

KAROLINSKA HOSPITAL
DEPARTMENT OF CARDIOLOGY
SWEDEN

ANNUAL STATISTICAL REPORT 2013

SWEDISH ICD AND PACEMAKER REGISTER

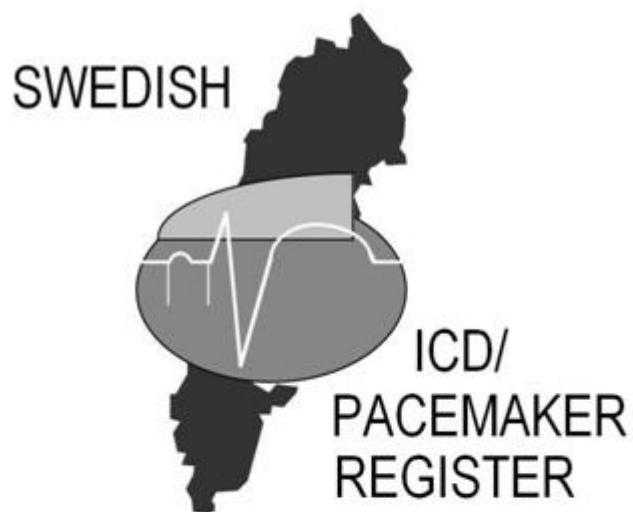


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Foreword

We are proud to present the annual report for 2013 with expanded data regarding quality and device longevity together with implant rates and usage of device therapy in Sweden. New for this report is the first survey of extraction data for Sweden. The report contains data from all implanting hospitals and > 95% of all procedures are reported when crosschecked with the Patient care registry from Socialstyrelsen.

Implant rates Pacemaker

There are 49784 active pacemaker patients in Sweden at the end of 2013. There are regional differences with the highest implant rates in the northern regions despite the sparse population density in that region. The overall implant rate has increased somewhat from 2012 697 vs 708 implants per million (p 8-12) The manufacturers shares of the market show slight redistribution and all regions are bound by tenders for 1-3 years (p 13-14)

Age and Gender distribution of pacemaker treatment

The average age for females receiving pacemaker treatment is 76 y and males 75 y and seven patients over 100 years of age received primary implants. There is a male predominance with 58% 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 year (p 15).

Pacemakers and leads

Pacemaker leads are now predominately bipolar with only very few unipolar leads implanted. Active fixation is used to 98% in the atrium but only to 77% in the ventricle where passive leads are used more commonly than in the US for example. We have now active fixation LV leads and 4% of the LV leads were active fixation. Only a small number of epicardial systems are implanted in small children patients without venous access and in some CRT patients. Venous access is almost equal between cephalic cut-down technique, 54%, and direct subclavian puncture 42% (p 18).

Pacemakers

All pacemakers implanted have RR capability and DDD-R is the most common subtype, 76%. CRT-P are used in small numbers. 5% of all PM implants. (p 19). The most common aetiology for pacemaker treatment is still the "conductive tissue fibrosis" 78% and ischaemic disease is more common in males, 10 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. (p 20) System upgrade is decreasing, especially in brady-paced patients with heart failure and 2013 a total of 183 patients were upgraded from normal brady pacing to CRT (p 21). The reason for this decrease is perhaps due to our shift to implant CRT as a first system in patients with mild heart failure. The most common symptom is syncope followed closely by dizziness and dyspnea (p 22). ECG indications are 2013 mainly related to sinus node disease with AV conduction disorders second (p 24-28). Smaller hospitals tend to use VVI-R pacing more often than larger hospitals. Generators are used to ERI criteria are fulfilled in 75% of the cases and 3% exhibit premature EOL (29-30). Lead failures are uncommon and survival rates are very good (p 31-32).

Implanting organisation

The number of procedures for each implanter vary to a large extent between hospitals (p 33-35). Recommendations as to minimum number of procedures from EHRA is not routinely followed.

Implant rates ICD

There are 7752 active ICD patients in Sweden 2013 and this is a >15% increase over 2012. The number centers implanting ICD's are 22 and represents roughly half of the PM implanting centers. Implant show the same regional differences as in pacemakers with the highest rates in the north and the lowest in the western region, 169 vs 11 per million. The highest differences are in primary prevention between the same regions, 100 vs 64 per million in northern and western region. Clear explanations for this are not at hand. The national average is 89 per million and is a decrease from 2012, (p 43). About 25% of the procedures are replacements. As with PM the regions are bound by tenders and manufacturers share show only slight variations over previous year. A small number of subcutaneous devices were implanted (p 44-45).

ICD Patients

The average age for ICD implant is 64 years in males and 61 years in females for all types of implants. 52 patients in the age group 80-89 (p 46). Clinical indication for ICD implant was secondary prevention in 34% and primary 66% (p 54) There is no change in this proportion since 2011. ECG indications. Aethiology was ischaemic heart disease in 46% of all patients but more common in males, 51% vs 32% males vs females. (p 55-56) Medication at the start of therapy is displayed in tables (p 67-69)

ICD Subtypes and leads

61% of the leads are single coil and 98% were active fixation. Venous access is comparable to PM implants with an equal distribution between cephalic cut-down and direct subclavian puncture. Subtypes are 43% DDR devices, 36% CRT-D and 20% VVI-R devices (p 49-51) Only 64% of the ICD's are used until normal EOL/ERI, 12% are changed due to system upgrade. Technical recalls stand for 0.2% of all box changes. ICD leads display larger failure rates but overall longevity is still good (p 60-64). 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 (p 65-66).

CRT implant rates

Implant rates of CRT system is only increasing slowly in Sweden, 54 per million CRT-D's and 45 per million CRT-P's new implants. The number of centers performing CRT implantations are less than the number doing ICD's (p 70-77). The distribution between CRT-D and CRT-P systems show regional differences with some regions doing almost exclusively CRT-D systems (p 74-75). The failure rate at implant is according to the registry 5% but this is most likely an underestimation when compared to the literature (p 79).

CRT implant rates

Implant rates of CRT system is only increasing slowly in Sweden, 54 per million CRT-D's and 45 per million CRT-P's new implants. The number of centers performing CRT implantations is less than the number doing ICD's (p 71-78). The distribution between CRT-D and CRT-P systems shows regional differences with some regions doing almost exclusively CRT-D systems (p 75-76). The failure rate at implant is according to the registry 5% but this is most likely an underestimation when compared to the literature (p 81).

CRT patients

The average age of CRT-P patients at first implant is 73 y and CRT-D patients 67 years with a large male predominance (p 79-80). Medication for patients receiving CRT for the first time is given in tables (p 83-85).

ILR

605 ILR's were implanted in Sweden 2013 with the main indication being dizzy spells and syncope. At the end of the ILR investigation period 46% of the patients were found to have a PM indication and 3% an ICD indication. In 1% 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 (p 87-91).

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, 10%, in small hospitals. The use of pacing mode in sinus node disease show the same tendency with 7% VVI-R systems on average but 13% in small hospitals (p 93-98). This unfortunate trend is constant since 2012 and may depend upon a lack of skilled implanters at small hospitals.

Lead extraction

For the first time we have included lead extractions in the registry. The definition used is base on ACC and EHRA documents. A lead extraction is a removal of a lead older than 1 year or any lead removal requiring the use of a specific tool. Leads less than two years old that are removed without a tool is a lead removal and not a lead extraction. The numbers from each hospital is presented in a table at p 100. The most common reason is infection. Preventive extraction of leads with problems such as Medtronic Sprint Fidelis and SJM Riata is also performed in a number of cases (p100-101). A more fully developed statistics will be available in 2014 report!

Complications Pacemaker

The total complication rate for pacemaker procedures is 5.4% with lead displacement being the most common. There is a variation among the operating hospitals (p 103-106). Hospitals that have registered <3% in total complication rate are excluded and 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 10.1% in 2012. The most common complication is infection with 2% followed by lead dislodgement 1.7%. The rate between hospitals are also given in tables and as with pacemaker treatment <3% is considered incomplete registration (p 107-110).

Complications CRT

This is presented as a both CRT-D and CRT-P complications. Both figures 3,9% and 6,2% are very low and does not compare well with literature findings of up to 15% complications. Reasons for this are unknown.

Procedures

Duration of fluoroscopy and procedure times are given for all types and hospitals in tables (p 112-130). The procedures that have been performed in less than 10 at different sites are marked as not reliable for comparison.

Device longevity ICD and PM

Generators generally have very good longevity with an average of 98% after 5 years but there are differences between models and manufacturers (p 131-140). Pacemaker lead survival is very good with a survival rate of 97,4% after 10 years (p 136) with very little difference between models and manufacturers. ICD generator survival is more heterogenous than PM generator survival with larger difference between manufacturers and models- (p 143-145). ICD lead survival is also shorter than pacemaker lead survival, 91% vs 99% after 10 years (p 147) The Medtronic Sprint Fidelis models were implanted in 903 cases in Sweden and the survival rate is 87,3% after 10 years. This is a decrease since last years figure of 89% (p 148) In the St Jude Riata models only a few failures have occurred so far (p 149-150)

Patients

The ICD patient survival is markedly longer than for pacemaker patients, 82% after 5 years for ICD patients vs 64% for pacemaker patients. This being an effect partly of course due to the average implant age 65 vs 75 for patients at the first implant (152). The heart failure patients have also the shortest expected survival rate among the PM and ICD patients. The difference between CRT-P and CRT-D patients is however surprisingly small in an unadjusted comparison (p 156-157).

Fredrik Gadler 2014 10 18

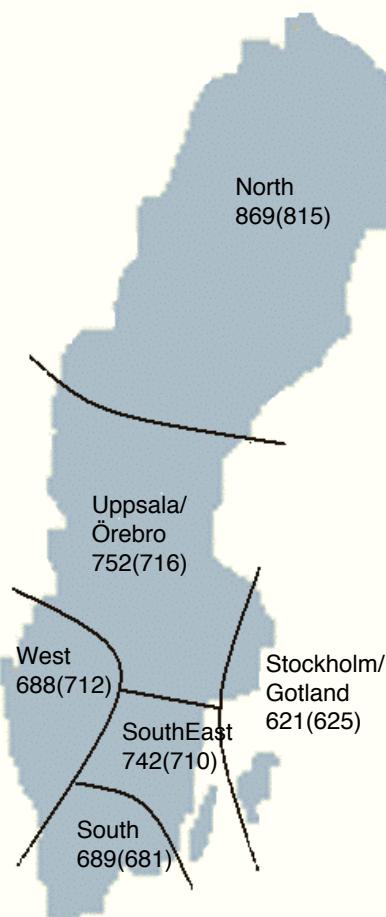
STATISTICS – PACEMAKER

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	2220203	1379	621	10222
Uppsala/Örebro	1996633	1501	752	10926
South-East Sweden	1012957	752	742	4971
Southern Sweden	1741584	1200	689	9070
Western Sweden	1794322	1235	688	9458
Northern Sweden	879165	764	869	5137
Total	9644864	6831	708	49784

Implants per million 2013(2012)



STATISTICS – PACEMAKER – IMPLANTING HOSPITALS

First implants per hospital

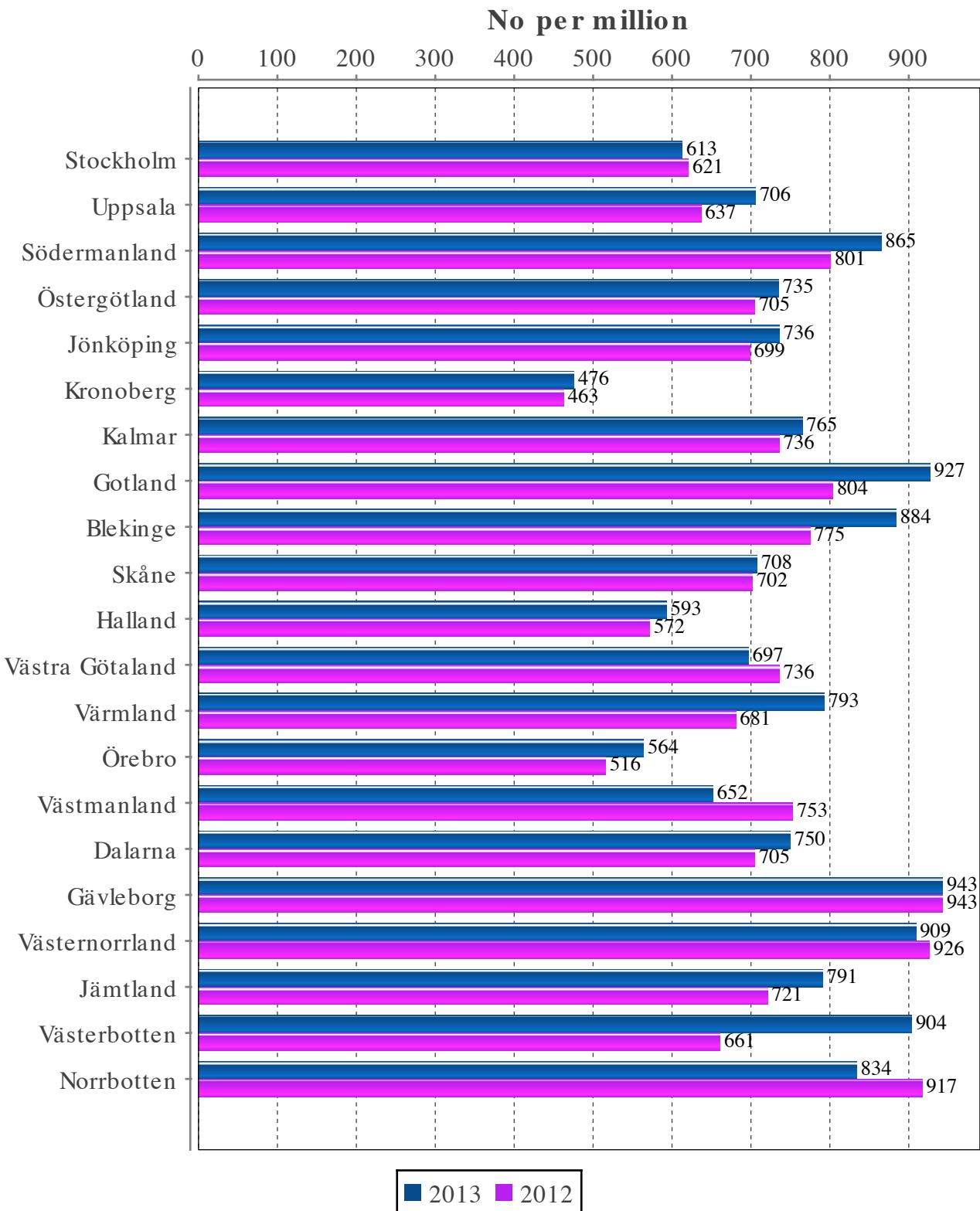
Region	Hospital	2013	2012
Northern Sweden	Norrlands Universitetssjukhus	207	145
	Skellefteå lasarett	56	48
	Sollefteå sjukhus	28	29
	Sunderby sjukhus	196	213
	Sundsvalls sjukhus	153	137
	Örnsköldsviks sjukhus	37	47
	Östersunds sjukhus	91	82
Southern Sweden	Blekingesjukhuset	152	143
	Centrallasarettet Växjö	74	79
	Länssjukhuset Halmstad	79	93
	Skånes universitetssjukhus, Lund	618	578
	Skånes universitetssjukhus, Malmö	282	291
South-East Sweden	Linköpings Universitetssjukhus	251	198
	Länssjukhuset Kalmar	99	95
	Länssjukhuset Ryhov	233	227
	Oskarshamns sjukhus	39	31
	Vrinnevisjukhuset	99	122
	Västerviks sjukhus	37	33
Stockholm/Gotland	Danderyds sjukhus	398	377
	Karolinska Universitetssjukhuset	471	450
	St Görans sjukhus	207	247
	Södersjukhuset	276	279
	Visby lasarett	39	38
Uppsala/Örebro	Akademiska sjukhuset	280	262
	Arvika sjukhus	22	22
	Centralsjukhuset Karlstad	154	135
	Centralsjukhuset Västerås	156	159
	Falu lasarett	192	186
	Hudiksvalls sjukhus	71	99
	Länssjukhuset Gävle	181	143
	Mälarsjukhuset	225	204
	Torsby	28	14
	Universitetssjukhuset Örebro	175	168
Western Sweden	Alingsås lasarett	59	55
	Borås lasarett	171	190
	Drottning Silvias Bus	9	12
	Kungälvs sjukhus	98	108
	Kärnsjukhuset Skövde	206	195
	Sahlgrenska Universitetssjukhuset	306	293
	Sahlgrenska Universitetssjukhuset /Östra	108	101
	Trollhättan, NÄL	201	241
	Varbergs sjukhus	90	75

STATISTICS – PACEMAKER – IMPLANTS PER COUNTY

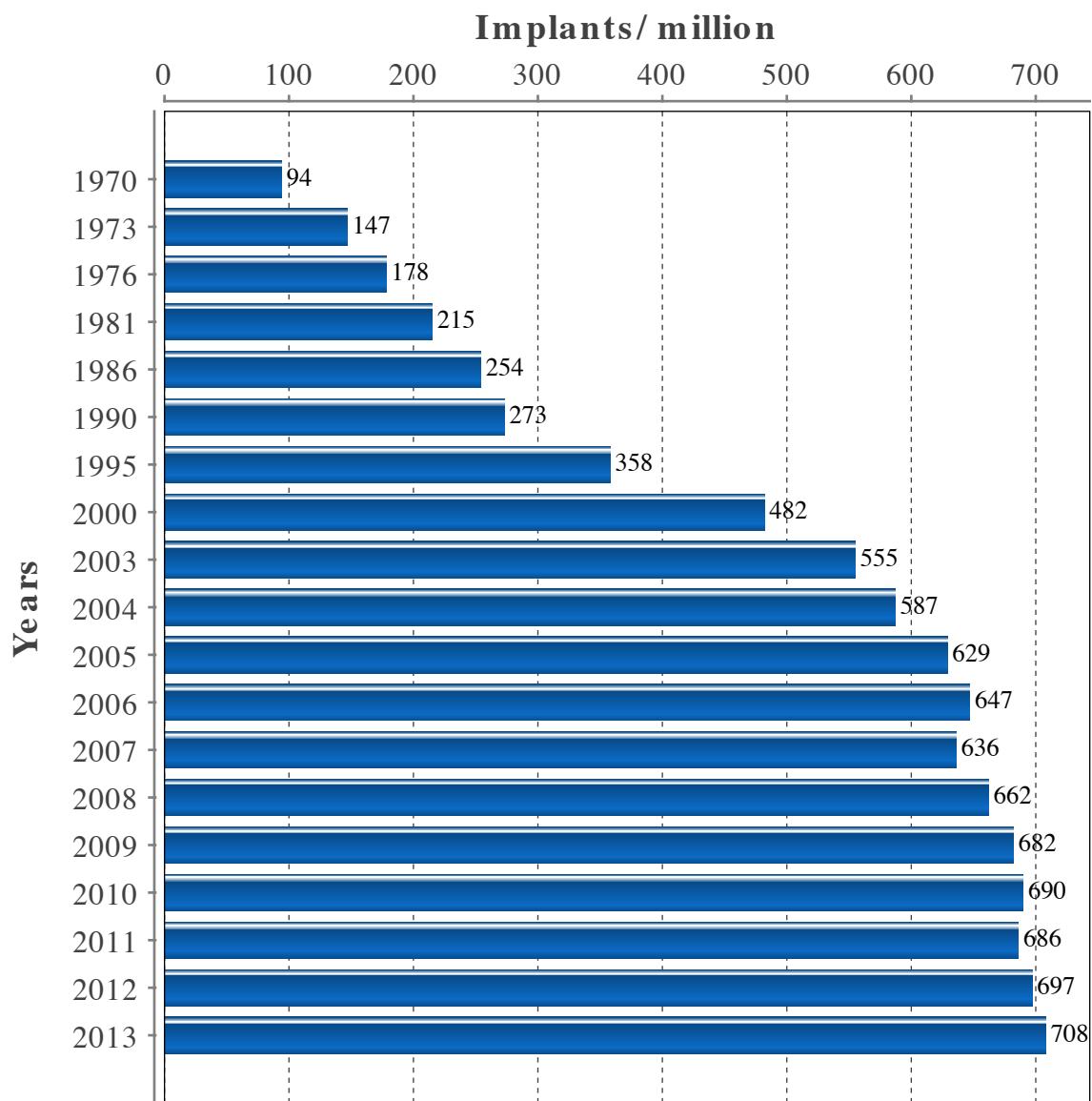
The regions are based on where the patients live, not where they are treated

County	Population	No of first	2013	Active patients
Stockholm	2163042	1326	613	9861
Uppsala	345481	244	706	1794
Södermanland	277569	240	865	1425
Östergötland	437848	322	735	2181
Jönköping	341235	251	736	1708
Kronoberg	187156	89	476	833
Kalmar	233874	179	765	1082
Gotland	57161	53	927	361
Blekinge	152757	135	884	974
Skåne	1274069	902	708	6662
Halland	306840	182	593	1473
Västra Götaland	1615084	1126	697	8587
Värmland	273815	217	793	1432
Örebro	285395	161	564	1385
Västmanland	259054	169	652	1349
Dalarna	277349	208	750	1512
Gävleborg	277970	262	943	2029
Västernorrland	242156	220	909	1462
Jämtland	126461	100	791	647
Västerbotten	261112	236	904	1419
Norrbotten	249436	208	834	1609
Total	9644864	6830	708	49785

STATISTICS – PACEMAKER – IMPLANTS PER COUNTY



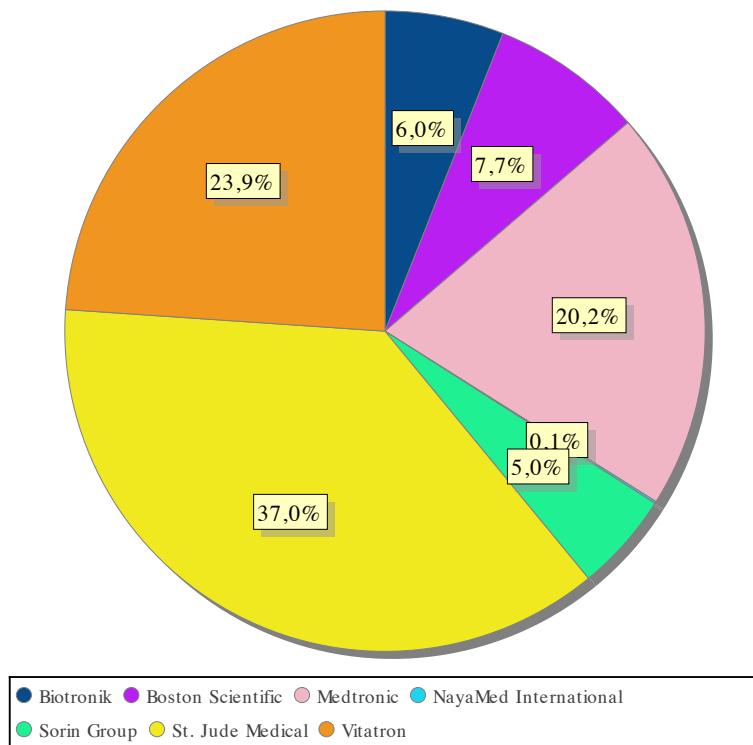
STATISTICS – PACEMAKER – HISTORICAL IMPLANTATION RATES



STATISTICS – PACEMAKER – PACEMAKERS PER MANUFACTURER

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

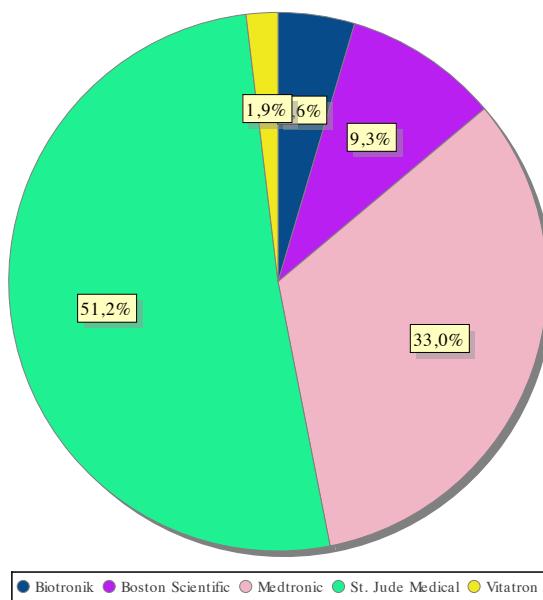
Manufacturer	2010 %	2011 %	2012 %	2013 %
Biotronik	6.0	6.0	7.6	6.0
Boston Scientific	12.0	7.0	6.7	7.7
Medtronic	48.0	42.0	26.1	20.2
Sorin Group	9.0	7.0	5.3	5.0
St. Jude Medical	21.0	30.0	36.2	37.0
Viatron	4.0	5.0	18.2	23.9
NayaMed International	-	-	-	0.1



STATISTICS – PACEMAKER – LEADS PER MANUFACTURER

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

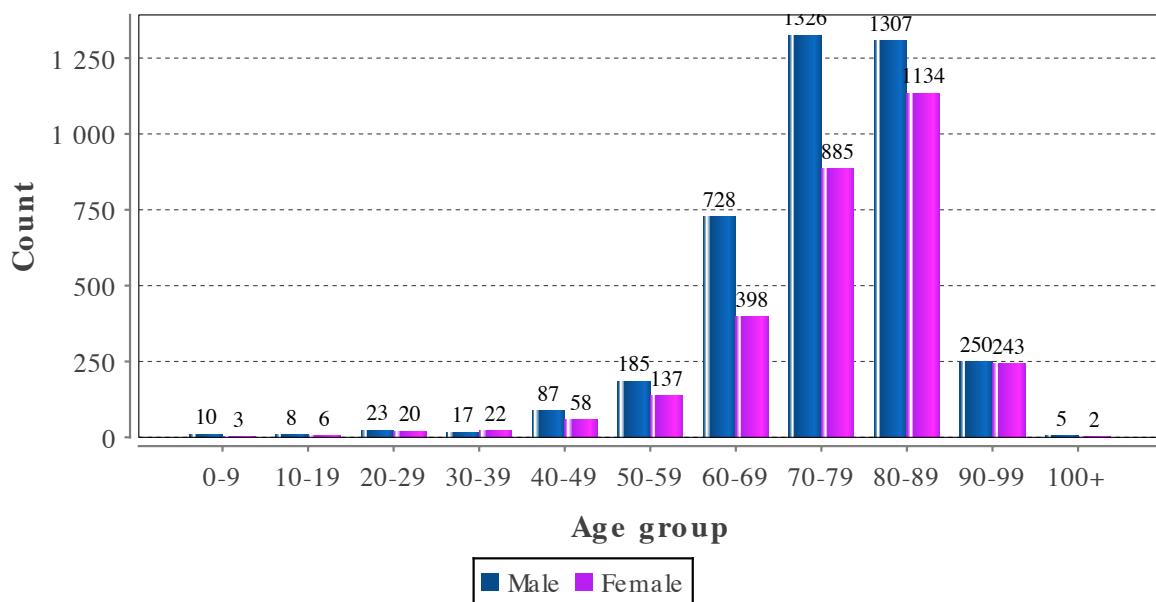
Manufacturer	2010 %	2011 %	2012 %	2013 %
Biotronik	1.0	1.0	2.1	4.6
Boston Scientific	8.0	10.0	10.0	9.3
Medtronic	48.0	39.0	31.0	33.0
St. Jude Medical	39.0	47.0	53.2	51.2
Viatron	4.0	3.0	3.7	1.9
Sorin Group	-	-	-	-



STATISTICS – PACEMAKER – AGE DISTRIBUTION MALES/FEMALES

Age and gender distribution for new implants, total numbers

Age (years)	Total no	%	Male	Female
0-9	13	0.2	10	3
10-19	14	0.2	8	6
20-29	43	0.6	23	20
30-39	39	0.6	17	22
40-49	145	2.1	87	58
50-59	322	4.7	185	137
60-69	1126	16.4	728	398
70-79	2211	32.3	1326	885
80-89	2441	35.6	1307	1134
90-99	493	7.2	250	243
100+	7	0.1	5	2
Average age	76	0.0	75	76
Total number of implants: 6854				

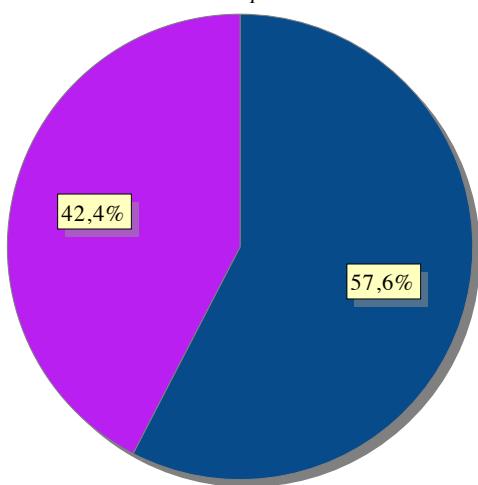


STATISTICS – PACEMAKER – TYPE OF IMPLANTS

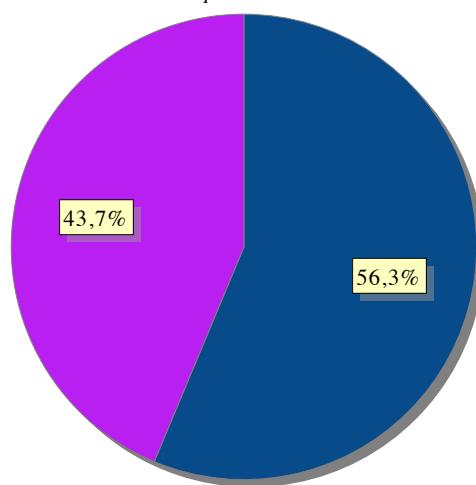
Ratio of new implants versus generator changes

	Total		Male		Female	
	no	%	no	%	no	%
First implant	6854	71.4	3946	57.6	2908	42.4
Replacement	2748	28.6	1546	56.3	1202	43.7
Total	9602	100.0	5492	57.2	4110	42.8

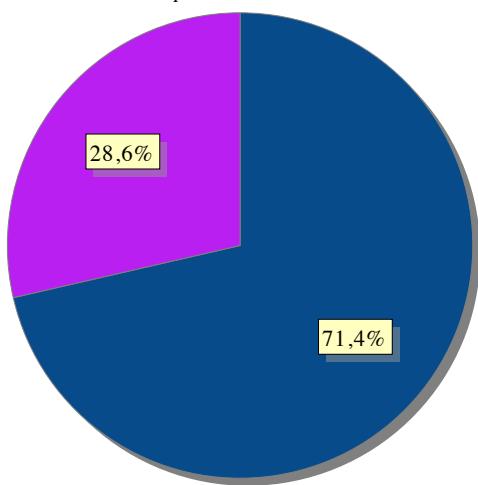
First implant



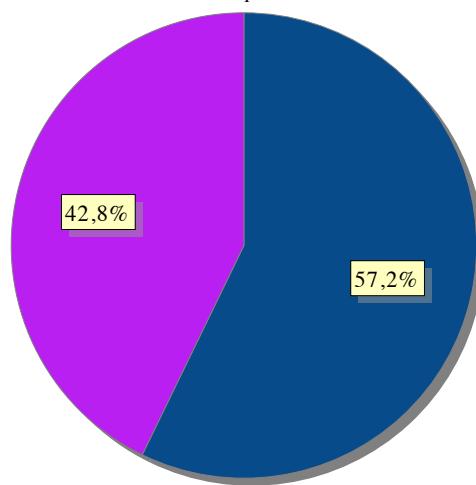
Replacement



Replacement ratio



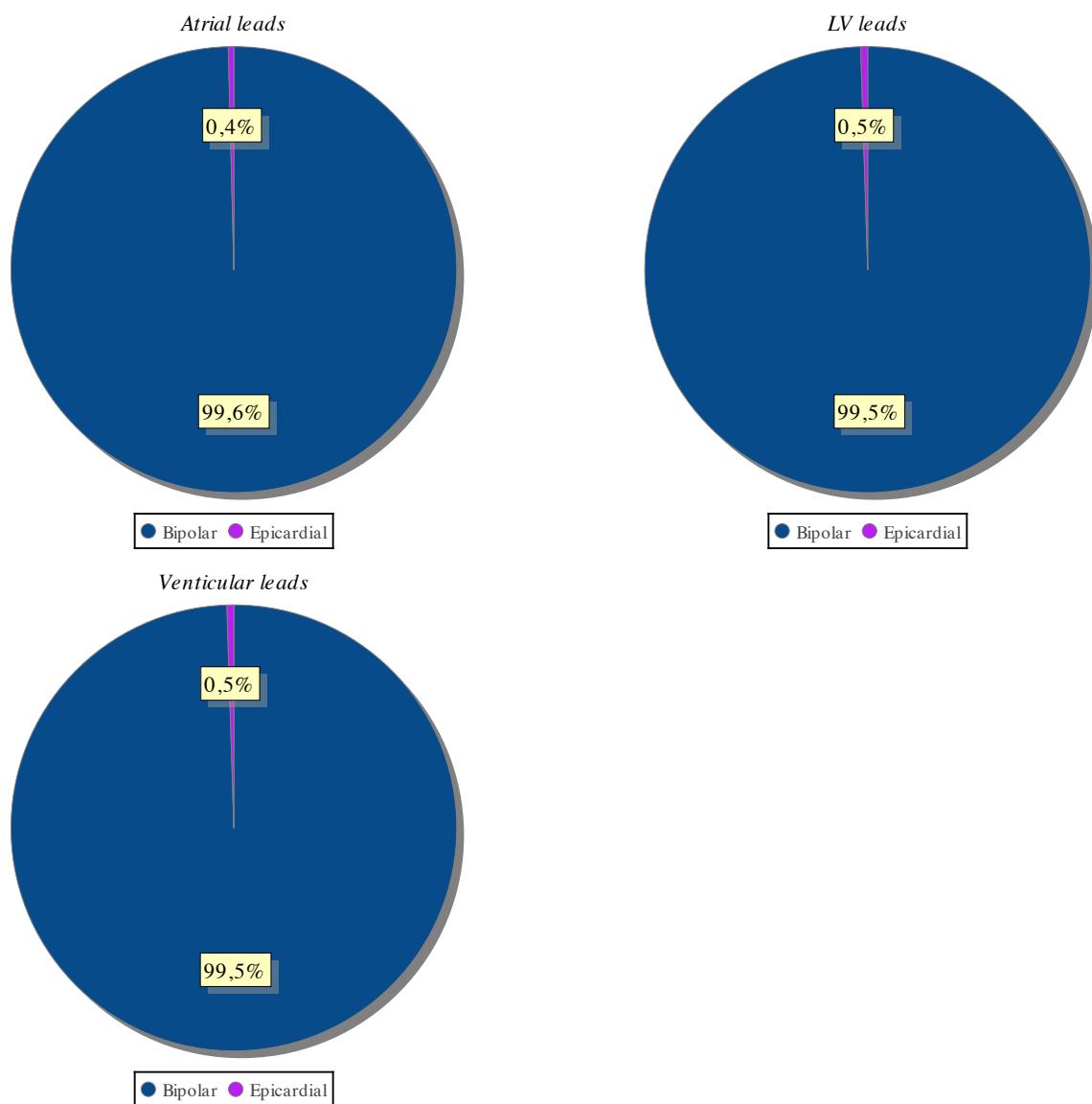
All implant



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

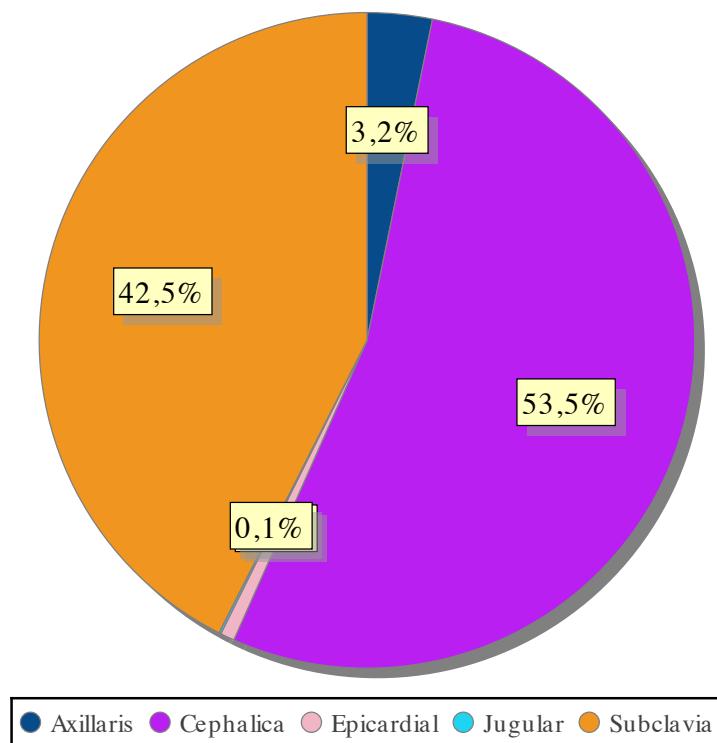
	Atrial		Ventricular		LV-lead	
	no	%	no	%	no	%
Bipolar	6643	99.6	7179	99.4	679	65.6
Epicardial	24	0.4	39	0.5	43	4.2
Unipolar	0	0.0	3	0.0	6	0.6
Quadripolar	0	0.0	0	0.0	307	29.7
	0	0.0	0	0.0	0	0.0
Active fixation	6559	98.4	5552	76.9	44	4.3
Passive fixation	108	1.6	1669	23.1	991	95.7
Total number of leads: 14923						



STATISTICS – PACEMAKER – LEAD ACCESS

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

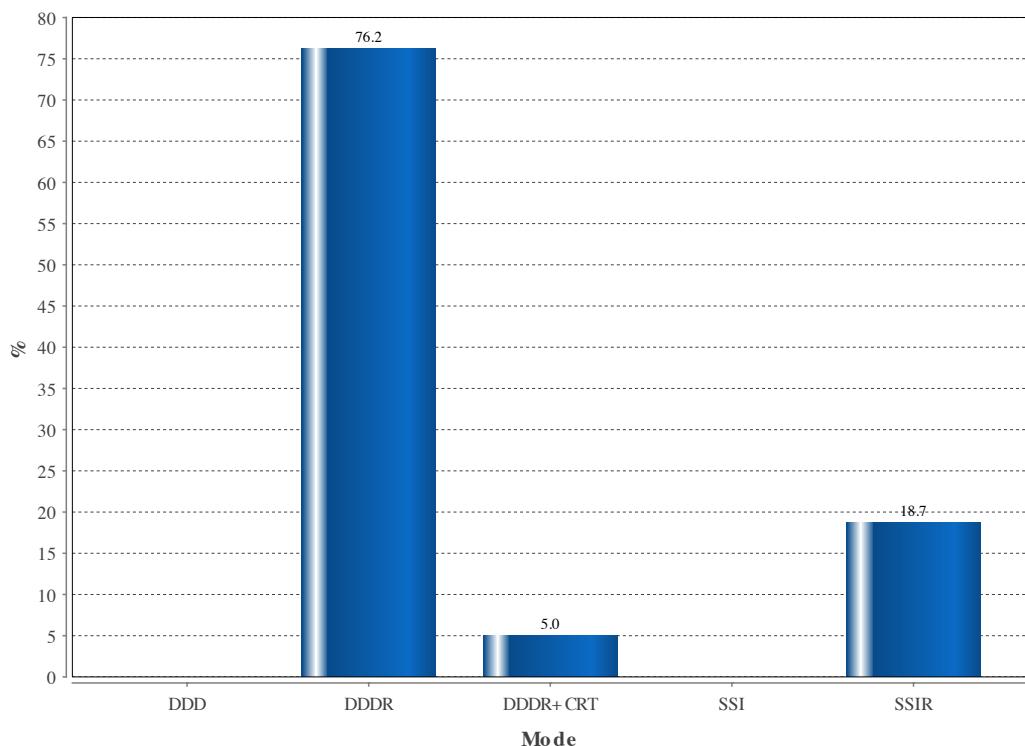
Lead access	No	%
Axillaris	473	3.2
Cephalica	7972	53.4
Epicardial	108	0.7
Jugular	16	0.1
N/A	6	0.0
Other	3	0.0
Subclavia	6345	42.5



STATISTICS – PACEMAKER – SUB TYPE

Implants by subtype

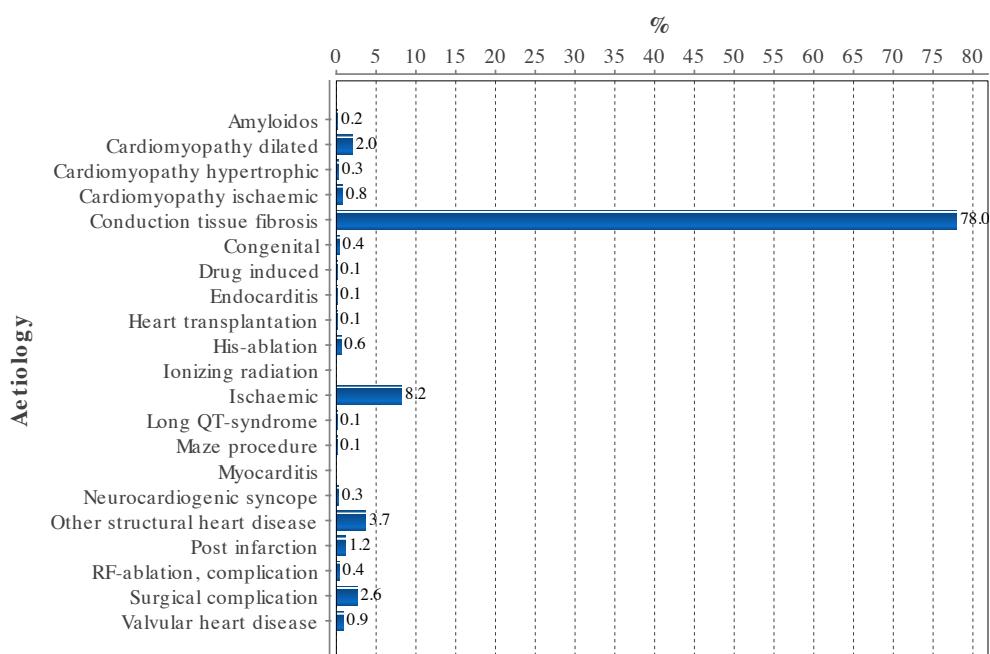
Mode	%	No
DDD	0.0	2
DDDR	76.2	5225
DDDR+CRT	5.0	344
SSI	0.0	2
SSIR	18.7	1281
Total number of first implants 6854		



STATISTICS – PACEMAKER - AETIOLOGY FIRST IMPLANT

Main aetiology for implanting pacemakers

Aetiology	Total %	Male %	Female %
Amyloidosis	0.2	0.2	0.2
Cardiomyopathy dilated	2.0	2.4	1.4
Cardiomyopathy hypertrophic	0.3	0.2	0.4
Cardiomyopathy ischaemic	0.8	1.0	0.5
Conduction tissue fibrosis	78.0	75.4	81.4
Congenital	0.4	0.4	0.4
Drug induced	0.1	0.1	0.1
Endocarditis	0.1	0.1	0.0
Heart transplantation	0.1	0.1	0.1
His-ablation	0.6	0.4	0.8
Ionizing radiation	0.0	0.0	0.1
Ischaemic	8.2	10.4	5.3
Long QT-syndrome	0.1	0.0	0.1
Maze procedure	0.1	0.1	0.1
Myocarditis	0.0	0.1	0.0
Neurocardiogenic syncope	0.3	0.3	0.3
Other structural heart disease	3.7	3.4	4.2
Post infarction	1.2	1.4	1.0
RF-ablation, complication	0.4	0.4	0.5
Surgical complication	2.6	2.8	2.2
Valvular heart disease	0.9	0.9	0.9



STATISTICS – PACEMAKER – SYSTEM UPGRADE

VVI to VVIR

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total	50	50	37	39	38	24	13	33	8
(Elective/ERI)	7	10	0	1	3	22	2	2	1
(Hemodynamic)	0	0	0	0	0	0	0	0	0

VVI/VVIR to DDD/DDDR

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total	44	39	45	59	70	39	53	108	83
(elective/ERI)	11	7	2	5	1	18	14	13	4
(Hemodynamic)	11	10	13	15	26	11	3	10	2

AAI/AAIR to DDD/DDDR

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total	58	58	50	54	44	26	39	68	52
(elective/ERI)	14	9	2	5	3	15	13	8	2
(Hemodynamic)	19	15	17	20	6	5	2	6	1

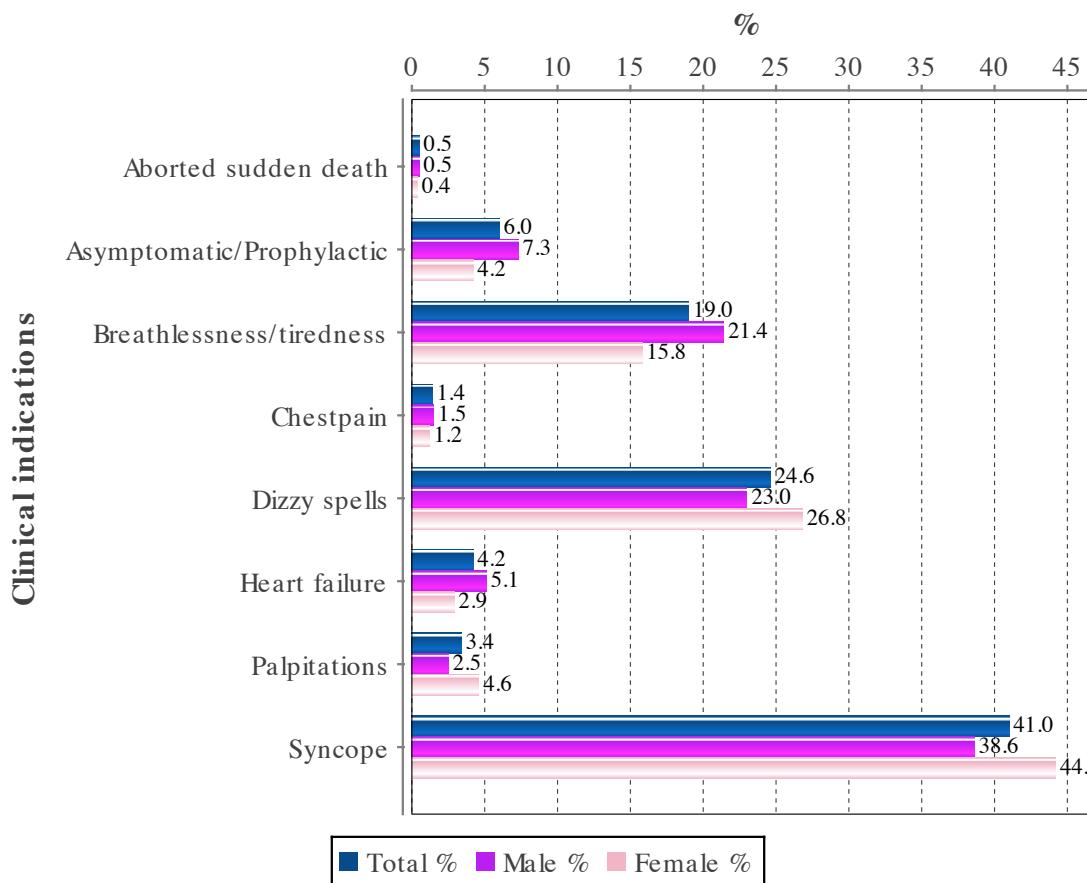
VVI/VVIR/DDD/DDDR to CRT

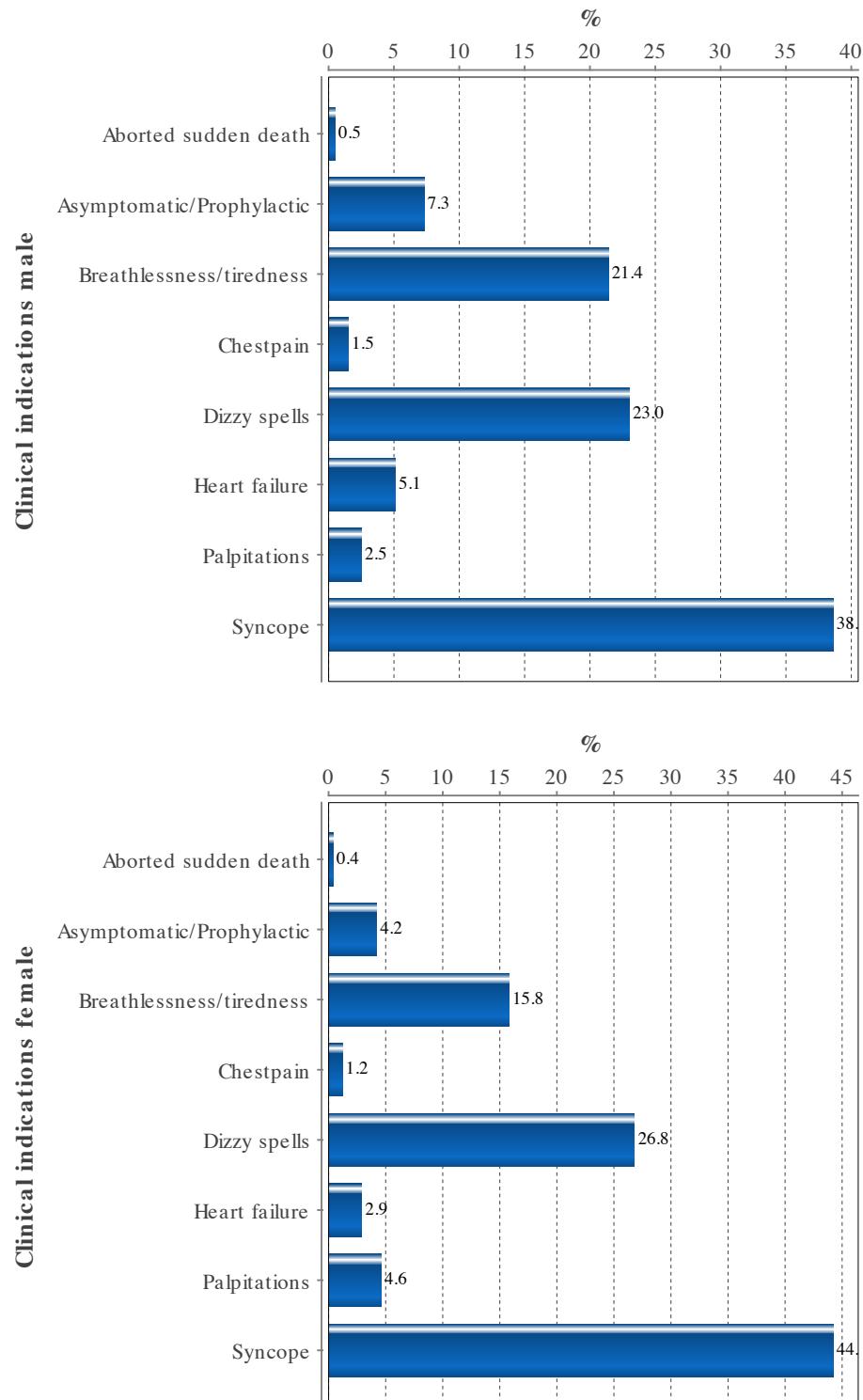
	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total	63	93	99	93	102	79	127	300	183
(elective/ERI)	10	14	8	3	2	11	21	22	6
(Hemodynamic)	47	61	65	74	84	62	16	22	3

