

Belgian Cancer Registry



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**RIZIV/INAMI convention Complex Surgery**

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**Oesophagus and Gastro-Oesophageal Junction**

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Global report

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July 2019 - June 2022

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Belgian Cancer Registry Team

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Version 3.1

2023/06/12

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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 three years of the RIZIV/INAMI convention regarding the reimbursement of complex surgery for tumours of the oesophagus or gastro-oesophageal junction (GOJ) and non-oncological conditions of the oesophagus. 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 pathology. For the latter two indication categories, which are presented together as "non-malignant pathology", not all indicators are calculated. For the malignant tumours, the resections were categorized as 'standard surgery' or 'non-standard surgery'. Resections carried out in emergency setting, resections with palliative intention, resections concerning a tumour recurrence and total laryngo-oesophagectomies were regarded as 'non-standard surgery', all the other resections were considered 'standard surgery'.

For details on the calculation of the indicators, see document 'Complex Surgery - Oesophagus Reading guide v2.0 (14/02/2020)'.

### 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 - 30/06/2022.
- In case of no surgery: date of MC 1/07/2019 - 30/06/2022.

#### Remarks:

- 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.
  - Registrations sent by collaborating hospitals were counted among those of the main expert centre within their collaboration.

## 2. General overview of registered patients

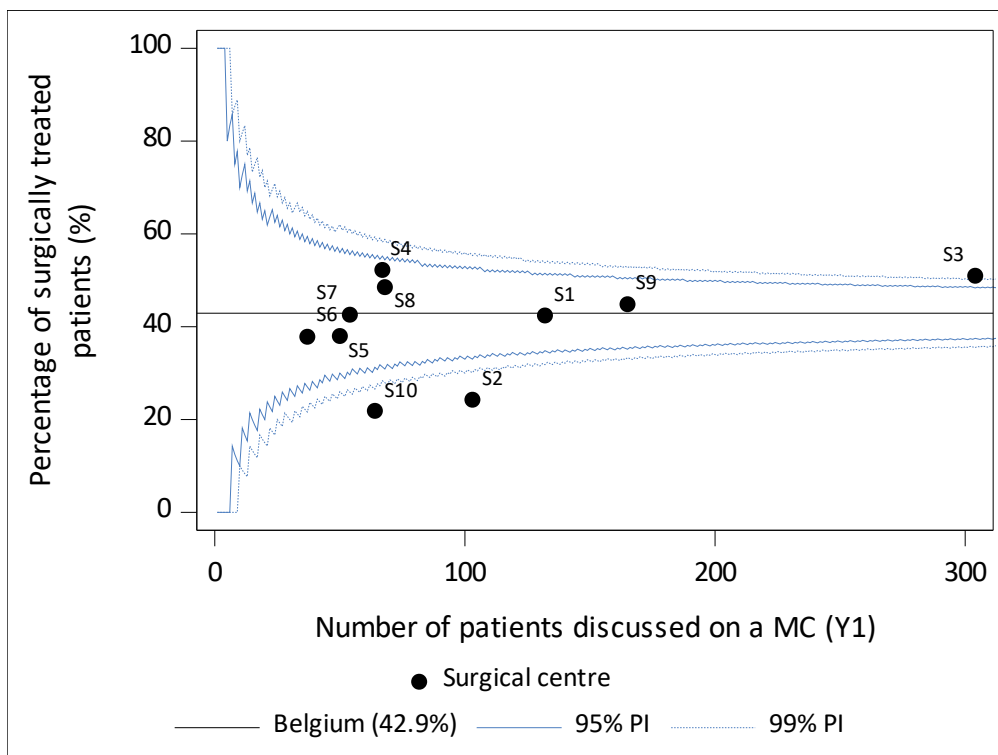
**Table 1:** Number of patients discussed on a multidisciplinary consult (MC), distribution of indication type by surgery type and by individual centre.

Characteristic	Belgium					
	Year 1		Year 2		Year 3	
	N	%	N	%	N	%
<b><i>N patients discussed on a MC</i></b>	<b>1,044</b>	<b>–</b>	<b>966</b>	<b>–</b>	<b>1,015</b>	<b>–</b>
<b><i>N patients with surgery</i></b>	<b>448</b>	<b>42.9<sup>a</sup></b>	<b>436</b>	<b>45.1<sup>a</sup></b>	<b>452</b>	<b>44.5<sup>a</sup></b>
Malignant tumour	418	93.3 <sup>b</sup>	404	92.7 <sup>b</sup>	419	92.7 <sup>b</sup>
Standard surgery	395	94.5 <sup>c</sup>	380	94.1 <sup>c</sup>	407	97.1 <sup>c</sup>
Non-standard surgery	23	5.5 <sup>c</sup>	24	5.9 <sup>c</sup>	12	2.9 <sup>c</sup>
Non-malignant pathology	30	6.7 <sup>b</sup>	32	7.3 <sup>b</sup>	33	7.3 <sup>b</sup>
Expert centres						
S1	56	12.5 <sup>b</sup>	39	8.9 <sup>b</sup>	43	9.5 <sup>b</sup>
S2	25	5.6 <sup>b</sup>	27	6.2 <sup>b</sup>	24	5.3 <sup>b</sup>
S3	155	34.6 <sup>b</sup>	129	29.6 <sup>b</sup>	118	26.1 <sup>b</sup>
S4	35	7.8 <sup>b</sup>	40	9.2 <sup>b</sup>	33	7.3 <sup>b</sup>
S5	19	4.2 <sup>b</sup>	21	4.8 <sup>b</sup>	23	5.1 <sup>b</sup>
S6	14	3.1 <sup>b</sup>	26	6.0 <sup>b</sup>	28	6.2 <sup>b</sup>
S7	23	5.1 <sup>b</sup>	32	7.3 <sup>b</sup>	46	10.2 <sup>b</sup>
S8	33	7.4 <sup>b</sup>	28	6.4 <sup>b</sup>	40	8.8 <sup>b</sup>
S9	74	16.5 <sup>b</sup>	74	17.0 <sup>b</sup>	70	15.5 <sup>b</sup>
S10	14	3.1 <sup>b</sup>	20	4.6 <sup>b</sup>	27	6.0 <sup>b</sup>
<b><i>N patients without surgery</i></b>	<b>596</b>	<b>57.1<sup>a</sup></b>	<b>530</b>	<b>54.9<sup>a</sup></b>	<b>563</b>	<b>55.5<sup>a</sup></b>
Malignant tumour	567	95.1 <sup>b</sup>	514	97.0 <sup>b</sup>	547	97.2 <sup>b</sup>
Non-malignant pathology	29	4.9 <sup>b</sup>	16	3.0 <sup>b</sup>	16	2.8 <sup>b</sup>
Expert centres						
S1	76	12.8 <sup>b</sup>	73	13.8 <sup>b</sup>	67	11.9 <sup>b</sup>
S2	78	13.1 <sup>b</sup>	42	7.9 <sup>b</sup>	79	14.0 <sup>b</sup>
S3	149	25.0 <sup>b</sup>	128	24.2 <sup>b</sup>	114	20.2 <sup>b</sup>
S4	32	5.4 <sup>b</sup>	35	6.6 <sup>b</sup>	33	5.9 <sup>b</sup>
S5	31	5.2 <sup>b</sup>	31	5.8 <sup>b</sup>	66	11.7 <sup>b</sup>
S6	23	3.9 <sup>b</sup>	26	4.9 <sup>b</sup>	21	3.7 <sup>b</sup>
S7	31	5.2 <sup>b</sup>	38	7.2 <sup>b</sup>	30	5.3 <sup>b</sup>
S8	35	5.9 <sup>b</sup>	49	9.2 <sup>b</sup>	54	9.6 <sup>b</sup>
S9	91	15.3 <sup>b</sup>	72	13.6 <sup>b</sup>	55	9.8 <sup>b</sup>
S10	50	8.4 <sup>b</sup>	36	6.8 <sup>b</sup>	44	7.8 <sup>b</sup>

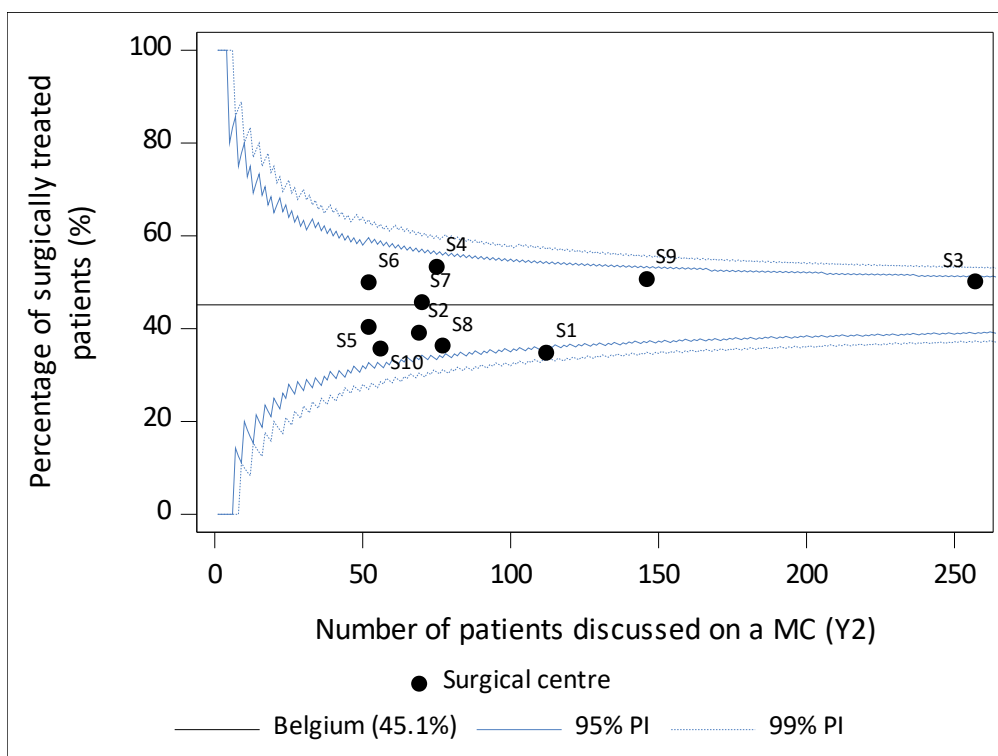
<sup>a</sup> percentage relative to the number of patients with MC  
<sup>b</sup> percentage relative to the number of patients with/without surgery  
<sup>c</sup> percentage relative to the number of malignant tumours  
Non-standard surgery = emergency, palliative, recurrence, total laryngectomy

**Figure 1:** Funnel and spaghetti plot of the proportion of patients discussed on a MC that were treated surgically, by individual expert centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

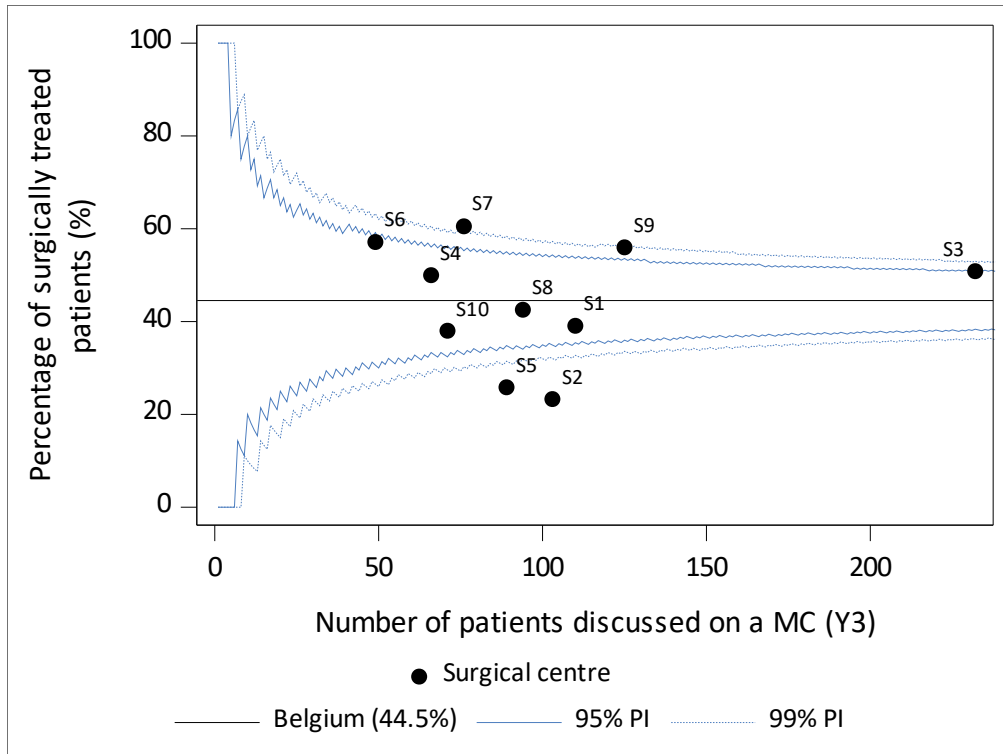
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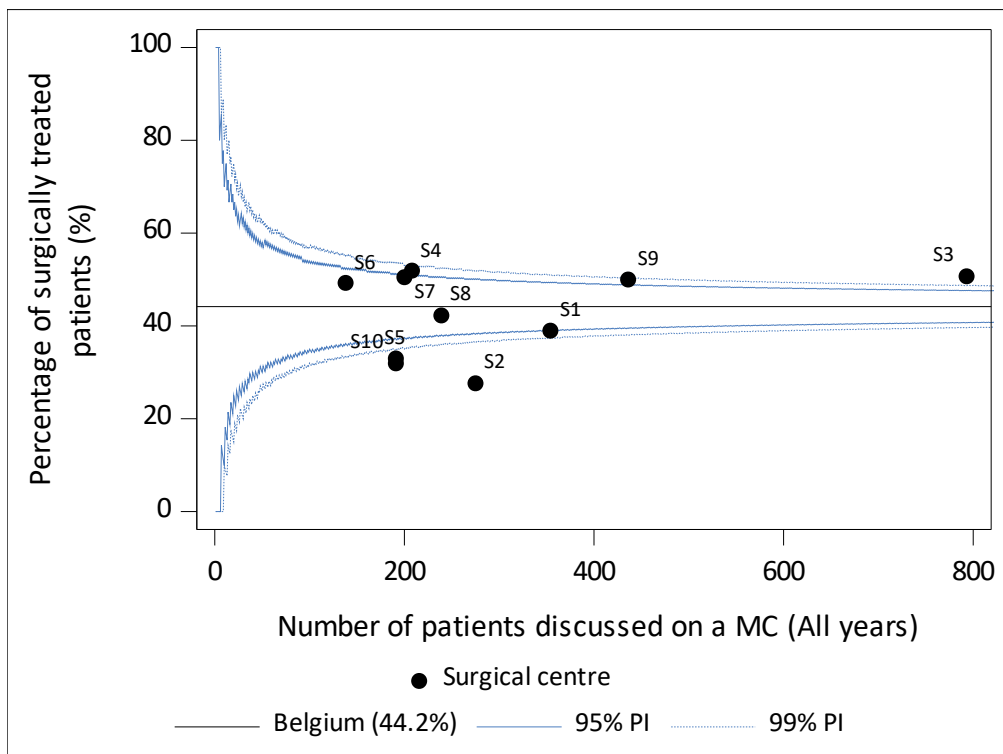
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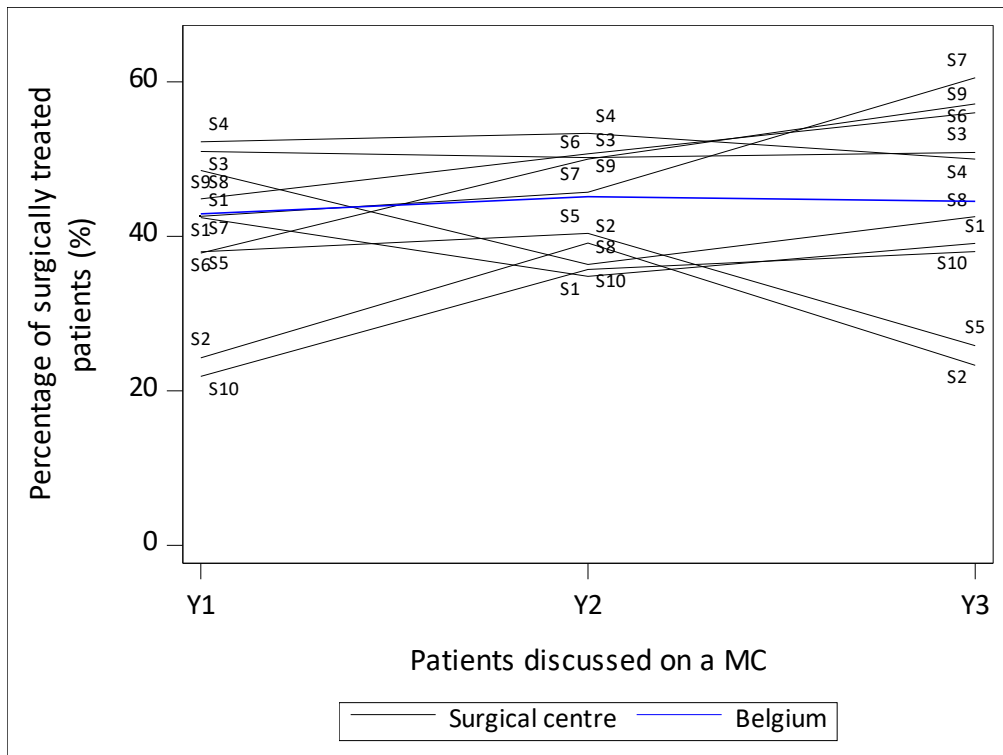
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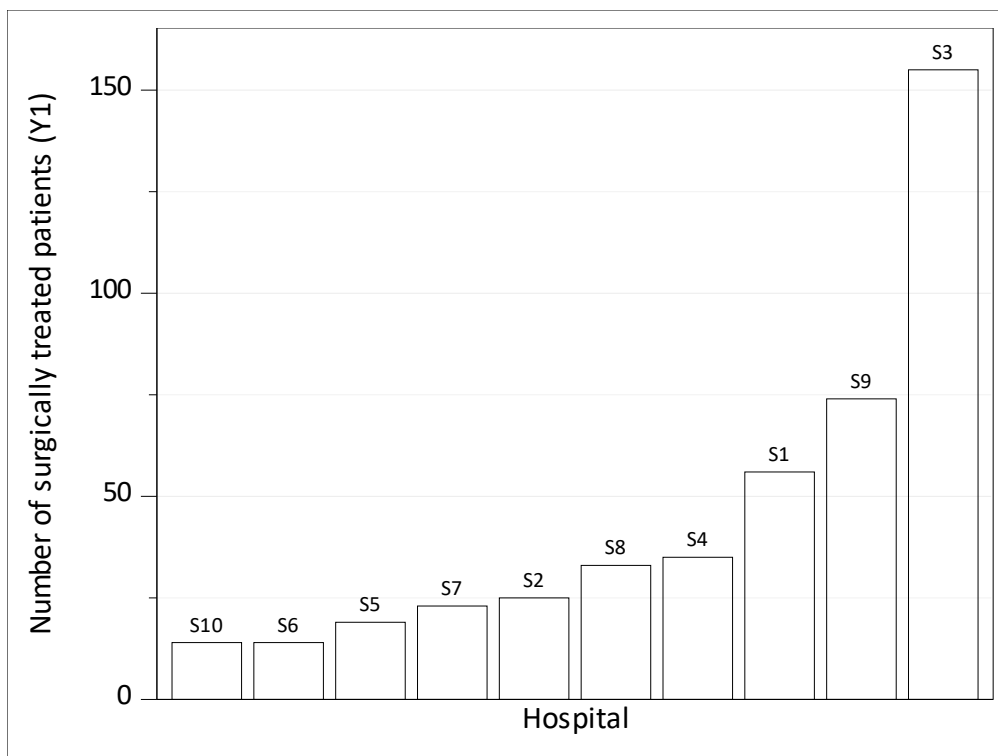


(e)

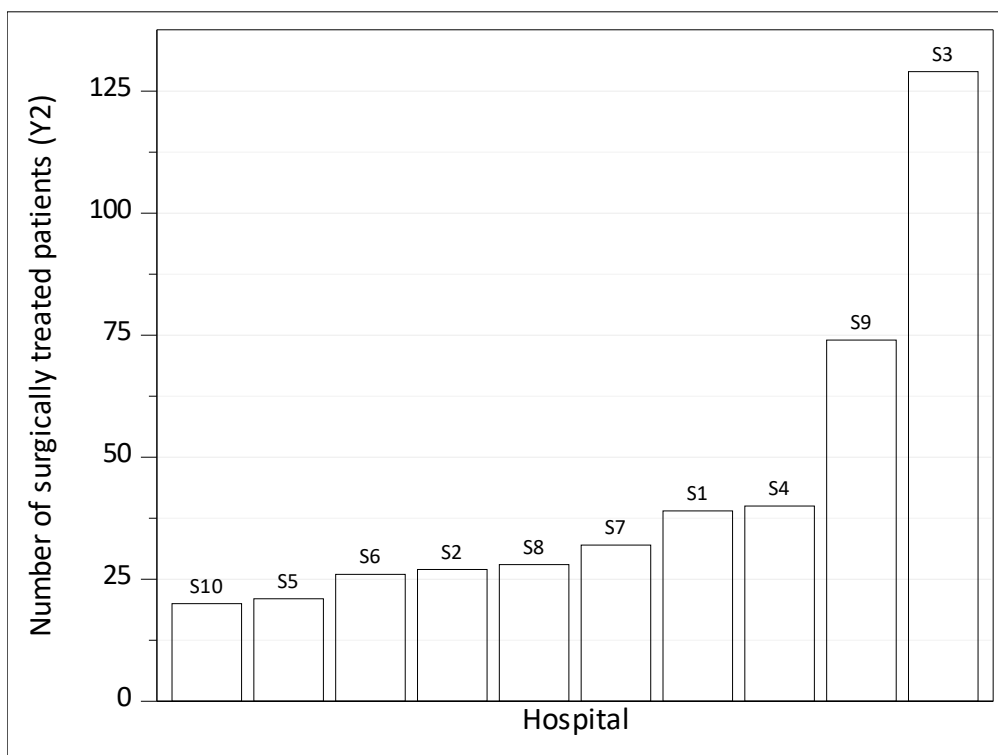


**Figure 2:** Absolute number of patients discussed on a MC that were treated surgically, by surgical centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined.

(a)

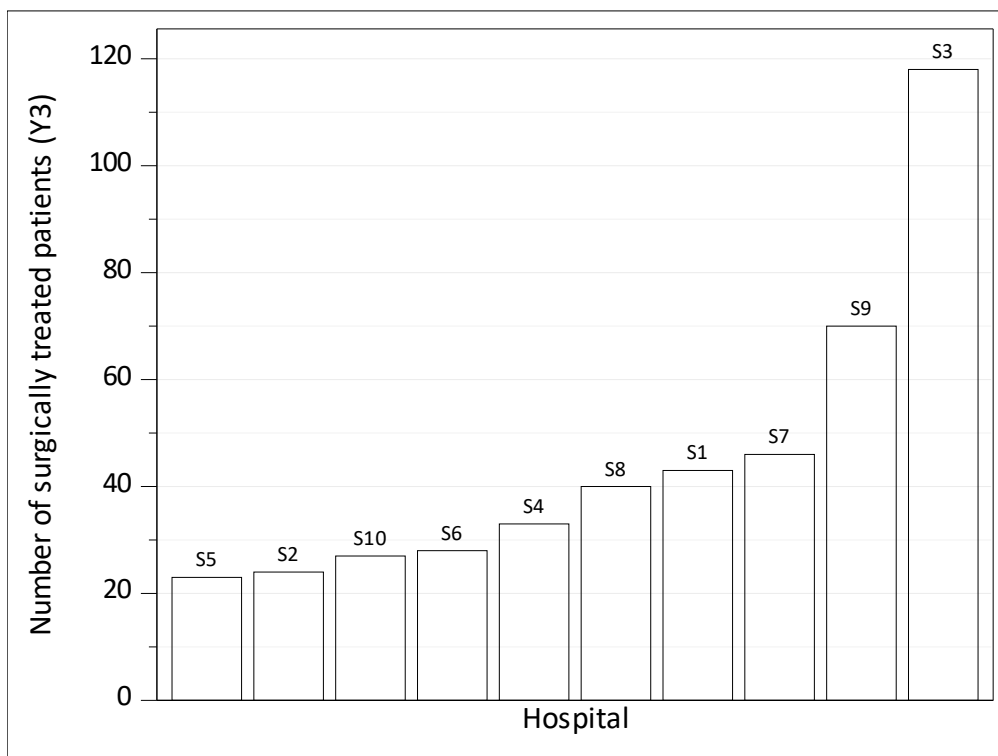


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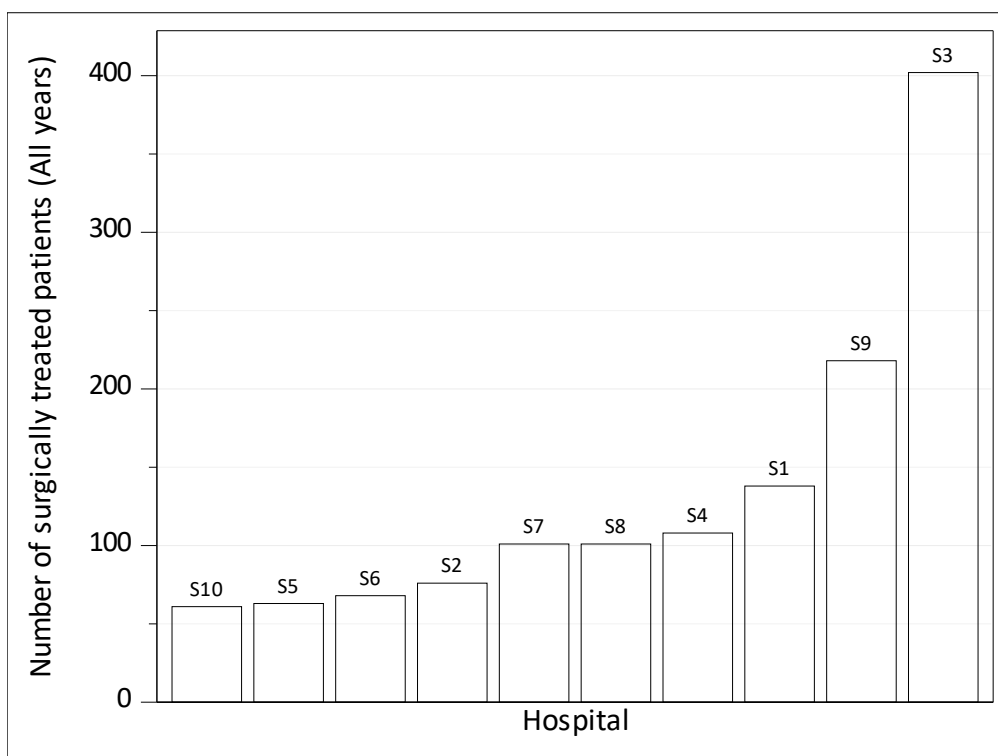




(c)



(d)



### 3. Malignant tumours

#### 3.1. Descriptives

##### 3.1.1. Patient case mix description

**Table 2:** Case mix description of all patients discussed on a MC who underwent surgical treatment (only for standard surgery).

Characteristic	Belgium (N=1,182)					
	Year 1		Year 2		Year 3	
	N	%	N	%	N	%
<b><i>N patients with standard surgery</i></b>	<b>395</b>		<b>380</b>		<b>407</b>	
<b><i>Expert centres</i></b>						
S1	52	13.2	35	9.2	34	8.4
S2	24	6.1	27	7.1	20	4.9
S3	131	33.2	110	28.9	112	27.5
S4	32	8.1	39	10.3	33	8.1
S5	17	4.3	16	4.2	17	4.2
S6	13	3.3	20	5.3	22	5.4
S7	21	5.3	28	7.4	43	10.6
S8	26	6.6	23	6.1	36	8.8
S9	65	16.5	62	16.3	65	16.0
S10	14	3.5	20	5.3	25	6.1
<b><i>Sex</i></b>						
Male	311	78.7	312	82.1	320	78.6
Female	84	21.3	68	17.9	87	21.4
<b><i>Age at surgery</i></b>						
<=69	260	65.8	247	65.0	245	60.2
70-79	117	29.6	113	29.7	143	35.1
>=80	18	4.6	20	5.3	19	4.7
<b><i>Lesion to treat (in oesophagus/GOJ)</i></b>						
Primary tumour	386	97.7	372	97.9	395	97.1
Relapse of primary tumour	9	2.3	6	1.6	10	2.5
Metastasis	0	0.0	2	0.5	2	0.5
<b><i>Morphology</i></b>						
Adenocarcinoma	301	76.2	273	71.8	307	75.4
Squamous cell carcinoma	89	22.5	100	26.3	93	22.9
Other, unspecified or missing	5	1.3	7	1.8	7	1.7
<b><i>Primary tumour localisation</i></b>						
C15.0/C15.3 Cervical/upper third oesophagus	13	3.3	5	1.3	10	2.5
C15.1/C15.4 Thoracic/middle third oesophagus	49	12.4	55	14.5	49	12.0

Characteristic	Belgium (N=1,182)					
	Year 1		Year 2		Year 3	
	N	%	N	%	N	%
C15.2/C15.5 Abdominal/lower third oesophagus	213	53.9	190	50.0	197	48.4
C15.8 Overlapping lesion of oesophagus	0	0.0	0	0.0	4	1.0
C16.0 Gastro-oesophageal junction	120	30.4	129	33.9	146	35.9
Other	0	0.0	1	0.3	1	0.2
<b>Clinical stage</b>						
0	4	1.1	1	0.3	3	0.8
I	45	11.9	34	9.4	33	8.5
II	63	16.7	69	19.2	75	19.4
III	183	48.4	187	51.9	191	49.4
IV	78	20.6	64	17.8	83	21.4
IVA <sup>#</sup>	62	79.5	52	82.5	71	86.6
IVB <sup>#</sup>	16	20.5	11	17.5	11	13.4
X	5	1.3	5	1.4	2	0.5
TNM not applicable or relapse*	17	—	20	—	20	—
<b>Pathological stage</b>						
0	6	7.1	4	5.1	2	2.4
I	37	43.5	42	53.2	33	39.8
II	20	23.5	17	21.5	20	24.1
III	15	17.6	9	11.4	24	28.9
IV	2	2.4	7	8.9	4	4.8
X	5	5.9	0	0.0	0	0.0
TNM not applicable or relapse*	5	—	6	—	6	—
Neoadjuvant treatment**	305	—	295	—	318	—
<b>yPathological stage</b>						
0	52	17.7	44	15.6	41	13.5
I	31	10.6	27	9.6	40	13.2
II	82	28.0	82	29.1	102	33.6
III	99	33.8	87	30.9	82	27.0
IV	27	9.2	38	13.5	35	11.5
X	2	0.7	4	1.4	4	1.3
TNM not applicable or relapse*	12	—	13	—	14	—
No neoadjuvant treatment**	90	—	85	—	89	—
<b>Prior surgery or endoscopic treatment***</b>						
Prior major thoracic or abdominal surgery	26	6.6	38	10.0	28	6.9
Endoscopic treatment	21	5.3	24	6.3	19	4.7
EMR/ESD	21	100.0	24	100.0	19	100.0
RFA	2	9.5	0	0.0	0	0.0
Ablation techniques other than RFA	0	0.0	0	0.0	0	0.0
Other treatment modality (that could affect the oesophagus)	5	1.3	5	1.3	8	2.0
<b>Neoadjuvant treatment</b>						

Characteristic	Belgium (N=1,182)					
	Year 1		Year 2		Year 3	
	N	%	N	%	N	%
Chemotherapy	93	23.5	114	30.0	107	26.3
Targeted therapy/biologicals	1	0.3	6	1.6	4	1.0
Radiotherapy	0	0.0	1	0.3	0	0.0
Chemoradiotherapy	212	53.7	180	47.4	211	51.8
No chemo, radiation or targeted treatment	90	22.8	85	22.4	89	21.9
<b>Charlson Comorbidity Index</b>						
0	180	45.6	156	41.1	170	41.8
1	101	25.6	113	29.7	104	25.6
2	65	16.5	59	15.5	65	16.0
3	28	7.1	26	6.8	38	9.3
4	11	2.8	12	3.2	21	5.2
5	8	2.0	3	0.8	3	0.7
6	1	0.3	6	1.6	1	0.2
7	1	0.3	3	0.8	3	0.7
8	0	0.0	1	0.3	1	0.2
9	0	0.0	1	0.3	1	0.2
<b>WHO score at surgery</b>						
0 - Asymptomatic, normal activity	121	30.6	86	22.6	97	23.8
1 - Symptomatic, but ambulant	221	55.9	240	63.2	262	64.4
2 - Symptomatic, bedbound < 50% day	50	12.7	40	10.5	42	10.3
3 - Symptomatic, bedbound > 50% day	2	0.5	13	3.4	5	1.2
4 - Completely dependent, 100% bedbound	1	0.3	1	0.3	1	0.2
<b>ASA score</b>						
1 - Healthy person	21	5.3	11	2.9	22	5.4
2 - Mild systemic disease, normal activity	211	53.4	165	43.4	155	38.1
3 - Serious systemic disease, limited activity	160	40.5	202	53.2	221	54.3
4 - Life-threatening illness, handicapped	3	0.8	2	0.5	9	2.2
<b>Surgery intention</b>						
Surgery as primary treatment	90	22.8	82	21.6	91	22.4
Post-induction (neoadjuvant chemo- and/or radiotherapy)	287	72.7	285	75.0	301	74.0
Salvage post-radical chemo- and/or radiotherapy	18	4.6	13	3.4	15	3.7
<b>Type of surgery</b>						
Minimally invasive surgery (MIS)	226	57.2	246	64.7	273	67.1
Open	162	41.0	124	32.6	130	31.9
Conversion from MIS to open surgery	7	1.8	10	2.6	4	1.0
<b>RIZIV code for complex surgery</b>						
228270-228281: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery	1	0.3	0	0.0	0	0.0
228292-228303: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery	0	0.0	1	0.3	0	0.0

Characteristic	Belgium (N=1,182)					
	Year 1		Year 2		Year 3	
	N	%	N	%	N	%
228314-228325: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery and extensive lymph node removal	107	27.1	128	33.7	114	28.0
228336-228340: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery and extensive lymph node removal	287	72.7	251	66.1	293	72.0
<b>Oesophagectomy</b>						
Partial	132	33.4	181	47.6	151	37.1
Subtotal	263	66.6	199	52.4	256	62.9
<b>Antithrombotic medication</b>						
No	317	80.3	302	79.5	340	83.5
Yes	78	19.7	78	20.5	67	16.5
<b>Was the patient referred?</b>						
No	99	25.1	88	23.2	79	19.4
Yes	296	74.9	292	76.8	328	80.6

Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

\* Tumours for which staging is not possible.

