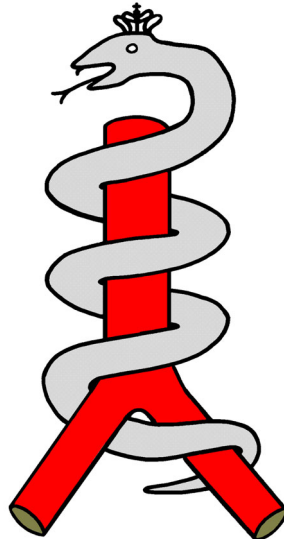


# **The Danish Vascular Registry**

**Landsregistret  
Karbise**

[www.karbise.dk](http://www.karbise.dk)



**Annual report 2000  
Comprehensive statistical version**

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## Introduction

This is one of two reports from *The Danish Vascular Registry* for the year 2000. The previous years the annual reporting was done as one paper. This has created some difficulty in finding the right reporting format. By dividing the report in 2, we hope to fulfil the need from the vascular surgeons and others with special interest to have more comprehensive and detailed statistics, and on the other hand, to make a shorter concise second report, aiming at a broader public. Owing to the growing European and international attention towards clinical databases, we have chosen to publish the statistical version in English, while the shorter more concise version is in Danish.

In Denmark year 2000, vascular services were confined to ten highly specialised departments. In the middle of the year an eleventh newly established department in Aabenraa joined *The Danish Vascular Registry (Karbasse)*, thereby securing that all Danish vascular departments are members, thus covering nearly all vascular surgery in Denmark.

The Registry was introduced in 1989 at the University Hospital of Copenhagen, Rigshospitalet, and over the next years accepted by the other vascular departments, giving full coverage of the country in 1993. All eleven departments have the same software with local data-collection and –processing. In the years 1993 – 95 it was agreed to publish the first reports with data on the number of vascular procedures and frequency of surgical infections. In 1996, it was agreed to establish a national registry with electronic reporting of all data except the surgeon identification. This is the fifth report since then, all available at [www.karbasse.dk](http://www.karbasse.dk). By now there is agreement on including the level of expertise of the surgeon (trainee, senior registrar and specialist). The efforts for the registry these years is to establish formal auditing processes in case of adverse results, and to further enhance the statistical presentations, besides a highly needed upgrading of the software.

The essential event in the registry is the *primary operation*, defined as an operation with independent significance and follow-up. More than one operation under the same admission, and even same anaesthesia, can be of independent significance, thus leading to its own course and follow-up in the database. To complicate matters further, each *primary operation* can have a number of attached *supplementary operations* without independent significance (e.g. reoperation for bleeding), and one patient can have more than one admission during the year. In 2000, the registry contains information on

**5159** patients with  
**5956** admissions, undertaken  
**6206** Anaesthesias  
**6508** primary operations and  
**817** supplementary operations

A huge effort has been made locally to secure the validity of the presented data. A more comprehensive validation of the registry is still awaiting publication for the 1998 data.

Hopefully, the information presented in this report will be useful in the continuing discussion among colleagues in vascular surgery, as means to secure and improve a high level of quality in the busy daily clinical life. To further aid this process each department will receive its own local copy of the report, with information of own results to compare with the national data. However, others may find the report interesting as well, despite the rather few comments in this version.

The representatives from the 11 departments have adopted the report in its present form.

Copenhagen October 2001

Leif Panduro Jensen ([lpj@dadlnet.dk](mailto:lpj@dadlnet.dk))  
Chairman of The Danish Vascular Registry

## Members and representatives of the Danish Vascular Registry:

Rigshospitalet:	Consultant Jørgen E. Lorentzen
Gentofte:	Consultant Leif Panduro Jensen
Hillerød:	Consultant Ole Michael Nielsen Ph. D.
Slagelse:	Consultant Jørgen Andersen
Odense:	Consultant Ole Røder
Aabenraa:	Consultant Anders Elbirk
Kolding:	Consultant Jørn Jepsen
Esbjerg:	Consultant Thorbjörn Jonung Ph. D.
Århus:	Consultant Jesper Laustsen
Viborg:	Consultant Torben Vestersgaard-Andersen
Aalborg:	Consultant Allan Kornmaaler Hansen

*In 2000, the elected board had the following representatives:*

Leif Panduro Jensen (chairman)  
Jesper Laustsen (secretary)  
Allan Kornmaaler Hansen (Treasurer)  
Ole Røder

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## The Danish Vascular Registry

### All primary vascular procedures in Denmark 1993 – 2000

*NOTE! Reoperations / supplementary operations under the same admission are **not** included  
No information was available from Gentofte Hospital for 1994 and 1995.*

	1993	1994	1995	1996	1997	1998	1999	2000
Supraaortic procedure	143	156	155	208	187	198	208	231
Visceral procedure	36	31	33	55	34	24	28	21
Aorto/iliac-femoral prosthesis	393	345	356	443	412	404	353	323
Abdominal Aortic Aneurysm	588	501	569	631	664	649	594	572
Other aneurysms	155	127	136	169	187	170	190	166
TEA aortic / iliac	142	100	104	120	124	89	97	80
TEA other	113	120	139	113	119	147	131	140
In situ bypass	495	507	628	753	616	592	576	597
Fem-pop bypass (not in situ)	447	461	473	455	426	385	342	279
Fem-crural bypass (not in situ)	81	60	101	158	99	97	124	90
other bypass procedures	353	363	444	313	310	312	297	291
Embolectomy / thrombectomy	454	405	373	477	445	431	414	404
Endovascular procedure (PTA)	438	504	629	723	939	970	1010	1108
Reoperation / revision	116	93	160	185	178	166	177	166
Varicose veins	136	82	133	293	506	603	671	863
Other operations	609	514	653	702	1048	1013	1001	1177
TEA	385	357	385	425	406	421	420	427
Bypass vein	604	601	714	1026	763	721	730	688
Bypass prosthesis	1769	1703	1891	1964	1920	1864	1736	1518
Primary operation	3412	3325	3705	4129	4254	4109	3998	4106
REDO operation	472	368	450	484	479	536	559	545
Revision etc.	362	333	415	518	647	585	558	580
<b>ALL</b>	<b>4699</b>	<b>4369</b>	<b>5086</b>	<b>5798</b>	<b>6294</b>	<b>6250</b>	<b>6213</b>	<b>6508</b>

This table has been published in this format since 1993. Since then, the grouping of operations have changed, therefore it cannot be compared with the other tables presented on the following pages.

## All procedures, 11 departments, 2000

*Primary operations and supplementary operations.*

*Odense has in addition performed 231 angioaccess operations, not included below*

Procedure	All	Rigshospitalet	Gentofte	Hillerød	Slagelse	Odense	Aabenraa	Kolding	Esbjerg	Skejby	Viborg	Aalborg
<b>TEA a. carotis</b>	<b>205</b>	93	0	0	0	42	0	0	0	28	14	28
<b>Other supraaortic operation</b>	<b>27</b>	6	1	0	0	9	0	0	0	4	0	7
<b>Visceral operation</b>	<b>21</b>	3	5	3	0	2	0	0	2	1	2	3
Renal	6	1	1	0	0	0	0	0	0	1	0	3
Mesenteric	15	2	4	3	0	2	0	0	2	0	2	0
<b>Aorto/iliac-femoral bypass</b>	<b>322</b>	12	34	10	24	76	0	30	8	32	45	51
Open surgery	319	12	34	10	24	73	0	30	8	32	45	51
Endovascular	3	0	0	0	0	3	0	0	0	0	0	0
<b>Abdominal Aortic Aneurysm</b>	<b>581</b>	76	85	30	71	82	0	33	27	68	48	61
Open surgery	568	68	85	28	71	79	0	33	27	68	48	61
Ruptured	205	29	34	11	22	31	0	12	10	20	13	23
Acute	91	12	8	6	13	12	0	2	2	15	8	13
Elective	242	24	41	9	34	32	0	17	13	25	26	21
Other (fibrosis etc.)	30	3	2	2	2	4	0	2	2	8	1	4
Endovascular	13	8	0	2	0	3	0	0	0	0	0	0
<b>Other aneurysms</b>	<b>179</b>	22	26	3	17	20	1	14	11	26	14	25
<b>Aorto-iliac TEA</b>	<b>80</b>	16	17	8	9	3	0	3	4	12	4	4
<b>Other TEA</b>	<b>144</b>	6	27	9	10	12	0	16	17	9	14	24
<b>Fem-fem cross-over bypass</b>	<b>226</b>	24	37	19	25	35	3	14	6	35	9	19
<b>Fem-pop bypass AK</b>	<b>218</b>	5	3	5	21	52	12	20	8	41	24	27
Prosthesis	207	4	3	2	19	49	11	20	8	41	24	26
In situ	9	1	0	3	1	2	1	0	0	0	0	1
Other	2	0	0	0	1	1	0	0	0	0	0	0
<b>Fem-pop bypass BK</b>	<b>300</b>	36	79	13	34	39	1	10	11	23	28	26
Prosthesis	59	8	15	3	14	8	1	1	0	8	0	1
In situ	229	26	64	10	20	30	0	8	10	13	27	21
Other	12	2	0	0	0	1	0	1	1	2	1	4
<b>Fem-crural bypass</b>	<b>445</b>	37	58	21	46	48	4	51	23	49	46	62
Prosthesis	43	2	17	0	2	2	0	8	2	10	0	0
In situ	355	33	39	19	37	40	4	40	21	34	39	49
Other	47	2	2	2	7	6	0	3	0	5	7	13
<b>Other arterial bypass</b>	<b>65</b>	14	2	5	4	15	0	4	1	6	7	7
<b>Embolectomy/Thrombectomy</b>	<b>509</b>	60	71	23	42	66	1	61	18	62	41	64
Bypass	175	14	30	7	9	16	0	28	4	23	16	28
Arteries	334	46	41	16	33	50	1	33	14	39	25	36
<b>Arterial thrombolysis</b>	<b>208</b>	84	23	17	4	7	0	0	9	44	6	14
<b>PTA</b>	<b>1160</b>	241	218	52	85	146	6	97	46	79	105	85
Aorto-iliac	687	117	129	20	63	104	4	61	14	50	77	48
Femoro-crural	270	87	54	30	3	17	2	7	27	19	12	12
Bypass	112	23	12	0	8	10	0	29	4	5	12	9
Other	91	14	23	2	11	15	0	0	1	5	4	16
<b>Venous procedures</b>	<b>893</b>	116	230	67	17	3	0	49	35	13	108	255
Varicose veins	864	115	220	64	17	1	0	48	33	12	103	251
Thrombolysis / thrombectomy	11	0	9	1	0	0	0	0	0	0	1	0
Other	18	1	1	2	0	2	0	1	2	1	4	4
<b>Reoperations</b>	<b>462</b>	63	89	14	36	55	0	31	28	57	22	67
<b>Other arterial operations</b>	<b>812</b>	26	80	31	36	66	21	127	45	58	134	188
<b>Other operations</b>	<b>468</b>	79	76	51	25	38	0	20	46	48	41	44
<b>All</b>	<b>7325</b>	<b>1019</b>	<b>1161</b>	<b>381</b>	<b>506</b>	<b>816</b>	<b>49</b>	<b>580</b>	<b>345</b>	<b>695</b>	<b>712</b>	<b>1061</b>