STATISTICS – PACEMAKER – CLINICAL INDICATIONS FIRST IMPLANT

Main symptom for implanting pacemakers

Indication	Total %	Male %	Female %
Aborted sudden death	0.5	0.5	0.4
Asymptomatic/Prophylactic	6.0	7.3	4.2
Breathlessness/tiredness	19.0	21.4	15.8
Chestpain	1.4	1.5	1.2
Dizzy spells	24.6	23.0	26.8
Heart failure	4.2	5.1	2.9
Palpitations	3.4	2.5	4.6
Syncope	41.0	38.6	44.2



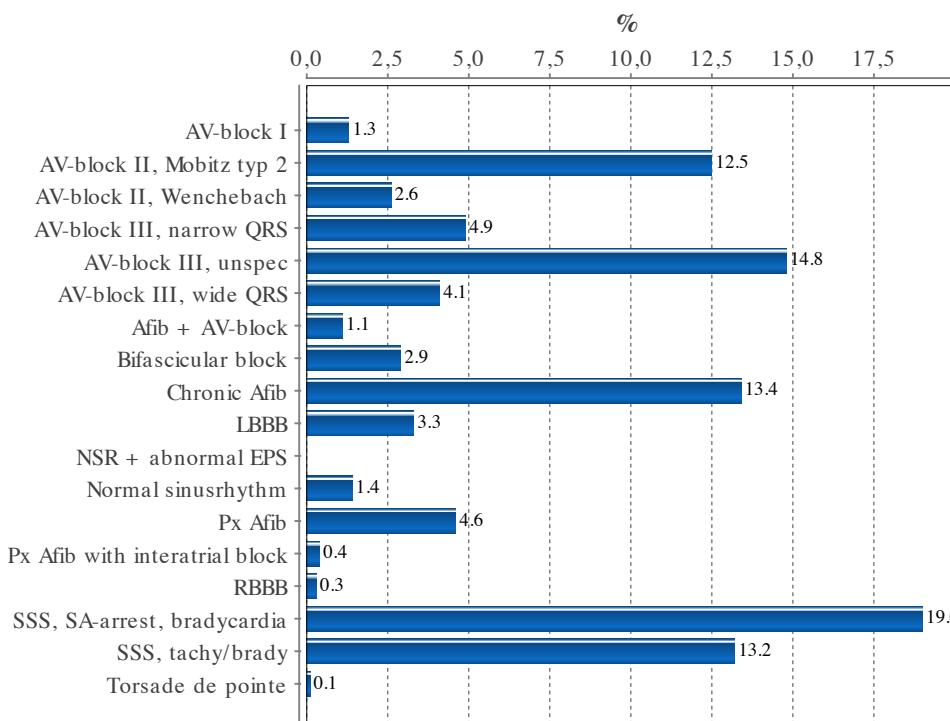


STATISTICS – PACEMAKER – ECG INDICATION FIRST IMPLANT

Main ECG indication, total

Indication	%
AV-block I	1.3
AV-block II, Mobitz typ 2	12.5
AV-block II, Wenchebach	2.6
AV-block III, narrow QRS	4.9
AV-block III, unspec	14.8
AV-block III, wide QRS	4.1
Afib + AV-block	1.1
Bifascicular block	2.9
Chronic Afib	13.4
LBBB	3.3
NSR + abnormal EPS	0.0
Normal sinusrhythm	1.4
Px Afib	4.6
Px Afib with interatrial block	0.4
RBBB	0.3
SSS, SA-arrest, bradycardia	19.0
SSS, tachy;brady	13.2
Torsade de pointe	0.1

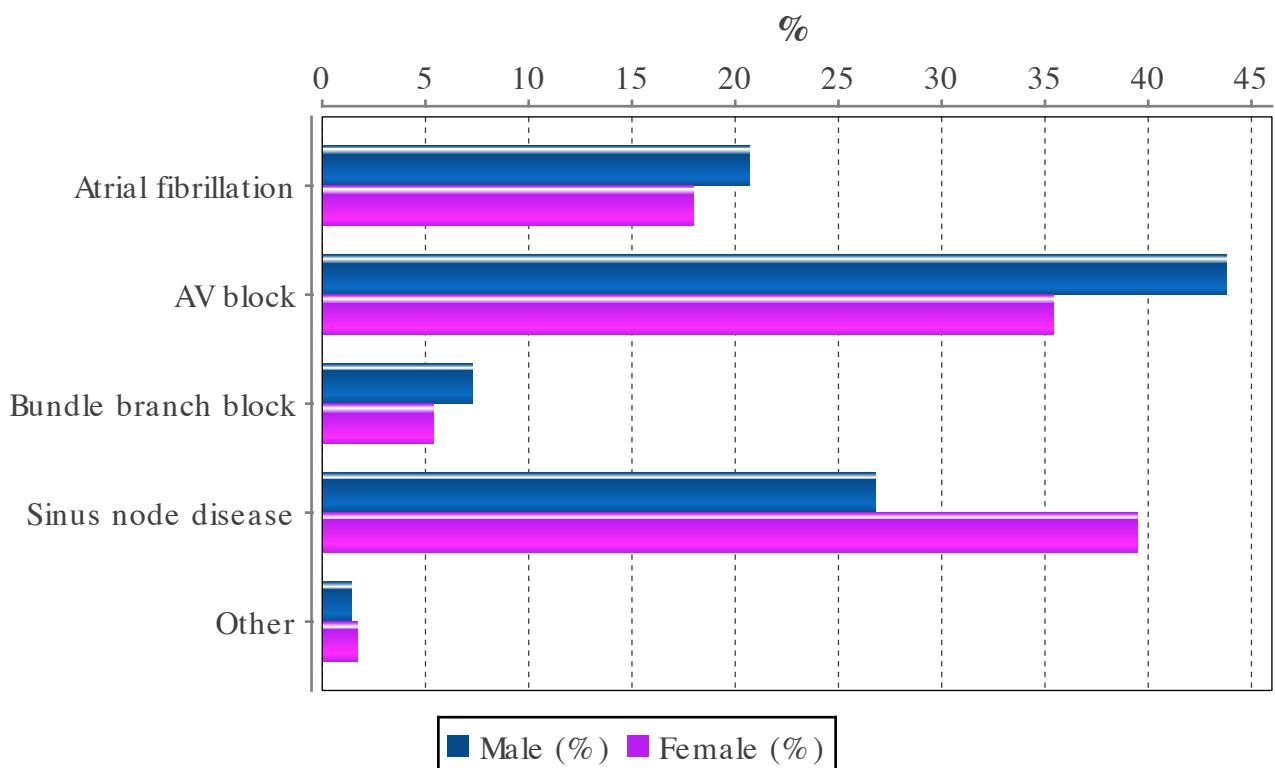
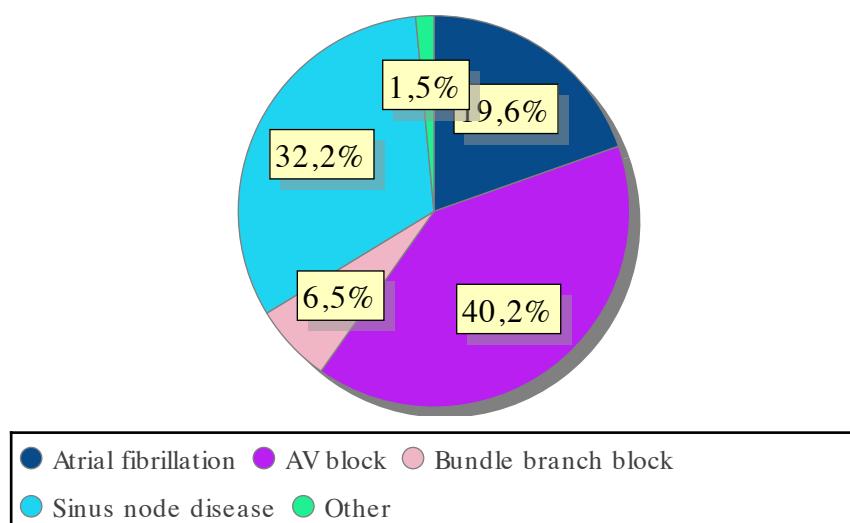
Clinical indications



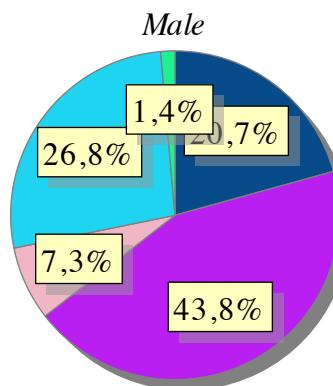
STATISTICS – PACEMAKER - PREPACING ECG FIRST IMPLANT

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

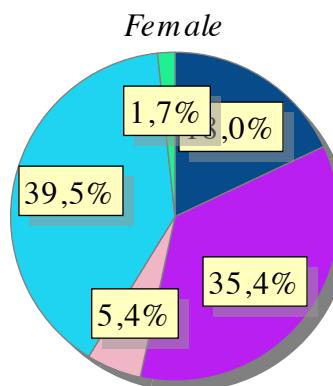
Indication	No	%	Male (%)	Female (%)	Younger than 18 (%)
Atrial fibrillation	1340	19.6	20.7	18.0	5.0
AV block	2758	40.2	43.8	35.4	70.0
Bundle branch block	445	6.5	7.3	5.4	0.0
Sinus node disease	2206	32.2	26.8	39.5	10.0
Other	105	1.5	1.4	1.7	15.0
Total number of implants 6854					



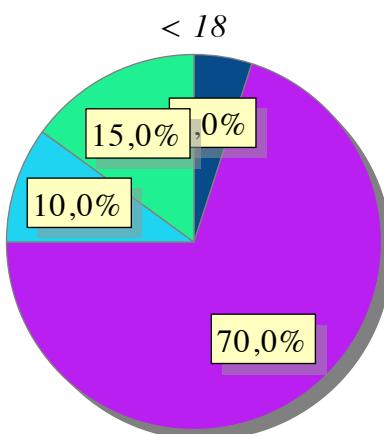
STATISTICS – PACEMAKER - PREPACING ECG FIRST IMPLANT



● Atrial fibrillation ● AV block ● Bundle branch block
● Sinus node disease ● Other



● Atrial fibrillation ● AV block ● Bundle branch block
● Sinus node disease ● Other



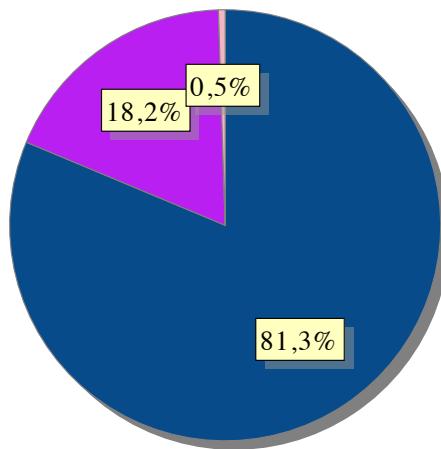
● Atrial fibrillation ● AV block ● Sinus node disease ● Other

STATISTICS – PACEMAKER – USE OF PACING MODES FIRST IMPLANT

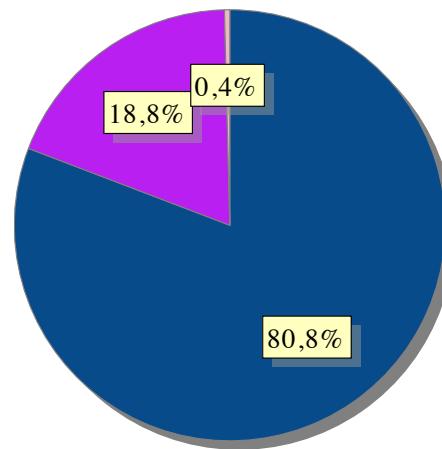
Use of pacemaker subtype for all indications per hospital size (number of new implants/year and hospital)

Size	Hospitals	DDD/R %	VVI/R %	AAI/R %
Large	14	82.3	17.2	0.5
Medium	19	80.8	18.8	0.4
Small	10	75.4	24.4	0.3
Total	43	81.3	18.2	0.5

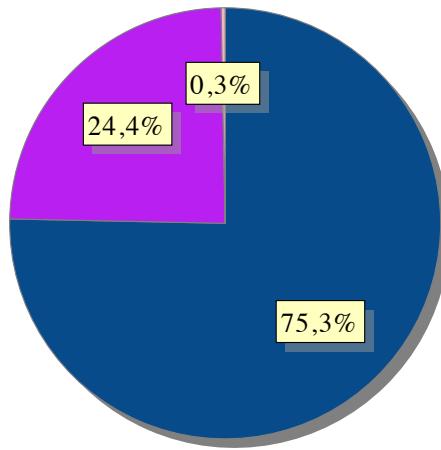
All hospitals



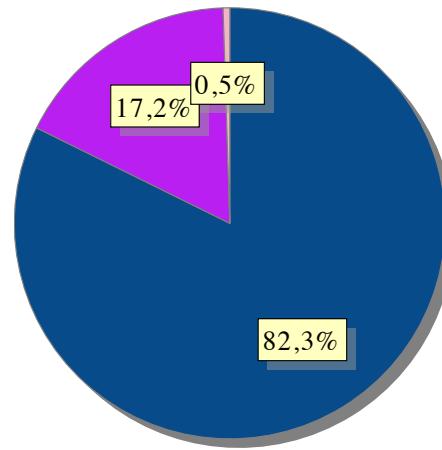
Medium hospitals



Small hospitals



Large hospitals



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

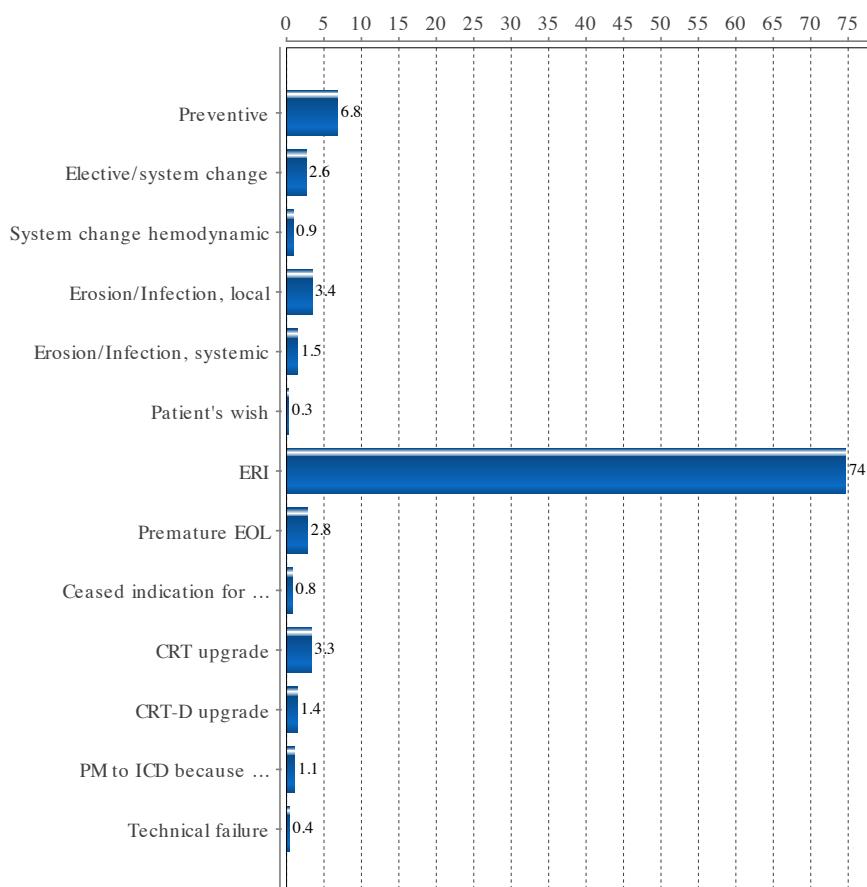
Use of pacemaker sub type for all indications per hospital (number of new implants / year and hospital))

Hospital	DDD/R	VVI/R	AAI/R
Akademiska sjukhuset	82.4	16.8	0.7
Alingsås lasarett	76.3	23.7	0.0
Arvika sjukhus	86.4	13.6	0.0
Blekingesjukhuset	80.9	19.1	0.0
Borås lasarett	87.1	12.9	0.0
Centrallasarettet Växjö	83.8	16.2	0.0
Centralsjukhuset Karlstad	80.5	19.5	0.0
Centralsjukhuset Västerås	83.3	16.7	0.0
Danderyds sjukhus	81.7	18.3	0.0
Drottning Silvias Bus	100.0	0.0	0.0
Falu lasarett	74.0	25.0	1.0
Hudiksvalls sjukhus	76.1	23.9	0.0
Karolinska Universitetssjukhuset	87.5	12.3	0.2
Kungälvs sjukhus	81.6	17.3	1.0
Kärnsjukhuset Skövde	87.9	11.7	0.5
Linköpings Universitetssjukhus	86.9	13.1	0.0
Länssjukhuset Gävle	79.6	20.4	0.0
Länssjukhuset Halmstad	83.5	16.5	0.0
Länssjukhuset Kalmar	68.7	29.3	2.0
Länssjukhuset Ryhov	79.1	20.9	0.0
Mälarsjukhuset	80.9	19.1	0.0
Norrlands Universitetssjukhus	79.2	17.9	2.9
Oskarshamns sjukhus	76.9	23.1	0.0
Sahlgrenska Universitetssjukhuset	89.2	10.8	0.0
Sahlgrenska Universitetssjukhuset /Östra	73.1	26.9	0.0
Skellefteå lasarett	64.3	35.7	0.0
Skånes universitetssjukhus, Lund	82.0	16.4	1.6
Skånes universitetssjukhus, Malmö	81.1	18.6	0.4
Söllefteå sjukhus	60.7	39.3	0.0
St Görans sjukhus	86.5	13.5	0.0
Sunderby sjukhus	78.6	21.4	0.0
Sundsvalls sjukhus	77.8	20.9	1.3
Södersjukhuset	77.8	21.5	0.7
Torsby	53.6	46.4	0.0
Trollhättan, NÄL	75.1	24.9	0.0
Universitetssjukhuset Örebro	84.0	16.0	0.0
Varbergs sjukhus	77.8	21.1	1.1
Visby lasarett	79.5	20.5	0.0
Vrinnevisjukhuset	81.8	17.2	1.0
Västerviks sjukhus	83.8	13.5	2.7
Örnsköldsviks sjukhus	91.9	8.1	0.0
Östersunds sjukhus	69.6	30.4	0.0

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	6.8	4.9	10.2	2.1
Elective/system change	2.6	2.3	3.2	0.7
System change hemodynamic	0.9	0.9	1.1	0.7
Erosion/Infection, local	3.4	4.7	1.6	2.1
Erosion/Infection, systemic	1.5	1.9	1.1	0.0
Patient's wish	0.3	0.3	0.4	0.0
ERI	74.7	74.3	73.9	86.1
Premature EOL	2.8	2.9	2.2	5.6
Ceased indication for PM therapy	0.8	1.0	0.4	0.7
CRT upgrade	3.3	3.5	3.3	0.0
CRT-D upgrade	1.4	1.8	1.0	1.4
PM to ICD because of arrhythmia	1.1	1.1	1.3	0.0
Technical failure	0.4	0.4	0.4	0.7



STATISTICS – PACEMAKER – REASON FOR GENERATOR EXPLANT

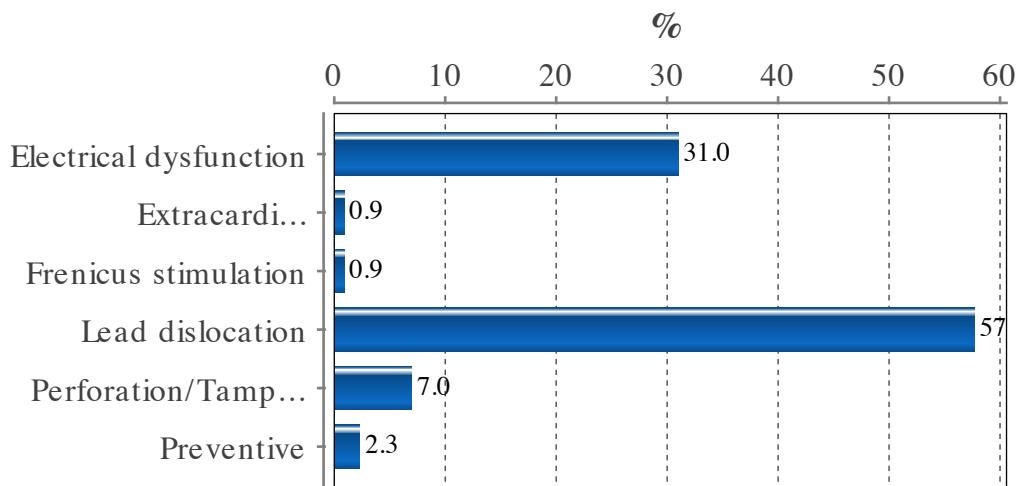
Historical explant indications

Reason	2009 %	2010 %	2011 %	2012 %	2013 %
Preventive	3.6	4.5	3.7	6.2	6.8
Erosion/Infection, local	4.9	4.7	4.9	5.1	3.4
Heart transplant	0.1	0.0	0.0	0.1	0.0
ERI	79.9	79.3	77.7	75.7	74.8
Premature EOL	1.8	3.3	4.3	2.8	2.8
Patient's wish	0.2	0.1	0.1	0.1	0.3
Recall/Alert	0.5	0.0	0.0	0.1	0.0
System change arrhythmia	3.5	3.7	3.3	0.0	0.0
System change hemodynamic	4.6	3.4	4.5	2.4	0.9
Technical failure	0.6	0.5	0.6	0.3	0.4
Ceased indication for PM therapy	0.3	0.5	0.4	0.4	0.8
CRT upgrade	0.0	0.0	0.2	4.1	3.3
PM to ICD because of arrhythmia	0.0	0.0	0.2	2.5	1.1
Elective/system change	0.0	0.0	0.0	0.0	2.6
Erosion/Infection, systemic	0.0	0.0	0.0	0.0	1.5
CRT-D upgrade	0.0	0.0	0.0	0.0	1.4

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.

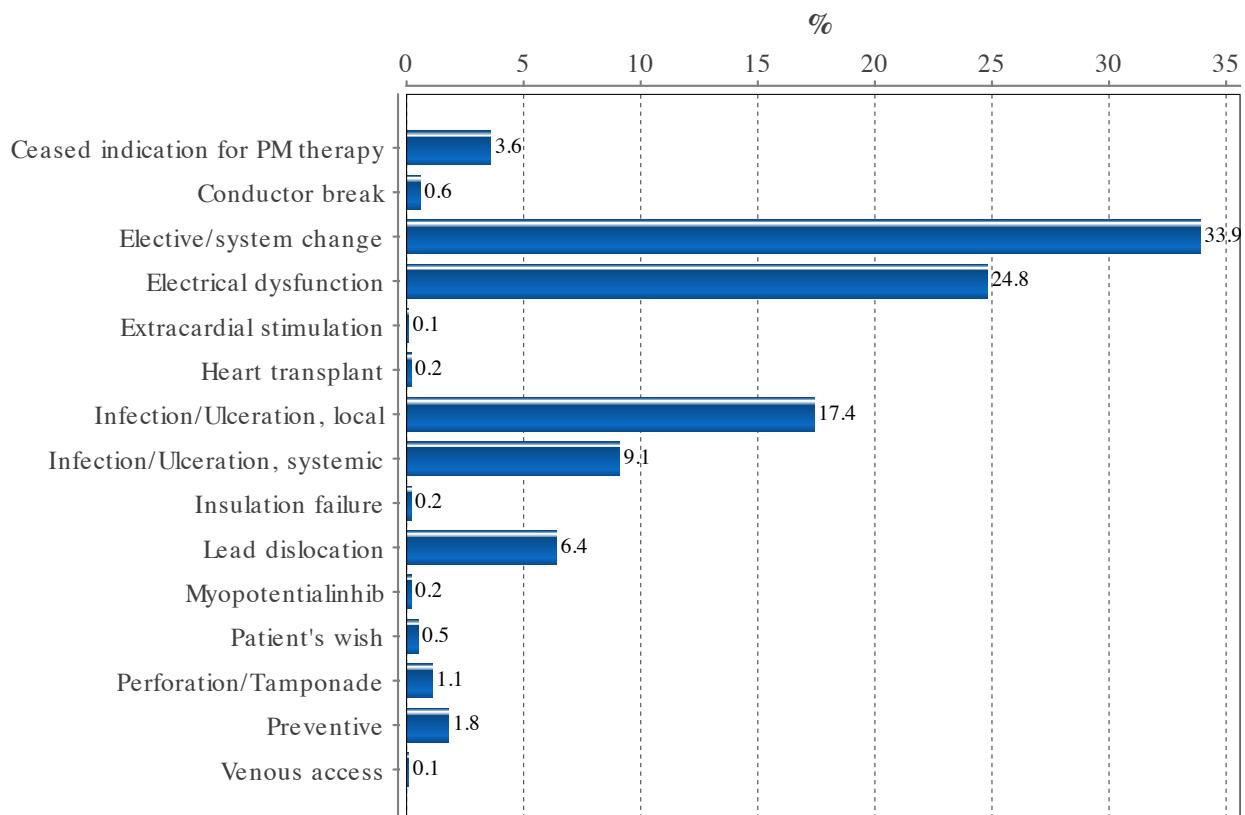
Reason	All hospital (%)	Small (%)	Medium (%)	Large (%)
Electrical dysfunction	31.0	0.0	28.0	35.2
Extracardial stimulation	0.9	0.0	1.2	0.8
Frenicus stimulation	0.9	0.0	1.2	0.8
Lead dislocation	57.7	100.0	61.0	52.5
Perforation/Tamponade	7.0	0.0	3.7	9.8
Preventive	2.3	0.0	4.9	0.8
				Total no 213



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	3.6	7.0	3.0	3.7
Conductor break	0.6	2.3	0.8	0.4
Elective/system change	33.9	18.6	39.8	31.9
Electrical dysfunction	24.8	46.5	32.3	19.5
Extracardial stimulation	0.1	-	0.3	-
Heart transplant	0.2	-	-	0.3
Infection/Ulceration, local	17.4	4.7	7.7	23.2
Infection/Ulceration, systemic	9.1	-	4.1	12.2
Insulation failure	0.2	2.3	-	0.1
Lead dislocation	6.4	11.6	9.7	4.3
Myopotentialinhib	0.2	4.7	-	-
Patient's wish	0.5	-	0.3	0.7
Perforation/Tamponade	1.1	-	0.6	1.4
Preventive	1.8	2.3	1.4	2.0
Venous access	0.1	-	-	0.1
Total no 1102				



STATISTICS – PACEMAKER – OPERATORCODE FOR IMPLANTS

Procedures per operator

Hospital	Operator	No
Akademiska sjukhuset	Arvanitis	17
	Dimberg	20
	Eriksson J	1
	Janiec	13
	Jidéus	25
	Landelius	2
	Lindblom	8
	Melki	4
	Mörtsell	52
	Myrdahl	1
	Nilsson L	127
	Ramström	3
	Schiller	4
	Teder	76
	Thorén	9
	Zemgulis	10
Alingsås lasarett	Kennergren	5
	Sivik	28
	Watsfeldt	45
Arvika sjukhus	Brunmark	20
	Saidi	1
	Westbom	19
Ålands centralsjukhus	Ove Carlström	13
	Slotte	13
Blekingesjukhuset	Borg	106
	Borsiin, Andreas	1
	Ericsson	68
	Gaidan, Haider	2
	Ghaidan, Haider	15
	Ringborn, Michael	3
Borås lasarett	Almqvist	23
	Friedemann	60
	Kennergren	1
	Lodin	36
	Sandgren	84
	Widfeldt	36
Centrallasarettet Växjö	Björkman	21
	Damkilde	9
	Ekstrand Johan	1
	Jacobsson K	16
	Johansson P	19
	Jonasson	19
	Mikael Sundin	3
	Näsström Jesper	1
	Rosén Helena	6
	Strandberg	26
	Weber	7
Centralsjukhuset Karlstad	Annan	9

Hospital	Operator	No
	Gerdes	2
	Hallén	9
	Mahknov	1
	Niklas Aldergård	77
	Saidi	75
	Schönberg	8
	Sigvant	13
Centralsjukhuset Västerås	Dilan	68
	SkoglundAndersson	42
	Täckström	35
	Wiberg	80
Danderyds sjukhus	2	83
	3	114
	4	135
	5	1
	6	172
Drottning Silvias Bus	Berggren	2
	Hallhagen	5
	Nilsson B	2
	Oskar Väärt	7
	Synnergren	5
Falu lasarett	Ågren	10
	Berglund	73
	Forsgren	137
	Guggi	38
Hudiksvalls sjukhus	Maru Fikru	19
	Myrdahl	1
	Roussinne	73
Karolinska Universitetssjukhus	Annan	4
	Gadler	202
	Hörnsten	200
	Jacobsson L	1
	Mortensen	11
	Reistam	15
	Reistam, Ulrika	8
	Reistam/Gadler	3
	Reistam/ Hörnsten	5
	Reistam/ Westholm	9
	Westholm	231
Kärnsjukhuset Skövde	Falmer	83
	Lorentzen	135
	Paulsson	52
	Winterfeldt	62
Kungälvs sjukhus	Fogelqvist	34
	Hellström	34
	Norström	16
	Skånberg	36
Länssjukhuset Gävle	Falck	13

STATISTICS – PACEMAKER – OPERATORCODE FOR IMPLANTS

Hospital	Operator	No
	Johansson Staffan	53
	Kastberg	62
	Larsson Anders	17
	Magnusson Bo	27
	Magnusson Peter	89
	Morin	13
Länssjukhuset Halmstad	Berggren	58
	Engdahl	53
Länssjukhuset Kalmar	Carlström	29
	David Olsson	9
	Flodmark	14
	Johansson R	42
	Michael Lindstaedt	12
	Samuelsson	16
Länssjukhuset Ryhov	Asking	36
	Christina Holmgren	19
	Jakobsson S	104
	Lagerberg	128
	Wellander	1
Linköpings Universitetssjukhus	Jönsson A	3
	Säfström	103
	Sonesson	121
	Szamlewska	5
	Szymanowski	116
Mälarsjukhuset	Andreas Pikwer	20
	Axel Nyberg	16
	Bozena Ostrowska	68
	Hanan Alwan	31
	Jan Haapaniemi	21
	Krister Blomberg	20
	Marcus Castegren	21
	Peter Spetz	41
	Ulla Lindblad	43
Norrlands Universitetssjukhus	Höglund	42
	Höglund/Rönn	1
	Jensen	22
	Kesek	48
	Kesek/Höglund	3
	Landström	65
	Rönn	77
Oskarshamns sjukhus	Van Der Wal	40
Örnsköldsviks sjukhus	Ehlin	57
	Maru	1
Östersunds sjukhus	Björklund	12

Hospital	Operator	No
	Friberg	41
	Hansson	58
	Sandström	1
Sahlgrenska Universitetssjukhuset	Annan	4
	Belboul	4
	Gäbel	8
	Jamaly	64
	Javid	41
	Johansson B	1
	Kennergren	34
	Petersson M	1
	Piotr Szamlewski	143
	Sandstedt	3
	SALIM BARYWANI	1
	Schultz	129
	Westbom	79
Sahlgrenska Universitetssjukhuset / Östra	Javid	52
	Johansson B	96
	Salim Barywani	24
	Schultz	2
Skånes universitetssjukhus, Lund	Annan	19
	Carl Johan Höijer	120
	Fredrik Slotte	132
	Ingrid Litterfeldt	124
	Johan Brandt	223
	Pyotr Platonov	88
	Rasmus Borgquist	69
	Steen Jensen	33
	Wang Lingwei	79
Skånes universitetssjukhus, Malmö	Annan	19
	Pehrsson	332
	WANG	39
Skellefteå lasarett	Boström	24
	Lindqvist	49
Sollefteå sjukhus	Åström	1
	Kramarz	31
	Rudenstam	1
Södersjukhuset	Jonsson J-E	91
	Kjellman B	61
	Lerner	92
	Olson J	154
St Görans sjukhus	1	82
	1+2	6

STATISTICS – PACEMAKER – OPERATORCODE FOR IMPLANTS

Hospital	Operator	No
	2	102
	3	63
	4	19
Sunderby sjukhus	Baas	5
	Haupt	101
	Johansson A	3
	Johansson P	52
	Lundblad	28
	Wennberg	70
Sundsvalls sjukhus	Annan	2
	Jonas	2
	Rudenholt	
	Khadhim	82
	Srock	45
	Sundelin	67
	Truedsson	3
Torsby sjukhus	Bentjerodt	9
	Brunmark	2
	Venizelos	24
Trollhättan, NÄL	Dinu Dusceac	44
	Jabbar	33
	Lennander	60
	Petersen P	33
	Söderbergh	54
	Wetterling	86
	Wiberg Dennis	16
Universitetssjukhuset Örebro	Anna Björkenheim	1
	Lindell	156
	Payam Khalili	20
	Tommy Andersson	82
Varbergs sjukhus	Ei Bahrawy	3
	Emma Sandgren	5
	Myredal	38
	Rorsman	93
Västerviks sjukhus	Arvidsson	37
	Åke Aldman	2
	Joachim Starck	10
	Ove Carlström	3
Visby lasarett	Jacobsson L	34
	Jacobsson/ Litorell	1
	Litorell	21
Vrinnevisjukhuset	Engström	33
	Lindberget	60
	N/A	1
	Svensson	59

STATISTICS – ICD

STATISTICS – ICD – IMPLANTING HOSPITALS

First implants per hospital

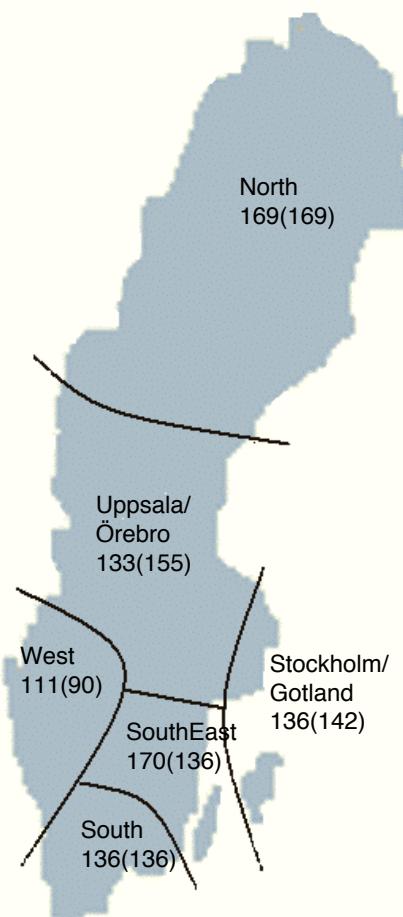
Region	Hospital	2013	2012
Northern Sweden	Norrlands Universitetssjukhus	40	73
	Skellefteå lasarett	5	3
	Sunderby sjukhus	52	32
	Sundsvalls sjukhus	24	21
	Örnsköldsviks sjukhus	8	6
	Östersunds sjukhus	18	12
Southern Sweden	Blekingesjukhuset	22	20
	Centrallasarettet Växjö	31	30
	Skånes universitetssjukhus, Lund	161	170
South-East Sweden	Linköpings Universitetssjukhus	93	74
	Länssjukhuset Kalmar	44	40
	Länssjukhuset Ryhov	35	20
Stockholm/Gotland	Danderyds sjukhus	83	60
	Karolinska Universitetssjukhuset	141	193
	St Görans sjukhus	34	36
	Södersjukhuset	54	57
	Visby lasarett	8	7
Uppsala/Örebro	Akademiska sjukhuset	44	66
	Centralsjukhuset Västerås	34	35
	Falu lasarett	46	40
	Hudiksvalls sjukhus	6	15
	Länssjukhuset Gävle	39	37
	Mälarsjukhuset	36	13
Western Sweden	Universitetssjukhuset Örebro	46	61
	Borås lasarett	37	40
	Kärnsjukhuset Skövde	32	30
	Sahlgrenska Universitetssjukhuset	78	65
	Sahlgrenska Universitetssjukhuset /Östra	4	1
	Trollhättan, NÄL	24	12
	Varbergs sjukhus	44	26

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	2220203	302	136	1868
Uppsala/Örebro	1996633	265	133	1623
South-East Sweden	1012957	172	170	823
Southern Sweden	1741584	236	136	1511
Western Sweden	1794322	199	111	1139
Northern Sweden	879165	149	169	788
Total	9644864	1323	137	7752

Implants per million 2013(2012)

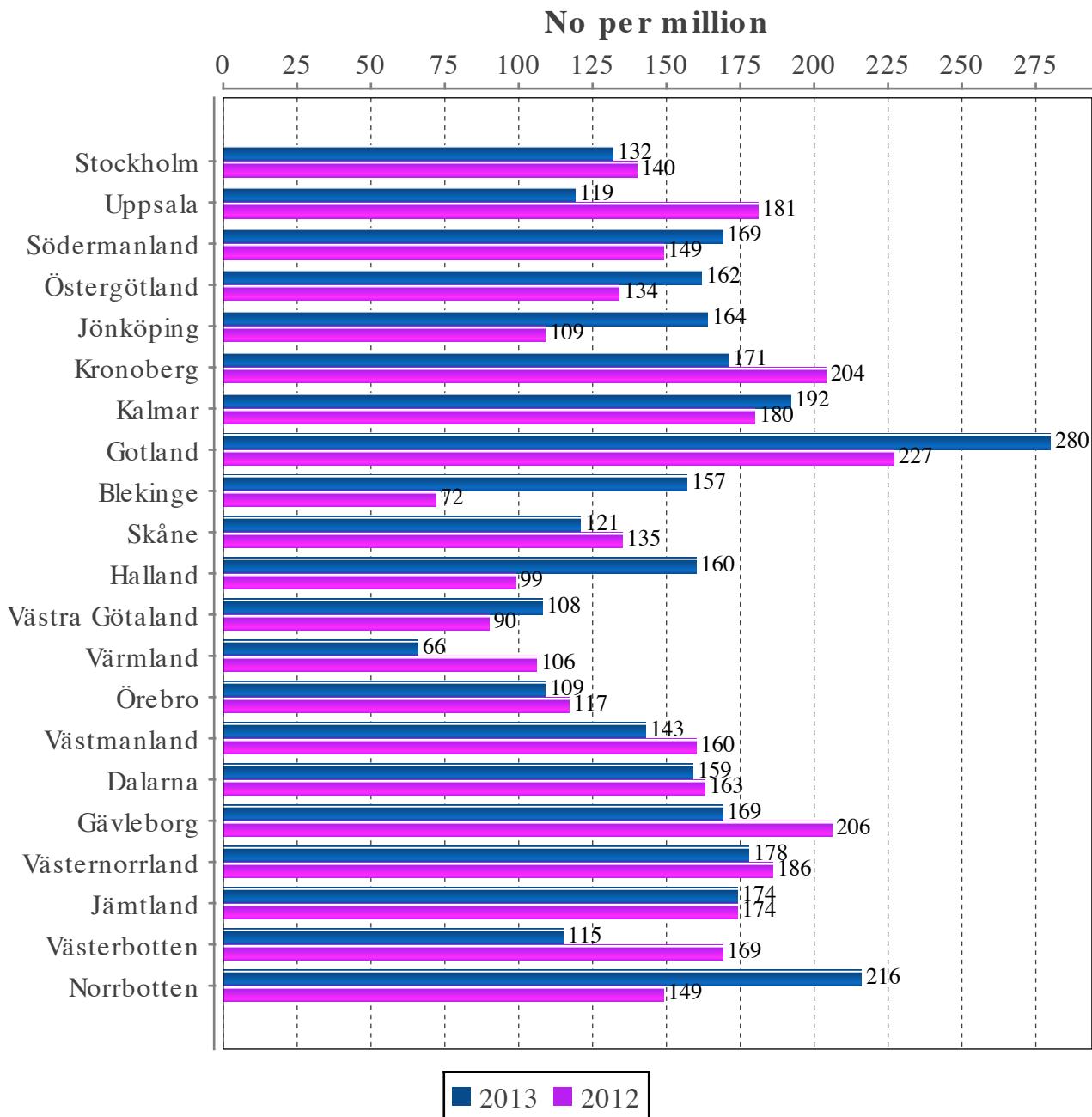


STATISTICS – ICD – IMPLANTS PER COUNTY

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

County	Population	No of first	2013	Active patients
Stockholm	2163042	286	132	1800
Uppsala	345481	41	119	321
Södermanland	277569	47	169	222
Östergötland	437848	71	162	332
Jönköping	341235	56	164	261
Kronoberg	187156	32	171	184
Kalmar	233874	45	192	230
Gotland	57161	16	280	68
Blekinge	152757	24	157	143
Skåne	1274069	154	121	1054
Halland	306840	49	160	270
Västra Götaland	1615084	175	108	999
Värmland	273815	18	66	170
Örebro	285395	31	109	209
Västmanland	259054	37	143	188
Dalarna	277349	44	159	213
Gävleborg	277970	47	169	300
Västernorrland	242156	43	178	190
Jämtland	126461	22	174	106
Västerbotten	261112	30	115	225
Norrbotten	249436	54	216	267
Total	9644864	1322	137	7752

STATISTICS – ICD – IMPLANTS PER COUNTY

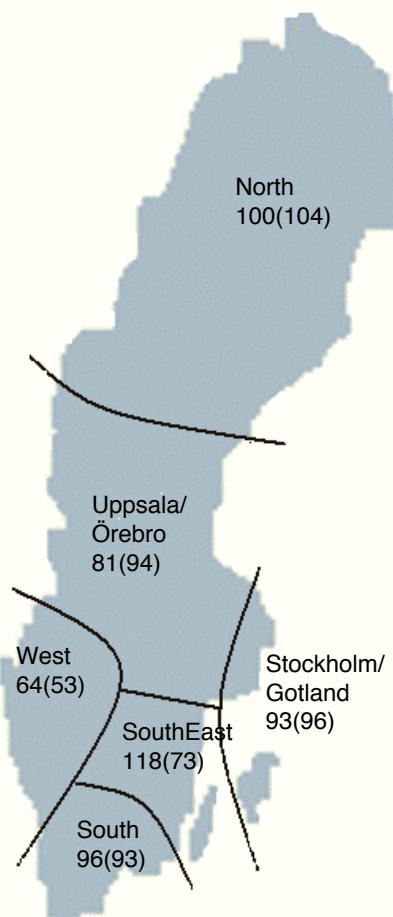


STATISTICS – ICD – PRIMARY PREVENTION PER REGION

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	2220203	206	93	1092
Uppsala/Örebro	1996633	162	81	709
South-East Sweden	1012957	120	118	423
Southern Sweden	1741584	168	96	745
Western Sweden	1794322	114	64	442
Northern Sweden	879165	88	100	328
Total	9644864	858	89	3739

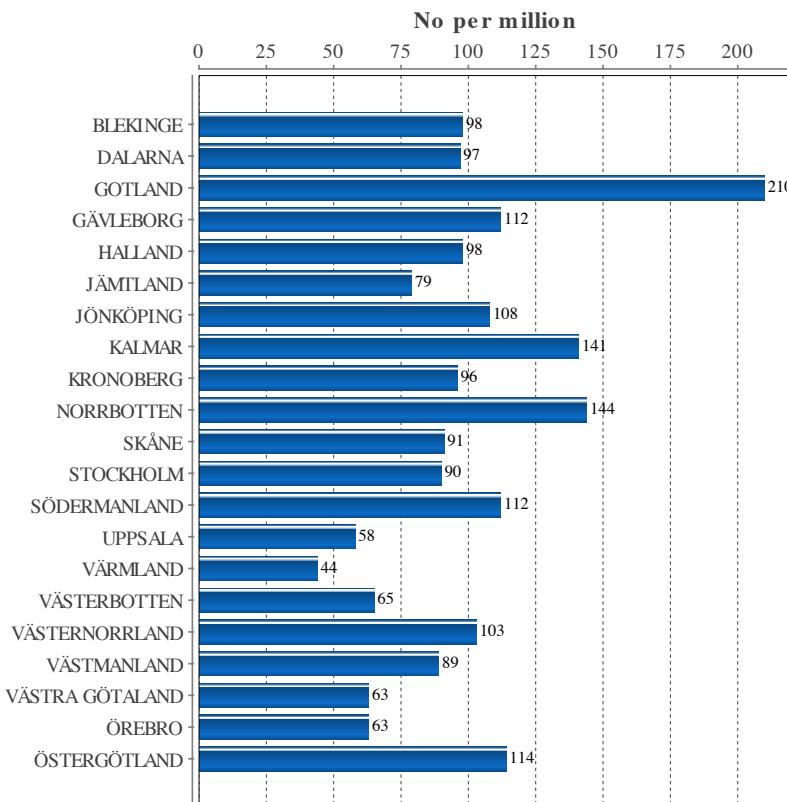
Implants per million 2013(2012)