\*\* Neoadjuvant treatment: patients who received either chemotherapy, targeted therapy, 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. Combinations of prior surgery, endoscopic and neoadjuvant treatments could also occur.

# Only IVA and IVB have been considered for this subsection. Hence the sum of their numbers might not be equal to the number portrayed in clinical stage IV.

### 3.1.2. Completeness of registration

The indicator 'completeness of cases' calculates for how many patients surgery was performed in the third convention year and how many of these were actually registered within the complex surgery database. These calculations 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 third convention year.

**Table 3:** Completeness of cases: Total number of patients with performed surgeries registered by all recognised Belgian centres.

Belgium, recognised centres			
	n registered	N performed	n/N (%)
<i>Expert centres</i>			

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

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

**Table 4:** Completeness of registration forms: Number of registrations in complex surgery database that were complete, by surgery type and by expert centre in the third convention year.

Characteristic	Belgium		
	N registered	n complete	n/N (%)
<b><i>N patients discussed on a MC in Year 3</i></b>	966	963	99.7
<b><i>Surgery status</i></b>			
N patients with surgery	419	416	99.3
N patients without surgery	547	547	100.0
<b><i>Expert centres</i></b>			
S1	101	99	98.0
S2	101	101	100.0
S3	224	224	100.0
S4	63	63	100.0
S5	82	82	100.0
S6	43	43	100.0
S7	74	74	100.0
S8	87	87	100.0
S9	121	121	100.0
S10	70	69	98.6

## 3.2. Process indicators

### 3.2.1. Time between confirmed diagnosis (pathological anatomy) and start of treatment

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

**Table 5:** Proportion of surgically treated patients in the three convention years for whom treatment started within 4 weeks since (anatomopathological) diagnosis (**only for standard surgery**).

Characteristic	Belgium				
	N	N miss*	n	n/N (%)	95% CI
<b><i>Surgically treated patients Y1+Y2+Y3</i></b>	1,172	10	323	27.6	[25.0, 30.2]
<b><i>Convention year</i></b>					
Year 1	390	5	99	25.4	[21.1, 30.0]
Year 2	375	5	122	32.5	[27.8, 37.5]
Year 3	407	0	102	25.1	[20.9, 29.6]
<b><i>Referral status</i></b>					
Surgically treated patients referred to an expert centre	909	7	249	27.4	[24.5, 30.4]
Surgically treated patients without referral	263	3	74	28.1	[22.8, 34.0]

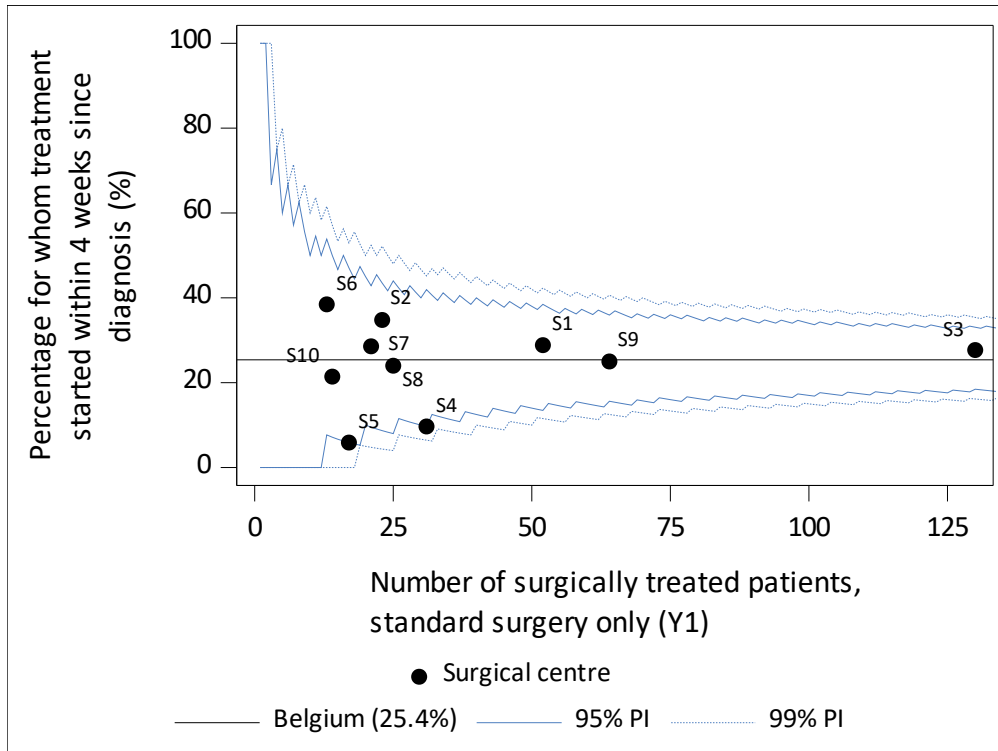
Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

\* Time difference not available because start of treatment is before date of diagnosis.

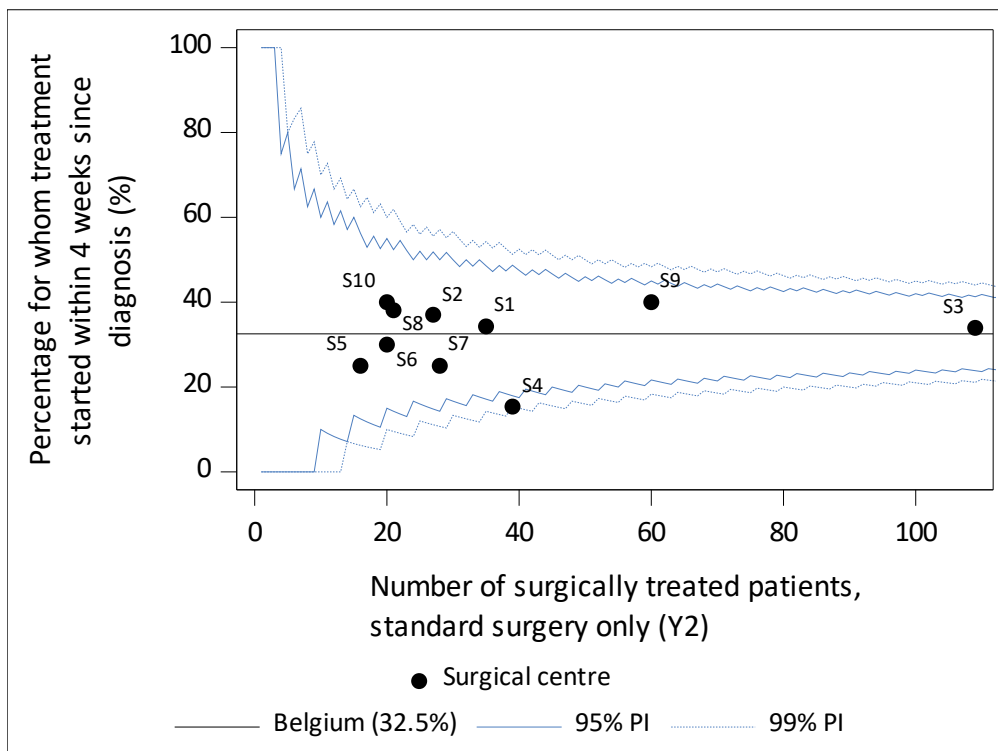


**Figure 3:** Funnel and spaghetti plot of the proportion of all surgically treated patients for whom treatment started within 4 weeks since (anatomopathological) diagnosis (**only for standard surgery**), per centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

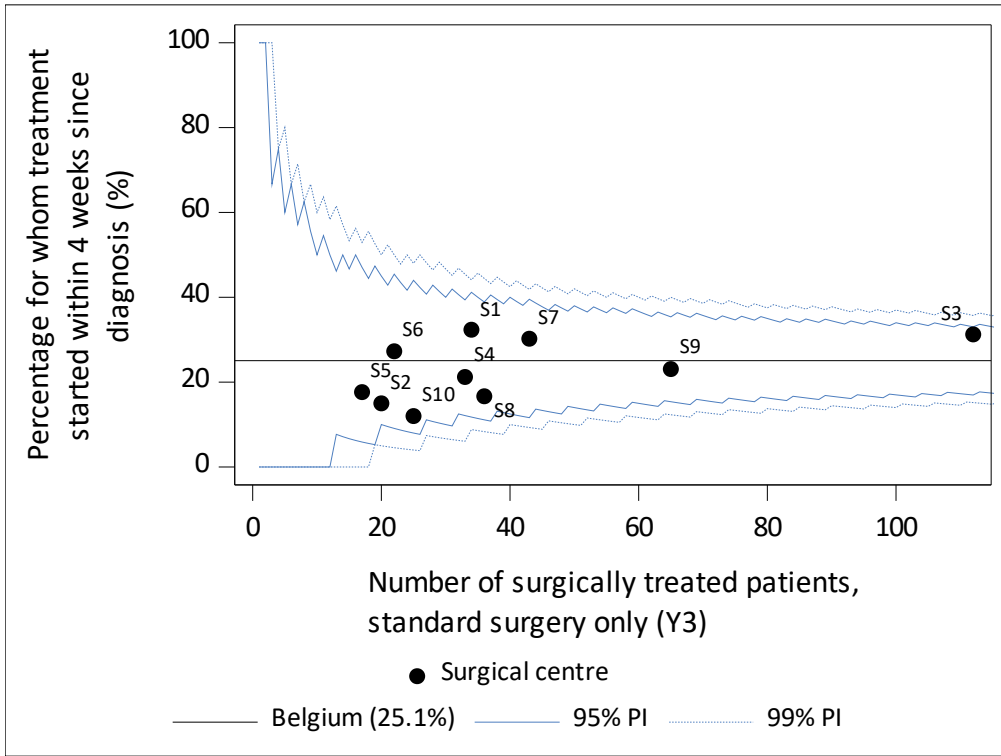
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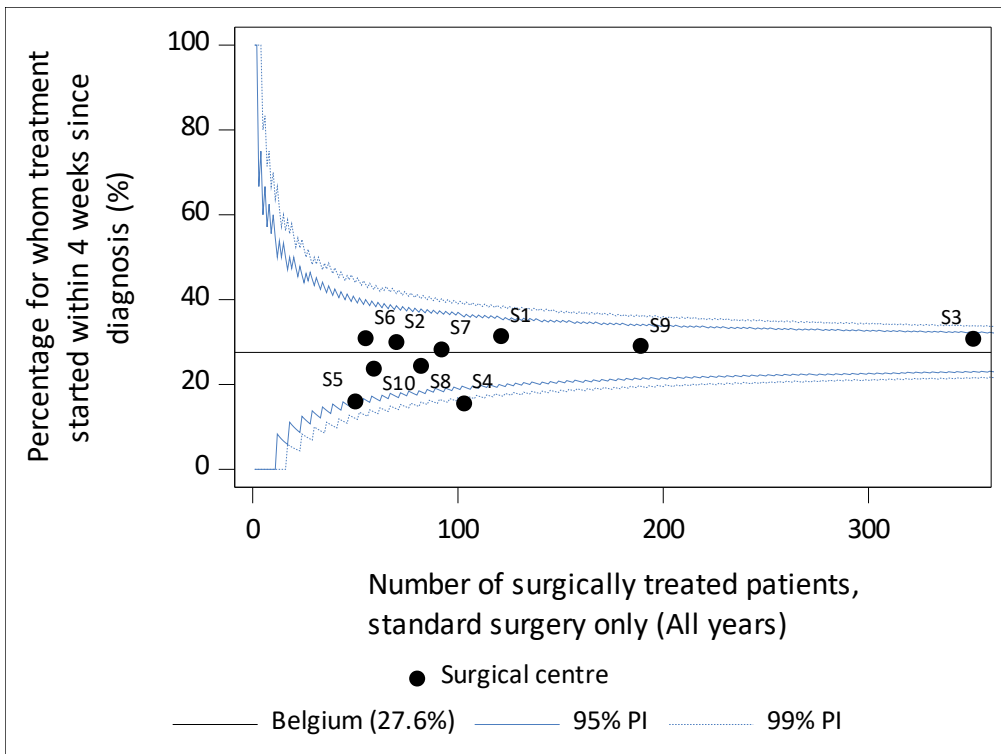
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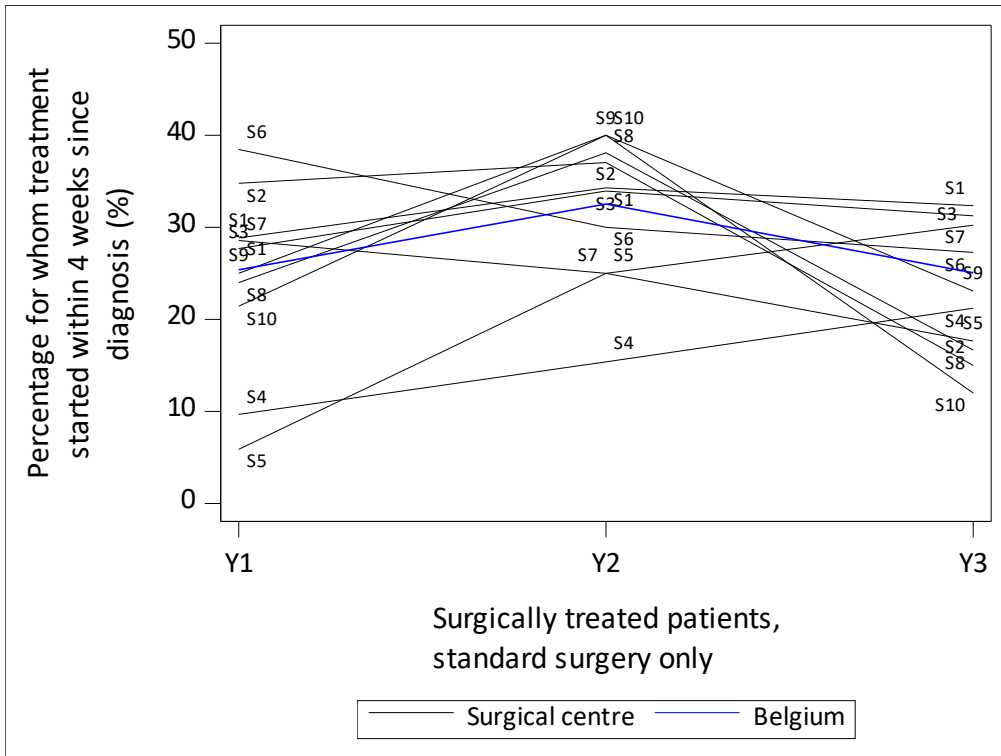
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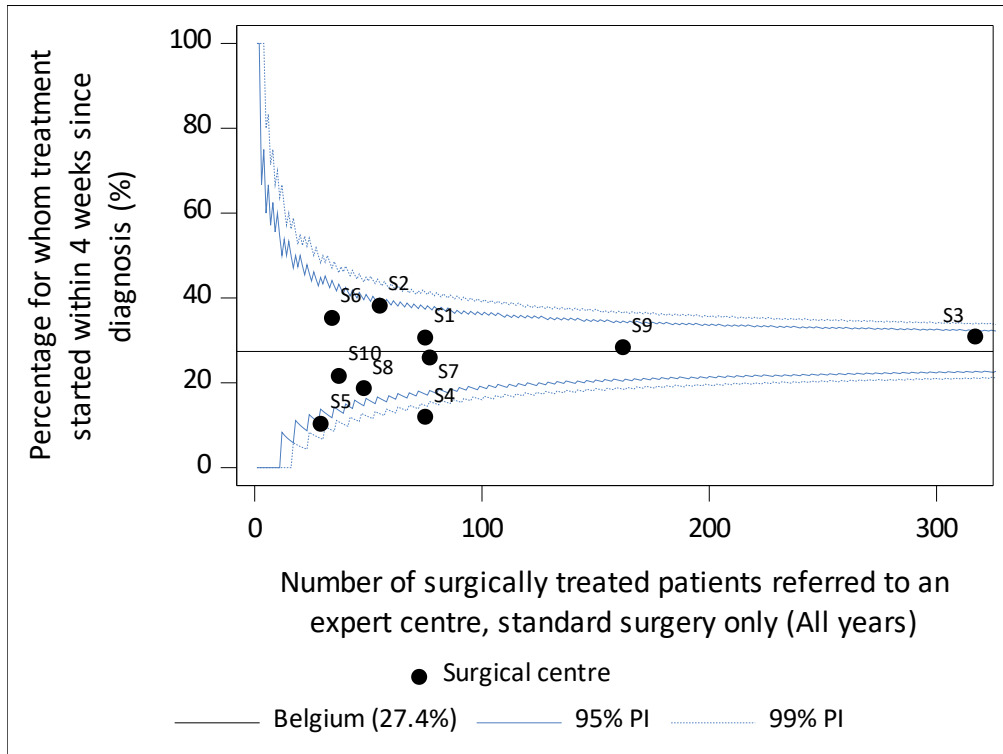


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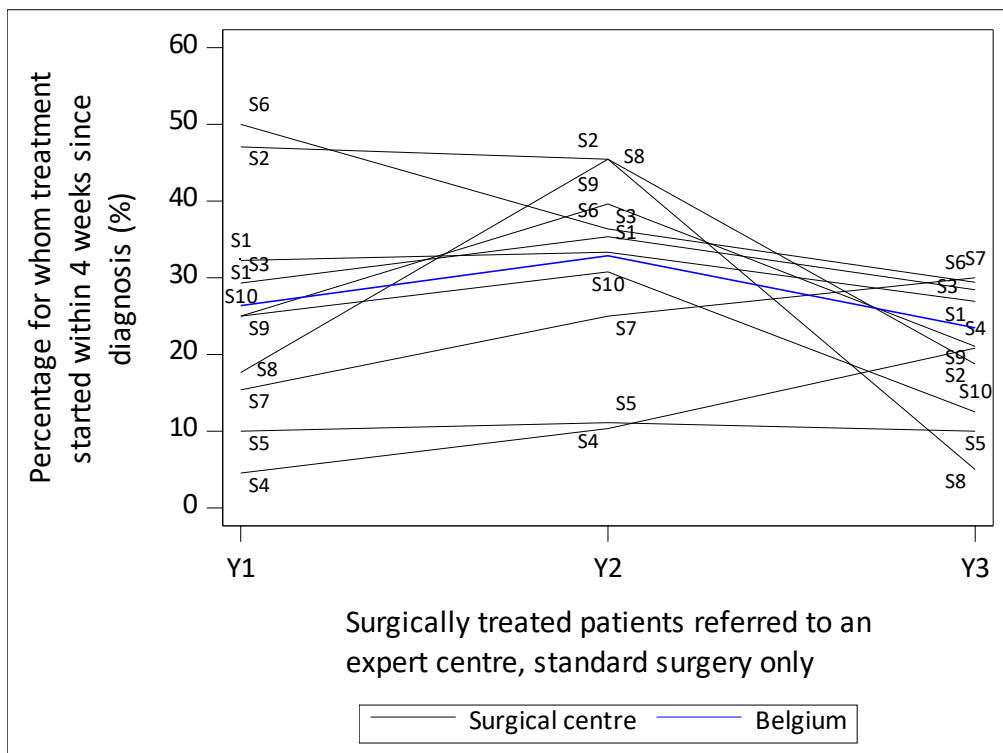


**Figure 4:** Funnel and spaghetti plot of the proportion of surgically treated patients **referred to an expert centre** for whom treatment started within 4 weeks since (anatomopathological) diagnosis (**only for standard surgery**), per centre for (a) all years combined, (b) evolution year 1, 2 and 3.

(a)

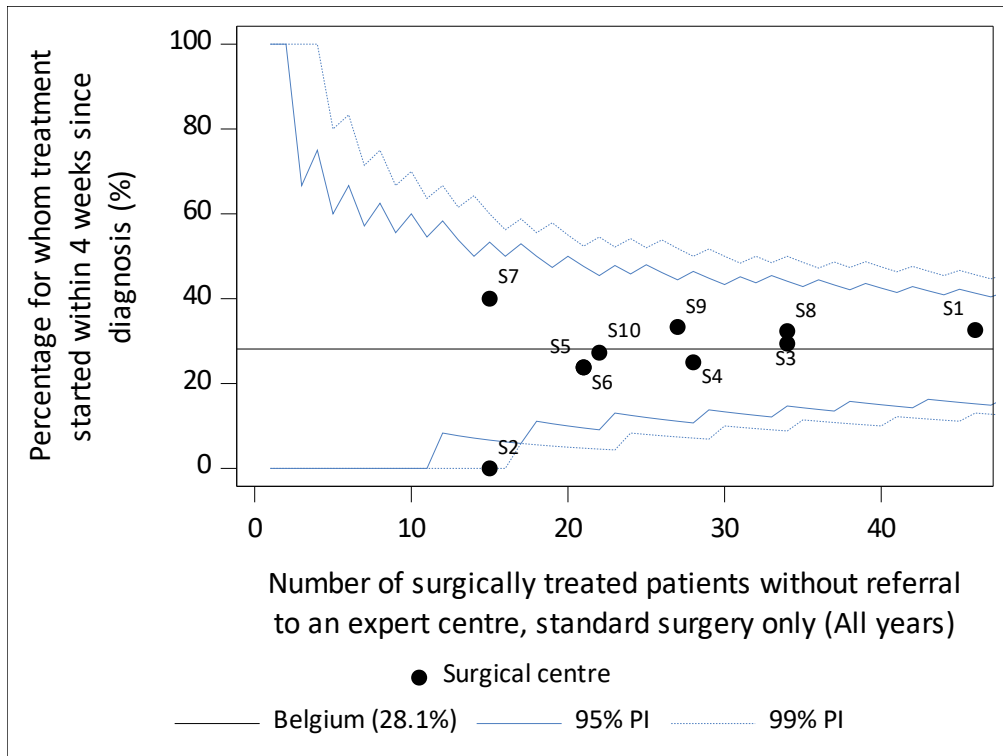


(b)

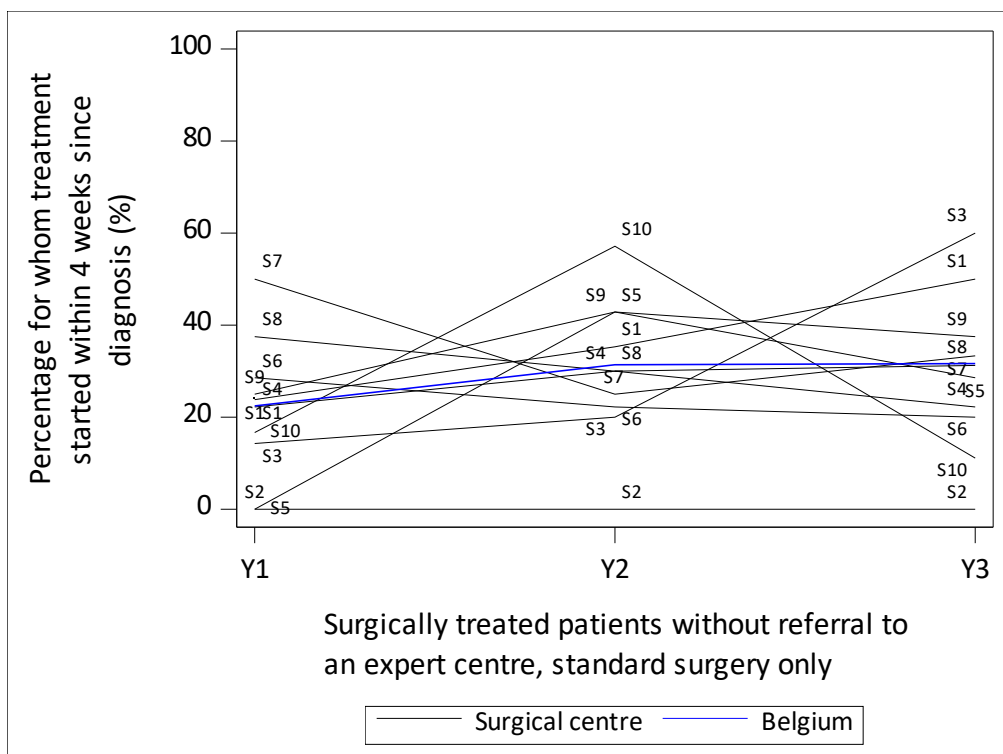


**Figure 5:** Funnel and spaghetti plot of the proportion of surgically treated patients **without referral** (= direct presentation at expert centre) for whom treatment started within 4 weeks since (anatomopathological) diagnosis (**only for standard surgery**), per centre, for (a) all years combined, (b) evolution year 1, 2 and 3.

(a)



(b)

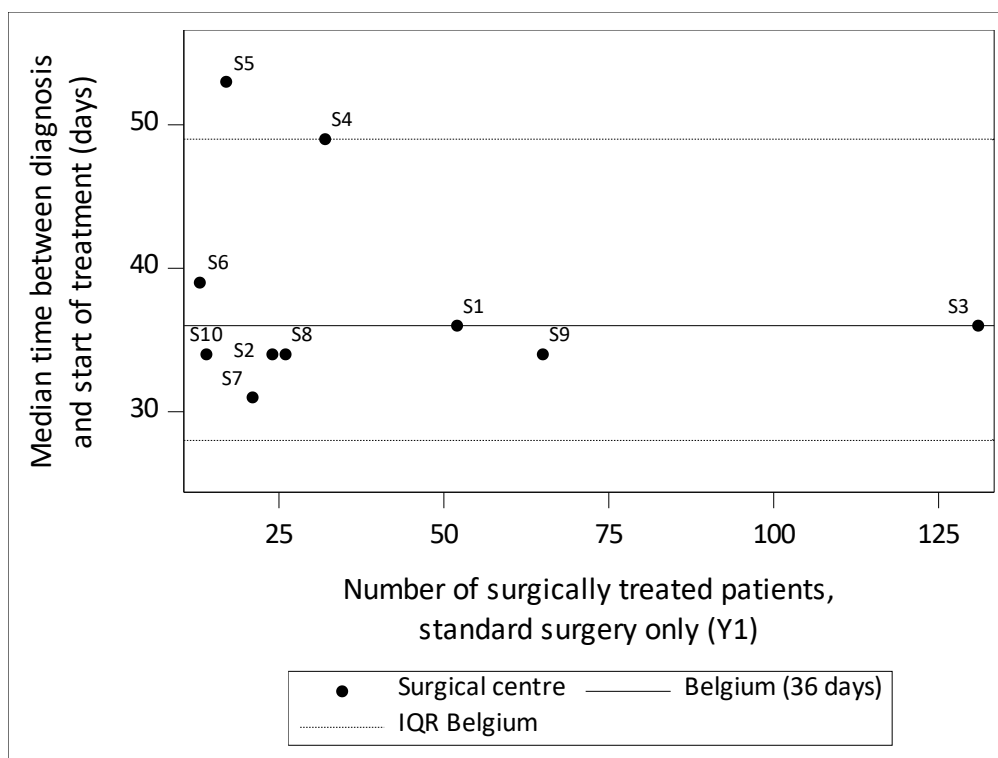


**Table 6:** Median time between (anatomopathological) diagnosis and start of treatment in the three convention years (**only for standard surgery**).

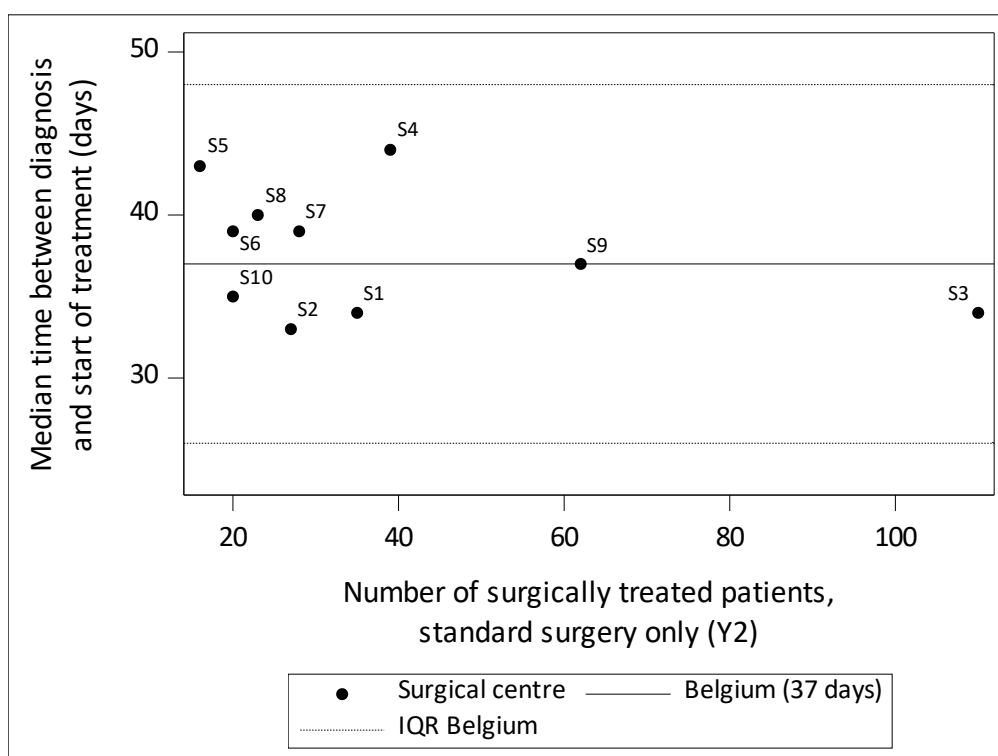
Characteristic	Belgium				
	N	N miss*	Median (days)	IQR**	P90***
<b><i>Surgically treated patients Y1+Y2+Y3</i></b>	1,172	10	37	[28, 49]	63
<b><i>Convention year</i></b>					
Year 1	390	5	36	[28, 49]	63
Year 2	375	5	37	[26, 48]	62
Year 3	407	0	39	[28, 49]	63
<b><i>Referral status</i></b>					
Surgically treated patients referred to an expert centre	909	7	38	[28, 49]	63
Surgically treated patients without referral	263	3	36	[27, 49]	64
Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.					
* Time difference not available because start of treatment is before date of diagnosis.					
** Interquartile Range=[the 25th, and 75th percentiles of the data]					
*** 90th percentile					

**Figure 6:** Median time between (anatomopathological) diagnosis and start of treatment (**only for standard surgery**), per centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined.

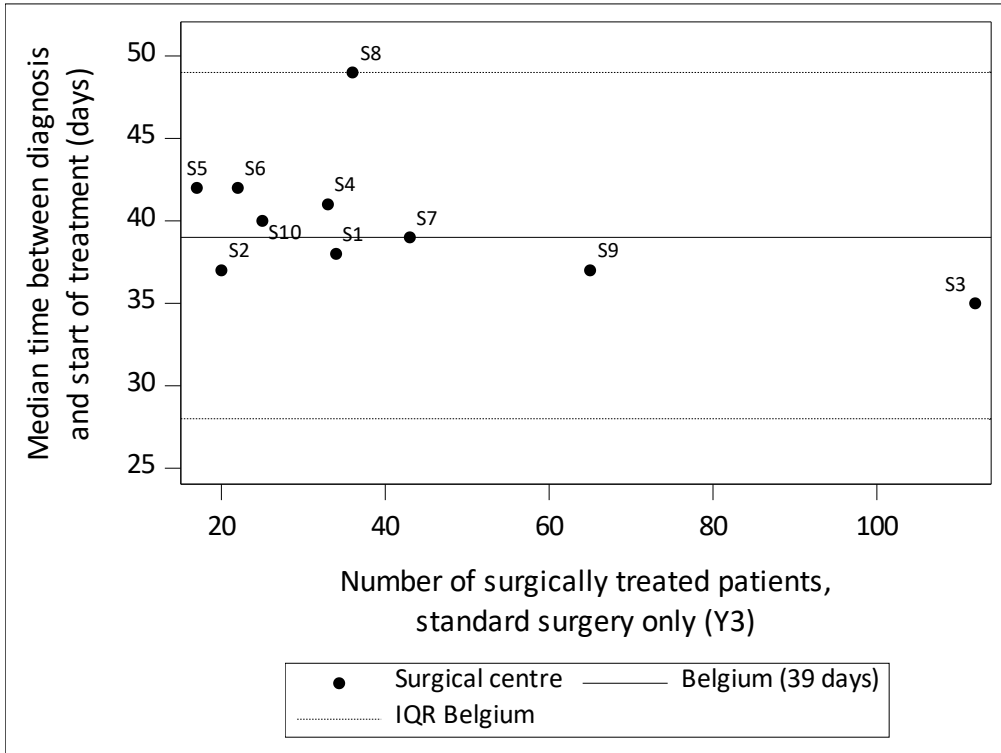
(a)



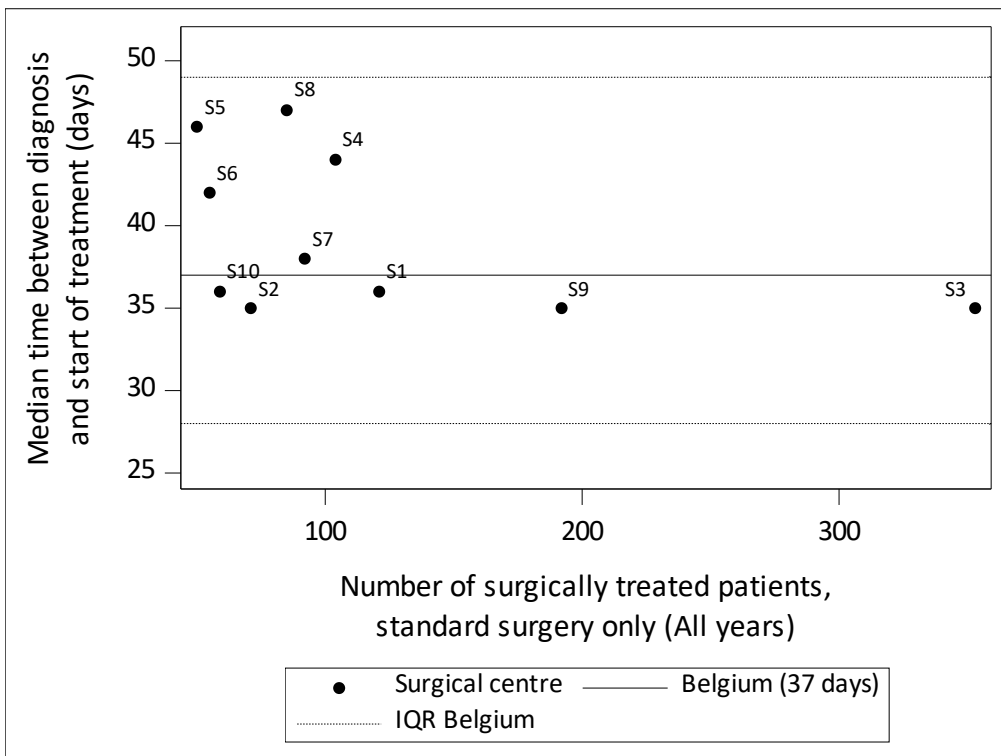
(b)



(c)



(d)





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

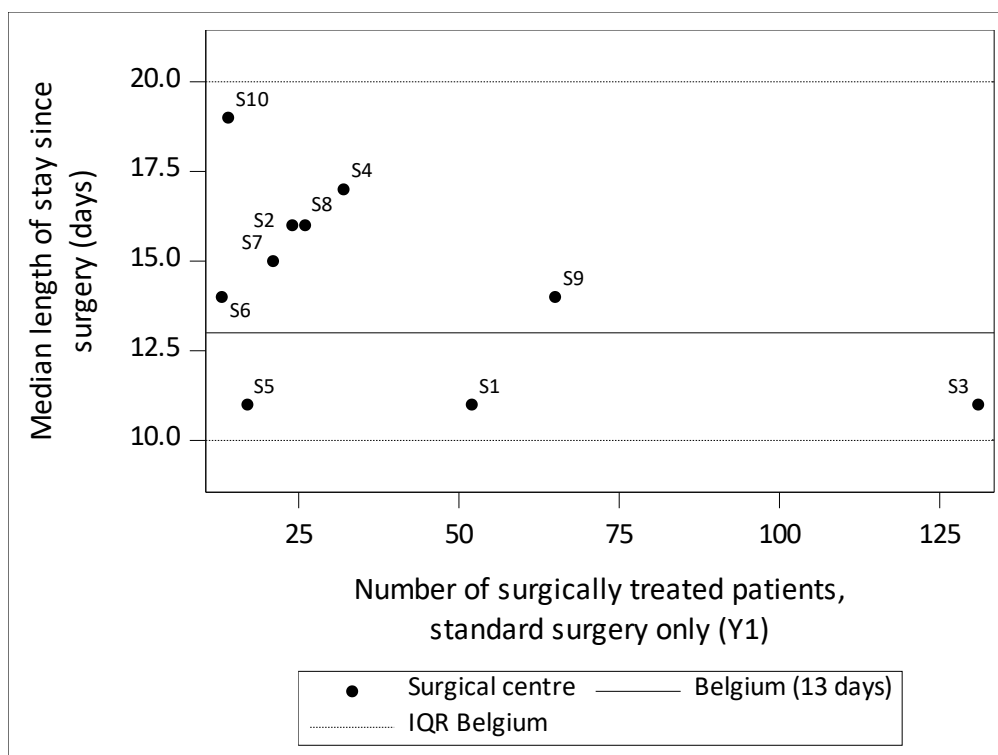
**Table 7:** Length of stay for patients surgically treated in an expert centre in the three convention years (**only for standard surgery**).