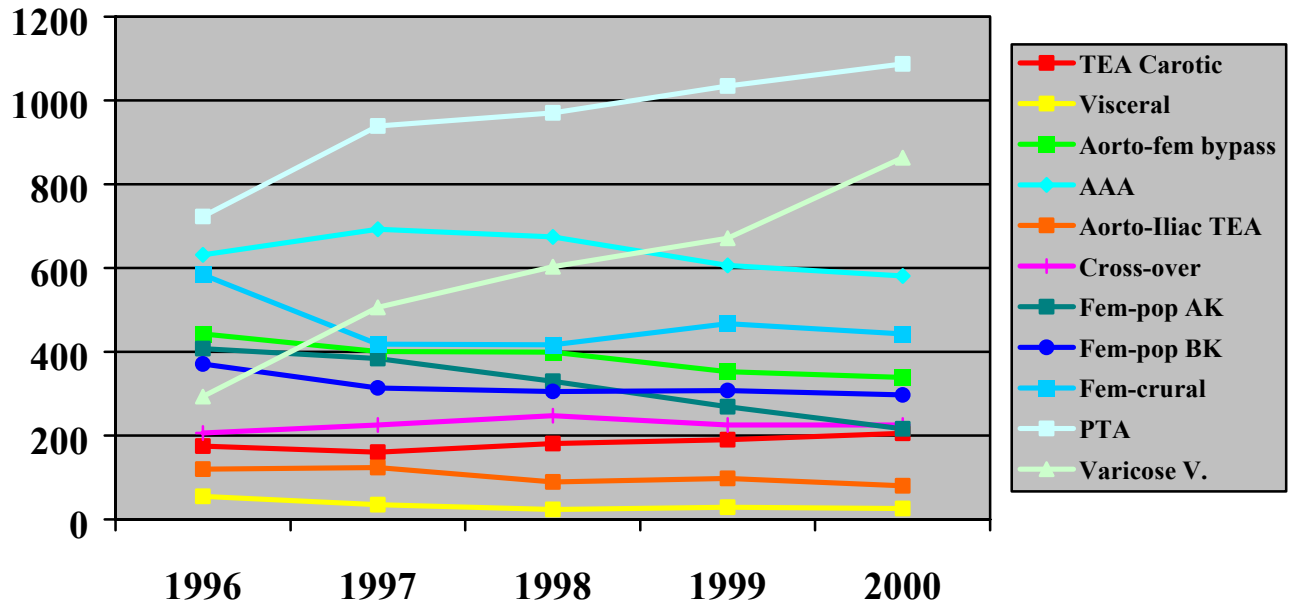
## Primary procedures, 11 departments, 2000

*NOTE! Reoperations / Supplementary operations under the same admission are **not** included*

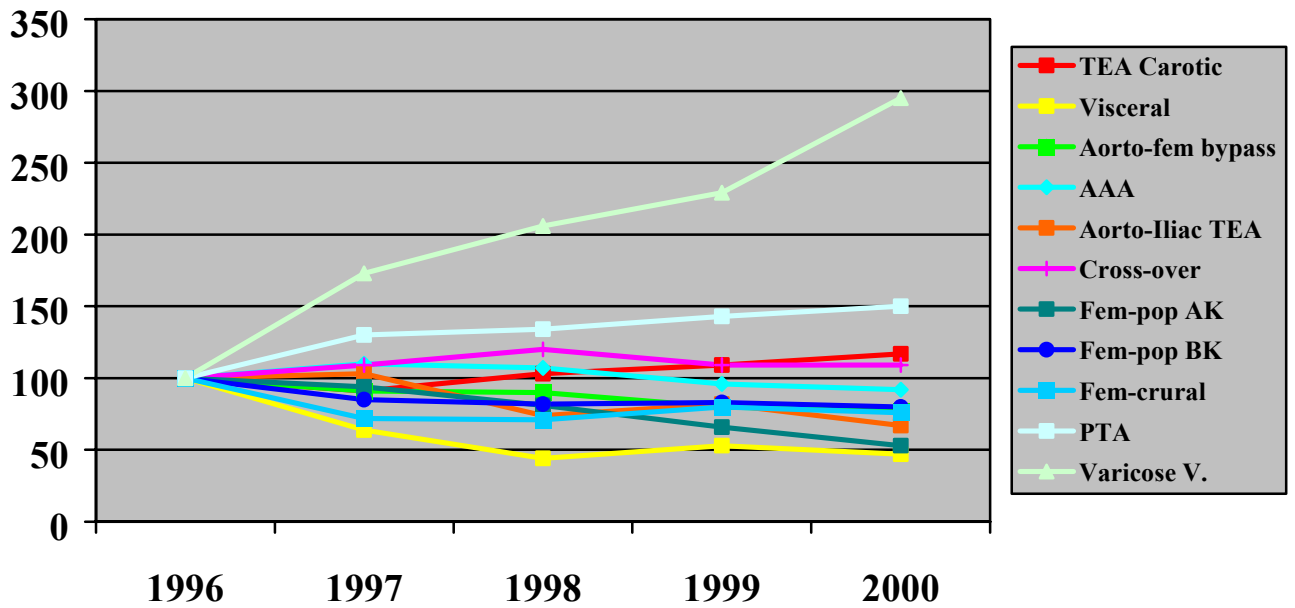
Procedure	All	Rigshospitalet	Gentofte	Hillerød	Slagelse	Odense	Aabenraa	Kolding	Esbjerg	Skejby	Viborg	Aalborg
<b>TEA a. carotis</b>	<b>205</b>	93	0	0	0	42	0	0	0	28	14	28
<b>Other supraaortic operation</b>	<b>26</b>	5	1	0	0	9	0	0	0	4	0	7
<b>Visceral operation</b>	<b>21</b>	3	5	3	0	2	0	0	2	1	2	3
Renal	6	1	1	0	0	0	0	0	0	1	0	3
Mesenteric	15	2	4	3	0	2	0	0	2	0	2	0
<b>Aorto/iliac-femoral bypass</b>	<b>320</b>	12	34	9	24	76	0	30	8	47	45	51
Open surgery	317	12	34	9	24	73	0	30	7	32	45	51
Endovascular	3	0	0	0	0	3	0	0	1	15	0	0
<b>Abdominal Aortic Aneurysm</b>	<b>581</b>	76	85	30	71	82	0	33	27	68	48	61
Open surgery	568	68	85	28	71	79	0	33	27	68	48	61
Ruptured	205	29	34	11	22	31	0	12	10	20	13	23
Acute	91	12	8	6	13	12	0	2	2	15	8	13
Elective	242	24	41	9	34	32	0	17	13	25	26	21
Other (fibrosis etc.)	30	3	2	2	2	4	0	2	2	8	1	4
Endovascular	13	8	0	2	0	3	0	0	0	0	0	0
<b>Other aneurysms</b>	<b>178</b>	22	26	3	17	20	1	14	10	26	14	25
<b>Aorto-iliac TEA</b>	<b>80</b>	16	17	8	9	3	0	3	4	12	4	4
<b>Other TEA</b>	<b>140</b>	6	27	9	10	12	0	16	17	8	11	24
<b>Fem-fem cross-over bypass</b>	<b>225</b>	24	37	19	25	35	3	14	6	35	8	19
<b>Fem-pop bypass AK</b>	<b>216</b>	5	3	5	21	52	12	20	6	41	24	27
Prosthesis	205	4	3	2	19	49	11	20	6	41	24	26
In situ	9	1	0	3	1	2	1	0	0	0	0	1
Other	2	0	0	0	1	1	0	0	0	0	0	0
<b>Fem-pop bypass BK</b>	<b>297</b>	36	79	13	33	39	1	10	10	22	28	26
Prosthesis	57	8	15	3	13	8	1	1	0	7	0	1
In situ	228	26	64	10	20	30	0	8	9	13	27	21
Other	12	2	0	0	0	1	0	1	1	2	1	4
<b>Fem-crural bypass</b>	<b>443</b>	37	58	21	45	48	4	51	23	49	45	62
Prosthesis	43	2	17	0	2	2	0	8	2	10	0	0
In situ	355	33	39	19	37	40	4	40	21	34	39	49
Other	45	2	2	2	6	6	0	3	0	5	6	13
<b>Other arterial bypass</b>	<b>65</b>	14	2	5	4	15	0	4	1	6	7	7
<b>Embolectomy/Thrombectomy</b>	<b>404</b>	43	52	19	34	60	1	50	13	44	32	56
Bypass	109	3	14	3	5	12	0	23	3	11	13	22
Arteries	295	40	38	16	29	48	1	27	10	33	19	34
<b>Arterial thrombolysis</b>	<b>192</b>	72	22	16	3	7	0	0	9	44	5	14
<b>PTA</b>	<b>1107</b>	196	217	52	84	146	6	95	45	78	103	85
Aorto-iliac	677	108	128	20	63	104	4	61	14	50	77	48
Femoro-crural	248	66	54	30	3	17	2	7	26	19	12	12
Bypass	94	9	12	0	8	10	0	27	4	5	10	9
Other	88	13	23	2	10	15	0	0	1	4	4	16
<b>Venous procedures</b>	<b>891</b>	116	230	67	17	3	0	49	34	12	108	255
Varicose veins	863	115	220	64	17	1	0	48	33	11	103	251
Thrombolysis / thrombectomy	11	0	9	1	0	0	0	0	0	0	1	0
Other	17	1	1	2	0	2	0	1	1	1	4	4
<b>Reoperations</b>	<b>166</b>	15	30	6	8	29	0	14	14	19	6	25
<b>Other arterial operations</b>	<b>670</b>	17	46	31	30	58	21	104	42	44	99	178
<b>Other operations</b>	<b>281</b>	42	27	43	9	20	0	8	33	35	38	26
<b>All</b>	<b>6508</b>	<b>850</b>	<b>998</b>	<b>359</b>	<b>444</b>	<b>758</b>	<b>49</b>	<b>515</b>	<b>303</b>	<b>608</b>	<b>641</b>	<b>983</b>

Odense has in addition performed 231 angioaccess operations, not included above.

Changes in number of procedures 1996 - 2000



Percentual changes in number of procedures 1996 - 2000





## Other operations

NCSP-code*	Explanation	No.
PBL30	A-v fistula from radial or ulnar artery	220
TPH20	Central venous catheder	88
PBL20	A-v fistula from the brachial artery	70
PEU82	Revision of bypass from the femoral artery	33
QDA10	Skin incision on the lower extremity	30
PFU81	Ligature of fistula after fem-pop bypass	28
PEN11	Profundaplasty	25
KKB10	Excision of retroperitoneal tumour	24
PEC10	Suture of the common femoral artery	22
TPW99	Other small operation on artery, vein or lymphatic	22
PBU82	Revision of a-v fistula on the upper extremity	19
NHQ17	Partial amputation of toe	18
PEU99	Other operation after reconstruction of fem./popl. artery	16
PEU81	Ligature of fistula after bypass from femoral artery	15
PFA10	Exploration of the popliteal artery	14
PBA20	Exploration of the brachial artery	12
NHQ14	Transmetatarsal amputation	11
PEA10	Exploration of the common femoral artery	11
PFU99	Op.after reconstruction to the distal popliteal artery	11
JAH00	Explorative laparotomy	10
KAC00	Nephrectomy	10
PDU88	Excision of bypass from aorta or iliac artery	10
PFU82	Revision of infrapopliteal bypass	10

\* NCSP = *Nordic Classification of Surgical Procedures. NOMESCO 1995, ISBN 87-16-11220-2, Internet: www.nom-nos.dk*

The groups *other arterial operations* and *other operations* in the table with [Primary operations](#) above is presented in detail here for codes with more than 10 occurrences.

