

Belgian Cancer Registry



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**RIZIV/INAMI convention Complex Surgery**

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**Pancreas and peri-ampullary region**

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Global report

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July 2019 - June 2024

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Belgian Cancer Registry Team

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Version 4.1

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# 1. Introduction and patient selection

## 1.1. Project background

This report includes data that have been delivered by recognised medical centres to the Belgian Cancer Registry for the five years of the RIZIV/INAMI convention regarding the reimbursement of complex surgery for benign, premalignant and malignant conditions of the pancreas and/or periampullary region. All patients considered for complex surgery at a multidisciplinary consult (MC) at an expert centre were included. For the patients for whom it was decided not to perform complex surgery only the descriptives were analysed. There are 3 major types of surgical indications: malignant tumours, benign tumours and non-tumoural conditions. The report is subdivided in 2 chapters: tumoural and non-tumoural pathology.

For details on the calculation of the indicators, see document 'Complex Surgery - Pancreas Reading guide v2.0 (14/02/2020)'. After the fifth convention year the indicator 'completeness of registration' will include all the data of the five convention years, including delayed/adjusted data deliveries.

## 1.2. Data selection criteria

All data from registrations by recognised expert centres sent to the Belgian Cancer Registry were included if:

- In case of surgery: date of surgery 1/07/2019 - 30/06/2024.
- In case of no surgery: date of MC 1/07/2019 - 30/06/2024.

Remark:

- Foreign patients were not included in the data selection criteria.
- In case that the same patient was registered by two different hospitals, the registration was assigned to the centre where the surgery was performed.
- In case that the same patient was registered by two different hospitals without any surgery, the registration was assigned to the centre where the first MC took place.
- In case that the same patient had multiple separate surgeries during the convention period, the different registrations were assessed individually to determine which registration was retained for the report.
- Registrations sent by collaborating hospitals were counted among those of the main expert centre within their collaboration.

## 2. General overview of registered patients

**Table 1.** Number of patients discussed on a multidisciplinary expert consult (MC expert), overview.

Patient group	Belgium									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
<i>Patients discussed on a MC expert</i>	<b>1,939</b>	–	<b>2,214</b>	–	<b>2,376</b>	–	<b>2,404</b>	–	<b>2,626</b>	–
<i>Patients with surgery</i>	<b>787</b>	<b>40.6<sup>a</sup></b>	<b>928</b>	<b>41.9<sup>a</sup></b>	<b>920</b>	<b>38.7<sup>a</sup></b>	<b>919</b>	<b>38.2<sup>a</sup></b>	<b>1,011</b>	<b>38.5<sup>a</sup></b>
<i>Pathology type</i>										
Malignant tumour	598	76.0 <sup>b</sup>	721	77.7 <sup>b</sup>	739	80.3 <sup>b</sup>	716	77.9 <sup>b</sup>	799	79.0 <sup>b</sup>
Benign tumour	126	16.0 <sup>b</sup>	135	14.5 <sup>b</sup>	112	12.2 <sup>b</sup>	118	12.8 <sup>b</sup>	112	11.1 <sup>b</sup>
Non-tumoural	63	8.0 <sup>b</sup>	72	7.8 <sup>b</sup>	69	7.5 <sup>b</sup>	85	9.2 <sup>b</sup>	100	9.9 <sup>b</sup>
<i>Type of surgery</i>										
242830-242841: Pancreaticoduodenectomy	563	71.5 <sup>b</sup>	601	64.8 <sup>b</sup>	597	64.9 <sup>b</sup>	597	65.0 <sup>b</sup>	620	61.3 <sup>b</sup>
Pancreaticoduodenectomy	512	90.9 <sup>c</sup>	548	91.2 <sup>c</sup>	548	91.8 <sup>c</sup>	533	89.3 <sup>c</sup>	550	88.7 <sup>c</sup>
Total Pancreatectomy	51	9.1 <sup>c</sup>	53	8.8 <sup>c</sup>	49	8.2 <sup>c</sup>	64	10.7 <sup>c</sup>	70	11.3 <sup>c</sup>
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	63	8.0 <sup>b</sup>	104	11.2 <sup>b</sup>	88	9.6 <sup>b</sup>	122	13.3 <sup>b</sup>	90	8.9 <sup>b</sup>
242874-242885: Hemipancreatectomy left	150	19.1 <sup>b</sup>	208	22.4 <sup>b</sup>	217	23.6 <sup>b</sup>	191	20.8 <sup>b</sup>	285	28.2 <sup>b</sup>
242896-242900: Enucleation of a pancreatic tumour	11	1.4 <sup>b</sup>	15	1.6 <sup>b</sup>	18	2.0 <sup>b</sup>	9	1.0 <sup>b</sup>	16	1.6 <sup>b</sup>
<i>Expert centres</i>										
S1	85	10.8 <sup>b</sup>	83	8.9 <sup>b</sup>	98	10.7 <sup>b</sup>	90	9.8 <sup>b</sup>	103	10.2 <sup>b</sup>
S2	36	4.6 <sup>b</sup>	36	3.9 <sup>b</sup>	33	3.6 <sup>b</sup>	41	4.5 <sup>b</sup>	41	4.1 <sup>b</sup>
S3	21	2.7 <sup>b</sup>	28	3.0 <sup>b</sup>	27	2.9 <sup>b</sup>	20	2.2 <sup>b</sup>	29	2.9 <sup>b</sup>
S4	135	17.2 <sup>b</sup>	154	16.6 <sup>b</sup>	161	17.5 <sup>b</sup>	154	16.8 <sup>b</sup>	192	19.0 <sup>b</sup>

Belgium										
Patient group	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
S5	37	4.7 <sup>b</sup>	46	5.0 <sup>b</sup>	34	3.7 <sup>b</sup>	34	3.7 <sup>b</sup>	44	4.4 <sup>b</sup>
S6	65	8.3 <sup>b</sup>	69	7.4 <sup>b</sup>	95	10.3 <sup>b</sup>	100	10.9 <sup>b</sup>	101	10.0 <sup>b</sup>
S7	70	8.9 <sup>b</sup>	80	8.6 <sup>b</sup>	64	7.0 <sup>b</sup>	79	8.6 <sup>b</sup>	54	5.3 <sup>b</sup>
S8	45	5.7 <sup>b</sup>	56	6.0 <sup>b</sup>	47	5.1 <sup>b</sup>	58	6.3 <sup>b</sup>	58	5.7 <sup>b</sup>
S9	87	11.1 <sup>b</sup>	106	11.4 <sup>b</sup>	107	11.6 <sup>b</sup>	111	12.1 <sup>b</sup>	115	11.4 <sup>b</sup>
S10	35	4.4 <sup>b</sup>	27	2.9 <sup>b</sup>	33	3.6 <sup>b</sup>	36	3.9 <sup>b</sup>	34	3.4 <sup>b</sup>
S11	30	3.8 <sup>b</sup>	45	4.8 <sup>b</sup>	37	4.0 <sup>b</sup>	40	4.4 <sup>b</sup>	31	3.1 <sup>b</sup>
S12	44	5.6 <sup>b</sup>	52	5.6 <sup>b</sup>	51	5.5 <sup>b</sup>	45	4.9 <sup>b</sup>	64	6.3 <sup>b</sup>
S13	30	3.8 <sup>b</sup>	58	6.3 <sup>b</sup>	41	4.5 <sup>b</sup>	31	3.4 <sup>b</sup>	38	3.8 <sup>b</sup>
S14	39	5.0 <sup>b</sup>	51	5.5 <sup>b</sup>	64	7.0 <sup>b</sup>	54	5.9 <sup>b</sup>	75	7.4 <sup>b</sup>
S15	28	3.6 <sup>b</sup>	37	4.0 <sup>b</sup>	28	3.0 <sup>b</sup>	26	2.8 <sup>b</sup>	32	3.2 <sup>b</sup>
<b>Patients without surgery</b>	<b>1,152</b>	<b>59.4<sup>a</sup></b>	<b>1,286</b>	<b>58.1<sup>a</sup></b>	<b>1,456</b>	<b>61.3<sup>a</sup></b>	<b>1,485</b>	<b>61.8<sup>a</sup></b>	<b>1,615</b>	<b>61.5<sup>a</sup></b>
<b>Pathology type</b>										
Malignant tumour	736	63.9 <sup>b</sup>	746	58.0 <sup>b</sup>	809	55.6 <sup>b</sup>	834	56.2 <sup>b</sup>	879	54.4 <sup>b</sup>
Benign tumour	258	22.4 <sup>b</sup>	361	28.1 <sup>b</sup>	395	27.1 <sup>b</sup>	421	28.4 <sup>b</sup>	501	31.0 <sup>b</sup>
Non-tumoural	158	13.7 <sup>b</sup>	179	13.9 <sup>b</sup>	252	17.3 <sup>b</sup>	230	15.5 <sup>b</sup>	235	14.6 <sup>b</sup>
<b>Expert centres</b>										
S1	59	5.1 <sup>b</sup>	71	5.5 <sup>b</sup>	72	4.9 <sup>b</sup>	99	6.7 <sup>b</sup>	91	5.6 <sup>b</sup>
S2	64	5.6 <sup>b</sup>	79	6.1 <sup>b</sup>	98	6.7 <sup>b</sup>	124	8.4 <sup>b</sup>	121	7.5 <sup>b</sup>
S3	29	2.5 <sup>b</sup>	46	3.6 <sup>b</sup>	89	6.1 <sup>b</sup>	97	6.5 <sup>b</sup>	85	5.3 <sup>b</sup>
S4	108	9.4 <sup>b</sup>	152	11.8 <sup>b</sup>	173	11.9 <sup>b</sup>	144	9.7 <sup>b</sup>	182	11.3 <sup>b</sup>
S5	48	4.2 <sup>b</sup>	24	1.9 <sup>b</sup>	43	3.0 <sup>b</sup>	50	3.4 <sup>b</sup>	97	6.0 <sup>b</sup>
S6	116	10.1 <sup>b</sup>	112	8.7 <sup>b</sup>	146	10.0 <sup>b</sup>	143	9.6 <sup>b</sup>	148	9.2 <sup>b</sup>
S7	82	7.1 <sup>b</sup>	96	7.5 <sup>b</sup>	99	6.8 <sup>b</sup>	118	7.9 <sup>b</sup>	126	7.8 <sup>b</sup>
S8	80	6.9 <sup>b</sup>	96	7.5 <sup>b</sup>	113	7.8 <sup>b</sup>	119	8.0 <sup>b</sup>	137	8.5 <sup>b</sup>
S9	101	8.8 <sup>b</sup>	72	5.6 <sup>b</sup>	78	5.4 <sup>b</sup>	63	4.2 <sup>b</sup>	77	4.8 <sup>b</sup>
S10	105	9.1 <sup>b</sup>	98	7.6 <sup>b</sup>	65	4.5 <sup>b</sup>	67	4.5 <sup>b</sup>	92	5.7 <sup>b</sup>

Belgium										
Patient group	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
S11	75	6.5 <sup>b</sup>	85	6.6 <sup>b</sup>	59	4.1 <sup>b</sup>	30	2.0 <sup>b</sup>	3	0.2 <sup>b</sup>
S12	51	4.4 <sup>b</sup>	71	5.5 <sup>b</sup>	80	5.5 <sup>b</sup>	66	4.4 <sup>b</sup>	85	5.3 <sup>b</sup>
S13	87	7.6 <sup>b</sup>	111	8.6 <sup>b</sup>	114	7.8 <sup>b</sup>	137	9.2 <sup>b</sup>	120	7.4 <sup>b</sup>
S14	79	6.9 <sup>b</sup>	137	10.7 <sup>b</sup>	184	12.6 <sup>b</sup>	177	11.9 <sup>b</sup>	190	11.8 <sup>b</sup>
S15	68	5.9 <sup>b</sup>	36	2.8 <sup>b</sup>	43	3.0 <sup>b</sup>	51	3.4 <sup>b</sup>	61	3.8 <sup>b</sup>

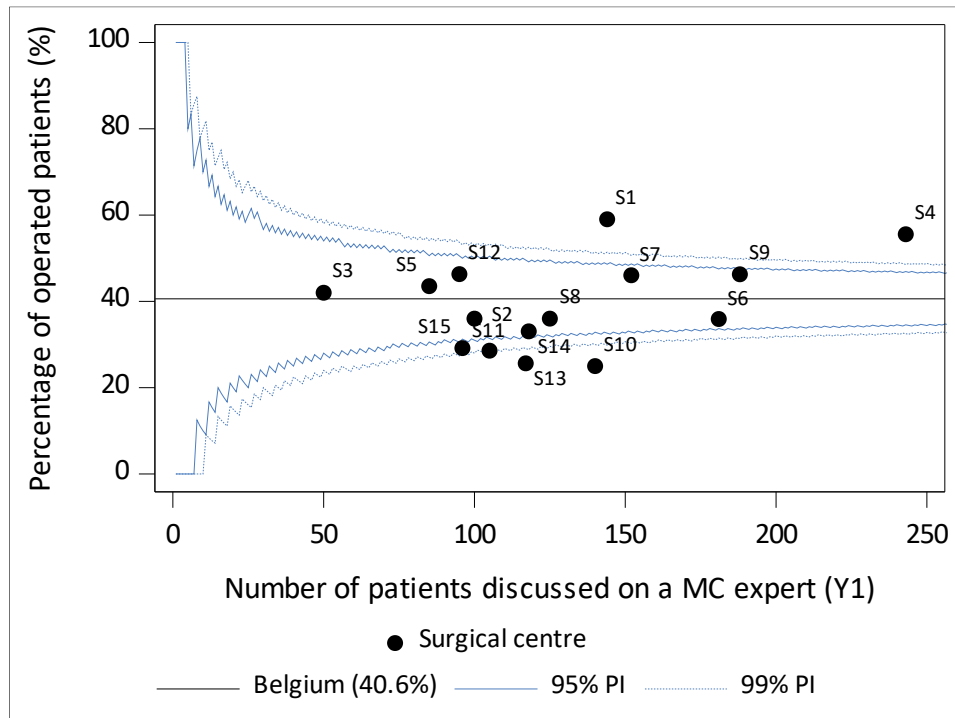
<sup>a</sup> percentage relative to the number of patients with MC expert

<sup>b</sup> percentage relative to the number of patients with/without surgery

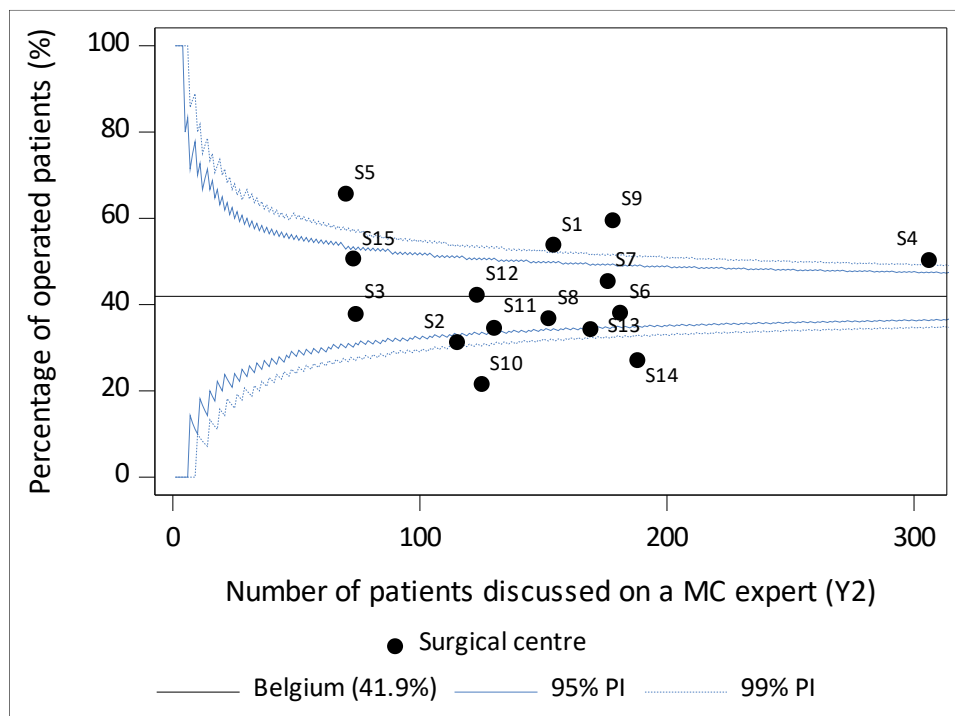
<sup>c</sup> percentage relative to the number of patients with 242830-242841 Pancreaticoduodenectomy as type of surgery

**Figure 1:** Funnel and spaghetti plot of the proportion of patients discussed on a MC expert who were treated with surgery by an individual expert centre, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5, (f) all years combined, (g) evolution year 1, 2, 3, 4 and 5.

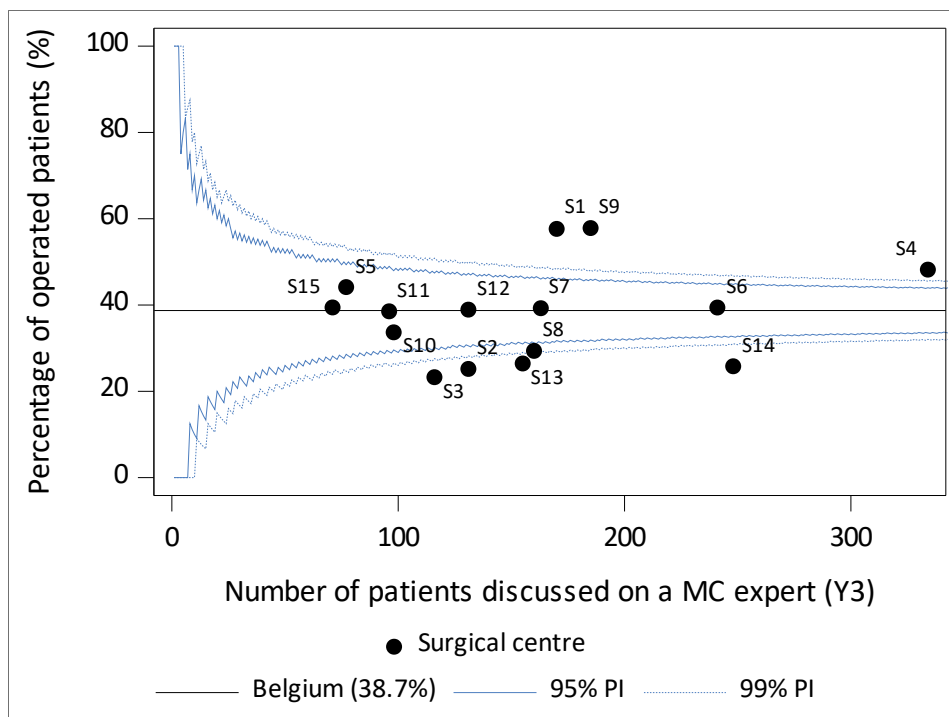
(a)



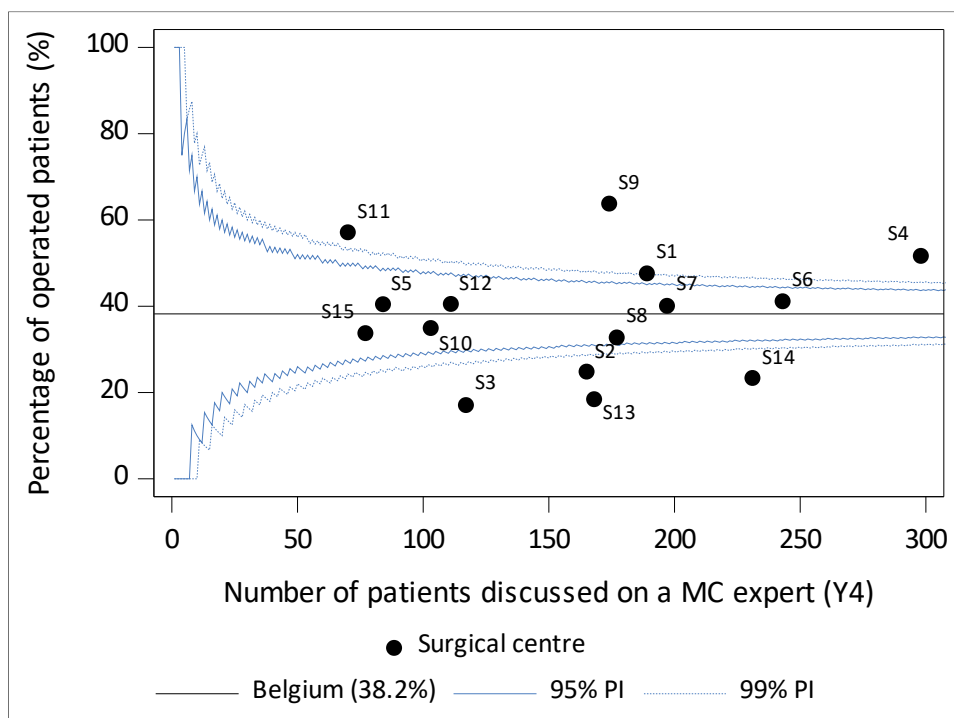
(b)



(c)

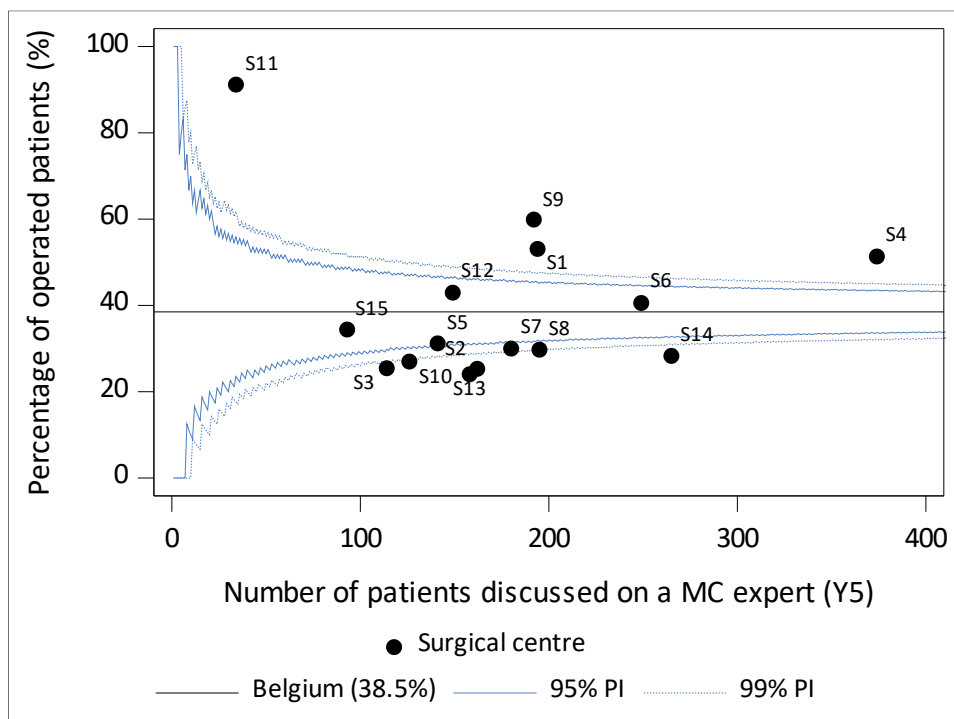


(d)

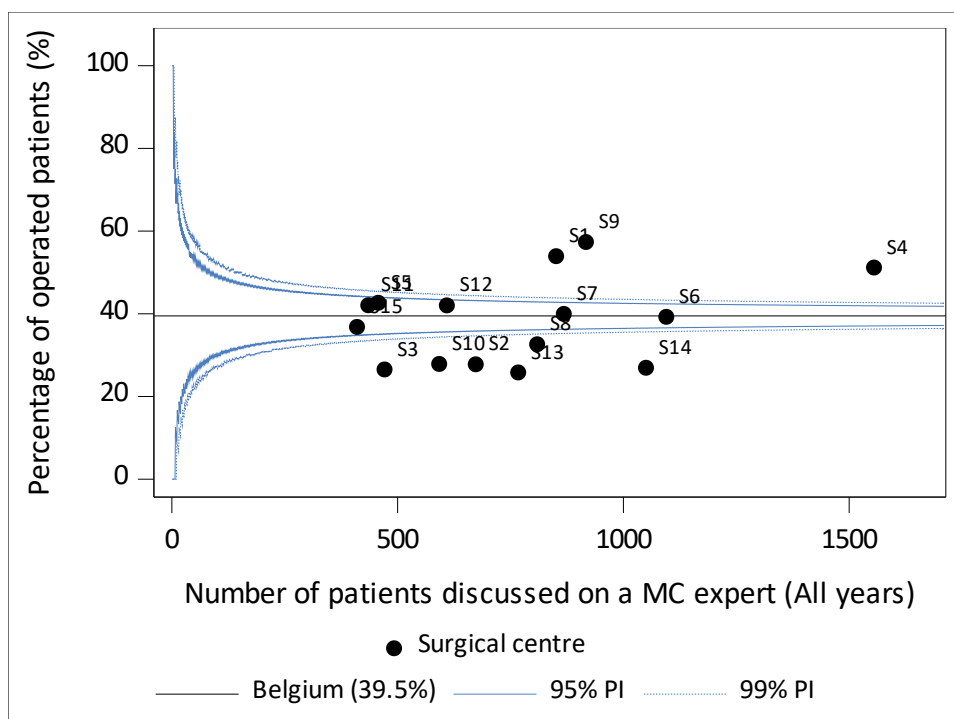




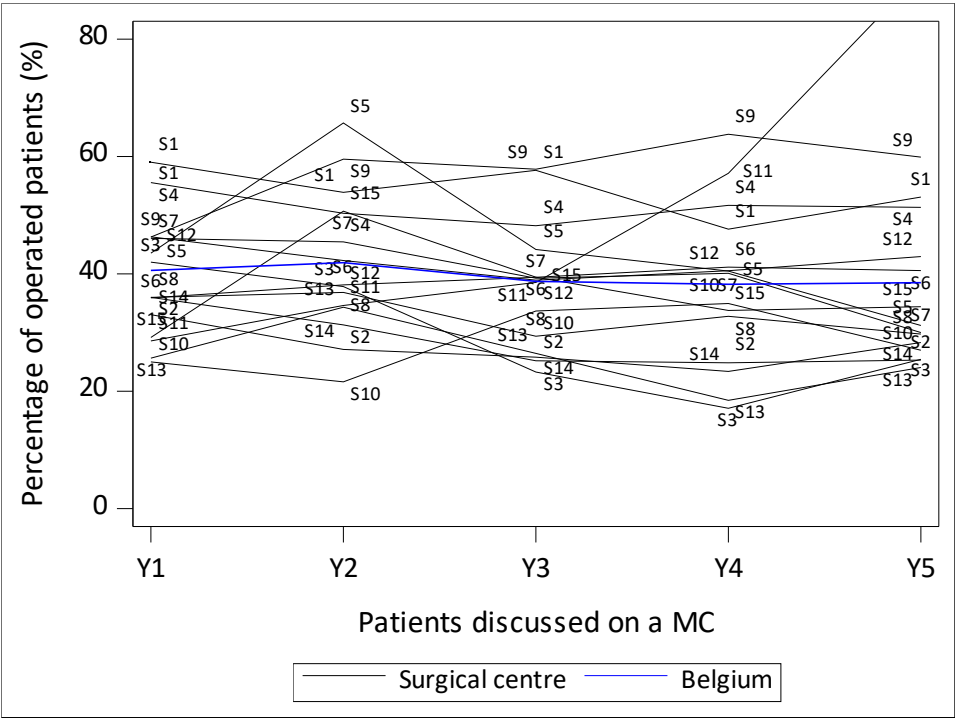
(e)



(f)

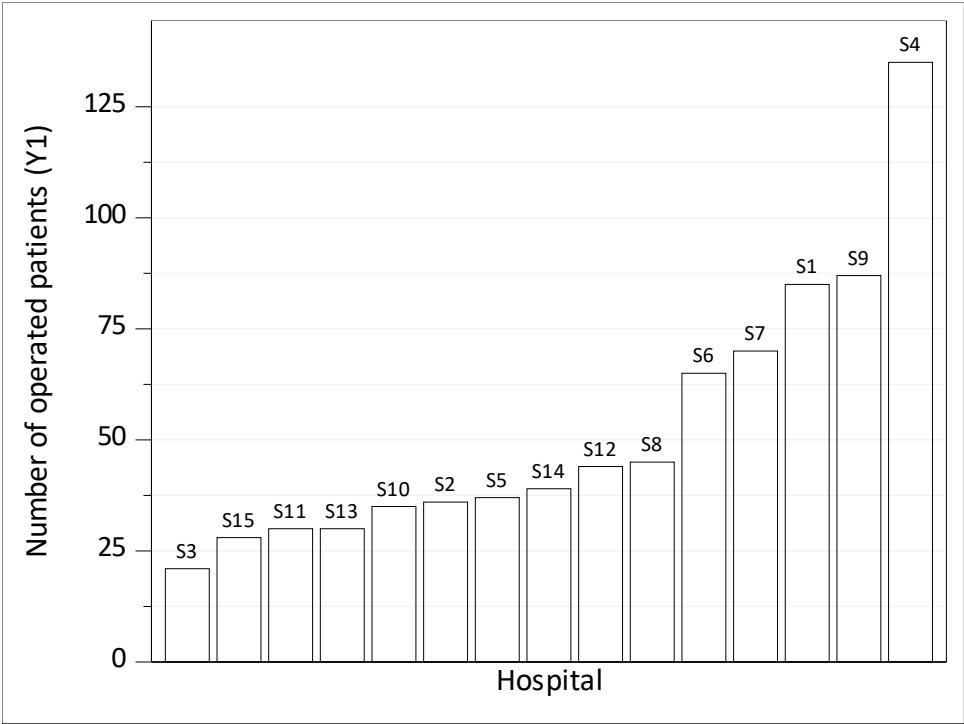


(g)

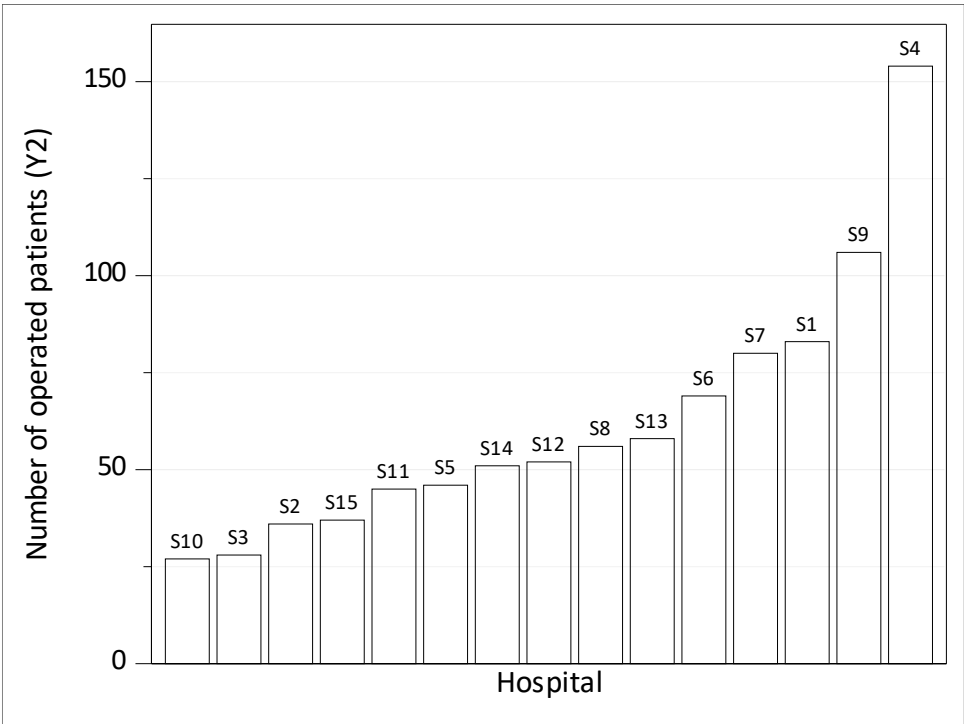


**Figure 2:** Absolute number of patients discussed on a MC expert that were treated with surgery in the five convention years, by surgical centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5 and (f) all years combined.

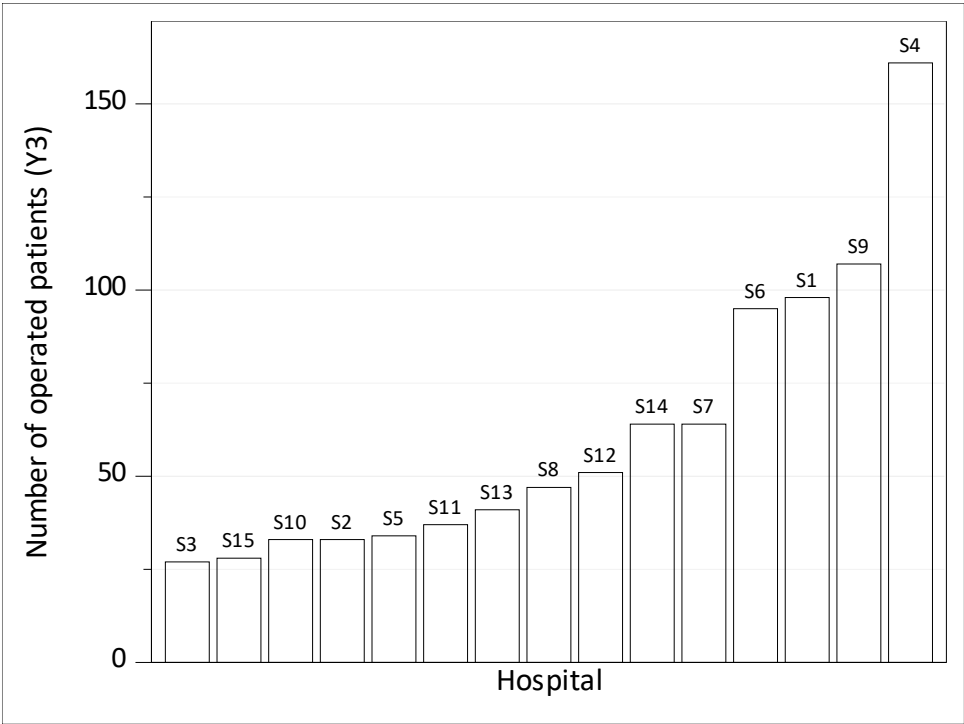
(a)



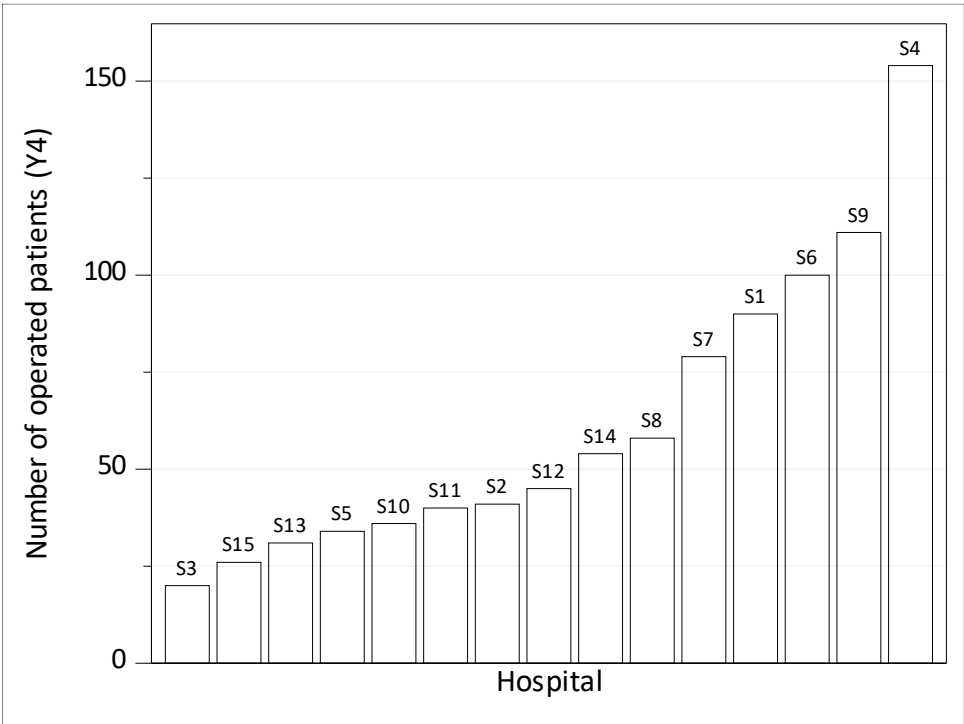
(b)



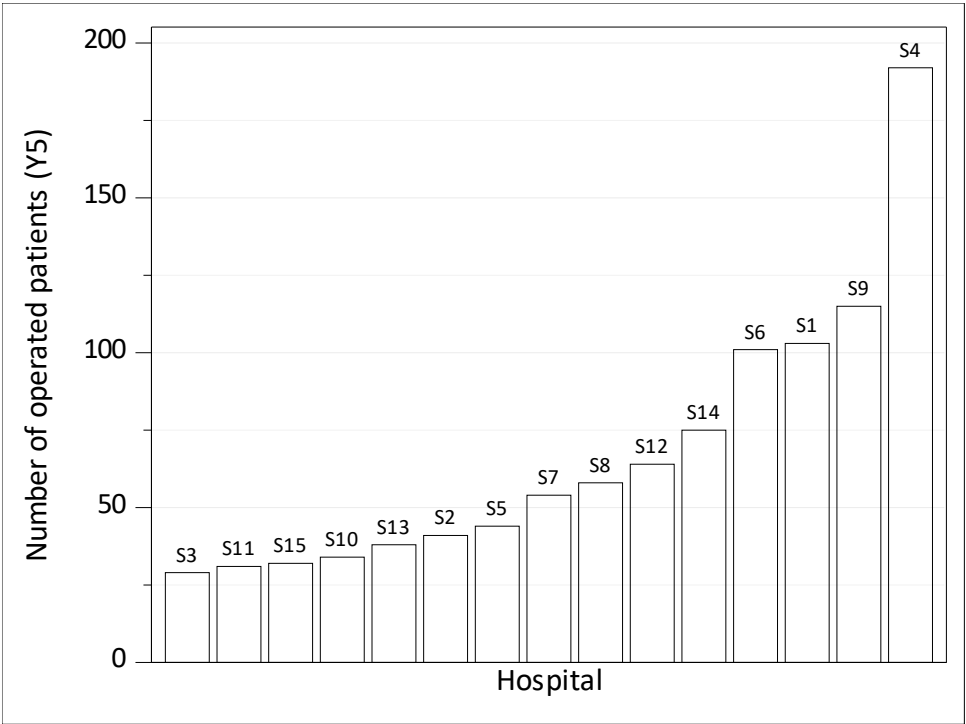
(c)



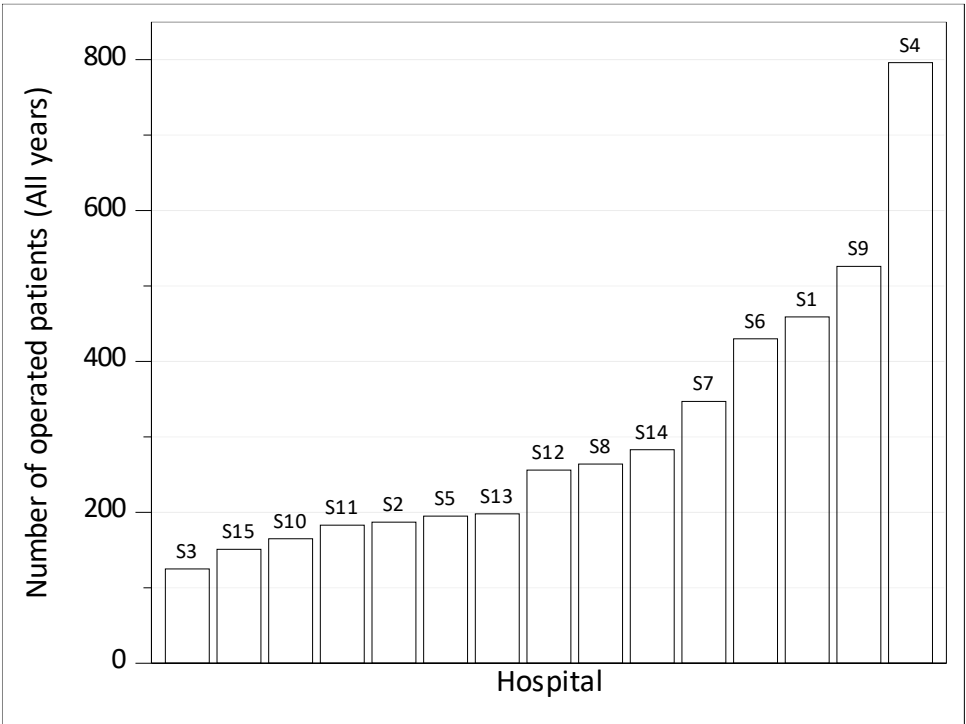
(d)



(e)

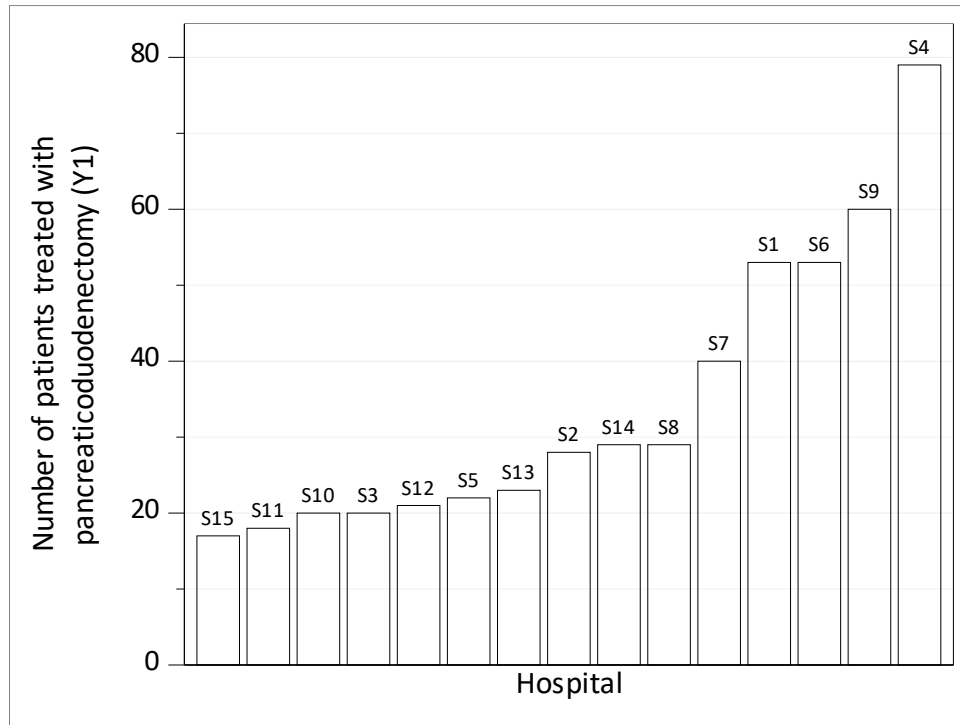


(f)

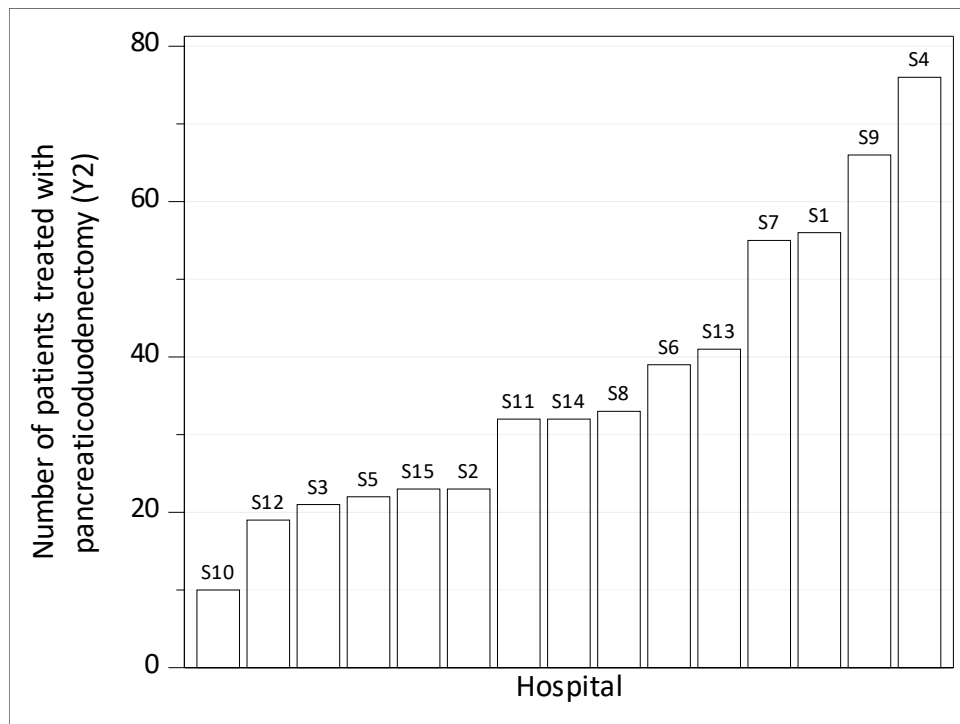


**Figure 3:** Absolute number of patients discussed on a MC expert that were treated with pancreaticoduodenectomy in the five convention years, by surgical centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5 and (f) all years combined.

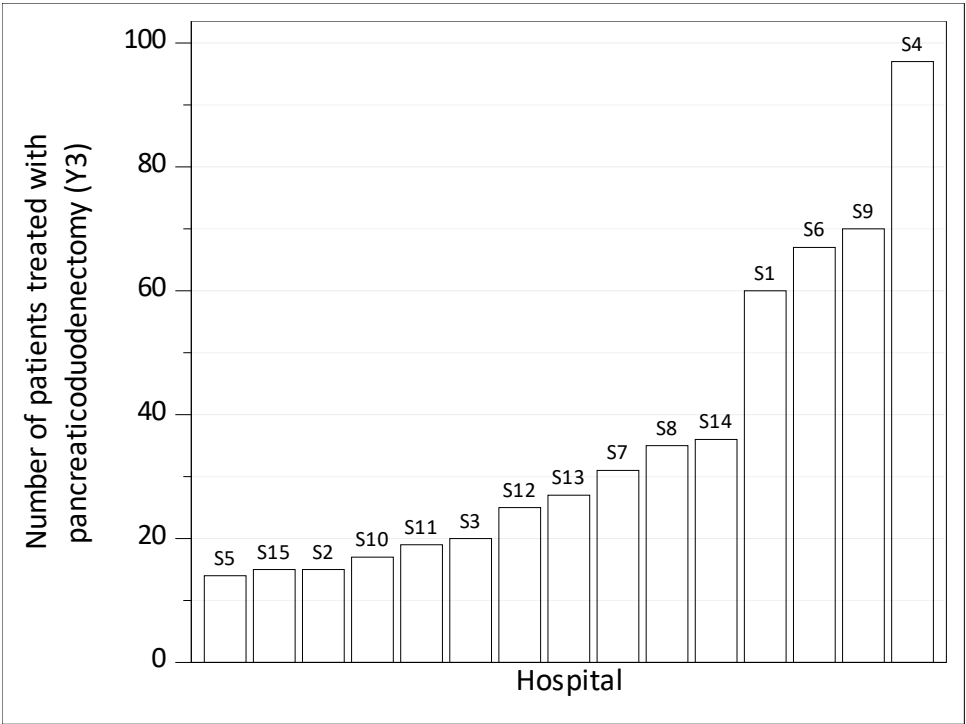
(a)



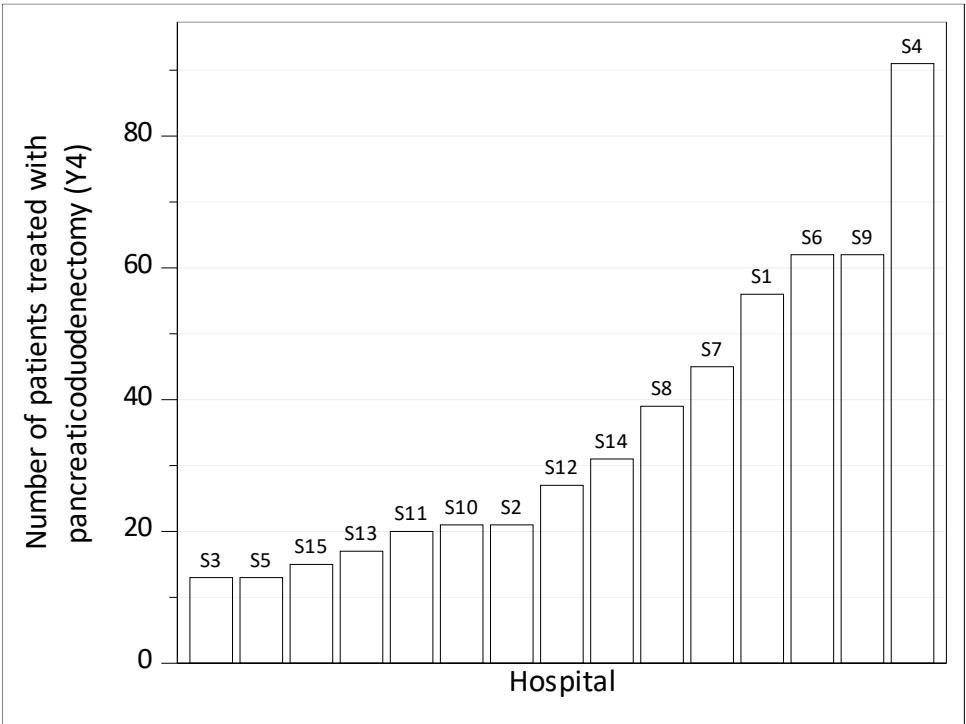
(b)



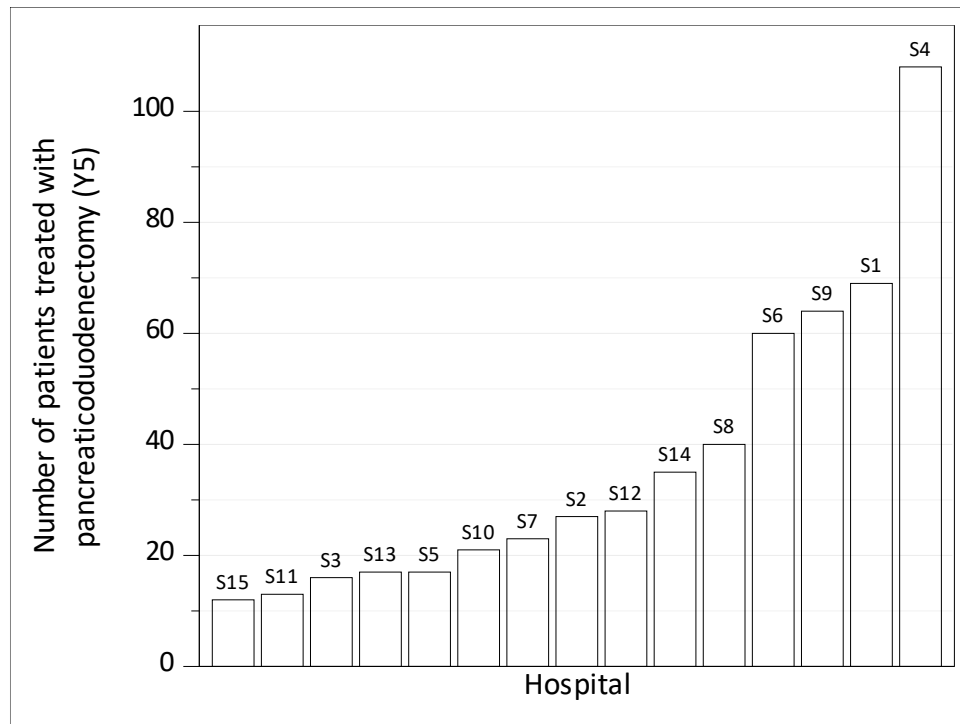
(c)



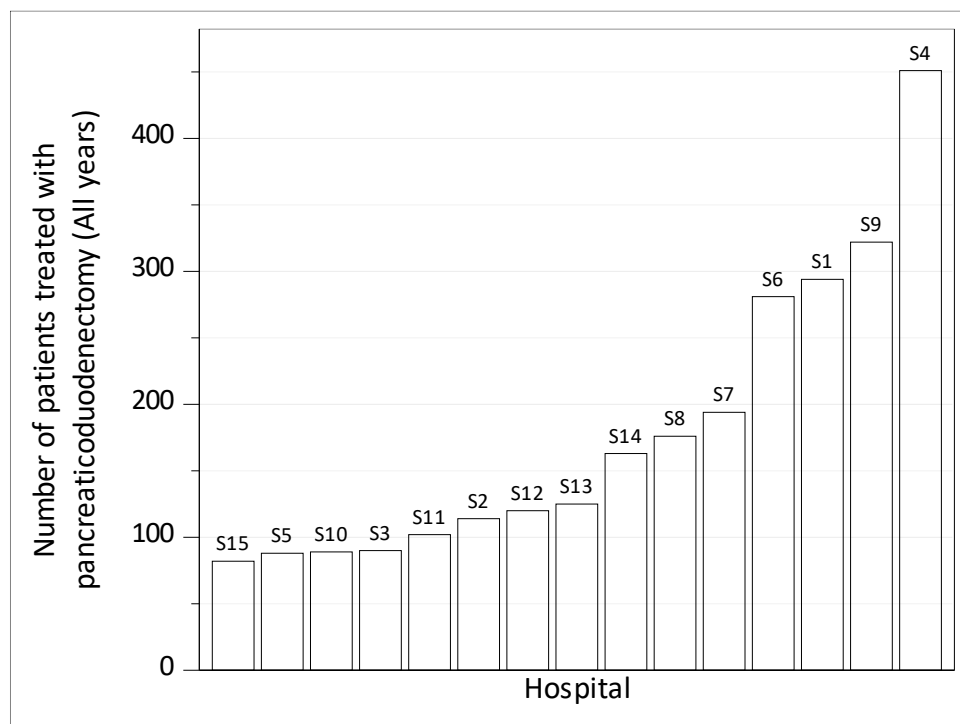
(d)



(e)



(f)





### 3. Tumoural pathology

#### 3.1. Descriptives

##### 3.1.1. Case mix description for operated patients with malignant versus benign tumours

**Table 2.** Case mix description of all patients with **malignant tumours** discussed on a MC expert who underwent surgical treatment.

Characteristic	Belgium									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
<b>Patients with surgery</b>	<b>598</b>		<b>721</b>		<b>739</b>		<b>716</b>		<b>799</b>	
Number of patients entered in prospective clinical trial	12	2.0	26	3.6	46	6.2	34	4.7	47	5.9
<b>Expert centres</b>										
S1	68	11.4	69	9.6	78	10.6	69	9.6	82	10.3
S2	29	4.8	22	3.1	25	3.4	28	3.9	29	3.6
S3	16	2.7	24	3.3	26	3.5	16	2.2	26	3.3
S4	94	15.7	111	15.4	121	16.4	124	17.3	160	20.0
S5	31	5.2	34	4.7	30	4.1	27	3.8	38	4.8
S6	52	8.7	58	8.0	82	11.1	84	11.7	93	11.6
S7	56	9.4	56	7.8	55	7.4	57	8.0	39	4.9
S8	34	5.7	42	5.8	39	5.3	46	6.4	51	6.4
S9	59	9.9	85	11.8	77	10.4	76	10.6	78	9.8
S10	27	4.5	20	2.8	22	3.0	31	4.3	15	1.9
S11	23	3.8	42	5.8	33	4.5	33	4.6	29	3.6
S12	31	5.2	35	4.9	35	4.7	31	4.3	44	5.5
S13	26	4.3	51	7.1	36	4.9	27	3.8	35	4.4
S14	30	5.0	37	5.1	56	7.6	45	6.3	53	6.6
S15	22	3.7	35	4.9	24	3.2	22	3.1	27	3.4
<b>Sex</b>										
Male	324	54.2	385	53.4	406	54.9	387	54.1	454	56.8
Female	274	45.8	336	46.6	333	45.1	329	45.9	345	43.2
<b>Age at surgery</b>										
<=69	348	58.2	403	55.9	404	54.7	394	55.0	429	53.7
70-79	190	31.8	259	35.9	260	35.2	247	34.5	287	35.9
>=80	60	10.0	59	8.2	75	10.1	75	10.5	83	10.4
<b>Lesion to treat (in (peri-)pancreas)</b>										
Primary tumour	581	97.2	687	95.3	722	97.7	694	96.9	778	97.4
Relapse of primary tumour	12	2.0	18	2.5	9	1.2	9	1.3	5	0.6
Metastasis	5	0.8	16	2.2	8	1.1	13	1.8	16	2.0
<b>Malignant morphology</b>										
Adenocarcinoma	476	79.6	554	76.8	552	74.7	545	76.1	579	72.5

Characteristic	Belgium									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
Neuroendocrine tumour	67	11.2	114	15.8	123	16.6	102	14.2	129	16.1
Other or unspecified	55	9.2	53	7.4	64	8.7	69	9.6	91	11.4
<b>Primary tumour localisation</b>										
C17.0 Duodenum	36	6.0	21	2.9	39	5.3	49	6.8	35	4.4
C24.0 Extrahepatic bile duct	45	7.5	52	7.2	44	6.0	40	5.6	33	4.1
C24.1 (Peri-) ampullary region	54	9.0	73	10.1	73	9.9	73	10.2	72	9.0
C25.0 Head of pancreas	287	48.0	307	42.6	329	44.5	306	42.7	344	43.1
C25.1 Body of pancreas	33	5.5	85	11.8	72	9.7	73	10.2	110	13.8
C25.2 Tail of pancreas	74	12.4	108	15.0	109	14.7	111	15.5	140	17.5
C25.3 Pancreatic duct	5	0.8	4	0.6	1	0.1	4	0.6	4	0.5
C25.4 Islands of Langerhans	0	0.0	4	0.6	22	3.0	7	1.0	1	0.1
C25.7-9 Other specified parts of pancreas	44	7.4	44	6.1	36	4.9	27	3.8	31	3.9
Other	20	3.3	23	3.2	14	1.9	26	3.6	29	3.6
<b>Clinical stage</b>										
0	12	2.1	6	0.9	23	3.2	14	2.0	29	3.7
I	278	48.5	334	47.9	358	49.9	339	48.6	408	52.2
II	145	25.3	228	32.7	198	27.6	215	30.8	199	25.5
III	63	11.0	61	8.8	84	11.7	85	12.2	87	11.1
IV	11	1.9	23	3.3	21	2.9	19	2.7	22	2.8
X	64	11.2	45	6.5	34	4.7	25	3.6	36	4.6
TNM not applicable or relapse*	25	—	24	—	21	—	19	—	18	—
<b>Pathological stage</b>										
0	12	2.5	18	3.1	35	6.0	24	4.4	37	5.9
I	115	24.4	163	27.9	159	27.1	129	23.8	177	28.4
II	155	32.8	200	34.2	207	35.3	192	35.5	194	31.1
III	157	33.3	163	27.9	165	28.2	179	33.1	193	30.9
IV	17	3.6	28	4.8	16	2.7	11	2.0	14	2.2
X	16	3.4	12	2.1	4	0.7	6	1.1	9	1.4
TNM not applicable or relapse*	20	—	19	—	18	—	18	—	14	—
Neoadjuvant treatment <sup>†</sup>	106	—	118	—	135	—	157	—	161	—
<b>yPathological stage</b>										
0	3	3.0	4	3.5	5	3.8	5	3.2	9	5.7
I	42	41.6	28	24.8	43	32.6	51	32.7	58	36.9
II	28	27.7	45	39.8	46	34.8	53	34.0	50	31.8
III	25	24.8	28	24.8	30	22.7	36	23.1	29	18.5
IV	2	2.0	8	7.1	8	6.1	9	5.8	10	6.4
X	1	1.0	0	0.0	0	0.0	2	1.3	1	0.6
TNM not applicable or relapse*	5	—	5	—	3	—	1	—	4	—
No neoadjuvant treatment	492	—	603	—	604	—	559	—	638	—
<b>Type of first diagnostic method</b>										
CT	359	60.0	438	60.7	442	59.8	462	64.6	534	66.8
ERCP	19	3.2	25	3.5	26	3.5	24	3.4	25	3.1

Belgium											
Characteristic		Year 1		Year 2		Year 3		Year 4		Year 5	
		N	%	N	%	N	%	N	%	N	%
EUS		99	16.6	98	13.6	97	13.1	63	8.8	75	9.4
MRI		98	16.4	122	16.9	145	19.6	139	19.4	134	16.8
PET		1	0.2	6	0.8	5	0.7	6	0.8	1	0.1
PET/CT		18	3.0	27	3.7	22	3.0	20	2.8	28	3.5
Surgery		4	0.7	5	0.7	2	0.3	1	0.1	2	0.3
Missing		0	0.0	0	0.0	0	0.0	1	0.0	0	0.0
<b>Method to obtain first tissue sample for APO</b>											
CT		5	0.8	7	1.0	3	0.4	9	1.3	4	0.5
ERCP		66	11.1	81	11.2	65	8.8	50	7.0	49	6.1
EUS		336	56.3	359	49.8	390	52.8	402	56.2	428	53.6
MRI		6	1.0	4	0.6	5	0.7	2	0.3	0	0.0
Surgery		184	30.8	270	37.4	276	37.3	252	35.2	318	39.8
Missing		1	0.0	0	0.0	0	0.0	1	0.0	0	0.0
<b>Prior surgery or other treatment **</b>											
Prior abdominal surgery		59	9.9	137	19.0	119	16.1	110	15.4	98	12.3
Other treatment modality (that could affect the pancreas)		66	11.0	101	14.0	109	14.7	121	16.9	143	17.9
<b>Neoadjuvant treatment</b>											
Chemotherapy		89	14.9	107	14.8	120	16.2	140	19.6	129	16.1
Radiotherapy		0	0.0	1	0.1	1	0.1	1	0.1	1	0.1
Chemoradiotherapy		17	2.8	10	1.4	14	1.9	16	2.2	31	3.9
No chemo or radiation treatment		492	82.3	603	83.6	604	81.7	559	78.1	638	79.8
<b>Charlson Comorbidity Index</b>											
0		263	44.0	272	37.7	304	41.1	278	38.8	344	43.1
1		129	21.6	162	22.5	189	25.6	192	26.8	190	23.8
2		88	14.7	121	16.8	139	18.8	113	15.8	115	14.4
3		46	7.7	72	10.0	53	7.2	63	8.8	67	8.4
4		26	4.3	43	6.0	26	3.5	36	5.0	43	5.4
5		14	2.3	19	2.6	11	1.5	16	2.2	16	2.0
6		14	2.3	14	1.9	9	1.2	5	0.7	11	1.4
7		9	1.5	9	1.2	2	0.3	9	1.3	5	0.6
8		5	0.8	4	0.6	3	0.4	3	0.4	5	0.6
9		3	0.5	2	0.3	2	0.3	0	0.0	2	0.3
10		1	0.2	2	0.3	1	0.1	1	0.1	0	0.0
12		0	0.0	1	0.1	0	0.0	0	0.0	1	0.1
<b>WHO score at surgery</b>											
0 - Asymptomatic, normal activity		188	31.4	176	24.4	195	26.4	144	20.1	261	32.7
1 - Symptomatic, but ambulant		347	58.0	462	64.1	447	60.5	491	68.6	456	57.1
2 - Symptomatic, bedbound < 50% day		53	8.9	70	9.7	82	11.1	70	9.8	71	8.9
3 - Symptomatic, bedbound > 50% day		9	1.5	12	1.7	15	2.0	11	1.5	11	1.4
4 - Completely dependent, 100% bedbound		1	0.2	1	0.1	0	0.0	0	0.0	0	0.0
<b>ASA score</b>											
1 - Healthy person		65	10.9	41	5.7	47	6.4	36	5.0	18	2.3

Characteristic	Belgium									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
2 - Mild systemic disease, normal activity	329	55.0	395	54.8	377	51.0	349	48.7	401	50.2
3 - Serious systemic disease, limited activity	202	33.8	275	38.1	302	40.9	323	45.1	369	46.2
4 - Life-threatening illness, handicapped	2	0.3	10	1.4	13	1.8	8	1.1	11	1.4
<b>Type of surgery</b>										
Minimally invasive surgery (MIS) – Laparoscopic	134	22.4	195	27.0	221	29.9	183	25.6	186	23.3
Minimally invasive surgery (MIS) - Hybrid	1	0.2	0	0.0	1	0.1	1	0.1	0	0.0
Minimally invasive surgery (MIS) - Robotic	11	1.8	58	8.0	66	8.9	91	12.7	157	19.6
Open	431	72.1	432	59.9	408	55.2	409	57.1	419	52.4
Conversion from MIS to open surgery	21	3.5	36	5.0	43	5.8	32	4.5	37	4.6
<b>Resectability status **</b>										
Before neoadjuvant treatment										
- Upfront resectable	–	–	10	15.4	33	24.1	31	18.6	40	23.0
- Borderline resectable	–	–	41	63.1	75	54.7	112	67.1	95	54.6
- Unresectable	–	–	14	21.5	27	19.7	14	8.4	26	14.9
- No neoadjuvant treatment	–	–	342	–	604	–	559	–	638	–
Before surgery										
- Upfront resectable	–	–	347	85.3	640	86.6	613	85.6	680	85.1
- Borderline resectable	–	–	53	13.0	93	12.6	99	13.8	107	13.4
- Unresectable	–	–	1	0.2	5	0.7	4	0.6	12	1.5
- Missing	–	–	6	1.5	1	0.1	0	0.0	0	0.0
<b>Simultaneous venous resection</b>										
No	484	80.9	635	88.1	640	86.6	609	85.1	697	87.2
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection	114	19.1	86	11.9	99	13.4	107	14.9	102	12.8
- With primary wedge-reconstruction	36	–	24	–	27	–	39	–	37	–
- With primary end-to-end reconstruction	42	–	47	–	55	–	36	–	30	–
- With vascular autograft interposition	1	–	3	–	3	–	4	–	1	–
- With vascular allograft interposition	9	–	3	–	8	–	12	–	28	–
- With synthetic/prosthetic interposition	3	–	1	–	2	–	1	–	3	–
- With peritoneal patch wedge-reconstruction	19	–	8	–	4	–	9	–	3	–
- Without reconstruction	4	–	0	–	0	–	6	–	0	–
<b>Simultaneous arterial resection **</b>										
No	580	97.0	711	98.6	722	97.7	701	97.9	789	98.7
Hepatic artery resection	5	0.8	7	1.0	6	0.8	7	1.0	3	0.4
- With primary wedge-reconstruction	0	–	0	–	0	–	0	–	0	–
- With primary end-to-end reconstruction	4	–	4	–	4	–	4	–	1	–
- With vascular autograft interposition	0	–	0	–	0	–	0	–	0	–
- With vascular allograft interposition	1	–	0	–	0	–	0	–	0	–
- With synthetic/prosthetic interposition	0	–	0	–	0	–	0	–	0	–
- Without reconstruction	0	–	3	–	2	–	3	–	2	–
Coeliac trunk resection	9	1.5	3	0.4	8	1.1	7	1.0	5	0.6
- With primary wedge-reconstruction	0	–	0	–	0	–	0	–	0	–

Characteristic	Belgium									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
- With primary end-to-end reconstruction	0	—	0	—	1	—	0	—	1	—
- With vascular autograft interposition	0	—	0	—	0	—	0	—	0	—
- With vascular allograft interposition	0	—	0	—	0	—	0	—	0	—
- With synthetic/prosthetic interposition	0	—	0	—	0	—	0	—	0	—
- Without reconstruction	9	—	3	—	7	—	7	—	4	—
Superior mesenteric artery (SMA) resection	4	0.7	0	0.0	2	0.3	1	0.1	2	0.3
- With primary wedge-reconstruction	1	—	0	—	0	—	0	—	0	—
- With primary end-to-end reconstruction	1	—	0	—	0	—	0	—	2	—
- With vascular autograft interposition	0	—	0	—	2	—	0	—	0	—
- With vascular allograft interposition	0	—	0	—	0	—	0	—	0	—
- With synthetic/prosthetic interposition	0	—	0	—	0	—	0	—	0	—
- Without reconstruction	2	—	0	—	0	—	1	—	0	—
<b>Simultaneous other organ resection **</b>										
No	383	64.0	458	63.5	426	57.6	436	60.9	455	56.9
Colon	29	4.8	13	1.8	11	1.5	22	3.1	27	3.4
Stomach	54	9.0	112	15.5	152	20.6	124	17.3	120	15.0
Adrenal gland	14	2.3	14	1.9	17	2.3	17	2.4	24	3.0
Spleen	96	16.1	139	19.3	157	21.2	149	20.8	215	26.9
Other	88	14.7	34	4.7	27	3.7	27	3.8	59	7.4
<b>RIZIV code for complex surgery</b>										
242830-242841: Pancreaticoduodenectomy	459	76.8	499	69.2	513	69.4	498	69.6	516	64.6
Pancreaticoduodenectomy	422	91.9	462	92.6	474	92.4	453	91.0	460	89.1
Total Pancreatectomy	37	8.1	37	7.4	39	7.6	45	9.0	56	10.9
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	43	7.2	70	9.7	55	7.4	82	11.5	57	7.1
242874-242885: Hemipancreatectomy left	88	14.7	142	19.7	160	21.7	130	18.2	214	26.8
242896-242900: Enucleation of a pancreatic tumour	8	1.3	10	1.4	11	1.5	6	0.8	12	1.5
<b>Antithrombotic medication</b>										
No	419	70.1	503	69.8	531	71.9	505	70.5	552	69.1
Yes	179	29.9	218	30.2	208	28.1	211	29.5	247	30.9
<b>Was the patient referred?</b>										
No	270	45.2	307	42.6	322	43.6	290	40.5	365	45.7
Yes	328	54.8	414	57.4	417	56.4	426	59.5	434	54.3

\* Tumour staging not possible.

