

# **DATABASE ANNUAL REPORT**

**2021**

PRODUCED BY THE ESTS DATABASE COMMITTEE



*Powered by **KData Clinical***



**EUROPEAN SOCIETY  
OF THORACIC SURGEONS  
DATABASE COMMITTEE**

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## Message from the President of ESTS

Dr Enrico Ruffini  
ESTS President  
**enrico.ruffini@unito.it**

Dear ESTS members, colleagues and friends,

For the second year, as ESTS President, I have the privilege to introduce the yearly Edition of the ESTS Silver Book, which summarises the activity of the ESTS Registry.

It is also a privilege of the President to highlight what is behind the scenes, to focus on some extra-clinical aspects of the terrific piece of work which the Silver Book represents for the Society.

The extraordinary teamwork which is behind the Registry needs also to be acknowledged, because it represents an amazing example of a multidisciplinary and multi-team effort.

A particular thanks go to the Director of the Database, Prof. Pierre-Emmanuel Falcoz, who after 9 years of dedicated and indefatigable commitment passes the baton to Prof. Zalan Szanto. Prof. Falcoz will cover the prestigious position of Editor. To both goes my personal best wishes for their new positions. The ESTS community owes a lot to Prof. Falcoz, who has taken the Registry to the current top-quality standards, currently representing the largest European Registry for thoracic diseases, including the largest prospective thymic database in the world. Thank you, Prof. Falcoz.

I would also like to thank the whole team of Kdata Clinical (led by Dr. Stefano Passani), who has worked hard this year, despite the objective limitations and difficulties due to the global situation, to coordinate, integrate and mainstream the large amount of data flowing into the Registry.

My deepest gratitude also goes to all the Clinical leaders of the Database sections, including the satellite databases (mesothelioma, thymic tumors, neuroendocrine tumors, chest wall, robotic pages), who, together with their respective working groups, were able to maintain a constant increase in the number of accrued cases even in this difficult year.

And of course a special thanks to our contributing Institutions and ESTS members who uploaded the cases into the Registry, with enthusiasm and spirit of service: a sign of commitment and devotion to our Society. In particular, my personal thanks on behalf of the entire Society go to the French Database Epithor, the Hungarian and the Brazilian Databases who massively contribute to the Registry.

The global situation regarding the Covid-19 pandemic is improving in many countries, thanks to mass vaccination and to the containment policies adopted by the global community. However, the impact of the pandemic on our Society has been huge, at any level: social, educational, emotional.

In our field, in thoracic surgery, a dramatic reduction of the elective surgical procedures, including oncological procedures, has occurred during the periods of lockdowns, when many hospitals were converted and restructured as Covid Hospitals. The consequences of the delay in oncological treatments, including surgery, as well as the delay in the diagnostic and staging work-up will be profound and they will be seen in the next future with a huge impact on our patients.

This also resulted in a contraction of the constant increase in the accrual rate which has occurred in the recent years until the start of the pandemic. Despite this, as you will see from the present report, an increase in the number of cases for all the sections and satellite databases has occurred, as a result of a continuous and strenuous effort from our contributing Institutions to maintain a surgical activity, in order to serve our patients, despite many logistic and technical difficulties throughout the world.

The accreditation process of the eligible Units, although structured through virtual visits replacing the on-site visits, has been maintained, and two additional centers have been accredited this year, a sign of recognition of the quality of the accreditation process which aims at providing excellence in quality and safety to our patients.

As you will see, all sections of the Registry increased the number of cases. The master section (lung section) still represents the vast majority of registered cases, but all the satellite databases are growing, and this is an amazing result, taking into account the rarity of the diseases.

The connection of the ESTS Registry with other Registries and Associations is also remarkable, including the long-lasting relationship between ESTS and STS databases and the contribution of the ESTS thymic database to the International Association for the Study of Lung Cancer (IASLC) Staging Project for the release of the 9<sup>th</sup> edition of the TNM stage classification.

The Covid-19 pandemic taught us that through a collaborative and global effort humanity can sustain any major crisis, that after any major crisis humanity have grown stronger and more mature. ESTS can play its part by maintaining its role as the leading Thoracic Surgical Society in the world.

I would like to finish by quoting our Constitution: “Our mission is to improve quality in all aspects of Thoracic Surgery: from clinical and surgical management of patients to education, training and credentialing of thoracic surgeons in Europe and worldwide”.

The ESTS Registry with the yearly Silver Book represents an essential component for the fulfillment of this mission.

Enrico Ruffini  
President of ESTS

## Message from the Director of ESTS Database

Prof Pierre-Emanuel Falcoz

ESTS Database Director

[pefalcoz@gmail.com](mailto:pefalcoz@gmail.com)



Dear ESTS members,

This year, the ESTS database committee, along with the K-Data team, worked very hard to produce the 12<sup>th</sup> edition of the Silver Book.

As you will discover during reading, the collection of data ranges from July 2007 to December 2020, in 240 contributing units throughout Europe, among which 125 are contributing for more than 100 cases. It provides the most current appraisal of the thoracic surgical activity in Europe, in the framework of a comprehensive, European-wide, population dataset. The 2021 Silver Book remains structured in different sub-chapters as in previous years.

For the 12<sup>th</sup> anniversary of the Silver book, I summarize the 2021 key findings in the following 12 major points:

1. In the past 12 months the ESTS Registry has grown to 188,976 total procedures from 172,961 in 2019: a remarkable increase of 16015 patients in this COVID-19 context !
2. As usual age is creeping up with the 61-70 age group including 64,317 entries (34.0%), and the 71-80 including 43,993 (23.3%) totaling 108,210 case (57.3%) of the overall total of procedures.
3. Lung procedures are the vast majority with 149,995 or 79.4%
4. There were 54,250 procedures performed in the VATS modality with an increase from 35.2% to 37.6% overall; if we look at the period 2014-20 there were 49.6% VATS in all procedures.
5. Primary neoplastic lung cancer was found in 72.9% of lung procedures.

6. If we look at significant complications, prolonged airways leak (>5 days) was described in 22.4% of lung reduction procedures, 12.5% of bilobectomies and 9.4% of lobectomies.
7. Unadjusted hospital mortality in primary lung cancer procedures was 5.5% in pneumonectomies, 3.5% in bilobectomies, 1.4% in lobectomies
8. Cumulative 30 days mortality shows a significant improvement; however with a heavy caveat of the enormous amount of missing data (data available in 81904 patients, excluding 89809 with missing data).
9. Cumulative 30 days mortality is shown in 2 periods:
  - 2007-13 = 3.6%
  - 2014-20 = 1.5%
10. Thymic registry: 2698 cumulative cases, thymomas being 2/3 of the total.. Significant cumulative number increase from 2560 in 2020. Progress has been made in datacompleteness, but it is still a significant issue.
11. Mesothelioma registry: a total of 2400 cases, (2373 in 2020); 56,25% overall data completeness. There is an overall improvement over 2020 findings.
12. NET registry: currently there are a total of 1648 lung cases (1505 in 2020), with persistent good overall data completeness (88,64%).
13. Chest Wall registry: overall 1372 cumulative procedures, subdivided in 3 discrete groups; reconstructive (162 cases), trauma (147 cases); congenital (930 cases). Overall data completeness is over 90%!!


After nine years leading the ESTS database committee, it is now time for me to pass the baton to my successor, the associate professor Zalan Szanto, from Pecs (Hungary). I am deeply convinced that Zalan will be very successful in this task as he had already shown in leading the Hungarian Database and creating the Hungarian Model.

Nevertheless, I am forever a data guy and will remain deeply involved in the ESTS database committee, sharing my experience in promoting the strategic development of this database and setting up new projects, in order to comprehensively assess surgical performance on an international level.

I will be my great pleasure to see you online for the second virtual June meeting,



Together we go forward...

A handwritten signature in black ink, consisting of several overlapping loops and a long horizontal stroke extending to the right.

**Prof. Pierre-Emmanuel Falcoz**

***Director of ESTS Audit and Database***

pefalcoz@gmail.com

## The European Society of Thoracic Surgeons Database

The European Society of Thoracic Surgeons Database was founded in 2001 by the ESTS Database Committee with the aim to develop risk-adjusted instruments for assessing the performance of thoracic surgery units across Europe. The first version of the Database led to the publication of the first risk-adjusted multinational risk-score for mortality (*Berrisford R et al. Eur J Cardiothorac Surg 2005; 28:305-311*) which has been already applied to compare the performance of different units (*Brunelli A et al. Eur J Cardiothorac Surg 2008; 33:284-288*).

The second version of the Database was launched online in July 2007 and has so far accrued approximately 205 general thoracic surgical units.

**Data is anonymously reported, independently accessed and encrypted to other users.**

Participation to the Database project is **totally free and voluntary**, but strongly recommended by our Society. In fact participation to the ESTS Database with at least 100 Major Lung Resections per year for at least 2 consecutive years is one of the key requirements for the ESTS Accreditation Program. You can access the Database from ESTS website or by using the address: <https://ests.kdataclinical.it>

To join the Database you need your own personal login account that you can request by downloading and completing an application form from the ESTS homepage (<http://www.ests.org>).

Once data is being recorded on the System (*powered by KData Clinical software*), you will be able to visualize your up-to-date summary of your surgical activity; called Clinical Care Analysis CCA, it includes a few surgical activity indicators (*Total N Procedures, Types Lung Procedures, VATS, Outcome at discharge, CPS and eligibility for ESTS Accreditation*)

**To the benefit of your patients, your practice and your specialty, your data will contribute to the followings:**

- Development of European benchmarks of performance through the analysis of outcomes and processes of care indicators.
- Performance assessment by risk-adjusted outcome and/or process indicators, which will allow you to compare your own institutional performance against European benchmarks.
- Analysis and development of new potential outcomes and processes of care indicators that may complement/substitute current quality of care measures.
- Autocalculation of the Composite Performance Score.
- Feedback to document quality efforts and areas for improvement in quality of care.
- Data for research projects, which can be used to assess new technologies/pathways of care that can ultimately lead to improved patient care and outcomes.
- Maintain your own data if data is requested or mandated by third parties.
- Use for local hospital administration resource allocation.
- Use for individual negotiations, public relations and expert witness.
- Opportunity to participate in a European quality improvement effort for general thoracic surgery that has a positive impact at the local, national and international levels.

## Participants benefits

- Participation to the ESTS Database is a pre-requisite to participate in the European Institutional Quality Certification Program.
- Participation will be acknowledged and, if requested, local institutional administrations made aware that your unit is enrolled in a European Thoracic Database aimed at implementing quality of care monitoring and improvement programs endorsed by ESTS and pre-requisite for future clinical Institutional European Accreditation.
- Your own data, collected in a standardized ESTS-endorsed Dataset, can be downloaded at local level and used for your internal quality analyses or institutional research purposes.
- Participants can visualize in the CCA (currently it includes: *Total N Procedures, Types Lung Procedures, VATS, Outcome at discharge, CPS and eligibility for ESTS Accreditation*) and be first to know about the quality of their data and their performance against European benchmarks.
- Participants can propose their own research projects based on the total data present in the database. Projects should be submitted to the ESTS database Committee for peer review and, if accepted, the requested and anonymized data will

be provided to the proponent of the project. ESTS will retain the responsibility for the final analysis and interpretation of results. The proponent of the project will be the first Author of the final manuscript and he/she will be allowed to include, if requested, two additional colleagues, who helped in the elaboration of the manuscript. The members of the Database Committee who contributed to the review process and assisted in the development of the manuscript will be also included in the list of Authors.

As the ESTS Database approached a more mature stage, and more demanding aspects of data management were required, it was been decided to make use of professional expertise in running and managing contents, data flow, data merge and so on of our Registry; in Nov 2009 the ESTS Council awarded this task to Dendrite Clinical System Italia srl, now renamed KData Clinical srl, following a management by-out in July 2015

Since 1993 Dendrite, and now KData Clinical, have established a highly respected track record in setting up and running a variety of International Registries, with an underlying philosophy of long term partnership with numerous Clinical Associations within and outside Europe.

**The main reasons for widespread participation in this field include:**

- Bottom-up approach to data management: the range of products and services starts from database and electronic patient records and serves Clinicians daily needs; it escalates to hospital-wide systems, to regional, national and finally to international registries.
- User-friendly inclusion of all who wish to participate: the Import Data process, governed by a Standard Operating Procedure SOP allows any Contributor to use his chosen type of tool to collect data, and KData will perform the correspondence and data merge required to add their data to the main ESTS Database, if there is clinically correct conformity with the required ESTS dataset.
- Automatically up-dated clinical statistical analysis shown in the CCA screen, integrated in the data collection section of the ESTS Registry.
- Contributors can retain, download and use own data, from the ESTS site, in MS Excel format, which lends itself to be analyzed by any clinical software product.
- Unblemished KData track record of data handling integrity: not ever lost, leaked or misplaced third Party data to date

## Institutions that contributed to the ESTS Registry

Please note that Only units contributing more than 100 patients and consistently (as of December 31<sup>th</sup> 2020) in the registry are shown

Country	City	Institution
ALBANIA	TIRANA	University Hospital of Lung Diseases "Shefqet Ndroqi"
AUSTRIA	VIENNA	Otto Wagner Hospital
BELGIUM	ANTWERP	University Hospital of Antwerp
BELGIUM	GENK	ZOL St. - Jan Genk
BELGIUM	BRUSSELS	Cliniques Universitaires Saint- Luc
BELGIUM	BRUSSELS	Hopital Academique Erasme
BELGIUM	LEUVEN	University Hospitals Leuven
BELGIUM	GILLY	GHDC Site Gilly, Belgium
CROATIA	ZAGREB	Department of Thoracic Surgery "Jordanovac" University Hospital Centre Zagreb
FRANCE	LA ROCHELLE	Hôpital St Louis
FRANCE	LE HAVRE	Clinique Petit Col Moulin
FRANCE	LE PLESSISROBINSON	Marie Lannelongue Hospital
FRANCE	LILLE	CHU Calmette
FRANCE	LILLE	Clinique de la Louvière
FRANCE	LILLE	Polyclinique du Bois
FRANCE	LYON	CHU Lyon Sud
FRANCE	LYON	Clinique St Louis
FRANCE	LYON	Hôpital privé Jean Mermoz
FRANCE	MARSEILLE	CHU Ste Marguerite
FRANCE	MARSEILLE	HIA Alphonse LAVERAN
FRANCE	MAXEVILLE	Médipole Gentilly
FRANCE	MEAUX	CH - Meaux
FRANCE	METZ	Hôpital Belle-Isle
FRANCE	MONTPELLIER	CHU de Montpellier
FRANCE	MONTPELLIER	Clinique du Millénaire
FRANCE	MORLAIX	CMC de la Baie de Morlaix
FRANCE	NANCY	CHU Central de
FRANCE	NANTES	CHU - Nantes
FRANCE	NANTES	Clinique St Augustin
FRANCE	NANTES	Nouvelle Clinique Nantaise
FRANCE	NICE	CHU Pasteur

FRANCE	NICE	Clinique Saint Georges
FRANCE	NIMES	Clinique les Franciscaines
FRANCE	PARIS	HEGP
FRANCE	PARIS	Hôtel Dieu
FRANCE	PARIS	IMM
FRANCE	PAU	CHG - Pau
FRANCE	POITIERS	CHU - Pointers
FRANCE	QUIMPER	Clinique Quimper sud
FRANCE	REIMS	Clinique Courlancy
FRANCE	ROUEN	CHU Charles Nicolle
FRANCE	SAINT BRIEUC	Hopital Yves le Foll
FRANCE	SAINT CLOUD	Clinique du Val D'or
FRANCE	SAINT ETIENNE	CH Privé de la Loire
FRANCE	SAINT ETIENNE	CHU – Saint Etienne
FRANCE	SAINT GRÉGOIRE	CH Privé Saint Grégoire
FRANCE	STRASBOURG	CHU - Strasbourg
FRANCE	STRASBOURG	Clinique St Odile
FRANCE	TALANT	Clinique Bénigne Joly
FRANCE	TOULOUSE	CHU Larrey
FRANCE	TOULOUSE	Clinique Pasteur
FRANCE	TOURS	CHU Trousseau
FRANCE	VALENCIENNES	Clinique Teissier
FRANCE	VANNES	Clinique Océane
GERMANY	BREMEN	Klinikum Bremen-Ost - Bremen
GERMANY	MONCHENGLADBACH	Maria Hilf Kliniken
GERMANY	DELMENHORST	Klinik f. Thoraxchirurgie, Klinikum Delmenhorst gGmbH
GERMANY	ESSEN	Medical University of Essen, Ruhrlandklinik, Dept. of Thoracic Surgery
GREECE	ATHENS	Evangelismos
GREECE	THESSALONIKI	Ahepa University Hospital
HUNGARY	BUDAPEST	National Institute of Oncology
HUNGARY	BUDAPEST	KORANYI National Institute for Pulmonology and Semmelweis University
HUNGARY	BUDAPEST	Bajcsy-Zsilinszky Körház Thoracic surgery
HUNGARY	DEBRECEN	University Of Debrecen
HUNGARY	SZEGED	University of Szeged, Department of Surgery
HUNGARY	PÉCS	University of Pecs, Department of Surgery
HUNGARY	GYŐR	Pamok Győr Hungars
HUNGARY	KECSKEMÉT	Bács Kiskun County Hospital
HUNGARY	GYŐR	Petz Aladar Teaching Hospital (PAMOK)

HUNGARY	MISKOLC	Semmelweis Teaching Hospital of Miskolc
HUNGARY	SZOLNOK	Hetenyi Geza County Hospital of Szolnok
HUNGARY	SZOMBATHELY	Teaching Hospital Markusovszky
IRELAND	DUBLIN	St. James's Hospital, Dublin, Republic of Ireland
ITALY	NAPLES	National Cancer Institute Pascale Foundation, Napoli
ITALY	ANCONA	Ospedali Riuniti Umberto I - GM Lancisi – G Salesi Ancona
ITALY	MILANO	Fondazione Ospedale Maggiore Policlinico
ITALY	PARMA	University Hospital Parma
ITALY	TORINO	A. O. Universitaria Molinette San Giovanni Battista
ITALY	FOGGIA	A. O. Universitaria Foggia – Dip. Chirurgia Toracica
ITALY	MILANO	Azienda Ospedaliero San Paolo
ITALY	ROZZANO(MI)	IRCCS Istituto Clinico Humanitas
ITALY	BOLOGNA	Discipline Chirurgiche, Rianimatorie Trapianti Univ.Bologna
ITALY	GENOVA	San Martino - Genoa
ITALY	SIENA	University Hospital Siena
ITALY	LECCE	V. Fazzi Hospital
ITALY	UDINE	AOU S. Maria della Misericordia
ITALY	ROMA	Campus Bio-Medico University Hospital, Thor. Surgery
ITALY	ROMA	University of Rome La Sapienza, Dep. Thoracic Surgery
ITALY	ROMA	Fondazione Policlinico Gemelli, University Cattolica del sacro cuore, IRCCS
ITALY	MONZA	Chirurgia Toracica San Gerardo
NETHERLANDS	AMSTERDAM	VUMC Dept of Surgery
NETHERLANDS	BREDA	Amphia Hospital
NETHERLANDS	HAARLEM	Kennemer Gasthuis
POLAND	POZNAN	Marcinkowski University of Medical Sciences
POLAND	WARSAW	National Institut of Tuberculosis and Lung Disease Warsaw
POLAND	POZNAN	Wielkopolskie Centrum Pulmonologii i Torakochirurgii im. Eugenii i Janusza Zeylandów Szamarzewskiego
PORTUGAL	LISBON	Santa Martha Hospital, Lisbon
PORTUGAL	VILA NOVA DE GAIA	centro Hospitalar de Vila Nova de Gaia Espinho
ROMANIA	BUCHAREST	Institute of Oncology Bucharerst
ROMANIA	BUCHAREST	Marius Nasta Institute of Pneumonology
ROMANIA	DROBETA-TURNU SEVERIN	County Emergency Hospital
ROMANIA	TIMISOARA	Clinical Muncipal Emergency Hospital
SLOVAKIA	BRATISLAVA	University Hospital Bratislava , Slovacchia

