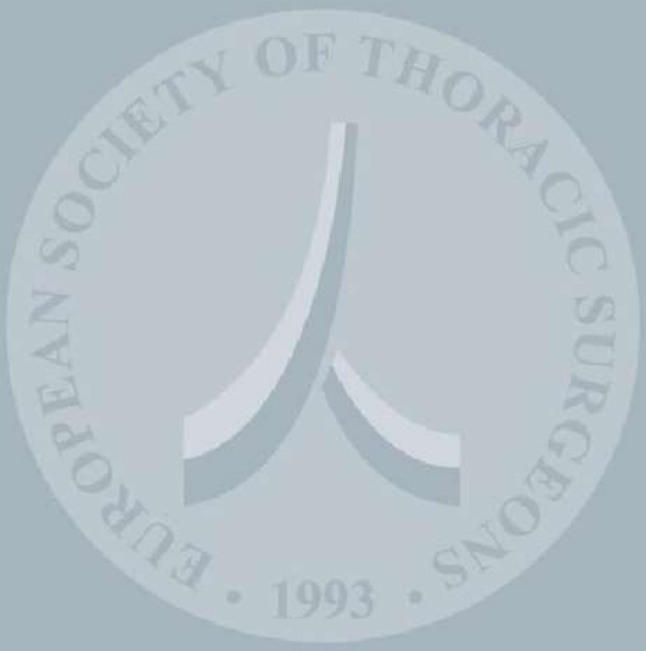

DATABASE ANNUAL REPORT

2021

PRODUCED BY THE ESTS DATABASE COMMITTEE

*Powered by **KData Clinical***

EUROPEAN SOCIETY OF THORACIC SURGEONS DATABASE COMMITTEE

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Appendices

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. ZalanSzanto. Prof. Falcoz will cover the prestigious position of Editor. To both go 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 Institutionsto maintain a surgical activity, in orderto 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 9th 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 Dtabase Director

pefalcoz@gmail.com

Dear ESTS members,

This year, the ESTS database committee, along with the K-Data team, worked very hard to produce the 12th 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 12th 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 data completeness, 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…

Prof. Pierre-Emmanuel Falcoz

Director of ESTS Audit and Database

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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 lead 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. Infact 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 aboutthe 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 their widespread activity 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 (see Appendix N.4) 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 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 31th 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 Kòrhàz 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 Györ Hungars
HUNGARY	KECSKEMÉT	Bàcs Kiskun County Hospital
HUNGARY	GYÓR	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

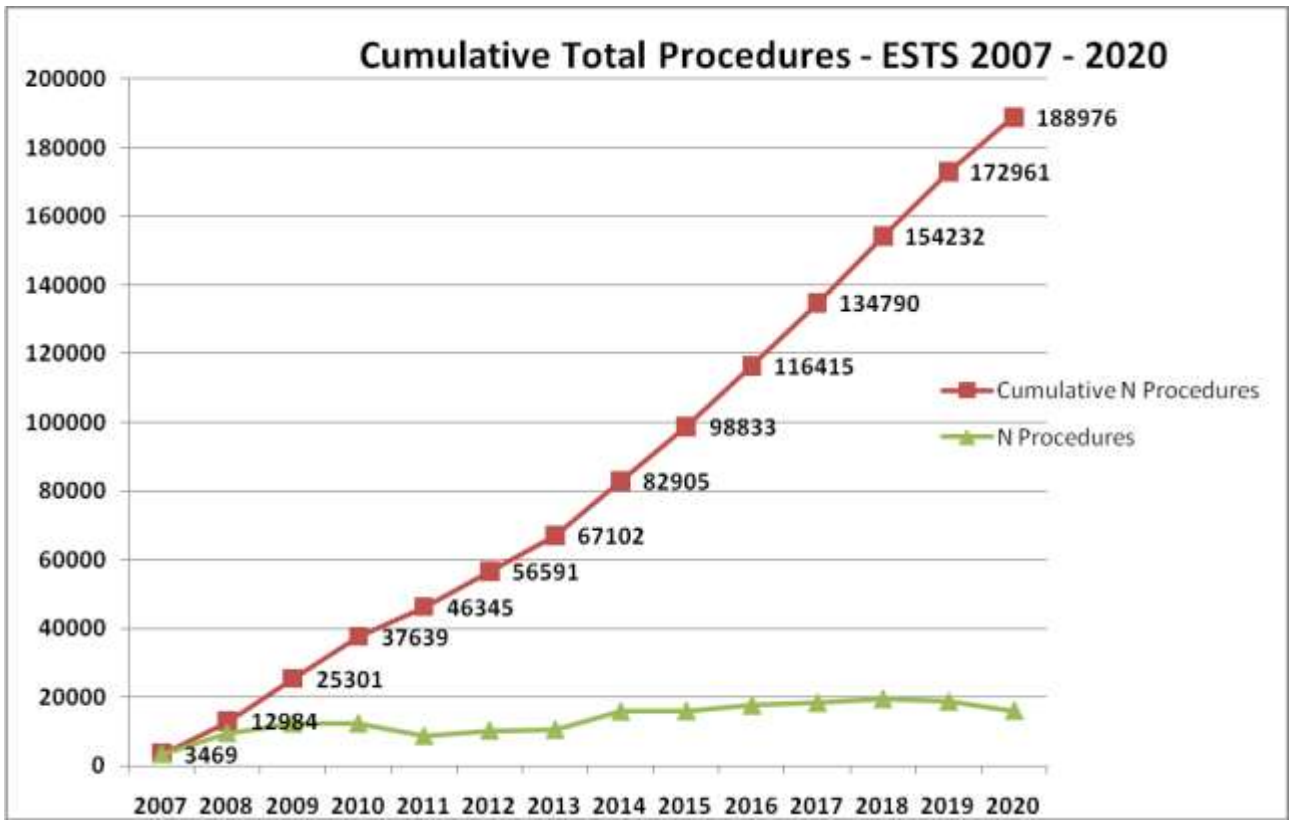
SLOVENIA	LJUBLJANA	University Medical Centre Ljubljana
SPAIN	BARCELONA	Hospital Clinic
SPAIN	BARCELONA	Sagrat Cor University Hospital
SPAIN	HEBRON	HG Vall d'Hebron
SPAIN	MADRID	H. Clinico San Carlos
SPAIN	MADRID	Hospital general Universitario Gregorio Maranon
SPAIN	MADRID	Ramon y Cajal University Hospital
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 fur 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)

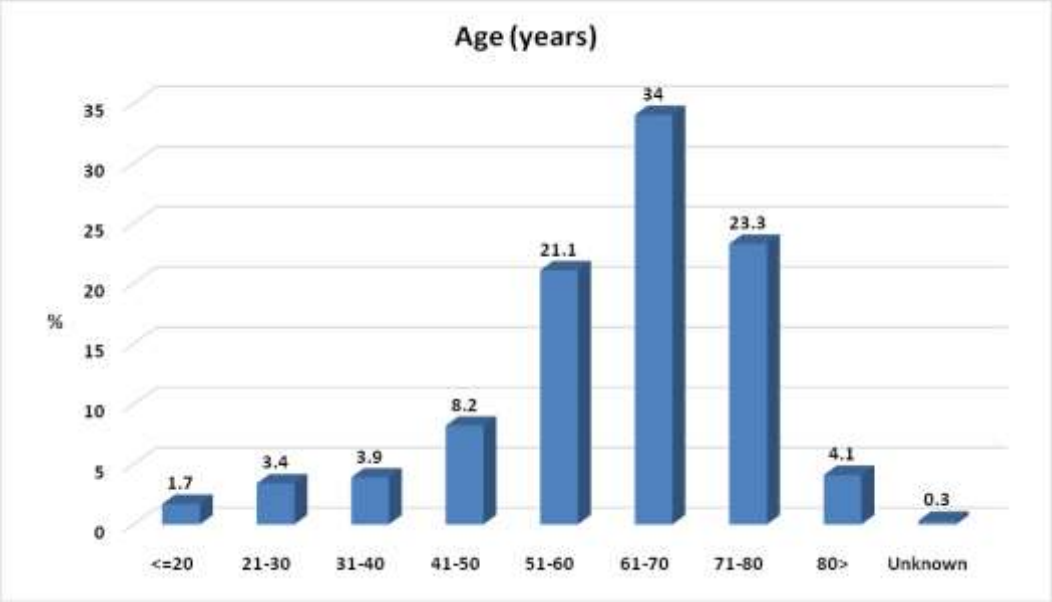
Growth of the ESTS Database 2007-20



Overall age and gender distributions

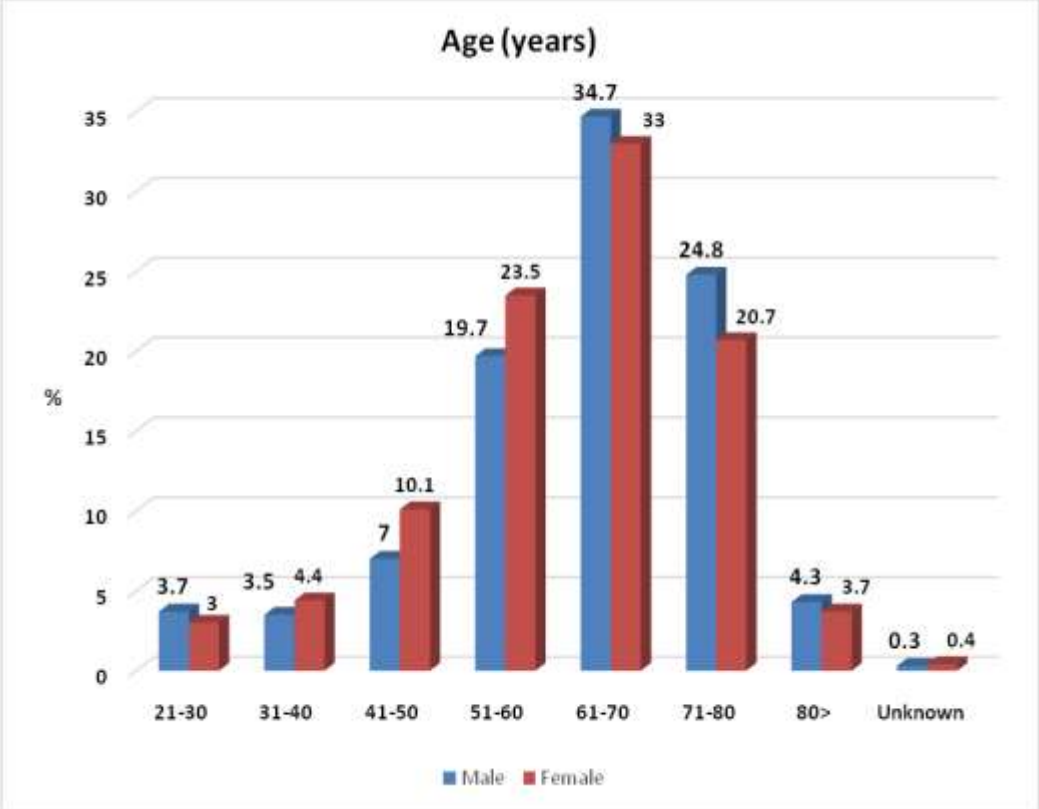
Age (years)

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
Total	**188976**	**100**



Gender according to age distribution (years)

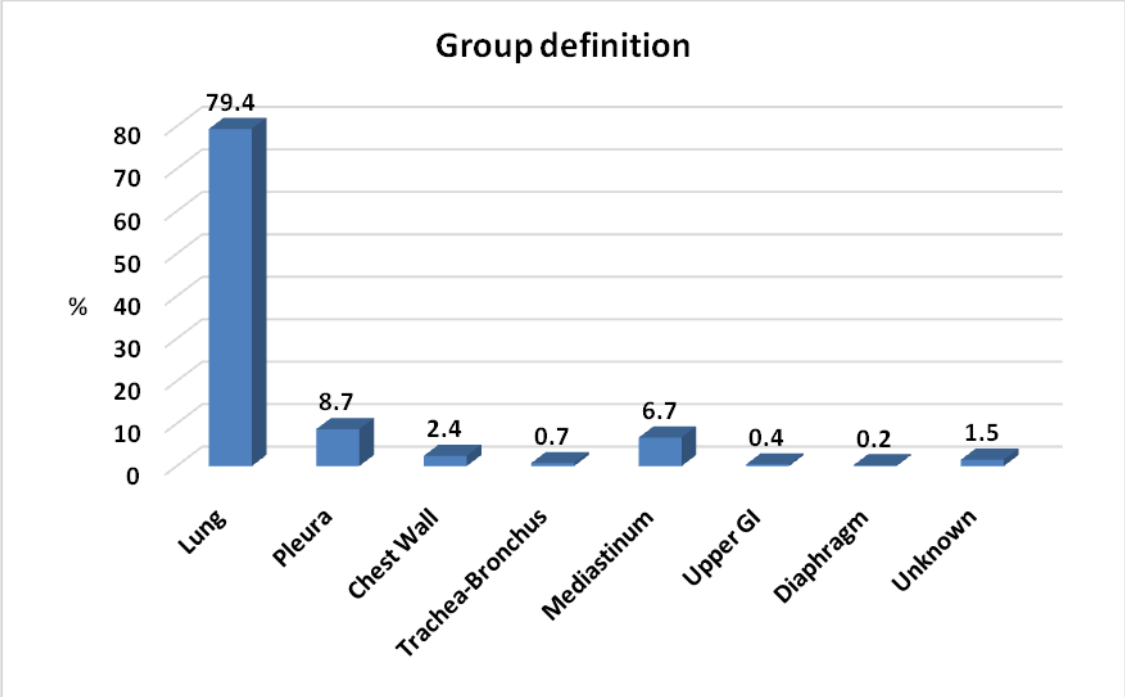
Age (years)	Male (%)	Female (%)
<=20	2	1.2
21-30	3.7	3
31-40	3.5	4.4
41-50	7	10.1
51-60	19.7	23.5
61-70	34.7	33
71-80	24.8	20.7
>80	4.3	3.7
Unknown	0.3	0.4



Total surgical activity within the entire dataset

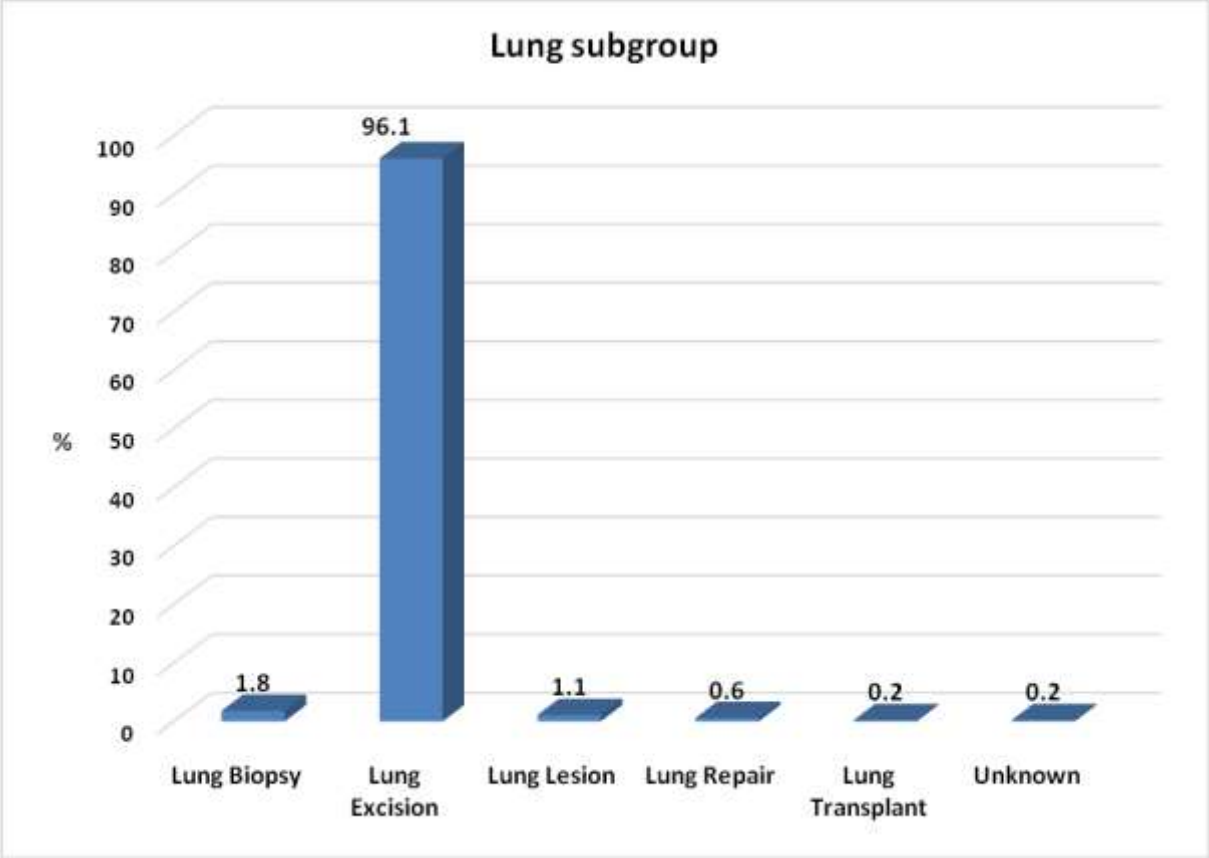
Group Definitions

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
Total	**188976**	**100**



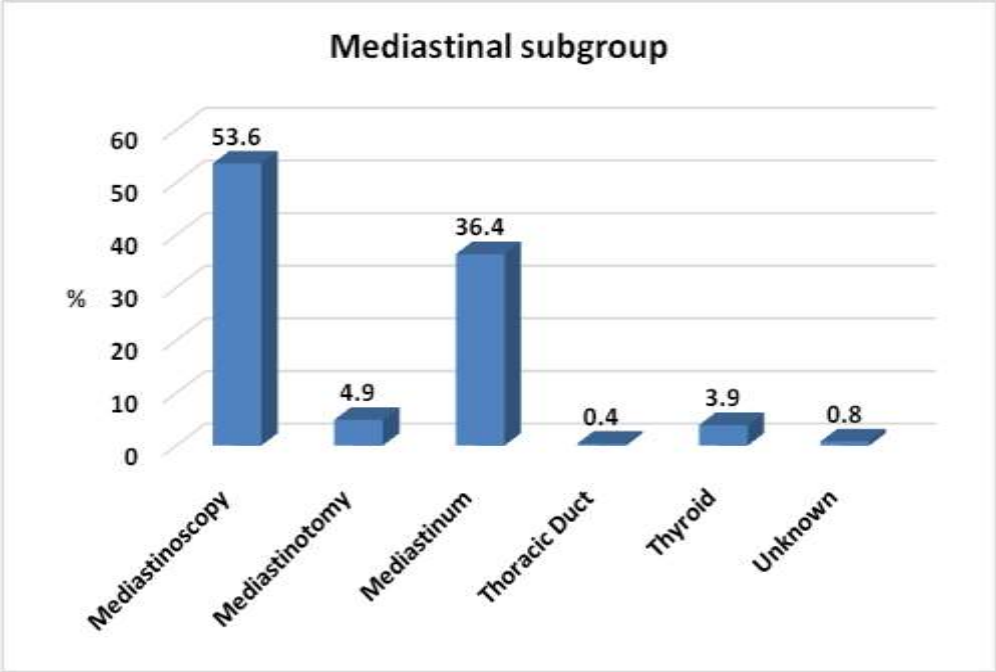
Lung Subgroup

	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
Total	**149995**	**100**



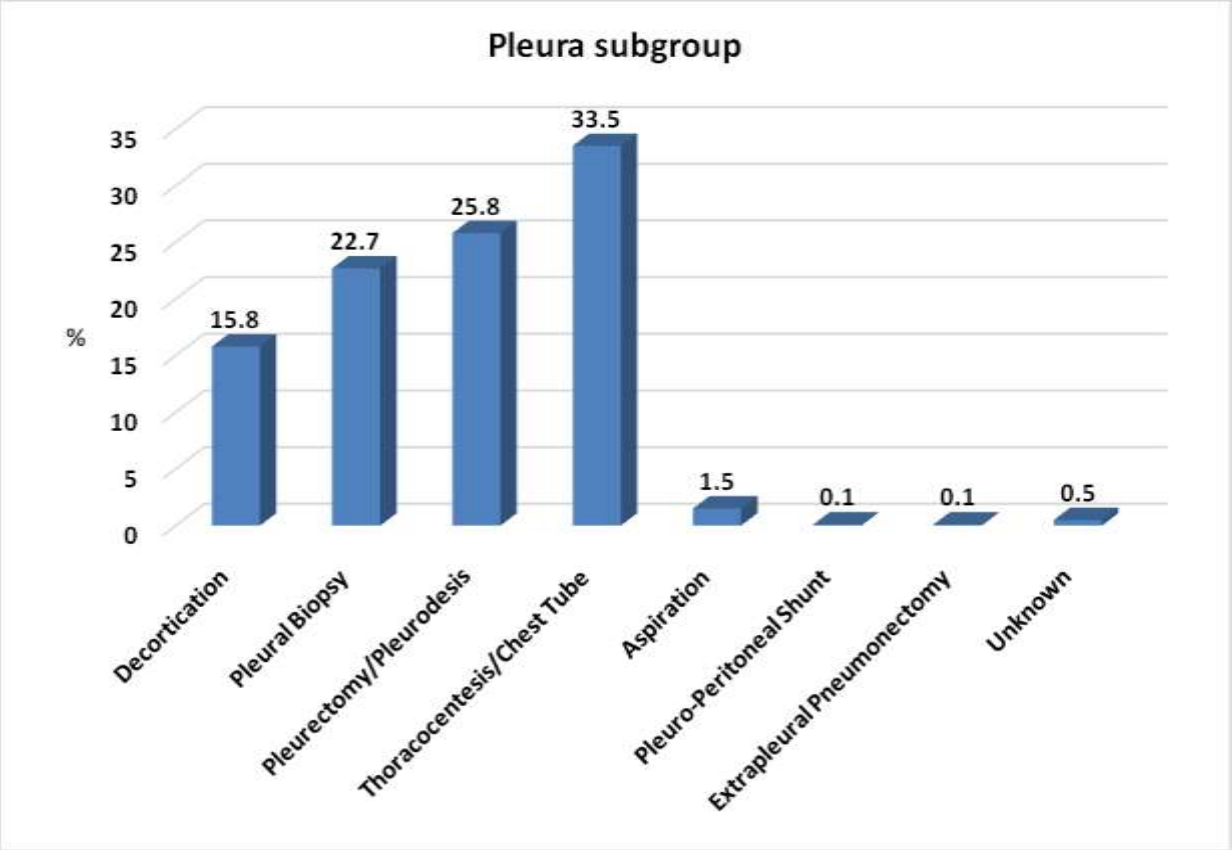
Mediastinum Subgroup

	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
Total	**12657**	**100**



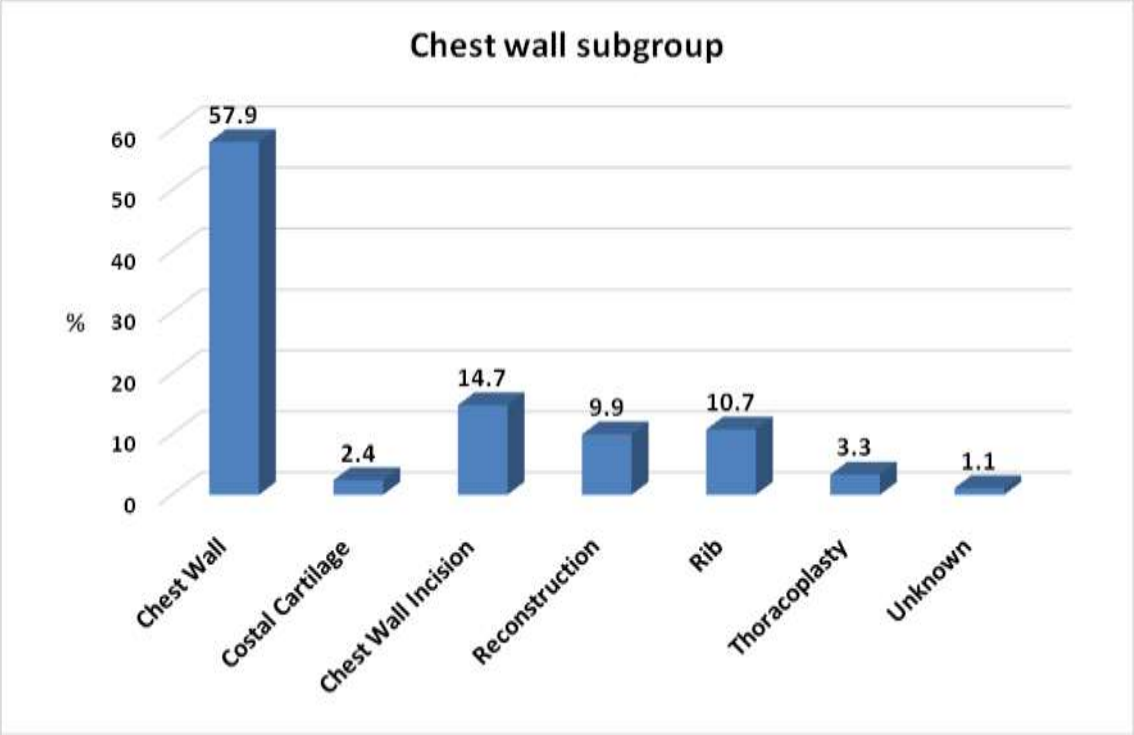
Pleura Subgroup

	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
Total	**16517**	**100**



Chest Wall Subgroup

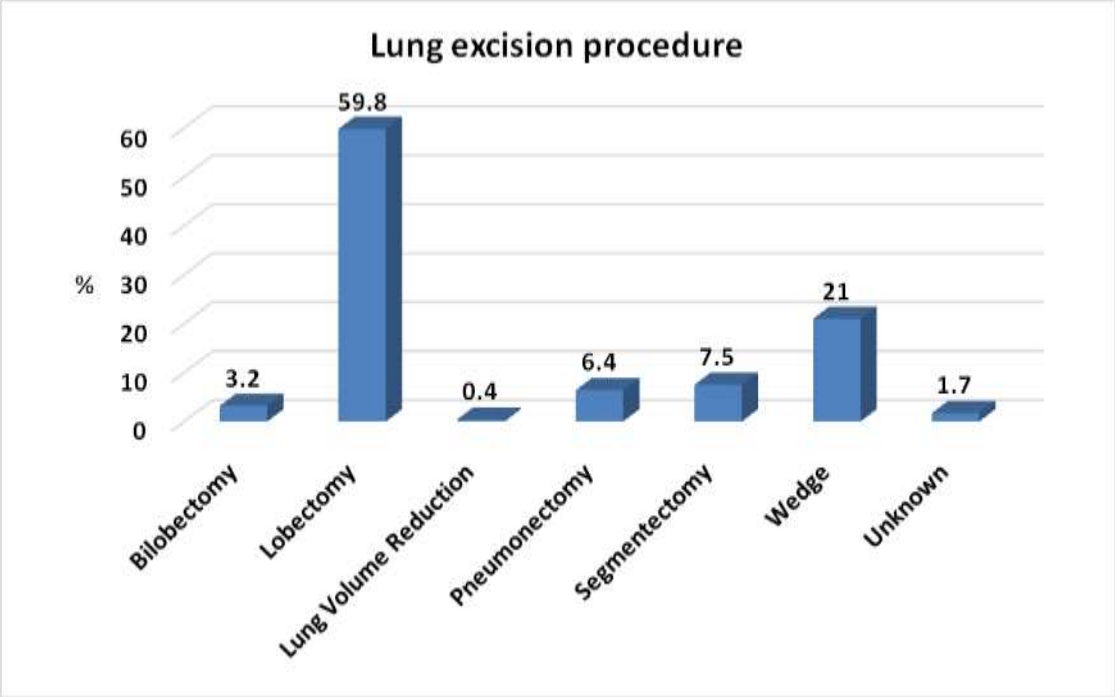
	Occurrences	Percent
Chest Wall	2627	57.9
Costal Cartilage	108	2.4
Chest Wall Incision	668	14.7
Reconstruction	450	9.9
Rib	483	10.7
Thoracoplasty	151	3.3
Unknown	50	1.1
Total	**4537**	**100**



Lung resections

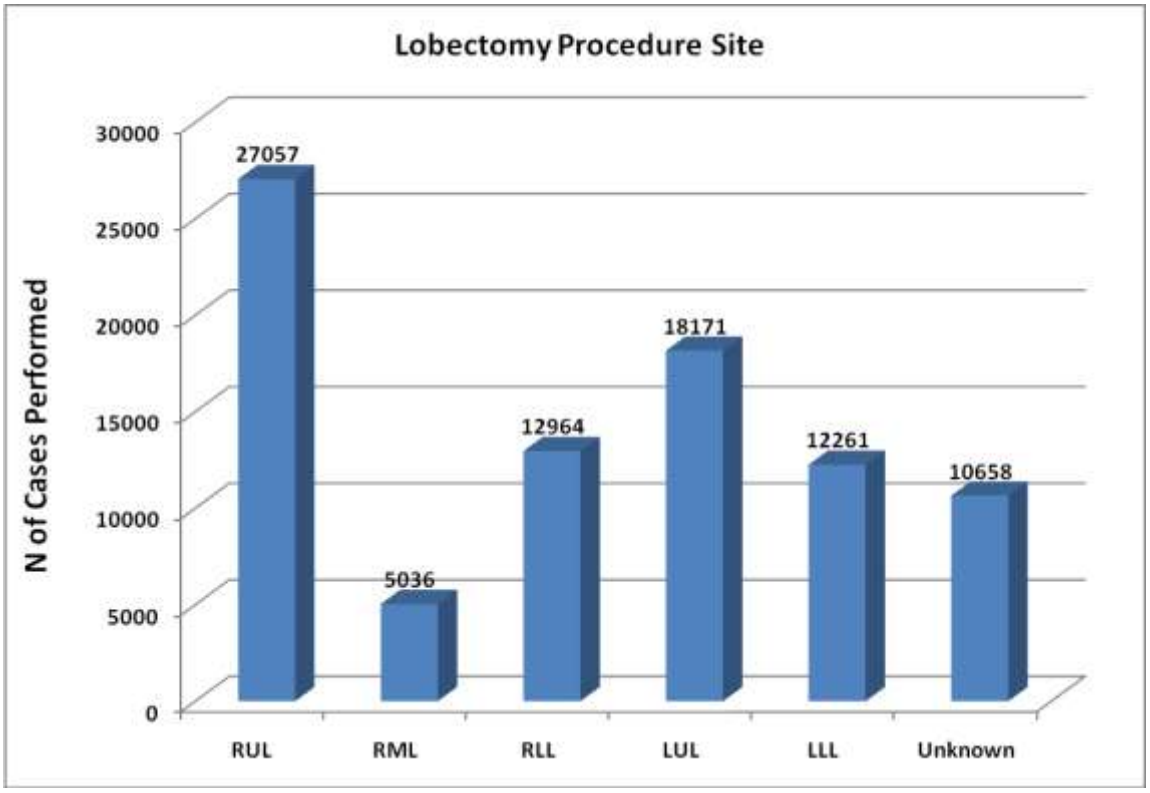
Types of lung resections performed, including all diagnoses