† Neoadjuvant treatment: patients who received either chemotherapy or radiotherapy, or a combination of these treatments prior to surgery.

\*\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients.

\*\* Results for this variable are only available from the second half of Y2 onwards.

**Table 3.** Case mix description of all patients with **benign tumours** discussed on a MC expert who underwent surgical treatment.

Belgium										
Characteristic	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
<b>Patients with surgery</b>	<b>126</b>		<b>135</b>		<b>112</b>		<b>118</b>		<b>112</b>	
<b>Expert centres</b>										
S1	10	7.9	5	3.7	9	8.0	11	9.3	10	8.9
S2	6	4.8	11	8.1	7	6.3	11	9.3	10	8.9
S3	3	2.4	4	3.0	0	0.0	2	1.7	1	0.9
S4	37	29.4	35	25.9	26	23.2	11	9.3	16	14.3
S5	2	1.6	8	5.9	3	2.7	6	5.1	4	3.6
S6	11	8.7	6	4.4	10	8.9	10	8.5	7	6.3
S7	9	7.1	19	14.1	6	5.4	15	12.7	8	7.1
S8	5	4.0	8	5.9	5	4.5	6	5.1	3	2.7
S9	18	14.3	11	8.1	13	11.6	19	16.1	13	11.6
S10	5	4.0	4	3.0	8	7.1	2	1.7	8	7.1
S11	4	3.2	2	1.5	4	3.6	4	3.4	2	1.8
S12	6	4.8	11	8.1	9	8.0	9	7.6	8	7.1
S13	3	2.4	4	3.0	5	4.5	3	2.5	2	1.8
S14	4	3.2	6	4.4	4	3.6	6	5.1	19	17.0
S15	3	2.4	1	0.7	3	2.7	3	2.5	1	0.9
<b>Sex</b>										
Male	67	53.2	70	51.9	48	42.9	50	42.4	58	51.8
Female	59	46.8	65	48.1	64	57.1	68	57.6	54	48.2
<b>Age at surgery</b>										
<=69	81	64.3	82	60.7	75	67.0	65	55.1	65	58.0
70-79	42	33.3	46	34.1	31	27.7	48	40.7	38	33.9
>=80	3	2.4	7	5.2	6	5.4	5	4.2	9	8.0
<b>Benign Tumoural Morphology</b>										
Adenoma	11	8.7	4	3.0	9	8.0	8	6.8	8	7.1
Cystadenoma	26	20.6	31	23.0	31	27.7	26	22.0	21	18.8
IPMN	67	53.2	78	57.8	61	54.5	71	60.2	73	65.2
Other benign	22	17.5	22	16.3	11	9.8	13	11.0	10	8.9
<b>Prior surgery or other treatment **</b>										
Prior abdominal surgery	9	7.1	15	11.1	18	16.1	17	14.4	23	20.5
Other treatment modality (that could affect the pancreas)	1	0.8	2	1.5	3	2.7	5	4.2	7	6.3
<b>Charlson Comorbidity Index</b>										
0	58	46.0	63	46.7	46	41.1	57	48.3	44	39.3
1	33	26.2	36	26.7	22	19.6	23	19.5	29	25.9
2	17	13.5	19	14.1	19	17.0	23	19.5	15	13.4
3	9	7.1	9	6.7	13	11.6	3	2.5	8	7.1
4	4	3.2	5	3.7	7	6.3	8	6.8	7	6.3

Belgium											
Characteristic		Year 1		Year 2		Year 3		Year 4		Year 5	
		N	%	N	%	N	%	N	%	N	%
5		3	2.4	2	1.5	0	0.0	2	1.7	3	2.7
6		2	1.6	1	0.7	2	1.8	1	0.8	2	1.8
7		0	0.0	0	0.0	1	0.9	0	0.0	2	1.8
8		0	0.0	0	0.0	0	0.0	1	0.8	2	1.8
9		0	0.0	0	0.0	1	0.9	0	0.0	0	0.0
11		0	0.0	0	0.0	1	0.9	0	0.0	0	0.0
<b>WHO score at surgery</b>											
0 - Asymptomatic, normal activity		66	52.4	61	45.2	58	51.8	45	38.1	51	45.5
1 - Symptomatic, but ambulant		55	43.7	64	47.4	46	41.1	67	56.8	53	47.3
2 - Symptomatic, bedbound < 50% day		5	4.0	8	5.9	8	7.1	5	4.2	8	7.1
3 - Symptomatic, bedbound > 50% day		0	0.0	2	1.5	0	0.0	1	0.8	0	0.0
<b>ASA score</b>											
1 - Healthy person		15	11.9	21	15.6	12	10.7	6	5.1	8	7.1
2 - Mild systemic disease, normal activity		75	59.5	78	57.8	62	55.4	68	57.6	55	49.1
3 - Serious systemic disease, limited activity		35	27.8	35	25.9	38	33.9	42	35.6	49	43.8
4 - Life-threatening illness, handicapped		1	0.8	1	0.7	0	0.0	2	1.7	0	0.0
<b>Type of surgery</b>											
Minimally invasive surgery (MIS) – Laparoscopic		58	46.0	62	45.9	54	48.2	37	31.4	31	27.7
Minimally invasive surgery (MIS) - Hybrid		0	0.0	2	1.5	0	0.0	0	0.0	0	0.0
Minimally invasive surgery (MIS) - Robotic		7	5.6	12	8.9	20	17.9	25	21.2	41	36.6
Open		56	44.4	52	38.5	35	31.3	53	44.9	36	32.1
Conversion from MIS to open surgery		5	4.0	7	5.2	3	2.7	3	2.5	4	3.6
<b>Simultaneous vascular resection</b>											
No vascular reconstruction		125	99.2	132	97.8	111	99.1	116	98.3	111	99.1
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection		1	0.8	3	2.2	1	0.9	2	1.7	1	0.9
<b>Simultaneous other organ resection</b>											
No		82	65.1	88	65.2	76	67.9	74	62.7	63	56.3
Colon		0	0.0	3	2.2	0	0.0	2	1.7	0	0.0
Stomach		3	2.4	7	5.2	7	6.3	11	9.3	6	5.4
Adrenal gland		1	0.8	0	0.0	1	0.9	0	0.0	0	0.0
Spleen		30	23.8	40	29.6	29	25.9	33	28.0	44	39.3
Other		16	12.7	4	3.0	2	1.8	3	2.5	2	1.8
<b>RIZIV code for complex surgery</b>											
242830-242841: Pancreaticoduodenectomy		67	53.2	62	45.9	46	41.1	53	44.9	49	43.8
Pancreaticoduodenectomy		56	83.6	51	82.3	39	84.8	40	75.5	42	85.7
Total Pancreatectomy		11	16.4	11	17.7	7	15.2	13	24.5	7	14.3
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)		15	11.9	21	15.6	21	18.8	23	19.5	13	11.6
242874-242885: Hemipancreatectomy left		41	32.5	47	34.8	39	34.8	40	33.9	49	43.8
242896-242900: Enucleation of a pancreatic tumour		3	2.4	5	3.7	6	5.4	2	1.7	1	0.9





### 3.1.2. Completeness of registration

The indicator 'completeness of malignant cases' assesses for how many patients with malignant tumours surgery was performed in the fifth convention year and how many of these patients were actually registered in the complex surgery database. These data are based on information that was extracted from the pathology reports from all Belgian laboratories for Pathological Anatomy.

Minimum target value:  $\geq 95\%$  for the fifth convention year.

**Table 4.** Completeness of **malignant** cases: Total number of patients with performed surgeries registered by expert centre in the fifth convention year.

	Belgium, recognised centres		
	n registered	N performed	n/N (%)
<b><i>Patients with surgery in Year 5</i></b>	820	820	100.0
<b><i>Expert centres</i></b>			
S1	82	82	100.0
S2	29	29	100.0
S3	26	26	100.0
S4	160	160	100.0
S5	38	38	100.0
S6	93	93	100.0
S7	39	39	100.0
S8	51	51	100.0
S9	78	78	100.0
S10	15	15	100.0
S11	29	29	100.0
S12	44	44	100.0
S13	35	35	100.0
S14	53	53	100.0
S15	27	27	100.0

The indicator 'completeness of registration forms' indicates for how many patients a fully completed dataset was received (including all requested complex surgery variables and textual reports).

Minimum target value:  $\geq 95\%$  for the fifth convention year.

**Table 5.** Completeness of registration forms for patients with tumoural pathology (**malignant and benign tumours**): number of registrations in complex surgery database that were complete in the fifth convention year, by expert centre.

Patient group	Belgium		
	N registered	n complete	n/N (%)
<b><i>Patients discussed on a MC expert in Year 5</i></b>	2,291	2,281	99.6
<b><i>Surgery status</i></b>			
Patients with surgery	911	902	99.0
Patients without surgery	1,380	1,379	99.9
<b><i>Expert centres</i></b>			
S1	179	178	99.4
S2	111	111	100.0
S3	97	97	100.0
S4	335	333	99.4
S5	138	134	97.1
S6	247	246	99.6
S7	155	155	100.0
S8	160	160	100.0
S9	144	143	99.3
S10	91	91	100.0
S11	34	34	100.0
S12	126	126	100.0
S13	146	146	100.0
S14	240	239	99.6
S15	88	88	100.0

## 3.2. Process indicators

### 3.2.1. Time between diagnosis and start of treatment

Normally this time frame is calculated between the date of anatomopathological confirmation (incidence date) and start of treatment. But since not all tumours can be confirmed histologically before surgical treatment, we will divide this indicator into 2 parts:

- For all patients: time between *suspected* diagnosis and start of treatment. The date of suspected diagnosis is the date of the first diagnostic method (CT, MRI, PET, PET/CT, ERCP, EUS, surgery, ...). This is the date of the first discovery of a tumour or mass and not the confirmation of a malignancy or a more specific diagnosis.
- Only for patients with histological confirmation before surgical treatment: time between *confirmed* diagnosis and start of treatment.

Start of treatment is defined as the start of the first oncological treatment, which can be any neoadjuvant treatment or surgery.

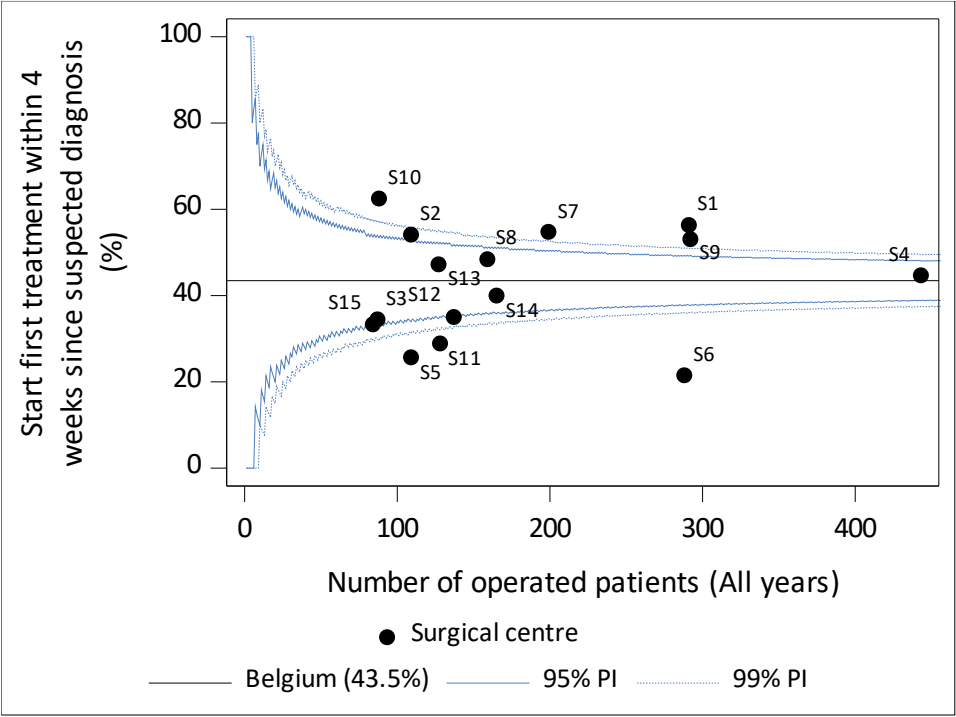
#### 3.2.1.1. Time between suspected diagnosis and start of first treatment for patients with (suspected) adenocarcinoma

**Table 6.** Proportion of operated patients with **suspected adenocarcinoma** in the five convention years for whom first treatment started within 4 weeks since suspected diagnosis.

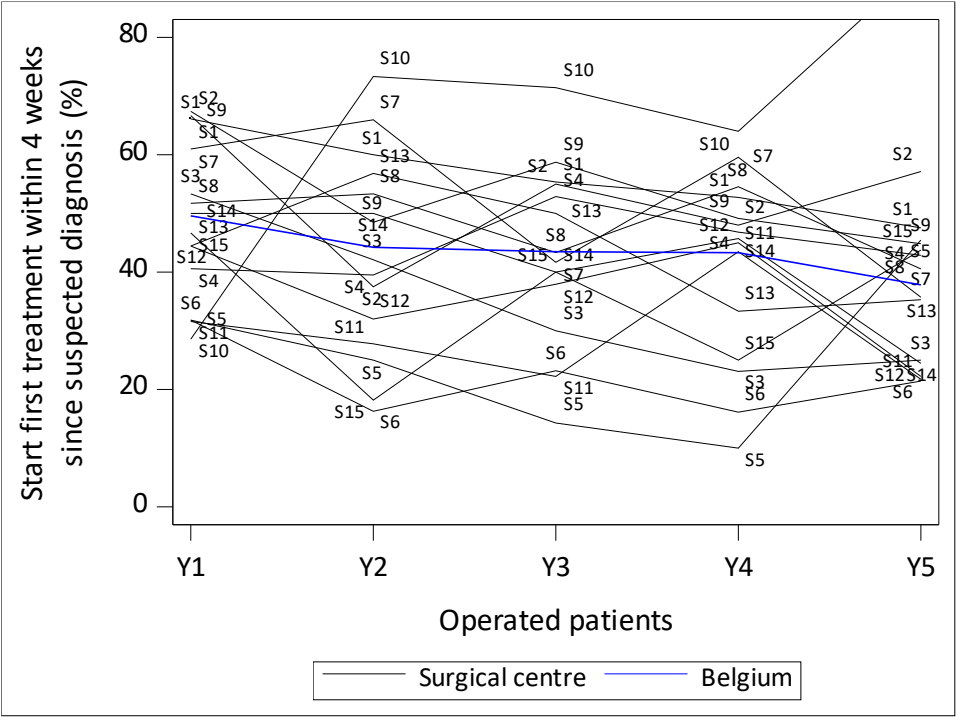
Patient group	Belgium			
	N	n	n/N (%)	95% CI
<b><i>Operated patients with adenocarcinoma</i></b>	2,706	1,176	43.5	[41.6, 45.4]
<b><i>Convention Year</i></b>				
Year 1	476	236	49.6	[45.0, 54.2]
Year 2	554	245	44.2	[40.0, 48.5]
Year 3	552	240	43.5	[39.3, 47.7]
Year 4	545	236	43.3	[39.1, 47.6]
Year 5	579	219	37.8	[33.9, 41.9]
<b><i>Referral status</i></b>				
Operated patients referred to an expert centre	1,601	673	42.0	[39.6, 44.5]
Operated patients without referral	1,105	503	45.5	[42.6, 48.5]

**Figure 4:** Funnel and spaghetti plot of the proportion of all operated patients with suspected **adenocarcinoma** for whom first treatment started within 4 weeks since **suspected** diagnosis, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

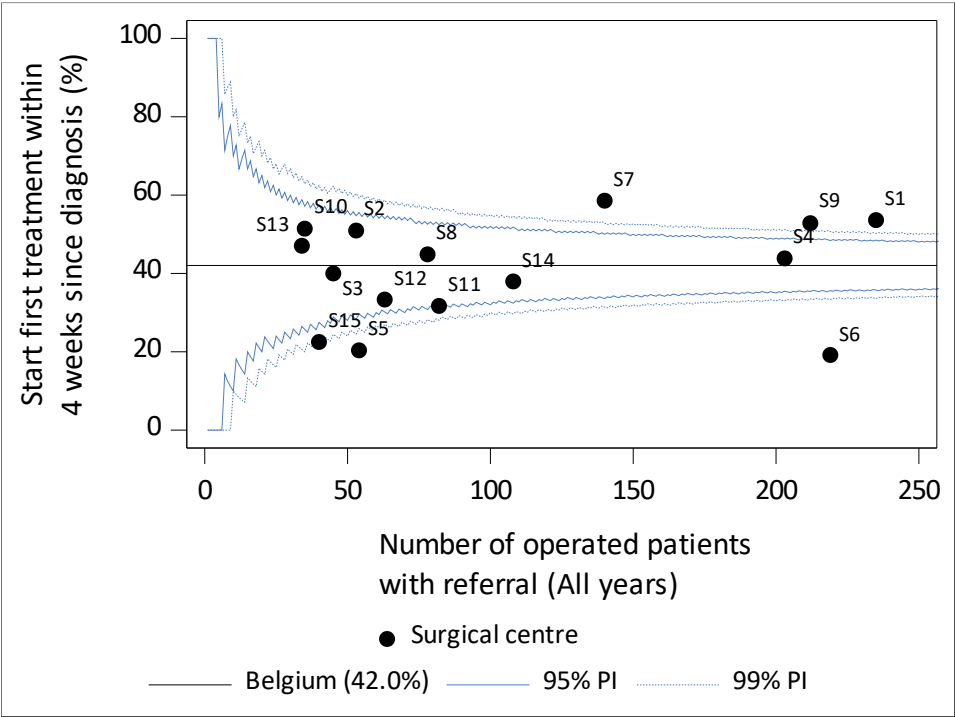


(b)

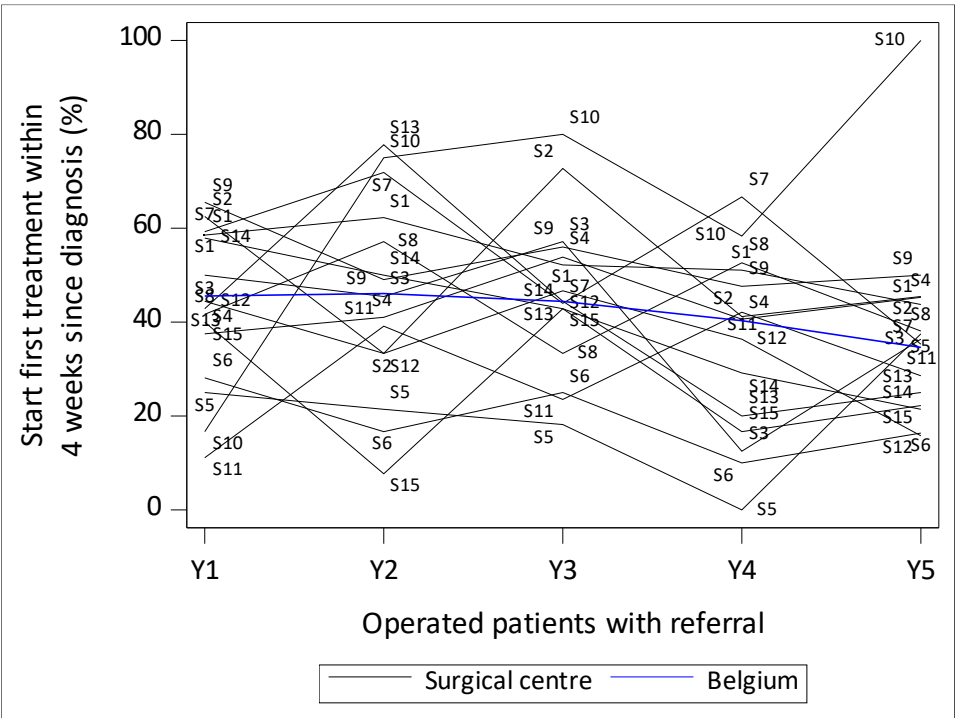


**Figure 5:** Funnel and spaghetti plot of the proportion of all operated patients referred to an expert centre with suspected **adenocarcinoma** for whom first treatment started within 4 weeks since suspected diagnosis, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

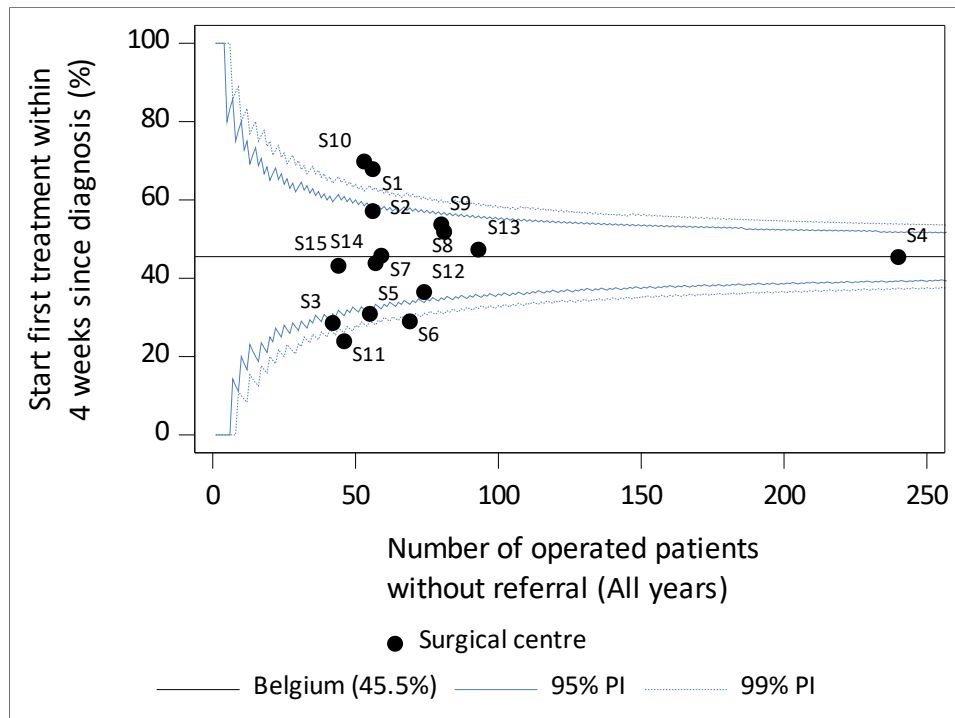


(b)

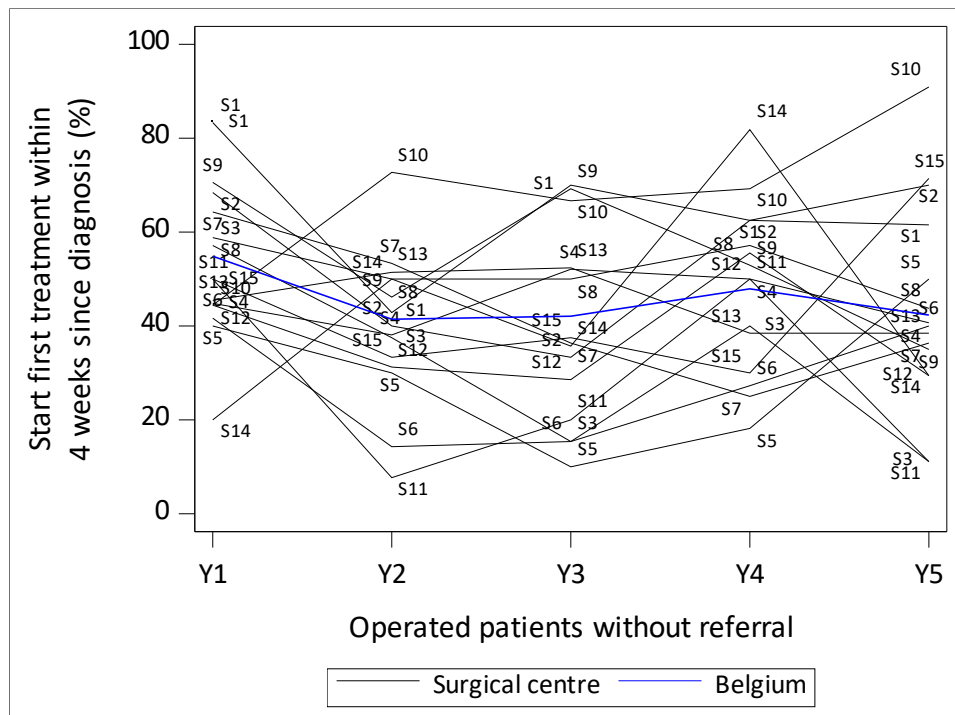


**Figure 6:** Funnel and spaghetti plot of the proportion of all operated patients **without referral** (= direct presentation at expert centre) with suspected **adenocarcinoma** for whom first treatment started within 4 weeks since **suspected** diagnosis, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)



(b)

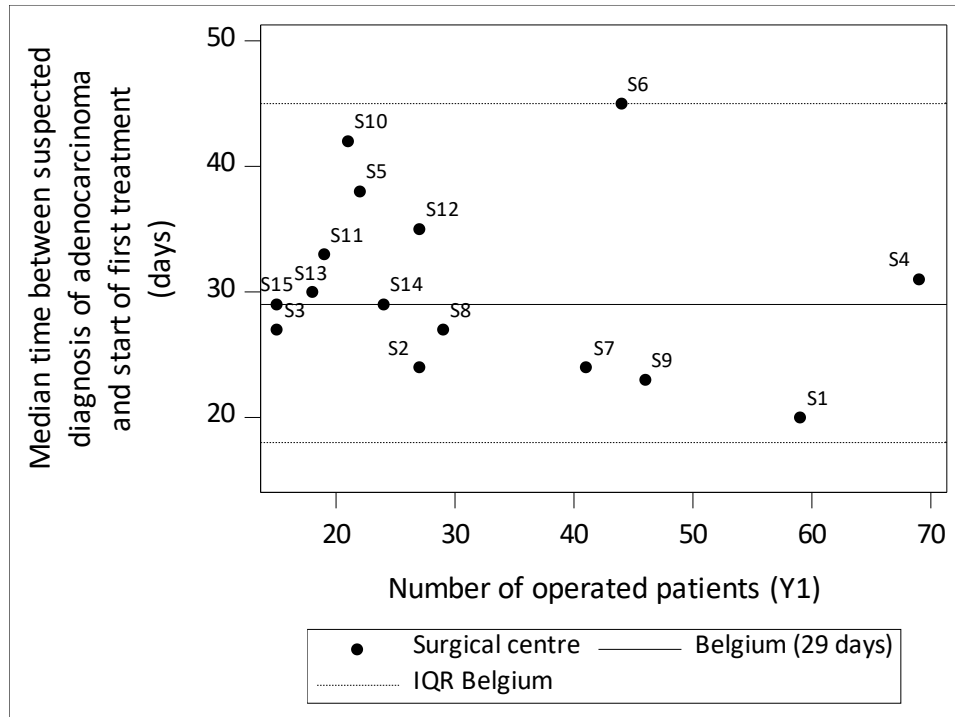


**Table 7.** Median time between **suspected** diagnosis of **adenocarcinoma** and start of first treatment in the five convention years.

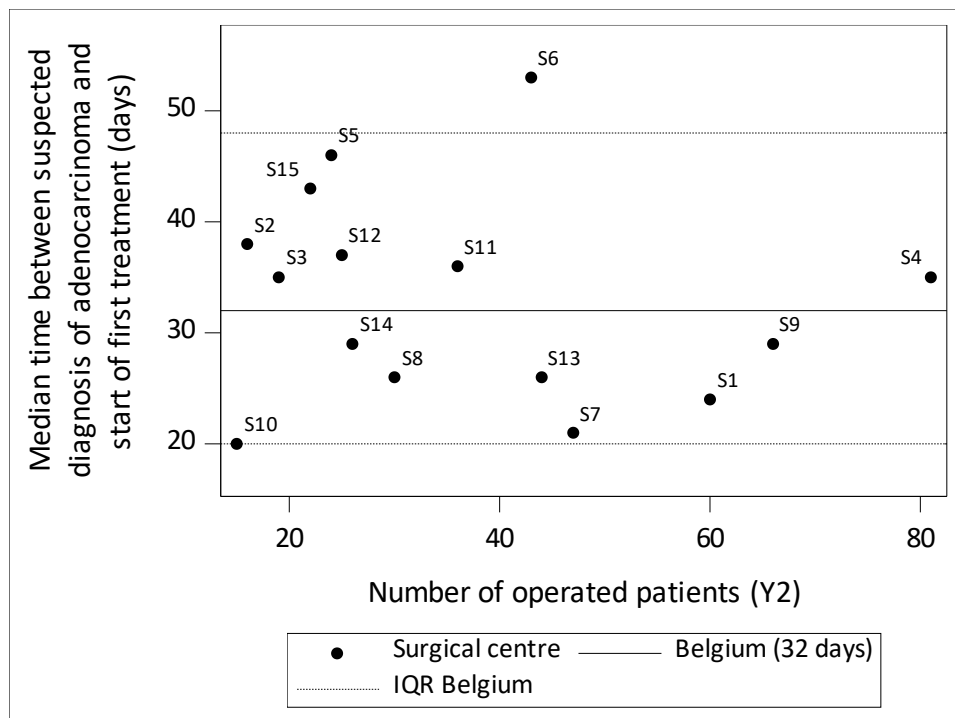
Belgium				
Patient group	N	Median (days)	IQR*	p90**
<b><i>Operated patients with adenocarcinoma</i></b>	2,706	32	[20, 49]	80
<b><i>Convention year</i></b>				
Year 1	476	29	[18, 45]	77
Year 2	554	32	[20, 48]	84
Year 3	552	33	[20, 50]	80
Year 4	545	32	[20, 47]	77
Year 5	579	35	[23, 55]	83
<b><i>Referral status</i></b>				
Operated patients referred to an expert centre	1,601	33	[21, 50]	77
Operated patients without referral	1,105	31	[19, 48]	88
* Interquartile Range= [the 25th, and 75th percentiles of the data]				
** 90th percentile				

**Figure 7:** Median time between **suspected** diagnosis of **adenocarcinoma** and start of first treatment, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5 and (f) all years combined.

(a)

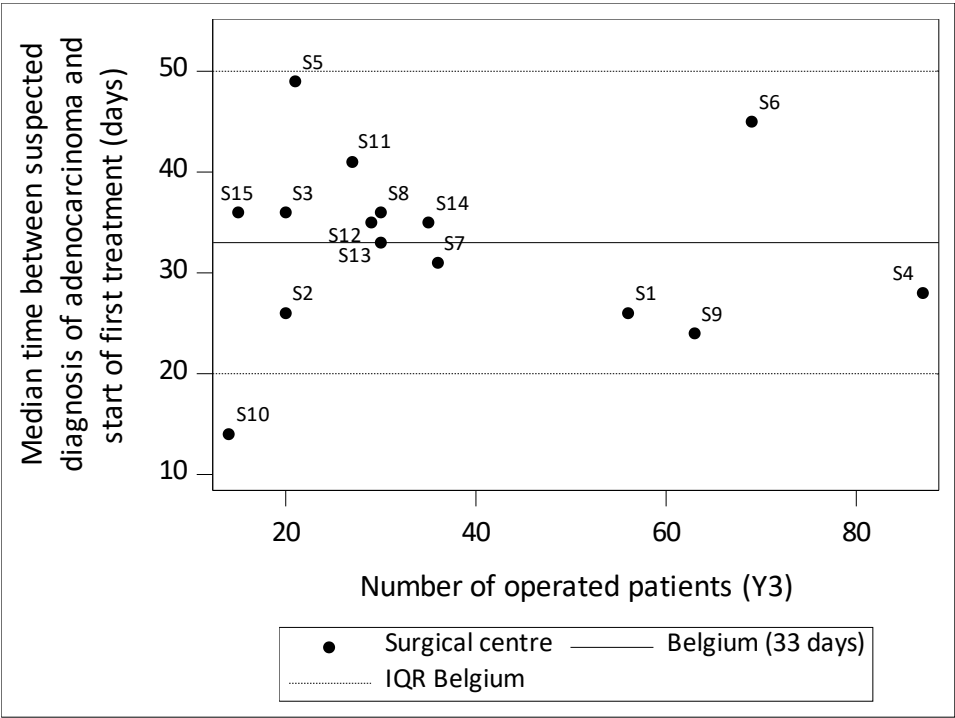


(b)

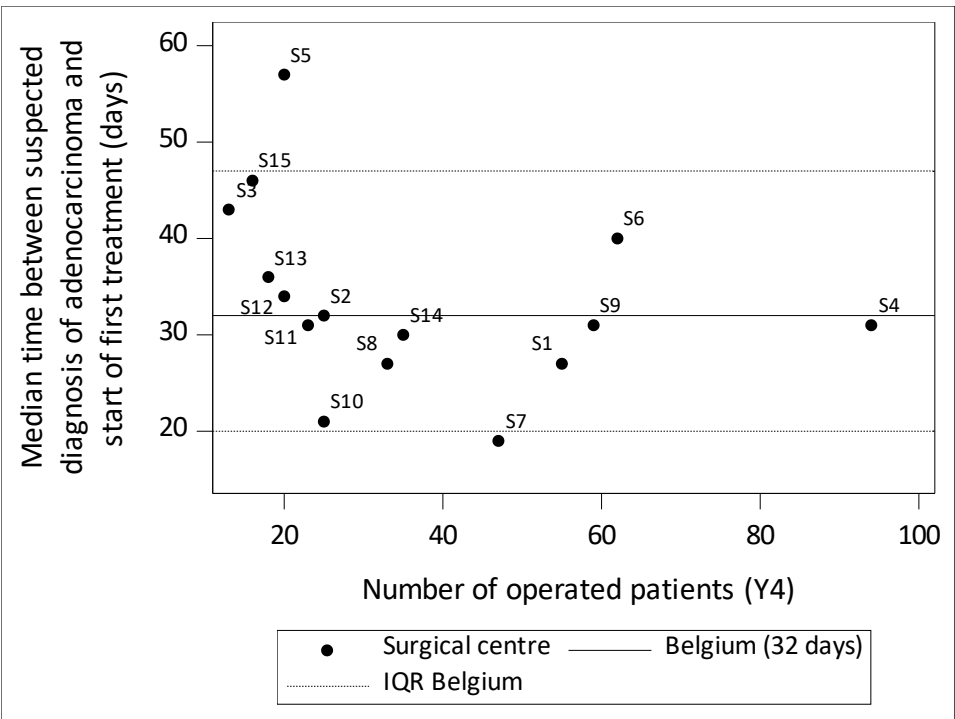




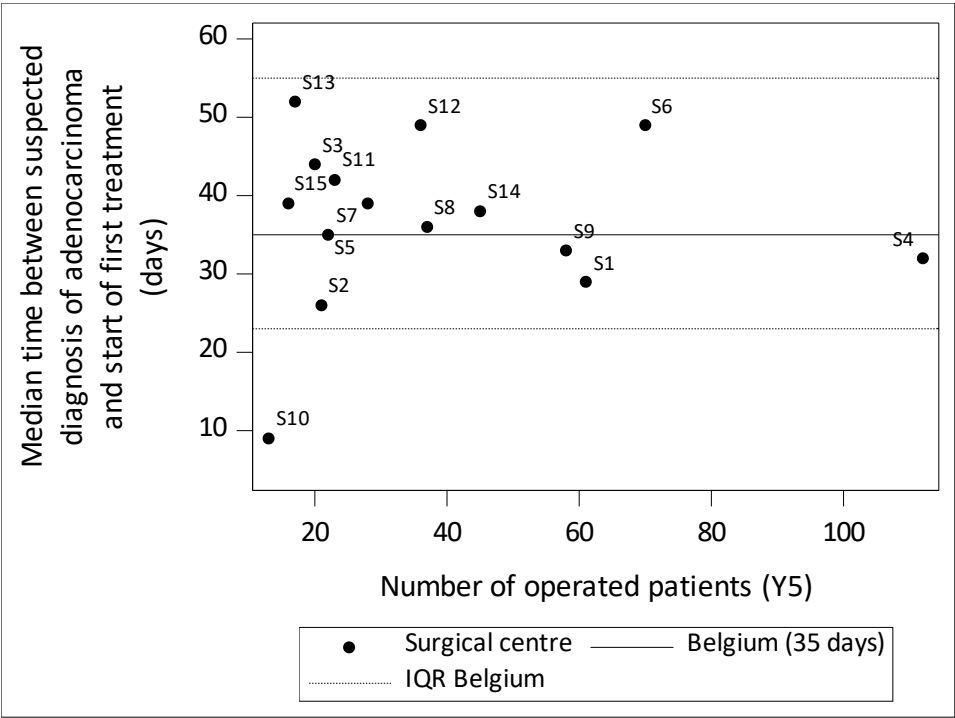
(c)



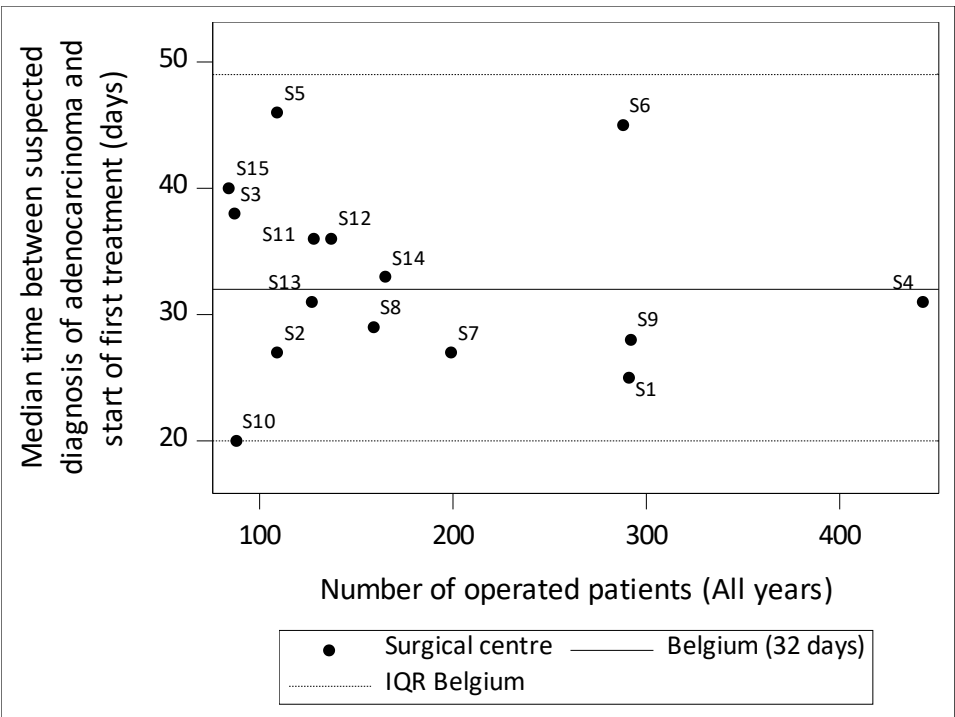
(d)



(e)



(f)



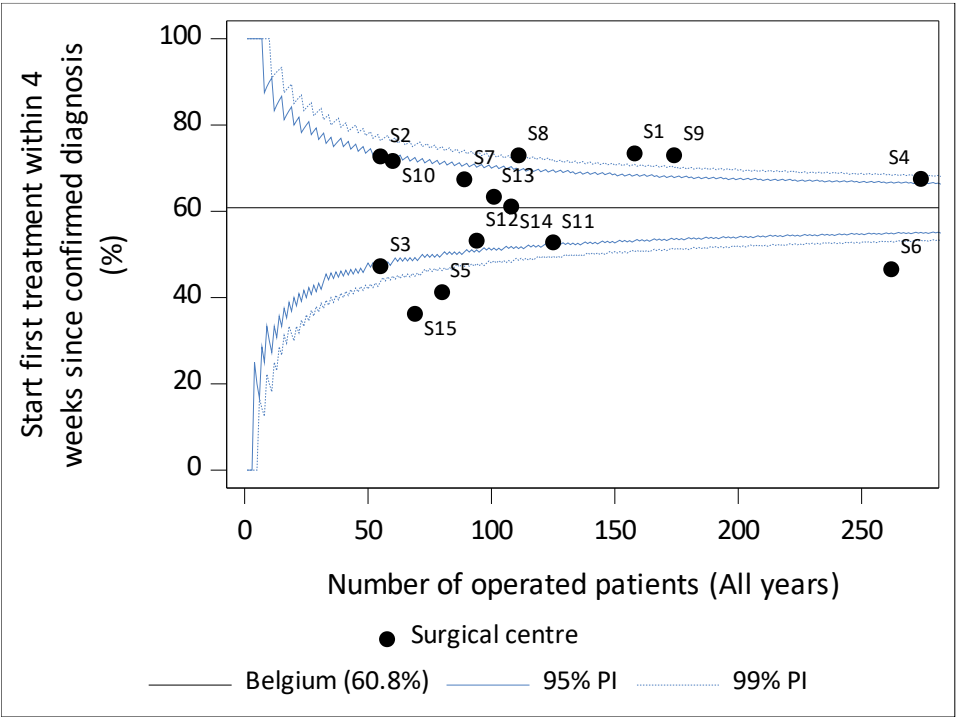
### 3.2.1.2. Time between confirmed diagnosis and start of first treatment for patients with adenocarcinoma

**Table 8.** Proportion of operated patients with **adenocarcinoma** in the five convention years for whom first treatment started within 4 weeks since **confirmed** diagnosis.

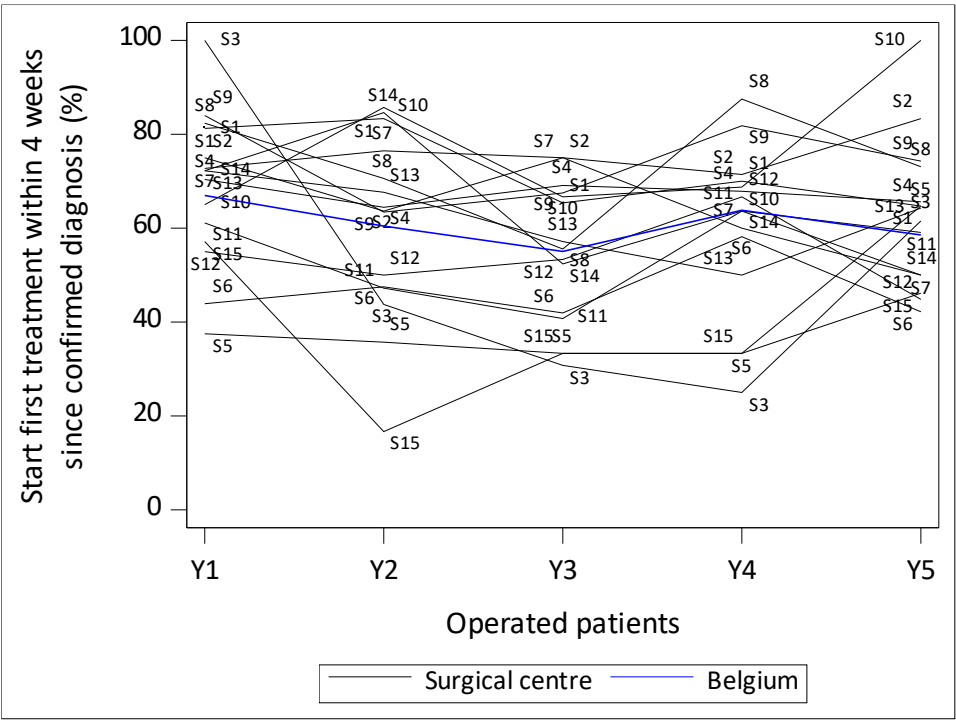
Belgium				
Patient group	N	n	n/N (%)	95% CI
<b>Operated patients with confirmed adenocarcinoma</b>	1,815	1,104	60.8	[58.5, 63.1]
<b>Convention year</b>				
Year 1	336	225	67.0	[61.7, 72.0]
Year 2	364	220	60.4	[55.2, 65.5]
Year 3	367	202	55.0	[49.8, 60.2]
Year 4	362	231	63.8	[58.6, 68.8]
Year 5	386	226	58.5	[53.5, 63.5]
<b>Referral status</b>				
Operated patients referred to an expert centre	1,088	637	58.5	[55.6, 61.5]
Operated patients without referral	727	467	64.2	[60.6, 67.7]
Remark: only operated patients with a histologically confirmed diagnosis are shown in this table.				

**Figure 8:** Funnel and spaghetti plot of the proportion of operated patients with **adenocarcinoma** for whom first treatment started within 4 weeks since **confirmed** diagnosis, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

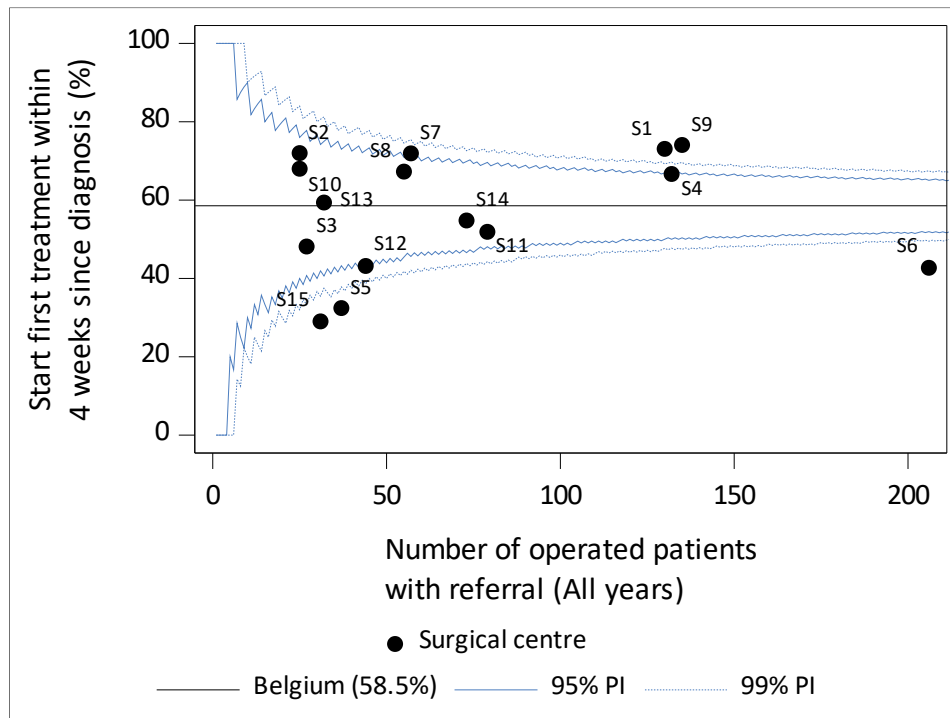


(b)

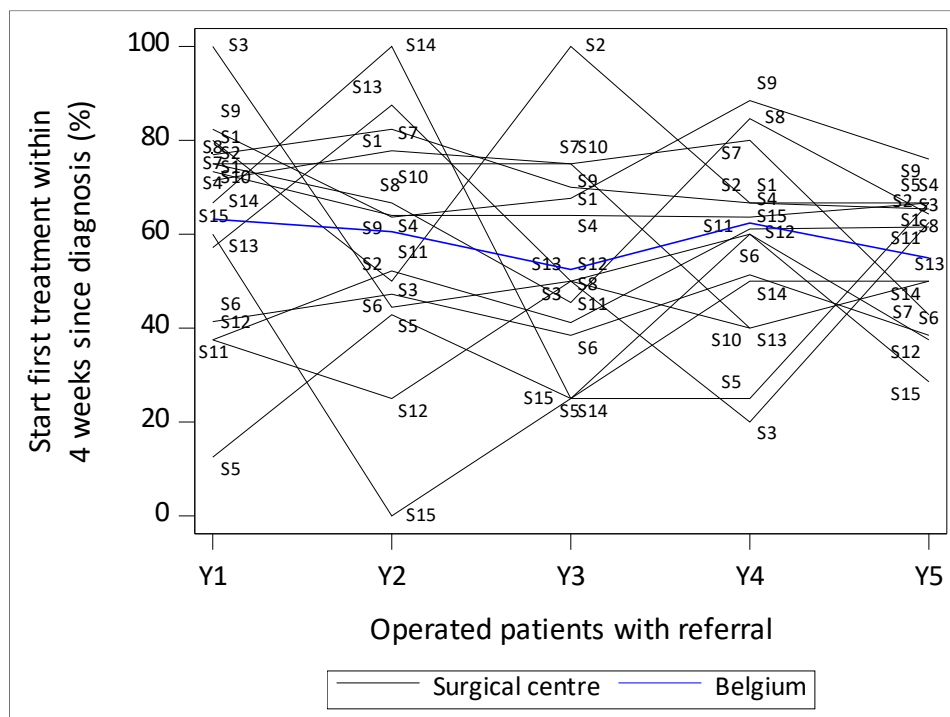


**Figure 9:** Funnel and spaghetti plot of the proportion of operated patients **referred to an expert centre with adenocarcinoma** for whom first treatment started within 4 weeks since **confirmed** diagnosis, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

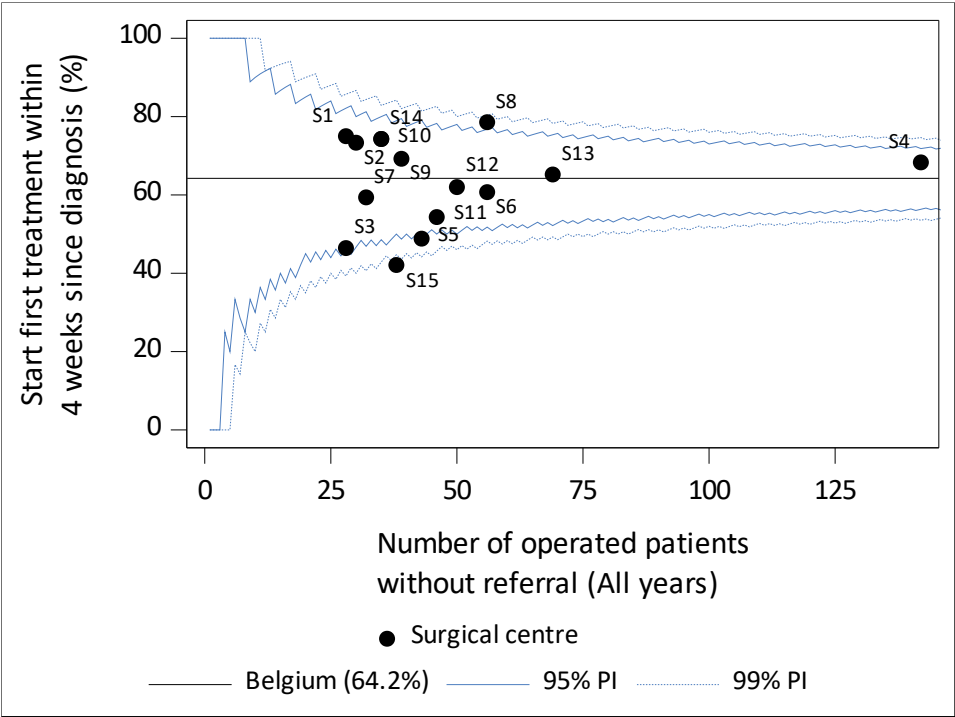


(b)

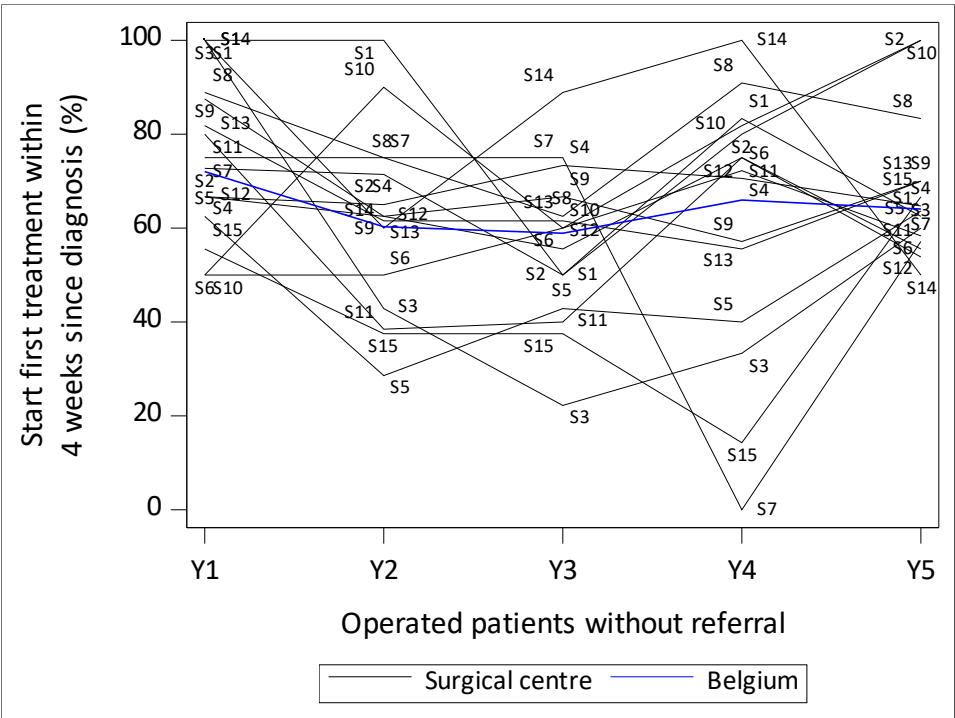


**Figure 10:** Funnel and spaghetti plot of the proportion of operated patients **without referral** (= direct presentation at expert centre) with **adenocarcinoma** for whom first treatment started within 4 weeks since **confirmed** diagnosis, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)



(b)

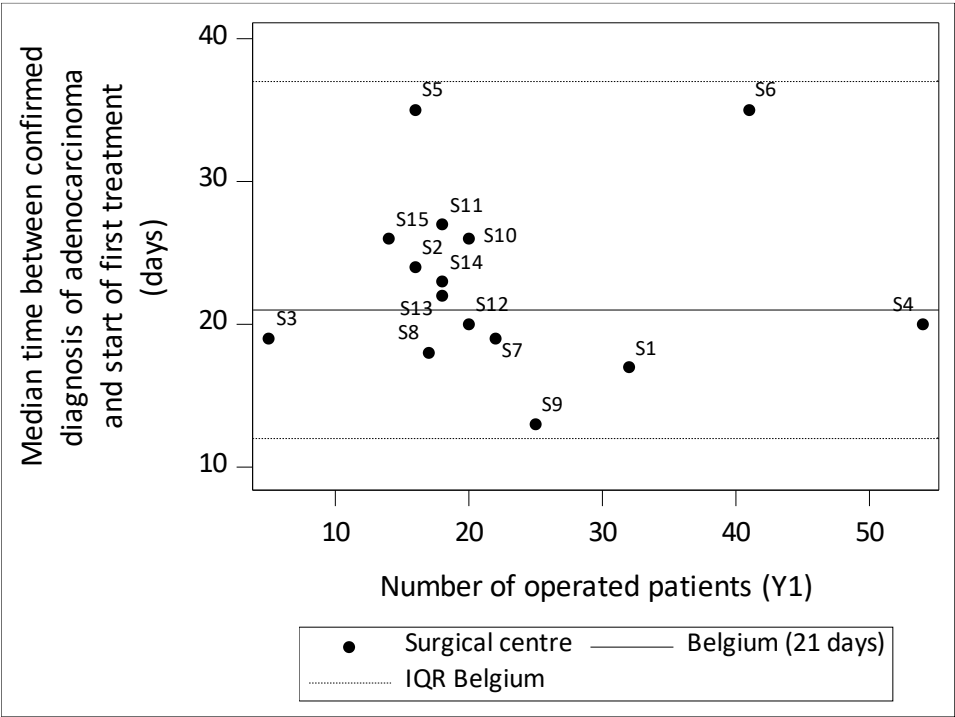


**Table 9.** Median time between **confirmed** diagnosis of **adenocarcinoma** and start of first treatment in the five convention years.

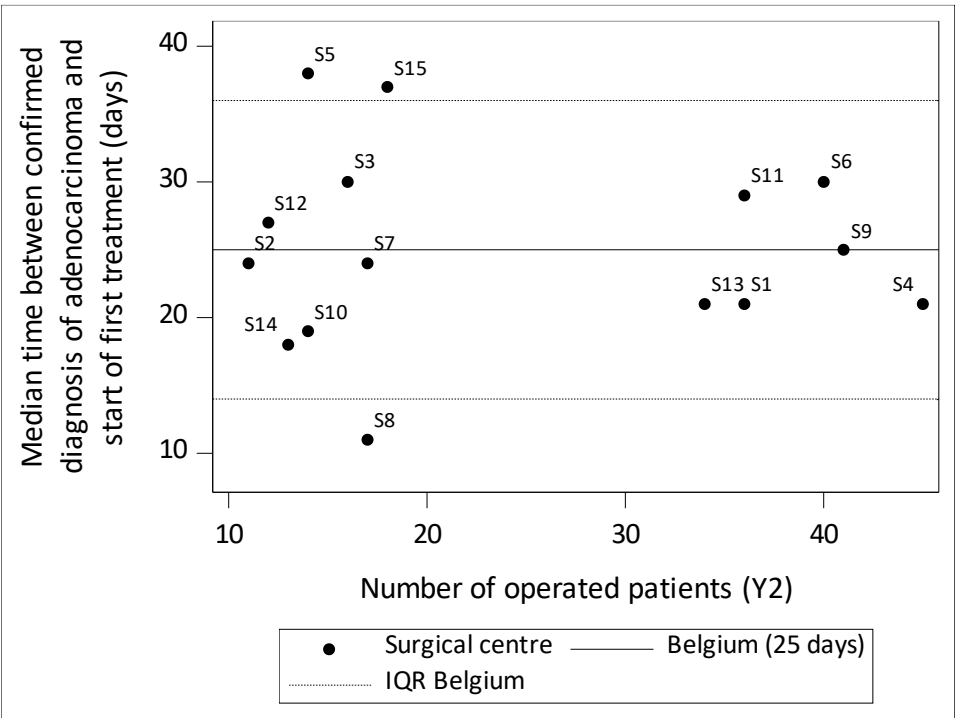
Belgium				
Patient group	N	Median (days)	IQR*	p90**
<b><i>Operated patients with confirmed adenocarcinoma</i></b>	1,815	25	[14, 37]	55
<b><i>Convention year</i></b>				
Year 1	336	21	[12, 37]	57
Year 2	364	25	[14, 36]	56
Year 3	367	27	[15, 37]	55
Year 4	362	24	[14, 35]	50
Year 5	386	26	[18, 40]	55
<b><i>Referral status</i></b>				
Operated patients referred to an expert centre	1,088	25	[15, 39]	57
Operated patients without referral	727	23	[14, 34]	51
Remark: only operated patients with a histologically confirmed diagnosis are shown in this table.				
* Interquartile Range= [the 25th, and 75th percentiles of the data]				
** 90th percentile				

**Figure 11:** Median time between **confirmed** diagnosis of **adenocarcinoma** and start of first treatment, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5 and (f) all years combined.