SLOVENIA	LJUBLJANA	University Medical Centre Ljubljana
SPAIN	BARCELONA	Hospital Clinic
SPAIN	BARCELONA	Sagrat Cor University Hospital
SPAIN	HEBRON	HG Vall d'Hebron
SPAIN	MADRID	H. Clinico San Carlos
SPAIN	MADRID	Hospital general Universitario Gregorio Maranon
SPAIN	MADRID	Ramon y Cajal University Hospital
SPAIN	NAVARRA	Clinica Universitaria De Navarra
SPAIN	SALAMANCA	University Hospital Salamanca
SPAIN	SEVILLA	HHUU Virgen del Rocio
SPAIN	VALENCIA	General University Hospital Valencia
SPAIN	SEVILLA	Hospital Virgen Macarena
SPAIN	PALMA	Hospital Universitari Son Espases
SPAIN	SAN SEBASTIAN	University Hospital Donostia
SWITZERLAND	ZURICH	UniversitätsSpital Zürich Klinik für Thoraxchirurgie
SWITZERLAND	ST. GALLEN	Klinik für Thoraxchirurgie Kantonsspital St. Gallen
TURKEY	BURSA	Uludag University, School of Medicine
TURKEY	ISTANBUL	Istanbul School of Medicine
TURKEY	ISTANBUL	Istanbul University, Cerrahpasa Medical Faculty
TURKEY	ISTANBUL	Sureyyapasa Chest Disease & Thoracic Surgery Hospital
UK	EXETER	Royal Devon & Exeter NHS Foundation Trust
UK	LEEDS	St. James's University Hospital

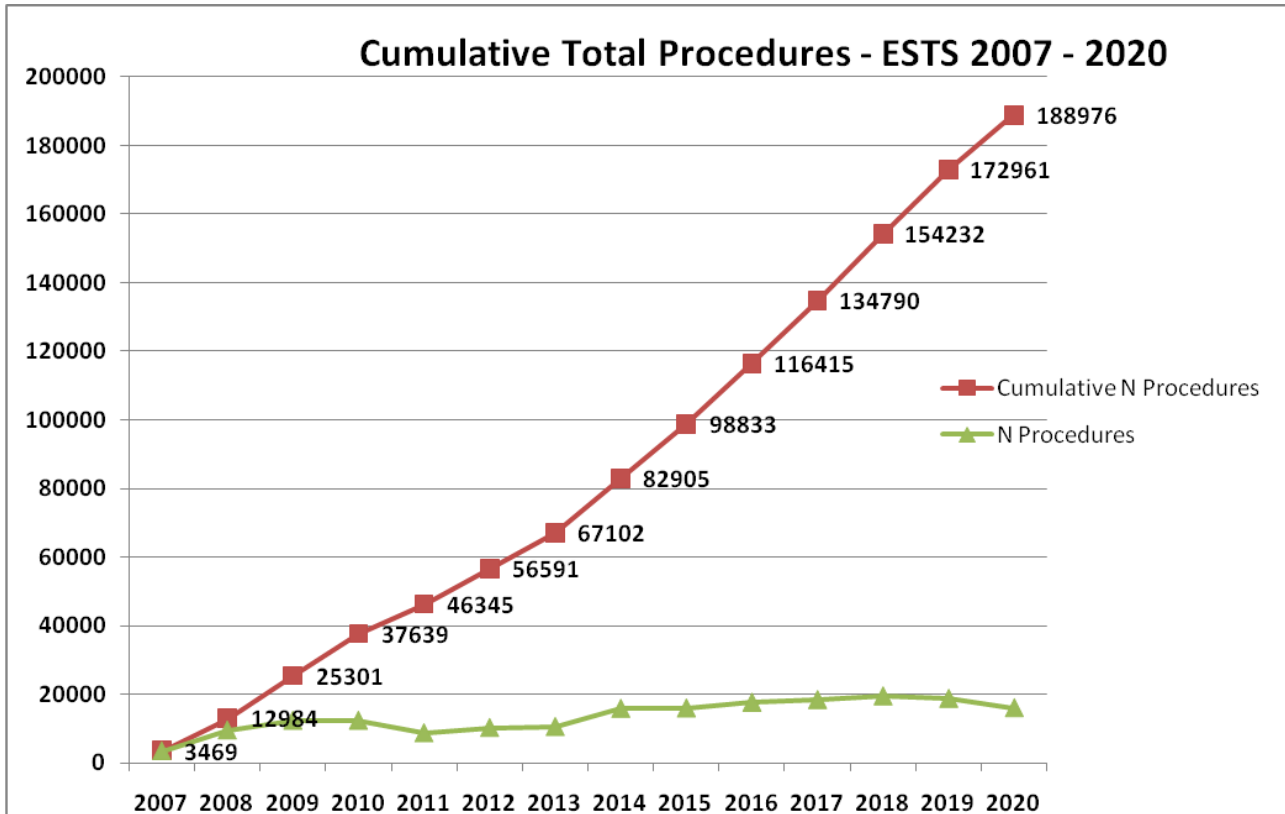


**PART 1**

**EUROPEAN DATABASE**

**CUMULATIVE ACTIVITY (2007-2020)  
(European units Only)**

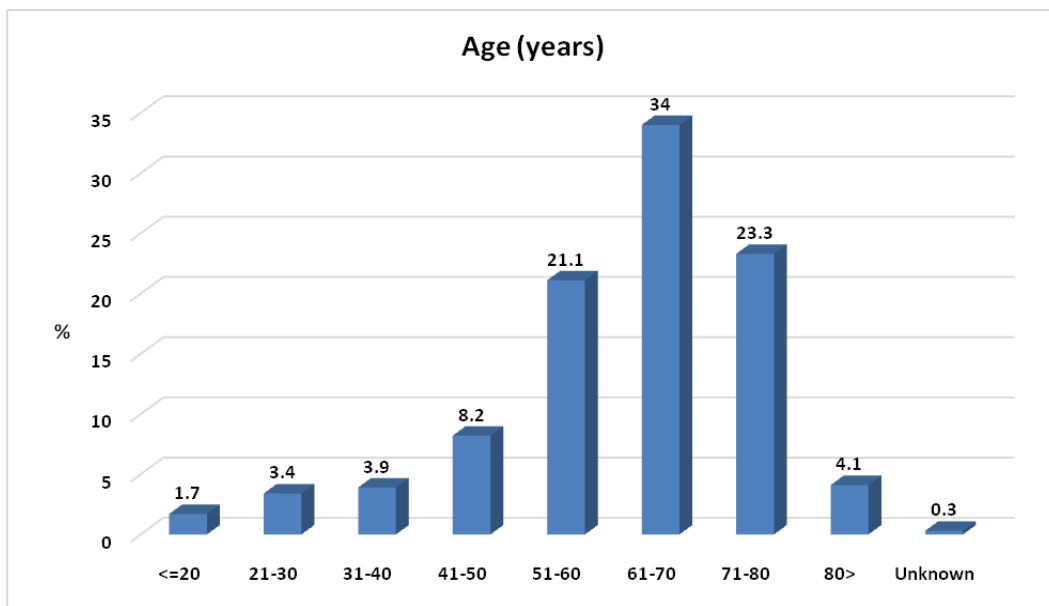
## Growth of the ESTS Database 2007-20



## Overall age and gender distributions

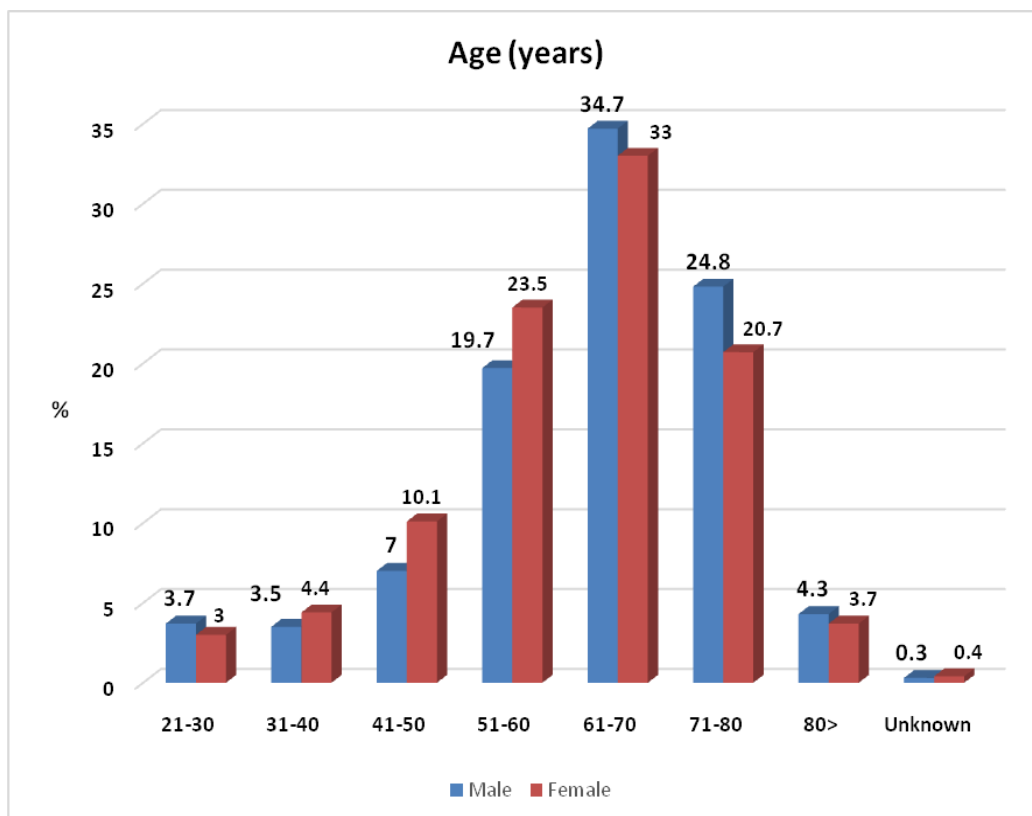
### Age (years)

Age (years)	Occurrences	Percentages
<=20	3239	1.7
21-30	6459	3.4
31-40	7292	3.9
41-50	15441	8.2
51-60	39903	21.1
61-70	64317	34
71-80	43993	23.3
>80	7666	4.1
Unknown	666	0.3
<b>Total</b>	<b>188976</b>	<b>100</b>



## Gender according to age distribution (years)

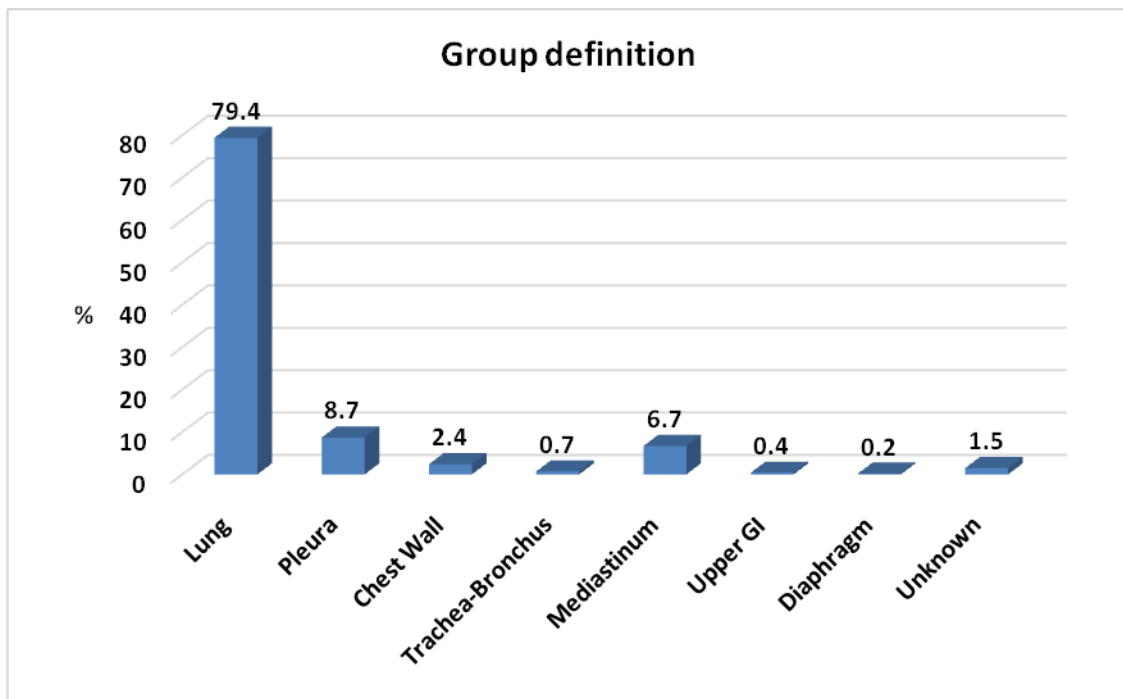
Age (years)	Male (%)	Female (%)
<=20	2	1.2
21-30	3.7	3
31-40	3.5	4.4
41-50	7	10.1
51-60	19.7	23.5
61-70	34.7	33
71-80	24.8	20.7
>80	4.3	3.7
Unknown	0.3	0.4



## Total surgical activity within the entire dataset

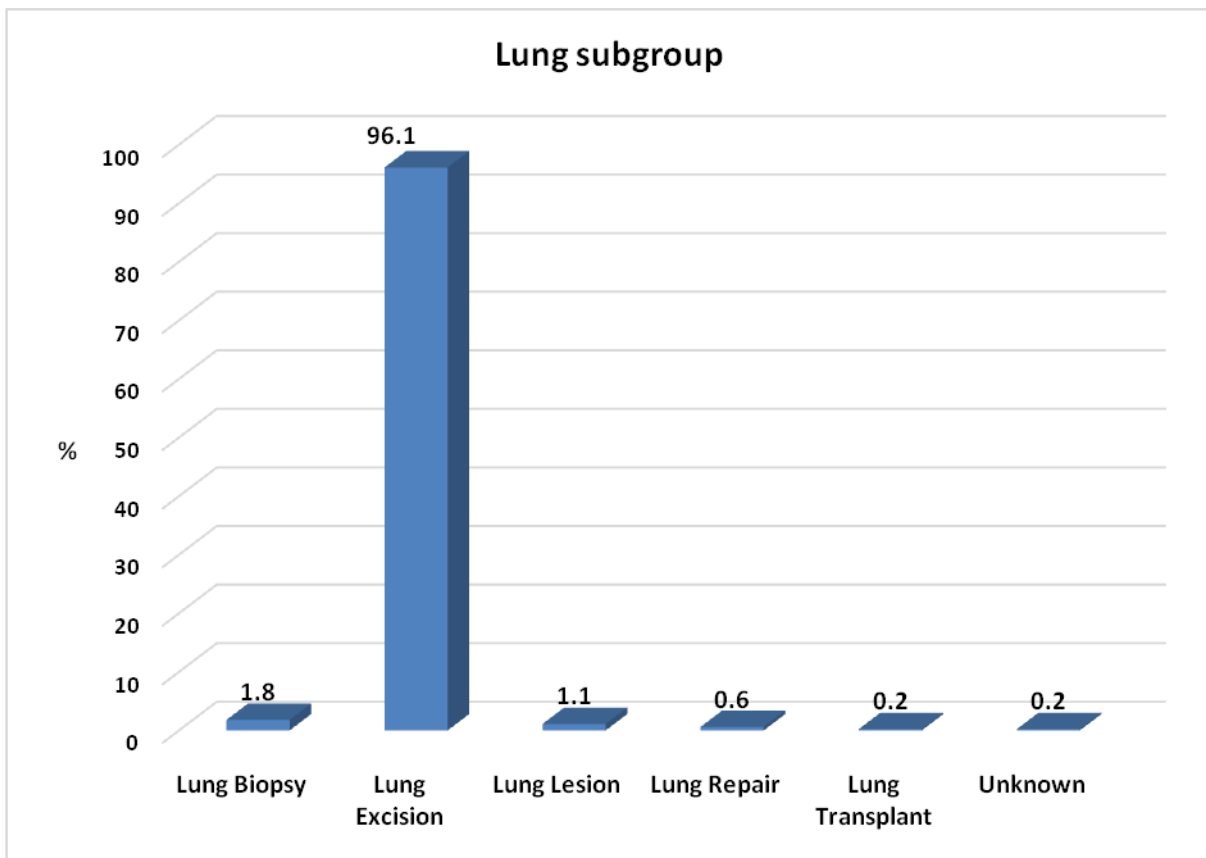
### Group Definitions

Group Definition	Occurrences	Percent
Lung	149995	79.4
Pleura	16517	8.7
Chest Wall	4537	2.4
Trachea-Bronchus	1396	0.7
Mediastinum	12657	6.7
Upper GI	710	0.4
Diaphragm	389	0.2
Unknown	2775	1.5
<b>Total</b>	<b>188976</b>	<b>100</b>



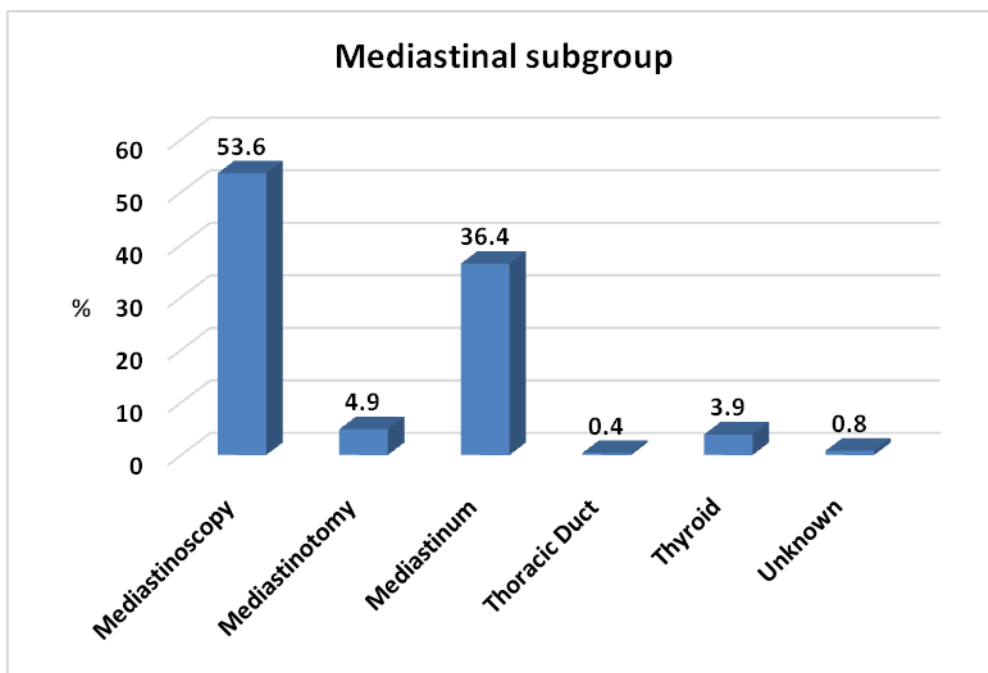
## Lung Subgroup

	Occurrences	Percent
Lung Biopsy	2715	1.8
Lung Excision	144112	96.1
Lung Lesion	1615	1.1
Lung Repair	922	0.6
Lung Transplant	369	0.2
Unknown	262	0.2
<b>Total</b>	<b>149995</b>	<b>100</b>



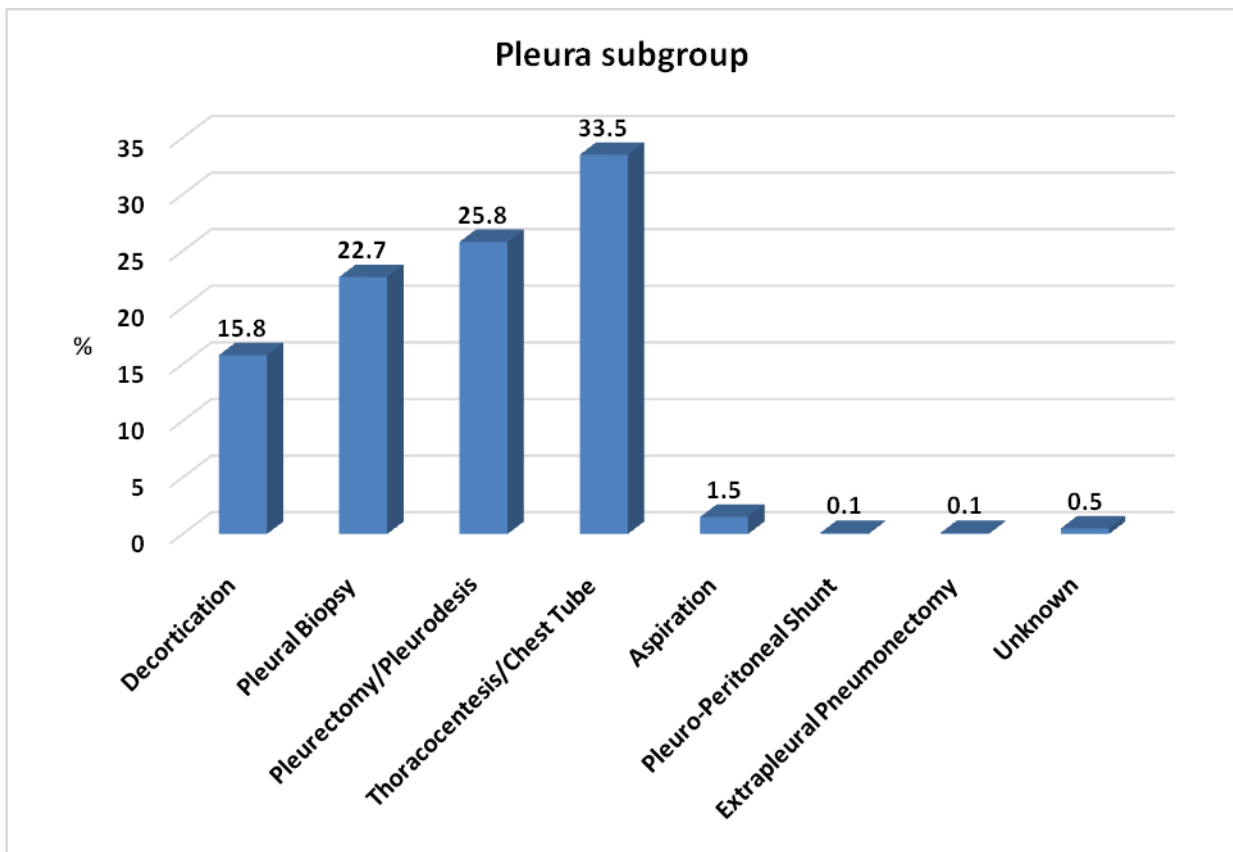
## Mediastinum Subgroup

	Occurrences	Percent
Mediastinoscopy	6782	53.6
Mediastinotomy	625	4.9
Mediastinum	4603	36.4
Thoracic Duct	58	0.4
Thyroid	493	3.9
Unknown	96	0.8
<b>Total</b>	<b>12657</b>	<b>100</b>