Characteristic	Belgium		
	N	Median (days)	IQR*
<b><i>From surgery to discharge Y1+Y2+Y3<sup>1</sup></i></b>	1,182	12	[9, 21]
<b><i>Convention year</i></b>			
Year 1	395	13	[10, 20]
Year 2	380	12	[9, 22]
Year 3	407	12	[9, 20]

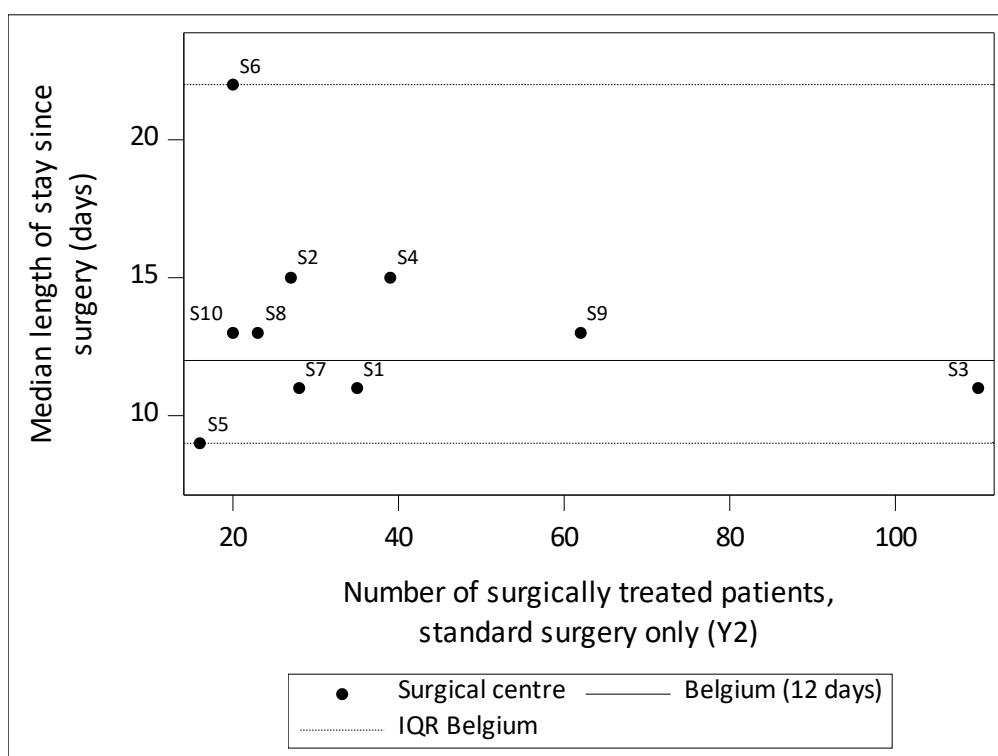
Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.  
<sup>1</sup> length of stay longer than 90 days was truncated at 90 days.  
 \* Interquartile Range=[the 25th, and 75th percentiles of the data]

**Figure 7:** Median length of stay for surgically treated patients (**only for standard surgery**), per centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined.

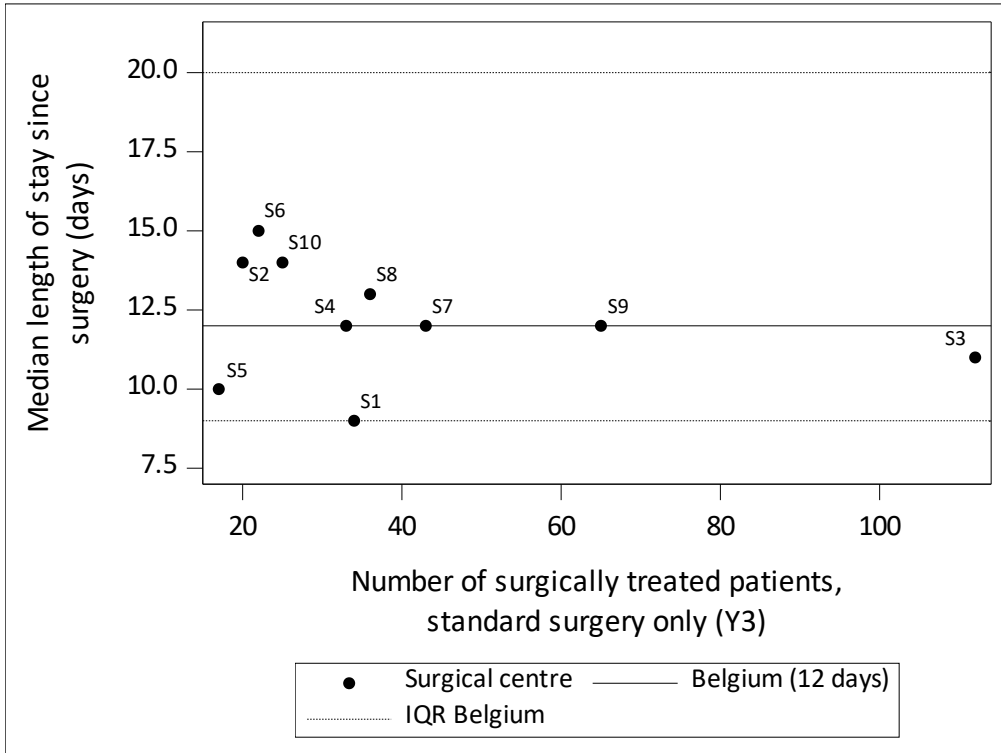
(a)



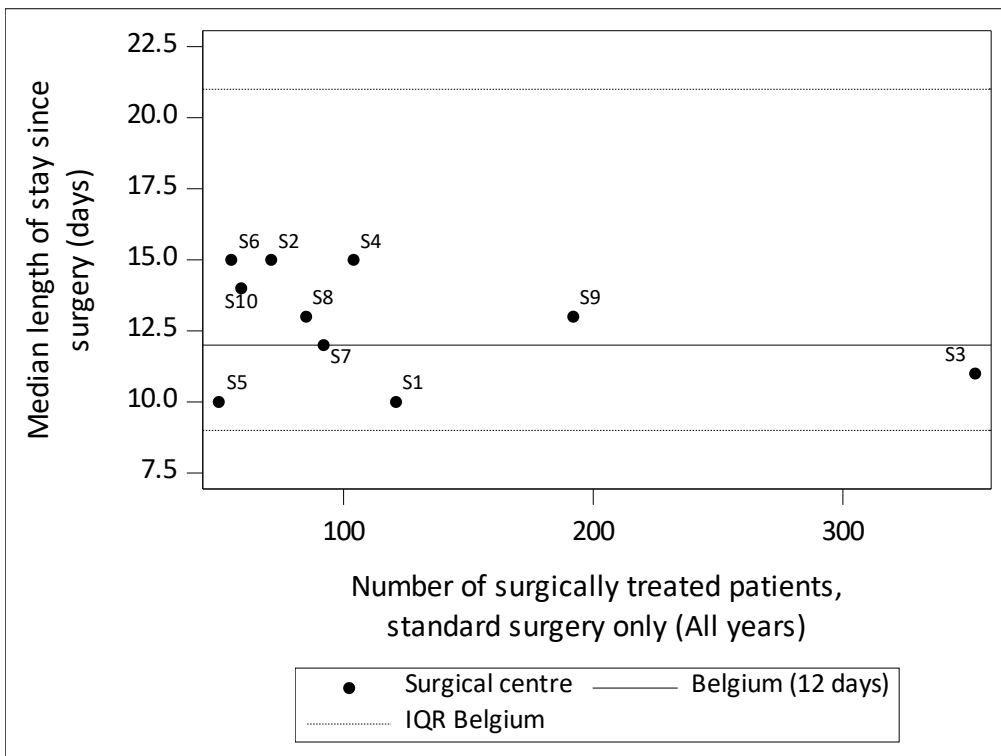
(b)



(c)



(d)



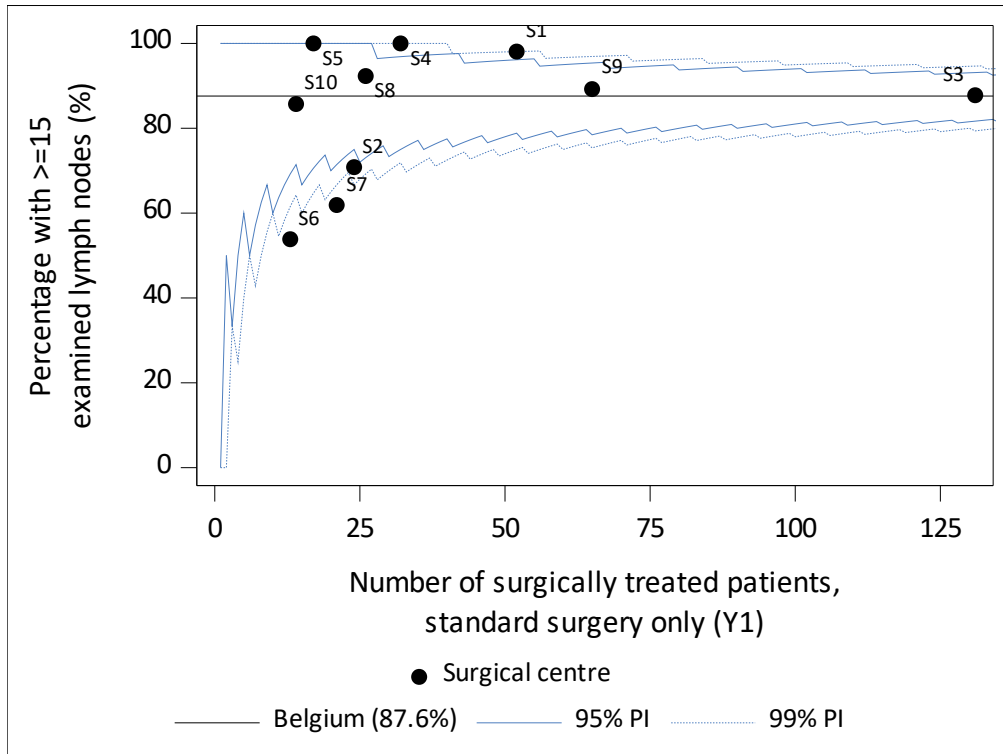
### 3.2.3. Proportion of surgically treated patients with $\geq 15$ lymph nodes examined

**Table 8:** Proportion of surgically treated patients in the three convention years for whom  $\geq 15$  lymph nodes were examined (**only for standard surgery**).

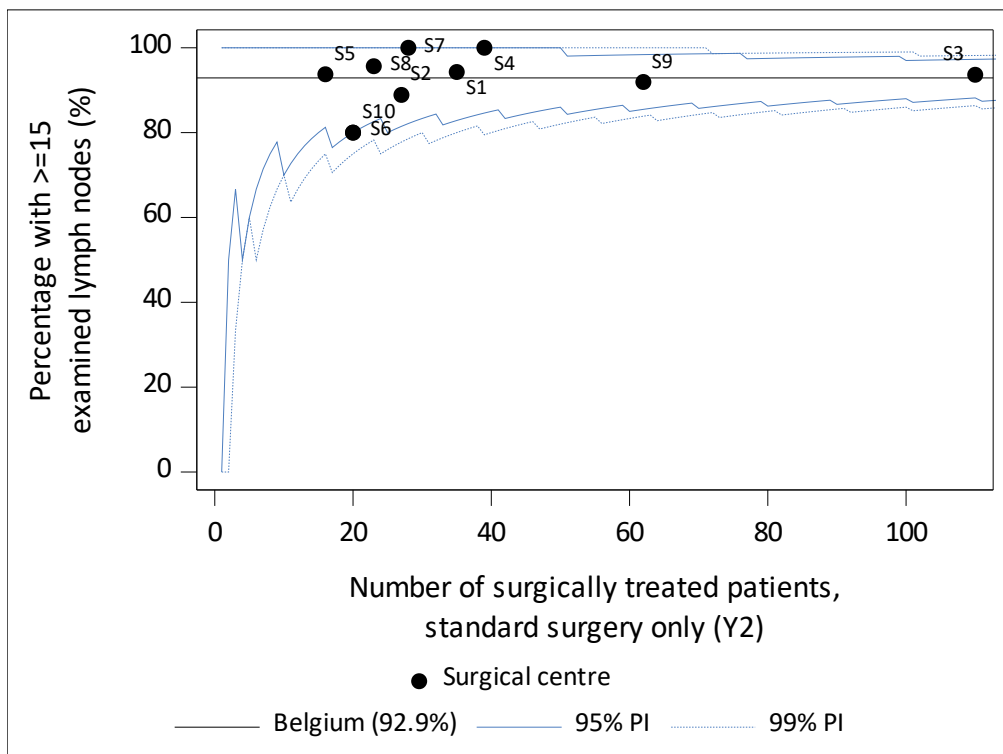
Characteristic	Belgium			
	N	n	n/N (%)	95% CI
<b><i>Surgically treated patients with <math>\geq 15</math> lymph nodes examined, Y1+Y2+Y3</i></b>	1,182	1,073	90.8	[89.0, 92.4]
<b><i>Convention year</i></b>				
Year 1	395	346	87.6	[83.9, 90.7]
Year 2	380	353	92.9	[89.8, 95.3]
Year 3	407	374	91.9	[88.8, 94.4]
<b><i>Surgery intention</i></b>				
Surgery as primary treatment	263	246	93.5	[89.9, 96.2]
Post-induction (neoadjuvant chemo- and/or radiotherapy)	873	788	90.3	[88.1, 92.1]
Salvage post-radical chemo- and/or radiotherapy	46	39	84.8	[71.1, 93.7]
<b><i>Morphology</i></b>				
Adenocarcinoma	881	798	90.6	[88.5, 92.4]
Squamous cell carcinoma	282	260	92.2	[88.4, 95.0]
Other, unspecified or missing	19	15	78.9	[54.4, 93.9]
Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.				

**Figure 8:** Funnel and spaghetti plot of the proportion of surgically treated patients with  $\geq 15$  lymph nodes examined (**only for standard surgery**), per centre, (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

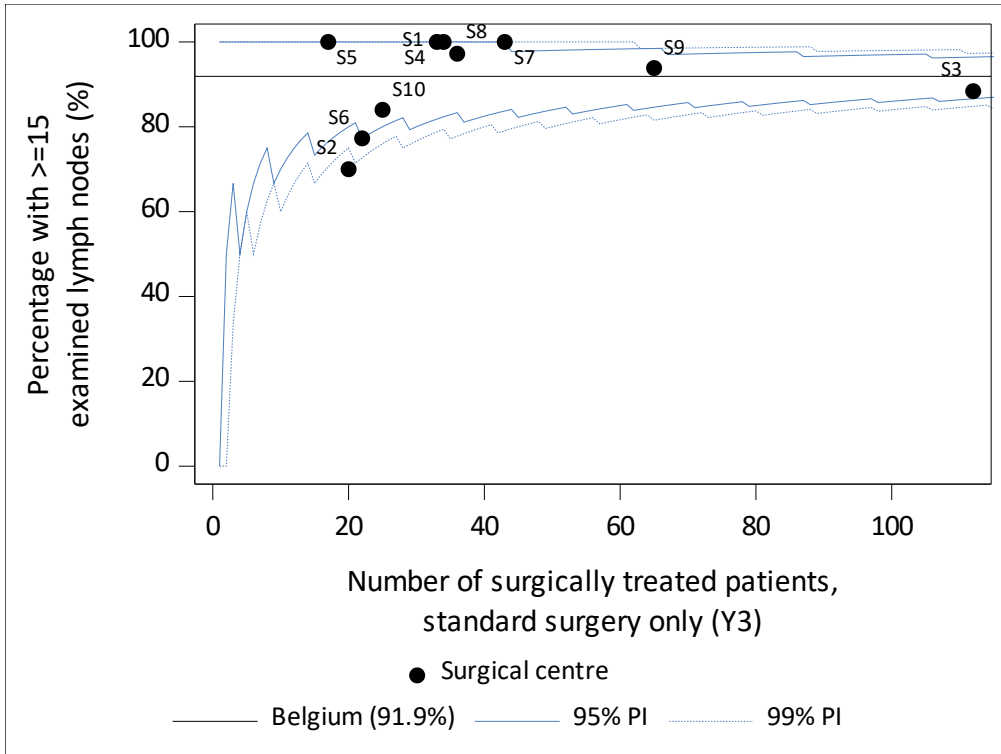
(a)



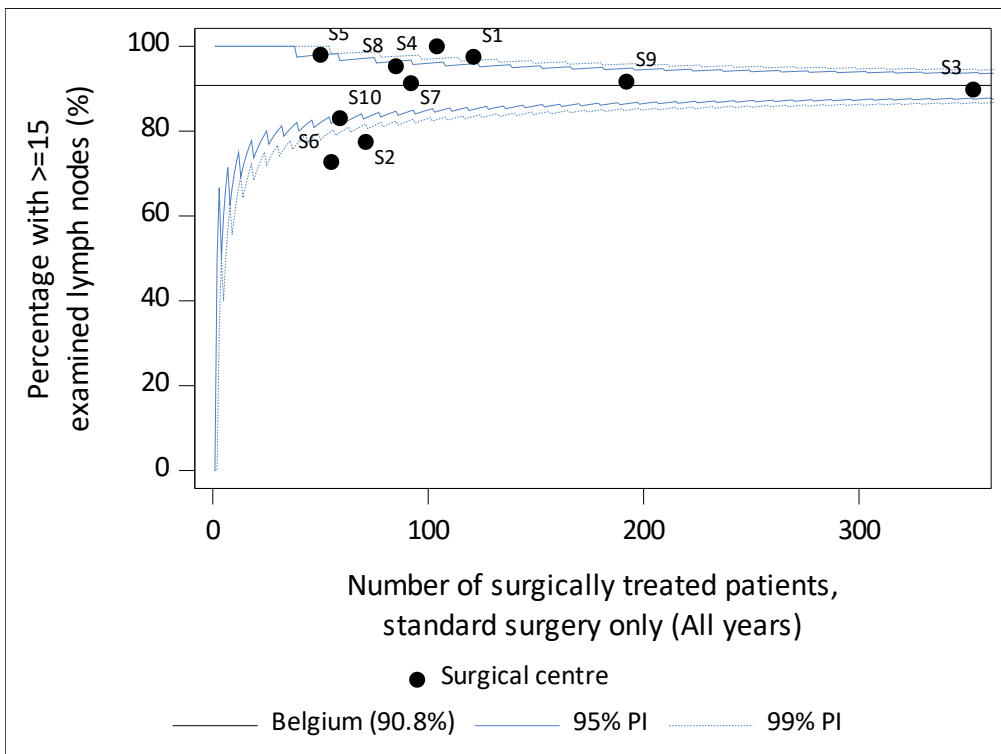
(b)



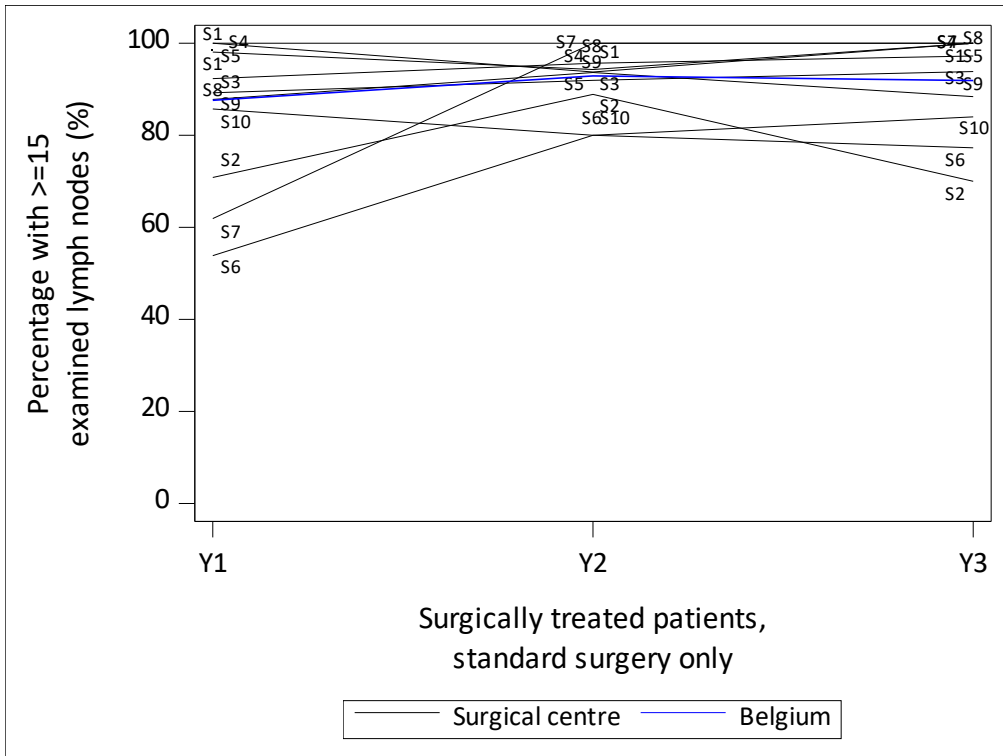
(c)



(d)



(e)



### 3.2.4. Proportion of surgically treated patients for whom a PET/CT was performed

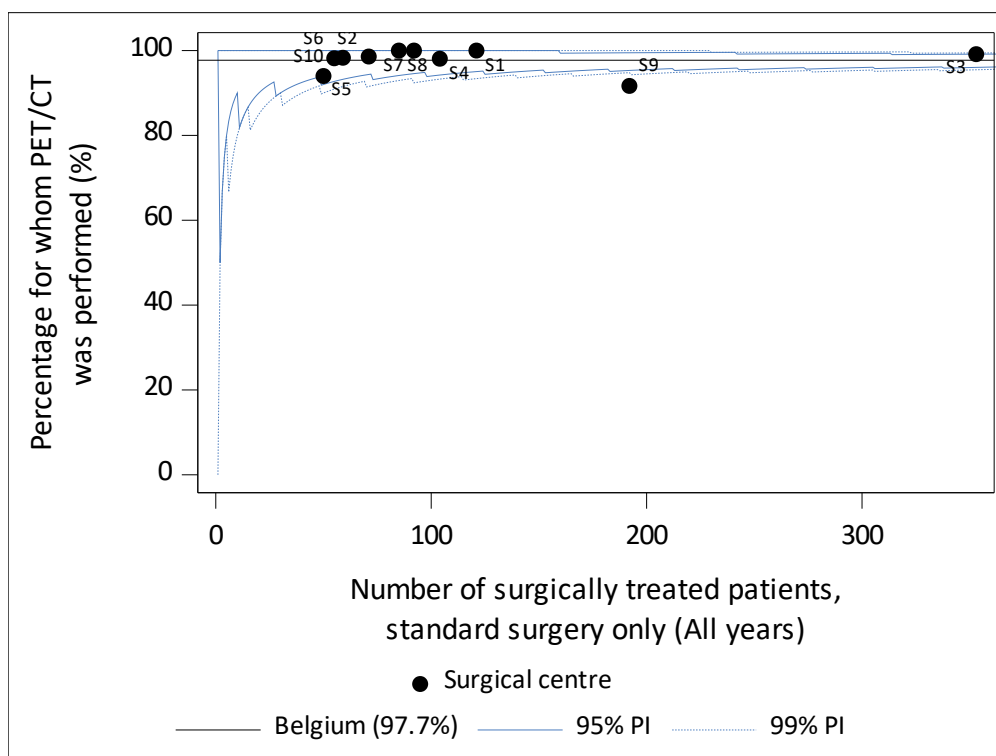
**Table 9:** Proportion of surgically treated patients in the three convention years for whom a PET/CT was performed (**only for standard surgery**).

Belgium				
Characteristic	N	n	n/N (%)	95% CI
<b>Surgically treated patients Y1+Y2+Y3, with PET/CT</b>	1,182	1,155	97.7	[96.7, 98.5]
<b>Convention year</b>				
Year 1	395	382	96.7	[94.4, 98.2]
Year 2	380	371	97.6	[95.6, 98.9]
Year 3	407	402	98.8	[97.2, 99.6]

Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

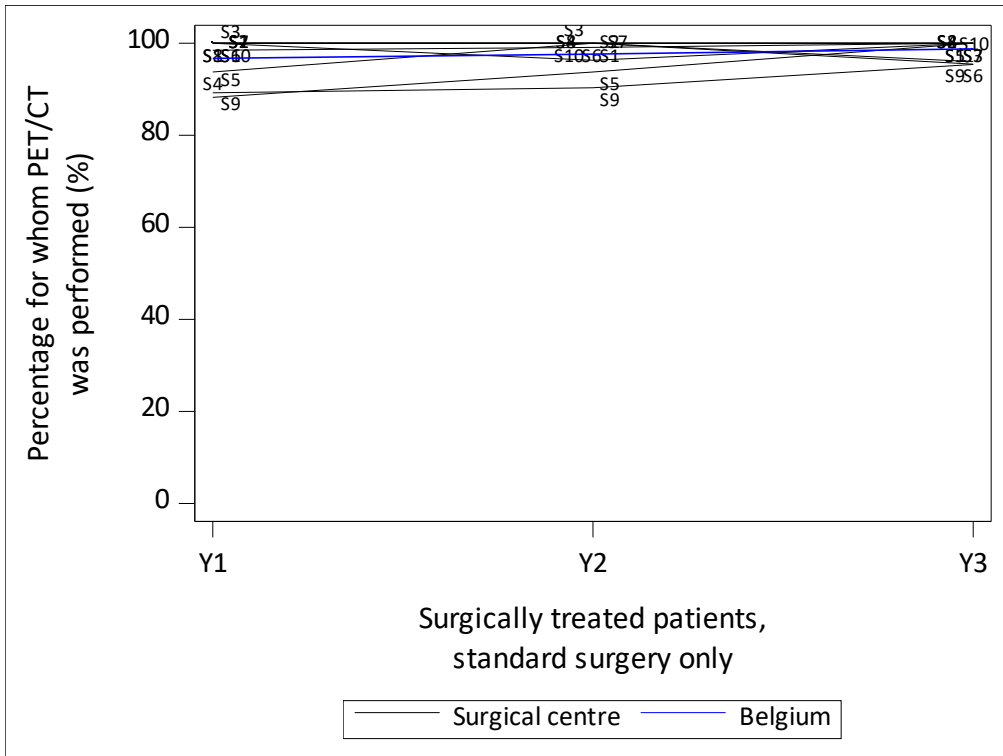
**Figure 9:** Funnel and spaghetti plot of the proportion of surgically treated patients for whom a PET/CT was performed (**only for standard surgery**), per centre, for (a) all years combined, (b) evolution year 1, 2 and 3.

(a)





(b)



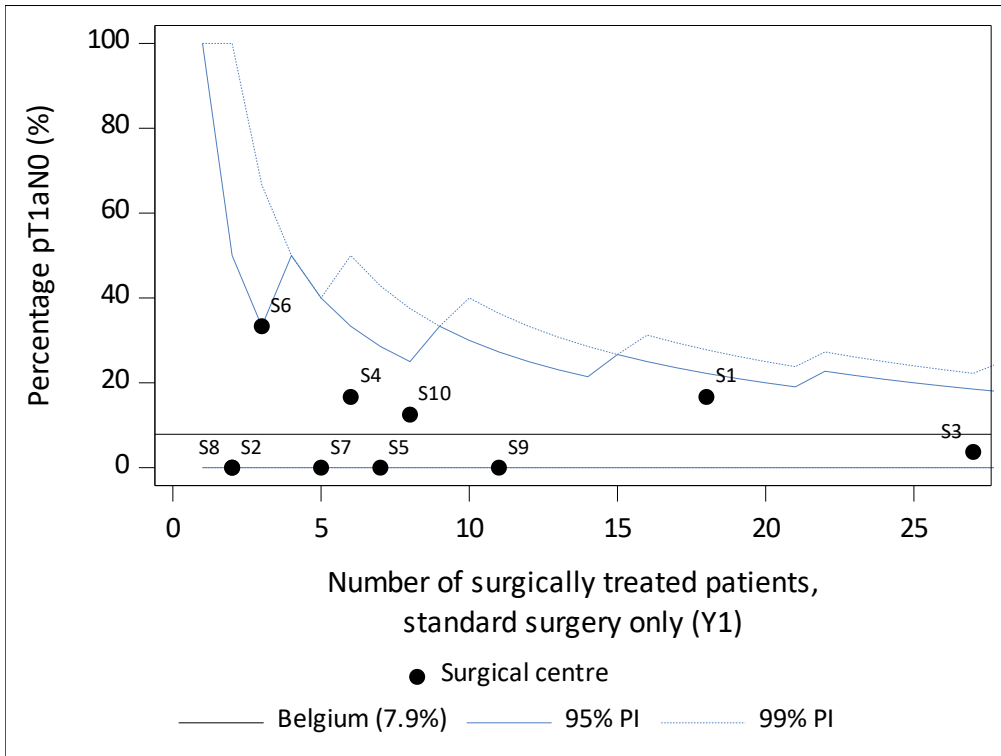
### 3.2.5. Proportion of surgically treated patients that were pT1aN0

**Table 10:** Proportion of surgically treated patients in the three convention years without neoadjuvant treatment that were pT1aN0 (**only for standard surgery**).

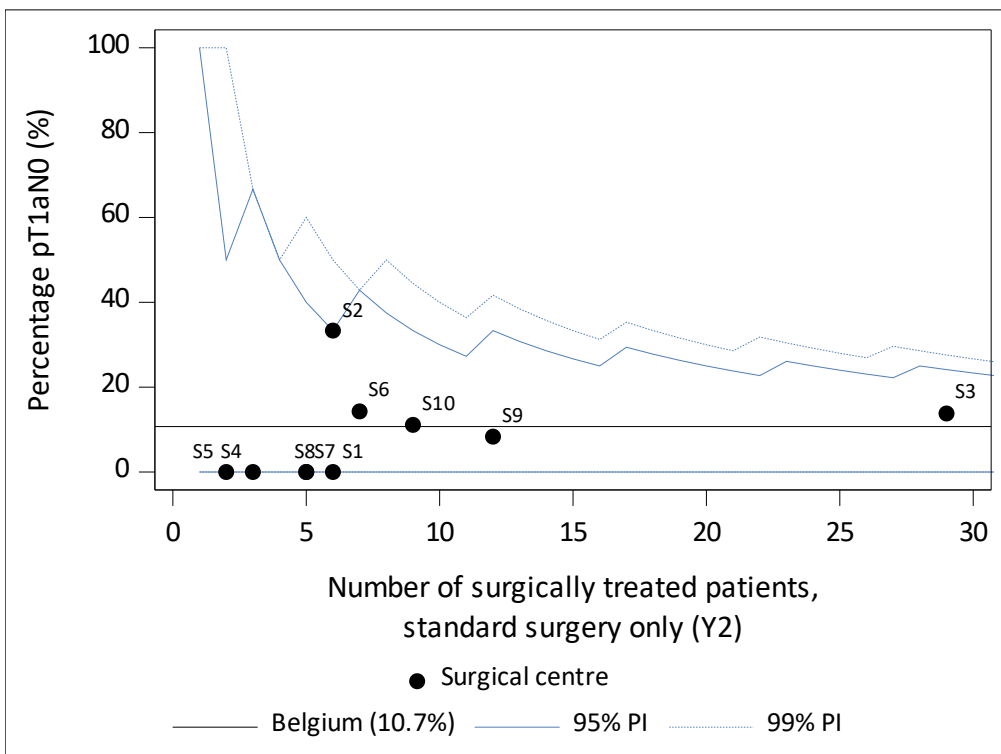
Characteristic	Belgium			
	N	n	n/N (%)	95% CI
<b><i>Surgically treated patients (no neoadjuvant treatment, no relapse) with pT1aN0 Y1+Y2+Y3</i></b>	260	25	9.6	[6.3, 13.9]
<b><i>Convention year</i></b>				
Year 1	89	7	7.9	[3.2, 15.5]
Year 2	84	9	10.7	[5.0, 19.4]
Year 3	87	9	10.3	[4.8, 18.7]
<b><i>Type of surgery</i></b>				
Minimally invasive surgery (MIS)	173	18	10.4	[6.3, 15.9]
Open	80	5	6.3	[2.1, 14.0]
Conversion from MIS to open surgery	7	2	28.6	[3.7, 71.0]
Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.				