(a)

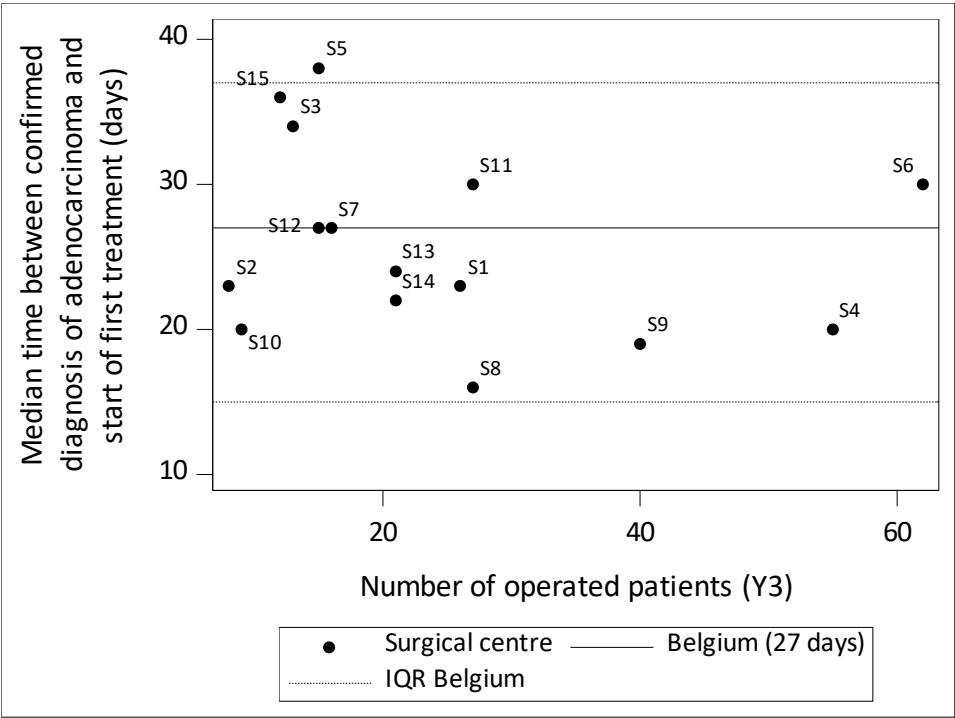


(b)

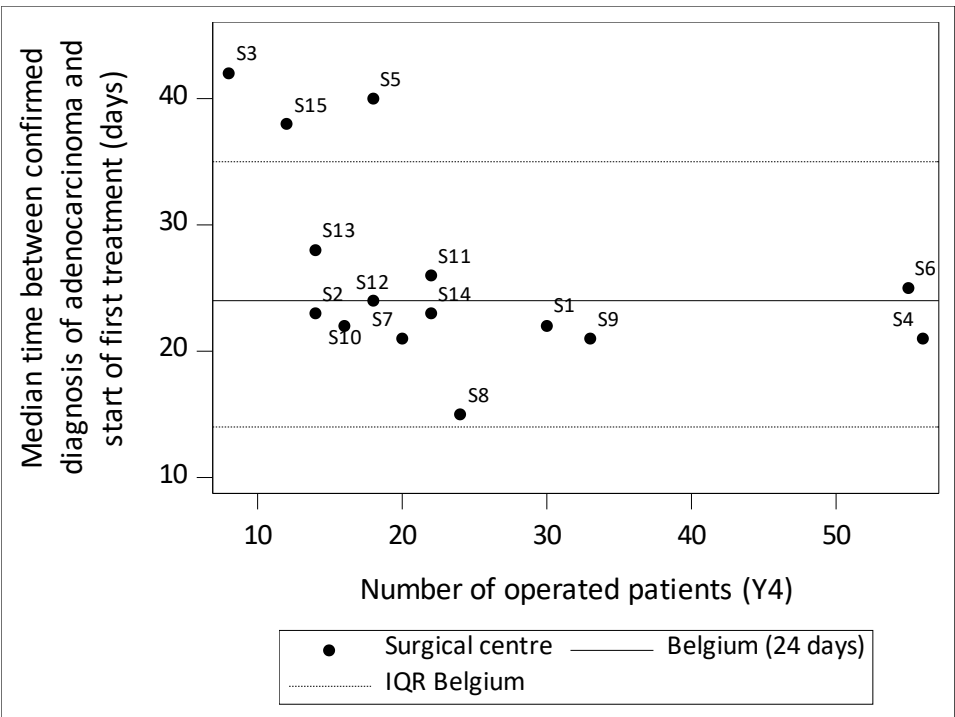




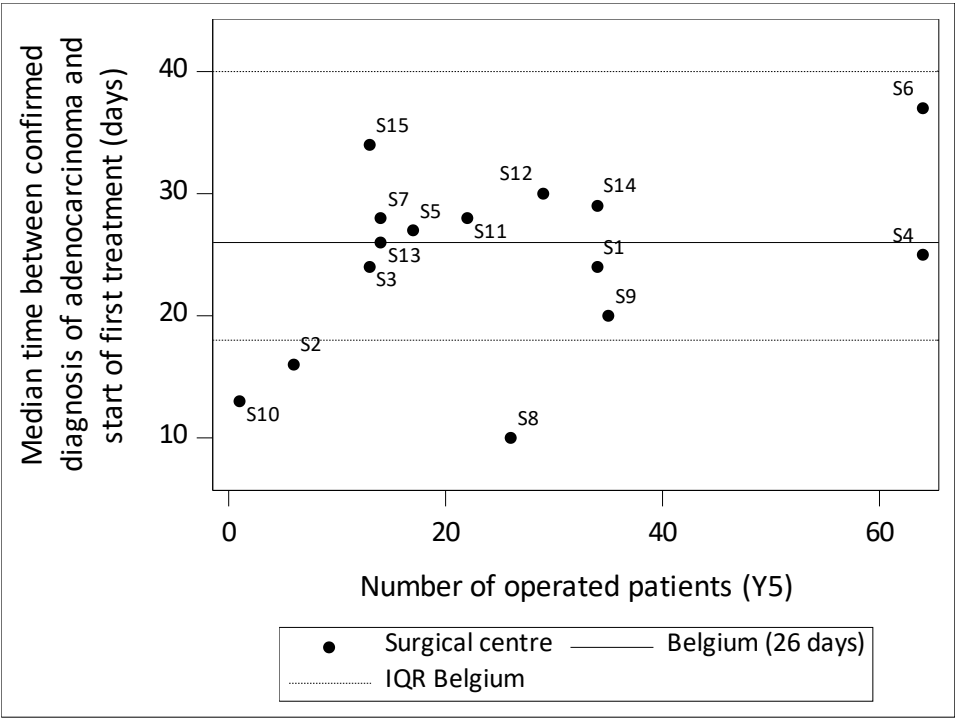
(c)



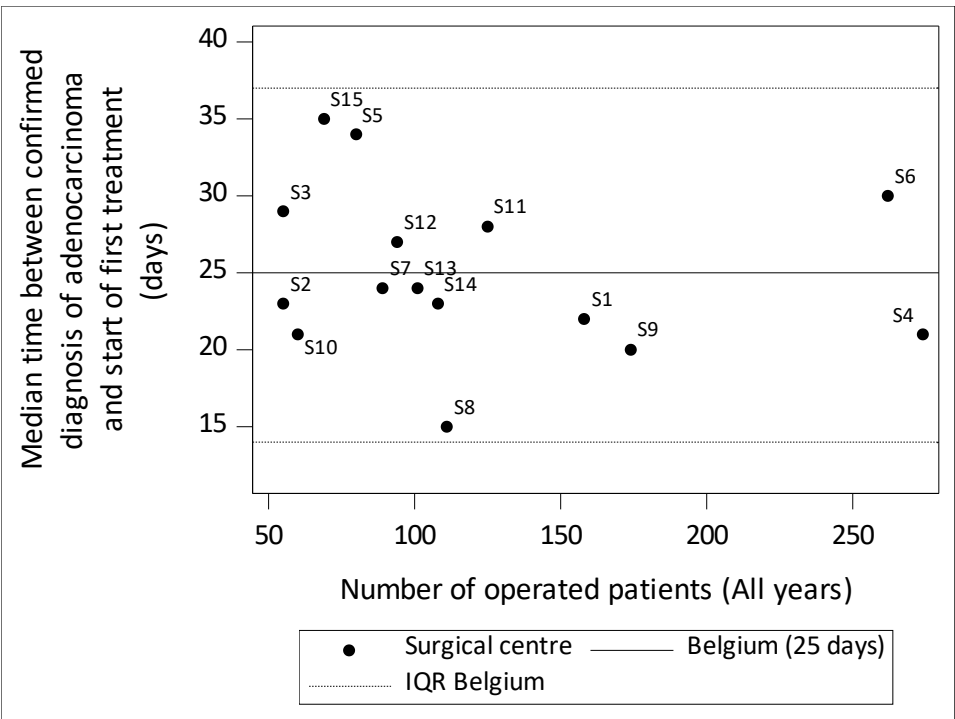
(d)



(e)



(f)



### 3.2.2. Length of stay in the expert centre for all operated patients

**Table 10.** Length of stay in an expert centre for all operated patients (**malignant and benign tumours**) in the five convention years.

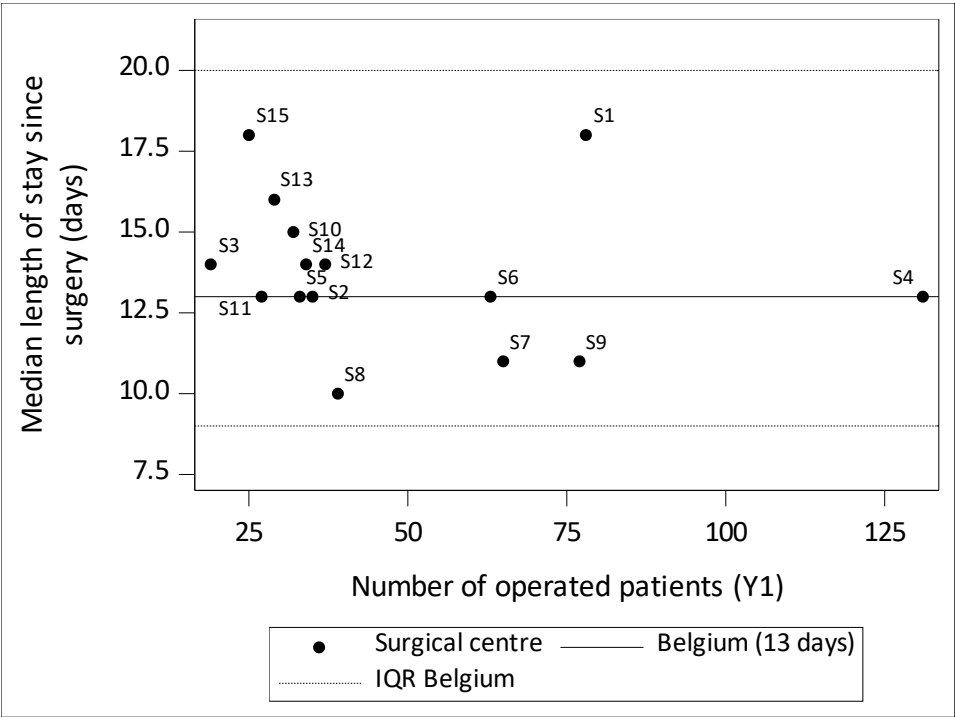
		Belgium	
Patient group	N	Median (days)	IQR*
<b>Operated patients with malignant/benign tumours <sup>1</sup></b>	4,176	12	[9, 18]
<b>Type of surgery</b>			
242830-242841: Pancreaticoduodenectomy	2,762	14	[10, 21]
Pancreaticoduodenectomy	2,499	14	[10, 21]
Total Pancreatectomy	263	15	[11, 21]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	400	10	[8, 15]
242874-242885: Hemipancreatectomy left	950	8	[7, 11]
242896-242900: Enucleation of a pancreatic tumour	64	8	[6, 12]
<b>Convention year</b>			
Year 1	724	13	[9, 20]
Year 2	856	12	[9, 19]
Year 3	851	12	[8, 17]
Year 4	834	12	[8, 18]
Year 5	911	12	[8, 18]

<sup>1</sup> length of stay longer than 90 days was truncated at 90 days.

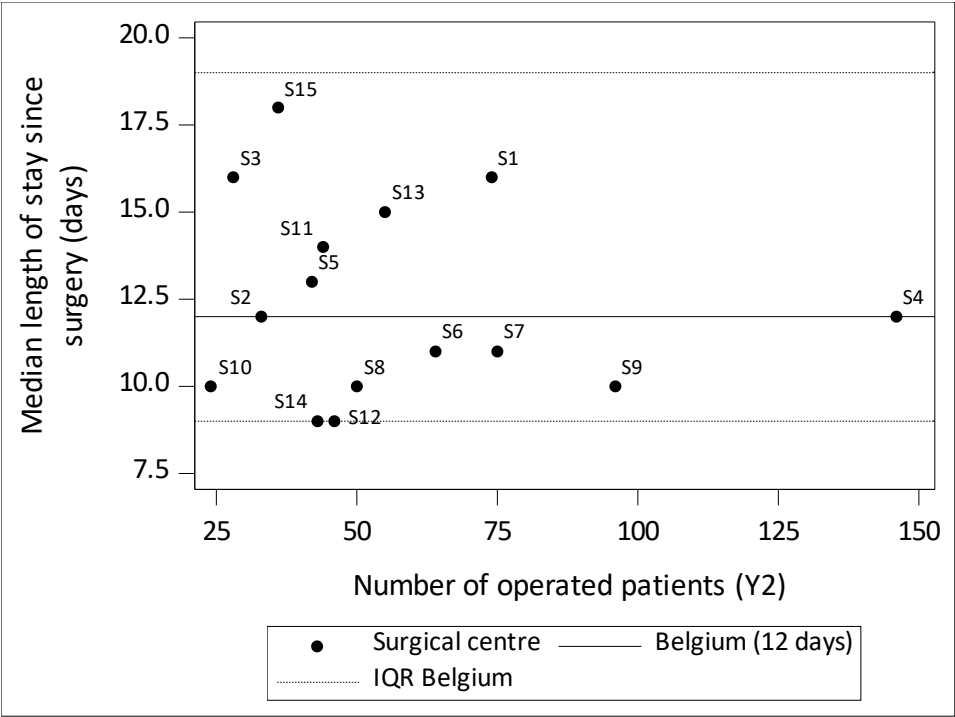
\* Interquartile Range= [the 25th, and 75th percentiles of the data]

**Figure 12:** Median length of stay for all operated patients (**malignant and benign tumours**), per centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5 and (f) all years combined.

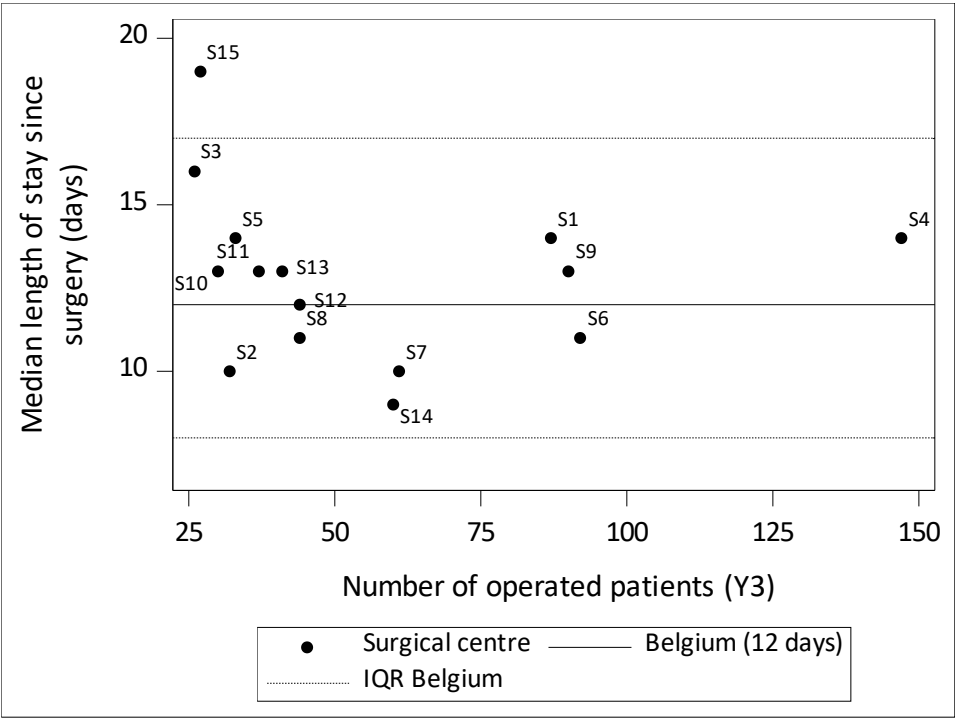
(a)



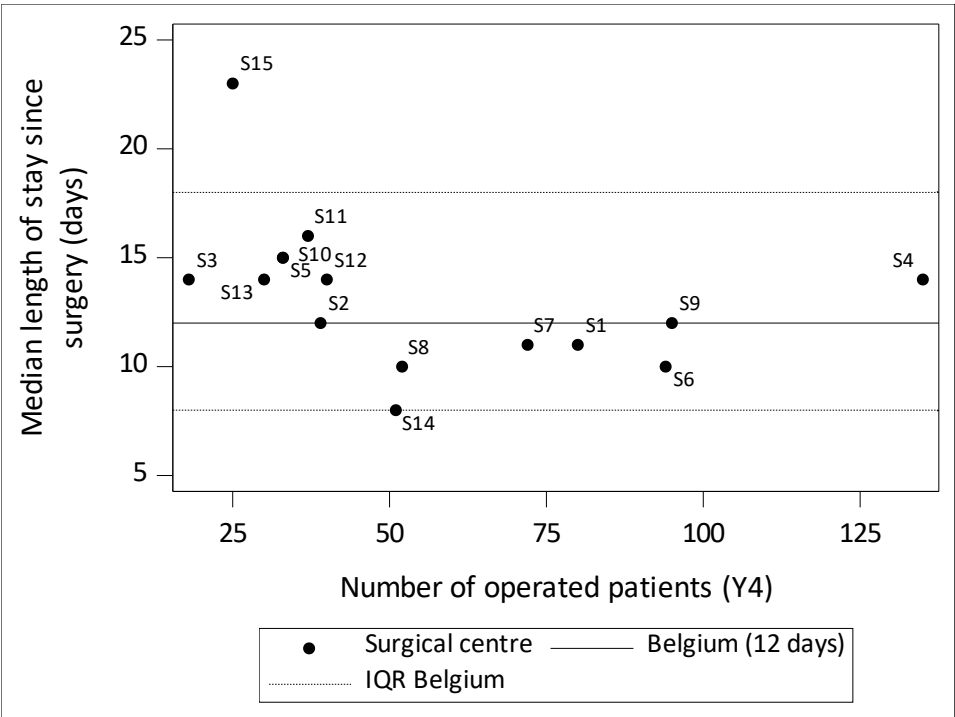
(b)



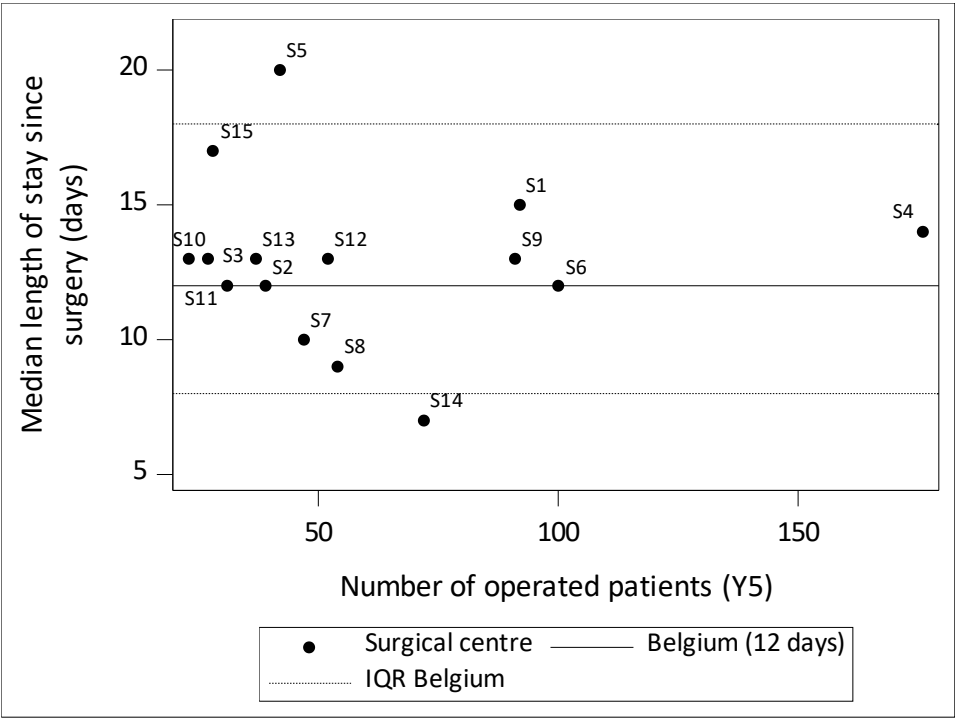
(c)



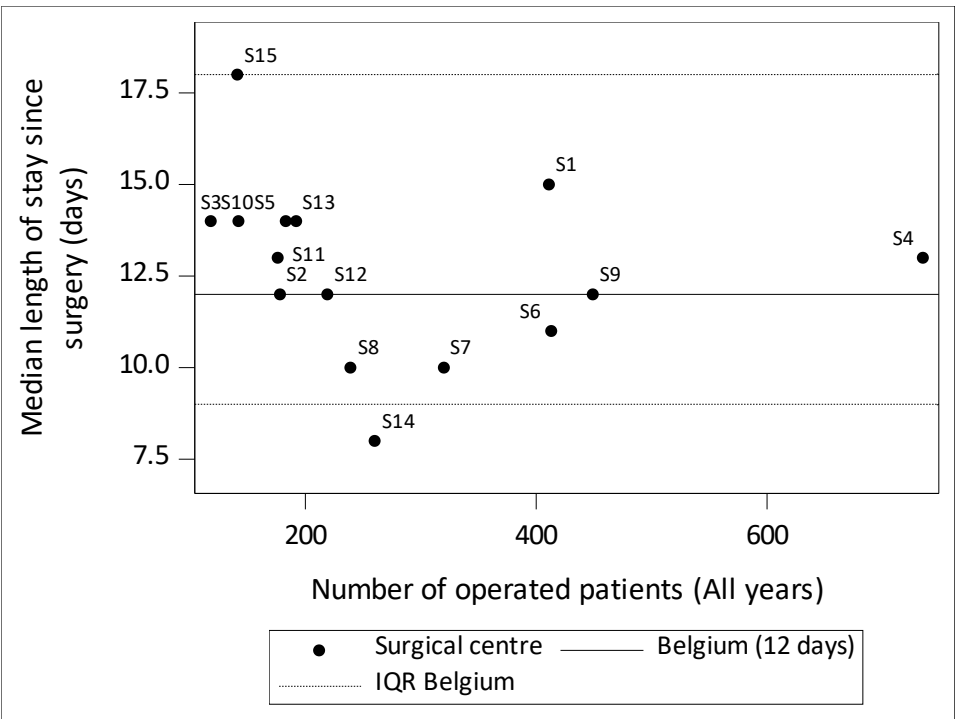
(d)



(e)



(f)



### 3.2.3. Proportion of operated patients with $\geq 12$ lymph nodes examined

**Table 11.** Proportion of operated patients with a **malignant tumour** in the five convention years for whom  $\geq 12$  lymph nodes were examined, by malignant morphology.

Characteristic	Belgium			
	N	n	n/N (%)	95% CI
<b><i>Operated patients with a malignant tumour</i></b>	3,573	2,912	81.5	[80.2, 82.8]
<b><i>Malignant morphology</i></b>				
Adenocarcinoma	2,706	2,440	90.2	[89.0, 91.3]
Neuroendocrine tumour	535	248	46.4	[42.1, 50.7]
Other or unspecified	332	224	67.5	[62.1, 72.5]

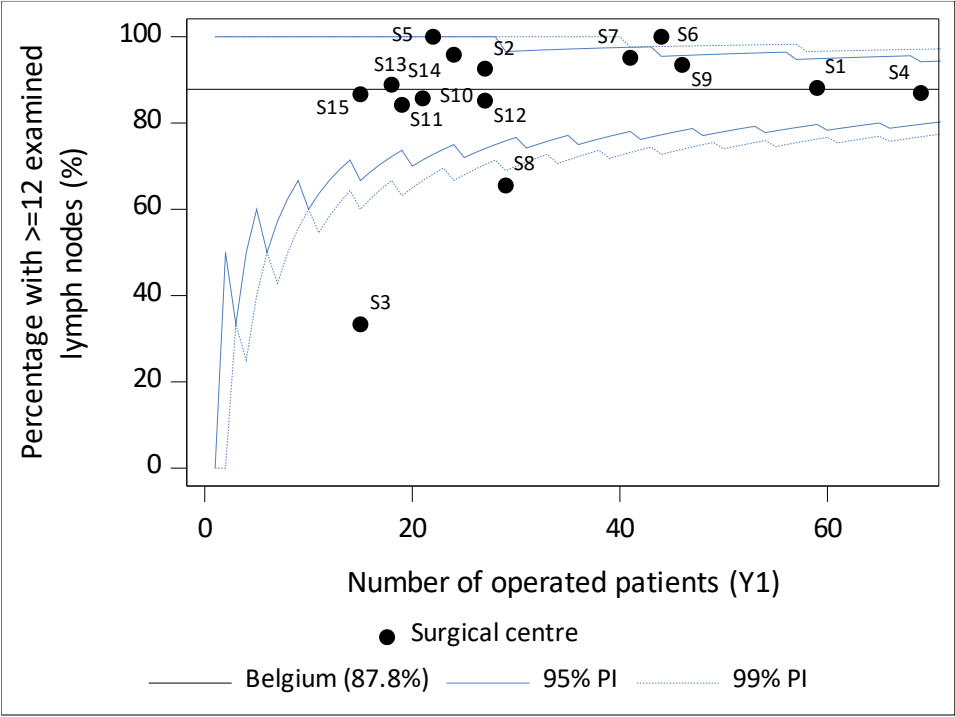
**Table 12.** Proportion of operated patients with **adenocarcinoma** in the five convention years for whom  $\geq 12$  lymph nodes were examined, by type of complex surgery.

Characteristic	Belgium			
	N	n	n/N (%)	95% CI
<b>Operated patients with adenocarcinoma</b>	2,706	2,440	90.2	[89.0, 91.3]
<b>Expert centres</b>				.
S1	291	275	94.5	[91.2, 96.8]
S2	109	107	98.2	[93.5, 99.8]
S3	87	58	66.7	[55.7, 76.4]
S4	443	346	78.1	[74.0, 81.9]
S5	109	102	93.6	[87.2, 97.4]
S6	288	270	93.8	[90.3, 96.3]
S7	199	190	95.5	[91.6, 97.9]
S8	159	132	83.0	[76.3, 88.5]
S9	292	279	95.5	[92.5, 97.6]
S10	88	79	89.8	[81.5, 95.2]
S11	128	119	93.0	[87.1, 96.7]
S12	137	127	92.7	[87.0, 96.4]
S13	127	116	91.3	[85.0, 95.6]
S14	165	163	98.8	[95.7, 99.9]
S15	84	77	91.7	[83.6, 96.6]
<b>Convention year</b>				
Year 1	476	418	87.8	[84.5, 90.6]
Year 2	554	487	87.9	[84.9, 90.5]
Year 3	552	503	91.1	[88.4, 93.4]
Year 4	545	498	91.4	[88.7, 93.6]
Year 5	579	534	92.2	[89.7, 94.3]
<b>RIZIV code for complex surgery</b>				
242830-242841: Pancreaticoduodenectomy	2,139	1,985	92.8	[91.6, 93.9]
Pancreaticoduodenectomy	1,975	1,829	92.6	[91.4, 93.7]
Total Pancreatectomy	164	156	95.1	[90.6, 97.9]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	183	147	80.3	[73.8, 85.8]
242874-242885: Hemipancreatectomy left	382	306	80.1	[75.7, 84.0]
242896-242900: Enucleation of a pancreatic tumour	2	2	100.0	[15.8, 100.0]

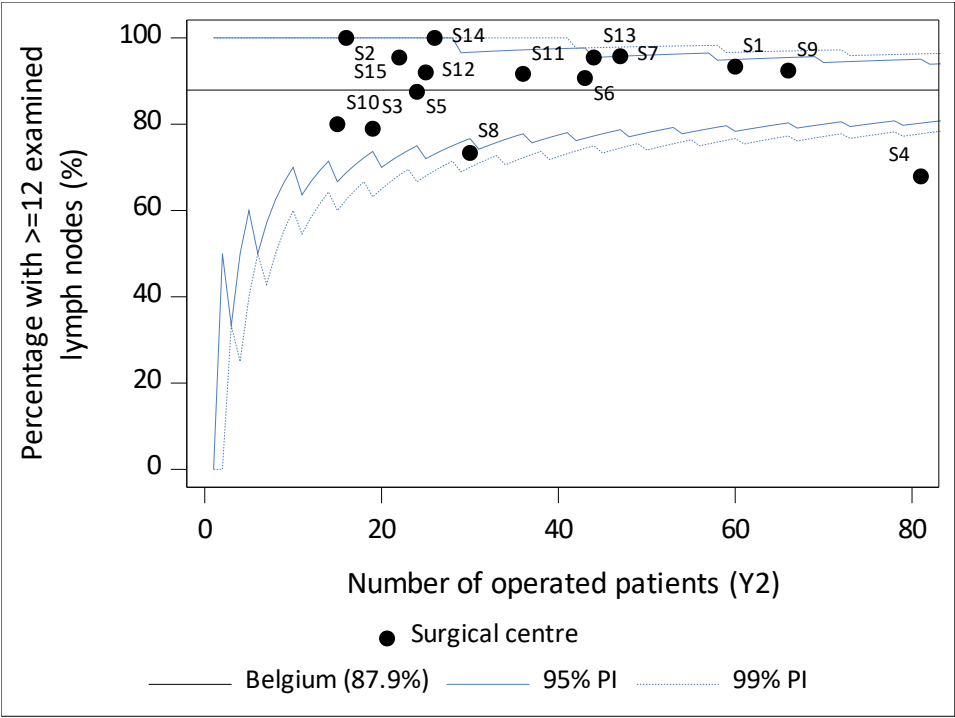


**Figure 13:** Funnel and spaghetti plot of the proportion of operated patients with **adenocarcinoma** for whom  $\geq 12$  lymph nodes were examined, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5, (f) all years combined, (g) evolution year 1, 2, 3, 4 and 5.

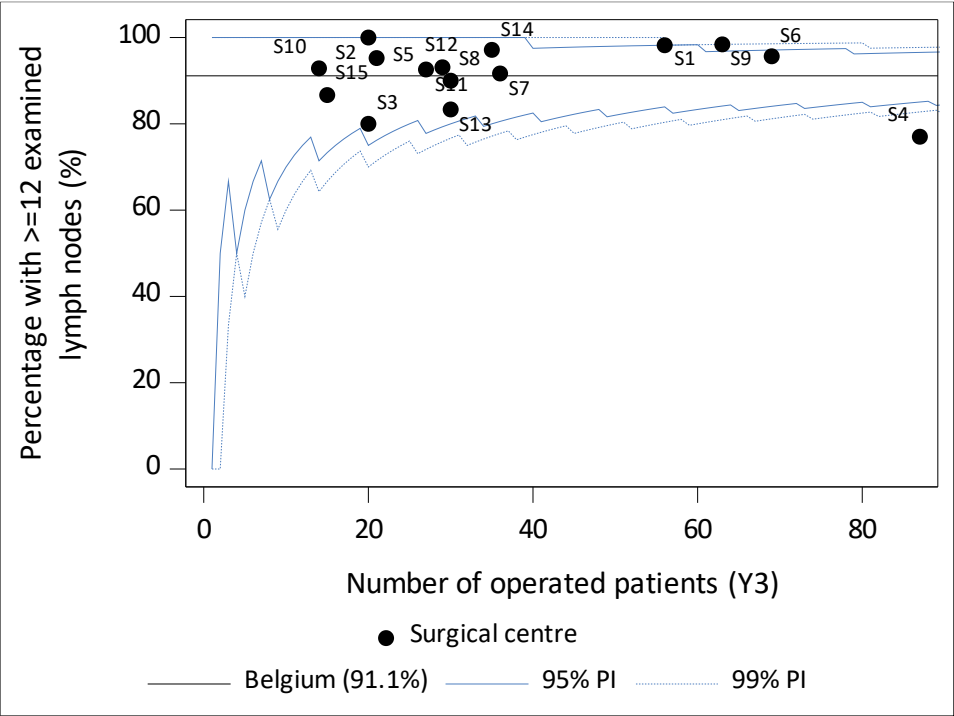
(a)



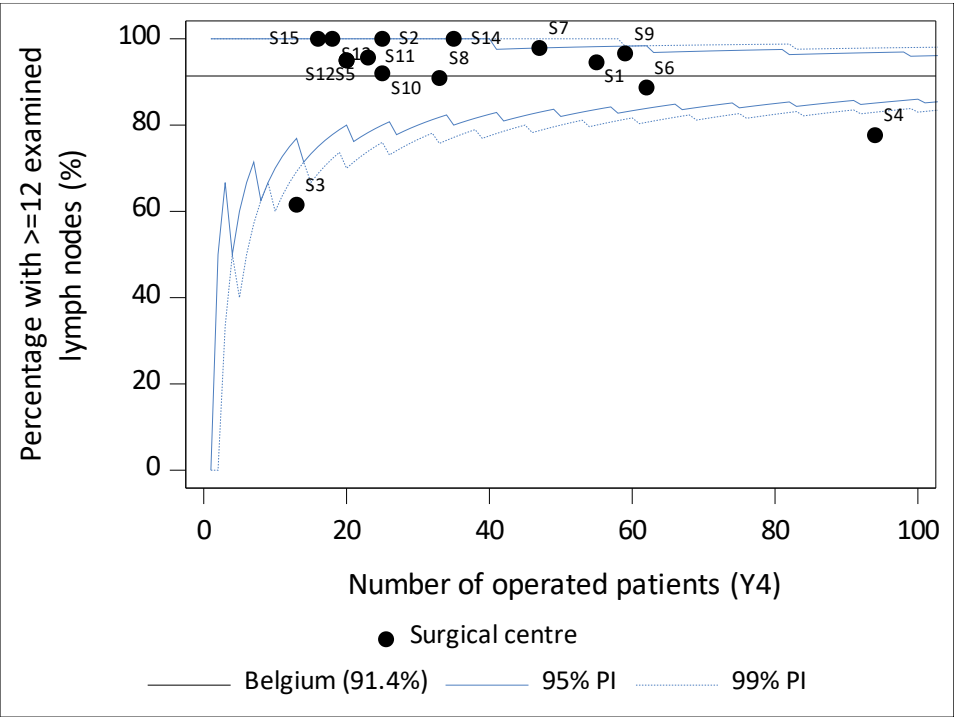
(b)



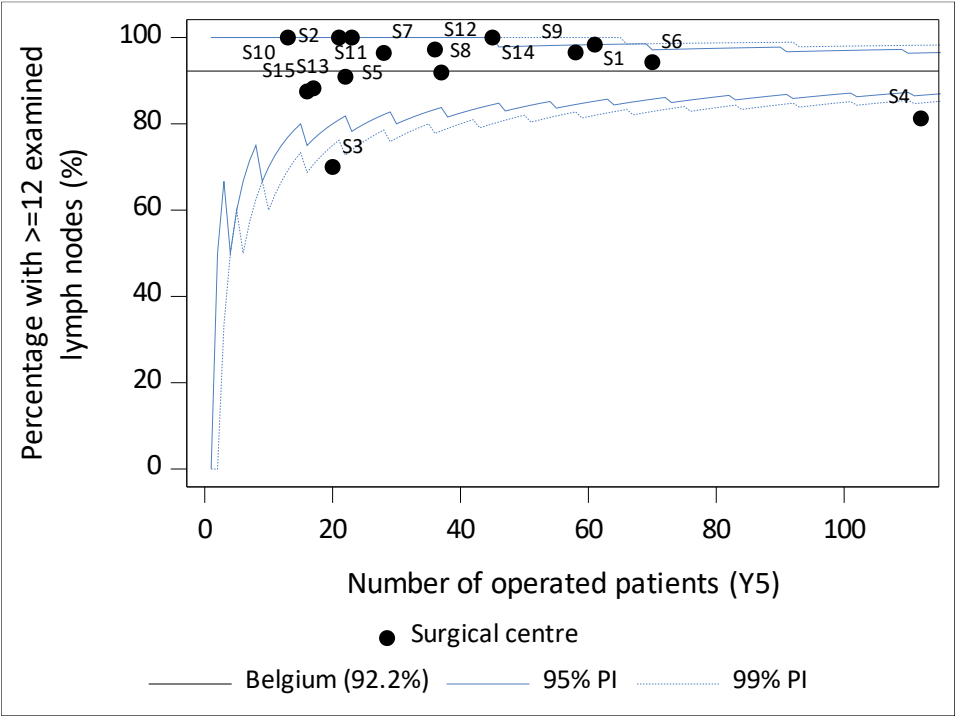
(c)



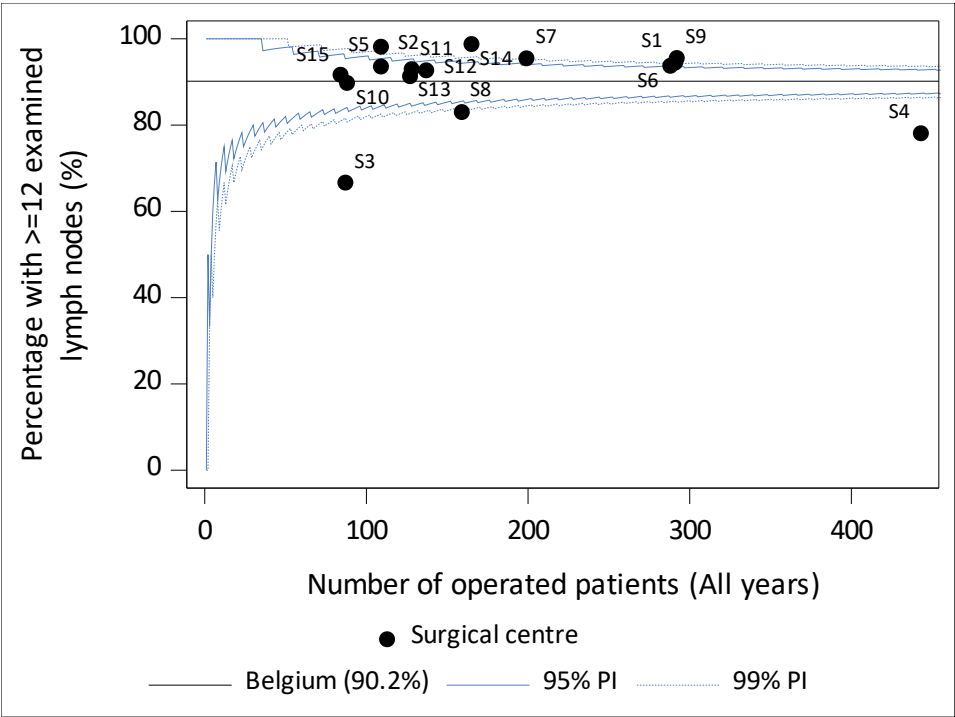
(d)



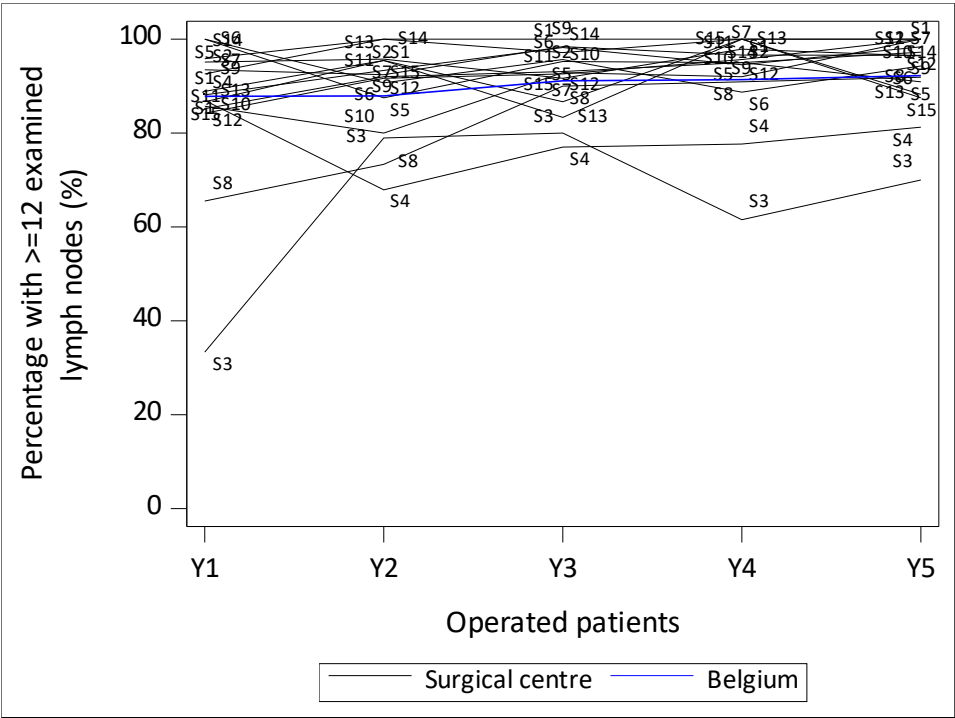
(e)



(f)



(g)



### 3.3. Outcome indicators

#### 3.3.1. Postoperative mortality

##### 3.3.1.1. Unadjusted 30-day postoperative mortality

**Table 13.** Unadjusted 30-day postoperative mortality for **malignant and benign tumoural** pathology in the five convention years, by patient and tumour characteristics.

Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
<b>Operated patients with a malignant/benign tumour</b>	<b>4,176</b>	<b>86</b>	<b>2.1</b>	<b>[1.7, 2.5]</b>
<b>Expert centres</b>				.
S1	411	11	2.7	[1.3, 4.7]
S2	178	3	1.7	[0.3, 4.8]
S3	118	5	4.2	[1.4, 9.6]
S4	735	14	1.9	[1.0, 3.2]
S5	183	7	3.8	[1.6, 7.7]
S6	413	12	2.9	[1.5, 5.0]
S7	320	1	0.3	[0.0, 1.7]
S8	239	4	1.7	[0.5, 4.2]
S9	449	4	0.9	[0.2, 2.3]
S10	142	1	0.7	[0.0, 3.9]
S11	176	8	4.5	[2.0, 8.8]
S12	219	3	1.4	[0.3, 4.0]
S13	192	4	2.1	[0.6, 5.2]
S14	260	7	2.7	[1.1, 5.5]
S15	141	2	1.4	[0.2, 5.0]
<b>Convention year</b>				
Year 1	724	18	2.5	[1.5, 3.9]
Year 2	856	19	2.2	[1.3, 3.4]
Year 3	851	22	2.6	[1.6, 3.9]
Year 4	834	13	1.6	[0.8, 2.7]
Year 5	911	14	1.5	[0.8, 2.6]
<b>Sex</b>				
Male	2,249	54	2.4	[1.8, 3.1]
Female	1,927	32	1.7	[1.1, 2.3]
<b>Age at surgery</b>				
<=69	2,346	32	1.4	[0.9, 1.9]
70-79	1,448	38	2.6	[1.9, 3.6]

Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
>=80	382	16	4.2	[2.4, 6.7]
<b><i>Lesion to treat (in (peri-)pancreas)</i></b>				
Primary tumour	4,064	83	2.0	[1.6, 2.5]
Relapse of primary tumour	54	2	3.7	[0.5, 12.7]
Metastasis	58	1	1.7	[0.0, 9.2]
<b><i>Morphology</i></b>				
Adenocarcinoma	2,706	68	2.5	[2.0, 3.2]
Neuroendocrine tumour	535	5	0.9	[0.3, 2.2]
Benign tumour	603	6	1.0	[0.4, 2.2]
Other or unspecified	332	7	2.1	[0.9, 4.3]
<b><i>Primary tumour localisation</i></b>				
C17.0 Duodenum	180	8	4.4	[1.9, 8.6]
C24.0 Extrahepatic bile duct	214	8	3.7	[1.6, 7.2]
C24.1 (Peri-) ampullary region	345	11	3.2	[1.6, 5.6]
C25.0 Head of pancreas	1,573	39	2.5	[1.8, 3.4]
C25.1 Body of pancreas	373	5	1.3	[0.4, 3.1]
C25.2 Tail of pancreas	542	1	0.2	[0.0, 1.0]
C25.3 Pancreatic duct	18	0	0.0	[0.0, 18.5]
C25.4 Islands of Langerhans	34	0	0.0	[0.0, 10.3]
C25.7-9 Other specified parts of pancreas	182	6	3.3	[1.2, 7.0]
Other	112	2	1.8	[0.2, 6.3]
Missing or benign	603	6	1.0	[0.4, 2.2]
<b><i>Clinical stage</i></b>				
0	84	0	0.0	[0.0, 4.3]
I	1,717	42	2.4	[1.8, 3.3]
II	985	20	2.0	[1.2, 3.1]
III	380	7	1.8	[0.7, 3.8]
IV	96	0	0.0	[0.0, 3.8]
X	204	9	4.4	[2.0, 8.2]
TNM not applicable or relapse*	710	8	1.1	[0.5, 2.2]
<b><i>Prior surgery or other treatment **</i></b>				
Prior abdominal surgery	605	16	2.6	[1.5, 4.3]
Other treatment modality (that could affect the pancreas)	558	16	2.9	[1.6, 4.6]
<b><i>Neoadjuvant treatment</i></b>				
Chemoradiotherapy	88	2	2.3	[0.3, 8.0]
Chemotherapy	586	5	0.9	[0.3, 2.0]
Radiotherapy	4	0	0.0	[0.0, 60.2]
No chemo or radiation treatment	3,498	79	2.3	[1.8, 2.8]
<b><i>Charlson Comorbidity Index</i></b>				
0	1,729	13	0.8	[0.4, 1.3]

Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
1	1,005	31	3.1	[2.1, 4.3]
2	669	21	3.1	[2.0, 4.8]
3	343	10	2.9	[1.4, 5.3]
4	205	3	1.5	[0.3, 4.2]
5	86	3	3.5	[0.7, 9.9]
6	61	3	4.9	[1.0, 13.7]
7	37	1	2.7	[0.1, 14.2]
8	23	0	0.0	[0.0, 14.8]
9	10	1	10.0	[0.3, 44.5]
10	5	0	0.0	[0.0, 52.2]
11	1	0	0.0	[0.0, 97.5]
12	2	0	0.0	[0.0, 84.2]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	1,245	16	1.3	[0.7, 2.1]
1 - Symptomatic, but ambulant	2,488	54	2.2	[1.6, 2.8]
2 - Symptomatic, bedbound < 50% day	380	13	3.4	[1.8, 5.8]
3 - Symptomatic, bedbound > 50% day	61	3	4.9	[1.0, 13.7]
4 - Completely dependent, 100% bedbound	2	0	0.0	[0.0, 84.2]
<b>ASA score</b>				
1 - Healthy person	269	3	1.1	[0.2, 3.2]
2 - Mild systemic disease, normal activity	2,189	36	1.6	[1.2, 2.3]
3 - Serious systemic disease, limited activity	1,670	45	2.7	[2.0, 3.6]
4 - Life-threatening illness, handicapped	48	2	4.2	[0.5, 14.3]
<b>Resectability status <sup>**</sup></b>				
Before neoadjuvant treatment				
Upfront resectable	135	0	0.0	[0.0, 2.7]
Borderline resectable	326	6	1.8	[0.7, 4.0]
Unresectable	82	1	1.2	[0.0, 6.6]
No neoadjuvant treatment	2,118	49	2.3	[1.7, 3.0]
Before surgery				
Upfront resectable	2,280	49	2.1	[1.6, 2.8]
Borderline resectable	352	7	2.0	[0.8, 4.1]
Unresectable	22	0	0.0	[0.0, 15.4]
Missing	7	0	0.0	[0.0, 41.0]
<b>Type of surgery</b>				
Minimally invasive surgery (MIS) – Laparoscopic	1,161	13	1.1	[0.6, 1.9]
Minimally invasive surgery (MIS) - Hybrid	5	0	0.0	[0.0, 52.2]
Minimally invasive surgery (MIS) - Robotic	488	8	1.6	[0.7, 3.2]
Open	2,331	54	2.3	[1.7, 3.0]
Conversion from MIS to open surgery	191	11	5.8	[2.9, 10.1]

Characteristic	Unadjusted 30-day postoperative mortality			
	Belgium			
	N	N of deaths	%	95% CI
<b><i>Simultaneous venous resection</i></b>				
No	3,660	70	1.9	[1.5, 2.4]
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection	516	16	3.1	[1.8, 5.0]
- With primary wedge-reconstruction	165	4	2.4	[0.7, 6.1]
- With primary end-to-end reconstruction	215	7	3.3	[1.3, 6.6]
- With vascular autograft interposition	12	0	0.0	[0.0, 26.5]
- With vascular allograft interposition	61	2	3.3	[0.4, 11.3]
- With synthetic/prosthetic interposition	10	2	20.0	[2.5, 55.6]
- With peritoneal patch wedge-reconstruction	43	0	0.0	[0.0, 8.2]
- Without reconstruction	10	1	10.0	[0.3, 44.5]
<b><i>Simultaneous arterial resection **</i></b>				
No	4,106	85	2.1	[1.7, 2.6]
Hepatic artery resection	28	0	0.0	[0.0, 12.3]
- With primary end-to-end reconstruction	17	0	0.0	[0.0, 19.5]
- With vascular allograft interposition	1	0	0.0	[0.0, 97.5]
- Without reconstruction	10	0	0.0	[0.0, 30.8]
Coeliac trunk resection	32	1	3.1	[0.1, 16.2]
- With primary end-to-end reconstruction	2	0	0.0	[0.0, 84.2]
- Without reconstruction	30	1	3.3	[0.1, 17.2]
Superior mesenteric artery (SMA) resection	9	0	0.0	[0.0, 33.6]
- With primary wedge-reconstruction	1	0	0.0	[0.0, 97.5]
- With primary end-to-end reconstruction	3	0	0.0	[0.0, 70.8]
- With vascular autograft interposition	2	0	0.0	[0.0, 84.2]
- Without reconstruction	3	0	0.0	[0.0, 70.8]
<b><i>Simultaneous other organ resection **</i></b>				
No	2,541	59	2.3	[1.8, 3.0]
Colon	107	5	4.7	[1.5, 10.6]
Stomach	596	17	2.9	[1.7, 4.5]
Adrenal gland	88	0	0.0	[0.0, 4.1]
Spleen	932	9	1.0	[0.4, 1.8]
Other	262	3	1.1	[0.2, 3.3]
<b><i>RIZIV code for complex surgery</i></b>				
242830-242841: Pancreaticoduodenectomy	2,762	74	2.7	[2.1, 3.4]
Pancreaticoduodenectomy	2,499	68	2.7	[2.1, 3.4]
Total Pancreatectomy	263	6	2.3	[0.8, 4.9]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	400	5	1.3	[0.4, 2.9]
242874-242885: Hemipancreatectomy left	950	6	0.6	[0.2, 1.4]
242896-242900: Enucleation of a pancreatic tumour	64	1	1.6	[0.0, 8.4]
<b><i>Antithrombotic medication</i></b>				



Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
No	2,945	46	1.6	[1.1, 2.1]
Yes	1,231	40	3.2	[2.3, 4.4]
<b><i>Was the patient referred?</i></b>				
No	1,886	36	1.9	[1.3, 2.6]
Yes	2,290	50	2.2	[1.6, 2.9]

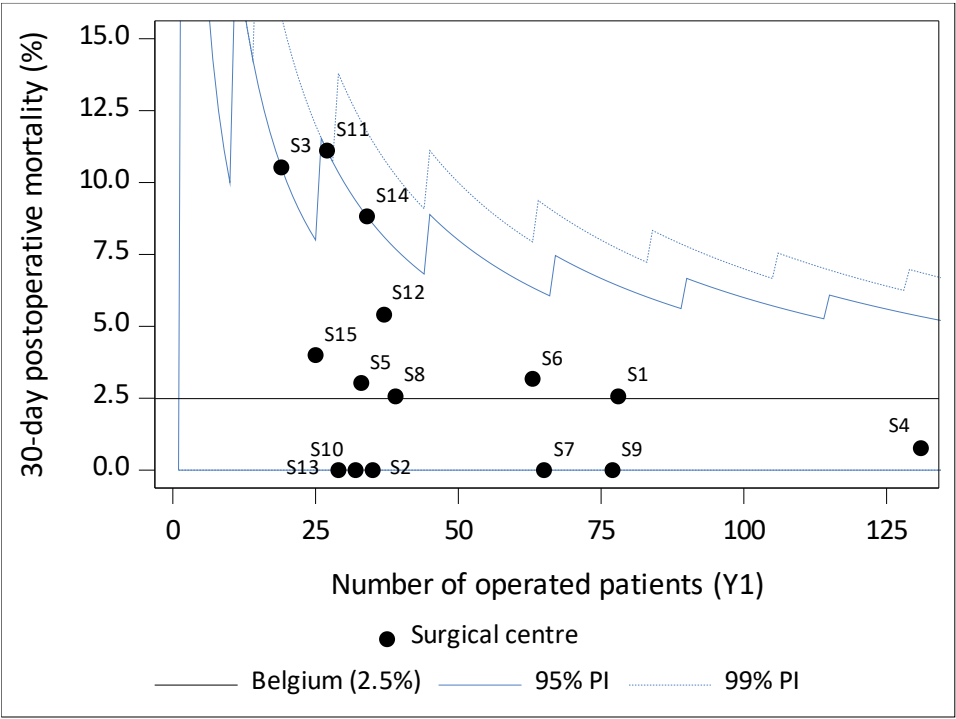
\* Tumour staging not possible.

\*\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients.

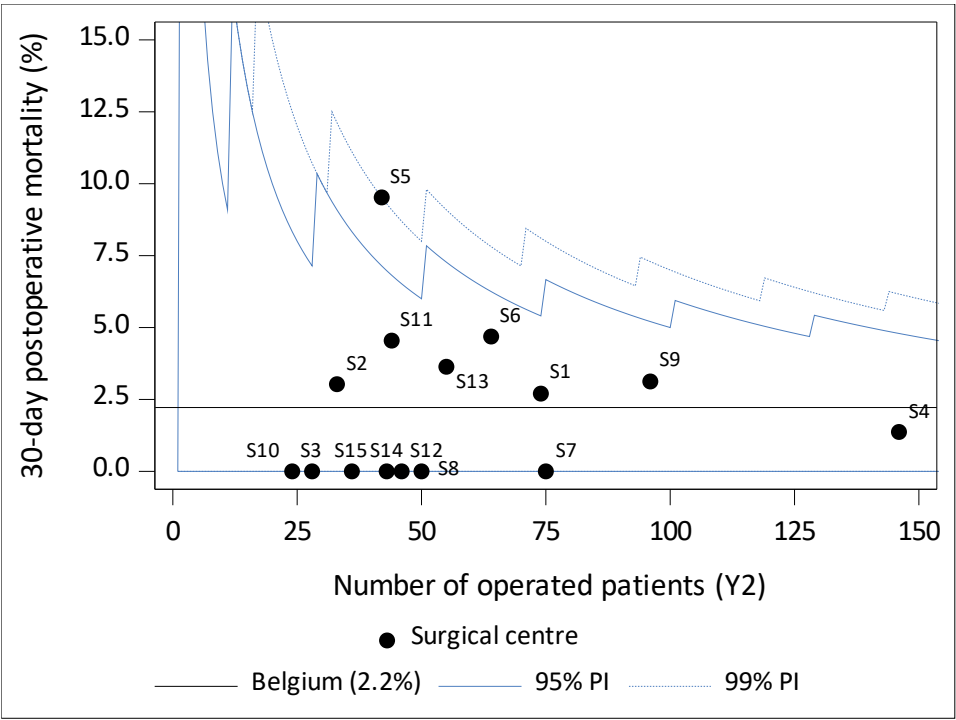
\*\* Results for this variable are only for malignant tumours and only available from the second half of Y2 onwards.

**Figure 14:** Funnel and spaghetti plot of the unadjusted 30-day postoperative mortality for **malignant and benign tumoural** pathology, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5, (f) all years combined, (g) evolution year 1, 2, 3, 4 and 5.

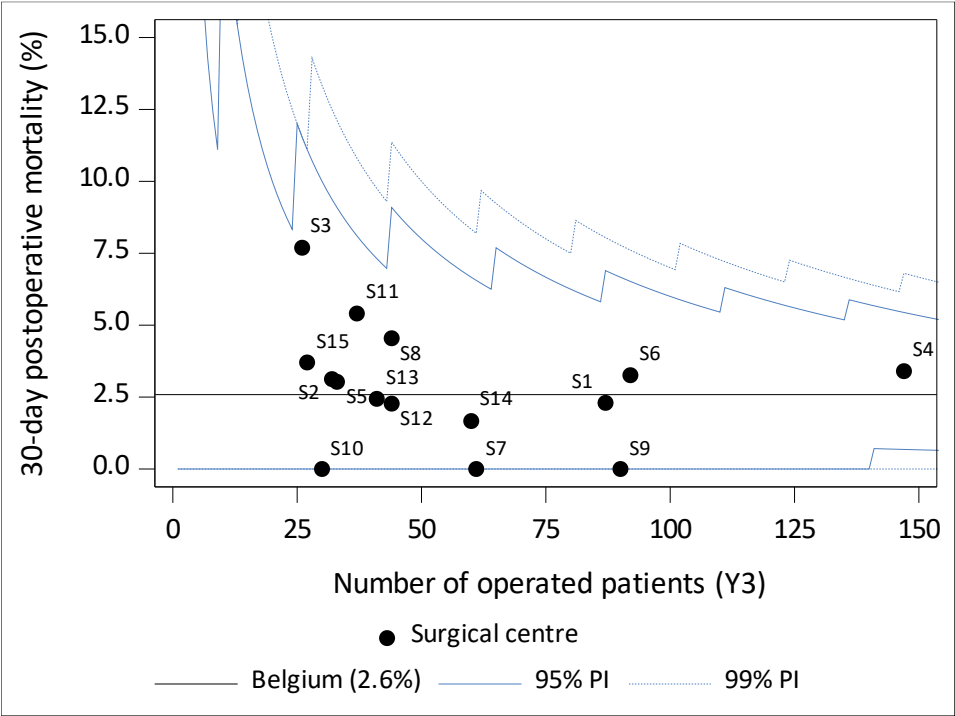
(a)



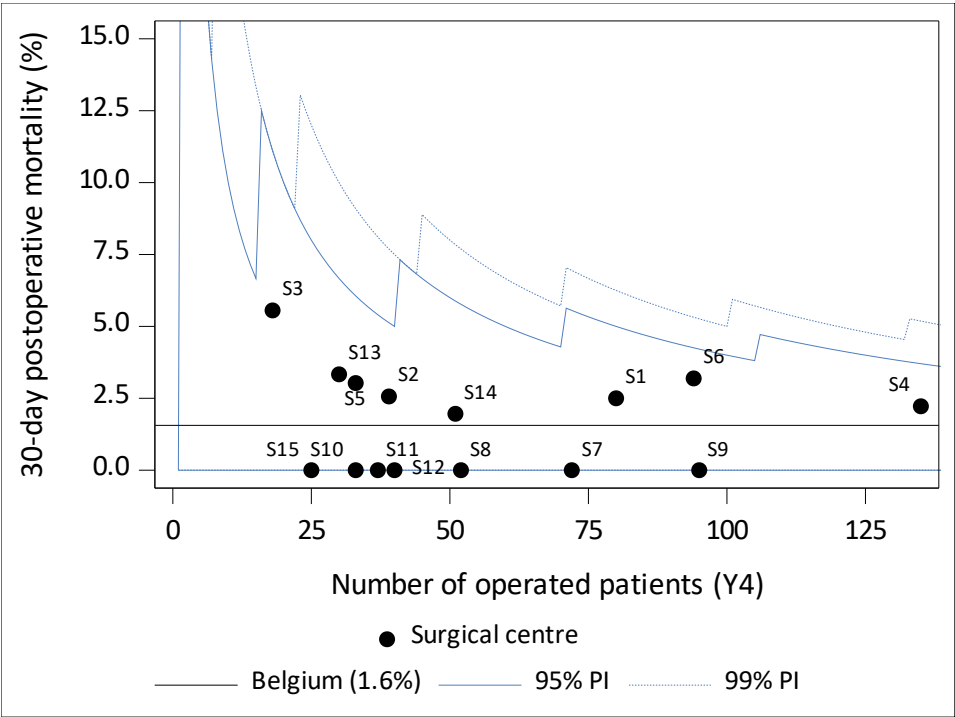
(b)



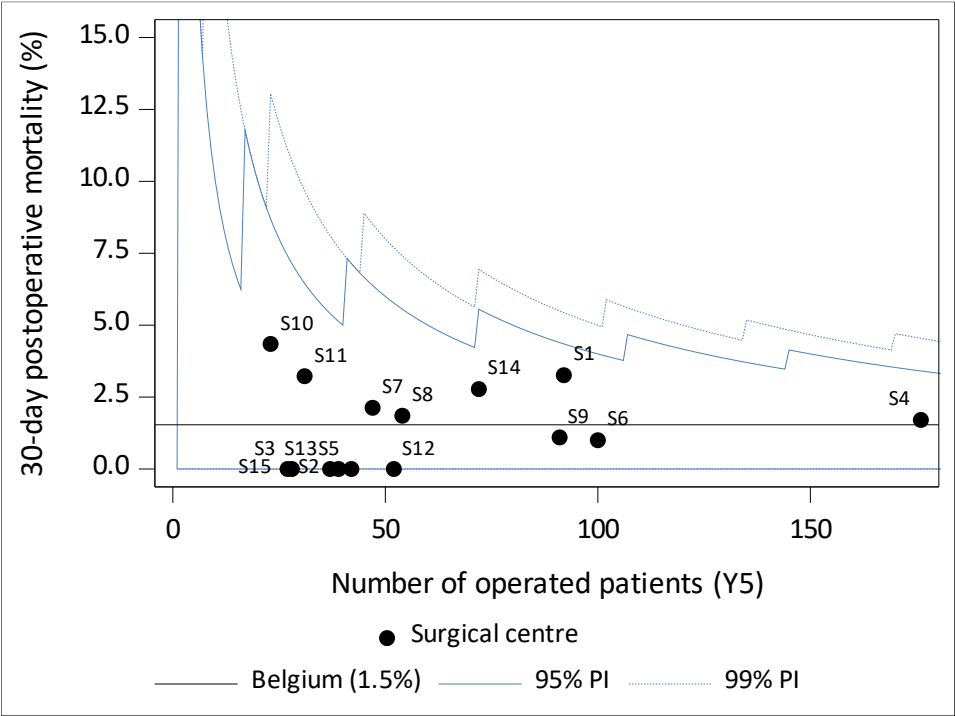
(c)



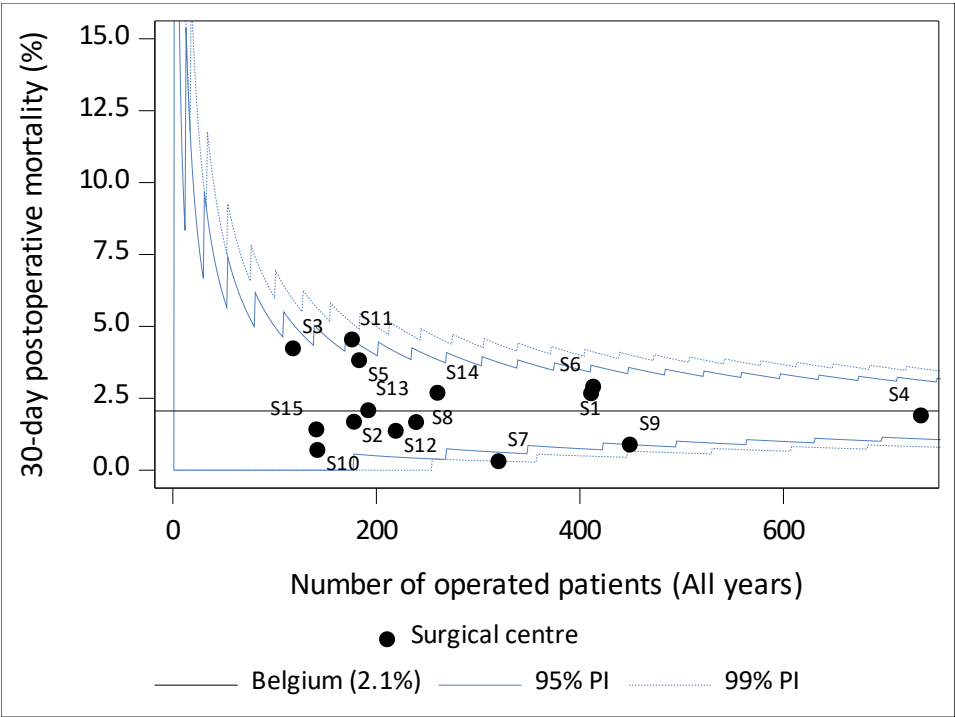
(d)



(e)



(f)





### 3.3.1.2 Adjusted 30-day postoperative mortality

**Table 14:** Case-mix adjusted odds ratio for postoperative mortality within 30 days and direct standardised 30-day postoperative mortality, for **malignant and benign tumoural** pathology, in the five convention years.