## Pleura Subgroup

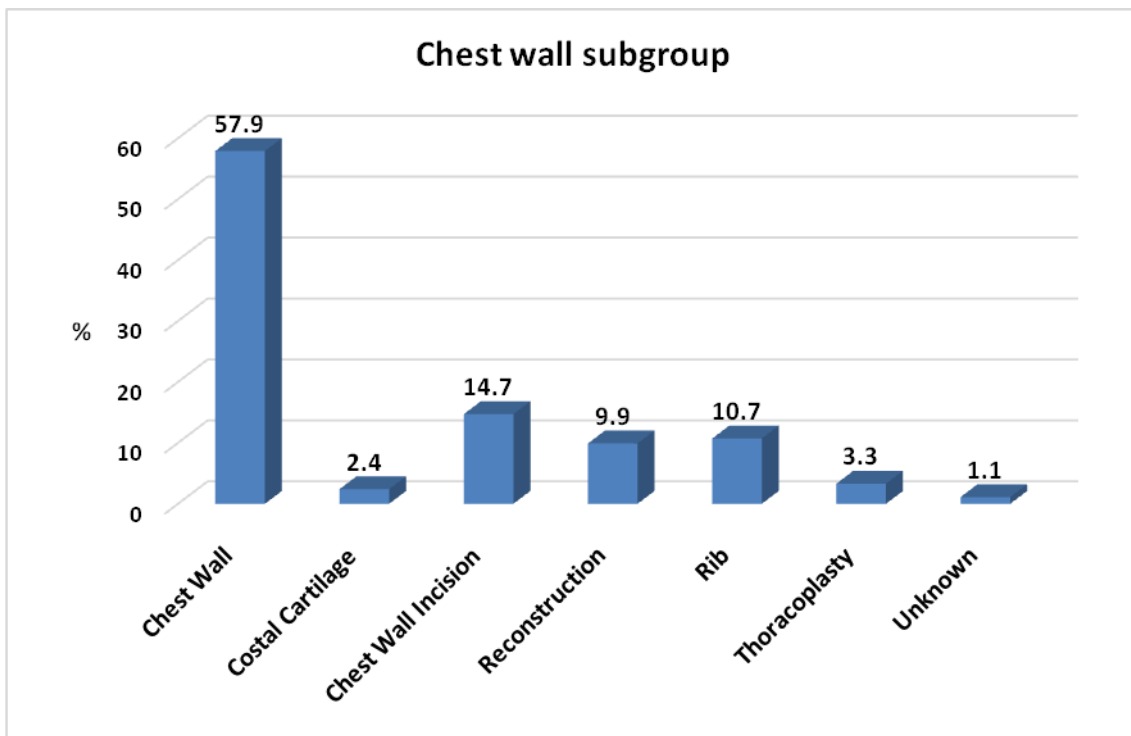
	Occurrences	Percent
Decortication	2606	15.8
Pleural Biopsy	3755	22.7
Pleurectomy/Pleurodesis	4255	25.8
Thoracocentesis/Chest Tube	5542	33.5
Aspiration	251	1.5
Pleuro-Peritoneal Shunt	9	0.1
Extrapleural Pneumonectomy	9	0.1
Unknown	90	0.5
<b>Total</b>	<b>16517</b>	<b>100</b>





## Chest Wall Subgroup

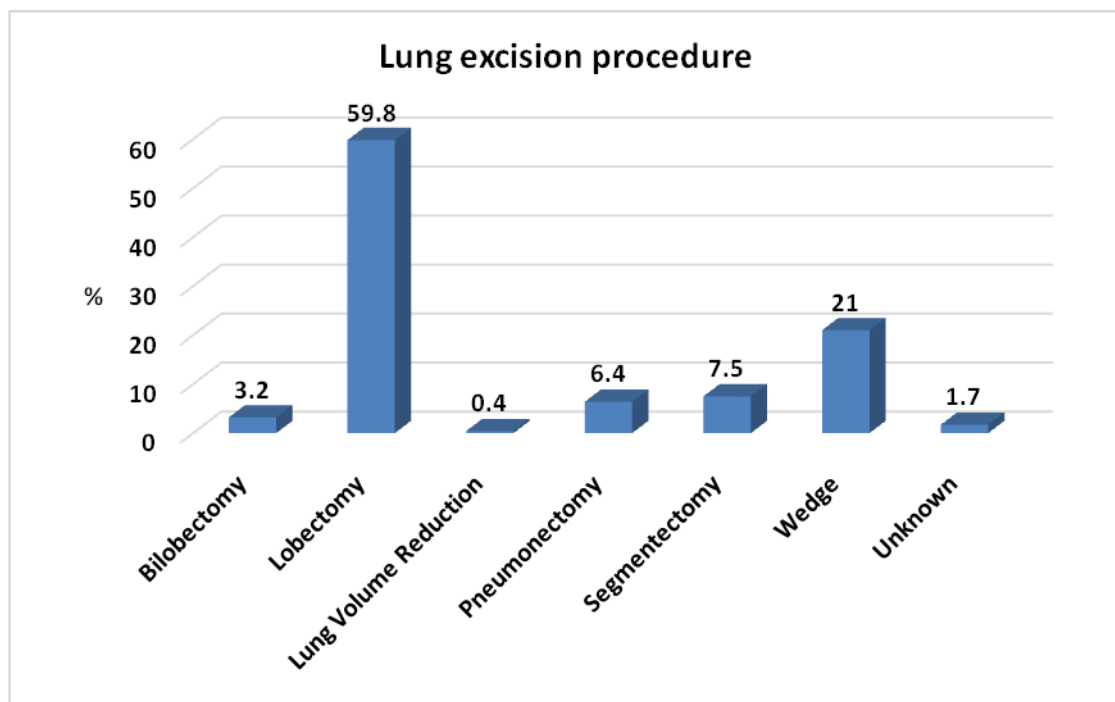
	Occurrences	Percent
Chest Wall	2627	57.9
Costal Cartilage	108	2.4
Chest Wall Incision	668	14.7
Reconstruction	450	9.9
Rib	483	10.7
Thoracoplasty	151	3.3
Unknown	50	1.1
<b>Total</b>	<b>4537</b>	<b>100</b>



## Lung resections

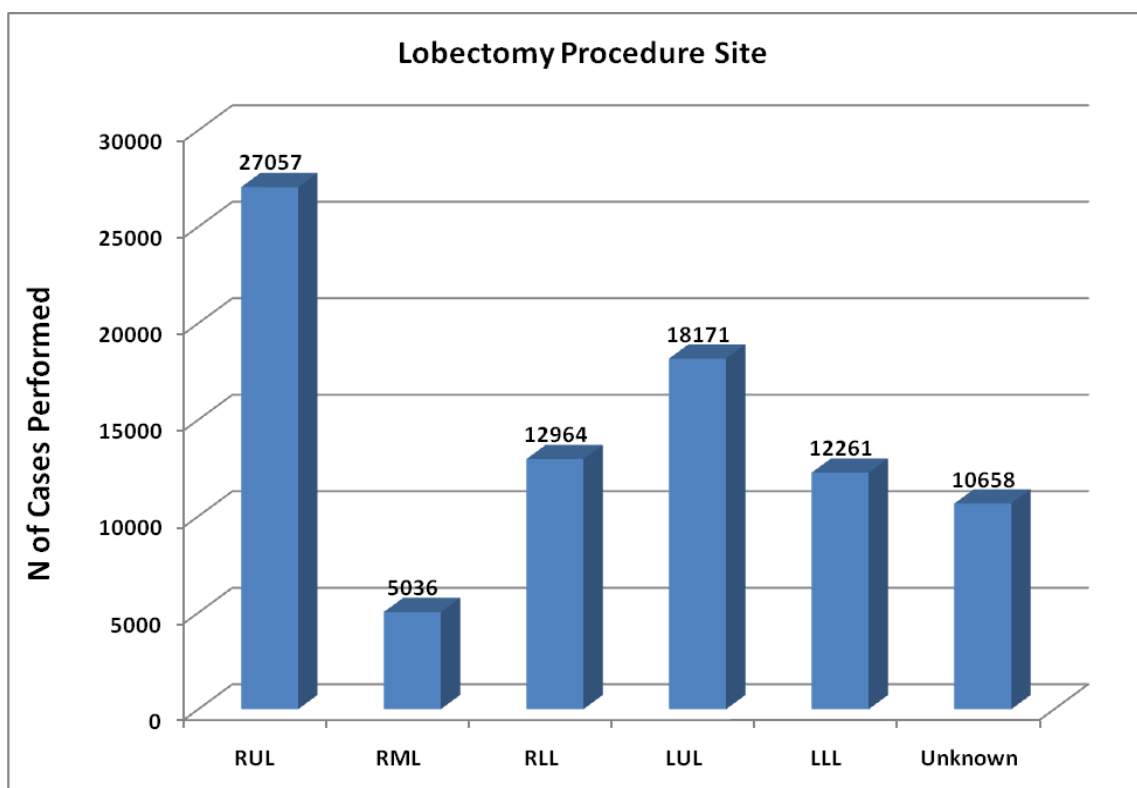
### Types of lung resections performed, including all diagnoses

	Occurrences	Percent
Bilobectomy	4585	3.2
Lobectomy	86147	59.8
Lung Volume Reduction	523	0.4
Pneumonectomy	9248	6.4
Segmentectomy	10820	7.5
Wedge	30338	21
Unknown	2451	1.7
<b>Total</b>	<b>144112</b>	<b>100</b>



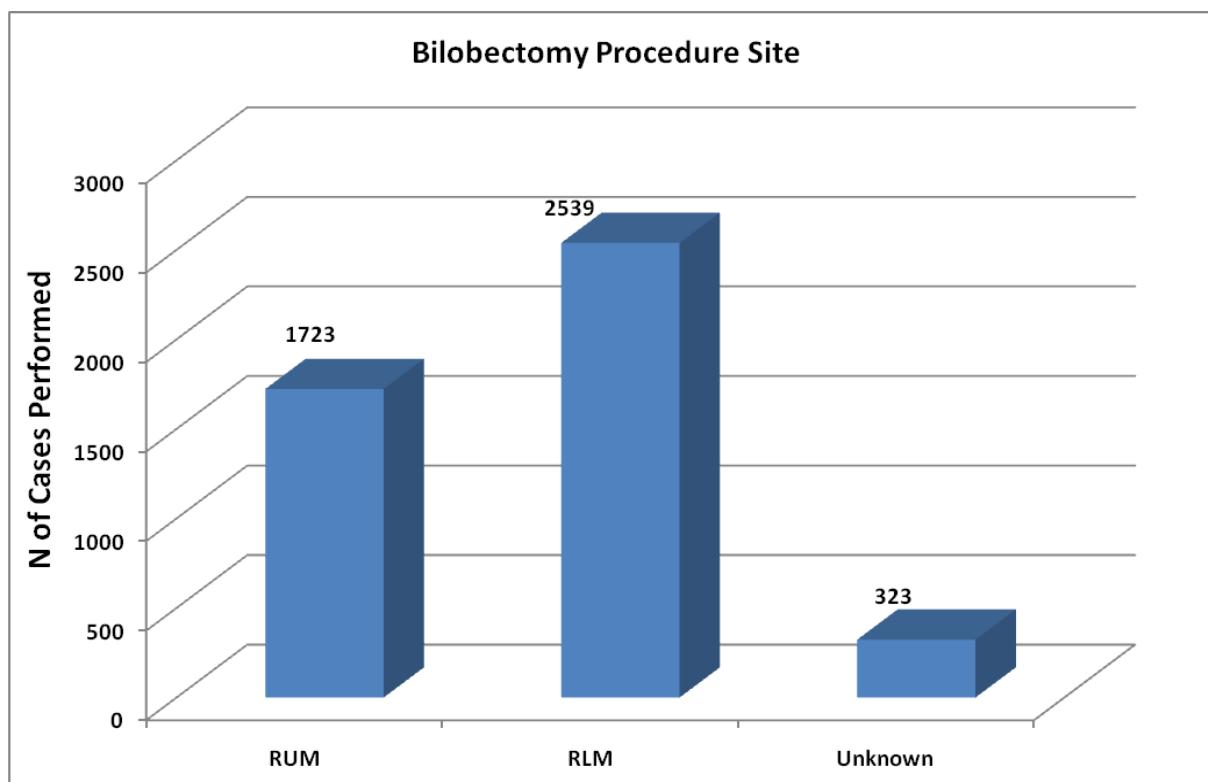
## Distribution of lobectomy by site of resection

Lobectomy Procedure Site	Occurrences	Percent
RUL	27057	31.4
RML	5036	5.8
RLL	12964	15.1
LUL	18171	21.1
LLL	12261	14.2
Unknown	10658	12.4
<b>Total</b>	<b>86147</b>	<b>100</b>



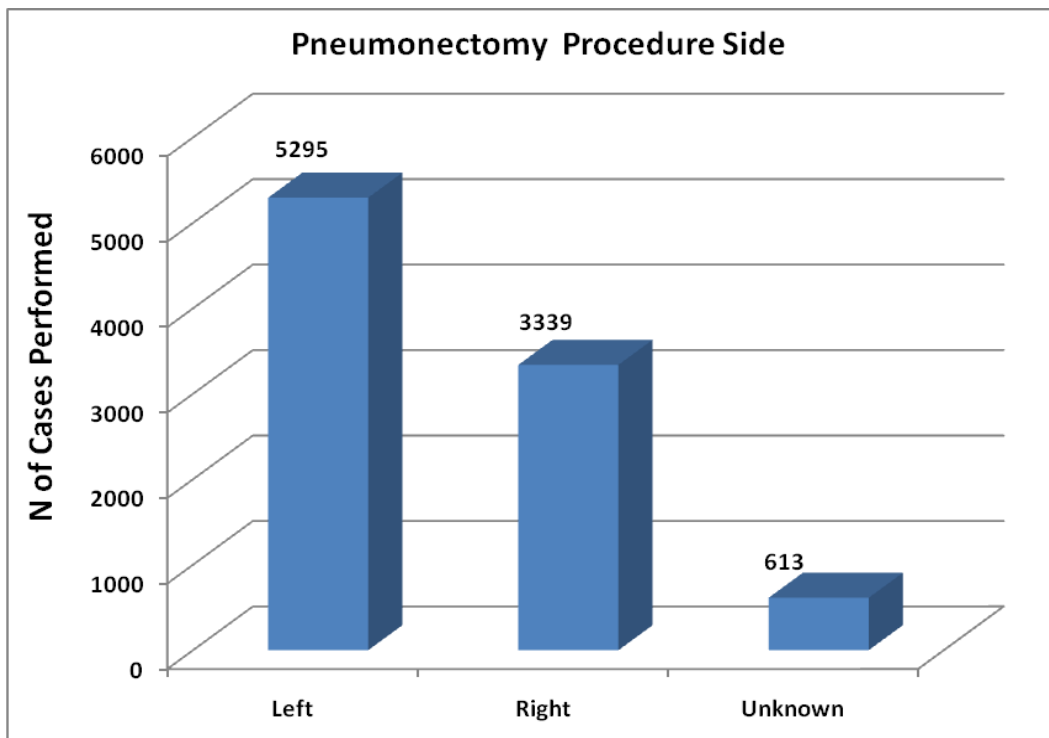
## Distribution of bilobectomy by site of resection

Bilobectomy Procedure Site	Occurrences	Percent
RUM	1723	37.6
RLM	2539	55.4
Unknown	323	7
<b>Total</b>	<b>4585</b>	<b>100</b>



## Distribution of pneumonectomy by side

Pneumonectomy Side	Occurrences	Percent
Left	5295	57.3
Right	3339	36.1
Unknown	613	6.6
<b>Total</b>	<b>9247</b>	<b>100</b>

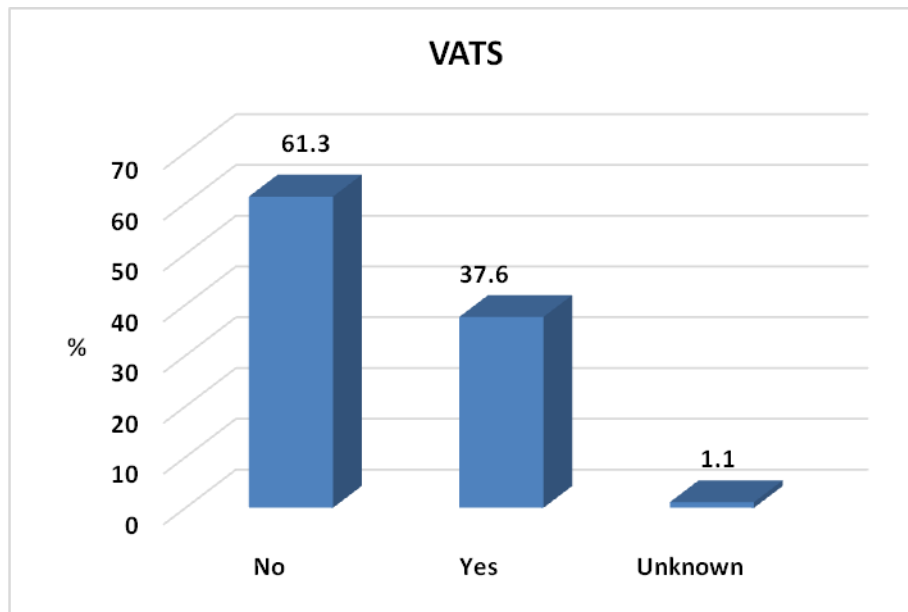


Pneumonectomy Qualifier	Occurrences	Percent
Alone	5293	57.2
Completion	439	4.7
Intrapericardial	800	8.6
Pleuropneumonectomy	235	2.5
Sleeve Resection	111	1.2
Diaphragm Resection	24	0.3
Atrial Resection	110	1.2
SVC Resection/Reconstruction	90	1
Vertebral Resection	162	1.8
Unknown	1984	21.5
<b>Total</b>	<b>9248</b>	<b>100</b>

## VATS as a proportion of all lung resections

VATS	Occurrences	Percent (%)
No	88289	61.3
Yes	54250	37.6
Unknown	1573	1.1
<b>Total</b>	<b>144112</b>	<b>100</b>

Note the increase from 35.2% to 37.6!!!! Also a similar % of data completeness



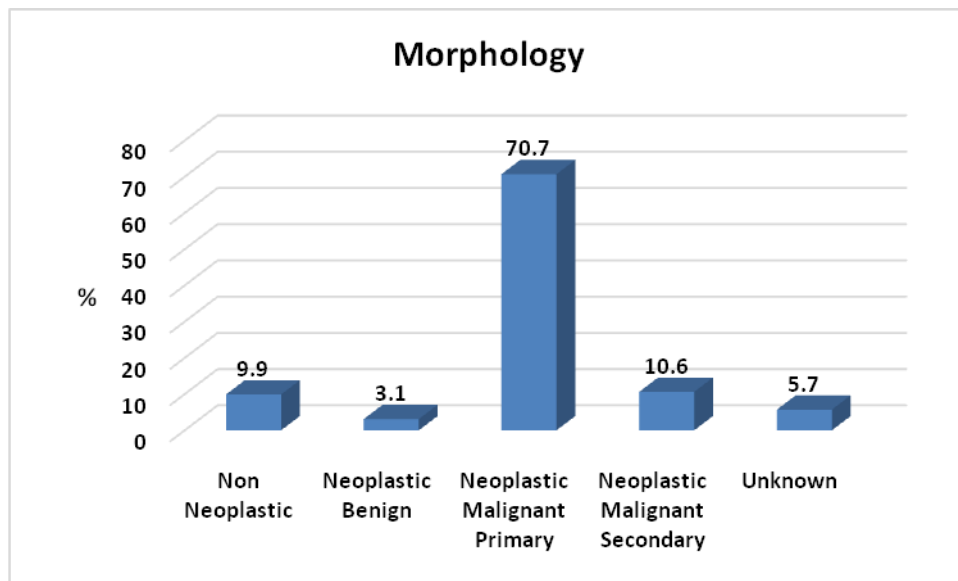
	No	Yes	Yes (%)
2007-2013	42650	9310	17.9
2014-2020	45639	44940	49.6
<b>Total</b>	<b>88289</b>	<b>54250</b>	<b>38.1</b>