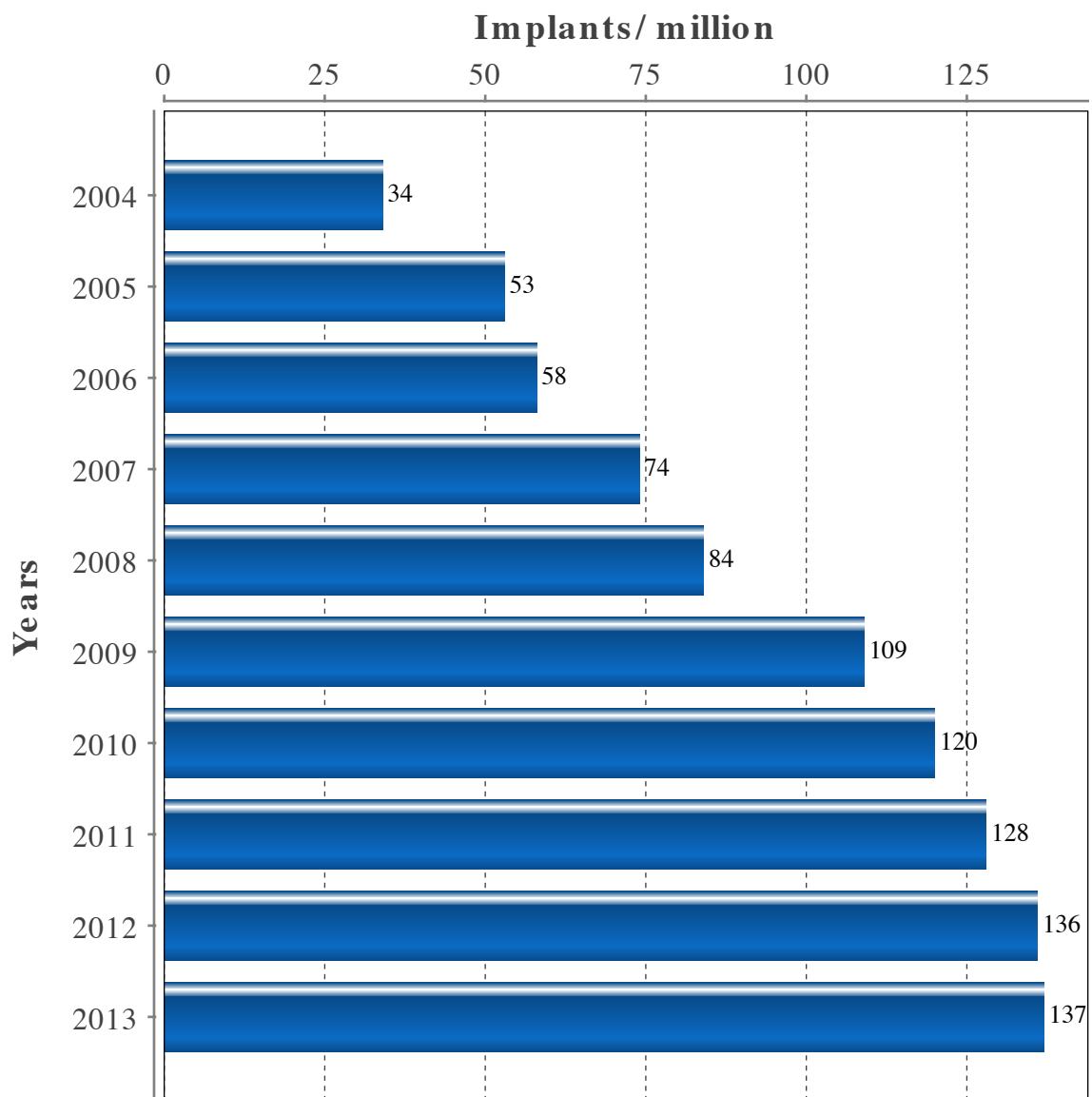
STATISTICS – ICD – PRIMARY PREVENTION PER COUNTY

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

County	Population	No of first	No/million
BLEKINGE	152757	15	98
DALARNA	277349	27	97
GOTLAND	57161	12	210
GÄVLEBORG	277970	31	112
HALLAND	306840	30	98
JÄMTLAND	126461	10	79
JÖNKÖPING	341235	37	108
KALMAR	233874	33	141
KRONOBERG	187156	18	96
NORRBOTTEN	249436	36	144
SKÅNE	1274069	116	91
STOCKHOLM	2163042	194	90
SÖDERMANLAND	277569	31	112
UPPSALA	345481	20	58
VÄRMLAND	273815	12	44
VÄSTERBOTTEN	261112	17	65
VÄSTERNORRLAND	242156	25	103
VÄSTMANLAND	259054	23	89
VÄSTRA GÖTALAND	1615084	101	63
ÖREBRO	285395	18	63
ÖSTERGÖTLAND	437848	50	114
Total	9644864	856	89



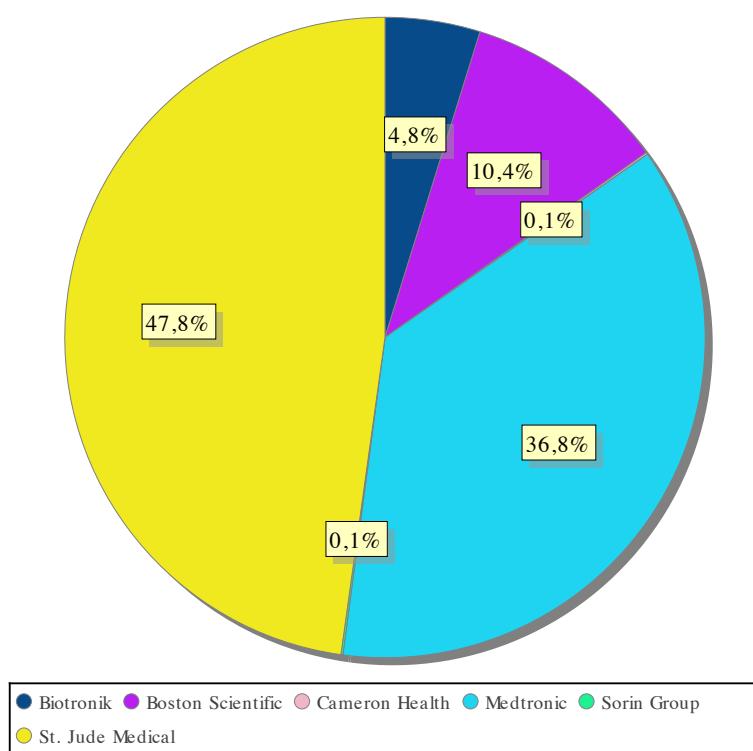
STATISTICS – ICD – HISTORICAL IMPLANTATION RATES



STATISTICS – ICD – ICDS PER MANUFACTURER

Market share per manufacturer in Sweden

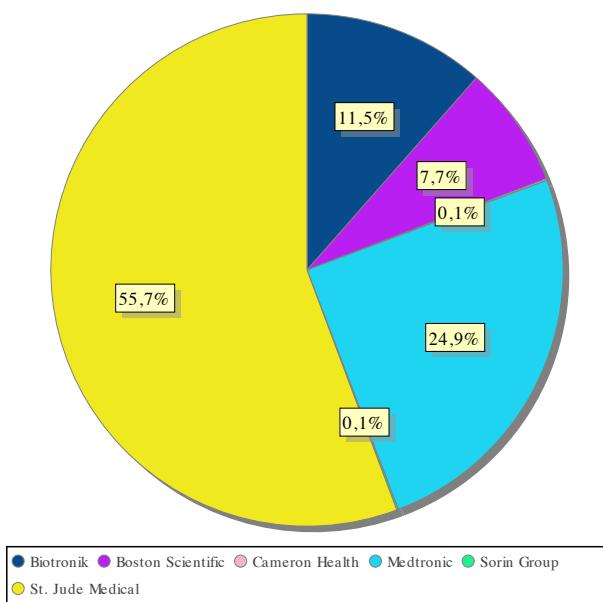
Manufacturer	2010 %	2011 %	2012 %	2013 %
Biotronik	3.4	5.6	6.2	4.8
Boston Scientific	15.8	5.8	7.0	10.4
Medtronic	40.8	43.9	42.8	36.8
Sorin Group	0.5	0.1	0.1	0.1
St. Jude Medical	39.5	44.6	43.7	47.8
Cameron Health	-	-	0.1	0.1



STATISTICS – ICD – LEADS PER MANUFACTURER

Market share per manufacturer in Sweden

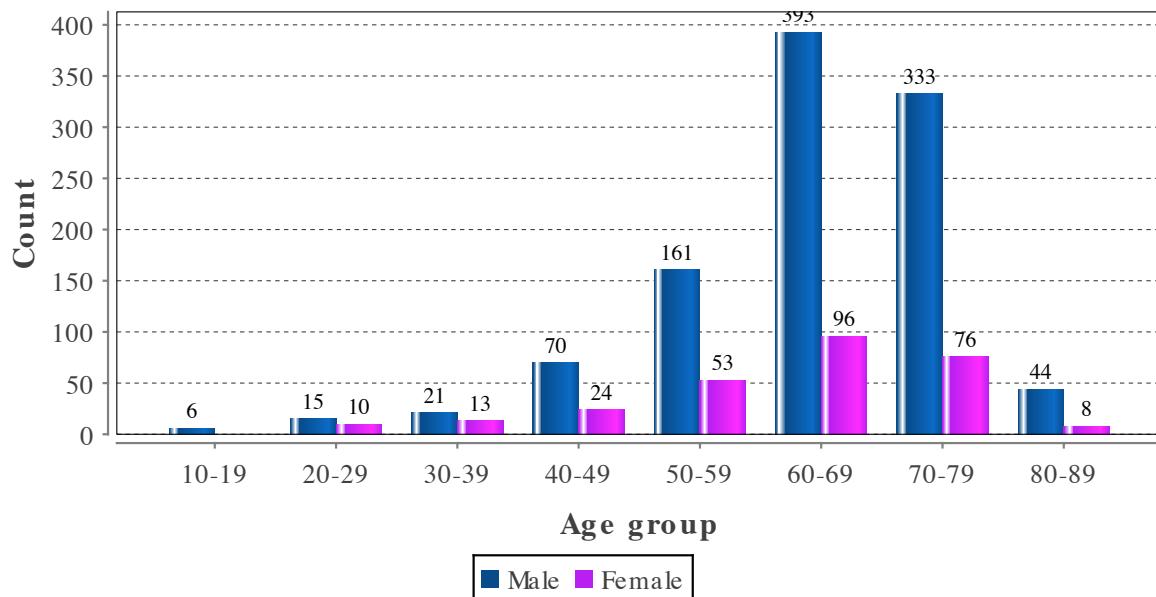
Manufacturer	2010 %	2011 %	2012 %	2013 %
Biotronik	12.8	18.1	16.1	11.5
Boston Scientific	11.4	7.4	13.4	7.7
Medtronic	23.1	23.6	23.5	24.9
Sorin Group	0.2	0.1	0.1	0.1
St. Jude Medical	52.5	50.9	46.8	55.7
Cameron Health	-	-	-	0.1



STATISTICS – ICD – AGE DISTRIBUTION MALES/FEMALES

Age and gender distribution for new implants, total numbers

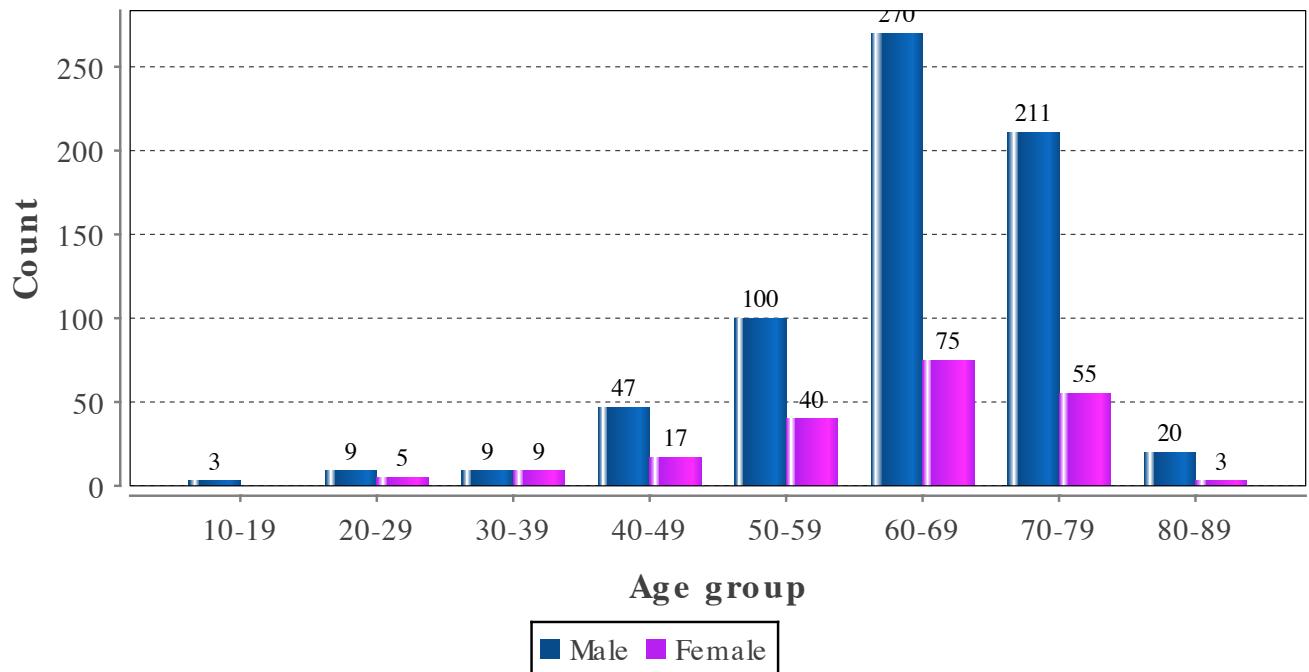
Age (years)	Total no	%	Male	Female
10-19	6	0.5	6	0
20-29	25	1.9	15	10
30-39	34	2.6	21	13
40-49	94	7.1	70	24
50-59	214	16.2	161	53
60-69	489	37.0	393	96
70-79	409	30.9	333	76
80-89	52	3.9	44	8
Average age	64	-	64	61
Total number of implants: 1323				



STATISTICS – ICD – AGE DISTRIBUTION PRIMARY PREVENTION

Primary prevention divided by gender and age.

Age (years)	Total no	%	Male	Female
10-19	3	0.3	3	0
20-29	14	1.6	9	5
30-39	18	2.1	9	9
40-49	64	7.3	47	17
50-59	140	16.0	100	40
60-69	345	39.5	270	75
70-79	266	30.5	211	55
80-89	23	2.6	20	3
Average age	64	-	64	62
Total number of implants: 873				

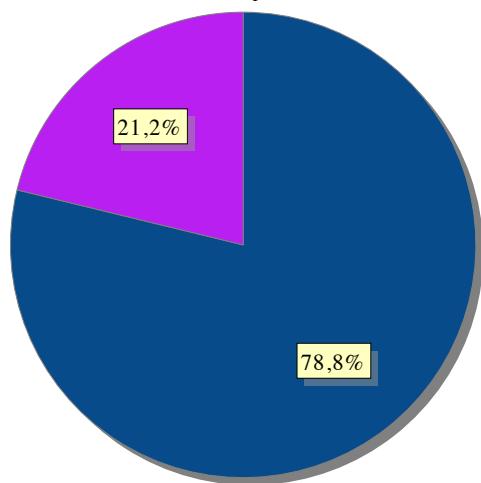


STATISTICS – ICD – TYPE OF IMPLANTS

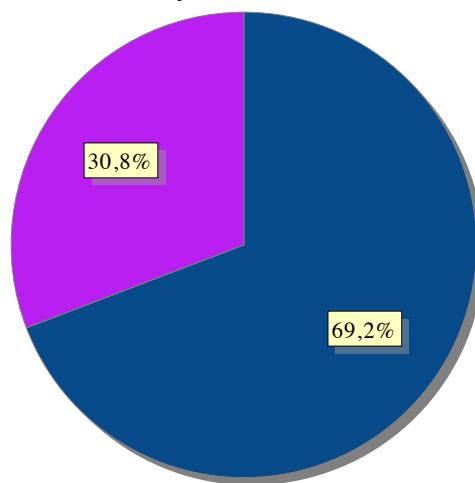
Ratio of new implants versus generator changes

	Total		Male		Female	
	no	%	no	%	no	%
First implant	1323	69.2	1043	78.8	280	21.2
Replacement	588	30.8	473	80.4	115	19.6
Total	1911	100.0	1516	79.3	395	20.7

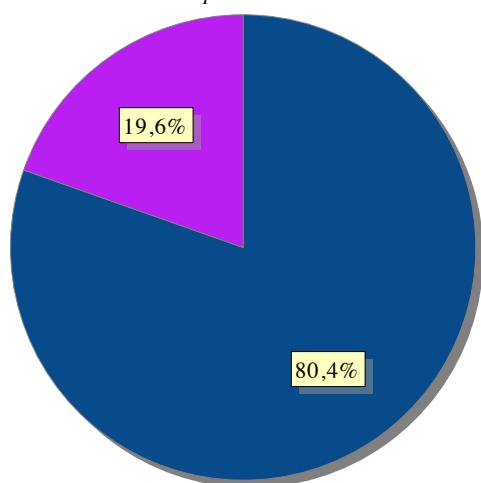
First implant



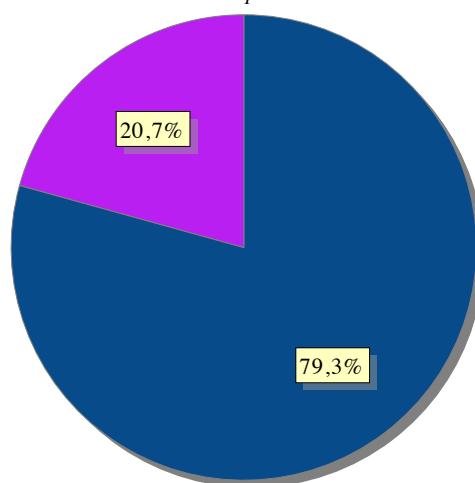
Replacement ratio



Replacement



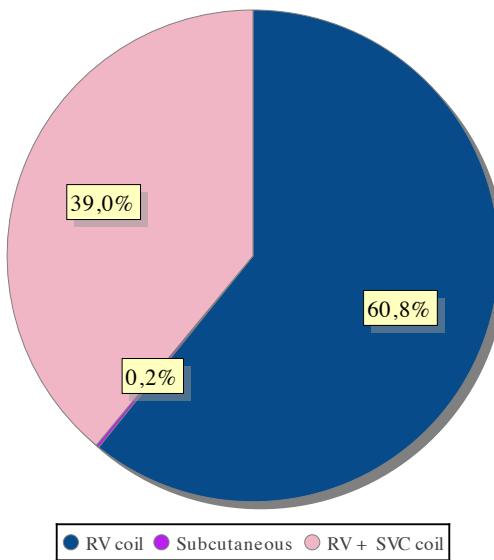
All implant



STATISTICS – ICD – LEAD TYPES

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

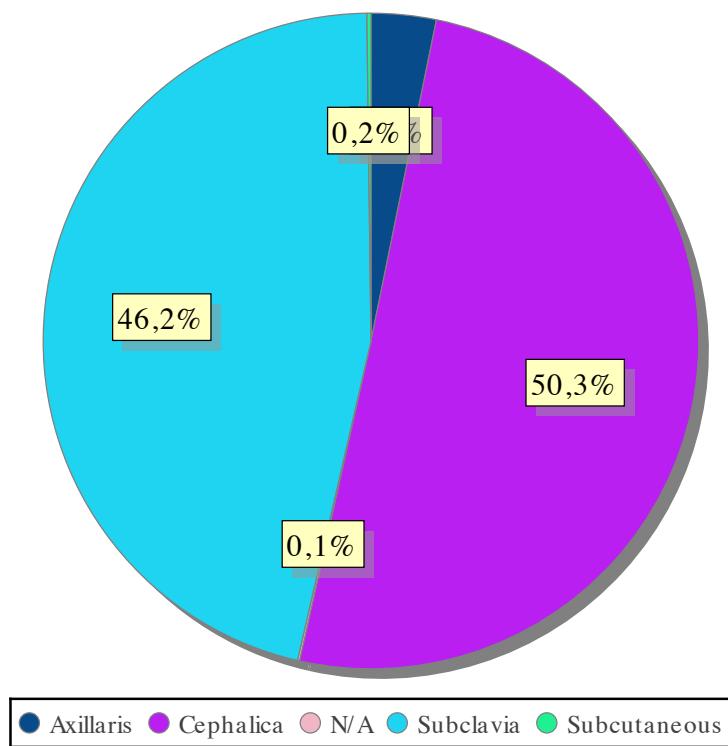
	2013		2012	
	no	%	no	%
RV coil	900	60.8	861	59.4
Subcutaneous	3	0.2	3	0.2
RV + SVC coil	577	39.0	586	40.4
Active fixation	1446	97.7	1358	93.7
Passive fixation	34	2.3	92	6.3
Total number of leads - 2013: 1480, 2012: 1450				



STATISTICS – ICD – LEAD ACCESS

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

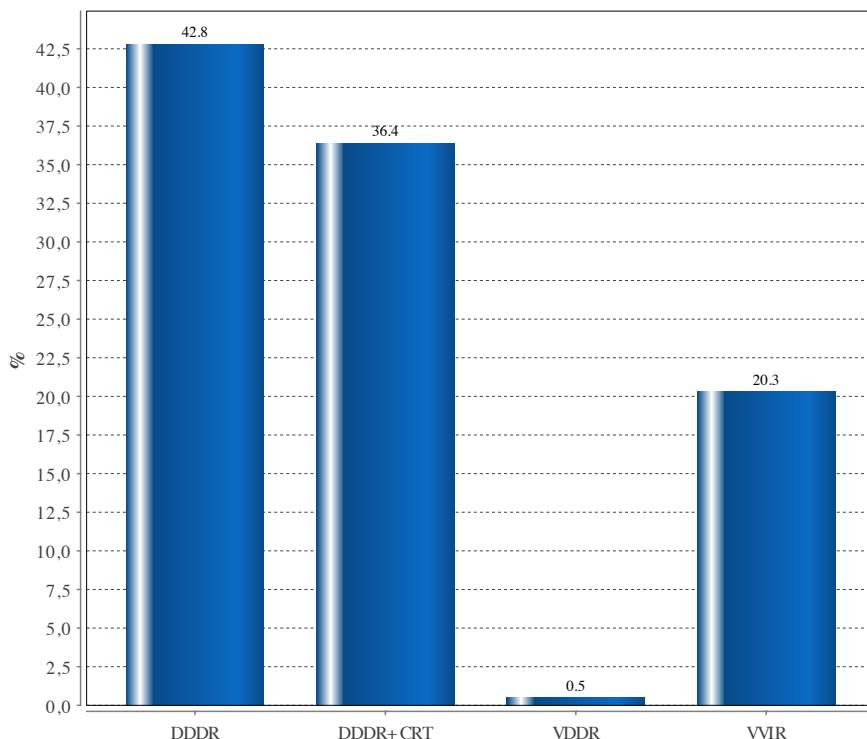
Lead access	No	%
Axillaris	47	3.2
Cephalica	745	50.3
N/A	1	0.1
Subclavia	684	46.2
Subcutaneous	3	0.2



STATISTICS – ICD – SUB TYPE

ICD subtype for new implants

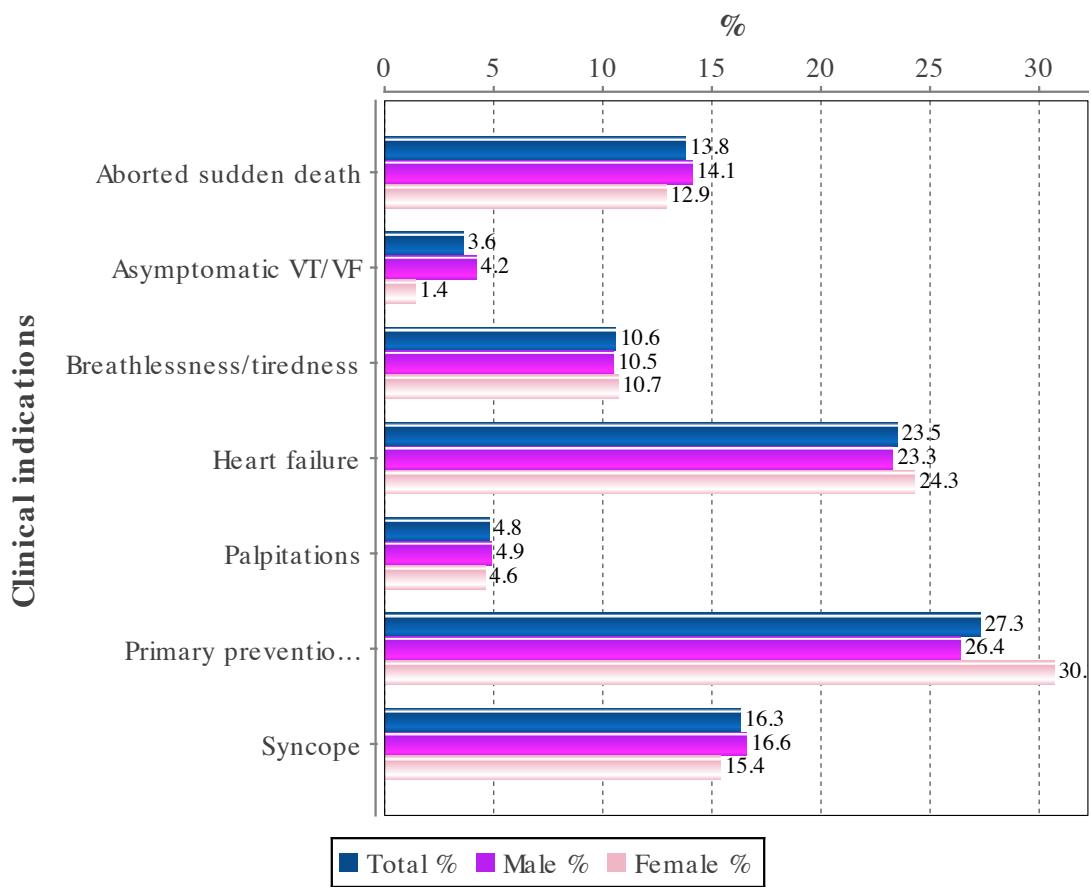
Mode	%	No
DDDR	42.8	566
DDDR+CRT	36.4	481
VDDR	0.5	7
VVIR	20.3	269



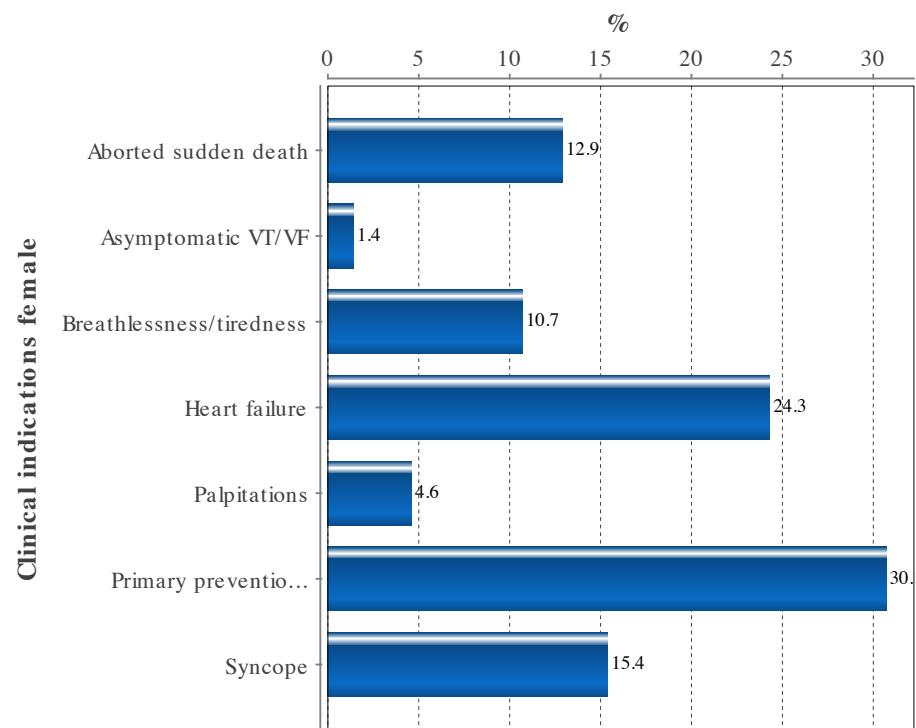
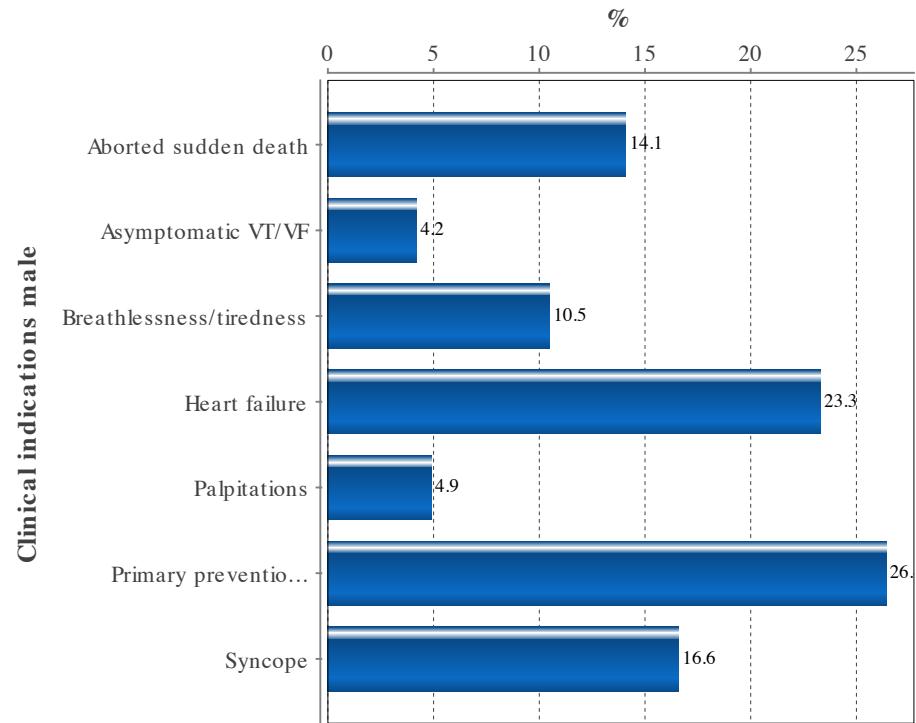
STATISTICS – ICD – CLINICAL INDICATIONS FIRST IMPLANT

Main symptom for implanting ICDs

Indication	Total %	Male %	Female %
Aborted sudden death	13.8	14.1	12.9
Asymptomatic VT/VF	3.6	4.2	1.4
Breathlessness/tiredness	10.6	10.5	10.7
Heart failure	23.5	23.3	24.3
Palpitations	4.8	4.9	4.6
Primary prevention, asymptomatic	27.3	26.4	30.7
Syncope	16.3	16.6	15.4



STATISTICS – ICD – CLINICAL INDICATIONS FIRST IMPLANT



STATISTICS – ICD – CLINICAL INDICATIONS

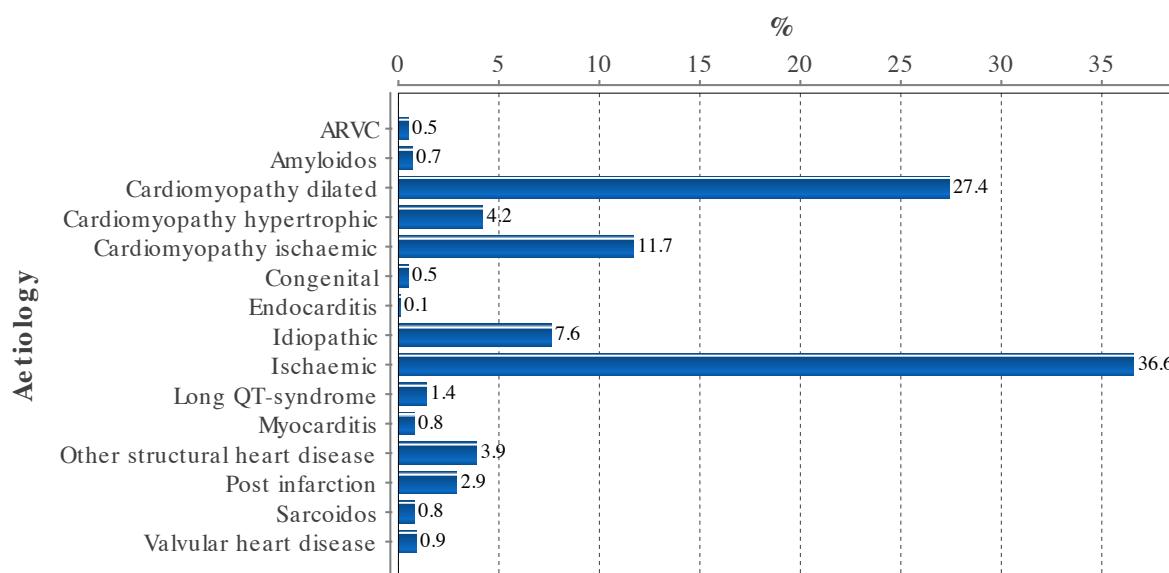
Main symptom for implanting ICDs, historical distribution

Indication	2011 %	2012 %	2013 %
Aborted sudden death	18.7	15.6	13.8
Asymptomatic VT/VF	3.9	3.6	3.6
Primary prevention	65.0	66.9	66.2
Syncope	12.4	13.9	16.3

STATISTICS – ICD - AETIOLOGY FIRST IMPLANT

Main aetiology for implanting pacemakers

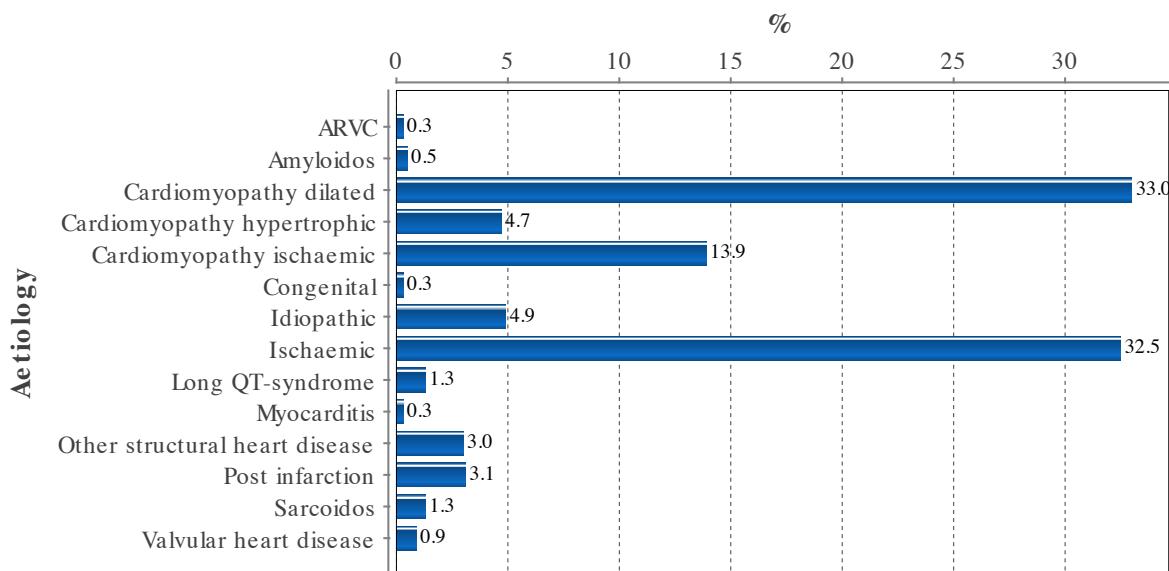
Aetiology	Total %	Male %	Female %
ARVC	0.5	0.4	1.1
Amyloidos	0.7	0.6	1.1
Cardiomyopathy dilated	27.4	26.0	32.9
Cardiomyopathy hypertrophic	4.2	3.4	7.1
Cardiomyopathy ischaemic	11.7	12.2	10.0
Congenital	0.5	0.6	0.4
Endocarditis	0.1	0.0	0.4
Idiopathic	7.6	7.6	7.5
Ischaemic	36.6	39.4	26.1
Long QT-syndrome	1.4	0.6	4.6
Myocarditis	0.8	1.0	0.4
Other structural heart disease	3.9	3.5	5.0
Post infarction	2.9	3.0	2.5
Sarcoidos	0.8	0.8	1.1
Valvular heart disease	0.9	1.2	0.0



STATISTICS – ICD - AETIOLOGY PRIMARY PREVENTION

Main aetiology for implanting ICDs due to primary prevention

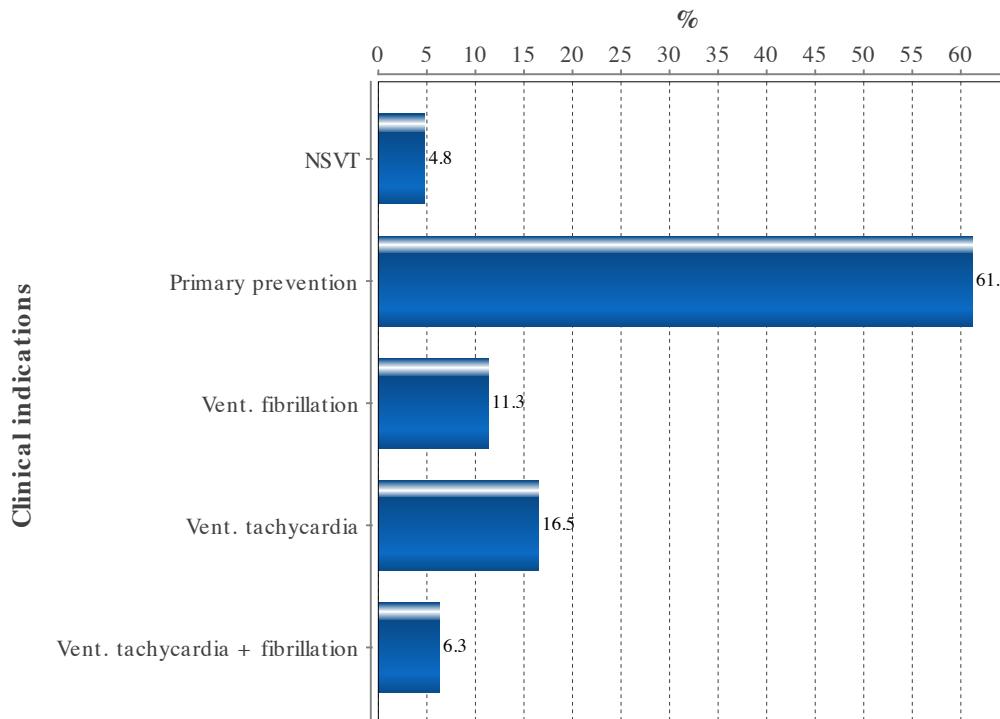
Aetiology	Total %	Male %	Female %
ARVC	0.3	0.4	0.0
Amyloidos	0.5	0.3	1.0
Cardiomyopathy dilated	33.0	30.9	39.7
Cardiomyopathy hypertrophic	4.7	3.7	7.8
Cardiomyopathy ischaemic	13.9	14.3	12.3
Congenital	0.3	0.4	0.0
Idiopathic	4.9	4.8	5.4
Ischaemic	32.5	36.5	19.6
Long QT-syndrome	1.3	0.4	3.9
Myocarditis	0.3	0.4	0.0
Other structural heart disease	3.0	2.2	5.4
Post infarction	3.1	3.0	3.4
Sarcoidos	1.3	1.2	1.5
Valvular heart disease	0.9	1.2	0.0



STATISTICS – ICD – ECG INDICATIONS (TACHY) FIRST IMPLANT

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

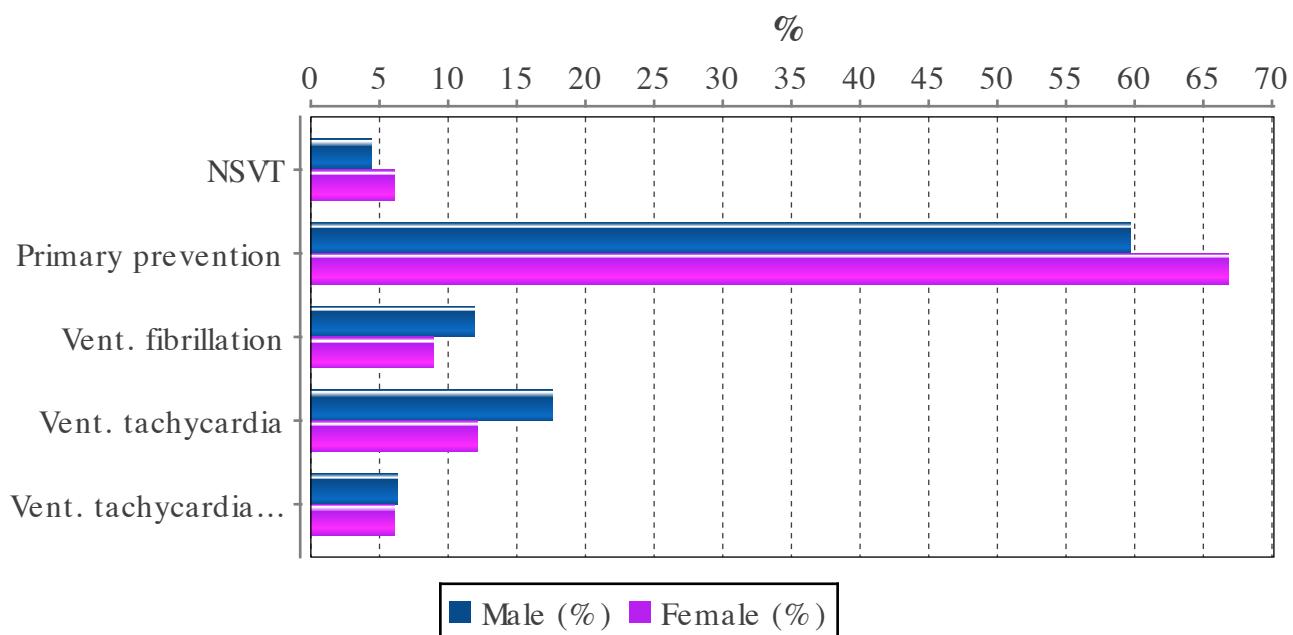
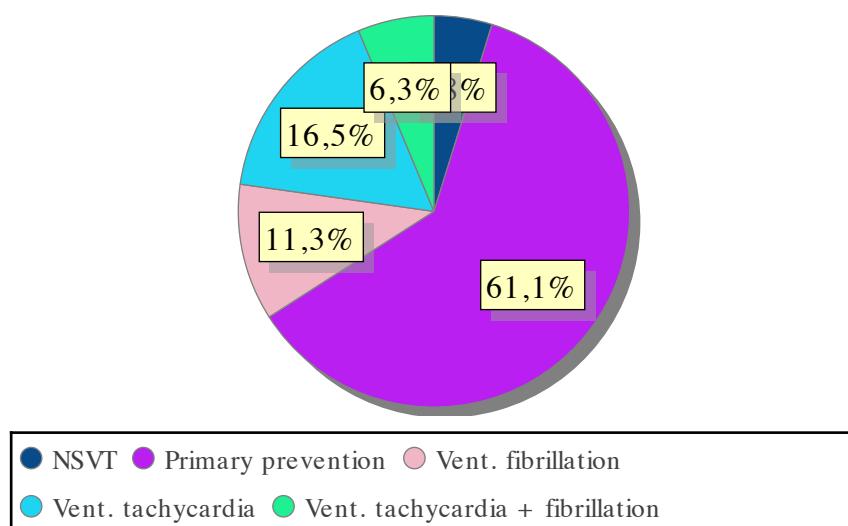
Indication	%
NSVT	4.8
Primary prevention	61.2
Vent. fibrillation	11.3
Vent. tachycardia	16.5
Vent. tachycardia + fibrillation	6.3



STATISTICS – ICD – PREPACING ECG (TACHY)

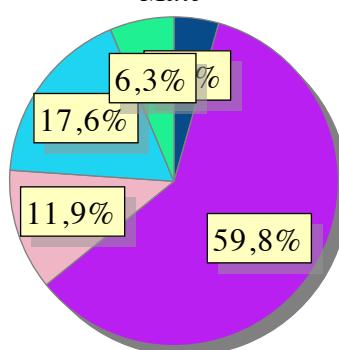
Documented ECG leading to ICD implant.(NSVT = non sustained VT) by gender and patients < 18 years

Indication	No	%	Male (%)	Female (%)	It 18 (%)
NSVT	63	4.8	4.4	6.1	0.0
Primary prevention	810	61.2	59.7	66.8	66.7
Vent. fibrillation	149	11.3	11.9	8.9	0.0
Vent. tachycardia	218	16.5	17.6	12.1	0.0
Vent. tachycardia + fibrillation	83	6.3	6.3	6.1	33.3
Total number of implants 1323					



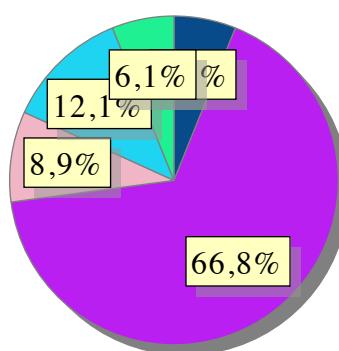
STATISTICS – ICD – PREPACING ECG (TACHY)

Male



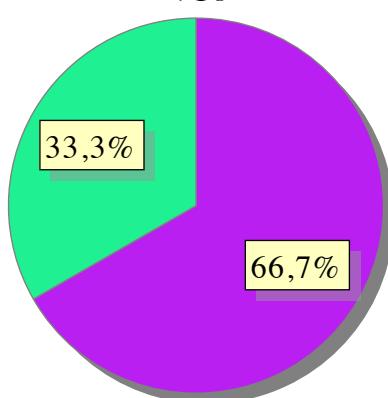
● NSVT ● Primary prevention ● Vent. fibrillation
● Vent. tachycardia ● Vent. tachycardia + fibrillation

Female



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

< 18

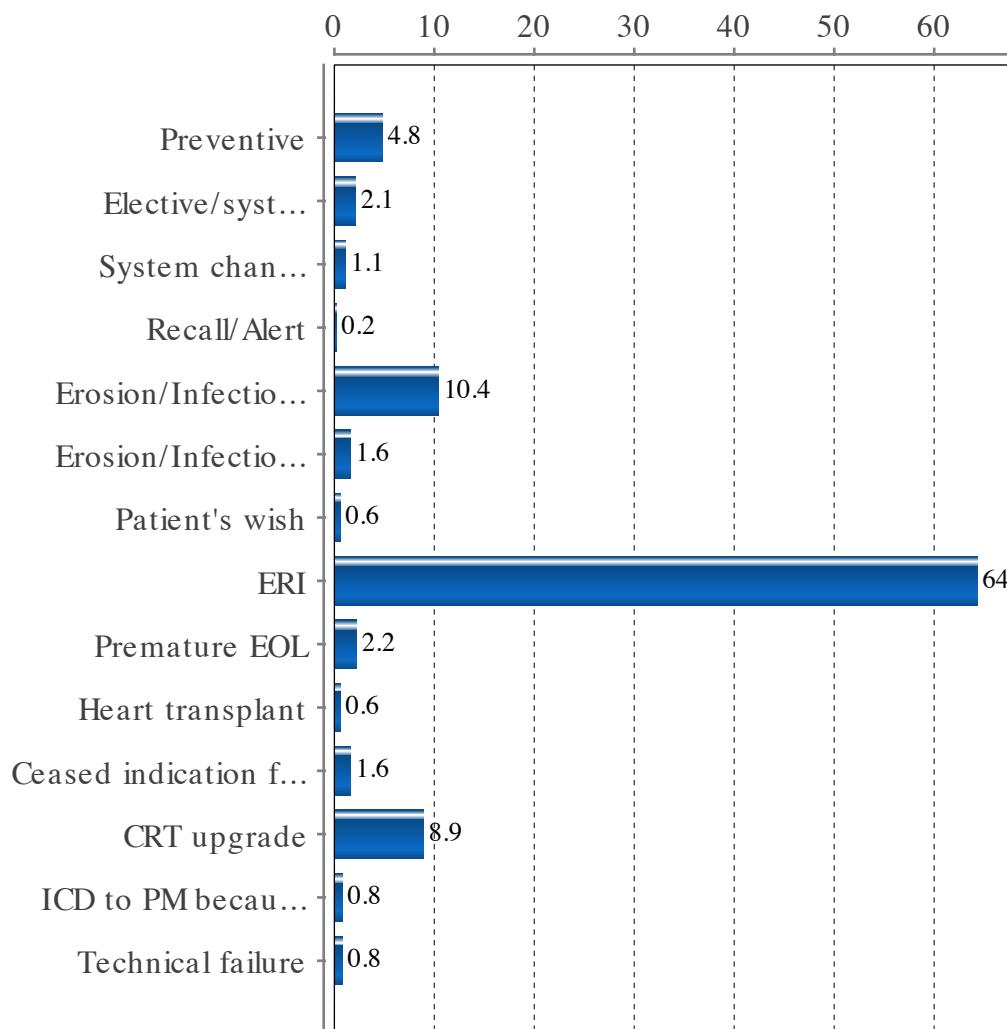


● Primary prevention ● Vent. tachycardia + fibrillation

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	4.8	4.3	5.9	0.0
Elective/system change	2.1	2.7	1.0	0.0
System change hemodynamic	1.1	1.2	1.0	0.0
Recall/Alert	0.2	0.2	0.0	0.0
Erosion/Infection, local	10.4	12.8	5.9	0.0
Erosion/Infection, systemic	1.6	1.9	1.0	0.0
Patient's wish	0.6	1.0	0.0	0.0
ERI	64.3	61.4	68.6	100.0
Premature EOL	2.2	0.7	5.4	0.0
Heart transplant	0.6	1.0	0.0	0.0
Ceased indication for ICD therapy	1.6	1.9	1.0	0.0
CRT upgrade	8.9	9.2	8.8	0.0
ICD to PM because of ceased indication	0.8	1.0	0.5	0.0
Technical failure	0.8	0.7	1.0	0.0