	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
Total	144112	100



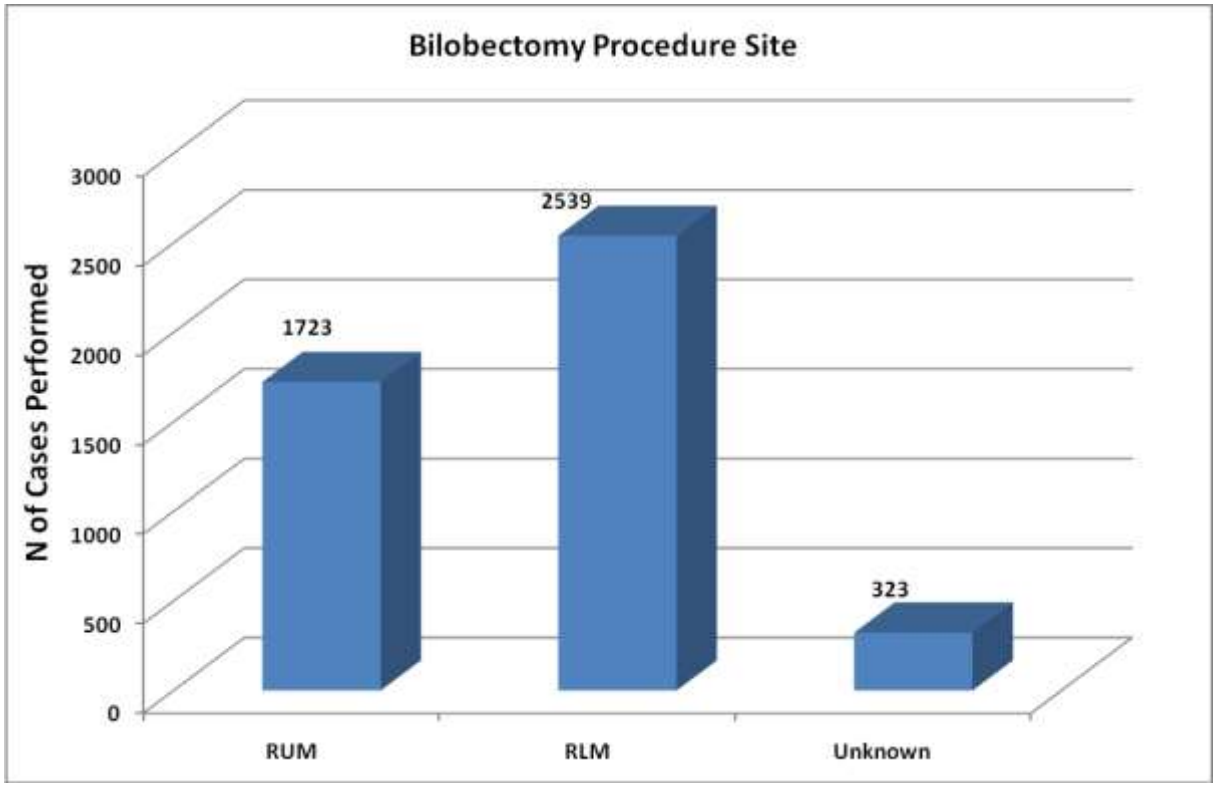
Distribution of lobectomy by site of resection

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
Total	**86147**	**100**



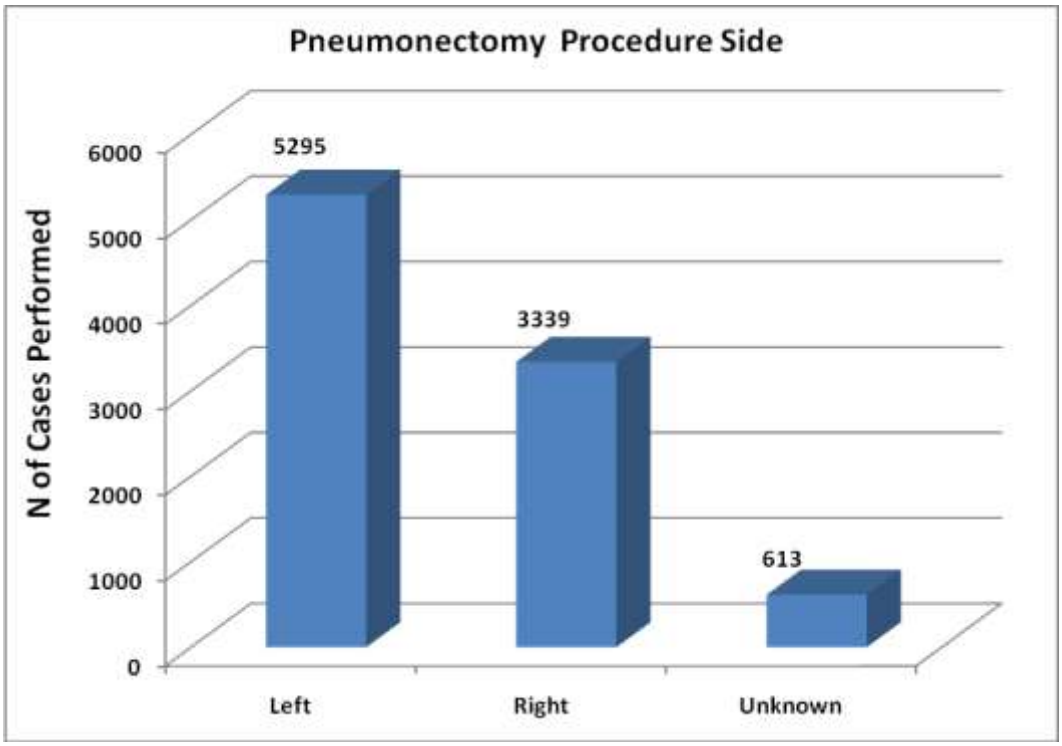
Distribution of bilobectomy by site of resection

Bilobectomy Procedure Site	Occurrences	Percent
RUM	1723	37.6
RLM	2539	55.4
Unknown	323	7
Total	**4585**	**100**



Distribution of pneumonectomy by side

Pneumonectomy Side	Occurrences	Percent
Left	5295	57.3
Right	3339	36.1
Unknown	613	6.6
Total	**9247**	**100**

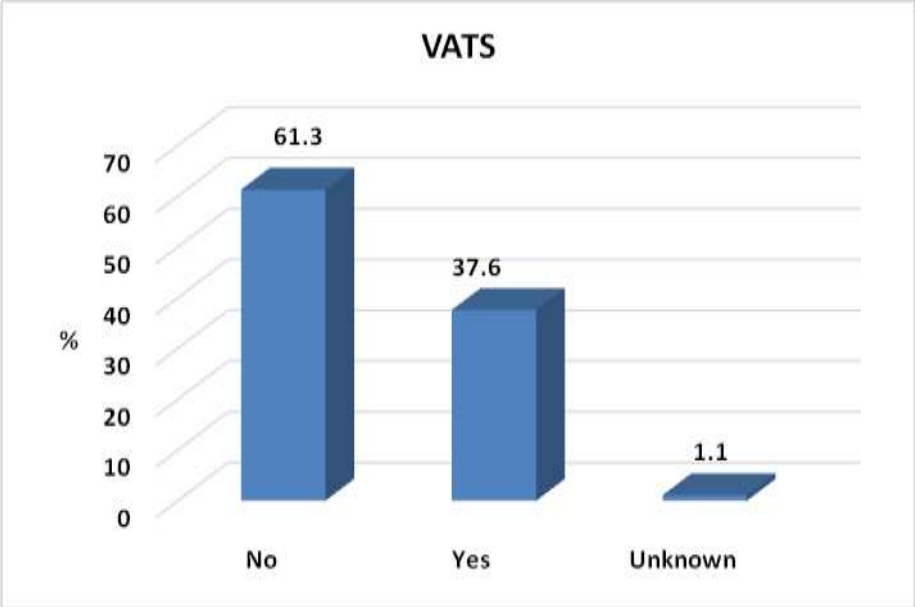


Pneumonectomy Qualifier	Occurrences	Percent
Alone	5293	57.2
Completion	439	4.7
Intrapericardial	800	8.6
Pleuropneumonectomy	235	2.5
Sleeve Resection	111	1.2
Diaphragm Resection	24	0.3
Atrial Resection	110	1.2
SVC Resection/Reconstruction	90	1
Vertebral Resection	162	1.8
Unknown	1984	21.5
Total	**9248**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

VATS as a proportion of all lung resections

VATS	Occurrences	Percent (%)
No	88289	61.3
Yes	54250	37.6
Unknown	1573	1.1
Total	**144112**	**100**

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



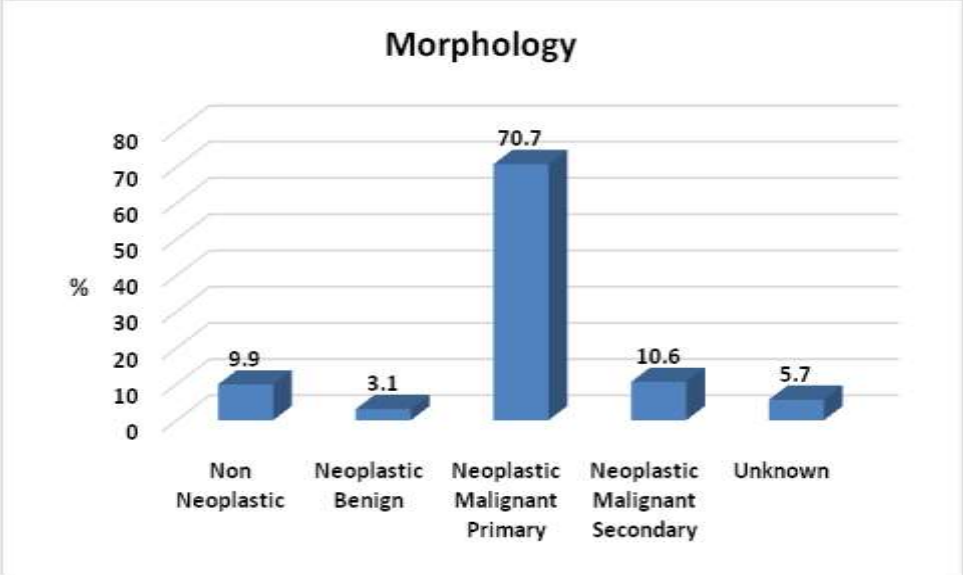
	No	Yes	Yes (%)
2007-2013	42650	9310	17.9
2014-2020	45639	44940	49.6
Total	**88289**	**54250**	**38.1**

VATS as a proportion of lobectomy

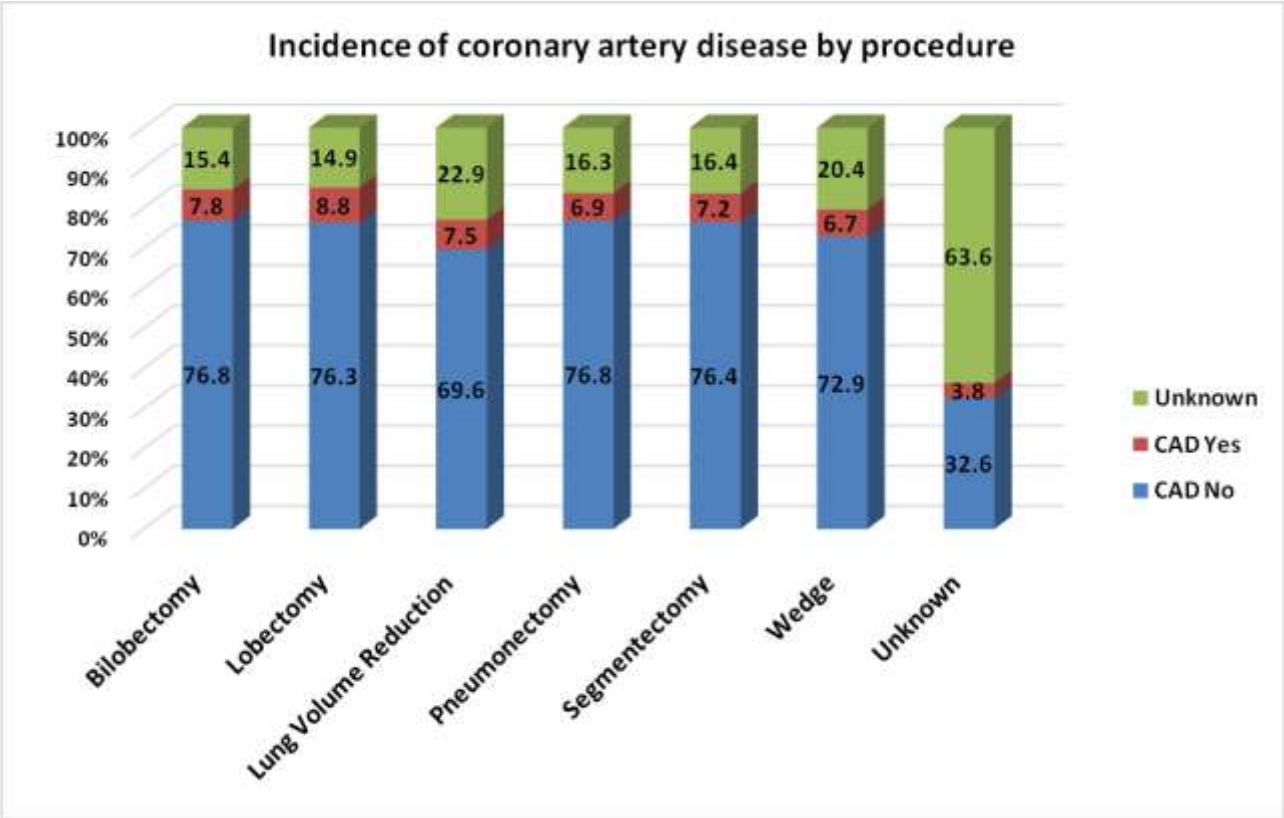
	No	Yes	Yes (%)
2007-2013	26961	2909	9.7
2014-2020	29300	26093	47.1
Total	**56261**	**29002**	**34**

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
Total	**144112**	**100**

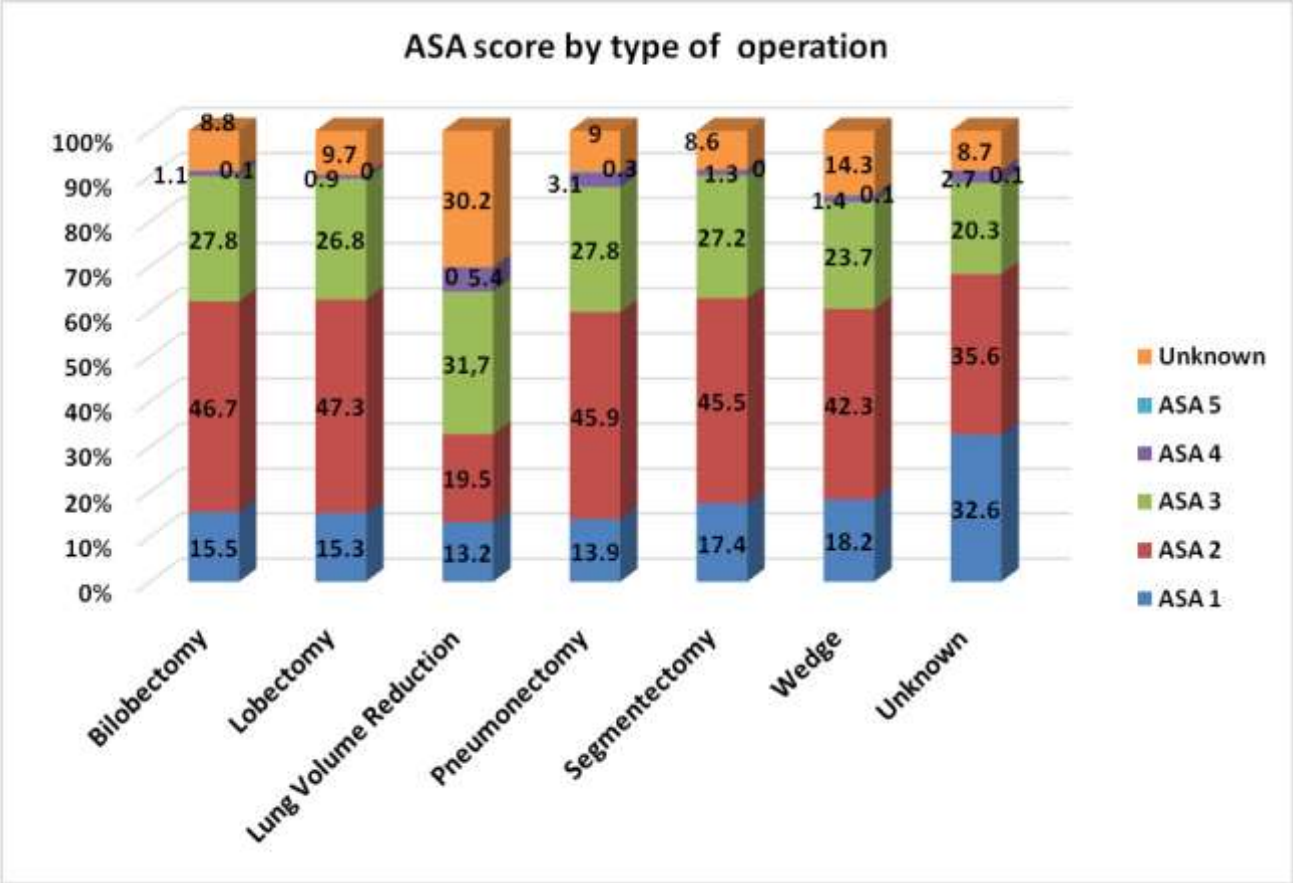


Incidence of coronary artery disease by procedure



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
Total	**107925**	**11492**	**24695**	**144112**

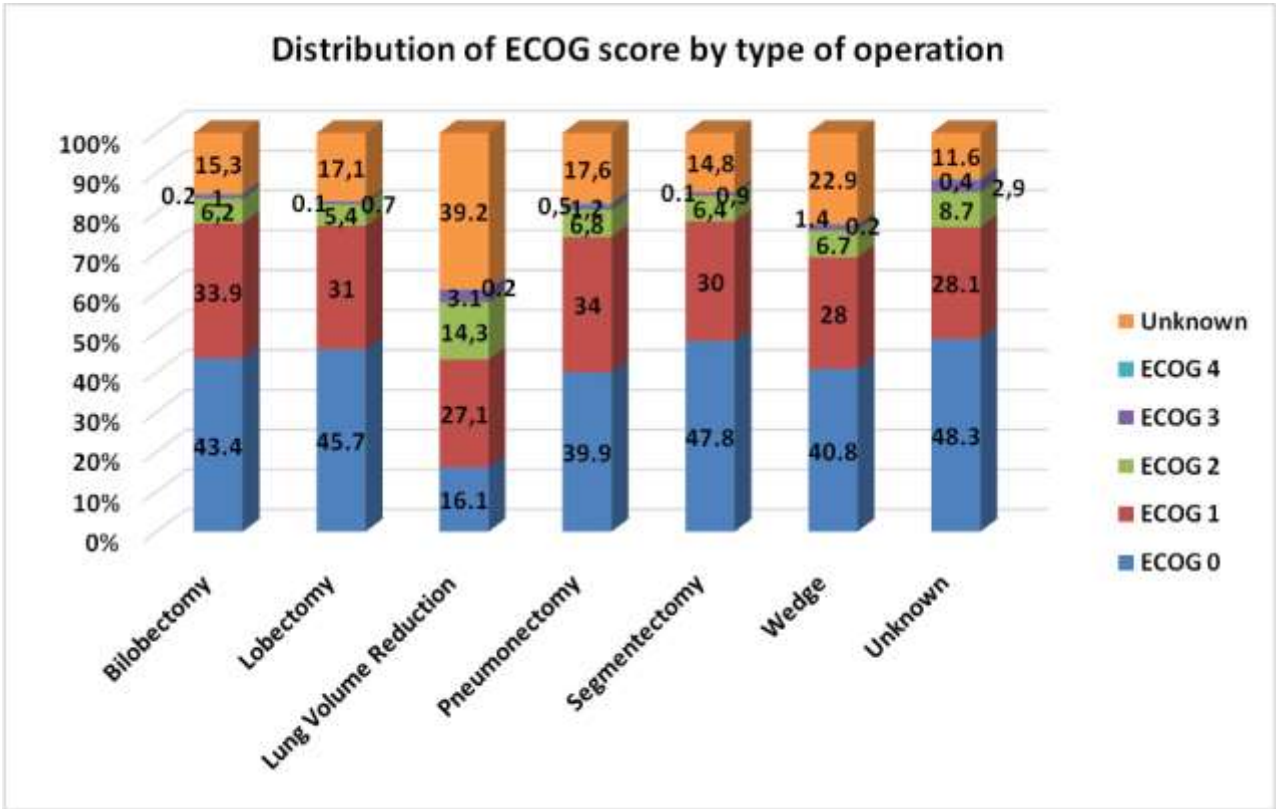
Distribution of ASA score by type of operation



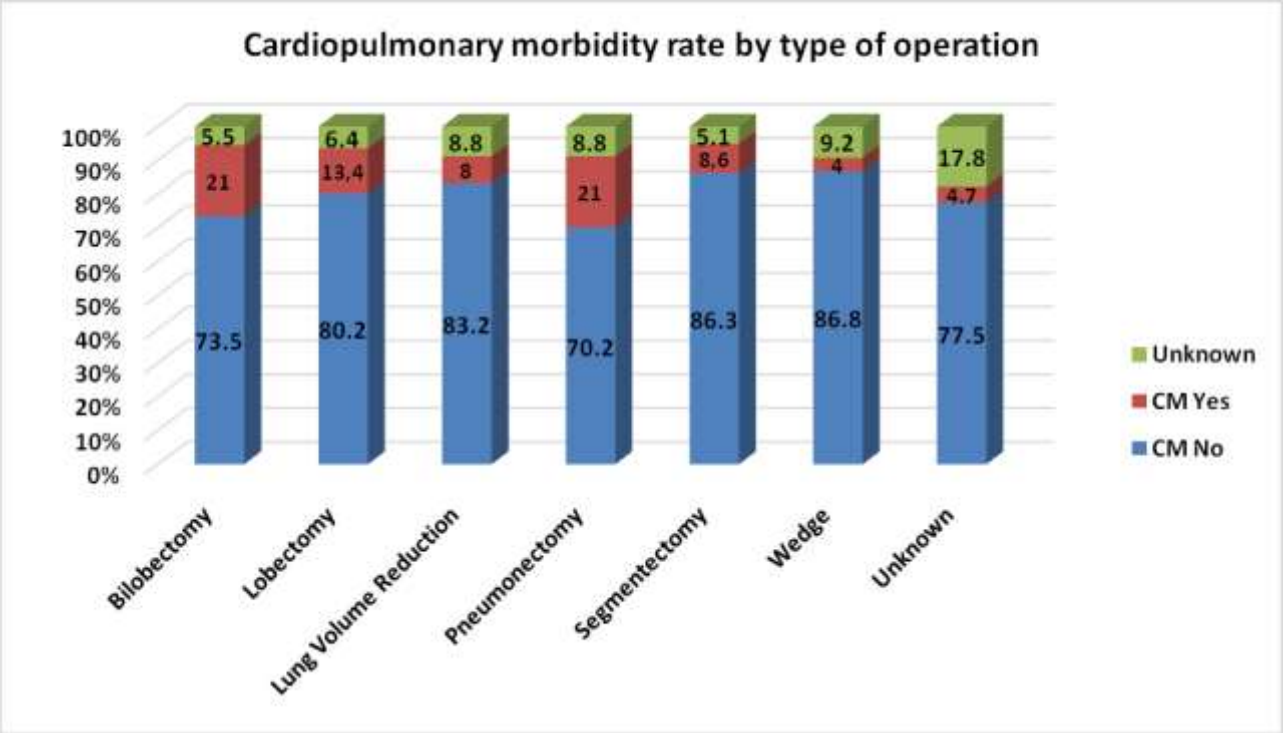
Lung Excision Procedure	ASA 1	ASA 2	ASA 3	ASA 4	ASA 5	Unknown	Total
Bilobectomy	711	2139	1276	51	3	405	4585
Lobectomy	13223	40752	23044	746	40	8342	86147
Lung Volume Reduction	69	102	166	28	0	158	523
Pneumonectomy	1288	4246	2574	285	23	832	9248
Segmentectomy	1885	4927	2939	138	1	930	10820
Wedge	5518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

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
Total	**63803**	**44013**	**8629**	**1324**	**244**	**26099**	**144112**



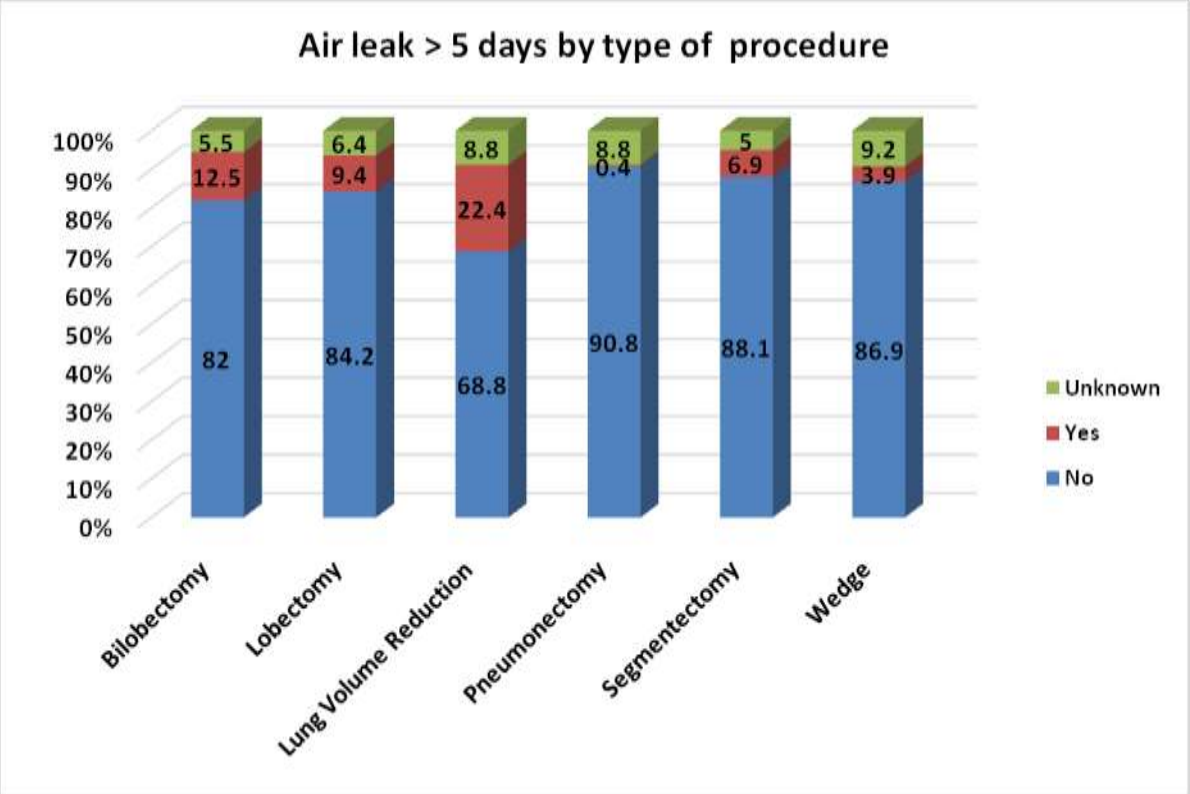
Cardiopulmonary morbidity rate in different types of lung resections



	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
Total	**116996**		**16712**		**10404**		**144112**

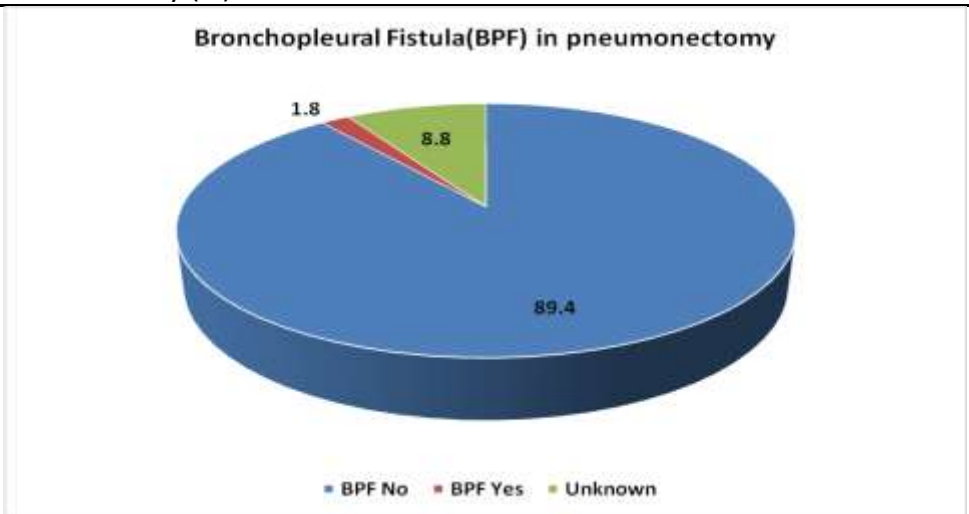
Incidence of prolonged air leak (> 5days) in different types of lung resections

	Air Leak > 5 days		
Lung Excision - PROCEDURE	**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

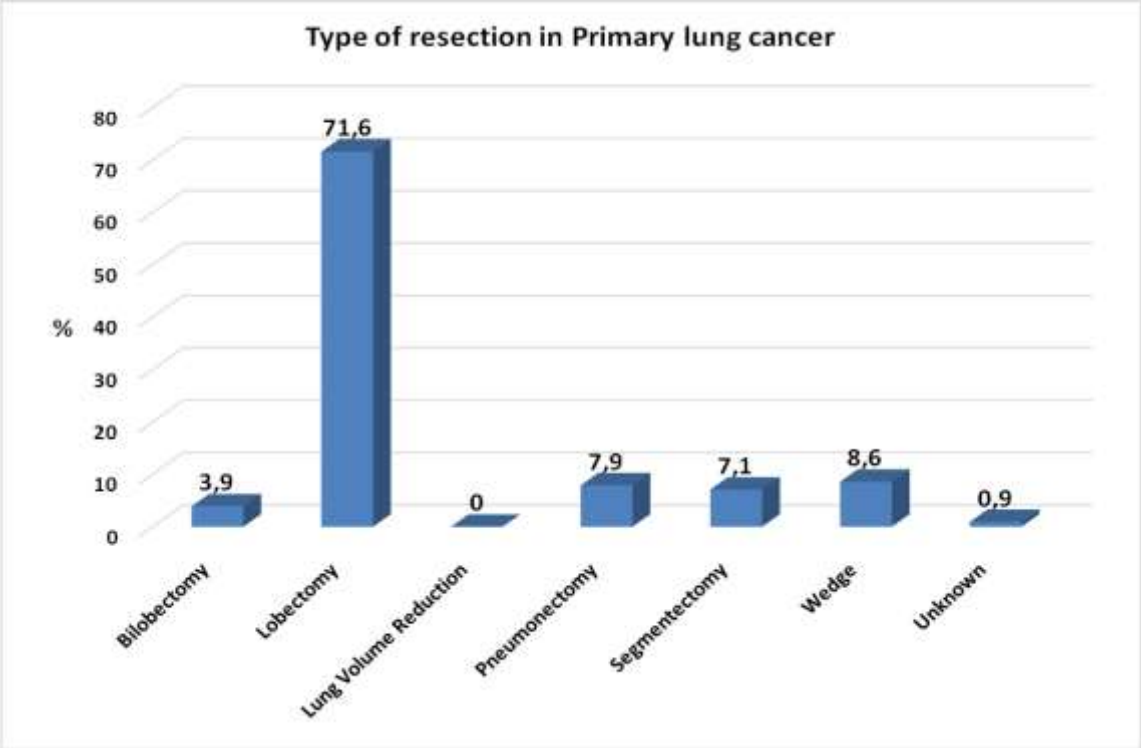
Bronchopleural fistula	**BPF No**	**BPF Yes**	**Unknown**	**Total**
Pneumonectomy (N)	8273	164	811	9248
Pneumonectomy (%)	89.4	1.8	8.8	100



Primary lung cancer

Lung resection for primary lung cancer: Types of procedures

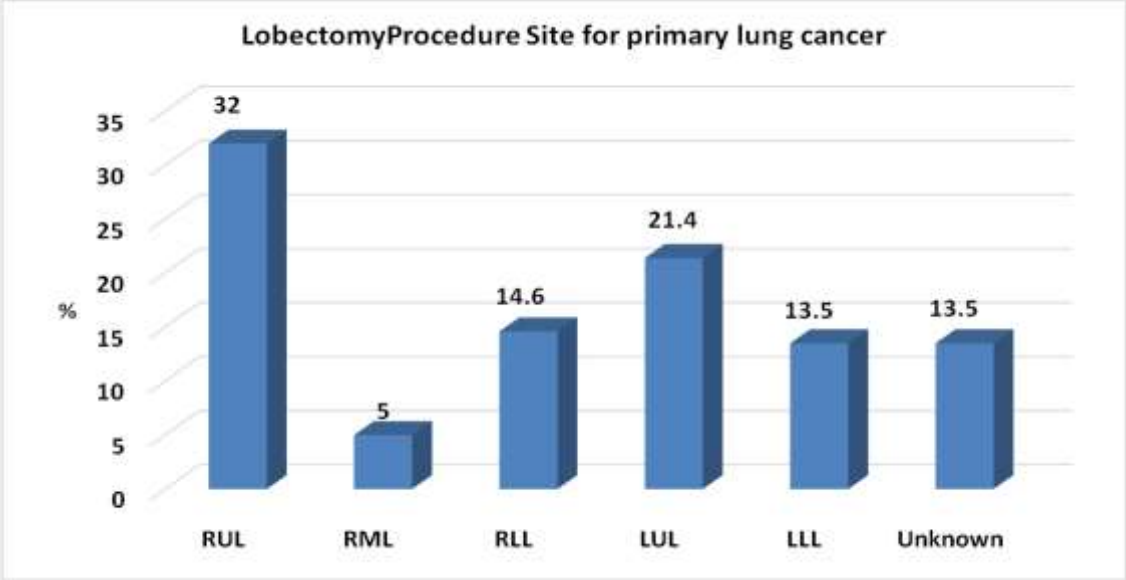
	Occurrences	Percent
Bilobectomy	4123	3.9
Lobectomy	75315	71.6
Lung Volume Reduction	15	0
Pneumonectomy	8280	7.9
Segmentectomy	7445	7.1
Wedge	9007	8.6
Unknown	911	0.9
Total	**105096**	**100**



