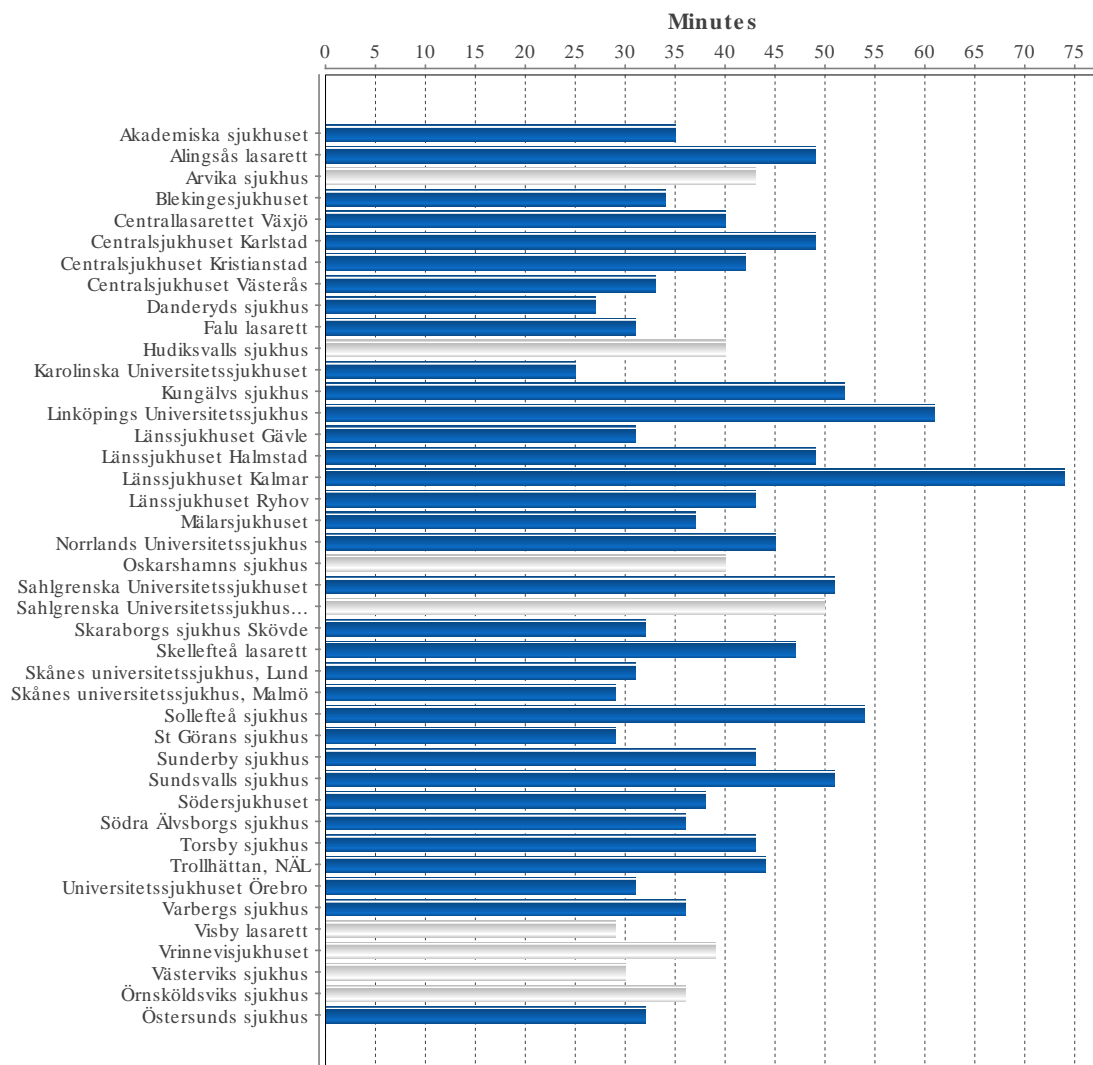
Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.



QUALITY – PACEMAKER – KNIFE TIME PER HOSPITAL

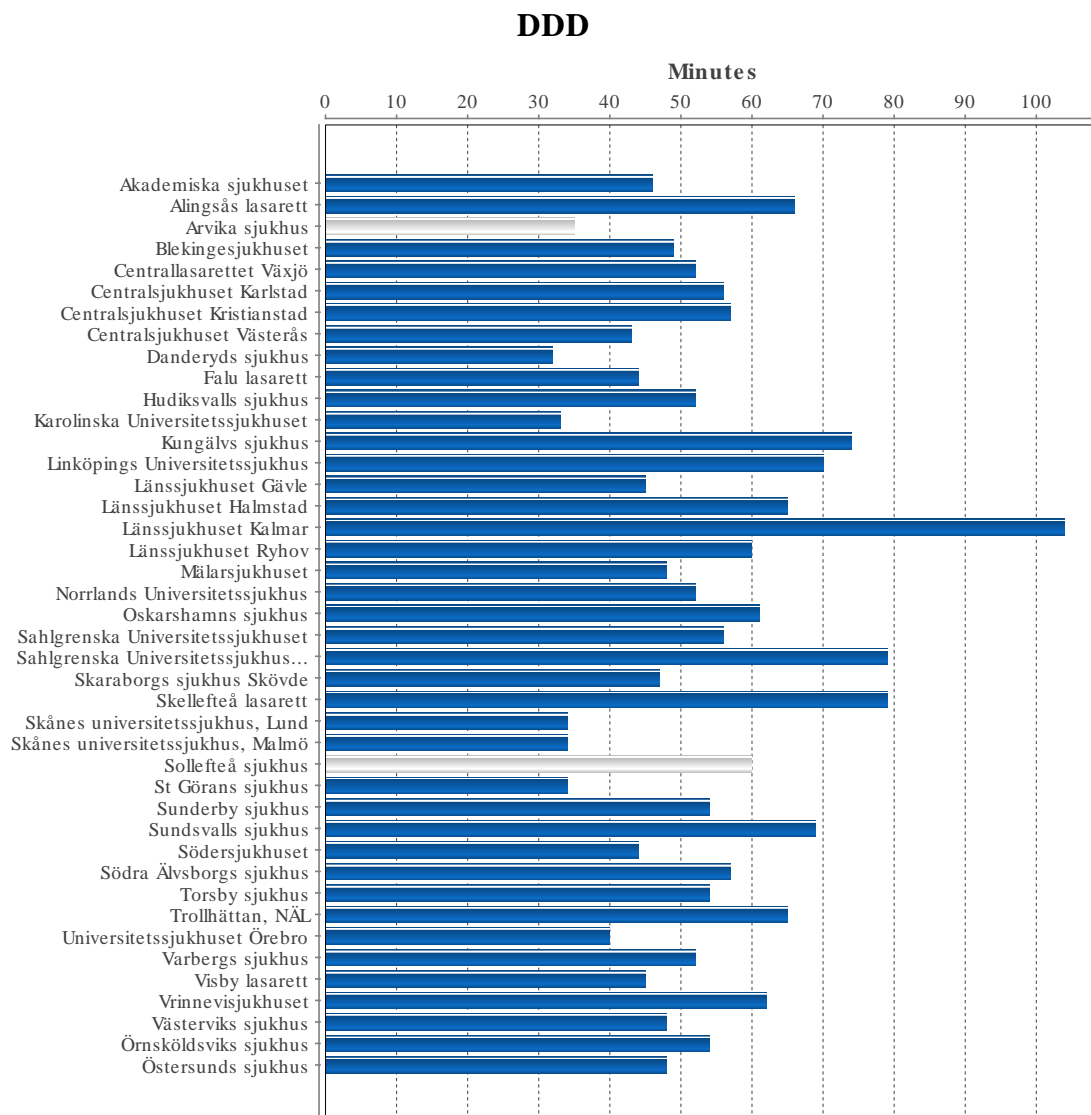
Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

VVI



QUALITY – PACEMAKER – KNIFE TIME PER HOSPITAL

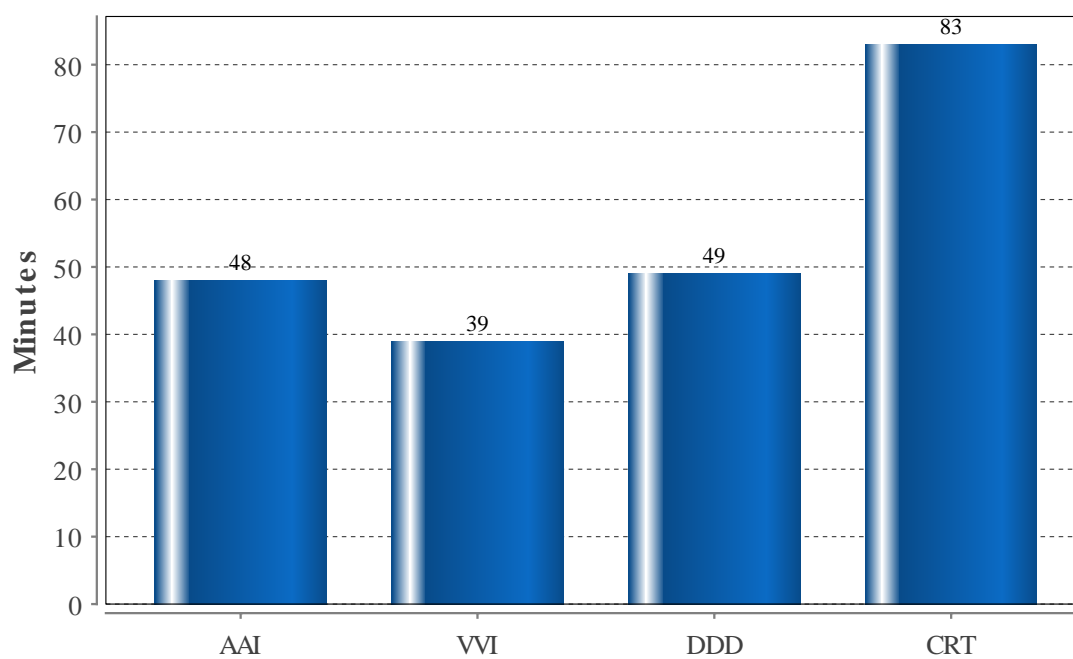
Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.



QUALITY – PACEMAKER – KNIFE TIME PER SUBTYPE

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

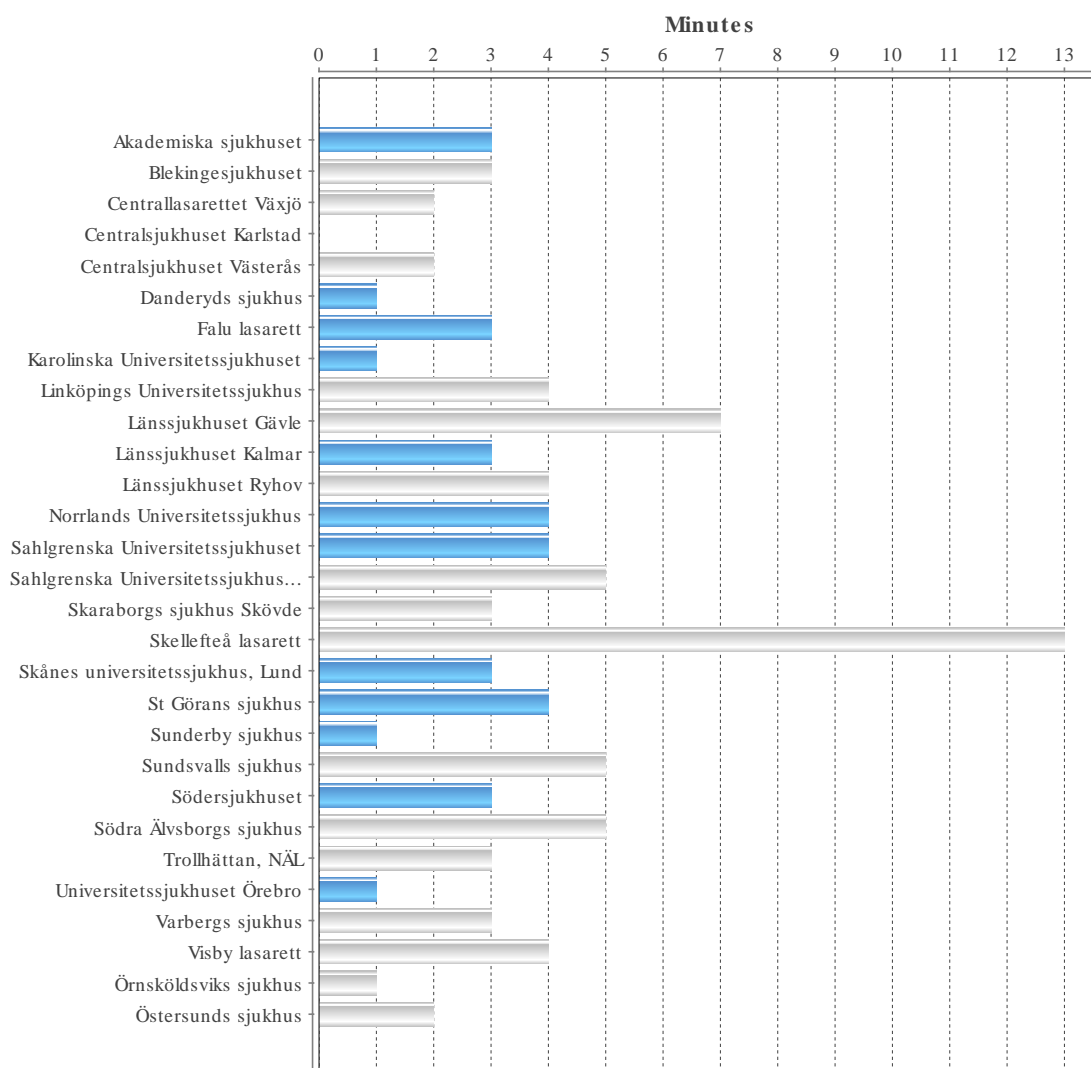
Knife time	Average	Standard deviation
AAI	48	33.6
VVI	39	22.5
DDD	49	23.4
CRT	83	37.0



QUALITY – ICD – FLUOROSCOPY PER 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.

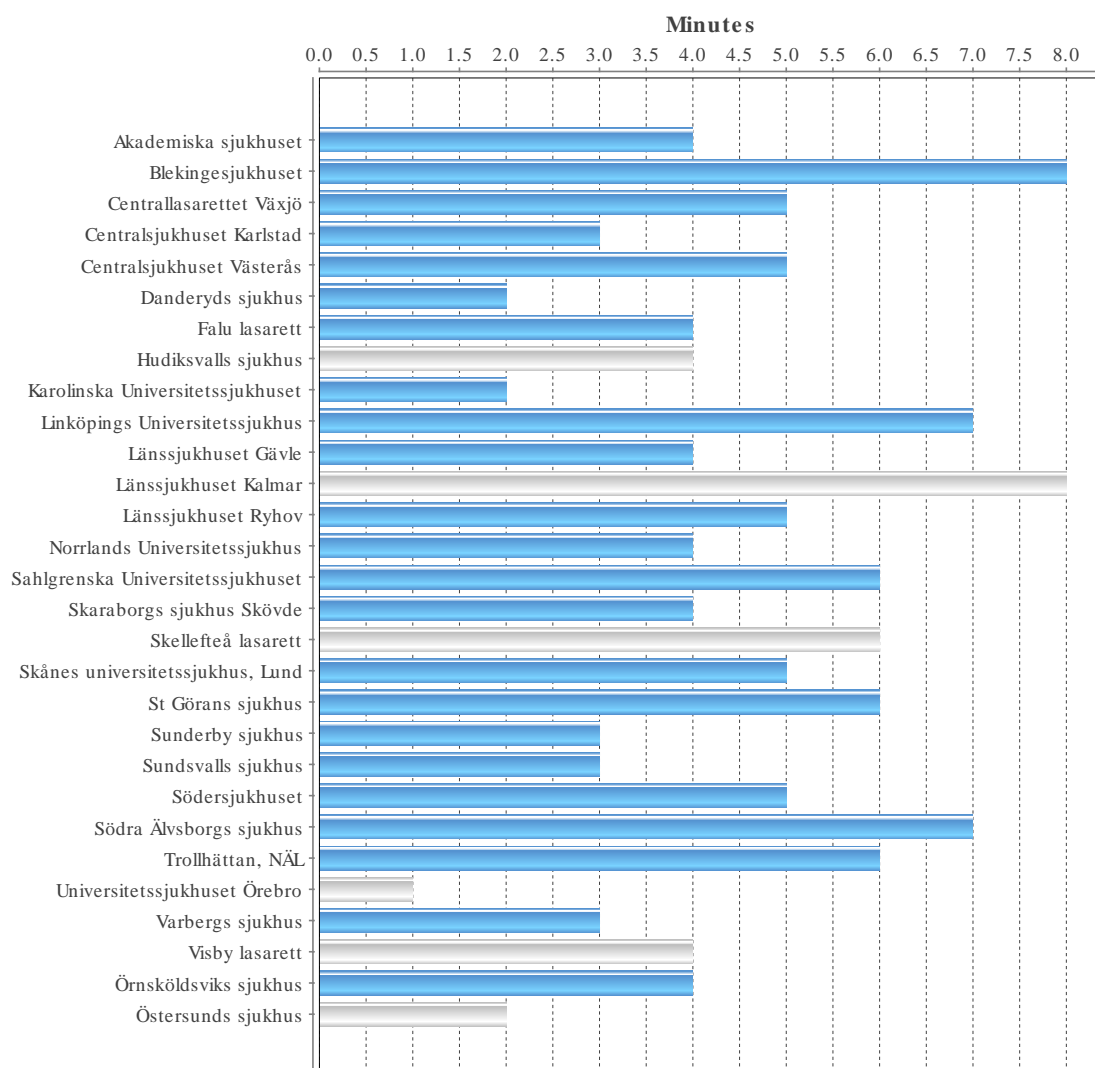
VVI



QUALITY – ICD – FLUOROSCOPY PER 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.