## VATS as a proportion of lobectomy

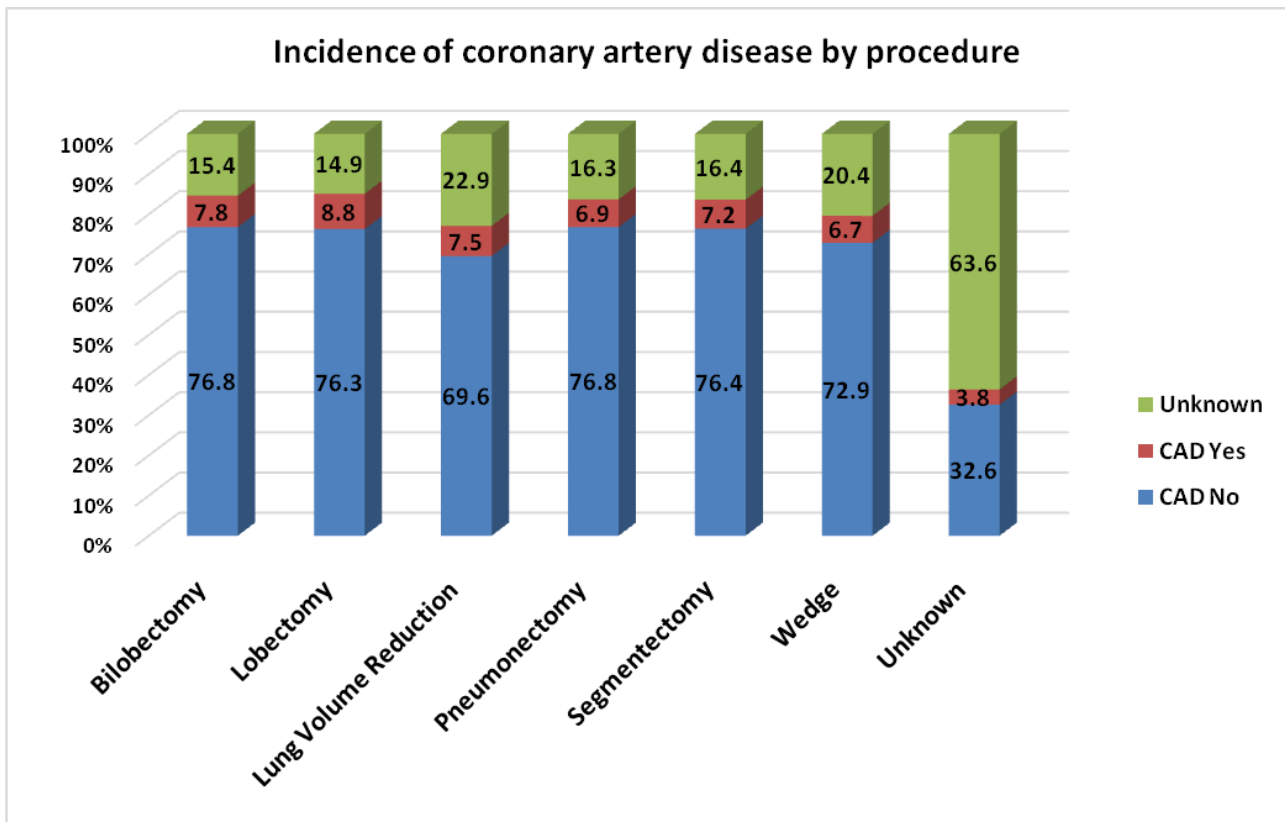
	No	Yes	Yes (%)
2007-2013	26961	2909	9.7
2014-2020	29300	26093	47.1
<b>Total</b>	<b>56261</b>	<b>29002</b>	<b>34</b>

## Lung resections pathology

Morphology	Occurrences	Percent (%)
Non Neoplastic	13506	9.4
Neoplastic Benign	4301	3
Neoplastic Malignant Primary	105096	72.9
Neoplastic Malignant Secondary	14741	10.2
Unknown	6468	4.5
<b>Total</b>	<b>144112</b>	<b>100</b>



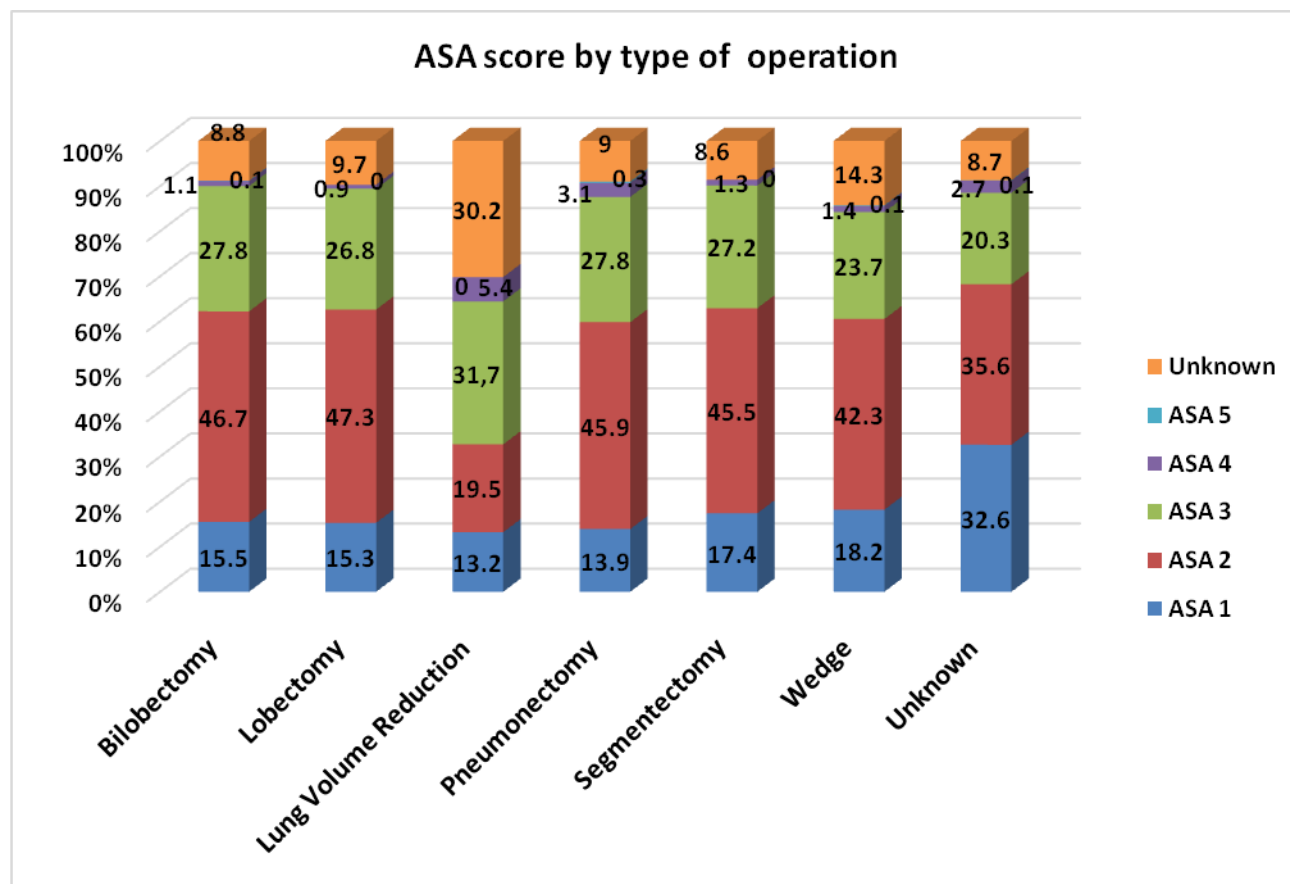
## Incidence of coronary artery disease by procedure



Lung Excision Procedure	CAD NO	CAD YES	Unknown	Total
Bilobectomy	3523	357	705	4585
Lobectomy	65768	7545	12834	86147
Lung Volume Reduction	364	39	120	523
Pneumonectomy	7098	642	1508	9248
Segmentectomy	8271	777	1772	10820
Wedge	22102	2039	6197	30338
Unknown	799	93	1559	2451
<b>Total</b>	<b>107925</b>	<b>11492</b>	<b>24695</b>	<b>144112</b>



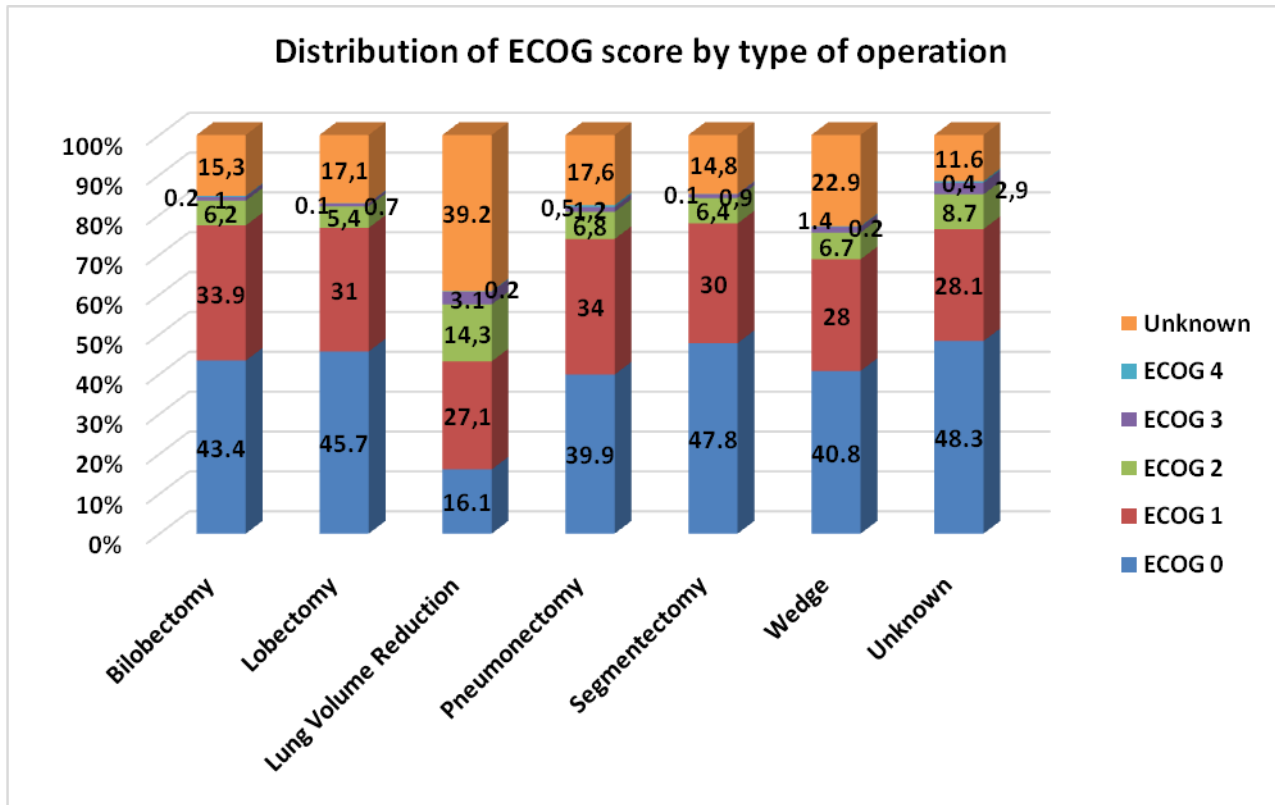
## Distribution of ASA score by type of operation



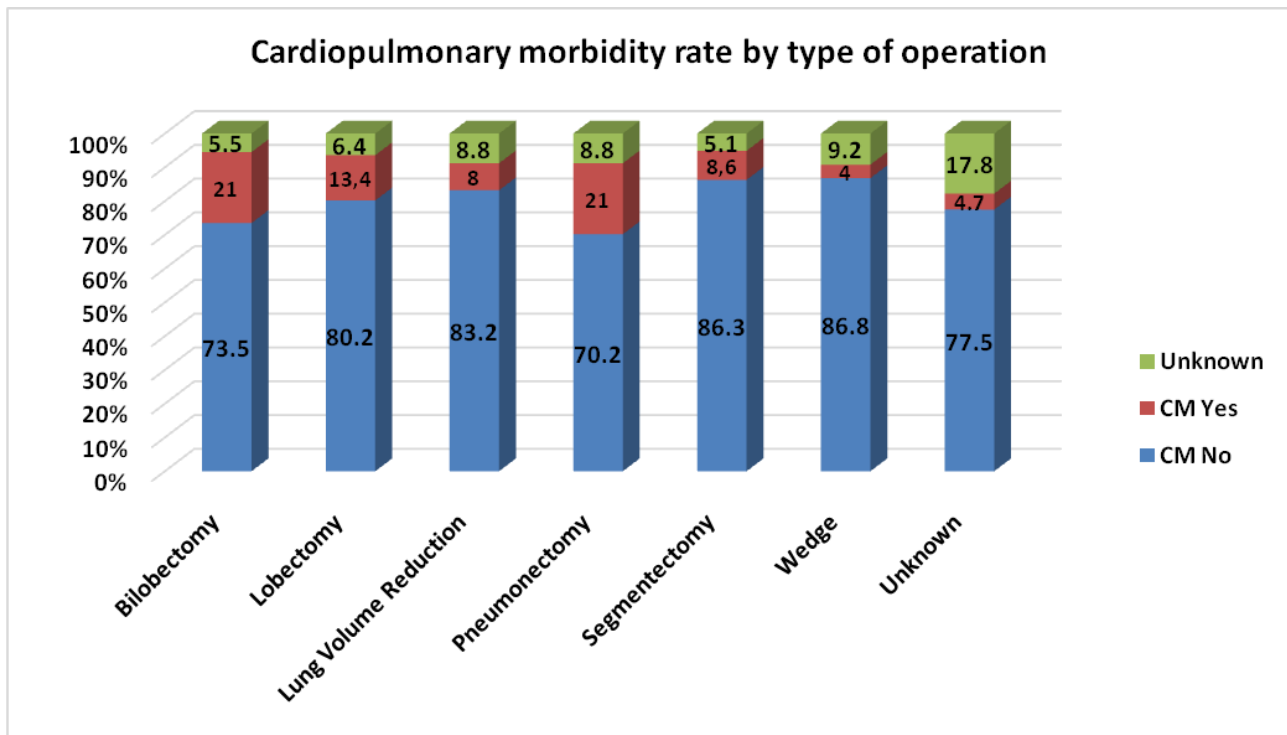
Lung Excision Procedure	ASA 1	ASA 2	ASA 3	ASA 4	ASA 5	Unknown	Total
Bilobectomy	711	2139	1276	51	3	405	4585
Lobectomy	13223	40752	23044	746	40	8342	86147
Lung Volume Reduction	69	102	166	28	0	158	523
Pneumonectomy	1288	4246	2574	285	23	832	9248
Segmentectomy	1885	4927	2939	138	1	930	10820
Wedge	5518	12835	7200	422	20	4343	30338
Unknown	799	871	498	66	3	214	2451
<b>Total</b>	<b>23493</b>	<b>65872</b>	<b>37697</b>	<b>1736</b>	<b>90</b>	<b>15224</b>	<b>144112</b>

## Distribution of ECOG score by type of operation

Lung Excision Procedure	ECOG 0	ECOG 1	ECOG 2	ECOG 3	ECOG 4	Unknown	Total
Bilobectomy	1989	1553	284	45	10	704	4585
Lobectomy	39327	26739	4693	571	93	14724	86147
Lung Volume Reduction	84	142	75	16	1	205	523
Pneumonectomy	3689	3150	632	109	43	1625	9248
Segmentectomy	5167	3244	688	100	14	1607	10820
Wedge	12364	8495	2043	413	73	6950	30338
Unknown	1183	690	214	70	10	284	2451
<b>Total</b>	<b>63803</b>	<b>44013</b>	<b>8629</b>	<b>1324</b>	<b>244</b>	<b>26099</b>	<b>144112</b>



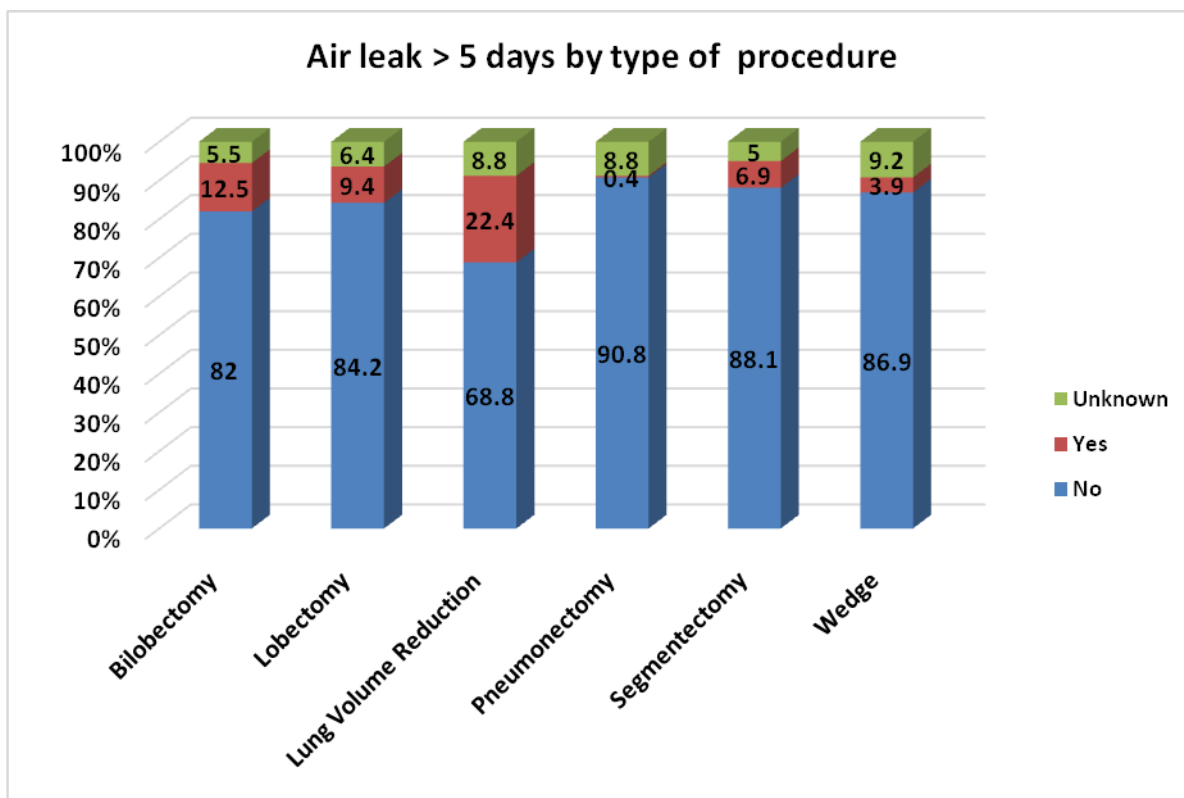
## Cardiopulmonary morbidity rate in different types of lung resections



	CM No	CM No (%)	CM Yes	CM Yes(%)	Unknown	Unknown (%)	Total
Bilobectomy	3371	73.5	961	21	253	5.5	4585
Lobectomy	69124	80.2	11506	13.4	5517	6.4	86147
Lung Volume Reduction	435	83.2	42	8	46	8.8	523
Pneumonectomy	6493	70.2	1944	21	811	8.8	9248
Segmentectomy	9342	86.3	932	8.6	546	5.1	10820
Wedge	26333	86.8	1211	4	2794	9.2	30338
Unknown	1898	77.5	116	4.7	437	17.8	2451
<b>Total</b>	<b>116996</b>		<b>16712</b>		<b>10404</b>		<b>144112</b>