## Endovascular procedures

NCSP-code*	Explanation	No.
PDQ10	Endoprosthesis in infrarenal aorta	15
PDQ30	Endoprosthesis in iliac artery	8
PEQ12	Endoprosthesis in superficial femoral artery	2

\* NCSP = *Nordic Classification of Surgical Procedures. NOMESCO 1995, ISBN 87-16-11220-2*

This table offers detailed information on the use of endoprostheses in Denmark. The use of endoprostheses is still rare, and confined to a few centres.

## Percutaneous Transluminal Angioplasty (PTA)

NCSP-code*	Explanation	No.	% with stent
PAP10	PTA of the brachiocephalic trunc	1	100
PAP20	PTA of the common carotid artery	3	67
PAP21	PTA of the internal carotid artery	5	60
PAP30	PTA of the subclavian artery	15	40
PBP10	PTA of the axillary artery	1	0
PBP20	PTA of the brachial artery	2	0
PBU83	PTA of a-v fistula on the upper extremity	2	0
PCP20	PTA of the coeliac trunc	1	0
PCP30	PTA of the superior mesenteric artery	4	25
PCP40	PTA of the renal artery	45	67
PCP99	PTA of other visceral artery	1	100
PDP10	PTA of the infrarenal aorta	10	80
PDP30	PTA of the iliac artery	677	75
PDP50	PTA of the infrarenal aorta/iliac with stent	13	100
PDU83	PTA of bypass from infrarenal aorta/iliac artery	8	50
PEP10	PTA of the common femoral artery	35	23
PEP11	PTA of the deep femoral artery	8	13
PEP12	PTA of the superficial femoral artery	171	11
PEU83	PTA of bypass to the femoral or popliteal artery	58	7
PFP10	PTA of the popliteal artery	37	14
PFP30	PTA of crural or pedal artery	19	5
PFU83	PTA of bypass to crural or pedal artery	44	2
PHP23	PTA of the iliac vein	1	0
PHP99	PTA of other vein	1	0

\* NCSP = Nordic Classification of Surgical Procedures. NOMESCO 1995, ISBN 87-16-11220-2

### Vascular core-operations

In 1994 a document<sup>♦</sup> was released from the central health authorities defining the area of vascular surgery, and estimating the need for vascular surgery in the coming years. According to this document, the overall need could be estimated to be 132 – 140 procedures per 100,000 inhabitants. This estimate covers what we have chosen to call *vascular core-operations*, as defined below:

#### Definition of Vascular Core-operations:

- ❖ All arterial and venous reconstructions, including:
  - Open surgery, endovascular procedures and endoprotheses
  - Embolectomy and thrombectomy
  - Thrombolysis
- ❖ Sympathectomy
- ❖ Operation for Thoracic Outlet Syndrome

#### Not included:

- ❖ Revision / thrombectomy of reconstructions within 30 days
- ❖ Varicose Veins
- ❖ Angioaccess for haemodialysis, or revision of these
- ❖ Minor reoperations (bleeding etc.), coded by NCSP-codes PWxyy
- ❖ Amputations
- ❖ Biopsies, e.g. the temporal artery

♦ ”KARKIRURGI – udvikling og organisation”, Sundhedsstyrelsen august 1994

## Vascular core-operations

4804 core-operations corresponds to 88 procedures per 100,000 inhabitants

Procedure	All	Rigshospitalet	Gentofte	Hillerød	Slagelse	Odense	Aabenraa	Kolding	Esbjerg	Skejby	Viborg	Aalborg
<b>TEA a. carotis</b>	<b>205</b>	93	0	0	0	42	0	0	0	28	14	28
<b>Other supraaortic operation</b>	<b>26</b>	5	1	0	0	9	0	0	0	4	0	7
<b>Visceral operation</b>	<b>20</b>	3	5	3	0	2	0	0	2	0	2	3
Renal	5	1	1	0	0	0	0	0	0	0	0	3
Mesenteric	15	2	4	3	0	2	0	0	2	0	2	0
<b>Aorto/iliac-femoral bypass</b>	<b>320</b>	12	34	9	24	76	0	30	7	32	45	51
Open surgery	317	12	34	9	24	73	0	30	7	32	45	51
Endovascular	3	0	0	0	0	3	0	0	0	0	0	0
<b>Abdominal Aortic Aneurysm</b>	<b>581</b>	76	85	30	71	82	0	33	27	68	48	61
Open surgery	568	68	85	28	71	79	0	33	27	68	48	61
Ruptured	205	29	34	11	22	31	0	12	10	20	13	23
Acute	91	12	8	6	13	12	0	2	2	15	8	13
Elective	242	24	41	9	34	32	0	17	13	25	26	21
Other (fibrosis etc.)	30	3	2	2	2	4	0	2	2	8	1	4
Endovascular	13	8	0	2	0	3	0	0	0	0	0	0
<b>Other aneurysms</b>	<b>177</b>	22	26	3	17	20	1	14	10	25	14	25
<b>Aorto-iliac TEA</b>	<b>80</b>	16	17	8	9	3	0	3	4	12	4	4
<b>Other TEA</b>	<b>139</b>	6	26	9	10	12	0	16	17	8	11	24
<b>Fem-fem cross-over bypass</b>	<b>225</b>	24	37	19	25	35	3	14	6	35	8	19
<b>Fem-pop bypass AK</b>	<b>215</b>	5	3	5	21	52	12	20	6	40	24	27
Prosthesis	204	4	3	2	19	49	11	20	6	40	24	26
In situ	9	1	0	3	1	2	1	0	0	0	0	1
Other	2	0	0	0	1	1	0	0	0	0	0	0
<b>Fem-pop bypass BK</b>	<b>297</b>	36	79	13	33	39	1	10	10	22	28	26
Prosthesis	57	8	15	3	13	8	1	1	0	7	0	1
In situ	228	26	64	10	20	30	0	8	9	13	27	21
Other	12	2	0	0	0	1	0	1	1	2	1	4
<b>Fem-crural bypass</b>	<b>443</b>	37	58	21	45	48	4	51	23	49	45	62
Prosthesis	43	2	17	0	2	2	0	8	2	10	0	0
In situ	355	33	39	19	37	40	4	40	21	34	39	49
Other	45	2	2	2	6	6	0	3	0	5	6	13
<b>Other arterial bypass</b>	<b>65</b>	14	2	5	4	15	0	4	1	6	7	7
<b>Embolectomy/Thrombectomy</b>	<b>385</b>	43	52	18	33	58	1	41	12	44	32	51
Bypass	91	3	14	2	4	11	0	14	2	11	13	17
Arteries	294	40	38	16	29	47	1	27	10	33	19	34
<b>Arterial thrombolysis</b>	<b>191</b>	72	21	16	3	7	0	0	9	44	5	14
<b>PTA</b>	<b>1105</b>	196	217	52	84	146	6	93	45	78	103	85
Aorto-iliac	677	108	128	20	63	104	4	61	14	50	77	48
Femoro-crural	248	66	54	30	3	17	2	7	26	19	12	12
Bypass	92	9	12	0	8	10	0	25	4	5	10	9
Other	88	13	23	2	10	15	0	0	1	4	4	16
<b>Venous procedures</b>	<b>27</b>	1	10	3	0	2	0	1	1	1	4	4
Varicose veins	0	0	0	0	0	0	0	0	0	0	0	0
Thrombolysis / thrombectomy	10	0	9	1	0	0	0	0	0	0	0	0
Other	17	1	1	2	0	2	0	1	1	1	4	4
<b>Reoperations</b>	<b>0</b>	0	0	0	0	0	0	0	0	0	0	0
<b>Other arterial operations</b>	<b>294</b>	16	40	15	27	43	2	31	12	39	19	50
<b>Other operations</b>	<b>9</b>	2	0	0	0	5	0	0	0	0	0	2
<b>All</b>	<b>4804</b>	<b>679</b>	<b>713</b>	<b>229</b>	<b>406</b>	<b>696</b>	<b>30</b>	<b>361</b>	<b>192</b>	<b>535</b>	<b>413</b>	<b>550</b>

## Eurovasc

In 1996 it was decided in the European Board of Vascular Surgery, Union Européenne des Médecins Spécialistes (UEMS), to establish a common European reporting of vascular procedures, the EUROVASC. The aim was to get existing vascular registries to report comparable data, and to stimulate the creation of vascular registries in the countries where they still did not exist. This initiative was followed by the VASCUNET collaboration of existing vascular registries in 1997. Since 1997, several registries have reported EUROVASC data, now available on the Internet (<http://www.esvs.org/esvs/eurovasc0199.html>). The Danish Vascular Registry (Karbasc) has participated in this collaboration from the beginning.

EUROVASC 2000 Procedure	All	Per 100.000	Rigshospitalet										
			Gentofte	Hillerød	Slagelse	Odense	Aabenraa	Kolding	Esbjerg	Århus	Viborg	Aalborg	
A. Open surg. on Carotid art.	205	3,8	93	0	0	0	42	0	0	0	28	14	28
B. Open surg. for AAA	568	10,5	68	85	28	71	79	0	33	27	68	48	61
C. Open surg. for COAD	621	11,4	52	87	36	58	111	3	47	17	79	57	74
D. Open surg. for POAD AK	433	8,0	14	39	14	41	73	13	51	24	60	39	65
E. Open surg. for POAD BK	744	13,7	70	137	34	79	90	5	61	33	72	75	88
F. PTA central	682	12,6	108	128	20	63	106	4	61	14	51	79	48
G. PTA peripheral	335	6,2	75	66	30	11	25	2	32	30	23	20	21
H. Endoprosthesis for AAA	13	0,2	8	0	2	0	3	0	0	0	0	0	0
I. Endoprosthesis for COAD	10	0,2	0	0	1	0	9	0	0	0	0	0	0
J. Endoprosthesis for POAD	2	0,0	0	0	2	0	0	0	0	0	0	0	0
K. Arterial trauma	44	0,8	18	1	2	0	2	0	4	0	4	3	10
L. Angioaccess	527	9,7	0	0	14	0	6	17	60	24	0	70	105

### Explanations and comments:

AAA = Abdominal Aortic Aneurysm

COAD = Central Occlusive Arterial Disease

POAD = Peripheral Occlusive Arterial Disease

PTA = Percutaneous Transluminal Angioplasty

Row B: - Laparotomy without reconstruction of aorta is also included (intention to treat)  
- Juxtarenal AAA is included as well