STATISTICS – ICD – REASON FOR GENERATOR EXPLANT

Historical explants indications

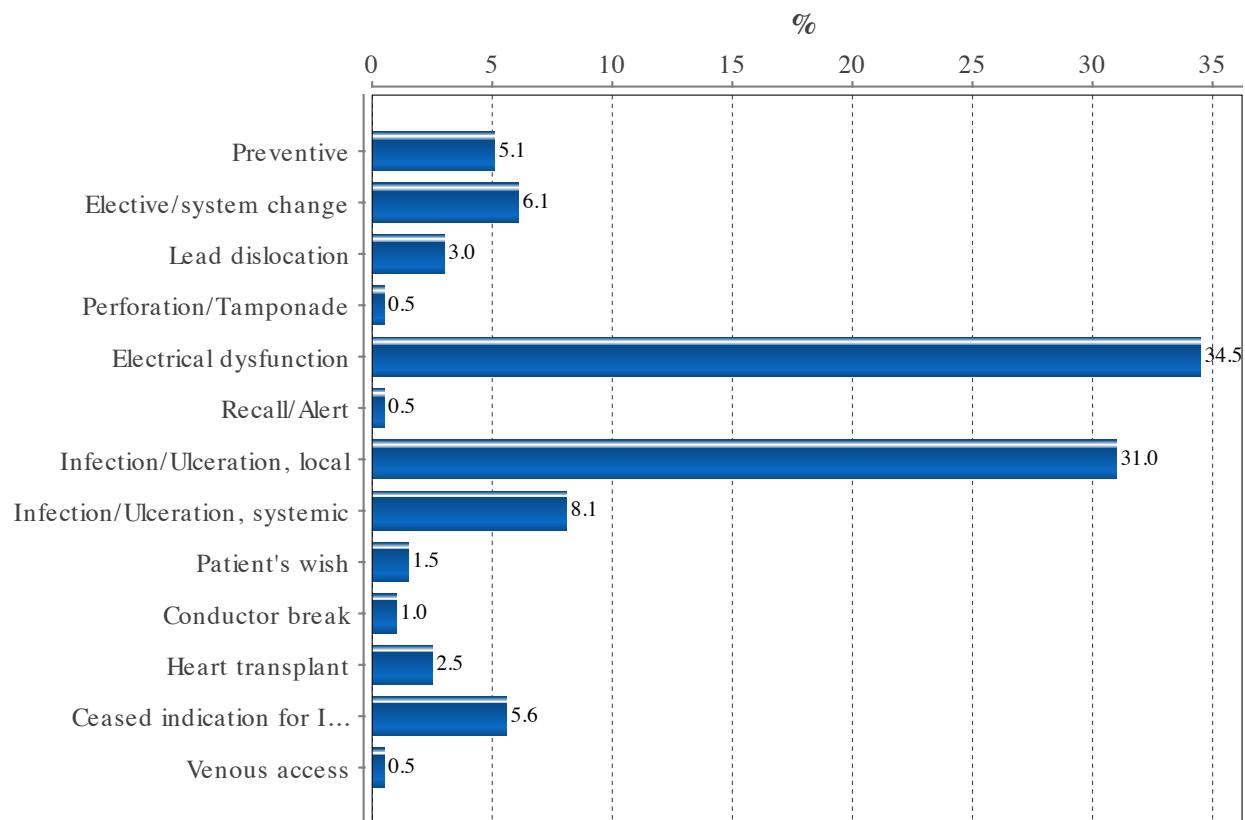
Reason	2011 %	2012 %	2013 %
Preventive	3.5	8.3	4.8
System change hemodynamic	7.4	2.8	1.1
Recall/Alert	0.2	0.0	0.2
Erosion/Infection, local	8.6	15.2	10.3
Patient's wish	0.5	0.8	0.6
ERI	69.7	57.3	64.1
Premature EOL	4.6	2.8	2.2
Heart transplant	2.3	1.0	0.6
Ceased indication for ICD therapy	1.4	1.0	1.6
CRT upgrade	0.5	8.7	8.9
Technical failure	1.4	0.6	0.8
ICD to PM because of ceased indication	0.0	1.2	1.0
Elective/system change	0.0	0.0	2.2
Erosion/Infection, systemic	0.0	0.0	1.6

STATISTICS – ICD – REASON FOR LEAD EXPLANT

Historical lead explants indications

Reason	2011 %	2012 %	2013 %
Preventive	9.7	6.0	5.1
Elective/system change	13.9	8.2	6.1
Lead dislocation	4.8	1.1	3.0
Perforation/Tamponade	1.2	1.1	0.5
Electrical dysfunction	33.9	38.8	34.5
Recall/Alert	0.6	0.5	0.5
Infection/Ulceration, local	15.8	26.2	31.0
Infection/Ulceration, systemic	3.6	12.6	8.1
Patient's wish	1.2	0.5	1.5
Connector failure	0.6	0.0	0.0
Conductor break	3.6	1.1	1.0
Heart transplant	6.7	2.2	2.5
Ceased indication for ICD therapy	4.2	1.1	5.6
Insulation failure	0.0	0.5	0.0
Venous access	0.0	0.0	0.5

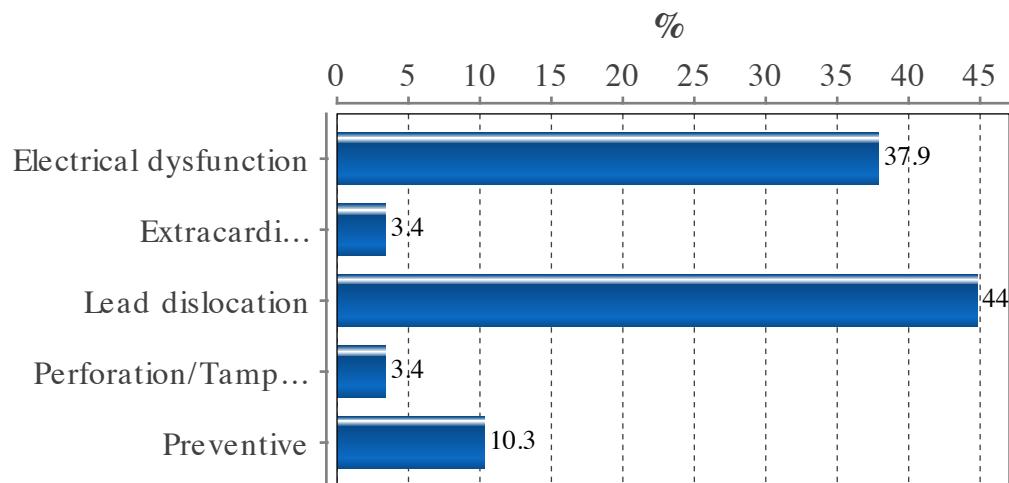
STATISTICS – ICD – REASON FOR LEAD EXPLANT



STATISTICS – ICD – REASON FOR LEAD CORRECTION

Historical lead correction indications

Reason	%
Electrical dysfunction	37.9
Extracardial stimulation	3.4
Lead dislocation	44.8
Perforation/Tamponade	3.4
Preventive	10.3
Total no 29	



STATISTICS – ICD – OPERATORCODE FOR IMPLANTS

<i>Procedures per operator</i>		
Hospital	Operator	No
Akademiska sjukhuset	Jidéus	1
	Mörtsell	33
	Nilsson L	15
	Teder	34
Ålands centralsjukhus	Ove Carlström	3
	Slotte	2
Blekingesjukhuset	Borg	37
	Ericsson	2
Borås lasarett	Friedemann	27
	Sandgren	21
Centrallasarettet Växjö	Björkman	5
	Damkilde	5
	Jacobsson K	3
	Johansson P	2
	Jonasson	12
	Strandberg	14
	Weber	3
Centralsjukhuset Västerås	Dilan	24
	Täckström	1
	Wiberg	20
Danderyds sjukhus	2	10
	3	36
	4	22
	6	27
Falu lasarett	Berglund	8
	Forsgren	50
	Guggi	1
Hudiksvalls sjukhus	Maru Fikru	2
	Roussinne	8
Karolinska Universitetssjukhus	Gadler	67
	Hörnsten	96
	Mortensen	2
	Reistam	1
	Reistam, Ulrika	2
	Reistam/ Hörnsten	2
	Reistam/ Westholm	1
	Westholm	72
Kärnsjukhuset Skövde	Falmer	8
	Lorentzen	19
	Paulsson	10
	Winterfeldt	2
Länssjukhuset Gävle	Falck	13
	Johansson Staffan	19
	Kastberg	4
	Magnusson Peter	22

Hospital	Operator	No
Länssjukhuset Kalmar	Carlström	41
	David Olsson	4
	Johansson R	11
	Michael Lindstaedt	2
Länssjukhuset Ryhov	Asking	5
	Christina Holmgren	3
	Jakobsson S	28
	Lagerberg	19
Linköpings Universitetssjukhus	Jönsson A	1
	Säfström	50
	Sonesson	34
	Szamlewski	7
	Szymanowski	36
Mälarsjukhuset	Andreas Pikwer	1
	Bozena Ostrowska	43
Norrlands Universitetssjukhus	Höglund	10
	Jensen	4
	Kesek	5
	Landström	22
	Rönn	13
Örnsköldsviks sjukhus	Ehlin	10
Östersunds sjukhus	Björklund	3
	Friberg	6
	Hansson	14
	Sandström	1
Sahlgrenska Universitetssjukhuset	Jamaly	11
	Javid	11
	Kennergren	7
	Piotr Szamlewski	48
	Schultz	6
	Westbom	28
Sahlgrenska Universitetssjukhuset / Östra	Javid	4
	Johansson B	8
Skånes universitetssjukhus, Lund	Carl Johan Höijer	31
	Fredrik Slotte	24
	Ingrid Litterfeldt	37
	Johan Brandt	53
	Pyotr Platonov	23
	Rasmus Borgquist	16
	Steen Jensen	9
	Wang Lingwei	41

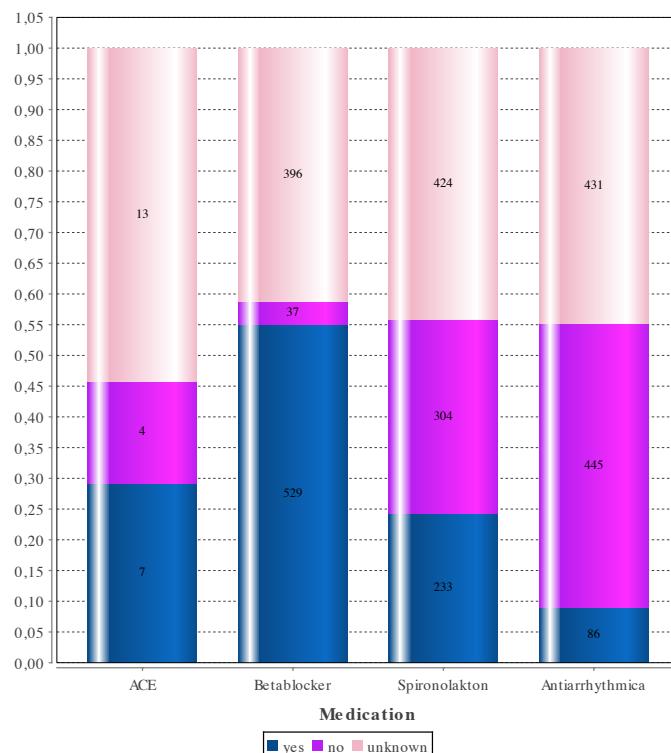
STATISTICS – ICD – OPERATORCODE FOR IMPLANTS

Hospital	Operator	No
Skånes universitetssjukhus, Malmö	Pehrsson	3
	WANG	1
Skellefteå lasarett	Lindqvist	8
Södersjukhuset	Jonsson J-E	14
	Kjellman B	17
	Lerner	18
	Olson J	26
St Görans sjukhus	1	22
	1+2	8
	2	8
	3	1
	4	8
Sunderby sjukhus	Haupt	43
	Johansson P	10
	Lundblad	7
	Wennberg	12
Sundsvalls sjukhus	Khadhim	11
	Srock	4
	Sundelin	14
Trollhättan, NÄL	Dinu Dusceac	17
	Jabbar	20
Universitetssjukhuset Örebro	Anna Björkenheim	1
	Lindell	43
	Payam Khalili	4
	Tommy Andersson	22
Varbergs sjukhus	Myredal	13
	Rorsman	52
Visby lasarett	Jacobsson L	11

STATISTICS – ICD – MEDICATION

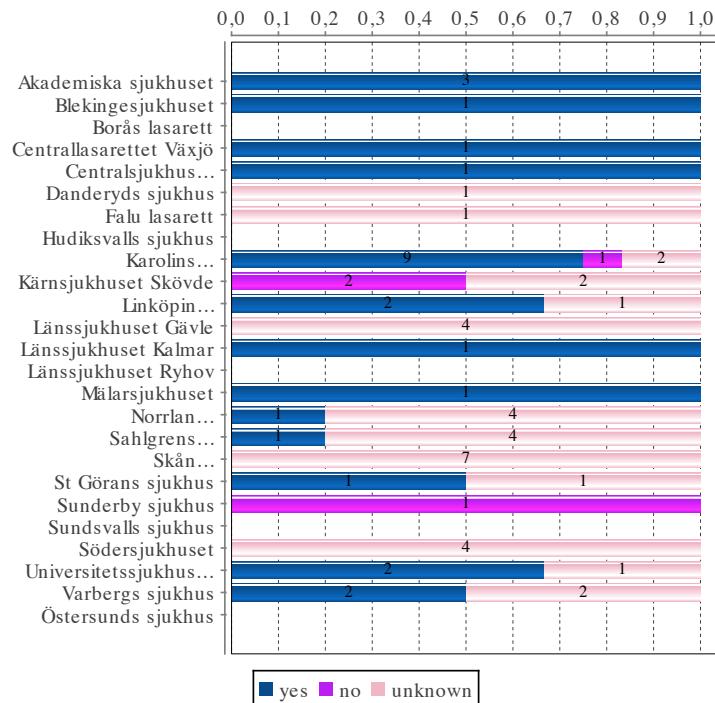
Previous medication for patients having ICD implant

Medication	yes	no	unknown	yes(%)	no(%)	unknown(%)
ACE	7	4	13	29	17	54
Betablocker	529	37	396	55	4	41
Spironolakton	233	304	424	24	32	44
Antiarrhythmic	86	445	431	9	46	45



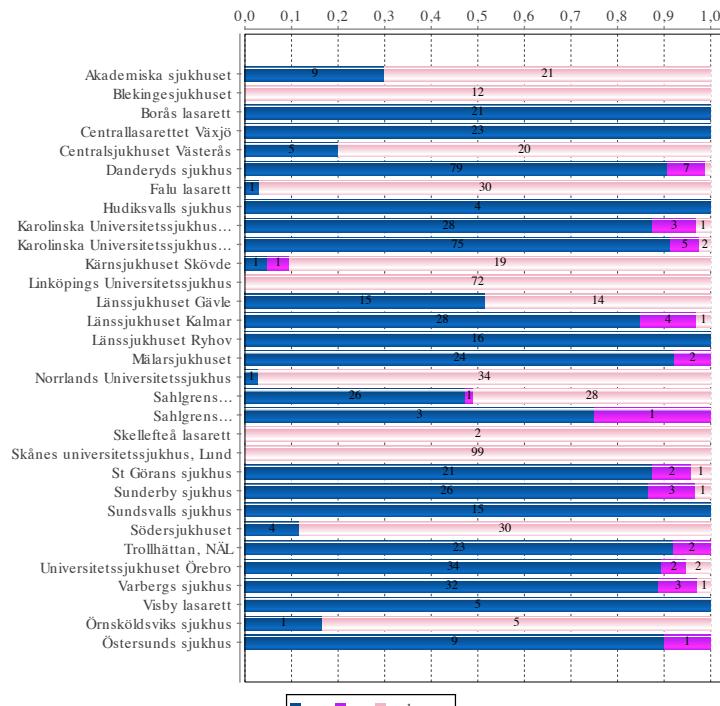
STATISTICS – ICD – MEDICATION PER HOSPITAL

ACE



█ yes
 █ no
 █ unknown

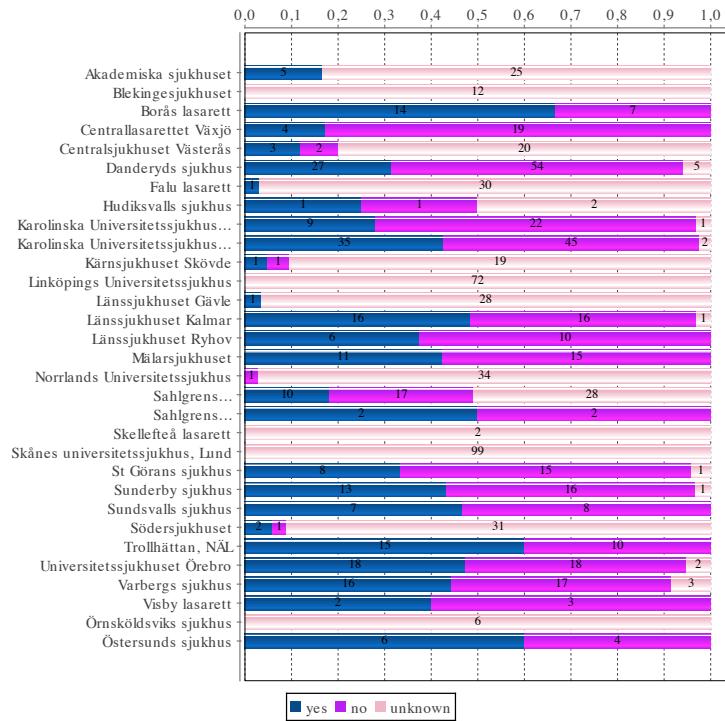
Betablocker



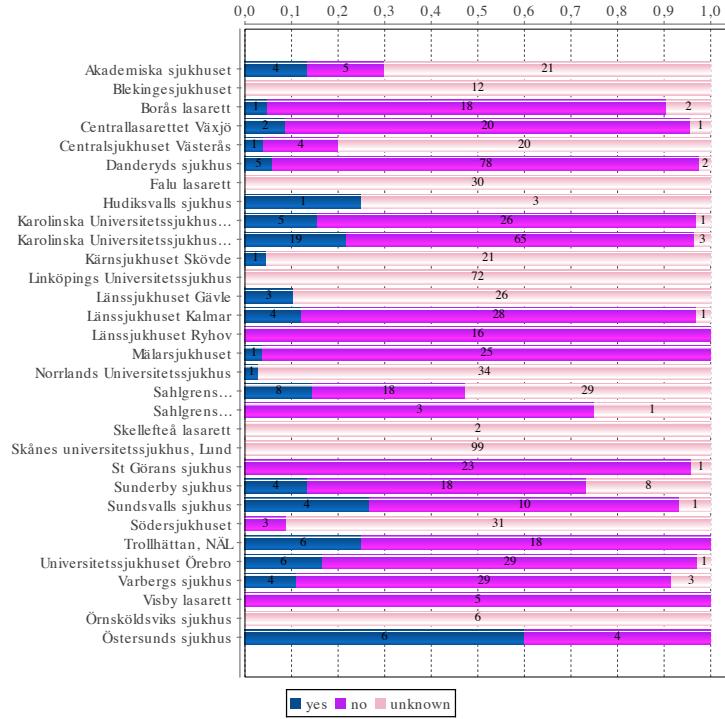
█ yes
 █ no
 █ unknown

STATISTICS – ICD – MEDICATION PER HOSPITAL

Spironolakton



Antiarrhythmica



STATISTICS – CRT

STATISTICS – CRT – HISTORICAL IMPLANT RATES

CRT Historical implant rates per million residents

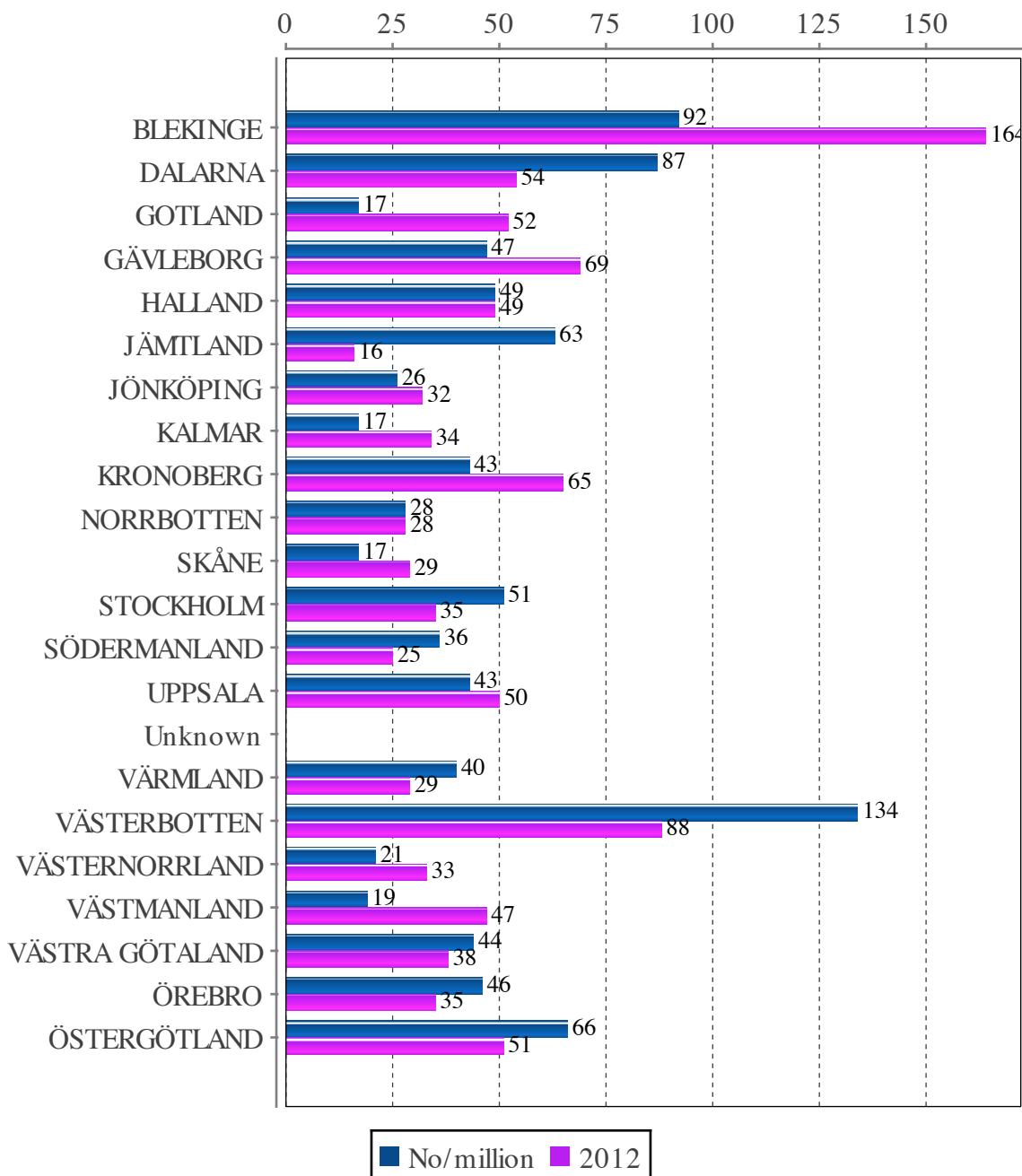
Year	Population	CRT-P		CRT-D	
		No	Rate	No	Rate
2009	9340682	329	3.5	281	3.0
2010	9415570	307	3.3	314	3.3
2011	9482855	354	3.7	441	4.7
2012	9555893	350	3.7	441	4.6
2013	9644864	416	4.3	547	5.7

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	152757	14	92
DALARNA	277349	24	87
GOTLAND	57161	1	17
GÄVLEBORG	277970	13	47
HALLAND	306840	15	49
JÄMTLAND	126461	8	63
JÖNKÖPING	341235	9	26
KALMAR	233874	4	17
KRONOBERG	187156	8	43
NORRBOTTEN	249436	7	28
SKÅNE	1274069	22	17
STOCKHOLM	2163042	110	51
SÖDERMANLAND	277569	10	36
UPPSALA	345481	15	43
Unknown	0	2	0
VÄRMLAND	273815	11	40
VÄSTERBOTTEN	261112	35	134
VÄSTERNORRLAND	242156	5	21
VÄSTMANLAND	259054	5	19
VÄSTRA GÖTALAND	1615084	71	44
ÖREBRO	285395	13	46
ÖSTERGÖTLAND	437848	29	66
Total	9644864	431	45

STATISTICS – CRT-P – IMPLANTS PER COUNTY

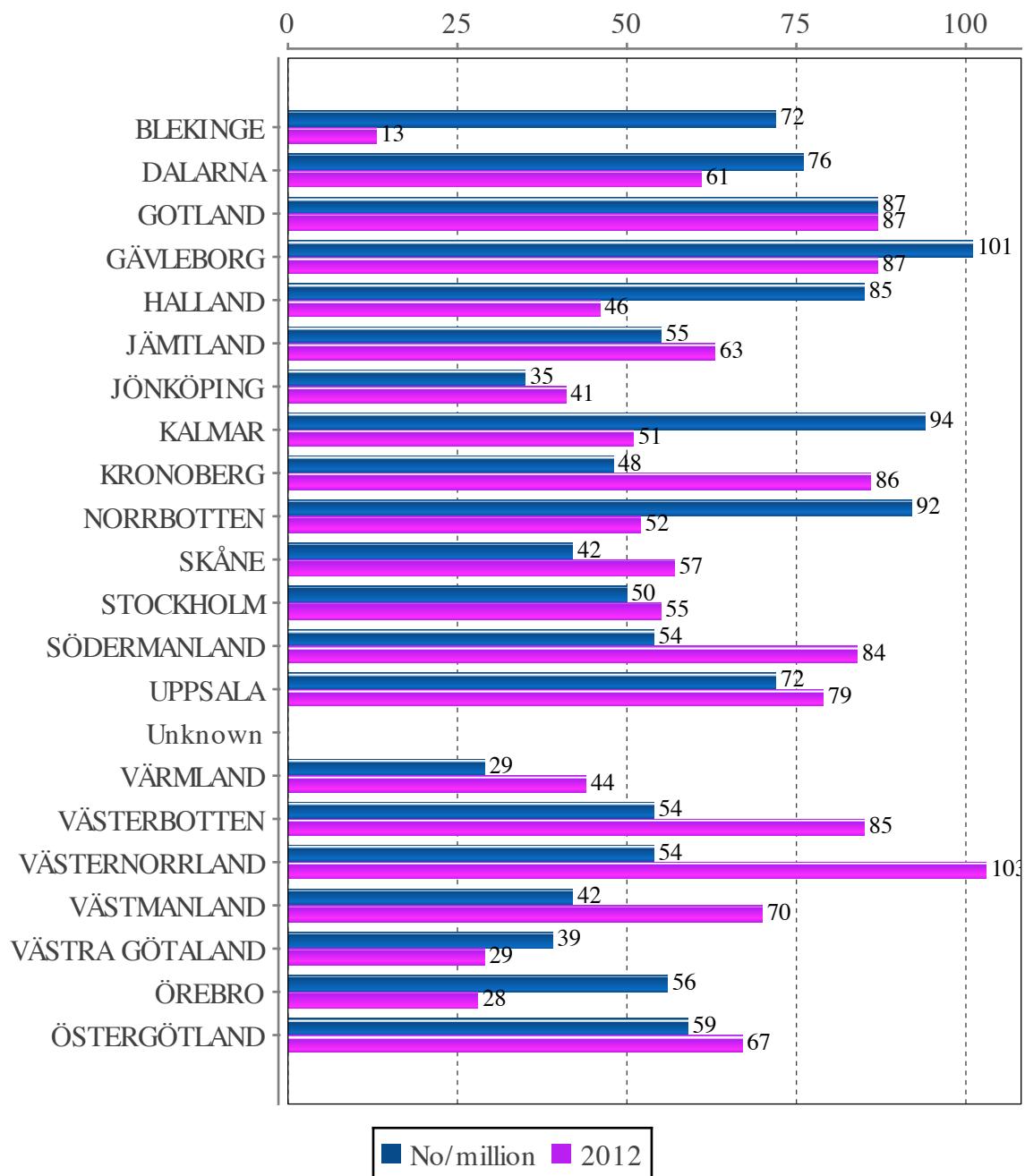


STATISTICS – CRT-D – IMPLANTS PER COUNTY

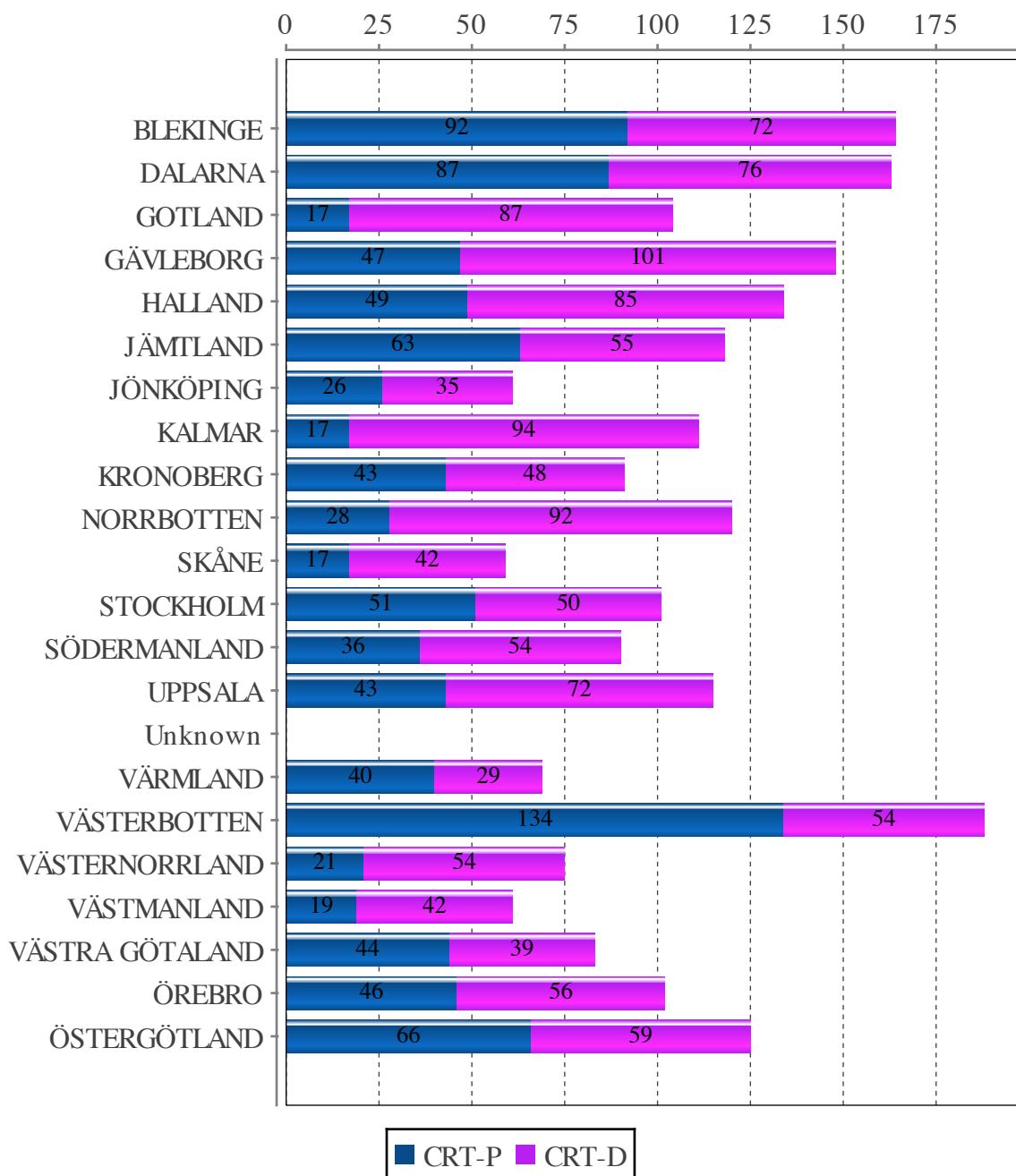
The regions are based on where the patients live, not where they are treated

	Population	No first impl	No/million
BLEKINGE	152757	11	72
DALARNA	277349	21	76
GOTLAND	57161	5	87
GÄVLEBORG	277970	28	101
HALLAND	306840	26	85
JÄMTLAND	126461	7	55
JÖNKÖPING	341235	12	35
KALMAR	233874	22	94
KRONOBERG	187156	9	48
NORRBOTTEN	249436	23	92
SKÅNE	1274069	53	42
STOCKHOLM	2163042	108	50
SÖDERMANLAND	277569	15	54
UPPSALA	345481	25	72
Unknown	0	6	0
VÄRMLAND	273815	8	29
VÄSTERBOTTEN	261112	14	54
VÄSTERNORRLAND	242156	13	54
VÄSTMANLAND	259054	11	42
VÄSTRA GÖTALAND	1615084	63	39
ÖREBRO	285395	16	56
ÖSTERGÖTLAND	437848	26	59
Total	9644864	522	54

STATISTICS – CRT-D – IMPLANTS PER COUNTY



STATISTICS – CRT – IMPLANTS PER COUNTY

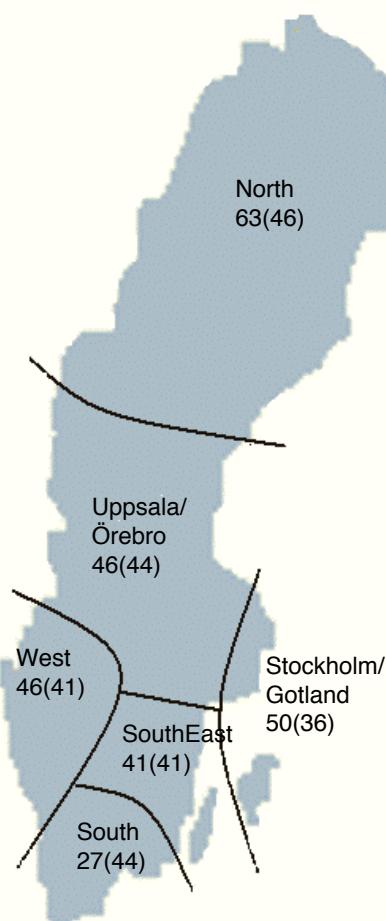


STATISTICS – CRT-P – IMPLANTS PER REGION

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	2220203	111	50
Uppsala/Örebro	1996633	91	46
South-East Sweden	1012957	42	41
Southern Sweden	1741584	47	27
Western Sweden	1794322	83	46
Northern Sweden	879165	55	63
Total	9644864	429	44

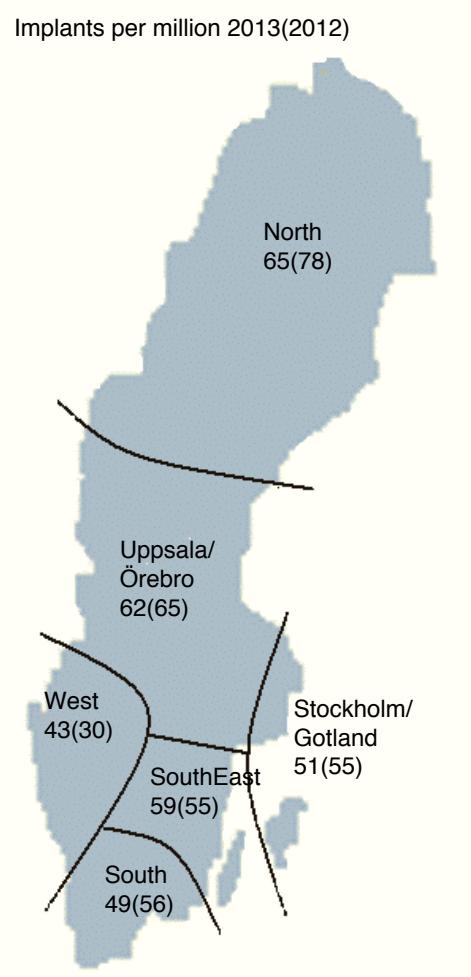
Implants per million 2013(2012)



STATISTICS – CRT-D – IMPLANTS PER REGION

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

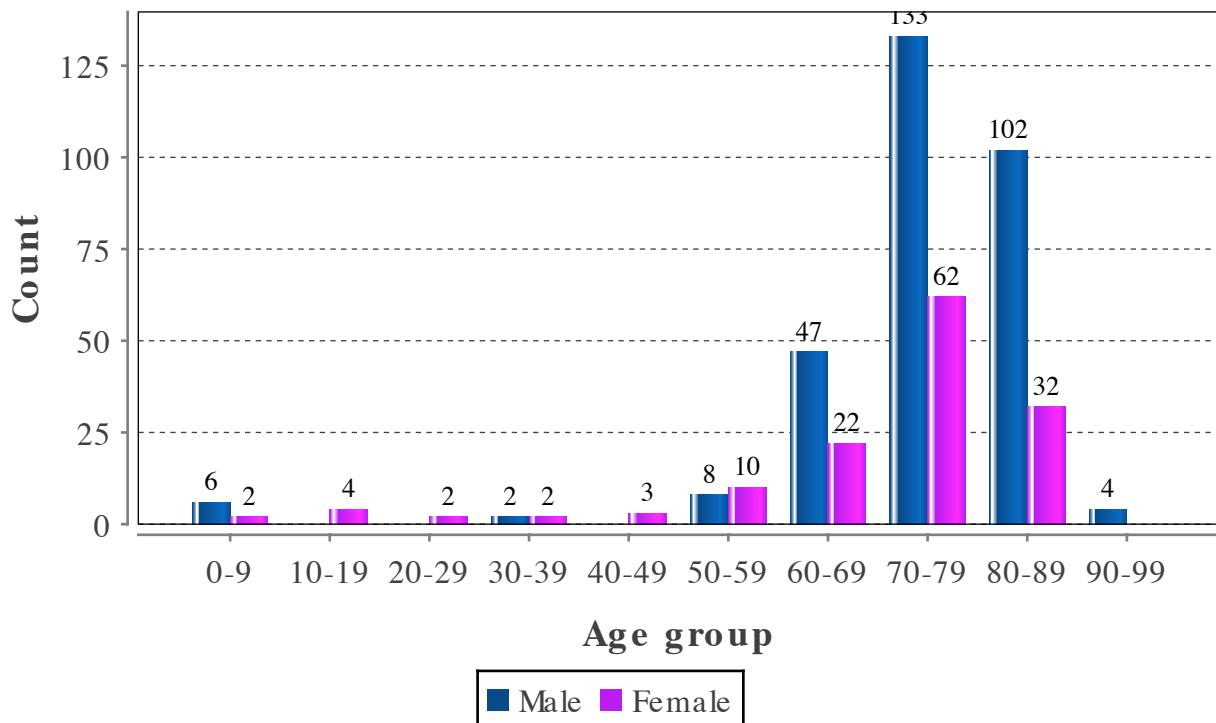
Region	Population	No of first impl	No per million
Stockholm/Gotland	2220203	113	51
Uppsala/Örebro	1996633	124	62
South-East Sweden	1012957	60	59
Southern Sweden	1741584	85	49
Western Sweden	1794322	78	43
Northern Sweden	879165	57	65
Total	9644864	517	54



STATISTICS – CRT-P – AGE DISTRIBUTION MALES/FEMALES

Age and gender distribution for new implants, total numbers

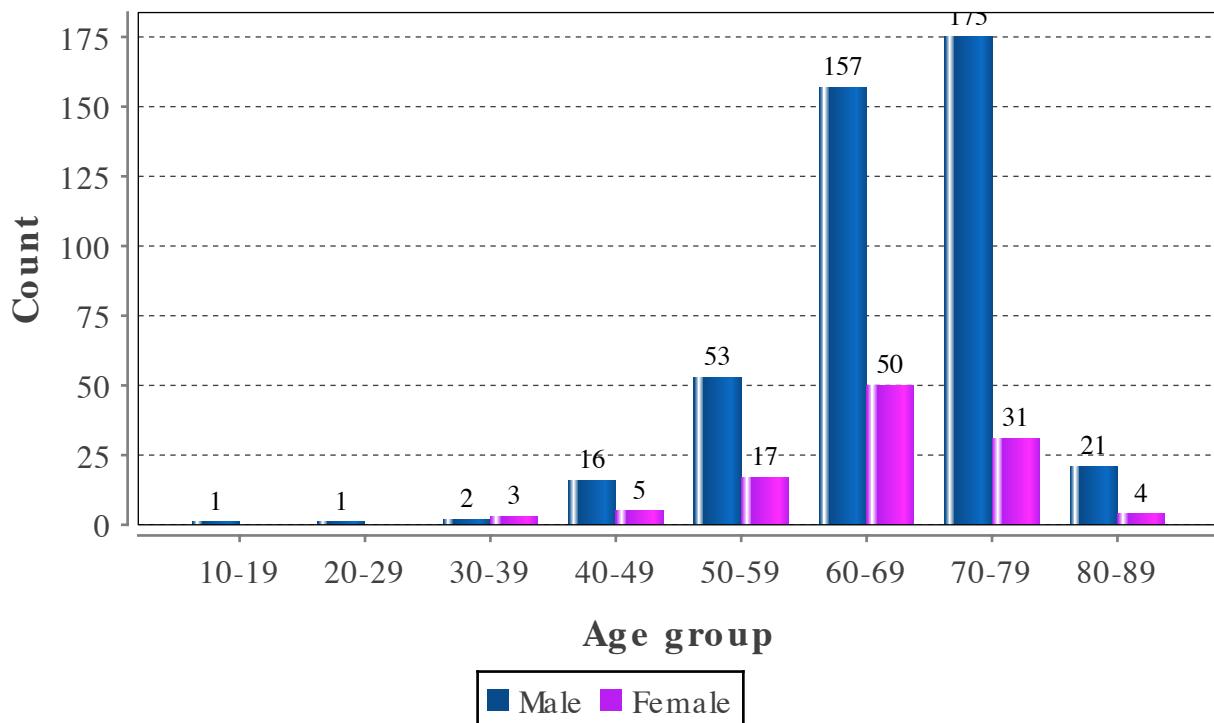
Age (years)	Total no	%	Male	Female
0-9	8	1.8	6	2
10-19	4	0.9	0	4
20-29	2	0.5	0	2
30-39	4	0.9	2	2
40-49	3	0.7	0	3
50-59	18	4.1	8	10
60-69	69	15.6	47	22
70-79	195	44.2	133	62
80-89	134	30.4	102	32
90-99	4	0.9	4	0
Average age	73	0.0	74	69
Total number of implants: 441				



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	1	0
20-29	1	0.2	1	0
30-39	5	0.9	2	3
40-49	21	3.9	16	5
50-59	70	13.1	53	17
60-69	207	38.6	157	50
70-79	206	38.4	175	31
80-89	25	4.7	21	4
Average age	67	0.0	67	65
Total number of implants: 536				



STATISTICS – CRT – SYSTEM STATUS

CRT-P (generator)

Status	First implant	Replacement
SC-lead plugged	5	1
SC-lead failed implant	11	3
SC-lead active system	327	228

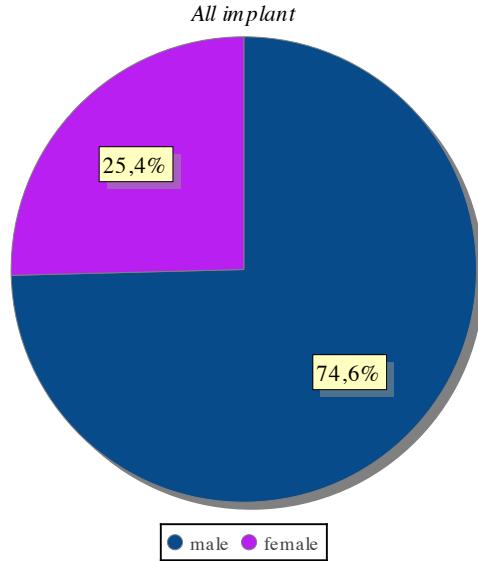
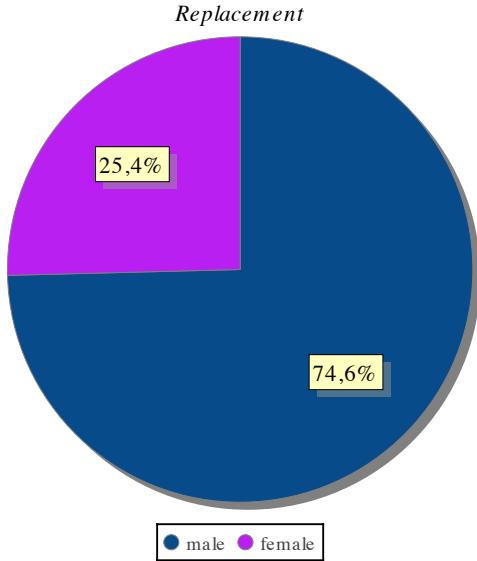
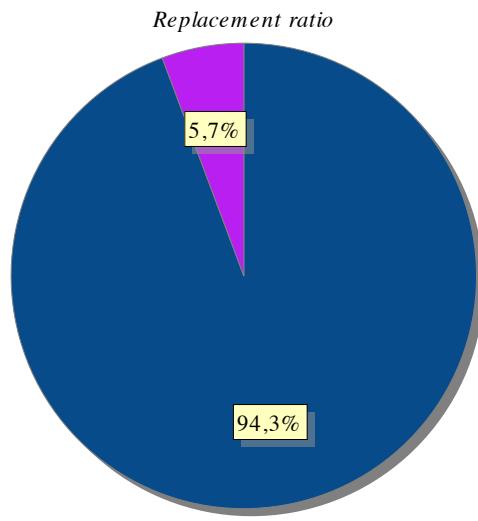
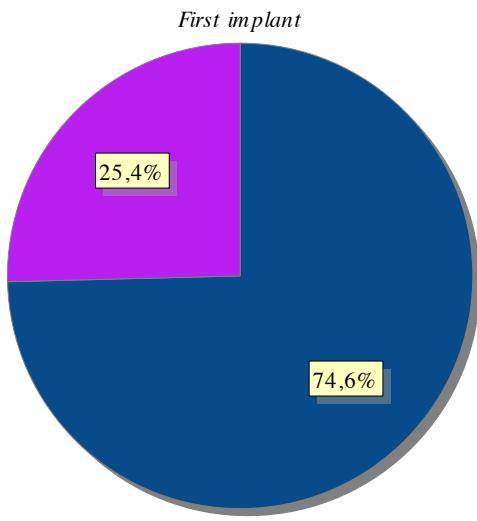
CRT-D (generator)

Status	First implant	Replacement
SC-lead plugged	24	1
SC-lead failed implant	18	3
SC-lead active system	412	228