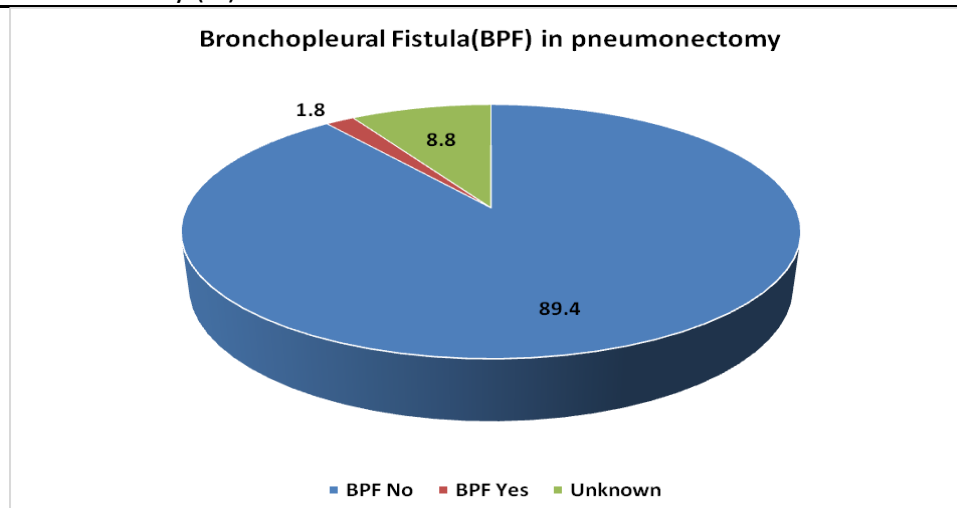
## Incidence of prolonged air leak (> 5days) in different types of lung resections

Lung Excision - PROCEDURE	Air Leak > 5 days		
	No (%)	Yes (%)	Unknown (%)
Bilobectomy	82	12.5	5.5
Lobectomy	84.2	9.4	6.4
Lung Volume Reduction	68.8	22.4	8.8
Pneumonectomy	90.8	0.4	8.8
Segmentectomy	88.1	6.9	5
Wedge	86.9	3.9	9.2



## Incidence of bronchopleural fistula (BPF) in pneumonectomy

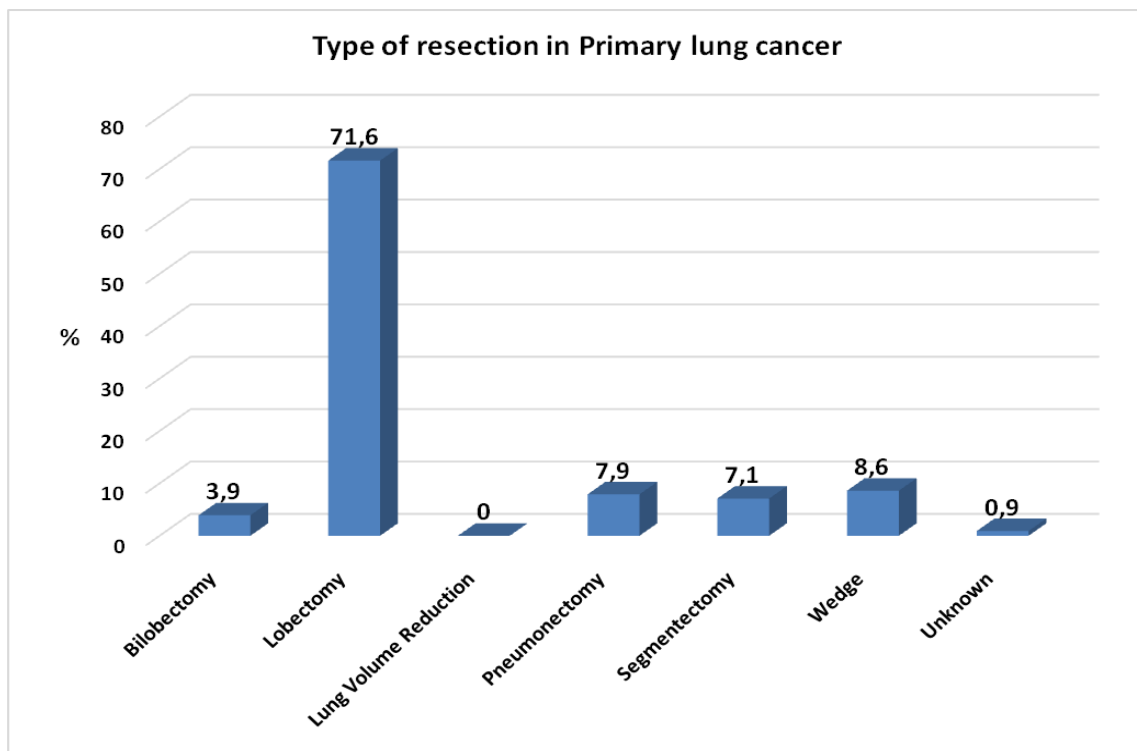
Bronchopleural fistula	BPF No	BPF Yes	Unknown	Total
Pneumonectomy (N)	8273	164	811	9248
Pneumonectomy (%)	89.4	1.8	8.8	100



## Primary lung cancer

### Lung resection for primary lung cancer: Types of procedures

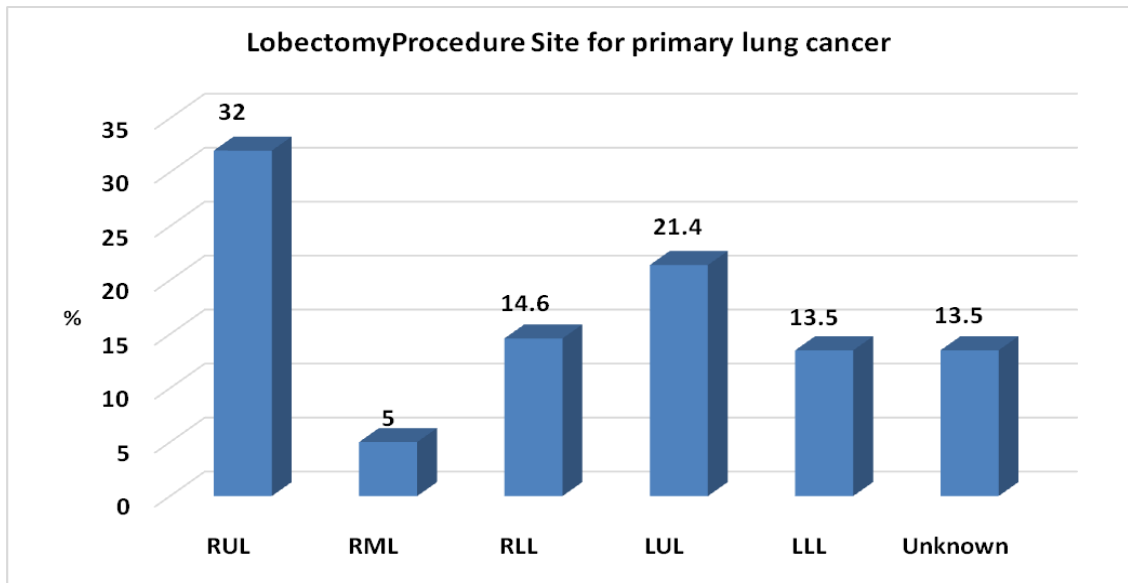
	Occurrences	Percent
Bilobectomy	4123	3.9
Lobectomy	75315	71.6
Lung Volume Reduction	15	0
Pneumonectomy	8280	7.9
Segmentectomy	7445	7.1
Wedge	9007	8.6
Unknown	911	0.9
<b>Total</b>	<b>105096</b>	<b>100</b>



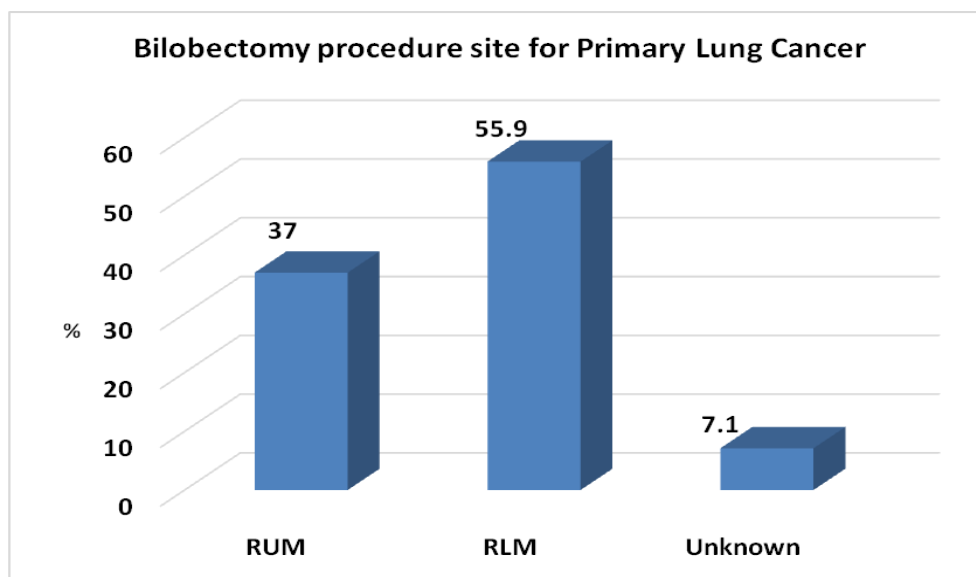
Bilobectomy – Lobectomy qualifier	Occurrences	Percent
Alone	67867	85.4
Chest Wall	3077	3.9
Superior Sulcus Tumor	477	0.6
Sleeve	2640	3.3
Diaphragm Resection	89	0.1
Atrial Resection	72	0.1
SVC Resection/Reconstruction	71	0.1
Vertebral Resection	373	0.5
Unknown	4772	6
<b>Total</b>	<b>79438</b>	<b>100</b>

## Distribution of lobectomy/bilobectomy by site of resection

Lobectomy procedure site	Occurrences	Percent
RUL	24081	32
RML	3779	5
RLL	10999	14.6
LUL	16126	21.4
LLL	10197	13.5
Unknown	10133	13.5
<b>Total</b>	<b>75315</b>	<b>100</b>



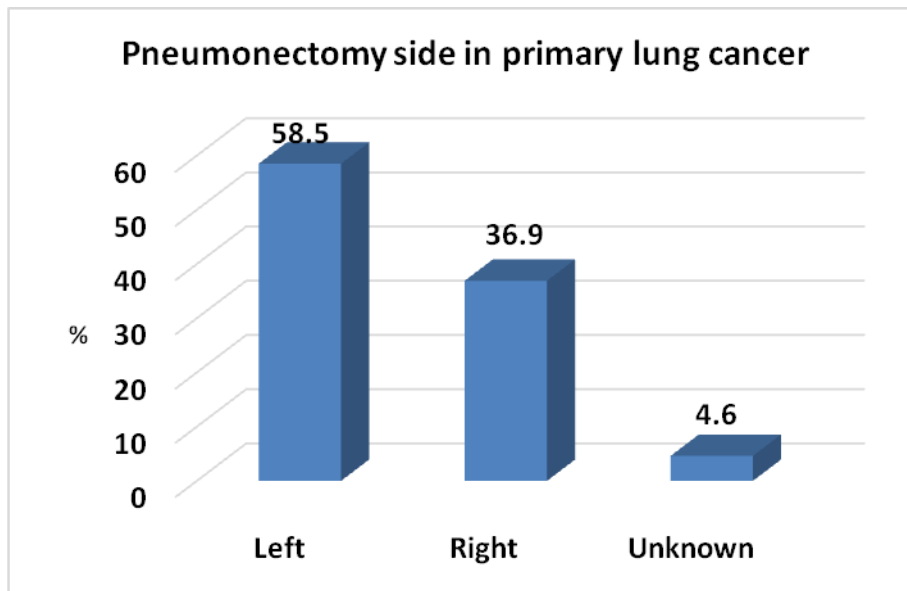
Bilobectomy procedure site	Occurrences	Percent
RUM	1523	37
RLM	2306	55.9
Unknown	294	7.1
<b>Total</b>	<b>4123</b>	<b>100</b>



## Distributions of pneumonectomy

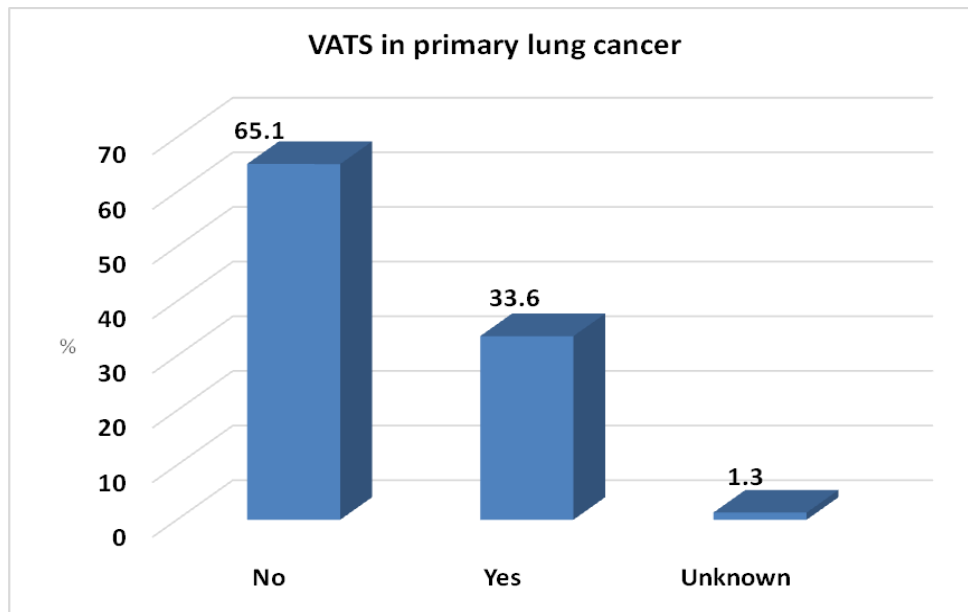
<b>Pneumonectomy Qualifier</b>	<b>Occurrences</b>	<b>Percent</b>
Alone	4768	57.6
Completion	352	4.3
Intrapericardial	708	8.5
Pleuropneumonectomy	185	2.2
Sleeve Resection	107	1.3
Diaphragm Resection	14	0.2
Atrial Resection	107	1.3
SVC Resection/Reconstruction	90	1.1
Vertebral Resection	158	1.9
Unknown	1791	21.6
<b>Total</b>	<b>8280</b>	<b>100</b>

<b>Pneumonectomy side</b>	<b>Occurrences</b>	<b>Percent</b>
Left	4840	58.5
Right	3060	36.9
Unknown	379	4.6
<b>Total</b>	<b>8279</b>	<b>100</b>



### Distribution of VATS procedures in total lung resections

VATS	Occurrences	Percent
No	68387	65.1
Yes	35375	33.6
Unknown	1334	1.3
<b>Total</b>	<b>105096</b>	<b>100</b>



### Distributions of VATS procedures in lobectomy/bilobectomy

VATS	Occurrences	Percent
No	52503	66.1
Yes	26128	32.9
Unknown	807	1
<b>Total</b>	<b>79438</b>	<b>100</b>



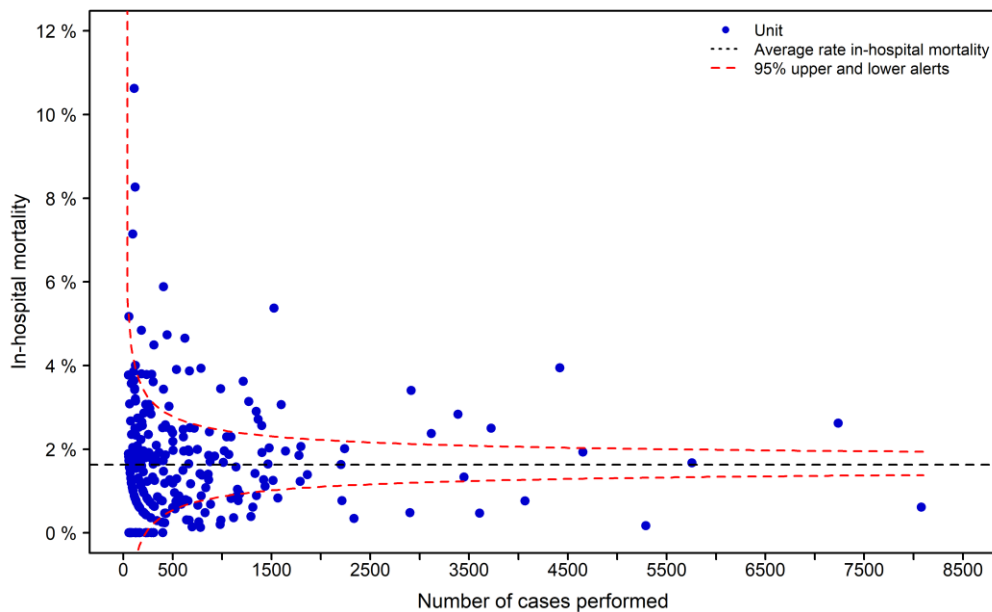
## Unadjusted in-hospital mortality rates in primary lung cancer resections

Outcome at Discharge - Died in Hospital	N	Died in Hospital	Percent(%)
Bilobectomy	3889	137	3.5
Lobectomy	70165	968	1.4
Lung Volume Reduction	11	0	0
Pneumonectomy	7836	431	5.5
Segmentectomy	6704	68	1
Wedge	8537	79	0.9
<b>Total</b>	<b>97142</b>	<b>1683</b>	<b>0.9</b>

## Overall unadjusted in-hospital mortality calculated in the total dataset

*(Only centres with at least N>50 procedures were included)*

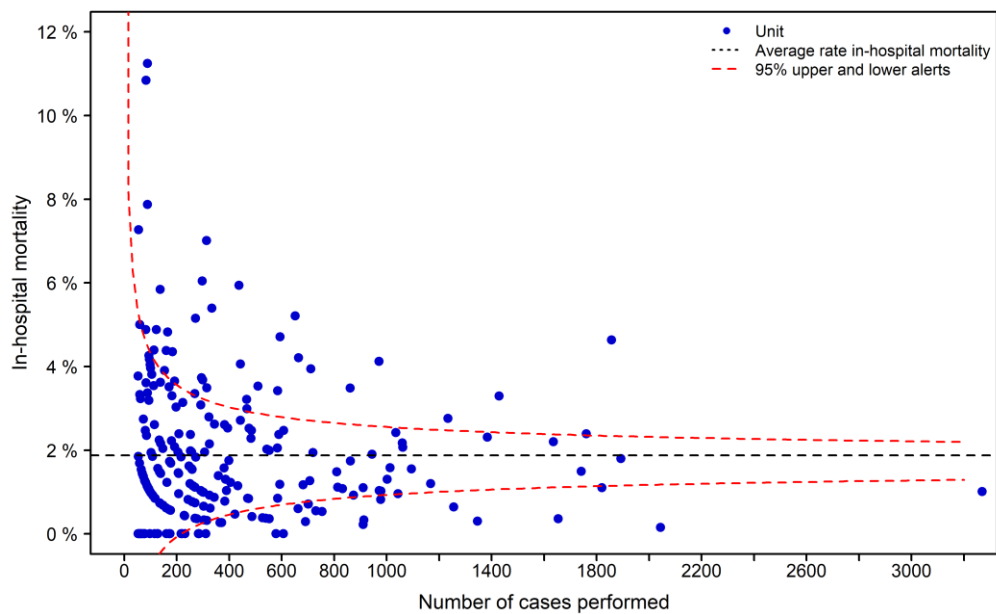
Please note that the majority of the units are within the limits. Around 12% of the Units are above the 95% upper limit whereas the 11% are below the 95% lower limit.



## Overall unadjusted in-hospital mortality calculated for the major lung resections

*(Only centres with at least N>50 major lung resections were included)*

Please note that most of the units are within the limits. Around 14% of the Units are above the 95% upper limit whereas the 9% are below the 95% lower limit.