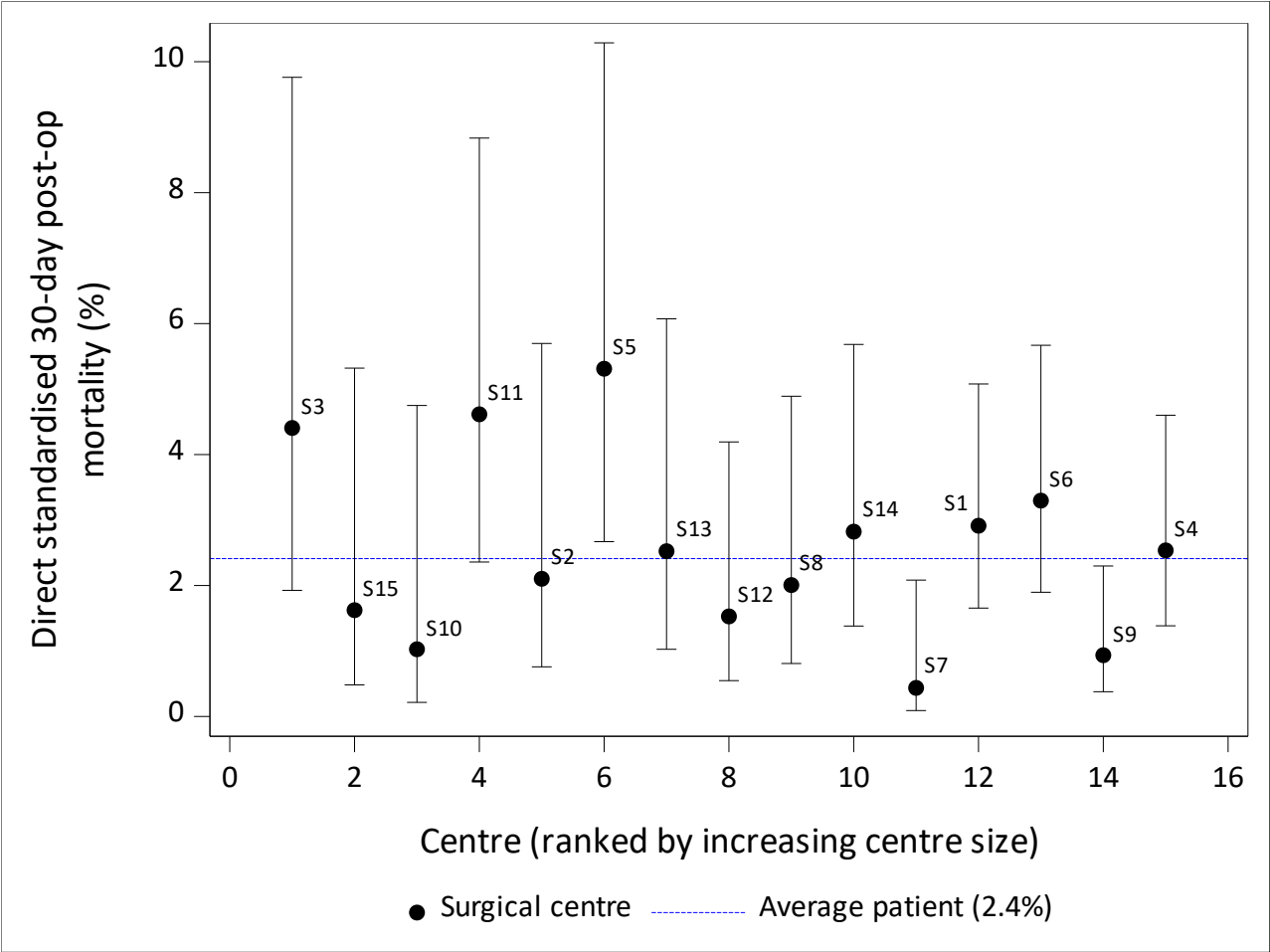
Expert centres	Adjusted Odds Ratio			Standardised probability (%)			
	Estimate	95% CI	Average patient	Estimate	95% CI	Average patient	
S1	1.38	[0.75, 2.53]	0.96	2.9	[1.7, 5.1]	2.4	
S2	0.98	[0.36, 2.69]	0.96	2.1	[0.8, 5.7]	2.4	
S3	2.14	[0.92, 4.99]	0.96	4.4	[1.9, 9.8]	2.4	
S4	1.19	[0.61, 2.34]	0.96	2.5	[1.4, 4.6]	2.4	
S5	2.62	[1.26, 5.45]	0.96	5.3	[2.7, 10.3]	2.4	
S6	1.57	[0.87, 2.85]	0.96	3.3	[1.9, 5.7]	2.4	
S7	0.20	[0.04, 0.88]	0.96	0.4	[0.1, 2.1]	2.4	
S8	0.94	[0.38, 2.32]	0.96	2.0	[0.8, 4.9]	2.4	
S9	0.43	[0.18, 1.04]	0.96	0.9	[0.4, 2.3]	2.4	
S10	0.47	[0.11, 2.09]	0.96	1.0	[0.2, 4.7]	2.4	
S11	2.25	[1.11, 4.55]	0.96	4.6	[2.4, 8.8]	2.4	
S12	0.71	[0.26, 1.94]	0.96	1.5	[0.5, 4.2]	2.4	
S13	1.19	[0.48, 2.92]	0.96	2.5	[1.0, 6.1]	2.4	
S14	1.33	[0.63, 2.82]	0.96	2.8	[1.4, 5.7]	2.4	
S15	0.75	[0.23, 2.45]	0.96	1.6	[0.5, 5.3]	2.4	

Adjusted for age at diagnosis, sex, ASA score, Charlson Comorbidity Index, type of surgery, vascular resection/reconstruction and tumour type (as proposed by the Belgian Pancreatic Cancer Group).

This table shows the case-mix adjusted odds ratio for postoperative mortality within 30 days and the center specific direct standardised 30-day mortality (%), together with their accompanying 95% confidence intervals. The 'average patient' odds ratio is obtained as a weighted average of the individual centre results with the fraction of patients per centre as weights. The 'average patient' results for the case-mix adjusted odds ratio and the direct standardised mortality serve as references and enable comparison of the individual center results with the reference. An individual center result is significantly different from the average result if the average result is not included in the center specific confidence interval.

The postoperative mortality probability was modelled using a logistic regression model. All the possible two-way interaction terms between the case-mix variables were evaluated during the model building procedure. The quality of the regression was assessed taking into account the deviance as well as Pearson goodness-of-fit and the Hosmer and Lemeshow goodness-of-fit test, and the residual plots were examined for potential influential points and resolved when needed.

**Figure 15:** Direct standardised 30-day postoperative mortality in the five convention years, by surgical centre.



### 3.3.1.3. Unadjusted 90-day postoperative mortality

**Table 15.** Unadjusted 90-day postoperative mortality for **malignant and benign tumoural** pathology in the five convention years, by patient and tumour characteristics.

Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
<b>Operated patients with a malignant/benign tumour</b>	<b>4,176</b>	<b>184</b>	<b>4.4</b>	<b>[3.8, 5.1]</b>
<b>Expert centres</b>				.
S1	411	19	4.6	[2.8, 7.1]
S2	178	13	7.3	[3.9, 12.2]
S3	118	8	6.8	[3.0, 12.9]
S4	735	29	3.9	[2.7, 5.6]
S5	183	9	4.9	[2.3, 9.1]
S6	413	23	5.6	[3.6, 8.2]
S7	320	6	1.9	[0.7, 4.0]
S8	239	11	4.6	[2.3, 8.1]
S9	449	11	2.4	[1.2, 4.3]
S10	142	7	4.9	[2.0, 9.9]
S11	176	14	8.0	[4.4, 13.0]
S12	219	7	3.2	[1.3, 6.5]
S13	192	5	2.6	[0.9, 6.0]
S14	260	11	4.2	[2.1, 7.4]
S15	141	11	7.8	[4.0, 13.5]
<b>Convention year</b>				
Year 1	724	33	4.6	[3.2, 6.3]
Year 2	856	47	5.5	[4.1, 7.2]
Year 3	851	45	5.3	[3.9, 7.0]
Year 4	834	28	3.4	[2.2, 4.8]
Year 5	911	31	3.4	[2.3, 4.8]
<b>Sex</b>				
Male	2,249	103	4.6	[3.8, 5.5]
Female	1,927	81	4.2	[3.4, 5.2]
<b>Age at surgery</b>				
<=69	2,346	63	2.7	[2.1, 3.4]
70-79	1,448	90	6.2	[5.0, 7.6]
>=80	382	31	8.1	[5.6, 11.3]
<b>Lesion to treat (in (peri-)pancreas)</b>				
Primary tumour	4,064	177	4.4	[3.7, 5.0]
Relapse of primary tumour	54	4	7.4	[2.1, 17.9]
Metastasis	58	3	5.2	[1.1, 14.4]
<b>Morphology</b>				



Unadjusted 90-day postoperative mortality					
Belgium					
Characteristic	N	N of deaths	%	95% CI	
Adenocarcinoma	2,706	149	5.5	[4.7, 6.4]	
Neuroendocrine tumour	535	14	2.6	[1.4, 4.4]	
Benign tumour	603	10	1.7	[0.8, 3.0]	
Other or unspecified	332	11	3.3	[1.7, 5.9]	
<b>Primary tumour localisation</b>					
C17.0 Duodenum	180	13	7.2	[3.9, 12.0]	
C24.0 Extrahepatic bile duct	214	16	7.5	[4.3, 11.9]	
C24.1 (Peri-) ampullary region	345	17	4.9	[2.9, 7.8]	
C25.0 Head of pancreas	1,573	92	5.8	[4.7, 7.1]	
C25.1 Body of pancreas	373	13	3.5	[1.9, 5.9]	
C25.2 Tail of pancreas	542	9	1.7	[0.8, 3.1]	
C25.3 Pancreatic duct	18	0	0.0	[0.0, 18.5]	
C25.4 Islands of Langerhans	34	0	0.0	[0.0, 10.3]	
C25.7-9 Other specified parts of pancreas	182	10	5.5	[2.7, 9.9]	
Other	112	4	3.6	[1.0, 8.9]	
Missing or benign	603	10	1.7	[0.8, 3.0]	
<b>Clinical stage</b>					
0	84	1	1.2	[0.0, 6.5]	
I	1,717	81	4.7	[3.8, 5.8]	
II	985	52	5.3	[4.0, 6.9]	
III	380	19	5.0	[3.0, 7.7]	
IV	96	4	4.2	[1.1, 10.3]	
X	204	12	5.9	[3.1, 10.0]	
TNM not applicable or relapse*	710	15	2.1	[1.2, 3.5]	
<b>Prior surgery or other treatment **</b>					
Prior abdominal surgery	605	29	4.8	[3.2, 6.8]	
Other treatment modality (that could affect the pancreas)	558	34	6.1	[4.3, 8.4]	
<b>Neoadjuvant treatment</b>					
Chemoradiotherapy	88	6	6.8	[2.5, 14.3]	
Chemotherapy	586	13	2.2	[1.2, 3.8]	
Radiotherapy	4	0	0.0	[0.0, 60.2]	
No chemo or radiation treatment	3,498	165	4.7	[4.0, 5.5]	
<b>Charlson Comorbidity Index</b>					
0	1,729	45	2.6	[1.9, 3.5]	
1	1,005	52	5.2	[3.9, 6.7]	
2	669	35	5.2	[3.7, 7.2]	
3	343	17	5.0	[2.9, 7.8]	
4	205	12	5.9	[3.1, 10.0]	
5	86	10	11.6	[5.7, 20.3]	
6	61	6	9.8	[3.7, 20.2]	
7	37	3	8.1	[1.7, 21.9]	

Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
8	23	1	4.3	[0.1, 21.9]
9	10	1	10.0	[0.3, 44.5]
10	5	2	40.0	[5.3, 85.3]
11	1	0	0.0	[0.0, 97.5]
12	2	0	0.0	[0.0, 84.2]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	1,245	31	2.5	[1.7, 3.5]
1 - Symptomatic, but ambulant	2,488	107	4.3	[3.5, 5.2]
2 - Symptomatic, bedbound < 50% day	380	36	9.5	[6.7, 12.9]
3 - Symptomatic, bedbound > 50% day	61	9	14.8	[7.0, 26.2]
4 - Completely dependent, 100% bedbound	2	1	50.0	[1.3, 98.7]
<b>ASA score</b>				
1 - Healthy person	269	6	2.2	[0.8, 4.8]
2 - Mild systemic disease, normal activity	2,189	80	3.7	[2.9, 4.5]
3 - Serious systemic disease, limited activity	1,670	94	5.6	[4.6, 6.8]
4 - Life-threatening illness, handicapped	48	4	8.3	[2.3, 20.0]
<b>Resectability status **</b>				
Before neoadjuvant treatment				
Upfront resectable	135	2	1.5	[0.2, 5.2]
Borderline resectable	326	13	4.0	[2.1, 6.7]
Unresectable	82	3	3.7	[0.8, 10.3]
No neoadjuvant treatment	2,118	106	5.0	[4.1, 6.0]
Before surgery				
Upfront resectable	2,280	106	4.6	[3.8, 5.6]
Borderline resectable	352	17	4.8	[2.8, 7.6]
Unresectable	22	0	0.0	[0.0, 15.4]
Missing	7	1	14.3	[0.4, 57.9]
<b>Type of surgery</b>				
Minimally invasive surgery (MIS) – Laparoscopic	1,161	27	2.3	[1.5, 3.4]
Minimally invasive surgery (MIS) - Hybrid	5	1	20.0	[0.5, 71.6]
Minimally invasive surgery (MIS) - Robotic	488	15	3.1	[1.7, 5.0]
Open	2,331	124	5.3	[4.4, 6.3]
Conversion from MIS to open surgery	191	17	8.9	[5.3, 13.9]
<b>Simultaneous venous resection</b>				
No	3,660	149	4.1	[3.5, 4.8]
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection	516	35	6.8	[4.8, 9.3]
- With primary wedge-reconstruction	165	10	6.1	[2.9, 10.9]
- With primary end-to-end reconstruction	215	16	7.4	[4.3, 11.8]
- With vascular autograft interposition	12	0	0.0	[0.0, 26.5]
- With vascular allograft interposition	61	4	6.6	[1.8, 15.9]
- With synthetic/prosthetic interposition	10	2	20.0	[2.5, 55.6]

Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
- With peritoneal patch wedge-reconstruction	43	2	4.7	[0.6, 15.8]
- Without reconstruction	10	1	10.0	[0.3, 44.5]
<b><i>Simultaneous arterial resection **</i></b>				
No	4,106	181	4.4	[3.8, 5.1]
Hepatic artery resection	28	0	0.0	[0.0, 12.3]
- With primary end-to-end reconstruction	17	0	0.0	[0.0, 19.5]
- With vascular allograft interposition	1	0	0.0	[0.0, 97.5]
- Without reconstruction	10	0	0.0	[0.0, 30.8]
Coeliac trunk resection	32	2	6.3	[0.8, 20.8]
- With primary end-to-end reconstruction	2	0	0.0	[0.0, 84.2]
- Without reconstruction	30	2	6.7	[0.8, 22.1]
Superior mesenteric artery (SMA) resection	9	1	11.1	[0.3, 48.2]
- With primary wedge-reconstruction	1	1	100.0	[2.5, 100.0]
- With primary end-to-end reconstruction	3	0	0.0	[0.0, 70.8]
- With vascular autograft interposition	2	0	0.0	[0.0, 84.2]
- Without reconstruction	3	0	0.0	[0.0, 70.8]
<b><i>Simultaneous other organ resection **</i></b>				
No	2,541	124	4.9	[4.1, 5.8]
Colon	107	6	5.6	[2.1, 11.8]
Stomach	596	33	5.5	[3.8, 7.7]
Adrenal gland	88	1	1.1	[0.0, 6.2]
Spleen	932	25	2.7	[1.7, 3.9]
Other	262	7	2.7	[1.1, 5.4]
<b><i>RIZIV code for complex surgery</i></b>				
242830-242841: Pancreaticoduodenectomy	2,762	153	5.5	[4.7, 6.5]
Pancreaticoduodenectomy	2,499	136	5.4	[4.6, 6.4]
Total Pancreatectomy	263	17	6.5	[3.8, 10.1]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	400	9	2.3	[1.0, 4.2]
242874-242885: Hemipancreatectomy left	950	21	2.2	[1.4, 3.4]
242896-242900: Enucleation of a pancreatic tumour	64	1	1.6	[0.0, 8.4]
<b><i>Antithrombotic medication</i></b>				
No	2,945	115	3.9	[3.2, 4.7]
Yes	1,231	69	5.6	[4.4, 7.0]
<b><i>Was the patient referred?</i></b>				
No	1,886	75	4.0	[3.1, 5.0]
Yes	2,290	109	4.8	[3.9, 5.7]

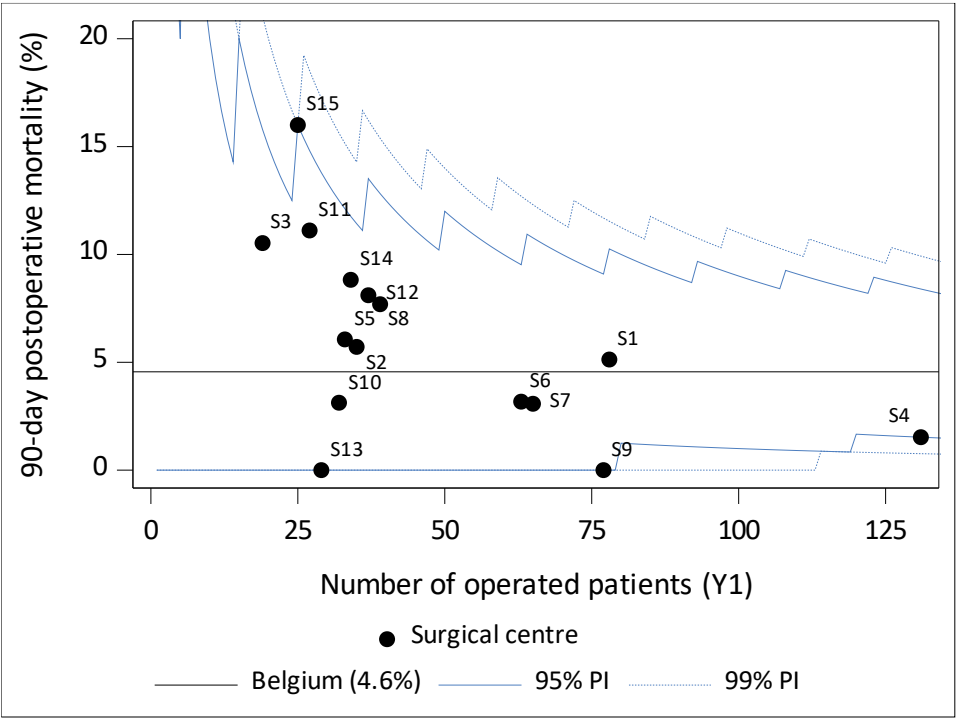
\* Tumour staging not possible.

\*\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients.

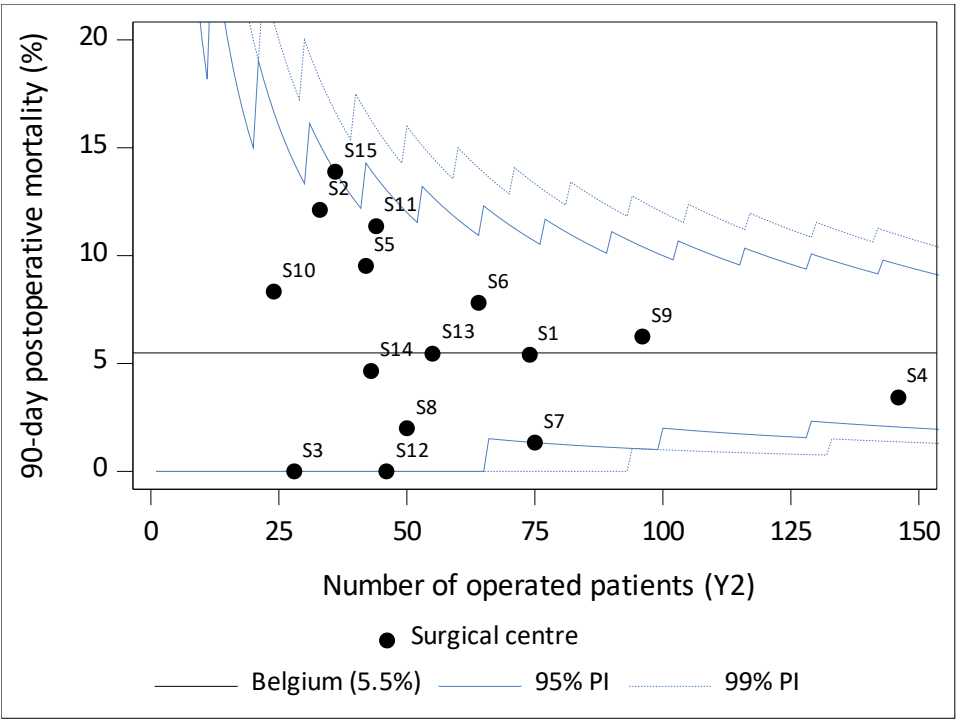
†† Results for this variable are only for malignant tumours and are only available from the second half of Y2 onwards.

**Figure 16:** Funnel and spaghetti plot of the unadjusted 90-day postoperative mortality for **malignant and benign tumoural** pathology, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5, (f) all years combined, (g) evolution year 1, 2, 3, 4 and 5.

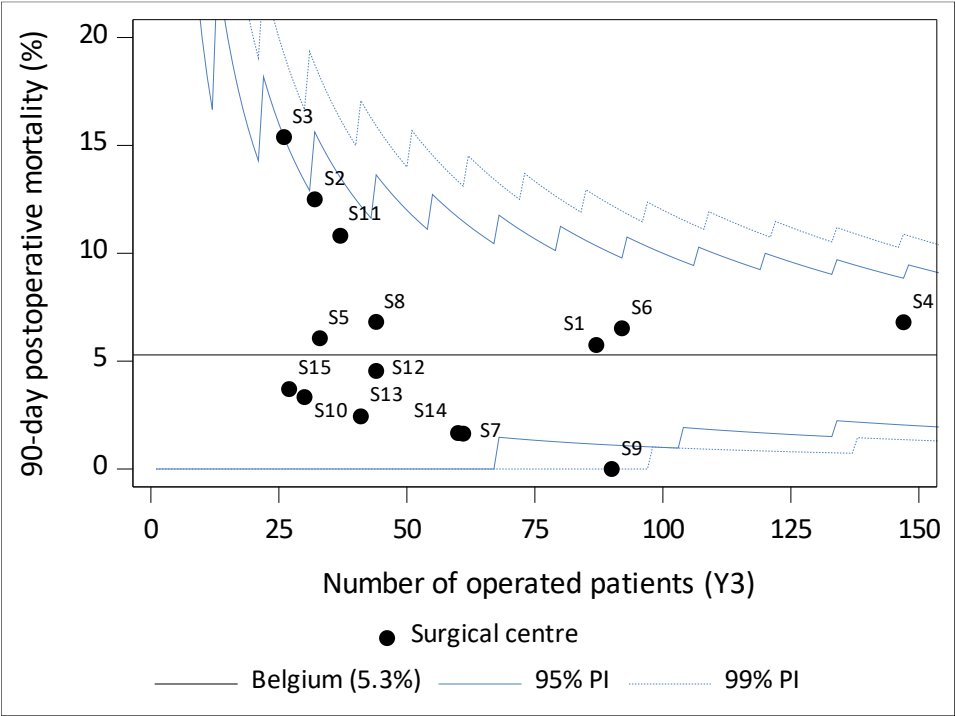
(a)



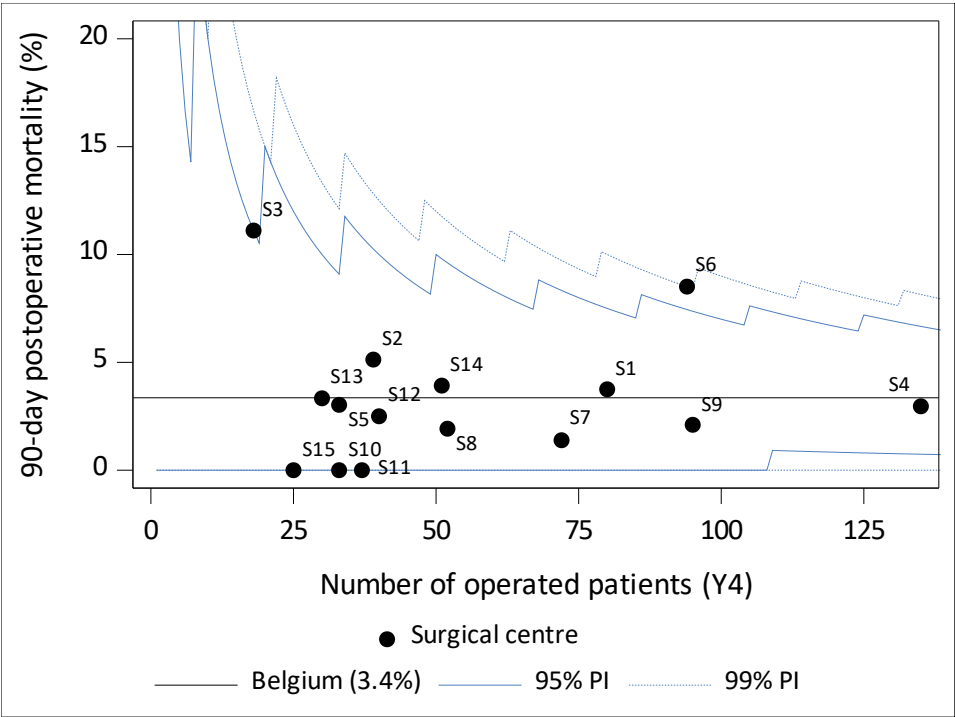
(b)



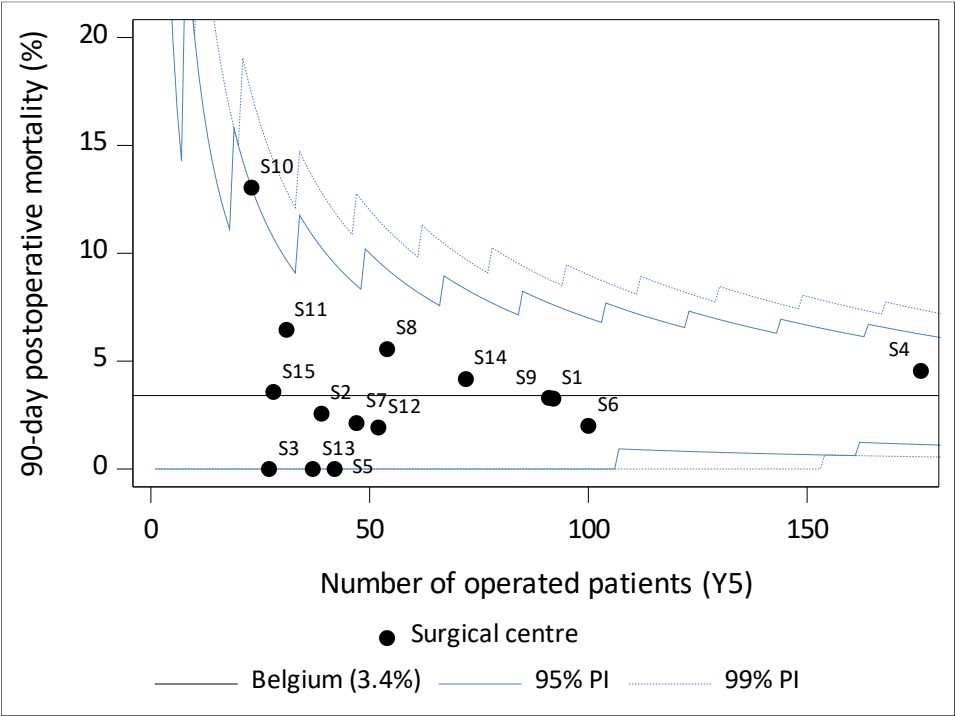
(c)



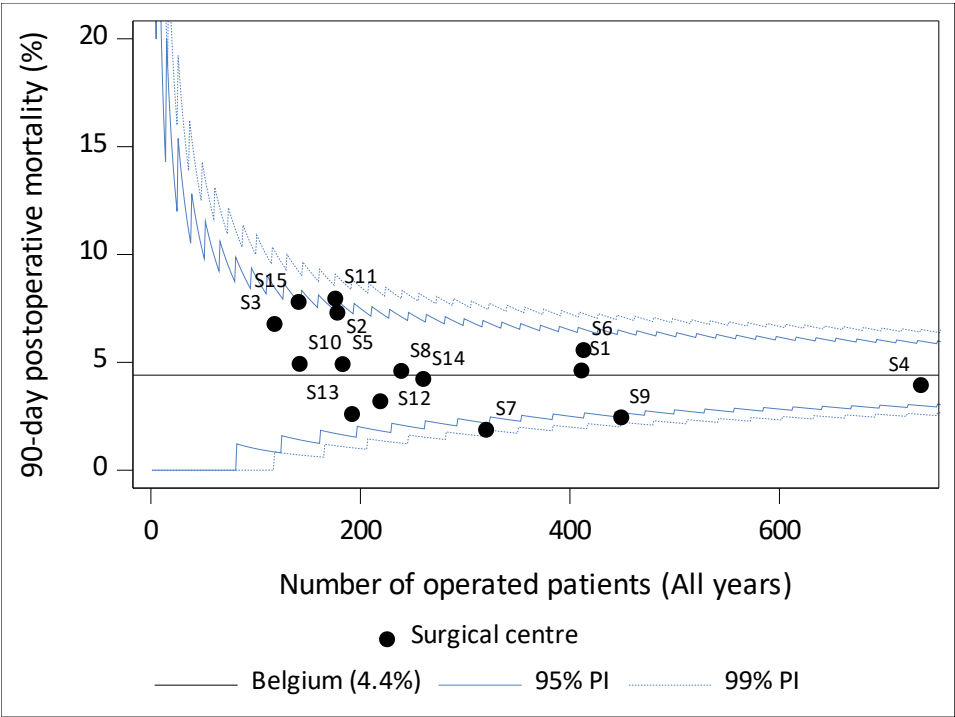
(d)



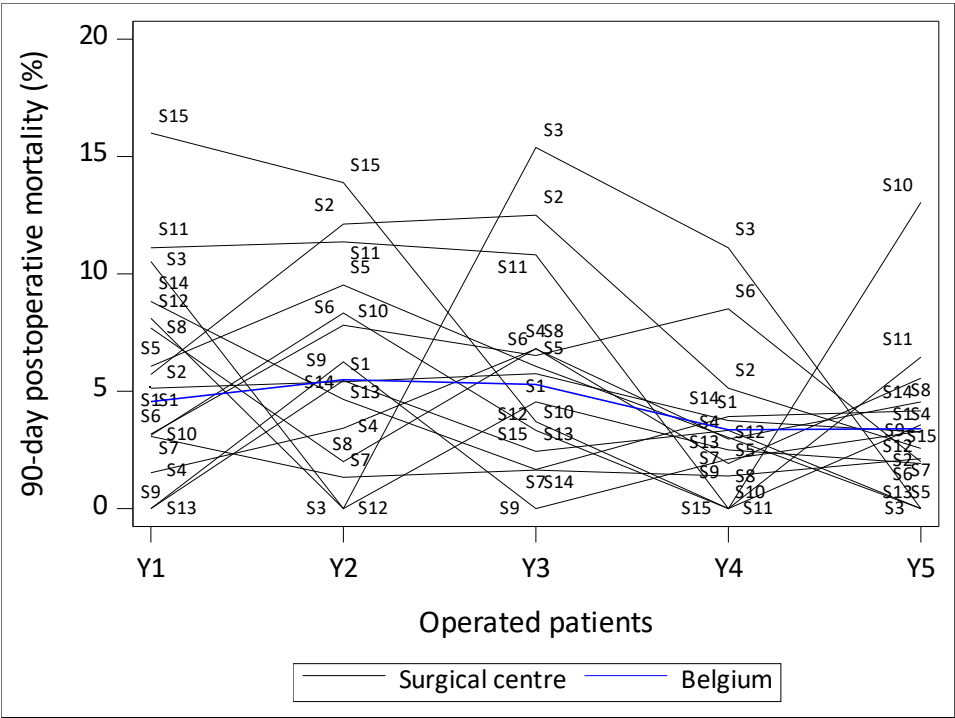
(e)



(f)



(g)



### 3.3.1.4 Adjusted 90-day postoperative mortality

**Table 16:** Case-mix adjusted odds ratio for postoperative mortality within 90 days and direct standardised 90-day postoperative mortality, for **malignant and benign tumoural** pathology, in the five convention years.

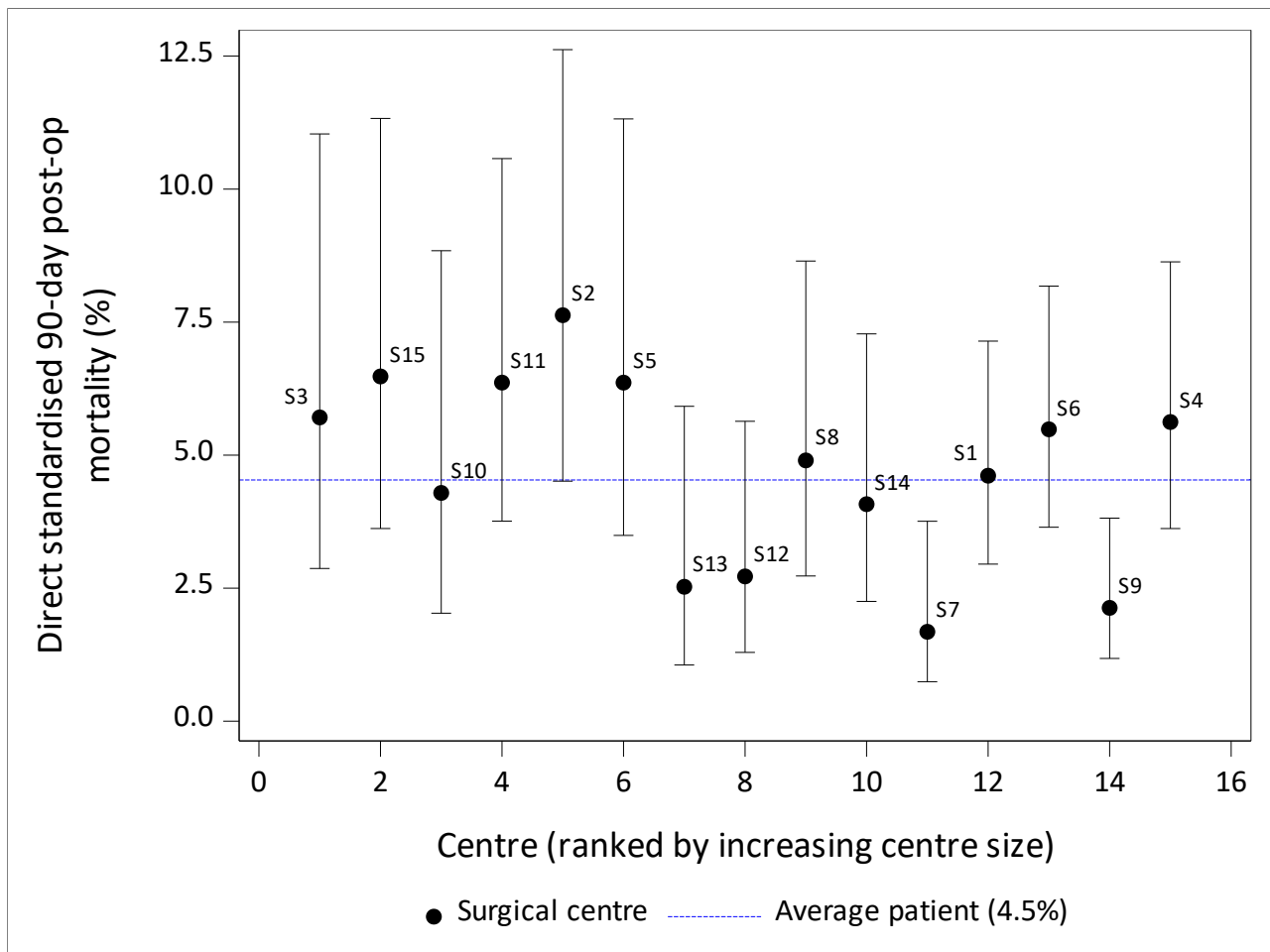
Adjusted Odds Ratio				Standardised probability (%)		
Expert centres	Estimate	95% CI	Average patient	Estimate	95% CI	Average patient
S1	1.07	[0.66, 1.72]	0.96	4.6	[3.0, 7.1]	4.5
S2	1.85	[1.05, 3.26]	0.96	7.6	[4.5, 12.6]	4.5
S3	1.34	[0.66, 2.72]	0.96	5.7	[2.9, 11.0]	4.5
S4	1.32	[0.80, 2.18]	0.96	5.6	[3.6, 8.6]	4.5
S5	1.51	[0.81, 2.84]	0.96	6.4	[3.5, 11.3]	4.5
S6	1.29	[0.82, 2.00]	0.96	5.5	[3.6, 8.2]	4.5
S7	0.37	[0.17, 0.82]	0.96	1.7	[0.7, 3.8]	4.5
S8	1.14	[0.62, 2.09]	0.96	4.9	[2.7, 8.6]	4.5
S9	0.47	[0.26, 0.85]	0.96	2.1	[1.2, 3.8]	4.5
S10	0.99	[0.46, 2.09]	0.96	4.3	[2.0, 8.8]	4.5
S11	1.51	[0.87, 2.64]	0.96	6.4	[3.8, 10.6]	4.5
S12	0.61	[0.29, 1.27]	0.96	2.7	[1.3, 5.6]	4.5
S13	0.56	[0.24, 1.32]	0.96	2.5	[1.1, 5.9]	4.5
S14	0.93	[0.51, 1.73]	0.96	4.1	[2.3, 7.3]	4.5
S15	1.54	[0.84, 2.85]	0.96	6.5	[3.6, 11.3]	4.5
Adjusted for age at diagnosis, sex, ASA score, Charlson Comorbidity Index, type of surgery, vascular resection/reconstruction and tumour type (as proposed by the Belgian Pancreatic Cancer Group).						

This table shows the case-mix adjusted odds ratio for postoperative mortality within 90 days and the center specific direct standardised 90-day mortality (%), together with their accompanying 95% confidence intervals. The 'average patient' odds ratio is obtained as a weighted average of the individual centre results with the fraction of patients per centre as weights. The 'average patient' results for the case-mix adjusted odds ratio and the direct standardised mortality serve as references and enable comparison of the individual center results with the reference. An individual center result is significantly different from the average result if the average result is not included in the center specific confidence interval.

The postoperative mortality probability was modelled using a logistic regression model. All the possible two-way interaction terms between the case-mix variables were evaluated during the model building procedure. The quality of the regression was assessed taking into account the deviance as well as Pearson goodness-of-fit and the Hosmer and Lemeshow goodness-of-fit test, and the residual plots were examined for potential influential points and resolved when needed.



**Figure 17:** Direct standardised 90-day postoperative mortality in the five convention years, by surgical centre.



### 3.3.2. Survival

Survival indicator 5 years after surgery cannot yet be calculated since there is only a limited number of patients with a 5-year follow-up after surgery at the time the report was made.

The vital status used in these analyses was determined on the 30<sup>th</sup> of October 2024.

#### 3.3.2.1. Unadjusted observed survival after surgery (all causes of death) for malignant and benign tumours

**Table 17.** Number of events, total person years, hazard and 95% CI, during the first year interval after surgery for **malignant and benign tumours**, in the five convention years.

Belgium					
Characteristic	N	N of deaths	Person Years	Hazard	95% CI
<b><i>Operated patients with a malignant/benign tumour</i></b>	<b>4,176</b>	<b>668</b>	<b>3,635</b>	<b>0.18</b>	<b>[0.17, 0.20]</b>
<b><i>Expert centres</i></b>					
S1	411	74	352	0.21	[0.17, 0.26]
S2	178	34	148	0.23	[0.16, 0.32]
S3	118	21	99	0.21	[0.13, 0.32]
S4	735	95	647	0.15	[0.12, 0.18]
S5	183	22	162	0.14	[0.09, 0.21]
S6	413	72	348	0.21	[0.16, 0.26]
S7	320	35	297	0.12	[0.08, 0.16]
S8	239	49	206	0.24	[0.18, 0.32]
S9	449	71	399	0.18	[0.14, 0.22]
S10	142	24	128	0.19	[0.12, 0.28]
S11	176	51	143	0.36	[0.27, 0.47]
S12	219	33	193	0.17	[0.12, 0.24]
S13	192	19	170	0.11	[0.07, 0.17]
S14	260	37	227	0.16	[0.11, 0.23]
S15	141	31	116	0.27	[0.18, 0.38]
<b><i>Convention year</i></b>					
Year 1	724	149	654	0.23	[0.19, 0.27]
Year 2	856	139	781	0.18	[0.15, 0.21]
Year 3	851	148	770	0.19	[0.16, 0.23]
Year 4	834	133	764	0.17	[0.15, 0.21]
Year 5	911	99	666	0.15	[0.12, 0.18]
<b><i>Tumoural Pathology</i></b>					
Adenocarcinoma	2,706	577	2,297	0.25	[0.23, 0.27]
Neuroendocrine tumour	535	28	487	0.06	[0.04, 0.08]
Benign tumour	603	21	564	0.04	[0.02, 0.06]
Other or unspecified	332	42	288	0.15	[0.11, 0.20]

**Table 18:** Unadjusted observed 1-year survival after surgery for **adenocarcinoma**, death by all causes, per individual expert centre.

1-year observed survival after surgery, %																		
Year 1				Year 2			Year 3			Year 4			Year 5			All years		
Expert Centres	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI
S1	59	79.7	[67.0, 87.9]	60	73.3	[60.2, 82.7]	56	73.2	[59.6, 82.9]	55	81.8	[68.8, 89.8]	61	75.4	[57.6, 86.6]	291	77.2	[71.7, 81.7]
S2	27	NA <sup>⌘</sup>	-	16	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	-	25	NA <sup>⌘</sup>	-	21	NA <sup>⌘</sup>	-	109	70.0	[60.0, 77.9]
S3	15	NA <sup>⌘</sup>	-	19	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	-	13	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	-	87	74.9	[63.7, 83.1]
S4	69	78.3	[66.6, 86.3]	81	85.0	[75.1, 91.2]	87	79.3	[69.2, 86.4]	94	81.9	[72.5, 88.3]	112	84.6	[75.4, 90.5]	443	81.7	[77.7, 85.1]
S5	22	NA <sup>⌘</sup>	-	24	NA <sup>⌘</sup>	-	21	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	-	22	NA <sup>⌘</sup>	-	109	83.3	[74.5, 89.3]
S6	44	79.5	[64.4, 88.8]	43	69.8	[53.7, 81.2]	69	72.5	[60.3, 81.5]	62	75.8	[63.1, 84.6]	70	73.6	[54.1, 85.8]	288	75.0	[69.3, 79.9]
S7	41	65.9	[49.3, 78.2]	47	85.1	[71.3, 92.6]	36	NA <sup>⌘</sup>	-	47	93.6	[81.5, 97.9]	28	NA <sup>⌘</sup>	-	199	84.1	[78.2, 88.6]
S8	29	NA <sup>⌘</sup>	-	30	NA <sup>⌘</sup>	-	30	NA <sup>⌘</sup>	-	33	NA <sup>⌘</sup>	-	37	NA <sup>⌘</sup>	-	159	72.1	[64.0, 78.6]
S9	46	78.3	[63.4, 87.7]	66	77.3	[65.2, 85.6]	63	77.8	[65.4, 86.2]	59	78.0	[65.1, 86.6]	58	84.5	[69.3, 92.5]	292	78.8	[73.6, 83.2]
S10	21	NA <sup>⌘</sup>	-	15	NA <sup>⌘</sup>	-	14	NA <sup>⌘</sup>	-	25	NA <sup>⌘</sup>	-	13	NA <sup>⌘</sup>	-	88	74.7	[64.1, 82.5]
S11	19	NA <sup>⌘</sup>	-	36	NA <sup>⌘</sup>	-	27	NA <sup>⌘</sup>	-	23	NA <sup>⌘</sup>	-	23	NA <sup>⌘</sup>	-	128	62.9	[53.6, 70.7]
S12	27	NA <sup>⌘</sup>	-	25	NA <sup>⌘</sup>	-	29	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	-	36	NA <sup>⌘</sup>	-	137	76.7	[68.3, 83.1]
S13	18	NA <sup>⌘</sup>	-	44	86.4	[72.1, 93.6]	30	NA <sup>⌘</sup>	-	18	NA <sup>⌘</sup>	-	17	NA <sup>⌘</sup>	-	127	86.6	[79.0, 91.6]
S14	24	NA <sup>⌘</sup>	-	26	NA <sup>⌘</sup>	-	35	NA <sup>⌘</sup>	-	35	NA <sup>⌘</sup>	-	45	85.9	[71.0, 93.4]	165	79.4	[72.1, 85.0]
S15	15	NA <sup>⌘</sup>	-	22	NA <sup>⌘</sup>	-	15	NA <sup>⌘</sup>	-	16	NA <sup>⌘</sup>	-	16	NA <sup>⌘</sup>	-	84	67.5	[56.0, 76.6]
⌘ N<40																		

**Table 19:** Unadjusted observed 3-year survival after surgery for **adenocarcinoma**, death by all causes, per individual expert centre.

3-year observed survival after surgery, %																		
Expert Centres	Year 1			Year 2			Year 3			Year 4			Year 5			All years		
	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI
S1	59	42.4	[29.7, 54.5]	60	43.3	[30.7, 55.3]	56	41.4	[27.1, 55.2]	55	NA <sup>⌘</sup>	NA <sup>⌘</sup>	61	NA <sup>⌘</sup>	NA <sup>⌘</sup>	291	44.0	[37.1, 50.7]
S2	27	NA <sup>⌘</sup>	-	16	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	-	25	NA <sup>⌘</sup>	NA <sup>⌘</sup>	21	NA <sup>⌘</sup>	NA <sup>⌘</sup>	109	42.9	[31.8, 53.6]
S3	15	NA <sup>⌘</sup>	-	19	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	-	13	NA <sup>⌘</sup>	NA <sup>⌘</sup>	20	NA <sup>⌘</sup>	NA <sup>⌘</sup>	87	33.1	[20.6, 46.3]
S4	69	46.4	[34.3, 57.6]	81	52.5	[41.0, 62.7]	87	39.3	[28.1, 50.4]	94	NA <sup>⌘</sup>	NA <sup>⌘</sup>	112	NA <sup>⌘</sup>	NA <sup>⌘</sup>	443	44.6	[38.8, 50.3]
S5	22	NA <sup>⌘</sup>	-	24	NA <sup>⌘</sup>	-	21	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	NA <sup>⌘</sup>	22	NA <sup>⌘</sup>	NA <sup>⌘</sup>	109	62.0	[50.1, 71.9]
S6	44	45.5	[30.5, 59.3]	43	48.8	[33.3, 62.6]	69	44.7	[32.7, 56.0]	62	NA <sup>⌘</sup>	NA <sup>⌘</sup>	70	NA <sup>⌘</sup>	NA <sup>⌘</sup>	288	47.2	[39.7, 54.3]
S7	41	48.8	[32.9, 62.9]	47	53.2	[38.1, 66.2]	36	NA <sup>⌘</sup>	-	47	NA <sup>⌘</sup>	NA <sup>⌘</sup>	28	NA <sup>⌘</sup>	NA <sup>⌘</sup>	199	57.4	[48.8, 65.0]
S8	29	NA <sup>⌘</sup>	-	30	NA <sup>⌘</sup>	-	30	NA <sup>⌘</sup>	-	33	NA <sup>⌘</sup>	NA <sup>⌘</sup>	37	NA <sup>⌘</sup>	NA <sup>⌘</sup>	159	39.0	[29.6, 48.2]
S9	46	50.0	[34.9, 63.3]	66	37.9	[26.3, 49.4]	63	46.7	[33.8, 58.6]	59	NA <sup>⌘</sup>	NA <sup>⌘</sup>	58	NA <sup>⌘</sup>	NA <sup>⌘</sup>	292	43.9	[37.0, 50.7]
S10	21	NA <sup>⌘</sup>	-	15	NA <sup>⌘</sup>	-	14	NA <sup>⌘</sup>	-	25	NA <sup>⌘</sup>	NA <sup>⌘</sup>	13	NA <sup>⌘</sup>	NA <sup>⌘</sup>	88	36.8	[24.9, 48.8]
S11	19	NA <sup>⌘</sup>	-	36	NA <sup>⌘</sup>	-	27	NA <sup>⌘</sup>	-	23	NA <sup>⌘</sup>	NA <sup>⌘</sup>	23	NA <sup>⌘</sup>	NA <sup>⌘</sup>	128	29.0	[20.0, 38.6]
S12	27	NA <sup>⌘</sup>	-	25	NA <sup>⌘</sup>	-	29	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	NA <sup>⌘</sup>	36	NA <sup>⌘</sup>	NA <sup>⌘</sup>	137	45.2	[35.0, 54.8]
S13	18	NA <sup>⌘</sup>	-	44	61.4	[45.4, 73.9]	30	NA <sup>⌘</sup>	-	18	NA <sup>⌘</sup>	NA <sup>⌘</sup>	17	NA <sup>⌘</sup>	NA <sup>⌘</sup>	127	53.0	[42.8, 62.2]
S14	24	NA <sup>⌘</sup>	-	26	NA <sup>⌘</sup>	-	35	NA <sup>⌘</sup>	-	35	NA <sup>⌘</sup>	NA <sup>⌘</sup>	45	NA <sup>⌘</sup>	NA <sup>⌘</sup>	165	48.1	[38.6, 57.0]
S15	15	NA <sup>⌘</sup>	-	22	NA <sup>⌘</sup>	-	15	NA <sup>⌘</sup>	-	16	NA <sup>⌘</sup>	NA <sup>⌘</sup>	16	NA <sup>⌘</sup>	NA <sup>⌘</sup>	84	35.0	[22.6, 47.8]

⌘ N&lt;40

⌘⌘ 3-year follow-up after surgery is not reached.

**Table 20.** Unadjusted 1-year observed survival after surgery for **adenocarcinoma**, death by all causes, in the five convention years.

Characteristic	1-year observed survival after surgery, %		
	Belgium		
	N	%	95% CI
<b><i>Operated patients with adenocarcinoma</i></b>	<b>2,706</b>	<b>77.5</b>	<b>[75.8, 79.1]</b>
<b><i>Convention year</i></b>			
Year 1	476	73.3	[69.1, 77.0]
Year 2	554	78.4	[74.8, 81.6]
Year 3	552	76.1	[72.3, 79.4]
Year 4	545	78.8	[75.1, 82.0]
Year 5	579	80.3	[75.8, 84.0]
<b><i>Sex</i></b>			
Male	1,465	75.8	[73.4, 77.9]
Female	1,241	79.5	[77.1, 81.7]
<b><i>Age at surgery</i></b>			
<=69	1,412	83.3	[81.1, 85.2]
70-79	997	73.4	[70.4, 76.1]
>=80	297	64.1	[58.2, 69.4]
<b><i>Lesion to treat (in (peri-)pancreas)</i></b>			
Primary tumour	2,647	77.3	[75.6, 78.9]
Relapse of primary tumour	26	NA <sup>JK</sup>	-
Metastasis	33	NA <sup>JK</sup>	-
<b><i>Primary tumour localisation</i></b>			
C17.0 Duodenum	138	81.9	[74.3, 87.5]
C24.0 Extrahepatic bile duct	206	77.2	[70.7, 82.4]
C24.1 (Peri-) ampullary region	321	83.9	[79.3, 87.6]
C25.0 Head of pancreas	1,343	73.6	[71.1, 76.0]
C25.1 Body of pancreas	239	83.4	[77.8, 87.7]
C25.2 Tail of pancreas	271	82.2	[76.9, 86.4]
C25.3 Pancreatic duct	13	NA <sup>JK</sup>	-
C25.7-9 Other specified parts of pancreas	104	70.0	[59.9, 78.0]
Other	71	88.1	[77.6, 93.9]
<b><i>Clinical stage</i></b>			
0	33	NA <sup>JK</sup>	-
I	1,374	78.0	[75.6, 80.1]
II	746	74.0	[70.6, 77.1]
III	313	80.3	[75.2, 84.4]
IV	64	75.6	[62.7, 84.5]
X	149	82.1	[74.7, 87.6]
TNM not applicable or relapse*	27	NA <sup>JK</sup>	-
<b><i>Pathological stage</i></b>			
0	43	97.5	[83.5, 99.6]

1-year observed survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
I	459	84.6	[80.8, 87.7]
II	764	77.2	[73.9, 80.1]
III	723	72.1	[68.5, 75.3]
IV	60	62.0	[48.2, 73.1]
X	23	NA <sup>JK</sup>	-
TNM not applicable or relapse*	19	NA <sup>JK</sup>	-
Neoadjuvant treatment <sup>†</sup>	615	79.0	[75.4, 82.1]
<b>yPathological stage</b>			
0	19	NA <sup>JK</sup>	-
I	213	86.2	[80.5, 90.3]
II	202	76.1	[69.3, 81.5]
III	137	74.9	[66.3, 81.5]
IV	33	NA <sup>JK</sup>	-
X	3	NA <sup>JK</sup>	-
TNM not applicable or relapse*	8	NA <sup>JK</sup>	-
No neoadjuvant treatment	2,091	77.0	[75.1, 78.8]
<b>Resection margin</b>			
R0	1,850	81.2	[79.3, 82.9]
R1	846	69.6	[66.3, 72.7]
R2	10	NA <sup>JK</sup>	-
<b>Prior surgery or other treatment **</b>			
Prior abdominal surgery	407	77.7	[73.2, 81.5]
Other treatment modality (that could affect the pancreas)	476	79.2	[75.1, 82.7]
<b>Neoadjuvant treatment</b>			
Chemoradiotherapy	85	74.4	[63.1, 82.7]
Chemotherapy	528	79.9	[76.0, 83.2]
Radiotherapy	2	NA <sup>JK</sup>	-
No chemo or radiation treatment	2,091	77.0	[75.1, 78.8]
<b>Charlson Comorbidity Index</b>			
0	1,067	82.6	[80.1, 84.8]
1	679	74.7	[71.2, 77.9]
2	436	75.0	[70.6, 78.9]
3	231	75.8	[69.5, 80.9]
4	140	70.4	[61.7, 77.4]
5	64	68.3	[54.7, 78.5]
6	36	NA <sup>JK</sup>	-
7	28	NA <sup>JK</sup>	-
8	14	NA <sup>JK</sup>	-
9	8	NA <sup>JK</sup>	-
10	3	NA <sup>JK</sup>	-
<b>WHO score at surgery</b>			
0 - Asymptomatic, normal activity	625	82.6	[79.3, 85.5]

1-year observed survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
1 - Symptomatic, but ambulant	1,736	78.3	[76.3, 80.3]
2 - Symptomatic, bedbound < 50% day	288	65.3	[59.3, 70.6]
3 - Symptomatic, bedbound > 50% day	55	58.1	[43.4, 70.2]
4 - Completely dependent, 100% bedbound	2	NA <sup>JK</sup>	-
<b>ASA score</b>			
1 - Healthy person	140	82.8	[75.4, 88.1]
2 - Mild systemic disease, normal activity	1,377	79.9	[77.6, 82.0]
3 - Serious systemic disease, limited activity	1,152	74.0	[71.3, 76.6]
4 - Life-threatening illness, handicapped	37	NA <sup>JK</sup>	-
<b>Resectability status <sup>**</sup></b>			
Before neoadjuvant treatment			
Upfront resectable	110	84.9	[76.2, 90.7]
Borderline resectable	305	79.7	[74.4, 83.9]
Unresectable	74	81.3	[69.9, 88.7]
No neoadjuvant treatment	1,502	78.5	[76.2, 80.6]
Before surgery			
Upfront resectable	1,645	79.0	[76.9, 81.0]
Borderline resectable	319	79.1	[73.9, 83.3]
Unresectable	21	NA <sup>JK</sup>	-
Missing	6	NA <sup>JK</sup>	-
<b>Type of surgery</b>			
Minimally invasive surgery (MIS) – Laparoscopic	595	82.8	[79.4, 85.7]
Minimally invasive surgery (MIS) - Hybrid	2	NA <sup>JK</sup>	-
Minimally invasive surgery (MIS) - Robotic	241	78.3	[72.1, 83.3]
Open	1,739	76.1	[73.9, 78.1]
Conversion from MIS to open surgery	129	71.3	[62.5, 78.4]
<b>Simultaneous venous resection</b>			
No	2,242	79.5	[77.7, 81.2]
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection	464	67.7	[63.1, 71.9]
- With primary wedge-reconstruction	152	69.4	[61.0, 76.3]
- With primary end-to-end reconstruction	193	66.6	[59.3, 72.9]
- With vascular autograft interposition	10	NA <sup>JK</sup>	-
- With vascular allograft interposition	54	65.1	[49.5, 76.9]
- With synthetic/prosthetic interposition	7	NA <sup>JK</sup>	-
- With peritoneal patch wedge-reconstruction	39	NA <sup>JK</sup>	-
- Without reconstruction	9	NA <sup>JK</sup>	-
<b>Simultaneous arterial resection <sup>**</sup></b>			
No	2,639	77.4	[75.6, 79.0]
Hepatic artery resection	27	NA <sup>JK</sup>	-
- With primary end-to-end reconstruction	16	NA <sup>JK</sup>	-
- With vascular allograft interposition	1	NA <sup>JK</sup>	-

1-year observed survival after surgery, %			
Characteristic	N	Belgium	
		%	95% CI
- Without reconstruction	10	NA <sup>⌘</sup>	-
Coeliac trunk resection	32	NA <sup>⌘</sup>	-
- With primary end-to-end reconstruction	2	NA <sup>⌘</sup>	-
- Without reconstruction	30	NA <sup>⌘</sup>	-
Superior mesenteric artery (SMA) resection	7	NA <sup>⌘</sup>	-
- With primary wedge-reconstruction	1	NA <sup>⌘</sup>	-
- With primary end-to-end reconstruction	3	NA <sup>⌘</sup>	-
- With vascular autograft interposition	2	NA <sup>⌘</sup>	-
- Without reconstruction	1	NA <sup>⌘</sup>	-
<b>Simultaneous other organ resection **</b>			
No	1,648	77.1	[74.9, 79.1]
Colon	84	68.7	[57.2, 77.7]
Stomach	477	76.8	[72.6, 80.5]
Adrenal gland	71	82.0	[70.4, 89.4]
Spleen	506	80.6	[76.7, 83.9]
Other	166	74.0	[66.3, 80.1]
<b>RIZIV code for complex surgery</b>			
242830-242841: Pancreaticoduodenectomy	2,139	76.2	[74.2, 78.0]
Pancreaticoduodenectomy	1,975	76.8	[74.8, 78.7]
Total Pancreatectomy	164	68.2	[60.2, 74.9]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	183	83.7	[77.4, 88.4]
242874-242885: Hemipancreatectomy left	382	82.3	[77.9, 86.0]
242896-242900: Enucleation of a pancreatic tumour	2	NA <sup>⌘</sup>	-
<b>Antithrombotic medication</b>			
No	1,865	79.6	[77.6, 81.4]
Yes	841	72.9	[69.7, 75.9]
<b>Was the patient referred?</b>			
No	1,105	79.3	[76.7, 81.6]
Yes	1,601	76.3	[74.0, 78.3]

\* Tumour staging not possible.

† Neoadjuvant treatment: patients who received either chemotherapy or radiotherapy, or a combination of these treatments prior to surgery.

\*\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients.

⌘ N<40



**Table 21.** Unadjusted 3-year observed survival after surgery for **adenocarcinoma**, death by all causes, in the five convention years.

Characteristic	3-year observed survival after surgery, %		
	Belgium		
	N	%	95% CI
<b><i>Operated patients with adenocarcinoma</i></b>	<b>2,706</b>	<b>45.1</b>	<b>[42.8, 47.4]</b>
<b><i>Convention year</i></b>			
Year 1	476	45.7	[41.2, 50.1]
Year 2	554	45.5	[41.3, 49.6]
Year 3	552	41.7	[37.2, 46.1]
Year 4	545	NA <sup>KK</sup>	NA <sup>KK</sup>
Year 5	579	NA <sup>KK</sup>	NA <sup>KK</sup>
<b><i>Sex</i></b>			
Male	1,465	43.5	[40.4, 46.6]
Female	1,241	46.9	[43.5, 50.3]
<b><i>Age at surgery</i></b>			
<=69	1,412	49.0	[45.7, 52.1]
70-79	997	43.7	[40.0, 47.4]
>=80	297	31.5	[25.2, 38.0]
<b><i>Lesion to treat (in (peri-)pancreas)</i></b>			
Primary tumour	2,647	44.6	[42.3, 46.9]
Relapse of primary tumour	26	NA <sup>K</sup>	-
Metastasis	33	NA <sup>K</sup>	-
<b><i>Primary tumour localisation</i></b>			
C17.0 Duodenum	138	66.0	[56.1, 74.3]
C24.0 Extrahepatic bile duct	206	43.8	[35.9, 51.4]
C24.1 (Peri-) ampullary region	321	62.5	[55.8, 68.4]
C25.0 Head of pancreas	1,343	37.2	[34.0, 40.4]
C25.1 Body of pancreas	239	47.9	[39.4, 55.8]
C25.2 Tail of pancreas	271	43.6	[36.1, 50.8]
C25.3 Pancreatic duct	13	NA <sup>K</sup>	-
C25.7-9 Other specified parts of pancreas	104	43.7	[32.9, 54.1]
Other	71	74.3	[60.7, 83.8]
<b><i>Clinical stage</i></b>			
0	33	NA <sup>K</sup>	-
I	1,374	47.9	[44.7, 51.1]
II	746	37.9	[33.7, 42.1]
III	313	41.1	[34.2, 47.9]
IV	64	44.4	[29.4, 58.4]
X	149	55.9	[46.7, 64.2]
TNM not applicable or relapse*	27	NA <sup>K</sup>	-
<b><i>Pathological stage</i></b>			
0	43	94.9	[81.0, 98.7]

3-year observed survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
I	459	67.4	[62.1, 72.1]
II	764	44.2	[39.9, 48.4]
III	723	34.4	[30.2, 38.7]
IV	60	26.3	[14.9, 39.2]
X	23	NA <sup>JK</sup>	-
TNM not applicable or relapse*	19	NA <sup>JK</sup>	-
Neoadjuvant treatment <sup>†</sup>	615	39.1	[34.2, 44.1]
<b>yPathological stage</b>			
0	19	NA <sup>JK</sup>	-
I	213	52.9	[43.8, 61.3]
II	202	31.6	[23.8, 39.6]
III	137	28.8	[19.3, 38.9]
IV	33	NA <sup>JK</sup>	-
X	3	NA <sup>JK</sup>	-
TNM not applicable or relapse*	8	NA <sup>JK</sup>	-
No neoadjuvant treatment	2,091	46.7	[44.1, 49.2]
<b>Resection margin</b>			
R0	1,850	51.5	[48.8, 54.2]
R1	846	31.0	[27.2, 35.0]
R2	10	NA <sup>JK</sup>	-
<b>Prior surgery or other treatment **</b>			
Prior abdominal surgery	407	45.0	[39.2, 50.7]
Other treatment modality (that could affect the pancreas)	476	42.9	[37.3, 48.5]
<b>Neoadjuvant treatment</b>			
Chemoradiotherapy	85	53.5	[39.4, 65.8]
Chemotherapy	528	37.3	[32.0, 42.6]
Radiotherapy	2	NA <sup>JK</sup>	-
No chemo or radiation treatment	2,091	46.7	[44.1, 49.2]
<b>Charlson Comorbidity Index</b>			
0	1,067	53.0	[49.3, 56.5]
1	679	41.0	[36.5, 45.5]
2	436	40.6	[35.0, 46.2]
3	231	39.4	[31.8, 46.9]
4	140	34.1	[24.5, 43.9]
5	64	37.9	[23.6, 52.0]
6	36	NA <sup>JK</sup>	-
7	28	NA <sup>JK</sup>	-
8	14	NA <sup>JK</sup>	-
9	8	NA <sup>JK</sup>	-
10	3	NA <sup>JK</sup>	-
<b>WHO score at surgery</b>			
0 - Asymptomatic, normal activity	625	50.4	[45.5, 55.0]

3-year observed survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
1 - Symptomatic, but ambulant	1,736	46.0	[43.2, 48.8]
2 - Symptomatic, bedbound < 50% day	288	32.1	[25.5, 38.9]
3 - Symptomatic, bedbound > 50% day	55	27.5	[14.3, 42.4]
4 - Completely dependent, 100% bedbound	2	NA <sup>JK</sup>	-
<b>ASA score</b>			
1 - Healthy person	140	54.6	[45.2, 62.9]
2 - Mild systemic disease, normal activity	1,377	49.2	[45.9, 52.3]
3 - Serious systemic disease, limited activity	1,152	39.1	[35.5, 42.6]
4 - Life-threatening illness, handicapped	37	NA <sup>JK</sup>	-
<b>Resectability status <sup>**</sup></b>			
Before neoadjuvant treatment			
Upfront resectable	110	39.1	[25.6, 52.3]
Borderline resectable	305	39.2	[30.8, 47.5]
Unresectable	74	36.0	[21.3, 50.9]
No neoadjuvant treatment	1,502	46.8	[43.4, 50.2]
Before surgery			
Upfront resectable	1,645	46.8	[43.5, 50.0]
Borderline resectable	319	38.1	[30.6, 45.6]
Unresectable	21	NA <sup>JK</sup>	-
Missing	6	NA <sup>JK</sup>	-
<b>Type of surgery</b>			
Minimally invasive surgery (MIS) – Laparoscopic	595	50.0	[45.1, 54.8]
Minimally invasive surgery (MIS) - Hybrid	2	NA <sup>JK</sup>	-
Minimally invasive surgery (MIS) - Robotic	241	42.5	[33.4, 51.2]
Open	1,739	44.8	[42.0, 47.6]
Conversion from MIS to open surgery	129	29.6	[20.5, 39.3]
<b>Simultaneous venous resection</b>			
No	2,242	48.6	[46.1, 51.1]
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection	464	27.6	[22.6, 32.8]
- With primary wedge-reconstruction	152	23.3	[14.8, 33.0]
- With primary end-to-end reconstruction	193	31.1	[23.5, 38.9]
- With vascular autograft interposition	10	NA <sup>JK</sup>	-
- With vascular allograft interposition	54	19.8	[6.9, 37.6]
- With synthetic/prosthetic interposition	7	NA <sup>JK</sup>	-
- With peritoneal patch wedge-reconstruction	39	NA <sup>JK</sup>	-
- Without reconstruction	9	NA <sup>JK</sup>	-
<b>Simultaneous arterial resection <sup>**</sup></b>			
No	2,639	45.4	[43.1, 47.7]
Hepatic artery resection	27	NA <sup>JK</sup>	-
- With primary end-to-end reconstruction	16	NA <sup>JK</sup>	-
- With vascular allograft interposition	1	NA <sup>JK</sup>	-

3-year observed survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
- Without reconstruction	10	NA <sup>✖</sup>	-
Coeliac trunk resection	32	NA <sup>✖</sup>	-
- With primary end-to-end reconstruction	2	NA <sup>✖</sup>	-
- Without reconstruction	30	NA <sup>✖</sup>	-
Superior mesenteric artery (SMA) resection	7	NA <sup>✖</sup>	-
- With primary wedge-reconstruction	1	NA <sup>✖</sup>	-
- With primary end-to-end reconstruction	3	NA <sup>✖</sup>	-
- With vascular autograft interposition	2	NA <sup>✖</sup>	-
- Without reconstruction	1	NA <sup>✖</sup>	-
<b>Simultaneous other organ resection **</b>			
No	1,648	45.6	[42.7, 48.4]
Colon	84	39.5	[26.5, 52.2]
Stomach	477	41.6	[36.0, 47.1]
Adrenal gland	71	34.9	[21.5, 48.7]
Spleen	506	44.3	[38.7, 49.8]
Other	166	46.5	[37.7, 54.8]
<b>RIZIV code for complex surgery</b>			
242830-242841: Pancreaticoduodenectomy	2,139	44.8	[42.2, 47.3]
Pancreaticoduodenectomy	1,975	44.9	[42.2, 47.5]
Total Pancreatectomy	164	44.2	[34.7, 53.2]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	183	45.8	[36.7, 54.4]
242874-242885: Hemipancreatectomy left	382	46.9	[40.4, 53.1]
242896-242900: Enucleation of a pancreatic tumour	2	NA <sup>✖</sup>	-
<b>Antithrombotic medication</b>			
No	1,865	47.8	[45.0, 50.5]
Yes	841	39.1	[35.1, 43.1]
<b>Was the patient referred?</b>			
No	1,105	45.8	[42.2, 49.3]
Yes	1,601	44.6	[41.6, 47.5]

\* Tumour staging not possible.