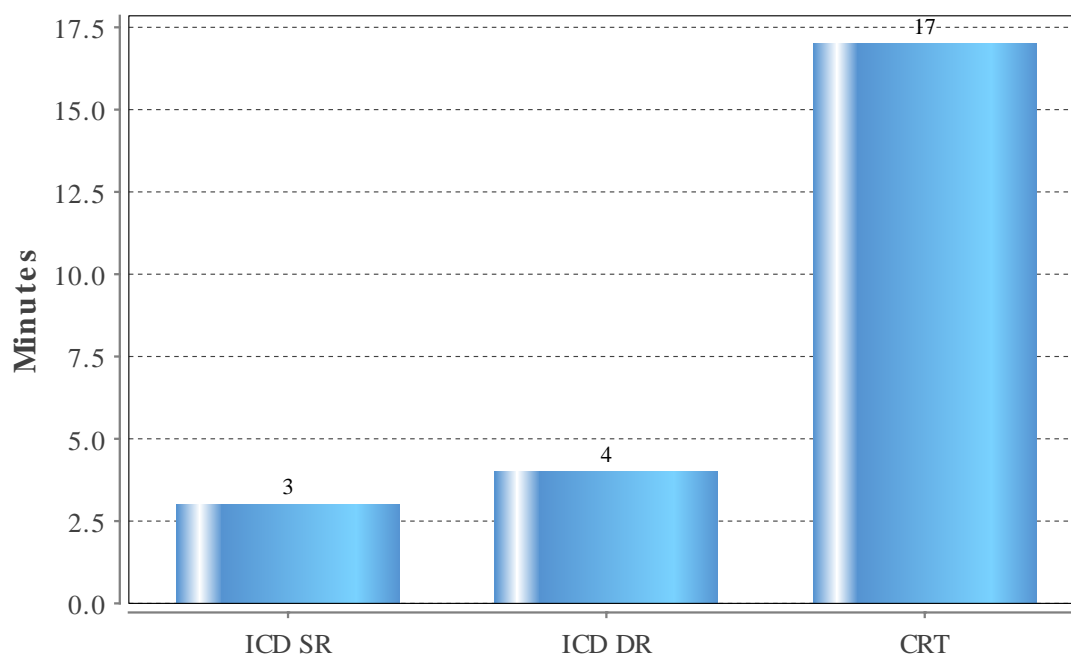
DDD



QUALITY – ICD – FLUOROSCOPY PER SUBTYPE

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

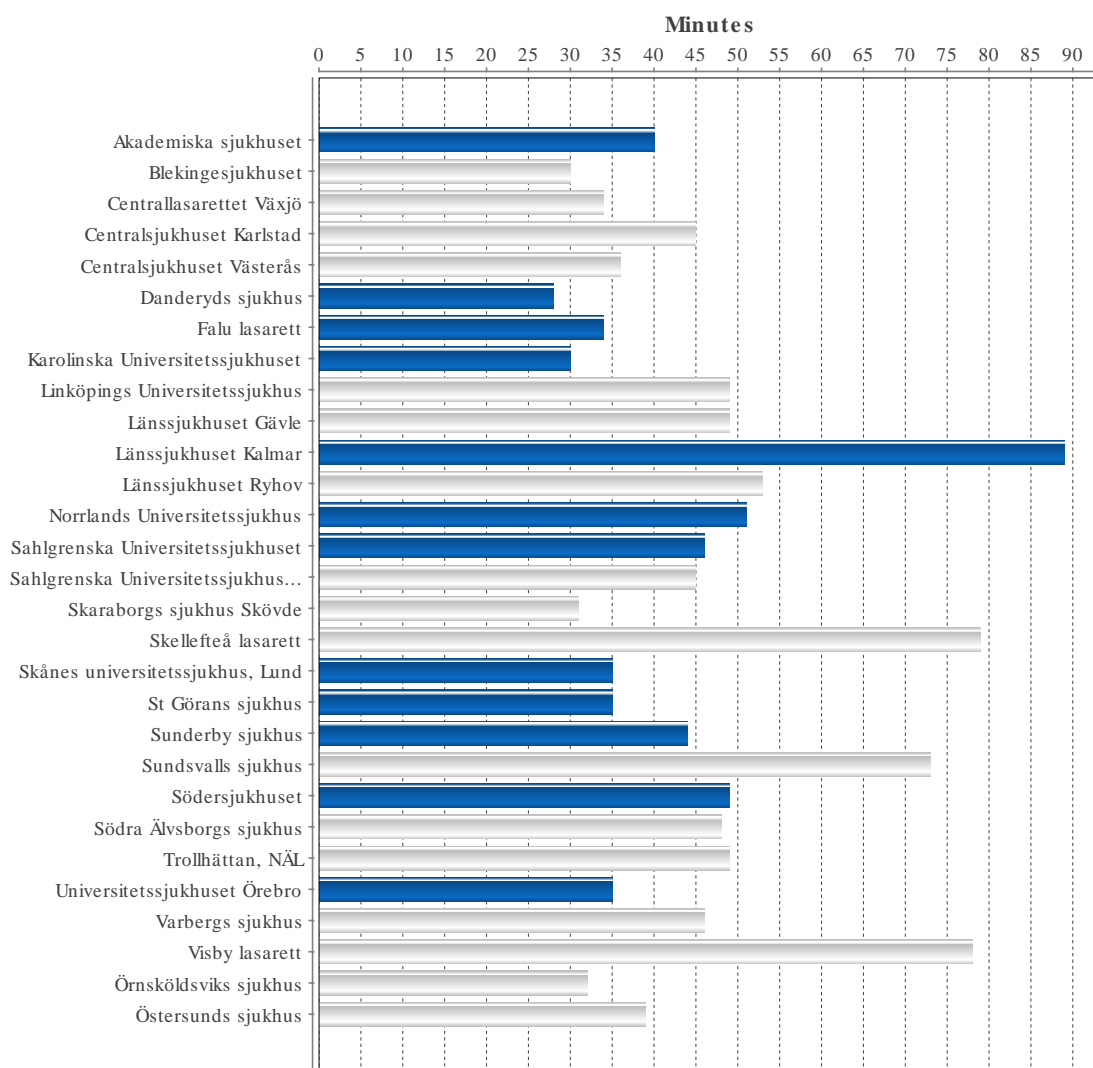
Knife time	Average	Standard deviation
ICD SR	3	4.1
ICD DR	4	4.8
CRT	17	20.4



QUALITY – ICD – KNIFE TIME PER HOSPITAL

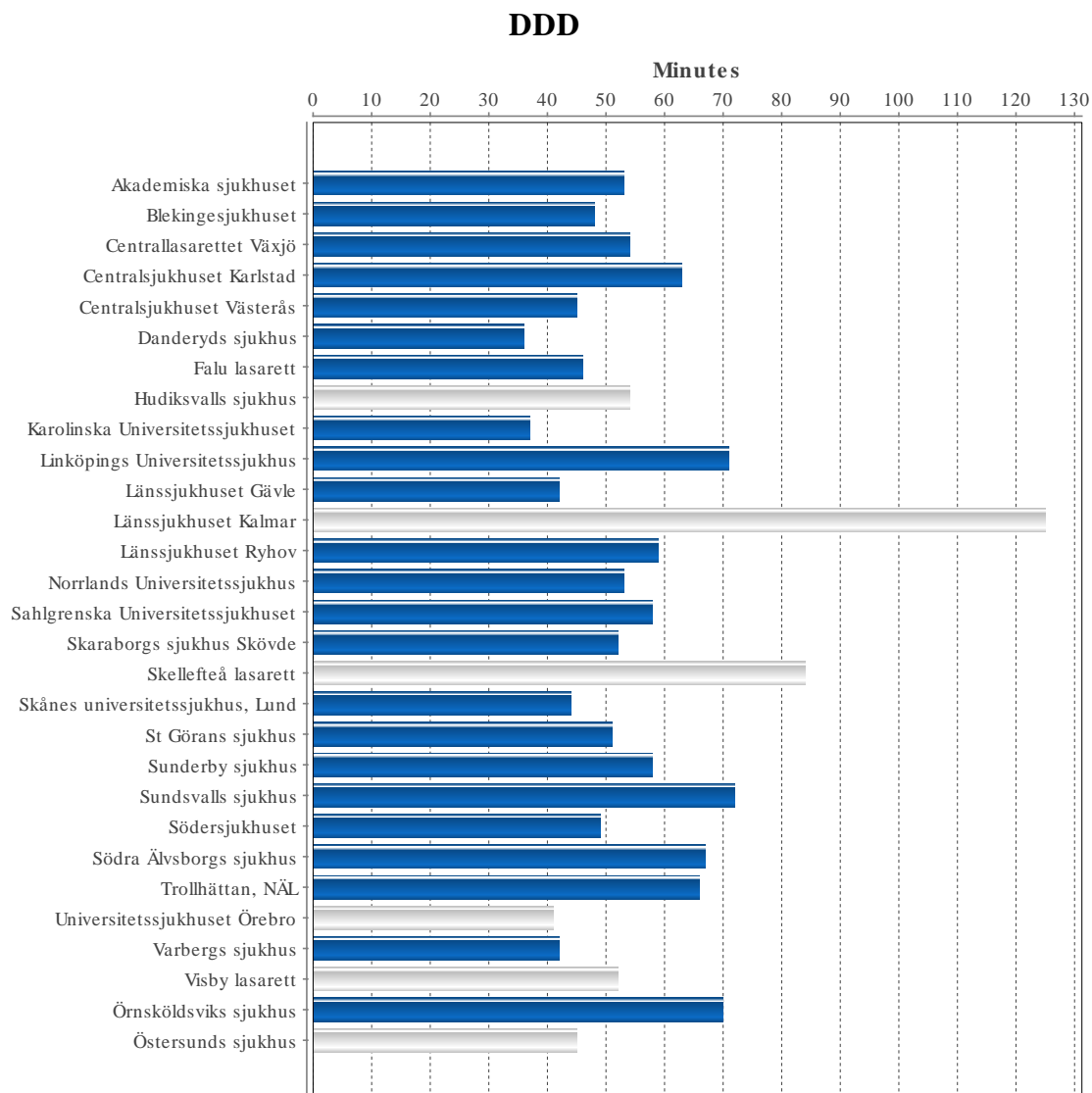
Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.

VVI



QUALITY – ICD – KNIFE TIME PER HOSPITAL

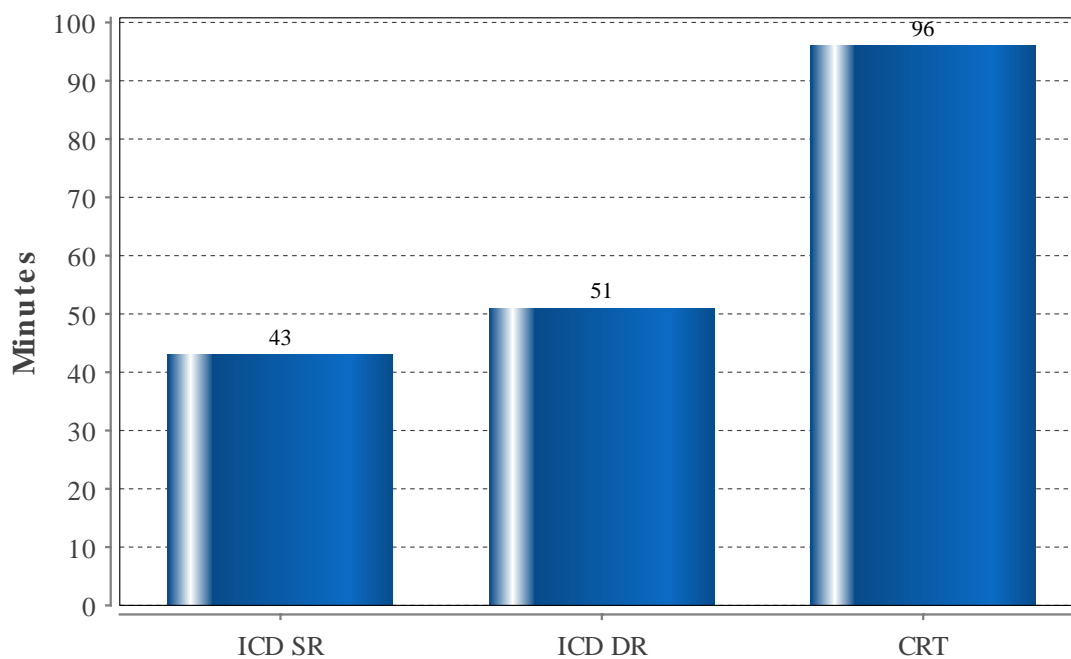
Mean duration for a new implant of different subtypes per hospital. Hospitals with less than 10 implants of a specific subtype are marked in grey, blue indicates 10 or more implants of this subtype, performed yearly at this hospital.