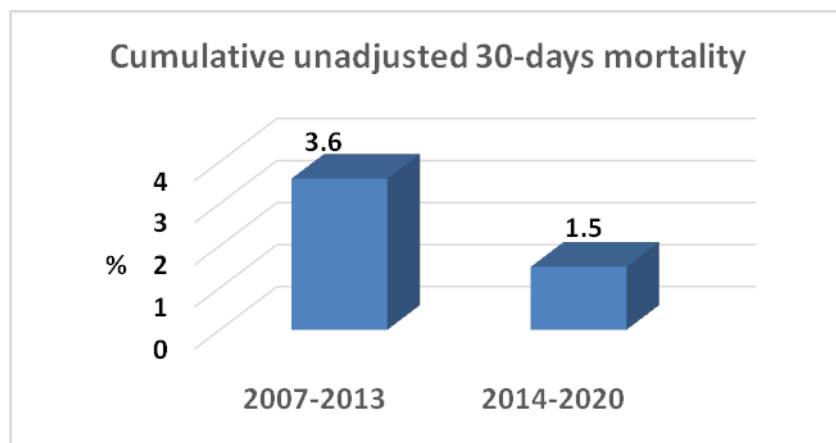


## Comparisons of outcomes between 2007-2013 vs 2014-2020 in the total dataset

\* Due to missing data, the 30-day mortality was only evaluated in 81,904 patients, leaving 89,809 patients out

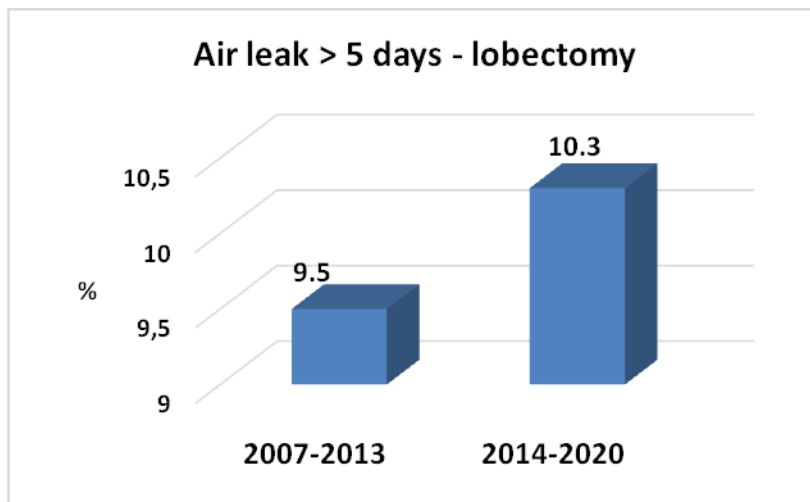
### Cumulative non-adjusted 30-day mortality

Cumulative non-adjusted 30-day mortality	Alive	Died	Died Percent
2007-2013	27781	1033	3.6
2014-2020	63784	984	1.5
<b>Total</b>	<b>91565</b>	<b>2017</b>	<b>2.2</b>



Prolonged air leak **(LOBECTOMY ONLY)**

Air leak > 5 Days	No	Yes	Yes(%)
2007-2013	24767	2607	9.5
2014-2020	47776	5480	10.3
<b>Total</b>	<b>72543</b>	<b>8087</b>	<b>10</b>



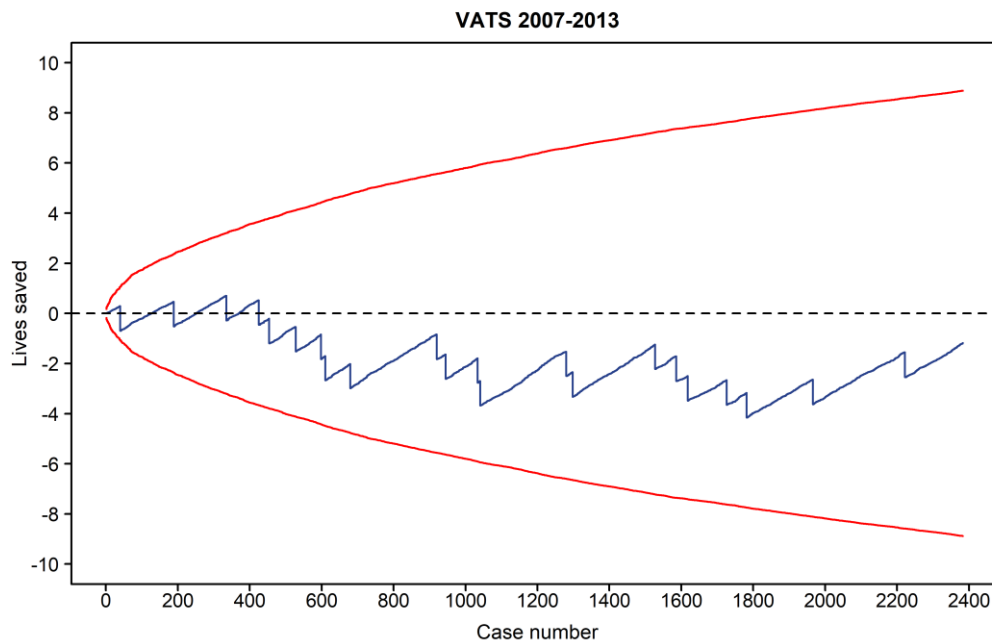
## Hospital Mortality trending presented as CUSUM plots

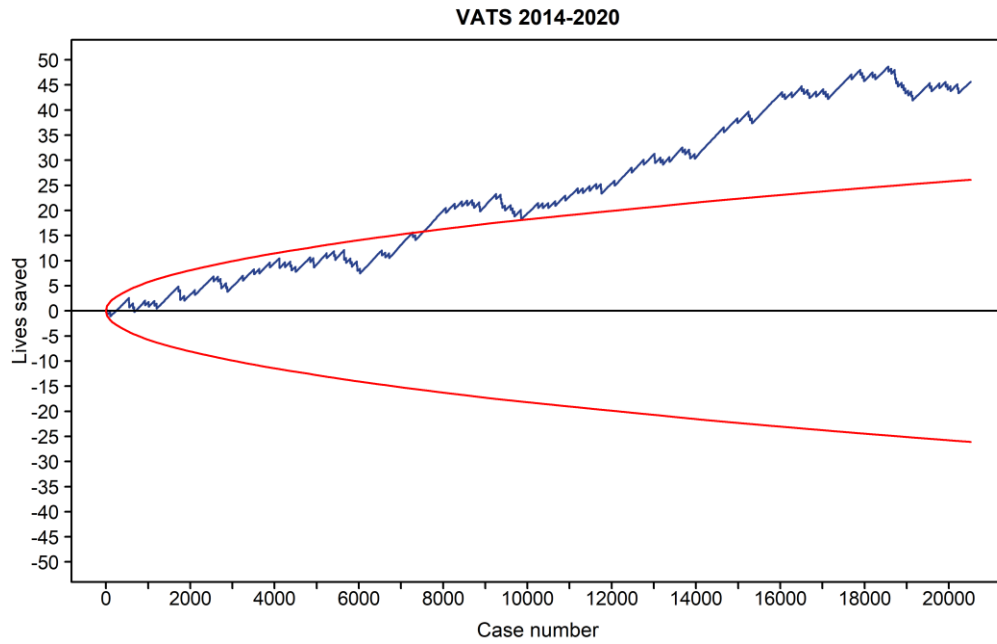
### VATS CUSUM PLOTS

Cumulative sum (CUSUM) techniques offer the possibility of checking a process along time and knowing if its quality is kept constant, improves or deteriorates. In the last case, corrective measures can be implemented and their efficacy investigated. We have used risk-adjusted expected minus observed CUSUM charts in this report. The results of the analysis are presented in graphs, where the horizontal axis represents the cases over time and the vertical axis shows the difference between the calculated risk of the outcome for a single individual and its occurrence.

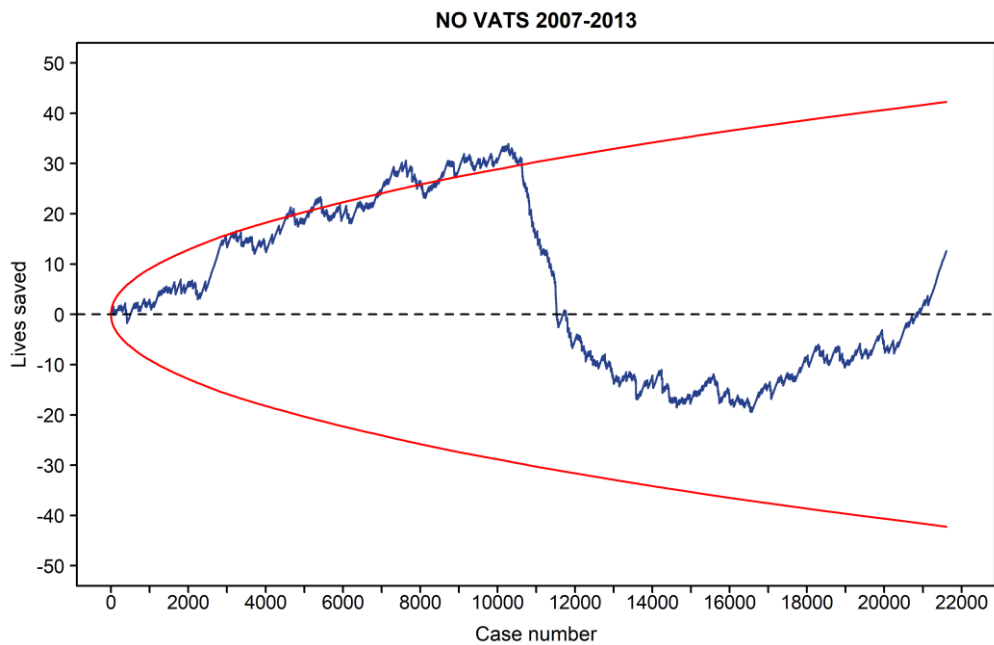
In the next figures, risk-adjusted CUSUM graphs for hospital mortality are presented for non-extended lobectomy performed through VATS or open approach in two different periods of time: 2007-2013 and 2014-2020.

In the case of VATS, the first timeframe shows some variation around the zero for the first 400 cases and a slight mortality raise in the following cases. In the period 2014-2020, a steady decrease in mortality is detected, especially after the first 6000 procedures. The last 3000 procedures show small fluctuations around 40-45 lives saved.

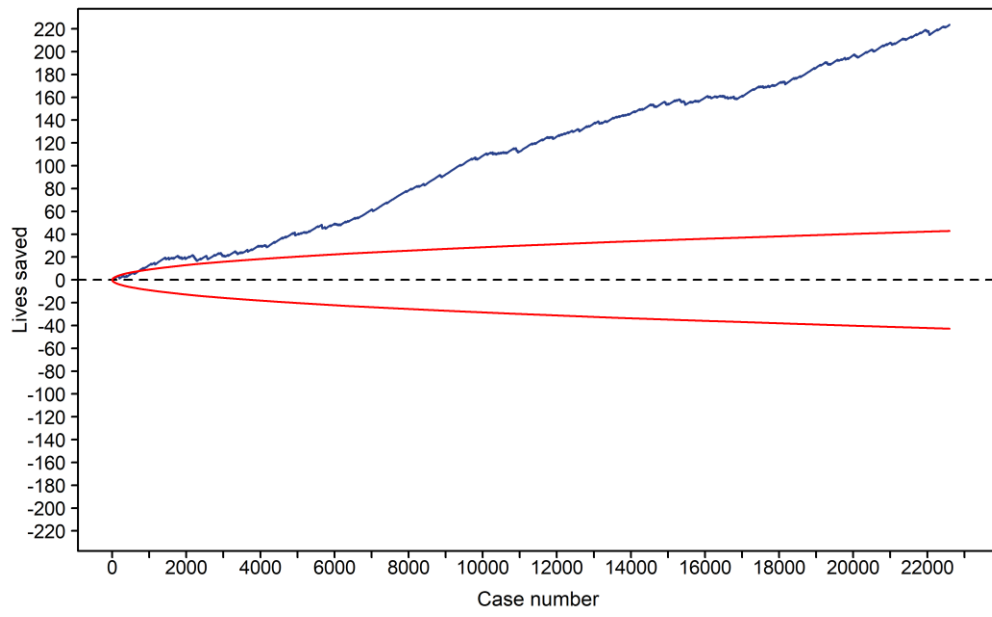




For cases not approached by VATS in the first time period, the graph shows a sharp decrease in mortality for the first 11000 procedures followed by a drop in lives saved for the following 5000 procedures, probably meaning that the easiest cases were shifted to VATS in most institutions. A subsequent increase in lives saved is shown from case 17000 onwards. Between 2013 and 2020, no VATS procedures resulted in a continuous and sharp improve of hospital mortality.



NO VATS 2014-2020



## Preliminary Analysis from ESTS Robotic pages, Lung & Thymus

### 1. RATS Lung, only Units with more than 150 lung resections performed in the last 3 years: 2018-2019-2020

Column D describes: Proportion of elderly people, Age>70 by unit

Column E describes: NofRATS Procedures

Unit	Total	n	Percent	RATS
Bm02dl	1631	466	28.57	136
Bm05dl	2185	728	33.32	103
Bm06dl	576	196	34.03	1
Bm19dl	211	62	29.38	
Ch10dl	1430	419	29.3	128
Fr130780521	1404	499	35.54	105
Fr140000209	836	250	29.9	
Fr170000087	271	109	40.22	
Fr210987558	1144	404	35.31	8
Fr290000215	301	92	30.56	
Fr310019351	989	286	28.92	
Fr330780479	304	114	37.5	
Fr330783648	1142	340	29.77	
Fr340015502	406	165	40.64	
Fr340796663	394	153	38.83	
Fr350000741	399	131	32.83	2
Fr370004467	504	186	36.9	
Fr380000067	418	175	41.87	
Fr380786442	319	129	40.44	
Fr440017598	348	108	31.03	
Fr440024982	317	111	35.02	16
Fr450010079	159	68	42.77	
Fr540000486	657	227	34.55	17
Fr540001138	542	152	28.04	
Fr560002511	304	105	34.54	
Fr570001057	501	161	32.14	7
Fr590000618	342	93	27.19	
Fr590780383	422	118	27.96	23
Fr590784864	402	109	27.11	24
Fr620100750	241	63	26.14	
Fr630000479	565	197	34.87	
Fr660780784	232	84	36.21	
Fr670000025	1158	388	33.51	15
Fr690000880	430	131	30.47	
Fr690784186	383	133	34.73	
Fr730000031	260	95	36.54	61
Fr750100273	783	253	32.31	
Fr750150104	1116	400	35.84	



Fr750712184	765	313	40.92	
Fr750803447	696	252	36.21	
Fr760000158	982	278	28.31	120
Fr760021329	261	89	34.1	
Fr760780510	310	110	35.48	
Fr800006124	478	150	31.38	
Fr830100574	398	169	42.46	
Fr840001861	502	190	37.85	
Fr860000223	658	209	31.76	29
Fr870000064	177	67	37.85	
Fr920000650	668	258	38.62	11
Fr920000684	639	191	29.89	
Fr920300043	351	149	42.45	112
Fr930100037	300	109	36.33	
Gr02d0	528	211	39.96	
Gy18dl	689	260	37.74	
Gy23dl	4045	1143	28.26	91
Hu01dl	1274	261	20.49	
Hu02dl	2433	562	23.1	
Hu03dl	5387	1202	22.31	
Hu04dl	758	164	21.64	
Hu05dl	667	114	17.09	
Hu06dl	1064	208	19.55	
Hu07dl	655	154	23.51	
Hu08dl	1905	407	21.36	
Hu09dl	3287	698	21.24	1
Hu12dl	3297	535	16.23	
Ie01dl	304	129	42.43	5
It03d0	1818	694	38.17	
It26dl	629	286	45.47	
It32dl	1481	556	37.54	18
It38dl	456	212	46.49	
It44dl	1166	503	43.14	178
It48dl	235	131	55.74	
It53dl				16
ITUNICAMPUS	456	212	46.49	
PI06dl	822	289	35.16	2
PI08dl	1864	456	24.46	
Sk01dl	749	139	18.56	
Sp01dl	1514	550	36.33	116
Sp07d0	1614	610	37.79	
Sp17dl	1545	571	36.96	
Sp28dl	706	209	29.6	
Sp31dl	662	252	38.07	
Uk05dl	1591	803	50.47	
<b>Total</b>	<b>74812</b>	<b>22955</b>	<b>30.68</b>	<b>1345</b>

## 2. RATS, thymus, 2018, 2019, 2020

21% missing data(573 records) on surgical approach

domain	N	Description
Au03dl	2	Thoracic Surgery - Medical University of Vienna - Waehringer Guertel
Au04dl	1	Klinische Abteilung fur thoraxchirurgie
Bm02dl	31	University Hospital of Antwerp
Bm05dl	1	University Hospitals Leuven - Belgium
Bm06dl	3	ZOL St.-Jan Genk - Belgium.
Bm19dl	2	GHDC Site Gilly, Belgium
Br02dl	1	Instituto do Cancer do Estado de Sao Paulo
Br08dl	1	Hospital Santa Isabel - Nazaré, Salvador - BA, Brazil
Ca01dl	67	Division of Thoracic Surgery, University of Montreal
Ch10dl	16	Thoraxchirurgin und Leitende Ärztin am USZ Zurich
Fr04dl	10	Sainte Marguerite University Hospital, Department of Thoracic Surgery & Diseases Transplantations
Gy23dl	80	Medical University of Essen, Ruhrlandklinik, Dept. of Thoracic Surgery
It27d0	51	Policlinico Gemelli Roma - Università Cattolica
It32dl	31	Molinette Torino
It35dl	44	AOU Careggi, SOD Chirurgia Toracica, Firenze
It42dl	1	INT Fondazione Pascale - Napoli
It43dl	24	European Institute of Oncology (IEO)
Pt05dl	2	Hospitais CUF Lisboa
Sp01dl	31	University Hospital Salamanca
Sp14d0	3	HHUU VIRGEN DEL ROCIO
Sw03d0	7	Kantonspital St. Gallen
Total	409	

## **PART 2**

### **UNITS-SPECIFIC ACTIVITY**

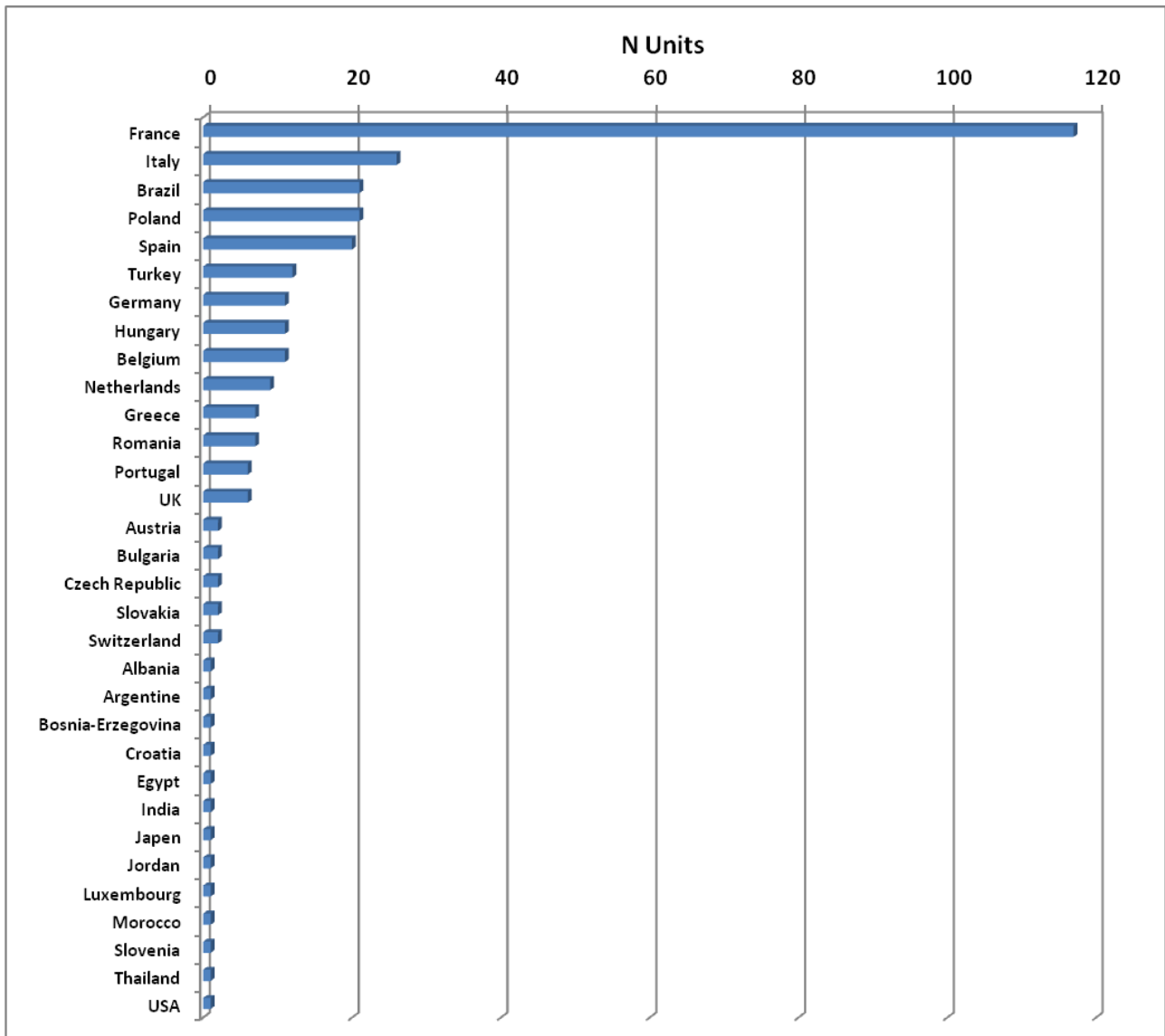
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### **COMPARATIVE ANALYSIS**