**Figure 10:** Funnel and spaghetti plot of the proportion of surgically treated patients without neoadjuvant treatment that were pT1aNO (only for standard surgery), per centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

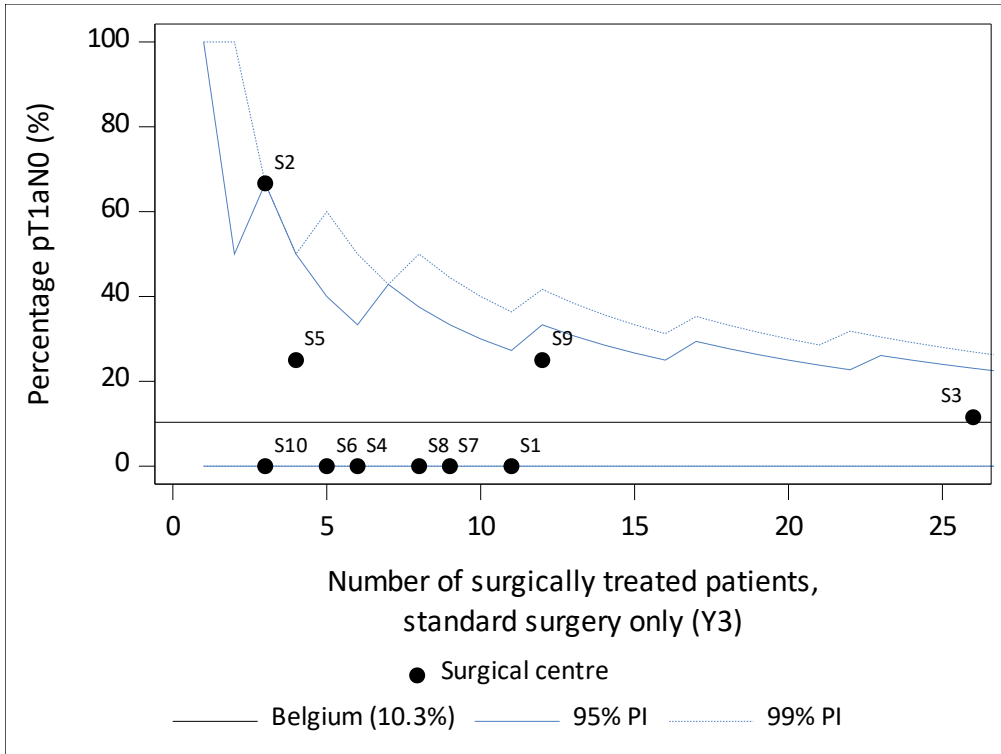
(a)



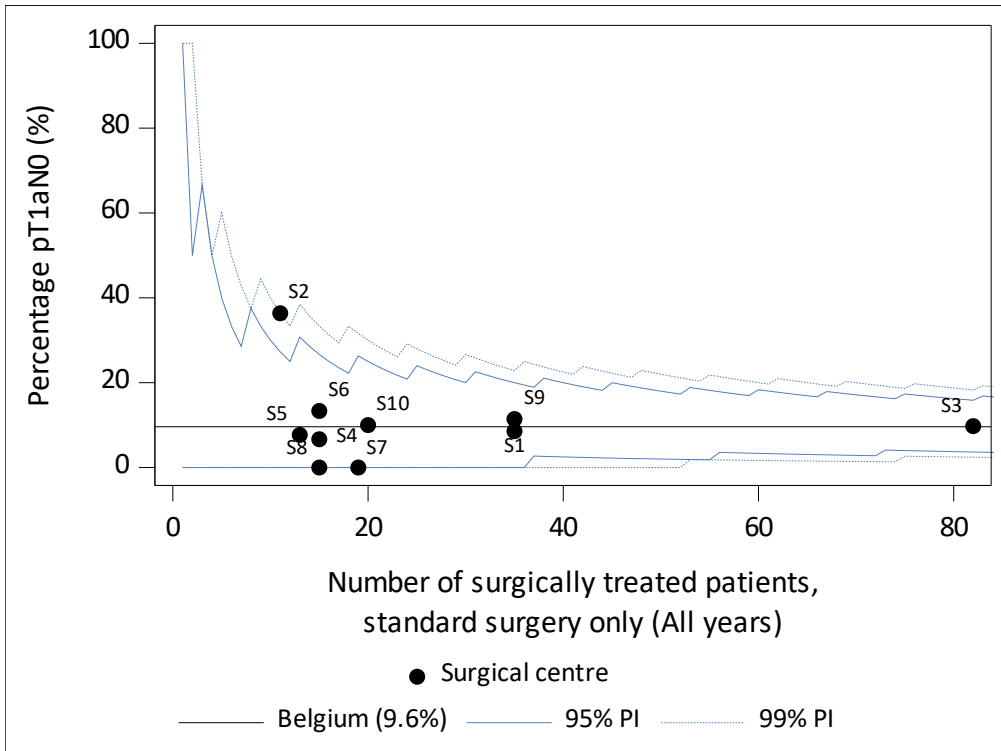
(b)



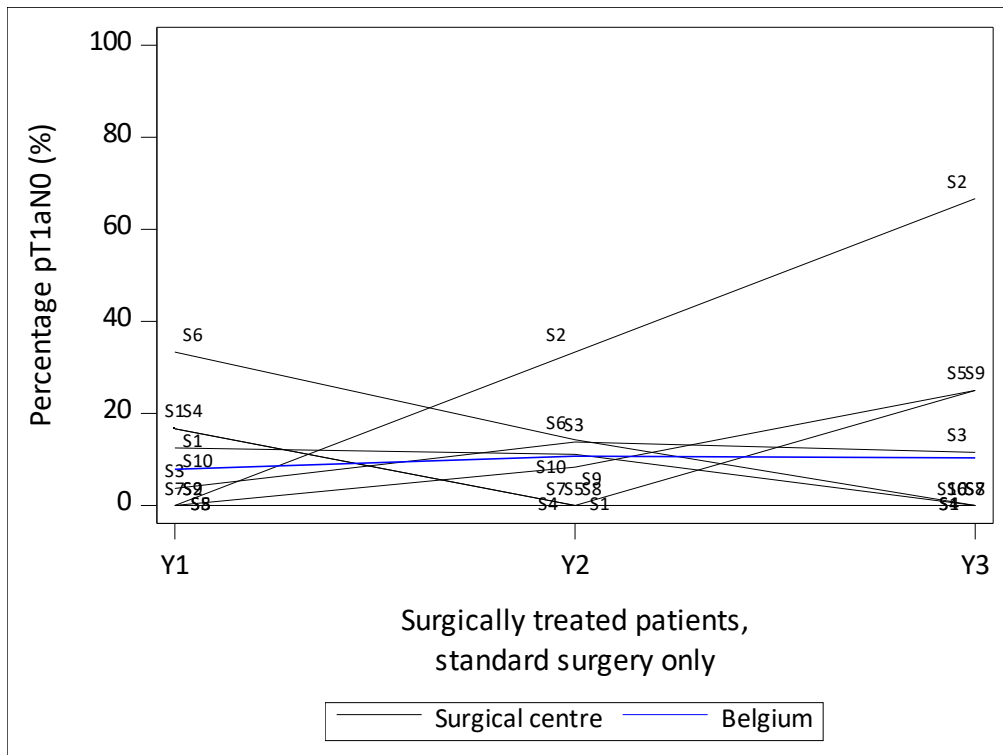
(c)



(d)



(e)



### 3.3. Outcome indicators

#### 3.3.1. Postoperative mortality

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

**Table 11:** Unadjusted 30-day postoperative mortality in the three convention years, by mode of surgery and by age, for the total malignant population.

Characteristic	Unadjusted 30-day postoperative mortality			
	Belgium			
	N	N of deaths	%	95% CI
<b>Overall Y1+Y2+Y3</b>	<b>1,241</b>	<b>34</b>	<b>2.7</b>	<b>[1.9, 3.8]</b>
<b>Convention year</b>				
Year 1	418	13	3.1	[1.7, 5.3]
Year 2	404	16	4.0	[2.3, 6.4]
Year 3	419	5	1.2	[0.4, 2.8]
<b>Mode of surgery</b>				
Standard surgery	1,182	28	2.4	[1.6, 3.4]
Non-standard surgery	59	6	10.2	[3.8, 20.8]
<b>Age at surgery</b>				
<=69	789	14	1.8	[1.0, 3.0]
70-79	392	18	4.6	[2.7, 7.2]
>=80	60	2	3.3	[0.4, 11.5]

Non-standard surgery = emergency, palliative, recurrence, total laryngectomy

**Table 12:** Unadjusted 30-day postoperative mortality in the three convention years, by patient and tumour characteristics for the standard surgery only.

Characteristic	Unadjusted 30-day postoperative mortality			
	Belgium			
	N	N of deaths	%	95% CI
<b>Overall Y1+Y2+Y3</b>	<b>1,182</b>	<b>28</b>	<b>2.4</b>	<b>[1.6, 3.4]</b>
<b>Convention year</b>				
Year 1	395	10	2.5	[1.2, 4.6]
Year 2	380	13	3.4	[1.8, 5.8]
Year 3	407	5	1.2	[0.4, 2.8]
<b>Sex</b>				
Male	943	25	2.7	[1.7, 3.9]

Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
Female	239	3	1.3	[0.3, 3.6]
<b>Age at surgery</b>				
<=69	752	11	1.5	[0.7, 2.6]
70-79	373	16	4.3	[2.5, 6.9]
>=80	57	1	1.8	[0.0, 9.4]
<b>Lesion to treat (in oesophagus/GOJ)</b>				
Primary tumour	1,153	28	2.4	[1.6, 3.5]
Relapse of primary tumour	25	0	0.0	[0.0, 13.7]
Metastasis	4	0	0.0	[0.0, 60.2]
<b>Morphology</b>				
Adenocarcinoma	881	21	2.4	[1.5, 3.6]
Squamous cell carcinoma	282	7	2.5	[1.0, 5.0]
Other, unspecified or missing	19	0	0.0	[0.0, 17.6]
<b>Primary tumour localisation</b>				
C15.0/C15.3 Cervical/upper third oesophagus	28	2	7.1	[0.9, 23.5]
C15.1/C15.4 Thoracic/middle third oesophagus	153	2	1.3	[0.2, 4.6]
C15.2/C15.5 Abdominal/lower third oesophagus	600	13	2.2	[1.2, 3.7]
C15.8 Overlapping lesion of oesophagus	4	0	0.0	[0.0, 60.2]
C16.0 Gastro-oesophageal junction	395	11	2.8	[1.4, 4.9]
Other	2	0	0.0	[0.0, 84.2]
<b>Clinical stage</b>				
0	8	0	0.0	[0.0, 36.9]
I	113	5	4.4	[1.5, 10.0]
II	208	5	2.4	[0.8, 5.5]
III	561	12	2.1	[1.1, 3.7]
IV	225	6	2.7	[1.0, 5.7]
IVA <sup>#</sup>	185	4	2.2	[0.6, 5.4]
IVB <sup>#</sup>	38	2	5.3	[0.6, 17.7]
X	35	0	0.0	[0.0, 10.0]
TNM not applicable or relapse	32	0	0.0	[0.0, 10.9]
<b>Prior surgery or endoscopic treatment *</b>				
Prior major thoracic or abdominal surgery	92	2	2.2	[0.3, 7.6]
Endoscopic treatment	64	2	3.1	[0.4, 10.8]
- EMR/ESD	64	2	3.1	[0.4, 10.8]
- RFA	2	0	0.0	[0.0, 84.2]
- Ablation techniques other than RFA	0			—
Other treatment modality (that could affect the oesophagus)	18	1	5.6	[0.1, 27.3]
<b>Neoadjuvant treatment</b>				
Chemotherapy	314	7	2.2	[0.9, 4.5]

Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
Targeted therapy/biologicals	11	0	0.0	[0.0, 28.5]
Radiotherapy	1	0	0.0	[0.0, 97.5]
Chemoradiotherapy	603	9	1.5	[0.7, 2.8]
No chemo, radiation or targeted treatment	264	12	4.5	[2.4, 7.8]
<b>Charlson Comorbidity Index</b>				
0	506	9	1.8	[0.8, 3.3]
1	318	4	1.3	[0.3, 3.2]
2	189	7	3.7	[1.5, 7.5]
3	92	2	2.2	[0.3, 7.6]
4	44	3	6.8	[1.4, 18.7]
5	14	1	7.1	[0.2, 33.9]
6	8	2	25.0	[3.2, 65.1]
7	7	0	0.0	[0.0, 41.0]
8	2	0	0.0	[0.0, 84.2]
9	2	0	0.0	[0.0, 84.2]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	304	2	0.7	[0.1, 2.4]
1 - Symptomatic, but ambulant	723	20	2.8	[1.7, 4.2]
2 - Symptomatic, bedbound < 50% day	132	4	3.0	[0.8, 7.6]
3 - Symptomatic, bedbound > 50% day	20	2	10.0	[1.2, 31.7]
4 - Completely dependent, 100% bedbound	3	0	0.0	[0.0, 70.8]
<b>ASA score</b>				
1 - Healthy person	54	0	0.0	[0.0, 6.6]
2 - Mild systemic disease, normal activity	531	10	1.9	[0.9, 3.4]
3 - Serious systemic disease, limited activity	583	18	3.1	[1.8, 4.8]
4 - Life-threatening illness, handicapped	14	0	0.0	[0.0, 23.2]
<b>Surgery intention</b>				
Surgery as primary treatment	263	11	4.2	[2.1, 7.4]
Post-induction (neoadjuvant chemo- and/or radiotherapy)	873	17	1.9	[1.1, 3.1]
Salvage post-radical chemo- and/or radiotherapy	46	0	0.0	[0.0, 7.7]
<b>Type of surgery</b>				
Minimally invasive surgery (MIS)	745	17	2.3	[1.3, 3.6]
Open	416	9	2.2	[1.0, 4.1]
Conversion from MIS to open surgery	21	2	9.5	[1.2, 30.4]
<b>RIZIV code for complex surgery</b>				
228270-228281: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery	1	0	0.0	[0.0, 97.5]
228292-228303: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery	1	0	0.0	[0.0, 97.5]



Unadjusted 30-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths		95% CI
			%	
228314-228325: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery and extensive lymph node removal	349	5	1.4	[0.5, 3.3]
228336-228340: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery and extensive lymph node removal	831	23	2.8	[1.8, 4.1]
<b><i>Oesophagectomy</i></b>				
Partial	464	13	2.8	[1.5, 4.7]
Subtotal	718	15	2.1	[1.2, 3.4]
<b><i>Antithrombotic medication</i></b>				
No	959	21	2.2	[1.4, 3.3]
Yes	223	7	3.1	[1.3, 6.4]
<b><i>Was the patient referred?</i></b>				
No	266	8	3.0	[1.3, 5.8]
Yes	916	20	2.2	[1.3, 3.4]

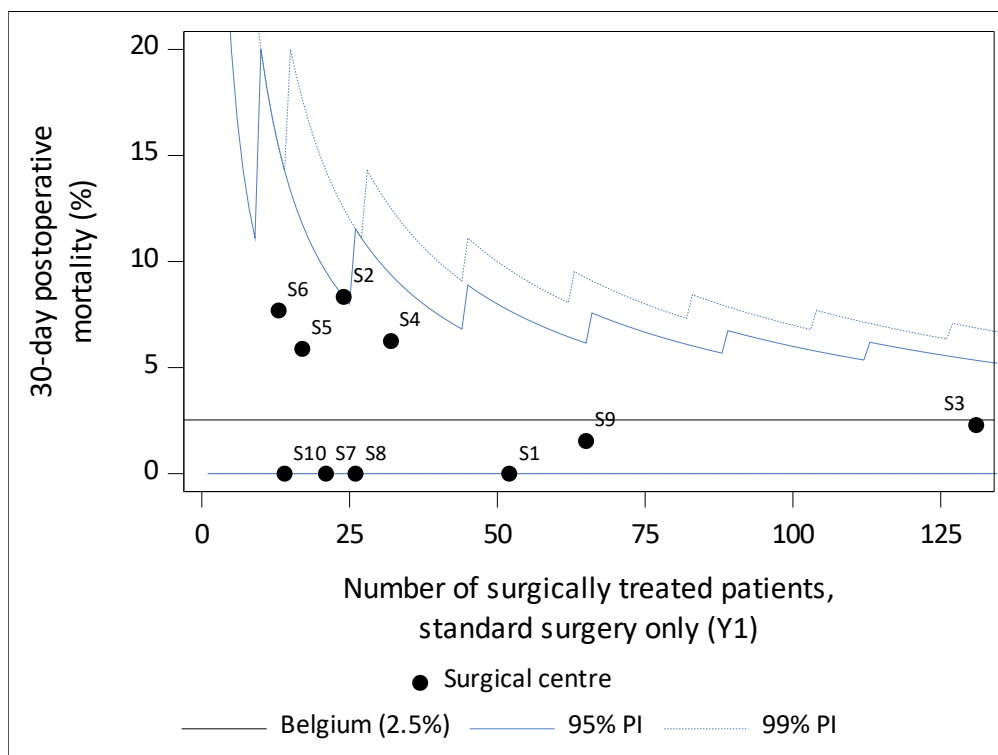
Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients. Combinations of prior surgery, endoscopic treatment and neoadjuvant treatments could also occur.

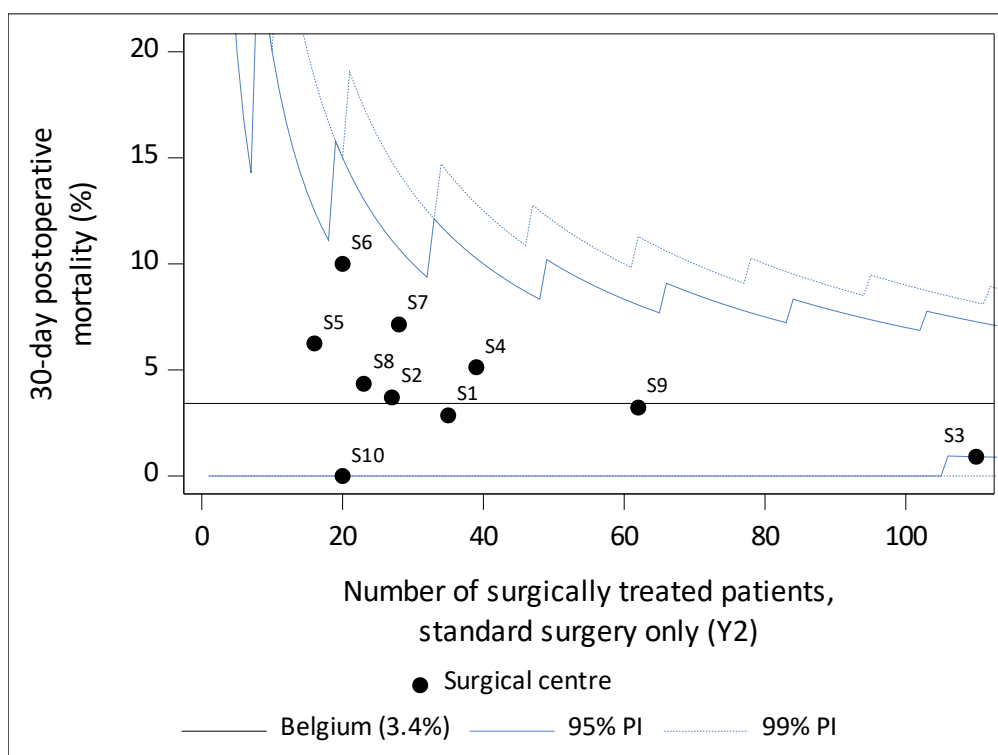
# Only IVA and IVB have been considered for this subsection. Hence the sum of their numbers might not be equal to the number portrayed in clinical stage IV.

**Figure 11:** Funnel and spaghetti plot of the unadjusted 30-day postoperative mortality (**only for standard surgery**), by surgical centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

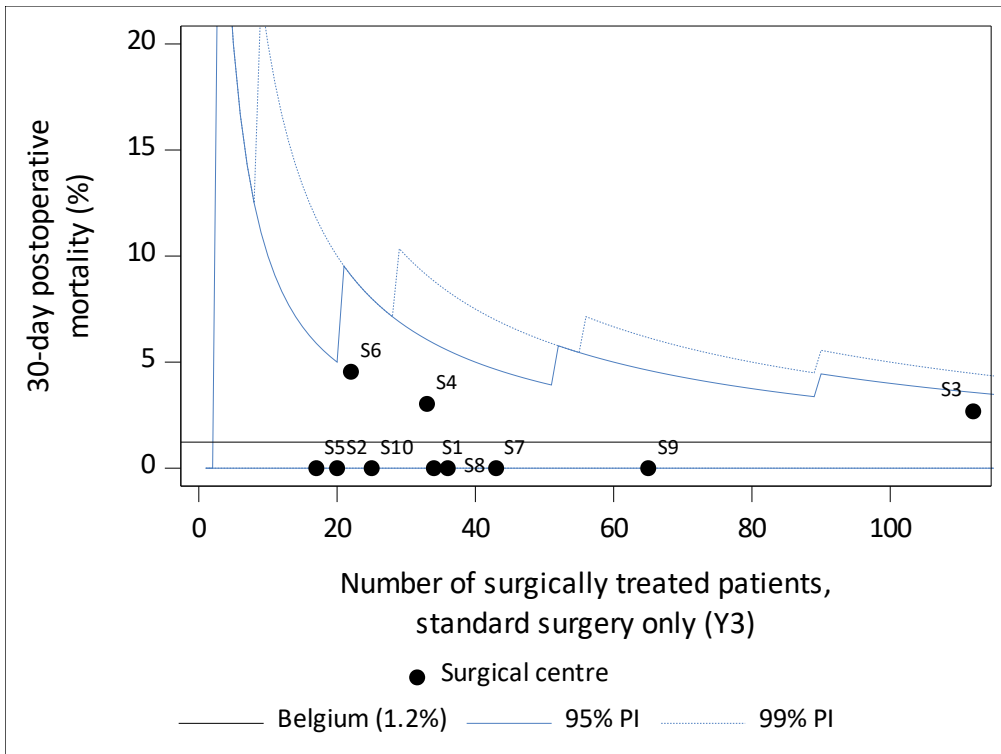
(a)



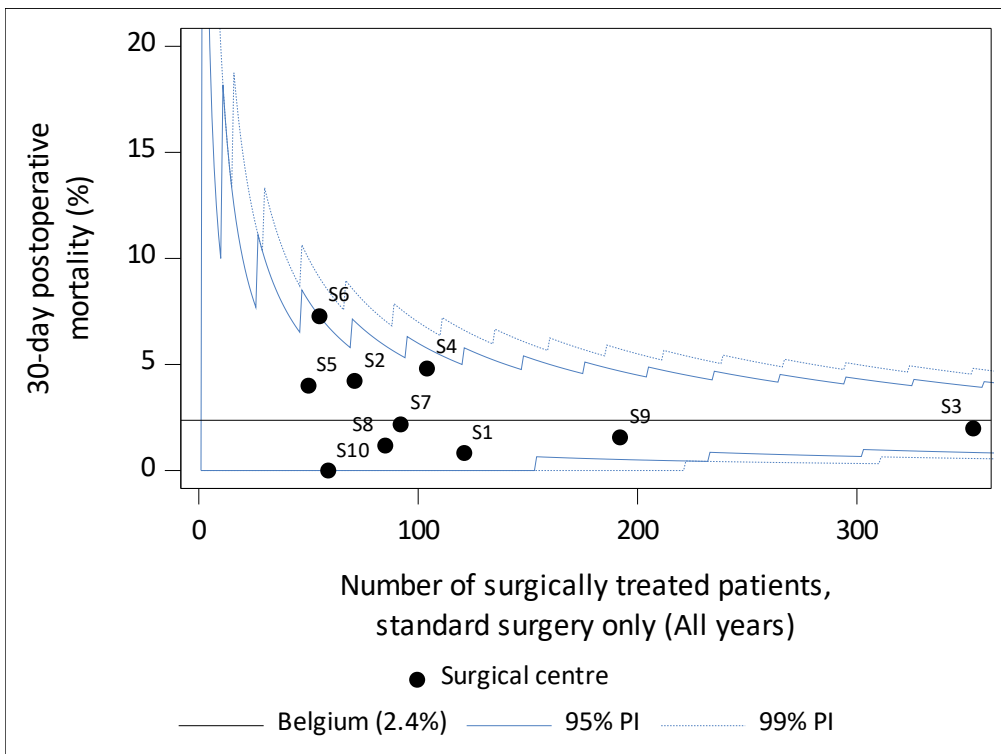
(b)



(c)



(d)





### 3.3.1.2 Adjusted 30-day postoperative mortality

**Table 13:** Case-mix adjusted odds ratio for postoperative mortality within 30 days and direct standardised 30-day postoperative mortality, for the **standard surgery only** in the three convention years.

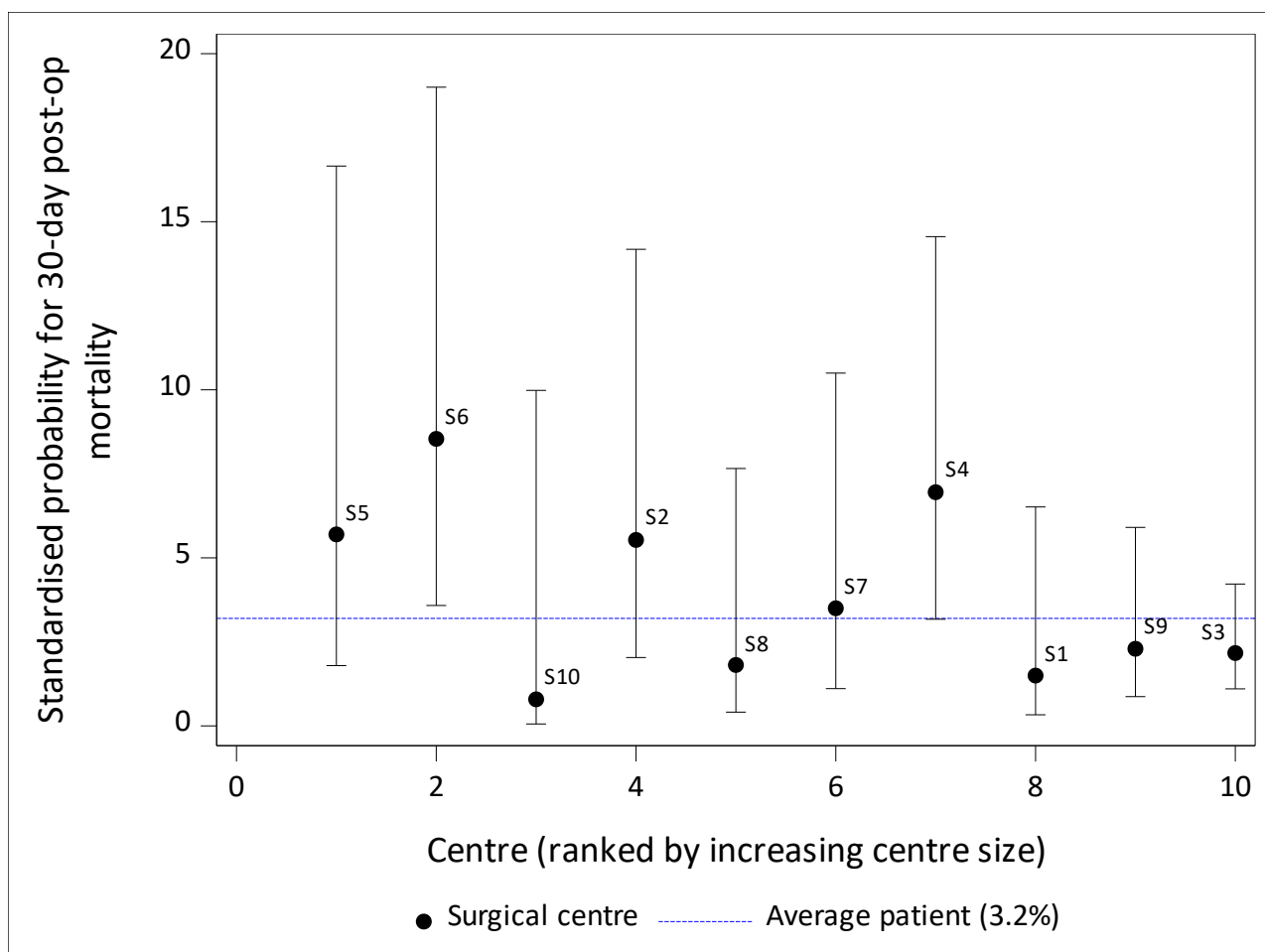
Expert centres	Adjusted Odds Ratio			Standardised probability (%)		
	Estimate	95% CI	Average patient	Estimate	95% CI	Average patient
S5	1.94	[0.58, 6.50]	1.06	5.7	[1.8, 16.7]	3.2
S6	3.07	[1.15, 8.25]	1.06	8.5	[3.6, 19.0]	3.2
S10	0.24	[0.02, 2.73]	1.06	0.8	[0.1, 10.0]	3.2
S2	1.88	[0.65, 5.45]	1.06	5.5	[2.0, 14.2]	3.2
S8	0.57	[0.13, 2.41]	1.06	1.8	[0.4, 7.7]	3.2
S7	1.14	[0.35, 3.68]	1.06	3.5	[1.1, 10.5]	3.2
S4	2.43	[0.99, 5.94]	1.06	7.0	[3.2, 14.6]	3.2
S1	0.47	[0.11, 1.99]	1.06	1.5	[0.3, 6.5]	3.2
S9	0.73	[0.27, 1.98]	1.06	2.3	[0.9, 5.9]	3.2
S3	0.69	[0.32, 1.49]	1.06	2.2	[1.1, 4.2]	3.2

Adjusted for surgery intention, primary tumour location, Charlson Comorbidity Index and clinical stage (as proposed by Audit Belgian Esophageal Surgery).

This table shows the case-mix adjusted odds ratio for postoperative mortality within 30 days and the center specific direct standardized 30-day mortality (%), together with their accompanying 95% confidence intervals. The 'average patient' odds ratio and direct standardized result, are weighted averages 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 standardized 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 12:** Standardised probability for the 30-day postoperative mortality for **standard surgery only** in the three convention years, by surgical centre.



### 3.3.1.3 Unadjusted 90-day postoperative mortality

**Table 14:** Unadjusted 90-day postoperative mortality in the three convention years, by mode of surgery and by age for the total malignant population.

Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
<b>Overall Y1+Y2+Y3</b>	<b>1,241</b>	<b>88</b>	<b>7.1</b>	<b>[5.7, 8.7]</b>
<b>Convention year</b>				
Year 1	418	27	6.5	[4.3, 9.3]
Year 2	404	44	10.9	[8.0, 14.3]
Year 3	419	17	4.1	[2.4, 6.4]
<b>Mode of surgery</b>				
Standard surgery	1,182	77	6.5	[5.2, 8.1]
Non-standard surgery	59	11	18.6	[9.7, 30.9]
<b>Age at surgery</b>				
<=69	789	38	4.8	[3.4, 6.6]
70-79	392	38	9.7	[7.0, 13.1]
>=80	60	12	20.0	[10.8, 32.3]
Non-standard surgery = emergency, palliative, recurrence, total laryngectomy				

**Table 15:** Unadjusted 90-day postoperative mortality in the three convention years, by patient and tumour characteristics for the standard surgery.

Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
<b>Overall Y1+Y2+Y3</b>	<b>1,182</b>	<b>77</b>	<b>6.5</b>	<b>[5.2, 8.1]</b>
<b>Convention year</b>				
Year 1	395	23	5.8	[3.7, 8.6]
Year 2	380	37	9.7	[6.9, 13.2]
Year 3	407	17	4.2	[2.5, 6.6]
<b>Sex</b>				
Male	943	65	6.9	[5.4, 8.7]
Female	239	12	5.0	[2.6, 8.6]
<b>Age at surgery</b>				
<=69	752	31	4.1	[2.8, 5.8]
70-79	373	35	9.4	[6.6, 12.8]
>=80	57	11	19.3	[10.0, 31.9]

Characteristic	Unadjusted 90-day postoperative mortality			
	Belgium			
	N	N of deaths	%	95% CI
<b>Lesion to treat (in oesophagus/GOJ)</b>				
Primary tumour	1,153	76	6.6	[5.2, 8.2]
Relapse of primary tumour	25	1	4.0	[0.1, 20.4]
Metastasis	4	0	0.0	[0.0, 60.2]
<b>Morphology</b>				
Adenocarcinoma	881	57	6.5	[4.9, 8.3]
Squamous cell carcinoma	282	20	7.1	[4.4, 10.7]
Other, unspecified or missing	19	0	0.0	[0.0, 17.6]
<b>Primary tumour localisation</b>				
C15.0/C15.3 Cervical/upper third oesophagus	28	3	10.7	[2.3, 28.2]
C15.1/C15.4 Thoracic/middle third oesophagus	153	10	6.5	[3.2, 11.7]
C15.2/C15.5 Abdominal/lower third oesophagus	600	44	7.3	[5.4, 9.7]
C15.8 Overlapping lesion of oesophagus	4	0	0.0	[0.0, 60.2]
C16.0 Gastro-oesophageal junction	395	20	5.1	[3.1, 7.7]
Other	2	0	0.0	[0.0, 84.2]
<b>Clinical stage</b>				
0	8	0	0.0	[0.0, 36.9]
I	113	8	7.1	[3.1, 13.5]
II	208	11	5.3	[2.7, 9.3]
III	561	43	7.7	[5.6, 10.2]
IV	225	14	6.2	[3.4, 10.2]
IVA <sup>#</sup>	185	11	5.9	[3.0, 10.4]
IVB <sup>#</sup>	38	2	5.3	[0.6, 17.7]
X	35	1	2.9	[0.1, 14.9]
TNM not applicable or relapse	32	0	0.0	[0.0, 10.9]
<b>Prior surgery or endoscopic treatment *</b>				
Prior major thoracic or abdominal surgery	92	7	7.6	[3.1, 15.1]
Endoscopic treatment	64	2	3.1	[0.4, 10.8]
- EMR/ESD	64	2	3.1	[0.4, 10.8]
- RFA	2	0	0.0	[0.0, 84.2]
- Ablation techniques other than RFA	0			—
Other treatment modality (that could affect the oesophagus)	18	2	11.1	[1.4, 34.7]
<b>Neoadjuvant treatment</b>				
Chemotherapy	314	14	4.5	[2.5, 7.4]
Targeted therapy/biologicals	11	1	9.1	[0.2, 41.3]
Radiotherapy	1	1	100.0	[2.5, 100.0]
Chemoradiotherapy	603	42	7.0	[5.1, 9.3]
No chemo, radiation or targeted treatment	264	20	7.6	[4.7, 11.5]
<b>Charlson Comorbidity Index</b>				



Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
0	506	23	4.5	[2.9, 6.7]
1	318	21	6.6	[4.1, 9.9]
2	189	18	9.5	[5.7, 14.6]
3	92	6	6.5	[2.4, 13.7]
4	44	4	9.1	[2.5, 21.7]
5	14	1	7.1	[0.2, 33.9]
6	8	2	25.0	[3.2, 65.1]
7	7	1	14.3	[0.4, 57.9]
8	2	0	0.0	[0.0, 84.2]
9	2	1	50.0	[1.3, 98.7]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	304	9	3.0	[1.4, 5.5]
1 - Symptomatic, but ambulant	723	51	7.1	[5.3, 9.2]
2 - Symptomatic, bedbound < 50% day	132	13	9.8	[5.3, 16.3]
3 - Symptomatic, bedbound > 50% day	20	3	15.0	[3.2, 37.9]
4 - Completely dependent, 100% bedbound	3	1	33.3	[0.8, 90.6]
<b>ASA score</b>				
1 - Healthy person	54	1	1.9	[0.0, 9.9]
2 - Mild systemic disease, normal activity	531	30	5.6	[3.8, 8.0]
3 - Serious systemic disease, limited activity	583	46	7.9	[5.8, 10.4]
4 - Life-threatening illness, handicapped	14	0	0.0	[0.0, 23.2]
<b>Surgery intention</b>				
Surgery as primary treatment	263	19	7.2	[4.4, 11.1]
Post-induction (neoadjuvant chemo- and/or radiotherapy)	873	56	6.4	[4.9, 8.2]
Salvage post-radical chemo- and/or radiotherapy	46	2	4.3	[0.5, 14.8]
<b>Type of surgery</b>				
Minimally invasive surgery (MIS)	745	50	6.7	[5.0, 8.8]
Open	416	24	5.8	[3.7, 8.5]
Conversion from MIS to open surgery	21	3	14.3	[3.0, 36.3]
<b>RIZIV code for complex surgery</b>				
228270-228281: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery	1	0	0.0	[0.0, 97.5]
228292-228303: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery	1	0	0.0	[0.0, 97.5]
228314-228325: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery and extensive lymph node removal	349	19	5.4	[3.3, 8.4]
228336-228340: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery and extensive lymph node removal	831	58	7.0	[5.3, 8.9]
<b>Oesophagectomy</b>				

Unadjusted 90-day postoperative mortality				
Belgium				
Characteristic	N	N of deaths	%	95% CI
Partial	464	29	6.3	[4.2, 8.9]
Subtotal	718	48	6.7	[5.0, 8.8]
<b>Antithrombotic medication</b>				
No	959	54	5.6	[4.3, 7.3]
Yes	223	23	10.3	[6.7, 15.1]
<b>Was the patient referred?</b>				
No	266	20	7.5	[4.7, 11.4]
Yes	916	57	6.2	[4.7, 8.0]

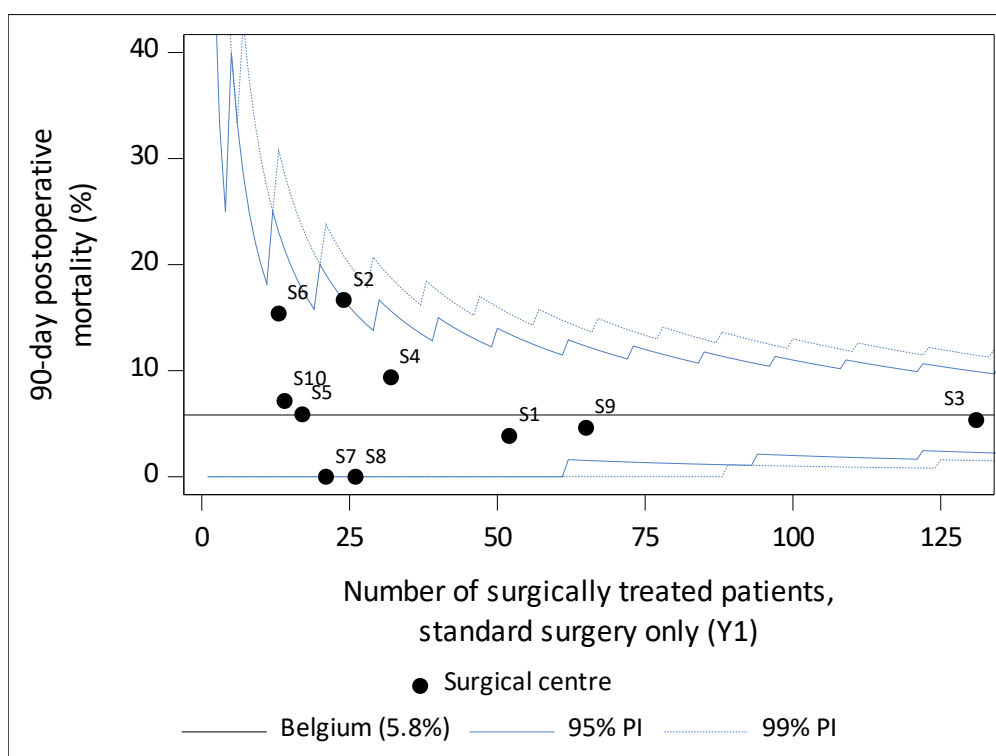
Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients. Combinations of prior surgery, endoscopic treatment and neoadjuvant treatments could also occur.

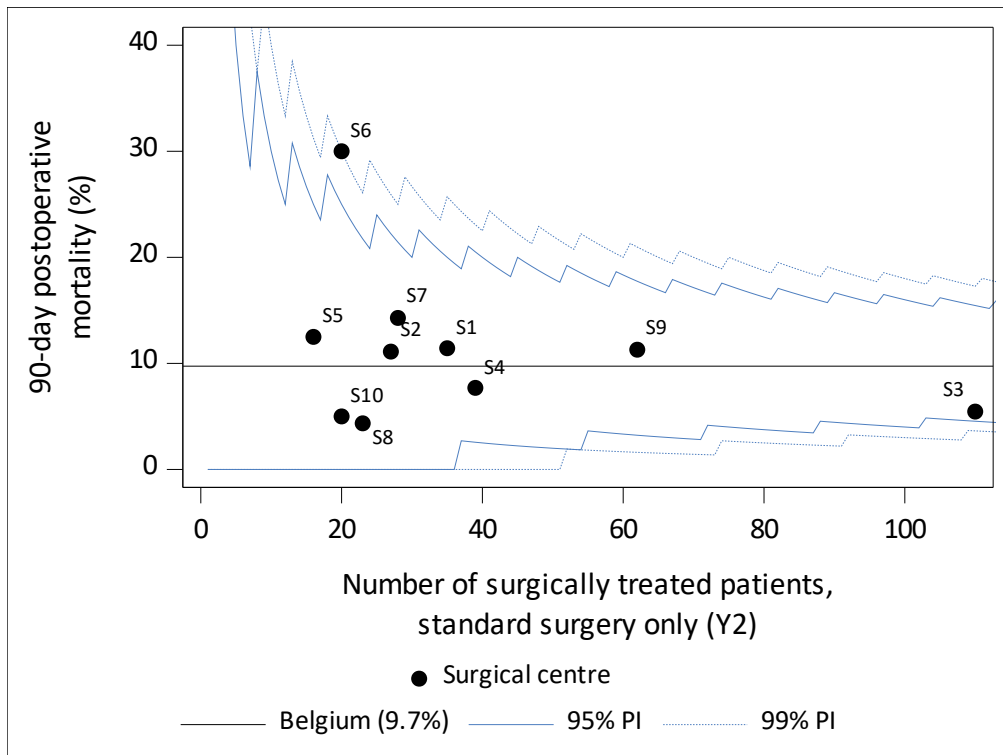
# Only IVA and IVB have been considered for this subsection. Hence the sum of their numbers might not be equal to the number portrayed in clinical stage IV.

**Figure 13:** Funnel and spaghetti plot of the unadjusted 90-day postoperative mortality (**only for standard surgery**), by surgical centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

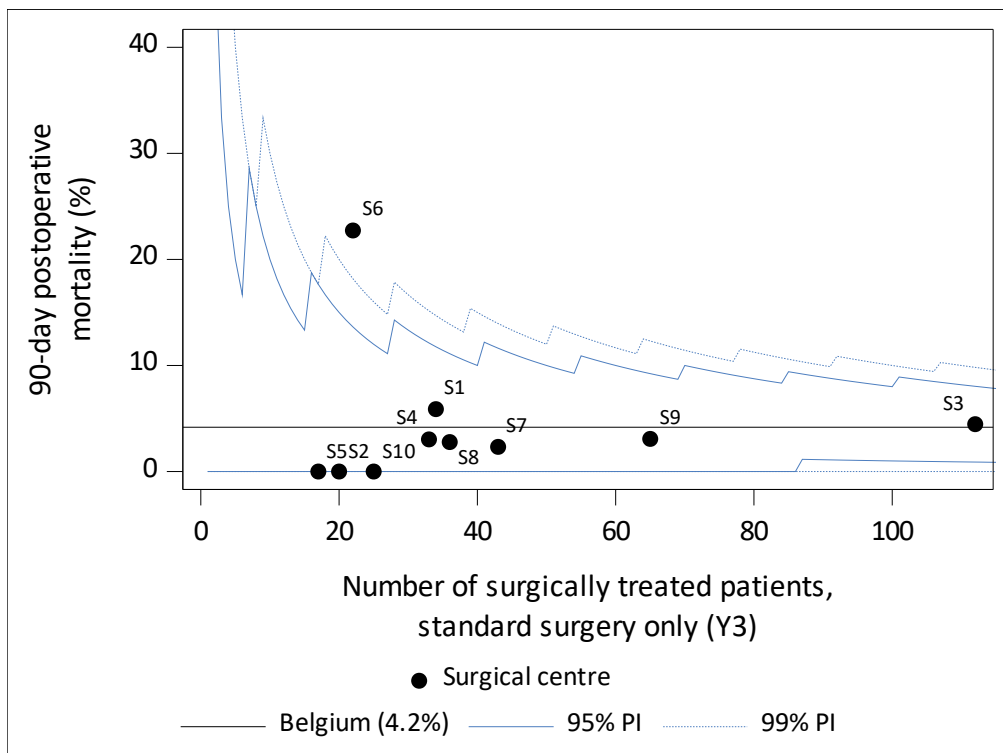
(a)



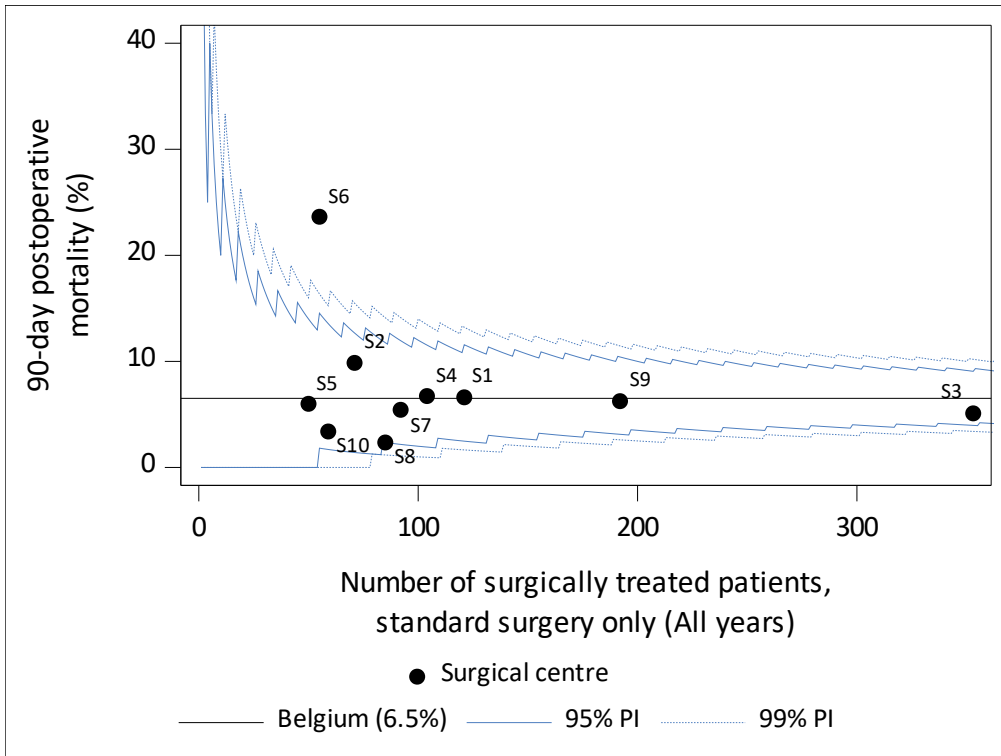
(b)



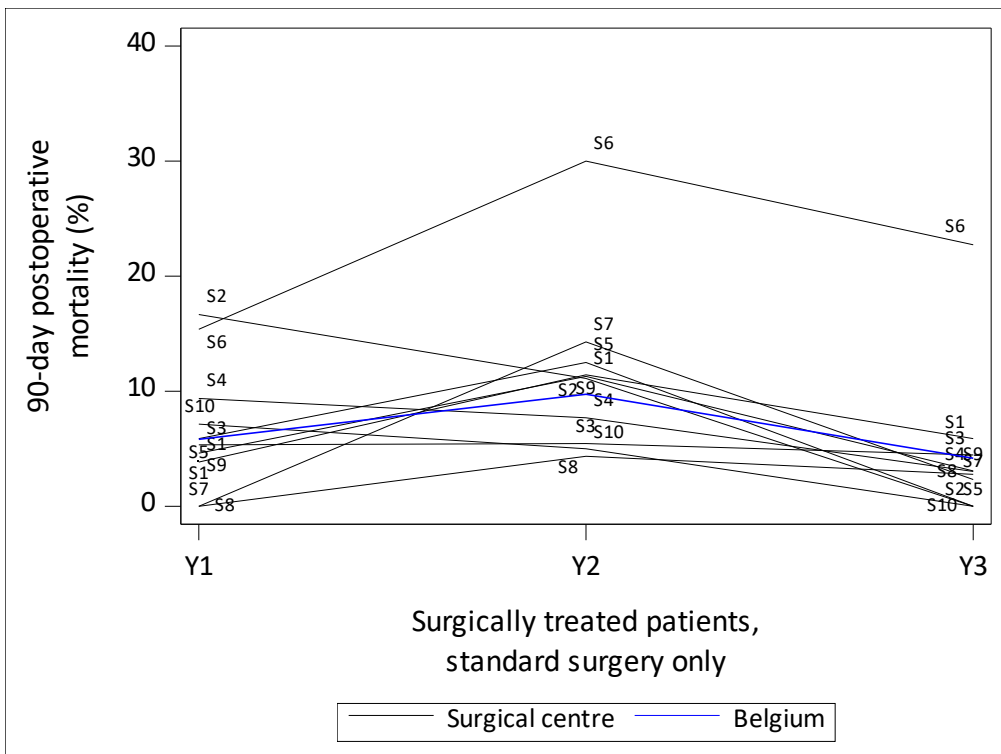
(c)



(d)



(e)



### 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 the **standard surgery only** in the three convention years.

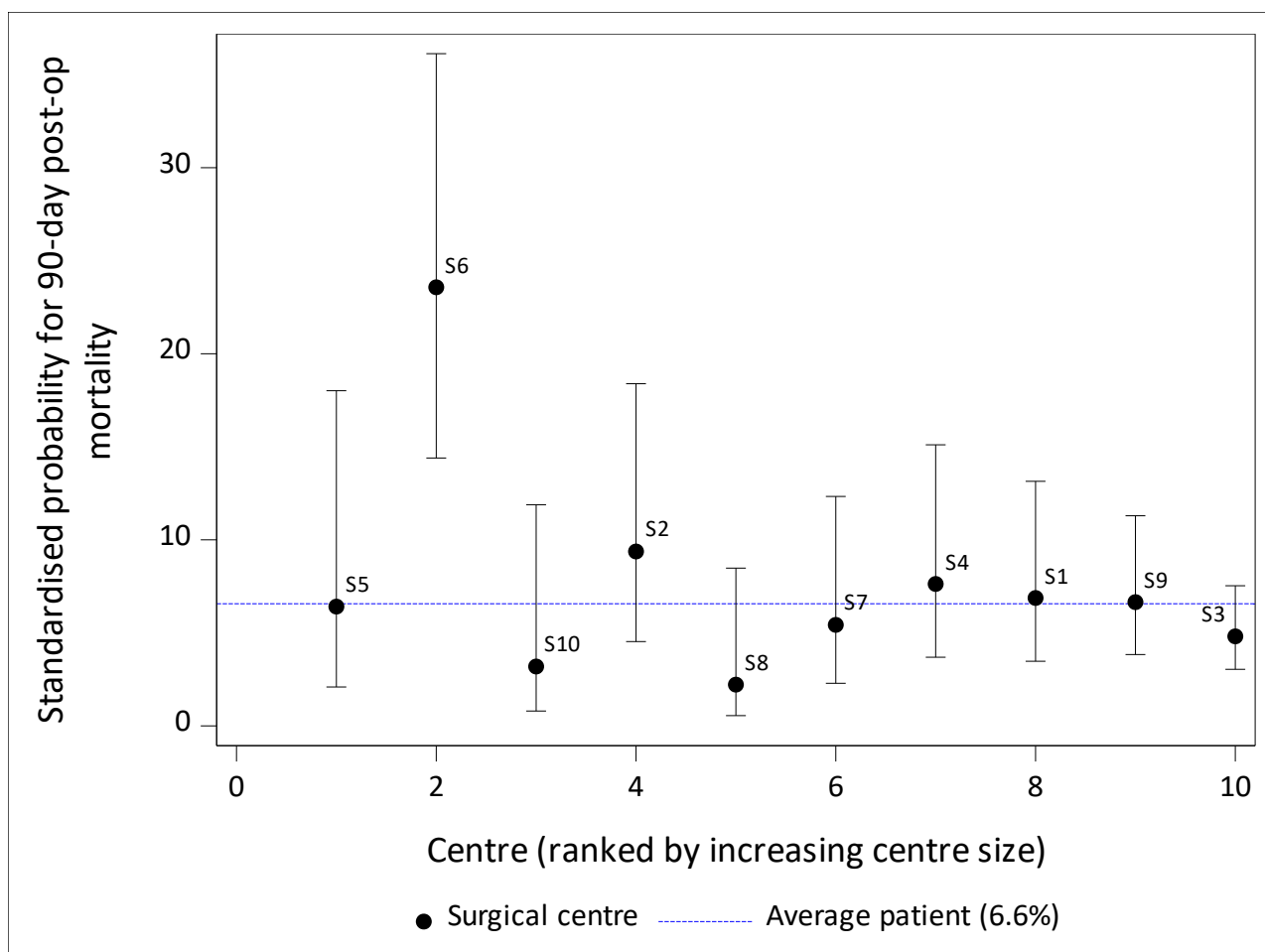
Expert centres	Adjusted Odds Ratio			Standardised probability (%)		
	Estimate	95% CI	Average patient	Estimate	95% CI	Average patient
S5	1.01	[0.33, 3.05]	1.08	6.4	[2.1, 18.0]	6.6
S6	4.80	[2.50, 9.22]	1.08	23.6	[14.4, 36.1]	6.6
S10	0.48	[0.13, 1.78]	1.08	3.2	[0.8, 11.9]	6.6
S2	1.54	[0.71, 3.34]	1.08	9.4	[4.5, 18.4]	6.6
S8	0.33	[0.09, 1.21]	1.08	2.2	[0.6, 8.5]	6.6
S7	0.84	[0.35, 2.01]	1.08	5.4	[2.3, 12.3]	6.6
S4	1.22	[0.57, 2.62]	1.08	7.6	[3.7, 15.1]	6.6
S1	1.09	[0.53, 2.24]	1.08	6.9	[3.5, 13.1]	6.6
S9	1.05	[0.57, 1.93]	1.08	6.7	[3.8, 11.3]	6.6
S3	0.74	[0.43, 1.26]	1.08	4.8	[3.0, 7.5]	6.6

Adjusted for surgery intention, primary tumour location, Charlson Comorbidity Index and clinical stage (as proposed by Audit Belgian Esophageal Surgery).

This table shows the case-mix adjusted odds ratio for postoperative mortality within 90 days and the center specific direct standardized 90-day mortality (%), together with their accompanying 95% confidence intervals. The 'average patient' odds ratio and direct standardized result, are weighted averages 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 standardized 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 14:** Standardised probability for the 90-day postoperative mortality for **standard surgery only** in the three convention years, by surgical centre.



### 3.3.2. Survival

Survival indicators 3 and 5 years after surgery cannot yet be calculated since there is only a limited number of patients with a 3-year follow-up after surgery at the time the report was made and no patients with a 5-year follow-up.

The vital status used in these analyses was determined on the 19<sup>th</sup> of October 2022.

#### 3.3.2.1 Unadjusted observed survival after surgery (all causes of death)

**Table 17:** Number of deaths, total person years and hazard during the first year interval after surgery, in the three convention years.

Belgium					
Characteristic	N	N of deaths	Person Years	hazard	95%CI
<b>Overall Y1+Y2+Y3</b>	<b>1,241</b>	<b>230</b>	<b>1,006</b>	<b>0.23</b>	<b>[0.20, 0.26]</b>
<b>Expert centres</b>					
S1	129	24	109	0.22	[0.14, 0.33]
S2	74	14	57	0.25	[0.13, 0.41]
S3	368	67	307	0.22	[0.17, 0.28]
S4	107	17	90	0.19	[0.11, 0.30]
S5	50	8	42	0.19	[0.08, 0.38]
S6	56	19	37	0.52	[0.31, 0.81]
S7	97	15	75	0.20	[0.11, 0.33]
S8	89	15	73	0.20	[0.11, 0.34]
S9	210	44	166	0.26	[0.19, 0.36]
S10	61	7	51	0.14	[0.06, 0.28]
<b>Convention year</b>					
Year 1	418	80	371	0.22	[0.17, 0.27]
Year 2	404	100	342	0.29	[0.24, 0.36]
Year 3	419	50	293	0.17	[0.13, 0.23]
<b>Mode of surgery</b>					
Standard surgery	1,182	208	964	0.22	[0.19, 0.25]
Non-standard surgery	59	22	43	0.51	[0.32, 0.78]
<b>Age at surgery</b>					
<=69	789	131	659	0.20	[0.17, 0.24]
70-79	392	82	303	0.27	[0.22, 0.34]
>=80	60	17	44	0.39	[0.23, 0.62]

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

Expert Centres	1-year observed survival after surgery, %											
	Year 1			Year 2			Year 3			Overall (Y1+Y2+Y3)		
	N	Estimate	95% CI	N	Estimate	95% CI	N	Estimate	95% CI	N	Estimate	95% CI
S1	52	92.3	[80.8, 97.0]	35	NA*	NA*	34	NA*	NA*	121	81.7	[73.3, 87.7]
S2	24	NA*	NA*	27	NA*	NA*	20	NA*	NA*	71	79.5	[67.8, 87.3]
S3	131	82.3	[74.6, 87.9]	110	75.5	[66.3, 82.5]	112	89.3	[79.3, 94.6]	353	81.6	[76.9, 85.5]
S4	32	NA*	NA*	39	NA*	NA*	33	NA*	NA*	104	83.8	[74.8, 89.7]
S5	17	NA*	NA*	16	NA*	NA*	17	NA*	NA*	50	82.4	[67.7, 90.8]
S6	13	NA*	NA*	20	NA*	NA*	22	NA*	NA*	55	65.1	[50.1, 76.6]
S7	21	NA*	NA*	28	NA*	NA*	43	89.7	[74.8, 96.0]	92	85.1	[75.7, 91.1]
S8	26	NA*	NA*	23	NA*	NA*	36	NA*	NA*	85	79.4	[68.1, 87.1]
S9	65	80.0	[68.1, 87.9]	62	71.0	[58.0, 80.6]	65	86.7	[71.6, 94.1]	192	79.1	[72.2, 84.4]
S10	14	NA*	NA*	20	NA*	NA*	25	NA*	NA*	59	86.6	[73.9, 93.4]

Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

\*N<40



**Table 19:** Unadjusted observed 1-year survival after surgery, death by all causes, in the three convention years, **standard surgery only**.

Characteristic	1-year observed survival after surgery, %		
	Belgium		
	N	Estimate	95% CI
<b>Overall Y1+Y2+Y3</b>	<b>1182</b>	<b>80.9</b>	<b>[78.4, 83.1]</b>
<b>Convention year</b>			
Year 1	395	82.0	[77.8, 85.4]
Year 2	380	76.5	[71.9, 80.5]
Year 3	407	83.7	[78.6, 87.7]
<b>Sex</b>			
Male	943	80.5	[77.6, 83.0]
Female	239	82.5	[76.7, 87.0]
<b>Age at surgery</b>			
<=69	752	82.9	[79.9, 85.6]
70-79	373	78.3	[73.5, 82.3]
>=80	57	70.7	[56.6, 81.0]
<b>Lesion to treat (in oesophagus/GOJ)</b>			
Primary tumour	1153	81.2	[78.7, 83.5]
Relapse of primary tumour	25	NA*	NA*
Metastasis	4	NA*	NA*
<b>Morphology</b>			
Adenocarcinoma	881	81.3	[78.5, 83.9]
Squamous cell carcinoma	282	79.3	[73.9, 83.8]
Other, unspecified or missing	19	NA*	NA*
<b>Primary tumour localisation</b>			
C15.0/C15.3 Cervical/upper third oesophagus	28	NA*	NA*
C15.1/C15.4 Thoracic/middle third oesophagus	153	79.6	[71.9, 85.4]
C15.2/C15.5 Abdominal/lower third oesophagus	600	81.7	[78.2, 84.6]
C15.8 Overlapping lesion of oesophagus	4	NA*	NA*
C16.0 Gastro-oesophageal junction	395	81.0	[76.4, 84.7]
Other	2	NA*	NA*
<b>Clinical stage</b>			
0	8	NA*	NA*
I	113	92.0	[85.3, 95.8]
II	208	86.1	[80.4, 90.3]
III	561	79.5	[75.7, 82.7]
IV	225	75.2	[68.5, 80.7]
IVA <sup>#</sup>	185	77.5	[70.2, 83.2]
IVB <sup>#</sup>	38	NA*	NA*
X	35	NA*	NA*
TNM not applicable or relapse	32	NA*	NA*

Characteristic	1-year observed survival after surgery, %		
	Belgium		
	N	Estimate	95% CI
<b><i>Prior surgery or endoscopic treatment**</i></b>			
Prior major thoracic or abdominal surgery	92	83.9	[74.3, 90.2]
Endoscopic treatment	64	91.8	[81.4, 96.5]
- EMR/ESD	64	91.8	[81.4, 96.5]
- RFA	2	NA*	NA*
- Ablation techniques other than RFA	0	NA*	NA*
Other treatment modality (that could affect the oesophagus)	18	NA*	NA*
<b><i>Neoadjuvant treatment</i></b>			
Chemotherapy	314	78.9	[73.6, 83.3]
Targeted therapy/biologicals	11	NA*	NA*
Radiotherapy	1	NA*	NA*
Chemoradiotherapy	603	78.4	[74.7, 81.6]
No chemo, radiation or targeted treatment	264	88.7	[84.2, 92.0]
<b><i>Charlson Comorbidity Index</i></b>			
0	506	84.1	[80.4, 87.1]
1	318	81.7	[76.8, 85.7]
2	189	76.5	[69.2, 82.2]
3	92	80.0	[69.8, 87.1]
4	44	69.8	[52.6, 81.7]
5	14	NA*	NA*
6	8	NA*	NA*
7	7	NA*	NA*
8	2	NA*	NA*
9	2	NA*	NA*
<b><i>WHO score at surgery</i></b>			
0 - Asymptomatic, normal activity	304	87.2	[82.6, 90.6]
1 - Symptomatic, but ambulant	723	80.3	[77.0, 83.1]
2 - Symptomatic, bedbound < 50% day	132	73.6	[64.9, 80.5]
3 - Symptomatic, bedbound > 50% day	20	NA*	NA*
4 - Completely dependent, 100% bedbound	3	NA*	NA*
<b><i>ASA score</i></b>			
1 - Healthy person	54	89.2	[76.0, 95.4]
2 - Mild systemic disease, normal activity	531	83.0	[79.3, 86.0]
3 - Serious systemic disease, limited activity	583	78.8	[75.1, 82.0]
4 - Life-threatening illness, handicapped	14	NA*	NA*
<b><i>Surgery intention</i></b>			
Surgery as primary treatment	263	88.2	[83.6, 91.6]
Post-induction (neoadjuvant chemo- and/or radiotherapy)	873	79.8	[76.8, 82.5]
Salvage post-radical chemo- and/or radiotherapy	46	56.7	[40.2, 70.2]
<b><i>Mode of surgery</i></b>			

Characteristic	1-year observed survival after surgery, %		
	Belgium		
	N	Estimate	95% CI
Elective	1182	80.9	[78.4, 83.1]
<b>Type of surgery</b>			
Minimally invasive surgery (MIS)	745	83.1	[80.1, 85.8]
Open	416	77.5	[72.9, 81.3]
Conversion from MIS to open surgery	21	NA*	NA*
<b>RIZIV code for complex surgery</b>			
228270-228281: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery	1	NA*	NA*
228292-228303: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery	1	NA*	NA*
228314-228325: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery and extensive lymph node removal	349	79.1	[74.2, 83.2]
228336-228340: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery and extensive lymph node removal	831	81.6	[78.6, 84.2]
<b>Oesophagectomy</b>			
Partial	464	78.2	[74.0, 81.8]
Subtotal	718	82.7	[79.5, 85.4]
<b>Antithrombotic medication</b>			
No	959	81.3	[78.5, 83.7]
Yes	223	79.2	[73.0, 84.1]
<b>Was the patient referred?</b>			
No	266	79.5	[73.9, 84.1]
Yes	916	81.2	[78.4, 83.8]

Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

\*N<40

\*\*Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients. Combinations of prior surgery, endoscopic treatment and neoadjuvant treatments could also occur.

# Only IVA and IVB have been considered for this subsection. Hence the sum of their numbers might not be equal to the number portrayed in clinical stage IV.

### 3.3.3. Proportion of surgically treated patients with a R0 resection

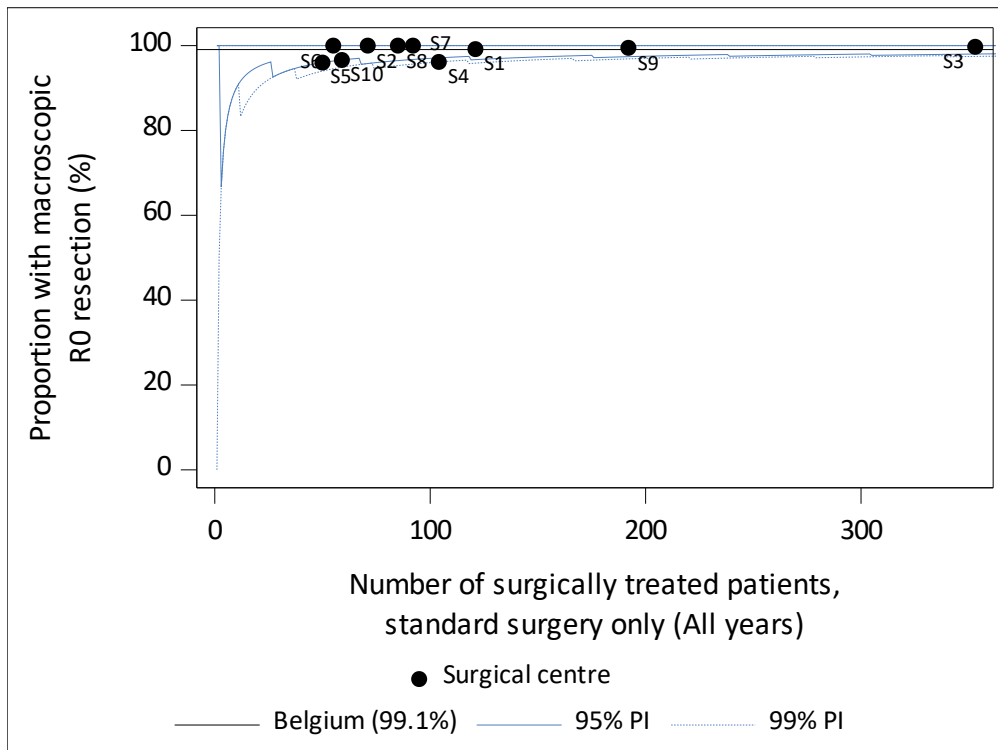
**Table 20:** Proportion of surgically treated patients in the three convention years with a macroscopic R0 resection, a microscopic R0 resection and with involvement of the proximal margin (**only for standard surgery**).