QUALITY – ICD – KNIFE TIME PER SUBTYPE

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

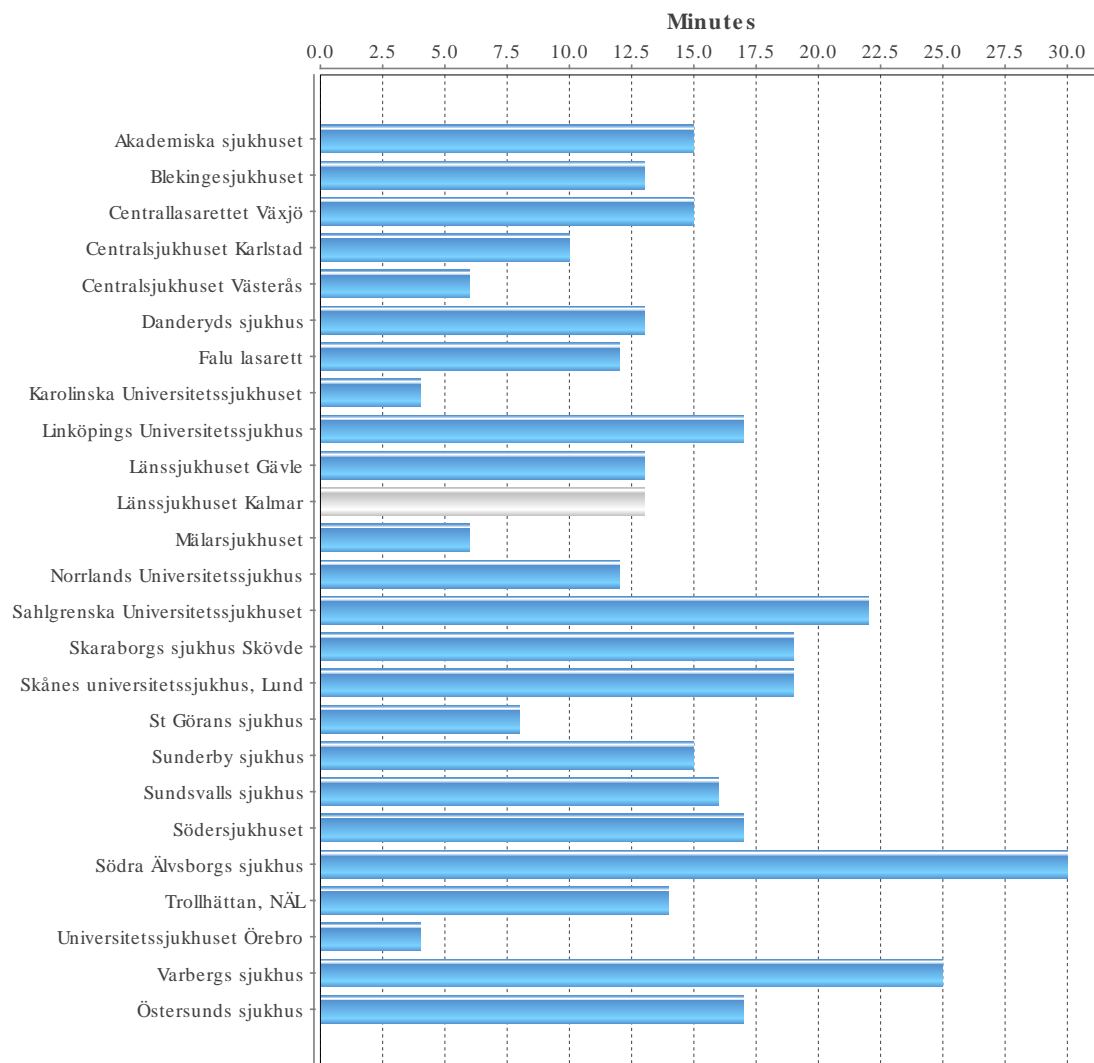
Knife time	Average	Standard deviation
ICD SR	43	21.5
ICD DR	51	22.7
CRT	96	42.6



QUALITY – CRT – FLUOROSCOPY

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

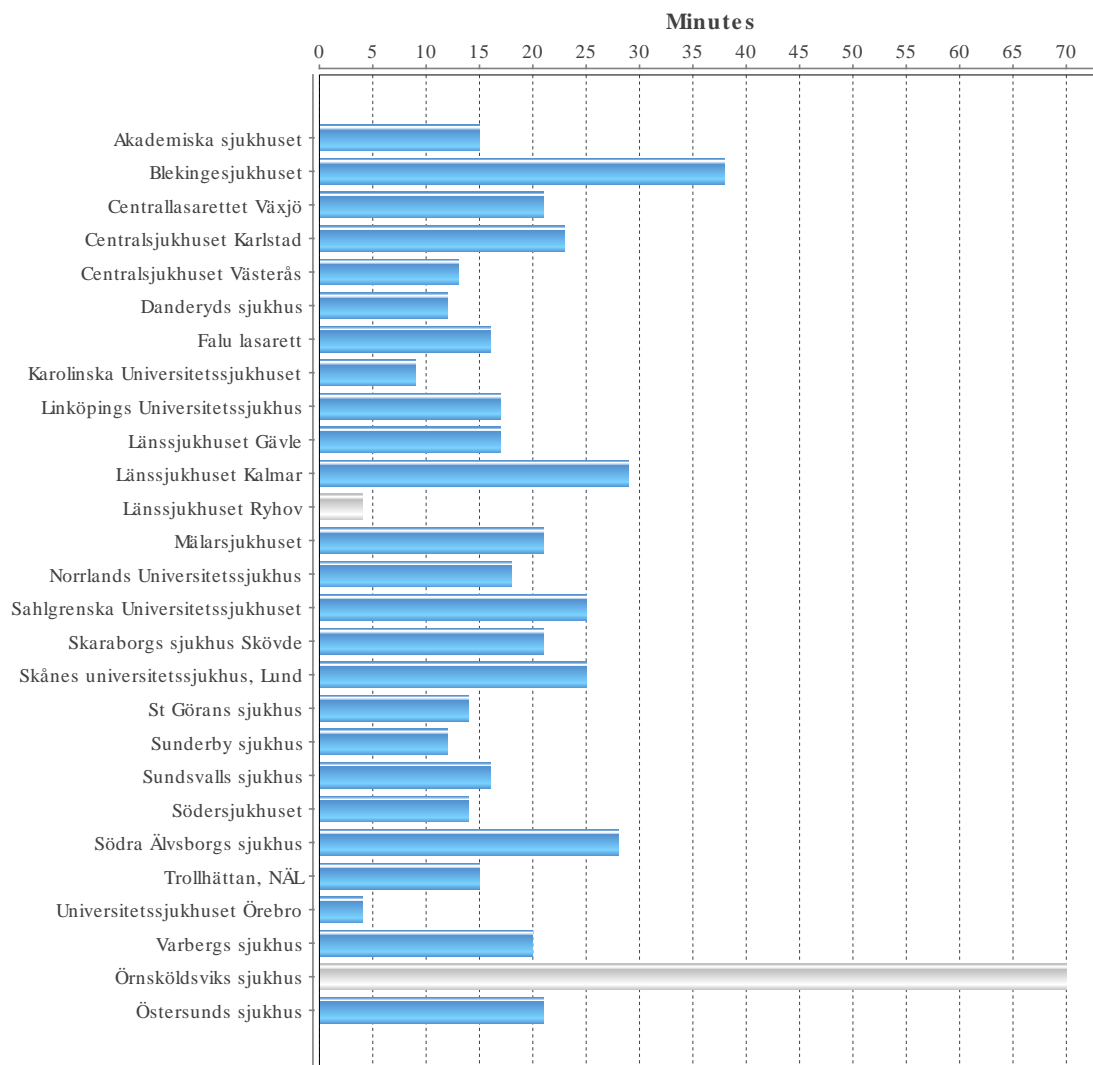
CRT-P



QUALITY – CRT – FLUOROSCOPY

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

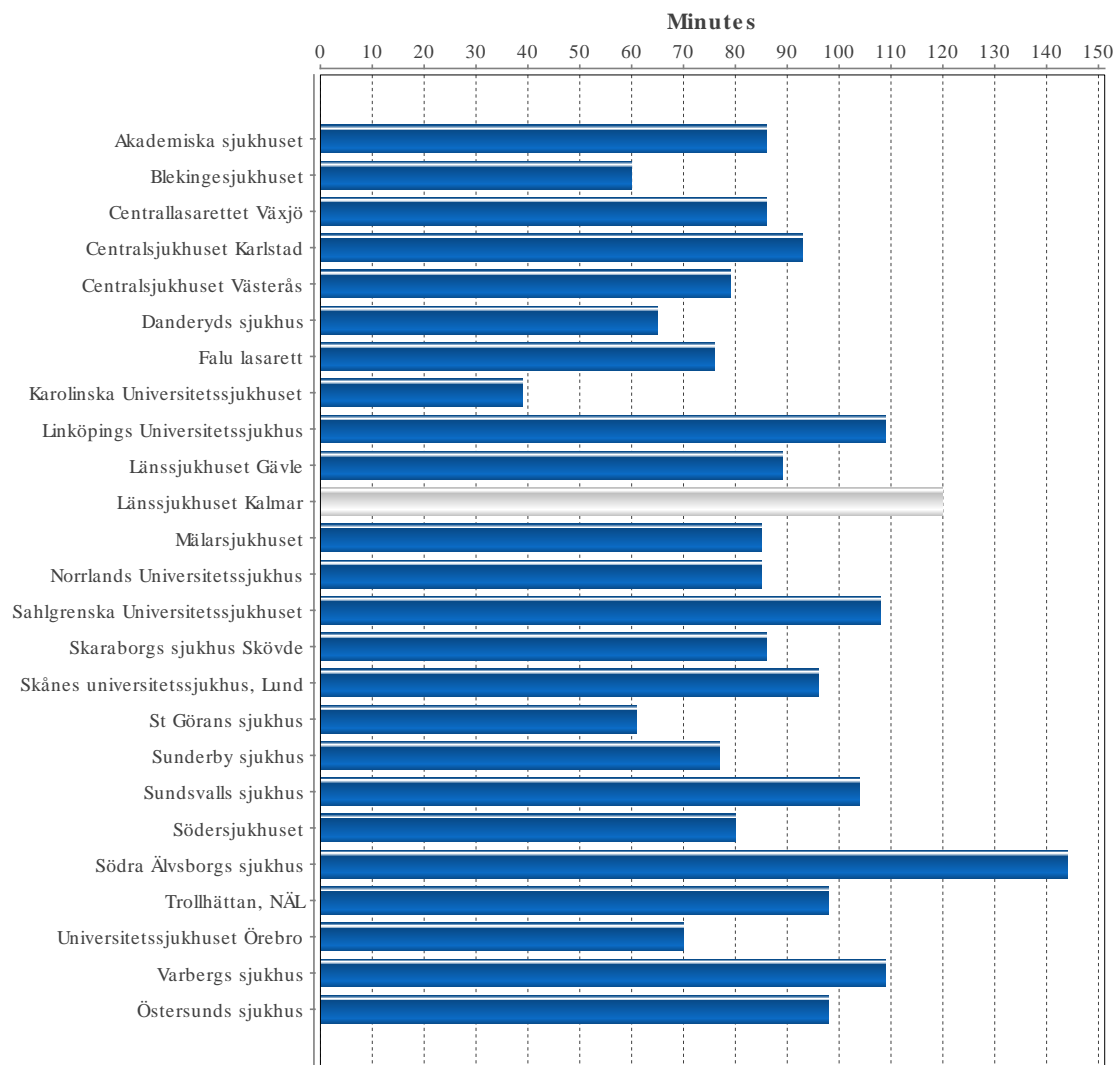
CRT-D



QUALITY – CRT – KNIFE TIME PER HOSPITAL

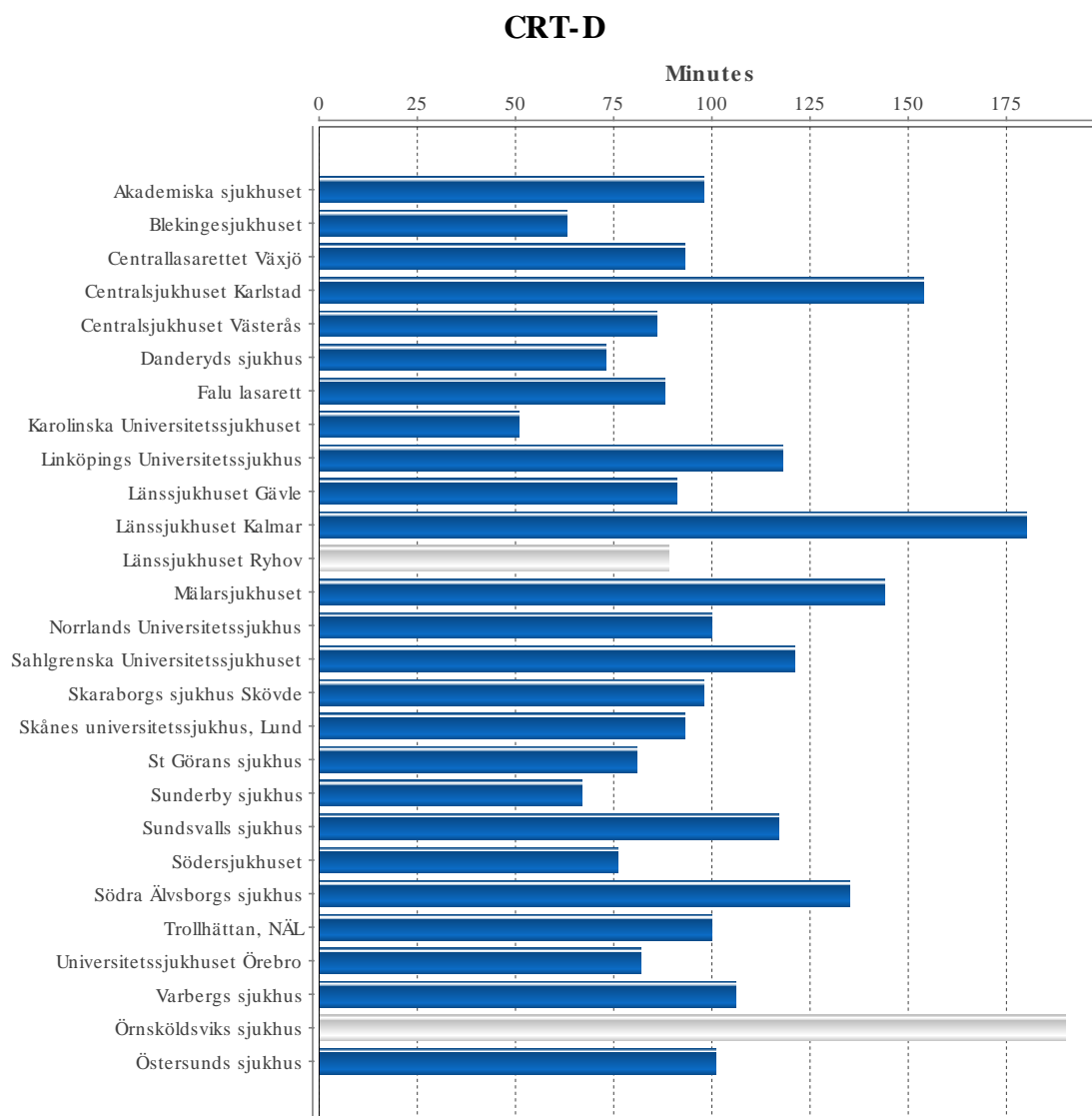
Mean skin to skin duration per subtype and hospital. Bars colored in grey are based on less than 10 observations

CRT-P



QUALITY – CRT – KNIFE TIME PER HOSPITAL

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



QUALITY – PACEMAKER – GENERATOR SURVIVAL

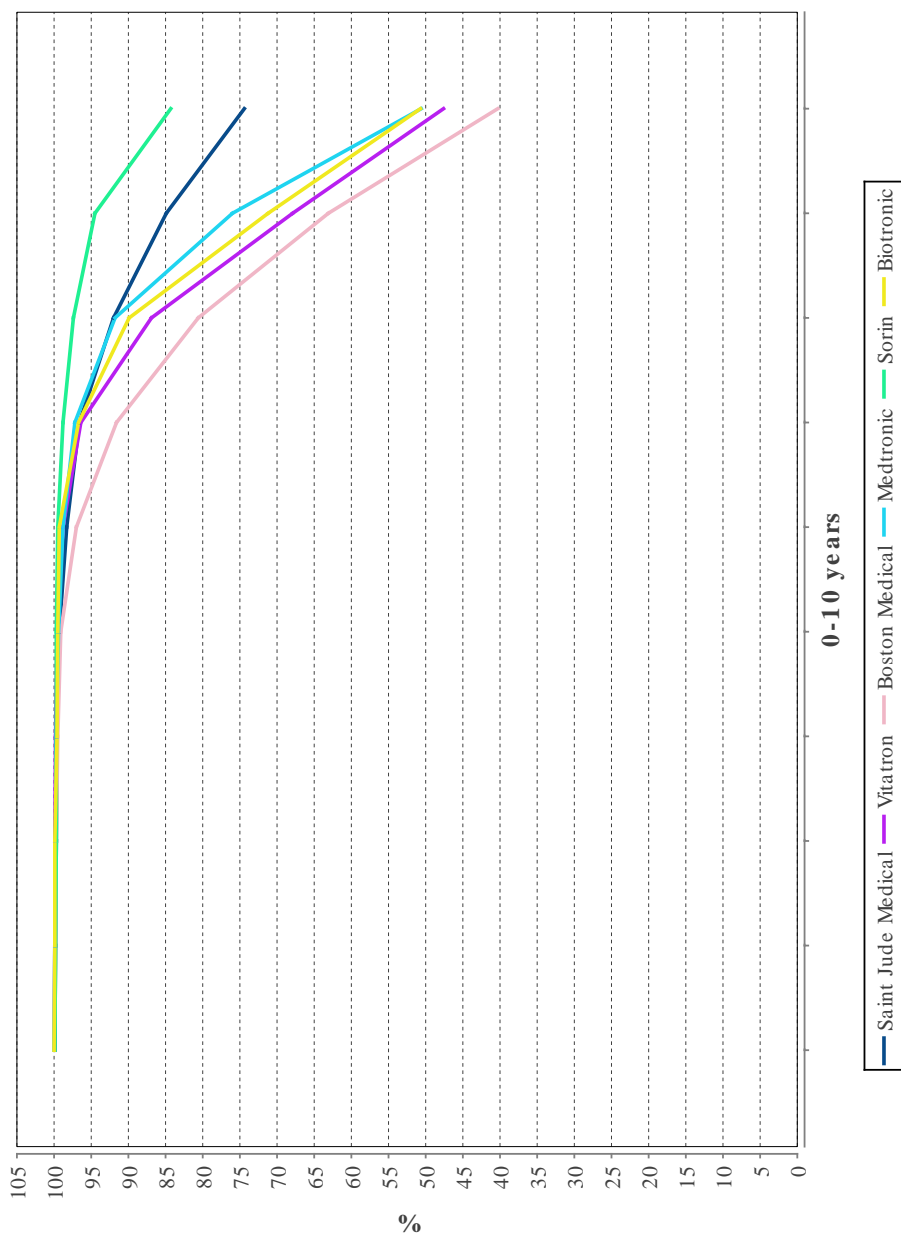
Year	At risk	Survival probability %
1	95148	100.0
2	79333	99.9
3	64680	99.8
4	51704	99.6
5	40121	99.4
6	30041	98.5
7	21430	96.3
8	13690	89.5
9	6921	75.2
10	2201	56.1