STATISTICS – CRT – TYPE OF IMPLANTS

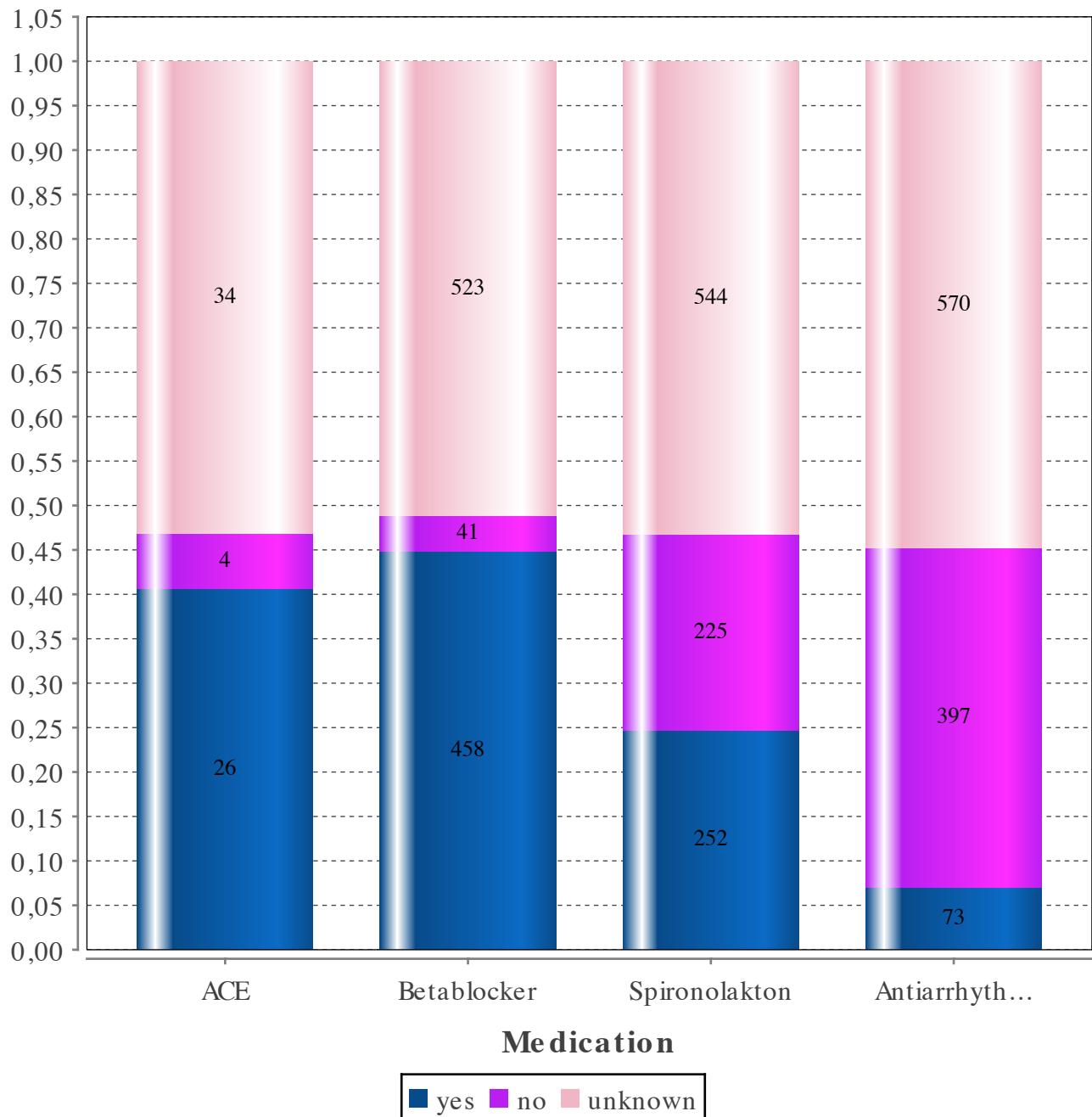
Based on both CRT-P and CRT-D

	Total		Male		Female	
	no	%	no	%	no	%
First implant	970	94.3	724	74.6	246	25.4
Replacement	59	5.7	44	74.6	15	25.4
Total	1029	100.0	768	74.6	261	25.4



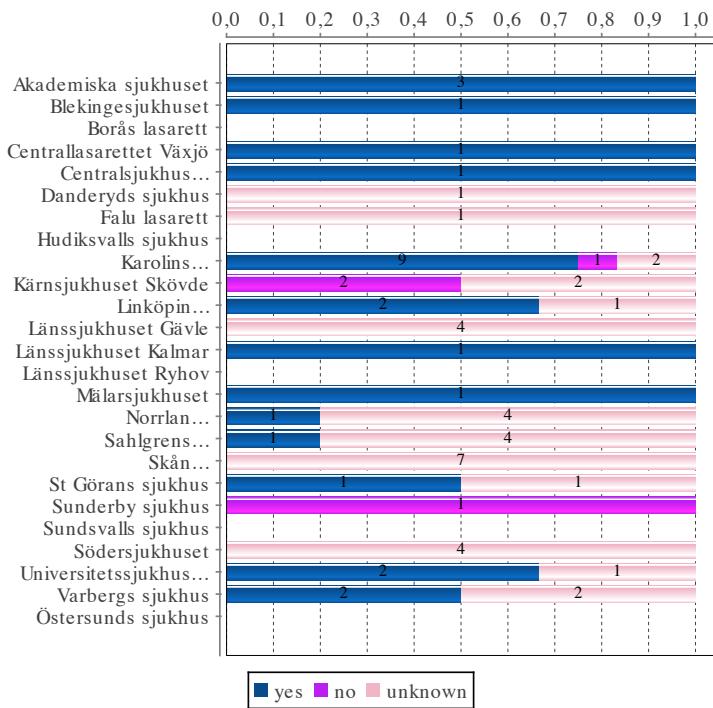
STATISTICS – CRT – MEDICATION

Previous medication for patients having CRT implant

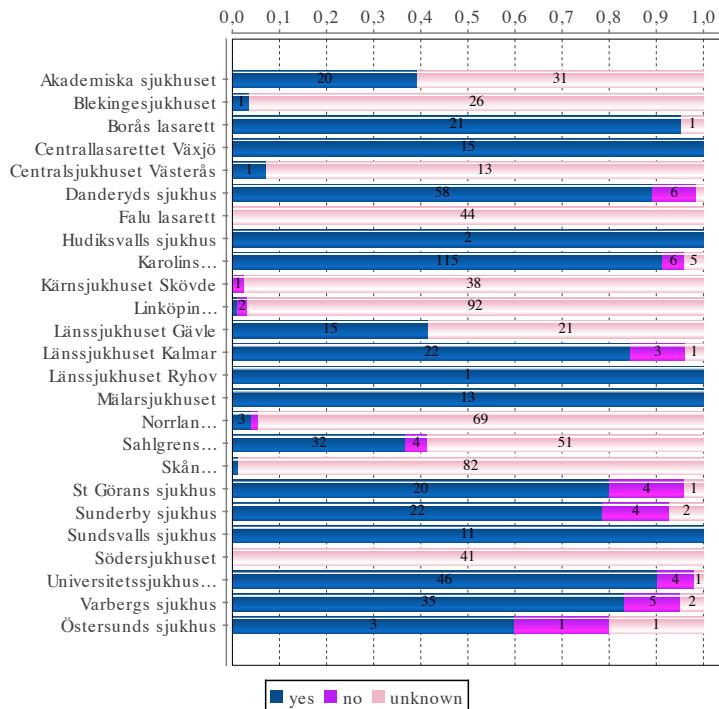


STATISTICS – CRT – MEDICATION PER HOSPITAL

ACE

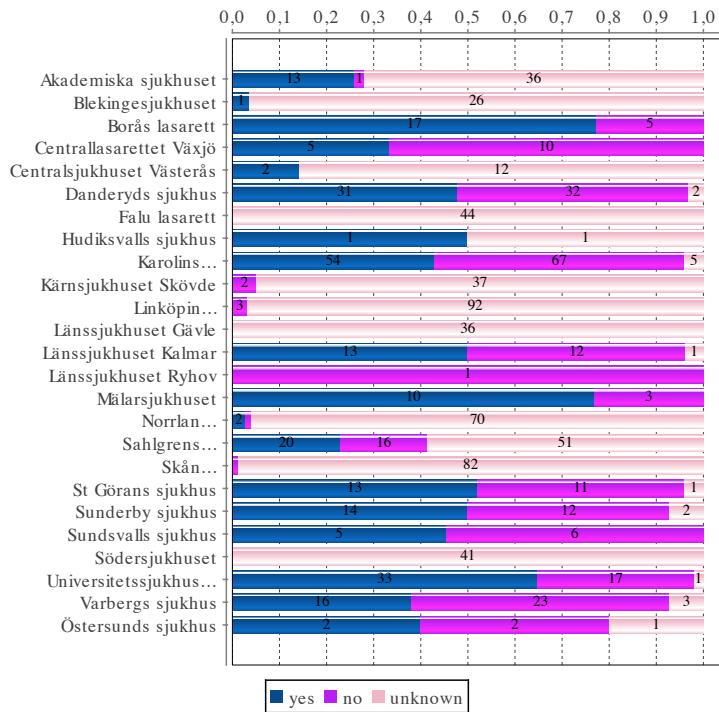


Betalblocker

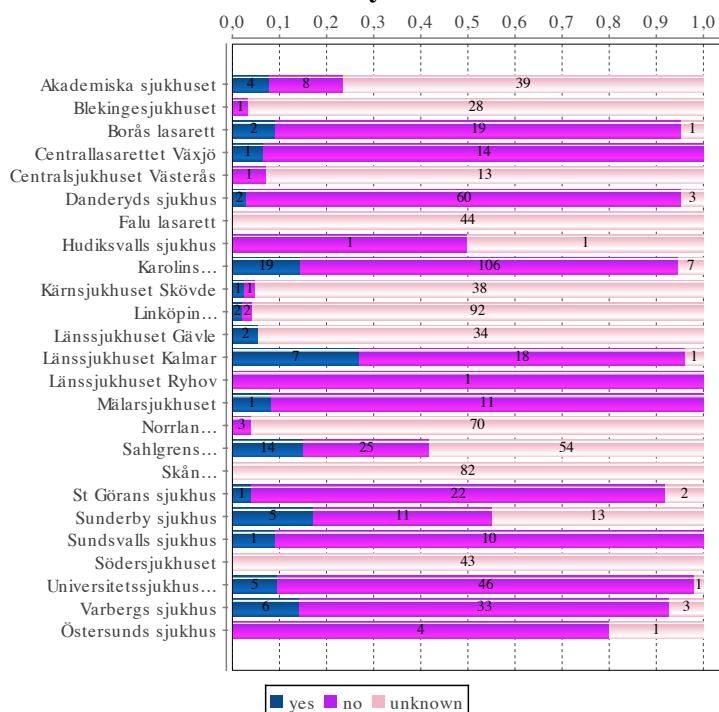


STATISTICS – CRT – MEDICATION PER HOSPITAL

Spiromolakton



Antiarrhythmica



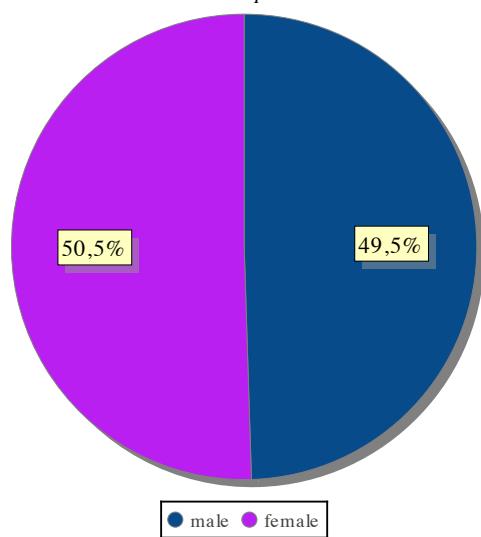
STATISTICS – ILR

STATISTICS – ILR – TYPE OF IMPLANTS

Ratio of new implants versus generator changes

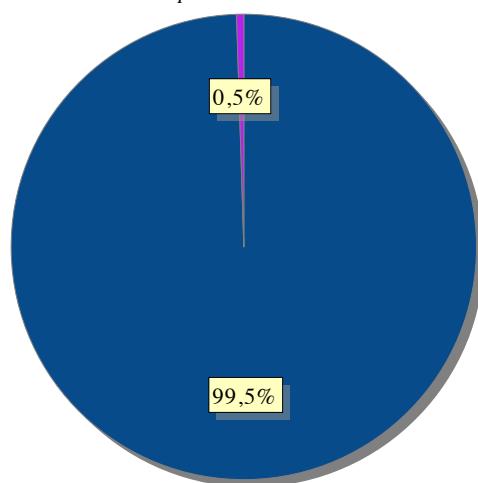
	Total		Male		Female	
	no	%	no	%	no	%
First implant	602	99.5	298	49.5	304	50.5
Replacement	3	0.5	0	0.0	3	100.0
Total	605	100.0	298	49.3	307	50.7

First implant



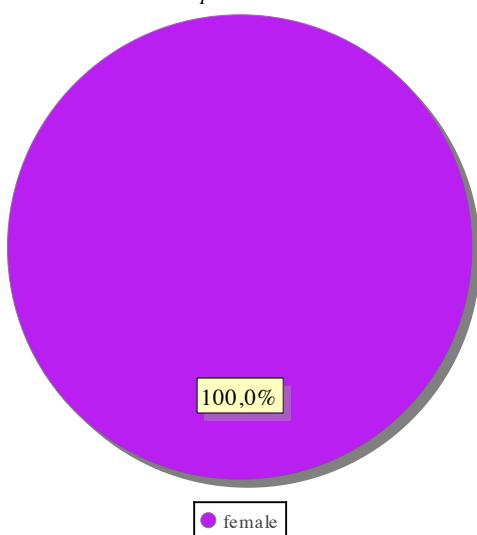
● male ● female

Replacement ratio



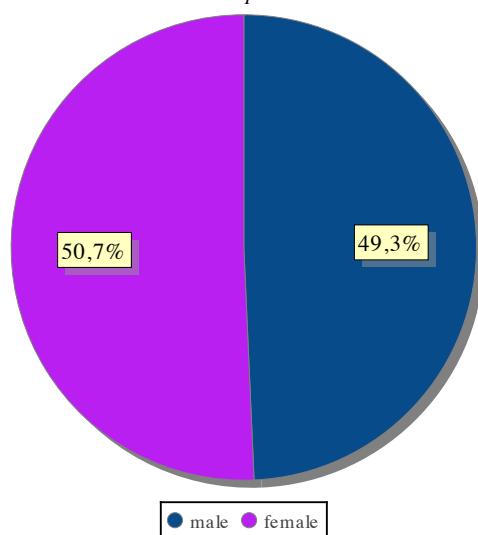
● First implant ● Replacement

Replacement



● female

All implant

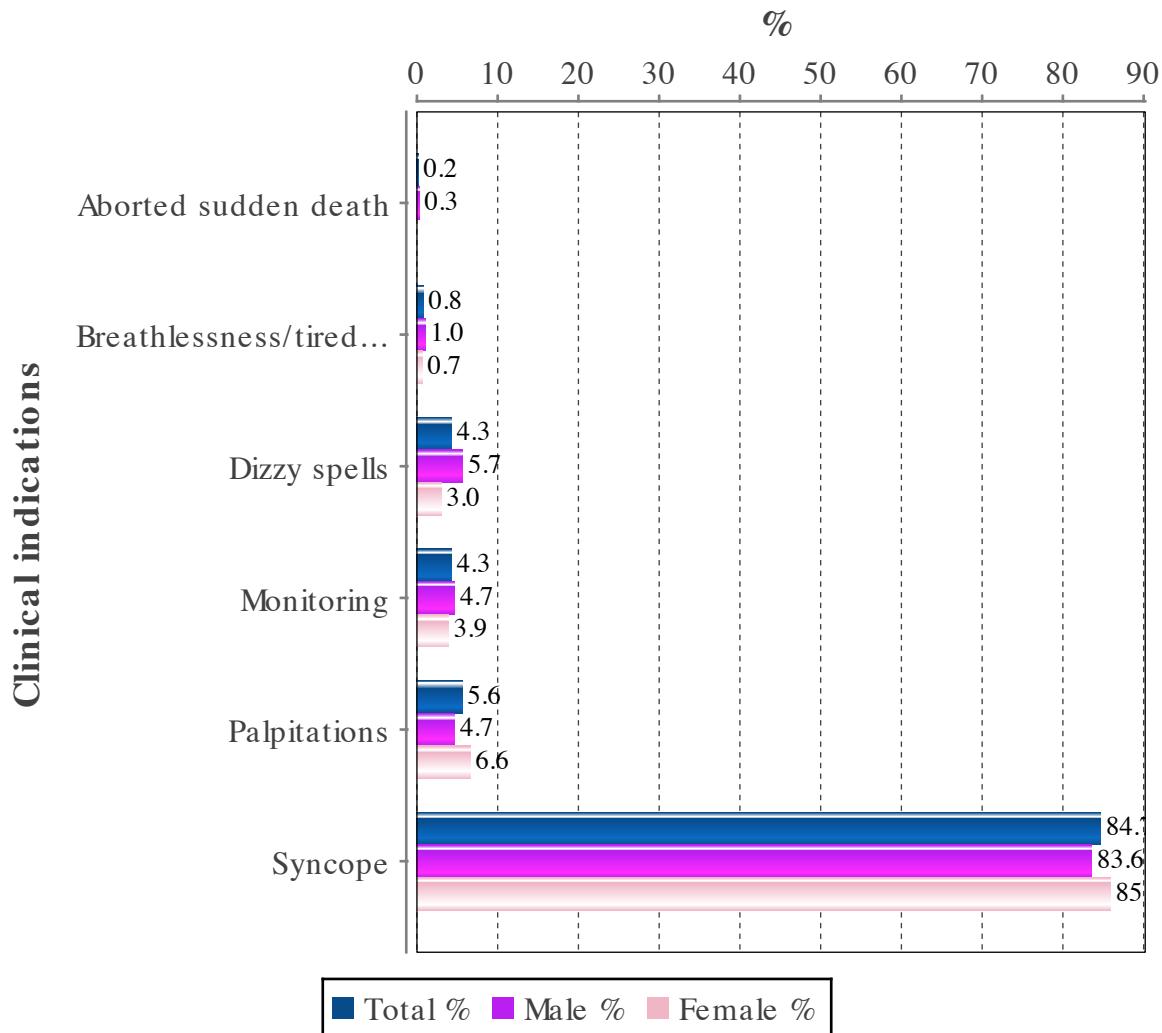


● male ● female

STATISTICS – ILR – CLINICAL INDICATIONS

Main symptom for implanting ILR

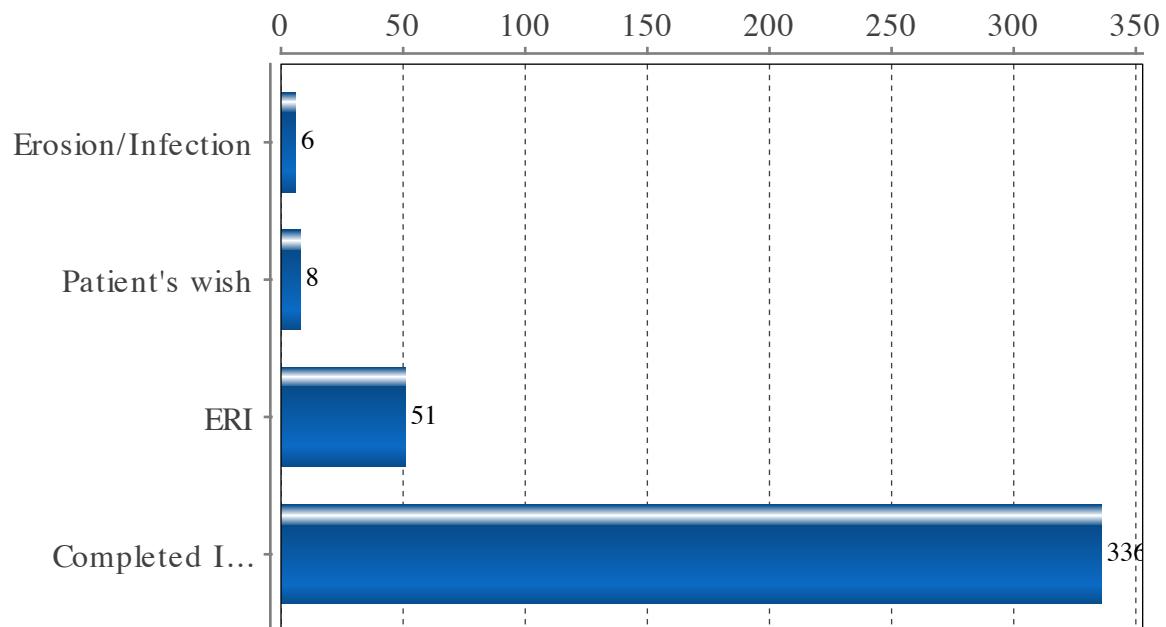
Indication	Total %	Male %	Female %
Aborted sudden death	0.2	0.3	0.0
Breathlessness/tiredness	0.8	1.0	0.7
Dizzy spells	4.3	5.7	3.0
Monitoring	4.3	4.7	3.9
Palpitations	5.6	4.7	6.6
Syncope	84.7	83.6	85.9



STATISTICS – ILR – REASON FOR REMOVAL

Reason for generator removal

Reason	No	%
Erosion/Infection	6	1.5
Patient's wish	8	2.0
ERI	51	12.7
Completed ILR investigation	336	83.8



STATISTICS – ILR – ACTION AFTER ILR

Investigation after first ILR implant in % of completed ILR investigation

Action	No	%
Pacemaker implant	156	46.4
ICD implant	11	3.3
New ILR implant	3	0.9

STATISTICS – ILR – DIAGNOSIS AT FOLLOWUP

Findings at ILR followup

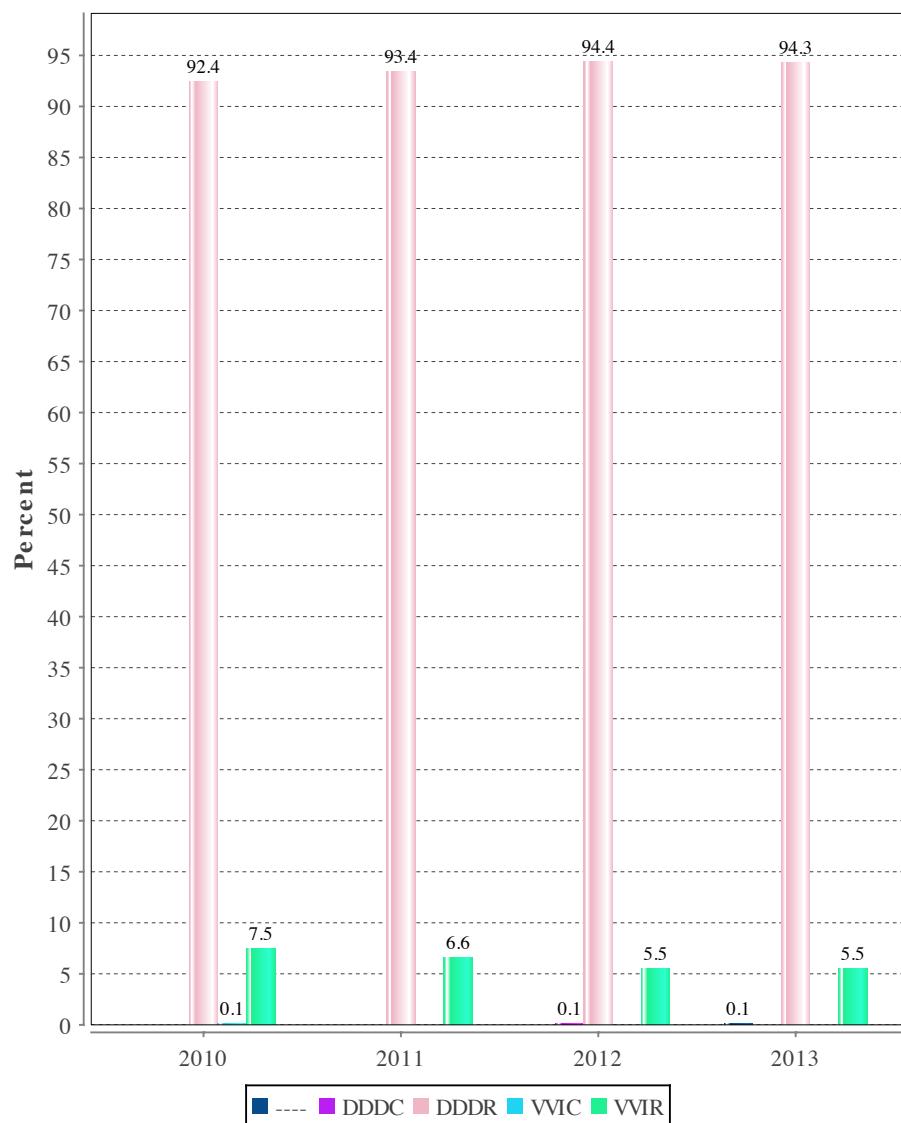
Action	No	%
Chronic Afib	3	4.8
NSVT	1	1.6
Normal sinusrhythm	53	85.5
Px Afib	2	3.2
SSS, SA-arrest, bradycardia	1	1.6
SSS, tachy;brady	2	3.2

QUALITY

QUALITY – PACEMAKER – FIRST IMPLANT HIGH DEGREE AV-BLOCK

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

Mode %	2010	2011	2012	2013
----	0.0	0.0	0.0	0.1
DDDC	0.0	0.0	0.1	0.0
DDDR	92.4	93.4	94.4	94.3
VVIC	0.1	0.0	0.0	0.0
VVIR	7.5	6.6	5.5	5.5



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 (%)	DDDR	DDDC	VVIC	VVIR
Akademiska sjukhuset	93.3	-	-	6.7
Alingsås lasarett	100.0	-	-	-
Arvika sjukhus	100.0	-	-	-
Blekingesjukhuset	95.0	-	-	5.0
Borås lasarett	100.0	-	-	-
Centrallasarettet Växjö	93.9	-	-	6.1
Centralsjukhuset Karlstad	92.9	-	-	7.1
Centralsjukhuset Västerås	95.2	-	-	4.8
Danderyds sjukhus	100.0	-	-	-
Drottning Silvias Bus	100.0	-	-	-
Falu lasarett	94.2	-	-	5.8
Hudiksvalls sjukhus	86.2	-	-	13.8
Karolinska Universitetssjukhuset	98.4	-	-	1.6
Kungälvs sjukhus	97.4	-	-	2.6
Kärnsjukhuset Skövde	100.0	-	-	-
Linköpings Universitetssjukhus	92.6	-	-	7.4
Länssjukhuset Gävle	88.6	-	-	11.4
Länssjukhuset Halmstad	100.0	-	-	-
Länssjukhuset Kalmar	68.5	-	-	31.5
Länssjukhuset Ryhov	95.3	-	-	4.7
Mälarsjukhuset	100.0	-	-	-
Norrlands Universitetssjukhus	93.7	-	-	6.3
Oskarshamns sjukhus	100.0	-	-	-
Sahlgrenska Universitetssjukhuset	98.4	0.8	-	0.8
Sahlgrenska Universitetssjukhuset /Östra	88.9	-	-	11.1
Skellefteå lasarett	78.6	-	-	21.4
Skånes universitetssjukhus, Lund	95.8	-	-	4.2
Skånes universitetssjukhus, Malmö	99.0	-	-	1.0
Söllefteå sjukhus	61.5	-	-	38.5
St Görans sjukhus	96.8	-	-	3.2
Sunderby sjukhus	93.4	-	-	6.6
Sundsvalls sjukhus	94.3	-	-	5.7
Södersjukhuset	88.7	-	-	11.3
Torsby	66.7	-	-	33.3
Trollhättan, NÄL	87.4	-	-	12.6
Universitetssjukhuset Örebro	98.5	-	-	1.5
Varbergs sjukhus	91.2	-	-	8.8
Visby lasarett	92.3	-	-	7.7
Vrinnevisjukhuset	92.9	-	-	7.1
Västerviks sjukhus	92.3	-	-	7.7
Örnsköldsviks sjukhus	100.0	-	-	-
Östersunds sjukhus	86.1	-	-	13.9

QUALITY – PACEMAKER – AV BLOCK MODES USED PER HOSPITAL

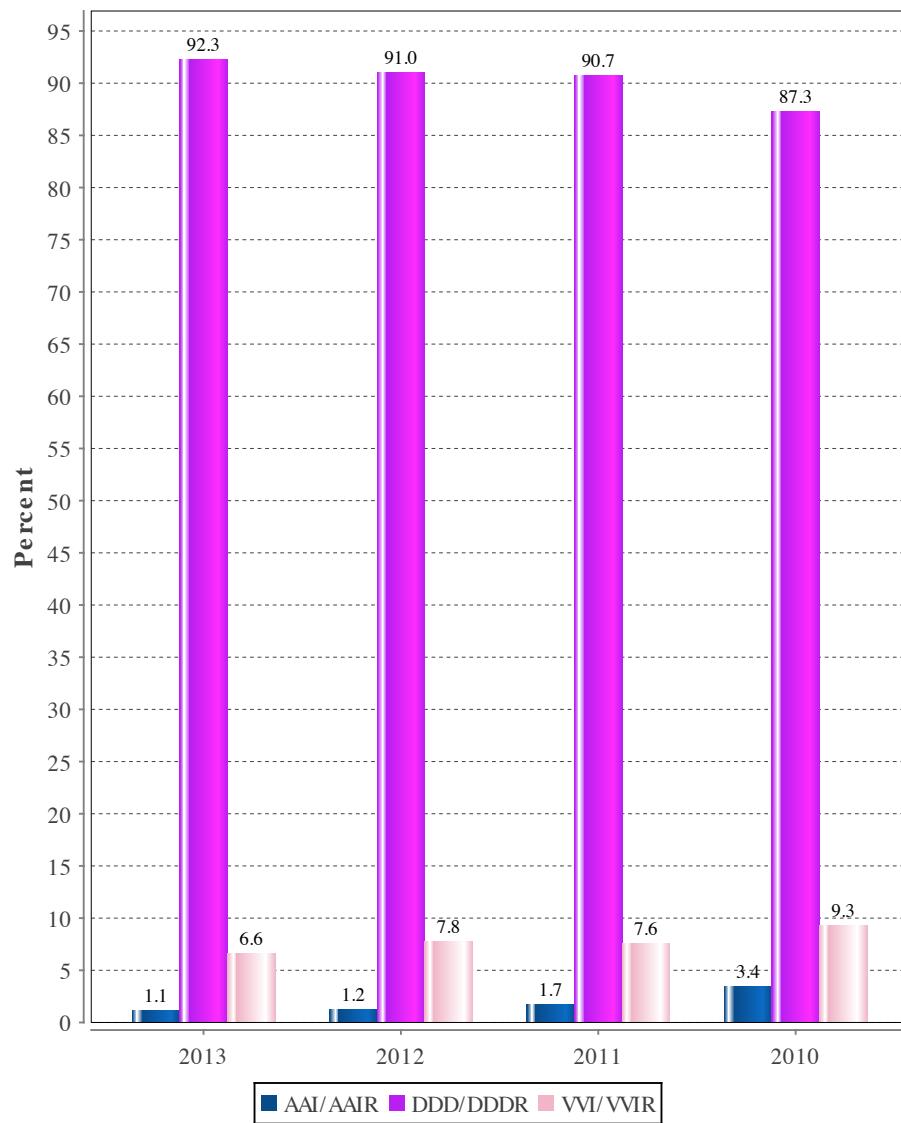
Use of pacing mode for total AV block indication per hospital size

Year	Mode	All hospitals (%)	Large (%)	Medium (%)	Small (%)
2013	DDDR	94.4	95.8	92.9	90.1
	DDDC	-	0.1	-	-
	VVIC	-	-	-	-
	VVIR	5.6	4.2	7.1	9.9
2012	DDDR	94.4	95.4	94.2	89.2
	DDDC	0.1	-	0.2	-
	VVIC	-	-	-	-
	VVIR	5.5	4.6	5.7	10.8
2011	DDDR	93.4	94.5	93.6	88.5
	VVI	-	-	-	0.4
	VVIR	6.6	5.5	6.4	11.2

QUALITY – PACEMAKER – FIRST IMPLANT SINUS NODE DYSFUNCTION

Use of pacing mode for Sinus Node Disease, historical data

Mode (%)	2013	2012	2011	2010
AAI/AAIR	1.1	1.2	1.7	3.4
DDD/DDDR	92.3	91.0	90.7	87.3
VVI/VVIR	6.6	7.8	7.6	9.3



**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 %
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
2011	DDDR	91.0	85.4	90.2	92.6
	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
2010	DDDR	91.0	79.6	90.6	95.0
	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 (%)	DDDR	DDDC	VVIC	VVIR	AAIC	AAIR
Akademiska sjukhuset	89.9	-	-	8.9	-	1.3
Alingsås lasarett	100.0	-	-	-	-	-
Arvika sjukhus	100.0	-	-	-	-	-
Blekingesjukhuset	93.5	-	-	6.5	-	-
Borås lasarett	97.2	-	-	2.8	-	-
Centrallasarettet Växjö	92.6	-	-	7.4	-	-
Centralsjukhuset Karlstad	89.4	-	-	10.6	-	-
Centralsjukhuset Västerås	96.8	-	-	3.2	-	-
Danderyds sjukhus	100.0	-	-	-	-	-
Falu lasarett	87.0	-	-	10.9	-	2.2
Hudiksvalls sjukhus	71.8	-	-	28.2	-	-
Karolinska Universitetssjukhuset	97.8	-	-	1.5	-	0.7
Kungälvs sjukhus	97.0	-	-	-	-	3.0
Kärnsjukhuset Skövde	97.2	-	-	1.4	-	1.4
Linköpings Universitetssjukhus	100.0	-	-	-	-	-
Länssjukhuset Gävle	90.0	-	-	10.0	-	-
Länssjukhuset Halmstad	80.0	-	-	20.0	-	-
Länssjukhuset Kalmar	71.0	-	-	22.6	-	6.5
Länssjukhuset Ryhov	81.4	-	-	18.6	-	-
Mälarsjukhuset	98.8	-	-	1.2	-	-
Norrlands Universitetssjukhus	76.5	-	-	11.8	-	11.8
Oskarshamns sjukhus	76.5	-	-	23.5	-	-
Sahlgrenska Universitetssjukhuset	97.3	-	-	2.7	-	-
Sahlgrenska Universitetssjukhuset /Östra	85.4	2.1	-	12.5	-	-
Skellefteå lasarett	70.8	-	-	29.2	-	-
Skånes universitetssjukhus, Lund	94.6	-	-	2.7	-	2.7
Skånes universitetssjukhus, Malmö	97.6	-	-	1.6	-	0.8
Sollefteå sjukhus	60.0	-	-	40.0	-	-
St Görans sjukhus	97.2	-	-	2.8	-	-
Sunderby sjukhus	95.7	-	-	4.3	-	-
Sundsvalls sjukhus	94.3	-	-	2.9	-	2.9
Södersjukhuset	98.7	-	-	1.3	-	-
Torsby	81.8	-	-	18.2	-	-
Trollhättan, NÄL	83.8	-	-	16.2	-	-
Universitetssjukhuset Örebro	93.2	-	-	6.8	-	-
Varbergs sjukhus	73.5	-	2.9	20.6	-	2.9
Visby lasarett	100.0	-	-	-	-	-
Vrinnevisjukhuset	94.7	-	-	2.6	-	2.6
Västerviks sjukhus	75.0	-	-	-	-	25.0
Örnsköldsviks sjukhus	100.0	-	-	-	-	-
Östersunds sjukhus	79.2	-	-	20.8	-	-

QUALITY – PACEMAKER – LEAD DISLOCATION

Dislocation rate for different lead types in atrial or ventricular placement. Based on all implants implanted 2004 and later and explanted/corrected 2013 or earlier

Type	Right atrium %	Right ventricle %	Left ventricle %	Total %
Fixed screw	1.7	1.2	185.5	2.4
Retractable screw	1.7	1.2	185.5	2.4
Passive	3.4	1.7	0.8	2.3
All	1.7	1.4	19.9	2.3

QUALITY – LEAD EXTRACTIONS

Extractions per hospital

Hospital	No of leads
Akademiska sjukhuset	64
Blekingesjukhuset	4
Borås lasarett	6
Danderyds sjukhus	5
Drottning Silvias Bus	3
Hudiksvalls sjukhus	2
Karolinska Huddinge	1
Karolinska Solna	197
Kärnsjukhuset Skövde	6
Kungälvs sjukhus	1
Länssjukhuset Gävle	1
Länssjukhuset Kalmar	7
Länssjukhuset Ryhov	2
Linköpings Universitetssjukhus	8
Norrlands Universitetssjukhus	3
Örnsköldsviks sjukhus	1
Östersunds sjukhus	1
Sahlgrenska Universitetssjukhuset	129
Sahlgrenska Universitetssjukhuset /Östra	1
Skånes universitetssjukhus, Lund	25
Skånes universitetssjukhus, Malmö	5
Södersjukhuset	2
Sunderby sjukhus	4
Sundsvalls sjukhus	1
Universitetssjukhuset Örebro	8
Varbergs sjukhus	2
Västerviks sjukhus	2

QUALITY – LEAD EXTRACTIONS

Extractions per type

Type	Extractions
ICD lead	93
Pacemaker lead	398

Extractions per model (more then 5 extractions)

Manufacturer	Model	Extractions
Boston Scientific	4470	19
Boston Scientific	4474	6
Medtronic	4074 Capture	7
Medtronic	4076 CapSure	51
Medtronic	5023M	11
Medtronic	5076 CapSure	10
Medtronic	6947 Sprint	7
Medtronic	6948 Sprint F	9
Medtronic	6949 Sprint F	14
St. Jude Medical	1156T Quickflex	6
St. Jude Medical	1258T QuickFlex	8
St. Jude Medical	1388T Tendril DX	7
St. Jude Medical	1480T	11
St. Jude Medical	1488T TendrilSDX	18
St. Jude Medical	1646T Isoflex	9
St. Jude Medical	1688T TendrilSDX	6
St. Jude Medical	1888TC Tendril ST	7
St. Jude Medical	1948 Isoflex	7
St. Jude Medical	1999 Optisense	22
St. Jude Medical	2088TC Tendril	19
St. Jude Medical	7122Q Durata	7
Vitatron	ICM09B Crystallin	10
Vitatron	ICQ09B Crystallin	11

Extractions per reason

Reason	Extractions
Ceased indication for ICD therapy	11
Ceased indication for PM therapy	12
Conductor break	7
Elective/system change	43
Electrical dysfunction	64
Extracardial stimulation	1
Heart transplant	6
Infection/Ulceration, local	212
Infection/Ulceration, systemic	88
Insulation failure	1

QUALITY – LEAD EXTRACTIONS

Reason	Extractions
Lead dislocation	9
Myopotentialinhib	2
Patient's wish	7
Preventive	24
Recall/Alert	1
Venous access	3

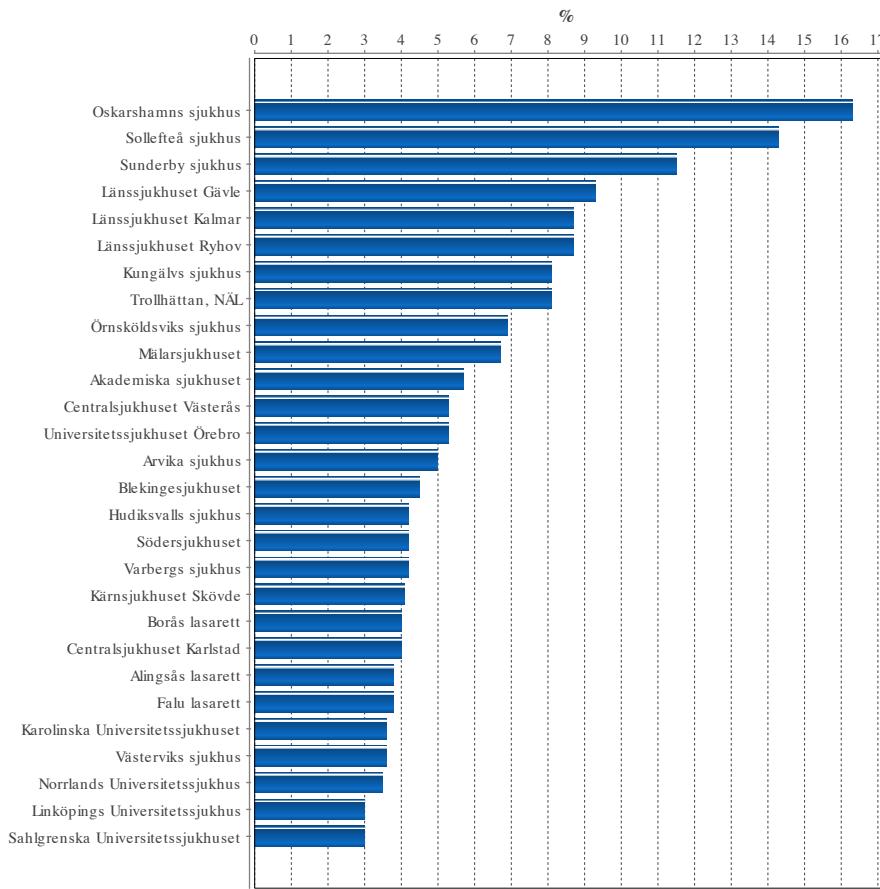
QUALITY – PACEMAKER – COMPLICATIONS

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

Complication	2012 %	2013 %	Based on
Discontinued surgery due to hemodynamic reasons	0.0	0.0	A
Electrical dysfunction	0.7	0.9	B
Local bleeding	0.3	0.2	A
Perforation/tamponade	0.3	0.4	B
Pneumothorax	0.5	0.4	B
Infection/perforation	0.6	0.5	A
Electrode displacement	2.2	2.3	B
Other	0.5	0.6	A
Subclavian or other related thrombosis	0.2	0.1	B
Death	0.0	0.0	A
Total	5.3	5.4	

Based on A=9612 (all implants) alternatively B=7398 (first implants + lead replacement)
validated events

QUALITY – PACEMAKER – COMPLICATIONS PER HOSPITAL



Following hospitals are considered to have incomplete complication registration (less than 3%)

Hospital	No of complications
Drottning Silvias Bus	22
Torsby	35
Skånes universitetssjukhus, Malmö	393
Sahlgrenska Universitetssjukhuset /Östra	180
Vrinnevisjukhuset	154
Skellefteå lasarett	73
Visby lasarett	56
Centrallasarettet Växjö	128
Skånes universitetssjukhus, Lund	897
Danderyds sjukhus	510
Länssjukhuset Halmstad	112
Östersunds sjukhus	113
St Görans sjukhus	273
Sundsvalls sjukhus	204

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	389	-	-	1.3	1.5	0.8	-
Alingsås lasarett	79	-	-	1.3	1.3	-	-
Arvika sjukhus	40	-	-	-	-	-	-
Blekingesjukhuset	202	-	-	1.5	1.5	-	0.5
Borås lasarett	248	-	-	1.2	2.0	-	-
Centrallasarettet Växjö	128	-	-	-	-	0.8	0.8
Centralsjukhuset Karlstad	200	-	-	2.0	1.0	0.5	-
Centralsjukhuset Västerås	226	-	-	-	1.8	1.8	-
Danderyds sjukhus	510	-	-	1.0	0.6	1.0	-
Drottning Silvias Bus	22	-	-	-	-	-	-
Falu lasarett	263	-	-	0.4	1.5	0.8	-
Hudiksvalls sjukhus	96	-	-	-	2.1	1.0	-
Karolinska Universitetssjukhuset	702	-	-	0.9	1.3	0.4	0.1
Kungälvs sjukhus	123	-	-	3.3	2.4	-	-
Kärnsjukhuset Skövde	345	-	-	0.6	2.3	0.9	-
Linköpings Universitetssjukhus	361	-	-	-	1.9	0.3	-
Länssjukhuset Gävle	281	-	-	0.7	4.6	0.7	-
Länssjukhuset Halmstad	112	-	0.9	-	-	0.9	-
Länssjukhuset Kalmar	126	-	-	1.6	6.3	-	-
Länssjukhuset Ryhov	287	-	-	-	5.9	-	-
Mälarsjukhuset	284	-	-	0.4	3.9	1.1	-
Norrlands Universitetssjukhus	260	-	-	-	2.7	0.8	-
Oskarshamns sjukhus	43	-	-	-	4.7	2.3	-
Sahlgrenska Universitetssjukhuset	540	-	-	0.6	1.3	0.2	-
Sahlgrenska Universitetssjukhuset /Östra	180	-	-	-	-	-	-
Skellefteå lasarett	73	-	-	-	1.4	-	-
Skånes universitetssjukhus, Lund	897	-	-	0.4	1.2	0.3	-
Skånes universitetssjukhus, Malmö	393	-	-	-	0.3	0.3	-
Sollefteå sjukhus	35	-	-	2.9	11.4	-	-
St Görans sjukhus	273	-	-	-	0.4	0.7	-
Sunderby sjukhus	261	-	-	-	1.9	-	-
Sundsvalls sjukhus	204	0.5	-	-	1.0	0.5	0.5
Södersjukhuset	401	-	0.2	1.5	0.5	-	-
Torsby	35	-	-	-	-	-	-
Trollhättan, NÄL	332	-	-	3.9	1.8	0.3	0.6
Universitetssjukhuset Örebro	264	-	-	-	2.7	1.1	-
Varbergs sjukhus	143	-	-	1.4	0.7	0.7	-
Visby lasarett	56	-	-	-	-	-	-
Vrinnevisjukhuset	154	-	-	-	-	-	-
Västerviks sjukhus	56	-	-	-	3.6	-	-
Örnsköldsviks sjukhus	58	-	-	-	3.4	1.7	-
Östersunds sjukhus	113	-	-	-	-	-	-

QUALITY – PACEMAKER – COMPLICATIONS PER HOSPITAL

Bl.: Bleeding, **Ot.**: Other, **Tm.**: Perforation/Tamponade, **Pn.**: Pneumothorax

Hospital	No	Bl. %	Ot. %	Tm. %	Pn. %	All %
Akademiska sjukhuset	389	-	0.3	1.0	0.8	5.7
Alingsås lasarett	79	1.3	-	-	-	3.8
Arvika sjukhus	40	5.0	-	-	-	5.0
Blekingesjukhuset	202	-	0.5	0.5	-	4.5
Borås lasarett	248	-	0.4	-	0.4	4.0
Centrallasarettet Växjö	128	-	-	0.8	-	2.3
Centralsjukhuset Karlstad	200	-	-	0.5	-	4.0
Centralsjukhuset Västerås	226	0.4	-	-	1.3	5.3
Danderyds sjukhus	510	-	0.2	-	-	2.7
Drottning Silvias Bus	22	-	-	-	-	-
Falu lasarett	263	0.8	0.4	-	-	3.8
Hudiksvalls sjukhus	96	-	-	-	1.0	4.2
Karolinska Universitetssjukhuset	702	0.1	0.1	0.3	0.3	3.6
Kungälvs sjukhus	123	-	1.6	-	0.8	8.1
Kärnsjukhuset Skövde	345	-	0.3	-	-	4.1
Linköpings Universitetssjukhus	361	0.6	-	-	0.3	3.0
Länssjukhuset Gävle	281	-	1.1	1.4	0.7	9.3
Länssjukhuset Halmstad	112	-	0.9	-	-	2.7
Länssjukhuset Kalmar	126	-	0.8	-	-	8.7
Länssjukhuset Ryhov	287	0.7	0.3	0.3	1.4	8.7
Mälarsjukhuset	284	0.4	0.7	0.4	-	6.7
Norrlands Universitetssjukhus	260	-	-	-	-	3.5
Oskarshamns sjukhus	43	4.7	-	-	4.7	16.3
Sahlgrenska Universitetssjukhuset	540	0.4	0.6	-	-	3.0
Sahlgrenska Universitetssjukhuset /Östra	180	0.6	0.6	-	-	1.1
Skellefteå lasarett	73	-	-	-	-	1.4
Skånes universitetssjukhus, Lund	897	0.1	0.1	0.2	-	2.5
Skånes universitetssjukhus, Malmö	393	-	-	-	-	0.5
Sollefteå sjukhus	35	-	-	-	-	14.3
St Görans sjukhus	273	-	0.4	-	1.5	2.9
Sunderby sjukhus	261	0.8	8.4	0.4	-	11.5
Sundsvalls sjukhus	204	-	-	0.5	-	2.9
Södersjukhuset	401	-	0.2	1.2	0.5	4.2
Torsby	35	-	-	-	-	-
Trollhättan, NÄL	332	0.9	-	-	0.6	8.1
Universitetssjukhuset Örebro	264	-	0.8	0.4	0.4	5.3
Varbergs sjukhus	143	0.7	0.7	-	-	4.2
Visby lasarett	56	-	1.8	-	-	1.8
Vrinnevisjukhuset	154	-	1.3	-	-	1.3
Västerviks sjukhus	56	-	-	-	-	3.6
Örnsköldsviks sjukhus	58	-	-	-	1.7	6.9
Östersunds sjukhus	113	-	1.8	0.9	-	2.7