	Belgium			
	N	n	n/N (%)	95% CI
<b>Macroscopic R0 resection, Y1+Y2+Y3</b>	1,182	1,171	99.1	[98.3, 99.5]
<b>Microscopic R0 resection, Y1+Y2+Y3</b>	1,182	1,119	94.7	[93.2, 95.9]
<b>Proximal margin involved, Y1+Y2+Y3</b>	1,182	15	1.3	[0.7, 2.1]

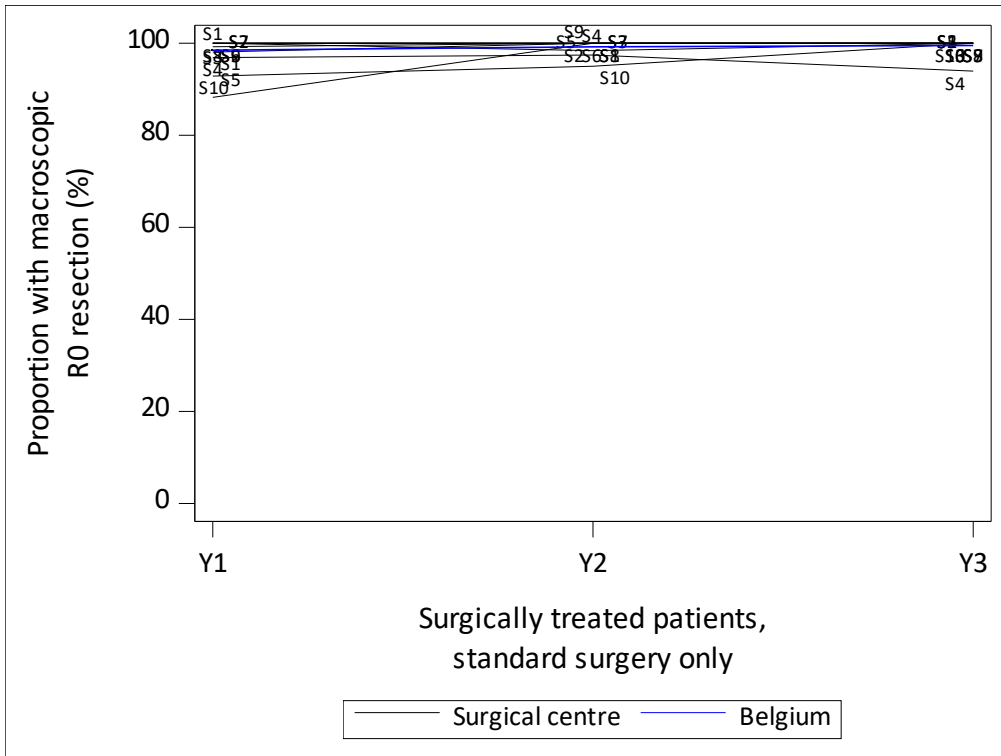
Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

**Figure 15:** Funnel and spaghetti plot of surgically treated patients with a macroscopic R0 resection (**only for standard surgery**), per centre, for (a) all years combined, (b) evolution year 1, 2 and 3.

(a)

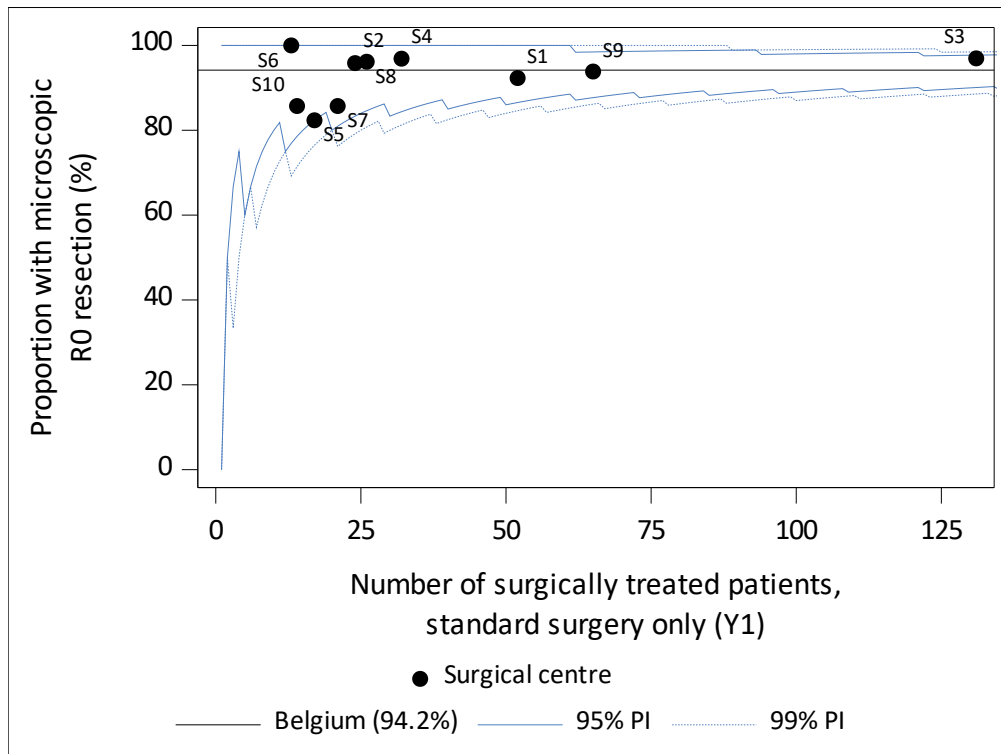


(b)

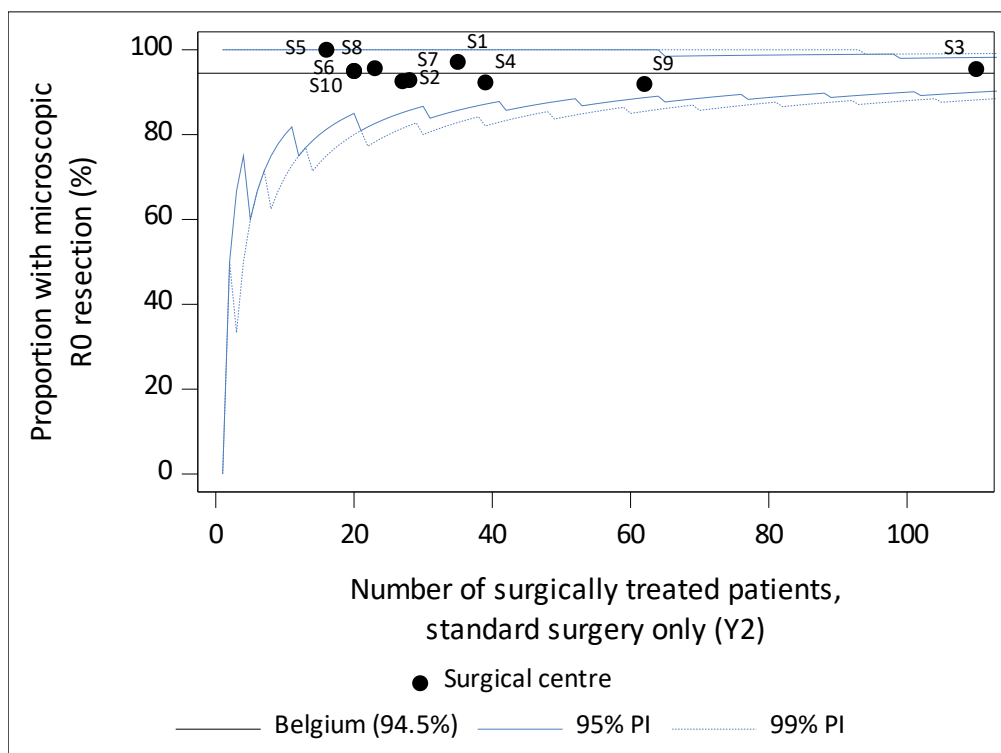


**Figure 16:** Funnel and spaghetti plot of surgically treated patients with a microscopic R0 resection (only for standard surgery), per centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

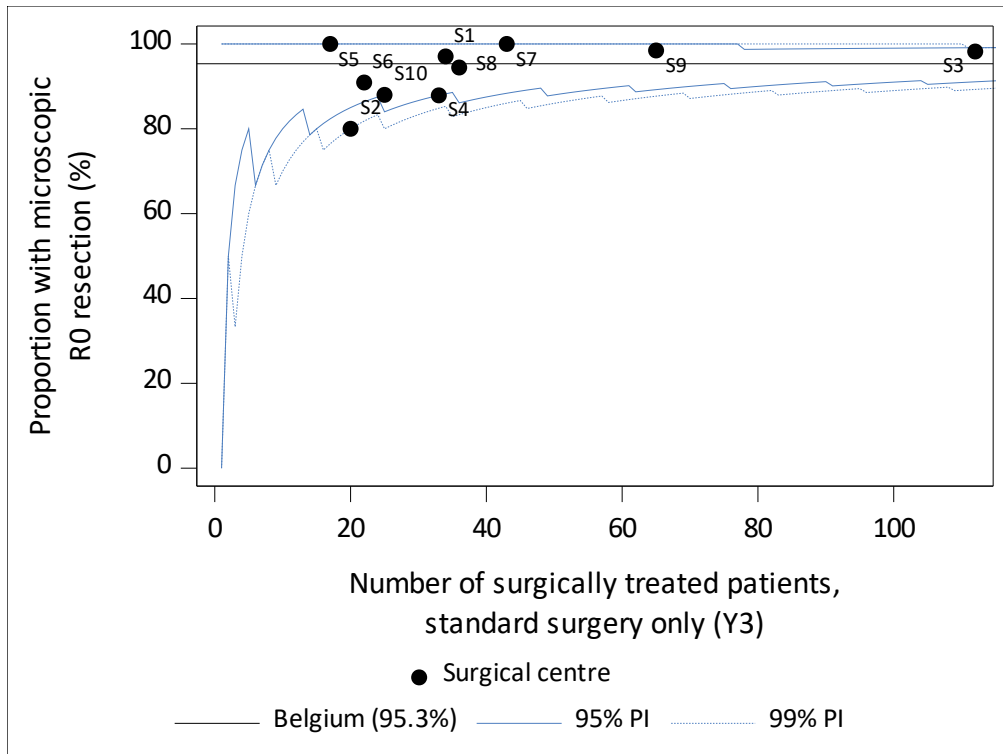
(a)



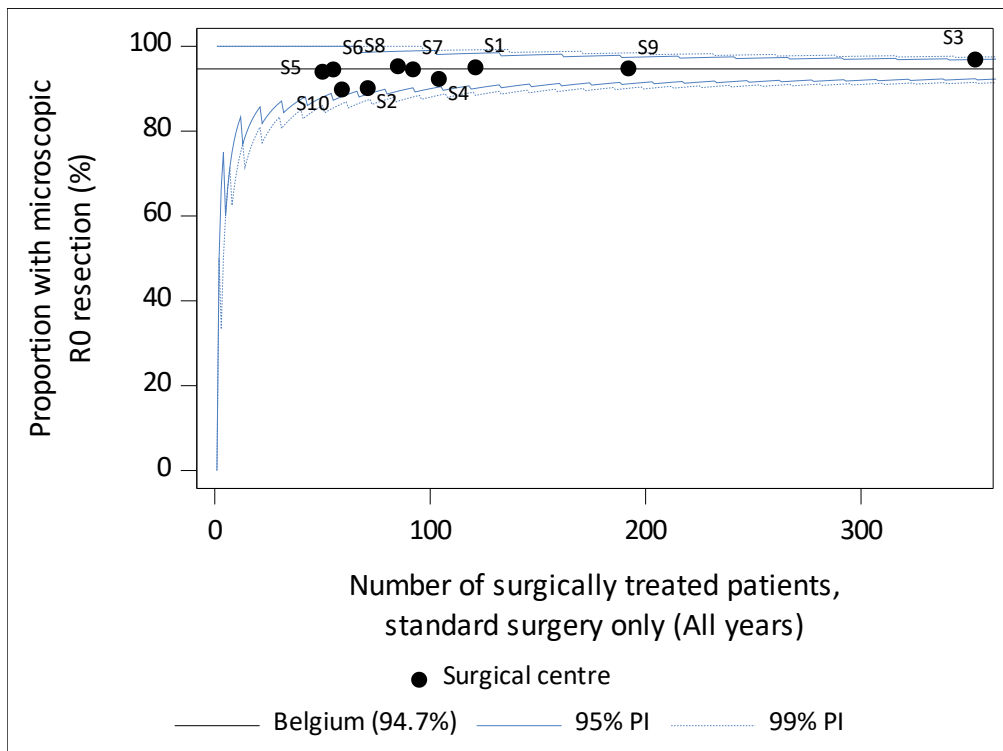
(b)



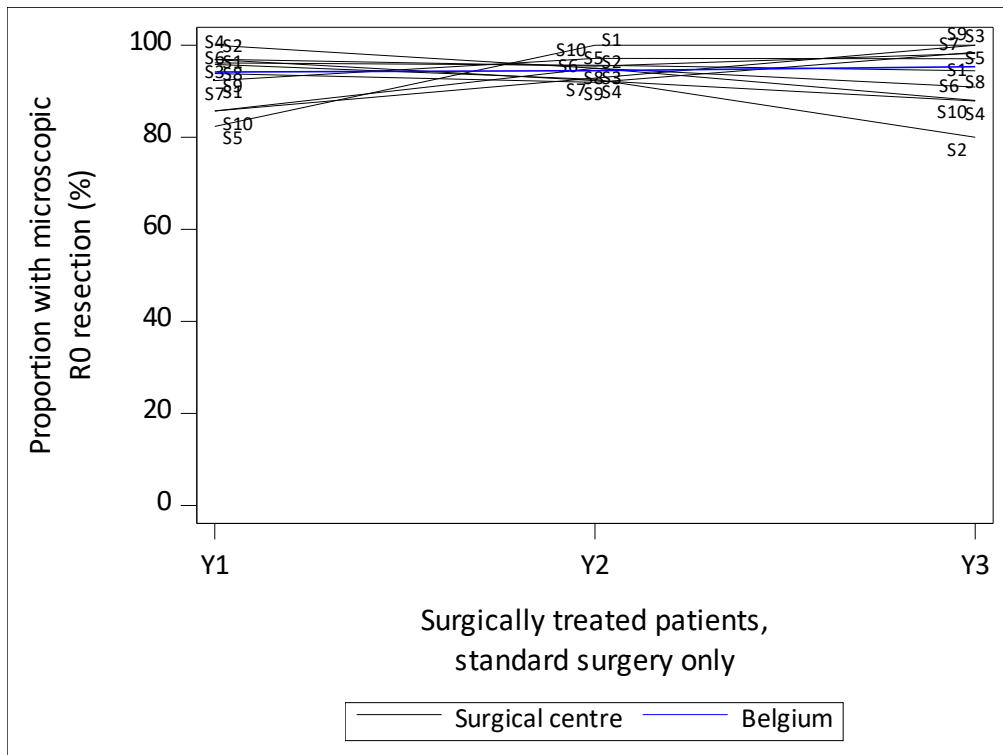
(c)



(d)



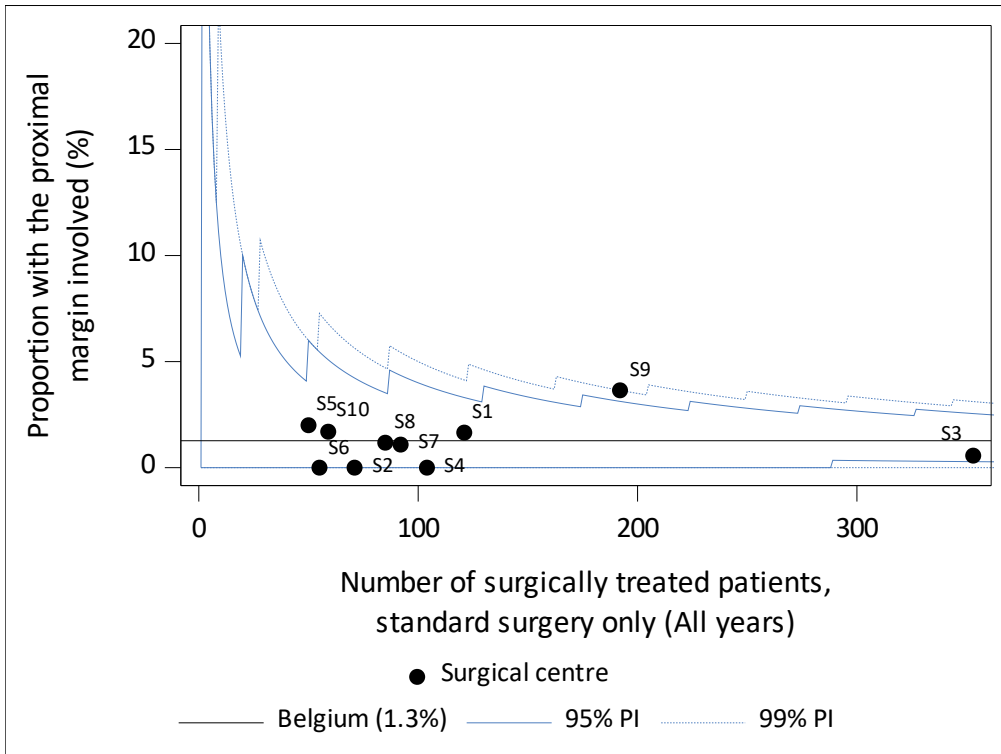
(e)



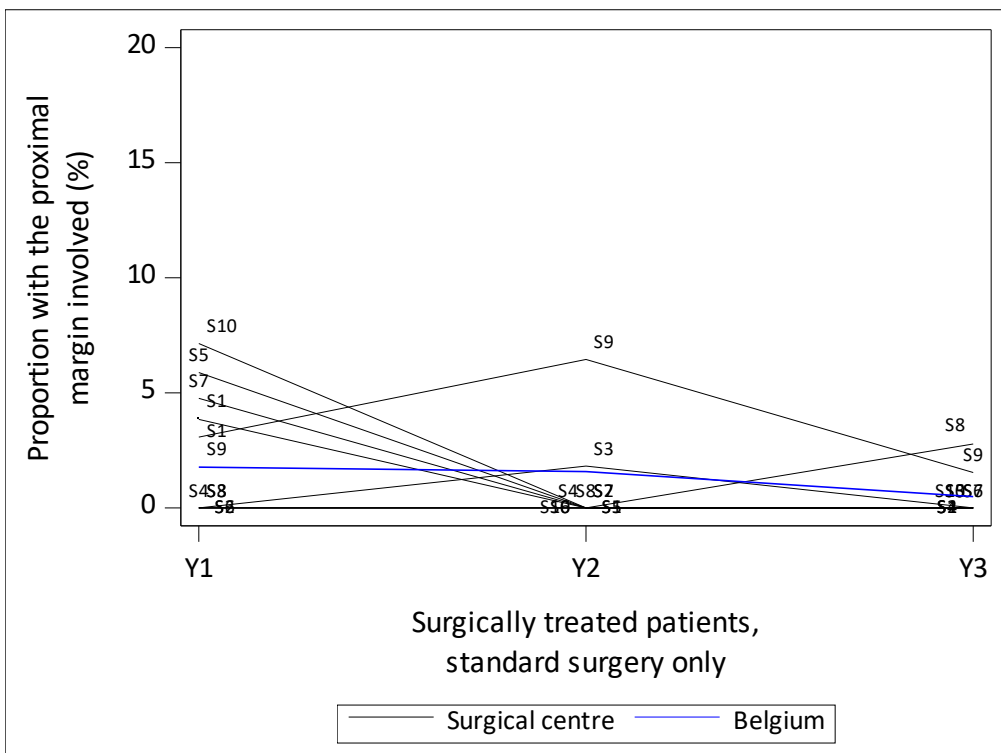


**Figure 17:** Funnel and spaghetti plot of surgically treated patients with involvement of the proximal margin (**only for standard surgery**), per centre, for (a) all years combined, (b) evolution year 1, 2 and 3.

(a)



(b)



### 3.3.4. Proportion of surgically treated 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 21:** Observed proportion of surgically treated patients in the three convention years with complications (90-day postoperative, in-hospital), by complication type (**standard surgery only**).

Complication type	Postoperative complications (90-day in-hospital)			
	Belgium			
	N	n	n/N (%)	95% CI
<b>Severe surgical complications (CD IIIb-V)<sup>1</sup></b>				
Year 1	395	115	29.1	[24.7, 33.9]
Year 2	380	113	29.7	[25.2, 34.6]
Year 3	407	107	26.3	[22.1, 30.9]
<b>Pneumonia (CD I-V)*</b>				
Year 1	395	96	24.3	[20.2, 28.8]
Year 2	380	75	19.7	[15.9, 24.1]
Year 3	407	75	18.4	[14.8, 22.5]
<b>Oesophago-enteric leak <sup>2</sup> (CD I-V)*</b>				
Year 1	395	55	13.9	[10.7, 17.7]
Year 2	380	61	16.1	[12.5, 20.1]
Year 3	407	57	14.0	[10.8, 17.8]
<b>Chyle leak (CD I-V)*</b>				
Year 1	395	30	7.6	[5.2, 10.7]
Year 2	380	27	7.1	[4.7, 10.2]
Year 3	407	32	7.9	[5.4, 10.9]

Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

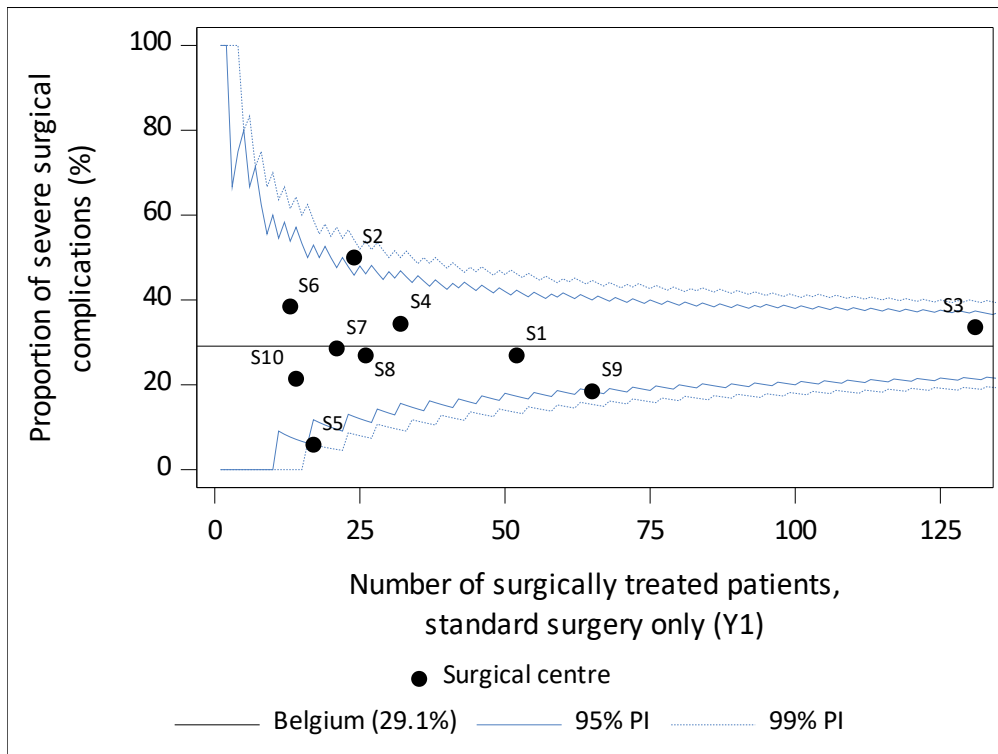
<sup>1</sup> CD: Clavien-Dindo grade

<sup>2</sup> Oesophago-enteric leak from anastomosis, staple line, or localised conduit necrosis.

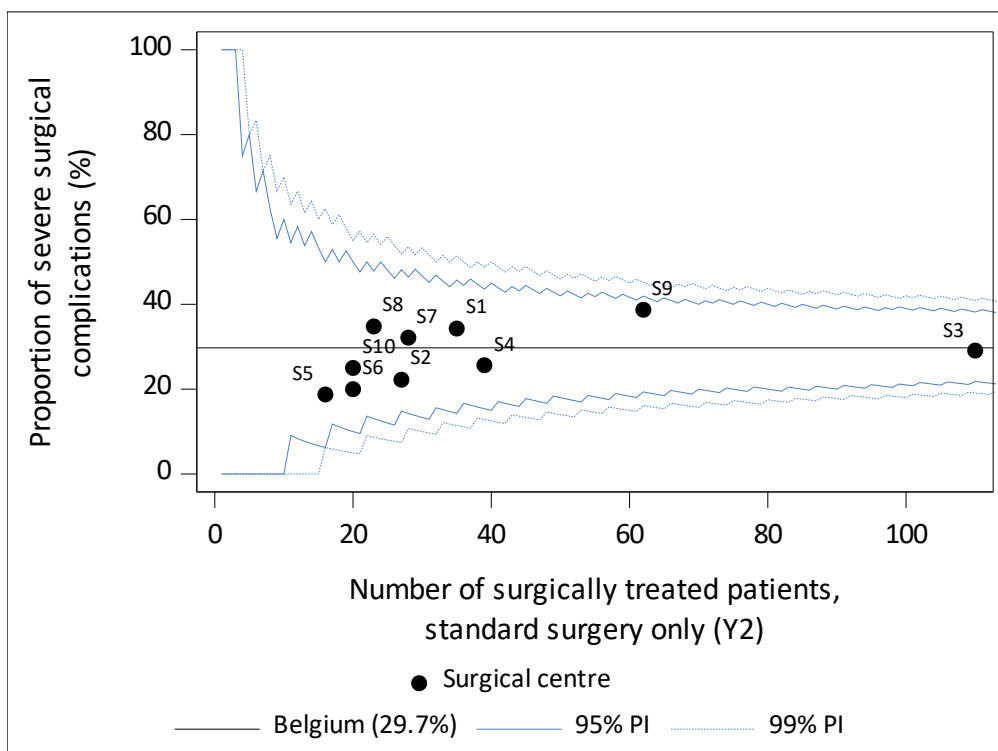
\* Patients could have a combination of complications, thus the total number of complications could be larger than the total number of patients.

**Figure 18:** Funnel and spaghetti plot of surgically treated patients **with severe surgical complications (Clavien-Dindo grade IIIb-V) within 90-days post-surgery, only for standard surgery,** per centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

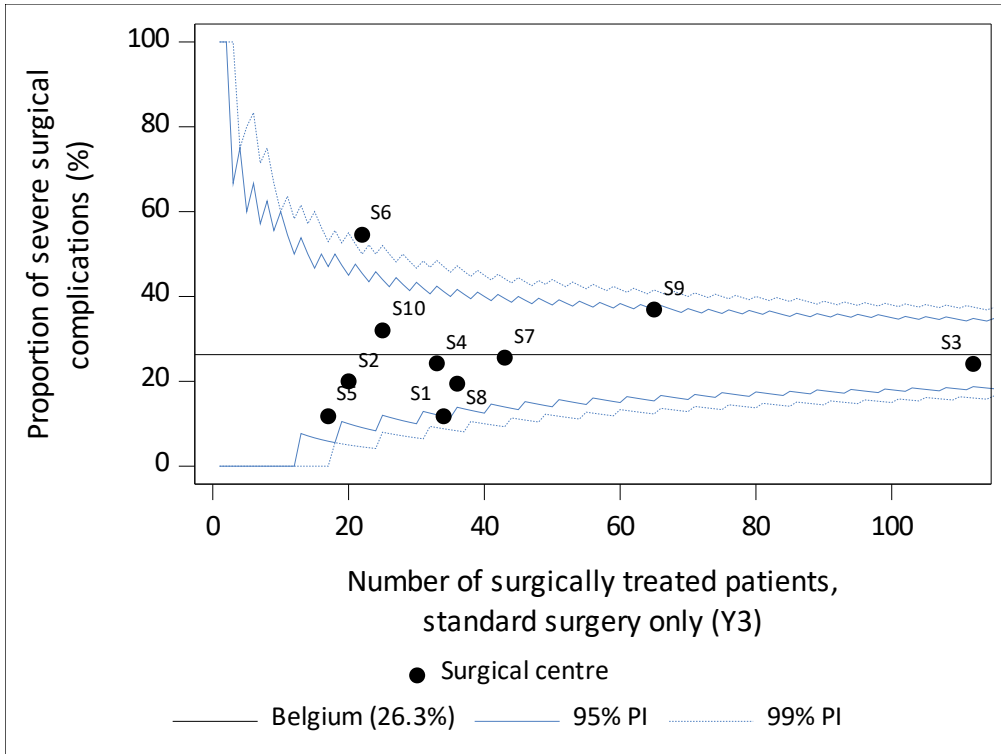
(a)



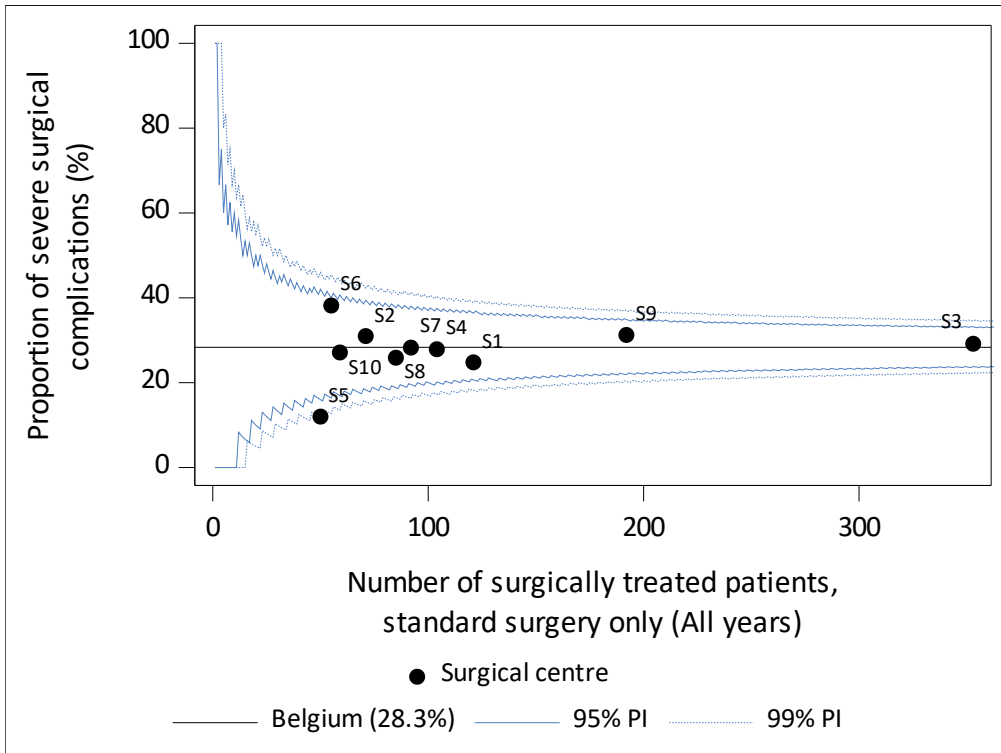
(b)



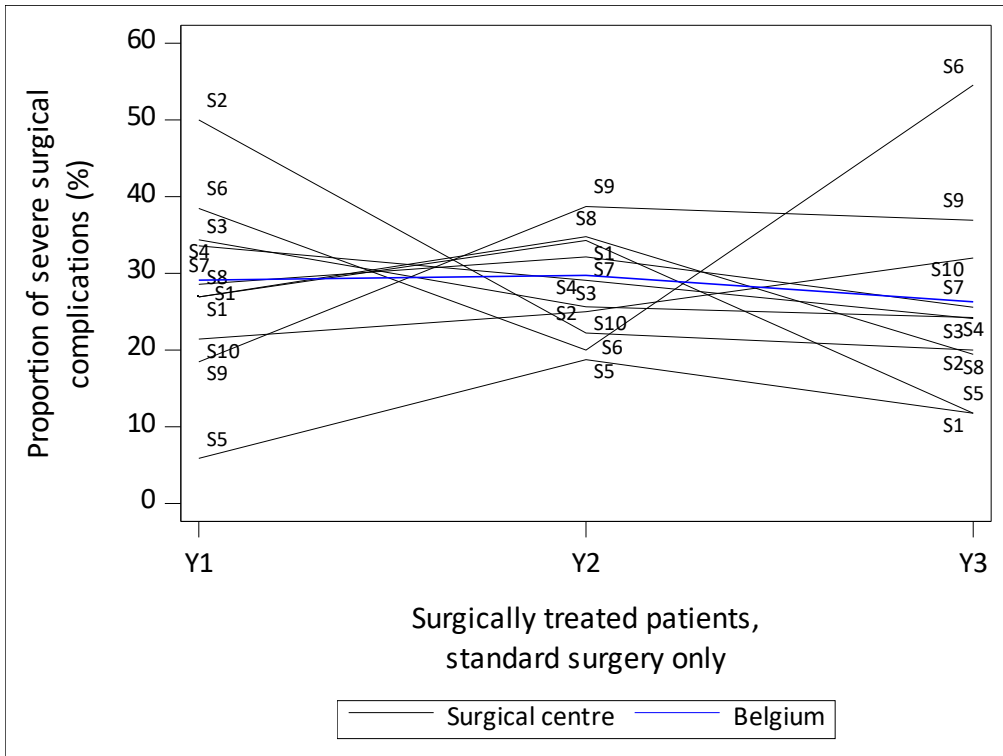
(c)



(d)

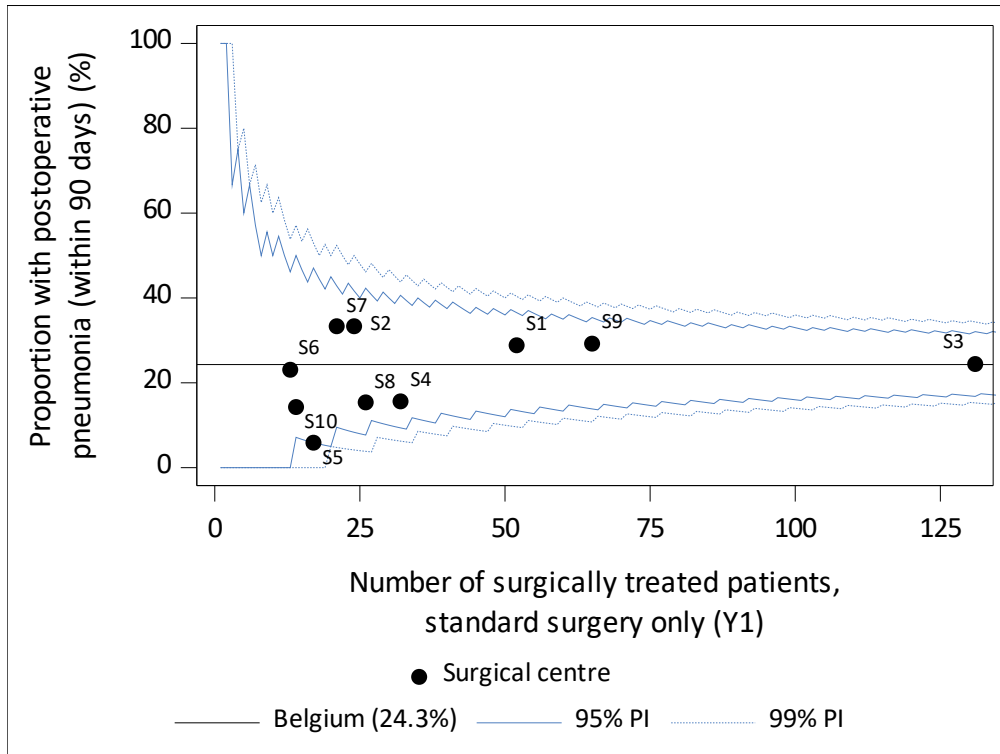


(e)