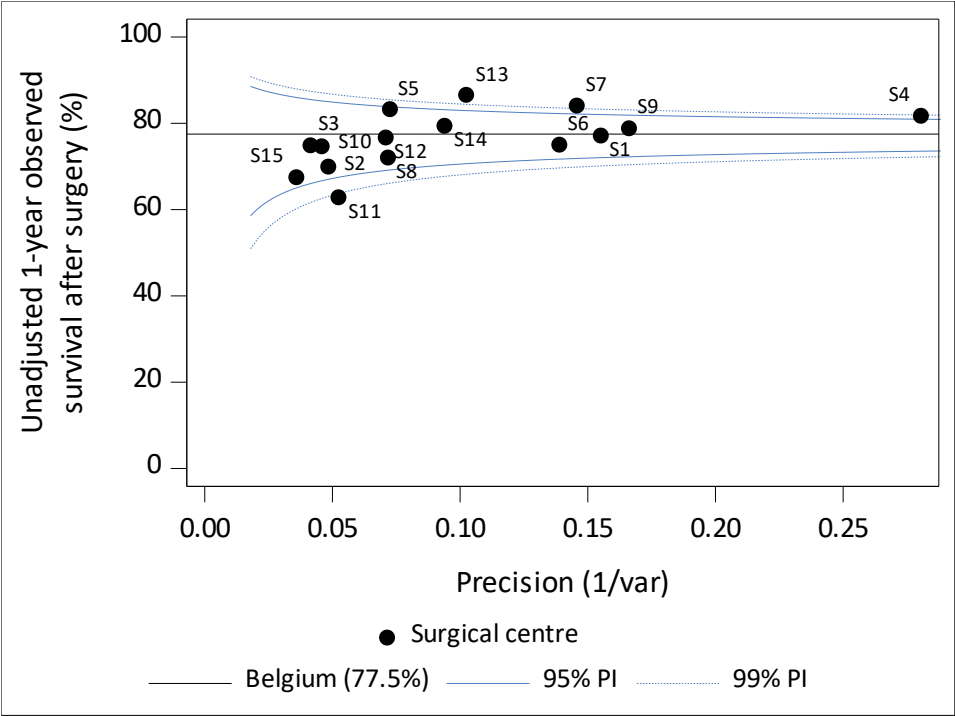
† Neoadjuvant treatment: patients who received either chemotherapy or radiotherapy, or a combination of these treatments prior to surgery.

\*\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients.

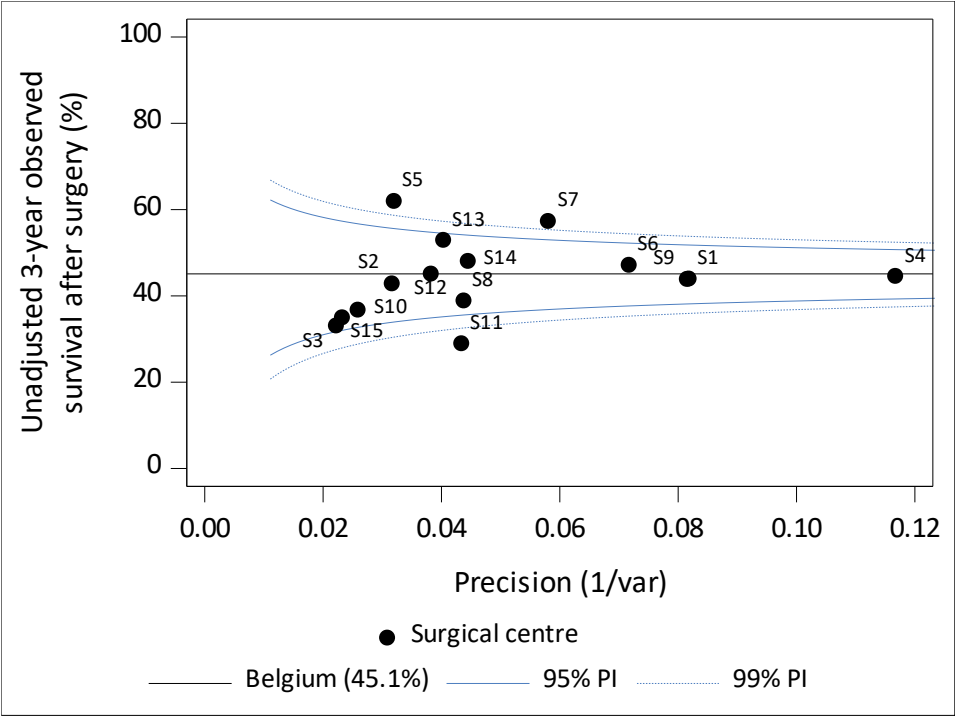
✖ N<40

✖✖✖ 3-year follow-up after surgery is not reached.

**Figure 18:** Unadjusted 1-year observed survival after surgery for **adenocarcinoma**, death by all causes, for all years combined.



**Figure 19:** Unadjusted 3-year observed survival after surgery for **adenocarcinoma**, death by all causes, for all years combined.





**Table 23:** Unadjusted 3-year relative survival after surgery for **adenocarcinoma** per individual expert centre.

3-year relative survival after surgery, %																		
Expert Centres	Year 1			Year 2			Year 3			Year 4			Year 5			All years		
	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI
S1	59	45.2	[31.7, 58.2]	60	48.2	[34.5, 61.0]	56	46.5	[31.9, 60.5]	55	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	61	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	291	48.6	[41.2, 55.6]
S2	27	NA <sup>⌘</sup>	-	16	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	-	25	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	21	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	109	45.5	[33.6, 56.9]
S3	15	NA <sup>⌘</sup>	-	19	NA <sup>⌘</sup>	-	20	NA <sup>⌘</sup>	-	13	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	20	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	87	37.5	[24.2, 51.1]
S4	69	49.4	[36.7, 61.3]	81	55.8	[43.8, 66.4]	87	41.2	[30.0, 52.3]	94	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	112	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	443	46.7	[40.6, 52.6]
S5	22	NA <sup>⌘</sup>	-	24	NA <sup>⌘</sup>	-	21	NA <sup>⌘</sup>	-	20	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	22	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	109	66.9	[54.4, 77.2]
S6	44	NA <sup>⌘</sup>	-	43	NA <sup>⌘</sup>	-	69	46.2	[33.2, 58.5]	62	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	70	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	288	51.4	[43.5, 58.8]
S7	41	NA <sup>⌘</sup>	-	47	NA <sup>⌘</sup>	-	36	NA <sup>⌘</sup>	-	47	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	28	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	199	61.7	[52.6, 69.9]
S8	29	NA <sup>⌘</sup>	-	30	NA <sup>⌘</sup>	-	30	NA <sup>⌘</sup>	-	33	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	37	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	159	43.2	[33.1, 53.2]
S9	46	NA <sup>⌘</sup>	-	66	39.2	[26.9, 51.7]	63	48.7	[34.6, 61.8]	59	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	58	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	292	45.9	[38.4, 53.1]
S10	21	NA <sup>⌘</sup>	-	15	NA <sup>⌘</sup>	-	14	NA <sup>⌘</sup>	-	25	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	13	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	88	39.0	[26.4, 51.7]
S11	19	NA <sup>⌘</sup>	-	36	NA <sup>⌘</sup>	-	27	NA <sup>⌘</sup>	-	23	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	23	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	128	31.0	[21.1, 41.6]
S12	27	NA <sup>⌘</sup>	-	25	NA <sup>⌘</sup>	-	29	NA <sup>⌘</sup>	-	20	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	36	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	137	47.6	[36.6, 58.1]
S13	18	NA <sup>⌘</sup>	-	44	NA <sup>⌘</sup>	-	30	NA <sup>⌘</sup>	-	18	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	17	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	127	58.0	[47.0, 67.8]
S14	24	NA <sup>⌘</sup>	-	26	NA <sup>⌘</sup>	-	35	NA <sup>⌘</sup>	-	35	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	45	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	165	50.9	[40.6, 60.6]
S15	15	NA <sup>⌘</sup>	-	22	NA <sup>⌘</sup>	-	15	NA <sup>⌘</sup>	-	16	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	16	NA <sup>⌘⌘</sup>	NA <sup>⌘⌘</sup>	84	38.6	[25.8, 51.5]

⌘ N&lt;50

⌘⌘ 3-year follow-up after surgery is not reached.



**Table 24.** Unadjusted 1-year relative survival after surgery for **adenocarcinoma** in the five convention years.

Characteristic	1-year relative survival after surgery, %		
	Belgium		
	N	%	95% CI
<b><i>Operated patients with adenocarcinoma</i></b>	<b>2,706</b>	<b>79.6</b>	<b>[77.9, 81.1]</b>
<b><i>Convention year</i></b>			
Year 1	476	75.4	[71.1, 79.1]
Year 2	554	80.2	[76.5, 83.5]
Year 3	552	77.9	[74.0, 81.3]
Year 4	545	80.7	[77.0, 84.0]
Year 5	579	83.7	[79.8, 87.0]
<b><i>Sex</i></b>			
Male	1,465	78.2	[75.9, 80.4]
Female	1,241	81.1	[78.7, 83.3]
<b><i>Age at surgery</i></b>			
<=69	1,412	84.4	[82.3, 86.3]
70-79	997	75.6	[72.6, 78.3]
>=80	297	69.2	[63.0, 74.8]
<b><i>Lesion to treat (in (peri-)pancreas)</i></b>			
Primary tumour	2,647	79.4	[77.6, 81.0]
Relapse of primary tumour	26	NA <sup>Ⓜ</sup>	-
Metastasis	33	NA <sup>Ⓜ</sup>	-
<b><i>Primary tumour localisation</i></b>			
C17.0 Duodenum	138	83.7	[75.8, 89.5]
C24.0 Extrahepatic bile duct	206	79.3	[72.7, 84.7]
C24.1 (Peri-) ampullary region	321	85.8	[81.0, 89.7]
C25.0 Head of pancreas	1,343	75.8	[73.3, 78.1]
C25.1 Body of pancreas	239	85.4	[79.7, 89.7]
C25.2 Tail of pancreas	271	84.7	[79.5, 88.8]
C25.3 Pancreatic duct	13	NA <sup>Ⓜ</sup>	-
C25.7-9 Other specified parts of pancreas	104	72.4	[62.3, 80.3]
Other	71	89.1	[78.3, 95.1]
<b><i>Clinical stage</i></b>			
0	33	NA <sup>Ⓜ</sup>	-
I	1,374	80.2	[77.8, 82.4]
II	746	76.0	[72.6, 79.1]
III	313	81.8	[76.7, 85.9]
IV	64	77.0	[64.3, 85.9]
X	149	84.5	[77.2, 89.9]
TNM not applicable or relapse*	27	NA <sup>Ⓜ</sup>	-
<b><i>Pathological stage</i></b>			
0	43	NA <sup>Ⓜ</sup>	-

1-year relative survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
I	459	86.9	[83.1, 90.0]
II	764	79.4	[76.1, 82.3]
III	723	73.7	[70.1, 76.9]
IV	60	65.2	[51.6, 76.0]
X	23	NA <sup>Ⓜ</sup>	-
TNM not applicable or relapse*	19	NA <sup>Ⓜ</sup>	-
Neoadjuvant treatment <sup>†</sup>	615	81.3	[77.9, 84.3]
<b><i>yPathological stage</i></b>			
0	19	NA <sup>Ⓜ</sup>	-
I	213	88.4	[82.9, 92.3]
II	202	78.0	[71.4, 83.4]
III	137	77.8	[69.7, 84.1]
IV	33	NA <sup>Ⓜ</sup>	-
X	3	NA <sup>Ⓜ</sup>	-
TNM not applicable or relapse*	8	NA <sup>Ⓜ</sup>	-
No neoadjuvant treatment	2,091	79.0	[77.1, 80.8]
<b><i>Resection margin</i></b>			
R0	1,850	83.1	[81.2, 84.9]
R1	846	72.1	[68.8, 75.2]
R2	10	NA <sup>Ⓜ</sup>	-
<b><i>Prior surgery or other treatment **</i></b>			
Prior abdominal surgery	407	79.4	[74.8, 83.3]
Other treatment modality (that could affect the pancreas)	476	80.7	[76.5, 84.3]
<b><i>Neoadjuvant treatment</i></b>			
Chemoradiotherapy	85	76.7	[65.7, 84.7]
Chemotherapy	528	82.2	[78.5, 85.3]
Radiotherapy	2	NA <sup>Ⓜ</sup>	-
No chemo or radiation treatment	2,091	79.0	[77.1, 80.8]
<b><i>Charlson Comorbidity Index</i></b>			
0	1,067	84.6	[82.1, 86.8]
1	679	76.5	[72.9, 79.8]
2	436	77.2	[72.7, 81.2]
3	231	78.1	[71.7, 83.3]
4	140	73.9	[65.2, 80.9]
5	64	70.8	[57.2, 81.2]
6	36	NA <sup>Ⓜ</sup>	-
7	28	NA <sup>Ⓜ</sup>	-
8	14	NA <sup>Ⓜ</sup>	-
9	8	NA <sup>Ⓜ</sup>	-
10	3	NA <sup>Ⓜ</sup>	-
<b><i>WHO score at surgery</i></b>			
0 - Asymptomatic, normal activity	625	84.5	[81.2, 87.3]

1-year relative survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
1 - Symptomatic, but ambulant	1,736	80.5	[78.4, 82.4]
2 - Symptomatic, bedbound < 50% day	288	67.4	[61.3, 72.8]
3 - Symptomatic, bedbound > 50% day	55	59.1	[44.4, 71.4]
4 - Completely dependent, 100% bedbound	2	NA <sup>✱</sup>	-
<b>ASA score</b>			
1 - Healthy person	140	84.1	[76.7, 89.4]
2 - Mild systemic disease, normal activity	1,377	82.0	[79.7, 84.1]
3 - Serious systemic disease, limited activity	1,152	76.2	[73.5, 78.7]
4 - Life-threatening illness, handicapped	37	NA <sup>✱</sup>	-
<b>Resectability status <sup>**</sup></b>			
Before neoadjuvant treatment			
Upfront resectable	110	87.2	[78.8, 92.7]
Borderline resectable	305	81.8	[76.7, 86.0]
Unresectable	74	82.5	[71.2, 89.9]
No neoadjuvant treatment	1,502	80.4	[78.1, 82.5]
Before surgery			
Upfront resectable	1,645	81.0	[78.8, 83.0]
Borderline resectable	319	81.0	[75.9, 85.1]
Unresectable	21	NA <sup>✱</sup>	-
Missing	6	NA <sup>✱</sup>	-
<b>Type of surgery</b>			
Minimally invasive surgery (MIS) – Laparoscopic	595	84.8	[81.4, 87.6]
Minimally invasive surgery (MIS) - Hybrid	2	NA <sup>✱</sup>	-
Minimally invasive surgery (MIS) - Robotic	241	80.3	[74.0, 85.3]
Open	1,739	78.2	[76.1, 80.2]
Conversion from MIS to open surgery	129	72.0	[62.9, 79.4]
<b>Simultaneous venous resection</b>			
No	2,242	81.6	[79.8, 83.3]
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection	464	70.0	[65.4, 74.1]
- With primary wedge-reconstruction	152	71.6	[63.3, 78.5]
- With primary end-to-end reconstruction	193	69.0	[61.8, 75.2]
- With vascular autograft interposition	10	NA <sup>✱</sup>	-
- With vascular allograft interposition	54	66.2	[51.0, 77.9]
- With synthetic/prosthetic interposition	7	NA <sup>✱</sup>	-
- With peritoneal patch wedge-reconstruction	39	NA <sup>✱</sup>	-
- Without reconstruction	9	NA <sup>✱</sup>	-
<b>Simultaneous arterial resection <sup>**</sup></b>			
No	2,639	79.4	[77.7, 81.0]
Hepatic artery resection	27	NA <sup>✱</sup>	-
- With primary end-to-end reconstruction	16	NA <sup>✱</sup>	-
- With vascular allograft interposition	1	NA <sup>✱</sup>	-

1-year relative survival after surgery, %			
Characteristic	N	Belgium	
		%	95% CI
- Without reconstruction	10	NA <sup>⌘</sup>	-
Coeliac trunk resection	32	NA <sup>⌘</sup>	-
- With primary end-to-end reconstruction	2	NA <sup>⌘</sup>	-
- Without reconstruction	30	NA <sup>⌘</sup>	-
Superior mesenteric artery (SMA) resection	7	NA <sup>⌘</sup>	-
- With primary wedge-reconstruction	1	NA <sup>⌘</sup>	-
- With primary end-to-end reconstruction	3	NA <sup>⌘</sup>	-
- With vascular autograft interposition	2	NA <sup>⌘</sup>	-
- Without reconstruction	1	NA <sup>⌘</sup>	-
<b>Simultaneous other organ resection <sup>**</sup></b>			
No	1,648	79.1	[76.9, 81.1]
Colon	84	69.9	[58.3, 79.0]
Stomach	477	78.9	[74.6, 82.5]
Adrenal gland	71	84.6	[73.3, 91.7]
Spleen	506	82.7	[78.8, 86.0]
Other	166	76.6	[69.1, 82.7]
<b>RIZIV code for complex surgery</b>			
242830-242841: Pancreaticoduodenectomy	2,139	78.2	[76.3, 80.0]
Pancreaticoduodenectomy	1,975	78.9	[76.9, 80.8]
Total Pancreatectomy	164	70.0	[62.0, 76.7]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	183	85.4	[79.0, 90.2]
242874-242885: Hemipancreatectomy left	382	84.7	[80.3, 88.2]
242896-242900: Enucleation of a pancreatic tumour	2	NA <sup>⌘</sup>	-
<b>Antithrombotic medication</b>			
No	1,865	81.4	[79.5, 83.2]
Yes	841	75.4	[72.1, 78.4]
<b>Was the patient referred?</b>			
No	1,105	81.4	[78.8, 83.8]
Yes	1,601	78.3	[76.1, 80.4]

\* Tumour staging not possible.

† Neoadjuvant treatment: patients who received either chemotherapy or radiotherapy, or a combination of these treatments prior to surgery.

\*\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients.

⌘ N<50

**Table 25.** Unadjusted 3-year relative survival after surgery for **adenocarcinoma** in the five convention years.

3-year relative survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
<b>Operated patients with adenocarcinoma</b>	<b>2,706</b>	<b>48.3</b>	<b>[45.9, 50.7]</b>
<b>Convention year</b>			
Year 1	476	48.9	[44.1, 53.7]
Year 2	554	48.8	[44.3, 53.2]
Year 3	552	44.7	[40.1, 49.3]
Year 4	545	NA <sup>KK</sup>	NA <sup>KK</sup>
Year 5	579	NA <sup>KK</sup>	NA <sup>KK</sup>
<b>Sex</b>			
Male	1,465	47.3	[44.0, 50.6]
Female	1,241	49.5	[45.9, 53.0]
<b>Age at surgery</b>			
<=69	1,412	50.9	[47.6, 54.1]
70-79	997	47.1	[42.9, 51.1]
>=80	297	39.9	[32.0, 48.0]
<b>Lesion to treat (in (peri-)pancreas)</b>			
Primary tumour	2,647	47.8	[45.3, 50.2]
Relapse of primary tumour	26	NA <sup>K</sup>	-
Metastasis	33	NA <sup>K</sup>	-
<b>Primary tumour localisation</b>			
C17.0 Duodenum	138	70.6	[59.7, 79.6]
C24.0 Extrahepatic bile duct	206	47.5	[38.9, 55.8]
C24.1 (Peri-) ampullary region	321	67.0	[59.8, 73.4]
C25.0 Head of pancreas	1,343	39.9	[36.5, 43.2]
C25.1 Body of pancreas	239	51.6	[42.6, 60.1]
C25.2 Tail of pancreas	271	46.8	[38.9, 54.5]
C25.3 Pancreatic duct	13	NA <sup>K</sup>	-
C25.7-9 Other specified parts of pancreas	104	46.6	[34.8, 57.8]
Other	71	77.3	[63.2, 87.2]
<b>Clinical stage</b>			
0	33	NA <sup>K</sup>	-
I	1,374	51.6	[48.1, 55.0]
II	746	40.9	[36.4, 45.4]
III	313	43.1	[35.8, 50.3]
IV	64	47.5	[31.7, 62.0]
X	149	59.4	[49.4, 68.3]
TNM not applicable or relapse*	27	NA <sup>K</sup>	-
<b>Pathological stage</b>			
0	43	NA <sup>K</sup>	-

3-year relative survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
I	459	72.6	[66.9, 77.8]
II	764	48.0	[43.4, 52.6]
III	723	36.9	[32.4, 41.4]
IV	60	28.7	[16.2, 42.8]
X	23	NA <sup>Ⓜ</sup>	-
TNM not applicable or relapse*	19	NA <sup>Ⓜ</sup>	-
Neoadjuvant treatment <sup>†</sup>	615	41.6	[36.4, 46.8]
<b><i>yPathological stage</i></b>			
0	19	NA <sup>Ⓜ</sup>	-
I	213	56.9	[47.4, 65.5]
II	202	32.5	[24.3, 41.0]
III	137	31.8	[21.6, 42.6]
IV	33	NA <sup>Ⓜ</sup>	-
X	3	NA <sup>Ⓜ</sup>	-
TNM not applicable or relapse*	8	NA <sup>Ⓜ</sup>	-
No neoadjuvant treatment	2,091	50.1	[47.4, 52.8]
<b><i>Resection margin</i></b>			
R0	1,850	54.9	[51.9, 57.8]
R1	846	34.2	[30.1, 38.3]
R2	10	NA <sup>Ⓜ</sup>	-
<b><i>Prior surgery or other treatment **</i></b>			
Prior abdominal surgery	407	48.3	[42.1, 54.3]
Other treatment modality (that could affect the pancreas)	476	46.4	[40.4, 52.2]
<b><i>Neoadjuvant treatment</i></b>			
Chemoradiotherapy	85	59.3	[45.2, 71.2]
Chemotherapy	528	39.5	[33.9, 45.0]
Radiotherapy	2	NA <sup>Ⓜ</sup>	-
No chemo or radiation treatment	2,091	50.1	[47.4, 52.8]
<b><i>Charlson Comorbidity Index</i></b>			
0	1,067	55.8	[51.9, 59.6]
1	679	44.1	[39.2, 48.9]
2	436	44.4	[38.3, 50.3]
3	231	42.4	[34.2, 50.5]
4	140	39.3	[28.7, 50.1]
5	64	42.7	[27.3, 57.9]
6	36	NA <sup>Ⓜ</sup>	-
7	28	NA <sup>Ⓜ</sup>	-
8	14	NA <sup>Ⓜ</sup>	-
9	8	NA <sup>Ⓜ</sup>	-
10	3	NA <sup>Ⓜ</sup>	-
<b><i>WHO score at surgery</i></b>			
0 - Asymptomatic, normal activity	625	52.6	[47.4, 57.5]

3-year relative survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
1 - Symptomatic, but ambulant	1,736	49.7	[46.6, 52.7]
2 - Symptomatic, bedbound < 50% day	288	35.4	[28.4, 42.6]
3 - Symptomatic, bedbound > 50% day	55	30.6	[16.6, 46.2]
4 - Completely dependent, 100% bedbound	2	NA <sup>✱</sup>	-
<b>ASA score</b>			
1 - Healthy person	140	56.5	[46.6, 65.4]
2 - Mild systemic disease, normal activity	1,377	52.5	[49.1, 55.8]
3 - Serious systemic disease, limited activity	1,152	42.4	[38.6, 46.2]
4 - Life-threatening illness, handicapped	37	NA <sup>✱</sup>	-
<b>Resectability status <sup>**</sup></b>			
Before neoadjuvant treatment			
Upfront resectable	110	41.7	[27.4, 55.6]
Borderline resectable	305	43.2	[34.8, 51.5]
Unresectable	74	38.5	[23.1, 54.0]
No neoadjuvant treatment	1,502	50.3	[46.7, 53.8]
Before surgery			
Upfront resectable	1,645	50.3	[46.8, 53.7]
Borderline resectable	319	40.9	[33.1, 48.6]
Unresectable	21	NA <sup>✱</sup>	-
Missing	6	NA <sup>✱</sup>	-
<b>Type of surgery</b>			
Minimally invasive surgery (MIS) – Laparoscopic	595	53.3	[48.1, 58.3]
Minimally invasive surgery (MIS) - Hybrid	2	NA <sup>✱</sup>	-
Minimally invasive surgery (MIS) - Robotic	241	46.7	[36.8, 56.1]
Open	1,739	48.1	[45.1, 51.1]
Conversion from MIS to open surgery	129	30.9	[21.4, 41.1]
<b>Simultaneous venous resection</b>			
No	2,242	52.1	[49.4, 54.7]
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection	464	30.1	[24.8, 35.7]
- With primary wedge-reconstruction	152	24.5	[15.5, 34.7]
- With primary end-to-end reconstruction	193	34.6	[26.6, 42.8]
- With vascular autograft interposition	10	NA <sup>✱</sup>	-
- With vascular allograft interposition	54	21.7	[8.3, 39.3]
- With synthetic/prosthetic interposition	7	NA <sup>✱</sup>	-
- With peritoneal patch wedge-reconstruction	39	NA <sup>✱</sup>	-
- Without reconstruction	9	NA <sup>✱</sup>	-
<b>Simultaneous arterial resection <sup>**</sup></b>			
No	2,639	48.7	[46.2, 51.2]
Hepatic artery resection	27	NA <sup>✱</sup>	-
- With primary end-to-end reconstruction	16	NA <sup>✱</sup>	-
- With vascular allograft interposition	1	NA <sup>✱</sup>	-

3-year relative survival after surgery, %			
Belgium			
Characteristic	N	%	95% CI
- Without reconstruction	10	NA <sup>✱</sup>	-
Coeliac trunk resection	32	NA <sup>✱</sup>	-
- With primary end-to-end reconstruction	2	NA <sup>✱</sup>	-
- Without reconstruction	30	NA <sup>✱</sup>	-
Superior mesenteric artery (SMA) resection	7	NA <sup>✱</sup>	-
- With primary wedge-reconstruction	1	NA <sup>✱</sup>	-
- With primary end-to-end reconstruction	3	NA <sup>✱</sup>	-
- With vascular autograft interposition	2	NA <sup>✱</sup>	-
- Without reconstruction	1	NA <sup>✱</sup>	-
<b>Simultaneous other organ resection <sup>**</sup></b>			
No	1,648	48.7	[45.6, 51.7]
Colon	84	39.7	[25.8, 53.7]
Stomach	477	45.2	[39.3, 51.0]
Adrenal gland	71	37.6	[23.0, 52.5]
Spleen	506	47.9	[41.9, 53.6]
Other	166	50.6	[41.1, 59.6]
<b>RIZIV code for complex surgery</b>			
242830-242841: Pancreaticoduodenectomy	2,139	47.9	[45.2, 50.6]
Pancreaticoduodenectomy	1,975	48.0	[45.2, 50.8]
Total Pancreatectomy	164	47.0	[36.7, 56.9]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	183	49.4	[39.8, 58.4]
242874-242885: Hemipancreatectomy left	382	50.4	[43.4, 57.0]
242896-242900: Enucleation of a pancreatic tumour	2	NA <sup>✱</sup>	-
<b>Antithrombotic medication</b>			
No	1,865	50.6	[47.7, 53.5]
Yes	841	43.2	[38.8, 47.5]
<b>Was the patient referred?</b>			
No	1,105	49.2	[45.4, 53.0]
Yes	1,601	47.7	[44.5, 50.8]

\* Tumour staging not possible.

† Neoadjuvant treatment: patients who received either chemotherapy or radiotherapy, or a combination of these treatments prior to surgery.

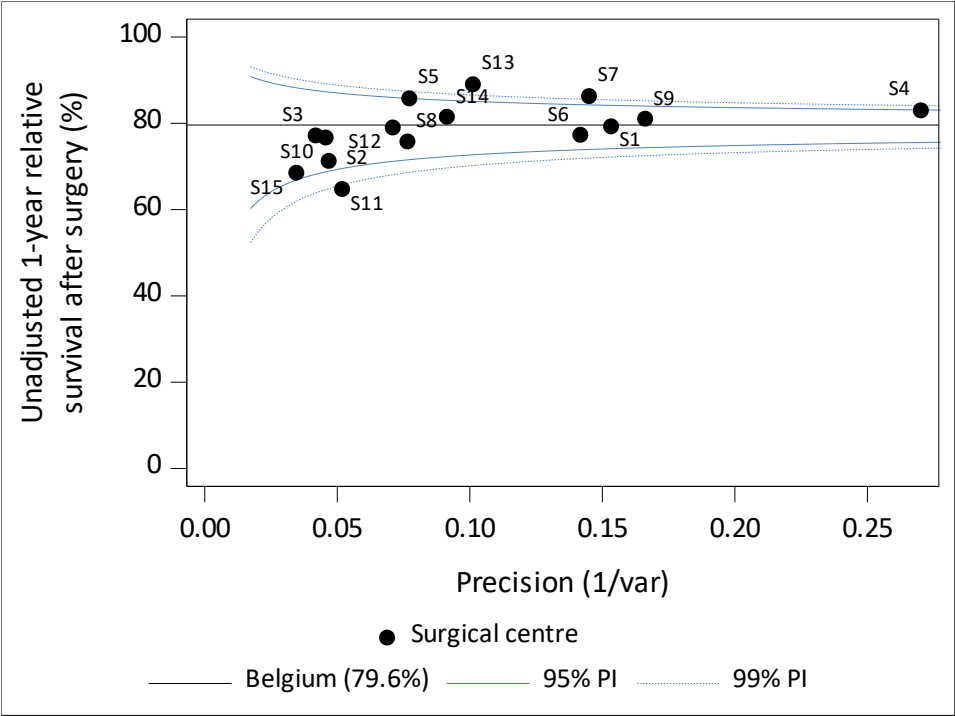
\*\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients.

✱ N<50

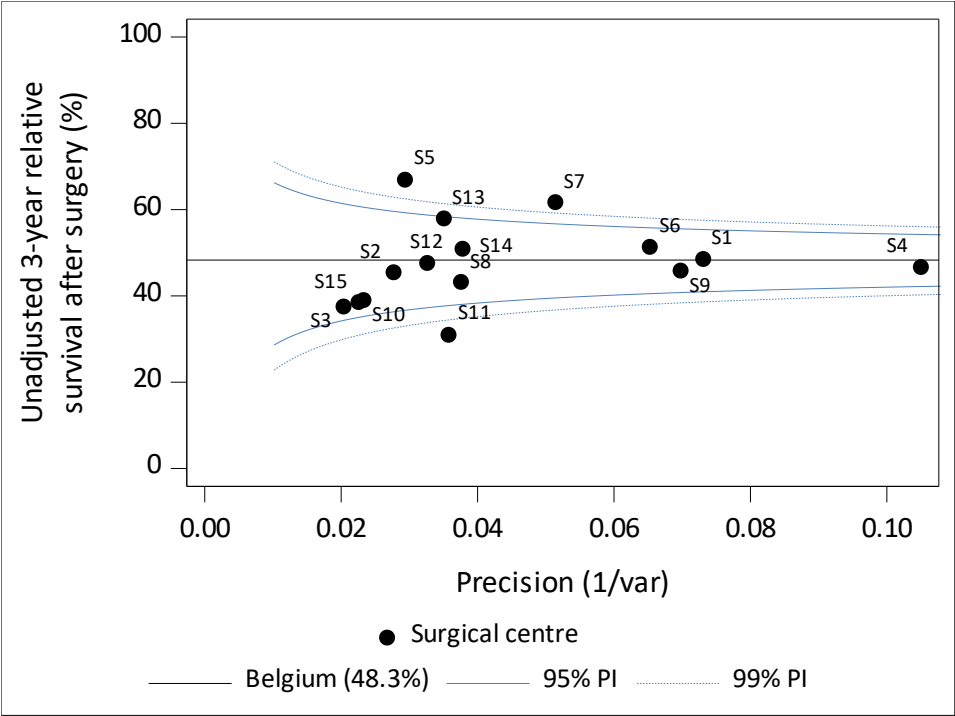
✱✱ 3-year follow-up after surgery is not reached.



**Figure 20:** Unadjusted 1-year relative survival after surgery for **adenocarcinoma** for all years combined.



**Figure 21:** Unadjusted 3-year relative survival after surgery for **adenocarcinoma** for all years combined.



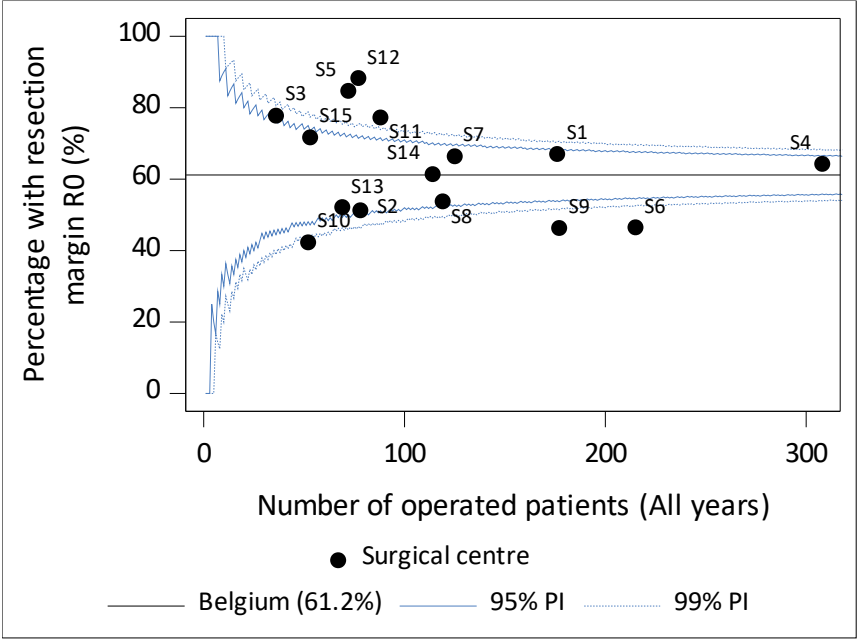
### 3.3.3. Proportion of operated patients with resection margin R0, R1, R2

**Table 26.** Proportion of operated patients with **pancreatic ductal adenocarcinoma** in the five convention years with resection margin R0, R1 and R2.

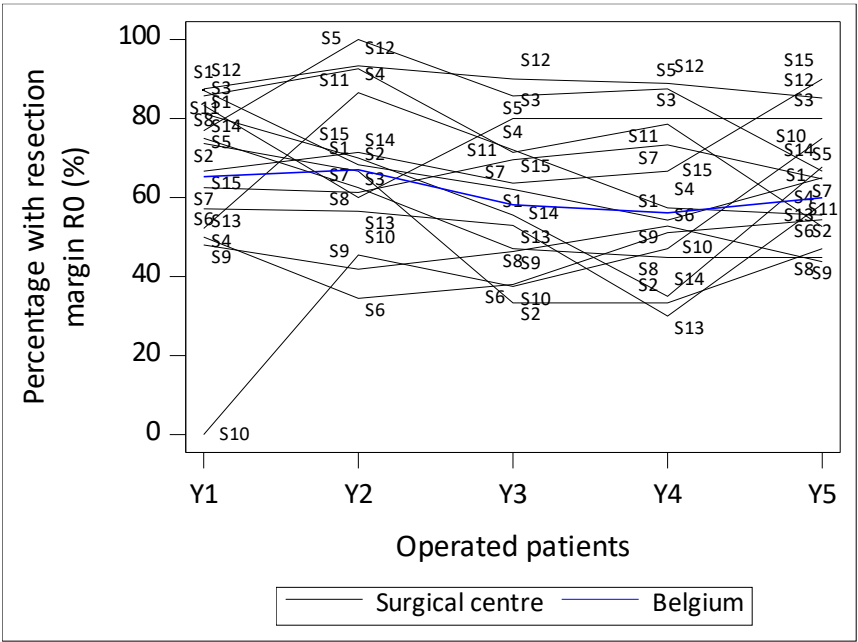
Resection margin	Belgium			
	N	n	n/N (%)	95% CI
<b>Operated patients with pancreatic ductal adenocarcinoma</b>	<b>1,759</b>			
<b>Convention year</b>				
Year 1	288			
Year 2	364			
Year 3	349			
Year 4	351			
Year 5	407			
<b>Resection margin status</b>				
R0	1,759	1,076	61.2	[58.8, 63.5]
- With simultaneous vascular resection		207		
- Without simultaneous vascular resection		869		
R1 indirect	1,759	447	25.4	[23.4, 27.5]
- With simultaneous vascular resection		128		
- Without simultaneous vascular resection		319		
R1 direct	1,759	228	13.0	[11.4, 14.6]
- With simultaneous vascular resection		81		
- Without simultaneous vascular resection		147		
R2	1,759	8	0.5	[0.2, 0.9]
- With simultaneous vascular resection		3		
- Without simultaneous vascular resection		5		
R0: tumour-free resection margin > 1mm				
R1 indirect: tumour-free resection margin ≤ 1mm				
R1 direct: microscopic tumour involvement of the resection margin				
R2: macroscopic tumour transection				
Remark: Enucleation is regarded as a R1 resection				
Remark: Reduced absolute number of patients is due to the specific selection of 'pancreatic ductal adenocarcinoma' (i.e. ICD-O-3 selection applied: topography C25, morphology 8500/3)				
Remark: Patients with R1 without specification direct or indirect were excluded from the table (N=8)				

**Figure 22:** Funnel and spaghetti plot of the proportion of operated patients with **pancreatic ductal adenocarcinoma** with resection margin **R0**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

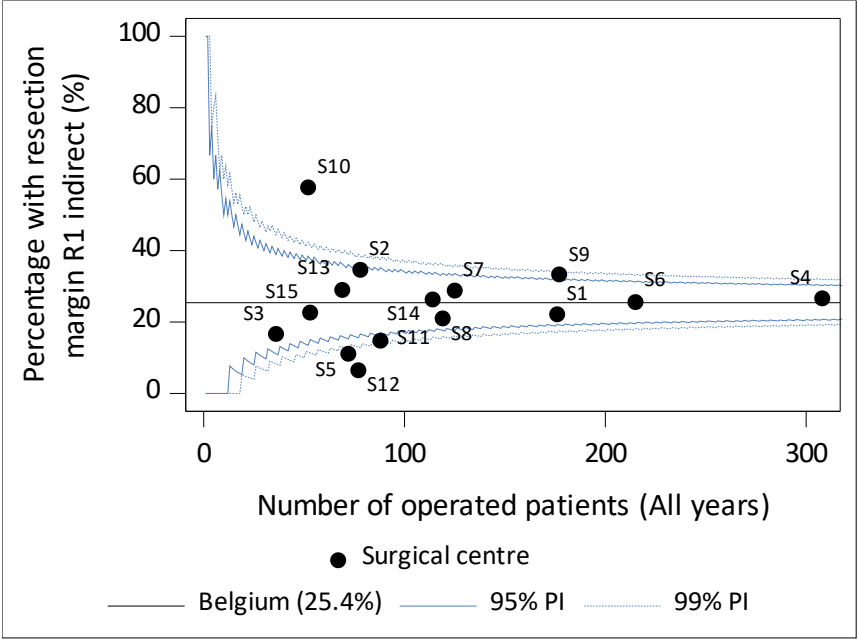


(b)

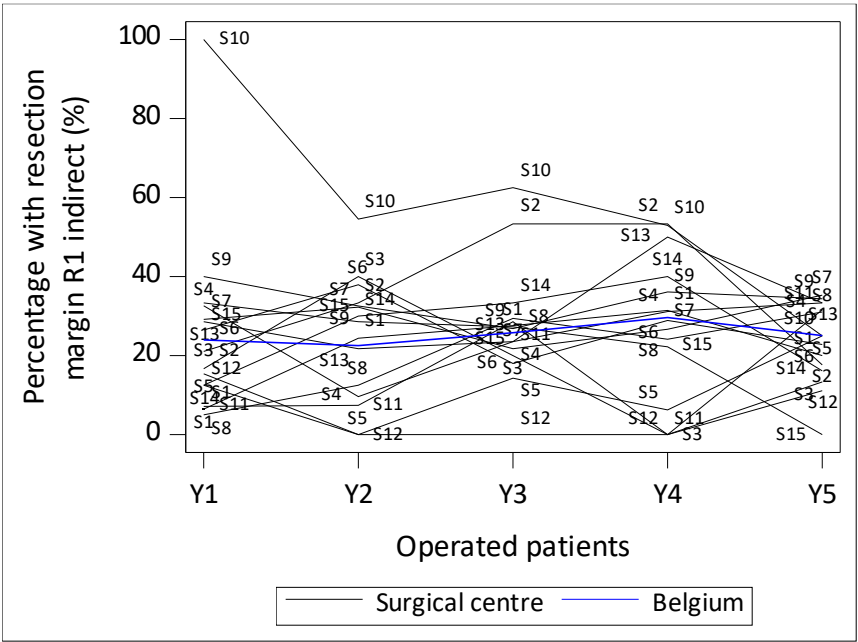


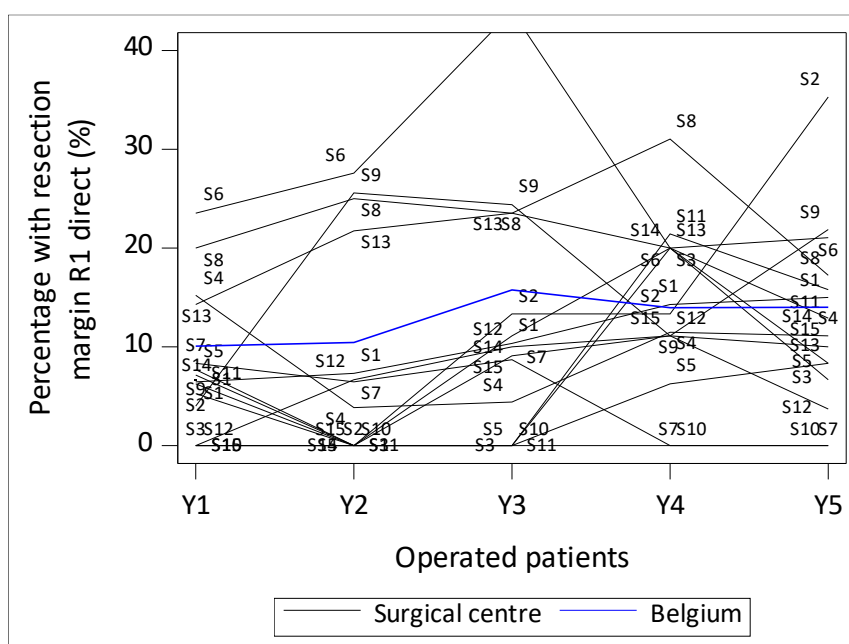
**Figure 23:** Funnel and spaghetti plot of the proportion of operated patients with **pancreatic ductal adenocarcinoma** with resection margin **R1 indirect**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)



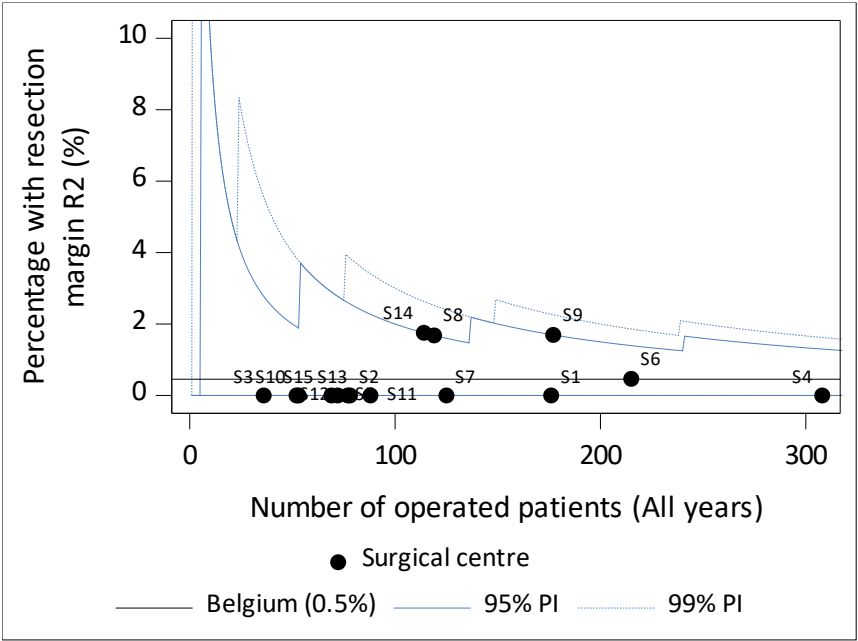
(b)



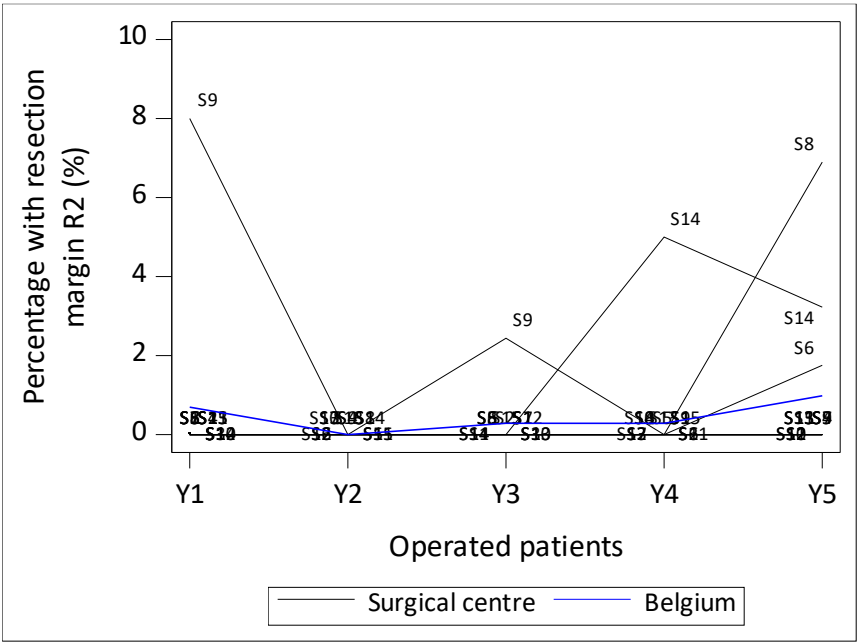


**Figure 25:** Funnel and spaghetti plot of the proportion of operated patients with **pancreatic ductal adenocarcinoma** with resection margin **R2**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)



(b)



### 3.3.4. Proportion of operated patients with surgical complications

Note that in-hospital is defined as the days the patient was hospitalised between the date of surgery and 90 days post-surgery.

**Table 27.** Proportion of operated patients (**malignant and benign tumours**) in the five convention years with surgical complications (90-day postoperative, in-hospital), by complication type.

Postoperative complications (90-day in-hospital)				
Belgium				
Complication type	N	n	n/N (%)	95% CI
<b>Severe postoperative complications (CD IIIb-V)</b>	4,176	609	14.6	[13.5, 15.7]
Year 1	724	98	13.5	[11.1, 16.2]
Year 2	856	114	13.3	[11.1, 15.8]
Year 3	851	125	14.7	[12.4, 17.2]
Year 4	834	112	13.4	[11.2, 15.9]
Year 5	911	160	17.6	[15.1, 20.2]
<b>Clinically relevant pancreatic fistula (Grade B or C) <sup>1*</sup></b>	4,176	828	19.8	[18.6, 21.1]
Grade B	4,176	751	18.0	[16.8, 19.2]
Year 1	724	120	16.6	[13.9, 19.5]
Year 2	856	151	17.6	[15.1, 20.4]
Year 3	851	142	16.7	[14.2, 19.4]
Year 4	834	144	17.3	[14.8, 20.0]
Year 5	911	194	21.3	[18.7, 24.1]
Grade C	4,176	77	1.8	[1.5, 2.3]
Year 1	724	15	2.1	[1.2, 3.4]
Year 2	856	15	1.8	[1.0, 2.9]
Year 3	851	26	3.1	[2.0, 4.4]
Year 4	834	10	1.2	[0.6, 2.2]
Year 5	911	11	1.2	[0.6, 2.2]
<b>Haemorrhage (Grade A, B or C) <sup>2*</sup></b>	4,176	362	8.7	[7.8, 9.6]
Grade A	4,176	84	2.0	[1.6, 2.5]
Year 1	724	14	1.9	[1.1, 3.2]
Year 2	856	17	2.0	[1.2, 3.2]
Year 3	851	15	1.8	[1.0, 2.9]
Year 4	834	12	1.4	[0.7, 2.5]
Year 5	911	26	2.9	[1.9, 4.2]
Grade B	4,176	163	3.9	[3.3, 4.5]
Year 1	724	22	3.0	[1.9, 4.6]
Year 2	856	45	5.3	[3.9, 7.0]
Year 3	851	28	3.3	[2.2, 4.7]
Year 4	834	26	3.1	[2.0, 4.5]
Year 5	911	42	4.6	[3.3, 6.2]



Postoperative complications (90-day in-hospital)				
Belgium				
Complication type	N	n	n/N (%)	95% CI
Grade C	4,176	115	2.8	[2.3, 3.3]
Year 1	724	26	3.6	[2.4, 5.2]
Year 2	856	24	2.8	[1.8, 4.1]
Year 3	851	23	2.7	[1.7, 4.0]
Year 4	834	19	2.3	[1.4, 3.5]
Year 5	911	23	2.5	[1.6, 3.8]
<b><i>Delayed gastric emptying (Grade A, B or C) <sup>3*</sup></i></b>	4,176	704	16.9	[15.7, 18.0]
Grade A	4,176	338	8.1	[7.3, 9.0]
Year 1	724	50	6.9	[5.2, 9.0]
Year 2	856	76	8.9	[7.1, 11.0]
Year 3	851	67	7.9	[6.2, 9.9]
Year 4	834	63	7.6	[5.9, 9.6]
Year 5	911	82	9.0	[7.2, 11.0]
Grade B	4,176	253	6.1	[5.4, 6.8]
Year 1	724	43	5.9	[4.3, 7.9]
Year 2	856	42	4.9	[3.6, 6.6]
Year 3	851	52	6.1	[4.6, 7.9]
Year 4	834	46	5.5	[4.1, 7.3]
Year 5	911	70	7.7	[6.0, 9.6]
Grade C	4,176	113	2.7	[2.2, 3.2]
Year 1	724	16	2.2	[1.3, 3.6]
Year 2	856	18	2.1	[1.3, 3.3]
Year 3	851	25	2.9	[1.9, 4.3]
Year 4	834	23	2.8	[1.8, 4.1]
Year 5	911	31	3.4	[2.3, 4.8]
<b><i>Bile leakage (Grade A, B or C) <sup>4*</sup></i></b>	4,176	140	3.4	[2.8, 3.9]
Grade A	4,176	43	1.0	[0.7, 1.4]
Year 1	724	8	1.1	[0.5, 2.2]
Year 2	856	9	1.1	[0.5, 2.0]
Year 3	851	10	1.2	[0.6, 2.2]
Year 4	834	11	1.3	[0.7, 2.3]
Year 5	911	5	0.5	[0.2, 1.3]
Grade B	4,176	45	1.1	[0.8, 1.4]
Year 1	724	5	0.7	[0.2, 1.6]
Year 2	856	9	1.1	[0.5, 2.0]
Year 3	851	10	1.2	[0.6, 2.2]
Year 4	834	13	1.6	[0.8, 2.7]
Year 5	911	8	0.9	[0.4, 1.7]
Grade C	4,176	52	1.2	[0.9, 1.6]
Year 1	724	8	1.1	[0.5, 2.2]
Year 2	856	6	0.7	[0.3, 1.5]
Year 3	851	10	1.2	[0.6, 2.2]

Postoperative complications (90-day in-hospital)				
Belgium				
Complication type	N	n	n/N (%)	95% CI
Year 4	834	11	1.3	[0.7, 2.3]
Year 5	911	17	1.9	[1.1, 3.0]
<b><i>Intra-abdominal abscess *</i></b>	4,176	262	6.3	[5.6, 7.1]
Year 1	724	43	5.9	[4.3, 7.9]
Year 2	856	45	5.3	[3.9, 7.0]
Year 3	851	54	6.3	[4.8, 8.2]
Year 4	834	60	7.2	[5.5, 9.2]
Year 5	911	60	6.6	[5.1, 8.4]
<b><i>Transferred to another hospital due to complications (CD I-IVb)</i></b>	4,176	3	0.1	[0.0, 0.2]
Year 1	724	2	0.3	[0.0, 1.0]
Year 2	856	0	0.0	[0.0, 0.4]
Year 3	851	0	0.0	[0.0, 0.4]
Year 4	834	1	0.1	[0.0, 0.7]
Year 5	911	0	0.0	[0.0, 0.4]

CD: Clavien-Dindo grade

<sup>1</sup> graded according to the 2016 update of the International Study Group of Pancreatic Surgery (ISGPS)

<sup>2</sup> graded according to the ISGPS definitions

<sup>3</sup> graded according to the ISGPS definitions

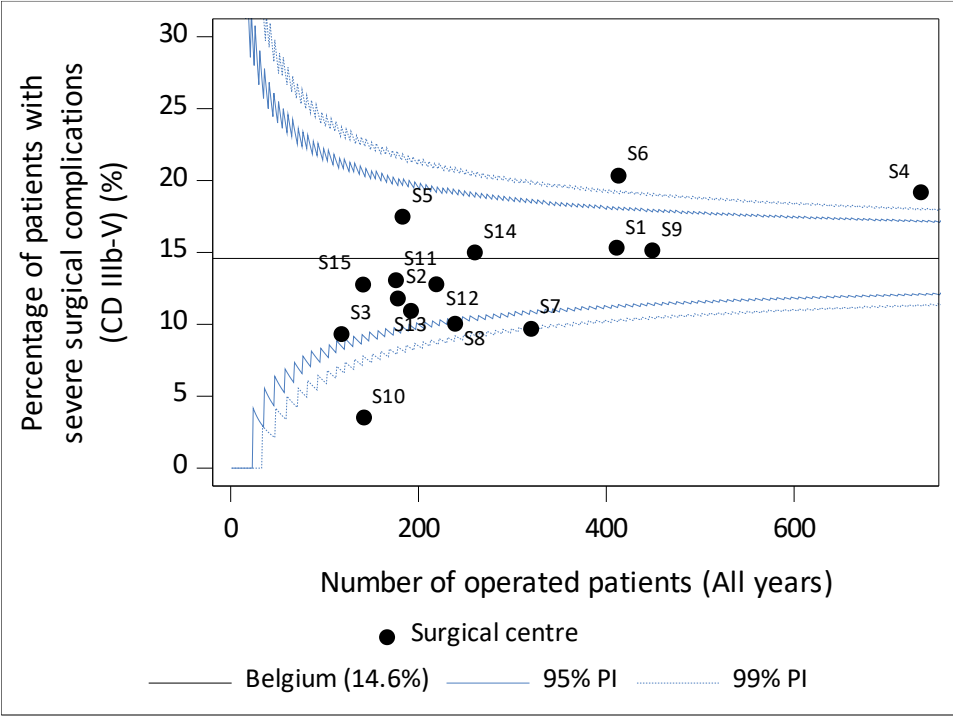
<sup>4</sup> graded according to the International Study Group of Liver Surgery (ISGLS)

More information can be found in the project manual.

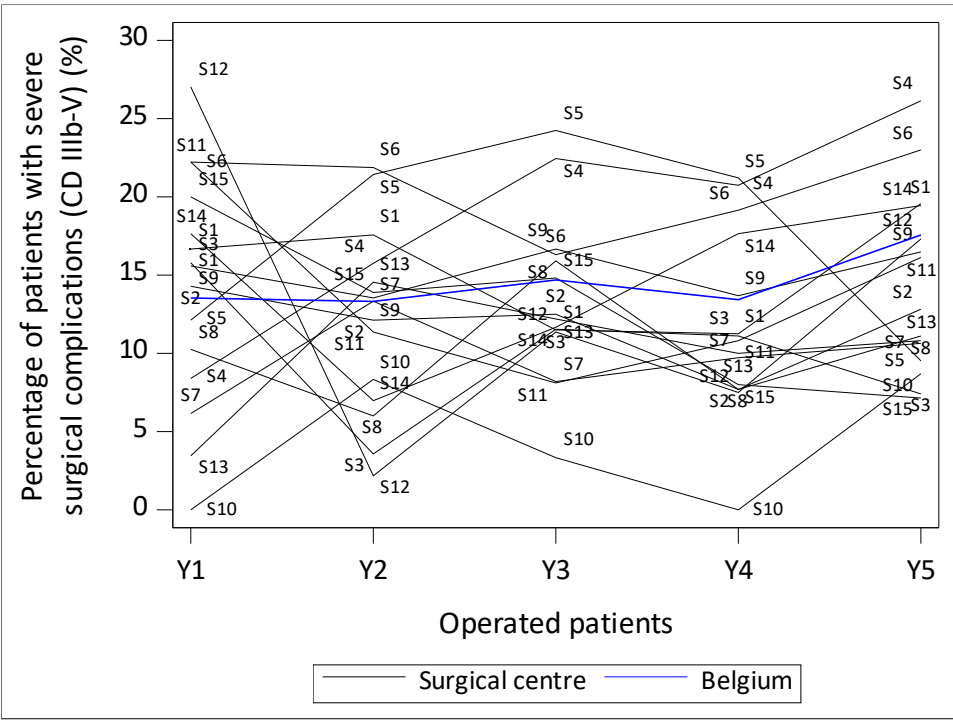
\* Patients could have a combination of complications, thus the total number of complications could be larger than the total number of patients.