### **BETWEEN CONTRIBUTING UNITS (2007-2020) (European units Only)**

*Only units contributing more than 150 lung resections **performed in the last three** years were included*

## Number of Units enrolled in the ESTS database as of December 2020, by Country



Proportion of elderly patients (older than 70 years of age) operated on in different European countries

Unit	Percent
Bm02dl	28.57
Bm05dl	33.32
Bm06dl	34.03
Bm19dl°	29.38
Ch10dl	29.3
Fr130780521	35.54
Fr140000209	29.9
Fr170000087°	40.22
Fr210987558	35.31
Fr290000215°	30.56
Fr310019351	28.92
Fr330780479	37.5
Fr330783648	29.77
Fr340015502°	40.64
Fr340796663°	38.83
Fr350000741°	32.83
Fr370004467	36.9
Fr380000067°	41.87
Fr380786442°	40.44
Fr440017598°	31.03
Fr440024982°	35.02
Fr450010079°	42.77
Fr540000486	34.55
Fr540001138	28.04
Fr560002511°	34.54
Fr570001057	32.14
Fr590000618°	27.19
Fr590780383°	27.96
Fr590784864°	27.11
Fr620100750°	26.14
Fr630000479	34.87
Fr660780784°	36.21
Fr670000025	33.51
Fr690000880°	30.47
Fr690784186°	34.73
Fr730000031°	36.54
Fr750100273	32.31
Fr750150104	35.84
Fr750712184	40.92

<b>Unit</b>	<b>Percent</b>
Fr750803447	36.21
Fr760000158	28.31
Fr760021329°	34.1
Fr760780510°	35.48
Fr800006124°	31.38
Fr830100574°	42.46
Fr840001861	37.85
Fr860000223	31.76
Fr870000064°	37.85
Fr920000650	38.62
Fr920000684	29.89
Fr920300043°	42.45
Fr930100037°	36.33
Gr02d0	39.96
Gy18dl	37.74
Gy23dl	28.26
Hu01dl	20.49
Hu02dl	23.1
Hu03dl	22.31
Hu04dl	21.64
Hu05dl	17.09
Hu06dl	19.55
Hu07dl	23.51
Hu08dl	21.36
Hu09dl	21.24
Hu12dl	16.23
Ie01dl°	42.43
It03d0	38.17
It26dl	45.47
It32dl	37.54
It38dl°	46.49
It44dl	43.14
It48dl°	55.74
PI06dl	35.16
PI08dl	24.46
Sk01dl	18.56
Sp01dl	36.33
Sp07d0	37.79
Sp17dl	36.96
Sp28dl	29.6
Sp31dl	38.07
Uk05dl	50.47

(°): Units with less than 500 patients included, results must be interpreted with caution

**Percentage of patients submitted to major anatomic lung resections with preoperative measurement of DLCO in different European Countries.**

<b>Unit</b>	<b>Percent</b>
Bm02dl	90.82
Bm05dl	91.97
Bm06dl°	87.69
Bm19dl°	91.25
Ch10dl	82.53
Fr130780521	96.6
Fr140000209	90.54
Fr170000087°	58.75
Fr210987558	60.48
Fr290000215°	64.34
Fr310019351	58.1
Fr330780479°	20.88
Fr330783648	56.83
Fr340015502°	13.93
Fr340796663°	75.24
Fr350000741°	64.26
Fr370004467°	84.81
Fr380000067°	54.88
Fr380786442°	69.23
Fr440017598°	41.91
Fr440024982°	58.52
Fr450010079°	30.39
Fr540000486	23.76
Fr540001138°	79.91
Fr560002511°	39.93
Fr570001057°	42.45
Fr590000618°	15.13
Fr590780383°	62.37
Fr590784864°	84.57
Fr620100750°	57.67
Fr630000479°	91.98
Fr660780784°	21.4
Fr670000025	37.42
Fr690000880°	98.08
Fr690784186°	77.85
Fr730000031°	86.1
Fr750100273	83.03
Fr750150104	68.7
Fr750712184°	62.63
Fr750803447	37.82
Fr760000158	71.64
Fr760021329°	80.38
Fr760780510°	10.78

<b>Unit</b>	<b>Percent</b>
Fr800006124°	82.82
Fr830100574°	95.21
Fr840001861°	86.96
Fr860000223	75.55
Fr870000064°	78.52
Fr920000650	86.34
Fr920000684	77.22
Fr920300043°	18.36
Fr930100037°	45.02
Gr02d0°	6.01
Gy18dl°	58.72
Gy23dl	89.66
Hu01dl	10.56
Hu02dl	37.67
Hu03dl	1.16
Hu04dl°	0.26
Hu05dl°	0.47
Hu06dl	1.51
Hu07dl°	0.23
Hu08dl	0
Hu09dl	0.05
Hu12dl	52.99
Ie01dl°	99.26
It03d0	72.53
It26dl°	84.27
It32dl	94.07
It38dl°	46.06
It44dl	61.54
It48dl°	97.74
PI06dl	82.22
PI08dl	9.53
Sk01dl	92.17
Sp01dl	90.05
Sp07d0	72.84
Sp17dl	81.92
Sp28dl	85.71
Sp31dl°	88.97
Uk05dl	93.56



**Percentage of patients with primary neoplastic disease and suspicious clinical N2 stage (enlarged >1cm mediastinal nodes at CT scan or PET positive mediastinal nodes) who underwent at least one preoperative invasive mediastinal staging procedure (EBUS, EUS, mediastinoscopy, mediastinotomy, VATS, TEMPLA etc.)**

<b>Unit</b>	<b>Percent</b>		
		Fr760780510°	0
Bm02dl°	86.52	Fr800006124°	66.67
Bm05dl°	89.87	Fr830100574°	81.08
Bm06dl°	86.72	Fr840001861°	38.89
Bm19dl°	72	Fr860000223°	12.5
Ch10dl°	86.89	Fr870000064°	16.67
Fr130780521°	82.08	Fr920000650°	40.48
Fr140000209°	64.29	Fr920000684°	35.09
Fr170000087°	1.92	Fr920300043°	58.33
Fr210987558°	32	Fr930100037°	51.92
Fr290000215°	12.82	Gr02d0°	2.7
Fr310019351°	54.21	Gy18dl°	51.47
Fr330780479°	70.59	Gy23dl°	55.83
Fr330783648°	29	Hu01dl°	3.97
Fr340015502°	62.5	Hu02dl°	9.84
Fr340796663°	44.19	Hu03dl	7
Fr350000741°	60	Hu04dl°	9.09
Fr370004467°	29.73	Hu05dl°	4
Fr380000067°	31.82	Hu06dl°	2.56
Fr380786442°	43.75	Hu07dl°	27.27
Fr440017598°	4.55	Hu08dl°	37.25
Fr440024982°	47.27	Hu09dl°	14.29
Fr450010079°	25	Hu12dl°	75
Fr540000486°	9.84	Ie01dl°	60
Fr540001138°	40.82	It03d0°	35.07
Fr560002511°	54.55	It26dl°	40
Fr570001057°	19.23	It32dl°	9.04
Fr590000618°	28.57	It38dl°	14.29
Fr590780383°	16.67	It44dl°	50.79
Fr590784864°	43.18	It48dl°	79.31
Fr620100750°	75	PI06dl°	79.8
Fr630000479°	50	PI08dl°	52.94
Fr660780784°	33.33	Sk01dl°	35.87
Fr670000025°	24.5	Sp01dl°	76.35
Fr690000880°	68.33	Sp07d0°	42.77
Fr690784186°	29.27	Sp17dl°	79.59
Fr730000031°	43.75	Sp28dl°	68
Fr750100273°	39.39	Sp31dl°	60.53
Fr750150104°	64.15	Uk05dl°	85.14
Fr750712184°	34.62	(°): Units with less than 500	
Fr750803447°	12.36	patients included, results must be	
Fr760000158°	41.27	interpreted with caution	
Fr760021329°	11.43		

## Percentage of patients submitted to lymph node dissection during major lung resection for malignant primary neoplastic disease grouped by Countries

Lymph node dissection more extended than sampling alone or selected biopsy (as defined and recommended by the ESTS guidelines for intra-operative mediastinal staging) in lung cancer patients was a frequent procedure in all countries.

This variable will be included in the composite performance score (CPS) used for the ESTS quality certification program.

Unit	Percent		
		Fr730000031°	99.55
Bm02dl	91.64	Fr750100273	98.83
Bm05dl	94.85	Fr750150104	92.51
Bm06dl°	98.73	Fr750712184°	95.07
Bm19dl°	99.34	Fr750803447	97.86
Ch10dl	97.39	Fr760000158	77.34
Fr130780521	95.55	Fr760021329°	93.72
Fr140000209	94.63	Fr760780510°	98.27
Fr170000087°	93.68	Fr800006124°	98.97
Fr210987558	99.34	Fr830100574°	90.91
Fr290000215°	98.36	Fr840001861°	100
Fr310019351	97.92	Fr860000223	97.06
Fr330780479°	98.88	Fr870000064°	84.44
Fr330783648	98.6	Fr920000650	85.77
Fr340015502°	96.38	Fr920000684	95.02
Fr340796663°	89.87	Fr920300043°	99.22
Fr350000741°	77.37	Fr930100037°	99.2
Fr370004467°	91.05	Gr02d0°	80.82
Fr380000067°	72.22	Gy18dl°	100
Fr380786442°	93.5	Gy23dl	96.87
Fr440017598°	95.61	Hu01dl	95.01
Fr440024982°	98.14	Hu02dl	90.17
Fr450010079°	14.71	Hu03dl	56.03
Fr540000486	97.95	Hu04dl°	97.7
Fr540001138°	99.54	Hu05dl°	63.5
Fr560002511°	97.15	Hu06dl	95.63
Fr570001057°	97.1	Hu07dl°	99.01
Fr590000618°	77.08	Hu08dl°	50.76
Fr590780383°	99.73	Hu09dl	91
Fr590784864°	86.32	Hu12dl	97.32
Fr620100750°	100	Ie01dl°	87.5
Fr630000479°	97.46	It03d0	94.58
Fr660780784°	96.93	It26dl°	55.56
Fr670000025	96.6	It32dl	87.24
Fr690000880°	95.89	It38dl°	97.26
Fr690784186°	100	It44dl	95.42

<b>Unit</b>	<b>Percent</b>
It48dl°	77.4
PI06dl	99.42
PI08dl	100
Sk01dl	53.18
Sp01dl	92.08
Sp07d0	92.93
Sp17dl	97.18
Sp28dl°	12.08
Sp31dl°	93.15
Uk05dl	80.99

## Primary lung cancer per contributing Units

### Percentage of lung excision procedures

Unit	Bilobectomy	Lobectomy	Lung Volume Reduction	Pneumonectomy	Segmentectomy	Wedge	Unknown
Bm02dl	3.8	62.6	0	11.6	5.9	16.1	0
Bm05dl	6.7	70.7	0	11.1	6	5.5	0
Bm06dl°	3.8	83.5	0	6.6	5.4	0.5	0.2
Bm19dl°	4.7	89.2	0	3.4	0	2.7	0
Ch10dl	2.9	75	0.2	10.1	5.3	4.8	1.7
Fr130780521	2.2	68.4	0	4.9	15.7	7.7	1.1
Fr140000209	4.3	75.8	0	4.6	2.4	11.6	1.3
Fr170000087°	2.2	82.6	0	10	1.5	1.5	2.2
Fr210987558	3.2	69.6	0	6.6	17.1	2.4	1.1
Fr290000215°	5.3	69.8	0	6	3.3	14.9	0.7
Fr310019351	3.2	83.1	0.1	6.2	2.4	2.5	2.5
Fr330780479°	2	82.2	0	5.6	4	5.9	0.3
Fr330783648	3.1	77.1	0	2.4	13.3	3	1.1
Fr340015502°	4.4	81	0	3	10.1	0.5	1
Fr340796663°	4.8	71.9	0	3	15.5	4.8	0
Fr350000741°	3	63.4	0	3	7.8	21	1.8
Fr370004467	3.8	71.4	0	3.2	4.7	15.3	1.6
Fr380000067°	3.3	70.4	0	4	17.1	3.5	1.7
Fr380786442°	2.5	72.4	0	2.5	19.8	2.2	0.6
Fr440017598°	7.5	72.7	0	6.9	4.3	7.5	1.1
Fr440024982°	2.2	77.9	0	5	6	5.7	3.2
Fr450010079°	1.3	59.7	0	3.1	5.7	25.8	4.4
Fr540000486	3.2	76.1	0	9.8	3.5	5.9	1.5
Fr540001138	2	70.9	0	6.8	13.6	5	1.7
Fr560002511°	8.2	79.3	0	5.6	1.3	5.6	0
Fr570001057	2.2	70.3	0	4	5.8	15.7	2
Fr590000618°	2	83.9	0	2.9	1.5	9.4	0.3
Fr590780383°	4.5	76.8	0	6.8	6.4	5	0.5
Fr590784864°	3.7	68.9	0	4.7	13.4	7.5	1.8
Fr620100750°	3.3	59.8	0	4.6	10.8	20.3	1.2
Fr630000479	3.2	75.6	0	5.1	7.4	7.3	1.4
Fr660780784°	3.4	91.8	0	3.5	0.9	0.4	0
Fr670000025	2.9	73.4	0	8.1	9.2	4.9	1.5
Fr690000880°	4.6	73.7	0	6.5	9.8	4.2	1.2
Fr690784186°	3.9	76.5	0	4.4	10.5	4.2	0.5
Fr730000031°	4.6	77.8	0	3	6.9	6.9	0.8
Fr750100273	2.4	67.9	0.1	7.2	18.3	3.2	0.9
Fr750150104	2.8	61.9	0.1	2.8	28.6	2.7	1.1
Fr750712184	2.8	54.6	0.1	6.1	27.5	7.7	1.2
Fr750803447	5	73	0	4.9	7.1	9.1	0.9

Unit	Bilobectomy	Lobectomy	Lung Volume Reduction	Pneumonectomy	Segmentectomy	Wedge	Unknown
Fr760000158	2.4	61.4	0	6.6	18.7	10.5	0.4
Fr760021329°	3.5	68.2	0	8.4	9.6	6.1	4.2
Fr760780510°	1.9	68.7	0	4.2	15.5	9.4	0.3
Fr800006124°	2.3	73.1	0	6.1	7.9	10	0.6
Fr830100574°	3.3	66.3	0	3.8	7.8	18.1	0.7
Fr840001861	1.2	56.1	0	2.2	25.4	11.3	3.8
Fr860000223	4	72.6	0	6.1	8.2	7.3	1.8
Fr870000064°	2.3	70.6	0	3.4	13	7.9	2.8
Fr920000650	2.9	72.9	0	3.1	14.7	5.5	0.9
Fr920000684	3.9	77.1	0	5.1	5.5	7.5	0.9
Fr920300043°	3.4	68.2	0	1.1	24.7	2.3	0.3
Fr930100037°	5	76	0.3	2.7	6	9	1
Gr02d0°	4.7	59.6	0	16.4	3.5	4.7	11.1
Gy18dl°	5.3	61.6	0	7.9	21.2	4	0
Gy23dl	3.2	70	0.1	5.5	5.5	15.7	0
Hu01dl	3.2	62.7	0	5.1	9.3	19.7	0
Hu02dl	3.1	75.8	0	4.9	6.3	9.7	0.2
Hu03dl	2.5	67.3	0	8.8	3.4	16.7	1.3
Hu04dl°	2.9	71	1.2	4.4	12.2	6.3	2
Hu05dl°	0.5	74.1	0	7.9	12.8	3.7	1
Hu06dl	1.5	71.7	0	5.5	1.5	19.7	0.1
Hu07dl°	1.2	74.6	0	2.4	1.6	20.2	0
Hu08dl	1.9	52.5	0	13	10.8	21.3	0.5
Hu09dl	3.5	70.1	0	10	3.1	12.4	0.9
Hu12dl	2.1	71.4	0	6.9	6.9	12.6	0.1
Ie01dl°	5.6	83.5	0	5.6	0	5.3	0
It03d0	3.6	75.1	0	5	7	9.2	0.1
It26dl°	1.3	56.9	0	4.7	4.2	31.2	1.7
It32dl	3.5	74.7	0	7.1	5.7	8.8	0.2
It38dl°	5.2	86.1	0	1.7	1.5	5.5	0
It44dl	4.3	74.4	0	6.2	9.1	6	0
It48dl°	3.7	89.8	0	0.5	6	0	0
PI06dl	3.7	82	0	4	7.9	2.4	0
PI08dl	5.2	78.3	0	9.9	3.4	3.2	0
Sk01dl	4.6	85.3	0	8	2.1	0	0
Sp01dl	4.7	81.7	0	5.7	6.6	1.2	0.1
Sp07d0	3.2	58.6	0	3.8	9.3	24.9	0.2
Sp17dl	3.7	74.4	0	6.1	8.4	7.3	0.1
Sp28dl	3.2	74.4	0	7.2	13.4	1.8	0
Sp31dl°	3	69.9	0	4.5	10.7	11.9	0
Uk05dl	3.3	80.6	0	6.8	7.7	1	0.6

(°): Units with less than 500 patients included, results must be interpreted with caution

## Proportion and type of extended resections amongst lobectomy and bilobectomy

Unit	Alone	Chest Wall	Superior Sulcus Tumor	Sleeve	Diaphragm Resection	Atrial Resection	SVC Resection Reconstruction	Vertebral Resection	Unk
Bm02dl	90.3	1.8	1.4	5.5	0.3	0.3	0	0	0.4
Bm05dl	79.4	3.9	1.7	14.3	0.2	0.2	0.1	0.1	0.1
Bm06dl°	90	2.7	0	6.2	0.3	0	0	0.3	0.5
Bm19dl°	93.5	5	0	1.5	0	0	0	0	0
Ch10dl	51.2	8.1	0.3	14.4	0.1	1.5	0.1	0	24.3
Fr130780521	89.5	6.6	0.8	3.1	0	0	0	0	0
Fr140000209	91.5	7.5	0	1	0	0	0	0	0
Fr170000087°	99.1	0.5	0	0	0	0	0.4	0	0
Fr210987558	89.1	8	0	2.5	0.3	0	0.1	0	0
Fr290000215°	84.9	13.3	0	1.8	0	0	0	0	0
Fr310019351	89.7	8.5	0.2	1.5	0.1	0	0	0	0
Fr330780479°	98	2	0	0	0	0	0	0	0
Fr330783648	90.8	5.9	0.3	3	0	0	0	0	0
Fr340015502°	94.2	3.8	0.3	1.7	0	0	0	0	0
Fr340796663°	94.1	2.3	0.3	3.3	0	0	0	0	0
Fr350000741°	91.3	6.4	0.4	1.9	0	0	0	0	0
Fr370004467°	94.2	5.3	0	0.5	0	0	0	0	0
Fr380000067°	86.2	10.9	0	2.9	0	0	0	0	0
Fr380786442°	77.8	19.7	0.4	2.1	0	0	0	0	0
Fr440017598°	79.9	17.6	0.4	1.8	0.3	0	0	0	0
Fr440024982°	76	16.1	0.4	7.5	0	0	0	0	0
Fr450010079°	68.1	3.1	27.8	0	1	0	0	0	0
Fr540000486	96.5	2.3	0	1.2	0	0	0	0	0
Fr540001138°	90.1	6.8	1	1.8	0.3	0	0	0	0
Fr560002511°	83.1	13.9	0	3	0	0	0	0	0
Fr570001057°	95	4.7	0	0.3	0	0	0	0	0
Fr590000618°	93.9	5.1	0.3	0.7	0	0	0	0	0
Fr590780383°	84.2	14.6	0.3	0.9	0	0	0	0	0
Fr590784864°	91.8	4.5	1	2.7	0	0	0	0	0
Fr620100750°	92.1	5.9	0	2	0	0	0	0	0
Fr630000479°	94.2	2.7	0.2	2.5	0.4	0	0	0	0
Fr660780784°	79.2	20.8	0	0	0	0	0	0	0
Fr670000025	87.1	9.3	0.3	3.3	0	0	0	0	0
Fr690000880°	88.1	4.2	0.6	7.1	0	0	0	0	0
Fr690784186°	84.7	11.4	1.6	2.3	0	0	0	0	0
Fr730000031°	94	5.1	0	0.9	0	0	0	0	0
Fr750100273	95.6	2.5	0.4	1.5	0	0	0	0	0
Fr750150104	94.5	3.7	0.6	1.2	0	0	0	0	0
Fr750712184°	92.1	5.2	0.2	2.3	0.2	0	0	0	0
Fr750803447	87.5	10.1	0.6	1.8	0	0	0	0	0