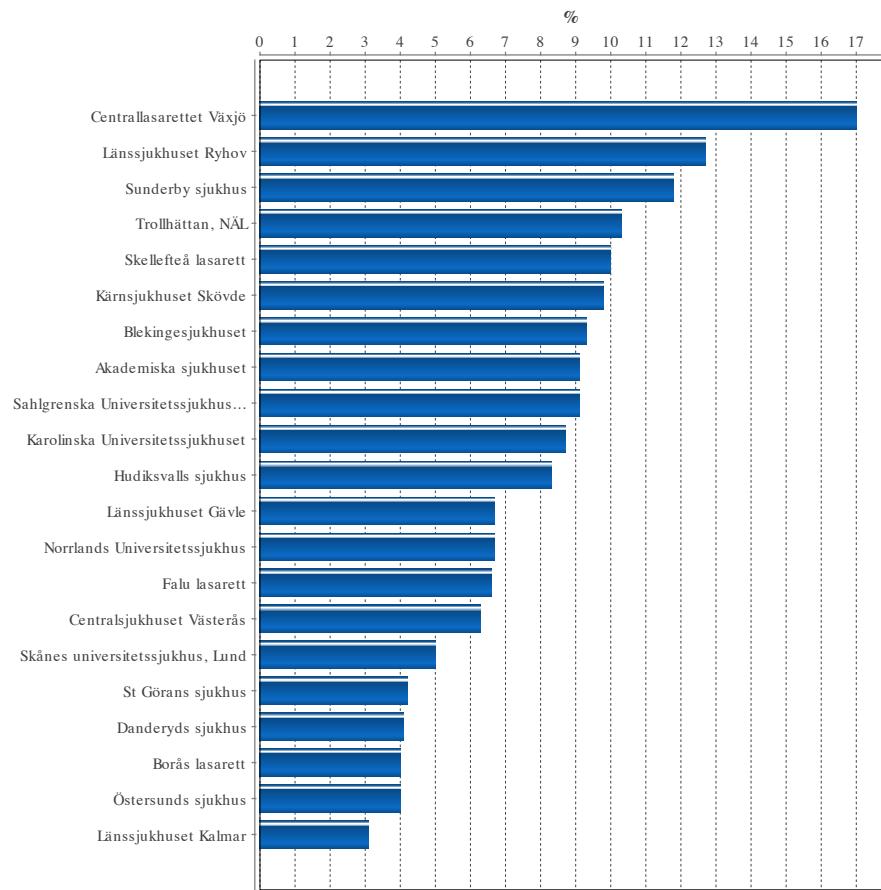
QUALITY – ICD – COMPLICATIONS

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

Complication	2012 %	2013 %
Discontinued surgery due to hemodynamic reasons	0.5	0.2
Electrical dysfunction	1.5	1.2
Local bleeding	0.8	0.7
Perforation/tamponade	0.5	0.3
Pneumothorax	0.6	0.3
Infection/perforation	3.0	2.0
Electrode displacement	2.1	1.7
Other	0.9	1.5
Subclavian or other related thrombosis	0.1	0.2
Death	0.1	0.0
Total	10.1	8.1

Based on 1323 (all implants) alternatively 1479 (first implants + lead replacements)
validated events

QUALITY – ICD – COMPLICATIONS PER HOSPITAL



Following hospitals are considered to have incomplete complication registration (less than 3%)

Hospital	No
Södersjukhuset	77
Universitetssjukhuset Örebro	70
Varbergs sjukhus	68
Mälarsjukhuset	45
Skånes universitetssjukhus, Malmö	4
Sundsvalls sjukhus	31
Linköpings Universitetssjukhus	136
Sahlgrenska Universitetssjukhuset	126
Visby lasarett	11
Örnsköldsviks sjukhus	10

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

Hospital	No	De. %	Dc. %	Df. %	Dp. %	In. %	Tr. %
Akademiska sjukhuset	88	-	-	2.3	-	1.1	-
Blekingesjukhuset	43	-	-	2.3	2.3	4.7	-
Borås lasarett	50	-	-	-	2.0	-	-
Centrallasarettet Växjö	47	-	-	-	2.1	4.3	-
Centralsjukhuset Västerås	48	-	-	4.2	-	-	-
Danderyds sjukhus	98	-	-	2.0	1.0	1.0	-
Falu lasarett	61	-	-	1.6	1.6	-	-
Hudiksvalls sjukhus	12	-	-	-	-	-	-
Karolinska Universitetssjukhuset	263	-	0.4	1.9	0.4	3.4	0.4
Kärnsjukhuset Skövde	41	-	-	2.4	7.3	-	-
Linköpings Universitetssjukhus	136	-	-	-	1.5	0.7	0.7
Länssjukhuset Gävle	60	-	-	-	1.7	1.7	-
Länssjukhuset Kalmar	64	-	-	-	-	1.6	-
Länssjukhuset Ryhov	55	-	-	1.8	10.9	-	-
Mälarsjukhuset	45	-	-	-	-	-	-
Norrlands Universitetssjukhus	60	-	-	-	1.7	3.3	-
Sahlgrenska Universitetssjukhuset	126	-	-	1.6	-	-	-
Sahlgrenska Universitetssjukhuset /Östra	11	-	-	-	-	-	-
Skellefteå lasarett	10	-	-	-	-	10.0	-
Skånes universitetssjukhus, Lund	242	-	-	1.2	2.1	0.8	-
Skånes universitetssjukhus, Malmö	4	-	-	-	-	-	-
St Görans sjukhus	48	-	-	-	-	-	-
Sunderby sjukhus	76	-	1.3	-	-	1.3	-
Sundsvalls sjukhus	31	-	-	-	-	-	-
Södersjukhuset	77	-	-	-	1.3	-	-
Trollhättan, NÄL	39	-	-	2.6	5.1	2.6	-
Universitetssjukhuset Örebro	70	-	-	-	-	1.4	-
Varbergs sjukhus	68	-	-	-	-	-	-
Visby lasarett	11	-	-	-	-	-	-
Örnsköldsviks sjukhus	10	-	-	-	-	-	-
Östersunds sjukhus	25	-	-	4.0	-	-	-

QUALITY – ICD – COMPLICATIONS PER HOSPITAL

Bl.: Bleeding, **Ot.**: Other, **Pa.**: Perioperative arrhythmia, **Tm.**: Perforation/Tamponade, **Pn.**: Pneumothorax

Hospital	No	Bl. %	Ot. %	Pa. %	Tm. %	Pn. %	All %
Akademiska sjukhuset	88	-	4.5	-	1.1	-	9.1
Blekingesjukhuset	43	-	-	-	-	-	9.3
Borås lasarett	50	-	-	-	-	2.0	4.0
Centrallasarettet Växjö	47	4.3	4.3	-	2.1	-	17.0
Centralsjukhuset Västerås	48	-	2.1	-	-	-	6.3
Danderyds sjukhus	98	-	-	-	-	-	4.1
Falu lasarett	61	1.6	-	-	1.6	-	6.6
Hudiksvalls sjukhus	12	-	8.3	-	-	-	8.3
Karolinska Universitetssjukhuset	263	1.1	0.4	-	-	0.8	8.7
Kärnsjukhuset Skövde	41	-	-	-	-	-	9.8
Linköpings Universitetssjukhus	136	-	-	-	-	-	2.9
Länssjukhuset Gävle	60	1.7	1.7	-	-	-	6.7
Länssjukhuset Kalmar	64	1.6	-	-	-	-	3.1
Länssjukhuset Ryhov	55	-	-	-	-	-	12.7
Mälarsjukhuset	45	-	-	-	-	2.2	2.2
Norrlands Universitetssjukhus	60	-	1.7	-	-	-	6.7
Sahlgrenska Universitetssjukhuset	126	0.8	-	-	-	-	2.4
Sahlgrenska Universitetssjukhuset /Östra	11	-	-	-	-	9.1	9.1
Skellefteå lasarett	10	-	-	-	-	-	10.0
Skånes universitetssjukhus, Lund	242	-	0.4	-	0.4	-	5.0
Skånes universitetssjukhus, Malmö	4	-	-	-	-	-	-
St Görans sjukhus	48	-	4.2	-	-	-	4.2
Sunderby sjukhus	76	-	7.9	-	1.3	-	11.8
Sundsvalls sjukhus	31	-	-	-	-	-	-
Södersjukhuset	77	-	-	-	-	-	1.3
Trollhättan, NÄL	39	-	-	-	-	-	10.3
Universitetssjukhuset Örebro	70	-	-	-	-	-	1.4
Varbergs sjukhus	68	-	-	-	-	-	-
Visby lasarett	11	-	-	-	-	-	-
Örnsköldsviks sjukhus	10	-	-	-	-	-	-
Östersunds sjukhus	25	-	-	-	-	-	4.0

QUALITY – CRT – COMPLICATIONS

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

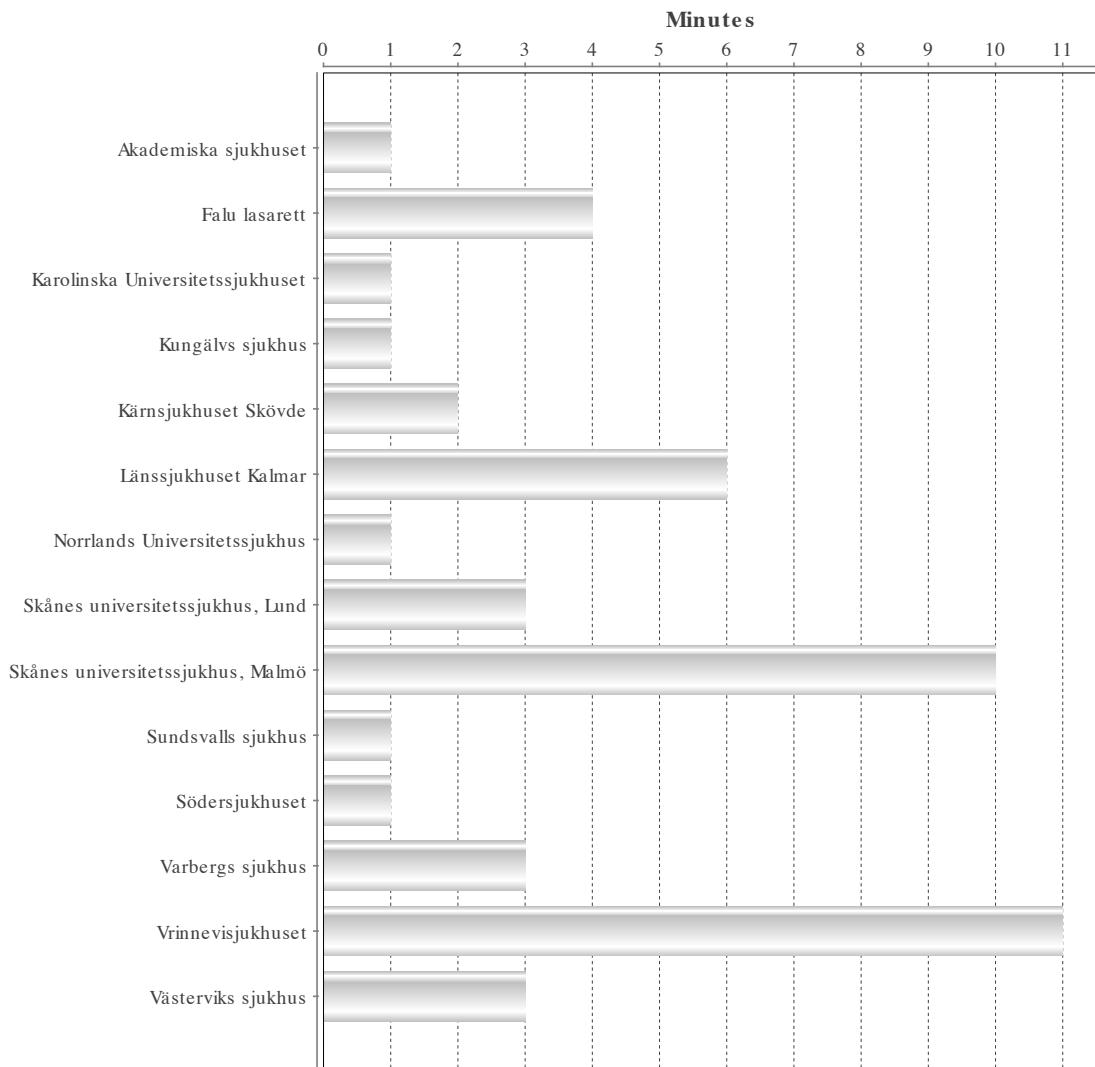
CRT-P Complication	%
Death	-
Discontinued surgery due to hemodynamic reasons	-
Electrical dysfunction	0.2
Electrode displacement	2.3
Infection/perforation	0.5
Local bleeding	0.2
Other	0.5
Perforation/tamponade	-
Peroperative arrhythmia requiring acute medication	-
Pneumothorax	0.2
Subclavian or other related thrombosis	-
Total	3.9
Total no of implants 431	

CRT-D Complication	%
Death	-
Discontinued surgery due to hemodynamic reasons	-
Electrical dysfunction	1.1
Electrode displacement	1.6
Infection/perforation	1.6
Local bleeding	0.5
Other	0.7
Perforation/tamponade	0.4
Peroperative arrhythmia requiring acute medication	-
Pneumothorax	0.2
Subclavian or other related thrombosis	0.2
Total	6.2
Total no of implants 565	

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.*

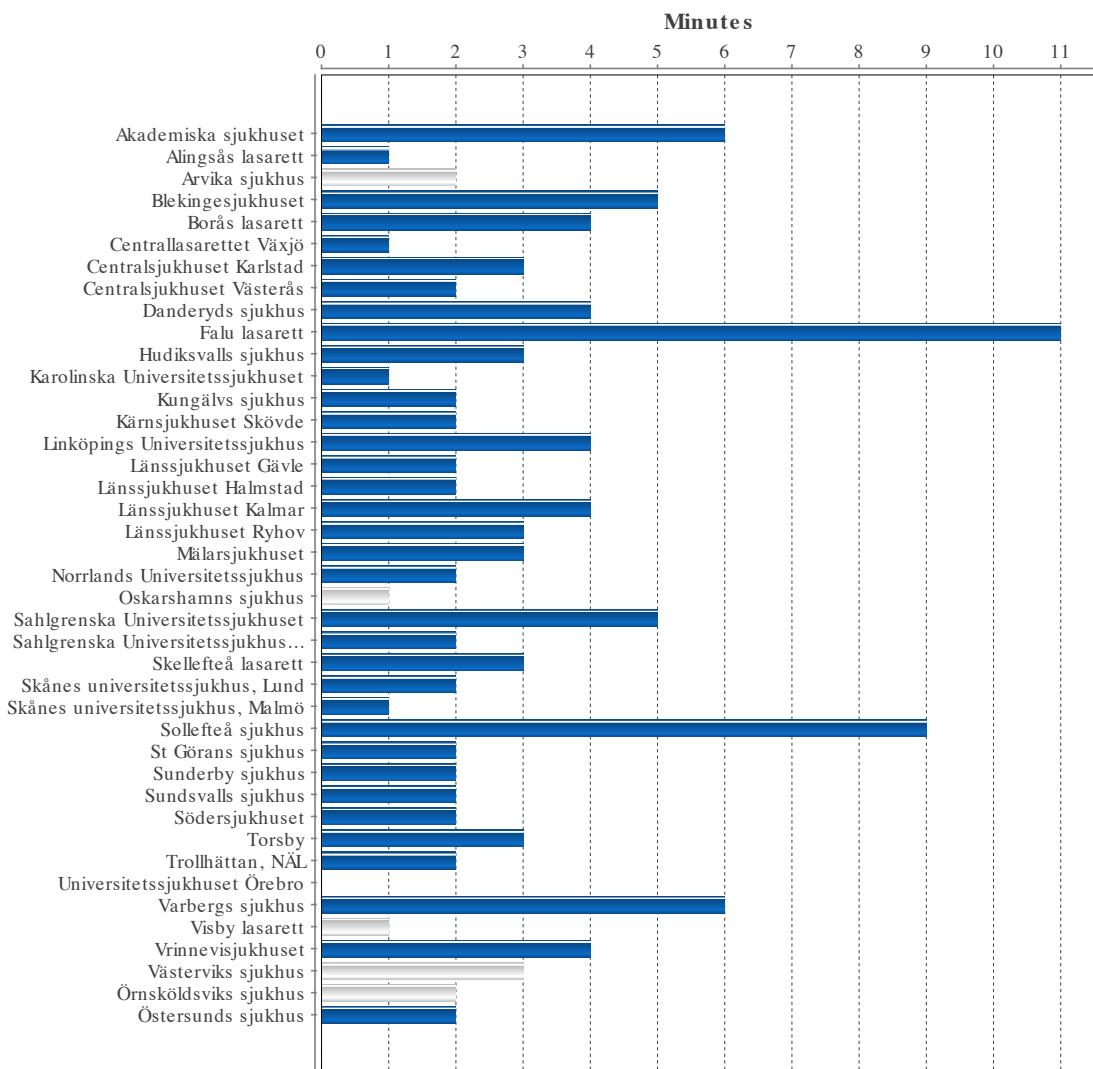
AAIC/ AAIR



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.*

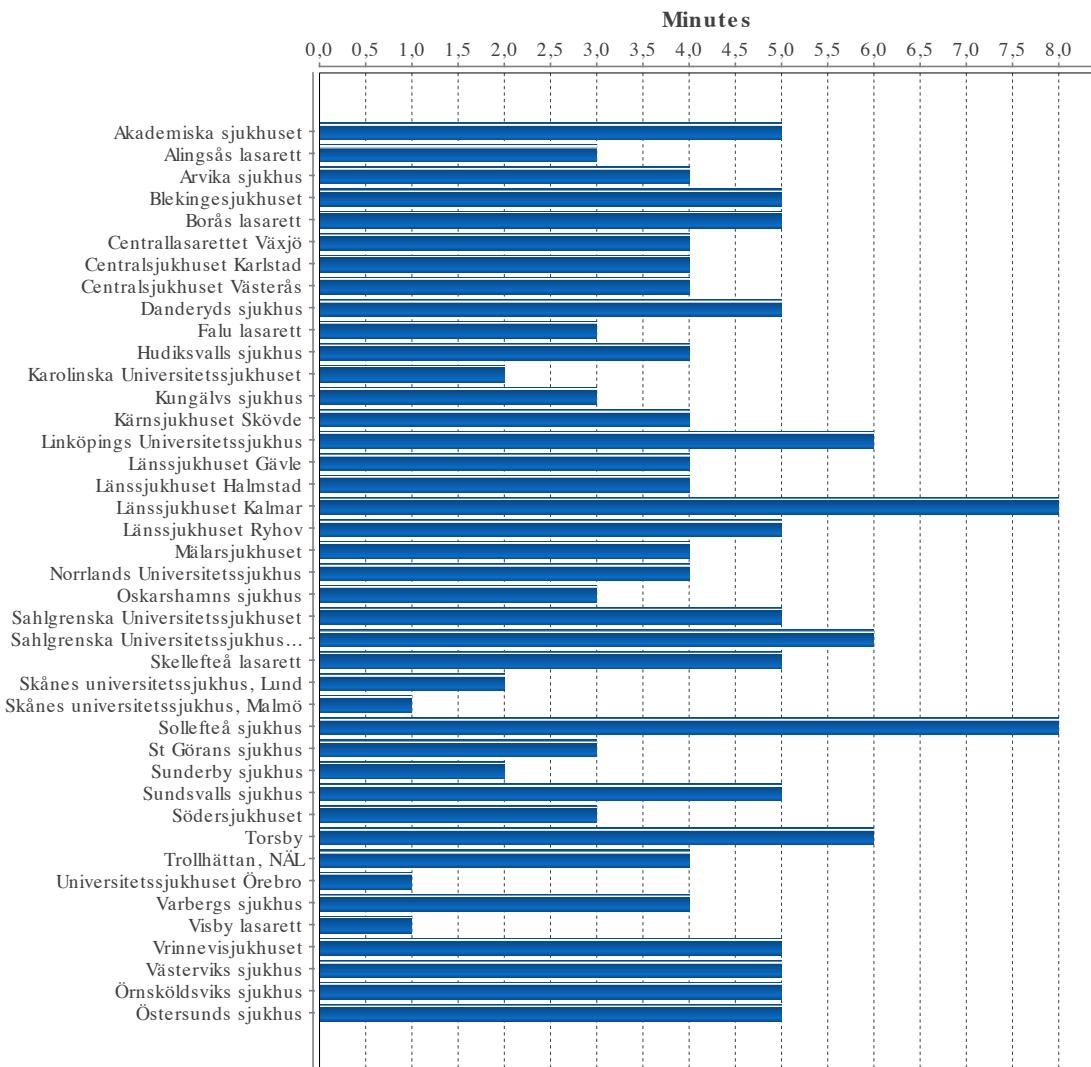
VVIC/ VVIR



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.*

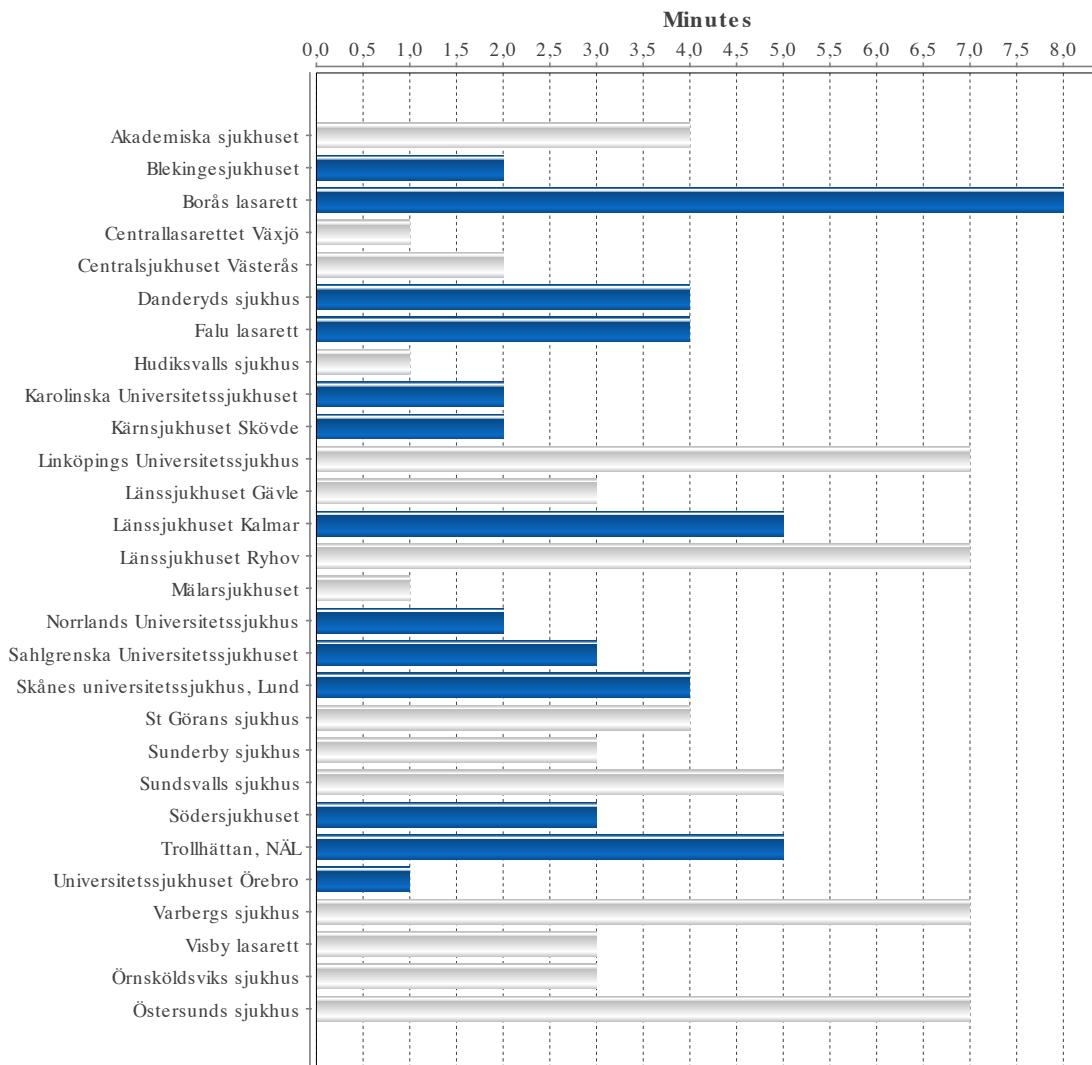
DDDC/ DDDR



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.*

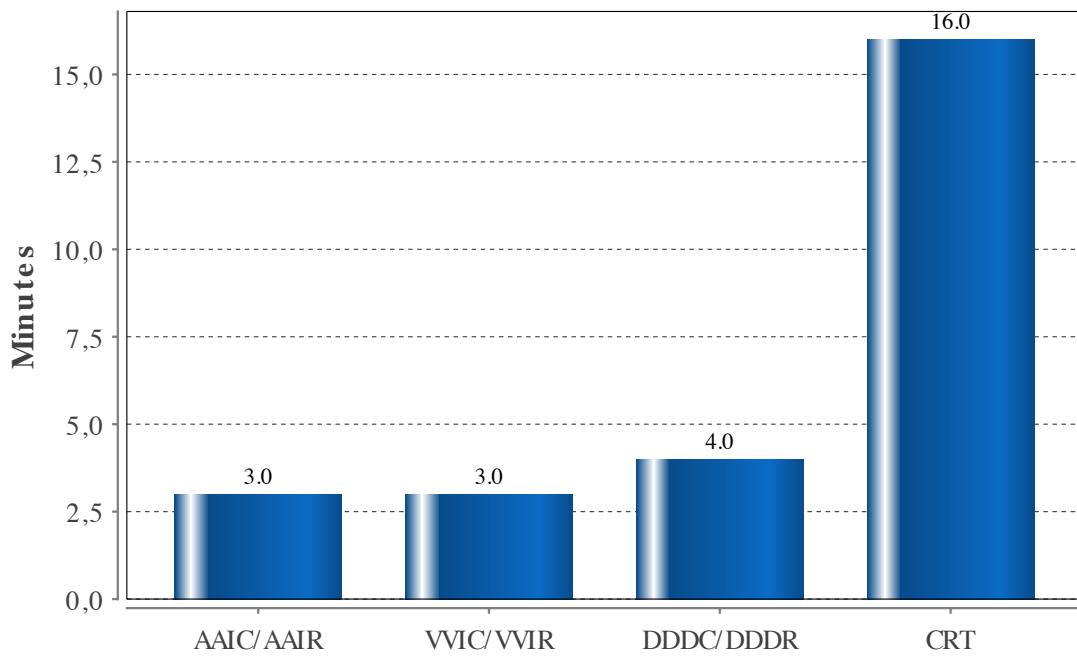
CRT



QUALITY – PACEMAKER – FLUOROSCOPY PER SUBTYPE

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

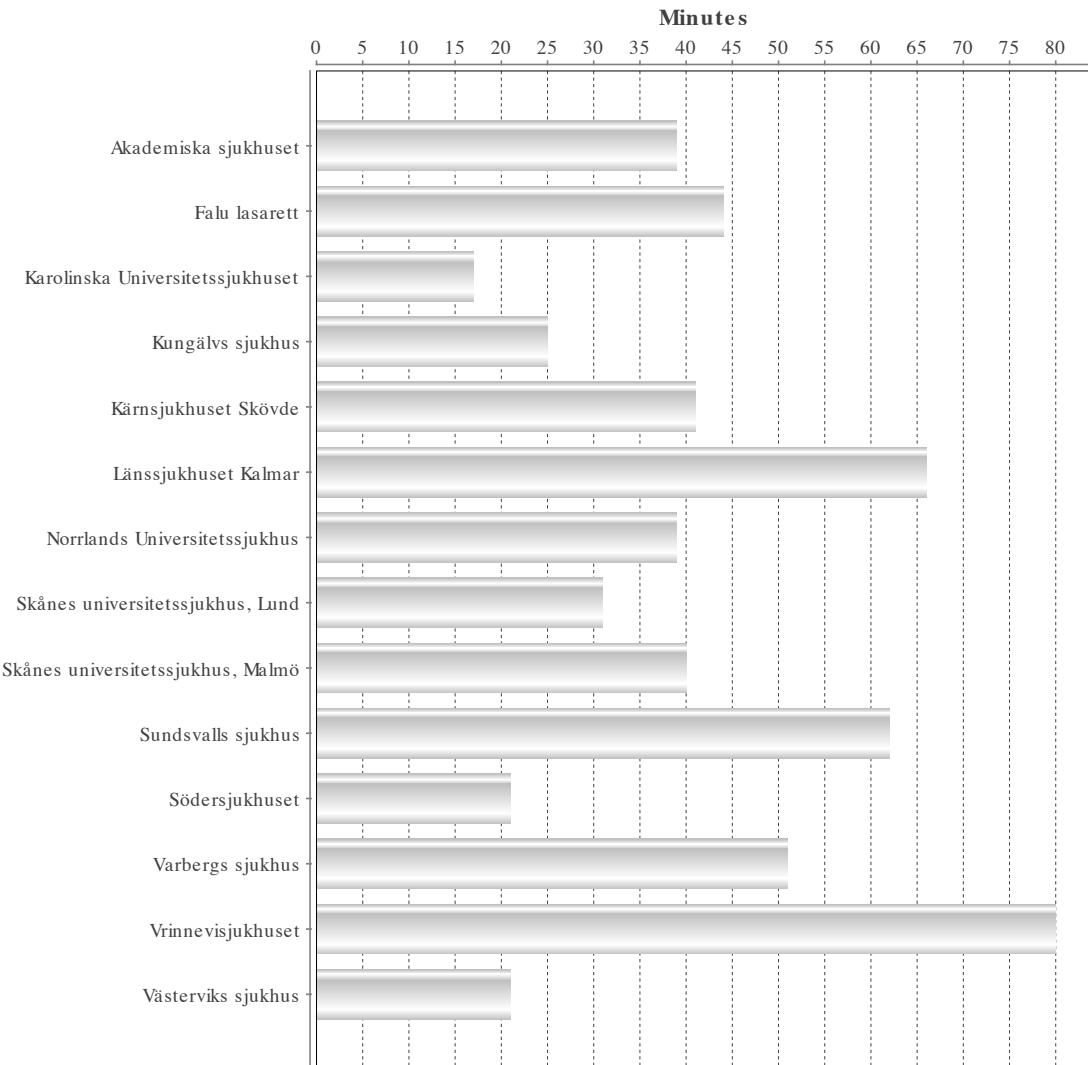
Knife time	Average	Standard deviation
AAIC/AAIR	3.0	3.0
VVIC/VVIR	3.0	12.8
DDDC/DDDR	4.0	4.8
CRT	16.0	14.2



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.

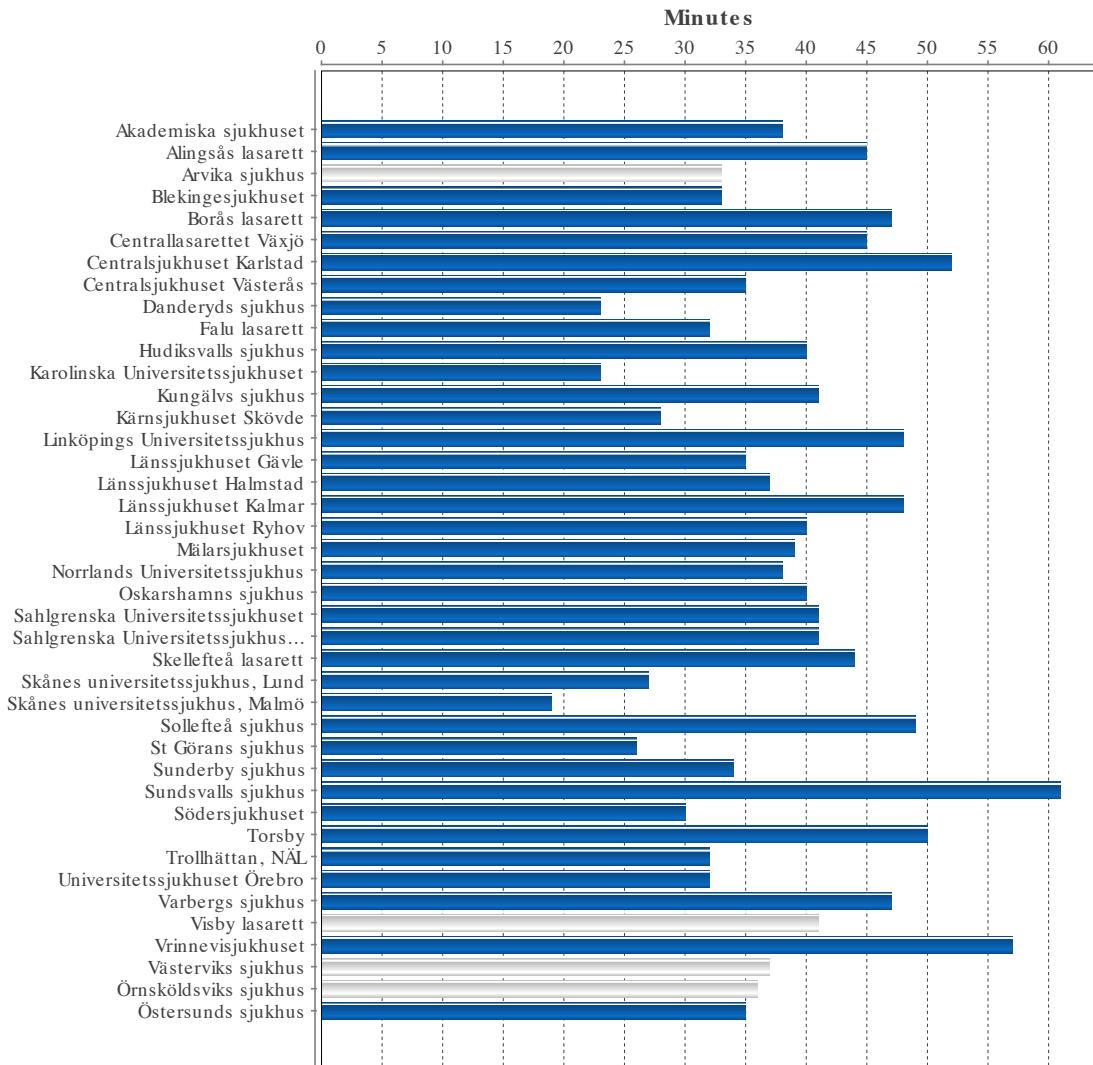
AAI/ AAIR



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.

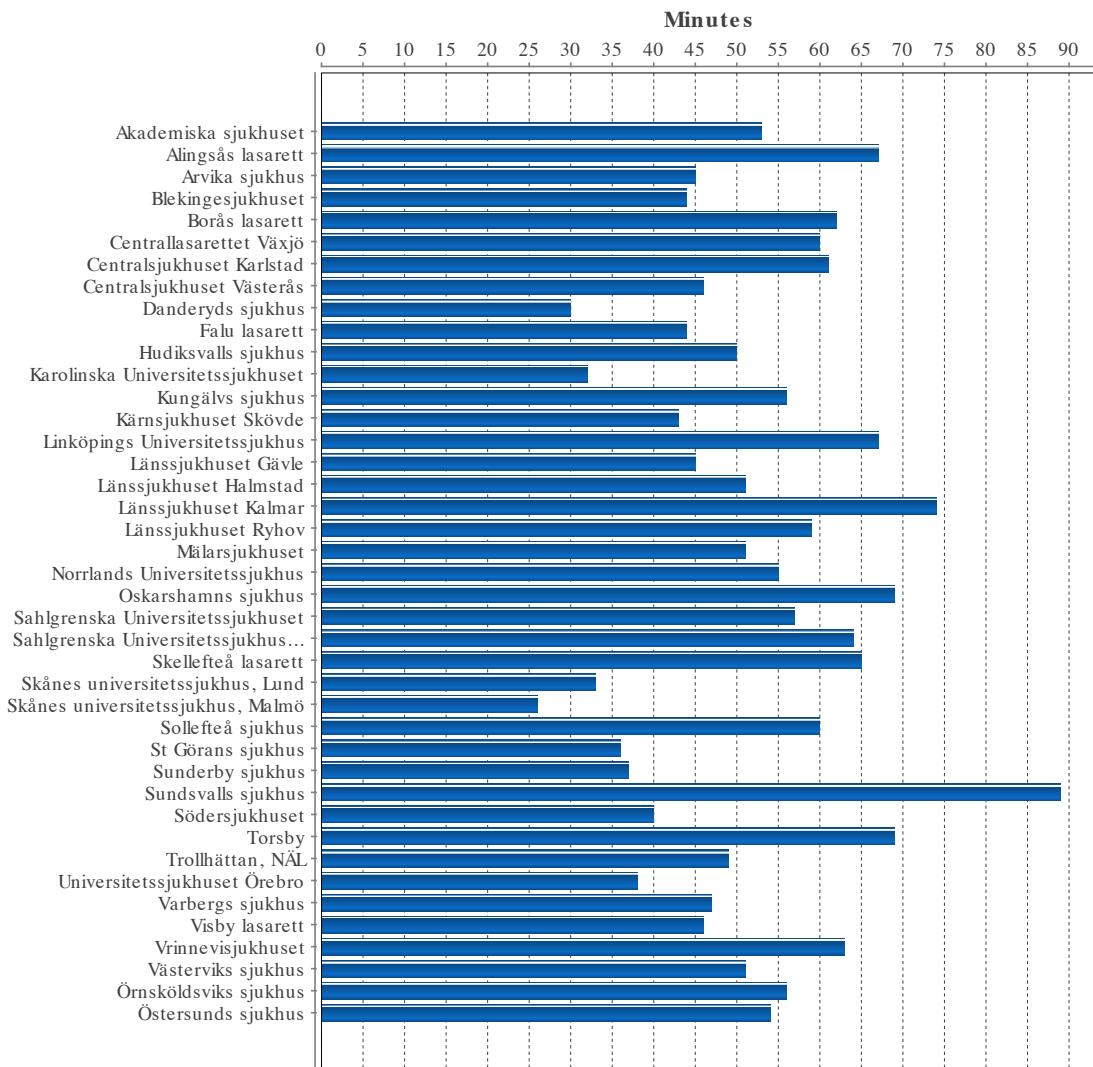
VVI/ VVIR



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.

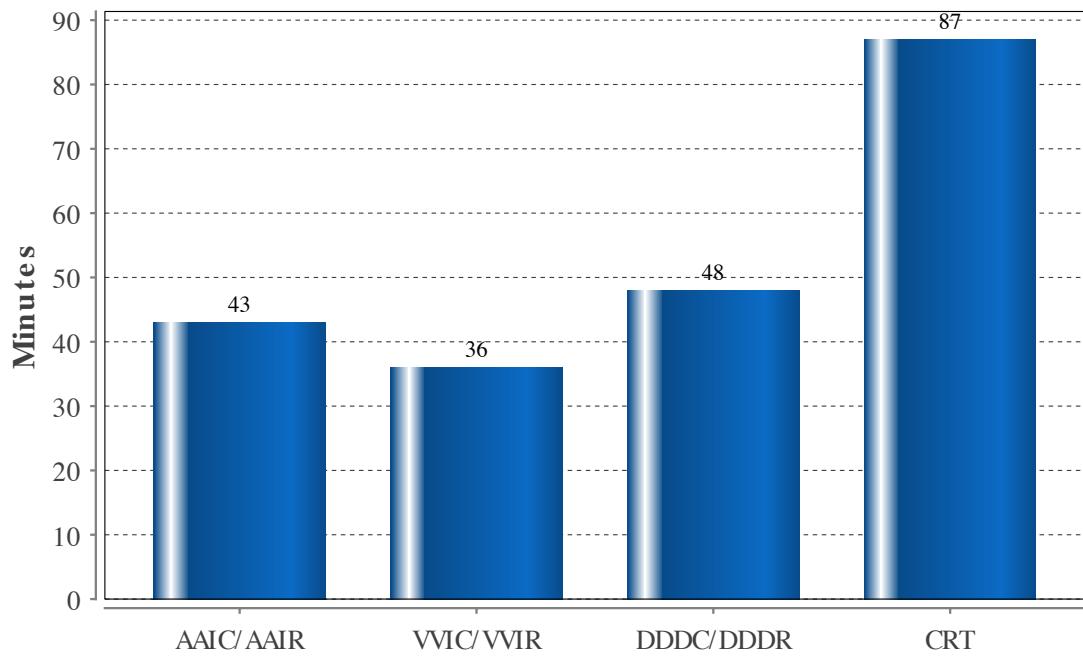
DDD/ DDDR



QUALITY – PACEMAKER – KNIFE TIME PER SUBTYPE

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

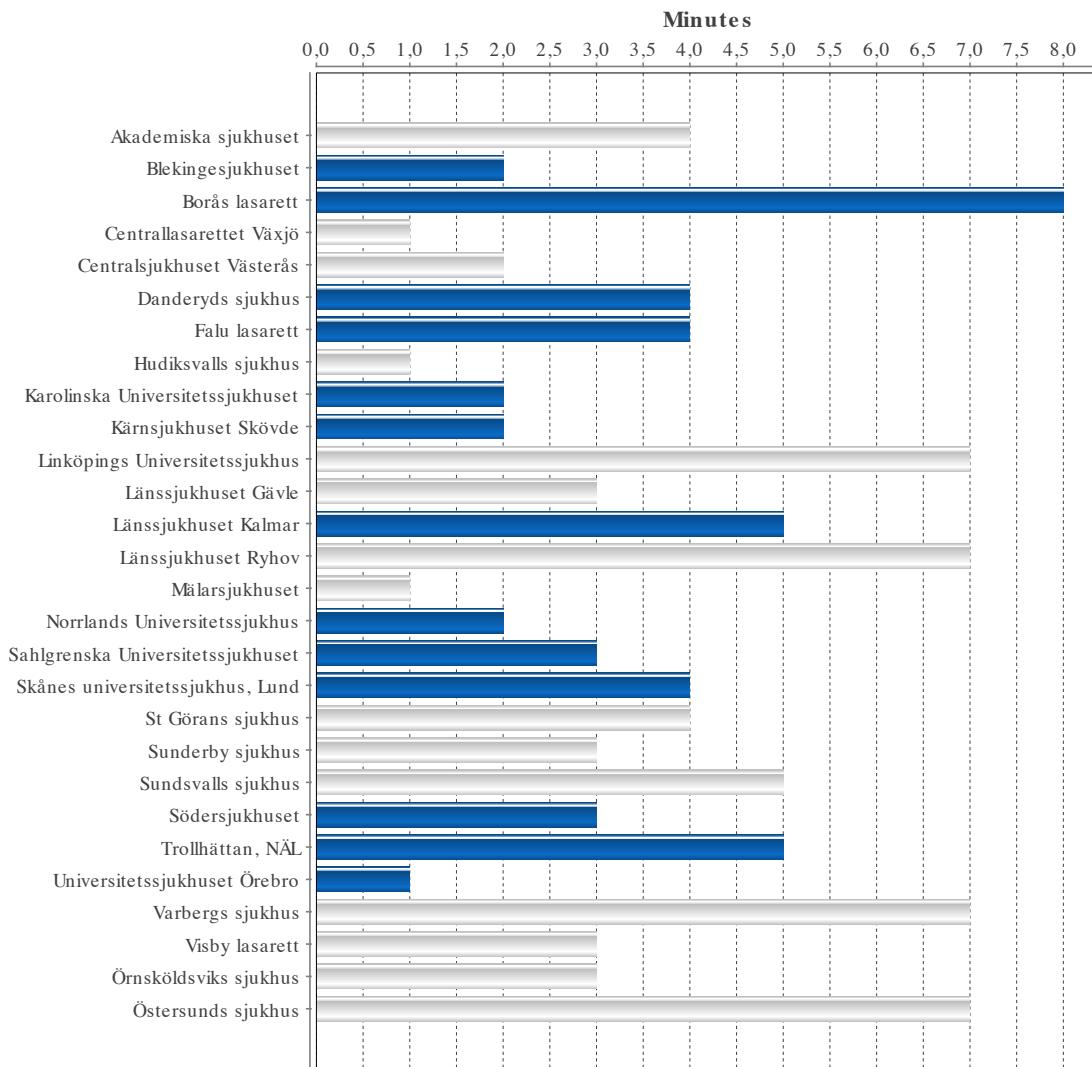
Knife time	Average	Standard deviation
AAIC/AAIR	43	19.4
VVIC/VVIR	36	19.8
DDDC/DDDR	48	24.4
CRT	87	38.1



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.*

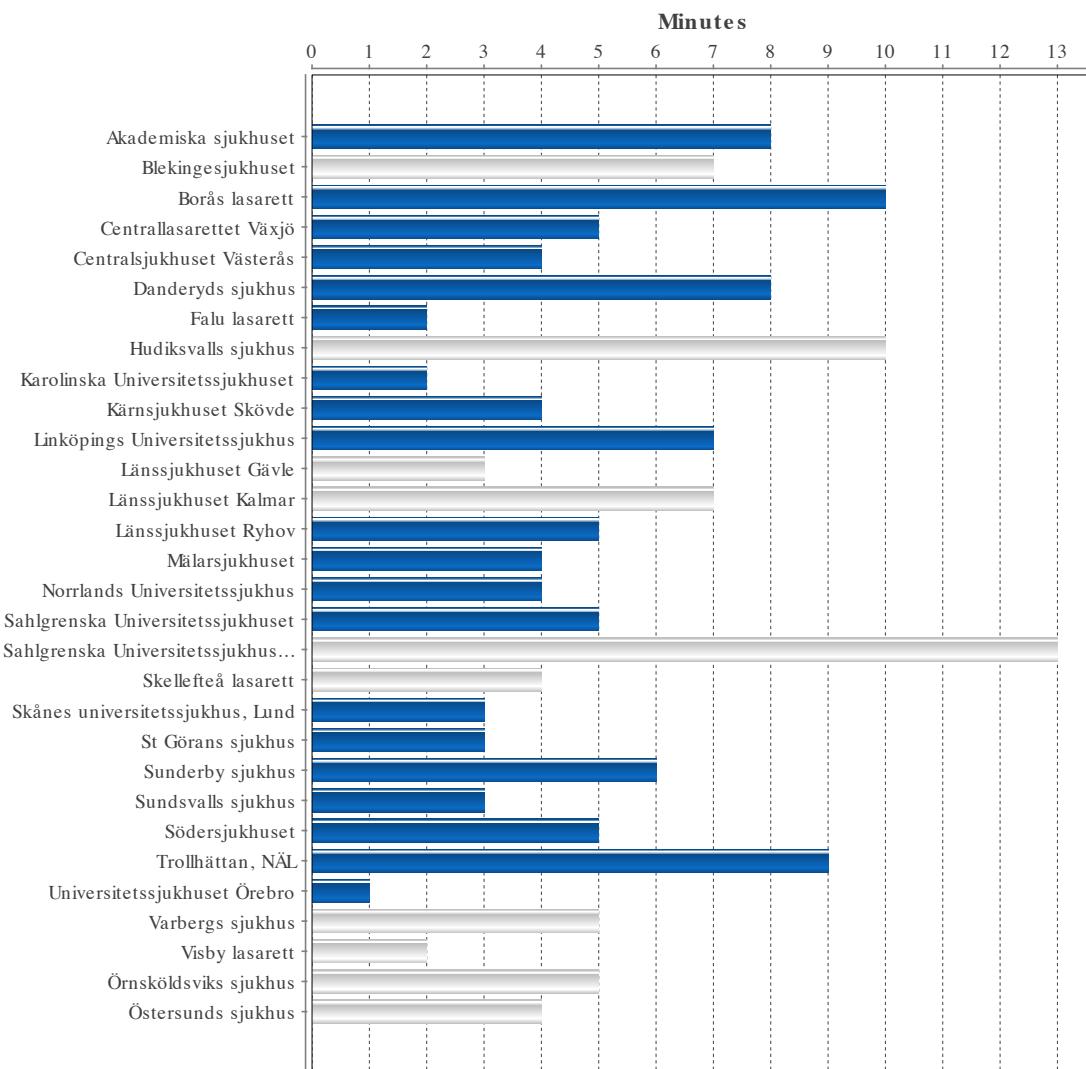
VVIC/ VVIR



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.*

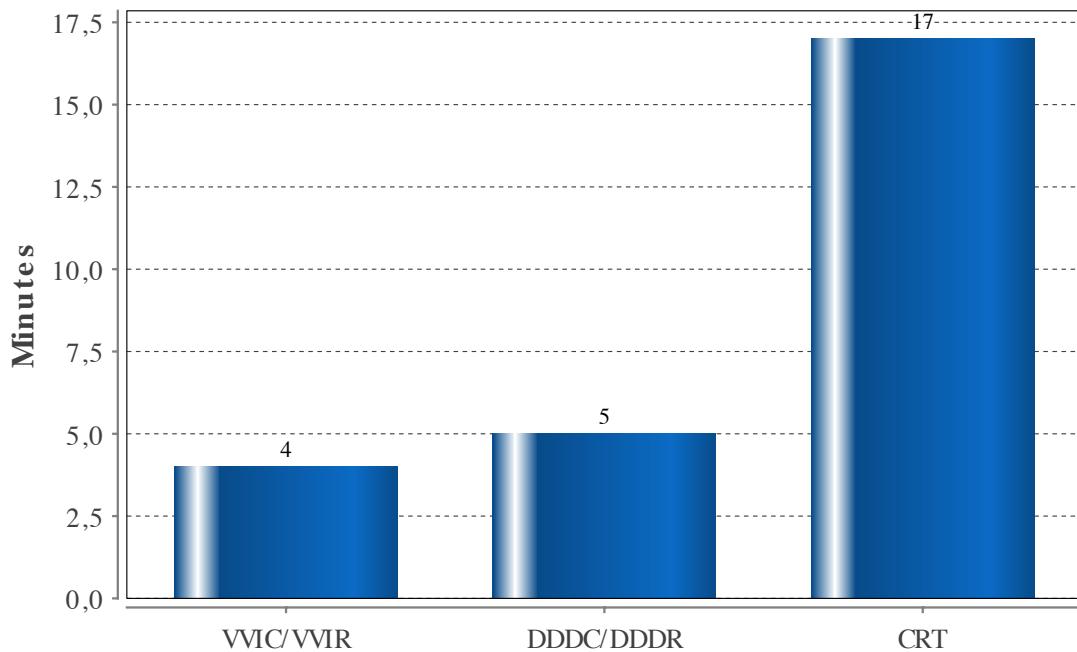
DDDC/ DDDR



QUALITY – ICD – FLUOROSCOPY PER SUBTYPE

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

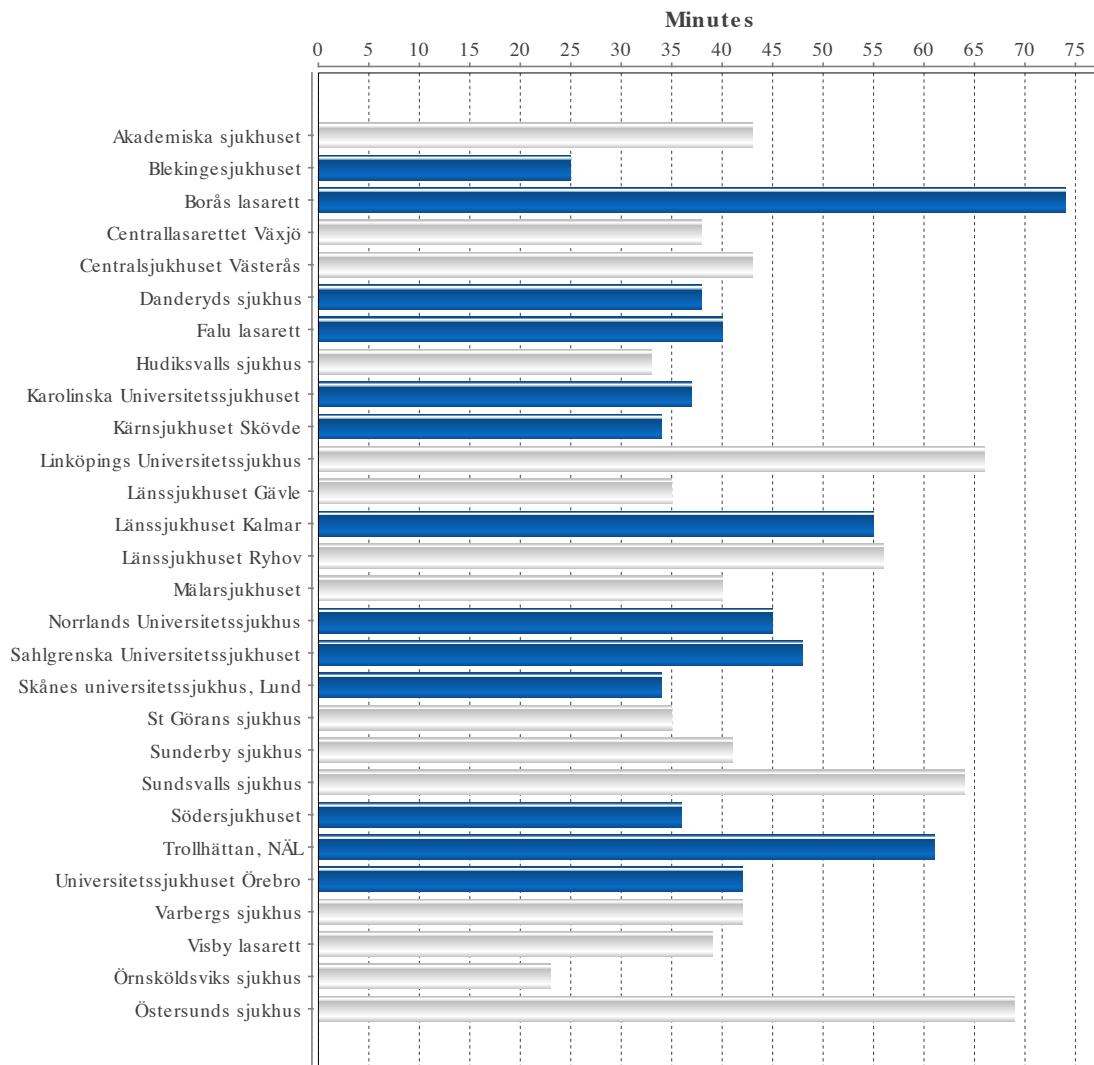
Knife time	Average	Standard deviation
VVIC/VVIR	4	5.0
DDDC/DDDR	5	6.1
CRT	17	15.3



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.