**Figure 26:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours** with **severe surgical complications** (CD IIIb-V), per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

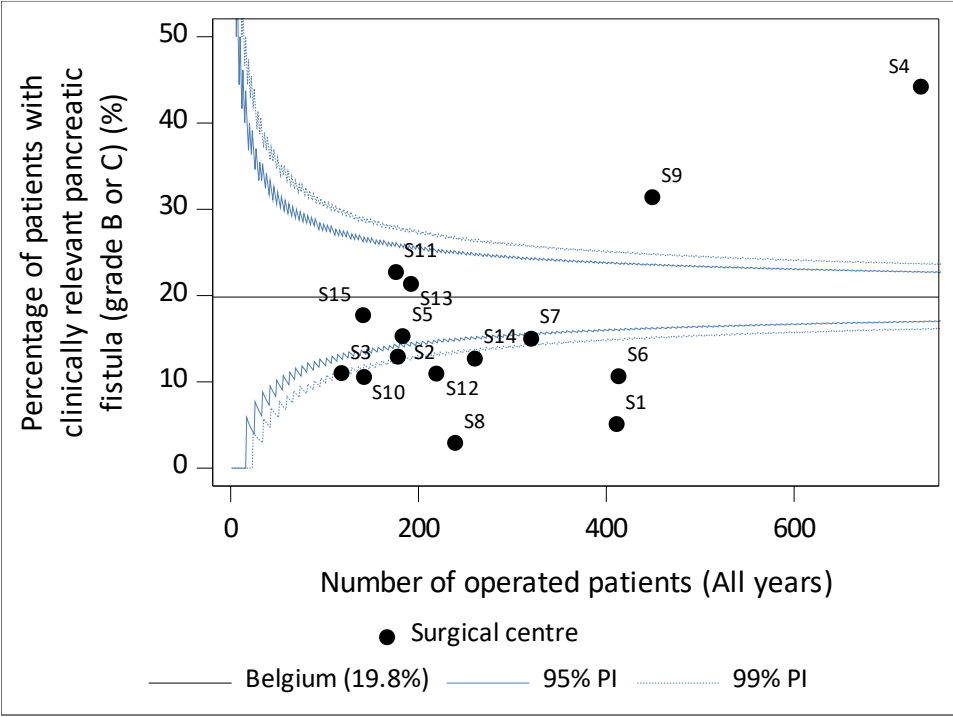


(b)

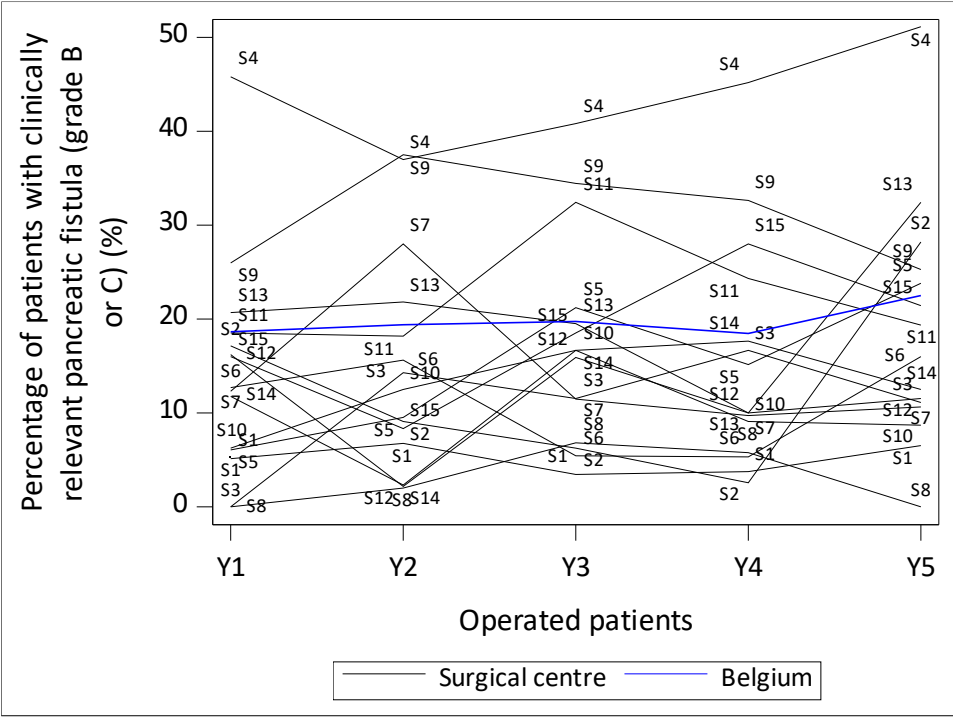


**Figure 27:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours with clinically relevant pancreatic fistula (grade B or C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

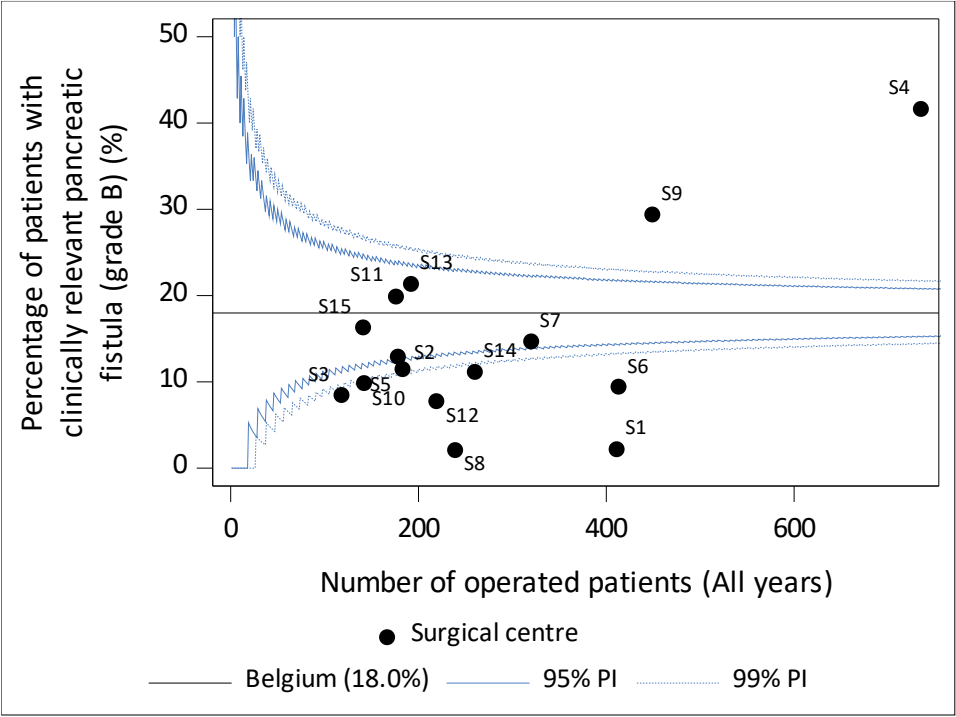


(b)

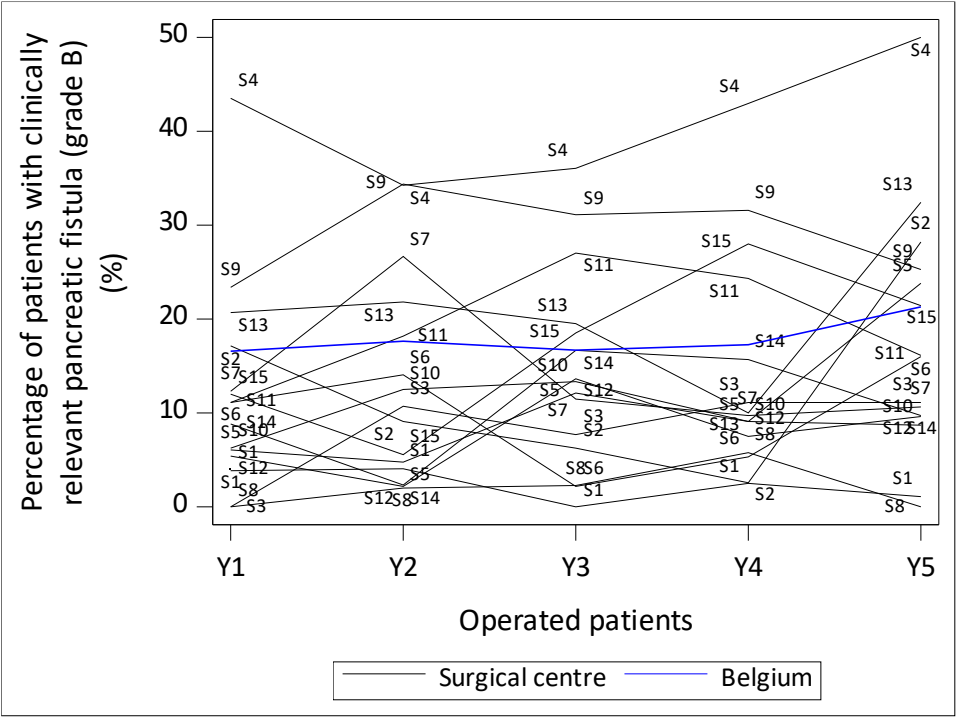


**Figure 28:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours with clinically relevant pancreatic fistula (grade B, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

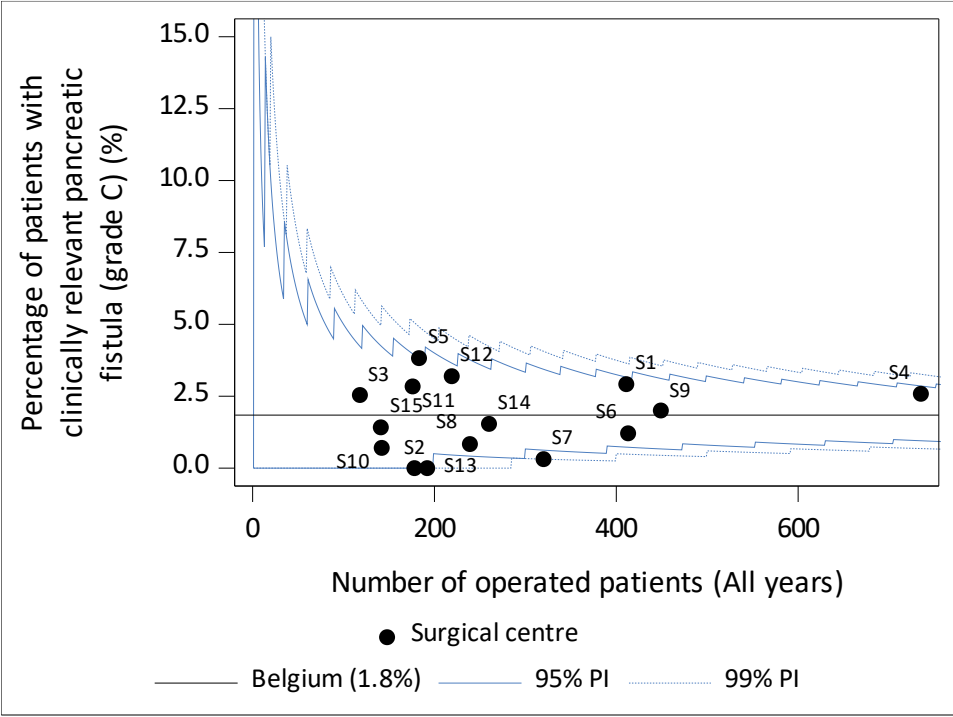


(b)

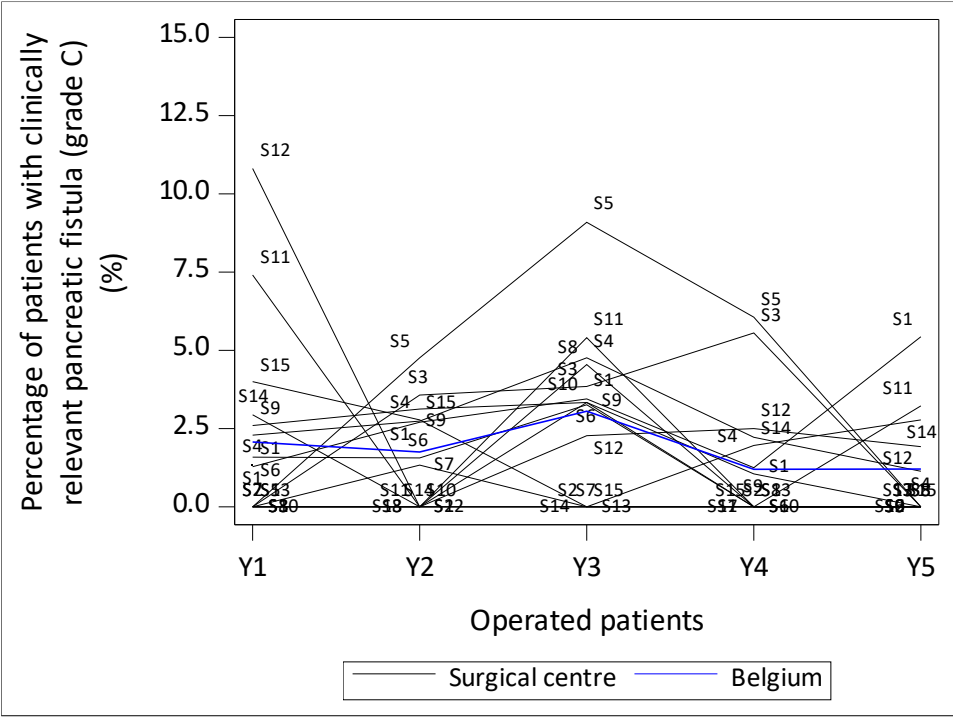


**Figure 29:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours** with **clinically relevant pancreatic fistula (grade C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

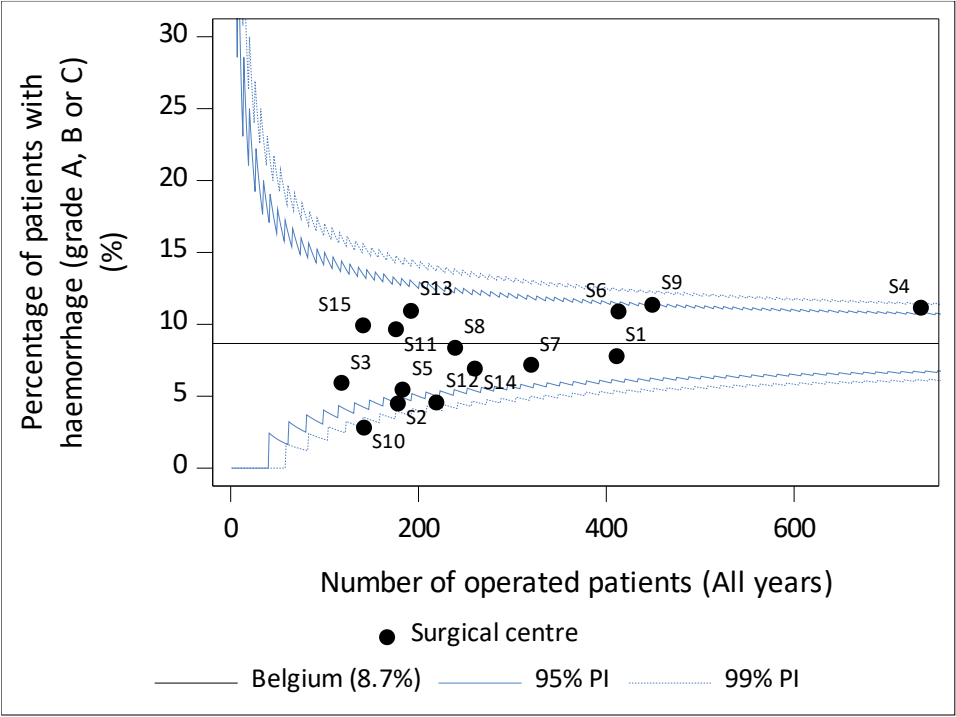


(b)

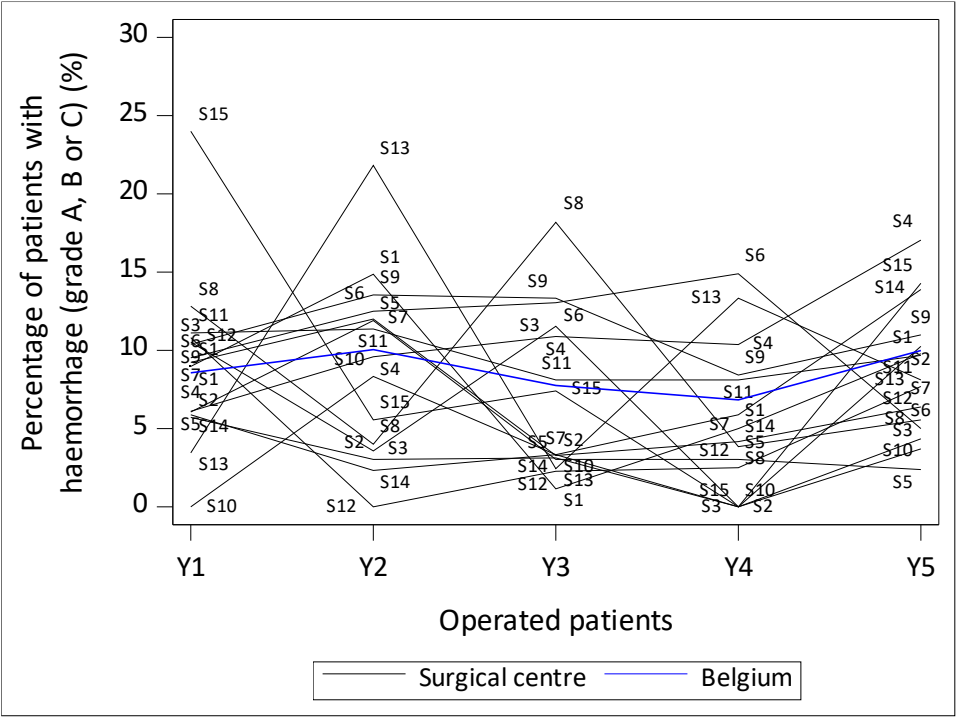


**Figure 30:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours with haemorrhage (grade A, B or C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

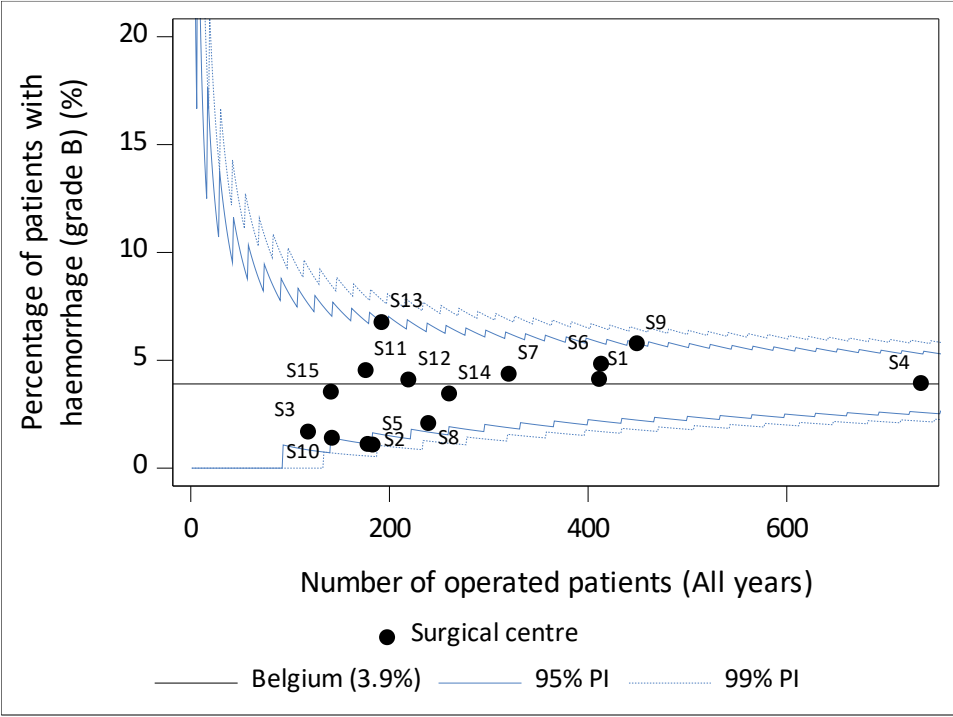


(b)

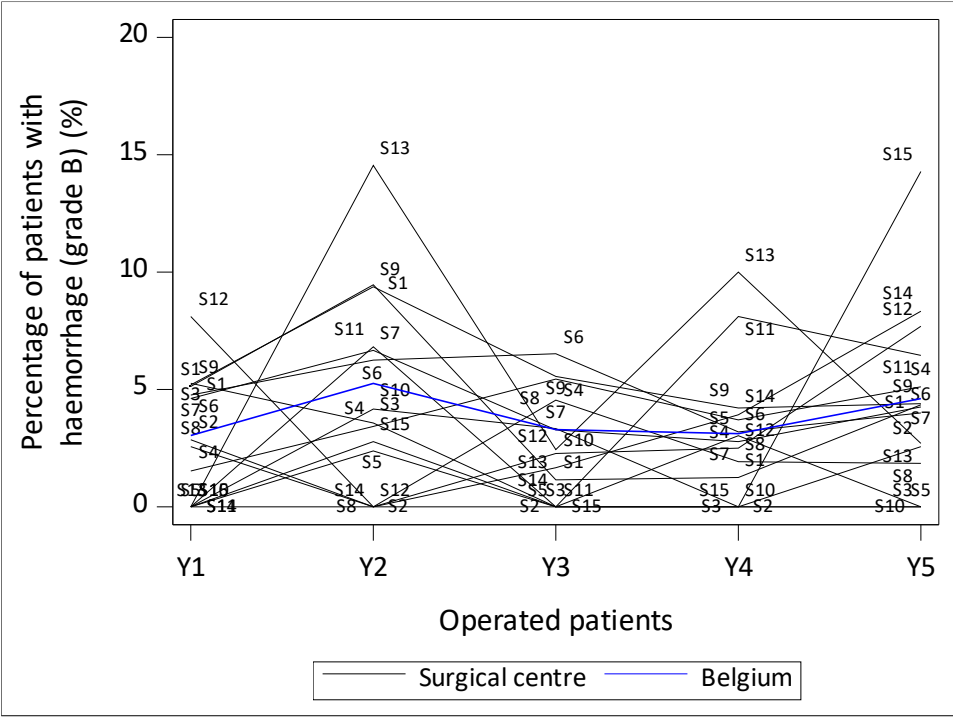


**Figure 31:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours** with **haemorrhage (grade B, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)



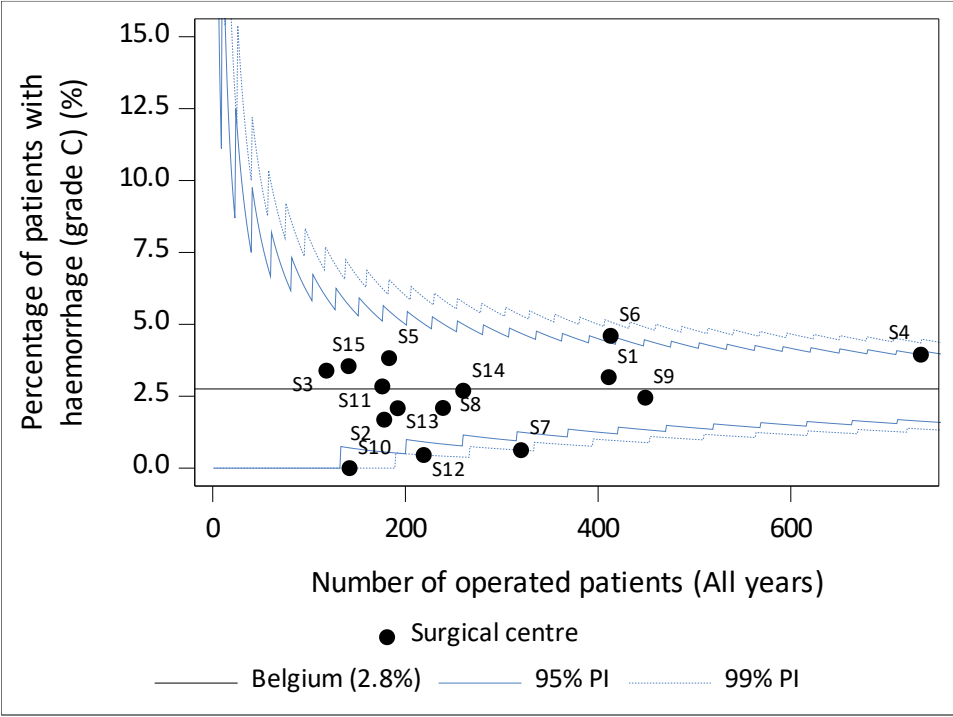
(b)



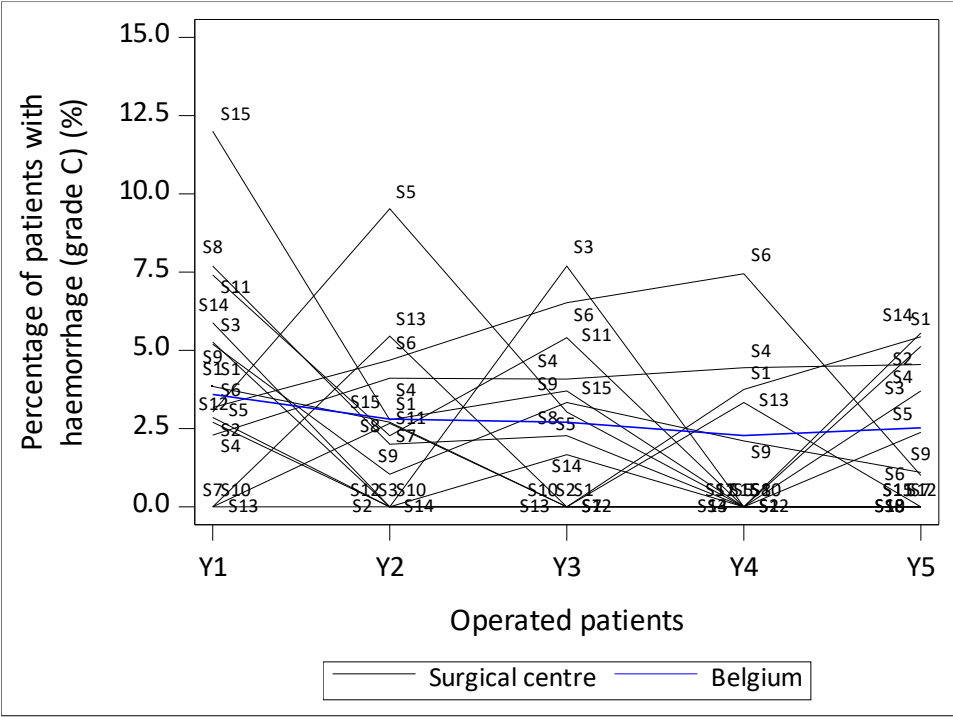


**Figure 32:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours** with **haemorrhage (grade C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

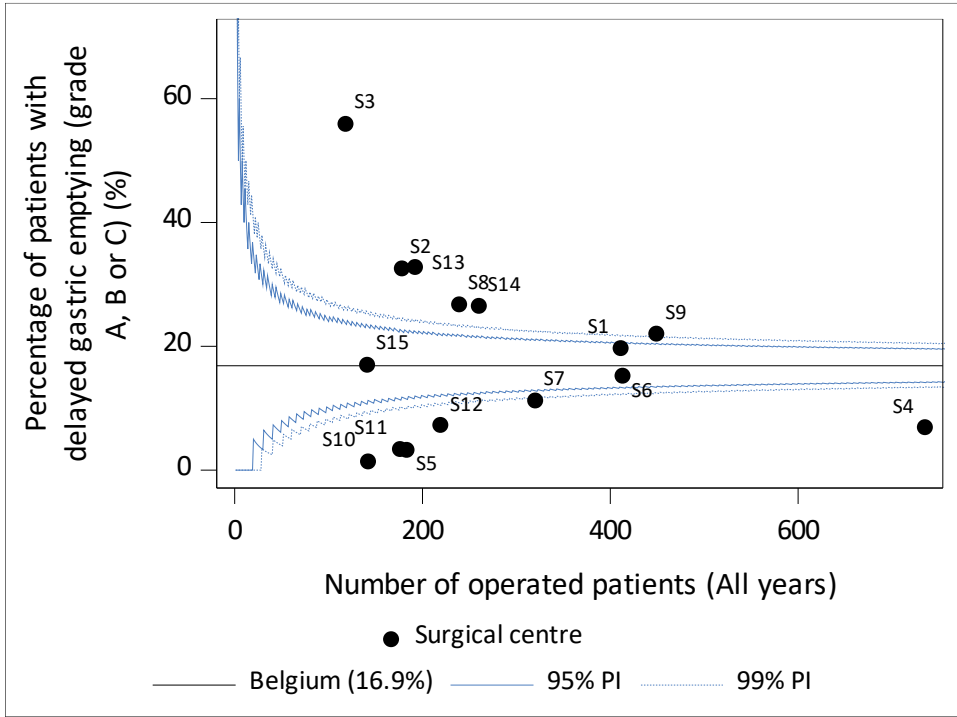


(b)

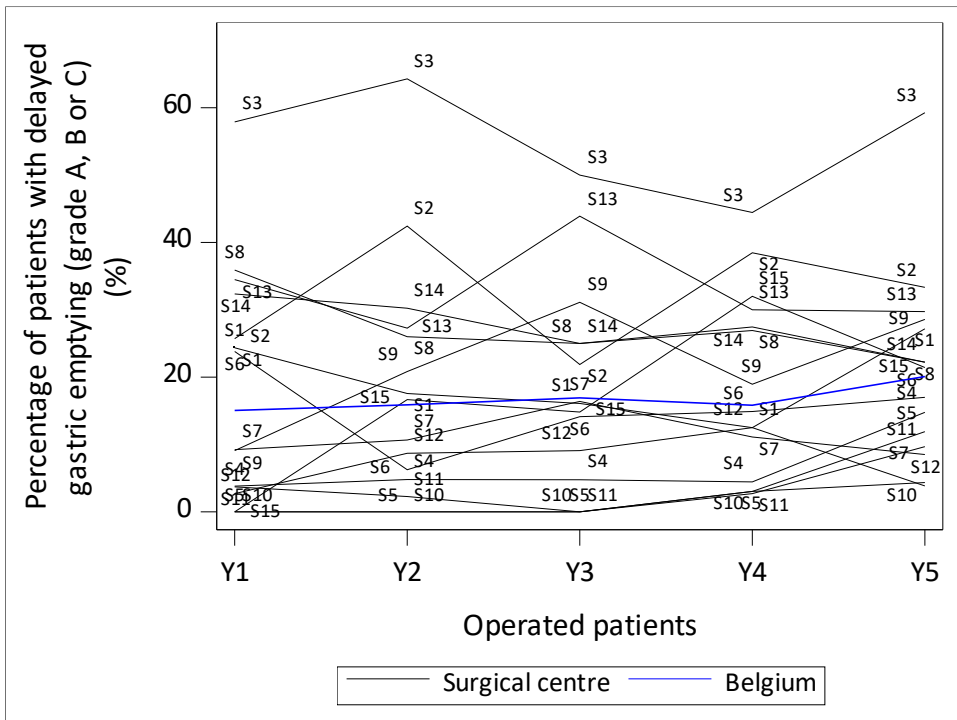


**Figure 33:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours with delayed gastric emptying (grade A, B or C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

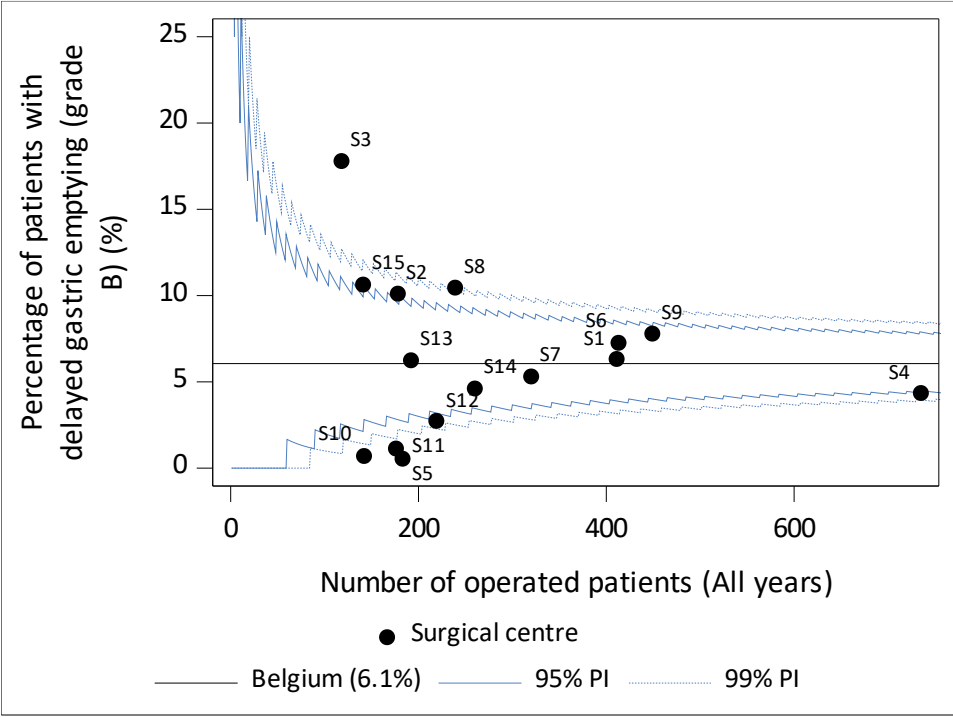


(b)

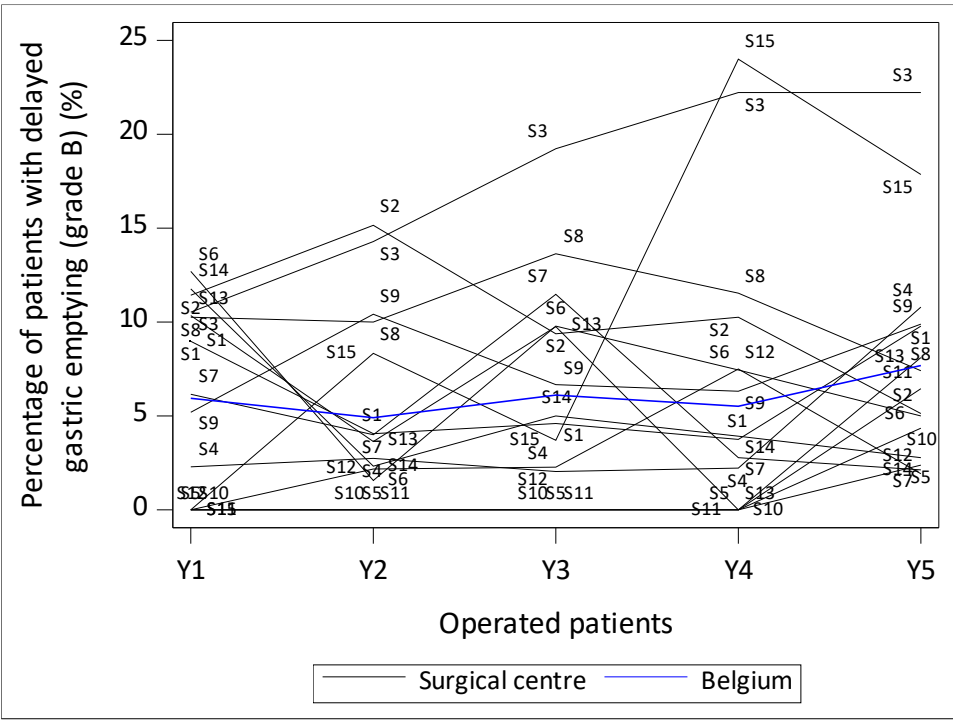


**Figure 34:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours with delayed gastric emptying (grade B, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

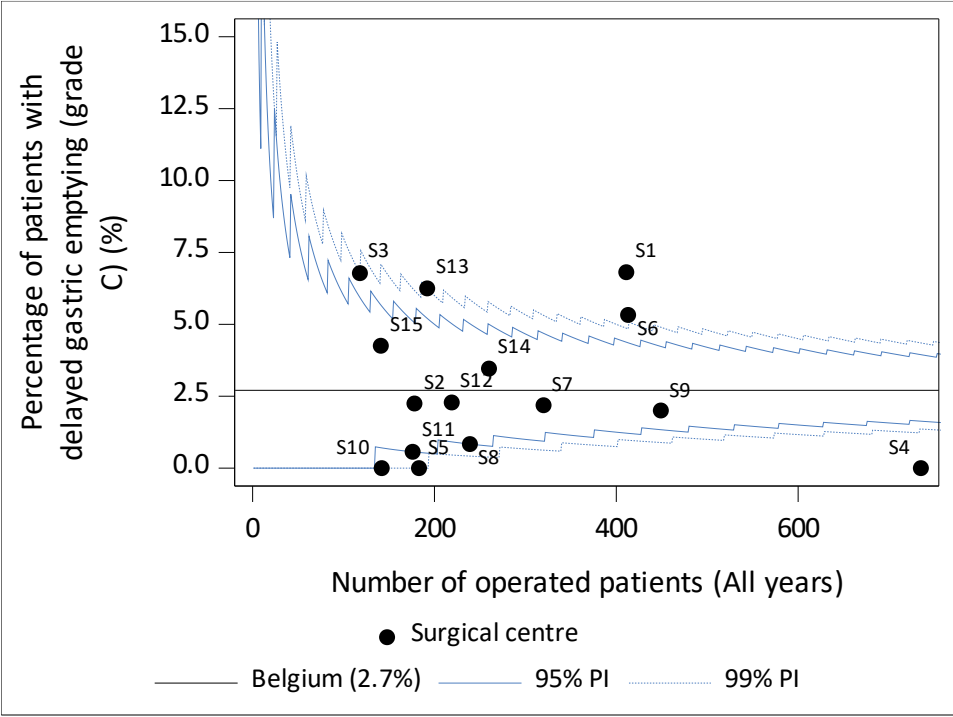


(b)

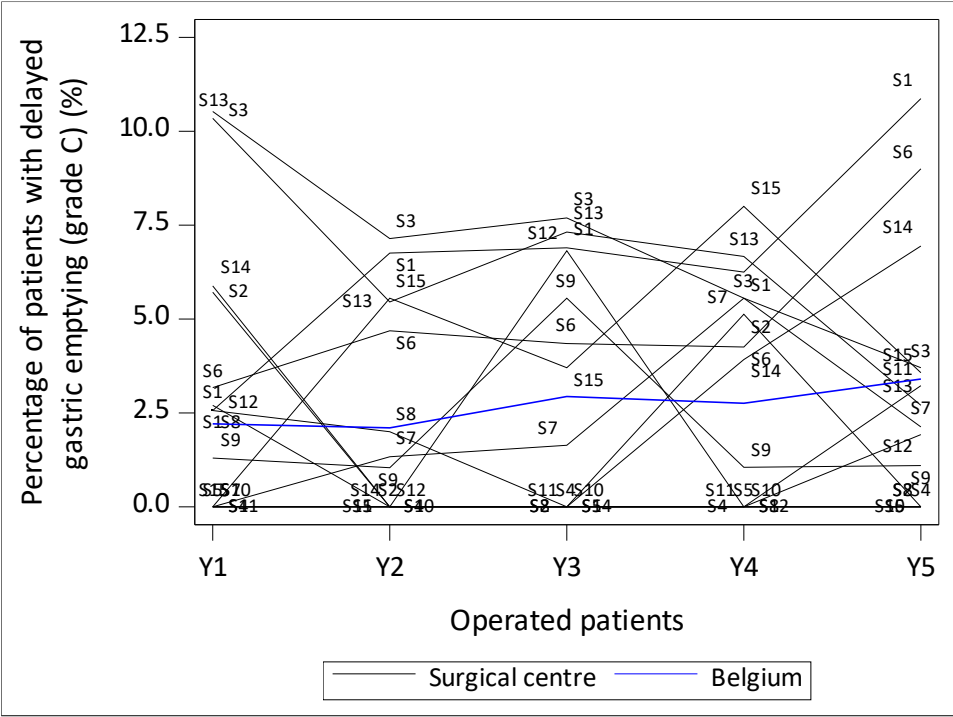


**Figure 35:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours with delayed gastric emptying (grade C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

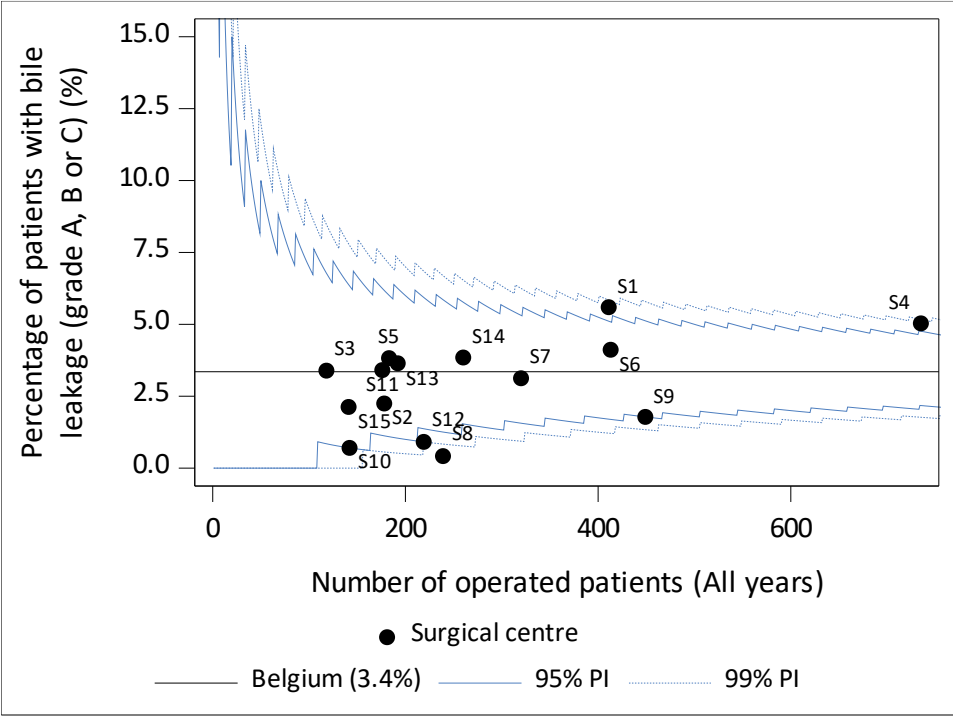


(b)

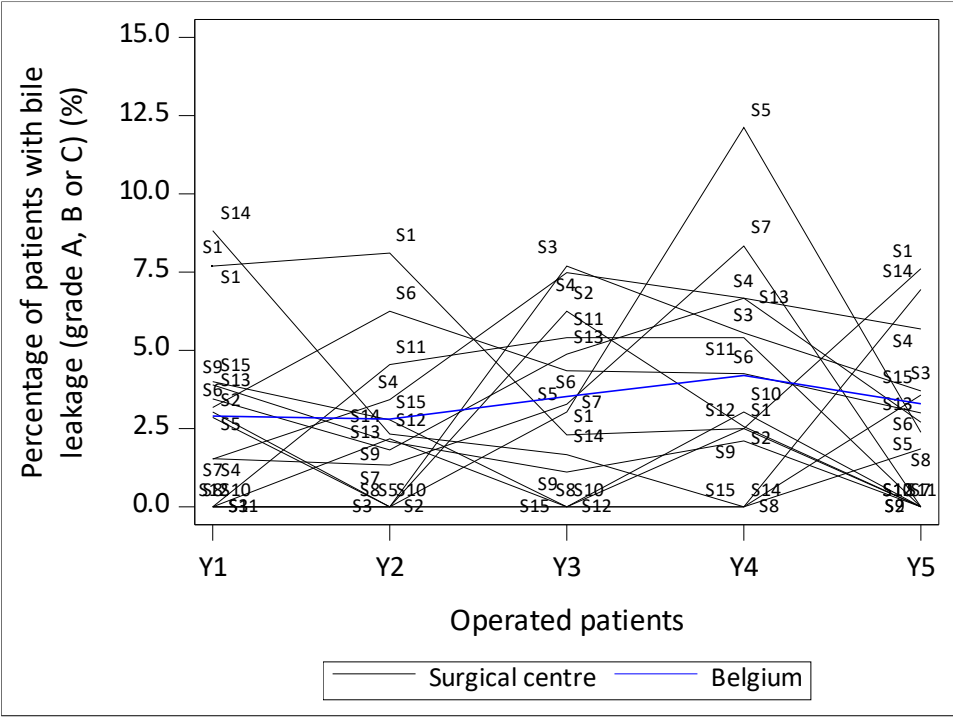


**Figure 36:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours** with **bile leakage (grade A, B or C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

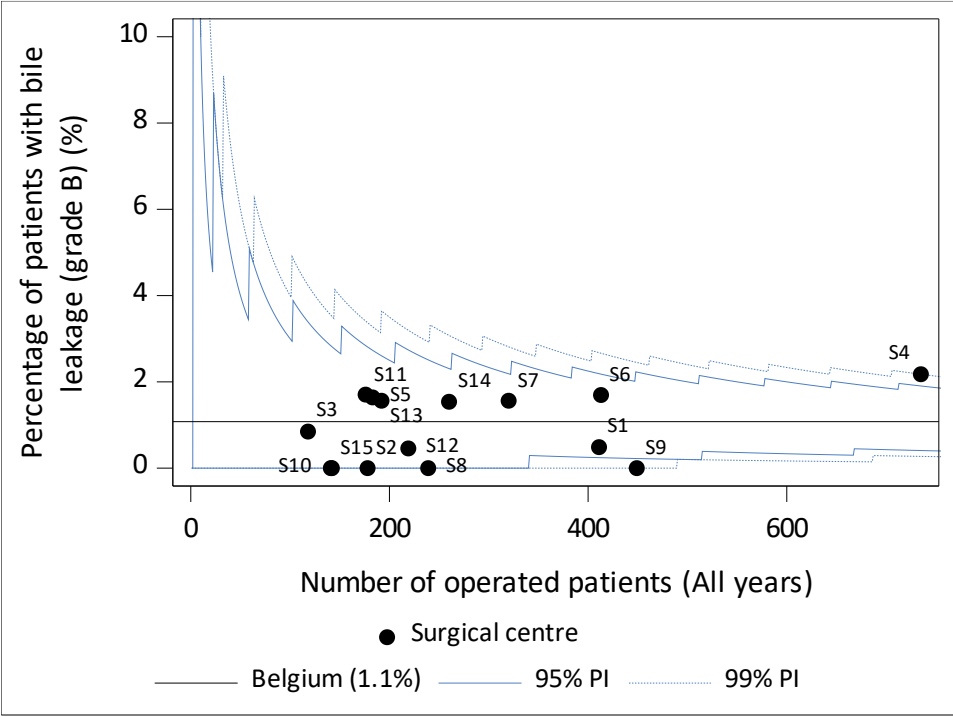


(b)

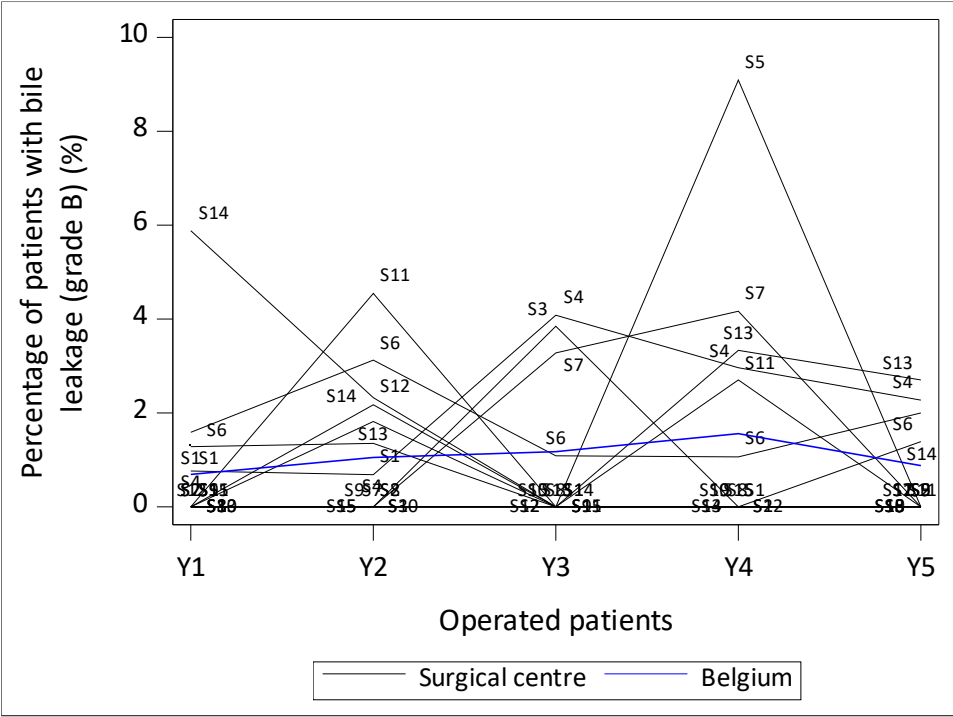


**Figure 37:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours** with **bile leakage (grade B, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

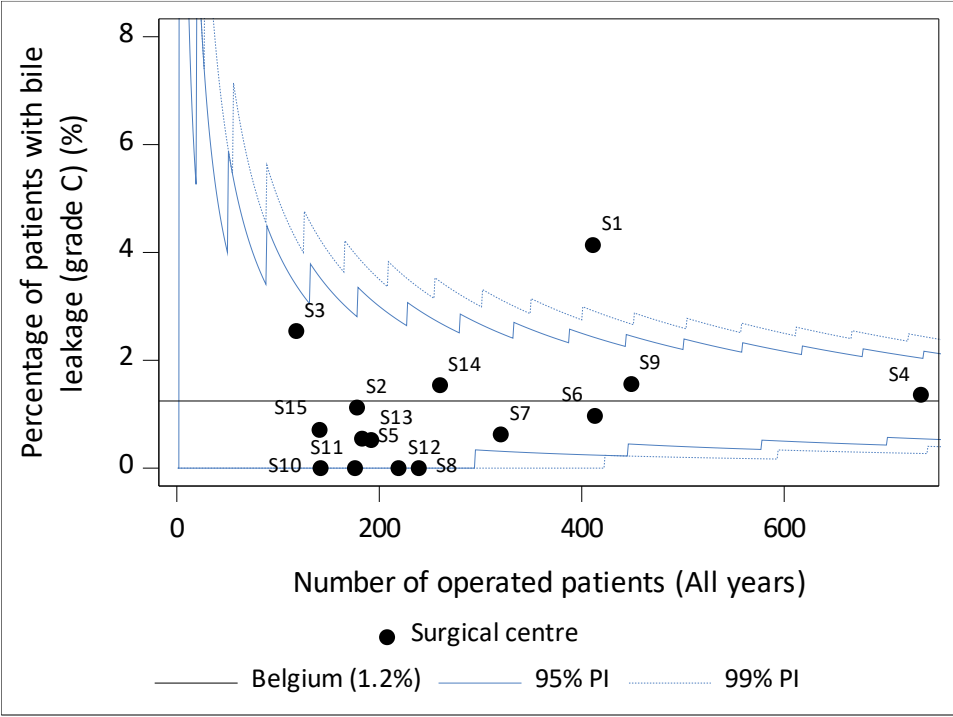


(b)

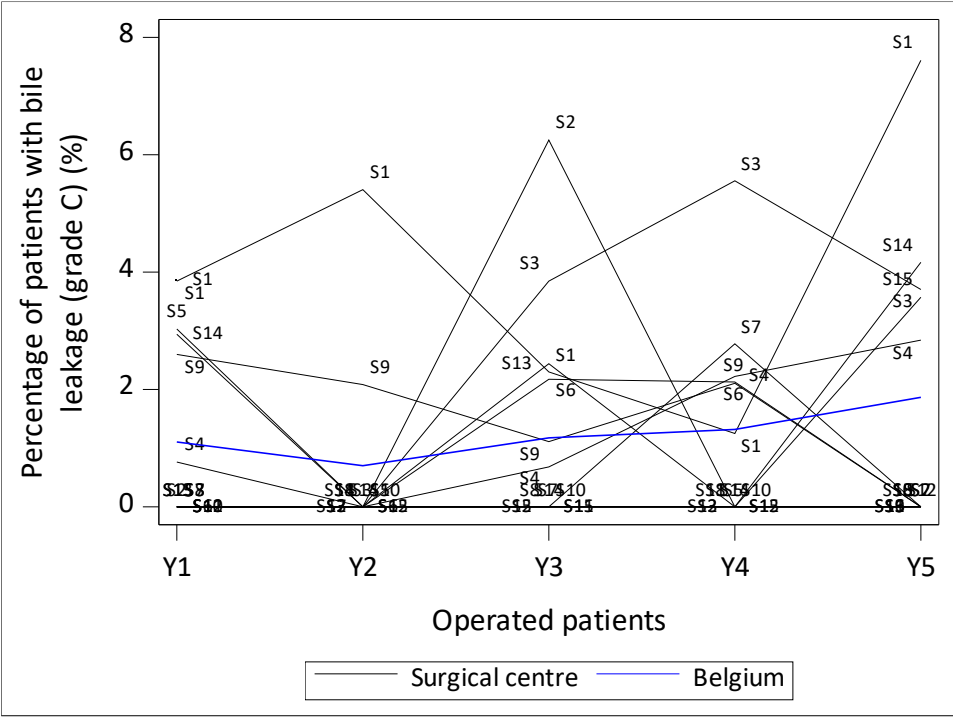


**Figure 38:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours** with **bile leakage (grade C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

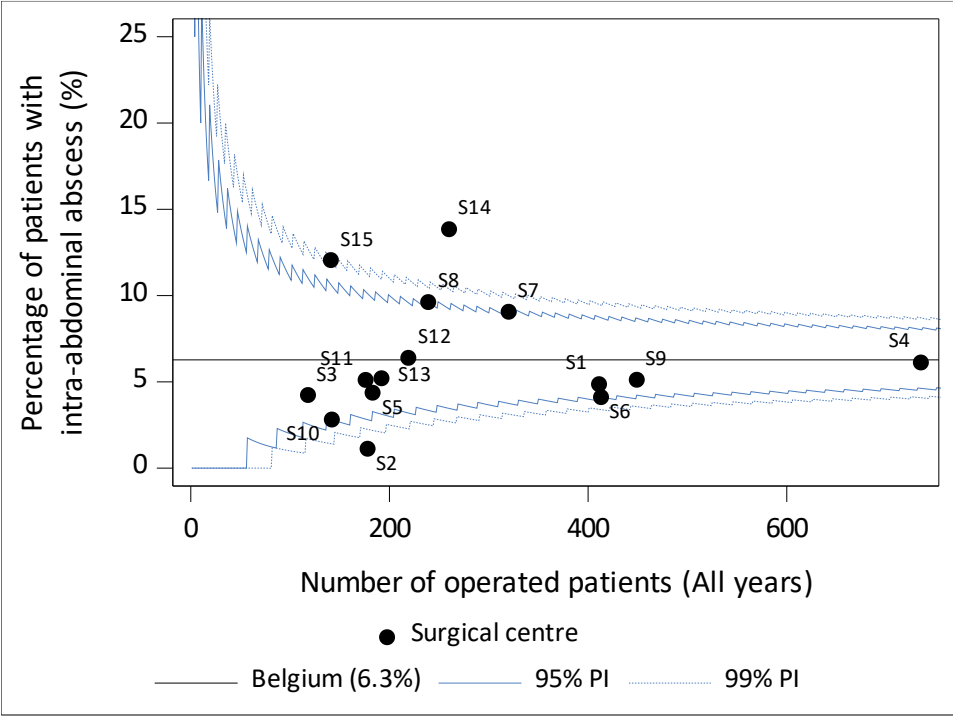


(b)

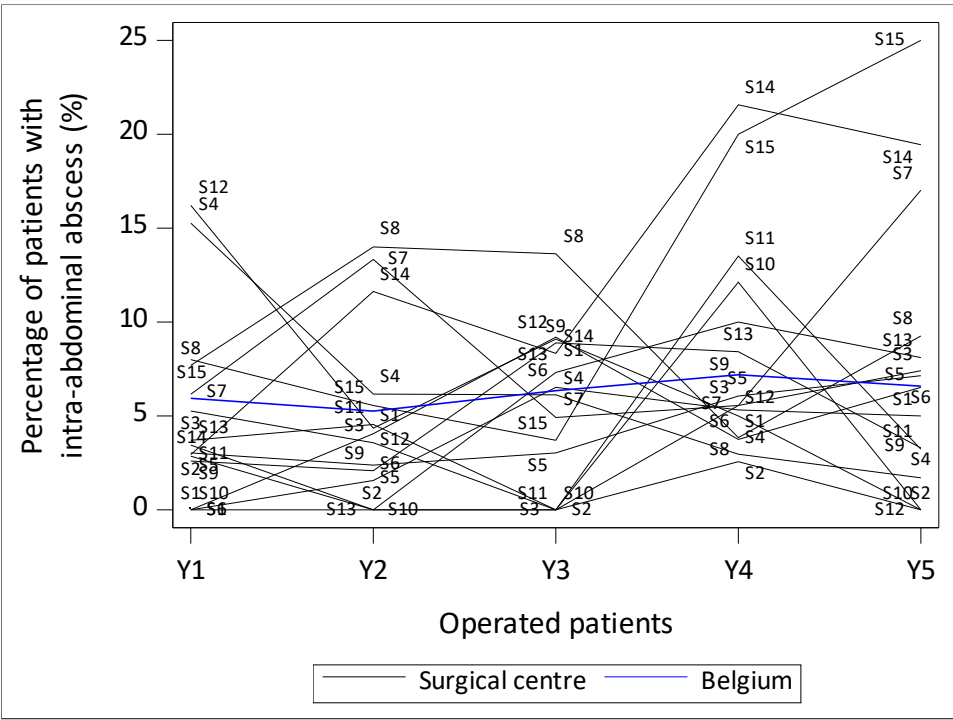


**Figure 39:** Funnel and spaghetti plot of operated patients with **malignant and benign tumours** with **intra-abdominal abscess (within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)



(b)





### 3.3.4.1. Proportion of operated patients with severe surgical complications (Clavien-Dindo grade IIIb-V, 90-day postoperative, in-hospital)

**Table 28.** Proportion of operated patients with **malignant and benign tumours** in the five convention years with severe surgical complications, by patient and tumour characteristics.

Characteristic	Severe surgical complications (Clavien-Dindo IIIb-V)			
	Belgium			
	N	n	n/N (%)	95% CI
<b>Operated patients with a malignant/benign tumour</b>	<b>4,176</b>	<b>609</b>	<b>14.6</b>	<b>[13.5, 15.7]</b>
<b>Expert centres</b>				.
S1	411	63	15.3	[12.0, 19.2]
S2	178	21	11.8	[7.5, 17.5]
S3	118	11	9.3	[4.7, 16.1]
S4	735	141	19.2	[16.4, 22.2]
S5	183	32	17.5	[12.3, 23.8]
S6	413	84	20.3	[16.6, 24.5]
S7	320	31	9.7	[6.7, 13.5]
S8	239	24	10.0	[6.5, 14.6]
S9	449	68	15.1	[12.0, 18.8]
S10	142	5	3.5	[1.2, 8.0]
S11	176	23	13.1	[8.5, 19.0]
S12	219	28	12.8	[8.7, 17.9]
S13	192	21	10.9	[6.9, 16.2]
S14	260	39	15.0	[10.9, 19.9]
S15	141	18	12.8	[7.7, 19.4]
<b>Convention year</b>				
Year 1	724	98	13.5	[11.1, 16.2]
Year 2	856	114	13.3	[11.1, 15.8]
Year 3	851	125	14.7	[12.4, 17.2]
Year 4	834	112	13.4	[11.2, 15.9]
Year 5	911	160	17.6	[15.1, 20.2]
<b>Sex</b>				
Male	2,249	366	16.3	[14.8, 17.9]
Female	1,927	243	12.6	[11.2, 14.2]
<b>Age at surgery</b>				
<=69	2,346	317	13.5	[12.2, 15.0]
70-79	1,448	230	15.9	[14.0, 17.9]
>=80	382	62	16.2	[12.7, 20.3]
<b>Lesion to treat (in (peri-)pancreas)</b>				
Primary tumour	4,064	589	14.5	[13.4, 15.6]
Relapse of primary tumour	54	9	16.7	[7.9, 29.3]
Metastasis	58	11	19.0	[9.9, 31.4]

Characteristic	Severe surgical complications (Clavien-Dindo IIIb-V)			
	Belgium			
	N	n	n/N (%)	95% CI
<b>Morphology</b>				
Adenocarcinoma	2,706	407	15.0	[13.7, 16.4]
Neuroendocrine tumour	535	74	13.8	[11.0, 17.1]
Benign tumour	603	81	13.4	[10.8, 16.4]
Other or unspecified	332	47	14.2	[10.6, 18.4]
<b>Primary tumour localisation</b>				
C17.0 Duodenum	180	34	18.9	[13.5, 25.4]
C24.0 Extrahepatic bile duct	214	40	18.7	[13.7, 24.6]
C24.1 (Peri-) ampullary region	345	64	18.6	[14.6, 23.1]
C25.0 Head of pancreas	1,573	249	15.8	[14.1, 17.7]
C25.1 Body of pancreas	373	47	12.6	[9.4, 16.4]
C25.2 Tail of pancreas	542	58	10.7	[8.2, 13.6]
C25.3 Pancreatic duct	18	1	5.6	[0.1, 27.3]
C25.4 Islands of Langerhans	34	1	2.9	[0.1, 15.3]
C25.7-9 Other specified parts of pancreas	182	19	10.4	[6.4, 15.8]
Other	112	15	13.4	[7.7, 21.1]
Missing or benign	603	81	13.4	[10.8, 16.4]
<b>Clinical stage</b>				
0	84	16	19.0	[11.3, 29.1]
I	1,717	249	14.5	[12.9, 16.3]
II	985	152	15.4	[13.2, 17.8]
III	380	55	14.5	[11.1, 18.4]
IV	96	14	14.6	[8.2, 23.3]
X	204	26	12.7	[8.5, 18.1]
TNM not applicable or relapse*	710	97	13.7	[11.2, 16.4]
<b>Resection margin <sup>##</sup></b>				
R0	2,584	377	14.6	[13.3, 16.0]
R1	965	148	15.3	[13.1, 17.8]
R2	13	3	23.1	[5.0, 53.8]
Missing	11	0	0.0	[0.0, 28.5]
<b>Prior surgery or other treatment <sup>**</sup></b>				
Prior abdominal surgery	605	89	14.7	[12.0, 17.8]
Other treatment modality (that could affect the pancreas)	558	100	17.9	[14.8, 21.4]
<b>Neoadjuvant treatment</b>				
Chemoradiotherapy	88	14	15.9	[9.0, 25.2]
Chemotherapy	586	71	12.1	[9.6, 15.0]
Radiotherapy	4	0	0.0	[0.0, 60.2]
No chemo or radiation treatment	3,498	524	15.0	[13.8, 16.2]
<b>Charlson Comorbidity Index</b>				
0	1,729	242	14.0	[12.4, 15.7]
1	1,005	139	13.8	[11.8, 16.1]

Severe surgical complications (Clavien-Dindo IIIb-V)				
Characteristic	N	Belgium		
		n	n/N (%)	95% CI
2	669	95	14.2	[11.6, 17.1]
3	343	60	17.5	[13.6, 21.9]
4	205	32	15.6	[10.9, 21.3]
5	86	22	25.6	[16.8, 36.1]
6	61	8	13.1	[5.8, 24.2]
7	37	5	13.5	[4.5, 28.8]
8	23	2	8.7	[1.1, 28.0]
9	10	2	20.0	[2.5, 55.6]
10	5	1	20.0	[0.5, 71.6]
11	1	0	0.0	[0.0, 97.5]
12	2	1	50.0	[1.3, 98.7]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	1,245	178	14.3	[12.4, 16.4]
1 - Symptomatic, but ambulant	2,488	349	14.0	[12.7, 15.5]
2 - Symptomatic, bedbound < 50% day	380	68	17.9	[14.2, 22.1]
3 - Symptomatic, bedbound > 50% day	61	13	21.3	[11.9, 33.7]
4 - Completely dependent, 100% bedbound	2	1	50.0	[1.3, 98.7]
<b>ASA score</b>				
1 - Healthy person	269	31	11.5	[8.0, 16.0]
2 - Mild systemic disease, normal activity	2,189	279	12.7	[11.4, 14.2]
3 - Serious systemic disease, limited activity	1,670	289	17.3	[15.5, 19.2]
4 - Life-threatening illness, handicapped	48	10	20.8	[10.5, 35.0]
<b>Resectability status **</b>				
Before neoadjuvant treatment				
Upfront resectable	135	16	11.9	[6.9, 18.5]
Borderline resectable	326	41	12.6	[9.2, 16.7]
Unresectable	82	9	11.0	[5.1, 19.8]
No neoadjuvant treatment	2,118	329	15.5	[14.0, 17.1]
Before surgery				
Upfront resectable	2,280	337	14.8	[13.3, 16.3]
Borderline resectable	352	56	15.9	[12.2, 20.2]
Unresectable	22	2	9.1	[1.1, 29.2]
Missing	7	0	0.0	[0.0, 41.0]
<b>Type of surgery</b>				
Minimally invasive surgery (MIS) – Laparoscopic	1,161	148	12.7	[10.9, 14.8]
Minimally invasive surgery (MIS) - Hybrid	5	2	40.0	[5.3, 85.3]
Minimally invasive surgery (MIS) - Robotic	488	77	15.8	[12.7, 19.3]
Open	2,331	342	14.7	[13.3, 16.2]
Conversion from MIS to open surgery	191	40	20.9	[15.4, 27.4]
<b>Simultaneous venous resection</b>				
No	3,660	521	14.2	[13.1, 15.4]

Severe surgical complications (Clavien-Dindo IIIb-V)				
Characteristic	N	Belgium		
		n	n/N (%)	95% CI
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection	516	88	17.1	[13.9, 20.6]
- With primary wedge-reconstruction	165	20	12.1	[7.6, 18.1]
- With primary end-to-end reconstruction	215	36	16.7	[12.0, 22.4]
- With vascular autograft interposition	12	2	16.7	[2.1, 48.4]
- With vascular allograft interposition	61	20	32.8	[21.3, 46.0]
- With synthetic/prosthetic interposition	10	2	20.0	[2.5, 55.6]
- With peritoneal patch wedge-reconstruction	43	7	16.3	[6.8, 30.7]
- Without reconstruction	10	1	10.0	[0.3, 44.5]
<b>Simultaneous arterial resection **</b>				
No	4,106	600	14.6	[13.5, 15.7]
Hepatic artery resection	28	2	7.1	[0.9, 23.5]
- With primary end-to-end reconstruction	17	2	11.8	[1.5, 36.4]
- With vascular allograft interposition	1	0	0.0	[0.0, 97.5]
- Without reconstruction	10	0	0.0	[0.0, 30.8]
Coeliac trunk resection	32	5	15.6	[5.3, 32.8]
- With primary end-to-end reconstruction	2	0	0.0	[0.0, 84.2]
- Without reconstruction	30	5	16.7	[5.6, 34.7]
Superior mesenteric artery (SMA) resection	9	2	22.2	[2.8, 60.0]
- With primary wedge-reconstruction	1	0	0.0	[0.0, 97.5]
- With primary end-to-end reconstruction	3	1	33.3	[0.8, 90.6]
- With vascular autograft interposition	2	1	50.0	[1.3, 98.7]
- Without reconstruction	3	0	0.0	[0.0, 70.8]
<b>Simultaneous other organ resection **</b>				
No	2,541	398	15.7	[14.3, 17.1]
Colon	107	28	26.2	[18.1, 35.6]
Stomach	596	90	15.1	[12.3, 18.2]
Adrenal gland	88	8	9.1	[4.0, 17.1]
Spleen	932	100	10.7	[8.8, 12.9]
Other	262	34	13.0	[9.2, 17.7]
<b>RIZIV code for complex surgery</b>				
242830-242841: Pancreaticoduodenectomy	2,762	460	16.7	[15.3, 18.1]
Pancreaticoduodenectomy	2,499	409	16.4	[14.9, 17.9]
Total Pancreatectomy	263	51	19.4	[14.8, 24.7]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	400	43	10.8	[7.9, 14.2]
242874-242885: Hemipancreatectomy left	950	100	10.5	[8.6, 12.7]
242896-242900: Enucleation of a pancreatic tumour	64	6	9.4	[3.5, 19.3]
<b>Antithrombotic medication</b>				
No	2,945	401	13.6	[12.4, 14.9]
Yes	1,231	208	16.9	[14.8, 19.1]

Severe surgical complications (Clavien-Dindo IIIb-V)				
Belgium				
Characteristic	N	n	n/N (%)	95% CI
<b><i>Was the patient referred?</i></b>				
No	1,886	274	14.5	[13.0, 16.2]
Yes	2,290	335	14.6	[13.2, 16.1]

\* Tumour staging not possible.

\*\* Patients could have received a combination of treatments listed,  
thus the total number of treatments could be larger than the total number of patients.

†† Results for this variable are only for malignant tumours and resectability status results are only available  
from the second half of Y2 onwards.

‡‡ Results for this variable are only for malignant tumours

## 4. Non-tumoural pathology

### 4.1. Descriptives

#### 4.1.1. Patient case mix description

**Table 29.** Case mix description of all patients with **non-tumoural pathology** discussed on a MC expert (with and without surgery).