Fr760000158	88.2	10.2	0	1.6	0	0	0	0	0
Fr760021329°	92.5	7.5	0	0	0	0	0	0	0
Fr760780510°	91.8	7.3	0	0.9	0	0	0	0	0
Fr800006124°	77.6	20.5	0.8	1.1	0	0	0	0	0
Fr830100574°	90.3	6.5	0	3.2	0	0	0	0	0
Fr840001861°	93.7	5.6	0	0.7	0	0	0	0	0
Fr860000223	93.2	3.6	1	2.2	0	0	0	0	0
Fr870000064°	98.4	0.8	0	0.8	0	0	0	0	0
Fr920000650	90.9	1.8	0.6	6.7	0	0	0	0	0
Fr920000684	87.3	6	1.7	5	0	0	0	0	0
Fr920300043°	84.1	15.9	0	0	0	0	0	0	0
Fr930100037°	84.4	10.7	0	4.9	0	0	0	0	0
Gr02d0°	93.1	2.9	1.1	1.8	0	0.7	0	0	0.4
Gy18dl°	78.2	6.9	1	12.4	0	1	0.5	0	0
Gy23dl	83.8	3.5	1.5	10	0.4	0.2	0.5	0.1	0
Hu01dl	79.9	2.5	0	2.3	0	0.2	0	0	15.1
Hu02dl	22.1	1.5	0.1	7.7	0.2	0	0.2	0.2	68
Hu03dl	36	1.5	0.1	6.1	0.6	0.2	0.1	0	55.4
Hu04dl°	23.1	4.3	0.6	1.3	0.7	0	0.7	0	69.3
Hu05dl°	0.7	0	4.9	0	0	0	0	0	94.4
Hu06dl°	96.7	0	0	0.2	0.2	0	0	0	2.9
Hu07dl°	98.4	0	0	1.3	0	0.3	0	0	0
Hu08dl	35.3	0.8	0.2	0.2	0.3	0.1	0	0.1	63
Hu09dl	36.2	1.3	0.2	1.2	0.3	0.2	0.3	0	60.3
Hu12dl	88.8	1.5	0	0.9	0.1	0	0	0	8.7
Ie01dl°	92	0.9	0.4	5.9	0	0.8	0	0	0
It03d0	94	1.3	0.1	3.9	0.1	0.2	0	0	0.4
It26dl°	96.6	2.6	0	0	0	0	0	0	0.8
It32dl	89.2	2.4	0.3	1.2	0	0	0	0.1	6.8
It38dl°	98.4	1.3	0	0.3	0	0	0	0	0
It44dl	95.7	1.9	0	1.3	0.5	0	0.4	0.2	0
It48dl°	98	2	0	0	0	0	0	0	0
Pl06dl	99.5	0.2	0	0.3	0	0	0	0	0
Pl08dl	93.2	1.2	0	5.3	0.1	0.1	0.1	0	0
Sk01dl°	95.1	1.7	0.2	3	0	0	0	0	0
Sp01dl	79.4	4.8	0.8	3.6	0.1	0.2	0	0	11.1
Sp07d0	93	2.8	0.5	0.3	0.3	0	0	0.1	3
Sp17dl	85.8	3.7	1.6	7.2	0.2	0.7	0.2	0.4	0.2
Sp28dl°	95.2	2	0.7	1.6	0.5	0	0	0	0
Sp31dl°	90.8	3.8	0.7	3.8	0	0.3	0	0.3	0.3
Uk05dl	95.9	1.8	0.2	1.7	0.4	0	0	0	0

(°): Units with less than 500 patients included, results must be interpreted with caution

## Proportion of extended and type of resection amongsts pneumonectomies

Unit	Alone	Completion	Intrapercardial	Pleuropneum.	Sleeve Resection	Diaphragm Resection	Atrial Resection	SVC Resection Reconstruction	Vertebral Resection	Unk
Bm02dl°	33.3	18.3	32.5	0.8	1.6	0	0	0	0.8	12.7
Bm05dl°	61.4	6.2	29.8	0.4	0.5	0	0	0.4	0.9	0.4
Bm06dl°	75	7.2	7.1	0	0	0	0	0	0	10.7
Bm19dl°	100	0	0	0	0	0	0	0	0	0
Ch10dl°	21.9	4.2	20.8	21.9	5.2	8.3	3.1	1.1	0	13.5
Fr130780521°	44.1	1.5	0	0	1.5	0	0	0	0	52.9
Fr140000209°	23.7	2.6	0	0	0	0	0	0	0	73.7
Fr170000087°	40.7	3.7	0	0	0	0	0	0	0	55.6
Fr210987558°	48.7	0	0	0	3.9	0	0	0	0	47.4
Fr290000215°	27.8	0	0	0	0	0	0	0	0	72.2
Fr310019351°	45.9	0	0	0	0	0	0	0	0	54.1
Fr330780479°	70.6	0	0	0	0	0	0	0	0	29.4
Fr330783648°	39.3	3.6	0	0	0	0	0	0	0	57.1
Fr340015502°	33.3	0	0	0	0	0	0	0	0	66.7
Fr340796663°	41.7	0	0	0	0	0	0	0	0	58.3
Fr350000741°	75	0	0	0	0	0	0	0	0	25
Fr370004467°	68.8	0	0	0	0	0	0	0	0	31.2
Fr380000067°	64.7	0	0	0	0	0	0	0	0	35.3
Fr380786442°	37.5	0	0	0	0	0	0	0	0	62.5
Fr440017598°	58.3	0	0	0	4.2	0	0	0	0	37.5
Fr440024982°	18.7	0	0	0	6.3	0	0	0	0	75
Fr450010079°	20	60	0	0	0	0	0	0	0	20
Fr540000486°	42.2	0	0	0	1.6	0	0	0	0	56.2
Fr540001138°	48.6	0	0	0	0	0	0	0	0	51.4
Fr560002511°	35.3	0	0	0	0	0	0	0	0	64.7
Fr570001057°	45	0	0	0	0	0	0	0	0	55
Fr590000618°	60	0	0	0	0	0	0	0	0	40
Fr590780383°	41.4	0	0	0	0	0	0	0	0	58.6
Fr590784864°	73.7	5.3	0	0	15.8	0	0	0	0	5.2
Fr620100750°	18.2	0	0	0	0	0	0	0	0	81.8
Fr630000479°	51.7	10.3	0	0	3.5	0	0	0	0	34.5
Fr660780784°	50	0	0	0	0	0	0	0	0	50
Fr670000025°	39.3	0	0	0	1.1	0	0	0	0	59.6
Fr690000880°	42.9	0	0	0	0	0	0	0	0	57.1
Fr690784186°	29.4	0	0	0	0	0	0	0	0	70.6
Fr730000031°	37.5	0	0	0	0	0	0	0	0	62.5
Fr750100273°	46.4	0	0	0	0	0	0	0	0	53.6
Fr750150104°	48.4	0	0	0	0	0	0	0	0	51.6
Fr750712184°	31.9	4.3	0	0	0	0	0	0	0	63.8
Fr750803447°	32.4	0	0	0	0	0	0	0	0	67.6
Fr760000158°	47.7	0	0	0	1.5	0	0	0	0	50.8



Fr760021329°	22.7	0	0	0	0	0	0	0	0	77.3
Fr760780510°	53.8	0	0	0	0	0	0	0	0	46.2
Fr800006124°	34.5	3.4	0	0	3.5	0	0	0	0	58.6
Fr830100574°	33.3	0	0	0	0	0	0	0	0	66.7
Fr840001861°	54.5	0	0	0	0	0	0	0	0	45.5
Fr860000223°	52.5	0	0	0	0	0	0	0	0	47.5
Fr870000064°	33.3	0	0	0	0	0	0	0	0	66.7
Fr920000650°	38.1	0	0	0	4.8	0	0	0	0	57.1
Fr920000684°	33.3	3	0	0	6.1	0	0	0	0	57.6
Fr920300043°	25	0	0	0	0	0	0	0	0	75
Fr930100037°	25	0	0	0	0	0	0	0	0	75
Gr02d0°	22.9	15.7	28.6	4.3	1.4	0	1.4	0	0	25.7
Gy18dl°	20.8	0	58.3	16.7	0	0	4.2	0	0	0
Gy23dl°	40.8	2	34	6.8	8.7	1.9	3.9	1.9	0	0
Hu01dl°	72.1	4.6	14	2.3	0	0	0	0	0	7
Hu02dl°	16	19.8	2.5	0	0	0	0	1.2	0	60.5
Hu03dl°	32.8	25.6	11.6	2.7	1.7	0.3	0	0	0	25.3
Hu04dl°	22.2	50	5.6	0	0	5.5	0	0	0	16.7
Hu05dl°	10	23.3	0	0	0	0	0	0	0	66.7
Hu06dl°	38.2	0	17.7	0	0	0	0	0	0	44.1
Hu07dl°	66.7	0	33.3	0	0	0	0	0	0	0
Hu08dl°	23.2	12.9	7.1	0	0	0	0	0	0	56.8
Hu09dl°	32.5	15	25	0	0	0	2.5	0	0	25
Hu12dl°	83.1	4.4	8.1	0	0	0	0	0	0	4.4
Ie01dl°	73.3	0	26.7	0	0	0	0	0	0	0
It03d0°	46.3	8.9	23.9	0	3	0	1.5	0	0	16.4
It26dl°	73.7	5.3	10.5	0	0	0	0	0	0	10.5
It32dl°	64.2	4.5	26.8	0	1.5	0	1.5	0	0	1.5
It38dl°	0	0	16.7	0	0	0	0	0	0	83.3
It44dl°	73.8	4.7	14.3	0	0	0	4.8	2.4	0	0
It48dl°	0	0	0	0	0	0	0	100	0	0
Pl06dl°	63.3	0	33.3	0	3.4	0	0	0	0	0
Pl08dl°	73.9	0	18.5	0	0.6	0	5.4	1.6	0	0
Sk01dl°	78.6	0	21.4	0	0	0	0	0	0	0
Sp01dl°	50	9.5	12.2	6.8	2.7	1.3	1.3	0	0	16.2
Sp07d0°	48.7	10.2	17.9	2.6	2.6	0	2.6	2.6	0	12.8
Sp17dl°	90.5	7.1	0	0	2.4	0	0	0	0	0
Sp28dl°	75.6	12.2	7.3	0	0	0	0	0	0	4.9
Sp31dl°	33.3	11.1	44.4	5.6	0	0	0	0	0	5.6
Uk05dl°	30.4	4.3	4.4	0	1.1	0	0	0	0	59.8

(°): Units with less than 500 patients included, results must be interpreted with caution

## Percentage of VATS (LOBECTOMIES)

Unit	No (%)	Yes(%)	Unknown(%)
Bm02dl	66.6	33.4	0
Bm05dl	45.4	49.5	5.1
Bm06dl°	32.5	65.6	1.9
Bm19dl°	14.9	85.1	0
Ch10dl	42.5	39.7	17.8
Fr130780521	44.1	54.2	1.7
Fr140000209	75.7	24.3	0
Fr170000087°	77.5	22.1	0.4
Fr210987558	64.4	20.8	14.8
Fr290000215°	50.8	49.2	0
Fr310019351	64.1	35.7	0.2
Fr330780479°	67.4	32.6	0
Fr330783648	44.6	53.5	1.9
Fr340015502°	39.7	60.1	0.2
Fr340796663°	27.6	71.9	0.5
Fr350000741°	20.8	76.7	2.5
Fr370004467	68.8	30.6	0.6
Fr380000067°	68.3	31.5	0.2
Fr380786442°	53.3	46.7	0
Fr440017598°	42	56.3	1.7
Fr440024982°	27.8	71.9	0.3
Fr450010079°	49	45.3	5.7
Fr540000486	84.5	15.2	0.3
Fr540001138	62.4	37	0.6
Fr560002511	48.4	51.6	0
Fr570001057	50.2	49.8	0
Fr590000618°	77.5	21	1.5
Fr590780383°	85.3	14.7	0
Fr590784864°	71.2	25.1	3.7
Fr620100750°	97.1	2.9	0
Fr630000479	48.5	51.1	0.4
Fr660780784°	74.6	25.4	0
Fr670000025	49.4	49	1.6
Fr690000880°	37.9	61.6	0.5
Fr690784186°	47.5	51.4	1.1
Fr730000031°	57.5	42.1	0.4
Fr750100273	57	39.1	3.9
Fr750150104	21.9	77.5	0.6
Fr750712184	79.7	17.6	2.7
Fr750803447	74.1	24.3	1.6
Fr760000158	28.8	69.4	1.8
Fr760021329°	56.7	43.3	0
Fr760780510°	47.7	52.3	0

Fr800006124°	24.4	75.2	0.4
Fr830100574°	38.2	60.5	1.3
Fr840001861	67	32.4	0.6
Fr860000223	76.7	23.1	0.2
Fr870000064°	53.7	45.2	1.1
Fr920000650	37.4	58.2	4.4
Fr920000684	34.6	62.6	2.8
Fr920300043°	34.4	65	0.6
Fr930100037°	75.3	23	1.7
Gr02d0°	97.9	1.9	0.2
Gy18dl°	89.7	10.3	0
Gy23dl	53.1	46.9	0
Hu01dl	34.5	65.3	0.2
Hu02dl	51.8	48	0.2
Hu03dl	40.5	59.3	0.2
Hu04dl°	52.9	44.4	2.7
Hu05dl°	48.2	51.6	0.2
Hu06dl	66.5	33.5	0
Hu07dl°	24.4	75.6	0
Hu08dl	82	17.8	0.2
Hu09dl	70	29.5	0.5
Hu12dl	58	41.6	0.4
Ie01dl°	41.9	58.1	0
It03d0	55.9	43.1	1
It26dl°	51.2	48.8	0
It32dl	71.9	28.1	0
It38dl	34.9	65.1	0
It44dl	71.7	28.3	0
It48dl°	9.3	90.7	0
PI06dl	55.5	44.4	0.1
PI08dl	58.2	41.8	0
Sk01dl	56.7	43.3	0
Sp01dl	65.6	34.4	0
Sp07d0	80.6	19.4	0
Sp17dl	70.7	29.3	0
Sp28dl	33	67	0
Sp31dl°	15.4	84.6	0
Uk05dl	26.6	72.2	1.2

(°): Units with less than 500 patients included, results must be interpreted with caution

## Observed versus predicted in-hospital mortality rates of major lung resections in different European Units

(risk adjustment according to Brunelli A et al. please see Appendix for details of applied risk models EUROLUNG2)

Unit	Observed	Predicted
Bm02dl	1.79	2.77
Bm05dl	1.62	2.18
Bm06dl°	0.85	1.84
Bm19dl°	2.82	1.37
Ch10dl	0.95	2.03
Fr130780521	2.14	1.7
Fr140000209	1.29	2.08
Fr170000087°	2.72	2.69
Fr210987558	1.51	2.46
Fr290000215°	0.97	1.99
Fr310019351	0.28	1.86
Fr330780479°	2.12	2.17
Fr330783648	2.44	1.58
Fr340015502°	1.33	1.45
Fr340796663°	0.57	1.48
Fr350000741°	0.53	1.36
Fr370004467°	2.27	1.95
Fr380000067°	0.43	2.34
Fr380786442°	1.85	2.03
Fr440017598°	0.79	1.78
Fr440024982°	0.95	1.55
Fr450010079°	2.04	2.09
Fr540000486	0.99	2.7
Fr540001138°	1.44	2.39
Fr560002511°	0	1.82
Fr570001057°	0.43	1.56
Fr590000618°	0.42	2.2
Fr590780383°	0.28	2.56
Fr590784864°	0	1.84
Fr620100750°	0.77	2.84
Fr630000479°	1.09	1.79
Fr660780784°	0	2.26
Fr670000025	0.89	1.94
Fr690000880°	0.3	1.67
Fr690784186°	0.7	1.82
Fr730000031°	2.91	1.62
Fr750100273°	0	1.89
Fr750150104°	0.99	1.56

<b>Unit</b>	<b>Observed</b>	<b>Predicted</b>
Fr750712184°	0.47	2.5
Fr750803447°	0	2.13
Fr760000158	0.19	1.56
Fr760021329°	2.01	2.22
Fr760780510°	0	1.82
Fr800006124°	1.21	1.84
Fr830100574°	4.41	2.05
Fr840001861°	1.16	2.1
Fr860000223	2.14	2.35
Fr870000064°	1.12	1.91
Fr920000650°	0.33	1.7
Fr920000684°	0.65	1.54
Fr920300043°	1.24	1.07
Fr930100037°	1.82	2.21
Gr02d0°	1.56	3.38
Gy18dl°	5.53	2.86
Gy23dl	1.85	2.08
Hu01dl°	1.37	1.3
Hu02dl	0.13	1.48
Hu03dl	0.88	1.68
Hu04dl°	1.5	1.49
Hu05dl°	0.47	1.65
Hu06dl°	0.5	1.66
Hu07dl°	2.48	1.21
Hu08dl°	2.27	3.12
Hu09dl°	0	2.29
Hu12dl	1.1	1.8
Ie01dl°	5.44	1.86
It03d0	0.55	2.09
It26dl°	0	2.73
It32dl	0.13	2.52
It38dl°	0.96	1.84
It44dl	0.69	1.83
It48dl°	0	1.16
PI06dl	0.61	1.75
PI08dl	1.19	1.72
Sk01dl°	0.61	1.71
Sp01dl	0.51	2.29
Sp07d0°	0.83	2.37
Sp17dl	1.82	2.58
Sp28dl°	1.56	1.85
Sp31dl°	1.37	1.51
Uk05dl	2.94	1.58



## STUDIO LEGALE MAGLIO & PARTNERS LUCERNA IURIS – INTERNATIONAL LEGAL NETWORK

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In collaborazione con

*Siegert & Kollegen – Friburg*  
*Alan Bensoussan Avocats – Paris*  
*Pinsent Masons Law Firm – London*  
*PLMJ Sociedade de Advogados – Lisboa*  
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*Stikeman Elliott LLP – Montréal*  
*Prescott Law Firm – New York*

### **Avvocato Marco Maglio**

*Presidente del Giurì di Autodisciplina  
per direct marketing, telemarketing, vendite a distanza e dirette*

K Data Clinical S.r.l.  
Via Orazio, 31  
00193 Roma

Milan, 23th May 2018

**RE: assessment of the legal compliance of the personal data processing management procedures pursuant to the current legislation on the protection of personal data and certification of the correct implementation of EU Regulation 2016/679 (General Data Protection regulation - GDPR).**

To K Data Klinical

with reference to the requirements established by the current legislation on personal data, as of today I have been able to carry out the necessary checks on the procedures and documentation used by you for the management of the charges imposed on the data controller to allow the adjustment of the processing of personal data to the EU Regulation 2016/679 (General regulation for the protection of personal data - the so-called GDPR).

This verification involved all the activities of data processing of your company.

The plan allowed to develop the following activities:

- 1) mapping of personal data processed
- 2) definition of the first version of the treatment register

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- 3) evaluation of the review of the roles of data processing, including the decision to proceed with the appointment of a data protection officer (Data Protection Officer) and definition of the document appointing the parties authorized to process data
- 4) review of the information to be provided to data subjects for data processing
- 5) review of data processing activities against suppliers and definition of treatment processes
- 6) preliminary assessment of the treatments and risk analysis in relation to the need to carry out the impact assessment in the processing of personal data
- 7) analysis of the evaluation processes of the adequacy of the technical and organizational security measures adopted for data processing
- 8) definition of the processes necessary to guarantee the adoption of data protection processes through design (privacy by design) and protection by default (privacy by default)
- 9) definition of processes for handling the notification obligation for data breaches (data breach notification)
- 10) definition of the criteria for the conservation of personal data

By carrying out these checks, I have been able to review the treatment procedures already adopted by you and verify the minimum IT security measures with the subjects you use for the provision of IT services. This verification required the implementation of an adjustment plan that is described in the document attached to this declaration (Annex 1).

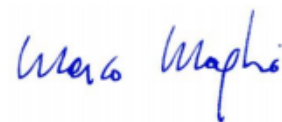
As a result of this verification I can acknowledge that the Holder, in order to prepare the documentation useful to certify the adoption of security measures suitable to prevent the illegal processing of personal data to be placed, has correctly carried out the adjustment activity to the EU Regulation 2016/679 and to proceed with updating the formalities required by the aforementioned legislation.

At the end of this review I can issue an opinion of full compliance of the processing processes with respect to the rules of the current legislation on the processing of personal data in the framework of EU Regulation 2016/679 for all companies in your Group.

Feel free to contact me to ensure the continuation of the adaptation and updating process and of your organizational procedures with respect to the frequent innovations that characterize this delicate subject, taking into account in particular the new rules introduced by the General Regulations for the protection of personal data (2016 / 679) will require a further implementation process after the date of full application of the same Regulation with effect from 25 May 2018.

Best regards.

Avv. Marco Maglio



Attachment– GDPR How to approach the change