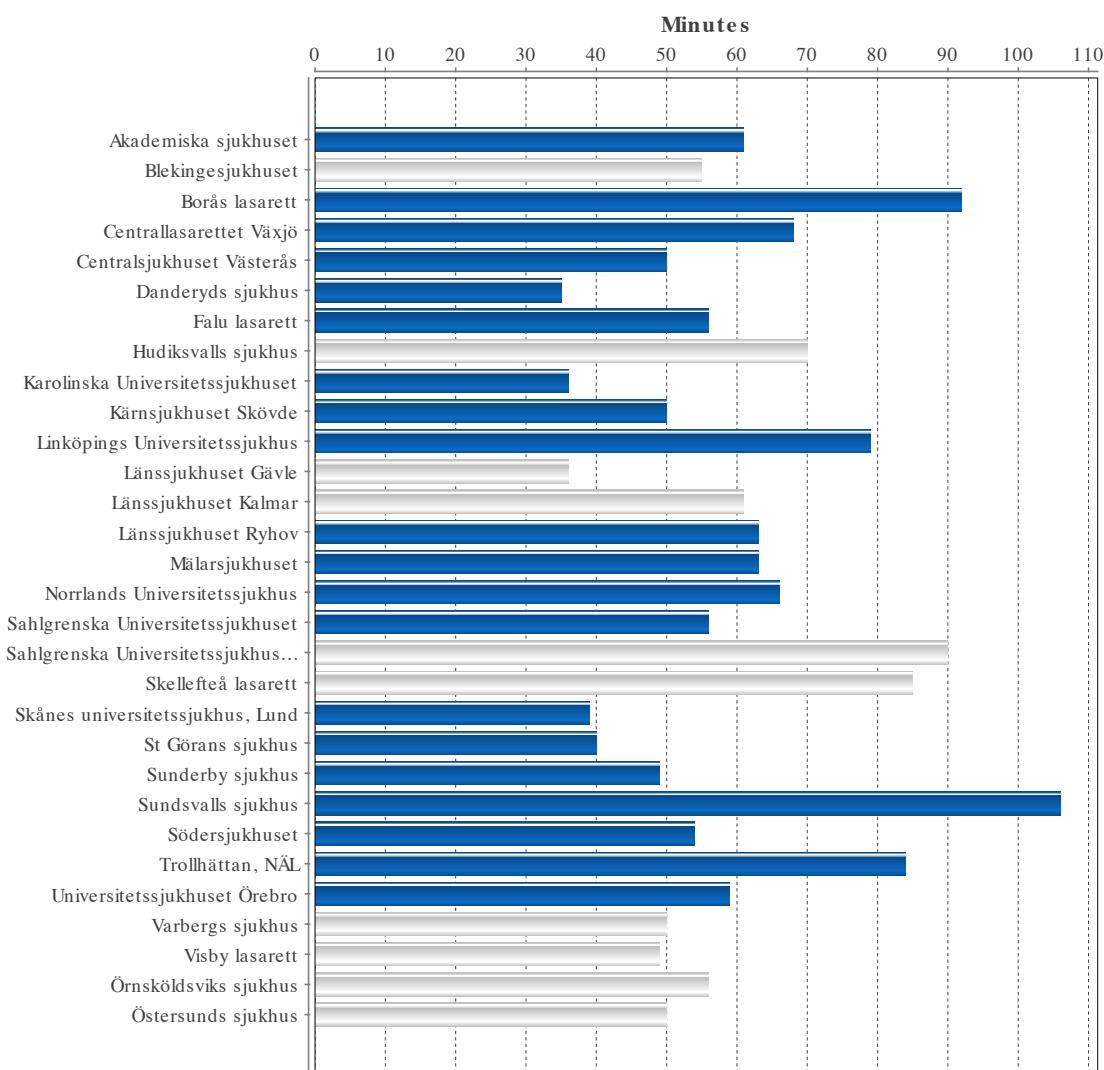
VVIC/ VVIR



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.

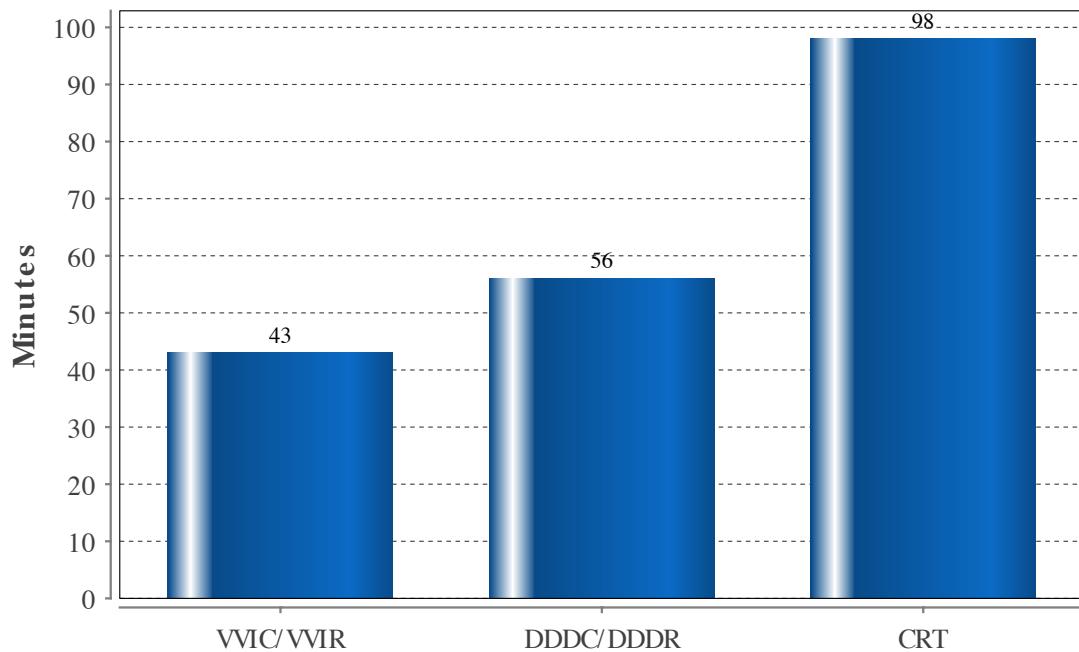
DDDC/ DDDR



QUALITY – ICD – KNIFE TIME PER SUBTYPE

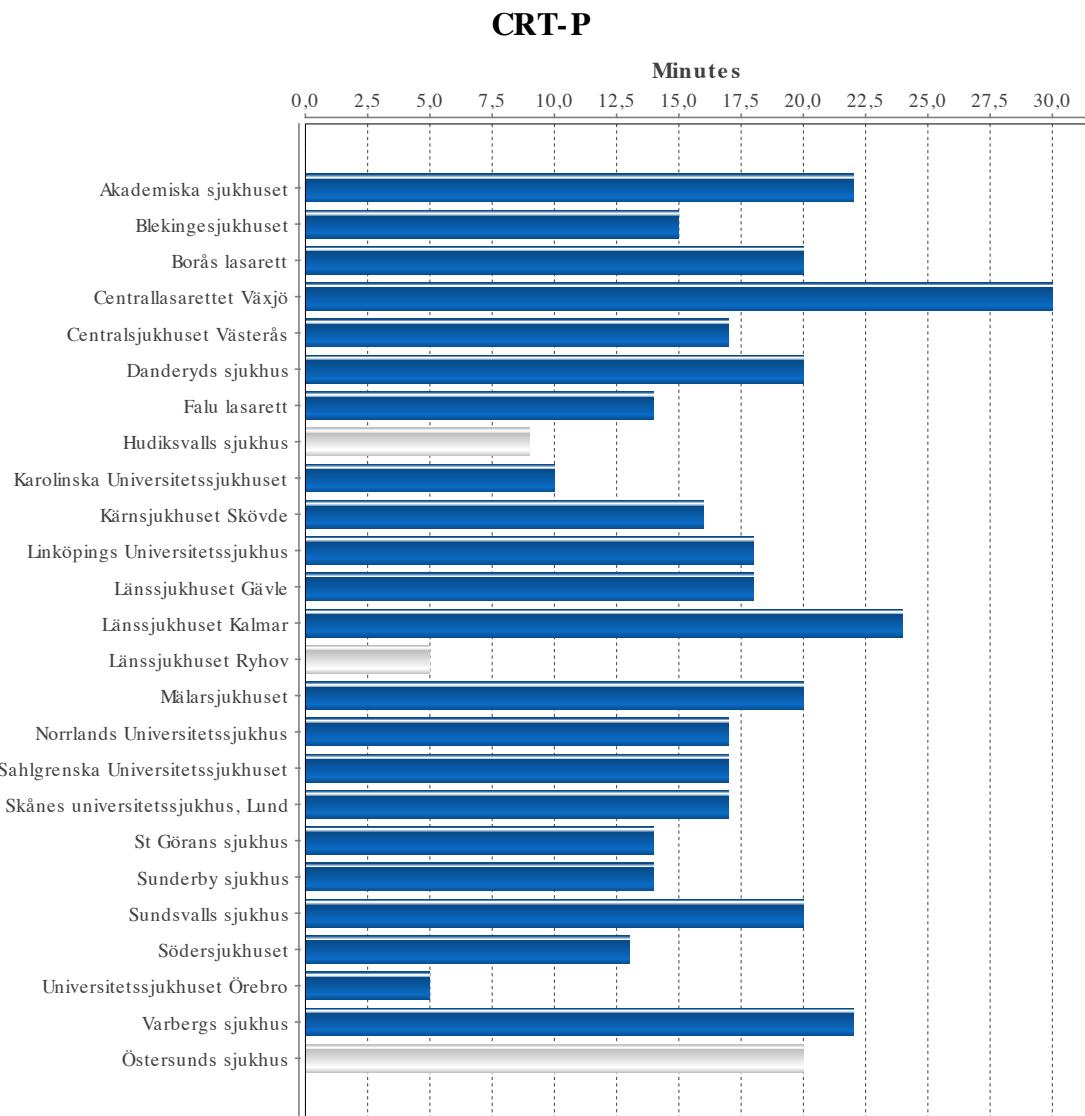
National mean skin to skin duration for a new implant of different subtypes

Knife time	Average	Standard deviation
VVIC/VVIR	43	22.8
DDDC/DDDR	56	28.5
CRT	98	43.5



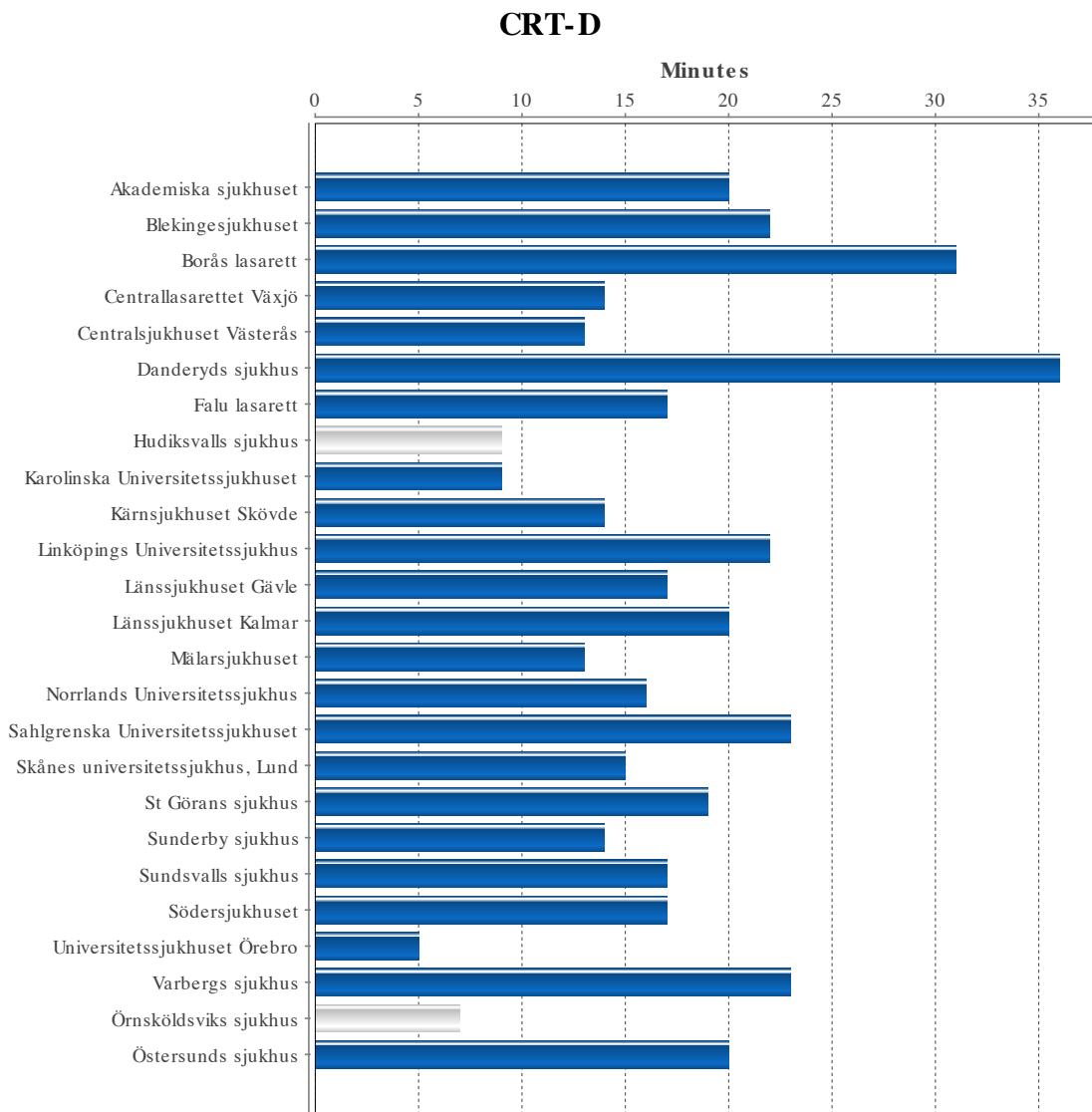
QUALITY – CRT – FLUOROSCOPY

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



QUALITY – CRT – FLUOROSCOPY

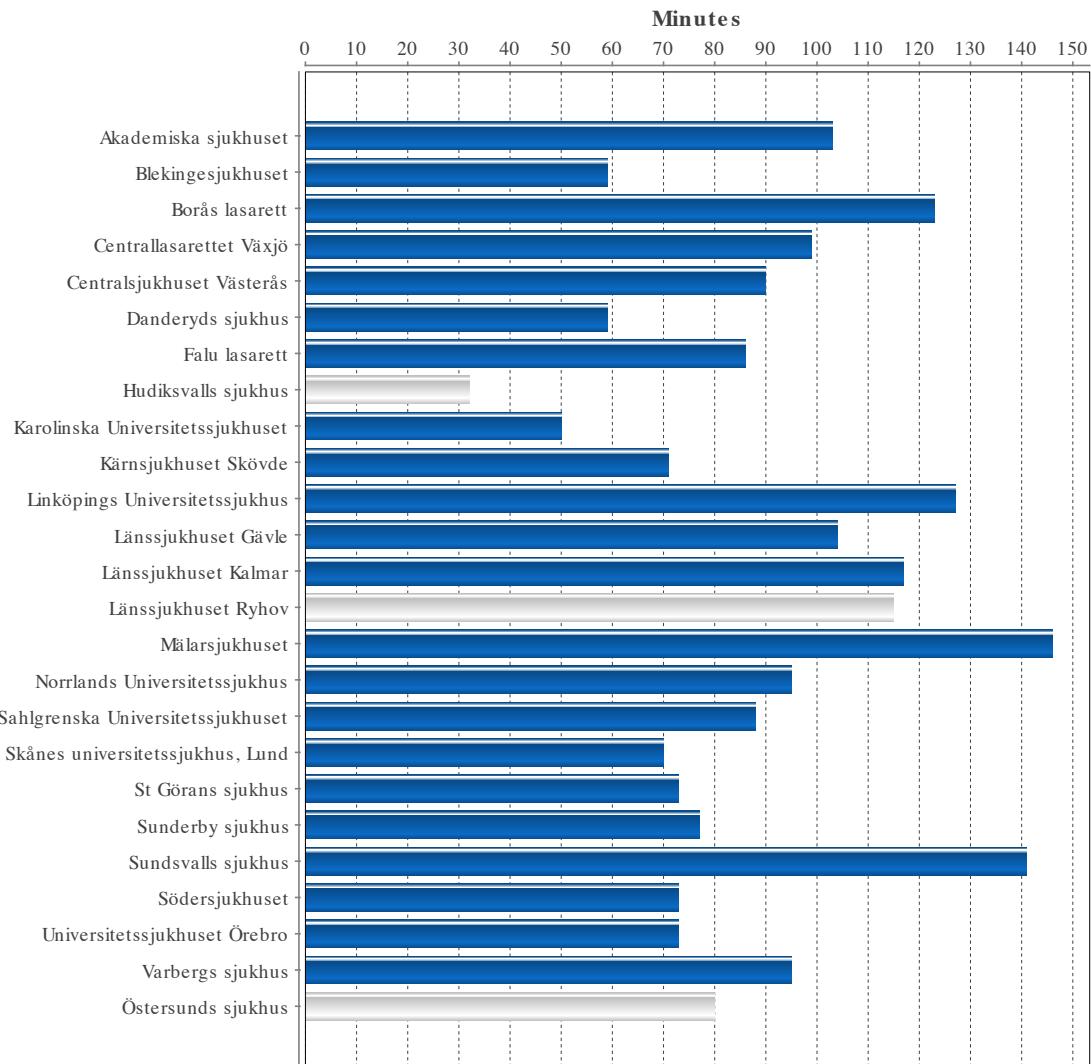
Mean fluoroscopy duration per different CRT implantation per hospital. Bars colored in grey are based on less than 10 observations



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

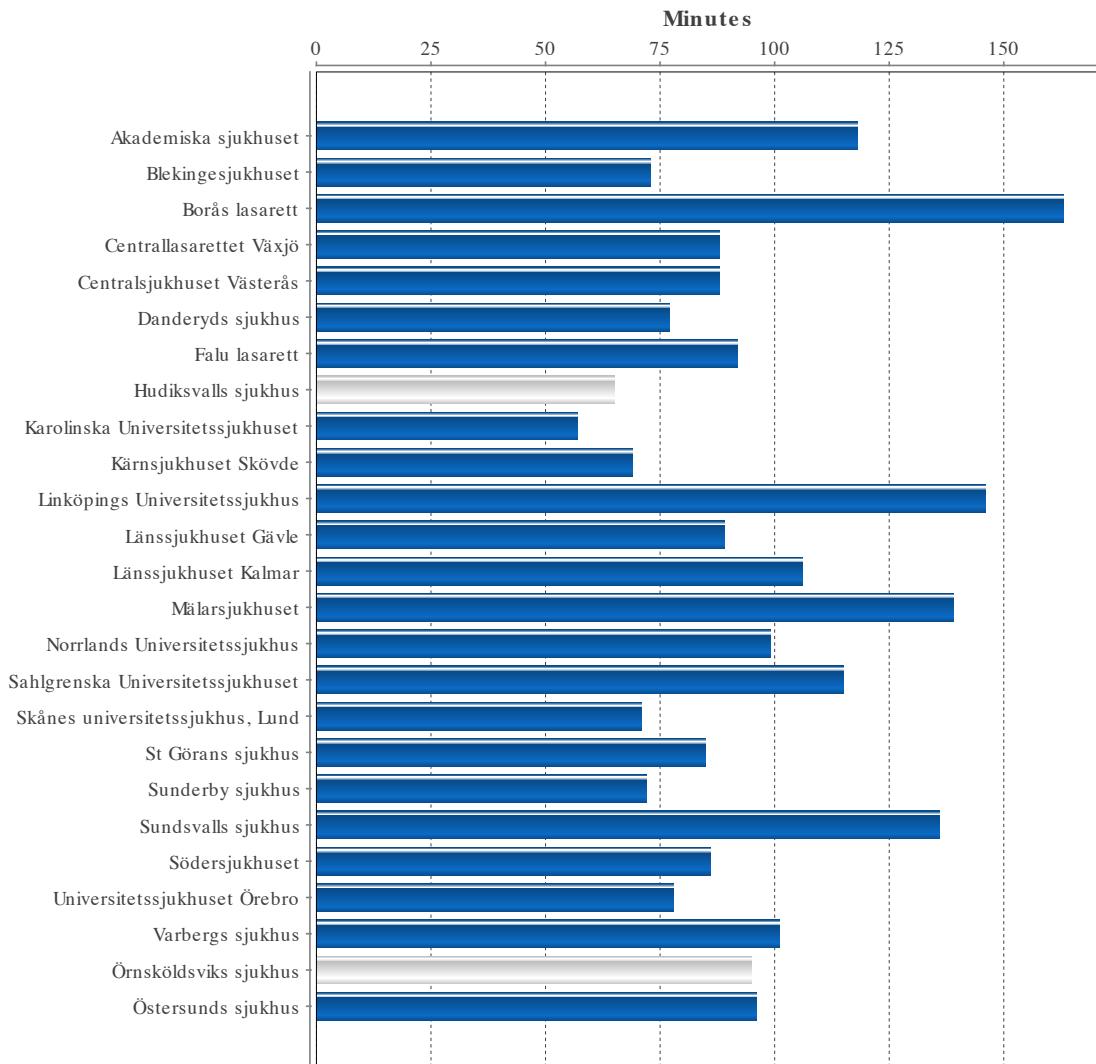
CRT-P



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

CRT-D



QUALITY – PACEMAKER – GENERATOR SURVIVAL

Year	At risk	Survival probability %
1	140950	100.0
2	118467	99.9
3	99152	99.8
4	81991	99.6
5	66749	99.0
6	52378	97.2
7	38656	92.6
8	25317	80.7
9	13181	60.1
10	4957	37.9

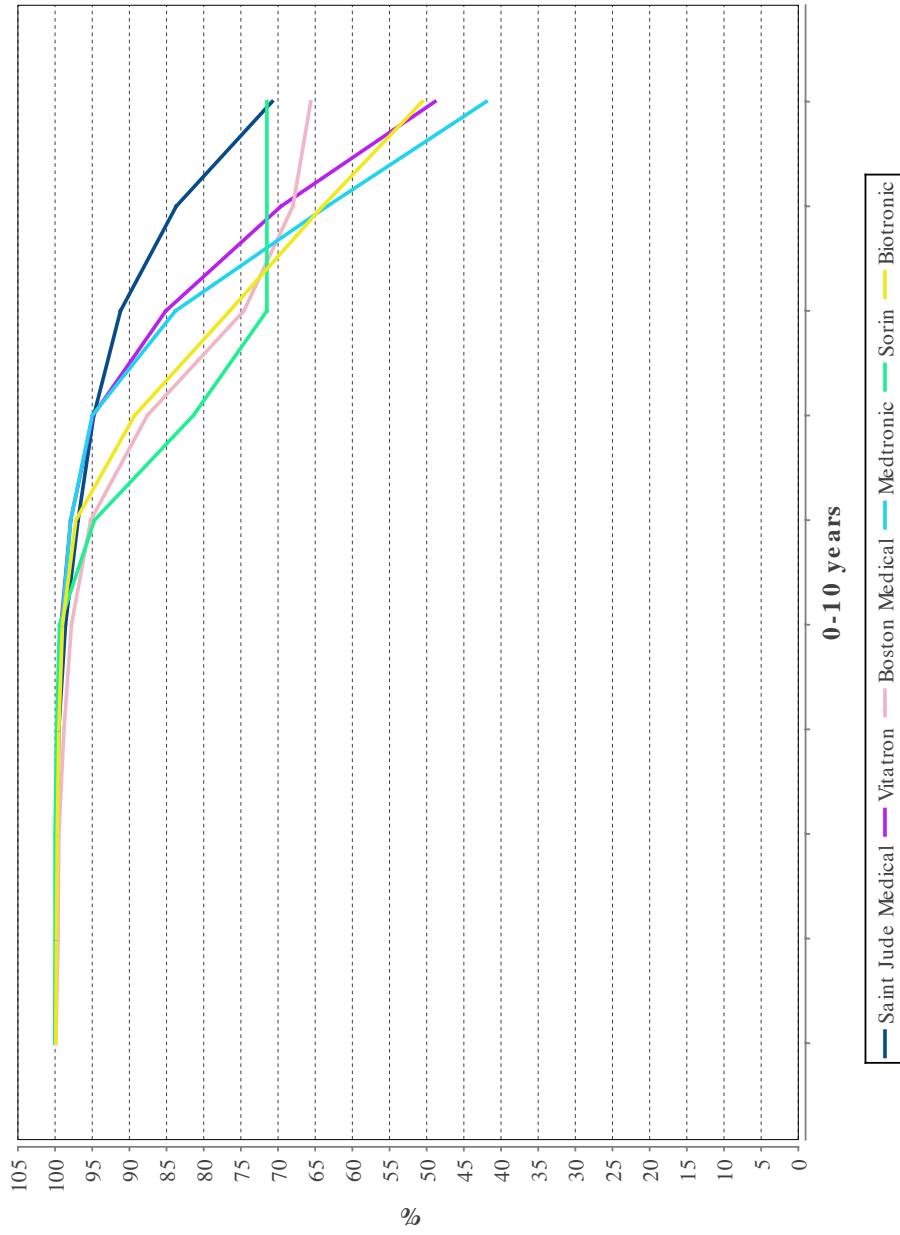
QUALITY – PACEMAKER – GENERATOR SURVIVAL PER MANUFACTURER

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 1990

Year	Total	Biotronic		Boston Scientific		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. %	
1	63540	100.0	1965	99.9	4172	99.9	18117	100.0	27001	100.0	11695	100.0	590	100.0
2	53996	99.8	1669	99.8	3498	99.6	15634	99.9	22740	99.8	9891	99.9	564	100.0
3	47094	99.8	1461	99.7	3061	99.5	13692	99.8	19681	99.7	8652	99.8	547	100.0
4	41168	99.5	1245	99.5	2762	98.8	12061	99.6	16851	99.5	7716	99.6	533	99.8
5	35993	98.9	1076	99.0	2492	97.8	10613	99.1	14318	98.6	6973	99.2	521	99.4
6	31223	96.6	917	97.2	2280	95.2	9196	97.9	12019	96.9	6325	97.9	486	94.7
7	22611	90.5	651	89.3	1246	87.6	6959	95.0	8967	94.8	4631	94.9	157	81.4
8	14383	80.5	381	76.5	645	74.6	4484	83.8	6174	91.2	2641	85.1	58	71.5
9	7662	70.0	188	64.0	284	68.0	2243	63.4	3663	83.7	1270	69.6	14	71.5
10	3006	58.2	60	50.6	123	65.6	853	42.0	1539	70.8	423	48.9	8	71.5

QUALITY – PACEMAKER – GENERATOR SURVIVAL PER MANUFACTURER

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 – LEAD SURVIVAL PER MODEL

Models that have at least 100 implants and 50 explants

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
Biotronik	Y60-BP	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7	99.7
Boston Scientific	4471	98.2	97.9	97.9	97.9	97.9	97.6	97.6	97.6	97.6
Boston Scientific	4457	99.6	99.5	99.3	99.1	99.1	99.1	99.1	99.1	99.1
Boston Scientific	4473	99.3	99.2	99.1	99.1	99.0	99.0	99.0	98.7	98.7
Boston Scientific	4474	99.7	99.2	99.0	98.7	98.5	98.4	98.3	98.0	98.0
Boston Scientific	4470	99.4	99.3	99.3	99.2	99.2	99.1	99.1	98.9	98.3
Intermedics	435-05	100.0	100.0	99.5	99.5	98.8	98.8	98.8	94.7	94.7
Intermedics	438-10	99.7	99.2	99.2	99.2	99.2	99.2	98.7	98.7	97.5
Intermedics	435-07	99.7	99.6	99.4	99.4	99.4	99.1	98.7	98.7	98.7
Medtronic	4965 CapSure	98.9	98.9	98.9	98.9	97.8	96.3	96.3	96.3	96.3
Medtronic	4057M	98.7	98.4	97.1	96.6	96.0	95.2	95.2	94.1	94.1
Medtronic	4968 CapSure	99.6	99.2	98.7	98.7	98.0	98.0	97.4	96.4	95.0
Medtronic	4524	99.3	99.3	99.3	99.3	99.3	99.3	99.3	99.3	96.6
Medtronic	4193 Attain OTW	95.7	95.0	94.6	94.4	94.1	93.8	93.3	93.3	93.3
Medtronic	4068	99.3	98.7	98.3	98.3	98.3	98.3	98.3	98.3	98.3
Medtronic	4033	99.6	99.6	99.4	99.4	99.4	99.4	99.4	99.4	99.4
Medtronic	5068 CapSure	100.0	99.6	99.3	99.3	99.3	99.3	99.3	99.3	99.3
Medtronic	N/A	99.5	99.4	99.4	99.0	98.8	98.8	98.1	97.6	97.6
Medtronic	5034	100.0	99.7	99.7	99.7	99.7	99.3	99.3	99.3	98.4
Medtronic	5024M	99.8	99.7	99.7	99.7	99.7	99.7	99.7	99.7	98.3
Medtronic	5092 Capsure SP	99.0	98.8	98.8	98.7	98.6	98.6	98.4	98.1	98.1
Medtronic	4023 Capsure SP	99.6	99.5	99.5	99.3	99.3	99.3	99.3	99.0	98.5
Medtronic	5054 CapSure Z	99.1	98.9	98.7	98.7	98.5	98.3	98.3	97.3	97.3
Medtronic	5033 CapSure Z	99.6	99.4	99.2	98.7	98.1	97.7	97.5	96.0	93.5
Medtronic	4074 Capsure	99.2	99.2	99.2	99.1	99.1	98.9	98.9	98.9	98.9
Medtronic	5076 CapSure	99.0	98.9	98.8	98.6	98.6	98.6	98.5	98.4	98.2
Medtronic	5023M	99.7	99.6	99.4	99.4	99.3	99.0	98.6	98.1	97.5
Medtronic	4076 CapSure	99.5	99.5	99.4	99.4	99.3	99.2	99.0	99.0	99.0
Osympka	KY1166C	99.5	99.5	99.0	99.0	98.2	97.0	94.3	94.3	94.3
Osympka	KY1167C	99.2	99.2	99.2	98.9	98.0	96.1	96.1	96.1	94.7
St. Jude Medical	1010T	100.0	100.0	100.0	100.0	98.8	97.5	93.2	93.2	93.2
St. Jude Medical	423S	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
St. Jude Medical	1148T	98.1	98.1	97.2	96.2	96.2	96.2	96.2	96.2	96.2
St. Jude Medical	1388K Tendril DX	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8	98.8
St. Jude Medical	1156T Quickflex	97.3	96.9	96.2	96.2	96.2	96.2	NaN	NaN	NaN
St. Jude Medical	1056T QuickSite	97.1	96.6	95.9	95.4	95.3	95.1	95.1	95.1	95.1
St. Jude Medical	1450K	99.3	99.1	99.0	99.0	99.0	99.0	98.4	97.6	97.6

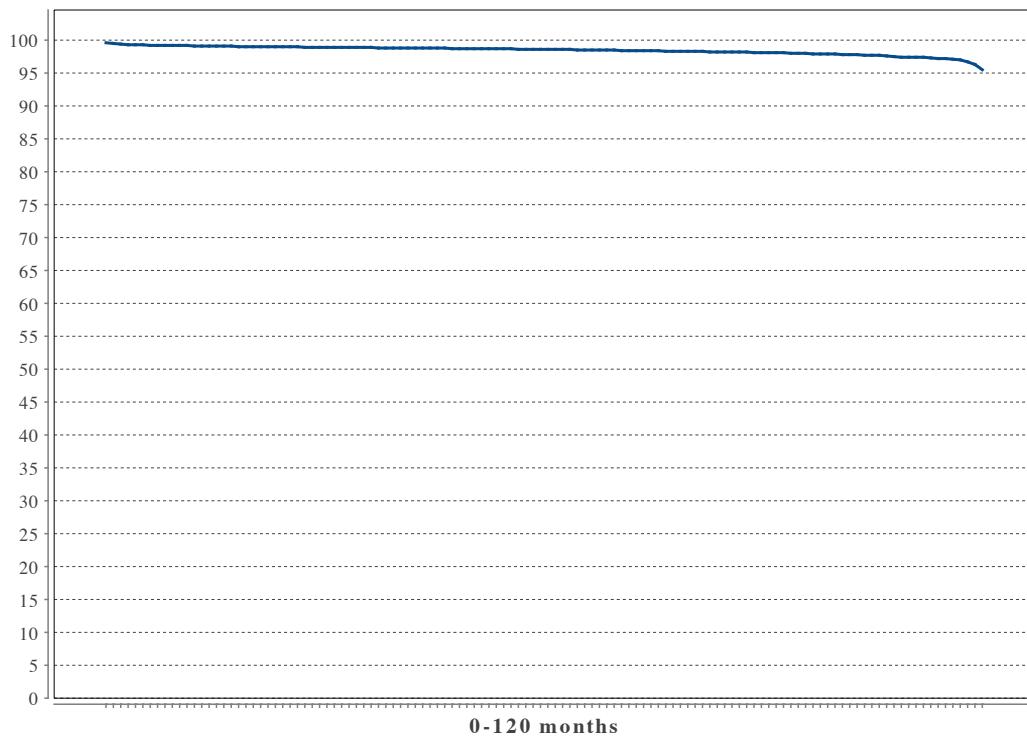
QUALITY – PACEMAKER – LEAD SURVIVAL PER MODEL

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
St. Jude Medical	1699TC OptiSense	99.0	98.7	98.6	98.5	98.5	98.5	98.5	98.5	NaN
St. Jude Medical	1258T QuickFlex	98.2	98.0	98.0	97.4	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	1452T Membrane E	99.2	99.1	98.8	98.7	98.5	98.5	97.1	96.6	95.3
St. Jude Medical	1452K Membrane	99.9	99.7	99.6	99.6	99.2	98.1	97.2	96.4	95.7
St. Jude Medical	1788TC Tendril ST	97.9	97.8	97.8	97.7	97.6	97.6	NaN	NaN	NaN
St. Jude Medical	1480T	99.1	98.7	98.7	98.7	98.6	98.5	98.3	98.3	98.3
St. Jude Medical	424K	99.8	99.7	99.6	99.6	99.5	99.5	98.4	98.0	98.0
St. Jude Medical	1888TC Tendril ST	98.7	98.6	98.6	98.6	98.6	98.6	NaN	NaN	NaN
St. Jude Medical	1788T Tendril ST	98.5	98.2	97.9	97.7	97.7	97.7	97.7	97.7	97.7
St. Jude Medical	1388T Tendril DX	99.6	99.5	99.3	99.3	99.1	98.7	97.9	97.7	96.6
St. Jude Medical	1450T Membrane E	99.5	99.5	99.5	99.4	99.2	98.8	98.8	98.5	97.3
St. Jude Medical	1636T Isoflex	98.4	98.3	98.1	98.0	97.9	97.8	97.8	97.6	97.0
St. Jude Medical	1403K	100.0	100.0	99.9	99.7	99.6	99.5	99.5	99.0	98.3
St. Jude Medical	1948 Isoflex	99.1	99.1	99.0	99.0	98.2	NaN	NaN	NaN	NaN
St. Jude Medical	1488T TendrilSDX	98.7	98.4	98.1	98.0	97.8	97.5	97.4	96.7	96.0
St. Jude Medical	1688T TendrilSDX	98.3	98.0	97.8	97.7	97.5	97.3	97.3	97.2	97.2
St. Jude Medical	1646T Isoflex	98.8	98.7	98.5	98.5	98.4	98.4	98.4	98.3	98.3
St. Jude Medical	1999 Optisense	99.2	98.9	98.8	98.8	98.8	98.8	98.8	NaN	NaN
St. Jude Medical	2088TC Tendril	99.4	99.1	99.1	99.1	NaN	NaN	NaN	NaN	NaN
Stöckert	SU00-100	100.0	99.4	99.4	98.7	97.8	96.5	94.7	91.9	82.2
Teletronics	033-856	99.5	97.5	97.5	97.5	96.2	96.2	96.2	93.1	93.1
Vitatron	ISP13	98.6	98.6	98.6	97.1	97.1	95.9	95.9	95.9	89.0
Vitatron	IMG49	99.0	99.0	98.5	98.2	98.2	96.5	95.5	92.6	86.6
Vitatron	IHP09B	98.5	98.4	98.4	98.4	98.4	98.4	98.4	98.4	98.4
Vitatron	ICF09 Cristallin	98.0	97.9	97.9	97.8	97.6	97.5	97.3	97.3	97.1
Vitatron	ICM09B Crystallin	99.0	98.9	98.9	98.8	98.8	98.5	98.5	98.5	98.5
Vitatron	ICQ09B Crystallin	99.4	99.3	99.3	99.3	99.2	99.2	99.2	99.2	99.2

QUALITY – PM – LEAD SURVIVAL

Based on all implants after 1990

Year	At risk	Survival probability %
1	175250	99.6
2	145498	99.1
3	120057	99.0
4	97076	98.9
5	76881	98.7
6	58748	98.6
7	42949	98.4
8	29625	98.2
9	18060	97.9
10	8065	97.4



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	Dromos DR	100.0	100.0	98.6	97.1	93.9	80.8	67.4	67.4	67.4
Biotronik	Metros TC 01	100.0	100.0	100.0	100.0	100.0	100.0	98.1	90.9	66.5
Biotronik	Actros DR	100.0	100.0	100.0	100.0	96.4	65.1	27.6	0.0	NaN
Biotronik	Pikos LP E 01	99.6	99.6	99.6	99.6	98.8	96.6	91.4	85.2	73.4
Biotronik	Actros SR	100.0	99.6	99.1	99.1	95.6	85.2	55.7	29.9	8.7
Biotronik	Philos DR	99.6	99.6	99.4	99.2	98.6	92.3	77.9	46.1	19.9
Boston Scientific	1130 Vigor SR	100.0	100.0	98.6	98.6	87.8	42.2	25.8	25.8	25.8
Boston Scientific	1284 Discovery	100.0	100.0	98.8	98.8	95.9	77.4	37.7	7.4	NaN
Boston Scientific	1230 Vigor DR	99.1	99.1	99.1	99.1	97.5	64.8	28.8	16.9	16.9
Boston Scientific	1274 Discovery	99.2	99.2	99.2	98.1	97.0	80.9	20.7	9.0	2.2
Boston Scientific	1280 Pulsar Max	100.0	100.0	100.0	99.3	97.6	81.9	50.4	9.6	0.0
Boston Scientific	1194 Insignia I	99.1	99.1	98.6	97.2	95.7	86.9	65.9	43.1	22.8
Boston Scientific	H140 Contak	100.0	100.0	99.3	98.8	92.8	80.3	56.6	26.6	0.0
Boston Scientific	1291 Insignia I	99.7	99.7	99.7	99.6	98.8	96.6	91.3	82.3	71.2
Boston Scientific	1298 Insignia I	99.8	99.4	97.8	96.9	85.8	63.6	38.9	17.9	5.8
Boston Scientific	1190 Insignia	99.8	99.3	98.8	98.5	97.8	94.1	81.7	63.8	50.8
Boston Scientific	1290 Insignia I	99.9	99.8	99.6	98.1	92.1	77.6	55.5	26.8	12.5
ELA Medical	212 Brio DR	100.0	100.0	100.0	100.0	87.6	56.0	14.3	6.8	0.0
ELA Medical	7234 Chorum	100.0	99.1	99.1	99.1	99.1	90.9	77.0	53.2	23.8
ELA Medical	6244 Chorus II	100.0	100.0	100.0	100.0	96.8	67.6	44.2	8.3	3.7
ELA Medical	4534 Opus RM	100.0	100.0	99.1	98.0	98.0	81.9	57.4	36.1	15.7
ELA Medical	7334 Chorum	100.0	100.0	100.0	100.0	96.6	88.6	63.2	39.4	17.6
ELA Medical	113 Talent	100.0	100.0	100.0	100.0	98.7	86.0	34.7	15.7	10.8
ELA Medical	7034 Chorus RM	100.0	100.0	100.0	100.0	96.9	82.5	52.3	29.8	12.0
ELA Medical	213 Talent DR	99.8	99.7	99.3	97.8	80.1	34.1	13.3	5.6	4.4
Intermedics	292-07 Unity	99.0	99.0	99.0	97.4	95.5	89.7	80.6	56.5	42.4
Intermedics	281-05 Nova II	99.6	99.6	99.1	98.5	98.5	95.3	94.1	88.1	64.6
Intermedics	292-03 Dash	99.1	98.7	98.7	97.2	93.9	86.8	76.5	59.8	48.4
Intermedics	294-03 Ralay	100.0	100.0	100.0	98.4	93.6	86.0	69.3	60.4	36.3
Intermedics	284-05 Cosmos II	100.0	99.4	99.4	98.3	94.6	84.2	74.2	56.7	32.8
Intermedics	294-09 Marathon	100.0	100.0	99.7	99.5	98.0	96.0	85.4	52.0	9.8
Medtronic	KDR700 Kappa DR	100.0	100.0	100.0	100.0	97.5	94.8	81.5	45.9	13.0

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 %
Medtronic	P1501DR EnRhythm	100.0	99.2	99.2	99.2	94.9	85.1	61.1	44.4	15.2
Medtronic	7950 Thera DR	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	83.3
Medtronic	8940 Thera SR	100.0	98.9	98.9	98.9	95.7	95.7	85.5	58.8	28.5
Medtronic	AT501	100.0	100.0	99.0	95.7	59.1	18.5	9.7	6.5	NaN
Medtronic	8417 Legend	100.0	99.1	99.1	99.1	99.1	99.1	99.1	99.1	82.4
Medtronic	7940 Thera DR	100.0	99.2	99.2	99.2	99.2	95.9	92.1	79.2	35.6
Medtronic	KSR703 Kappa SR	100.0	100.0	99.5	97.3	95.0	86.1	69.3	30.4	0.0
Medtronic	7964 Thera D	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.9	54.4
Medtronic	KDR401 Kappa DR	99.6	99.6	99.6	99.6	99.0	96.3	77.3	34.1	16.5
Medtronic	7108 Minuet	100.0	100.0	100.0	99.3	97.7	97.7	94.3	92.8	78.0
Medtronic	KD701 Kappa D	100.0	100.0	100.0	100.0	100.0	98.9	85.5	44.2	7.3
Medtronic	8160 Prodigy SR	100.0	100.0	100.0	100.0	100.0	97.1	93.5	82.4	68.9
Medtronic	7864 Prodigy	100.0	100.0	100.0	99.6	99.6	97.0	95.6	87.2	63.9
Medtronic	E2SR01 EnPulse	100.0	100.0	100.0	99.2	96.6	93.2	57.6	24.2	17.0
Medtronic	8424 Legend II	100.0	100.0	100.0	100.0	100.0	100.0	97.9	95.1	82.7
Medtronic	KDR703 Kappa DR	100.0	100.0	100.0	100.0	98.8	95.0	82.4	38.6	9.2
Medtronic	8960i Thera SR	99.8	99.5	98.3	97.6	97.2	95.4	92.7	81.4	53.8
Medtronic	7860i Prodigy	100.0	99.7	99.7	99.1	98.2	95.4	91.4	82.0	49.7
Medtronic	SS303 Sigma S	100.0	100.0	100.0	99.1	98.4	96.9	94.9	90.7	70.2
Medtronic	KSR901 Kappa SR	99.5	99.2	98.8	98.8	97.7	93.1	59.6	24.1	7.5
Medtronic	KSR701 Kappa SR	100.0	100.0	99.7	99.2	98.3	94.5	63.8	24.2	4.8
Medtronic	7960i Thera DR	100.0	100.0	99.9	99.5	99.4	96.3	90.3	75.5	45.2
Medtronic	8042 InSync	100.0	99.7	98.9	97.9	93.9	86.7	67.1	36.8	13.9
Medtronic	RESR01 Relia SR	99.8	99.7	99.7	99.4	99.4	NaN	NaN	NaN	NaN
Medtronic	KDR901 Kappa DR	99.9	99.9	99.9	99.7	99.0	96.8	81.1	45.1	17.5
Medtronic	SEDRL1 Sensia	99.9	99.9	99.7	99.7	99.6	98.8	97.2	NaN	NaN
Medtronic	E2DR01 EnPulse	100.0	100.0	99.9	99.5	98.7	96.8	87.3	57.8	24.7
Medtronic	KDR701 Kappa DR	100.0	99.9	99.8	99.4	98.4	95.0	76.1	36.9	9.5
Medtronic	REDR01 Relia DR	99.9	99.8	99.7	99.7	99.5	99.5	NaN	NaN	NaN
Sorin Group	233	100.0	100.0	100.0	98.3	74.1	30.5	14.6	7.6	5.0