Row C: - Femoro-femoral cross-over bypass is included here

Row F: - PTA of the renal and visceral arteries is not included

- PTA of reconstructions is included

Row L: - Only open surgical procedures are included

### Average length of hospital stay

Procedure	No.	Preoperative days	Postoperative days	Admission total days
<b>TEA a. carotis</b>	<b>205</b>	1,8	4,8	6,6
<b>Other supraaortic operation</b>	<b>26</b>	2,2	5,3	7,6
<b>Visceral operation</b>	<b>21</b>	2,6	10,6	13,1
Renal	6	0,8	10,5	11,3
Mesenteric	15	3,3	10,6	13,9
<b>Aorto/iliac-femoral bypass</b>	<b>320</b>	2,6	9,3	11,8
Open surgery	317	2,5	9,3	11,9
Endovascular	3	4,0	4,0	8,0
<b>Abdominal Aortic Aneurysm</b>	<b>581</b>	1,5	10,8	12,3
Open surgery	568	1,5	10,9	12,4
Ruptured	205	0,2	11,2	11,3
Acute	91	1,8	10,9	12,6
Elective	242	2,3	10,1	12,5
Other (fibrosis etc.)	30	2,5	15,3	17,8
Endovascular	13	3,3	8,1	11,4
<b>Other aneurysms</b>	<b>178</b>	2,0	6,4	8,4
<b>Aorto-iliac TEA</b>	<b>80</b>	3,3	8,3	11,6
<b>Other TEA</b>	<b>140</b>	2,3	5,6	7,9
<b>Fem-fem cross-over bypass</b>	<b>225</b>	4,4	6,8	11,2
<b>Fem-pop bypass AK</b>	<b>216</b>	3,0	6,8	9,8
Prosthesis	205	3,0	6,5	9,5
In situ	9	4,1	12,0	16,1
Other	2	2,0	8,0	10,0
<b>Fem-pop bypass BK</b>	<b>297</b>	3,1	9,9	13,1
Prosthesis	57	3,2	10,2	13,4
In situ	228	3,1	10,0	13,1
Other	12	3,1	7,3	10,3
<b>Fem-crural bypass</b>	<b>443</b>	4,0	10,5	14,5
Prosthesis	43	4,8	12,5	17,3
In situ	355	4,0	10,3	14,4
Other	45	3,2	9,9	13,1
<b>Other arterial bypass</b>	<b>65</b>	2,6	8,1	10,7
<b>Embolectomy/Thrombectomy</b>	<b>404</b>	0,7	4,7	5,4
Bypass	109	1,1	6,9	8,0
Arteries	295	0,6	3,9	4,5
<b>Arterial thrombolysis</b>	<b>192</b>	0,9	7,0	7,9
<b>PTA</b>	<b>1107</b>	1,6	3,1	4,7
Aorto-iliac	677	1,5	3,1	4,5
Femoro-crural	248	2,2	3,4	5,5
Bypass	94	1,6	3,2	4,8
Other	88	1,3	2,8	4,1
<b>Venous procedures</b>	<b>891</b>	0,7	1,0	1,6
Varicose veins	863	0,6	0,9	1,6
Thrombolysis / thrombectomy	11	2,8	3,5	6,3
Other	17	1,0	1,7	2,7
<b>Reoperations</b>	<b>166</b>	2,6	8,6	11,2
<b>Other arterial operations</b>	<b>670</b>	2,1	2,8	5,0
<b>Other operations</b>	<b>281</b>	1,7	3,6	5,3
<b>All - average</b>	<b>6508</b>	<b>1,9</b>	<b>5,6</b>	<b>7,5</b>
<b>All - median</b>	<b>6508</b>	<b>1,0</b>	<b>3,0</b>	<b>5,0</b>

The average length of stay for the different groups of operations should be read with care, for several reasons:

- The average length of stay will be prolonged if a few patient have exceptionally long admissions. This is in fact the case above, as the median admission time is substantially lower than the average.
- The different departments do not handle the admissions alike; some will admit the patient for an arteriogram, and then later re-admit for the operation, while other will do it all in one admission, leading to longer preoperative admission time.

- Some departments have the opportunity to transfer the patients to other departments after a few days, while other keep the patients in own department until they are ready for discharge. The former department will of course have shorter postoperative stays than the latter.
- Scheduled patients for major operations on a Monday are always admitted Friday.
- Operations with high early mortality-rates will keep a low postoperative average admission time, thus dragging in the opposite direction of the factors above.

### NUMBER OF VASCULAR PROCEDURES PER COUNTY (= “AMT”) IN DENMARK 2000

The Danish Vascular Registry contains information regarding community and county of the patients, allowing for analysis of the frequency of vascular procedures in the different counties. The figures reveal huge differences between different parts of Denmark. The explanation is not known but could be due to differences in the prevalence of vascular disease (although not likely) or differences in the service offered.

#### The Vascular Procedures for each county

All calculations are based on the postal code or community-code of each patient, as the basis for establishing in which county the patient is living. It is the primary operation that is used for the calculations, since it is the best indicator of the vascular service in each county.

The number of procedures is converted to numbers per 100,000 inhabitants by division with the population 1 January 2000 for each county. The information was obtained from the homepage of the National County Organisation (“Amrådsforeningen”) at <http://www.arf.dk/>, under the heading *Statistik*.

The number of inhabitants in Greenland and the Faeroe Islands was obtained from:

Greenland: <http://www.greenland-guide.dk/gt/visit/intro-01.htm> (unknown year)

Faeroe Islands: <http://www.puffin.fo/travel/> (1.1.1999)

In the table below, *Denmark* is without Greenland and Faeroe Islands, whereas *All* includes them.

#### Inhabitants per County (amt) 1<sup>st</sup> January 2000

	County code	Inhabitants
H:S	13-14	586.026
Københavns amt	15	613.444
Frederiksborg amt	20	365.306
Roskilde amt	25	231.559
Vestsjællands amt	30	295.086
Storstrøms amt	35	259.106
Bornholms amt	40	44.337
Fyns amt	42	471.974
Sønderjyllands amt	50	253.482
Ribe amt	55	224.345
Vejle amt	60	347.542
Ringkøbing amt	65	272.857
Århus amt	70	637.122
Viborg amt	76	233.681
Nordjyllands amt	80	494.153
Greenland	90	55.000
Faeroe Islands	97	45.000
<b>DENMARK</b>		<b>5.330.020</b>
<b>ALL</b>		<b>5.430.020</b>

## All procedures, Core-procedures and venous procedures

County	Code	All procedures		Core-procedures		Varicose veins	
		No.	Per 100,000	No.	Per 100,000	No.	Per 100,000
H:S	13-14	645	110	488	83	111	18,9
Københavns amt	15	967	158	717	117	184	30,0
Frederiksborg amt	20	392	107	252	69	72	19,7
Roskilde amt	25	168	73	143	62	23	9,9
Vestsjællands amt	30	198	67	176	60	11	3,7
Storstrøms amt	35	202	78	184	71	7	2,7
Bornholms amt	40	38	86	33	74	4	9,0
Fyns amt	42	493	104	451	96	6	1,3
Sønderjyllands amt	50	272	107	240	95	3	1,2
Ribe amt	55	336	150	215	96	39	17,4
Vejle amt	60	543	156	376	108	53	15,2
Ringkøbing amt	65	276	101	209	77	8	2,9
Århus amt	70	576	90	504	79	19	3,0
Viborg amt	76	409	175	229	98	106	45,4
Nordjyllands amt	80	923	187	534	108	213	43,1
Greenland	90	1	2	1	2	0	0,0
Faeroe Islands	97	14	31	14	31	0	0,0
Unknown / Other		55		38		4	
<b>Denmark</b>		<b>6438</b>	<b>121</b>	<b>4751</b>	<b>89</b>	<b>859</b>	<b>16,1</b>
<b>All</b>		<b>6508</b>	<b>120</b>	<b>4804</b>	<b>88</b>	<b>863</b>	<b>15,9</b>

The total number of operations exceeds the number of core-procedures and varicose veins. The missing operations primarily constitute angioaccess for haemodialysis, minor amputations etc.

In a document from the Danish National Board of Health (Sundhedsstyrelsen)<sup>2</sup> the need for vascular treatment was estimated on the basis of incidence of diseases and vascular surgical practice in other countries. The cumulated need for vascular procedures has been estimated to be 132 –140 arterial procedures per 100,000 inhabitants. In 2000, the core-procedures constituted 88 per 100,000 inhabitants, which are approximately 33% below the estimated need.

<sup>2</sup> KARKIRURGI – udvikling og organisation, notat, Sundhedsstyrelsen august 1994

## Percutaneous transluminal angioplasty (PTA, balloon-treatment)

County	Code	All PTA		Central PTA		Peripheral PTA	
		No.	Per 100,000	No.	Per 100,000	No.	Per 100,000
H:S	13-14	156	27	88	15	56	9,6
Københavns amt	15	215	35	134	22	54	8,8
Frederiksborg amt	20	59	16	23	6	32	8,8
Roskilde amt	25	39	17	28	12	2	0,9
Vestsjællands amt	30	31	11	26	9	2	0,7
Storstrøms amt	35	31	12	23	9	0	0,0
Bornholms amt	40	14	32	6	14	6	13,5
Fyns amt	42	98	21	72	15	13	2,8
Sønderjyllands amt	50	52	21	38	15	6	2,4
Ribe amt	55	49	22	17	8	25	11,1
Vejle amt	60	94	27	57	16	8	2,3
Ringkøbing amt	65	48	18	36	13	7	2,6
Århus amt	70	74	12	50	8	18	2,8
Viborg amt	76	64	27	41	18	6	2,6
Nordjyllands amt	80	79	16	47	10	12	2,4
Greenland	90	0	0	0	0	0	0,0
Faeroe Islands	97	2	4	1	2	1	2,2
Unknown / Other		2		2		0	
<b>Denmark</b>		<b>1103</b>	<b>21</b>	<b>686</b>	<b>13</b>	<b>247</b>	<b>4,6</b>
<b>All</b>		<b>1107</b>	<b>20</b>	<b>689</b>	<b>13</b>	<b>248</b>	<b>4,6</b>

The table includes all PTA-procedures whether stents have been deployed or not. Presumably, not all Danish PTA-procedures are included in the figures above, since they some places are performed at radiological departments without direct involvement from the vascular departments.



## Carotid trombendarterectomy (TEA)

County	Code	Carotid TEA	
		No.	Per 100,000
<b>H:S</b>	13-14	28	4,8
<b>Københavns amt</b>	15	30	4,9
<b>Frederiksborg amt</b>	20	10	2,7
<b>Roskilde amt</b>	25	5	2,2
<b>Vestsjællands amt</b>	30	7	2,4
<b>Storstrøms amt</b>	35	8	3,1
<b>Bornholms amt</b>	40	1	2,3
<b>Fyns amt</b>	42	15	3,2
<b>Sønderjyllands amt</b>	50	8	3,2
<b>Ribe amt</b>	55	6	2,7
<b>Vejle amt</b>	60	15	4,3
<b>Ringkøbing amt</b>	65	4	1,5
<b>Århus amt</b>	70	28	4,4
<b>Viborg amt</b>	76	9	3,9
<b>Nordjyllands amt</b>	80	28	5,7
<b>Greenland</b>	90	0	0,0
<b>Faeroe Islands</b>	97	3	6,7
<b>Unknown / Other</b>		0	
<b>Denmark</b>		<b>202</b>	<b>3,8</b>
<b>All</b>		<b>205</b>	<b>3,8</b>

In Denmark, only symptomatic patients are operated on. In the recommendations from the central health authorities, the need is estimated to be 4-6 per 100,000 inhabitants, but according to international experience, the need is more likely 8-10 per 100,000 inhabitants. As it can be seen from the table, the actual figures are substantially lower, as they have been for the last years, and there are huge variations between the different counties.