Belgium (N=1,443)										
Characteristic	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
<b>Patients discussed on a MC expert</b>	<b>221</b>		<b>251</b>		<b>321</b>		<b>315</b>		<b>335</b>	
<b>Surgery status</b>										
Patients with surgery	63	28.5	72	28.7	69	21.5	85	27.0	100	29.9
Patients without surgery	158	71.5	179	71.3	252	78.5	230	73.0	235	70.1
<b>Expert centres</b>										
S1	10	4.5	15	6.0	19	5.9	18	5.7	15	4.5
S2	24	10.9	25	10.0	42	13.1	49	15.6	51	15.2
S3	13	5.9	25	10.0	20	6.2	17	5.4	17	5.1
S4	10	4.5	26	10.4	39	12.1	42	13.3	39	11.6
S5	4	1.8	4	1.6	1	0.3	1	0.3	3	0.9
S6	13	5.9	9	3.6	10	3.1	7	2.2	2	0.6
S7	7	3.2	10	4.0	14	4.4	25	7.9	25	7.5
S8	14	6.3	24	9.6	40	12.5	30	9.5	35	10.4
S9	42	19.0	25	10.0	43	13.4	24	7.6	48	14.3
S10	35	15.8	22	8.8	19	5.9	22	7.0	35	10.4
S11	9	4.1	4	1.6	1	0.3	4	1.3	0	0.0
S12	8	3.6	19	7.6	28	8.7	18	5.7	23	6.9
S13	10	4.5	18	7.2	16	5.0	28	8.9	12	3.6
S14	17	7.7	24	9.6	28	8.7	29	9.2	25	7.5
S15	5	2.3	1	0.4	1	0.3	1	0.3	5	1.5
<b>Sex</b>										
Male	150	67.9	167	66.5	198	61.7	196	62.2	207	61.8
Female	71	32.1	84	33.5	123	38.3	119	37.8	128	38.2
<b>Age at MC</b>										
<=69	165	74.7	183	72.9	221	68.8	214	67.9	250	74.6
70-79	38	17.2	51	20.3	71	22.1	76	24.1	60	17.9
>=80	16	7.2	14	5.6	26	8.1	21	6.7	25	7.5
Missing	2	0.9	3	1.2	3	0.9	4	1.3	0	0.0
<b>Indication</b>										
Pancreatitis	109	49.3	149	59.4	156	48.6	157	49.8	154	46.0

Belgium (N=1,443)										
Characteristic	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
Other	112	50.7	102	40.6	165	51.4	158	50.2	181	54.0
<b><i>Was the patient referred?</i></b>										
No	151	68.3	172	68.5	219	68.2	224	71.1	210	62.7
Yes	70	31.7	78	31.1	102	31.8	91	28.9	125	37.3
Missing	0	0.0	1	0.4	0	0.0	0	0.0	0	0.0

**Table 30.** Case mix description of all patients with **non-tumoural pathology** discussed on a MC expert who underwent surgical treatment.

						Belgium (N=389)					
		Year 1		Year 2		Year 3		Year 4		Year 5	
Characteristic		N	%	N	%	N	%	N	%	N	%
<i>Patients with surgery</i>		<b>63</b>		<b>72</b>		<b>69</b>		<b>85</b>		<b>100</b>	
<i>Expert centres</i>											
S1		7	11.1	9	12.5	11	15.9	10	11.8	11	11.0
S2		1	1.6	3	4.2	1	1.4	2	2.4	2	2.0
S3		2	3.2	0	0.0	1	1.4	2	2.4	2	2.0
S4		4	6.3	8	11.1	14	20.3	19	22.4	16	16.0
S5		4	6.3	4	5.6	1	1.4	1	1.2	2	2.0
S6		2	3.2	5	6.9	3	4.3	6	7.1	1	1.0
S7		5	7.9	5	6.9	3	4.3	7	8.2	7	7.0
S8		6	9.5	6	8.3	3	4.3	6	7.1	4	4.0
S9		10	15.9	10	13.9	17	24.6	16	18.8	24	24.0
S10		3	4.8	3	4.2	3	4.3	3	3.5	11	11.0
S11		3	4.8	1	1.4	0	0.0	3	3.5	0	0.0
S12		7	11.1	6	8.3	7	10.1	5	5.9	12	12.0
S13		1	1.6	3	4.2	0	0.0	1	1.2	1	1.0
S14		5	7.9	8	11.1	4	5.8	3	3.5	3	3.0
S15		3	4.8	1	1.4	1	1.4	1	1.2	4	4.0
<i>Sex</i>											
Male		42	66.7	50	69.4	47	68.1	57	67.1	71	71.0
Female		21	33.3	22	30.6	22	31.9	28	32.9	29	29.0
<i>Age at surgery</i>											



Belgium (N=389)										
Characteristic	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
<=69	56	88.9	63	87.5	62	89.9	76	89.4	82	82.0
70-79	7	11.1	9	12.5	6	8.7	6	7.1	14	14.0
>=80	0	0.0	0	0.0	1	1.4	3	3.5	4	4.0
<b>Indication</b>										
Pancreatitis	36	57.1	51	70.8	44	63.8	56	65.9	63	63.0
Other	27	42.9	21	29.2	25	36.2	29	34.1	37	37.0
<b>Prior surgery or other treatment **</b>										
Prior abdominal surgery	10	15.9	15	20.8	19	27.5	15	17.6	21	21.0
Other treatment modality (that could affect the pancreas)	11	17.5	18	25.0	14	20.3	16	18.8	19	19.0
<b>Charlson Comorbidity Index</b>										
0	22	34.9	30	41.7	31	44.9	40	47.1	39	39.0
1	18	28.6	17	23.6	13	18.8	19	22.4	30	30.0
2	13	20.6	9	12.5	8	11.6	14	16.5	18	18.0
3	4	6.3	8	11.1	9	13.0	7	8.2	8	8.0
4	3	4.8	5	6.9	4	5.8	4	4.7	2	2.0
5	0	0.0	1	1.4	2	2.9	0	0.0	3	3.0
6	3	4.8	1	1.4	0	0.0	0	0.0	0	0.0
8	0	0.0	0	0.0	0	0.0	1	1.2	0	0.0
9	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0
10	0	0.0	0	0.0	1	1.4	0	0.0	0	0.0
11	0	0.0	1	1.4	0	0.0	0	0.0	0	0.0
<b>WHO score at surgery</b>										
0 - Asymptomatic, normal activity	11	17.5	15	20.8	21	30.4	17	20.0	38	38.0
1 - Symptomatic, but ambulant	39	61.9	49	68.1	38	55.1	61	71.8	51	51.0
2 - Symptomatic, bedbound < 50% day	9	14.3	7	9.7	8	11.6	5	5.9	8	8.0
3 - Symptomatic, bedbound > 50% day	3	4.8	1	1.4	1	1.4	1	1.2	1	1.0



Belgium (N=389)										
Characteristic	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
242830-242841: Pancreaticoduodenectomy	37	58.7	40	55.6	38	55.1	46	54.1	55	55.0
Pancreaticoduodenectomy	34	91.9	35	87.5	35	92.1	40	87.0	48	87.3
Total Pancreatectomy	3	8.1	5	12.5	3	7.9	6	13.0	7	12.7
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	5	7.9	13	18.1	12	17.4	17	20.0	20	20.0
242874-242885: Hemipancreatectomy left	21	33.3	19	26.4	18	26.1	21	24.7	22	22.0
242896-242900: Enucleation of a pancreatic tumour	0	0.0	0	0.0	1	1.4	1	1.2	3	3.0
<b>Antithrombotic medication</b>										
No	50	79.4	57	79.2	53	76.8	63	74.1	78	78.0
Yes	13	20.6	15	20.8	16	23.2	22	25.9	22	22.0
<b>Was the patient referred?</b>										
No	39	61.9	41	56.9	43	62.3	56	65.9	63	63.0
Yes	24	38.1	31	43.1	26	37.7	29	34.1	37	37.0

\*\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients.

#### 4.1.2. Completeness of registration

The indicator 'completeness of registration forms' indicates for how many patients a fully completed dataset was received (including all requested complex surgery variables and textual reports).

Minimum target value:  $\geq 95\%$  for the fifth convention year.

**Table 31.** Completeness of registration forms: number of registrations in complex surgery database that were complete in the fifth convention year, by expert centre.

Patient group	Belgium		
	N registered	n complete	n/N (%)
<i>Patients discussed on a MC expert in Year 5</i>	335	335	100.0
<i>Surgery status</i>			
Patients with surgery	100	100	100.0
Patients without surgery	235	235	100.0
<i>Expert centres</i>			
S1	15	15	100.0
S2	51	51	100.0
S3	17	17	100.0
S4	39	39	100.0
S5	3	3	100.0
S6	2	2	100.0
S7	25	25	100.0
S8	35	35	100.0
S9	48	48	100.0
S10	35	35	100.0
S11	0	0	0.0
S12	23	23	100.0
S13	12	12	100.0
S14	25	25	100.0
S15	5	5	100.0

## 4.2. Process indicators

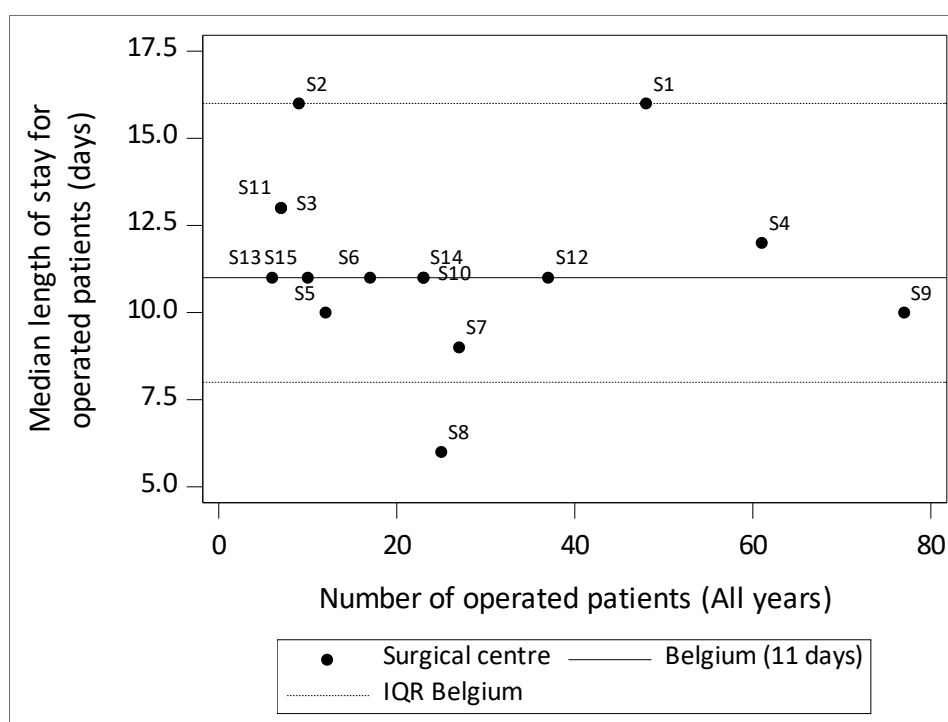
### 4.2.1. Length of stay in the expert centre

**Table 32.** Length of stay in an expert centre for operated patients in the five convention years.

Characteristic	N	Belgium	
		Median (days)	IQR*
<b><i>Operated patients with non-tumoural pathology<sup>1</sup></i></b>	389	11	[8, 16]
<b><i>Convention year</i></b>			
Year 1	63	12	[9, 15]
Year 2	72	12	[7, 16]
Year 3	69	10	[7, 14]
Year 4	85	10	[8, 15]
Year 5	100	12	[8, 16]

<sup>1</sup> length of stay longer than 90 days was truncated at 90 days.  
 \* Interquartile Range= [the 25th, and 75th percentiles of the data]

**Figure 40:** Median length of stay for operated patients, per centre, for all years combined.



### **4.3. Outcome indicators**

#### **4.3.1. Postoperative mortality**

##### *4.3.1.1. Unadjusted 30-day postoperative mortality*

There were only 4 postoperative deaths observed for all hospitals combined (N=1 for Y1, N=1 for Y2, N=0 for Y3, N=1 for Y4 and N=1 for Y5), therefore no results are given.

##### *4.3.1.2. Unadjusted 90-day postoperative mortality*

There were only 9 postoperative deaths observed for all hospitals combined (N=3 for Y1, N=2 for Y2, N=0 for Y3, N=2 for Y4 and N=2 for Y5), therefore no results are given.

#### **4.3.2. Survival**

##### *4.3.2.1. Unadjusted 1-year observed survival after surgery (all causes of death)*

There were only 23 all-cause deaths observed within the first year after surgery for all hospitals combined (N=6 for Y1, N=2 for Y2, N=5 for Y3, N=3 for Y4 and N=3 for Y5), therefore no results are given.

##### *4.3.2.2. Unadjusted 1-year relative survival after surgery*

There were only 23 all-cause deaths observed within the first year after surgery for all hospitals combined (N=6 for Y1, N=2 for Y2 and N=5 for Y3, N=3 for Y4 and N=3 for Y5), therefore no results are given.

### 4.3.3. Proportion of operated patients with surgical complications

Note that in-hospital is defined as the days the patient was hospitalised between the date of surgery and 90 days post-surgery.

**Table 33.** Proportion of operated patients with surgical complications in the five convention years (90-day postoperative, in-hospital), by complication type.

Postoperative complications (90-day in-hospital)				
Belgium				
Complication type	N	n	n/N (%)	95% CI
<b>Severe postoperative complications (CD IIIb-V)</b>	389	50	12.9	[9.7, 16.6]
Year 1	63	9	14.3	[6.7, 25.4]
Year 2	72	7	9.7	[4.0, 19.0]
Year 3	69	7	10.1	[4.2, 19.8]
Year 4	85	13	15.3	[8.4, 24.7]
Year 5	100	14	14.0	[7.9, 22.4]
<b>Clinically relevant pancreatic fistula (Grade B or C) <sup>1*</sup></b>	389	65	16.7	[13.1, 20.8]
Grade B	389	58	14.9	[11.5, 18.8]
Year 1	63	4	6.3	[1.8, 15.5]
Year 2	72	11	15.3	[7.9, 25.7]
Year 3	69	8	11.6	[5.1, 21.6]
Year 4	85	15	17.6	[10.2, 27.4]
Year 5	100	20	20.0	[12.7, 29.2]
Grade C	389	7	1.8	[0.7, 3.7]
Year 1	63	0	0.0	[0.0, 5.7]
Year 2	72	2	2.8	[0.3, 9.7]
Year 3	69	1	1.4	[0.0, 7.8]
Year 4	85	4	4.7	[1.3, 11.6]
Year 5	100	0	0.0	[0.0, 3.6]
<b>Haemorrhage (Grade A, B or C) <sup>2*</sup></b>	389	20	5.1	[3.2, 7.8]
Grade A	389	2	0.5	[0.1, 1.8]
Year 1	63	0	0.0	[0.0, 5.7]
Year 2	72	1	1.4	[0.0, 7.5]
Year 3	69	0	0.0	[0.0, 5.2]
Year 4	85	1	1.2	[0.0, 6.4]
Year 5	100	0	0.0	[0.0, 3.6]
Grade B	389	14	3.6	[2.0, 6.0]
Year 1	63	2	3.2	[0.4, 11.0]
Year 2	72	3	4.2	[0.9, 11.7]
Year 3	69	1	1.4	[0.0, 7.8]
Year 4	85	2	2.4	[0.3, 8.2]

Postoperative complications (90-day in-hospital)				
Belgium				
Complication type	N	n	n/N (%)	95% CI
Year 5	100	6	6.0	[2.2, 12.6]
Grade C	389	4	1.0	[0.3, 2.6]
Year 1	63	1	1.6	[0.0, 8.5]
Year 2	72	0	0.0	[0.0, 5.0]
Year 3	69	0	0.0	[0.0, 5.2]
Year 4	85	2	2.4	[0.3, 8.2]
Year 5	100	1	1.0	[0.0, 5.4]
<b><i>Delayed gastric emptying (Grade A, B or C) <sup>3*</sup></i></b>	389	45	11.6	[8.6, 15.2]
Grade A	389	24	6.2	[4.0, 9.0]
Year 1	63	2	3.2	[0.4, 11.0]
Year 2	72	8	11.1	[4.9, 20.7]
Year 3	69	1	1.4	[0.0, 7.8]
Year 4	85	6	7.1	[2.6, 14.7]
Year 5	100	7	7.0	[2.9, 13.9]
Grade B	389	14	3.6	[2.0, 6.0]
Year 1	63	0	0.0	[0.0, 5.7]
Year 2	72	2	2.8	[0.3, 9.7]
Year 3	69	6	8.7	[3.3, 18.0]
Year 4	85	2	2.4	[0.3, 8.2]
Year 5	100	4	4.0	[1.1, 9.9]
Grade C	389	7	1.8	[0.7, 3.7]
Year 1	63	1	1.6	[0.0, 8.5]
Year 2	72	1	1.4	[0.0, 7.5]
Year 3	69	1	1.4	[0.0, 7.8]
Year 4	85	3	3.5	[0.7, 10.0]
Year 5	100	1	1.0	[0.0, 5.4]
<b><i>Bile leakage (Grade A, B or C) <sup>4*</sup></i></b>	389	6	1.5	[0.6, 3.3]
Grade A	389	2	0.5	[0.1, 1.8]
Year 1	63	0	0.0	[0.0, 5.7]
Year 2	72	0	0.0	[0.0, 5.0]
Year 3	69	0	0.0	[0.0, 5.2]
Year 4	85	2	2.4	[0.3, 8.2]
Year 5	100	0	0.0	[0.0, 3.6]
Grade B	389	2	0.5	[0.1, 1.8]
Year 1	63	0	0.0	[0.0, 5.7]
Year 2	72	1	1.4	[0.0, 7.5]
Year 3	69	0	0.0	[0.0, 5.2]
Year 4	85	0	0.0	[0.0, 4.2]
Year 5	100	1	1.0	[0.0, 5.4]
Grade C	389	2	0.5	[0.1, 1.8]



Postoperative complications (90-day in-hospital)				
Belgium				
Complication type	N	n	n/N (%)	95% CI
Year 1	63	1	1.6	[0.0, 8.5]
Year 2	72	0	0.0	[0.0, 5.0]
Year 3	69	0	0.0	[0.0, 5.2]
Year 4	85	1	1.2	[0.0, 6.4]
Year 5	100	0	0.0	[0.0, 3.6]
<b><i>Intra-abdominal abscess *</i></b>	389	29	7.5	[5.0, 10.5]
Year 1	63	3	4.8	[1.0, 13.3]
Year 2	72	6	8.3	[3.1, 17.3]
Year 3	69	6	8.7	[3.3, 18.0]
Year 4	85	9	10.6	[5.0, 19.2]
Year 5	100	5	5.0	[1.6, 11.3]
<b><i>Transferred to another hospital due to complications (CD I-IVb)</i></b>	389	1	0.3	[0.0, 1.4]
Year 1	63	0	0.0	[0.0, 5.7]
Year 2	72	0	0.0	[0.0, 5.0]
Year 3	69	1	1.4	[0.0, 7.8]
Year 4	85	0	0.0	[0.0, 4.2]
Year 5	100	0	0.0	[0.0, 3.6]

CD: Clavien-Dindo grade

<sup>1</sup> graded according to the 2016 update of the International Study Group of Pancreatic Surgery (ISGPS)

<sup>2</sup> graded according to the ISGPS definitions

<sup>3</sup> graded according to the ISGPS definitions

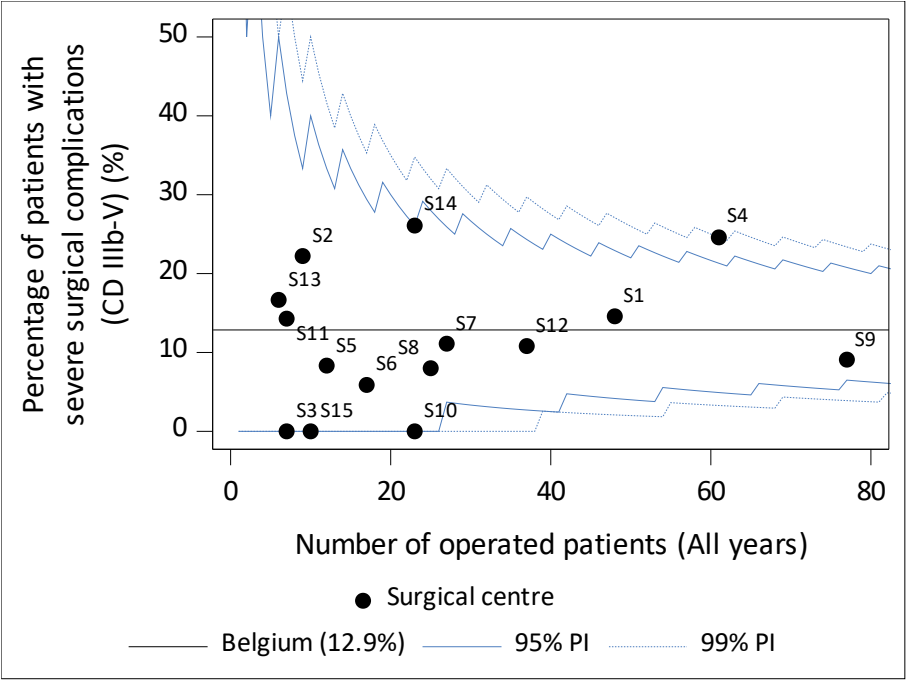
<sup>4</sup> graded according to the International Study Group of Liver Surgery (ISGLS)

More information can be found in the project manual.

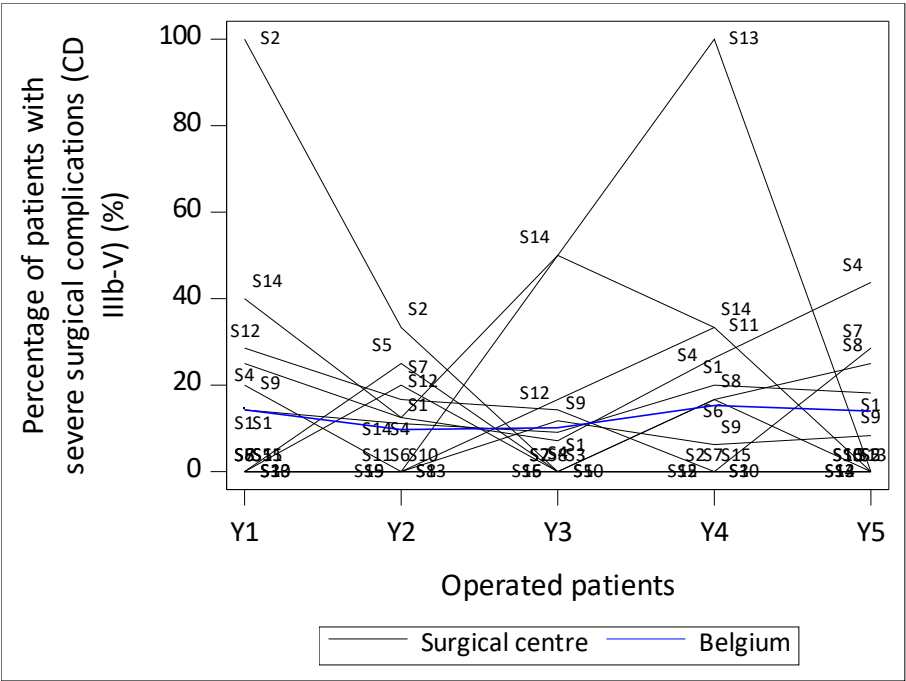
\* Patients could have a combination of complications, thus the total number of complications could be larger than the total number of patients.

**Figure 41:** Funnel and spaghetti plot of operated patients with **severe surgical complications (CD IIIb-V)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

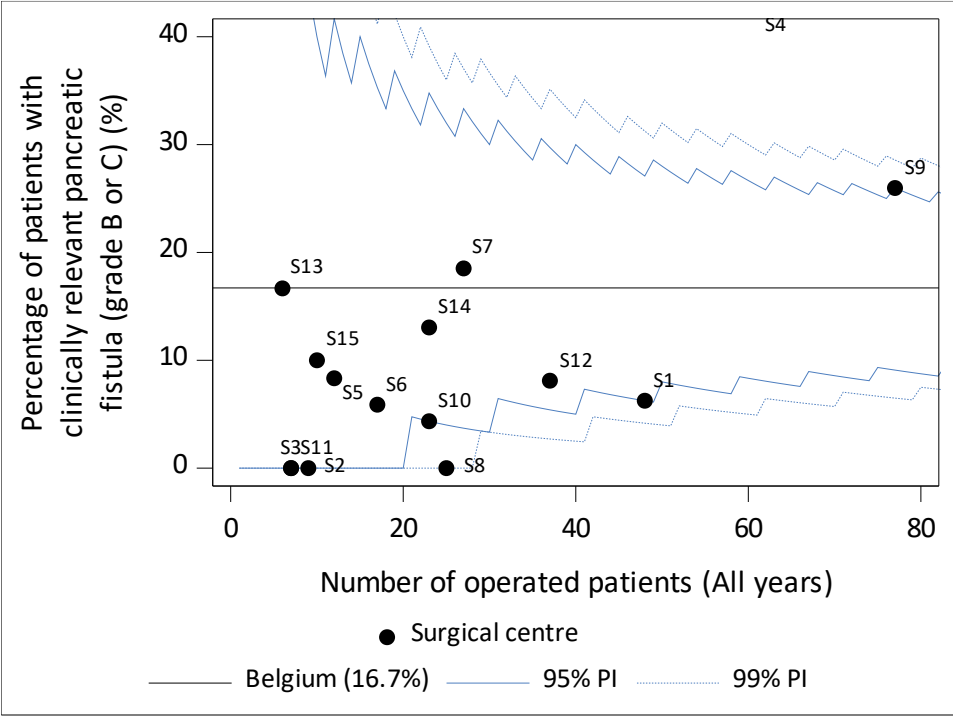


(b)

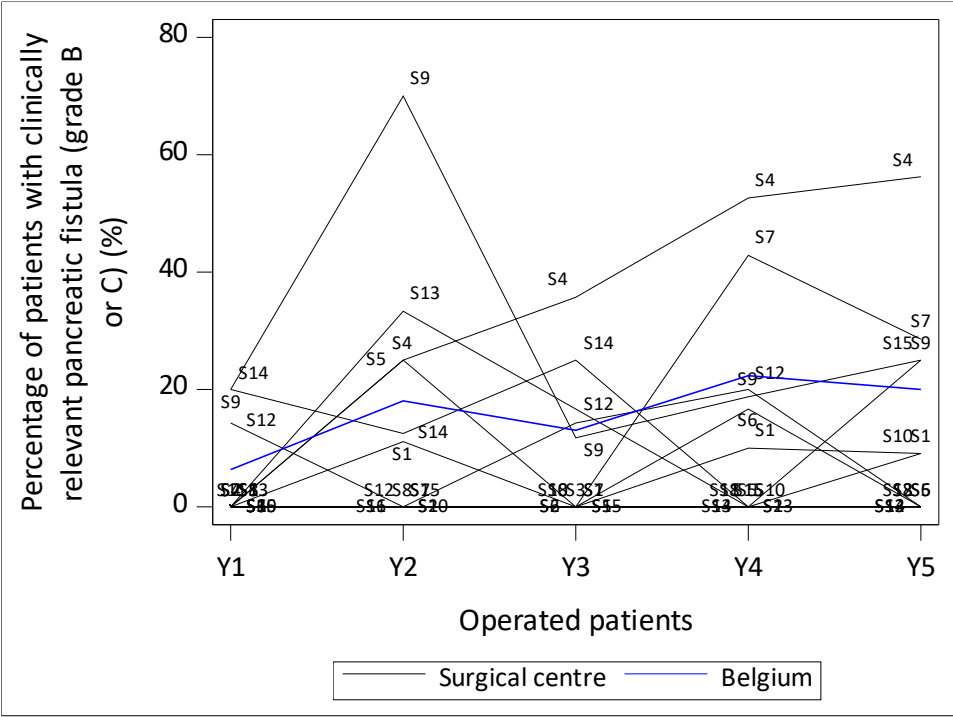


**Figure 42:** Funnel and spaghetti plot of operated patients with **clinically relevant pancreatic fistula (grade B or C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

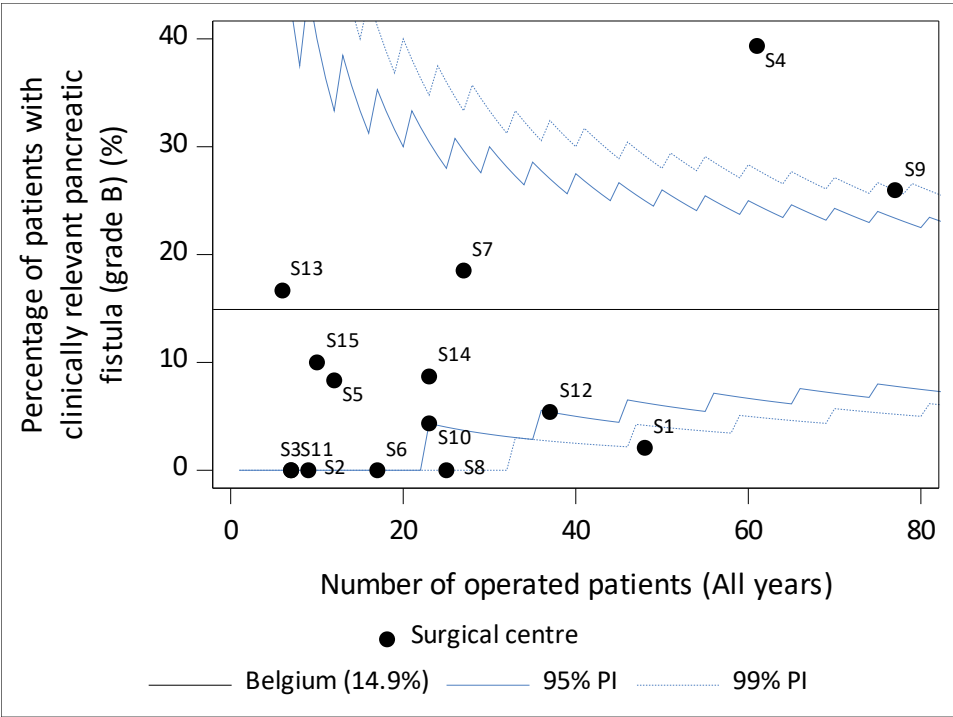


(b)

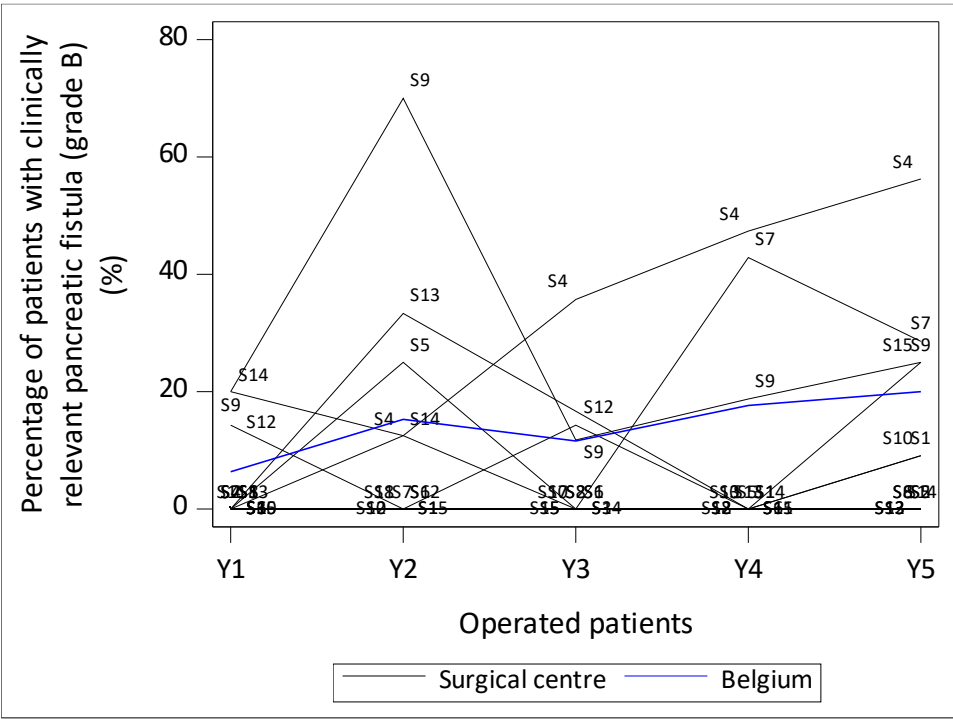


**Figure 43:** Funnel and spaghetti plot of operated patients with **clinically relevant pancreatic fistula (grade B, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

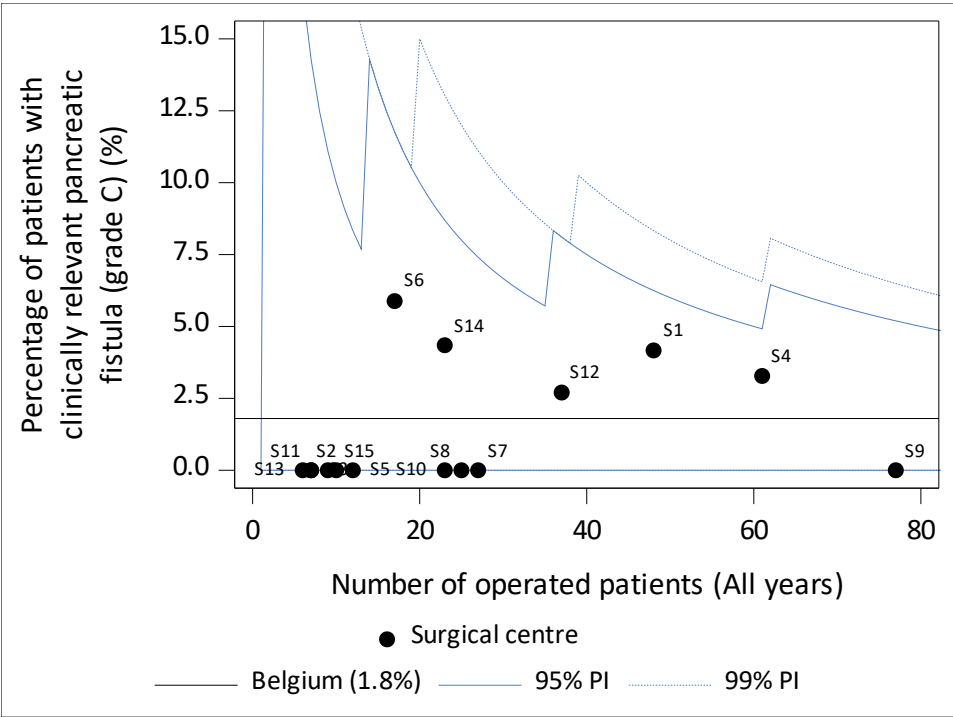


(b)

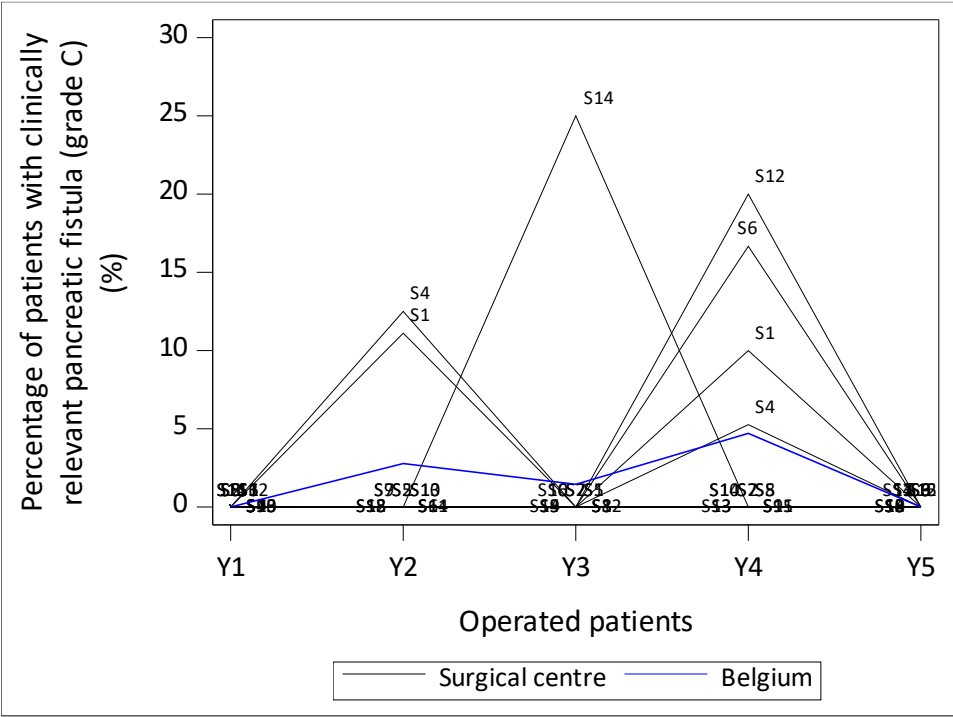


**Figure 44:** Funnel and spaghetti plot of operated patients with **clinically relevant pancreatic fistula (grade C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

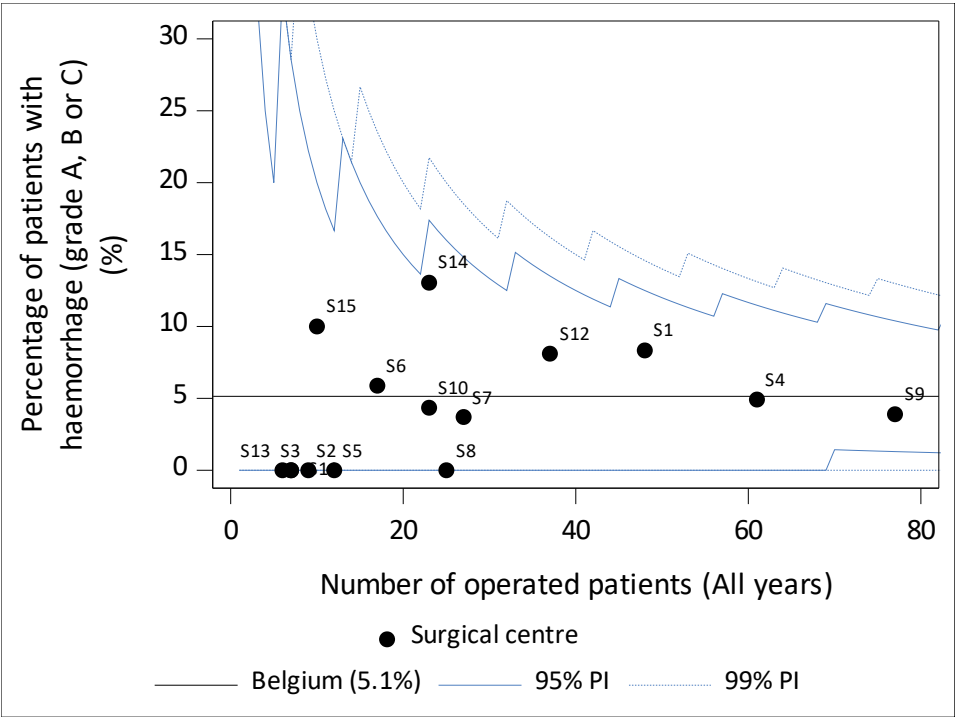


(b)

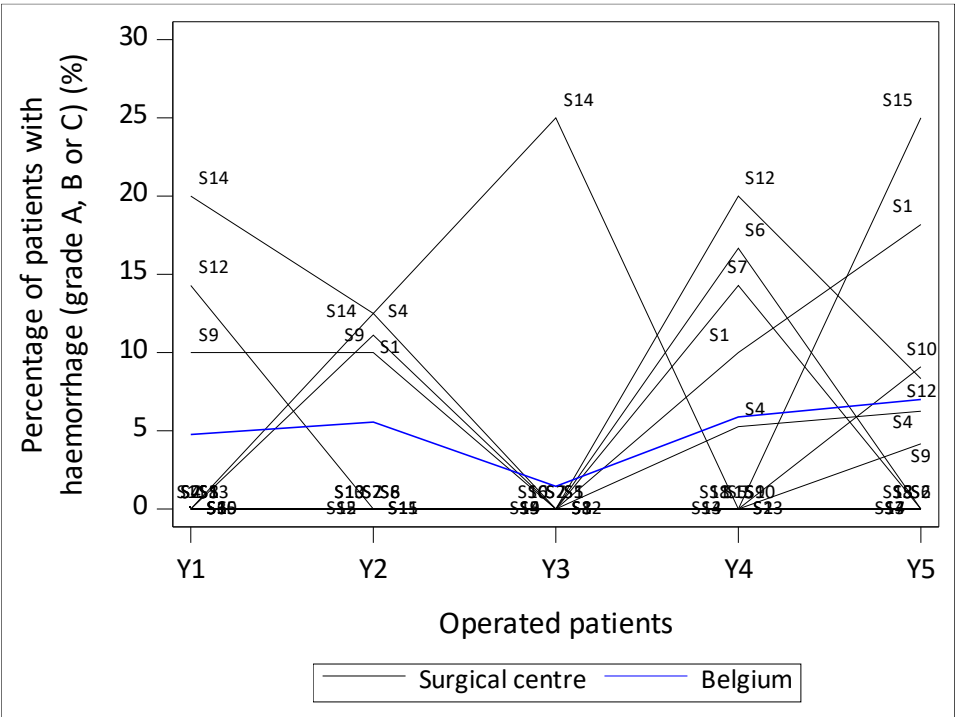


**Figure 45:** Funnel and spaghetti plot of operated patients with **haemorrhage (grade A, B or C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

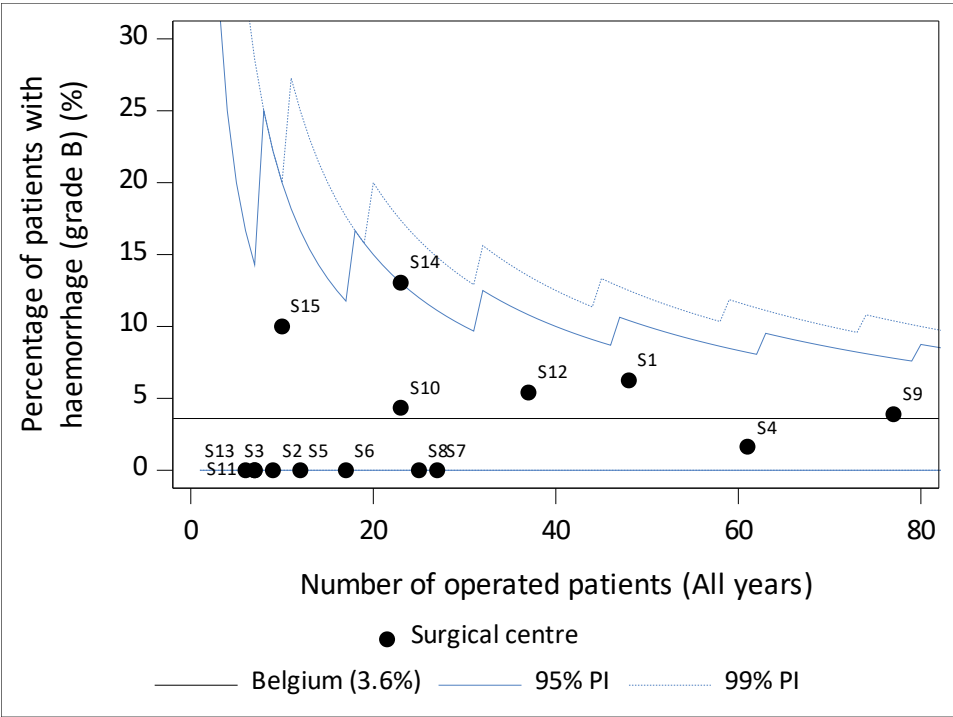


(b)

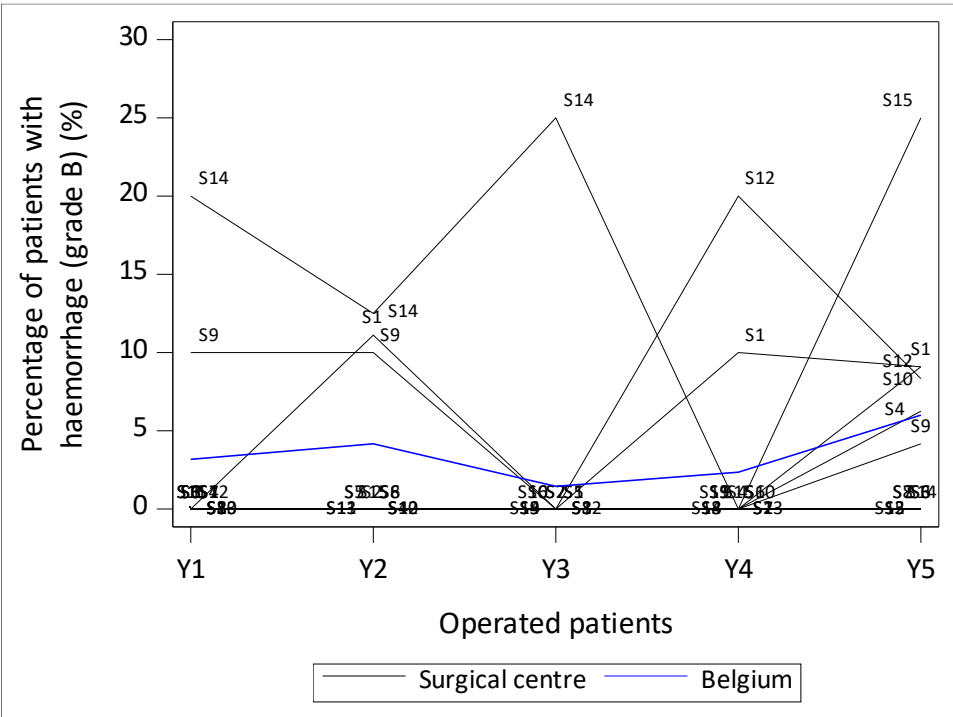


**Figure 46:** Funnel and spaghetti plot of operated patients with **haemorrhage (grade B, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

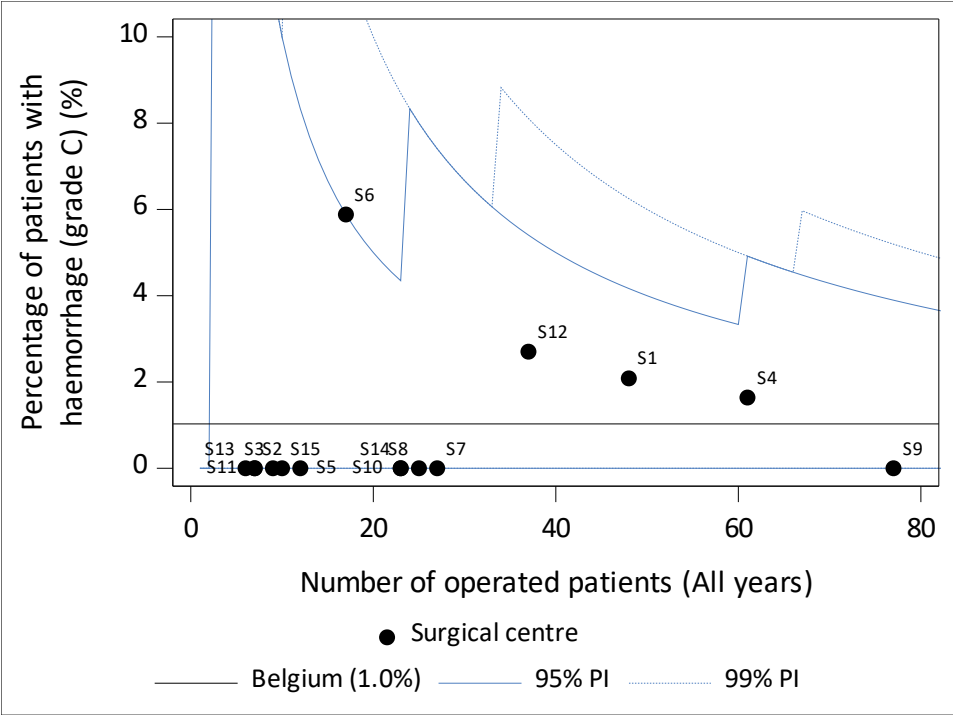


(b)

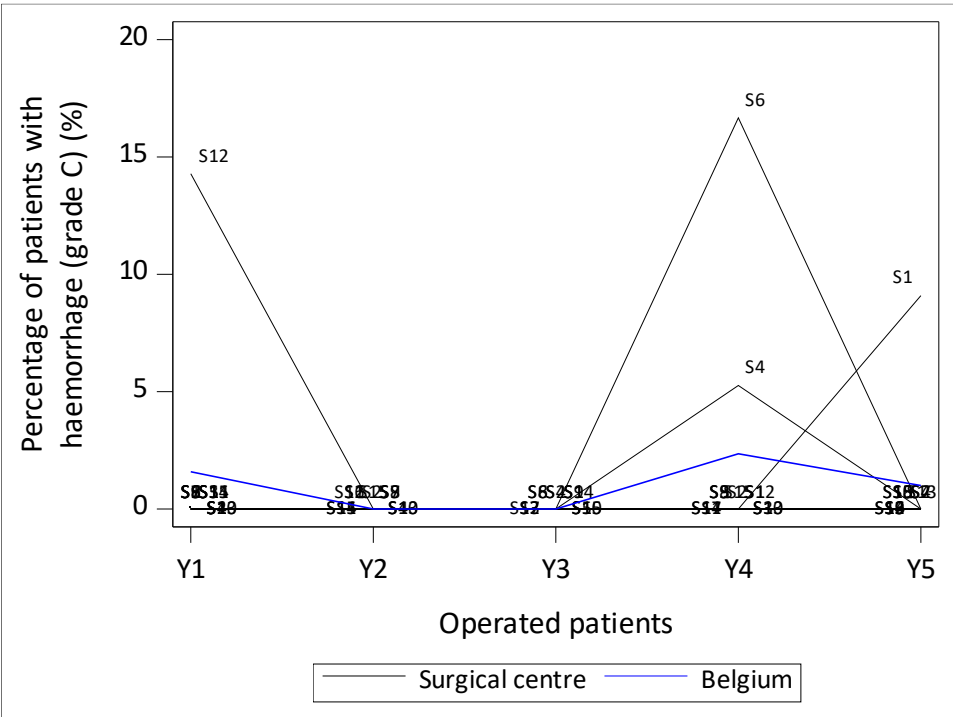


**Figure 47:** Funnel and spaghetti plot of operated patients with **haemorrhage (grade C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)



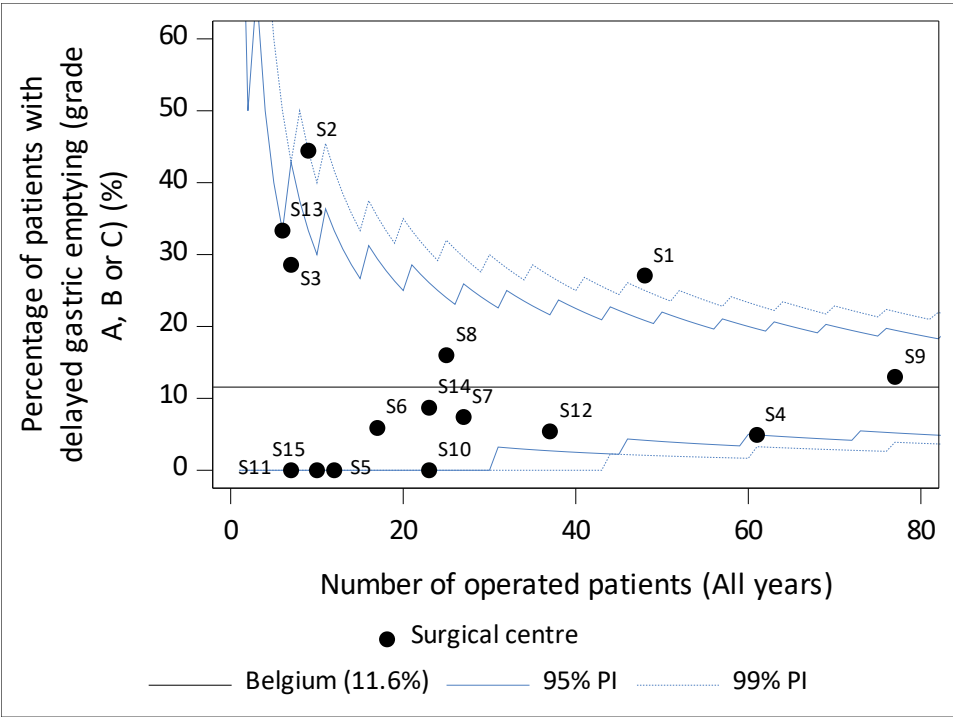
(b)



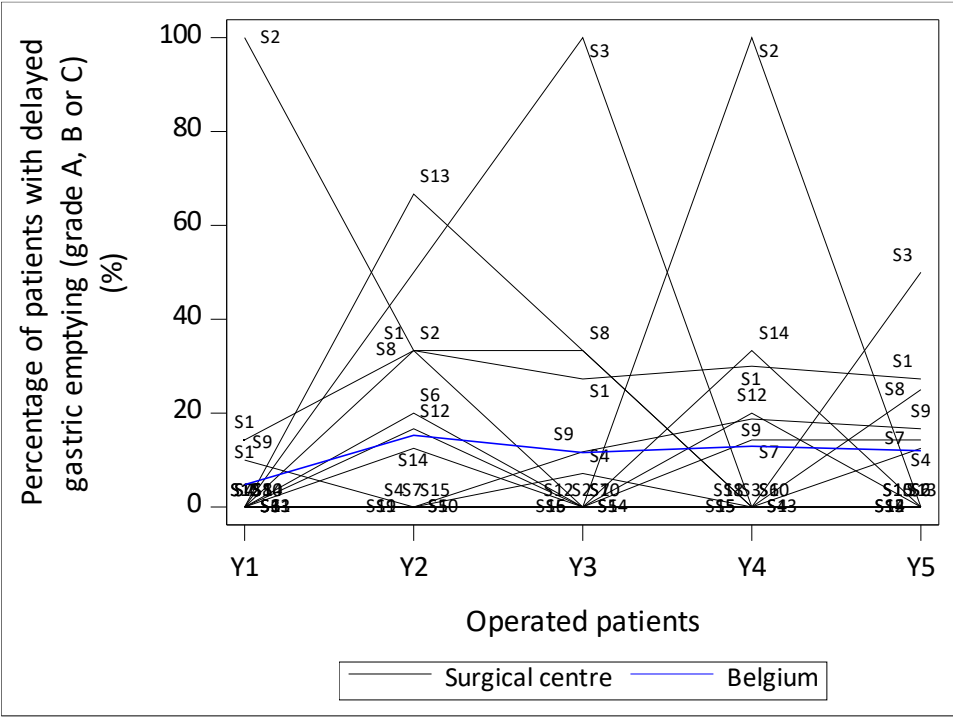


**Figure 48:** Funnel and spaghetti plot of operated patients with **delayed gastric emptying (grade A, B or C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

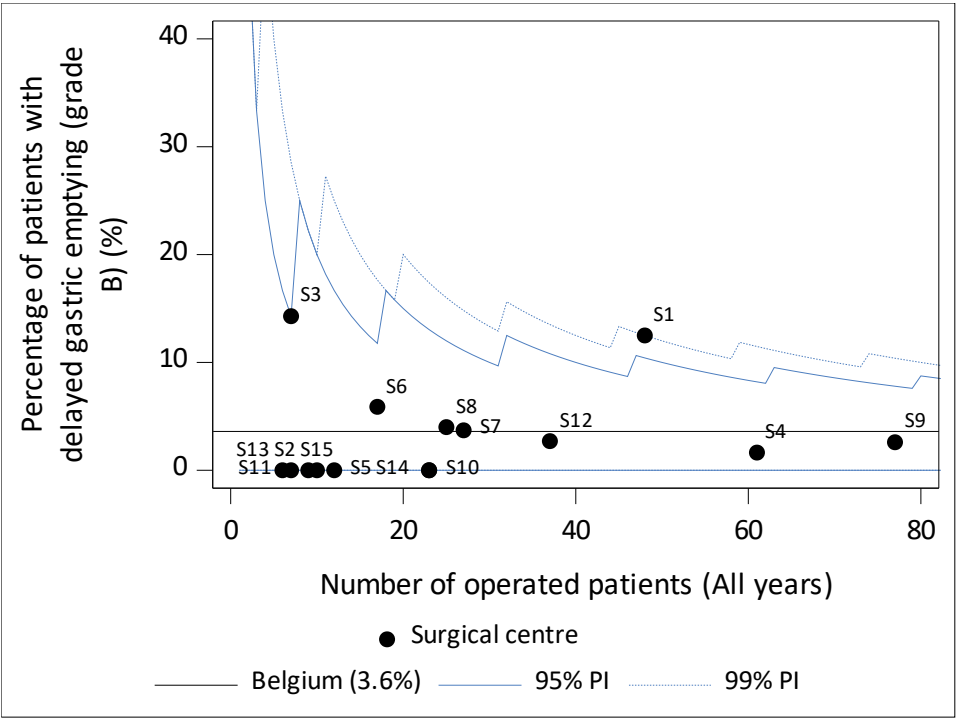


(b)

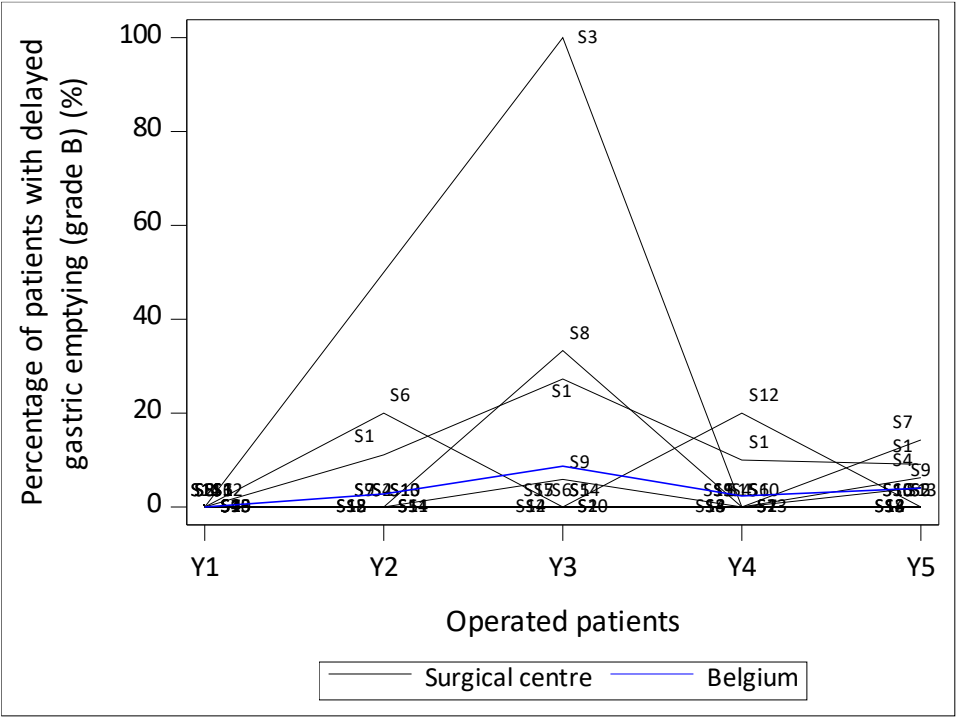


**Figure 49:** Funnel and spaghetti plot of operated patients with **delayed gastric emptying (grade B, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

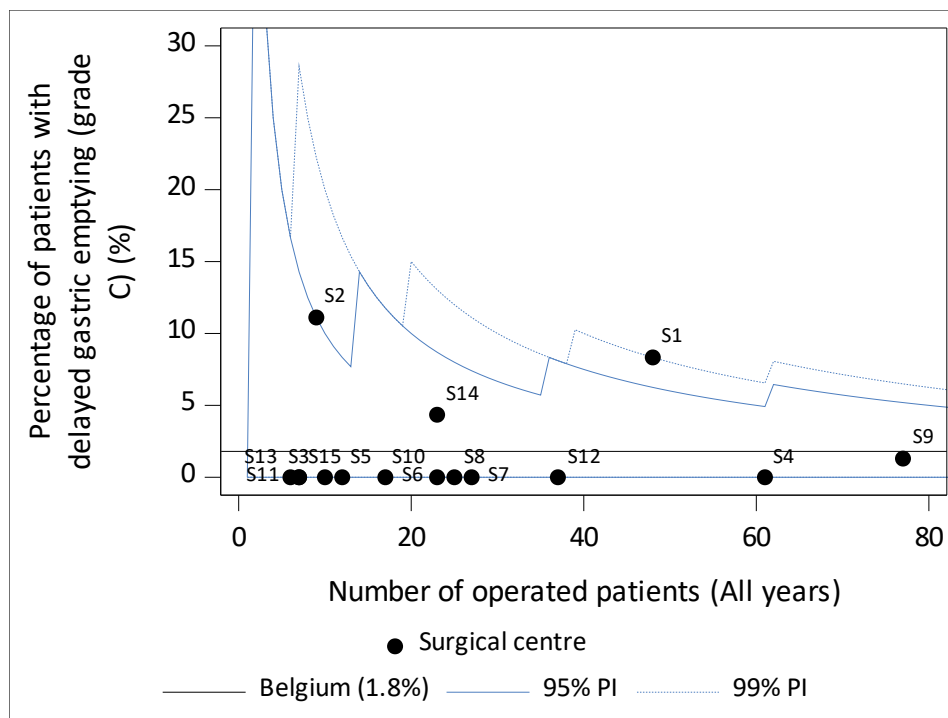


(b)

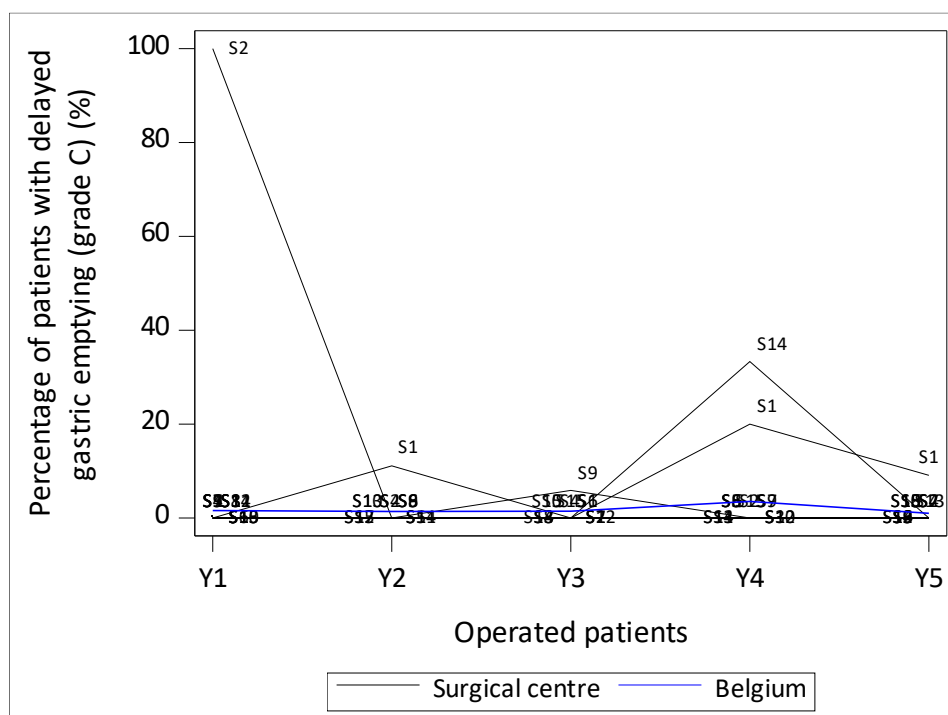


**Figure 50:** Funnel and spaghetti plot of operated patients with **delayed gastric emptying (grade C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