QUALITY – PACEMAKER – GENERATOR SURVIVAL PER MANUFACTURER

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	95118	100.0	5281	100.0	12055	100.0	26996	100.0	29229	99.9	16952	100.0	4605	99.9
2	79308	99.9	4049	99.9	9698	99.8	23093	99.9	23712	99.8	14631	99.9	4125	99.8
3	64661	99.8	3056	99.9	7531	99.7	19385	99.8	18830	99.7	12282	99.9	3577	99.7
4	51697	99.6	2377	99.6	6161	99.5	16002	99.7	14890	99.6	9335	99.8	2932	99.7
5	40121	99.4	1774	99.5	4906	99.1	13140	99.4	10908	99.3	7024	99.6	2369	99.7
6	30041	98.6	1146	99.3	3865	97.0	10415	98.8	7694	98.3	5046	98.8	1875	99.5
7	21430	96.2	690	96.7	2946	91.6	7380	97.2	5029	96.6	4007	96.4	1378	98.8
8	13690	89.8	346	89.9	1866	80.6	4370	91.8	3275	92.0	3043	86.9	790	97.4
9	6921	76.3	118	71.2	866	63.1	1874	76.0	1887	84.9	1798	67.9	378	94.5
10	2201	58.0	35	50.7	164	40.3	526	50.6	815	74.4	593	47.6	68	84.3

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



QUALITY – PACEMAKER – GENERATOR SURVIVAL PER MODEL

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	Philos SR	100.0	100.0	100.0	100.0	100.0	100.0	96.8	96.8	96.8
Biotronik	Axios SR	100.0	100.0	100.0	100.0	100.0	94.7	77.3	71.3	61.1
Biotronik	Philos II DR-T	99.7	99.7	99.3	99.3	99.3	98.3	98.3	98.3	NaN
Biotronik	Philos II DR	100.0	100.0	99.6	99.2	98.8	97.3	87.2	63.8	43.7
Biotronik	Effecta DR	100.0	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN
Biotronik	Talos SR	99.8	99.8	99.8	99.8	99.8	99.4	98.0	NaN	NaN
Biotronik	Effecta SR	99.9	99.9	99.9	99.9	99.9	NaN	NaN	NaN	NaN
Boston Scientific	1294 Insignia I	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	70.0
Boston Scientific	1297 Insignia I	100.0	100.0	100.0	100.0	97.3	97.3	93.8	89.6	NaN
Boston Scientific	1192 Insignia	100.0	100.0	100.0	100.0	98.1	98.1	98.1	90.4	NaN
Boston Scientific	J172 Ingenio	98.6	98.6	98.6	98.6	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	99.3	99.3	99.3	NaN	NaN	NaN	NaN
Boston Scientific	S601 Altrua 60	100.0	99.6	99.1	99.1	99.1	96.5	93.6	81.8	NaN
Boston Scientific	S603 Altrua 60	100.0	100.0	99.5	98.4	96.6	88.3	59.5	39.1	NaN
Boston Scientific	S402 Altrua 40	99.7	99.7	99.7	99.7	99.2	99.2	97.2	93.6	93.6
Boston Scientific	S606 Altrua 60	99.8	99.8	99.8	99.5	98.8	97.5	96.1	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	99.4	98.6	95.3	84.1	58.1	20.3	5.1
Boston Scientific	S602 Altrua 60	100.0	99.6	99.6	99.4	98.9	97.5	95.0	90.3	90.3
Boston Scientific	1291 Insignia I	99.5	99.5	99.5	99.5	98.7	96.9	95.0	88.3	83.7
Boston Scientific	S501 Altrua 50	100.0	100.0	99.3	99.3	99.3	98.0	95.0	91.5	NaN
Boston Scientific	J277 Vitalio MRI	99.5	99.2	99.2	NaN	NaN	NaN	NaN	NaN	NaN
Boston Scientific	S404 EL Altrua 40	100.0	99.9	99.8	99.5	99.1	98.7	98.1	NaN	NaN
Boston Scientific	1190 Insignia	99.9	99.1	98.6	98.4	96.9	93.6	86.1	69.9	53.4
Boston Scientific	L231 Proponent MRI EL DR	99.8	99.8	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Boston Scientific	1290 Insignia I	99.9	99.8	99.6	98.6	92.9	79.3	57.6	32.2	11.0
LivaNova	2530 Rhapsody	100.0	100.0	100.0	100.0	100.0	99.0	98.0	95.6	NaN
LivaNova	Reply SR	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	NaN
LivaNova	Esprit DR	100.0	100.0	100.0	99.7	99.7	98.9	95.9	92.9	NaN

QUALITY – PACEMAKER – GENERATOR SURVIVAL PER MODEL

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
LivaNova	2550 Symphony DR	100.0	100.0	100.0	100.0	99.7	99.5	98.6	97.1	92.2
LivaNova	Reply 200 DR	99.9	99.5	99.5	NaN	NaN	NaN	NaN	NaN	NaN
LivaNova	Reply DR	99.7	99.6	99.6	99.6	99.4	98.4	96.5	87.3	-27.8
Medtronic	KDR931 Kappa DR	100.0	100.0	100.0	100.0	100.0	100.0	100.0	94.1	58.7
Medtronic	SS303 Sigma S	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	NaN
Medtronic	ADSR01 Adapta	100.0	99.0	99.0	99.0	99.0	99.0	77.7	39.3	0.0
Medtronic	P1501DR EnRhythm	100.0	100.0	100.0	100.0	97.3	79.6	46.9	26.5	19.6
Medtronic	KSR703 Kappa SR	100.0	100.0	100.0	97.1	93.8	79.4	49.4	29.3	10.1
Medtronic	E2DR31 EnPulse	100.0	100.0	100.0	98.9	98.9	98.9	97.4	92.6	78.3
Medtronic	E2SR01 EnPulse	100.0	100.0	100.0	99.3	96.6	91.5	53.4	13.1	4.4
Medtronic	A3DR01 Advisa DR MRI	100.0	100.0	100.0	100.0	100.0	97.3	97.3	NaN	NaN
Medtronic	KSR901 Kappa SR	98.6	98.6	98.6	98.6	98.6	89.6	45.9	17.2	8.8
Medtronic	SEDR01 Sensia	100.0	100.0	100.0	100.0	99.6	99.2	97.5	80.8	43.2
Medtronic	C2TR01 Syncra CRT	99.8	99.6	99.6	98.6	94.5	91.8	NaN	NaN	NaN
Medtronic	ADDR01 Adapta	100.0	99.8	99.6	99.3	98.6	98.4	95.4	81.7	46.0
Medtronic	VEDR01 Versa	100.0	99.7	99.5	99.3	99.1	97.5	94.5	78.3	53.6
Medtronic	8042 InSync III	100.0	99.8	99.0	97.9	95.8	87.3	68.2	35.9	11.4
Medtronic	EN1DR01 Ensura DR MRI	99.8	99.7	99.6	99.5	99.1	98.3	NaN	NaN	NaN
Medtronic	SESR01 Sensia	99.9	99.9	99.7	99.4	98.7	96.1	93.1	69.3	NaN
Medtronic	ADDRL1 Adapta	99.9	99.8	99.8	99.8	99.7	99.3	99.1	97.9	90.7
Medtronic	RESR01 Relia SR	99.7	99.7	99.7	99.3	98.7	97.4	91.1	77.4	NaN
Medtronic	E2DR01 EnPulse	100.0	99.8	99.7	99.2	98.5	96.5	89.3	60.6	22.1
Medtronic	SEDRL1 Sensia	99.9	99.9	99.8	99.8	99.6	99.4	98.9	97.1	92.3
Medtronic	REDR01 Relia DR	99.9	99.8	99.7	99.6	99.4	98.9	97.1	91.5	NaN
St. Jude Medical	5157 M/S Verity ADx XL SR	100.0	100.0	100.0	100.0	100.0	95.2	95.2	95.2	95.2

QUALITY – PACEMAKER – GENERATOR SURVIVAL PER MODEL

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
St. Jude Medical	5610 Victory	100.0	100.0	100.0	100.0	97.1	83.2	44.4	18.2	0.0
St. Jude Medical	2525T Microny II	98.6	98.6	98.6	94.1	80.3	76.7	67.9	56.0	32.0
St. Jude Medical	5180 Identity ADx SR	100.0	100.0	97.9	97.9	88.2	77.7	51.1	13.9	4.6
St. Jude Medical	5810 Victory DR	100.0	100.0	94.6	87.6	68.3	45.5	27.8	20.3	20.3
St. Jude Medical	1136 Sustain XL	100.0	100.0	100.0	99.1	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	5356 Verity ADx XL DR	100.0	100.0	100.0	99.1	97.1	97.1	97.1	94.2	84.3
St. Jude Medical	2136 Sustain XL DR	99.5	99.5	99.5	99.1	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	99.4	97.5	90.4	80.5	62.4	42.9	28.6
St. Jude Medical	2212 Accent DR	99.8	99.6	99.6	99.1	98.5	98.5	97.0	NaN	NaN
St. Jude Medical	2224 Accent DR MRI	99.8	99.8	99.8	98.9	98.9	NaN	NaN	NaN	NaN
St. Jude Medical	2160 Endurity	99.5	99.5	99.5	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	1272 Assurity MRI SR	100.0	100.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3222 Allure RF	99.7	99.7	99.7	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	1160 Endurity SR	99.9	99.7	99.7	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3212 Anthem	99.6	99.1	98.3	97.1	92.7	83.3	74.3	NaN	NaN
St. Jude Medical	5386 Identity ADx XL DR	99.0	98.6	98.1	98.1	95.5	94.9	91.9	78.8	61.4
St. Jude Medical	5626 Zephyr XL	99.9	99.6	99.6	99.5	99.4	99.4	98.8	98.1	98.1
St. Jude Medical	2112 Accent DR	99.9	99.9	99.9	99.8	99.5	97.8	NaN	NaN	NaN
St. Jude Medical	2260 Assurity + DR	99.7	99.7	99.6	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	5156 Verity ADx XL SR	100.0	100.0	100.0	99.7	99.6	99.3	99.2	98.7	98.2
St. Jude Medical	5826 Zephyr XL	99.8	99.7	99.6	99.5	99.3	98.8	95.9	89.4	84.0
St. Jude Medical	2272 Assurity MRI DR	99.9	99.9	NaN	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	5816 Victory XL	99.8	99.7	99.6	99.5	99.1	98.0	92.7	84.4	69.2
Vitatron	T20SR	99.8	99.8	99.8	99.3	98.3	96.3	94.3	92.2	88.4
Vitatron	C10S	99.9	99.9	99.7	99.5	99.2	98.8	97.2	95.7	94.6
Vitatron	C70DR	100.0	100.0	100.0	100.0	99.8	97.8	88.4	65.2	33.5
Vitatron	T70DR	99.5	99.4	99.4	99.0	97.0	92.3	73.6	48.4	27.4
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	98.4	97.1	95.8	89.4
Vitatron	T60DR	100.0	100.0	99.7	99.3	98.3	96.0	84.9	63.4	42.9

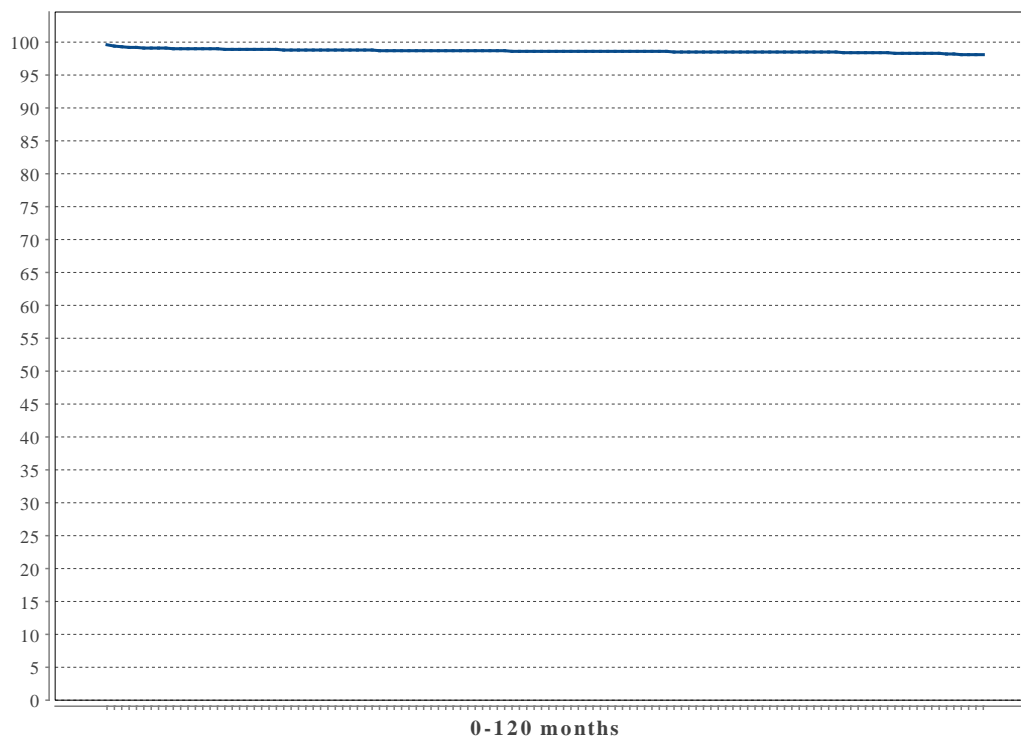
QUALITY – PACEMAKER – GENERATOR SURVIVAL PER MODEL

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
Vitatron	G20A1	99.9	99.9	99.9	99.9	99.3	NaN	NaN	NaN	NaN
Vitatron	C60DR	99.9	99.9	99.6	99.4	98.4	95.8	84.9	61.3	36.2
Vitatron	G70A1	99.9	99.8	99.8	99.8	99.8	98.2	NaN	NaN	NaN

QUALITY – PM – LEAD SURVIVAL

Based on all implants after 1990

Year	At risk	Survival probability %
1	141668	99.6
2	118384	99.0
3	96704	98.8
4	77387	98.8
5	60047	98.7
6	44903	98.6
7	32194	98.6
8	21597	98.5
9	12584	98.5
10	5528	98.3