## Peripheral bypass procedures

County	Code	All peripheral bypass		For claudication		For critical ischemia	
		No.	Per 100,000	No.	Per 100,000	No.	Per 100,000
H:S	13-14	73	12	7	1,2	57	10
Københavns amt	15	137	22	16	2,6	105	17
Frederiksborg amt	20	37	10	1	0,3	33	9
Roskilde amt	25	28	12	4	1,7	22	10
Vestsjællands amt	30	35	12	3	1,0	30	10
Storstrøms amt	35	42	16	2	0,8	35	14
Bornholms amt	40	1	2	0	0,0	1	2
Fyns amt	42	106	22	23	4,9	69	15
Sønderjyllands amt	50	50	20	13	5,1	31	12
Ribe amt	55	38	17	2	0,9	34	15
Vejle amt	60	85	24	8	2,3	74	21
Ringkøbing amt	65	46	17	7	2,6	33	12
Århus amt	70	110	17	30	4,7	68	11
Viborg amt	76	52	22	7	3,0	37	16
Nordjyllands amt	80	112	23	22	4,5	81	16
Greenland	90	0	0	0	0,0	0	0
Faeroe Islands	97	3	7	0	0,0	1	2
Unknown / Other		8		0		6	
<b>Denmark</b>		<b>952</b>	<b>18</b>	<b>145</b>	<b>2,7</b>	<b>710</b>	<b>13</b>
<b>All</b>		<b>963</b>	<b>18</b>	<b>145</b>	<b>2,7</b>	<b>717</b>	<b>13</b>

Patients with peripheral ischaemia can be graded with regard to the presence of intermittent claudication (muscle pain when walking) or critical ischaemia (pain at rest) non-healing ulcers or gangrene. The latter group risk a major amputation within a short period. The incidence of symptomatic atherosclerotic disease in the legs can be estimated to be 9000 per year in Denmark, but only a minority of these progresses to the need for an operation each year.

## Abdominal aortic aneurysms (AAA)

County	Code	All aneurysms		Elective operation		Operation for rupture	
		No.	Per 100,000	No.	Per 100,000	No.	Per 100,000
H:S	13-14	41	7	13	2,2	15	2,6
Københavns amt	15	85	14	40	6,5	34	5,5
Frederiksborg amt	20	35	10	11	3,0	12	3,3
Roskilde amt	25	19	8	10	4,3	5	2,2
Vestsjællands amt	30	30	10	10	3,4	12	4,1
Storstrøms amt	35	42	16	21	8,1	15	5,8
Bornholms amt	40	5	11	1	2,3	3	6,8
Fyns amt	42	60	13	24	5,1	21	4,4
Sønderjyllands amt	50	16	6	5	2,0	7	2,8
Ribe amt	55	29	13	13	5,8	11	4,9
Vejle amt	60	35	10	20	5,8	12	3,5
Ringkøbing amt	65	26	10	13	4,8	7	2,6
Århus amt	70	67	11	25	3,9	18	2,8
Viborg amt	76	22	9	13	5,6	7	3,0
Nordjyllands amt	80	60	12	21	4,2	23	4,7
Greenland	90	1	2	0	0,0	1	1,8
Faeroe Islands	97	3	7	1	2,2	0	0,0
Unknown / Other		5		1		2	
<b>Denmark</b>		<b>572</b>	<b>11</b>	<b>240</b>	<b>4,5</b>	<b>202</b>	<b>3,8</b>
<b>All</b>		<b>581</b>	<b>11</b>	<b>242</b>	<b>4,5</b>	<b>205</b>	<b>3,8</b>

Besides the two groups *elective* and *ruptured*, the total figures above for abdominal aneurysm repair includes the groups *acute* and *other* mentioned in the table of [primary procedures](#).

### THE QUALITY OF TREATMENT 2000

The evaluation of various quality aspects of the treatments offered is very complicated. It is of course essential that registration covers reliable and validated indicators, that the indicators are registered in a uniform manner, and that the registration is complete. An evaluation of this process is laborious, but necessary. The Danish Vascular Registry is currently performing such an evaluation on the 1998 data, which will be published soon in a separate report.

The aim of vascular surgery is to prevent amputation, stroke and death from vascular atherosclerotic and aneurysmatic disease, but also to reduce the consequences in the form of pain, immobility and discomfort. In the Danish Vascular Registry several indicators are registered to document this: Amputation, stroke and death. Other quality-indicators are perioperative complications (e.g. surgical wound infection), and social conditions before and after surgery. Not all of these indicators have been sufficiently validated currently, and should therefore be interpreted with caution.

Another factor complicating the interpretation of quality indicators is the diversion in risk factors and prognostic factors among the patients; the more ill the patient is before treatment (heart, lungs, etc.) the worse the outcome. There is therefore a need for case-mix correction, or explanation, of results regarding the use of risk factors. There is a huge methodological work to be done in this field, but progress is constantly made, allowing for more detailed analyses to be published. Uncorrected data are at best worthless, at worst misleading.

The data on the next pages should be looked at with the above-mentioned words of caution in mind.

## Clean operations and surgical wound infections 2000

*The figures only include operations classified as clean or potentially contaminated*

Procedure	Procedures No.	Superficial Wound Infections		Deep Wound Infections		All Wound Infections	
		No.	%	No.	%	No.	%
<b>TEA a. carotis</b>	<b>205</b>	0		0		0	
<b>Other supraaortic operation</b>	<b>26</b>	0		0		0	
<b>Visceral operation</b>	<b>20</b>	0		0		0	
Renal	6	0		0		0	
Mesenteric	14	0		0		0	
<b>Aorto/iliac-femoral bypass</b>	<b>314</b>	7	2,2	5	1,6	12	3,8
Open surgery	311	7	2,3	5	1,6	12	3,9
Endovascular	3	0		0		0	
<b>Abdominal Aortic Aneurysm</b>	<b>574</b>	13	2,3	4	0,7	17	3,0
Open surgery	561	13	2,3	4	0,7	17	3,0
Ruptured	204	9	4,4	2	1,0	11	5,4
Acute	90	1	1,1	1	1,1	2	2,2
Elective	240	3	1,3	1	0,4	4	1,7
Other (fibrosis etc.)	27	0		0		0	
Endovascular	13	0		0		0	
<b>Other aneurysms</b>	<b>175</b>	7	4,0	4	2,3	11	6,3
<b>Aorto-iliac TEA</b>	<b>79</b>	3	3,8	1	1,3	4	5,1
<b>Other TEA</b>	<b>140</b>	5	3,6	2	1,4	7	5,0
<b>Fem-fem cross-over bypass</b>	<b>224</b>	6	2,7	7	3,1	13	5,8
<b>Fem-pop bypass AK</b>	<b>214</b>	8	3,7	5	2,3	13	6,1
Prosthesis	203	7	3,4	5	2,5	12	5,9
In situ	9	1	11,1	0		1	11,1
Other	2	0		0		0	
<b>Fem-pop bypass BK</b>	<b>296</b>	22	7,4	5	1,7	27	9,1
Prosthesis	56	4	7,1	1	1,8	5	8,9
In situ	228	18	7,9	4	1,8	22	9,6
Other	12	0		0		0	
<b>Fem-crural bypass</b>	<b>440</b>	25	5,7	6	1,4	31	7,0
Prosthesis	42	2	4,8	2	4,8	4	9,5
In situ	354	20	5,6	4	1,1	24	6,8
Other	44	3	6,8	0		3	6,8
<b>Other arterial bypass</b>	<b>62</b>	4	6,5	2	3,2	6	9,7
<b>Embolectomy/Thrombectomy</b>	<b>404</b>	1	0,2	2	0,5	3	0,7
Bypass	109	1	0,9	1	0,9	2	1,8
Arteries	295	0		1	0,3	1	0,3
<b>Arterial thrombolysis</b>	<b>192</b>	0		1	0,5	1	0,5
<b>PTA</b>	<b>1107</b>	0		3	0,3	3	0,3
Aorto-iliac	677	0		2	0,3	2	0,3
Femoro-crural	248	0		0		0	
Bypass	94	0		1	1,1	1	1,1
Other	88	0		0		0	
<b>Venous procedures</b>	<b>891</b>	8	0,9	0		8	0,9
Varicose veins	863	8	0,9	0		8	0,9
Thrombolysis / thrombectomy	23	0		0		0	
Other	10	0		0		0	
<b>Reoperations</b>	<b>83</b>	3	3,6	2	2,4	5	6,0
<b>Other arterial operations</b>	<b>633</b>	1	0,2	3	0,5	4	0,6
<b>Other operations</b>	<b>215</b>	4	1,9	0		4	1,9
<b>All</b>	<b>6299</b>	<b>117</b>	<b>1,9</b>	<b>52</b>	<b>0,8</b>	<b>169</b>	<b>2,7</b>

The level of Surgical Wound Infections is acceptable and lives up to international standards.

## Primary operations and complications 2000

Procedure	No.	Occlusion within 30 days		Wound complications		Surgical complications		General complications	
		No.	%	No.	%	No.	%	No.	%
<b>TEA a. carotis</b>	<b>205</b>	0		10	4,9	20	9,8	16	7,8
<b>Other supraaortic operation</b>	<b>26</b>	1	3,8	3	11,5	3	11,5	0	
<b>Visceral operation</b>	<b>21</b>	0		0		2	9,5	3	14,3
Renal	6	0		0		1	16,7	2	33,3
Mesenteric	15	0		0		1	6,7	1	6,7
<b>Aorto/iliac-femoral bypass</b>	<b>320</b>	5	1,6	35	10,9	16	5,0	37	11,6
Open surgery	317	5	1,6	35	11,0	16	5,0	37	11,7
Endovascular	3	0		0		0		0	
<b>Abdominal Aortic Aneurysm</b>	<b>581</b>	6	1,0	30	5,2	78	13,4	202	34,8
Open surgery	568	6	1,1	30	5,3	78	13,7	199	35,0
Ruptured	205	4	2,0	11	5,4	44	21,5	109	53,2
Acute	91	2	2,2	3	3,3	11	12,1	25	27,5
Elective	242	0		14	5,8	22	9,1	57	23,6
Other (fibrosis etc.)	30	0		2	6,7	1	3,3	8	26,7
Endovascular	13	0		0		0		3	23,1
<b>Other aneurysms</b>	<b>178</b>	5	2,8	27	15,2	6	3,4	13	7,3
<b>Aorto-Iliac TEA</b>	<b>80</b>	1	1,3	7	8,8	1	1,3	5	6,3
<b>Other TEA</b>	<b>140</b>	2	1,4	13	9,3	2	1,4	5	3,6
<b>Fem-fem cross-over bypass</b>	<b>225</b>	11	4,9	20	8,9	1	0,4	12	5,3
<b>Fem-pop bypass AK</b>	<b>216</b>	13	6,0	25	11,6	1	0,5	5	2,3
Prosthesis	205	12	5,9	25	12,2	1	0,5	4	2,0
In situ	9	1	11,1	0		0		1	11,1
Other	2	0		0		0		0	
<b>Fem-pop bypass BK</b>	<b>297</b>	24	8,1	57	19,2	8	2,7	19	6,4
Prosthesis	57	5	8,8	14	24,6	0		3	5,3
In situ	228	17	7,5	41	18,0	8	3,5	14	6,1
Other	12	2	16,7	2	16,7	0		2	16,7
<b>Fem-crural bypass</b>	<b>443</b>	64	14,4	88	19,9	9	2,0	25	5,6
Prosthesis	43	10	23,3	10	23,3	2	4,7	2	4,7
In situ	355	49	13,8	70	19,7	6	1,7	21	5,9
Other	45	5	11,1	8	17,8	1	2,2	2	4,4
<b>Other arterial bypass</b>	<b>65</b>	4	6,2	11	16,9	2	3,1	8	12,3
<b>Embolectomy/Thrombectomy</b>	<b>404</b>	32	7,9	17	4,2	6	1,5	39	9,7
Bypass	109	14	12,8	7	6,4	1	0,9	7	6,4
Arteries	295	18	6,1	10	3,4	5	1,7	32	10,8
<b>Arterial thrombolysis</b>	<b>192</b>	29	15,1	14	7,3	8	4,2	6	3,1
<b>PTA</b>	<b>1107</b>	38	3,4	51	4,6	22	2,0	24	2,2
Aorto-Iliac	677	16	2,4	37	5,5	4	0,6	13	1,9
Femoro-crural	248	15	6,0	5	2,0	12	4,8	5	2,0
Bypass	94	5	5,3	6	6,4	2	2,1	1	1,1
Other	88	2	2,3	3	3,4	4	4,5	5	5,7
<b>Venous procedures</b>	<b>891</b>	0		9	1,0	2	0,2	0	
Varicose veins	863	0		8	0,9	2	0,2	0	
Thrombolysis / thrombectomy	11	0		0		0		0	
Other	17	0		1	5,9	0		0	
<b>Reoperations</b>	<b>166</b>	0		23	13,9	4	2,4	3	1,8
<b>Other arterial operations</b>	<b>670</b>	25	3,7	22	3,3	5	0,7	12	1,8
<b>Other operations</b>	<b>281</b>	1	0,4	9	3,2	1	0,4	4	1,4
<b>All</b>	<b>6508</b>	<b>261</b>	<b>4,0</b>	<b>471</b>	<b>7,2</b>	<b>197</b>	<b>3,0</b>	<b>438</b>	<b>6,7</b>