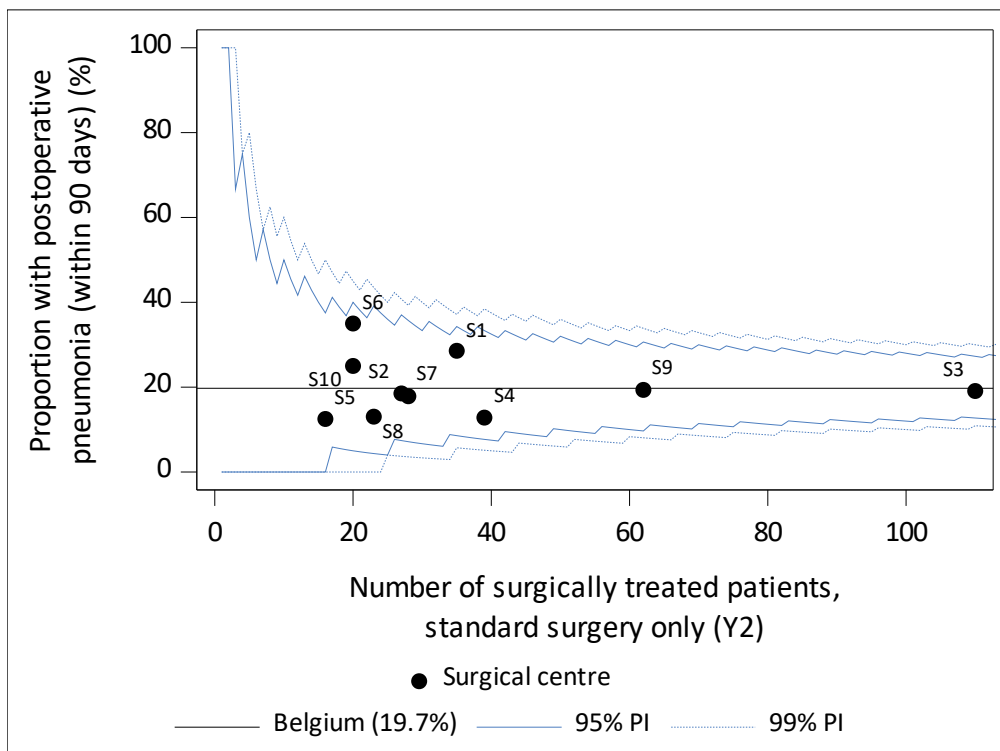


**Figure 19:** Funnel and spaghetti plot of surgically treated patients **with postoperative pneumonia (Clavien-Dindo grade I-V) within 90-days post-surgery, only for standard surgery**, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

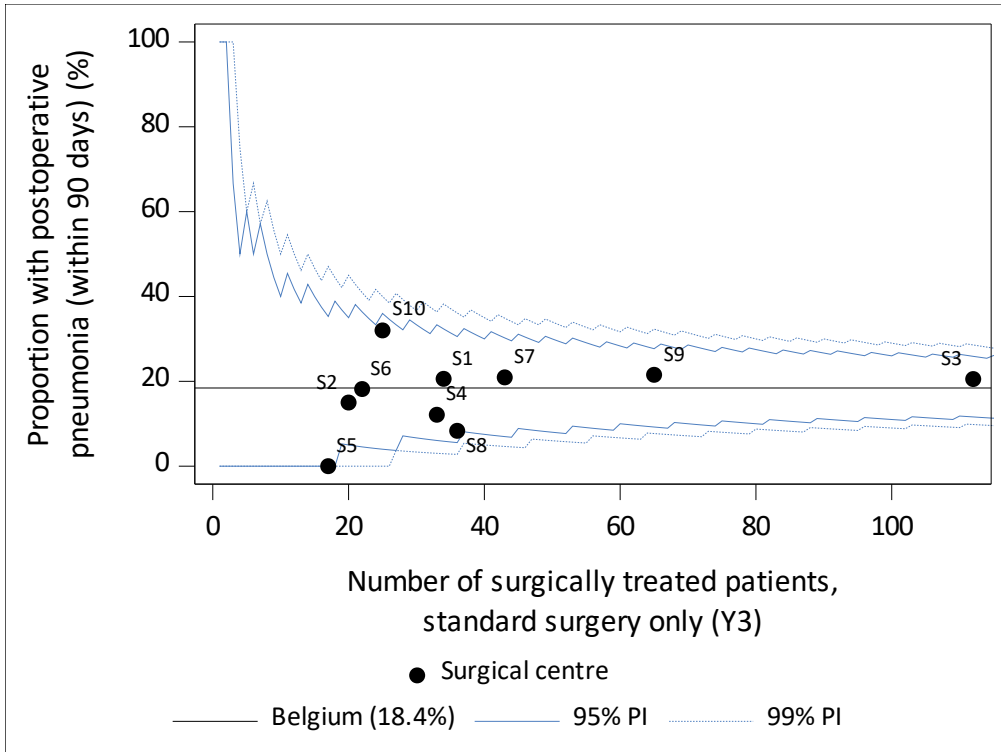
(a)



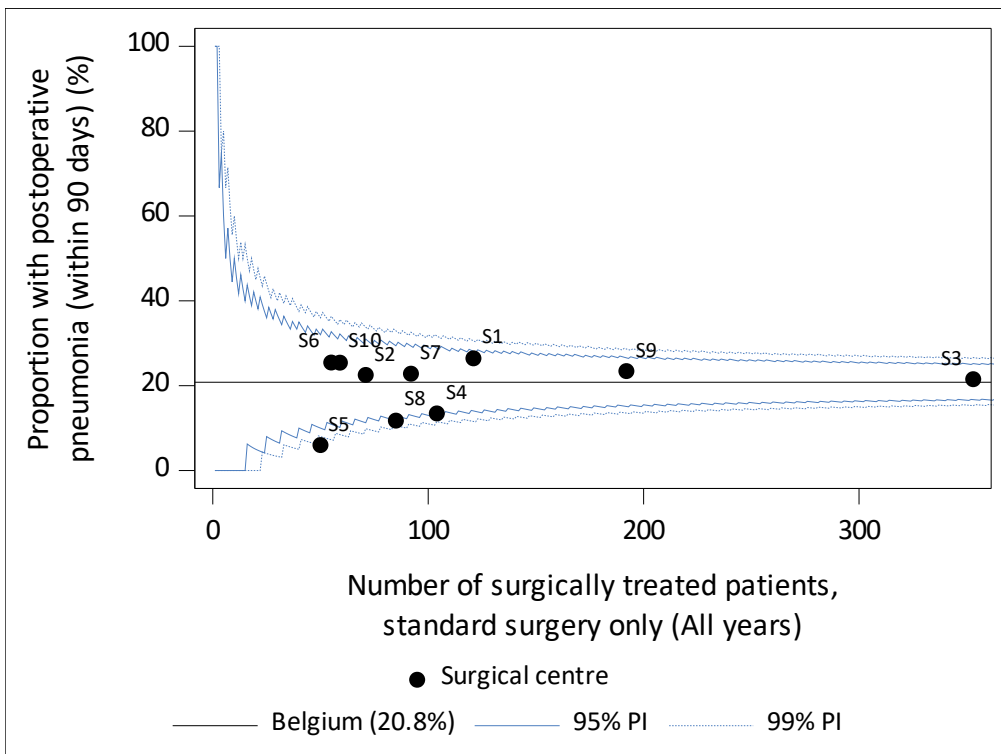
(b)



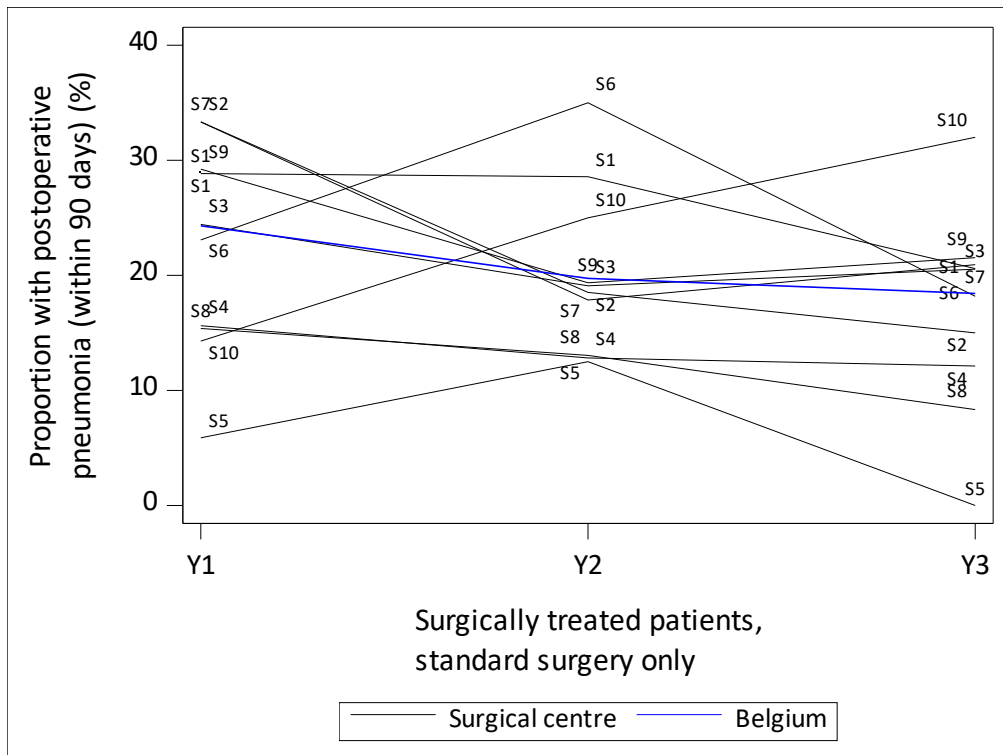
(c)



(d)



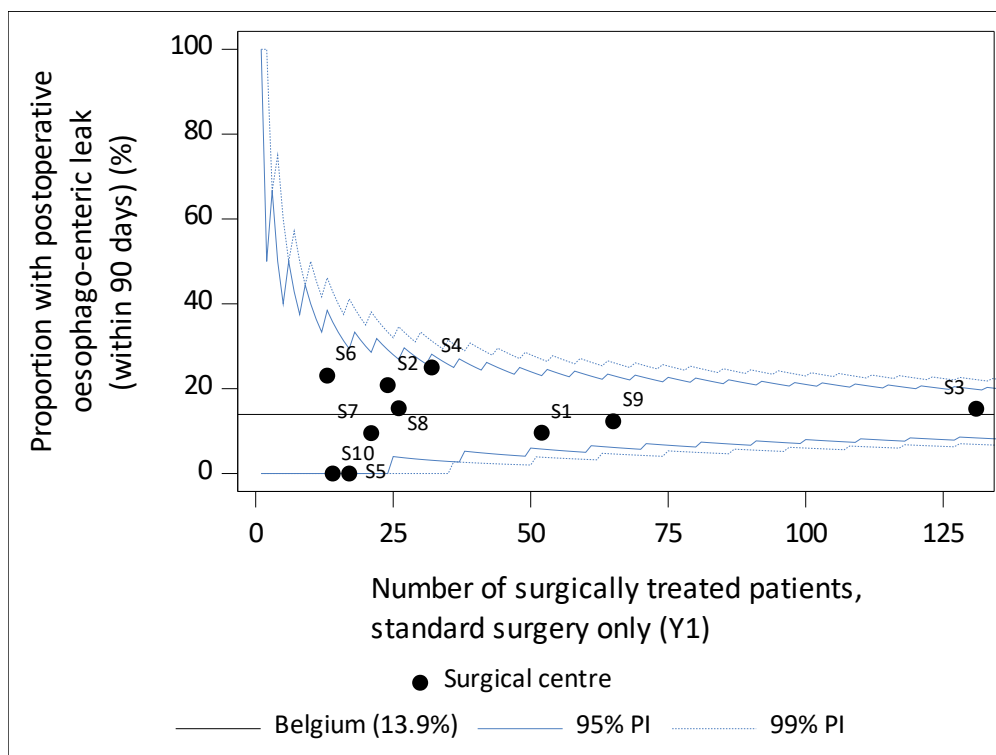
(e)



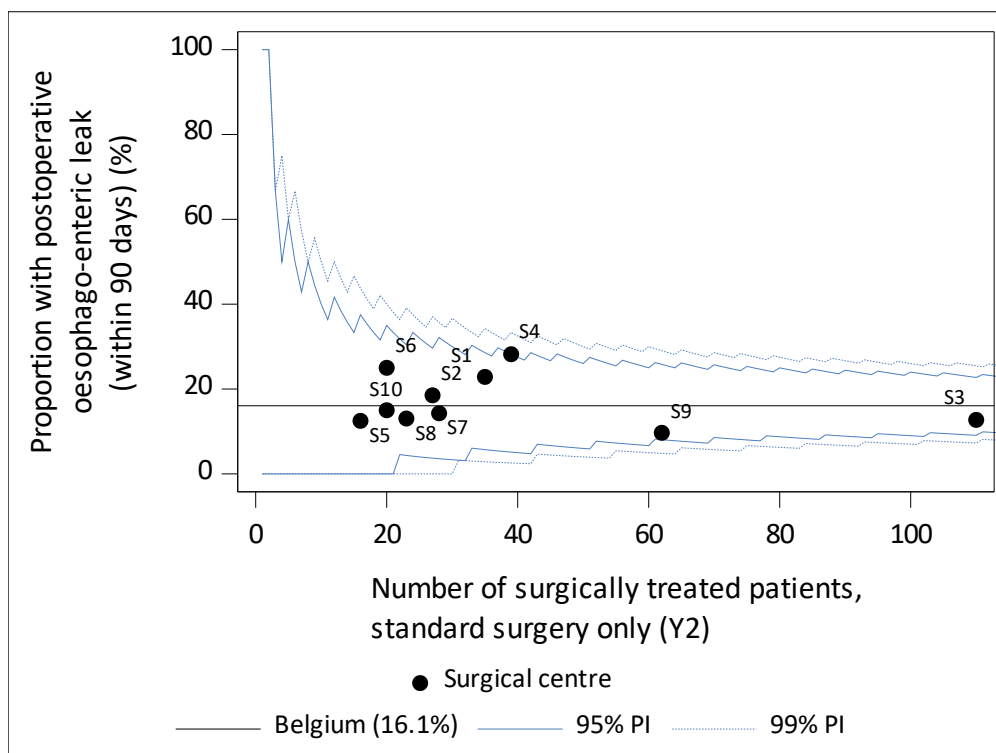


**Figure 20:** Funnel and spaghetti plot of surgically treated patients **with postoperative oesophago-enteric leak (Clavien-Dindo grade I-V) within 90-days post-surgery, only for standard surgery**, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

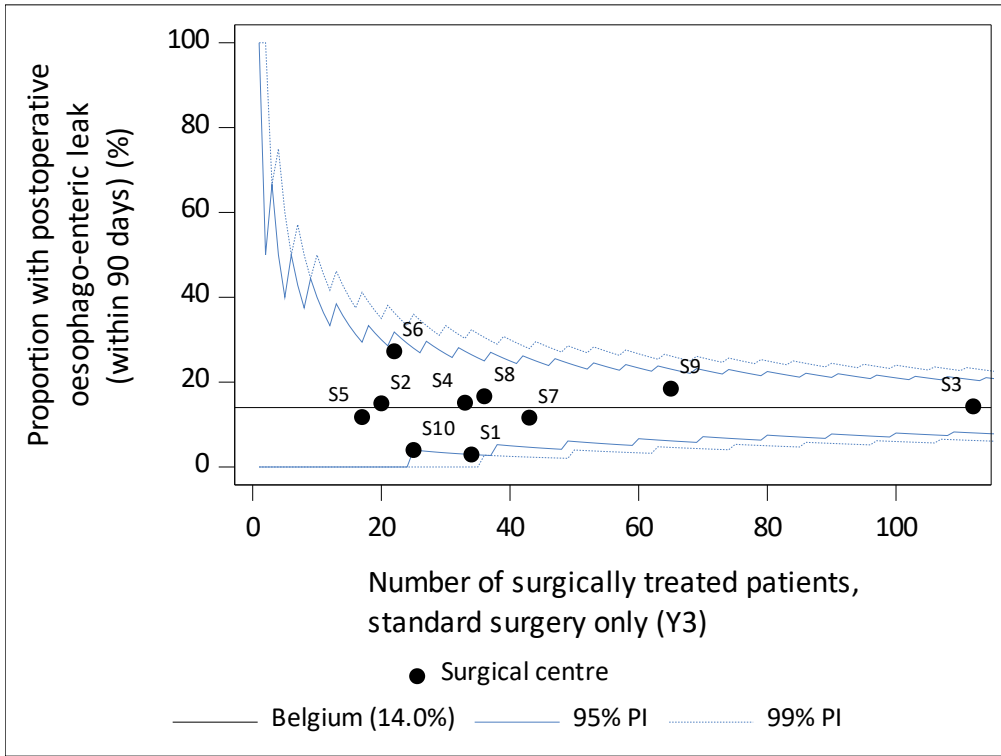
(a)



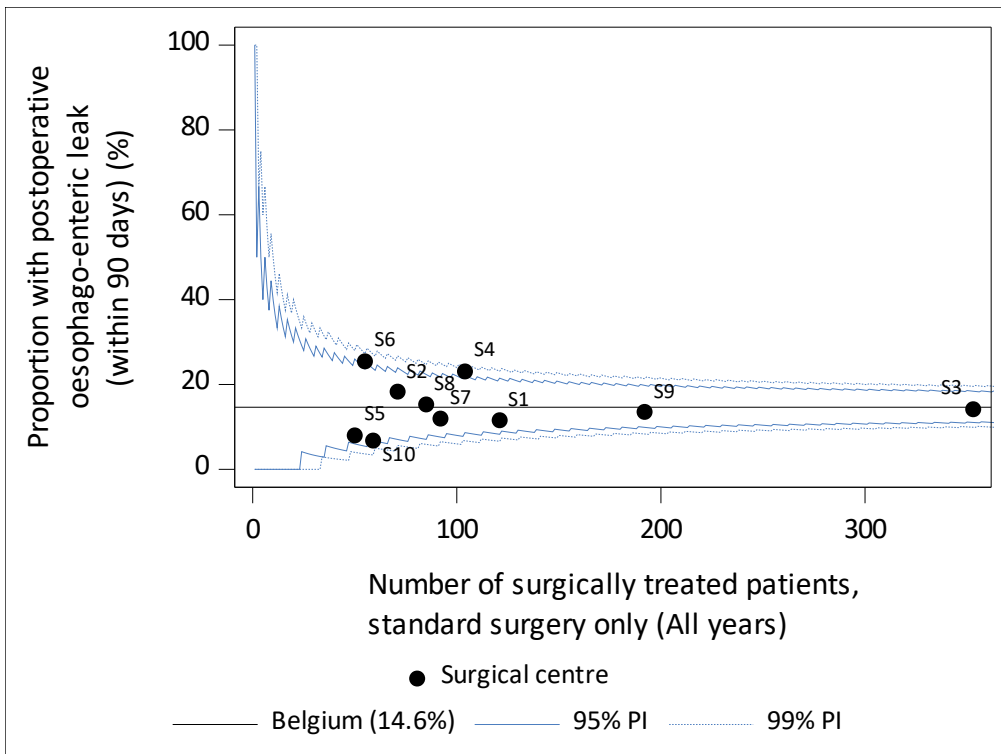
(b)



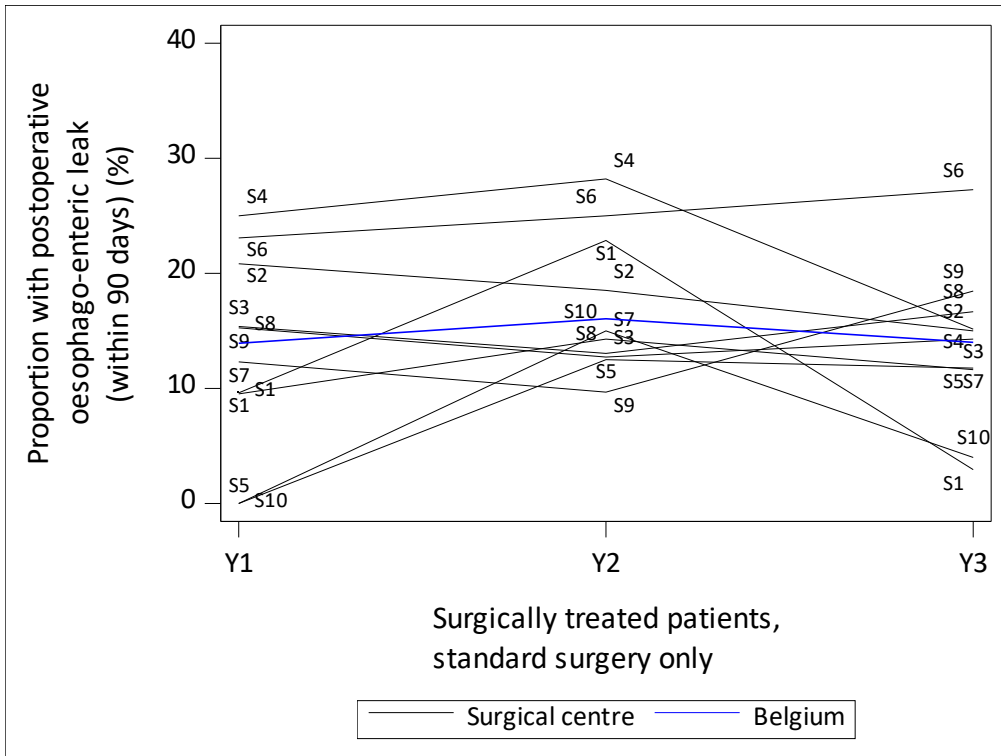
(c)



(d)

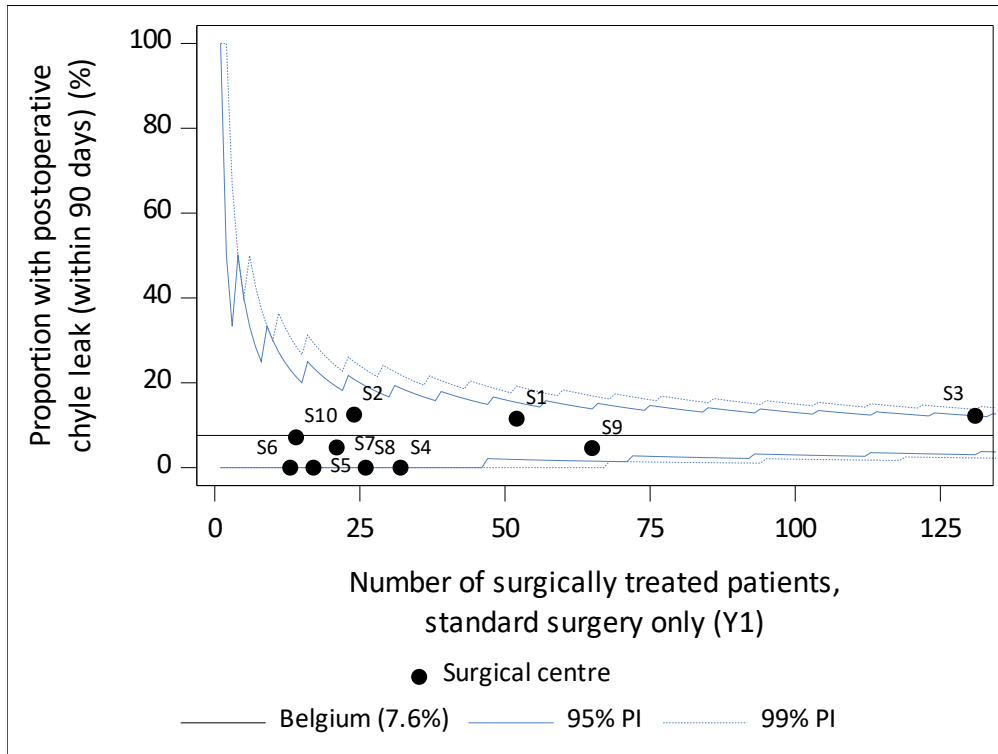


(e)

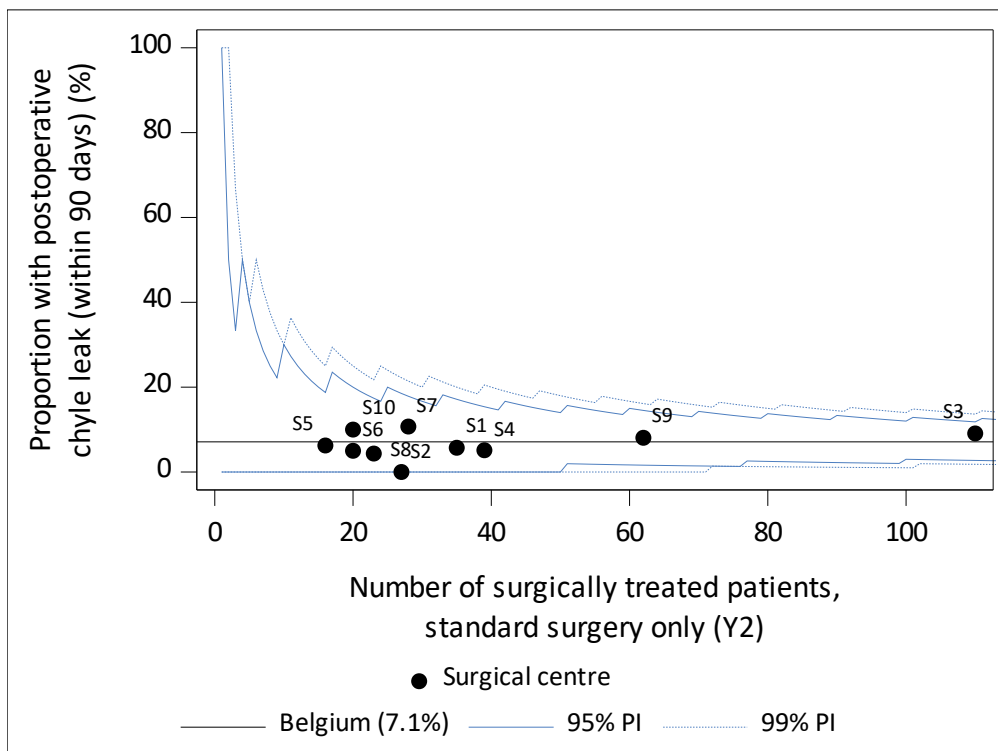


**Figure 21:** Funnel and spaghetti plot of surgically treated patients **with postoperative chyle leak (Clavien-Dindo grade I-V) within 90-days post-surgery, only for standard surgery**, per centre, for (a) year 1, (b) year 2, (c) year 3, (d) all years combined, (e) evolution year 1, 2 and 3.

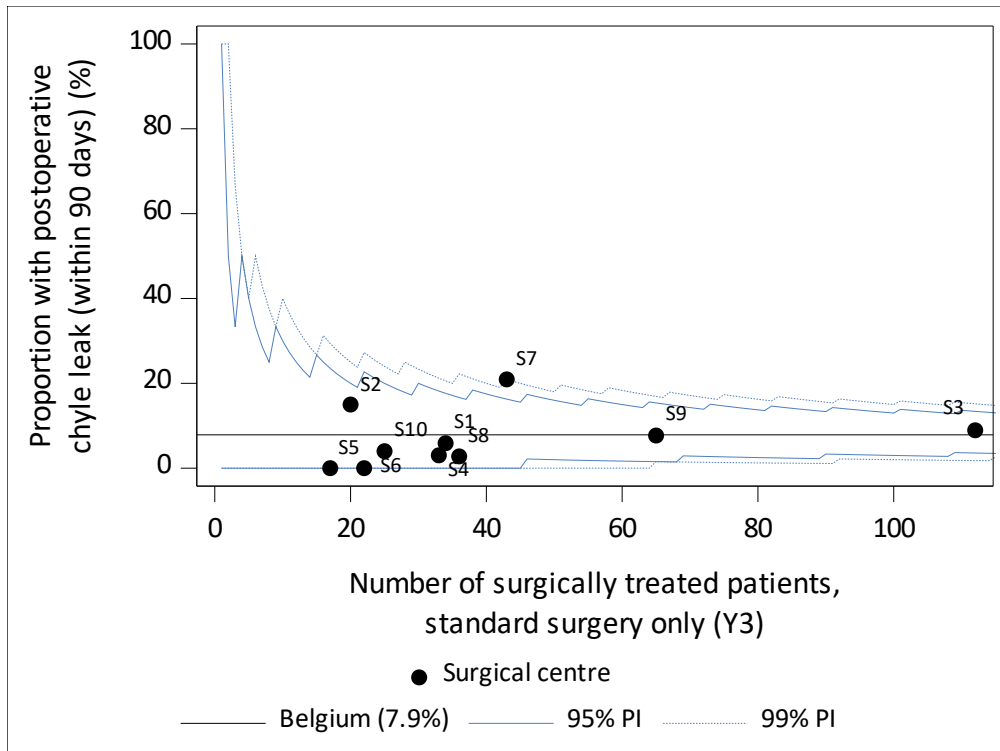
(a)



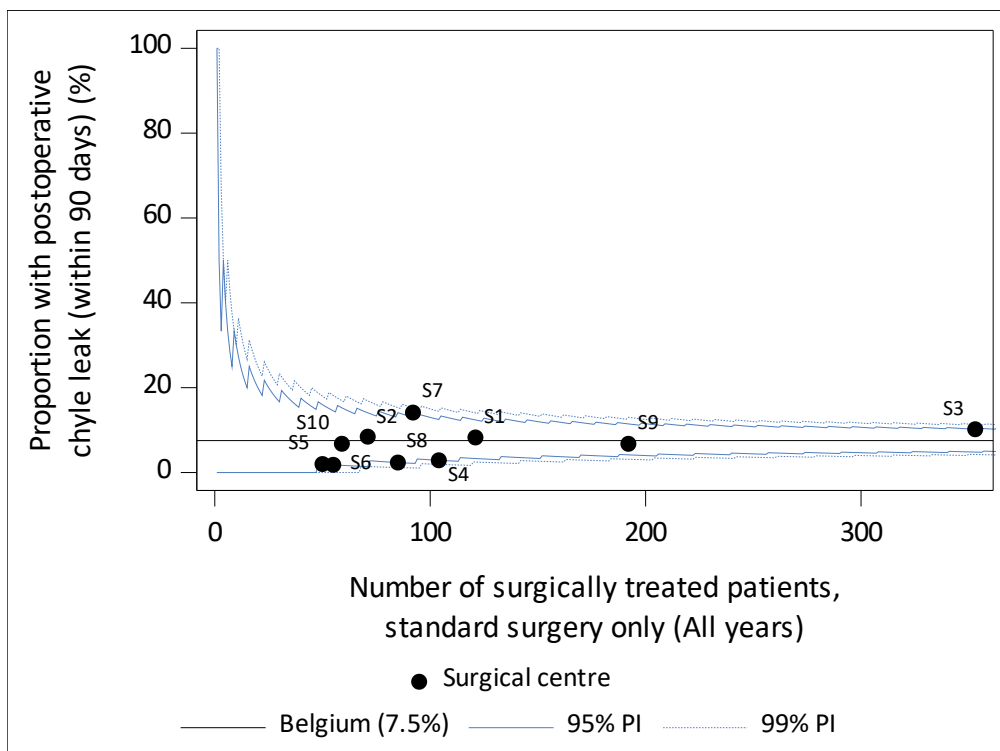
(b)



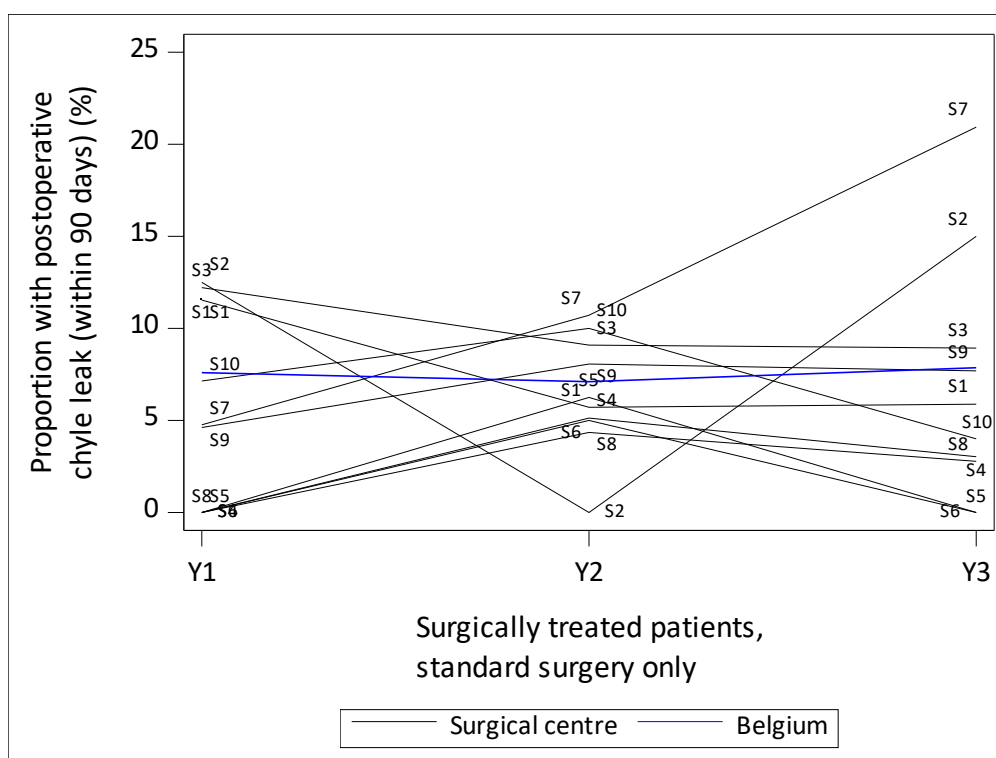
(c)



(d)



(e)



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

**Table 22:** Proportion of surgically treated patients with severe surgical complications, by patient and tumour characteristics (standard surgery only).