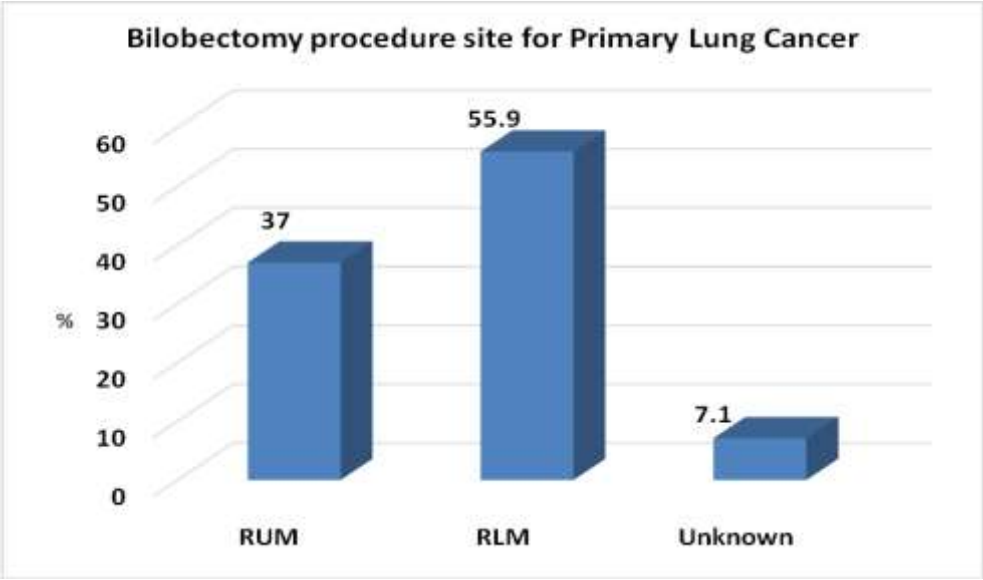
Bilobectomy – Lobectomy qualifier	Occurrences	Percent
Alone	67867	85.4
Chest Wall	3077	3.9
Superior Sulcus Tumor	477	0.6
Sleeve	2640	3.3
Diaphragm Resection	89	0.1
Atrial Resection	72	0.1
SVC Resection/Reconstruction	71	0.1
Vertebral Resection	373	0.5
Unknown	4772	6
Total	**79438**	**100**

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
Total	**75315**	**100**



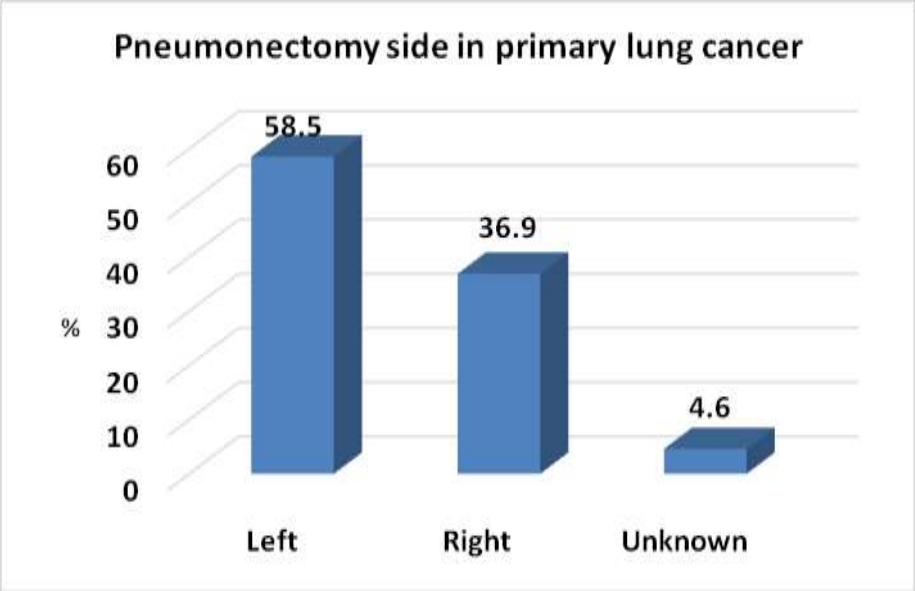
Bilobectomy procedure site	Occurrences	Percent
RUM	1523	37
RLM	2306	55.9
Unknown	294	7.1
Total	**4123**	**100**



Distributions of pneumonectomy

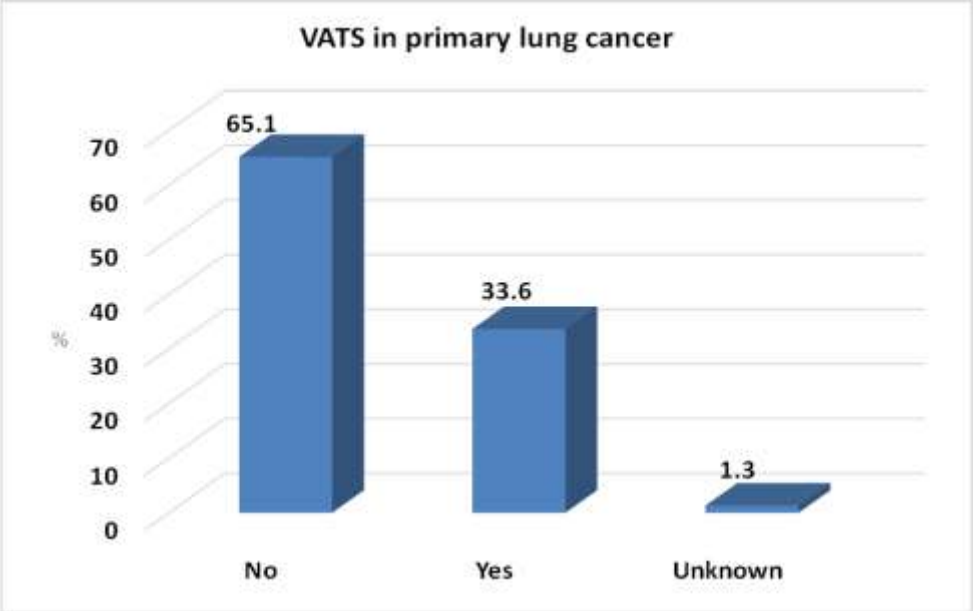
Pneumonectomy Qualifier	Occurrences	Percent
Alone	4768	57.6
Completion	352	4.3
Intrapericardial	708	8.5
Pleuropneumonectomy	185	2.2
Sleeve Resection	107	1.3
Diaphragm Resection	14	0.2
Atrial Resection	107	1.3
SVC Resection/Reconstruction	90	1.1
Vertebral Resection	158	1.9
Unknown	1791	21.6
Total	**8280**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

Pneumonectomy side	Occurrences	Percent
Left	4840	58.5
Right	3060	36.9
Unknown	379	4.6
Total	**8279**	**100**



Distribution of VATS procedures in total lung resections

VATS	Occurrences	Percent
No	68387	65.1
Yes	35375	33.6
Unknown	1334	1.3
Total	**105096**	**100**



Distributions of VATS procedures in lobectomy/bilobectomy

VATS	Occurrences	Percent
No	52503	66.1
Yes	26128	32.9
Unknown	807	1
Total	**79438**	**100**

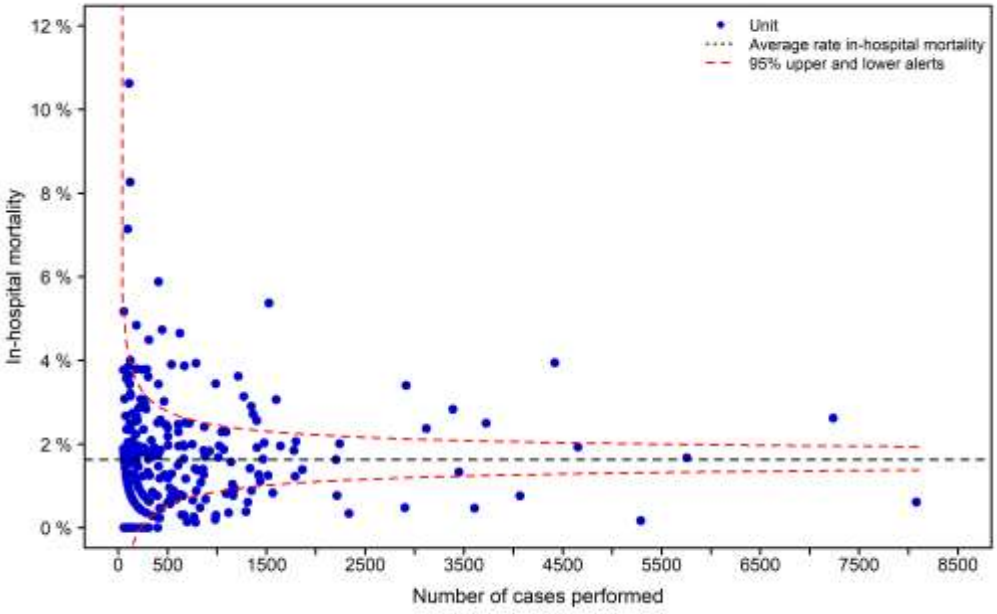
Unadjusted in-hospital mortality rates in primary lung cancer resections

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
Total	**97142**	**1683**	**0.9**

Overall unadjusted in-hospital mortality calculated in the total dataset

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

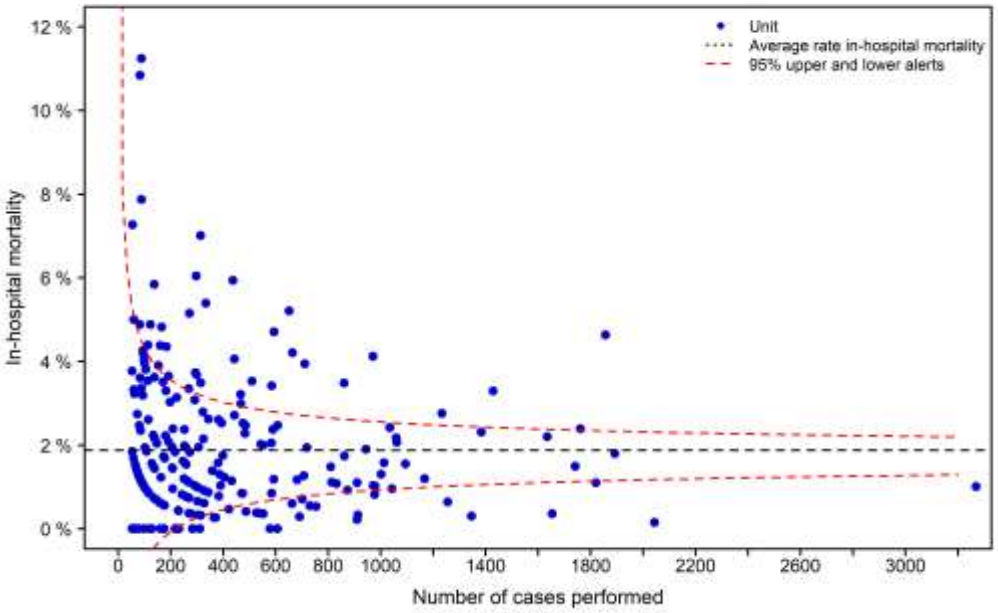
Please note that the majority of the units are within the limits. Around 12% of the Units are above the 95% upper limit whereas the 11% are below the 95% lower limit.



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.

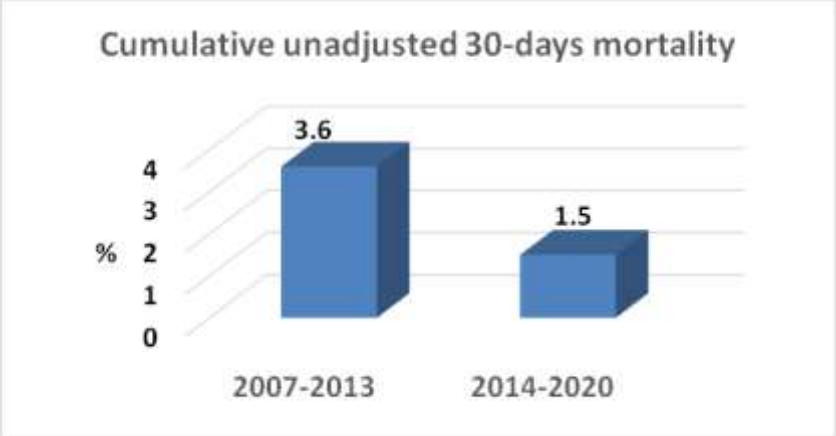


Comparisons of outcomes between 2007-2013 *vs* 2014-2020 in the total dataset

** Due to missing data, the 30-day mortality was only evaluated in 81.904 patients, leaving 89809 patients out*

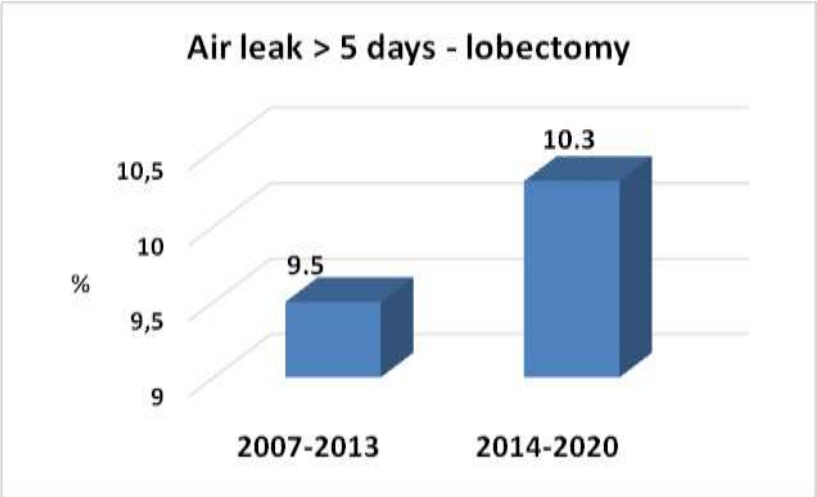
Cumulative non-adjusted 30-day mortality

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



Prolonged air leak (*LOBECTOMY ONLY*)

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



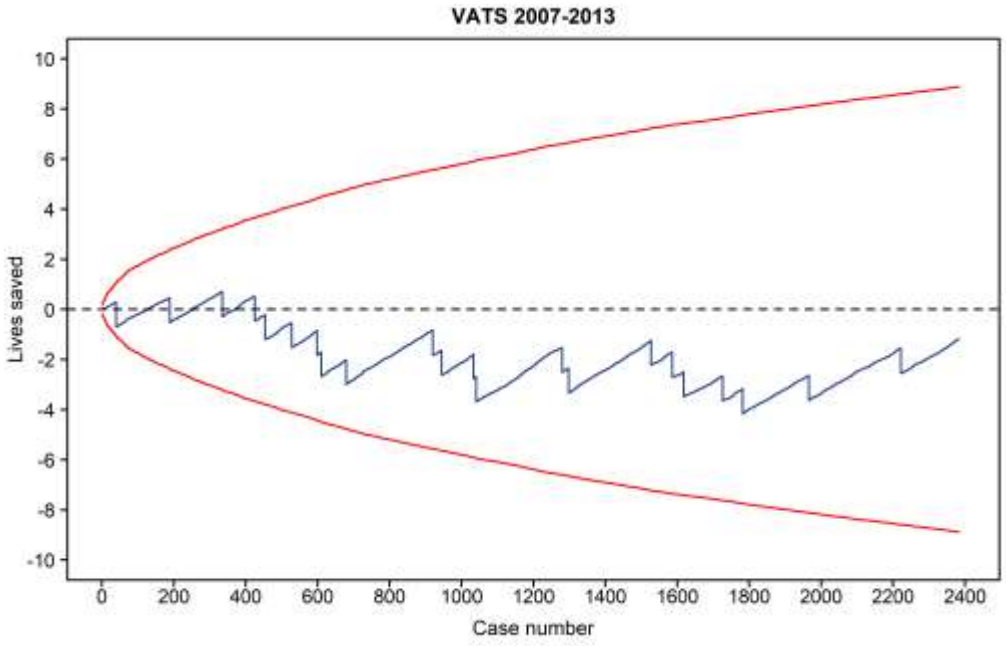
Hospital Mortality trending presented as CUSUM plots

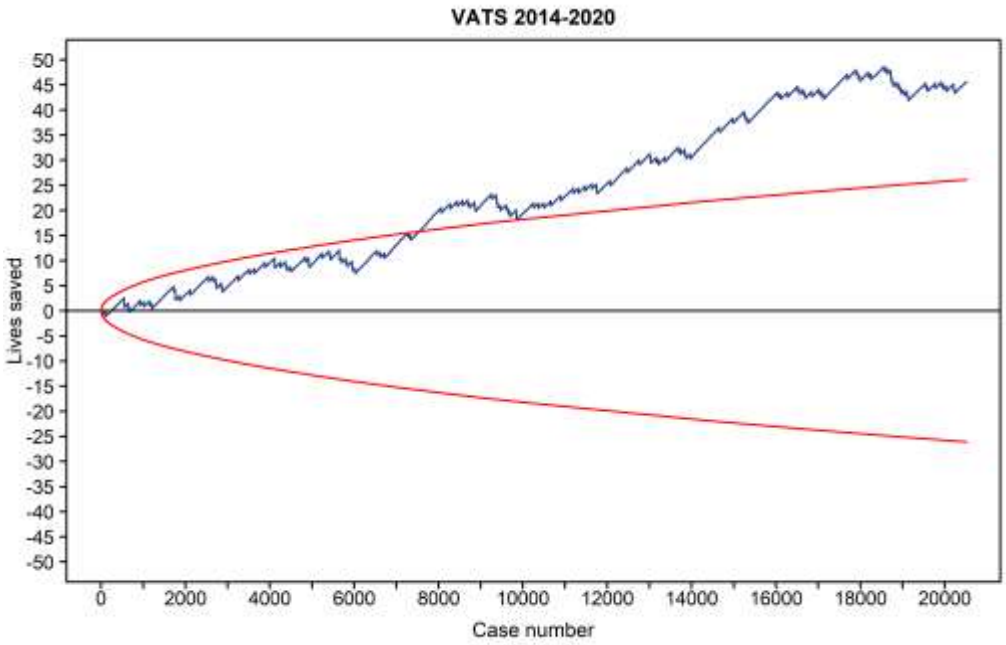
VATS CUSUM PLOTS

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, were the horizontal axis represents the cases over time and the vertical axis shown the difference between the calculated risk of the outcome for a single individual and its occurrence.

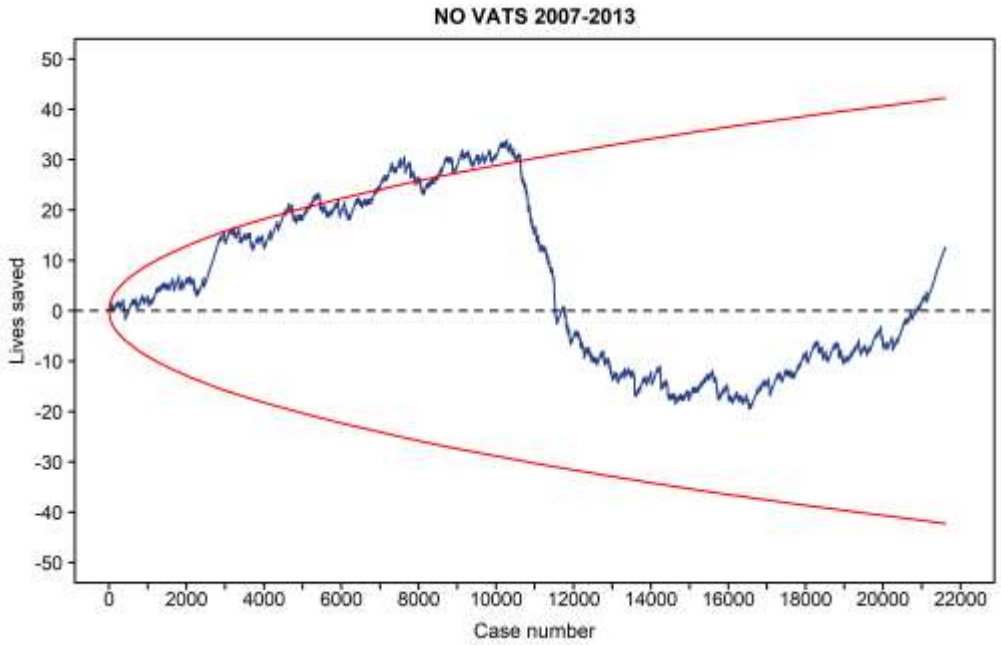
In the next figures, risk-adjusted CUSUM graphs for hospital mortality are presented for non-extended lobectomy performed through VATS or open approach in two different periods of time: 2007-2013 and 2014-2020.

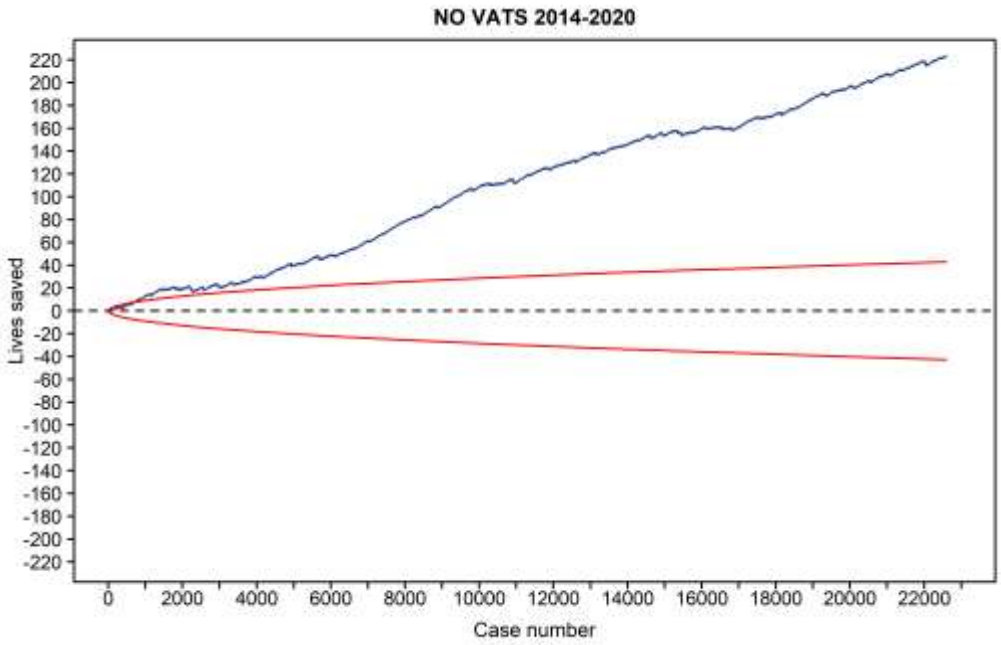
In the case of VATS, the first timeframe shows some variation around the zero for the first 400 cases and a slight mortality raise in the following cases. In the period 2014-2020, a steady decrease in mortality is detected, especially after the first 6000 procedures. The last 3000 procedures show small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





For cases not approached by VATS in the first time period, the graph shows a sharpdecrease in mortality for the first 11000 procedures followed byadrop 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 shartpimprove of hospital mortality.




NO VATS 2014-2020
Lives saved
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
22000
Case number

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
Pl06dl	822	289	35.16	2
Pl08dl	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	
Total	**74812**	**22955**	**30.68**	**1345**

2. RATS, thymus, 2018, 2019, 2020

21% missing data(573 records) on surgical approach

Unit	N
Thoracic Surgery - Medical University of Vienna - Waehringer Guertel	2
Klinische Abteilung fur thoraxchirurgie	1
University Hospital of Antwerp	31
University Hospitals Leuven - Belgium	1
ZOL St.-Jan Genk - Belgium.	3
GHDC Site Gilly, Belgium	2
Instituto do Cancer do Estado de Sao Paulo	1
Hospital Santa Isabel - Nazaré, Salvador - BA, Brazil	1
Division of Thoracic Surgery, University of Montreal	67
Thoraxchirurgin und Leitende Ärztin am USZ Zurich	16
Sainte Marguerite University Hospital, Department of Thoracic Surgery & Diseases of the Esophagus, and Lung Transplantations	10
Medical University of Essen, Ruhrlandklinik, Dept. of Thoracic Surgery	80
Policlinico Gemelli Roma - Università Cattolica	51
Molinette Torino	31
AOU Careggi, SOD Chirurgia Toracica, Firenze	44
INT Fondazione Pascale - Napoli	1
European Institute of Oncology (IEO)	24
Hospitais CUF Lisboa	2
University Hospital Salamanca	31
HHUU VIRGEN DEL ROCIO	3
Kantonspital St. Gallen	7
Total	409

PART 2

UNITS-SPECIFIC ACTIVITY

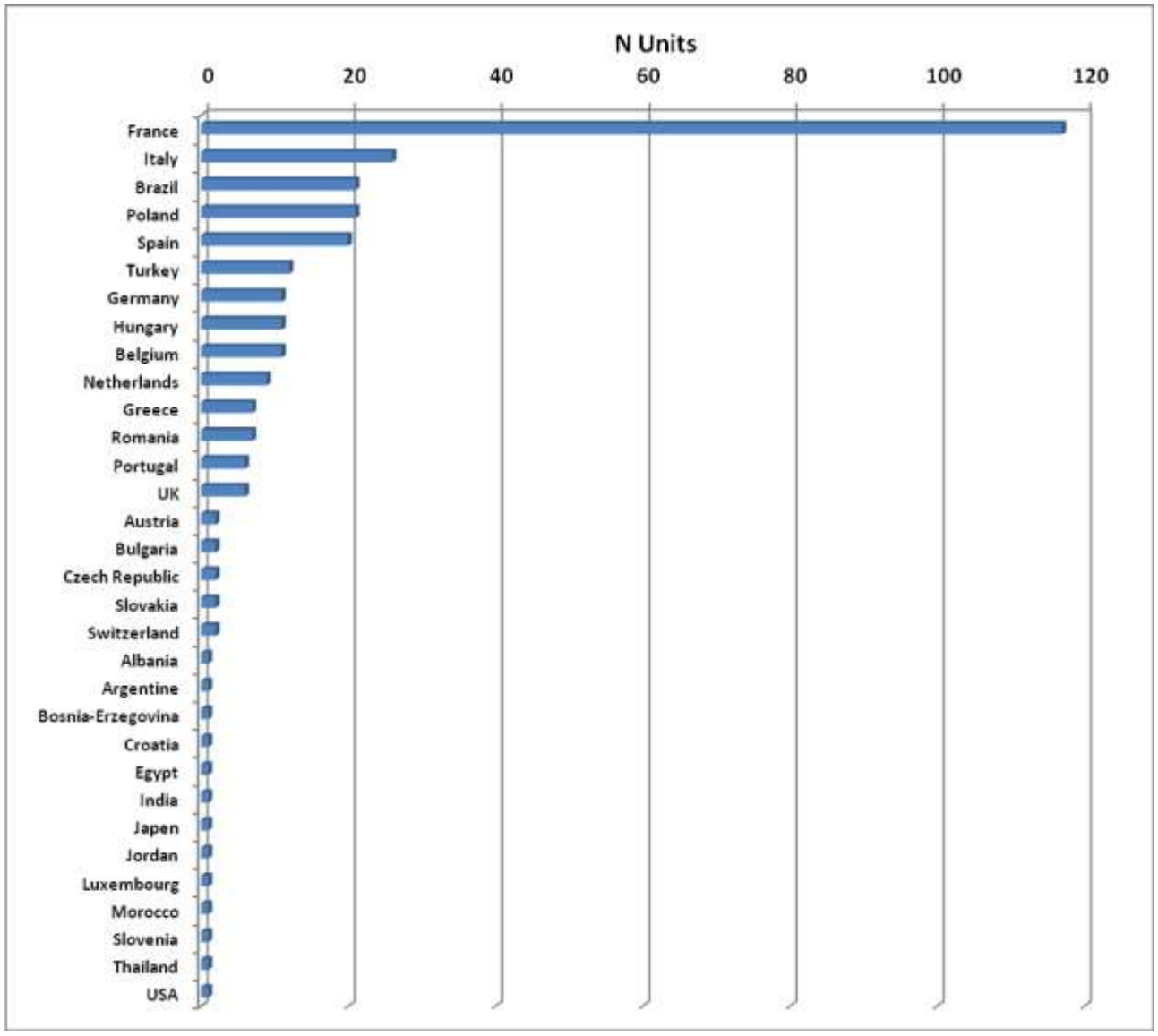
&

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

Unit	Percent
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
Pl06dl	35.16
Pl08dl	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.

Unit	Percent
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

Unit	Percent
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
Pl06dl	82.22
Pl08dl	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, TEMLA etc.)

Unit	Percent
Bm02dl°	86.52
Bm05dl°	89.87
Bm06dl°	86.72
Bm19dl°	72
Ch10dl°	86.89
Fr130780521°	82.08
Fr140000209°	64.29
Fr170000087°	1.92
Fr210987558°	32
Fr290000215°	12.82
Fr310019351°	54.21
Fr330780479°	70.59
Fr330783648°	29
Fr340015502°	62.5
Fr340796663°	44.19
Fr350000741°	60
Fr370004467°	29.73
Fr380000067°	31.82
Fr380786442°	43.75
Fr440017598°	4.55
Fr440024982°	47.27
Fr450010079°	25
Fr540000486°	9.84
Fr540001138°	40.82
Fr560002511°	54.55
Fr570001057°	19.23
Fr590000618°	28.57
Fr590780383°	16.67
Fr590784864°	43.18
Fr620100750°	75
Fr630000479°	50
Fr660780784°	33.33
Fr670000025°	24.5
Fr690000880°	68.33
Fr690784186°	29.27
Fr730000031°	43.75
Fr750100273°	39.39
Fr750150104°	64.15
Fr750712184°	34.62
Fr750803447°	12.36
Fr760000158°	41.27
Fr760021329°	11.43
Fr760780510°	0
Fr800006124°	66.67
Fr830100574°	81.08
Fr840001861°	38.89
Fr860000223°	12.5
Fr870000064°	16.67
Fr920000650°	40.48
Fr920000684°	35.09
Fr920300043°	58.33
Fr930100037°	51.92
Gr02d0°	2.7
Gy18dl°	51.47
Gy23dl°	55.83
Hu01dl°	3.97
Hu02dl°	9.84
Hu03dl	7
Hu04dl°	9.09
Hu05dl°	4
Hu06dl°	2.56
Hu07dl°	27.27
Hu08dl°	37.25
Hu09dl°	14.29
Hu12dl°	75
Ie01dl°	60
It03d0°	35.07
It26dl°	40
It32dl°	9.04
It38dl°	14.29
It44dl°	50.79
It48dl°	79.31
Pl06dl°	79.8
Pl08dl°	52.94
Sk01dl°	35.87
Sp01dl°	76.35
Sp07d0°	42.77
Sp17dl°	79.59
Sp28dl°	68
Sp31dl°	60.53
Uk05dl°	85.14

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

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

Unit	Percent
It48dl°	77.4
Pl06dl	99.42
Pl08dl	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	Unk
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	Unk
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
Pl06dl	3.7	82	0	4	7.9	2.4	0
Pl08dl	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 estended 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

Unit	Alone	Chest Wall	Superior Sulcus Tumor	Sleeve	Diaphragm Resection	Atrial Resection	SVC Resection Reconstruction	Vertebral Resection	Unk
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 estended and type of resection amongts pneumonectomies

Unit	Alone	Completion	Intrapericardial	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

Unit	Alone	Completion	Intrapericardial	Pleuropneum.	Sleeve Resection	Diaphragm Resection	Atrial Resection	SVC Resection Reconstruction	Vertebral Resection	Unk
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

Unit	No (%)	Yes(%)	Unknown(%)
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
Pl06dl	55.5	44.4	0.1
Pl08dl	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

Unit	Observed	Predicted
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
Pl06dl	0.61	1.75
Pl08dl	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

PART 3

THYMOMA SECTION
(Database users only)

Message from Clinical Leader of ESTS Registry Thymoma section

Dr. Bernhard Moser

Chair ESTS Thymic Working Group

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It is a great honour for me to contribute to the further development of the ESTS thymic epithelial tumor section as the new Chair of the ESTS Thymic Working group. Over the years I have followed the evolution of the ESTS Thymic Database from a retrospective to the prospective database. It is a collaborative effort with international participation and impact spearheaded by Dr. Enrico Ruffini.