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 %
Sorin Group	Reply DR	99.7	99.6	99.6	99.6	99.6	99.6	NaN	NaN	NaN
St. Jude Medical	285K Genisis	98.6	98.6	98.6	98.6	98.6	96.1	89.9	78.1	59.5
St. Jude Medical	2350L Trilogy DR	99.2	99.2	99.2	97.4	94.3	93.1	80.1	56.8	14.4
St. Jude Medical	5326 Zephyr XL	100.0	99.2	99.2	96.9	96.9	88.8	66.0	55.0	35.3
St. Jude Medical	2091 Polarity	100.0	100.0	100.0	99.0	99.0	97.7	95.9	87.0	77.1
St. Jude Medical	2425T Microny SR	100.0	100.0	100.0	100.0	97.8	94.7	75.3	67.4	46.5
St. Jude Medical	2028 Synchrony	99.5	99.5	99.5	96.0	86.9	77.2	66.1	53.8	39.7
St. Jude Medical	5366 Integrity	100.0	100.0	99.5	99.0	96.0	94.7	94.0	86.1	69.6
St. Jude Medical	748	100.0	100.0	100.0	99.1	98.5	97.8	97.8	97.8	97.8
St. Jude Medical	2038 Dialog II	99.5	99.5	99.5	99.5	98.4	97.1	95.5	92.9	85.8
St. Jude Medical	2318L Trilogy DC	99.6	99.6	99.2	98.6	96.8	93.2	82.7	50.5	13.0
St. Jude Medical	5180 Identity	100.0	100.0	99.1	98.6	93.7	80.0	56.5	25.7	11.5
St. Jude Medical	5380 Identity	100.0	99.6	92.5	75.5	57.4	35.7	14.1	6.6	4.9
St. Jude Medical	688	99.8	99.8	99.8	99.8	99.8	99.4	98.6	97.7	94.3
St. Jude Medical	2010 Paragon	100.0	100.0	100.0	99.4	98.8	97.0	97.0	93.9	84.6
St. Jude Medical	5172 Identity	99.7	99.7	99.3	95.9	87.4	67.9	48.5	25.1	16.2
St. Jude Medical	5370 Identity	100.0	99.7	98.5	80.5	40.4	19.3	5.7	3.2	1.0
St. Jude Medical	5596 FrontierII	100.0	100.0	99.4	97.0	92.9	80.8	64.9	45.2	NaN
St. Jude Medical	2034 Sensolog	99.6	99.6	99.6	99.6	99.6	97.9	95.3	92.6	80.0
St. Jude Medical	2022T Synchrony	99.6	99.3	99.3	98.7	98.7	97.2	93.6	85.4	70.0
St. Jude Medical	5330 Affinity	99.8	99.6	99.4	98.9	98.1	93.9	82.7	57.5	35.4
St. Jude Medical	2364L Trilogy DR	100.0	100.0	99.7	99.3	97.8	90.3	78.7	46.5	16.8
St. Jude Medical	5376 IdentityXL	100.0	99.8	99.8	99.5	98.4	94.9	89.6	70.8	40.5
St. Jude Medical	2040 Multilog	99.8	99.8	99.8	99.8	99.5	99.2	99.2	96.9	93.0
St. Jude Medical	5626 Zephyr XL	99.9	99.8	99.8	99.4	98.9	98.9	98.9	98.9	98.9
St. Jude Medical	2016T Paragon II	100.0	100.0	100.0	99.7	99.3	97.6	95.3	91.6	75.5
St. Jude Medical	5142 Integrity	99.9	99.8	99.8	99.5	99.3	97.1	95.0	92.4	82.2
St. Jude Medical	2033 Sensolog	99.9	99.7	99.7	99.7	99.4	98.5	97.1	93.2	76.9
St. Jude Medical	2400L Regency SR	99.9	99.9	99.8	99.8	99.0	97.9	95.6	94.1	87.2
St. Jude Medical	2037 Dialog II	100.0	100.0	100.0	100.0	100.0	99.4	98.1	94.6	88.7
St. Jude Medical	2404L Regency SR	99.6	99.5	99.2	99.0	98.6	96.9	93.1	87.5	76.4
St. Jude Medical	5346 Integrity	100.0	100.0	99.7	99.6	97.3	94.3	88.7	70.6	37.6
St. Jude Medical	5386 IdentityXL	99.8	99.5	99.4	99.3	98.3	97.1	94.2	86.2	73.4
St. Jude Medical	2045 Sensorithm	99.9	99.9	99.9	99.5	98.2	96.7	93.2	86.0	67.3

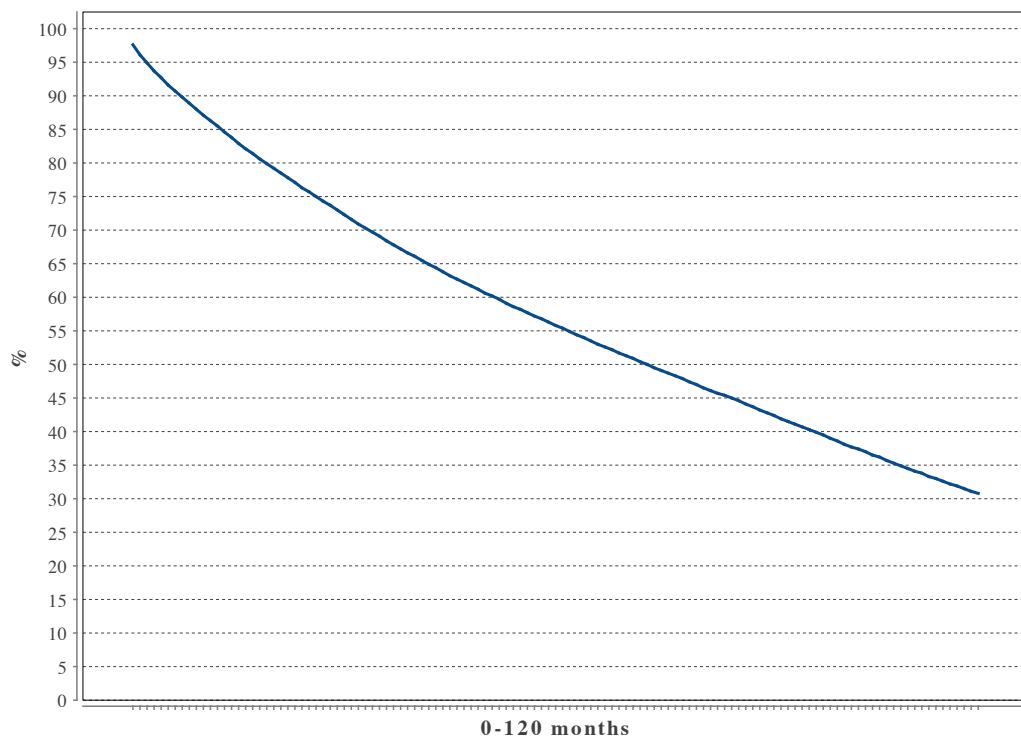
QUALITY – PACEMAKER – GENERATOR SURVIVAL PER MODEL

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
St. Jude Medical	5826 Zephyr XL	99.8	99.7	99.6	99.5	99.4	98.9	98.9	98.9	98.9
St. Jude Medical	5156 Verity	99.9	99.9	99.8	99.6	99.4	99.2	98.7	97.7	94.9
St. Jude Medical	5816 Victory XL	99.8	99.7	99.7	99.6	99.2	98.0	91.9	88.0	88.0
Teletronics	1256	98.5	98.5	98.5	98.5	97.1	92.2	92.2	88.1	65.2
Teletronics	1206	97.9	97.9	97.2	93.9	83.4	74.2	70.4	63.6	63.6
Teletronics	8218	99.8	99.8	99.8	99.8	99.8	99.8	94.6	83.6	61.2
Teletronics	8224	99.8	99.5	99.5	99.2	97.7	93.3	81.6	60.6	35.7
Teletronics	1254	99.6	99.6	99.0	98.2	97.2	89.9	72.9	51.8	43.3
Teletronics	158	99.5	99.5	99.3	98.1	97.5	96.7	94.2	88.8	82.0
Vitatron	740	100.0	100.0	98.7	98.7	98.7	97.0	87.3	80.5	32.9
Vitatron	703	100.0	100.0	100.0	100.0	100.0	100.0	91.9	84.0	70.0
Vitatron	600	100.0	100.0	100.0	98.5	85.3	59.1	46.4	41.8	41.8
Vitatron	620 Ceryx	99.2	99.2	99.2	99.2	99.2	98.0	92.3	74.7	44.6
Vitatron	710	100.0	100.0	100.0	99.3	99.3	93.7	87.1	62.7	30.5
Vitatron	700	100.0	100.0	100.0	97.8	96.6	95.1	90.4	81.0	61.2
Vitatron	520	100.0	99.5	99.5	99.5	97.3	93.8	91.6	74.6	45.9
Vitatron	800	100.0	100.0	100.0	100.0	98.4	93.9	91.0	73.3	40.8
Vitatron	640	100.0	100.0	100.0	98.5	98.0	95.9	88.4	62.8	17.9
Vitatron	920	100.0	100.0	100.0	99.5	96.5	88.4	59.7	32.4	10.2
Vitatron	540	100.0	100.0	99.7	99.7	99.4	99.0	95.2	87.9	53.5
Vitatron	340	99.8	99.8	99.8	99.5	99.5	97.6	95.3	83.6	52.9
Vitatron	9000	99.8	99.8	99.6	98.7	95.2	89.5	65.4	33.3	11.9
Vitatron	T20SR	99.9	99.7	99.7	99.4	98.6	97.4	97.4	95.8	94.5
Vitatron	820	100.0	99.6	99.6	99.0	96.7	90.4	74.5	51.1	17.5
Vitatron	840	100.0	99.7	99.5	99.3	97.9	93.7	73.3	39.6	10.9
Vitatron	C70DR	100.0	100.0	100.0	100.0	99.7	97.5	80.6	50.4	NaN
Vitatron	T70DR	99.7	99.5	99.5	99.2	97.5	91.6	72.4	41.4	25.0
Vitatron	T60DR	99.9	99.9	99.7	99.3	98.2	94.1	76.7	44.2	23.4
Vitatron	860	100.0	99.9	99.7	99.2	97.6	92.4	73.0	39.9	17.8
Vitatron	C20SR	100.0	99.9	99.9	99.9	99.5	98.5	97.6	96.4	87.5
Vitatron	C60DR	99.9	99.8	99.7	99.4	98.3	93.8	74.4	42.6	17.5

QUALITY – PACEMAKER – PATIENT SURVIVAL

Based on all implants after 1990

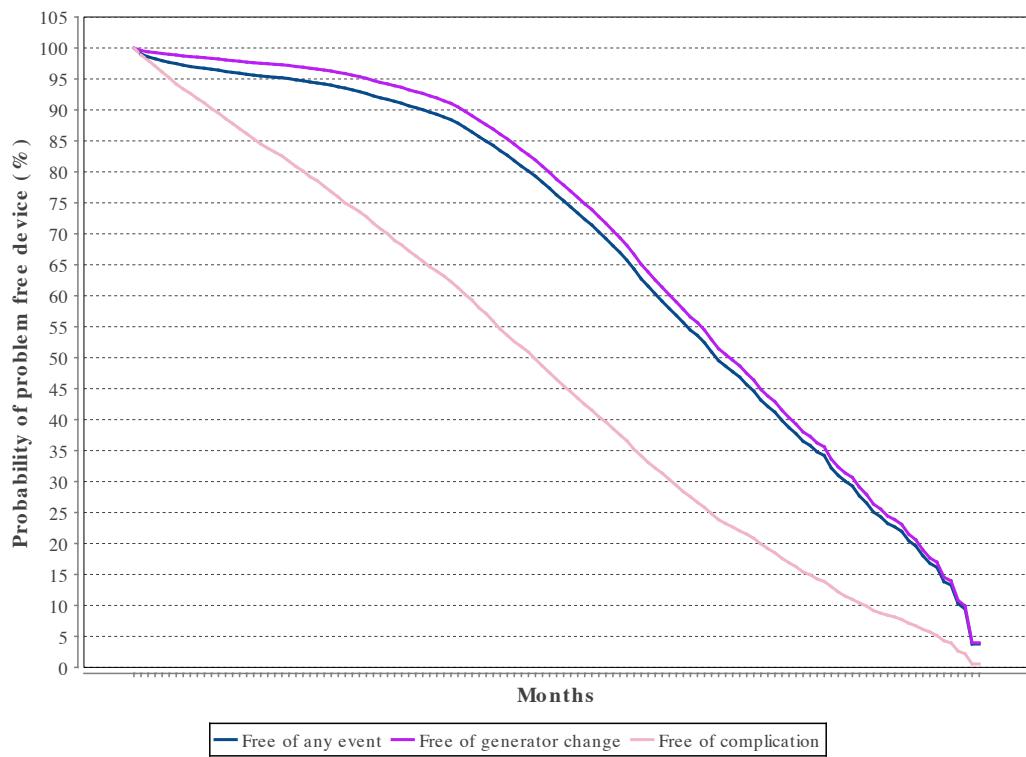
Year	At risk	Survival probability %
1	78444	97.6
2	67981	85.5
3	60309	76.3
4	53646	68.4
5	47738	61.7
6	42143	55.8
7	32120	50.4
8	22937	45.4
9	15499	40.3
10	10333	35.3



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	14219	96.4	98.2	89.5
2	11750	94.7	96.9	80.1
3	9356	91.7	94.2	70.0
4	7069	86.4	89.1	59.3
5	4618	76.3	78.8	46.5
6	2641	62.8	65.1	34.2
7	1271	48.6	50.5	23.2
8	560	35.8	37.3	14.9
9	180	22.7	23.9	8.1
10	10	3.8	4.0	0.6



QUALITY – ICD – GENERATOR SURVIVAL

Year	At risk	Survival probability %
1	13238	99.9
2	10864	99.6
3	8656	99.2
4	6579	97.1
5	4686	91.8
6	2907	79.3
7	1579	62.0
8	745	43.9
9	319	28.8
10	100	16.2

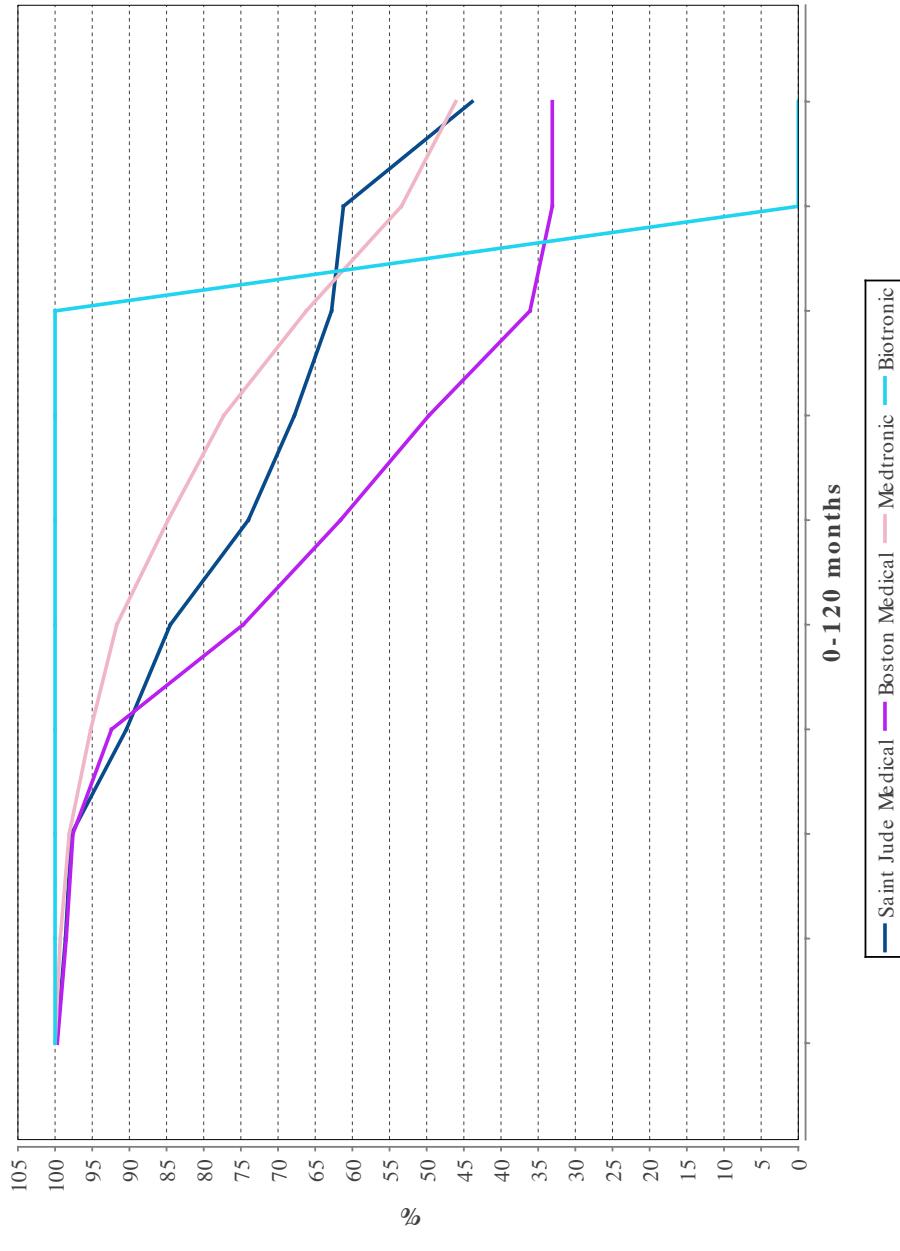
QUALITY – ICD – GENERATOR SURVIVAL PER MANUFACTURER

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 1990

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. %
1	2877	133.2	27	100.0	703	99.7	1263	100.0	884
2	2579	132.1	25	100.0	637	98.5	1131	99.3	786
3	2365	131.2	24	100.0	582	97.6	1030	98.1	729
4	2089	126.0	23	100.0	507	92.4	921	95.2	638
5	1786	117.0	23	100.0	363	74.7	832	91.7	568
6	1509	106.8	23	100.0	281	61.6	719	84.8	486
7	845	98.3	3	100.0	123	49.7	475	77.3	244
8	373	88.4	2	100.0	46	36.1	215	66.2	110
9	151	49.2	0	0.0	18	33.1	91	53.4	42
10	43	41.0	0	0.0	7	33.1	31	46.1	5
									43.9

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 1990



QUALITY – ICD – LEAD SURVIVAL PER MODEL

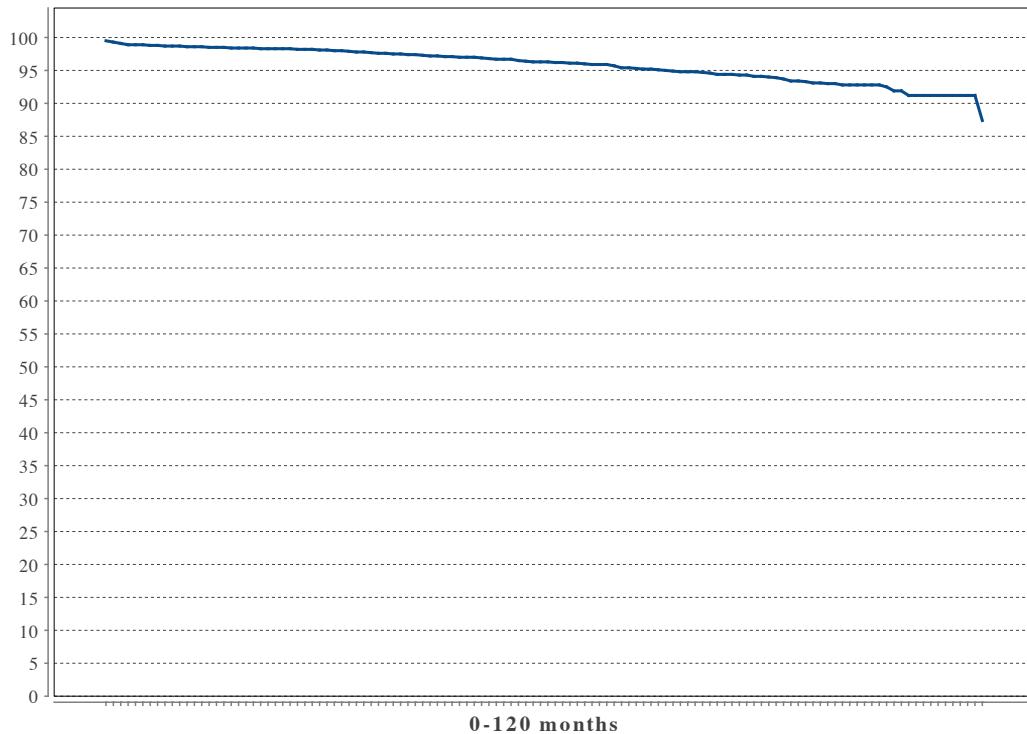
Models that have at least 50 implants and 20 explants

Manufacturer	Model	Years								
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	9 (%)
Biotronik	Linox smart SD 65/18 Linox SD	98.2	97.7	95.5	95.5	93.2	93.2	93.2	NaN	NaN
Medtronic	6943 Sprint	95.4	95.4	92.8	92.8	92.8	92.8	88.8	83.6	83.6
Medtronic	6932 Sprint	97.3	95.9	94.4	92.8	92.8	90.7	90.7	86.9	86.9
Medtronic	6948 Sprint F	98.4	98.4	94.6	93.1	92.6	91.4	88.3	85.5	85.5
Medtronic	6935 Sprint	99.5	99.5	99.5	98.2	98.2	NaN	NaN	NaN	NaN
Medtronic	6944 Sprint	98.3	98.0	97.0	96.7	95.2	93.5	91.8	90.0	90.0
Medtronic	6949 Sprint F	98.5	97.4	96.4	94.4	93.5	91.7	90.6	90.1	88.6
Medtronic	6947 Sprint	99.3	99.3	99.3	99.1	98.7	98.2	98.2	97.1	97.1
St. Jude Medical	7001 Riata ST	97.4	97.4	97.4	97.4	97.4	96.5	96.5	NaN	NaN
St. Jude Medical	1581 Riata	95.6	95.6	95.6	94.8	94.0	93.2	93.2	90.4	90.4
St. Jude Medical	1571 Riata	99.4	99.4	99.4	98.8	98.8	98.8	98.8	98.8	98.8
St. Jude Medical	7120Q Durata	98.7	98.2	97.2	97.2	NaN	NaN	NaN	NaN	NaN
St. Jude Medical	7122 Durata	99.2	99.0	98.7	98.7	98.7	98.7	98.7	NaN	NaN
St. Jude Medical	7120 Durata	98.1	97.8	97.8	97.6	97.6	NaN	NaN	NaN	NaN
St. Jude Medical	7122Q Durata	98.7	98.5	98.5	98.5	NaN	NaN	NaN	NaN	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

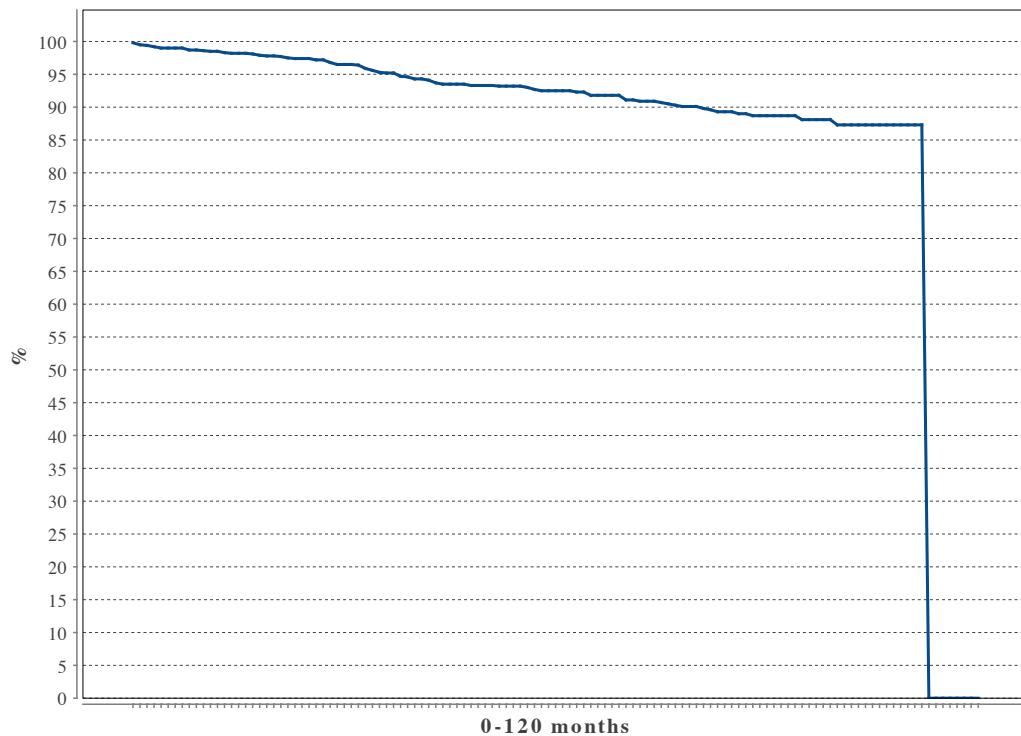
Year	At risk	Survival probability %
1	10114	99.5
2	8251	98.6
3	6583	98.3
4	4995	97.7
5	3694	97.0
6	2570	96.3
7	1753	95.3
8	1093	94.4
9	643	93.1
10	293	91.9



QUALITY – ICD – SURVIVAL MEDTRONIC SPRINT FIDELIS

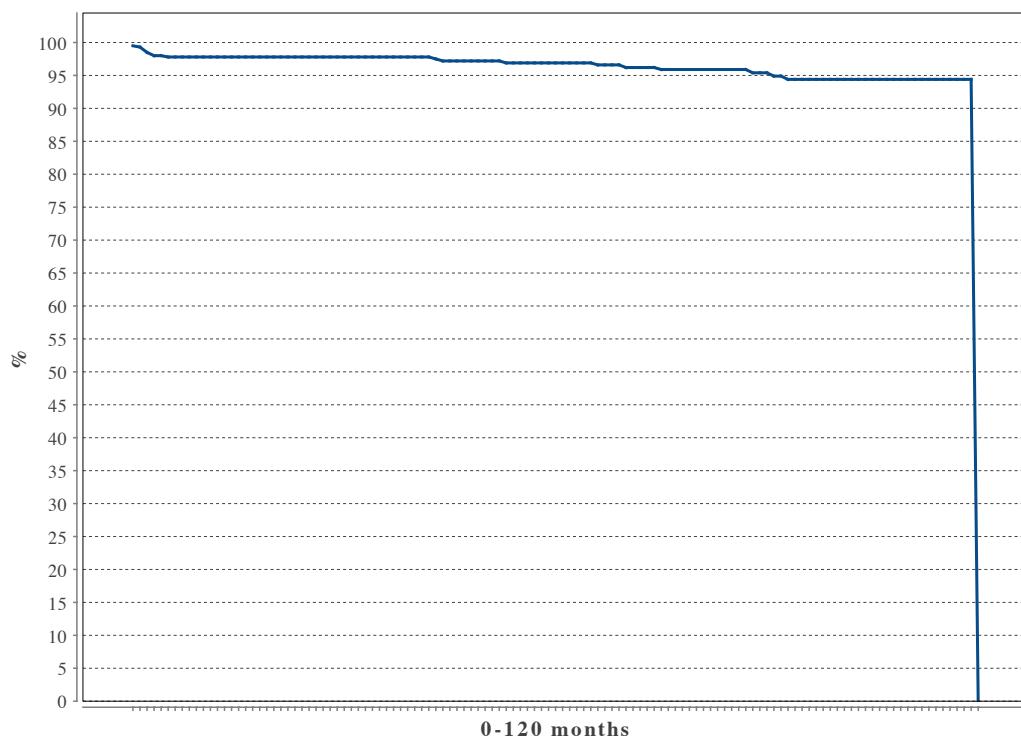
Survival probability for ICD lead Medtronic Sprint Fidelis. Elective replacement and replacements due to infections and system changes have been considered as censored events.

Year	At risk	Survival probability %
1	803	99.8
2	746	98.5
3	702	97.4
4	634	95.2
5	585	93.3
6	538	92.5
7	488	90.9
8	318	89.3
9	155	88.1
10	21	87.3



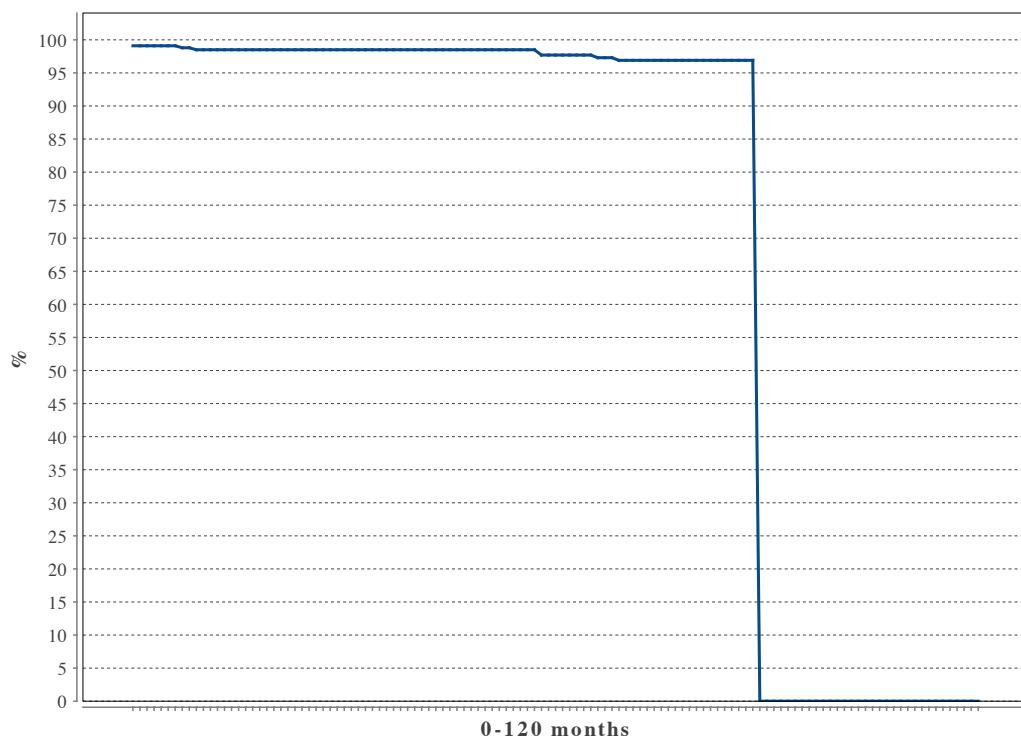
Survival probability for SJM lead type 1561,1570,1571,1572,1580,1581,1582,1591. Elective replacement and replacements due to infections and system changes have been considered as censored events.

Year	At risk	Survival probability %
1	412	99.5
2	385	97.8
3	368	97.8
4	350	97.8
5	329	97.2
6	305	96.9
7	271	96.2
8	248	95.9
9	145	94.4
10	43	94.4



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	351	99.1
2	315	98.5
3	303	98.5
4	288	98.5
5	267	98.5
6	244	97.7
7	197	96.9
8	34	96.9
9	0	0.0
10	0	0.0



QUALITY – ICD – GENERATOR SURVIVAL PER MODEL

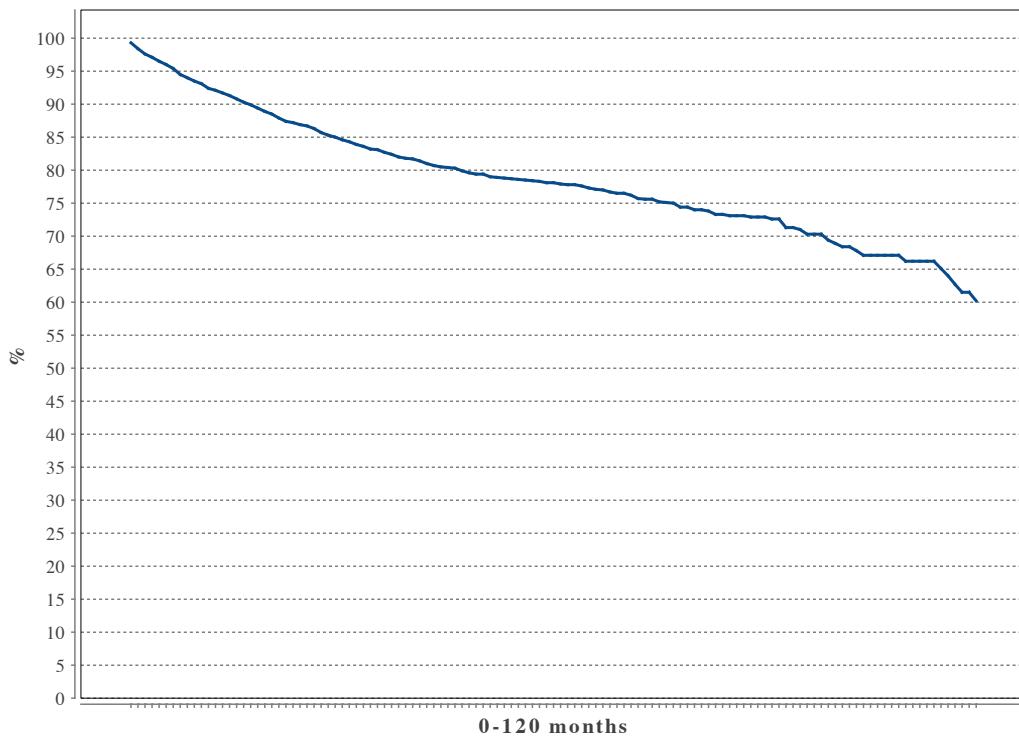
Models that have at least 100 implants and 50 explants

Manuf	Model	Year 1 %	Year 2 %	Year 3 %	Year 4 %	Year 5 %	Year 6 %	Year 7 %	Year 8 %	Year 9 %
Boston Scientific	T167 Vitality 2	100.0	100.0	99.1	97.4	87.4	74.8	61.4	33.2	8.9
Medtronic	7278 Maximo	99.1	96.3	96.3	92.8	85.1	62.8	30.8	0.0	NaN
Medtronic	7271 GEM DR	100.0	100.0	97.8	90.6	84.2	74.7	66.2	48.8	36.8
Medtronic	C174AWK Concerto	99.5	98.9	97.7	91.0	64.3	37.6	28.9	NaN	NaN
Medtronic	D164AWG Virtuoso	100.0	98.7	98.7	96.6	88.5	78.4	66.4	NaN	NaN
Medtronic	7227Cx Gem	100.0	100.0	100.0	99.2	95.9	90.3	73.3	56.2	41.3
Medtronic	7298 Sentry	100.0	99.6	94.8	78.7	45.1	20.3	11.3	4.6	4.6
Medtronic	7288 Intrinsic	100.0	99.6	97.9	97.0	89.8	67.0	25.0	4.7	4.1
Medtronic	7232Cx Maximo VR	100.0	99.7	98.8	98.1	96.4	94.0	89.7	79.2	33.0
Medtronic	D284TRK Maximo II	99.8	99.8	98.2	86.1	52.9	NaN	NaN	NaN	NaN
St. Jude Medical	V-341 Atlas + DR	98.1	98.1	97.0	85.3	59.0	29.5	22.1	7.9	7.9
St. Jude Medical	V-193 Atlas + VR	98.5	98.5	98.5	97.6	93.9	91.7	89.4	66.2	24.0
St. Jude Medical	V-367 Atlas II	99.5	98.2	94.8	83.3	56.7	36.8	20.4	NaN	NaN
St. Jude Medical	V-243 Atlas + DR	99.0	98.5	96.3	95.2	93.3	84.5	63.2	45.3	NaN
St. Jude Medical	V-268 Atlas II	100.0	100.0	99.1	98.1	88.6	61.8	32.9	NaN	NaN
St. Jude Medical	3213-36 Promote HF	99.6	99.3	98.0	96.9	86.0	50.7	NaN	NaN	NaN

QUALITY – ICD – PATIENT SURVIVAL

Based on all implants after 1990

Year	At risk	Survival probability %
1	2966	99.3
2	2663	92.1
3	2445	86.9
4	2160	82.7
5	1848	79.6
6	1564	78.1
7	855	75.7
8	409	73.3
9	190	70.3
10	86	67.1



QUALITY – CRT – FREE OF EVENT

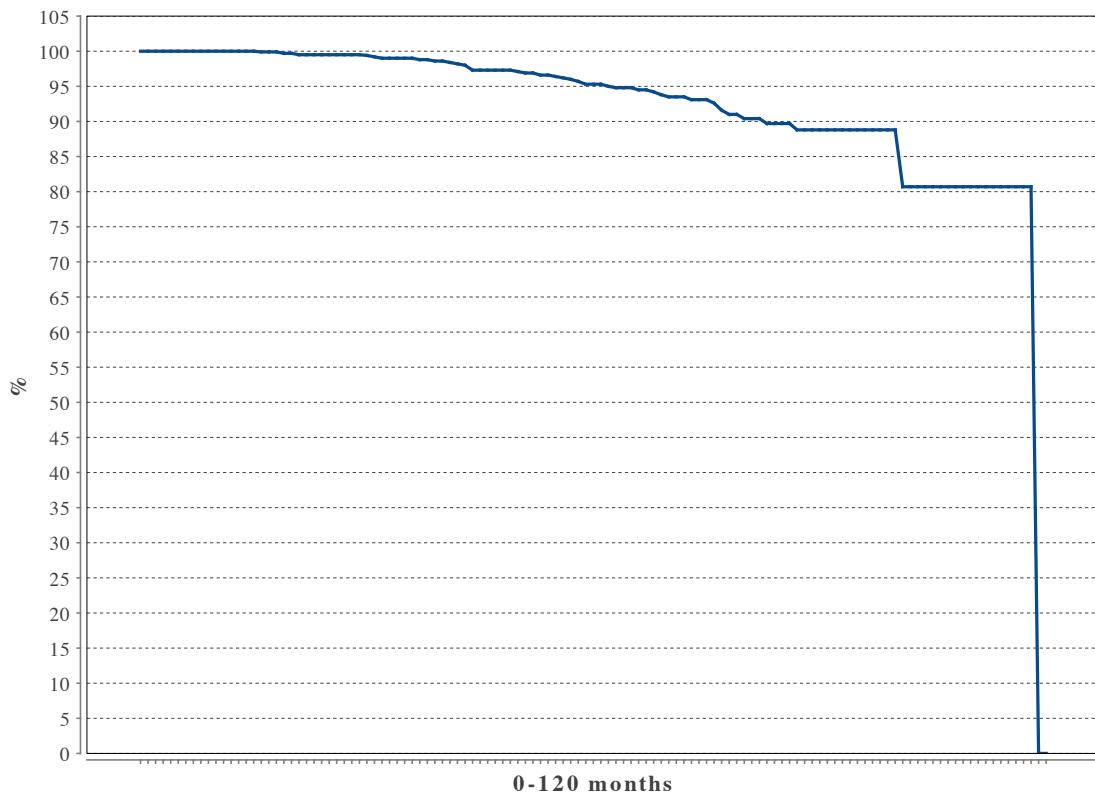
Probability of event free CRT-device

Year	At risk	Free of any event %	Free of generator change %	Free of complication %
1	20470	95.5	98.1	86.9
2	15674	94.1	97.2	76.0
3	11478	92.7	96.2	64.7
4	8274	90.5	94.4	54.5
5	5510	86.2	90.2	43.9
6	3556	82.0	86.2	34.7
7	2133	77.2	81.3	26.4
8	975	70.6	74.6	16.7
9	334	65.9	69.6	8.6
10	17	NaN	NaN	NaN

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 1990

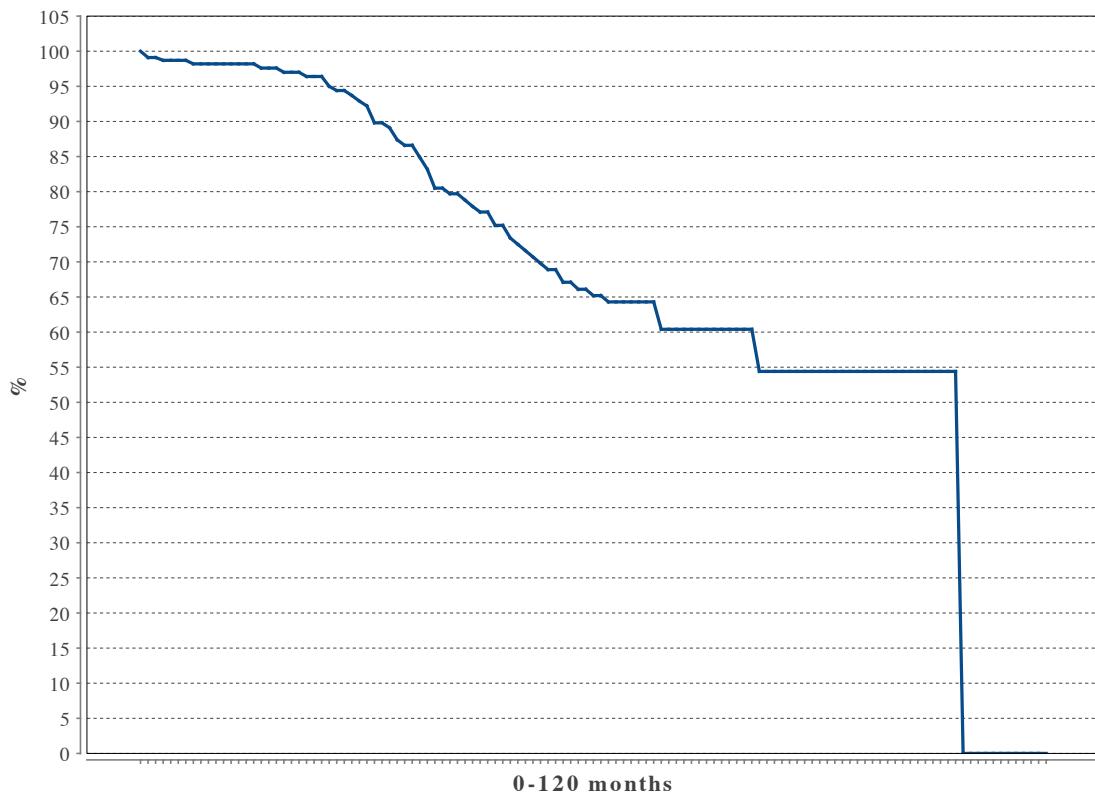
Year	At risk	Survival probability %
1	930	100.0
2	741	100.0
3	603	99.5
4	500	99.0
5	445	97.3
6	413	95.3
7	241	93.5
8	117	89.7
9	29	88.8
10	9	80.7



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 1990

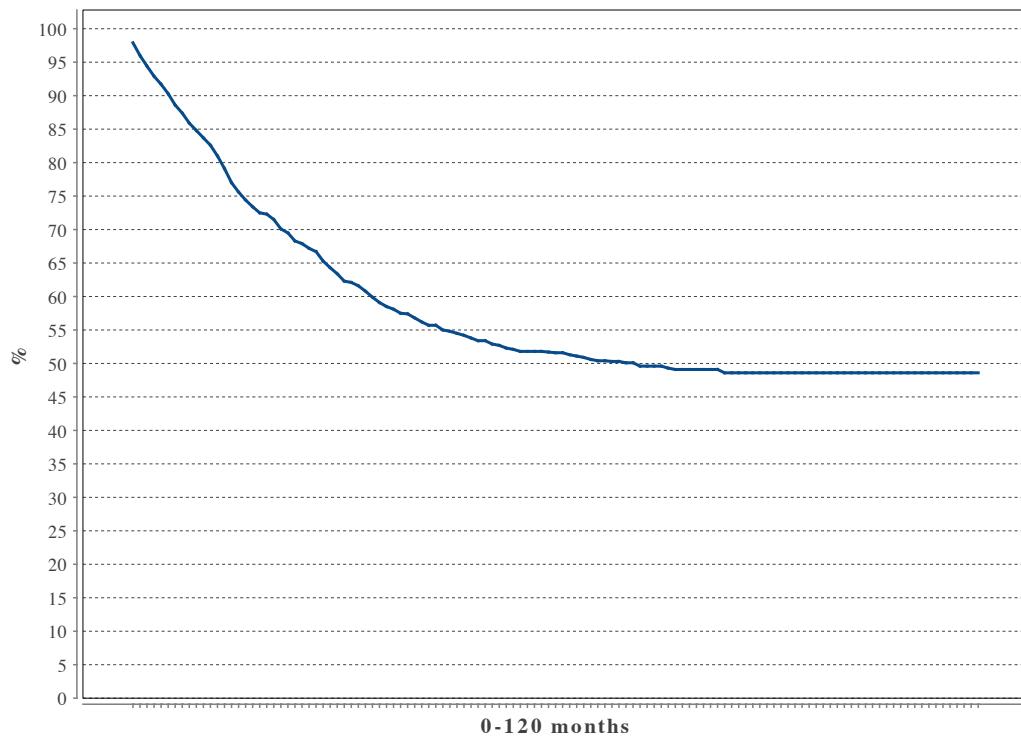
Year	At risk	Survival probability %
1	245	100.0
2	187	98.2
3	146	96.4
4	106	86.6
5	85	75.2
6	72	65.2
7	23	60.4
8	9	54.4
9	4	54.4
10	1	54.4



QUALITY – CRT-P – PATIENT SURVIVAL

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

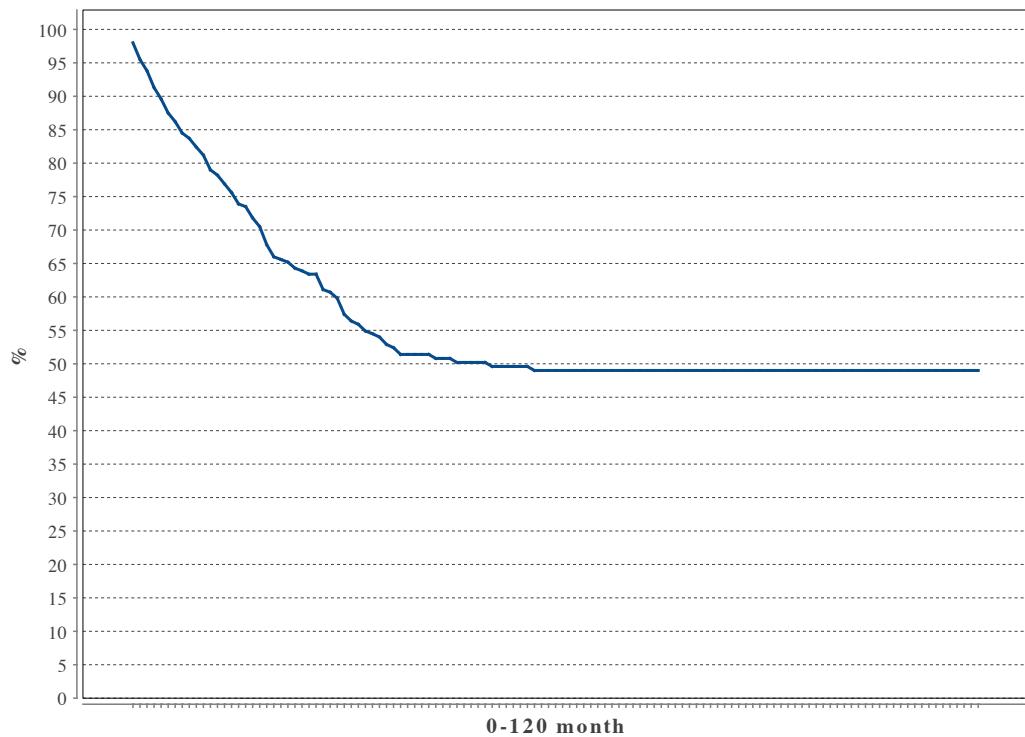
Year	At risk	Survival probability %
1	932	97.9
2	743	81.0
3	605	67.9
4	502	58.5
5	447	53.8
6	415	51.6
7	230	49.6
8	109	48.6
9	27	48.6
10	10	48.6



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	246	98.0
2	188	78.2
3	147	63.9
4	107	52.9
5	86	50.2
6	73	49.0
7	21	49.0
8	10	49.0
9	5	49.0
10	1	49.0



QUALITY – DEAD WITHIN ONE YEAR FROM IMPLANT

Ratio of patients being dead one year after implantation

Type	Implants in 2013	Death within year	%
PM	9517	898	9.4
ICD	1760	80	4.5
CRT-P	407	44	10.8
CRT-D	500	28	5.6