## Wound Complications

Procedure	No.	All Wound complications		Haemathoma		Lymph oozing / Lymphocele		Sloughing Wound Edge	
		No.	%	No.	%	No.	%	No.	%
<b>TEA a. carotis</b>	<b>205</b>	10	4,9	10	4,9	0		0	
<b>Other supraaortic operation</b>	<b>26</b>	3	11,5	2	7,7	1	3,8	0	
<b>Visceral operation</b>	<b>21</b>	0		0		0		0	
Renal	6	0		0		0		0	
Mesenteric	15	0		0		0		0	
<b>Aorto/iliac-femoral bypass</b>	<b>320</b>	35	10,9	10	3,1	21	6,6	5	1,6
Open surgery	317	35	11,0	10	3,2	21	6,6	5	1,6
Endovascular	3	0		0		0		0	
<b>Abdominal Aortic Aneurysm</b>	<b>581</b>	30	5,2	11	1,9	13	2,2	6	1,0
Open surgery	568	30	5,3	11	1,9	13	2,3	6	1,1
Ruptured	205	11	5,4	5	2,4	3	1,5	3	1,5
Acute	91	3	3,3	1	1,1	0		2	2,2
Elective	242	14	5,8	5	2,1	8	3,3	1	0,4
Other (fibrosis etc.)	30	2	6,7	0		2	6,7	0	
Endovascular	13	0		0		0		0	
<b>Other aneurysms</b>	<b>178</b>	27	15,2	11	6,2	14	7,9	2	1,1
<b>Aorto-Iliac TEA</b>	<b>80</b>	7	8,8	0		7	8,8	0	
<b>Other TEA</b>	<b>140</b>	13	9,3	1	0,7	11	7,9	0	
<b>Fem-fem cross-over bypass</b>	<b>225</b>	20	8,9	3	1,3	14	6,2	4	1,8
<b>Fem-pop bypass AK</b>	<b>216</b>	25	11,6	5	2,3	17	7,9	3	1,4
Prosthesis	205	25	12,2	5	2,4	17	8,3	3	1,5
In situ	9	0		0		0		0	
Other	2	0		0		0		0	
<b>Fem-pop bypass BK</b>	<b>297</b>	57	19,2	5	1,7	41	13,8	10	3,4
Prosthesis	57	14	24,6	2	3,5	7	12,3	5	8,8
In situ	228	41	18,0	3	1,3	32	14,0	5	2,2
Other	12	2	16,7	0		2	16,7	0	
<b>Fem-crural bypass</b>	<b>443</b>	88	19,9	19	4,3	50	11,3	27	6,1
Prosthesis	43	10	23,3	2	4,7	4	9,3	4	9,3
In situ	355	70	19,7	15	4,2	41	11,5	21	5,9
Other	45	8	17,8	2	4,4	5	11,1	2	4,4
<b>Other arterial bypass</b>	<b>65</b>	11	16,9	2	3,1	8	12,3	1	1,5
<b>Embolectomy/Thrombectomy</b>	<b>404</b>	17	4,2	8	2,0	5	1,2	4	1,0
Bypass	109	7	6,4	1	0,9	3	2,8	3	2,8
Arteries	295	10	3,4	7	2,4	2	0,7	1	0,3
<b>Arterial thrombolysis</b>	<b>192</b>	14	7,3	10	5,2	2	1,0	2	1,0
<b>PTA</b>	<b>1107</b>	51	4,6	37	3,3	9	0,8	5	0,5
Aorto-Iliac	677	37	5,5	24	3,5	9	1,3	4	0,6
Femoro-crural	248	5	2,0	5	2,0	0		0	
Bypass	94	6	6,4	5	5,3	0		1	1,1
Other	88	3	3,4	3	3,4	0		0	
<b>Venous procedures</b>	<b>891</b>	9	1,0	4	0,4	3	0,3	1	0,1
Varicose veins	863	8	0,9	4	0,5	3	0,3	0	
Thrombolysis / thrombectomy	23	0		0		0		0	
Other	10	1	10,0	0		0		1	10,0
<b>Reoperations</b>	<b>166</b>	23	13,9	5	3,0	12	7,2	5	3,0
<b>Other arterial operations</b>	<b>670</b>	22	3,3	10	1,5	7	1,0	6	0,9
<b>Other operations</b>	<b>276</b>	9	3,3	2	0,7	2	0,7	2	0,7
<b>All</b>	<b>6508</b>	<b>471</b>	<b>7,2</b>	<b>155</b>	<b>2,4</b>	<b>237</b>	<b>3,6</b>	<b>83</b>	<b>1,3</b>

## Other surgical complications (percent)

Procedure	No.	All	Bleeding	Ruptured abdominal fascia	Bowel obstruction	Ischaemic colon	Peripheral Embolisation	Major neurological	Nerve lesion
<b>TEA a. carotis</b>	<b>205</b>	9,8	1,5	-	-	-	-	6,3	1,0
<b>Other supraaortic operation</b>	<b>26</b>	11,5	7,7	-	-	-	-	3,8	-
<b>Visceral operation</b>	<b>21</b>	9,5	-	4,8	-	4,8	-	-	-
Renal	6	16,7	-	-	-	16,7	-	-	-
Mesenteric	15	6,7	-	6,7	-	-	-	-	-
<b>Aorto/iliac-femoral bypass</b>	<b>320</b>	5,0	1,9	-	0,9	1,3	-	-	0,6
Open surgery	317	5,0	1,9	-	0,9	1,3	-	-	0,6
Endovascular	3	-	-	-	-	-	-	-	-
<b>Abdominal Aortic Aneurysm</b>	<b>581</b>	13,4	5,5	3,1	1,5	4,5	1,9	-	-
Open surgery	568	13,7	5,6	3,2	1,6	4,6	1,9	-	-
Ruptured	205	21,5	10,7	2,9	2,4	8,3	3,4	-	-
Acute	91	12,1	3,3	3,3	2,2	3,3	2,2	-	-
Elective	242	9,1	2,9	3,7	0,8	2,5	0,4	-	-
Other (fibrosis etc.)	30	3,3	-	-	-	-	3,3	-	-
Endovascular	13	-	-	-	-	-	-	-	-
<b>Other aneurysms</b>	<b>178</b>	3,4	2,8	-	-	0,6	-	-	-
<b>Aorto-Iliac TEA</b>	<b>80</b>	1,3	1,3	-	-	-	-	-	-
<b>Other TEA</b>	<b>140</b>	1,4	1,4	-	-	-	-	-	-
<b>Fem-fem cross-over bypass</b>	<b>225</b>	0,4	0,4	-	-	-	-	-	-
<b>Fem-pop bypass AK</b>	<b>216</b>	0,5	0,5	-	-	-	-	-	-
Prosthesis	205	0,5	0,5	-	-	-	-	-	-
In situ	9	-	-	-	-	-	-	-	-
Other	2	-	-	-	-	-	-	-	-
<b>Fem-pop bypass BK</b>	<b>297</b>	2,7	1,3	-	-	0,3	-	-	0,3
Prosthesis	57	-	-	-	-	-	-	-	-
In situ	228	3,5	1,8	-	-	0,4	-	-	0,4
Other	12	-	-	-	-	-	-	-	-
<b>Fem-crural bypass</b>	<b>443</b>	2,0	1,6	-	-	0,2	0,2	-	-
Prosthesis	43	4,7	2,3	-	-	2,3	-	-	-
In situ	355	1,7	1,4	-	-	-	0,3	-	-
Other	45	2,2	2,2	-	-	-	-	-	-
<b>Other arterial bypass</b>	<b>65</b>	3,1	1,5	1,5	-	1,5	-	-	-
<b>Embolectomy/Thrombectomy</b>	<b>404</b>	1,5	1,0	-	-	-	-	-	0,5
Bypass	109	0,9	0,9	-	-	-	-	-	-
Arteries	295	1,7	1,0	-	-	-	-	-	0,7
<b>Arterial thrombolysis</b>	<b>192</b>	4,2	1,6	-	-	-	1,0	-	0,5
<b>PTA</b>	<b>1107</b>	2,0	0,8	-	-	-	1,4	-	-
Aorto-Iliac	677	0,6	0,4	-	-	-	0,1	-	-
Femoro-crural	248	4,8	0,8	-	-	-	4,0	-	-
Bypass	94	2,1	1,1	-	-	-	1,1	-	-
Other	88	4,5	3,4	-	-	-	3,4	-	-
<b>Venous procedures</b>	<b>891</b>	0,2	0,2	-	-	-	-	-	-
Varicose veins	863	0,2	0,2	-	-	-	-	-	-
Thrombolysis / thrombectomy	23	-	-	-	-	-	-	-	-
Other	10	-	-	-	-	-	-	-	-
<b>Reoperations</b>	<b>166</b>	2,4	1,2	0,6	0,6	-	-	-	-
<b>Other arterial operations</b>	<b>670</b>	0,7	0,6	-	-	-	0,1	-	-
<b>Other operations</b>	<b>276</b>	0,4	0,4	-	-	-	-	-	-
<b>All</b>	<b>6508</b>	<b>3,0</b>	<b>1,4</b>	<b>0,3</b>	<b>0,2</b>	<b>0,5</b>	<b>0,5</b>	<b>0,2</b>	<b>0,1</b>