One of the main objectives of the Chair of this working group is to ensure further success of the database that is based on meticulous data input from experts in thymic epithelial tumor treatment on several continents. Another objective of this position is to encourage studies proposed by contributing centers, that are willing to put in the extra work, in order to further drive surgical and medical progress in the field of thymic diseases.As one of these last year`s highlights of ESTS Thymic Database activities I want to direct your attention to the project “Thymomectomy plus total thymectomy versus simple thymomectomy for early-stage thymoma without myasthenia gravis: a European Society of Thoracic Surgeons Thymic Working Group Study” headed by Francesco Guerrera.

As with the previous editions, the thymic epithelial tumor section of the 2021 ESTS Silver Book includes the data of the ESTS prospective thymic database as of December 2020, coordinated by the ESTS database committee and managed by the official platform of the ESTS Registry (KData Clinical srl). The continued support of currently 75 centers around the globe (62 from Europe, 5 from Asia, 7 from South America and 1 from Africa) has increased the number of registered cases to 2698. The trend of minimally-invasive surgery continues: in the meanwhile, VATS and RATS already make up 43.9% of all reported surgical approaches (35% of the surgical accesses in the 2019 Silverbook).

The introduction of the IASLC/ITMIG TNM stage classification of thymic tumors (8th edition) was well adopted by the centers contributing to the database.

The introduction in 2016 of the “minimum dataset”, defined as the minimum set of variables considered essential for the use of the patient record (see below), and the Clinical Care Analysis (CCA or dashboard), which allows each center to have a visual feedback of the registered patients, resulted in a steady increase of the completeness rate.

Thoracic surgeons face unmet challenges during the COVID-19 pandemic. During this time everyone participating in the ESTS Thymic Working group appreciates even more the time and energy that our colleagues devote to thymic research and to provide the necessary data to keep this project alive, so that on the long run progress in thymic cancer research will ultimately result in better treatment recommendations and outcome for our patients.

Once again, I wish to thank all the ESTS thymic contributors for their ongoing valuable effort in providing data even during the Covid19 pandemic. Further I want to welcome new contributors to join us in this important ESTS project!

Dr. Bernhard Moser
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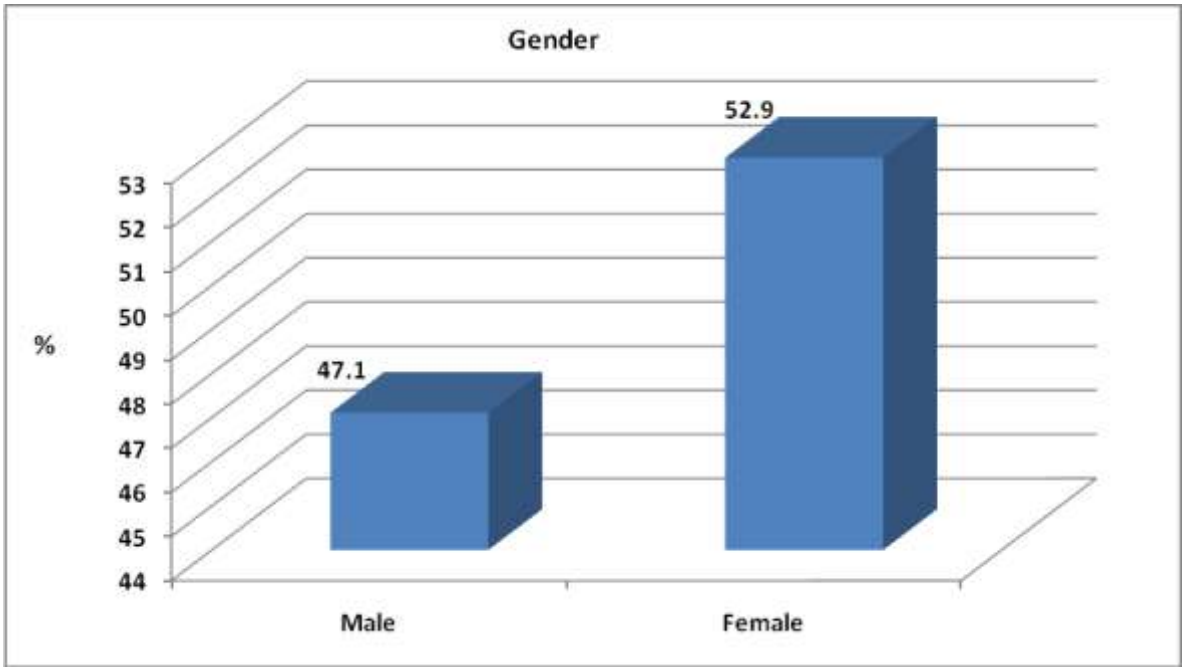
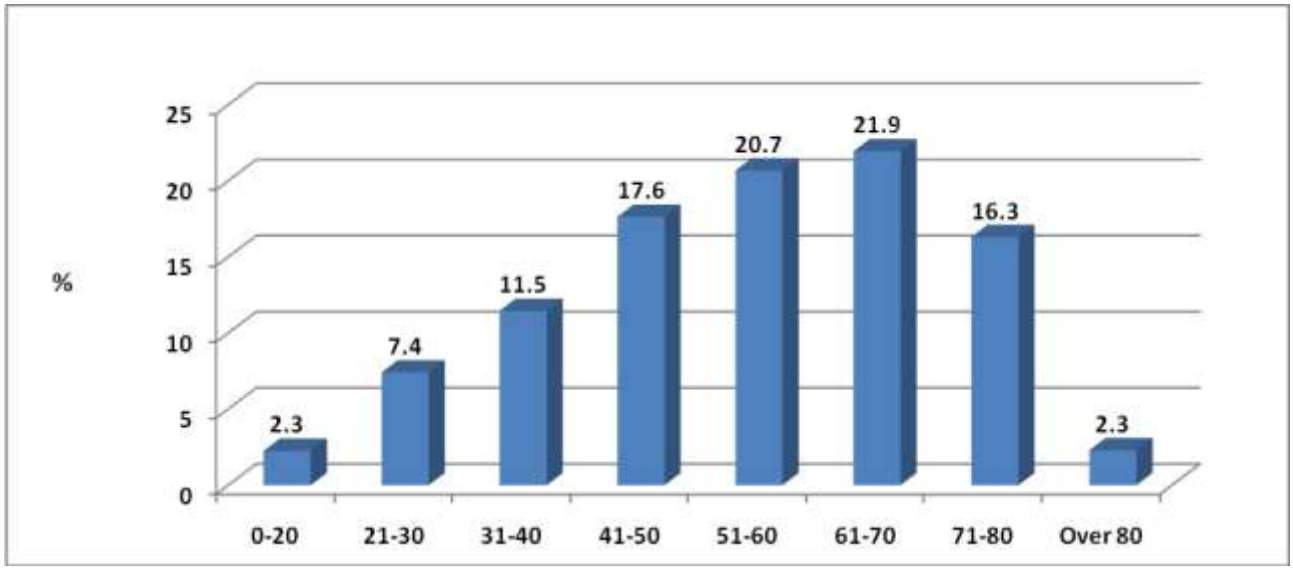
Thymoma Section fields

Thymic Tumors: prospective cases
January 2007- December 2020
N=2698

Demographics: gender and age groups

Gender	Occurrences	Percent
Male	1271	47.1
Female	1427	52.9
Total	**2698**	**100.0**

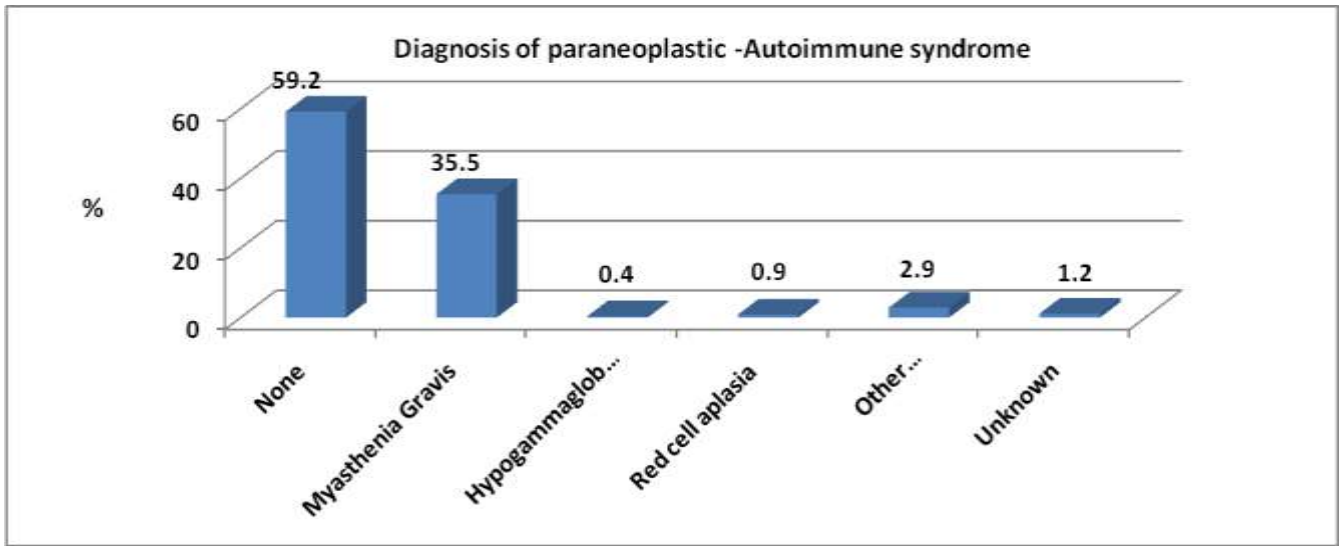




Associated paraneoplastic syndromes

Diagnosis of paraneoplastic -Autoimmune syndrome	Occurrences	Percent
None	1258	59.2
Myasthenia Gravis	754	35.5
Hypogammaglobulinemia	8	0.4
Red cell aplasia	19	0.9
Other autoimmune	61	2.9
Unknown	25	1.2
Total number of patients	**2125**	**100**

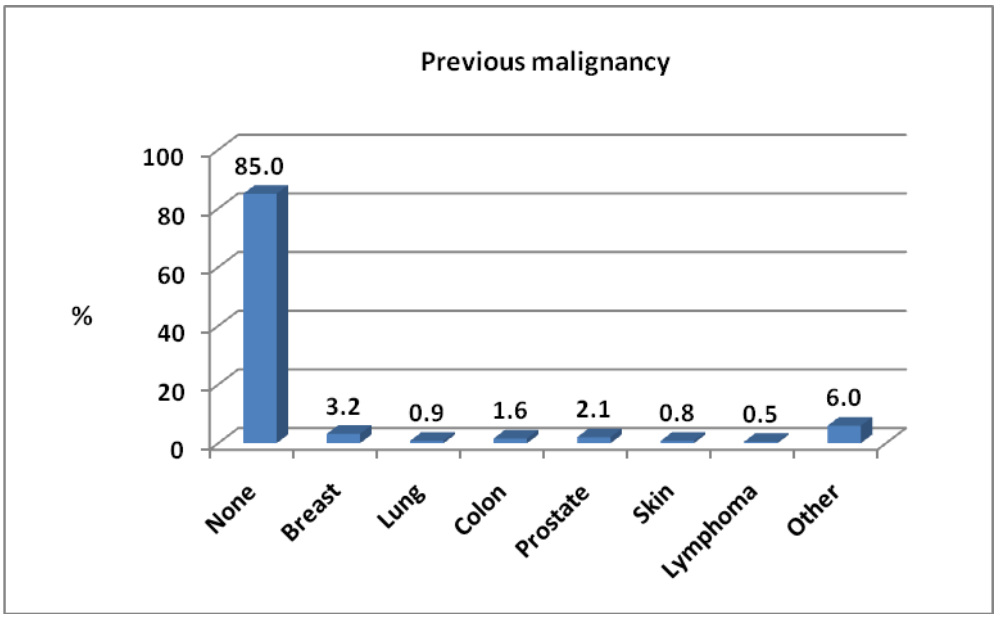
*** Percentages calculated at the net of unknowns cases (N=602; 22.3%)**



Previous malignancy

Previous malignancy	Occurrences	Percent
None	1200	85.0
Breast	45	3.2
Lung	12	0.9
Colon	23	1.6
Prostate	29	2.1
Skin	11	0.8
Lymphoma	7	0.5
Other	84	6.0
Total number of patients	**1411**	**100**

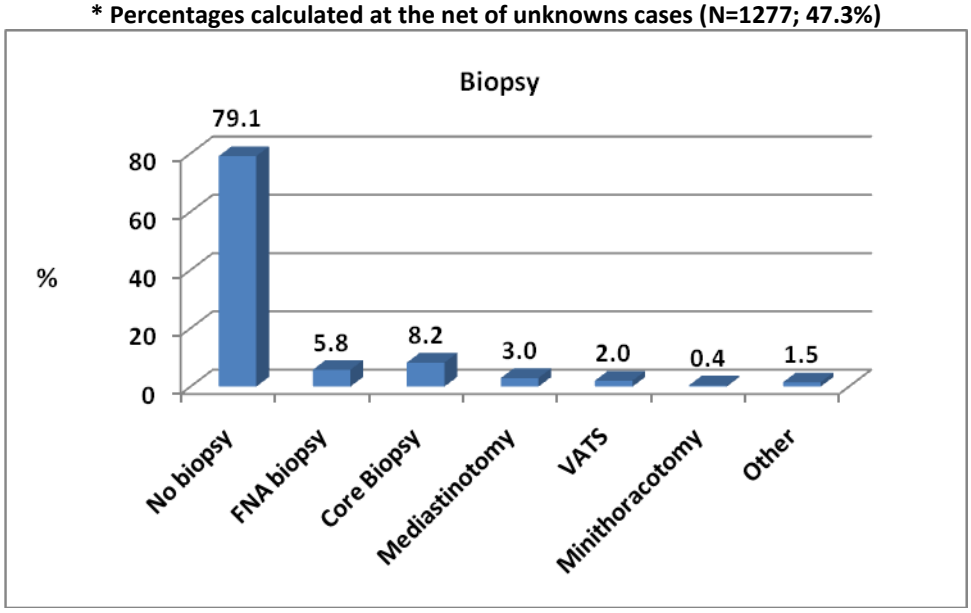
*** Percentages calculated at the net of unknowns cases (N=1298; 48.1%)**



Preoperative diagnosis

Biopsy	Occurrences	Percent
No biopsy	1124	79.1
FNA biopsy	82	5.8
Core Biopsy	117	8.2
Mediastinotomy	42	3.0
VATS	29	2.0
Minithoracotomy	6	0.4
Other	21	1.5
Total	**1421**	**100.0**

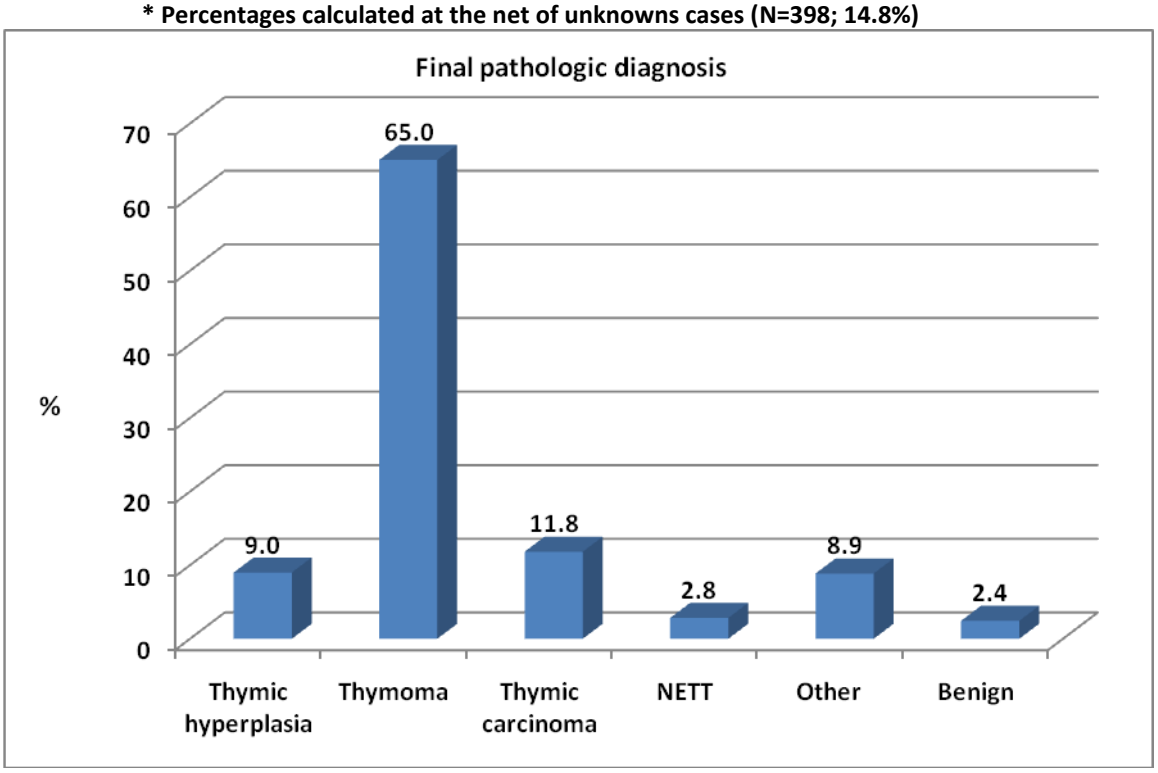
*** Percentages calculated at the net of unknowns cases (N=1277; 47.3%)**



Final pathologic diagnosis

Final pathologic diagnosis	Occurrences	Percent
Thymic hyperplasia	207	9.0
Thymoma	1496	65.0
Thymic carcinoma	272	11.8
NETT	65	2.8
Other	204	8.9
Benign	56	2.4
Total	**2300**	**100.0**

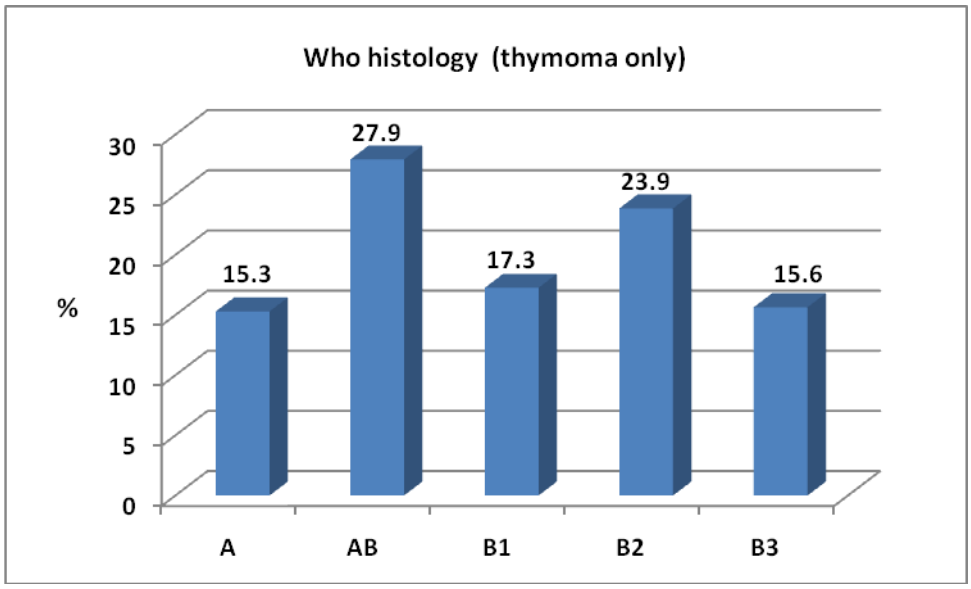
*** Percentages calculated at the net of unknowns cases (N=398; 14.8%)**



WHO histology (thymoma only)

WHO histology	Occurrences	Percent
A	218	15.3
AB	398	27.9
B1	246	17.3
B2	340	23.9
B3	223	15.6
Total	**1425**	**100.0**

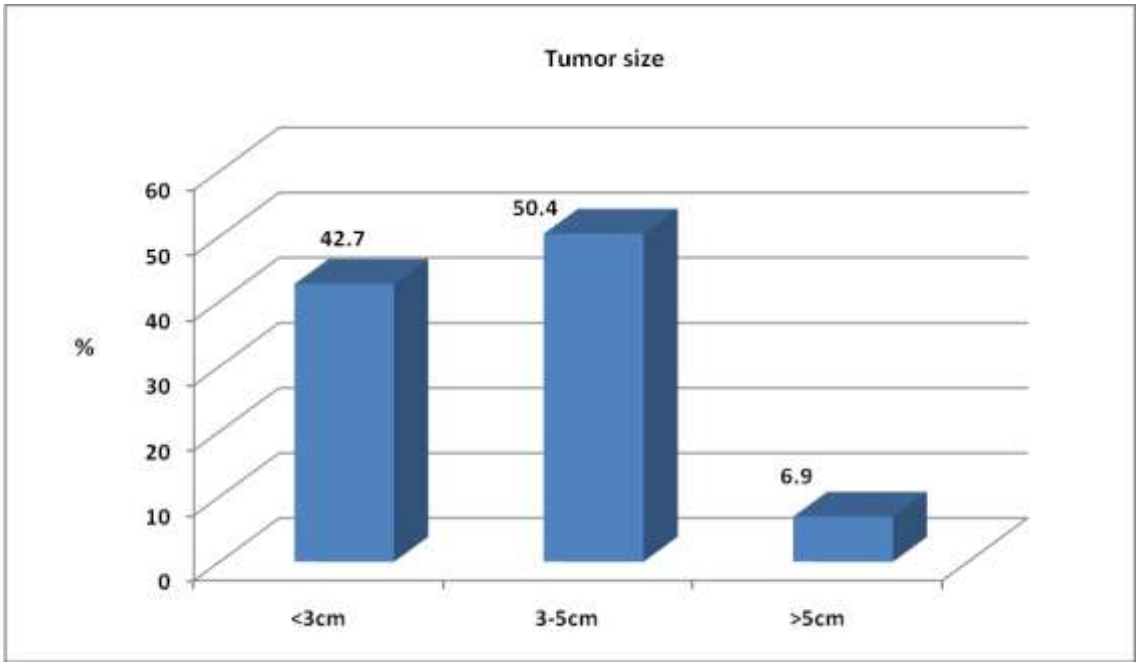
*** Percentages calculated at the net of unknowns cases (N=150;9.5%)**



Tumor size

Tumor size	Occurrences	Percent
<3cm	707	42.7
3-5cm	835	50.4
>5cm	115	6.9
Total	**1657**	**100.0**

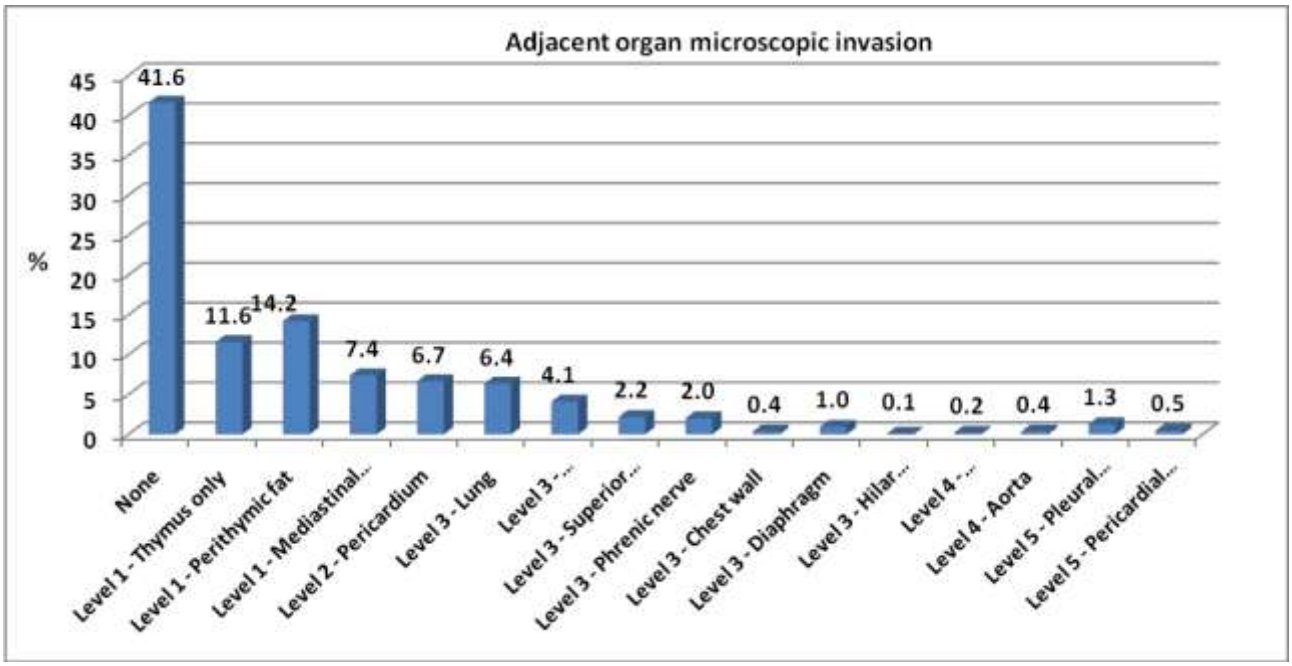
*** Percentages calculated at the net of unknowns cases (N=1040; 38.54%)**



Invasion to surrounding organs

Adjacent organ microscopic invasion	Occurrences	Percent
None	779	41.6
Level 1 - Thymus only	217	11.6
Level 1 - Perithymic fat	266	14.2
Level 1 - Mediastinal pleura	139	7.4
Level 2 - Pericardium	125	6.7
Level 3 - Lung	119	6.4
Level 3 - Brachiocephalic vein	77	4.1
Level 3 - Superior vena cava	41	2.2
Level 3 - Phrenic nerve	38	2.0
Level 3 - Chest wall	7	0.4
Level 3 - Diaphragm	18	1.0
Level 3 - Hilar pulmonary vessels	2	0.1
Level 4 - Intrapericardial pulmonary artery	4	0.2
Level 4 - Aorta	7	0.4
Level 5 - Pleural nodules	24	1.3
Level 5 - Pericardial nodules	9	0.5
Total number of patients	**1872**	**100**

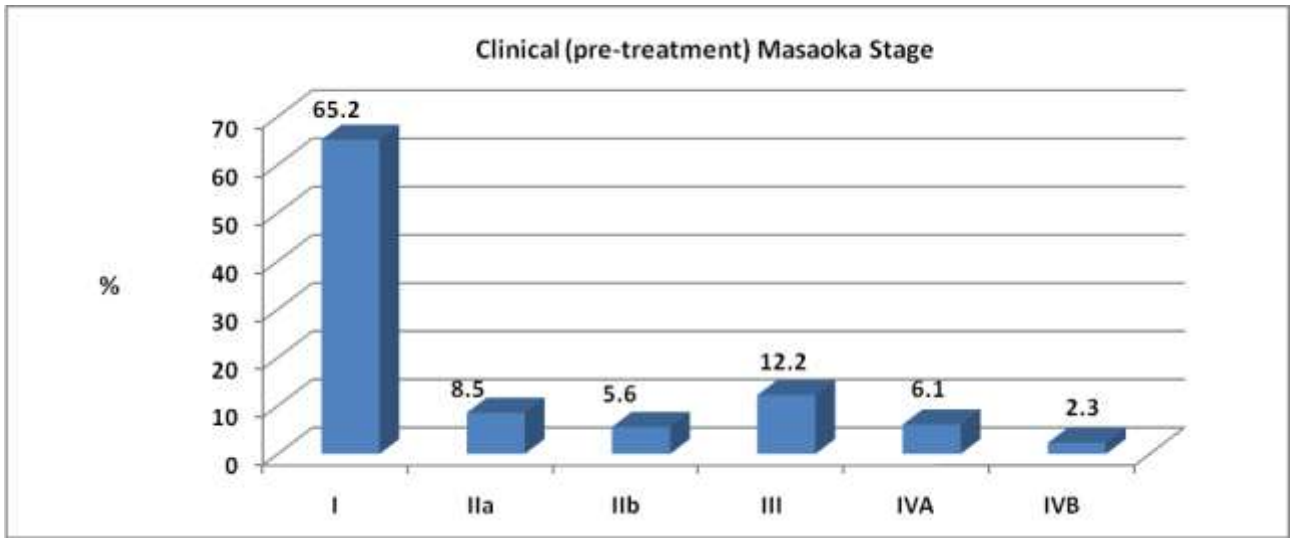
*** Percentages calculated at the net of unknowns cases (N=1268;47.0%)**



Clinical (pre-treatment) stage according to Masaoka-Koga

Clinical (pre-treatment) Masaoka Stage	Occurrences	Percent
I	672	65.2
IIa	88	8.5
IIb	58	5.6
III	126	12.2
IVA	63	6.1
IVB	24	2.3
Total	**1031**	**100.0**

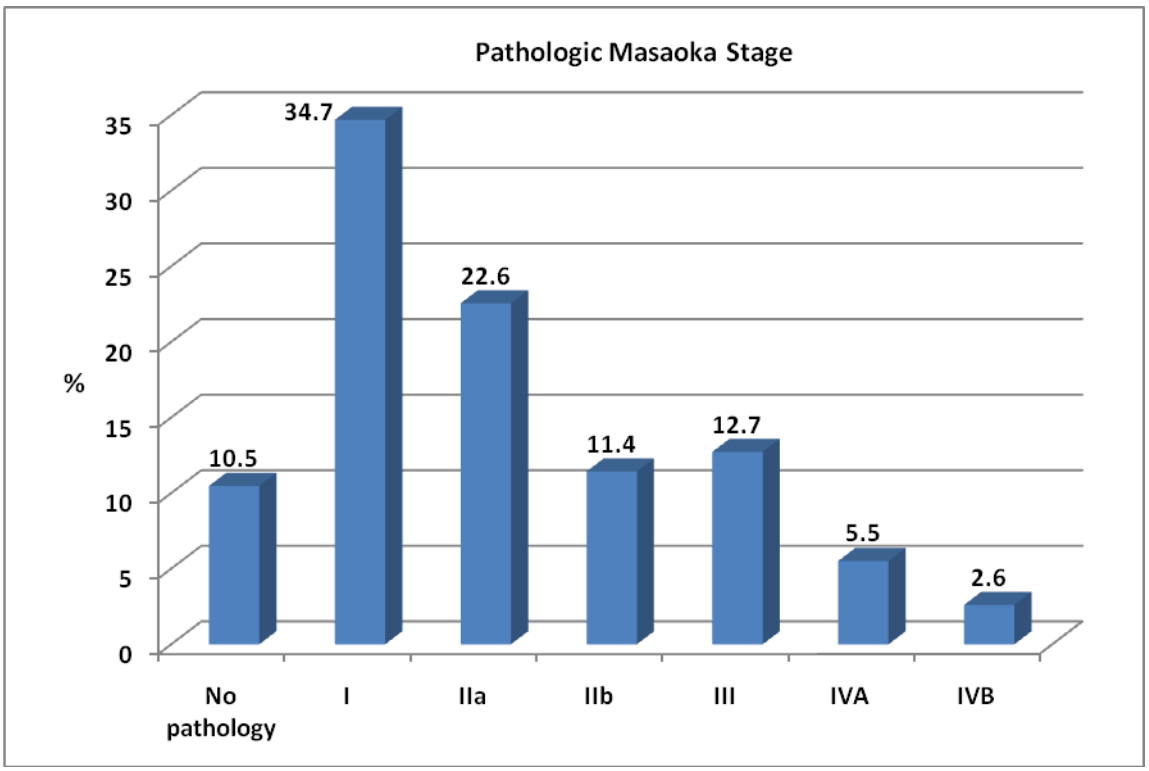
*** Percentages calculated at the net of unknowns cases (N=1667;61.8%)**