Characteristic	Severe surgical complications (Clavien-Dindo IIIb-V)			
	Belgium			
	N	n	n/N (%)	95% CI
<b>Overall Y1+Y2+Y3</b>	1,182	335	28.3	[25.8, 31.0]
<b>Convention year</b>				
Year 1	395	115	29.1	[24.7, 33.9]
Year 2	380	113	29.7	[25.2, 34.6]
Year 3	407	107	26.3	[22.1, 30.9]
<b>Sex</b>				
Male	943	264	28.0	[25.1, 31.0]
Female	239	71	29.7	[24.0, 35.9]
<b>Age at surgery</b>				
<=69	752	197	26.2	[23.1, 29.5]
70-79	373	119	31.9	[27.2, 36.9]
>=80	57	19	33.3	[21.4, 47.1]
<b>Lesion to treat (in oesophagus/GOJ)</b>				

Characteristic	Severe surgical complications (Clavien-Dindo IIIb-V)			
	Belgium			
	N	n	n/N (%)	95% CI
Primary tumour	1,153	324	28.1	[25.5, 30.8]
Relapse of primary tumour	25	10	40.0	[21.1, 61.3]
Metastasis	4	1	25.0	[0.6, 80.6]
<b>Morphology</b>				
Adenocarcinoma	881	227	25.8	[22.9, 28.8]
Squamous cell carcinoma	282	104	36.9	[31.2, 42.8]
Other, unspecified or missing	19	4	21.1	[6.1, 45.6]
<b>Primary tumour localisation</b>				
C15.0/C15.3 Cervical/upper third oesophagus	28	12	42.9	[24.5, 62.8]
C15.1/C15.4 Thoracic/middle third oesophagus	153	54	35.3	[27.7, 43.4]
C15.2/C15.5 Abdominal/lower third oesophagus	600	174	29.0	[25.4, 32.8]
C15.8 Overlapping lesion of oesophagus	4	3	75.0	[19.4, 99.4]
C16.0 Gastro-oesophageal junction	395	90	22.8	[18.7, 27.2]
Other	2	2	100.0	[15.8, 100.0]
<b>Clinical stage</b>				
0	8	1	12.5	[0.3, 52.7]
I	113	39	34.5	[25.8, 44.0]
II	208	66	31.7	[25.5, 38.5]
III	561	150	26.7	[23.1, 30.6]
IV	225	62	27.6	[21.8, 33.9]
IVA <sup>#</sup>	185	47	25.4	[19.3, 32.3]
IVB <sup>#</sup>	38	15	39.5	[24.0, 56.6]
X	35	12	34.3	[19.1, 52.2]
TNM not applicable or relapse	32	5	15.6	[5.3, 32.8]
<b>Prior surgery or endoscopic treatment *</b>				
Prior major thoracic or abdominal surgery	92	30	32.6	[23.2, 43.2]
Endoscopic treatment	64	22	34.4	[22.9, 47.3]
- EMR/ESD	64	22	34.4	[22.9, 47.3]
- RFA	2	0	0.0	[0.0, 84.2]
- Ablation techniques other than RFA	0			–
Other treatment modality (that could affect the oesophagus)	18	7	38.9	[17.3, 64.3]
<b>Neoadjuvant treatment</b>				
Chemotherapy	314	70	22.3	[17.8, 27.3]
Targeted therapy/biologicals	11	5	45.5	[16.7, 76.6]
Radiotherapy	1	0	0.0	[0.0, 97.5]
Chemoradiotherapy	603	189	31.3	[27.7, 35.2]
No chemo, radiation or targeted treatment	264	76	28.8	[23.4, 34.7]
<b>Charlson Comorbidity Index</b>				
0	506	116	22.9	[19.3, 26.8]
1	318	80	25.2	[20.5, 30.3]

Characteristic	Severe surgical complications (Clavien-Dindo IIIb-V)			
	Belgium			
	N	n	n/N (%)	95% CI
2	189	76	40.2	[33.2, 47.6]
3	92	35	38.0	[28.1, 48.8]
4	44	12	27.3	[15.0, 42.8]
5	14	4	28.6	[8.4, 58.1]
6	8	5	62.5	[24.5, 91.5]
7	7	4	57.1	[18.4, 90.1]
8	2	2	100.0	[15.8, 100.0]
9	2	1	50.0	[1.3, 98.7]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	304	69	22.7	[18.1, 27.8]
1 - Symptomatic, but ambulant	723	201	27.8	[24.6, 31.2]
2 - Symptomatic, bedbound < 50% day	132	52	39.4	[31.0, 48.3]
3 - Symptomatic, bedbound > 50% day	20	11	55.0	[31.5, 76.9]
4 - Completely dependent, 100% bedbound	3	2	66.7	[9.4, 99.2]
<b>ASA score</b>				
1 - Healthy person	54	11	20.4	[10.6, 33.5]
2 - Mild systemic disease, normal activity	531	125	23.5	[20.0, 27.4]
3 - Serious systemic disease, limited activity	583	192	32.9	[29.1, 36.9]
4 - Life-threatening illness, handicapped	14	7	50.0	[23.0, 77.0]
<b>Surgery intention</b>				
Surgery as primary treatment	263	76	28.9	[23.5, 34.8]
Post-induction (neoadjuvant chemo- and/or radiotherapy)	873	238	27.3	[24.3, 30.3]
Salvage post-radical chemo- and/or radiotherapy	46	21	45.7	[30.9, 61.0]
<b>Type of surgery</b>				
Minimally invasive surgery (MIS)	745	208	27.9	[24.7, 31.3]
Open	416	114	27.4	[23.2, 32.0]
Conversion from MIS to open surgery	21	13	61.9	[38.4, 81.9]
<b>RIZIV code for complex surgery</b>				
228270-228281: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery	1	0	0.0	[0.0, 97.5]
228292-228303: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery	1	0	0.0	[0.0, 97.5]
228314-228325: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery and extensive lymph node removal	349	87	24.9	[20.5, 29.8]
228336-228340: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery and extensive lymph node removal	831	248	29.8	[26.7, 33.1]
<b>Oesophagectomy</b>				
Partial	464	115	24.8	[20.9, 29.0]
Subtotal	718	220	30.6	[27.3, 34.2]
<b>Antithrombotic medication</b>				



Severe surgical complications (Clavien-Dindo IIIb-V)				
Belgium				
Characteristic	N	n	n/N (%)	95% CI
No	959	255	26.6	[23.8, 29.5]
Yes	223	80	35.9	[29.6, 42.5]
<b><i>Was the patient referred?</i></b>				
No	266	71	26.7	[21.5, 32.4]
Yes	916	264	28.8	[25.9, 31.9]

Non-standard surgery (= emergency, palliative, recurrence, total laryngectomy) is not included in this table.

\* Patients could have received a combination of treatments listed, thus the total number of treatments could be larger than the total number of patients. Combinations of prior surgery, endoscopic and neoadjuvant treatments could also occur.

# Only IVA and IVB have been considered for this subsection. Hence the sum of their numbers might not be equal to the number portrayed in clinical stage IV.

## 4. Non-malignant pathology

### 4.1. Descriptives

#### 4.1.1. Patient case mix description

**Table 23:** Case mix description of all the patients with **non-malignant pathology** of the oesophagus/GOJ that had surgery.

Characteristic	Belgium (N=95)					
	Year 1		Year 2		Year 3	
	N	%	N	%	N	%
<b>Overall Y1+Y2+Y3</b>	<b>30</b>		<b>32</b>		<b>33</b>	
<b>Expert centres</b>						
S1	1	3.3	2	6.3	6	18.2
S2	0	0.0	0	0.0	2	6.1
S3	16	53.3	12	37.5	6	18.2
S4	1	3.3	0	0.0	0	0.0
S5	2	6.7	5	15.6	6	18.2
S6	1	3.3	5	15.6	6	18.2
S7	2	6.7	0	0.0	2	6.1
S8	5	16.7	3	9.4	4	12.1
S9	2	6.7	5	15.6	1	3.0
<b>Sex</b>						
Male	13	43.3	17	53.1	17	51.5
Female	17	56.7	15	46.9	16	48.5
<b>Age at surgery</b>						
<=69	26	86.7	23	71.9	24	72.7
70-79	4	13.3	8	25.0	8	24.2
>=80	0	0.0	1	3.1	1	3.0
<b>Indication</b>						
Achalasia	2	6.7	1	3.1	4	12.1
Benign tumour	1	3.3	3	9.4	0	0.0
Boerhaave	1	3.3	4	12.5	3	9.1
Substances	2	6.7	0	0.0	4	12.1
Other	24	80.0	24	75.0	22	66.7
<b>RIZIV code for complex surgery</b>						
228270-228281: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery	15	50.0	21	65.6	23	69.7
228292-228303: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery	11	36.7	8	25.0	9	27.3

Characteristic	Belgium (N=95)					
	Year 1		Year 2		Year 3	
	N	%	N	%	N	%
228314-228325: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery and extensive lymph node removal	2	6.7	2	6.3	0	0.0
228336-228340: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery and extensive lymph node removal	2	6.7	1	3.1	1	3.0

## 4.2. Outcome indicators

### 4.2.1. Postoperative mortality

There were 8 postoperative deaths observed for all hospitals combined in the first year after surgery for the three convention years. There were 2 postoperative deaths in the first 30 days and 4 postoperative deaths in the first 90 days. Therefore no postoperative mortality or observed survival results are given.

### 4.2.2. Proportion of surgically treated 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 24:** Proportion of surgically treated patients in the three convention years with complications (90-day postoperative, in-hospital), by complication type.

Complication type	Postoperative complications (90-day in-hospital) Y1+Y2+Y3			
	Belgium			
	N	n	n/N (%)	95% CI
<b>Severe surgical complications (CD IIIb-V)<sup>1</sup></b>				
Year 1	30	5	16.7	[5.6, 34.7]
Year 2	32	8	25.0	[11.5, 43.4]
Year 3	33	12	36.4	[20.4, 54.9]
<b>Pneumonia (CD I-V)*</b>				
Year 1	30	4	13.3	[3.8, 30.7]
Year 2	32	3	9.4	[2.0, 25.0]
Year 3	33	3	9.1	[1.9, 24.3]
<b>Oesophago-enteric leak <sup>2</sup> (CD I-V)*</b>				
Year 1	30	4	13.3	[3.8, 30.7]
Year 2	32	6	18.8	[7.2, 36.4]
Year 3	33	6	18.2	[7.0, 35.5]
<b>Chyle leak (CD I-V)*</b>				
Year 1	30	1	3.3	[0.1, 17.2]
Year 2	32	0	0.0	[0.0, 10.9]
Year 3	33	1	3.0	[0.1, 15.8]

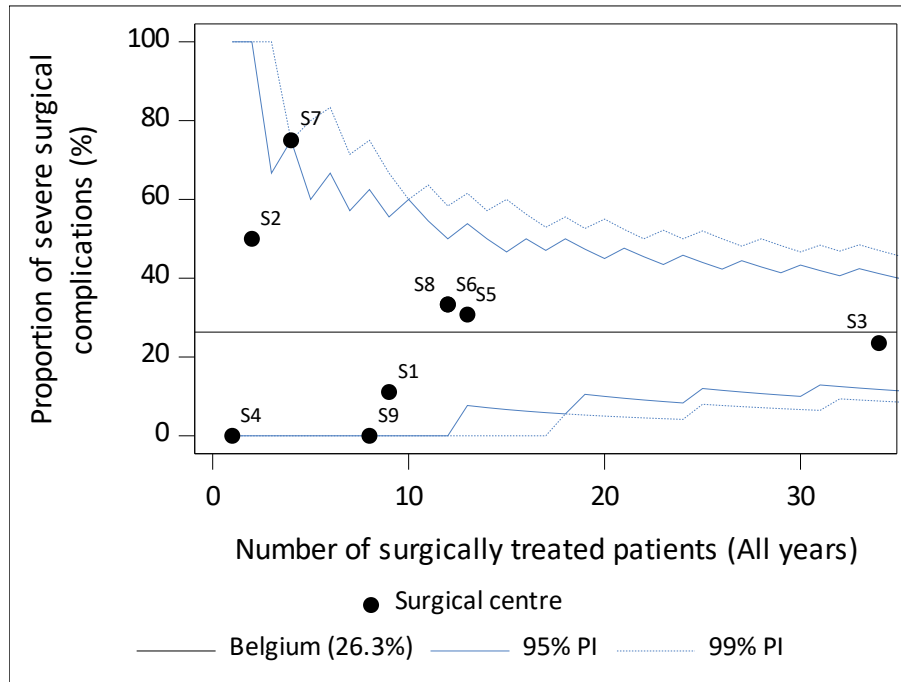
<sup>1</sup> CD: Clavien-Dindo grade

<sup>2</sup> Oesophago-enteric leak from anastomosis, staple line, or localised conduit necrosis

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

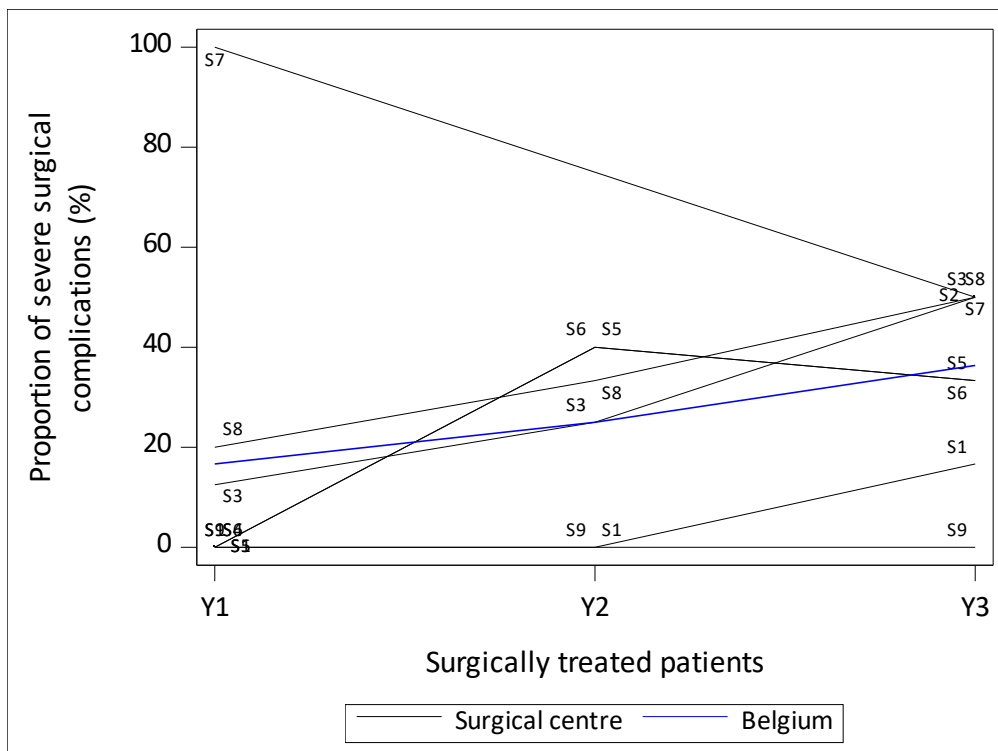
**Figure 22:** Funnel and spaghetti plot of surgically treated patients **with severe surgical complications (Clavien-Dindo grade IIIb-V) within 90-days** post-surgery, per centre, for (a) all years combined, (b) evolution year 1, 2 and 3.

(a)



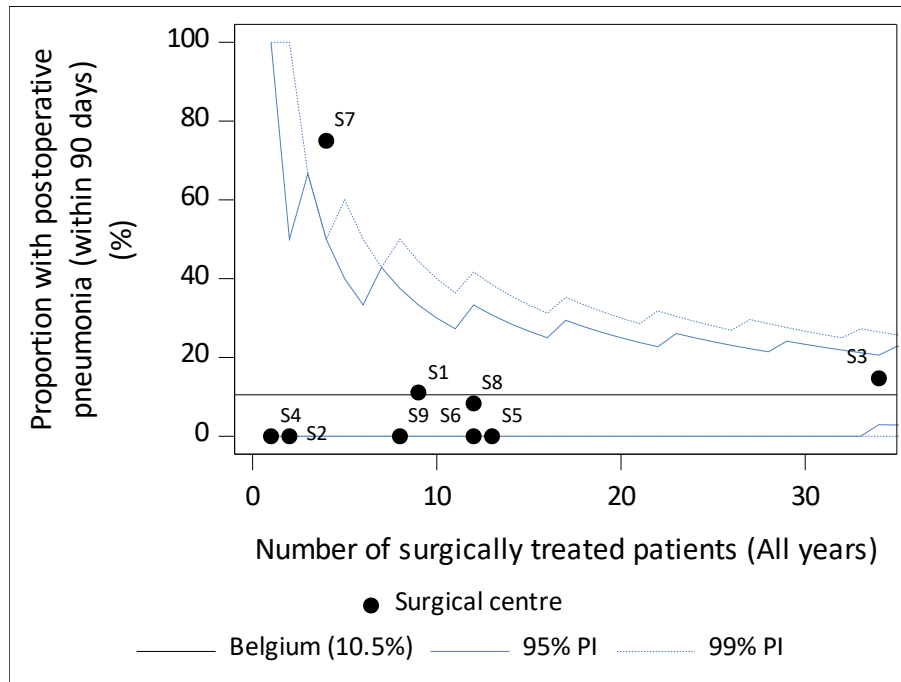
N=1 hospital is not displayed in the graph above because it had no patients for the current selection.

(b)



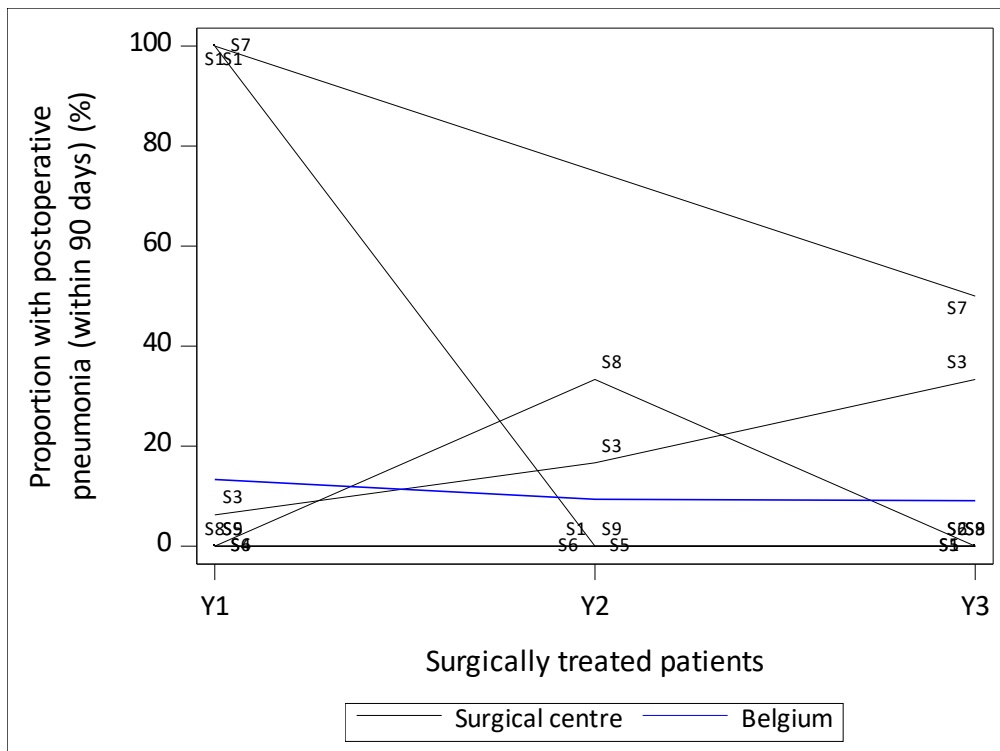
**Figure 23:** Funnel and spaghetti plot of surgically treated patients **with postoperative pneumonia (Clavien-Dindo grade I-V) within 90-days** post-surgery, per centre, for (a) all years combined, (b) evolution year 1, 2 and 3.

(a)



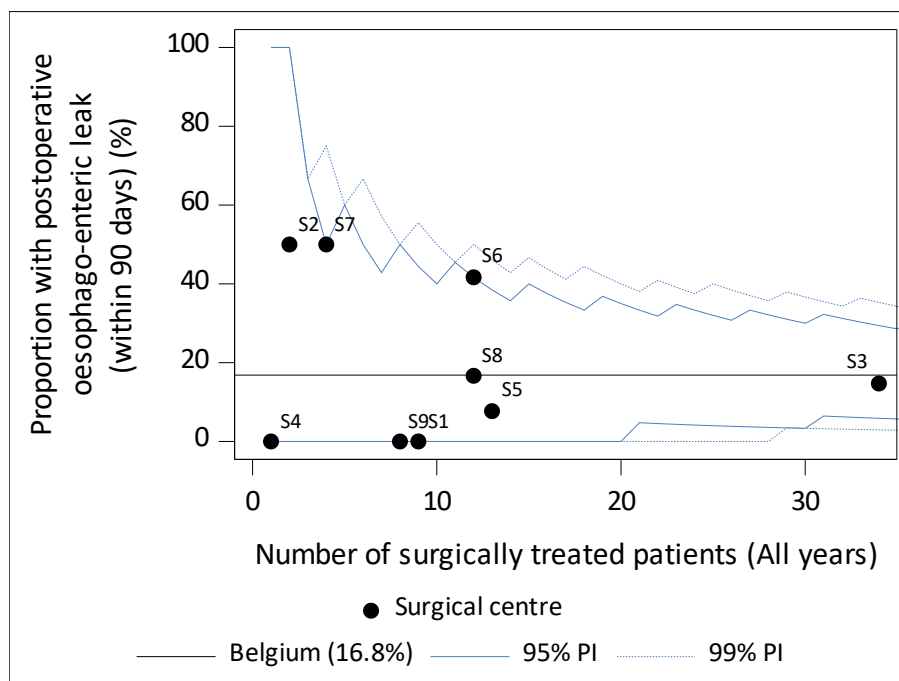
N=1 hospital is not displayed in the graph above because it had no patients for the current selection.

(b)



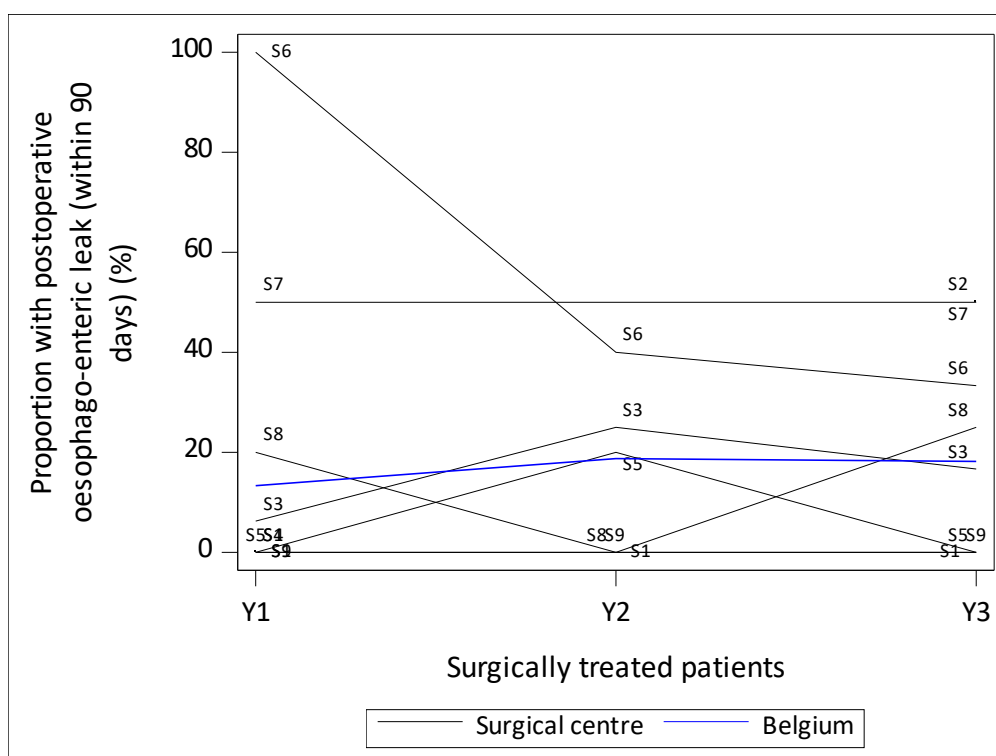
**Figure 24:** Funnel and spaghetti plot of surgically treated patients **with postoperative oesophago-enteric leak (Clavien-Dindo grade I-V) within 90-days** post-surgery, for (a) all years combined, (b) evolution year 1, 2 and 3.

(a)



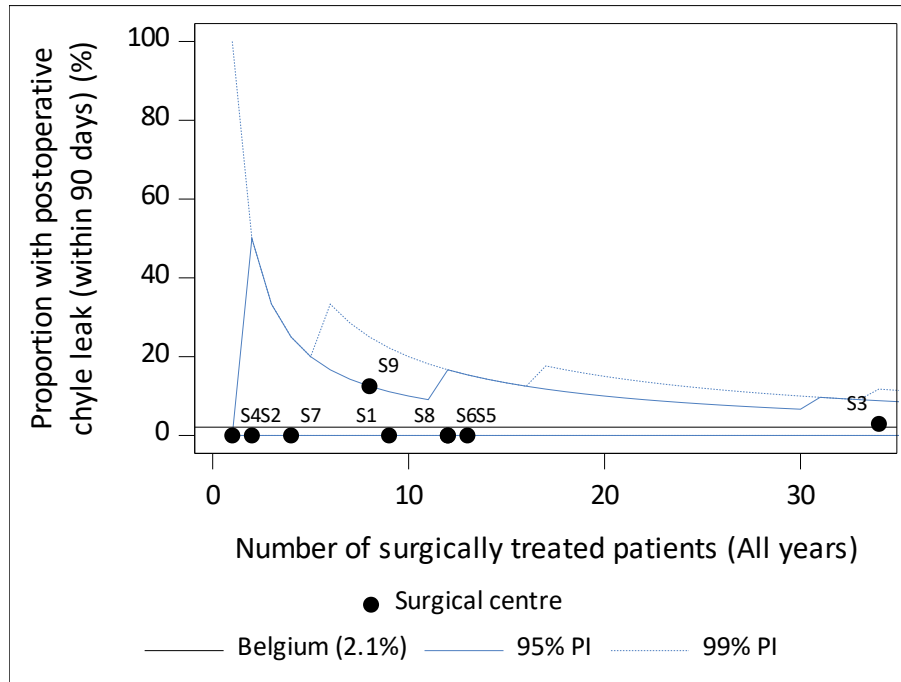
N=1 hospital is not displayed in the graph above because it had no patients for the current selection.

(b)



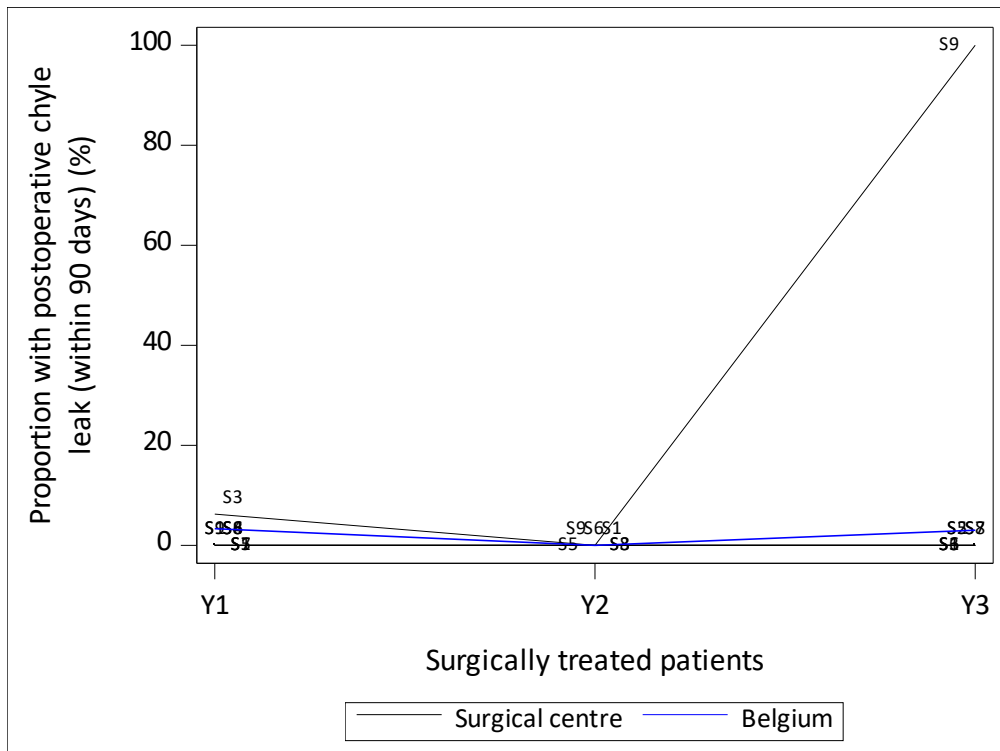
**Figure 25:** Funnel and spaghetti plot of surgically treated patients **with postoperative chyle leak (Clavien-Dindo grade I-V) within 90-days** post-surgery, per centre, for (a) all years combined, (b) evolution year 1, 2 and 3.

(a)



N=1 hospital is not displayed in the graph above because it had no patients for the current selection.

(b)





#### 4.2.2.1 Proportion of surgically treated patients with severe surgical complications (Clavien-Dindo grade IIIb-V, 90-day postoperative, in-hospital)

**Table 25:** Proportion of surgically treated patients in the three convention years with severe surgical complications, by patient and treatment characteristics.

Characteristic	Severe surgical complications (Clavien-Dindo IIIb-V) Y1+Y2+Y3			
	Belgium			
	N	n	n/N (%)	95% CI
<b>Overall Year 1 + 2 + 3</b>	95	25	26.3	[17.8, 36.4]
<b>Convention year</b>				
Year 1	30	5	16.7	[5.6, 34.7]
Year 2	32	8	25.0	[11.5, 43.4]
Year 3	33	12	36.4	[20.4, 54.9]
<b>Sex</b>				
Male	47	11	23.4	[12.3, 38.0]
Female	48	14	29.2	[17.0, 44.1]
<b>Age at surgery</b>				
<=69	73	16	21.9	[13.1, 33.1]
70-79	20	9	45.0	[23.1, 68.5]
>=80	2	0	0.0	[0.0, 84.2]
<b>Prior surgery or endoscopic treatment *</b>				
Prior major thoracic or abdominal surgery	34	6	17.6	[6.8, 34.5]
Endoscopic treatment	2	1	50.0	[1.3, 98.7]
EMR/ESD	1	0	0.0	[0.0, 97.5]
RFA	0	0	0.0	–
Ablation techniques other than RFA	1	1	100.0	[2.5, 100.0]
Other treatment modality (that could affect the oesophagus)	9	5	55.6	[21.2, 86.3]
<b>Charlson Comorbidity Index</b>				
0	53	15	28.3	[16.8, 42.3]
1	17	3	17.6	[3.8, 43.4]
2	14	2	14.3	[1.8, 42.8]
3	5	1	20.0	[0.5, 71.6]
4	3	2	66.7	[9.4, 99.2]
5	1	1	100.0	[2.5, 100.0]
6	2	1	50.0	[1.3, 98.7]
<b>WHO score at surgery</b>				
0 - Asymptomatic, normal activity	26	4	15.4	[4.4, 34.9]
1 - Symptomatic, but ambulant	46	10	21.7	[10.9, 36.4]
2 - Symptomatic, bedbound < 50% day	6	2	33.3	[4.3, 77.7]
3 - Symptomatic, bedbound > 50% day	6	3	50.0	[11.8, 88.2]
4 - Completely dependent, 100% bedbound	11	6	54.5	[23.4, 83.3]
<b>ASA score</b>				
1 - Healthy person	9	3	33.3	[7.5, 70.1]

Characteristic	Severe surgical complications (Clavien-Dindo IIIb-V) Y1+Y2+Y3			
	Belgium			
	N	n	n/N (%)	95% CI
2 - Mild systemic disease, normal activity	45	9	20.0	[9.6, 34.6]
3 - Serious systemic disease, limited activity	31	7	22.6	[9.6, 41.1]
4 - Life-threatening illness, handicapped	8	4	50.0	[15.7, 84.3]
5 - Dying	2	2	100.0	[15.8, 100.0]
<b><i>Surgery intention</i></b>				
Surgery as primary treatment	5	1	20.0	[0.5, 71.6]
Missing	90	24	26.7	[17.9, 37.0]
<b><i>Mode of surgery</i></b>				
Elective	73	17	23.3	[14.2, 34.6]
Emergency	22	8	36.4	[17.2, 59.3]
<b><i>Type of surgery</i></b>				
Minimally invasive surgery (MIS)	25	7	28.0	[12.1, 49.4]
Open	67	17	25.4	[15.5, 37.5]
Conversion from MIS to open surgery	3	1	33.3	[0.8, 90.6]
<b><i>RIZIV code for complex surgery</i></b>				
228270-228281: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery	59	13	22.0	[12.3, 34.7]
228292-228303: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery	28	12	42.9	[24.5, 62.8]
228314-228325: Thoracic or thoracic-abdominal oesophagectomy or gastro-oesophagectomy in one surgery with continuity recovery and extensive lymph node removal	4	0	0.0	[0.0, 60.2]
228336-228340: Subtotal oesophagectomy up to the level of the arcus aortae, with continuity recovery and extensive lymph node removal	4	0	0.0	[0.0, 60.2]
<b><i>Oesophagectomy</i></b>				
Partial	62	12	19.4	[10.4, 31.4]
Subtotal	30	11	36.7	[19.9, 56.1]
Total laryngectomy	3	2	66.7	[9.4, 99.2]
<b><i>Antithrombotic medication</i></b>				
No	83	21	25.3	[16.4, 36.0]
Yes	12	4	33.3	[9.9, 65.1]
<b><i>Was the patient referred?</i></b>				
No	58	17	29.3	[18.1, 42.7]
Yes	37	8	21.6	[9.8, 38.2]

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

Combinations of prior surgery and endoscopic treatment could also occur.