QUALITY – PACEMAKER – LEAD SURVIVAL PER MODEL

Models that have at least 50 implants and 10 explants

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
Biotronik	Selox SR 60	97.9	97.9	96.6	96.6	96.6	96.6	96.6	96.6	96.6
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	99.1	98.5	98.5	98.5	98.5	98.5	NaN	NaN	NaN
Biotronik	Selox ST 60	100.0	100.0	100.0	99.4	99.4	99.4	99.4	99.4	99.4
Biotronik	Safio ProMRI S60	99.4	99.4	99.4	99.4	99.4	99.4	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	98.4	NaN	NaN
Biotronik	Solia S60 MRI	98.7	98.7	98.7	98.7	98.7	98.7	NaN	NaN	NaN
Biotronik	Siello S53	98.6	98.5	98.3	98.3	98.3	98.3	98.3	NaN	NaN
Biotronik	Solia S53 MRI	98.9	98.9	98.9	98.9	98.9	NaN	NaN	NaN	NaN
Boston Scientific	4480 Fineline II Sterox EZ MRI	96.0	96.0	95.4	94.7	94.7	94.7	94.7	94.7	94.7
Boston Scientific	4542 Easytrak	96.3	95.3	94.1	92.7	92.7	90.5	90.5	90.5	90.5
Boston Scientific	4474 Fineline II Sterox EZ MRI	99.5	99.0	98.7	98.4	98.1	98.0	97.9	97.5	97.5
Boston Scientific	4471 Fineline II Sterox EZ MRI	97.7	97.5	97.5	97.5	97.5	97.2	97.2	97.2	96.1
Boston Scientific	7741 Ingevity MRI	98.5	98.5	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Boston Scientific	7742 Ingevity MRI	98.7	98.7	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Boston Scientific	4457 Fineline II Sterox EZ MRI	99.5	99.3	99.1	99.0	99.0	99.0	99.0	99.0	99.0
Boston Scientific	4473 Fineline II Sterox EZ MRI	99.2	99.1	99.0	99.0	98.9	98.9	98.9	98.8	98.8
Boston Scientific	4470 Fineline II Sterox EZ MRI	99.4	99.3	99.3	99.2	99.2	99.2	99.2	99.0	98.7
Medtronic	4396 Attain Ability MRI	98.7	98.7	98.7	98.7	98.7	98.7	NaN	NaN	NaN
Medtronic	4965 CapSure Epi	98.8	98.8	98.8	97.9	96.9	94.5	94.5	94.5	94.5
Medtronic	4196 Attain Ability MRI	97.8	96.2	96.2	96.2	96.2	96.2	96.2	96.2	96.2
Medtronic	4194 Attain OTW	95.0	94.6	94.6	93.9	93.9	93.9	93.9	93.9	93.9
Medtronic	4193 Attain OTW	94.8	94.0	93.6	93.3	92.5	92.0	91.5	90.5	90.5
Medtronic	4796 Attain Stability MRI	98.9	98.9	97.2	97.2	97.2	NaN	NaN	NaN	NaN
Medtronic	5092 Capsure SP Novus	98.7	98.5	98.5	98.4	98.2	98.2	97.9	97.6	97.6

QUALITY – PACEMAKER – LEAD SURVIVAL PER MODEL

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
Medtronic	5086 CapSureFix MRI	99.0	99.0	99.0	99.0	99.0	98.6	98.6	NaN	NaN
Medtronic	4296 Attain Ability MRI	97.4	96.7	96.7	96.7	96.7	96.7	96.7	NaN	NaN
Medtronic	4968 CapSure Epi	99.7	99.3	98.6	98.6	98.0	98.0	97.5	96.9	93.0
Medtronic	5054 CapSure Z Novus MRI	99.1	98.9	98.8	98.8	98.6	98.5	98.5	97.8	97.8
Medtronic	4074 Capsure Sense MRI	99.1	99.1	99.1	99.0	99.0	98.9	98.9	98.9	98.9
Medtronic	5076 CapSureFix MRI	99.0	98.9	98.8	98.6	98.6	98.4	98.3	98.2	97.7
Medtronic	4076 CapSureFix Novus MRI	99.4	99.4	99.3	99.3	99.3	99.2	99.1	99.1	99.0
N/A	N/A	99.5	99.4	99.4	99.1	98.9	98.9	97.9	97.4	97.4
Osypka	KY-5	95.2	92.0	90.5	88.3	87.4	87.4	86.3	86.3	86.3
St. Jude Medical	1699T OptiSense	98.7	98.1	98.1	98.1	98.1	98.1	98.1	98.1	98.1
St. Jude Medical	1056K QuickSite	97.2	96.6	96.0	95.2	95.2	95.2	92.6	92.6	92.6
St. Jude Medical	1084T Myodex	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0
St. Jude Medical	1480T	98.8	98.3	98.2	98.2	98.0	97.8	97.6	97.6	97.6
St. Jude Medical	1488T Tendril SDX	98.6	98.2	97.9	97.7	97.5	97.2	97.0	96.1	95.1
St. Jude Medical	1156T Quickflex	97.4	96.9	96.3	96.3	95.9	95.9	95.9	95.9	95.9
St. Jude Medical	1056T QuickSite	96.5	95.9	95.2	94.6	94.4	94.1	94.1	94.1	92.0
St. Jude Medical	1699TC OptiSense	99.0	98.7	98.6	98.5	98.5	98.4	98.3	98.3	98.3
St. Jude Medical	LPA1200M52cm TendrilMRI	98.1	98.0	97.6	97.6	97.6	NaN	NaN	NaN	NaN
St. Jude Medical	1636T Isoflex	98.0	97.8	97.6	97.5	97.4	97.1	97.1	96.8	96.3
St. Jude Medical	LPA1200M58cm TendrilMRI	99.1	98.7	98.5	98.1	96.5	NaN	NaN	NaN	NaN
St. Jude Medical	1788TC Tendril ST	97.9	97.8	97.8	97.7	97.6	97.6	97.6	97.6	97.6
St. Jude Medical	1458Q Quartet MRI	98.3	97.6	97.3	97.3	97.3	97.3	97.3	NaN	NaN
St. Jude Medical	1888TC Tendril ST	98.7	98.7	98.6	98.6	98.6	98.5	98.4	98.4	98.4
St. Jude Medical	1788T Tendril ST	98.4	98.0	97.7	97.5	97.5	97.5	97.5	97.5	97.5
St. Jude Medical	1258T QuickFlex	98.1	97.9	97.8	97.7	97.4	96.8	96.8	NaN	NaN
St. Jude Medical	1688T Tendril SDX	97.2	96.6	96.3	96.0	95.6	95.2	95.2	94.7	94.4

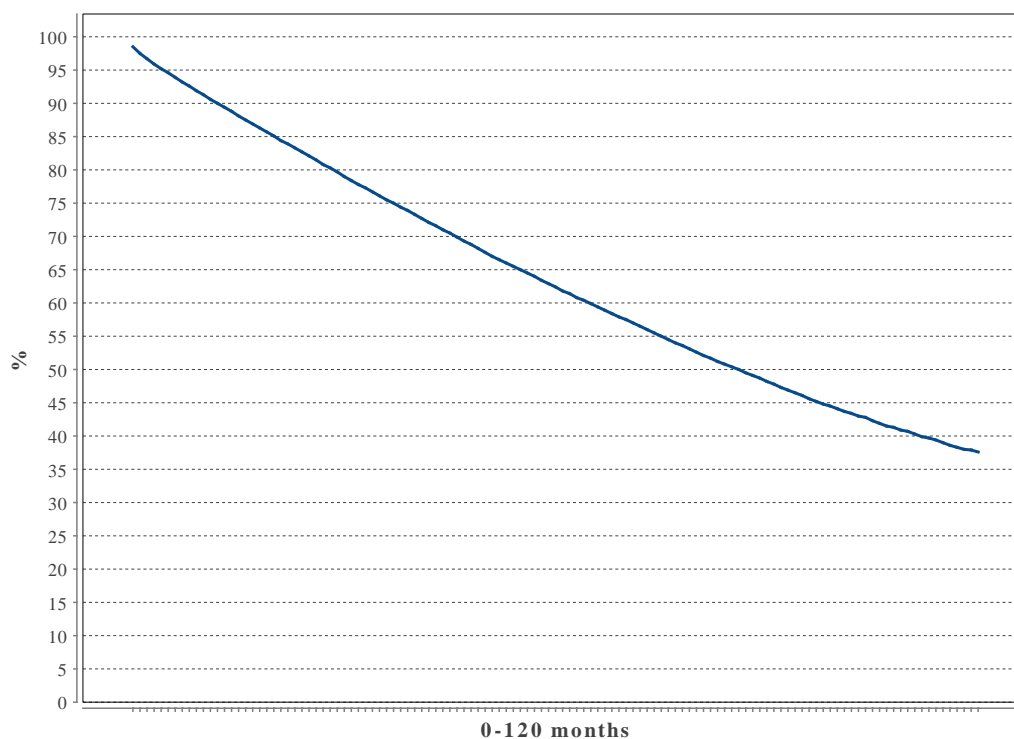
QUALITY – PACEMAKER – LEAD SURVIVAL PER MODEL

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
St. Jude Medical	1646T Isoflex	98.6	98.3	98.2	98.1	98.0	98.0	98.0	97.9	97.7
St. Jude Medical	1948 Isoflex MRI	98.9	98.8	98.8	98.7	98.6	98.6	98.6	98.6	NaN
St. Jude Medical	1999 Optisense	99.2	99.0	98.9	98.8	98.8	98.7	98.6	98.6	NaN
St. Jude Medical	2088TC Tendril STS MRI	99.4	99.2	99.1	99.1	99.0	99.0	99.0	NaN	NaN
Vitatron	ICL08 Crystalline	97.3	96.8	96.8	96.8	96.8	95.9	94.6	94.6	94.6
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	98.5	98.5	98.5	98.5	98.5	98.5	98.5	98.5
Vitatron	ICM09B Crystalline	98.9	98.8	98.8	98.7	98.7	98.5	98.5	98.5	98.3
Vitatron	ICQ09B Crystalline	99.3	99.1	99.1	99.1	99.0	99.0	99.0	99.0	99.0

QUALITY – PACEMAKER – PATIENT SURVIVAL

Based on all implants after 1990

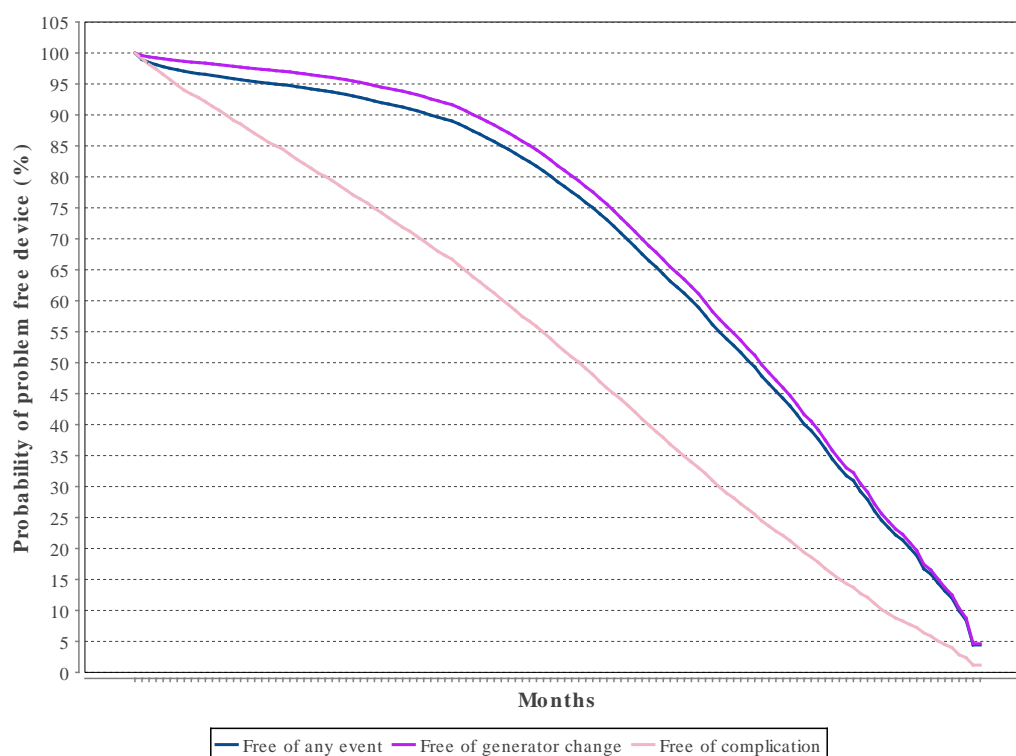
Year	At risk	Survival probability %
1	96496	98.5
2	79983	90.0
3	65344	82.7
4	52332	75.5
5	40771	68.8
6	30708	62.4
7	22169	56.5
8	14428	50.8
9	7740	45.6
10	3095	41.3



QUALITY – ICD – FREE OF EVENT

Probability of event free ICD-device

Year	At risk	Free of any event %	Free of generator change %	Free of complication %
1	22514	96.2	98.1	90.7
2	19052	94.4	96.7	82.1
3	15792	91.8	94.3	73.4
4	12564	87.4	90.0	63.9
5	9008	79.2	81.8	52.8
6	5679	67.5	70.0	40.9
7	3021	53.8	55.9	28.9
8	1343	39.0	40.6	18.6
9	367	22.2	23.1	8.8
10	19	4.4	4.6	1.2



QUALITY – ICD – GENERATOR SURVIVAL

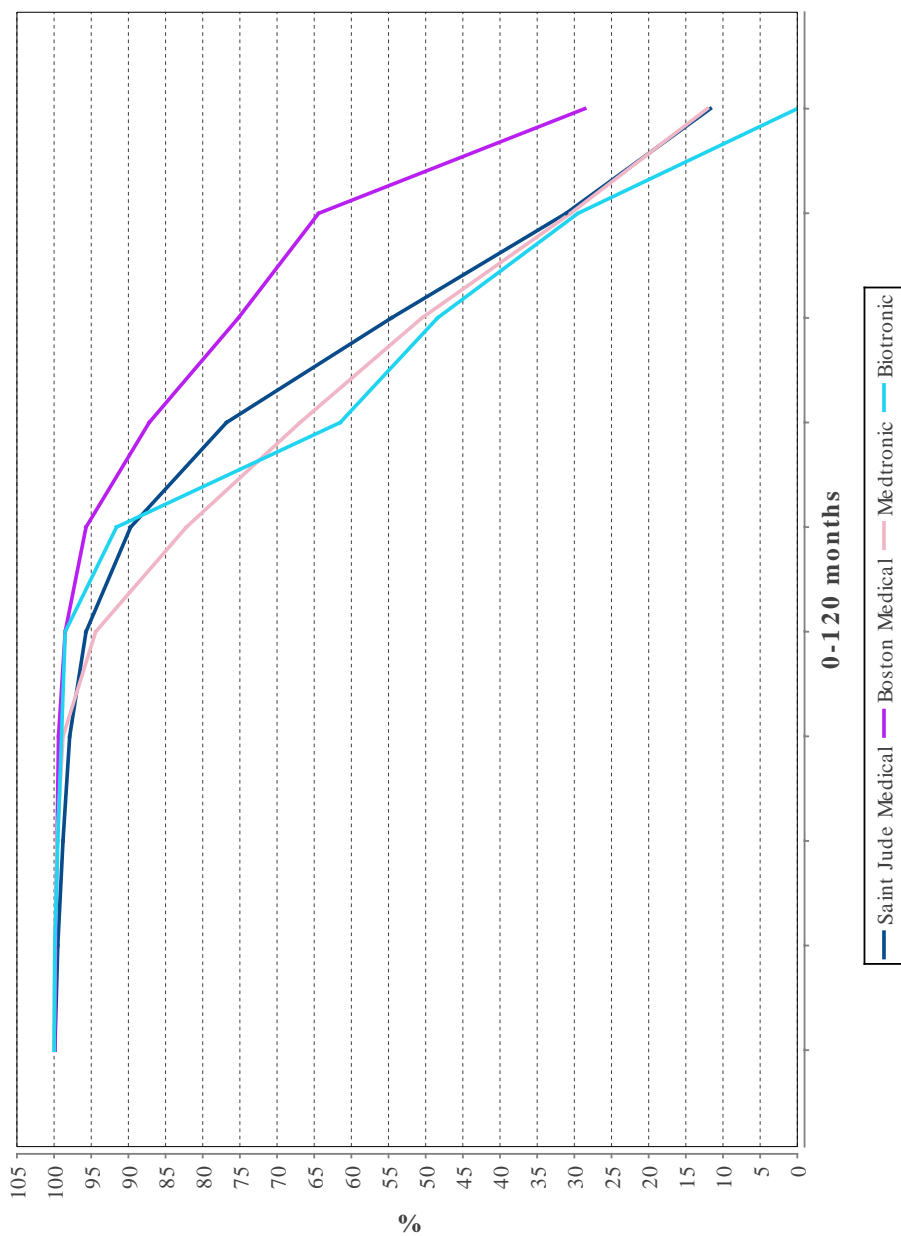
Year	At risk	Survival probability %
1	16980	99.9
2	14087	99.7
3	11192	99.3
4	8663	98.5
5	6388	95.6
6	4274	87.4
7	2498	73.7
8	1178	55.9
9	442	36.1
10	72	14.7