## General complications (percent)

Procedure	No.	All	Cardiac	Pulmonary	Impaired renal function	Dialysis	Stroke	Deep Venous Thrombosis	Pulmonary embolism	Compartment syndrome	Multi Organ Failure
<b>TEA a. carotis</b>	<b>205</b>	7,8	1,5	1,0	-	0,5	0,5	-	-	-	-
<b>Other supraaortic operation</b>	<b>26</b>	-	-	-	-	-	-	-	-	-	-
<b>Visceral operation</b>	<b>21</b>	19,0	4,8	4,8	9,5	4,8	-	-	-	-	-
Renal	6	50,0	-	16,7	33,3	16,7	-	-	-	-	-
Mesenteric	15	6,7	6,7	-	-	-	-	-	-	-	-
<b>Aorto/iliac-femoral bypass</b>	<b>320</b>	14,1	5,9	4,1	1,6	0,6	0,9	-	-	0,3	0,9
Open surgery	317	14,2	6,0	4,1	1,6	0,6	0,9	-	-	0,3	0,9
Endovascular	3	-	-	-	-	-	-	-	-	-	-
<b>Abdominal Aortic Aneurysm</b>	<b>581</b>	38,6	16,0	13,9	11,9	9,8	1,5	0,2	0,3	0,2	4,3
Open surgery	568	38,9	16,4	14,3	12,0	10,0	1,6	0,2	0,4	0,2	4,4
Ruptured	205	56,6	22,9	19,0	17,1	18,5	3,4	0,5	1,0	-	6,3
Acute	91	30,8	14,3	11,0	11,0	3,3	-	-	-	-	1,1
Elective	242	28,1	13,2	12,0	7,9	5,4	0,8	-	-	0,4	4,1
Other (fibrosis etc.)	30	30,0	3,3	10,0	13,3	10,0	-	-	-	-	3,3
Endovascular	13	23,1	-	-	7,7	-	-	-	-	-	-
<b>Other aneurysms</b>	<b>178</b>	7,9	4,5	1,1	0,6	-	0,6	-	-	1,1	-
<b>Aorto-Iliac TEA</b>	<b>80</b>	7,5	2,5	2,5	-	-	1,3	-	-	1,3	-
<b>Other TEA</b>	<b>140</b>	4,3	2,1	0,7	1,4	0,7	-	-	-	-	-
<b>Fem-fem cross-over bypass</b>	<b>225</b>	6,2	2,2	0,9	1,3	0,4	1,3	-	-	0,9	0,4
<b>Fem-pop bypass AK</b>	<b>216</b>	3,2	1,9	1,4	-	-	-	-	-	-	-
Prosthesis	205	2,9	1,5	1,5	-	-	-	-	-	-	-
In situ	9	11,1	11,1	-	-	-	-	-	-	-	-
Other	2	-	-	-	-	-	-	-	-	-	-
<b>Fem-pop bypass BK</b>	<b>297</b>	6,4	4,4	0,3	1,3	-	-	-	0,3	0,3	-
Prosthesis	57	5,3	1,8	-	1,8	-	-	-	-	1,8	-
In situ	228	6,1	4,8	0,4	1,3	-	-	-	-	-	-
Other	12	16,7	8,3	-	-	-	-	-	8,3	-	-
<b>Fem-crural bypass</b>	<b>443</b>	6,8	3,8	1,6	0,7	0,2	0,2	-	-	0,7	0,5
Prosthesis	43	7,0	-	2,3	-	2,3	-	-	-	-	2,3
In situ	355	6,8	4,5	1,4	0,8	-	0,3	-	-	0,8	0,3
Other	45	6,7	2,2	2,2	-	-	-	-	-	-	-
<b>Other arterial bypass</b>	<b>65</b>	12,3	3,1	3,1	1,5	1,5	-	-	-	-	-
<b>Embolectomy/Thrombectomy</b>	<b>404</b>	9,9	4,7	1,5	1,2	1,0	0,7	-	0,2	1,7	0,5
Bypass	109	6,4	4,6	0,9	-	-	-	-	-	1,8	-
Arteries	295	11,2	4,7	1,7	1,7	1,4	1,0	-	0,3	1,7	0,7
<b>Arterial thrombolysis</b>	<b>192</b>	3,6	1,0	0,5	-	-	0,5	-	-	1,6	-
<b>PTA</b>	<b>1107</b>	2,3	1,2	0,4	0,2	0,1	0,3	-	-	0,1	-
Aorto-Iliac	677	2,1	1,2	0,4	0,3	0,1	0,1	-	-	-	-
Femoro-crural	248	2,4	1,6	0,4	-	-	-	-	-	-	-
Bypass	94	1,1	-	-	-	-	-	-	-	1,1	-
Other	88	5,7	1,1	-	-	-	2,3	-	-	-	-
<b>Venous procedures</b>	<b>891</b>	0,1	-	0,1	-	-	-	-	-	-	-
Varicose veins	863	0,1	-	0,1	-	-	-	-	-	-	-
Thrombolysis / thrombectomy	23	-	-	-	-	-	-	-	-	-	-
Other	10	-	-	-	-	-	-	-	-	-	-
<b>Reoperations</b>	<b>166</b>	2,4	0,6	0,6	0,6	-	-	-	-	-	0,6
<b>Other arterial operations</b>	<b>670</b>	1,9	1,2	0,1	0,6	0,1	0,3	-	-	-	-
<b>Other operations</b>	<b>276</b>	1,4	-	0,4	0,4	0,4	-	-	-	-	-
<b>All</b>	<b>6508</b>	<b>7,5</b>	<b>3,3</b>	<b>2,0</b>	<b>1,6</b>	<b>1,1</b>	<b>0,4</b>	<b>0,0</b>	<b>0,1</b>	<b>0,3</b>	<b>0,5</b>



## Presentation of results for the departments

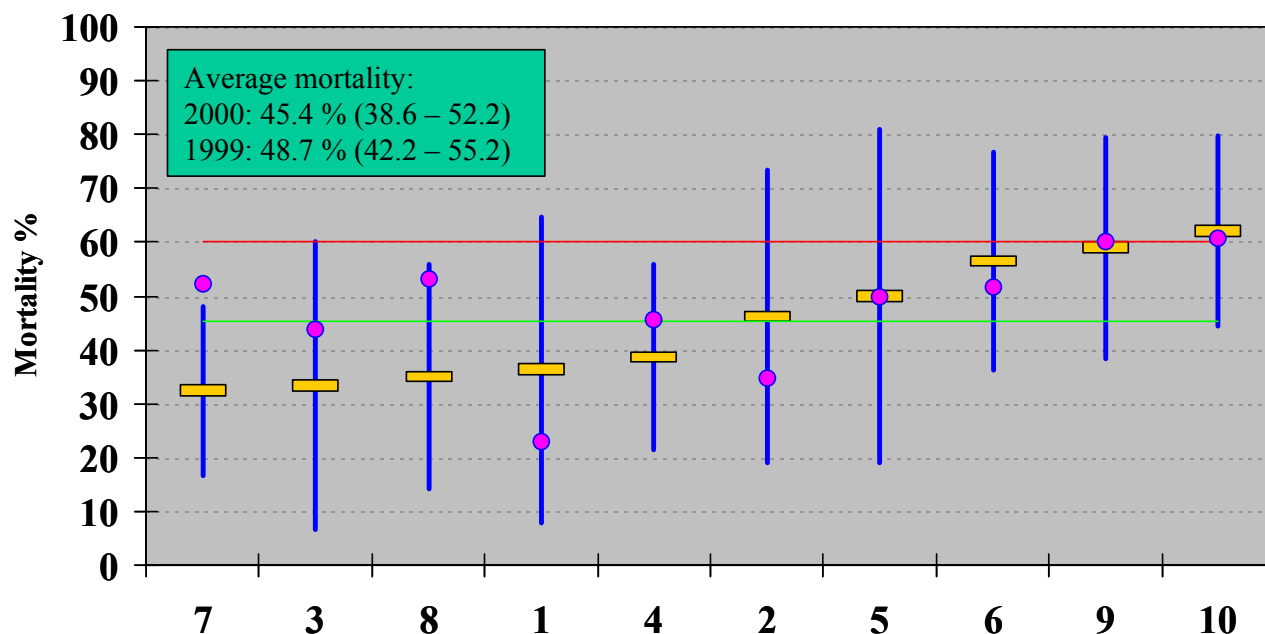
The quality data in this report are also given with results from each department. The name of the department is, however, *not* given, since the focus of the national report is on nation-wide variations rather than the individual departmental result. Each department is given its own result for comparison with results from other department, which leads to the first step in the quality process, the *internal audit*. If results divert significantly from the average, or are significantly worse than the accepted standards, attention should be given to explain and presumably correct the problem. If the poor results tend to be repeated over the years, it may lead to *external audit* initiated from the department itself or the board of the Danish Vascular Registry. In addition to the obvious explanation that bad results are a consequence of poor performance, reported bad results can emerge from improper understanding of the definitions of the dataset, improper data handling, missing follow-up or factors related to risk factors and patient selection. Although the interpretation of data can get very complicated, it is still of great importance to publish the inter-department variation for the sake of auditing. Of course, it should be kept in mind that variations are inevitable according to the rules of statistics. When 11 departments are compared, there will always be about half below and above average, even if all are performing excellently.

To the public (patients) these data on variation are of lesser interest; here the important question is whether the department lives up to established levels of good standards or not. Therefore a separate version with basic well explained statistics is planned for this year, aiming at the non-professional public.

Few standards have been established in vascular surgery, but some will be presented in the next pages.

The following figures are structured in the same way: The result of each department is marked with a short horizontal (yellow) line, and the departments are ranked from best to worse. The 95% statistical confidence limit is marked with a vertical (blue) line, indicating the limits of reliability for each result. A (green) horizontal line marks the average result, and when known, a (red) horizontal line marks the established standard for good performance. Finally, a (purple) dot marks the result from 1999 for comparison with this years result, and the ranking of the department in 1999 is given on the x-axis. The mortality data are corrected from the Civil Registry System.