Pathologic Masaoka-Koga stage

Pathologic Masaoka Stage	Occurrences	Percent
No pathology	209	10.5
I	692	34.7
IIa	450	22.6
IIb	228	11.4
III	254	12.7
IVA	110	5.5
IVB	52	2.6
Total	**1995**	**100.0**

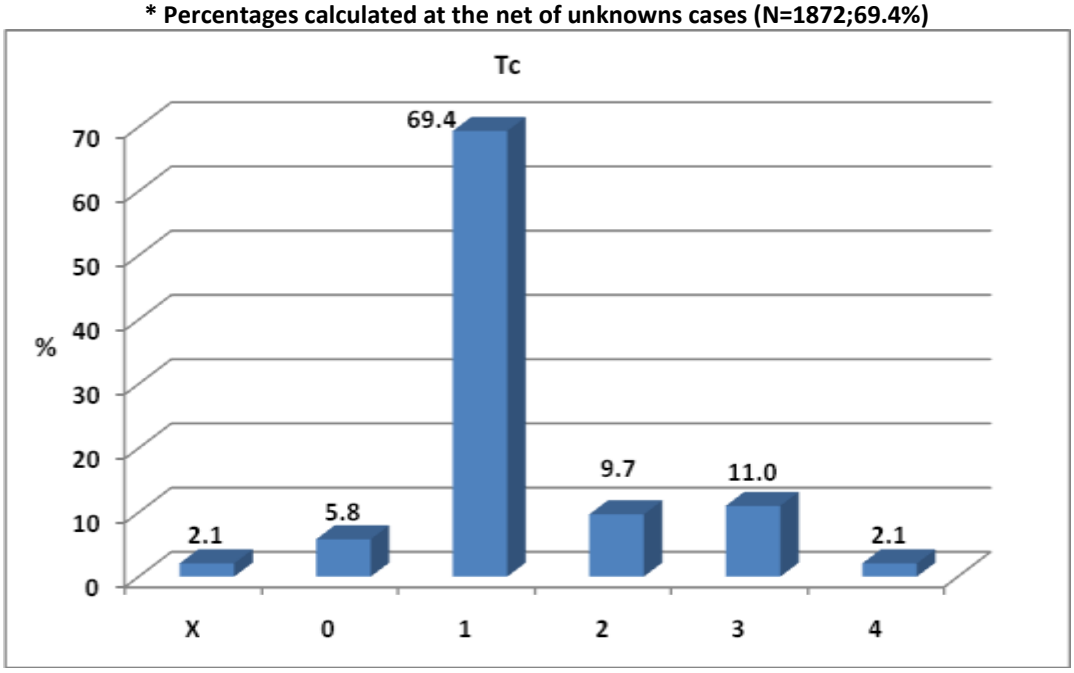
*** Percentages calculated at the net of unknowns cases (N=703;26.1%)**



Clinical TNM Staging

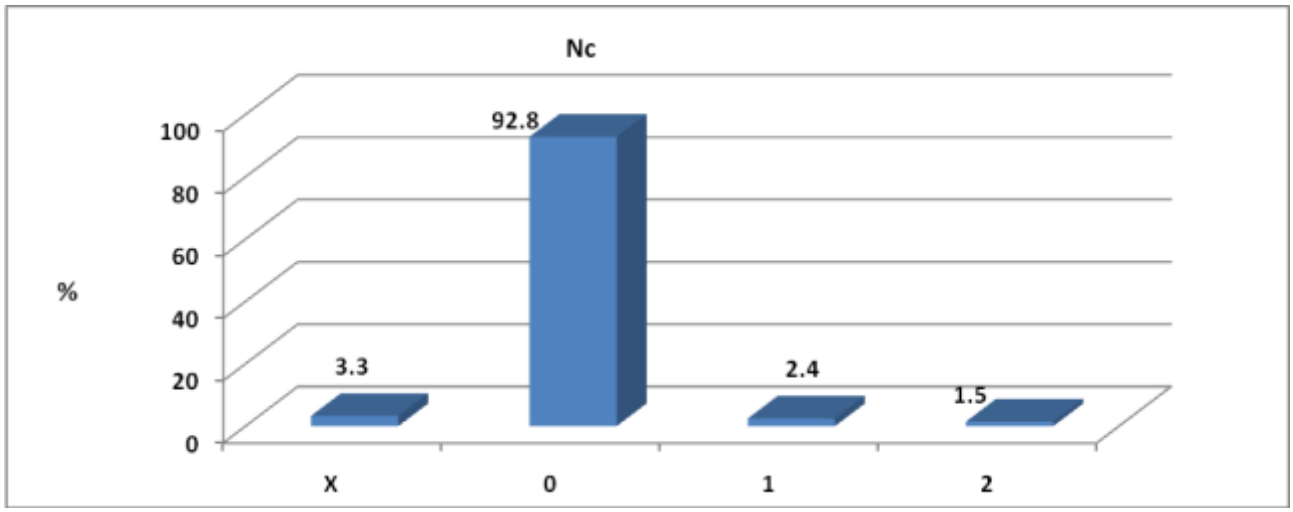
T Clinical	Occurrences	Percent
X	17	2.1
0	48	5.8
1	573	69.4
2	80	9.7
3	91	11.0
4	17	2.1
Total	**826**	**100.0**

*** Percentages calculated at the net of unknowns cases (N=1872;69.4%)**



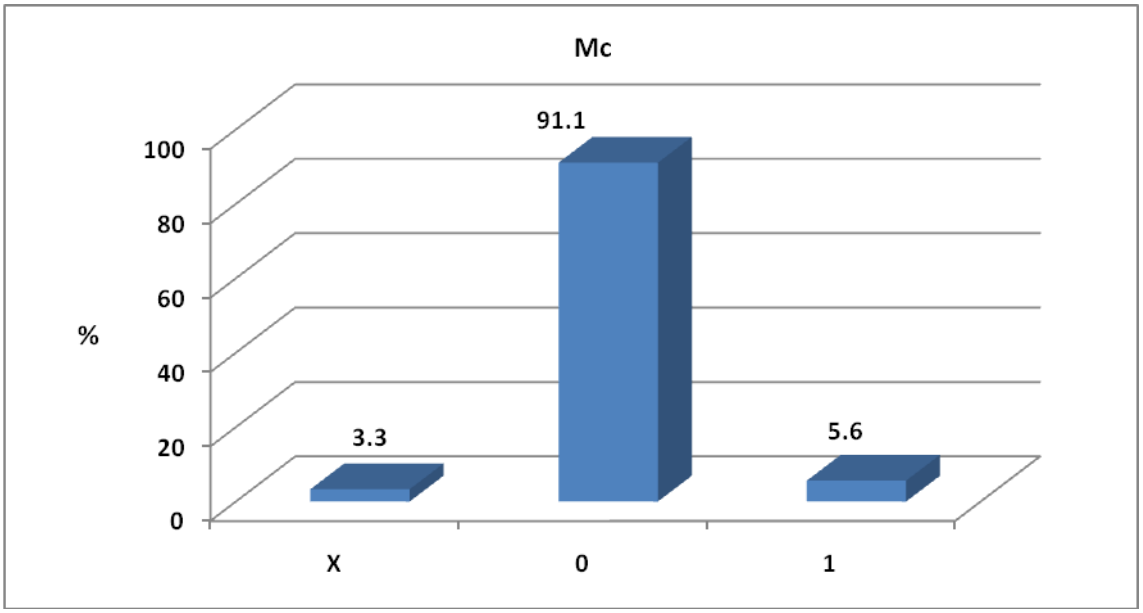
N Clinical	Occurrences	Percent
X	27	3.3
0	765	92.8
1	20	2.4
2	12	1.5
Total	**824**	**100.0**

*** Percentages calculated at the net of unknowns cases (N=1874;69.5%)**



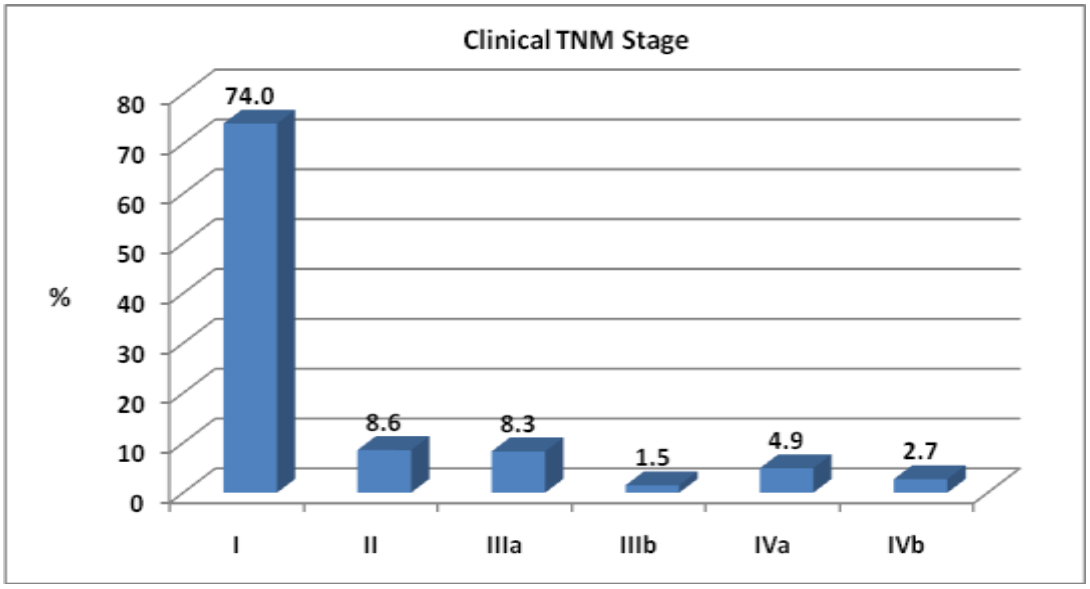
M Clinical	Occurrences	Percent
X	27	3.3
0	745	91.1
1	46	5.6
Total	**488**	**100.0**

*** Percentages calculated at the net of unknowns cases (N=1880;69.7%)**



Clinical TNM Stage	Occurrences	Percent
I	545	74.0
II	63	8.6
IIIa	61	8.3
IIIb	11	1.5
IVa	36	4.9
IVb	20	2.7
Total	**736**	**100.0**

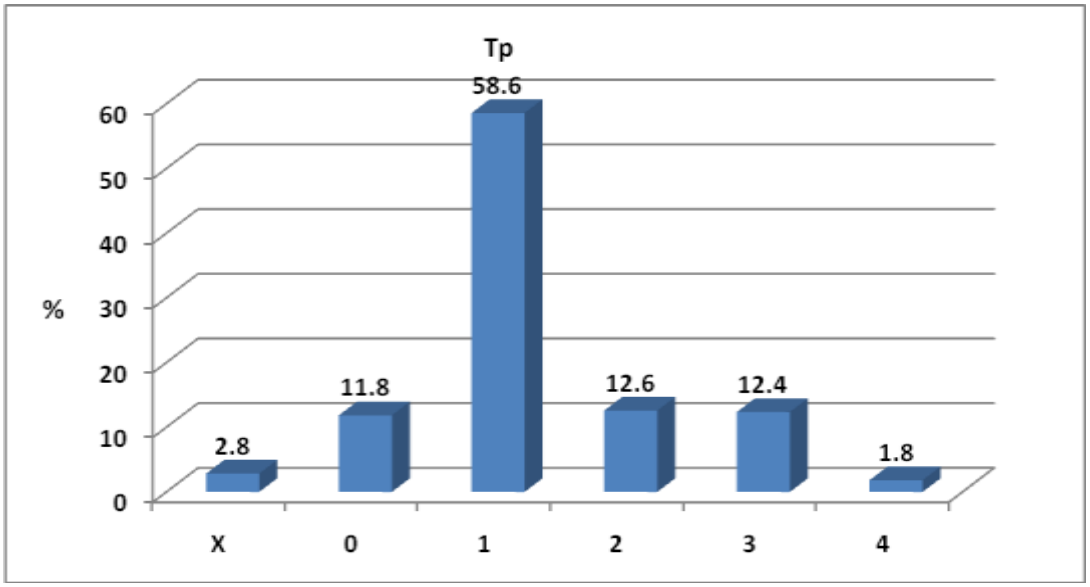
*** Percentages calculated at the net of unknowns cases (N=1962;72.7%)**



Pathologic TNM Staging

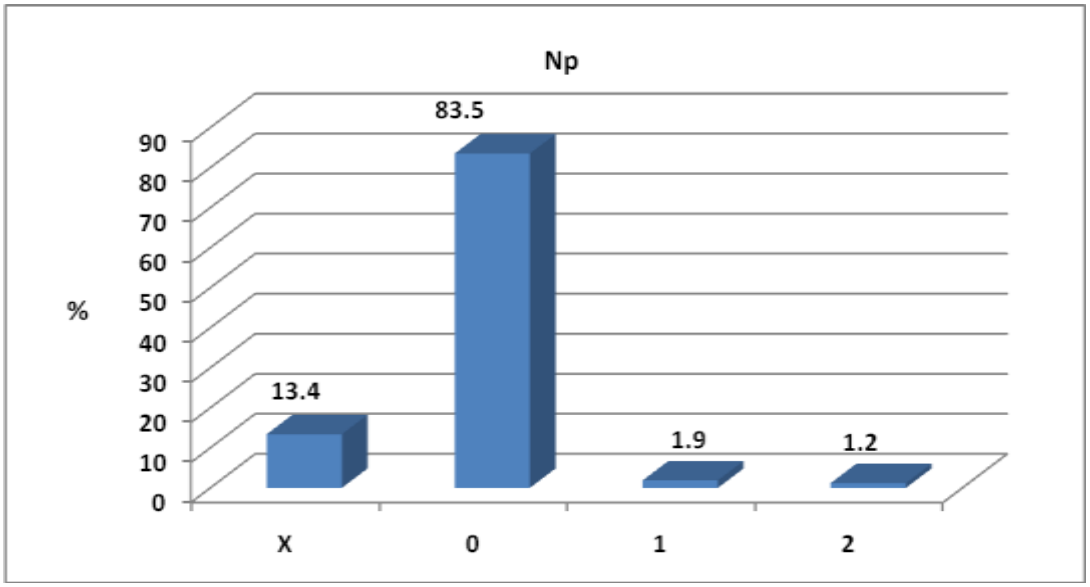
T pathology	Occurrences	Percent
X	39	2.8
0	163	11.8
1	806	58.6
2	173	12.6
3	170	12.4
4	25	1.8
Total	**1376**	**100.0**

*** Percentages calculated at the net of unknowns cases (N=1322;49%)**



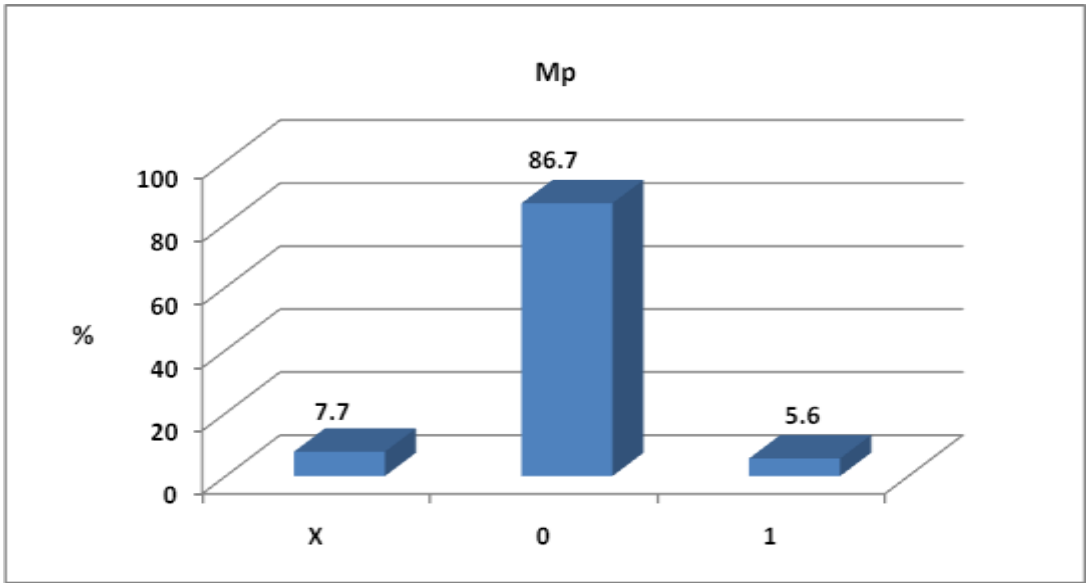
N pathology	Occurrences	Percent
X	157	13.4
0	978	83.5
1	22	1.9
2	14	1.2
Total	**1171**	**100.0**

*** Percentages calculated at the net of unknowns cases (N=1527;56.6%)**



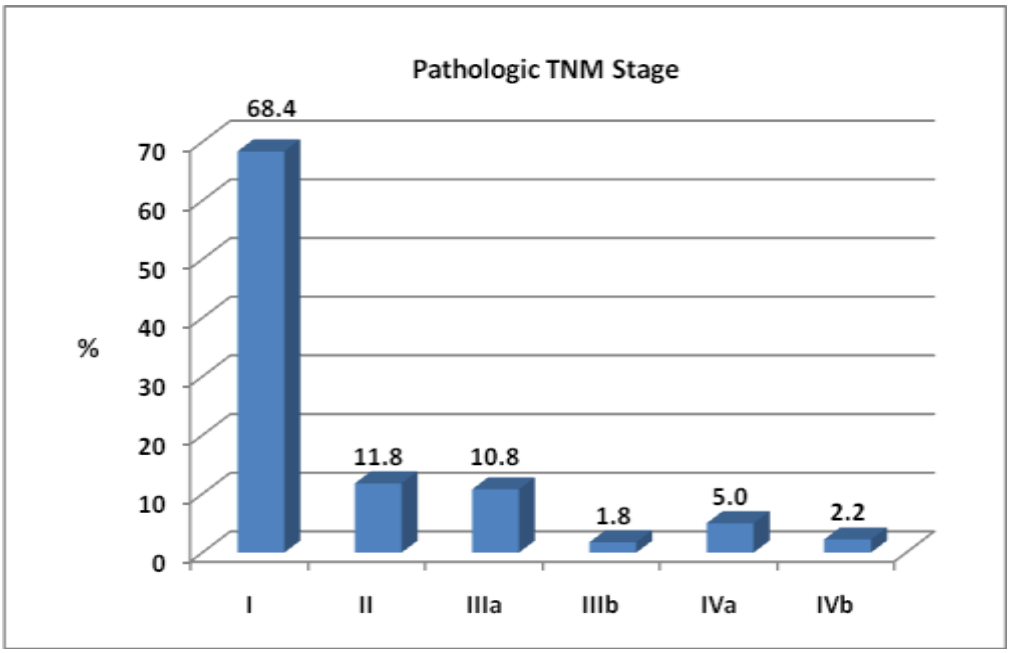
M pathology	Occurrences	Percent
X	105	7.7
0	1175	86.7
1	76	5.6
Total	**1356**	**100.0**

*** Percentages calculated at the net of unknowns cases (N=1342;49.7%)**



Pathologic TNM Stage	Occurrences	Percent
I	736	68.4
II	127	11.8
IIIa	116	10.8
IIIb	19	1.8
IVa	54	5.0
IVb	24	2.2
Total	**958**	**100.0**

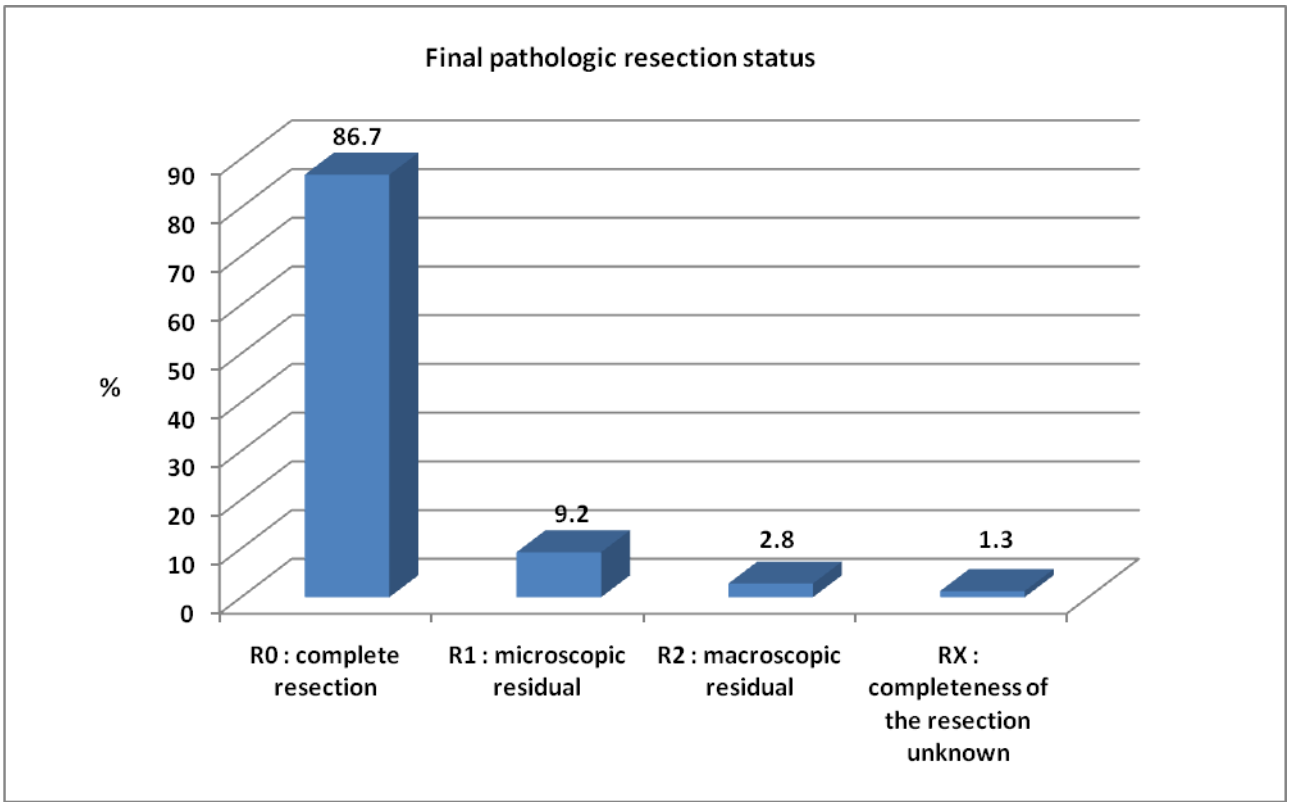
*** Percentages calculated at the net of unknowns cases (N=1622;60.1%)**



Final pathologic resection status

Final pathologic resection status	Occurrences	Percent
R0 : complete resection	1803	86.7
R1 : microscopic residual	192	9.2
R2 : macroscopic residual	58	2.8
RX : completeness of the resection unknown	26	1.3
Total	**2079**	**100.0**

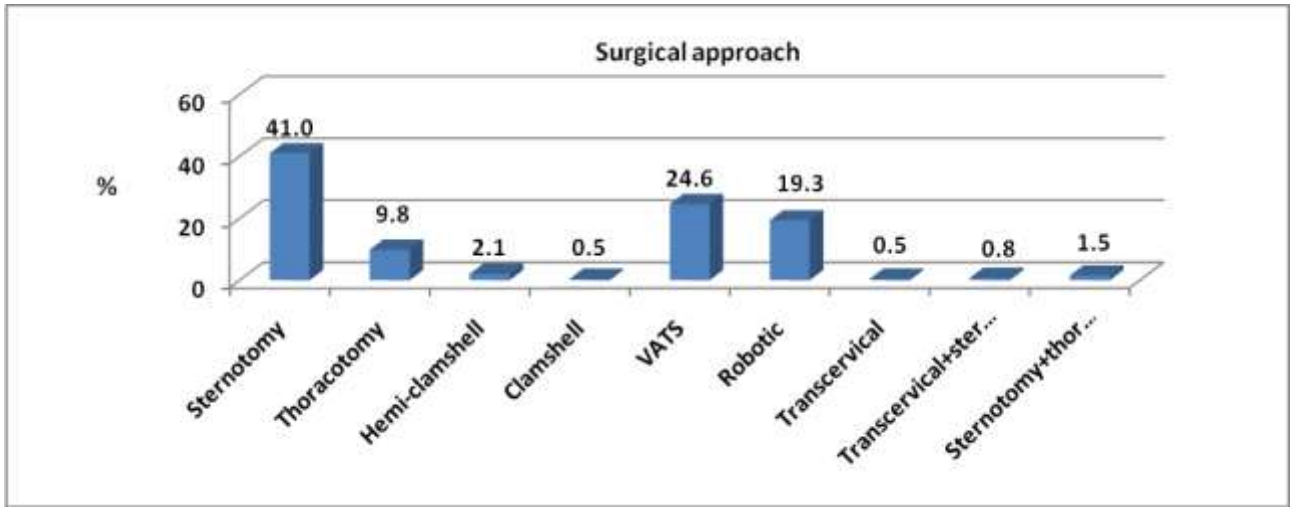
*** Percentages calculated at the net of unknowns cases (N=619;22.9%)**



Surgical approach

Surgical approach	Occurrences	Percent
Sternotomy	871	41.0
Thoracotomy	209	9.8
Hemi-clamshell	44	2.1
Clamshell	10	0.5
VATS	522	24.6
Robotic	411	19.3
Transcervical	10	0.5
Transcervical+sternal split	16	0.8
Sternotomy+thoracotomy	32	1.5
Total	**2125**	**100.0**

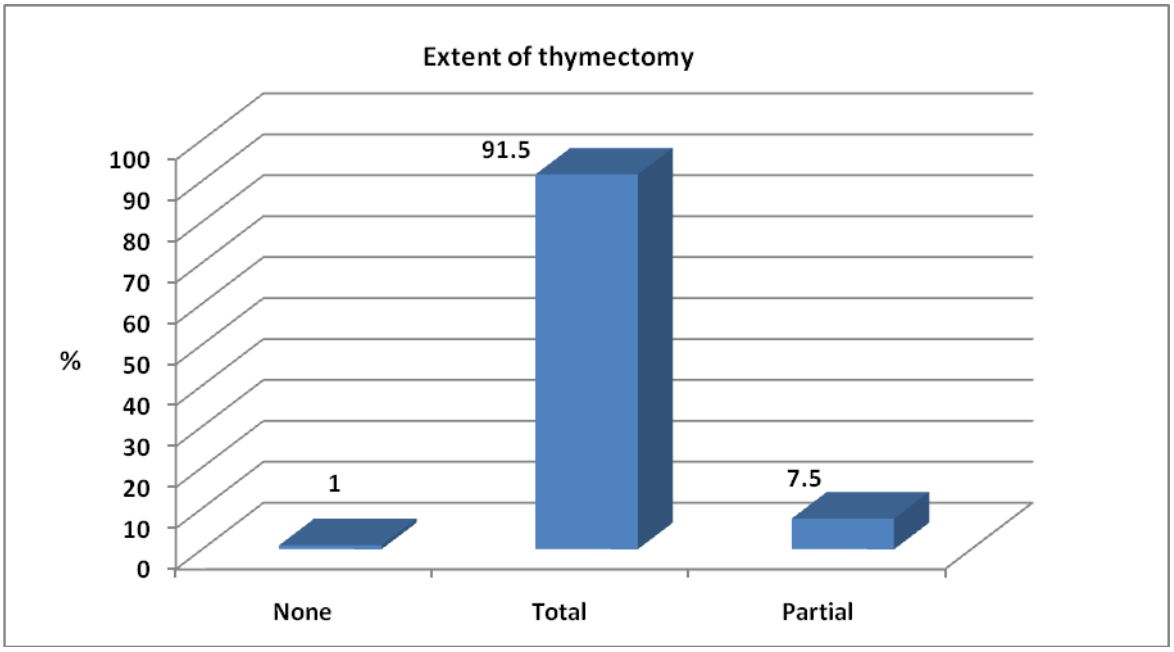
*** Percentages calculated at the net of unknowns cases (N=573; 21.2%)**



Extent of associated thymectomy

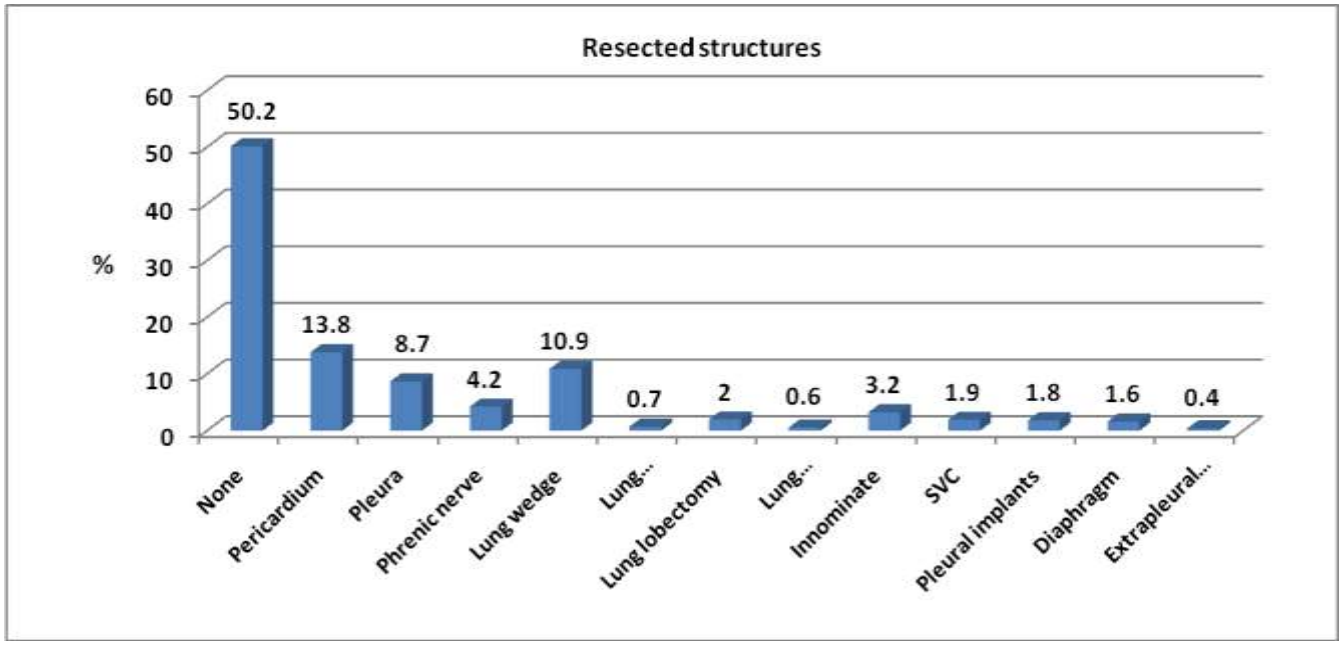
Extent of thymectomy	Occurrences	Percent
None	17	1.0
Total	1614	91.5
Partial	132	7.5
Total	**1763**	**100.0**