QUALITY – ICD – GENERATOR SURVIVAL PER MANUFACTURER

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	16914	133.3	704	100.0	1816	99.9	7197	100.0	7197	99.9
2	14032	133.0	595	99.9	1517	99.8	6004	99.9	5916	99.5
3	11168	132.5	480	99.5	1266	99.6	4720	99.6	4702	98.8
4	8648	131.7	384	99.0	1067	99.4	3584	98.8	3613	97.9
5	6375	129.0	272	98.5	836	98.5	2677	94.4	2590	95.7
6	4264	119.7	177	91.6	636	95.7	1714	82.2	1737	89.7
7	2490	97.5	59	61.5	492	87.2	956	66.9	983	76.8
8	1177	76.2	23	48.4	259	75.2	471	50.5	424	54.6
9	442	51.8	7	29.5	111	64.4	173	30.5	151	31.1
10	72	17.5	0	0.0	10	28.6	41	12.1	21	11.7

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



QUALITY – ICD – GENERATOR SURVIVAL PER MODEL

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	83.1	24.5	12.3	12.3	NaN
Biotronik	Lumax 540 DR-T	100.0	98.8	98.8	97.6	97.6	95.0	91.3	24.6	NaN
Boston Scientific	F102 Teligen	100.0	100.0	100.0	100.0	100.0	98.1	91.0	88.0	NaN
Boston Scientific	H247 Livian	100.0	100.0	100.0	100.0	93.8	71.6	33.6	NaN	NaN
Boston Scientific	P107 Cognis CRT	99.0	99.0	99.0	99.0	95.9	94.1	83.2	83.2	NaN
Boston Scientific	T167 Vitality 2	100.0	100.0	98.8	97.5	95.0	81.6	77.1	62.2	12.5
Boston Scientific	F110 Teligen	100.0	99.5	99.5	99.0	97.9	94.8	90.7	90.7	NaN
Medtronic	D264TRM Maximo II	100.0	100.0	100.0	84.6	54.8	NaN	NaN	NaN	NaN
Medtronic	D164VWC Virtuoso	100.0	100.0	98.4	96.8	93.3	91.4	85.0	65.0	50.0
Medtronic	D354TRM Protecta	100.0	100.0	98.1	93.9	60.0	NaN	NaN	NaN	NaN
Medtronic	D154ATG EnTrust	100.0	100.0	100.0	98.2	86.4	57.0	20.0	3.1	1.6
Medtronic	DTBC2D4 Brava	100.0	100.0	100.0	100.0	NaN	NaN	NaN	NaN	NaN
Medtronic	7278 Maximo	100.0	100.0	100.0	94.4	82.4	63.1	24.2	-	NaN
Medtronic	7304 Maximo	100.0	98.9	97.5	75.0	34.8	7.5	5.0	NaN	NaN
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	91.7	NaN	NaN	NaN
Medtronic	D354TRG Protecta	100.0	99.1	95.4	84.3	48.4	NaN	NaN	NaN	NaN
Medtronic	D364VRG Protecta	99.6	99.6	99.6	98.9	98.1	98.1	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	C174AWK Concerto	99.5	99.0	97.8	91.3	65.5	40.9	23.1	14.0	4.9
Medtronic	D364TRG Protecta	100.0	99.5	96.6	84.9	61.3	41.7	NaN	NaN	NaN
Medtronic	DDBC3D4 Evera S DR DF4	99.7	99.7	99.7	99.7	NaN	NaN	NaN	NaN	NaN
Medtronic	D164AWG Virtuoso	100.0	98.7	98.7	96.6	88.5	76.5	62.3	30.6	4.0
Medtronic	7232Cx Maximo VR	100.0	100.0	98.9	98.3	97.0	95.7	87.3	58.9	18.1
Medtronic	D284VRC Maximo II	99.7	99.7	99.4	99.4	98.0	96.9	93.0	78.7	NaN
Medtronic	D364DRG Protecta	99.5	99.5	99.0	98.3	95.9	82.2	NaN	NaN	NaN
Medtronic	D284TRK Maximo II	99.8	99.8	98.8	87.5	52.3	17.6	15.0	10.8	NaN

QUALITY – ICD – GENERATOR SURVIVAL PER MODEL

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
Medtronic	D284DRG Maximo II	99.8	99.8	99.4	98.4	93.7	77.8	43.1	11.2	NaN
St. Jude Medical	1211-36 Current VR	100.0	100.0	100.0	100.0	100.0	100.0	NaN	NaN	NaN
St. Jude Medical	3251-40 Unify Quadra	98.6	98.6	96.8	91.8	85.7	NaN	NaN	NaN	NaN
St. Jude Medical	2233-40 Fortify DR	100.0	100.0	100.0	97.0	94.0	94.0	NaN	NaN	NaN
St. Jude Medical	V-341 Atlas + DR	98.5	98.5	98.5	88.1	65.0	39.8	35.8	10.6	0.0
St. Jude Medical	V-193 Atlas + VR	98.0	98.0	98.0	95.6	95.6	95.6	89.9	76.5	21.1
St. Jude Medical	3235-40Q Unify	100.0	100.0	100.0	98.6	91.9	76.3	NaN	NaN	NaN
St. Jude Medical	3239-40Q Promote	99.3	99.3	99.3	99.3	99.3	92.2	92.2	NaN	NaN
St. Jude Medical	1211-36Q Current VR	99.3	99.3	99.3	99.3	99.3	99.3	NaN	NaN	NaN
St. Jude Medical	1233-40Q Fortify	100.0	100.0	99.1	99.1	95.6	93.4	NaN	NaN	NaN
St. Jude Medical	1359-40QC Fortify Assura	100.0	98.5	98.5	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3211-36 Promote	99.3	99.3	98.3	96.9	86.2	55.6	NaN	NaN	NaN
St. Jude Medical	3211-36Q Promote	99.4	99.4	99.4	97.6	94.7	89.0	NaN	NaN	NaN
St. Jude Medical	2211-36 Current + DR	99.3	99.3	98.5	98.5	98.5	77.3	NaN	NaN	NaN
St. Jude Medical	3361-40QC Unify Assura	99.1	92.2	85.4	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	V-168 Atlas 2 VR	100.0	100.0	100.0	97.5	94.9	88.8	77.8	32.6	0.0
St. Jude Medical	2359-40C Fortify Assura	97.3	91.2	91.2	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3215-36 Promote HF	99.2	98.4	98.4	94.0	90.5	65.8	16.2	NaN	NaN
St. Jude Medical	1207-36 Current VR	100.0	100.0	99.2	96.8	95.1	94.2	93.1	85.2	85.2
St. Jude Medical	1377-36QC Ellipse VR	100.0	100.0	100.0	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	V-243 Atlas + DR	100.0	100.0	100.0	98.7	97.3	92.7	74.0	41.9	0.0
St. Jude Medical	3235-40 Unify	100.0	100.0	98.7	94.2	85.7	68.2	NaN	NaN	NaN
St. Jude Medical	3361-40C Unify Assura	98.5	90.7	78.5	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3367-40QC Quadra Assura	100.0	98.2	93.9	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	2233-40Q Fortify DR	99.6	99.1	98.6	95.6	93.5	86.7	NaN	NaN	NaN
St. Jude Medical	3251-40Q Unify Quadra	99.6	97.1	96.1	94.6	87.3	NaN	NaN	NaN	NaN

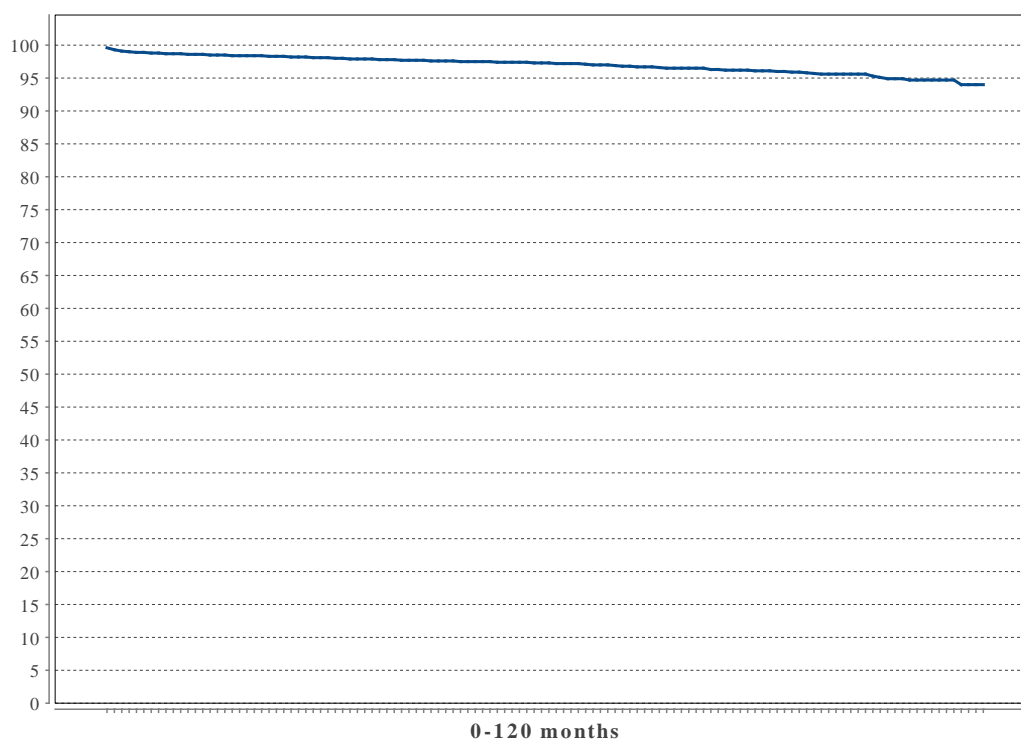
QUALITY – ICD – GENERATOR SURVIVAL PER MODEL

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
St. Jude Medical	V-367 Atlas II	99.5	98.3	95.0	83.8	55.8	32.9	18.1	4.6	4.6
St. Jude Medical	2359-40QC Fortify Assura	99.7	99.7	99.7	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	2377-36QC Ellipse DR	99.1	98.4	98.4	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	2207-36 Current DR	99.6	99.6	99.6	96.6	94.7	90.2	79.9	43.0	27.0
St. Jude Medical	V-268 Atlas II	100.0	100.0	99.1	98.1	87.6	66.1	18.5	2.0	2.0
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	3371-40QC Quadra Assura MP	99.6	98.6	NaN	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	3213-36 Promote HF	99.6	99.3	98.0	96.6	86.1	57.0	21.4	11.2	NaN

QUALITY – ICD – LEAD SURVIVAL

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 probability %
1	13259	99.6
2	11172	98.6
3	9100	98.3
4	7153	97.9
5	5507	97.5
6	4097	97.3
7	2860	96.7
8	1834	96.2
9	1007	95.7
10	426	94.9



QUALITY – ICD – LEAD SURVIVAL PER MODEL

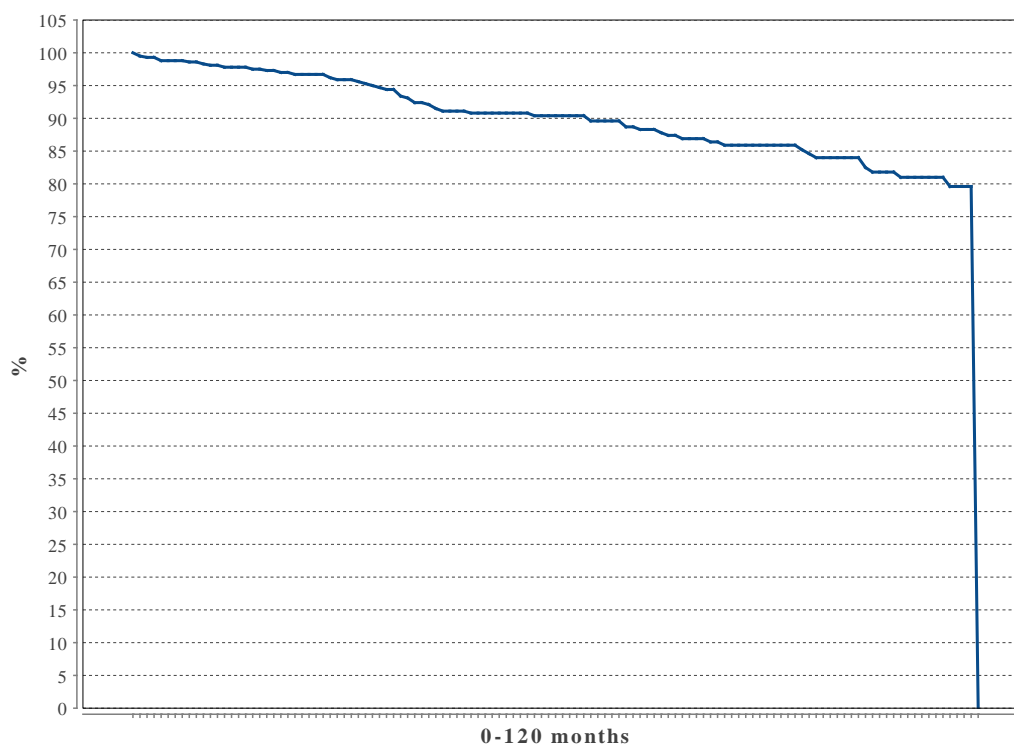
Models that have at least 50 implants and 20 explants

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
Biotronik	Linix Smart SD 65/18	97.8	97.3	95.8	95.8	94.6	94.6	93.1	93.1	93.1
Biotronik	Linix Smart S75	98.5	98.2	98.2	98.2	98.2	98.2	NaN	NaN	NaN
Boston Scientific	0692 Reliance	97.7	96.9	96.9	96.9	NaN	NaN	NaN	NaN	NaN
Medtronic	6948 Sprint Fidelis	98.4	98.4	95.7	92.6	92.6	91.3	88.1	84.1	81.6
Medtronic	6944 Sprint	98.6	98.3	97.9	97.9	96.5	95.4	94.8	94.8	94.8
Medtronic	6949 Sprint Fidelis	97.6	95.9	93.9	89.6	89.0	86.8	84.4	84.4	82.1
Medtronic	6935 Sprint Quattro Secure S MRI	99.6	99.6	99.6	99.3	98.9	98.1	96.9	96.9	NaN
Medtronic	6947M Sprint Quattro Secure MRI	99.3	99.3	99.3	99.3	99.3	99.3	NaN	NaN	NaN
Medtronic	6935M Sprint Quattro Secure S MRI	99.5	99.5	99.5	99.5	NaN	NaN	NaN	NaN	NaN
Medtronic	6947 Sprint Quattro Secure MRI	99.2	99.2	99.1	98.9	98.7	98.7	98.5	98.5	98.5
St. Jude Medical	1571 Riata	96.9	96.9	96.9	92.5	92.5	92.5	92.5	92.5	92.5
St. Jude Medical	7041 Riata ST	98.9	98.9	98.9	98.9	95.7	95.7	95.7	93.8	93.8
St. Jude Medical	1581 Riata	95.8	95.8	95.8	92.9	89.8	86.0	86.0	72.2	54.2
St. Jude Medical	7001 Riata ST	97.1	97.1	97.1	97.1	97.1	96.0	94.8	94.8	94.8
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	LDA210Q Optisure	98.1	98.1	NaN	NaN	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	7122 Durata	99.4	99.2	98.7	98.7	98.7	98.3	98.3	98.3	NaN
St. Jude Medical	7120Q Durata	98.5	97.9	97.7	97.4	97.4	96.5	96.5	NaN	NaN
St. Jude Medical	7120 Durata	97.9	97.6	97.5	97.2	97.2	97.1	96.8	96.8	NaN
St. Jude Medical	7122Q Durata	98.5	98.1	97.7	97.6	97.6	97.6	97.6	NaN	NaN