**(a)**

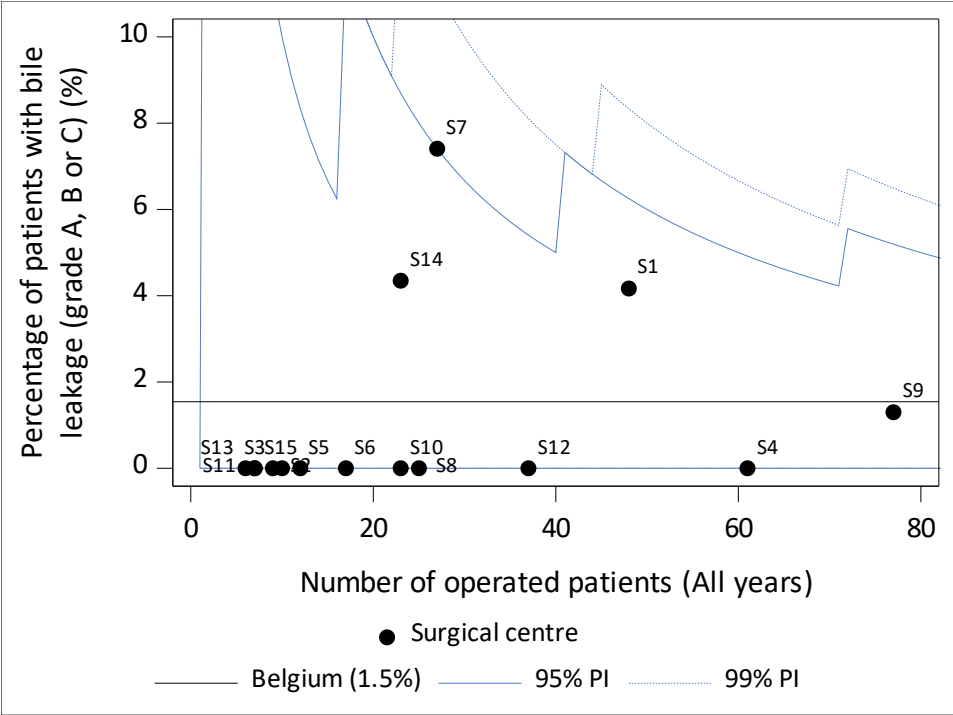


**(b)**

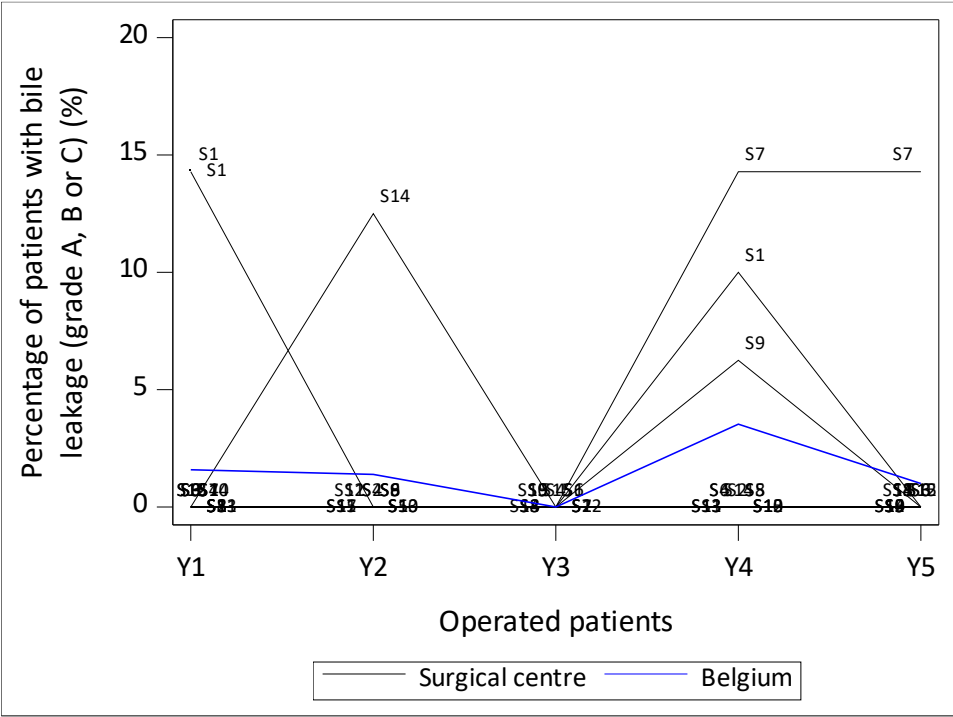


**Figure 51:** Funnel and spaghetti plot of operated patients with **bile leakage (grade A, B or C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

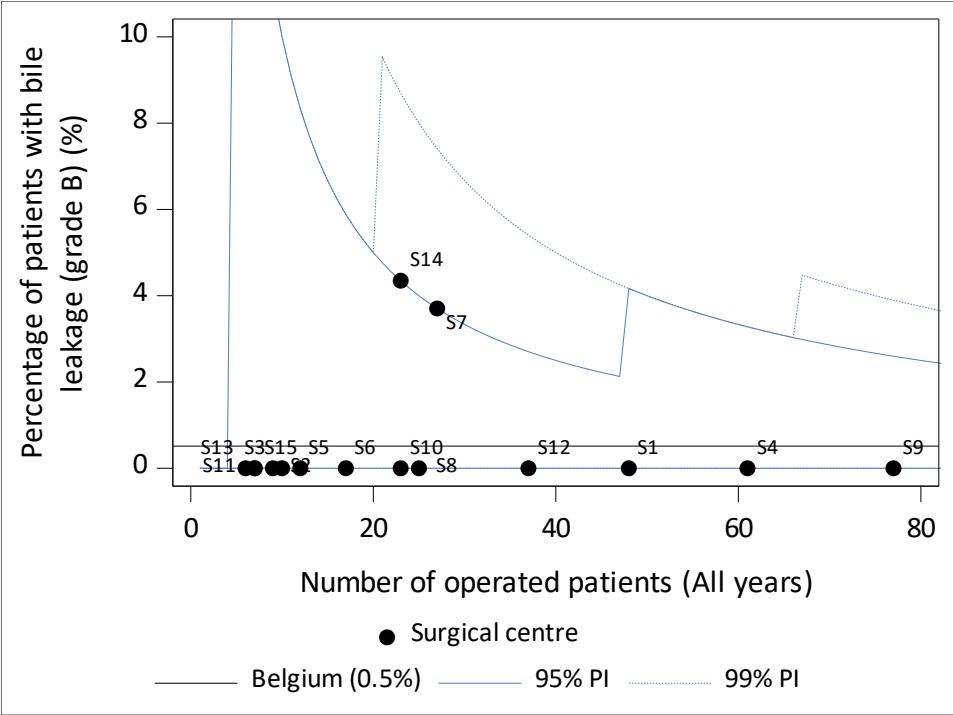


(b)

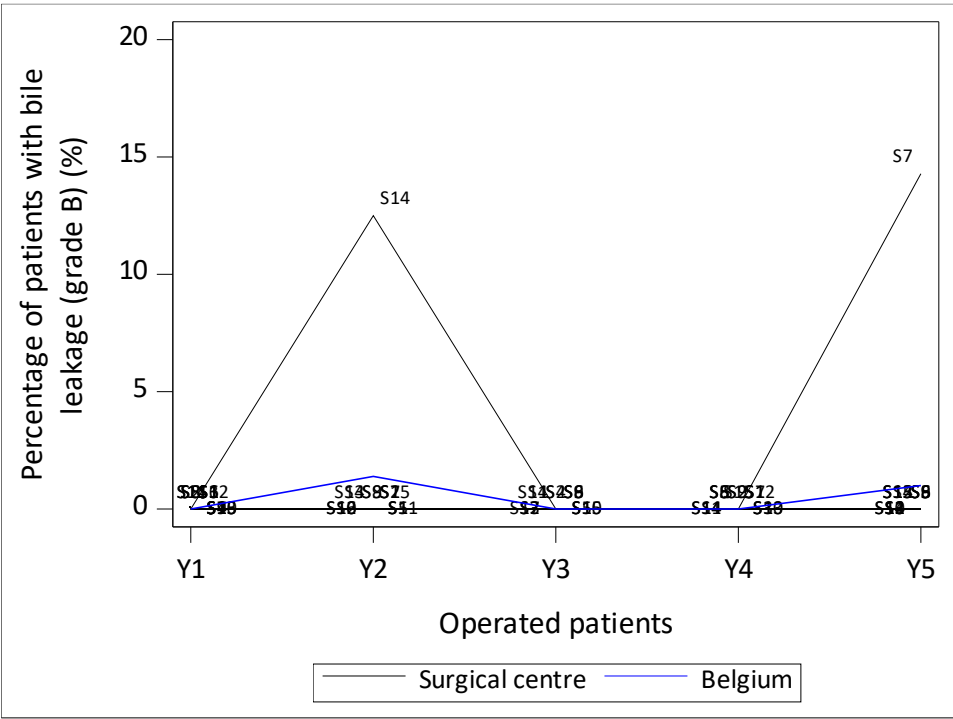


**Figure 52:** Funnel and spaghetti plot of operated patients with **bile leakage (grade B, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

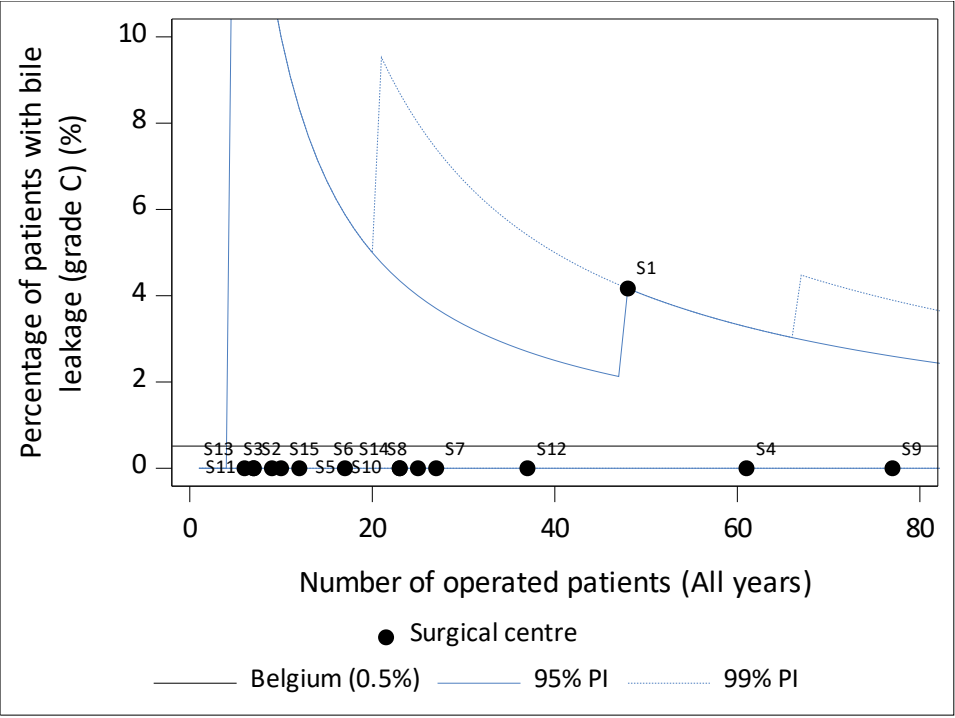


(b)

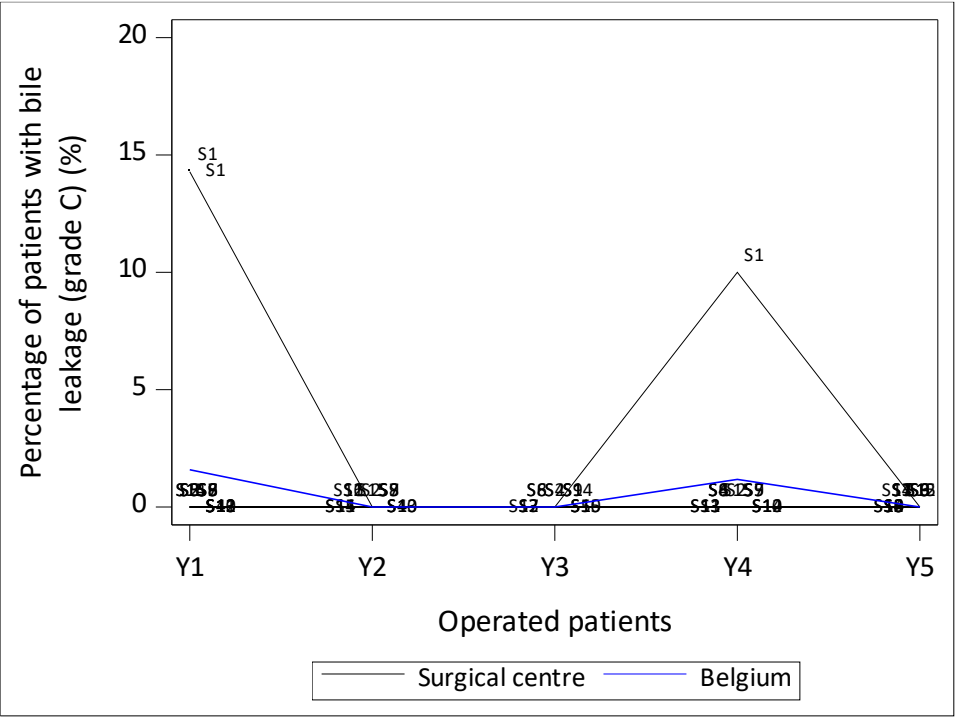


**Figure 53:** Funnel and spaghetti plot of operated patients with **bile leakage (grade C, within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)

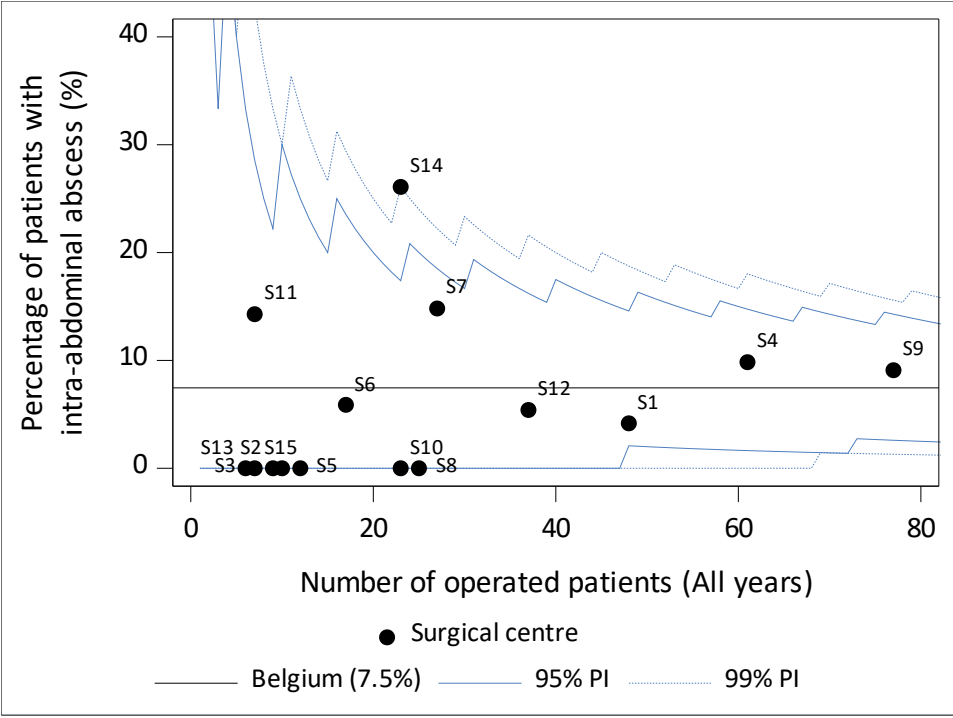


(b)

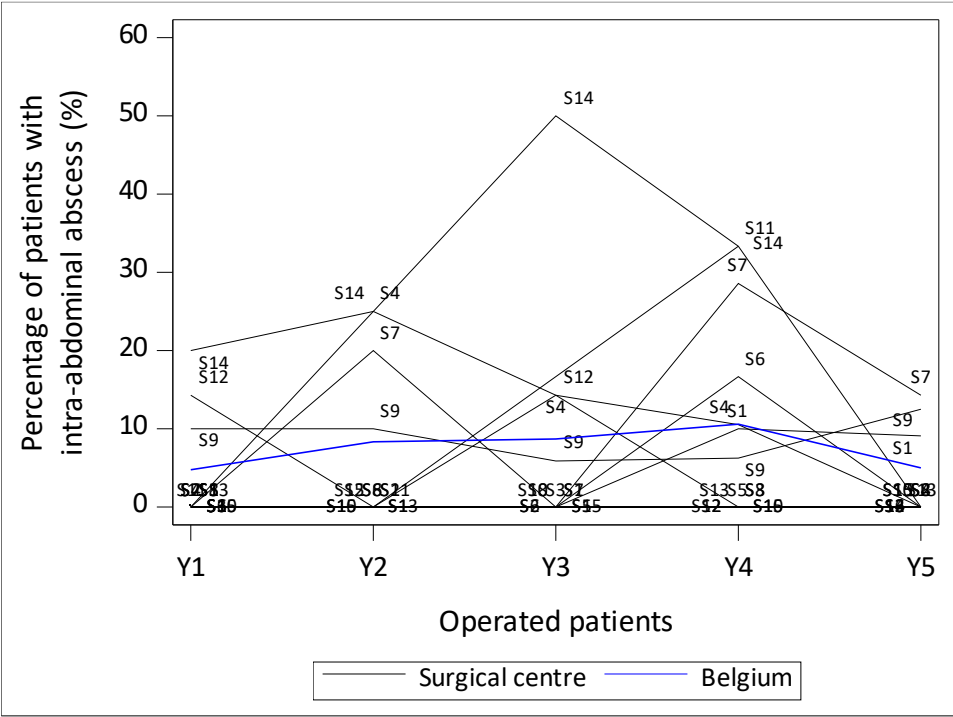


**Figure 54:** Funnel and spaghetti plot of operated patients with **intra-abdominal abscess (within 90 days)**, per centre, for (a) all years combined, (b) evolution year 1, 2, 3, 4 and 5.

(a)



(b)



#### 4.3.3.1. Proportion of operated patients with severe surgical complications (Clavien-Dindo grade IIIb-V, 90-day postoperative, in-hospital)

**Table 34.** Proportion of operated patients with severe surgical complications in the five convention years, by patient and tumour characteristics.

Severe surgical complications (Clavien-Dindo IIIb-V)				
Belgium				
Characteristic	N	n	n/N (%)	95% CI
<b>Operated patients with non-tumoural pathology</b>	<b>389</b>	<b>50</b>	<b>12.9</b>	<b>[9.7, 16.6]</b>
<b>Expert centres</b>				.
S1	48	7	14.6	[6.1, 27.8]
S2	9	2	22.2	[2.8, 60.0]
S3	7	0	0.0	[0.0, 41.0]
S4	61	15	24.6	[14.5, 37.3]
S5	12	1	8.3	[0.2, 38.5]
S6	17	1	5.9	[0.1, 28.7]
S7	27	3	11.1	[2.4, 29.2]
S8	25	2	8.0	[1.0, 26.0]
S9	77	7	9.1	[3.7, 17.8]
S10	23	0	0.0	[0.0, 14.8]
S11	7	1	14.3	[0.4, 57.9]
S12	37	4	10.8	[3.0, 25.4]
S13	6	1	16.7	[0.4, 64.1]
S14	23	6	26.1	[10.2, 48.4]
S15	10	0	0.0	[0.0, 30.8]
<b>Convention year</b>				
Year 1	63	9	14.3	[6.7, 25.4]
Year 2	72	7	9.7	[4.0, 19.0]
Year 3	69	7	10.1	[4.2, 19.8]
Year 4	85	13	15.3	[8.4, 24.7]
Year 5	100	14	14.0	[7.9, 22.4]
<b>Sex</b>				
Male	267	35	13.1	[9.3, 17.8]
Female	122	15	12.3	[7.0, 19.5]
<b>Age at surgery</b>				
<=69	339	45	13.3	[9.8, 17.4]
70-79	42	3	7.1	[1.5, 19.5]
>=80	8	2	25.0	[3.2, 65.1]
<b>Prior surgery or other treatment **</b>				
Prior abdominal surgery	80	12	15.0	[8.0, 24.7]
Other treatment modality (that could affect the pancreas)	78	14	17.9	[10.2, 28.3]



Severe surgical complications (Clavien-Dindo IIIb-V)				
Belgium				
Characteristic	N	n	n/N (%)	95% CI
<b>Charlson Comorbidity Index</b>				
0	162	21	13.0	[8.2, 19.1]
1	97	8	8.2	[3.6, 15.6]
2	62	12	19.4	[10.4, 31.4]
3	36	5	13.9	[4.7, 29.5]
4	18	2	11.1	[1.4, 34.7]
5	6	1	16.7	[0.4, 64.1]
6	4	1	25.0	[0.6, 80.6]
8	1	0	0.0	[0.0, 97.5]
9	1	0	0.0	[0.0, 97.5]
10	1	0	0.0	[0.0, 97.5]
11	1	0	0.0	[0.0, 97.5]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	102	13	12.7	[7.0, 20.8]
1 - Symptomatic, but ambulant	238	30	12.6	[8.7, 17.5]
2 - Symptomatic, bedbound < 50% day	37	3	8.1	[1.7, 21.9]
3 - Symptomatic, bedbound > 50% day	7	0	0.0	[0.0, 41.0]
4 - Completely dependent, 100% bedbound	5	4	80.0	[28.4, 99.5]
<b>ASA score</b>				
1 - Healthy person	22	0	0.0	[0.0, 15.4]
2 - Mild systemic disease, normal activity	205	26	12.7	[8.5, 18.0]
3 - Serious systemic disease, limited activity	154	21	13.6	[8.6, 20.1]
4 - Life-threatening illness, handicapped	7	3	42.9	[9.9, 81.6]
5 - Dying	1	0	0.0	[0.0, 97.5]
<b>Type of surgery</b>				
Minimally invasive surgery (MIS) – Laparoscopic	76	12	15.8	[8.4, 26.0]
Minimally invasive surgery (MIS) - Hybrid	2	0	0.0	[0.0, 84.2]
Minimally invasive surgery (MIS) - Robotic	47	6	12.8	[4.8, 25.7]
Open	241	28	11.6	[7.9, 16.4]
Conversion from MIS to open surgery	23	4	17.4	[5.0, 38.8]
<b>Simultaneous vascular resection</b>				
No vascular reconstruction	370	47	12.7	[9.5, 16.5]
Simultaneous superior mesenteric vein/portal vein (SMV/PV) resection	16	3	18.8	[4.0, 45.6]
Simultaneous arterial resection **	2	0	0.0	[0.0, 84.2]
Missing	1	0	0.0	[0.0, 97.5]
<b>Simultaneous other organ resection **</b>				
No	248	32	12.9	[9.0, 17.7]
Colon	15	4	26.7	[7.8, 55.1]
Stomach	44	9	20.5	[9.8, 35.3]

Severe surgical complications (Clavien-Dindo IIIb-V)				
Belgium				
Characteristic	N	n	n/N (%)	95% CI
Adrenal gland	8	2	25.0	[3.2, 65.1]
Spleen	91	10	11.0	[5.4, 19.3]
Other	28	4	14.3	[4.0, 32.7]
<b><i>RIZIV code for complex surgery</i></b>				
242830-242841: Pancreaticoduodenectomy	216	30	13.9	[9.6, 19.2]
Pancreaticoduodenectomy	192	26	13.5	[9.0, 19.2]
Total Pancreatectomy	24	4	16.7	[4.7, 37.4]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	67	6	9.0	[3.4, 18.5]
242874-242885: Hemipancreatectomy left	101	14	13.9	[7.8, 22.2]
242896-242900: Enucleation of a pancreatic tumour	5	0	0.0	[0.0, 52.2]
<b><i>Antithrombotic medication</i></b>				
No	301	43	14.3	[10.5, 18.8]
Yes	88	7	8.0	[3.3, 15.7]
<b><i>Was the patient referred?</i></b>				
No	242	34	14.0	[9.9, 19.1]
Yes	147	16	10.9	[6.4, 17.1]

\*\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients.

## 5. Total operated population

### 5.1. Case mix description for the total operated population

**Table 35.** Case mix description for the **total operated** population.

Characteristic	Belgium									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
<b><i>Patients with surgery</i></b>	<b>787</b>		<b>928</b>		<b>920</b>		<b>919</b>		<b>1,011</b>	
<b><i>Morphology</i></b>										
Adenocarcinoma	476	60.5	554	59.7	552	60.0	545	59.3	579	57.3
Neuroendocrine tumour	67	8.5	114	12.3	123	13.4	102	11.1	129	12.8
Benign tumour	126	16.0	135	14.5	112	12.2	118	12.8	112	11.1
Other or unspecified	118	15.0	125	13.5	133	14.5	154	16.8	191	18.9
<b><i>Type of surgery</i></b>										
Minimally invasive surgery (MIS) – Laparoscopic	207	26.3	270	29.1	293	31.8	234	25.5	233	23.0
Minimally invasive surgery (MIS) - Hybrid	1	0.1	3	0.3	2	0.2	1	0.1	0	0.0
Minimally invasive surgery (MIS) - Robotic	21	2.7	78	8.4	91	9.9	128	13.9	217	21.5
Open	532	67.6	530	57.1	483	52.5	511	55.6	516	51.0
Conversion from MIS to open surgery	26	3.3	47	5.1	51	5.5	45	4.9	45	4.5
<b><i>RIZIV code for complex surgery</i></b>										
242830-242841: Pancreaticoduodenectomy	563	71.5	601	64.8	597	64.9	597	65.0	620	61.3
Pancreaticoduodenectomy	512	90.9	548	91.2	548	91.8	533	89.3	550	88.7
Total Pancreatectomy	51	9.1	53	8.8	49	8.2	64	10.7	70	11.3

Characteristic	Belgium									
	Year 1		Year 2		Year 3		Year 4		Year 5	
	N	%	N	%	N	%	N	%	N	%
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	63	8.0	104	11.2	88	9.6	122	13.3	90	8.9
242874-242885: Hemipancreatectomy left	150	19.1	208	22.4	217	23.6	191	20.8	285	28.2
242896-242900: Enucleation of a pancreatic tumour	11	1.4	15	1.6	18	2.0	9	1.0	16	1.6

## 5.2. Postoperative mortality for the total operated population

### 5.2.1. Unadjusted 30-day postoperative mortality

**Table 36.** Unadjusted 30-day postoperative mortality for **the total operated** population in the five convention years, by patient and tumour characteristics.

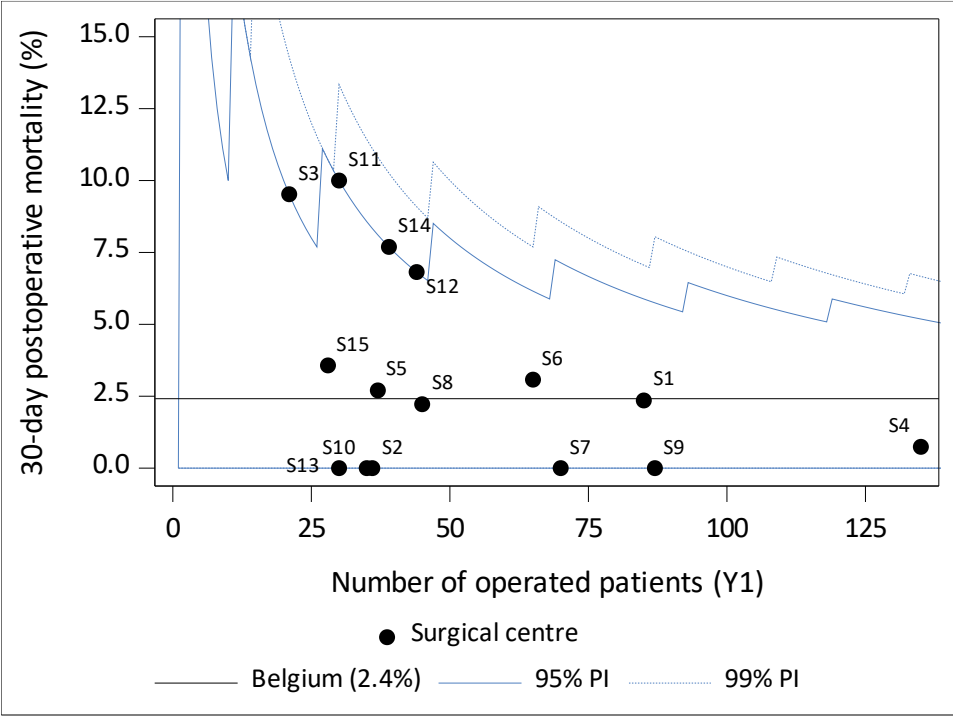
Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
<b>Patients with surgery</b>	<b>4,565</b>	<b>90</b>	<b>2.0</b>	<b>[1.6, 2.4]</b>
<b>Expert centres</b>				.
S1	459	11	2.4	[1.2, 4.2]
S2	187	3	1.6	[0.3, 4.6]
S3	125	5	4.0	[1.3, 9.1]
S4	796	14	1.8	[1.0, 2.9]
S5	195	7	3.6	[1.5, 7.3]
S6	430	12	2.8	[1.5, 4.8]
S7	347	1	0.3	[0.0, 1.6]
S8	264	4	1.5	[0.4, 3.8]
S9	526	6	1.1	[0.4, 2.5]
S10	165	1	0.6	[0.0, 3.3]
S11	183	8	4.4	[1.9, 8.4]
S12	256	4	1.6	[0.4, 4.0]
S13	198	5	2.5	[0.8, 5.8]
S14	283	7	2.5	[1.0, 5.0]
S15	151	2	1.3	[0.2, 4.7]
<b>Convention year</b>				
Year 1	787	19	2.4	[1.5, 3.7]
Year 2	928	20	2.2	[1.3, 3.3]
Year 3	920	22	2.4	[1.5, 3.6]
Year 4	919	14	1.5	[0.8, 2.5]
Year 5	1,011	15	1.5	[0.8, 2.4]
<b>Sex</b>				
Male	2,516	57	2.3	[1.7, 2.9]
Female	2,049	33	1.6	[1.1, 2.3]
<b>Age at surgery</b>				
<=69	2,685	35	1.3	[0.9, 1.8]
70-79	1,490	38	2.6	[1.8, 3.5]
>=80	390	17	4.4	[2.6, 6.9]
<b>Lesion to treat (in (peri-)pancreas)</b>				

Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
Primary tumour	4,453	87	2.0	[1.6, 2.4]
Relapse of primary tumour	54	2	3.7	[0.5, 12.7]
Metastasis	58	1	1.7	[0.0, 9.2]
<b>Morphology</b>				
Adenocarcinoma	2,706	68	2.5	[2.0, 3.2]
Neuroendocrine tumour	535	5	0.9	[0.3, 2.2]
Benign tumour	603	6	1.0	[0.4, 2.2]
Other or unspecified	721	11	1.5	[0.8, 2.7]
<b>Charlson Comorbidity Index</b>				
0	1,891	13	0.7	[0.4, 1.2]
1	1,102	32	2.9	[2.0, 4.1]
2	731	23	3.1	[2.0, 4.7]
3	379	10	2.6	[1.3, 4.8]
4	223	4	1.8	[0.5, 4.5]
5	92	3	3.3	[0.7, 9.2]
6	65	3	4.6	[1.0, 12.9]
7	37	1	2.7	[0.1, 14.2]
8	24	0	0.0	[0.0, 14.2]
9	11	1	9.1	[0.2, 41.3]
10	6	0	0.0	[0.0, 45.9]
11	2	0	0.0	[0.0, 84.2]
12	2	0	0.0	[0.0, 84.2]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	1,347	16	1.2	[0.7, 1.9]
1 - Symptomatic, but ambulant	2,726	55	2.0	[1.5, 2.6]
2 - Symptomatic, bedbound < 50% day	417	14	3.4	[1.8, 5.6]
3 - Symptomatic, bedbound > 50% day	68	3	4.4	[0.9, 12.4]
4 - Completely dependent, 100% bedbound	7	2	28.6	[3.7, 71.0]
<b>ASA score</b>				
1 - Healthy person	291	3	1.0	[0.2, 3.0]
2 - Mild systemic disease, normal activity	2,394	36	1.5	[1.1, 2.1]
3 - Serious systemic disease, limited activity	1,824	48	2.6	[1.9, 3.5]
4 - Life-threatening illness, handicapped	55	3	5.5	[1.1, 15.1]
5 - Dying	1	0	0.0	[0.0, 97.5]
<b>Type of surgery</b>				
Minimally invasive surgery (MIS) – Laparoscopic	1,237	14	1.1	[0.6, 1.9]
Minimally invasive surgery (MIS) - Hybrid	7	0	0.0	[0.0, 41.0]
Minimally invasive surgery (MIS) - Robotic	535	8	1.5	[0.6, 2.9]
Open	2,572	57	2.2	[1.7, 2.9]
Conversion from MIS to open surgery	214	11	5.1	[2.6, 9.0]
<b>RIZIV code for complex surgery</b>				

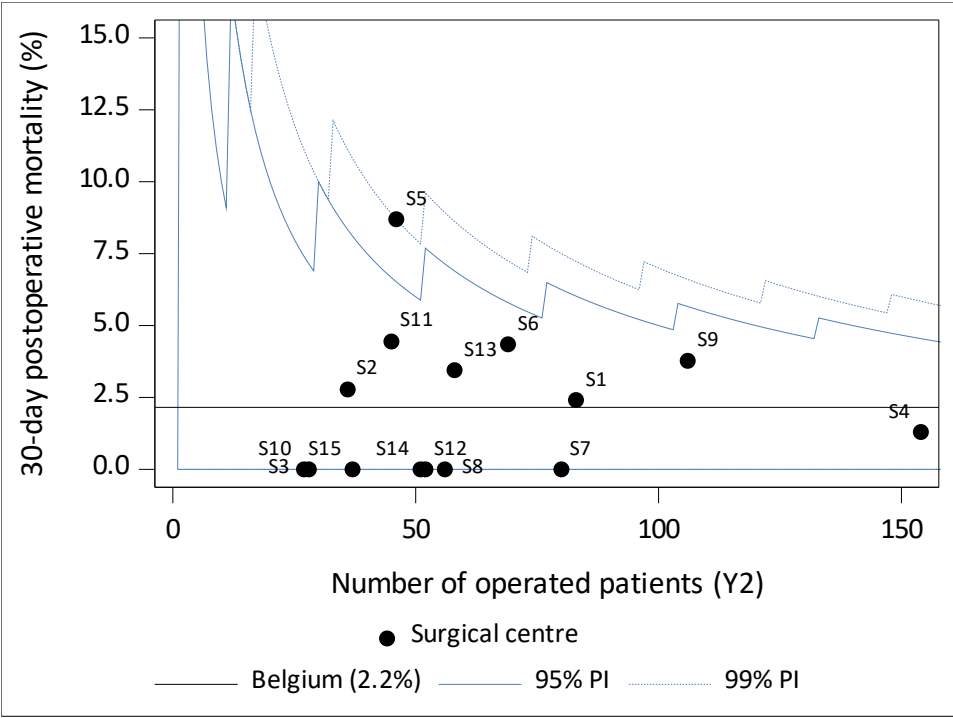
Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
242830-242841: Pancreaticoduodenectomy	2,978	77	2.6	[2.0, 3.2]
Pancreaticoduodenectomy	2,691	71	2.6	[2.1, 3.3]
Total Pancreatectomy	287	6	2.1	[0.8, 4.5]
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	467	5	1.1	[0.3, 2.5]
242874-242885: Hemipancreatectomy left	1,051	7	0.7	[0.3, 1.4]
242896-242900: Enucleation of a pancreatic tumour	69	1	1.4	[0.0, 7.8]
<b><i>Antithrombotic medication</i></b>				
No	3,246	48	1.5	[1.1, 2.0]
Yes	1,319	42	3.2	[2.3, 4.3]
<b><i>Was the patient referred?</i></b>				
No	2,128	40	1.9	[1.3, 2.6]
Yes	2,437	50	2.1	[1.5, 2.7]

**Figure 55:** Funnel and spaghetti plot of the unadjusted 30-day postoperative mortality for **the total operated** population, in the five convention years, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5, (f) all years combined, (g) evolution year 1, 2, 3, 4 and 5.

(a)

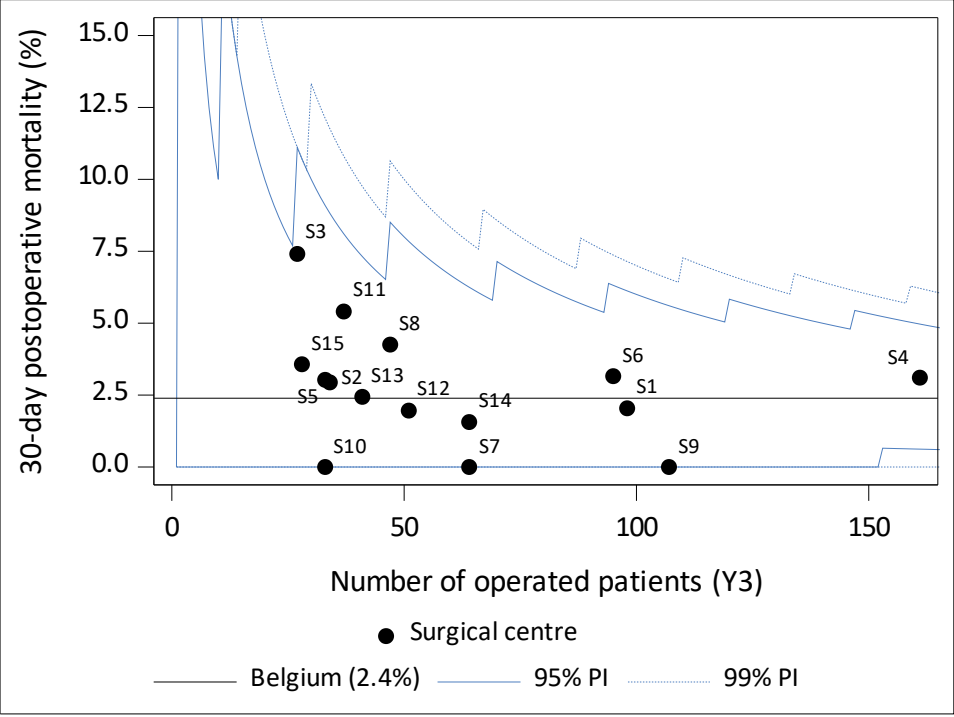


(b)

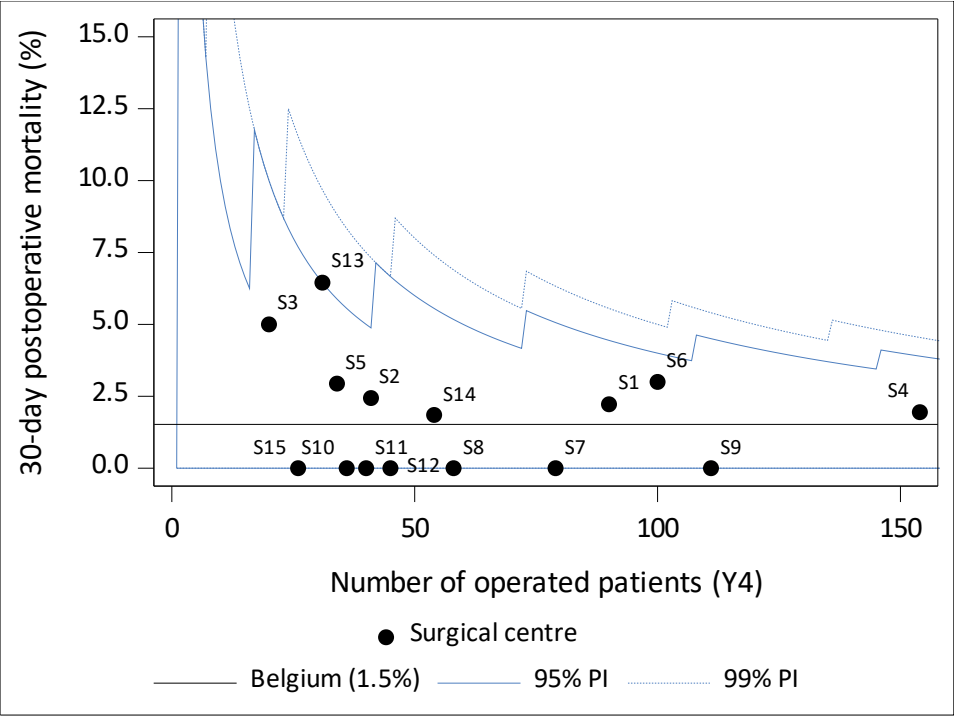




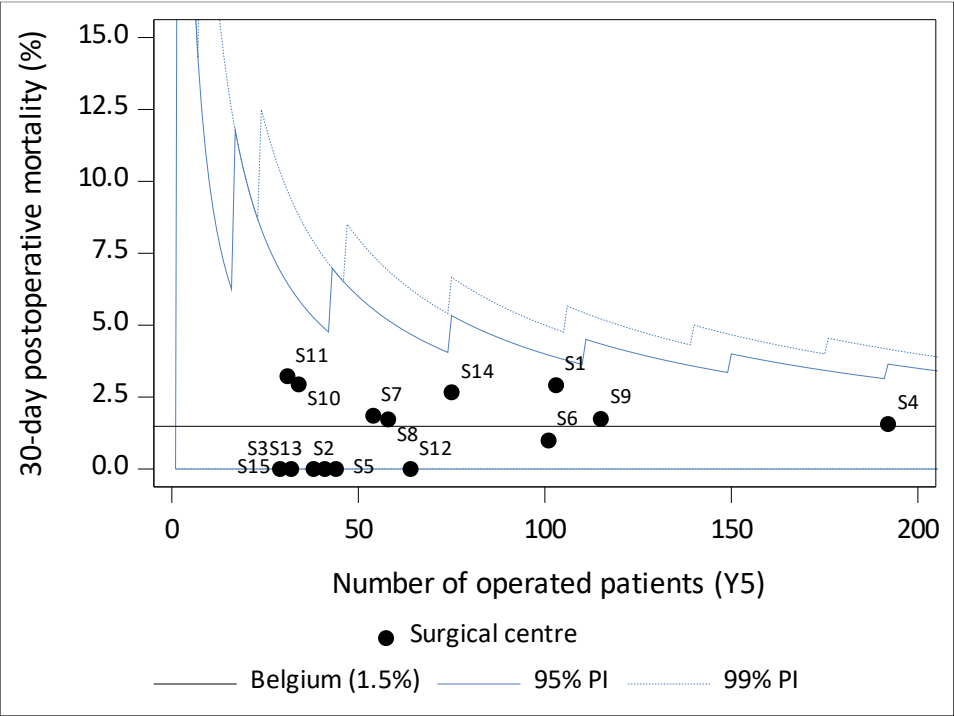
(c)



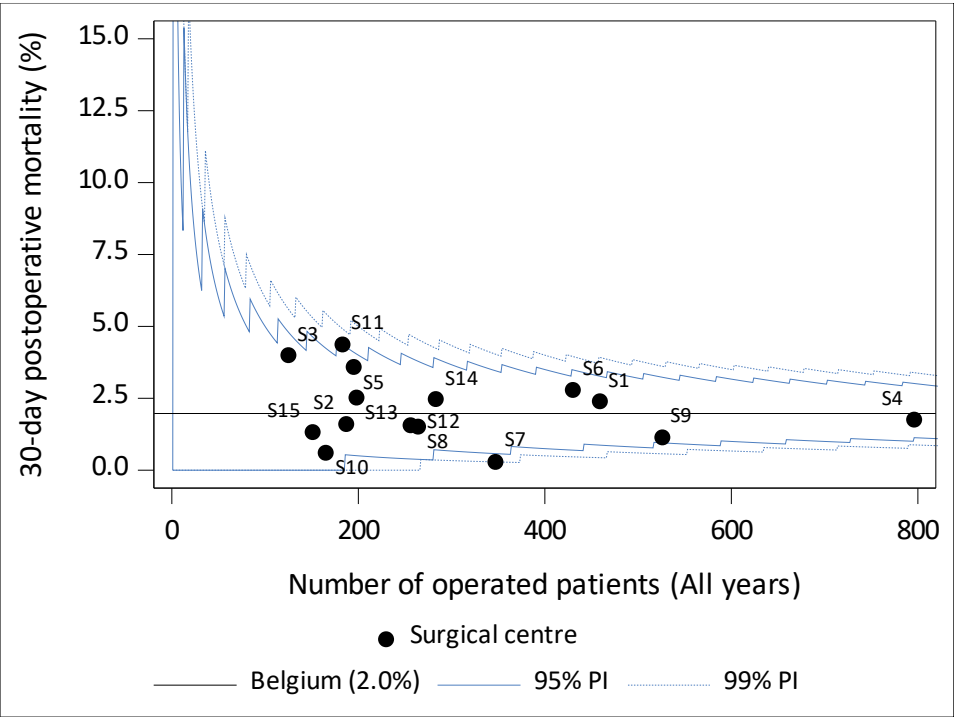
(d)



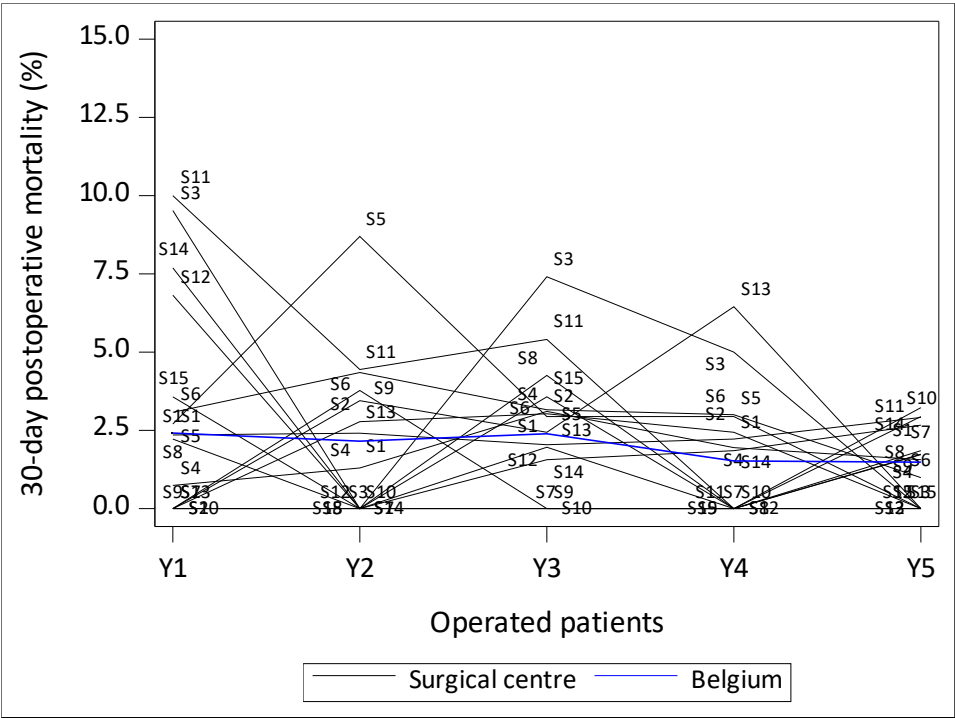
(e)



(f)



(g)



### 5.2.1. Unadjusted 90-day postoperative mortality

**Table 37.** Unadjusted 90-day postoperative mortality for **the total operated** population in the five convention years, by patient and tumour characteristics.

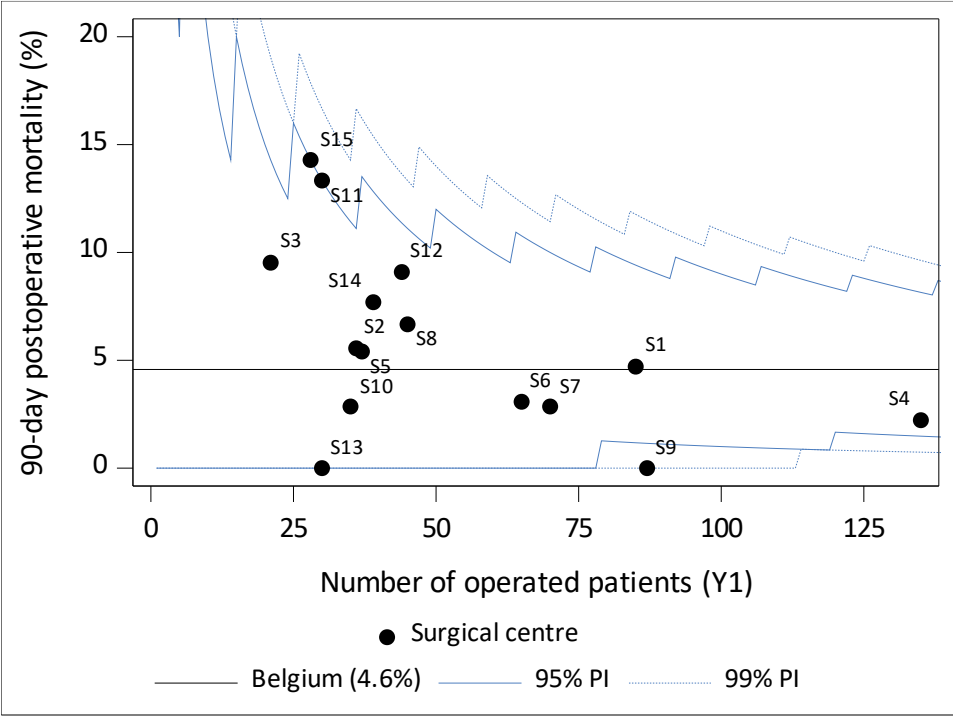
Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
<b>Patients with surgery</b>	<b>4,565</b>	<b>193</b>	<b>4.2</b>	<b>[3.7, 4.9]</b>
<b>Expert centres</b>				.
S1	459	20	4.4	[2.7, 6.6]
S2	187	13	7.0	[3.8, 11.6]
S3	125	8	6.4	[2.8, 12.2]
S4	796	30	3.8	[2.6, 5.3]
S5	195	9	4.6	[2.1, 8.6]
S6	430	23	5.3	[3.4, 7.9]
S7	347	6	1.7	[0.6, 3.7]
S8	264	12	4.5	[2.4, 7.8]
S9	526	13	2.5	[1.3, 4.2]
S10	165	7	4.2	[1.7, 8.5]
S11	183	15	8.2	[4.7, 13.2]
S12	256	8	3.1	[1.4, 6.1]
S13	198	6	3.0	[1.1, 6.5]
S14	283	12	4.2	[2.2, 7.3]
S15	151	11	7.3	[3.7, 12.7]
<b>Convention year</b>				
Year 1	787	36	4.6	[3.2, 6.3]
Year 2	928	49	5.3	[3.9, 6.9]
Year 3	920	45	4.9	[3.6, 6.5]
Year 4	919	30	3.3	[2.2, 4.6]
Year 5	1,011	33	3.3	[2.3, 4.6]
<b>Sex</b>				
Male	2,516	109	4.3	[3.6, 5.2]
Female	2,049	84	4.1	[3.3, 5.1]
<b>Age at surgery</b>				
<=69	2,685	71	2.6	[2.1, 3.3]
70-79	1,490	90	6.0	[4.9, 7.4]
>=80	390	32	8.2	[5.7, 11.4]
<b>Lesion to treat (in (peri-)pancreas)</b>				
Primary tumour	4,453	186	4.2	[3.6, 4.8]
Relapse of primary tumour	54	4	7.4	[2.1, 17.9]
Metastasis	58	3	5.2	[1.1, 14.4]
<b>Morphology</b>				

Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
Adenocarcinoma	2,706	149	5.5	[4.7, 6.4]
Neuroendocrine tumour	535	14	2.6	[1.4, 4.4]
Benign tumour	603	10	1.7	[0.8, 3.0]
Other or unspecified	721	20	2.8	[1.7, 4.3]
<b>Charlson Comorbidity Index</b>				
0	1,891	46	2.4	[1.8, 3.2]
1	1,102	55	5.0	[3.8, 6.4]
2	731	38	5.2	[3.7, 7.1]
3	379	18	4.7	[2.8, 7.4]
4	223	13	5.8	[3.1, 9.8]
5	92	10	10.9	[5.3, 19.1]
6	65	6	9.2	[3.5, 19.0]
7	37	3	8.1	[1.7, 21.9]
8	24	1	4.2	[0.1, 21.1]
9	11	1	9.1	[0.2, 41.3]
10	6	2	33.3	[4.3, 77.7]
11	2	0	0.0	[0.0, 84.2]
12	2	0	0.0	[0.0, 84.2]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	1,347	32	2.4	[1.6, 3.3]
1 - Symptomatic, but ambulant	2,726	112	4.1	[3.4, 4.9]
2 - Symptomatic, bedbound < 50% day	417	37	8.9	[6.3, 12.0]
3 - Symptomatic, bedbound > 50% day	68	9	13.2	[6.2, 23.6]
4 - Completely dependent, 100% bedbound	7	3	42.9	[9.9, 81.6]
<b>ASA score</b>				
1 - Healthy person	291	6	2.1	[0.8, 4.4]
2 - Mild systemic disease, normal activity	2,394	83	3.5	[2.8, 4.3]
3 - Serious systemic disease, limited activity	1,824	99	5.4	[4.4, 6.6]
4 - Life-threatening illness, handicapped	55	5	9.1	[3.0, 20.0]
5 - Dying	1	0	0.0	[0.0, 97.5]
<b>Type of surgery</b>				
Minimally invasive surgery (MIS) – Laparoscopic	1,237	30	2.4	[1.6, 3.4]
Minimally invasive surgery (MIS) - Hybrid	7	1	14.3	[0.4, 57.9]
Minimally invasive surgery (MIS) - Robotic	535	15	2.8	[1.6, 4.6]
Open	2,572	129	5.0	[4.2, 5.9]
Conversion from MIS to open surgery	214	18	8.4	[5.1, 13.0]
<b>RIZIV code for complex surgery</b>				
242830-242841: Pancreaticoduodenectomy	2,978	159	5.3	[4.6, 6.2]
Pancreaticoduodenectomy	2,691	142	5.3	[4.5, 6.2]
Total Pancreatectomy	287	17	5.9	[3.5, 9.3]

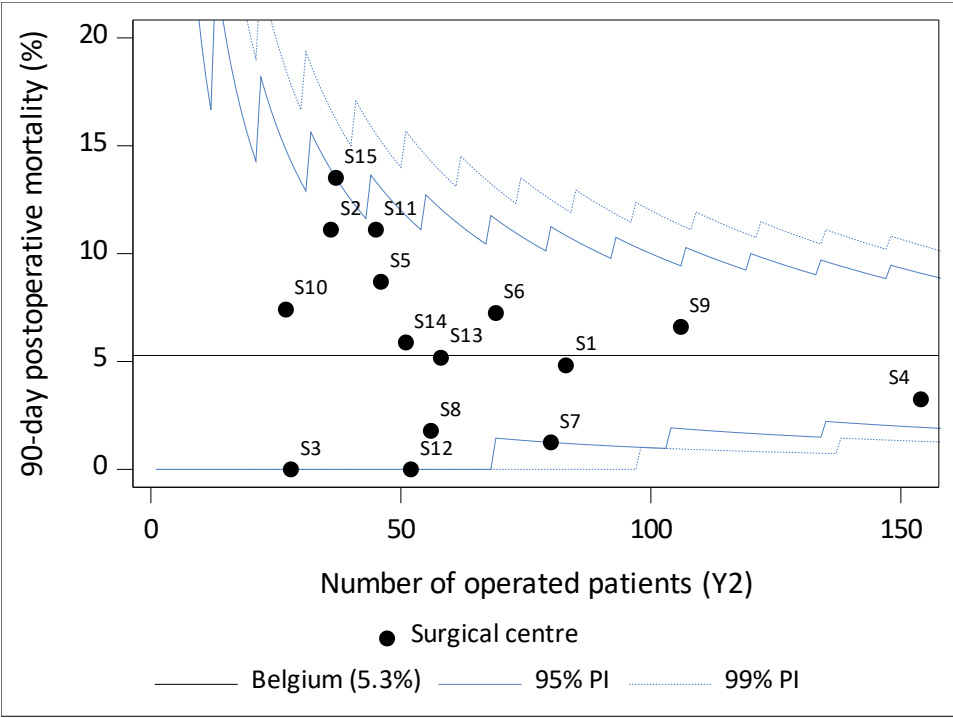
Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
242852-242863: Hemipancreatectomy left with jejunal anastomosis of the resection plane of the pancreas, or almost total pancreatectomy (95 pct)	467	10	2.1	[1.0, 3.9]
242874-242885: Hemipancreatectomy left	1,051	23	2.2	[1.4, 3.3]
242896-242900: Enucleation of a pancreatic tumour	69	1	1.4	[0.0, 7.8]
<b><i>Antithrombotic medication</i></b>				
No	3,246	122	3.8	[3.1, 4.5]
Yes	1,319	71	5.4	[4.2, 6.7]
<b><i>Was the patient referred?</i></b>				
No	2,128	82	3.9	[3.1, 4.8]
Yes	2,437	111	4.6	[3.8, 5.5]

**Figure 56:** Funnel and spaghetti plot of the unadjusted 90-day postoperative mortality for **the total operated** population, in the five convention years, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) year 4, (e) year 5, (f) all years combined, (g) evolution year 1, 2, 3, 4 and 5.

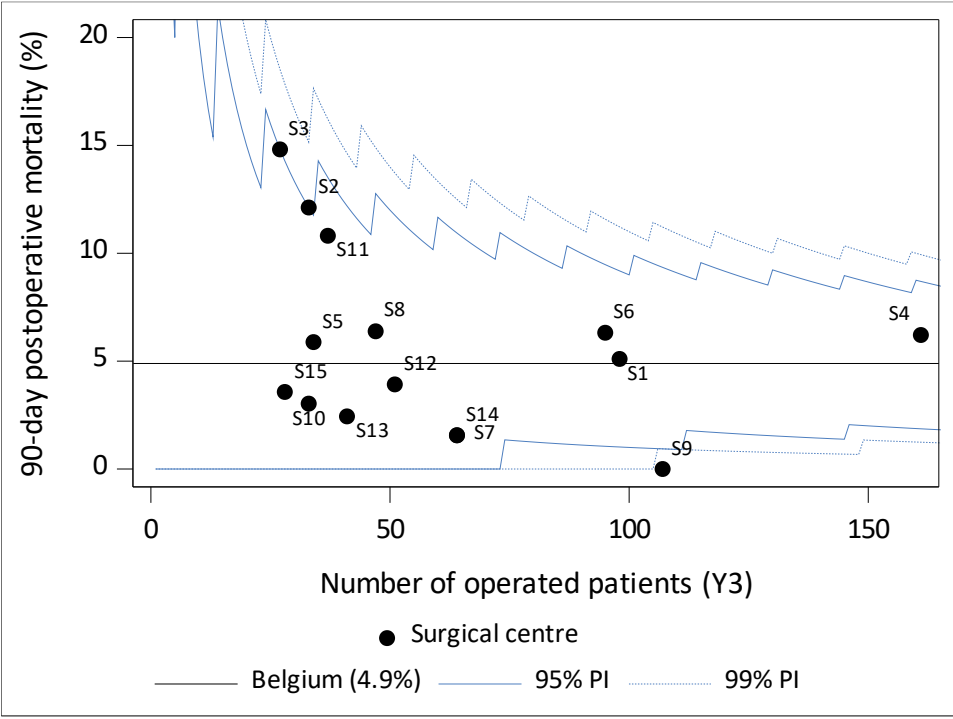
(a)



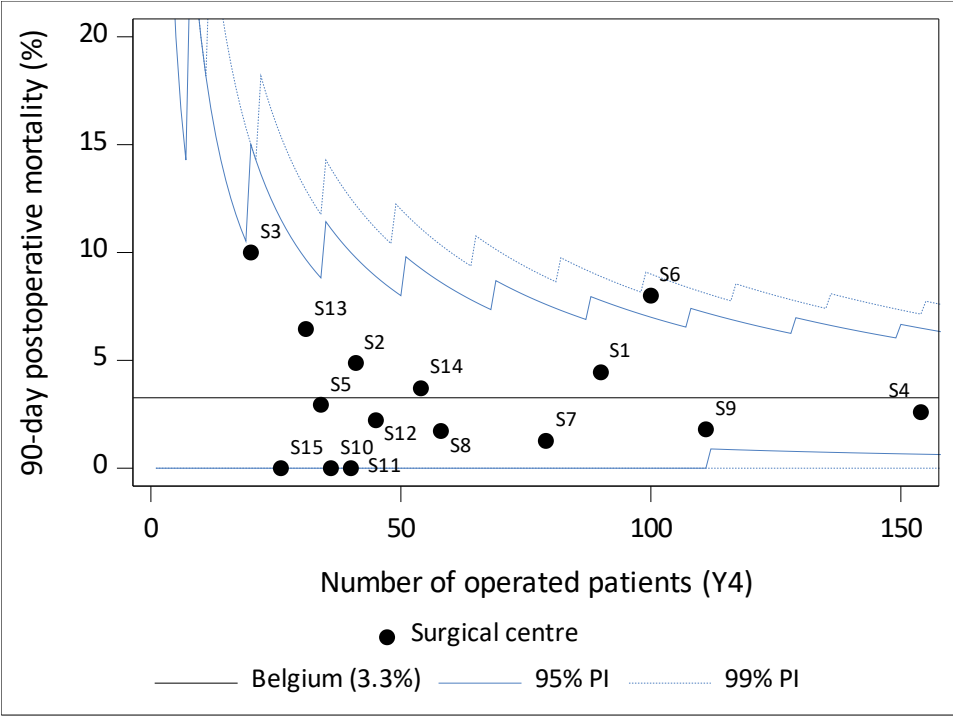
(b)



(c)

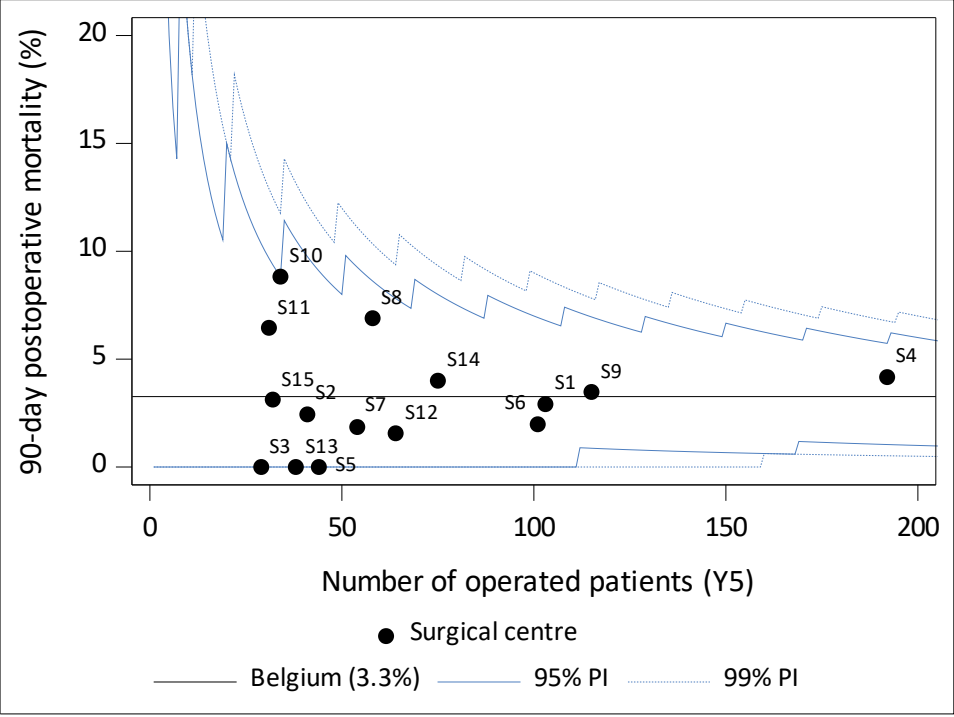


(d)

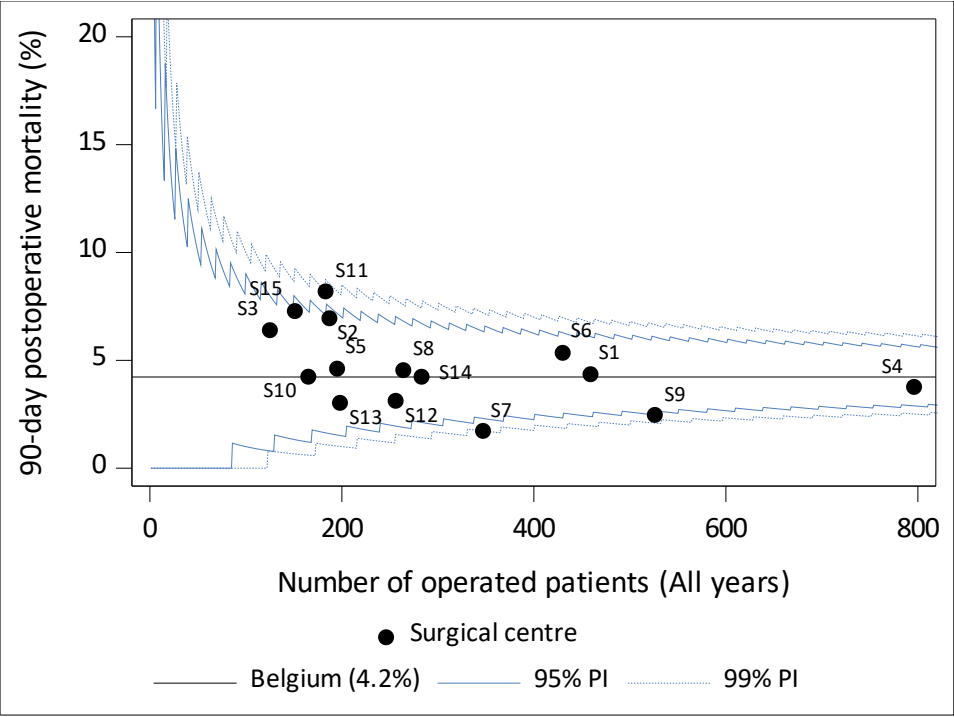




(e)



(f)



(g)