*** Percentages calculated at the net of unknowns cases (N=935; 34.7%)**



Resected structures associated with thymic tumor resection

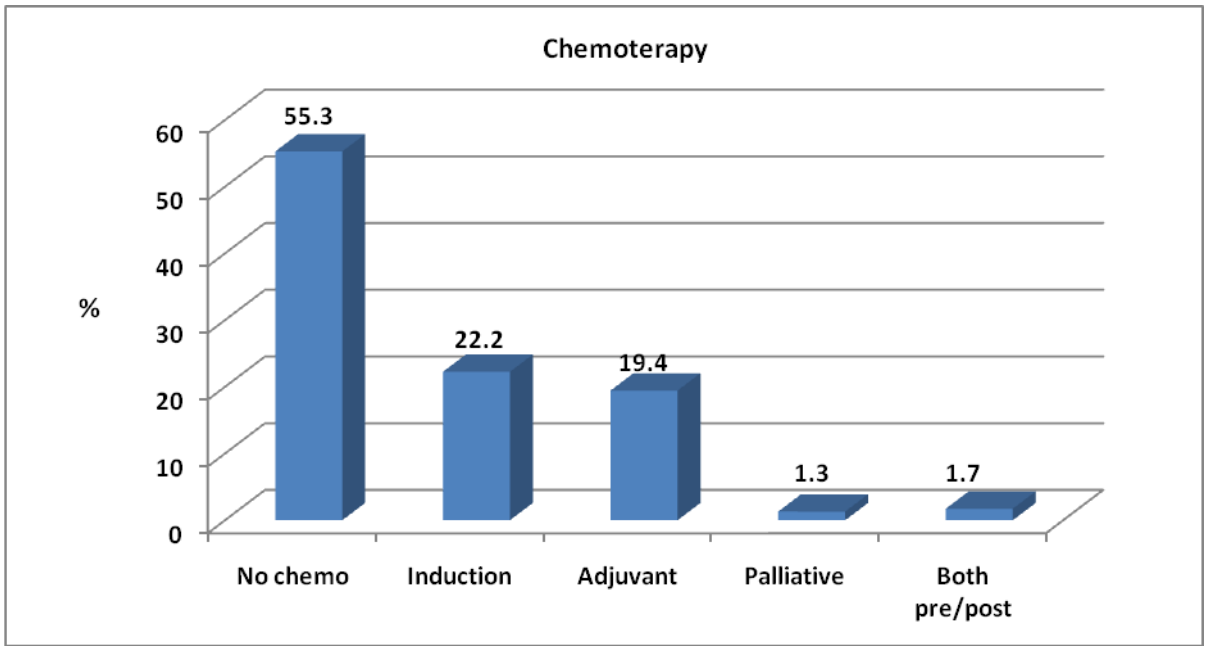
Resected structures	Occurrences	Percent
None	994	50.2
Pericardium	274	13.8
Pleura	172	8.7
Phrenic nerve	84	4.2
Lung wedge	216	10.9
Lung segmentectomy	14	0.7
Lung lobectomy	39	2.0
Lung pneumonectomy	11	0.6
Innominate	64	3.2
SVC	38	1.9
Pleural implants	36	1.8
Diaphragm	32	1.6
Extrapleural pneumonectomy	8	0.4
Total number of patients	**1982**	



Chemotherapy

Chemotherapy	Occurrences	Percent
No chemo	256	55.3
Induction	103	22.2
Adjuvant	90	19.4
Palliative	6	1.3
Both pre/post	8	1.7
Total	**463**	**100.0**

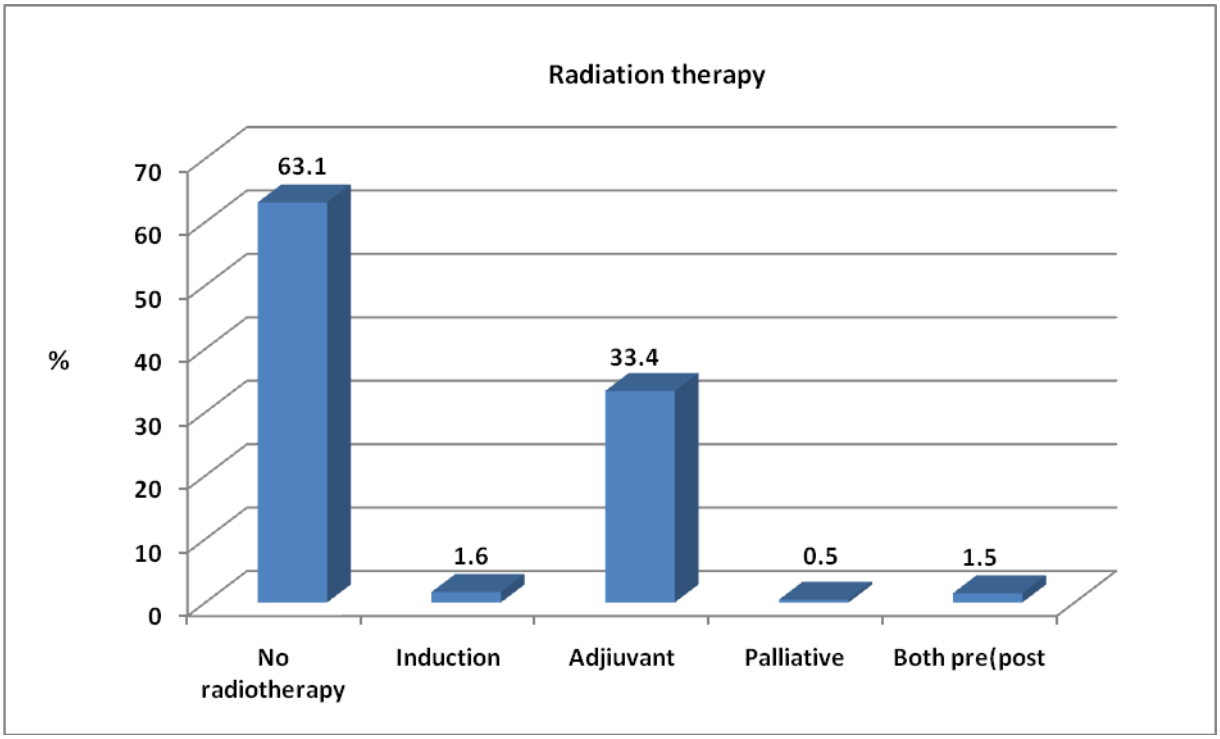
*** Percentages calculated at the net of unknowns cases (N=2235;82.8%)**



Radiotherapy

Radiation therapy	Occurrences	Percent
No radiotherapy	692	63.1
Induction	18	1.6
Adjiuvant	366	33.4
Palliative	5	0.5
Both pre(post	16	1.5
Total	**1097**	**100.0**

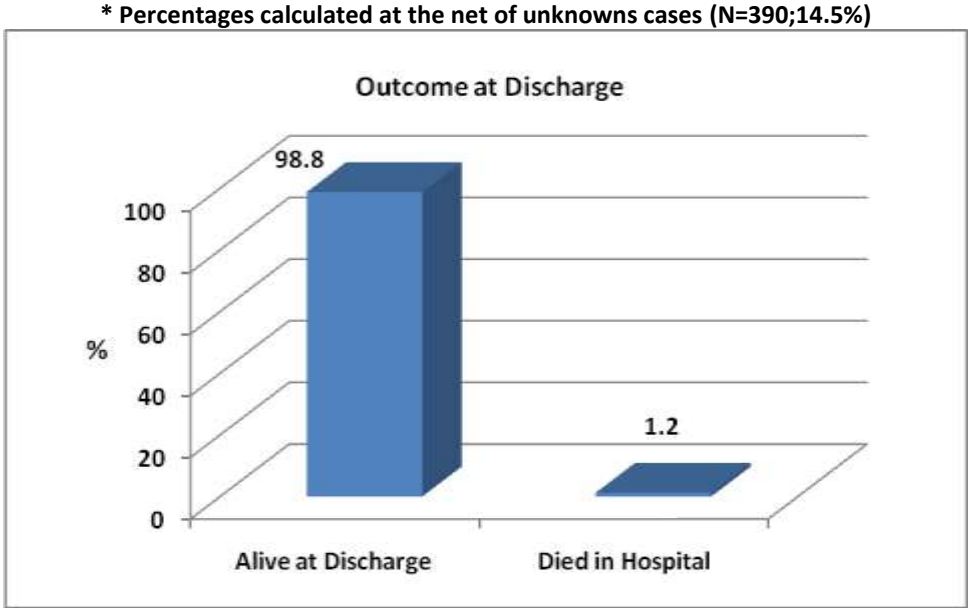
*** Percentages calculated at the net of unknowns cases (N=2816;72%)**



Outcome at hospital discharge

Outcome at Discharge	Occurrences	Percent
Alive at Discharge	2275	98.8
Died in Hospital	28	1.2
Total	**2303**	**100.0**

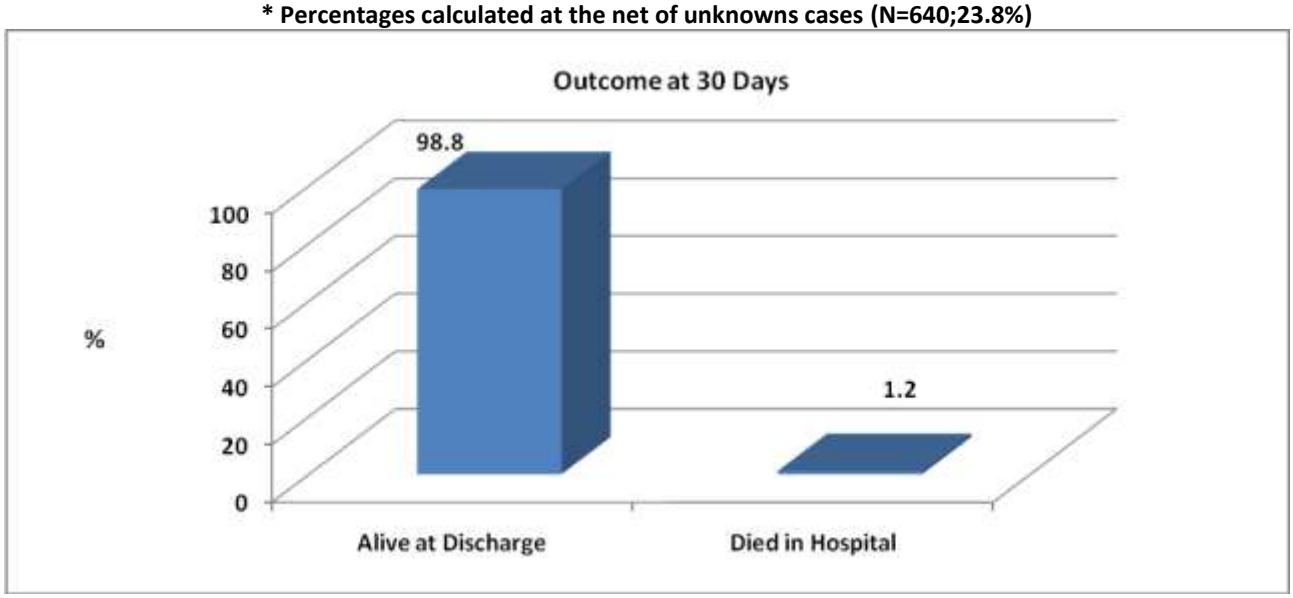
*** Percentages calculated at the net of unknowns cases (N=390;14.5%)**



Outcome at 30 days

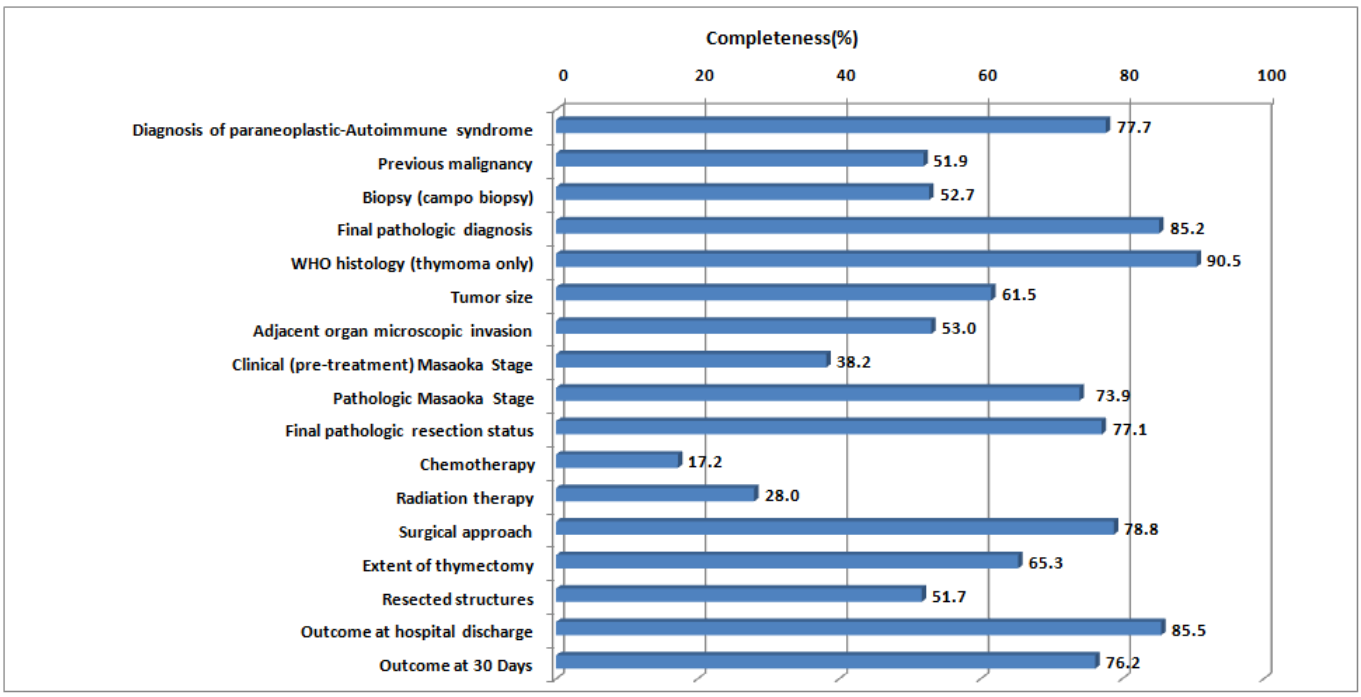
Outcome at 30 Days	Occurrences	Percent
Alive at Discharge	2029	98.8
Died in Hospital	24	1.2
Total	**2053**	**100.0**

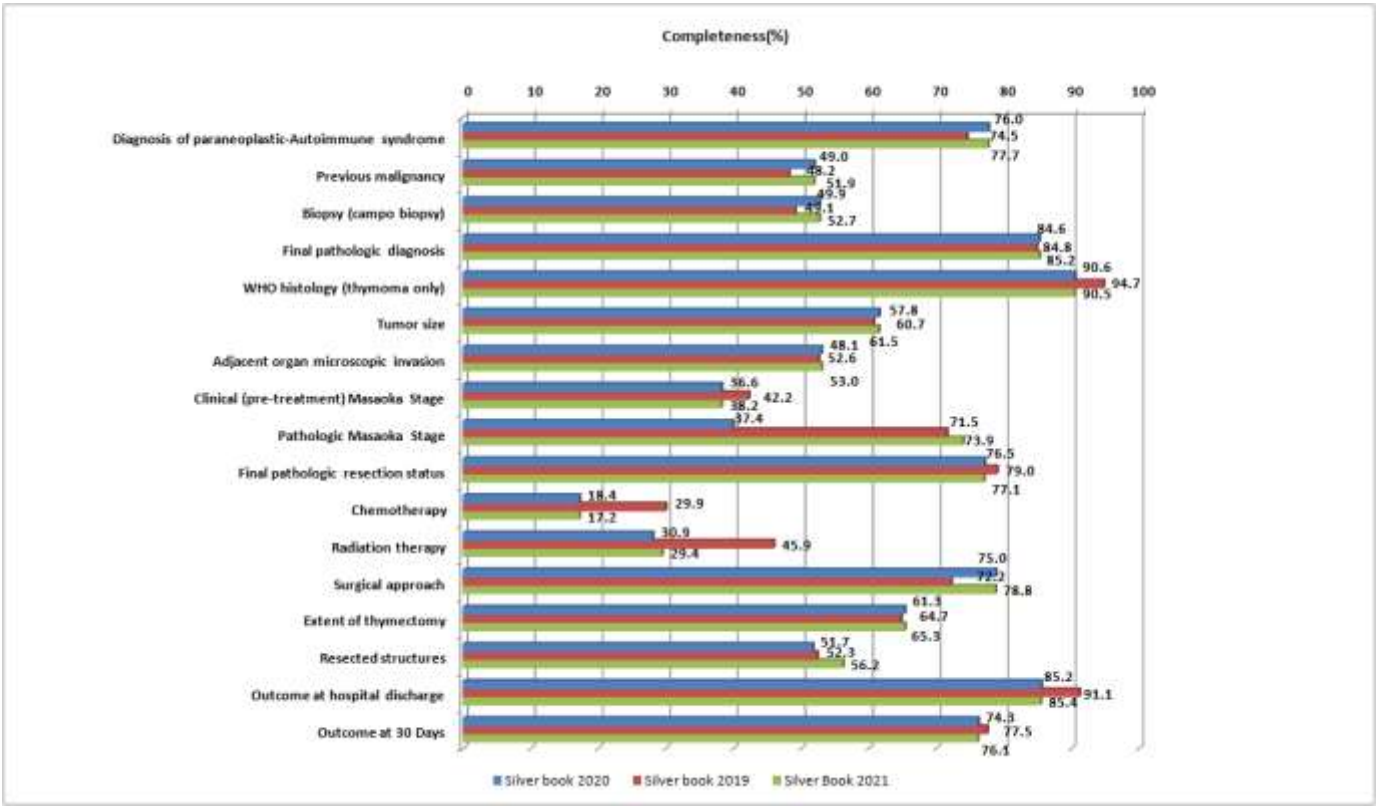
*** Percentages calculated at the net of unknowns cases (N=640;23.8%)**



Data Completeness

Name of Field	Unknown (%)	Completeness(%)
Diagnosis of paraneoplastic-Autoimmune syndrome	22.3	77.7
Previous malignancy	48.1	51.9
Biopsy (campo biopsy)	47.3	52.7
Final pathologic diagnosis	14.8	85.2
WHO histology (thymoma only)	9.5	90.5
Tumor size	38.5	61.5
Adjacent organ microscopic invasion	47.0	53.0
Clinical (pre-treatment) Masaoka Stage	61.8	38.2
Pathologic Masaoka Stage	26.1	73.9
Final pathologic resection status	22.9	77.1
Chemotherapy	82.8	17.2
Radiation therapy	72	28.0
Surgical approach	21.2	78.8
Extent of thymectomy	34.7	65.3
Resected structures	48.3	51.7
Outcome at hospital discharge	14.5	85.5
Outcome at 30 Days	23.8	76.2




Completeness(%)
0
10
20
30
40
50
60
70
80
90
100
Diagnosis of paraneoplastic-Autoimmune syndrome
76.0
74.5
77.7
Previous malignancy
49.0
48.2
51.9
Biopsy (campo biopsy)
49.9
52.7
Final pathologic diagnosis
84.6
84.8
85.2
WHO histology (thymoma only)
90.6
94.7
90.5
Tumor size
57.8
60.7
61.5
Adjacent organ microscopic invasion
48.1
52.6
53.0
Clinical (pre-treatment) Masaoka Stage
56.6
42.2
Pathologic Masaoka Stage
71.5
73.9
Final pathologic resection status
76.5
79.0
77.1
Chemotherapy
18.4
29.9
17.2
Radiation therapy
30.9
45.9
29.4
Surgical approach
75.0
78.8
Extent of thymectomy
61.3
64.7
65.3
Resected structures
51.7
52.3
56.2
Outcome at hospital discharge
85.2
91.1
85.4
Outcome at 30 Days
74.3
77.5
76.1
Silver book 2020
Silver book 2019
Silver Book 2021

PART 4

MESOTHELIOMA SECTION

(Database users only)

Message from Clinical Leader of the Mesothelioma section of ESTS Registry

Dr Andrea Bille
Chair ESTS Mesothelioma Database
Andrea.Bille@gstt.nhs.uk

Dear Colleagues,

The ESTS mesothelioma registry has been established two years ago: 2373case of mesothelioma have been recorded in the registry. Sixty-three units have introduced cases in the Registry and 21 units have introduced more than 10 cases.

The aim of this registry is to collect all mesothelioma cases treated in the institutions associated with ESTS, including not only surgical cases but also patients treated with chemotherapy and/or radiotherapy. The registry gives the opportunity to collect preoperative data (patient characteristics, clinical staging), intraoperative data and postoperative outcome (complications, in hospital mortality, overall survival and disease free interval or time of progression). Moreover we are collecting data on the multimodality treatment approach. This registry allows also to collect follow up date and data on recurrence

Thirty to 40% of patients in the registry had missing information regarding clinical and pathological staging and more than 70% of patients do not have information on their multimodality treatment. This will affect the number of analysis we can perform. It is important for all units to complete all data fields to have a more robust dataset

Recently ESTS Database Committee and IASLC have signed a data share agreement in order to share the data for the 9th TNM edition. This collaboration will let our members to introduce the data in the ESTS registry and have their data imported in the IASLC database for staging purpose. This agreement should reduce the work load in uploading the data. ESTS but also all the institutions and contributors will get credit for any publication or research from IASLC using our data.

In order to improve the quality of the data and the number of patients to be included in the IASLC staging project it is important to include every mesothelioma case in the registry and improve the data completeness. Some fields, like clinical, pathological stage, histology and type of surgery will

be mandatory to increase the number of core data to analyze.Follow up data and survival data will be carefully reviewed in order to complete the data analysis on our registry. Next year we are aiming to publish a preliminary analysis on the data recorded in our registry.

Also research projects involving retrospective data collected in the registry are welcome and they should be presented to the database committee. One recent project on malignant mesothelioma with distant metastasis has been completed and published in Tumori Journal. I strongly invite all ESTS members with an interest in mesothelioma to consider to submit cases to the ESTS mesothelioma registry and to consider the database as possible resource for their project.

Best regards

Dr. Andrea Billè

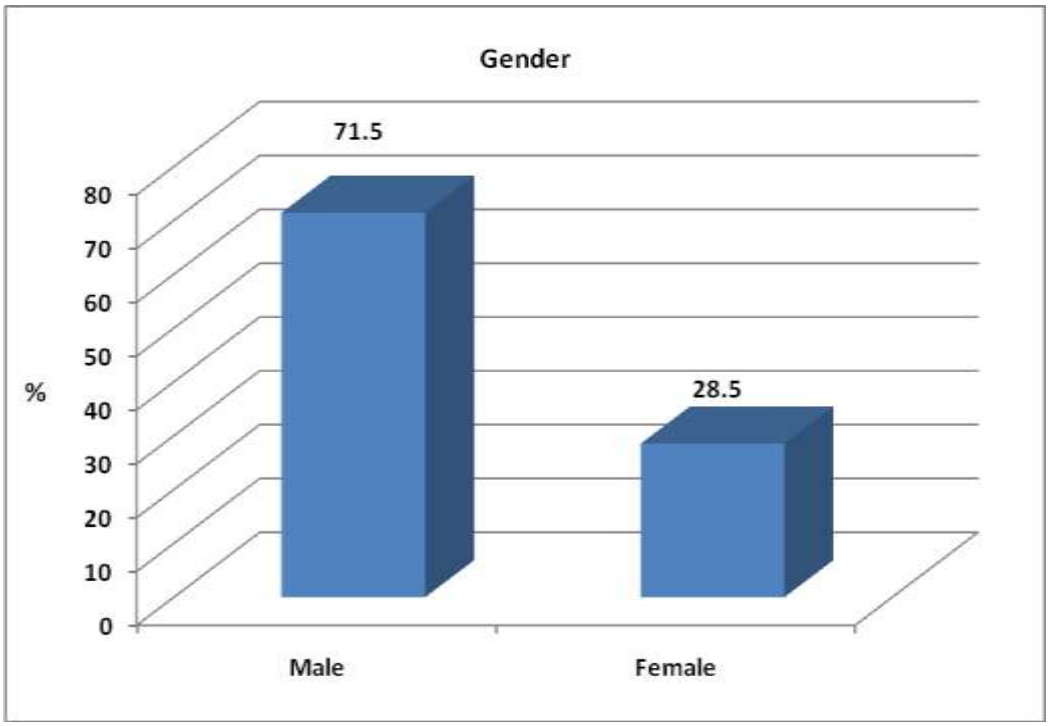
Chair of the ESTS Mesothelioma Working GroupAndrea.Bille@gstt.nhs.uk

Mesothelioma Section fields

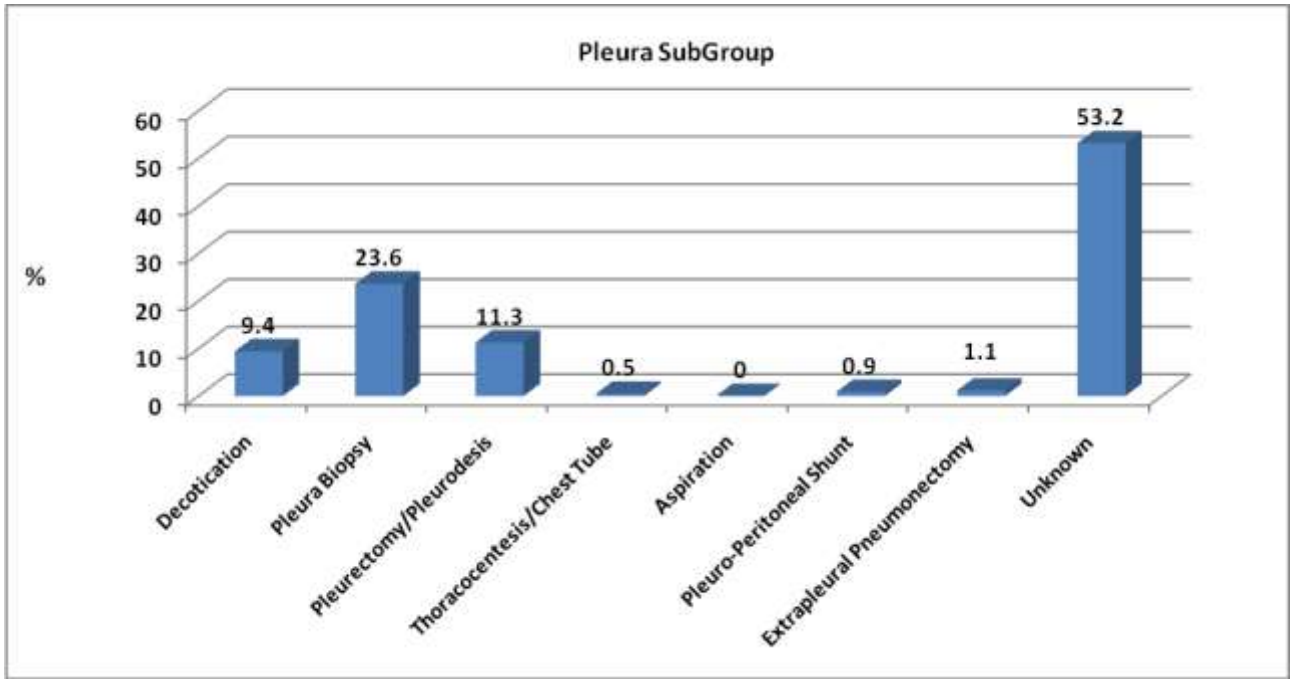
Group definition: Pleura – Diagnosis : Mesothelioma; prospective cases
January 1990- May 2021
N=2400

Demographics: gender

Gender	Occurrences	Percent
Male	1715	71.5
Female	685	28.5
Total	**2400**	**100**

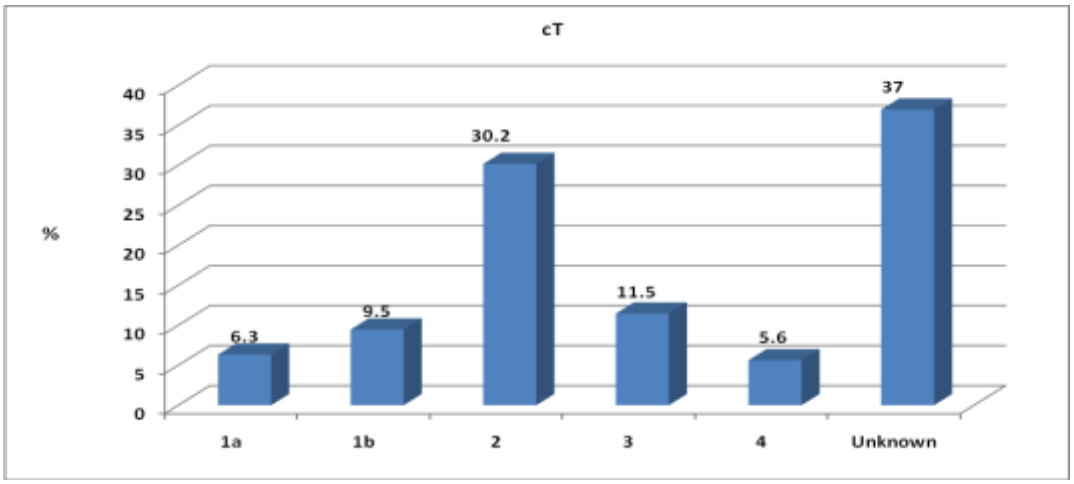


Pleura Subgroup	Occurrences	Percent
Decotication	226	9.4
Pleura Biopsy	567	23.6
Pleurectomy/Pleurodesis	270	11.3
Thoracocentesis/Chest Tube	11	0.5
Aspiration	1	0.0
Pleuro-Peritoneal Shunt	21	0.9
Extrapleural Pneumonectomy	27	1.1
Unknown	1277	53.2
Total	**2400**	**100.0**

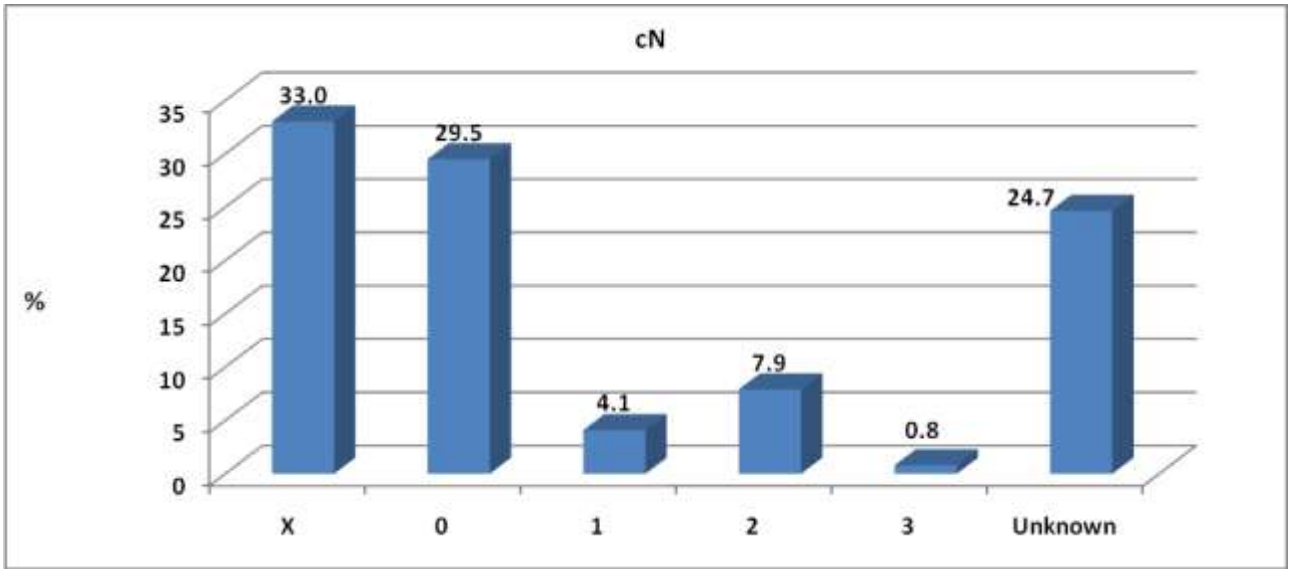


Clinical Staging : cT,cN,cM

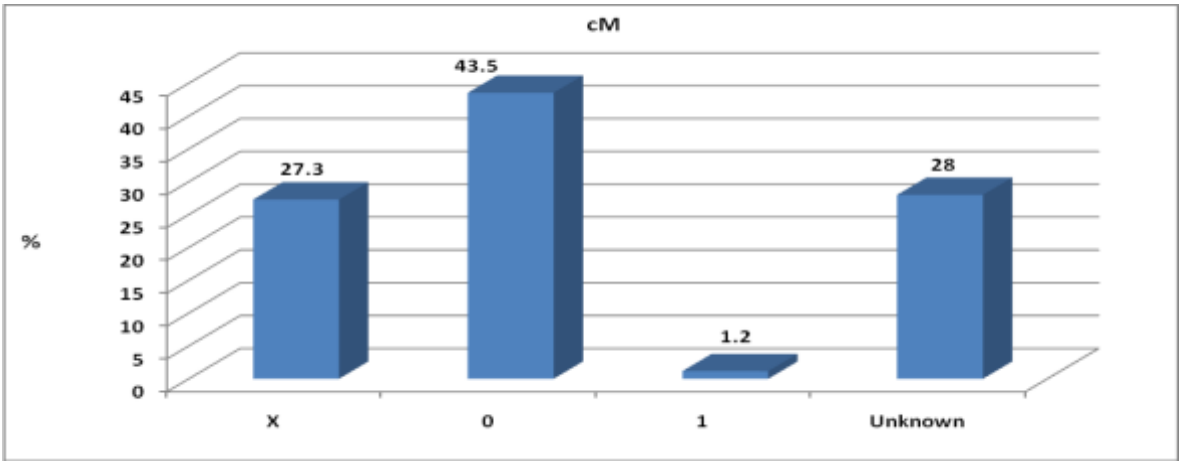
cT	Occurrences	Percent
1a	152	6.3
1b	227	9.5
2	724	30.2
3	275	11.5
4	135	5.6
Unknown	887	37.0
Total	**2400**	**100.0**