QUALITY – ICD – SURVIVAL MEDTRONIC SPRINT FIDELIS

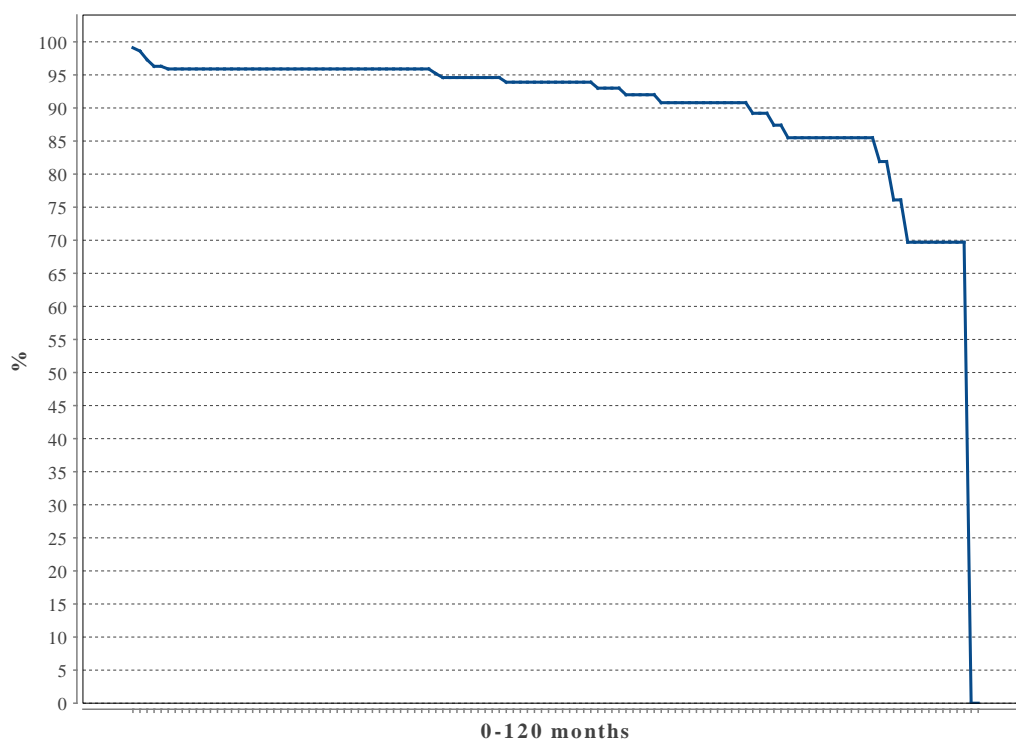
Survival probability for ICD lead Medtronic Sprint Fidelis. Elective replacement and replacements due to infections and system changes have been considered as censored events.

Year	At risk	Survival probability %
1	429	100.0
2	385	98.1
3	353	96.7
4	305	94.4
5	265	90.8
6	236	90.4
7	200	88.3
8	165	85.9
9	134	84.6
10	108	81.8



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.

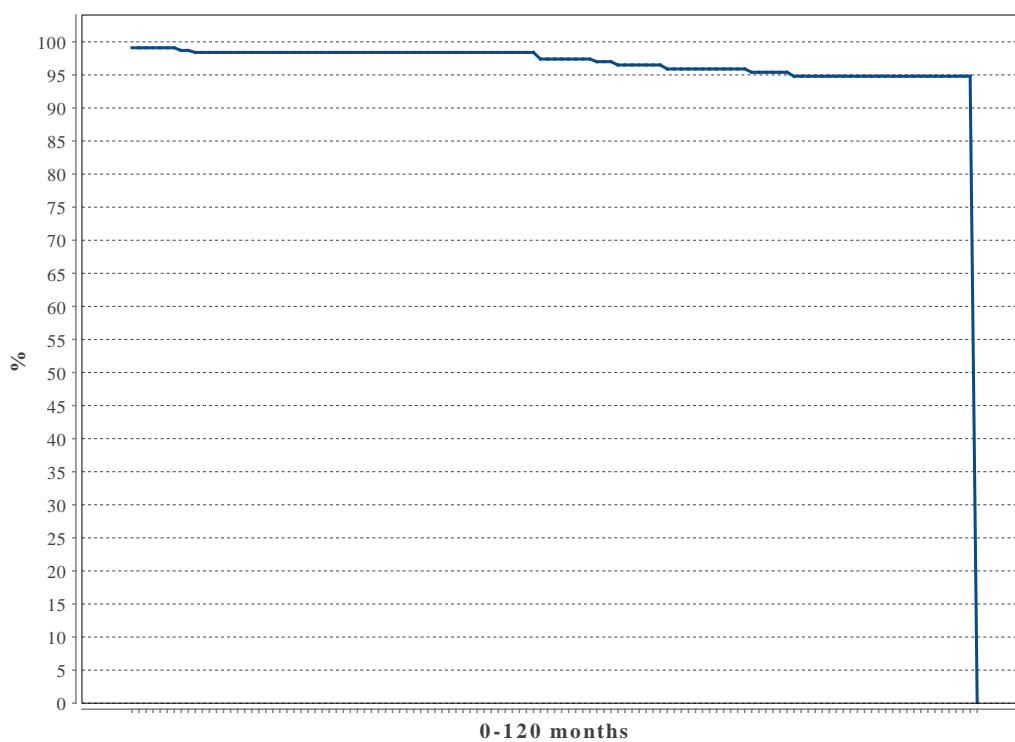
Year	At risk	Survival probability %
1	222	99.1
2	196	95.9
3	179	95.9
4	161	95.9
5	141	94.6
6	117	93.9
7	83	92.0
8	63	90.8
9	42	85.5
10	14	76.1



QUALITY – ICD – SURVIVAL SJM 7000,7001,7002,7040,7041,7042

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.

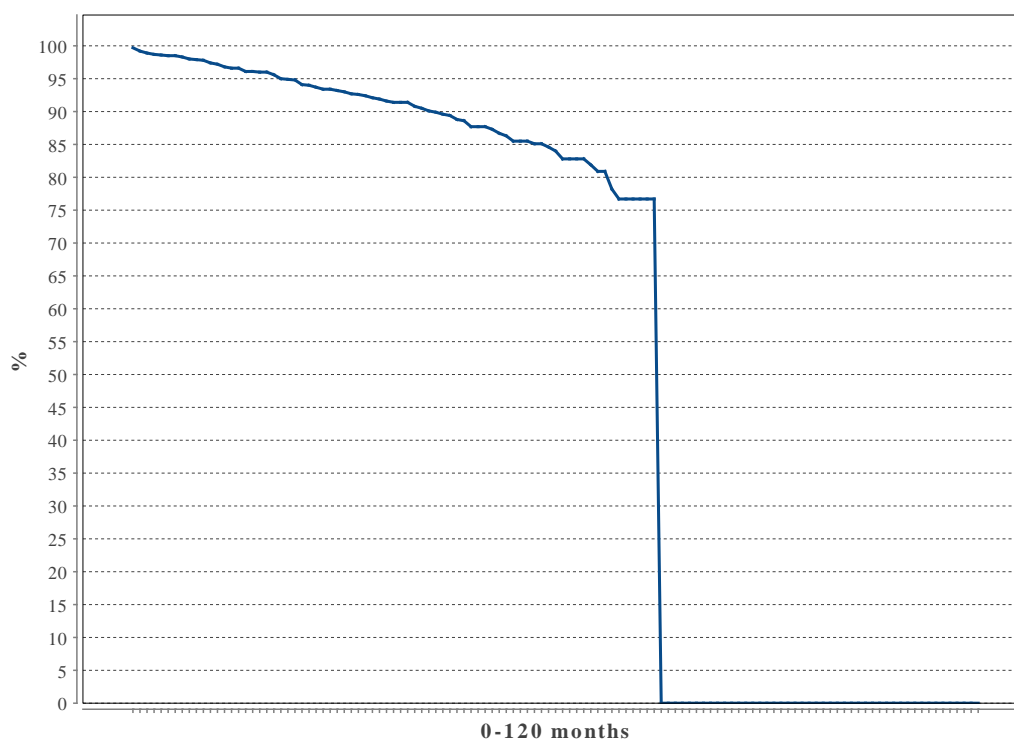
Year	At risk	Survival probability %
1	316	99.1
2	280	98.4
3	268	98.4
4	253	98.4
5	231	98.4
6	209	97.4
7	192	96.5
8	175	95.9
9	157	94.8
10	130	94.8



QUALITY – ICD – SURVIVAL SJM Fortify

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

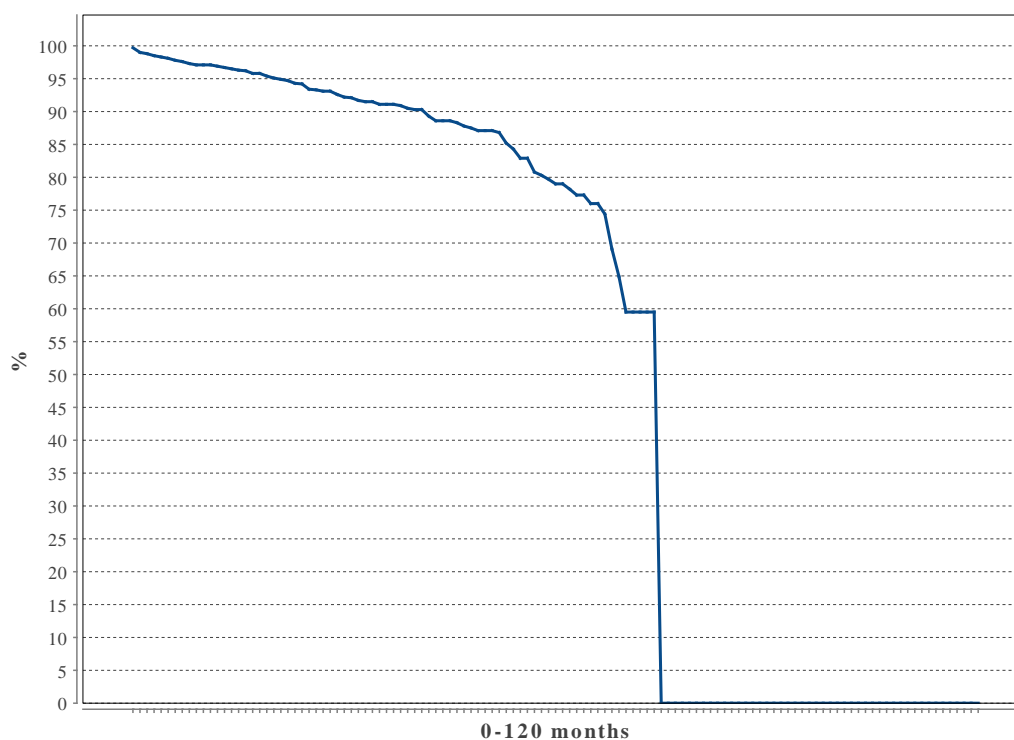
Year	At risk	Survival probability %
1	1358	99.7
2	1100	97.2
3	782	94.1
4	520	91.6
5	301	87.7
6	155	84.0
7	26	76.7
8	0	0.0
9	0	0.0
10	0	0.0



QUALITY – ICD – SURVIVAL SJM Unify

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

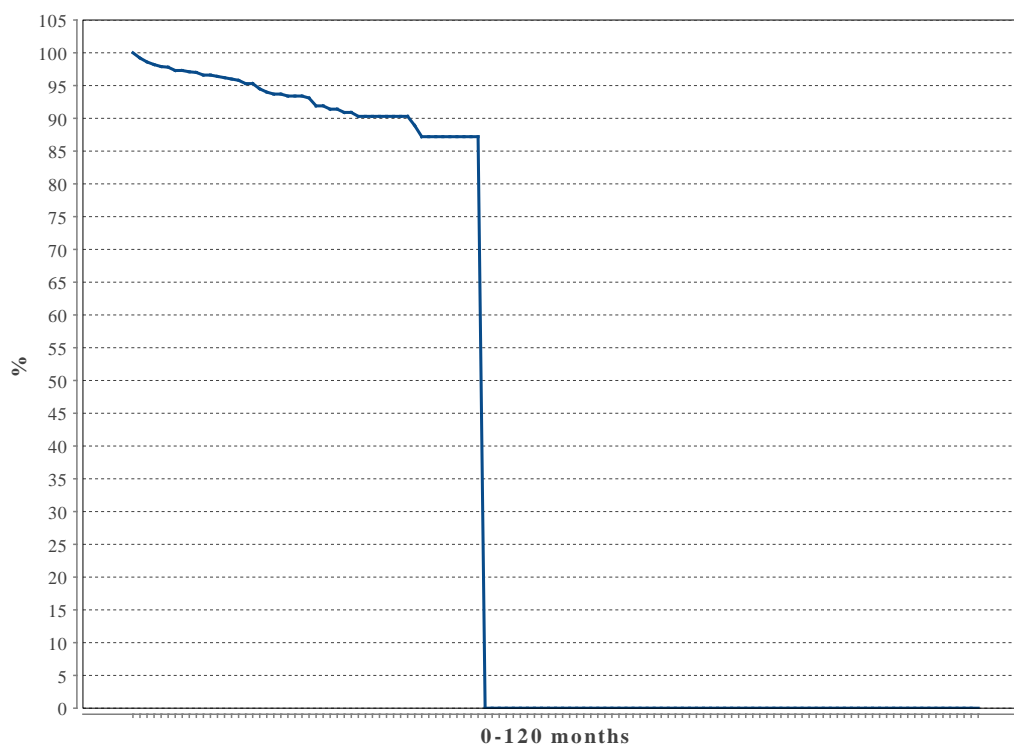
Year	At risk	Survival probability %
1	1174	99.7
2	895	96.9
3	650	94.2
4	459	91.1
5	288	87.5
6	116	79.0
7	10	59.5
8	0	0.0
9	0	0.0
10	0	0.0



QUALITY – ICD – SURVIVAL SJM Quadra

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

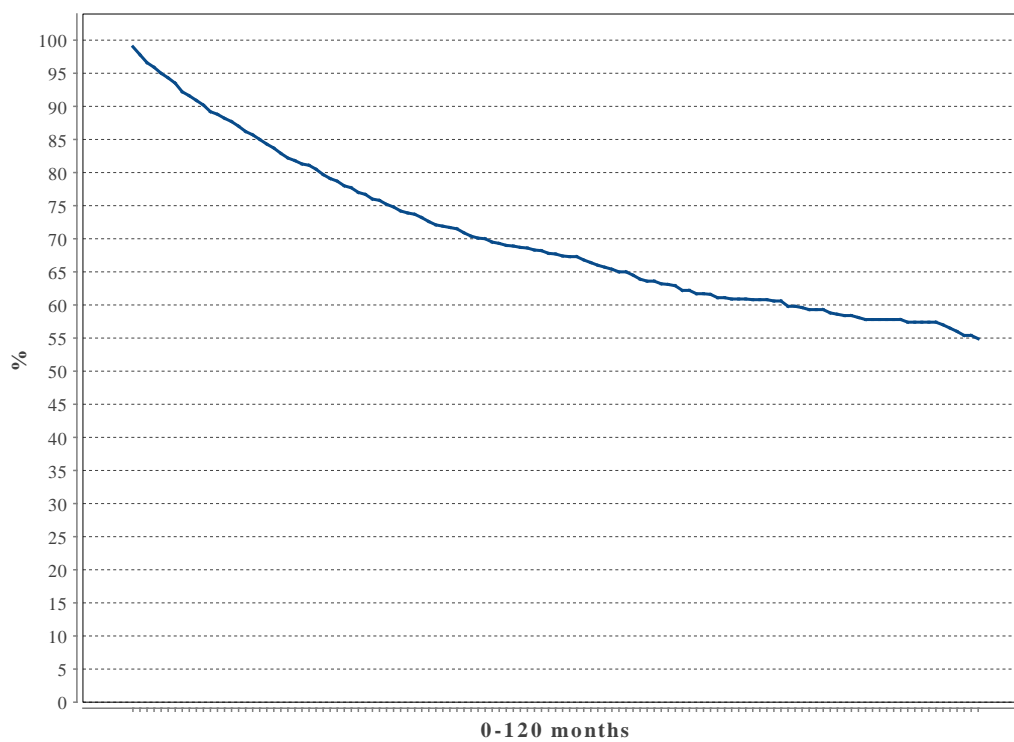
Year	At risk	Survival probability %
1	781	100.0
2	494	96.4
3	279	93.4
4	104	90.3
5	2	87.2
6	0	0.0
7	0	0.0
8	0	0.0
9	0	0.0
10	0	0.0