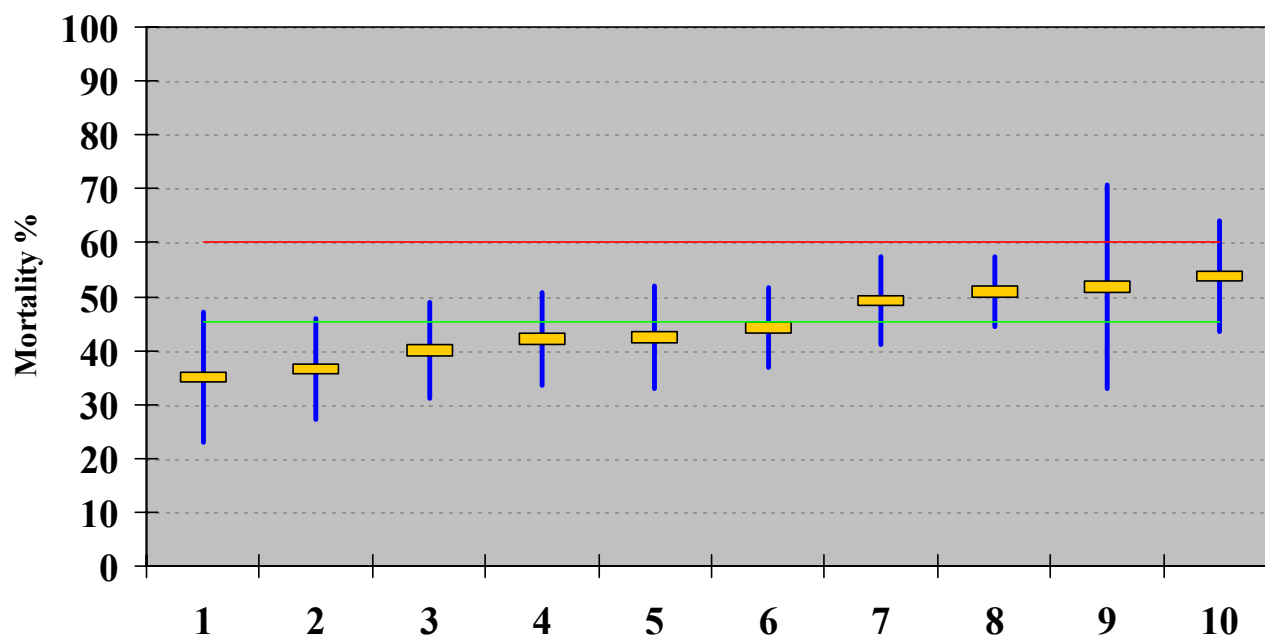
### 30 day mortality for operation of Ruptured Abdominal Aortic Aneurysm 2000



Patients dying during the operation are included, but not patients who died before the operation could be initiated. Untreated, this condition bears 100% mortality within hours or days. The Scandinavian standard for treatment of this disease is mortality below 60%<sup>3</sup>, and the national average of 49% is well below. All departments seem to have satisfactory results.

The Danish Vascular Registry has in its present form been collecting data since 1996. It could therefore be of interest to calculate the departmental mortality over the full 5 years period, as shown below:

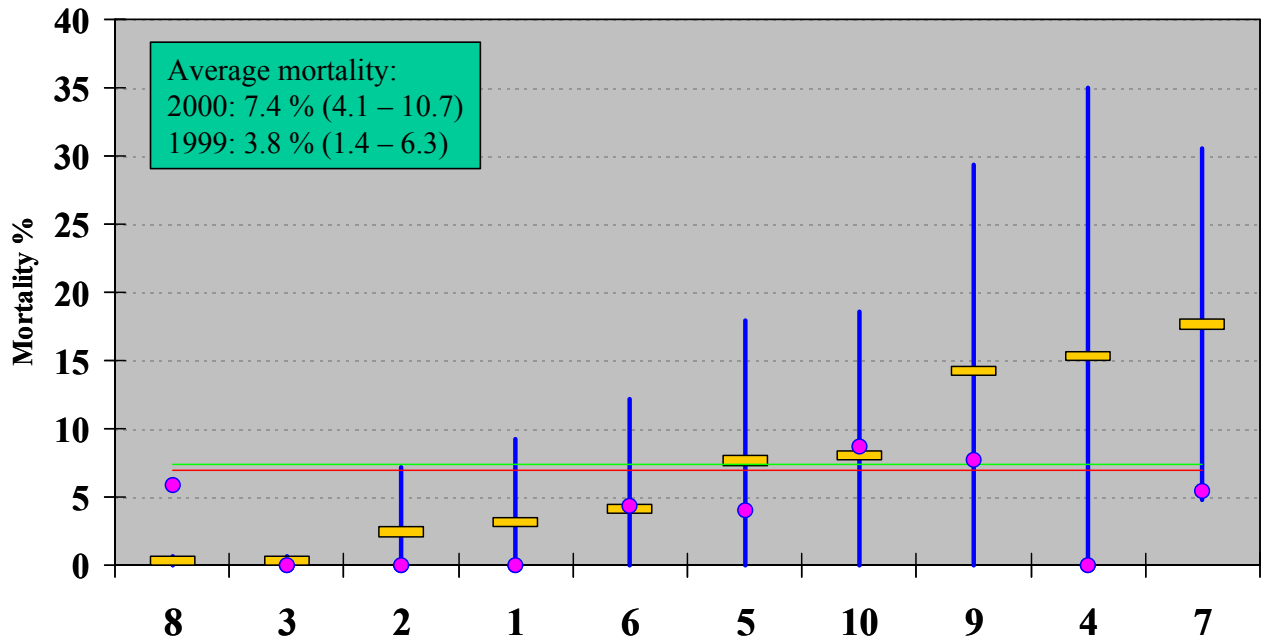
### 30 day mortality for operation of ruptured Abdominal Aortic Aneurysm 1996 – 2000



As seen, the variations narrow around the average, and the confidence limits become smaller.

<sup>3</sup> Bergqvist D et al. Nordisk Medicin 1994; 109: 10: 256-7

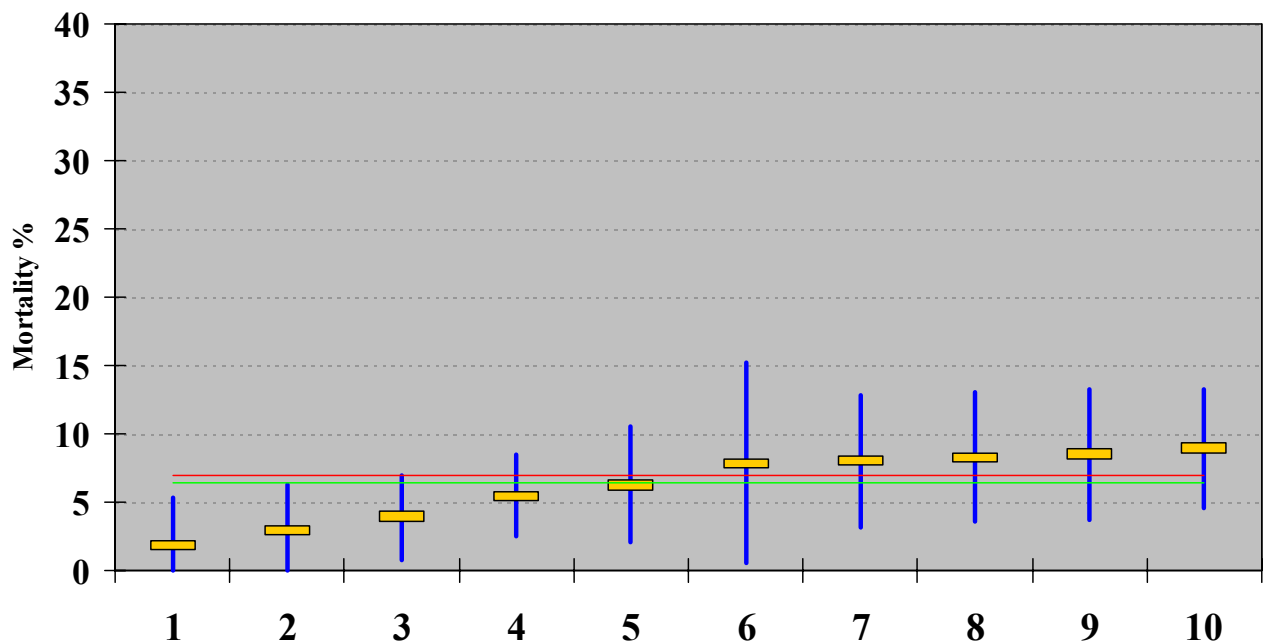
### 30 day mortality for operation of Elective Abdominal Aortic Aneurysm 2000



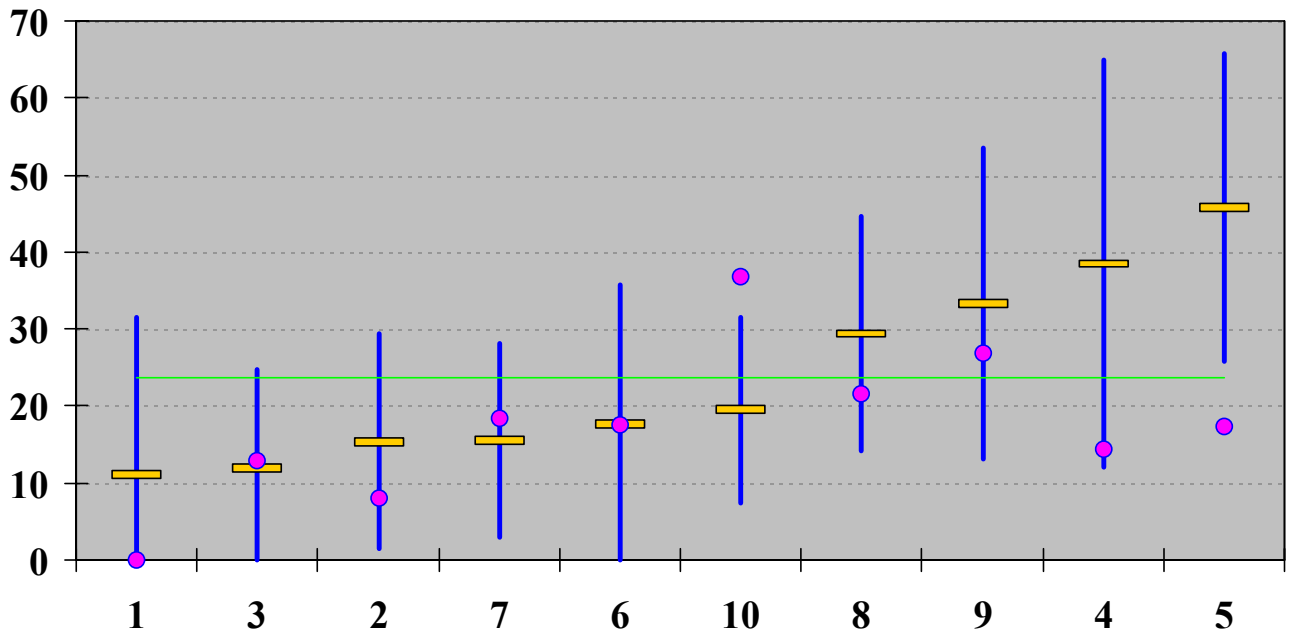
The average mortality is higher than the very low figure of 1999 and is a little above the nordic standard. Like the previous years huge shift in ranking are seen among departments.

Again, the data can be calculated for the last five years, as shown below. The departments become more centred on the average, and the confidence limits narrows.

### 30 day mortality for operation of Elective Abdominal Aortic Aneurysm 1996 - 2000



## General complications of Operation for Elective Abdominal Aortic Aneurysm



Elective surgery for AAA cannot be performed without a certain mortality and morbidity, despite the many efforts to reduce it. The general complications illustrated above consist mainly of cardiac, pulmonary and renal complications and stroke. The last 3 years, a department placed significantly higher than the rest, and this is seen again this year. This department will be encouraged to perform an audit to clarify the reasons. Again, the departments have made huge shifts in rank, but mostly within the statistical confidence limits.

### Causes of variation

As it has been stated above, several factors can influence the outcome of the individual patient, and comparison of results from departments (or surgeons) should be made with caution and with adjustment for the most significant risk factors. Some factors are inherent in the patients themselves, and cannot be avoided. Sometimes the risk factors can be (partially) corrected with optimisation of preoperative treatment, or they may, at the least, give rise to a more precise evaluation of the risk for the patient and lead to a better patient selection. This problem has been addressed in the 1998 report from the Danish Vascular Registry, found on the Internet at [www.karbase.dk](http://www.karbase.dk).