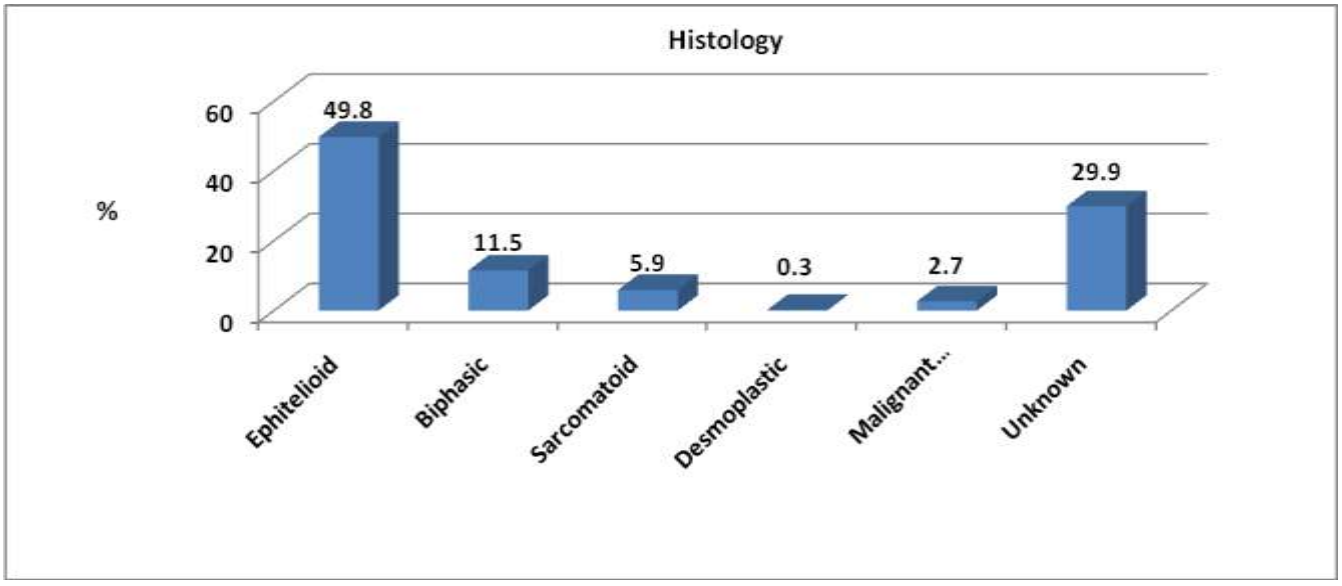
cN	Occurrences	Percent
X	793	33.0
0	708	29.5
1	98	4.1
2	190	7.9
3	19	0.8
Unknown	592	24.7
Total	**2400**	**100.0**



cM	Occurrences	Percent
X	655	27.3
0	1045	43.5
1	28	1.2
Unknown	672	28.0
Total	**2400**	**100.0**

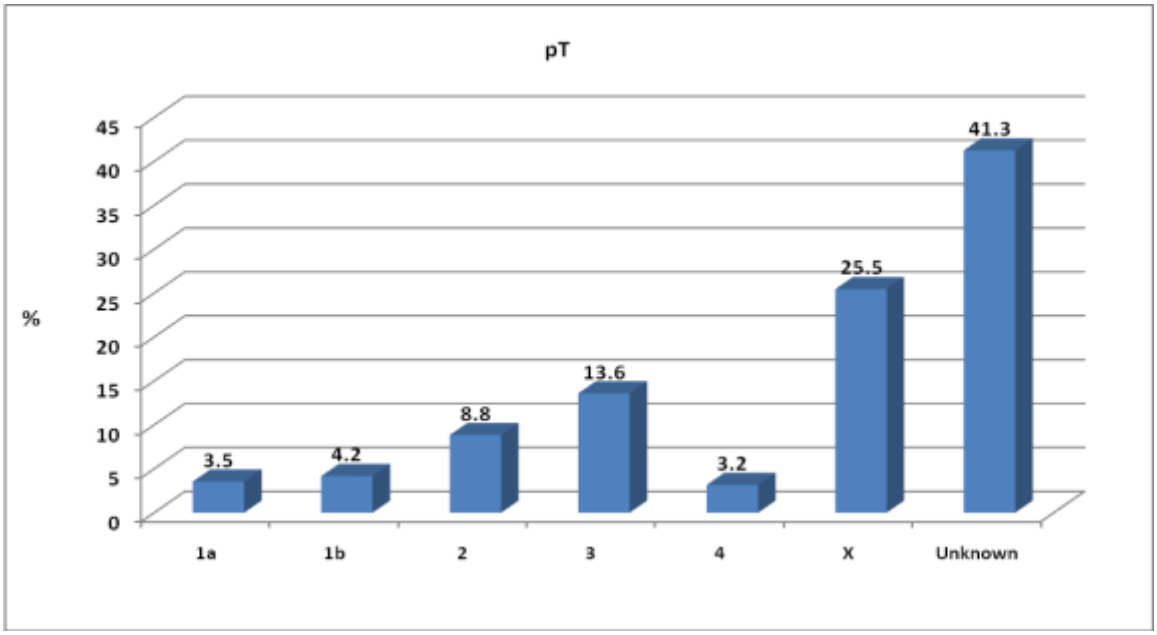


Histology	Occurrences	Percent
Ephitelioid	1194	49.8
Biphasic	276	11.5
Sarcomatoid	142	5.9
Desmoplastic	6	0.3
Malignant mesothelioma	64	2.7
Unknown	718	29.9
Total	**2400**	**100.0**

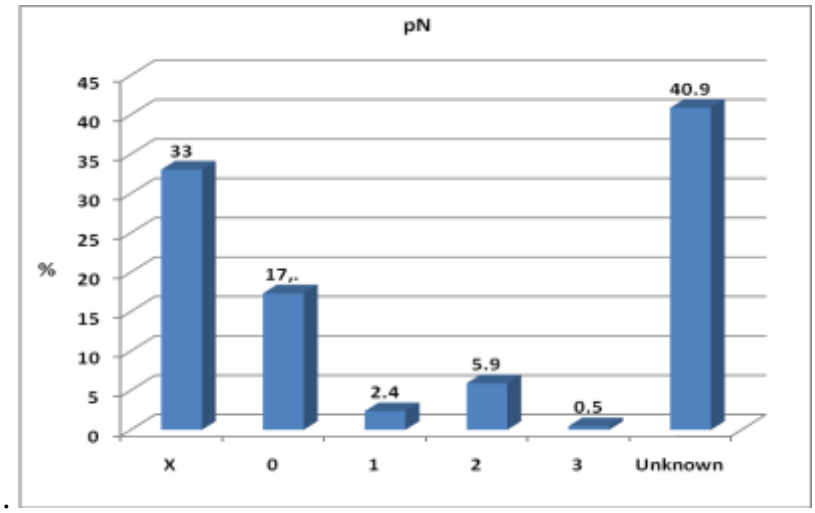


Pathological Staging : pT,pN,pM

pT	Occurrences	Percent
1a	85	3.5
1b	100	4.2
2	212	8.8
3	326	13.6
4	76	3.2
X	611	25.5
Unknown	990	41.3
Total	**2400**	**100.0**



pN	Occurrences	Percent
X	793	33.0
0	416	17.3
1	57	2.4
2	142	5.9
3	11	0.5
Unknown	981	40.9
Total	**2400**	**100.0**



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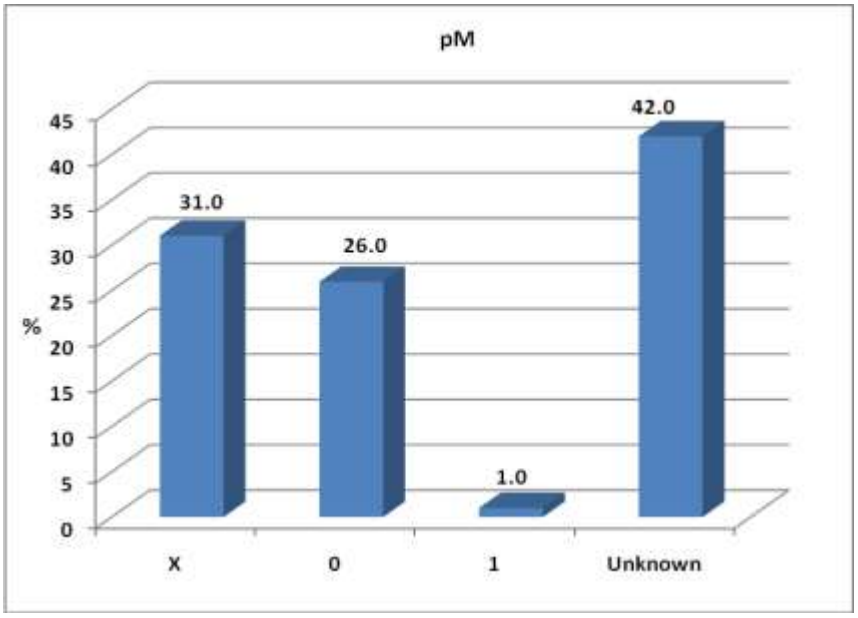
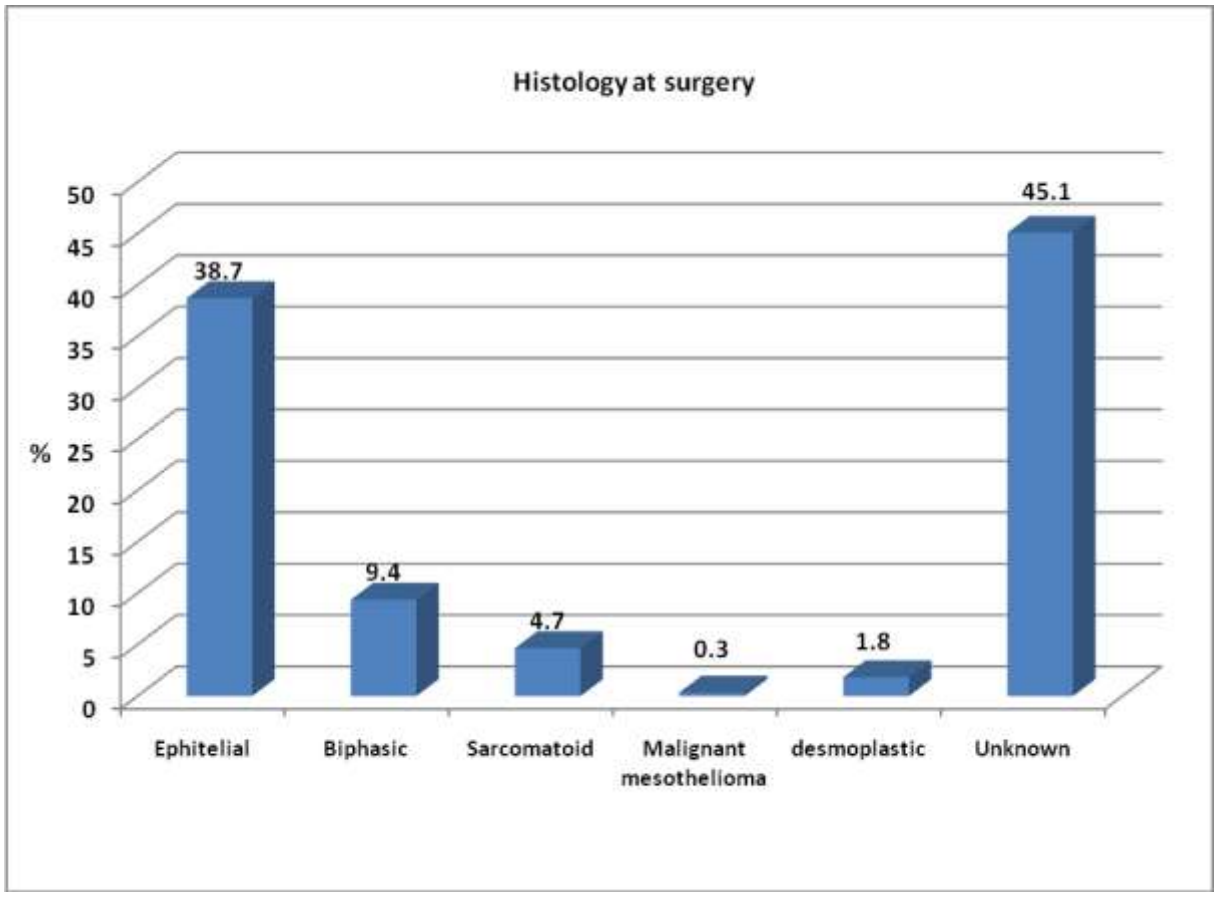
pM	Occurrences	Percent
X	745	31.0
0	623	26.0
1	24	1.0
Unknown	1008	42.0
Total	**2400**	**100.0**



Histology at surgery	Occurrences	Percent
Ephitelial	929	38.7
Biphasic	225	9.4
Sarcomatoid	112	4.7
Malignant mesothelioma	8	0.3
desmoplastic	44	1.8
Unknown	1082	45.1
Total	**2400**	**100.0**

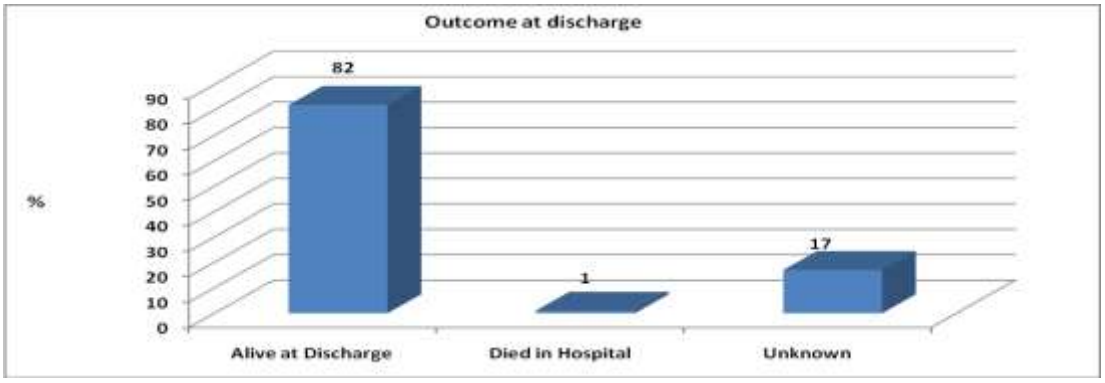


First Treatment at sequence	Occurrences	Percent
None	115	4.8
Surgery	350	14.6
Chemotherapy	355	14.8
Radiotherapy	7	0.3
Other	4	0.2
Unknown	1569	65.4
Total	**2400**	**100.0**

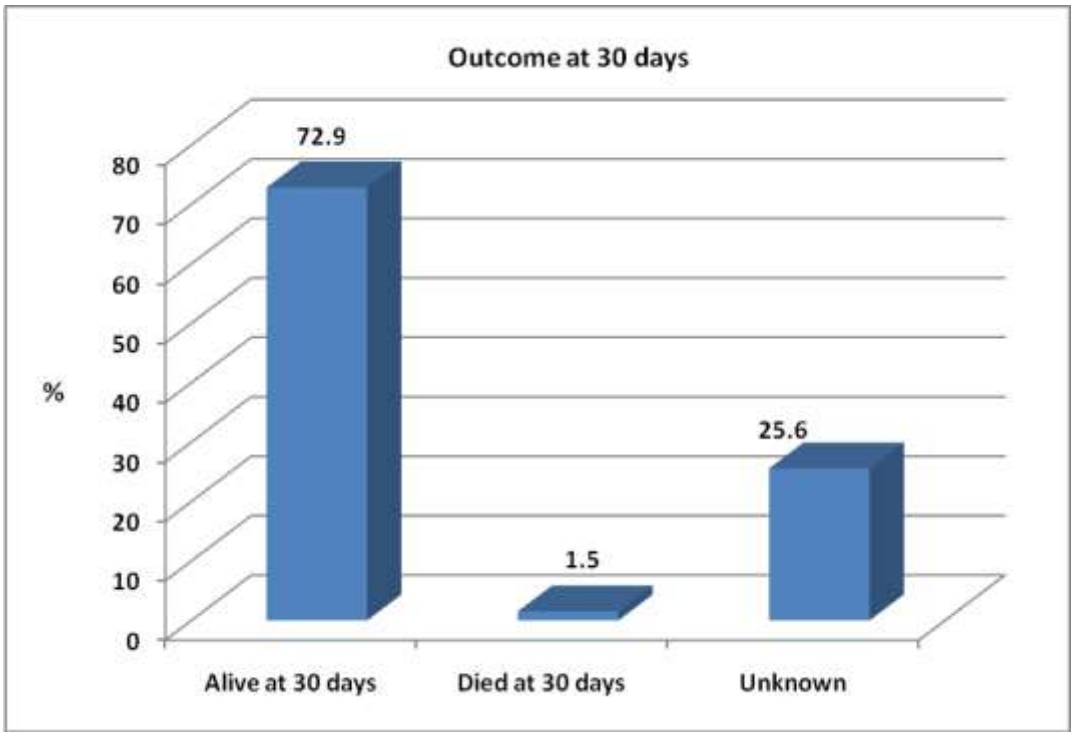
Second Treatment at sequence	Occurrences	Percent
None	158	6.6
Surgery	124	5.2
Chemotherapy	239	10.0
Radiotherapy	27	1.1
Other	8	0.3
Unknown	1844	76.8
Total	**2400**	**100.0**

Third Treatment at sequence	Occurrences	Percent
None	215	9.0
Surgery	7	0.3
Chemotherapy	26	1.1
Radiotherapy	82	3.4
Other	16	0.7
Unknown	2054	85.6
Total	**2400**	**100.0**

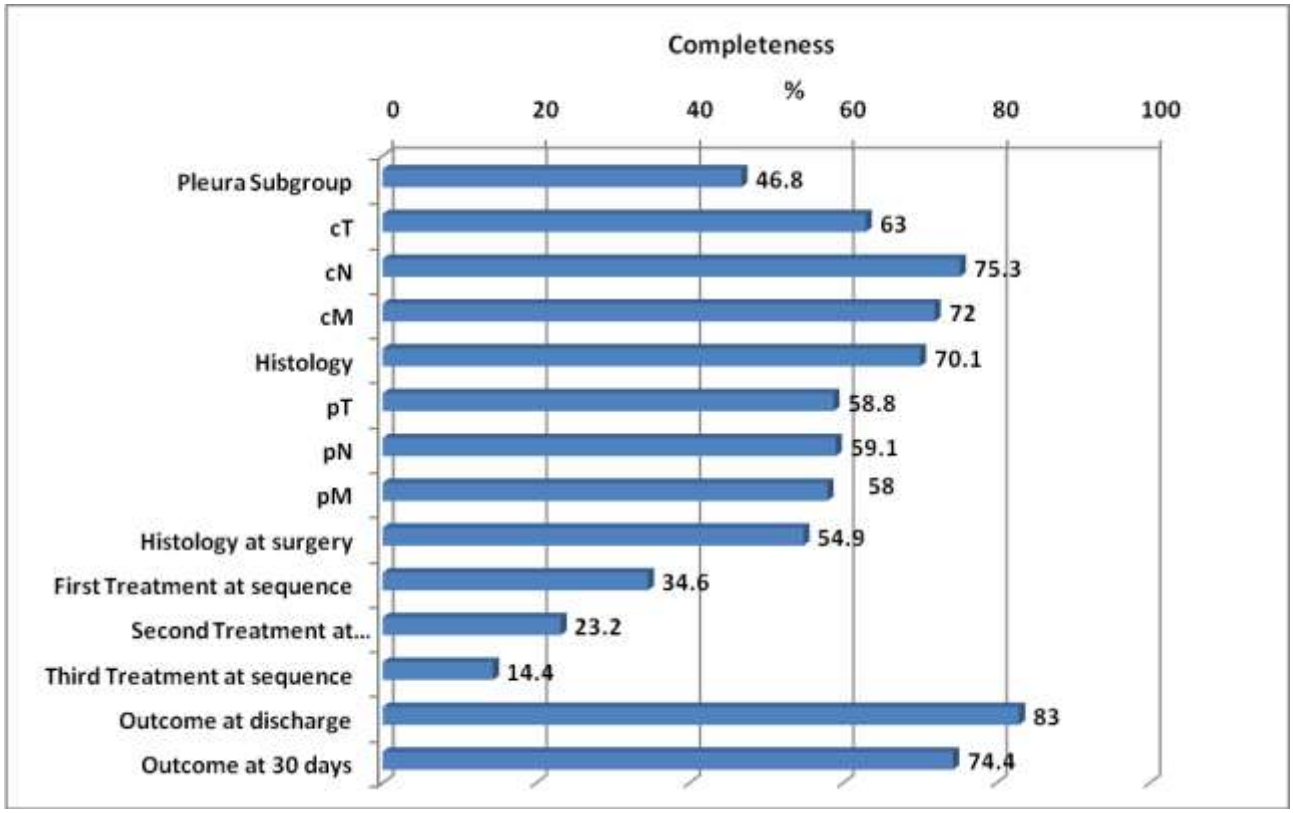
Outcome at discharge	Occurrences	Percent
Alive at Discharge	1967	82.0
Died in Hospital	25	1.0
Unknown	408	17.0
Total	**2400**	**100.0**

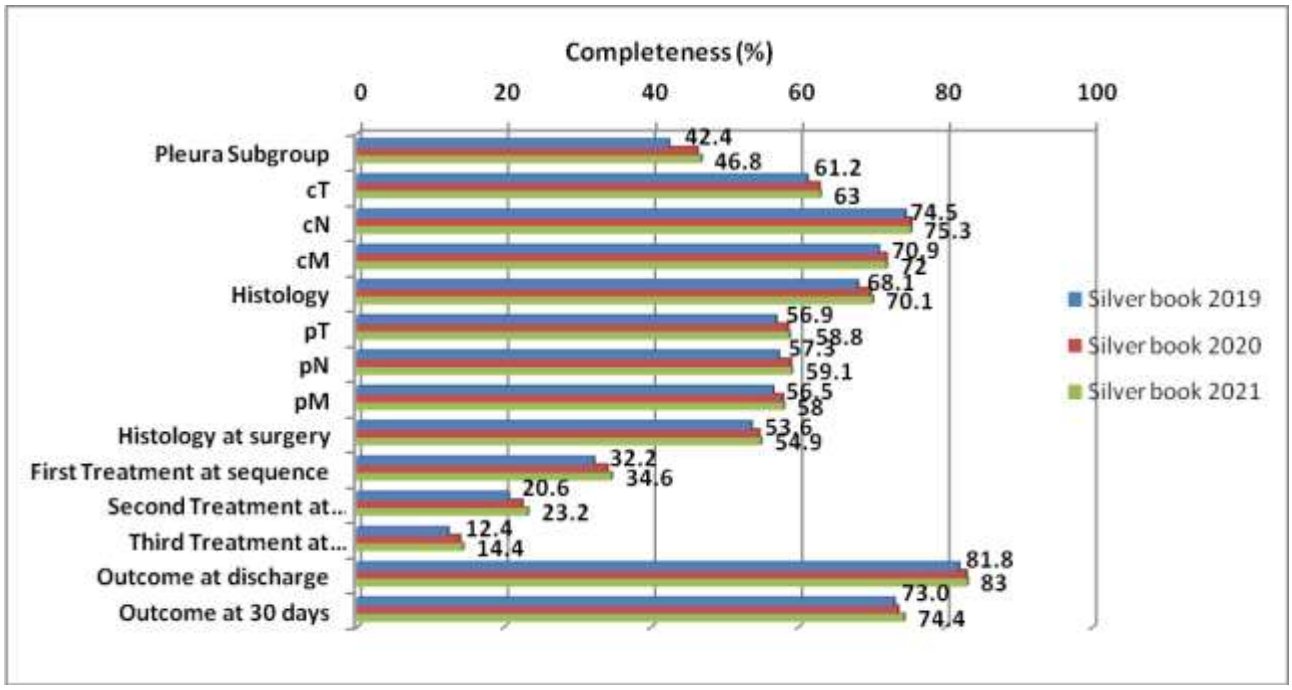


Outcome at 30 days	Occurrences	Percent
Alive at 30 days	1749	72.9
Died at 30 days	37	1.5
Unknown	614	25.6
Total	**2400**	**100.0**



Name of Field	Unknown (%)	Completeness(%)
Pleura Subgroup	53.2	46.8
cT	37.0	63.0
cN	24.7	75.3
cM	28.0	72.0
Histology	29.9	70.1
pT	41.3	58.8
pN	40.9	59.1
pM	42.0	58.0
Histology at surgery	45.1	54.9
First Treatment at sequence	65.4	34.6
Second Treatment at sequence	76.8	23.2
Third Treatment at sequence	85.6	14.4
Outcome at discharge	17.0	83.0
Outcome at 30 days	25.6	74.4




Completeness (%)
0
20
40
60
80
100
Pleura Subgroup
cT
cN
cM
Histology
pT
pN
pM
Histology at surgery
First Treatment at sequence
Second Treatment at...
Third Treatment at...
Outcome at discharge
Outcome at 30 days
42.4
46.8
61.2
63
74.5
75.3
70.9
72
68.1
70.1
56.9
58.8
57.3
59.1
56.5
58
53.6
54.9
32.2
34.6
20.6
23.2
12.4
14.4
81.8
83
73.0
74.4
Silver book 2019
Silver book 2020
Silver book 2021

PART 5

NETTS SECTION
(Database users only)

Message from Clinical Leader of ESTS RegistryNETTS section

Dr Pierluigi Filosso
Chair NETTs Database
pierluigi.filosso@unito.it

DearColleagues,

for the second time, thisyear the NETTssectionhasbeenincluded in the ESTS Database Annual Report (the so called*"Silver Book"*). The NETTsWorking-Group wasborn in 2012, during the 20thEuropean Conference on General Thoracic Surgery, held in Essen (Germany). At that time, the project for a retrospective database waslaunched and in afewmonthswewereable to collecta very large series ofpatientsoperatedbetween 1994 and 2012 in 17 ESTS General Thoracic SurgeryCentresworldwide.

Severalpapershavebeenpublishedusingthisretrospectiveseries, and currentlytheyrepresentthe benchmark for the treatment ofsuch rare tumors. In fact, thesepapershavebeenlargelycited in the scientific community, demonstrating the importance of the work done so far by our Group.

The next stepwastaken in 2015,whenthe ESTS NETTsWorking Group decided to promote a new prospectivedatabase, using the official ESTS platform:itrepresentedone of the first satellite databasesincorporatedinto the ESTS Core Registry.

Up to now, 1648 NETTspatients (198 prospective)havebeenincluded in the database: thisrepresentsone of the largestseries of lungNETTsevercollected. Thisextraordinaryresultis due to the enthusiastic input from the Centers whichconstantly upload theircases in the database.
I wouldlike to highlight some importantaspects, whichmaybetter summarize the reported results:

1. The majority of surgical procedureswereanatomicalresections, with 193 pneumonectomies and 1009 lobectomies (centraltumorspercentage: 41.2%). The majority of patientsreceived a radical resection (R1 + R2: 2.4%, only)
2. LungNETTsconfirmed to have a predisposition indevelopingsecondmalignancies
3. VATS was performed in 9.1 % of cases, a good increment from last year's 5.5%.
4. Data completenesspercentageis now 83,7%: thistestifiesthe accuracy with whicheach Center hasentereditscases in the database; however there was a 16,8% data unknow (missing) about Outcome at Operation, and this must improve.

Furthermore, the ESTS NETTs database represents a uniqueopportunity for any ESTS contributor to propose studiesusingthese data.Proposals are welcome and will be discussedamong the NETTsSteeringCommitteeand the ESTS Database Committee.

On behalf of the ESTS Database Committee and the ESTS Leadership, I wouldlike to personallythankall the Centers whocontributed to the success of this database.