QUALITY – ICD – PATIENT SURVIVAL

Based on all implants after 1990

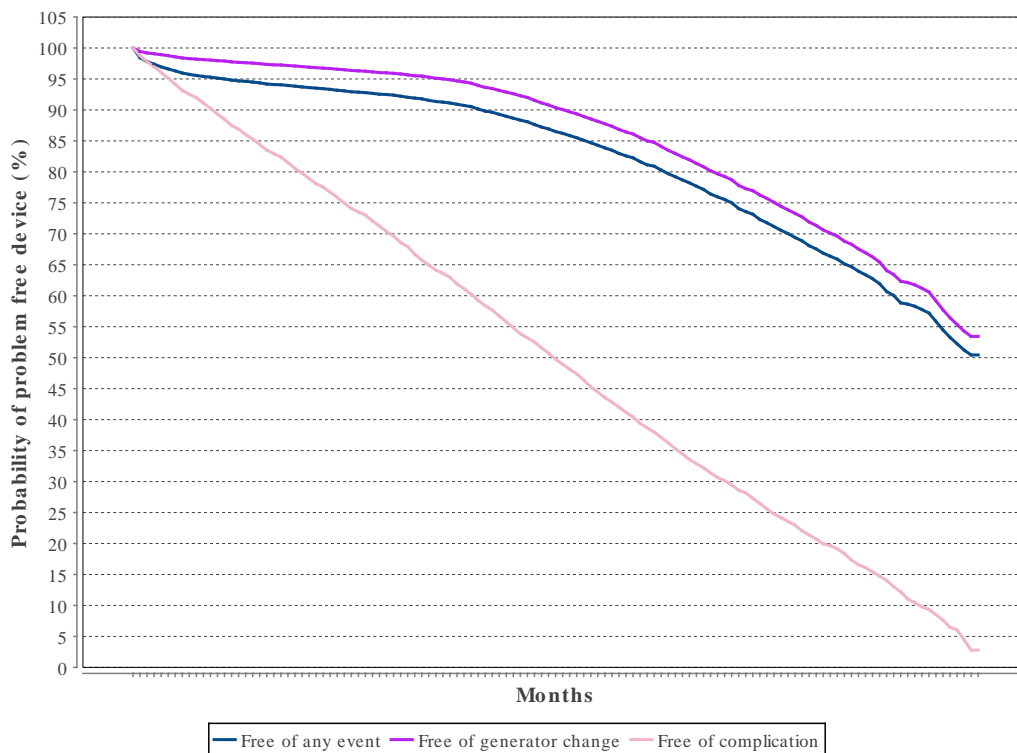
Year	At risk	Survival probability %
1	2116	99.0
2	1813	88.8
3	1595	81.3
4	1310	75.2
5	997	70.4
6	711	67.7
7	504	63.9
8	371	61.1
9	313	59.3
10	159	57.8



QUALITY – CRT – FREE OF EVENT

Probability of event free CRT-device

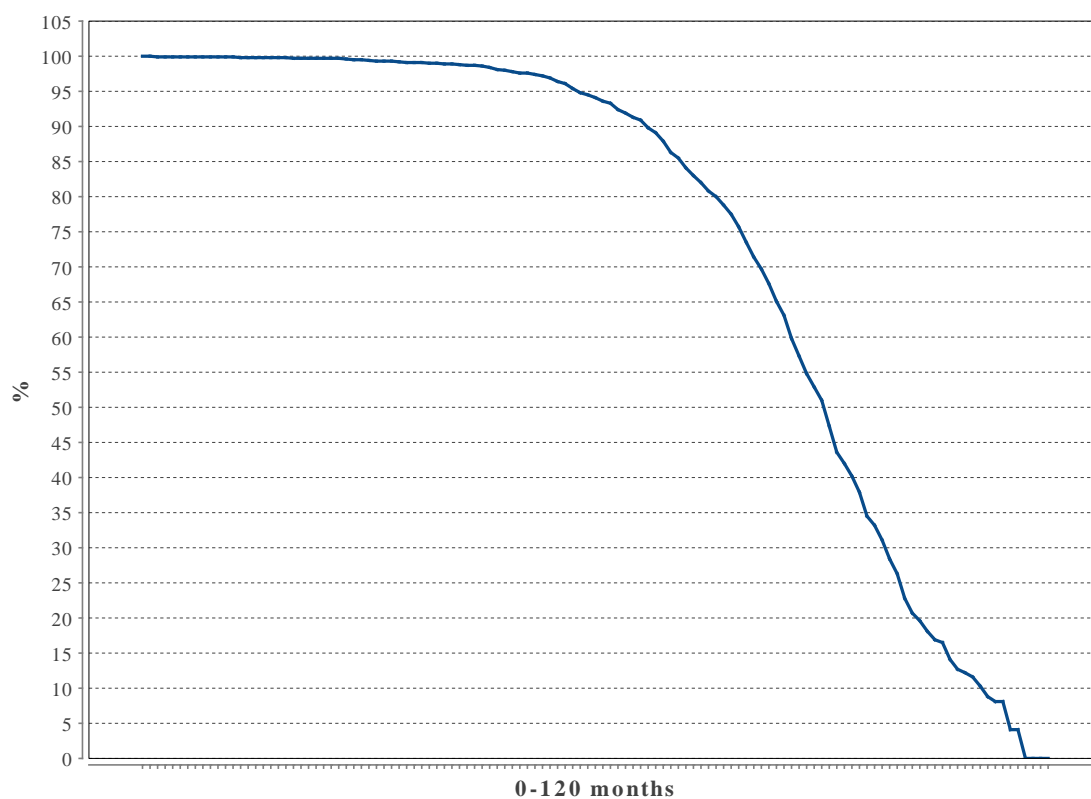
Year	At risk	Free of any event %	Free of generator change %	Free of complication %
1	31224	95.1	98.0	89.3
2	25098	93.7	97.0	79.8
3	19895	92.5	96.0	70.4
4	14938	90.5	94.3	60.3
5	10441	86.5	90.4	49.8
6	6795	81.7	85.5	39.4
7	3946	75.5	79.2	30.2
8	2066	68.1	71.9	21.4
9	842	60.0	63.4	13.0
10	65	50.4	53.4	2.8



QUALITY – CRT-P – GENERATOR SURVIVAL

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

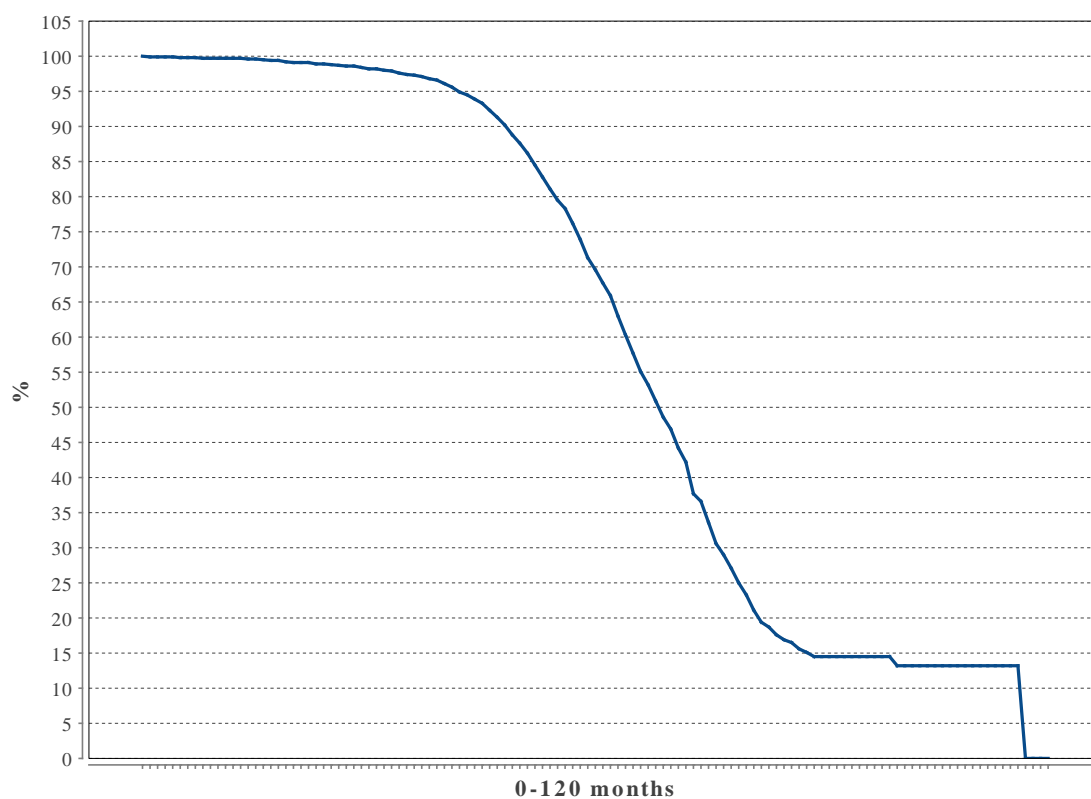
Year	At risk	Survival probability %
1	5085	100.0
2	4018	99.9
3	3060	99.7
4	2310	99.1
5	1689	98.0
6	1168	94.1
7	717	84.1
8	383	65.1
9	137	34.5
10	30	12.7



QUALITY – CRT-D – GENERATOR SURVIVAL

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

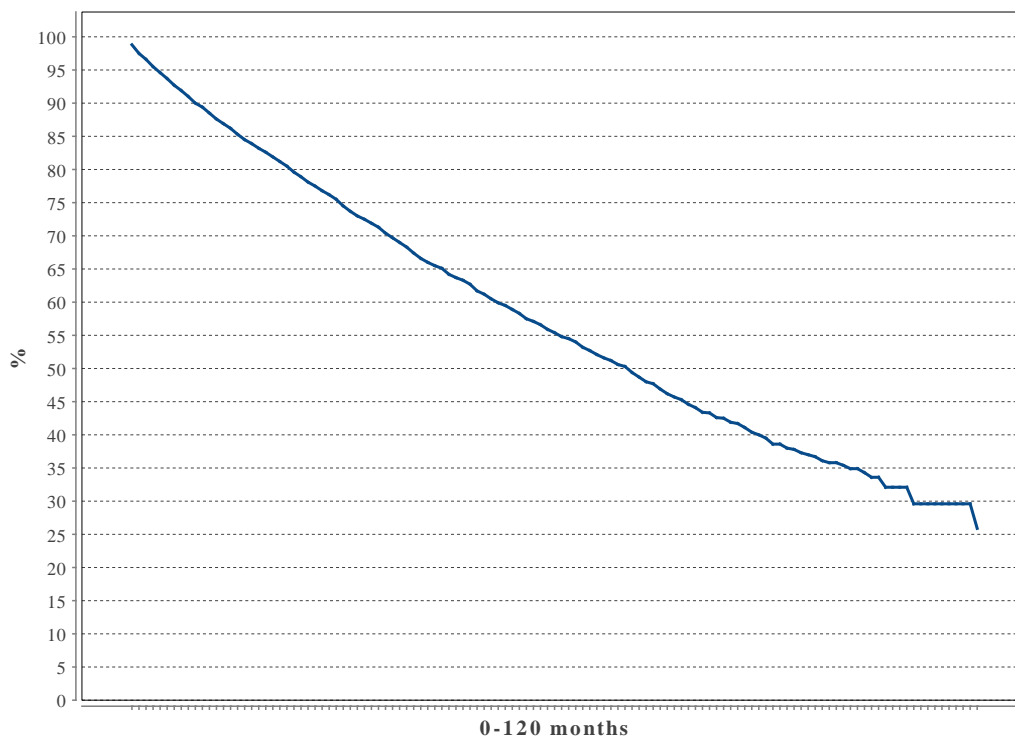
Year	At risk	Survival probability %
1	5597	100.0
2	4440	99.7
3	3376	98.9
4	2472	97.3
5	1621	90.2
6	816	69.6
7	298	42.2
8	52	17.6
9	17	14.5
10	5	13.2



QUALITY – CRT-P – PATIENT SURVIVAL

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

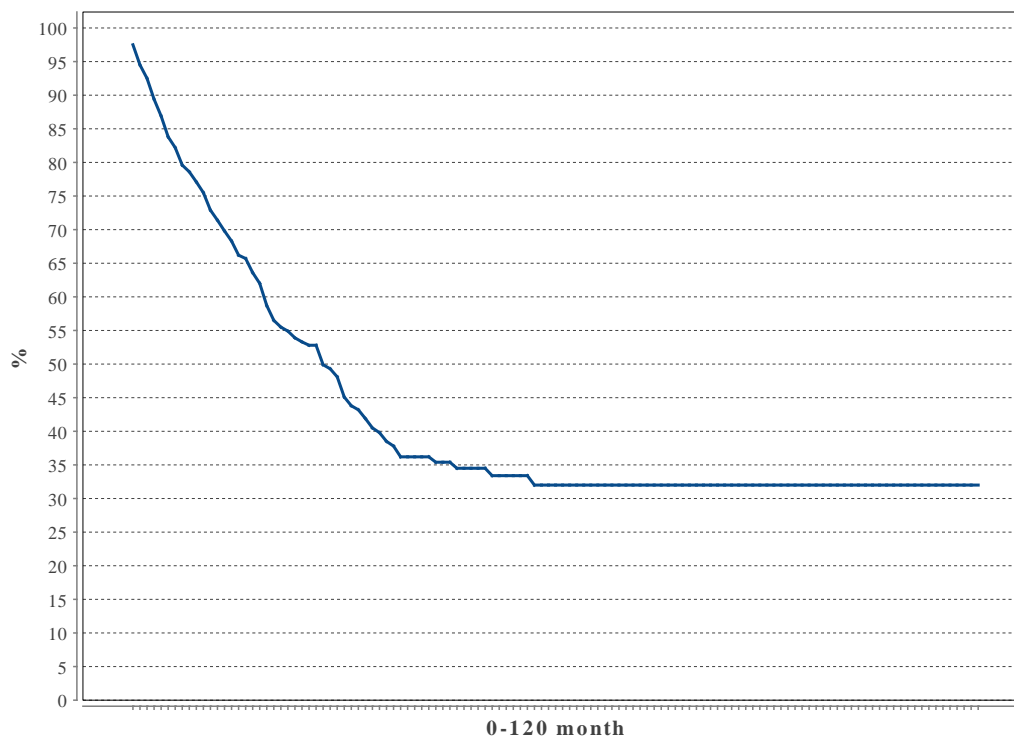
Year	At risk	Survival probability %
1	5129	98.8
2	3992	87.6
3	3052	78.9
4	2318	70.4
5	1684	62.7
6	1164	55.4
7	721	48.7
8	386	42.5
9	141	37.0
10	35	32.1



QUALITY – CRT-D – PATIENT SURVIVAL

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

Year	At risk	Survival probability %
1	204	97.5
2	142	71.4
3	101	53.3
4	58	38.5
5	36	34.5
6	22	32.0
7	19	32.0
8	18	32.0
9	17	32.0
10	10	32.0



QUALITY – DEAD WITHIN ONE YEAR FROM IMPLANT

Ratio of patients being dead one year after implantation

Type	Implants in 2016	Death within year	%
PM	9321	872	9.4
ICD	2237	113	5.1
CRT-P	473	64	13.5
CRT-D	603	38	6.3