Best regards

Dr. Pierluigi Filosso

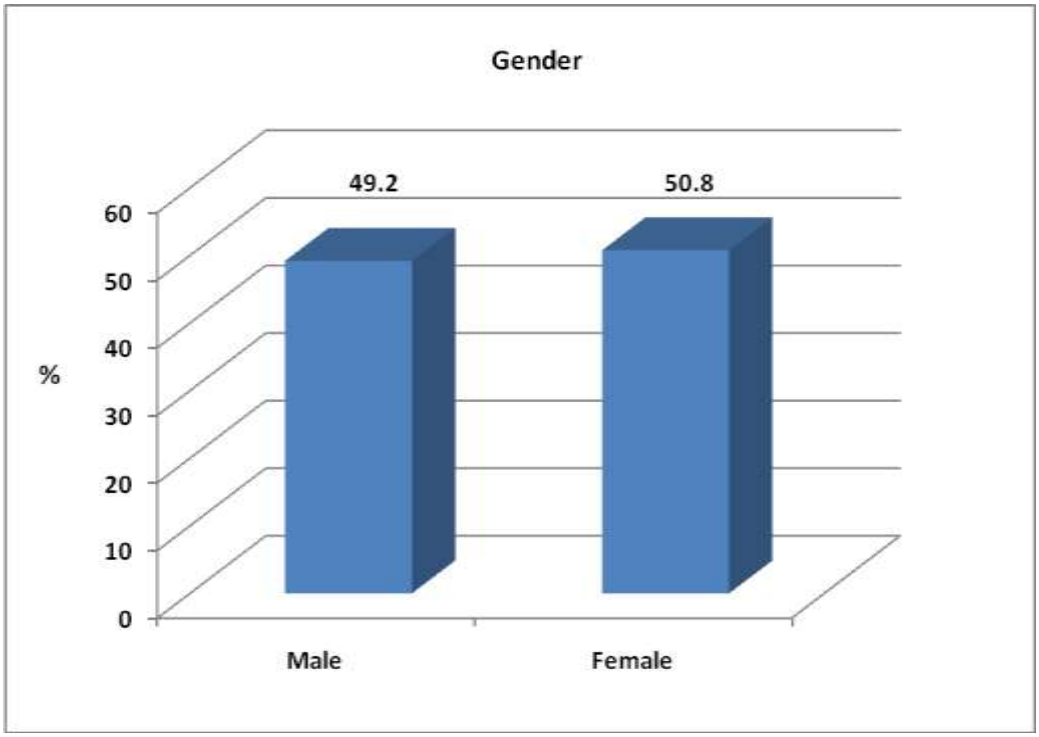
Chair NETTs Database
pierluigi.filosso@unito.it

NETTS Section fields

Group Definition : Lung And Diagnosis : Lung Cancer (NSCLC)
January 1980- December 2020
N=1648

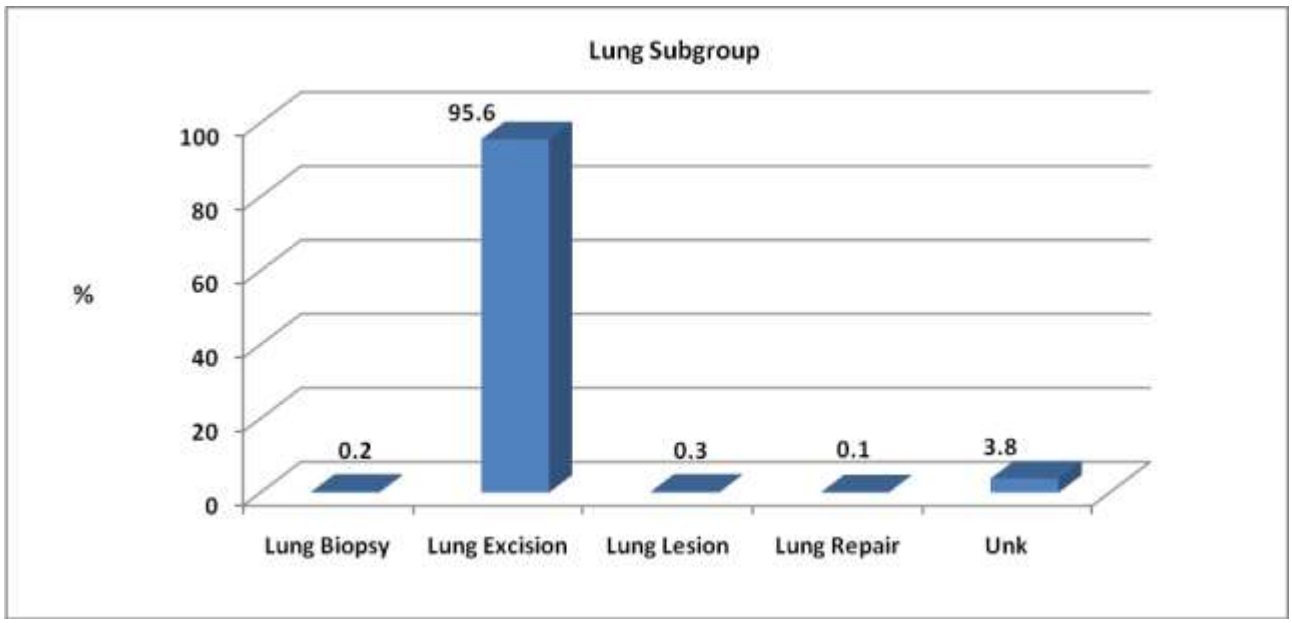
Demographics: gender

Gender	Occurrences	Percent
Male	811	49.2
Female	837	50.8
Total	1648	100



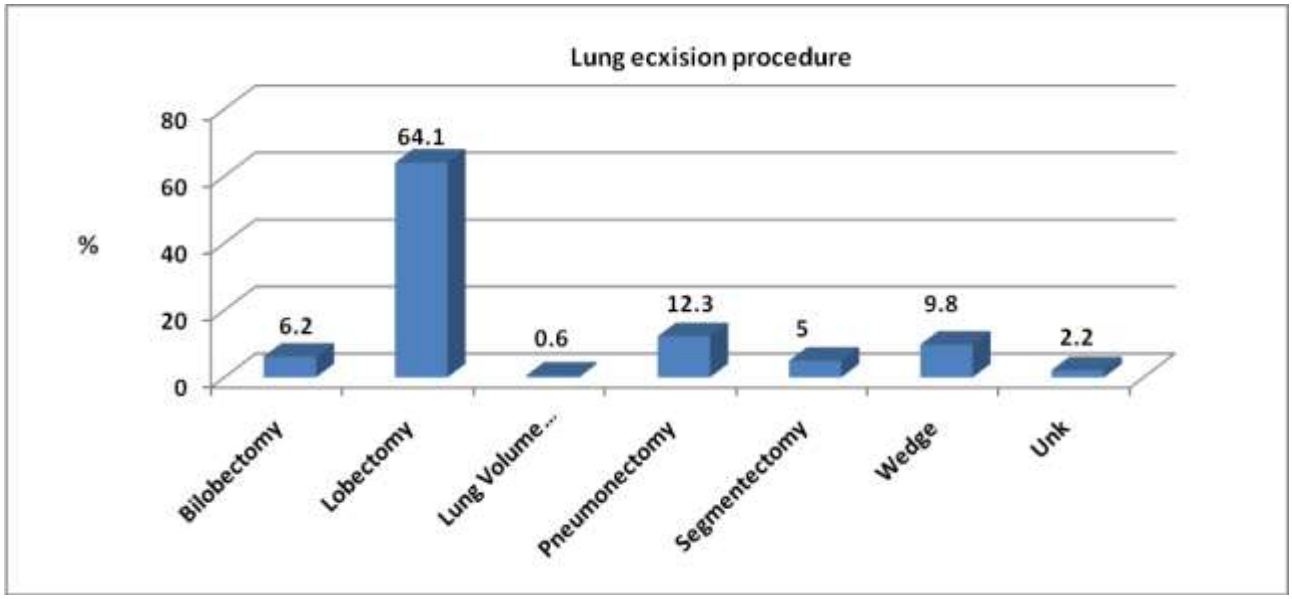
Lung Subgroup

Lungsubgroup	Occurrences	Percent
Lung Biopsy	4	0.2
Lung Excision	1575	95.6
Lung Lesion	5	0.3
Lung Repair	1	0.1
Unk	63	3.8
Total	1648	100



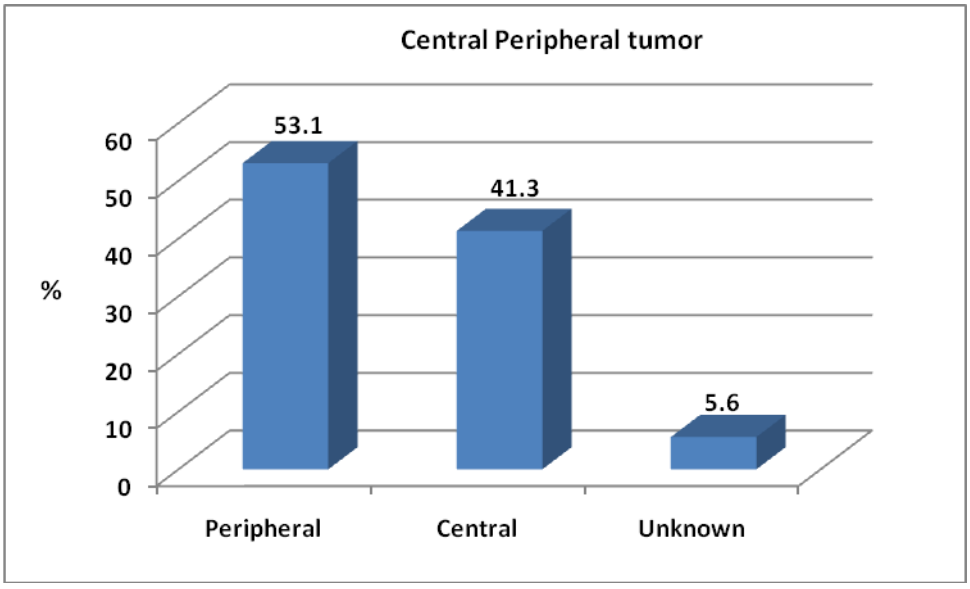
Lung Excision Procedure

Lung excision procedure	Occurrences	Percent
Bilobectomy	98	6.2
Lobectomy	1009	64.1
Lung Volume Reduction	9	0.6
Pneumonectomy	193	12.3
Segmentectomy	78	5.0
Wedge	154	9.8
Unk	34	2.2
Total	1575	100



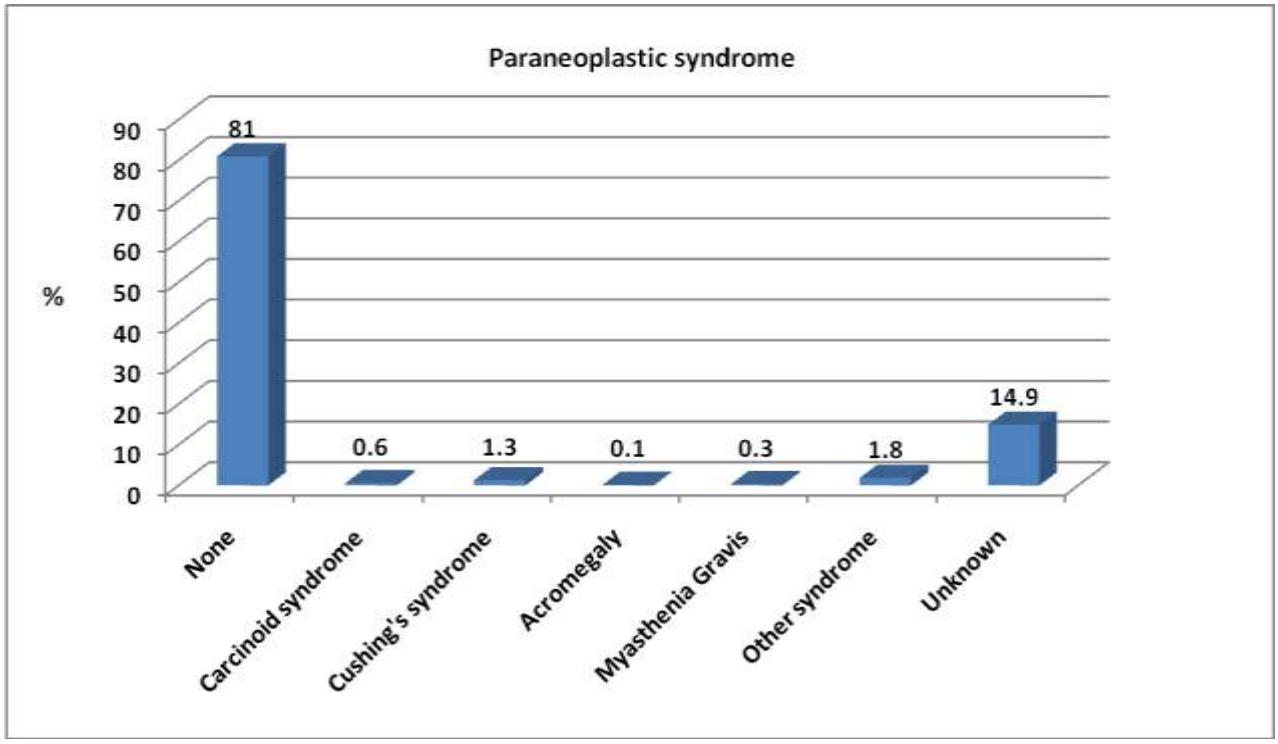
Centralperipheraltumor

centralperipheraltumor	Occurrences	Percent
Peripheral	836	53.1
Central	651	41.3
Unknown	88	5.6
Total	1575	100



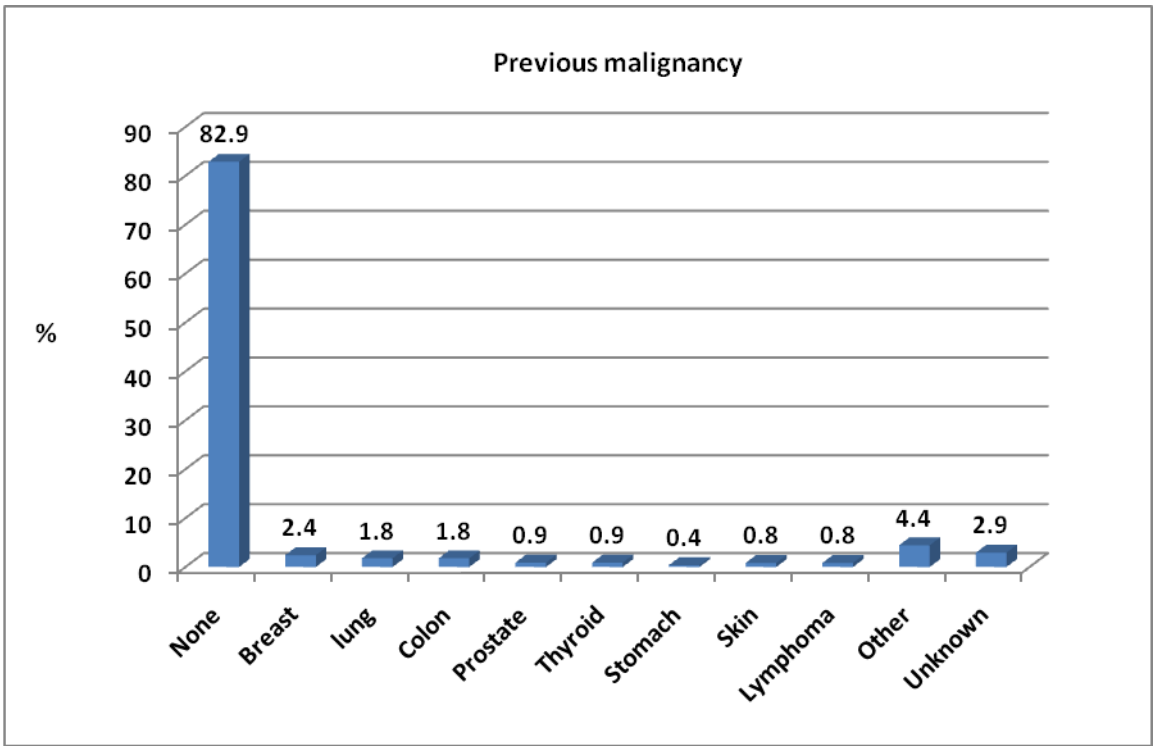
Paraneoplastic syndrome

paraneoplasticsyndrome	Occurrences	Percent
None	1275	81.0
Carcinoid syndrome	9	0.6
Cushing's syndrome	20	1.3
Acromegaly	2	0.1
Myasthenia Gravis	5	0.3
Other syndrome	29	1.8
Unknown	235	14.9
Total	1575	100



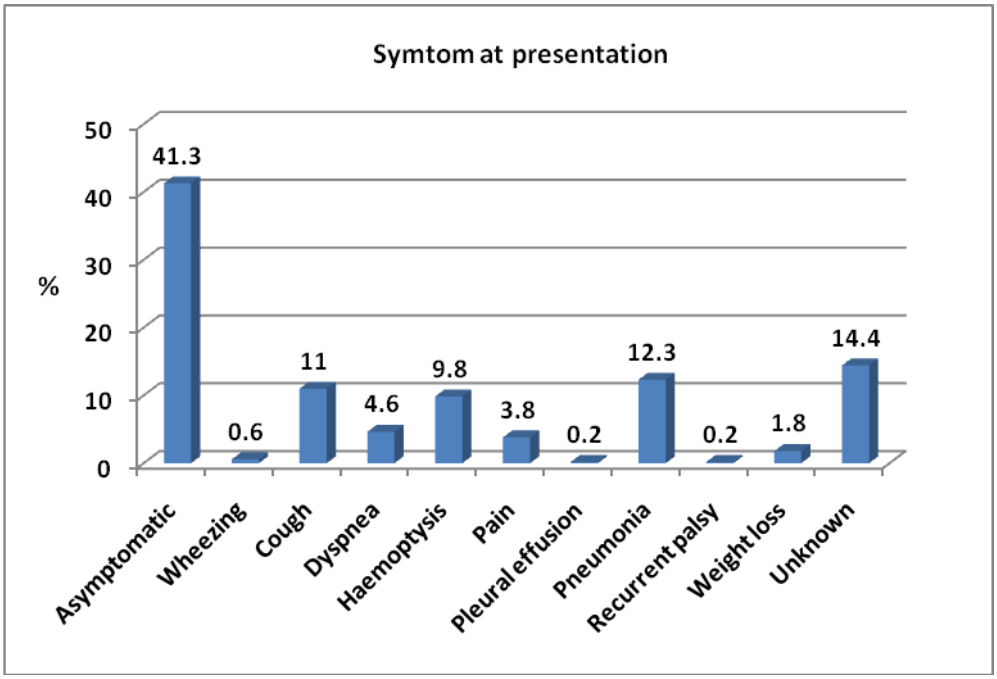
Previous Malignancy

previous malignancy	Occurrences	Percent
None	1305	82.9
Breast	38	2.4
lung	28	1.8
Colon	28	1.8
Prostate	14	0.9
Thyroid	14	0.9
Stomach	6	0.4
Skin	13	0.8
Lymphoma	13	0.8
Other	70	4.4
Unknown	46	2.9
Total	1575	100



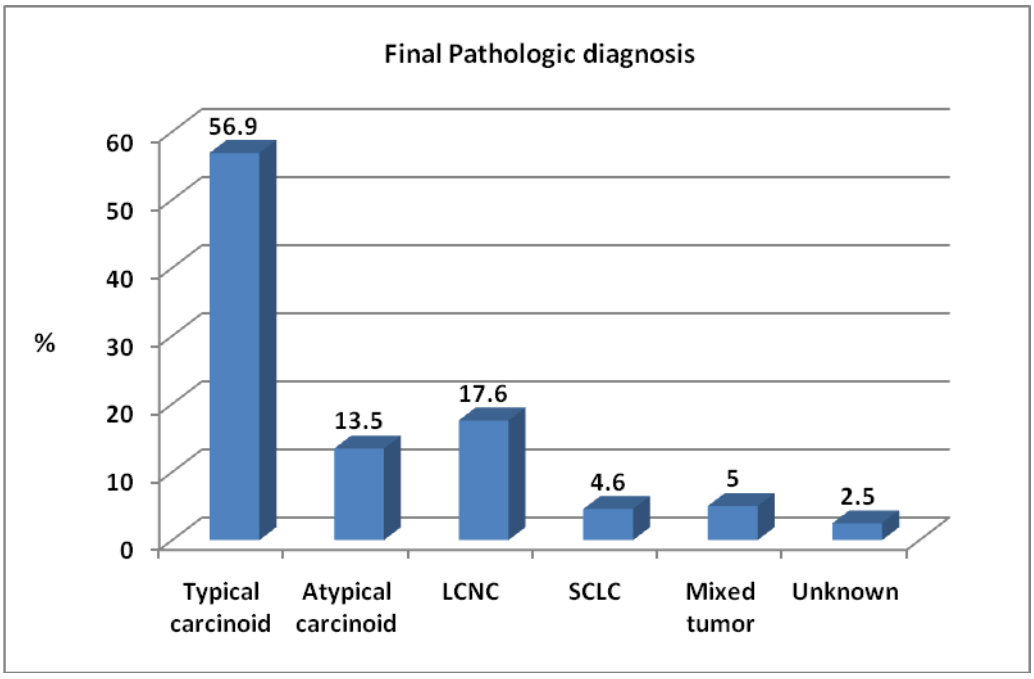
Symptom at presentation

symptomsatpresentation	Occurrences	Percent
Asymptomatic	650	41.3
Wheezing	9	0.6
Cough	173	11.0
Dyspnea	73	4.6
Haemoptysis	155	9.8
Pain	60	3.8
Pleural effusion	3	0.2
Pneumonia	194	12.3
Recurrent palsy	3	0.2
Weight loss	28	1.8
Unknown	227	14.4
Total	1575	100



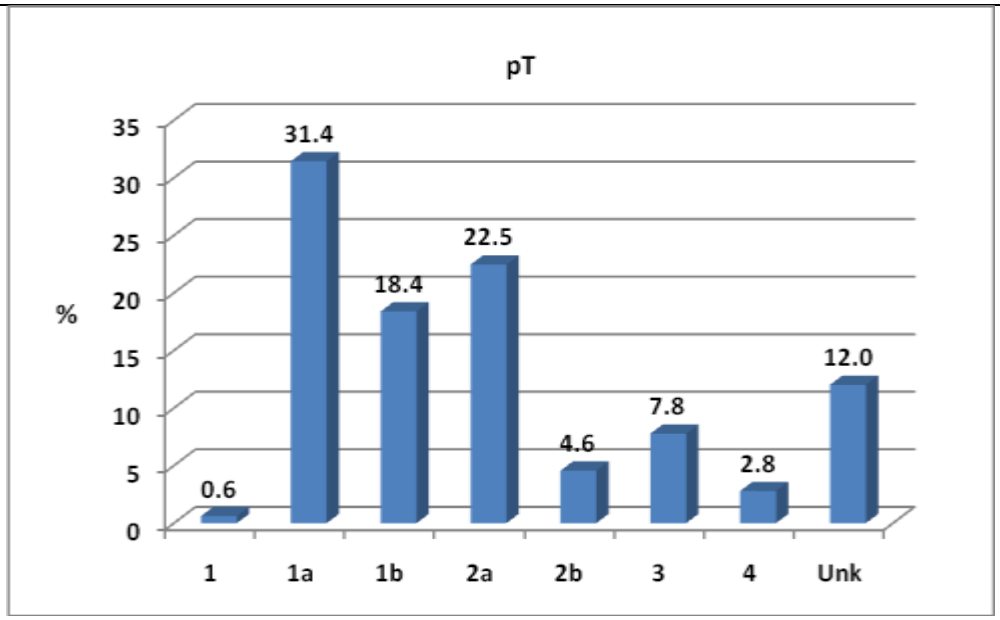
Final pathologic diagnosis

finalpathologicdiagnosis	Occurrences	Percent
Typical carcinoid	896	56.9
Atypical carcinoid	212	13.5
LCNC	277	17.6
SCLC	72	4.6
Mixed tumor	79	5.0
Unknown	39	2.5
Total	1575	100

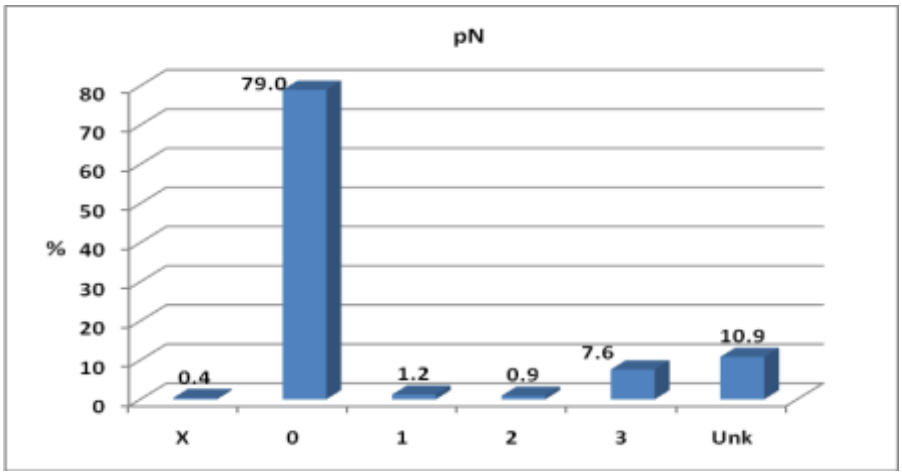


Pathological Staging (On all Lung Subgroup) : pT,pN,pM

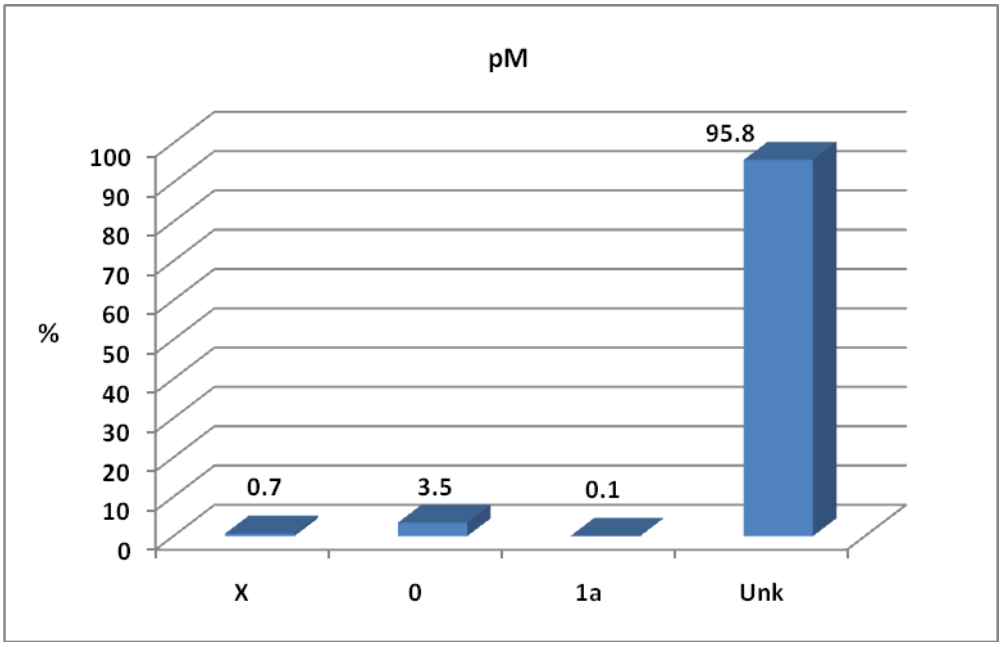
pT	Occurrences	Percent
1	10	0.6
1a	518	31.4
1b	303	18.4
2a	370	22.5
2b	75	4.6
3	128	7.8
4	46	2.8
Unk	198	12.0
Total	**1648**	**100.0**



pN	Occurrences	Percent
X	6	0.4
0	1302	79.0
1	20	1.2
2	15	0.9
3	126	7.6
Unk	179	10.9
Total	**1648**	**100.0**

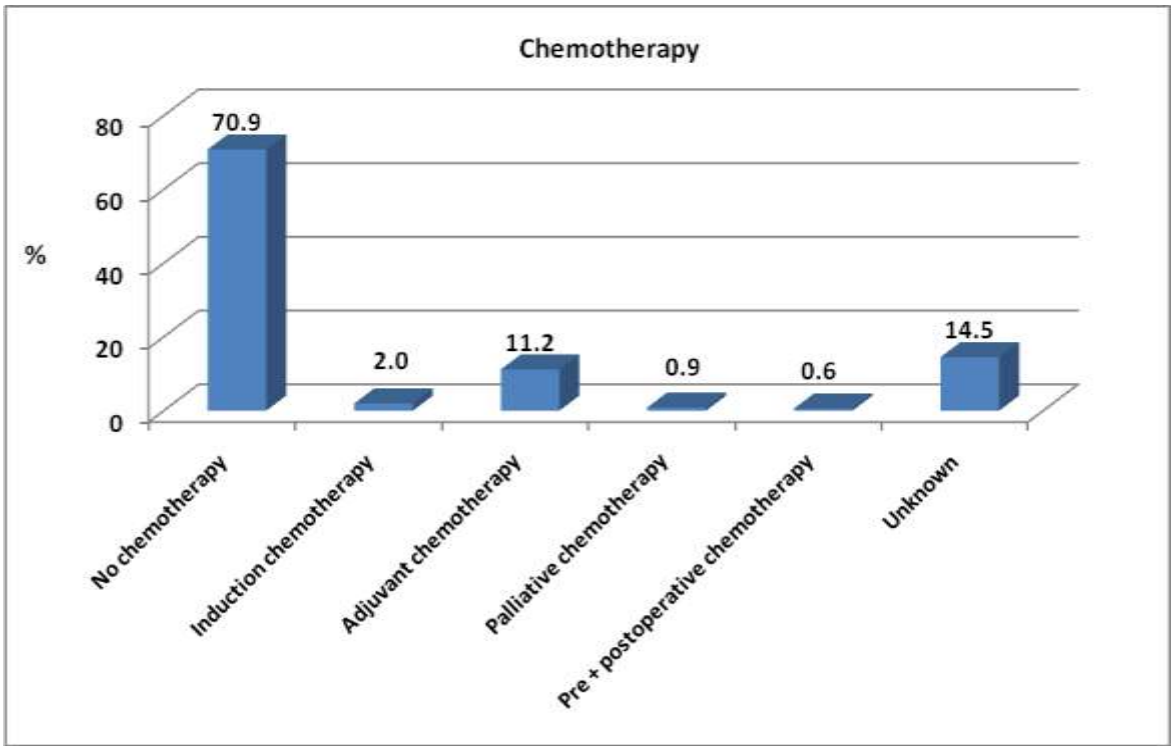


pM	Occurrences	Percent
X	11	0.7
0	57	3.5
1a	2	0.1
Unk	1578	95.8
Total	**1648**	**100.0**



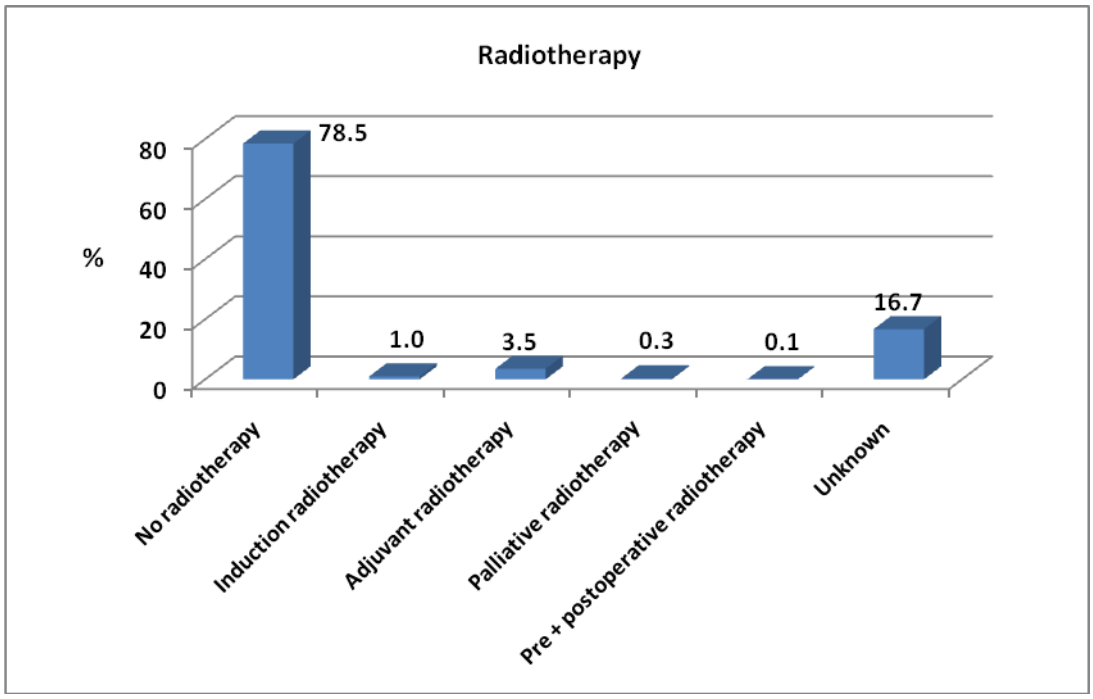
Chemotherapy

chemotherapy	Occurrences	Percent
No chemotherapy	1116	70.9
Induction chemotherapy	31	2.0
Adjuvant chemotherapy	176	11.2
Palliative chemotherapy	14	0.9
Pre + postoperative chemotherapy	9	0.6
Unknown	229	14.5
Total	1575	100



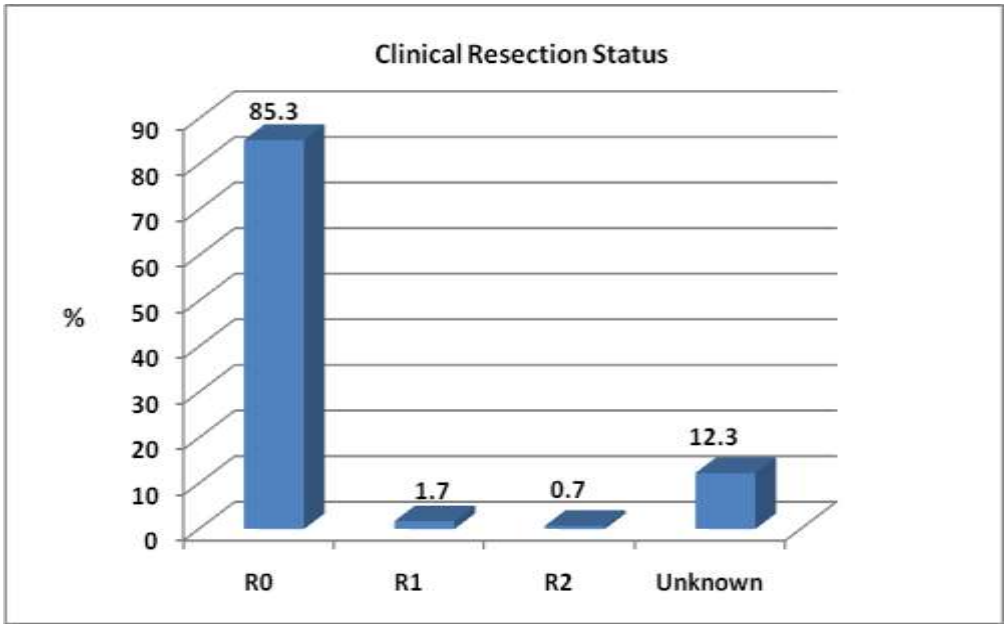
Radiotherapy

Radiotherapy	Occurrences	Percent
No radiotherapy	1236	78.5
Induction radiotherapy	15	1.0
Adjuvant radiotherapy	55	3.5
Palliative radiotherapy	5	0.3
Pre + postoperative radiotherapy	1	0.1
Unknown	263	16.7
Total	1575	100



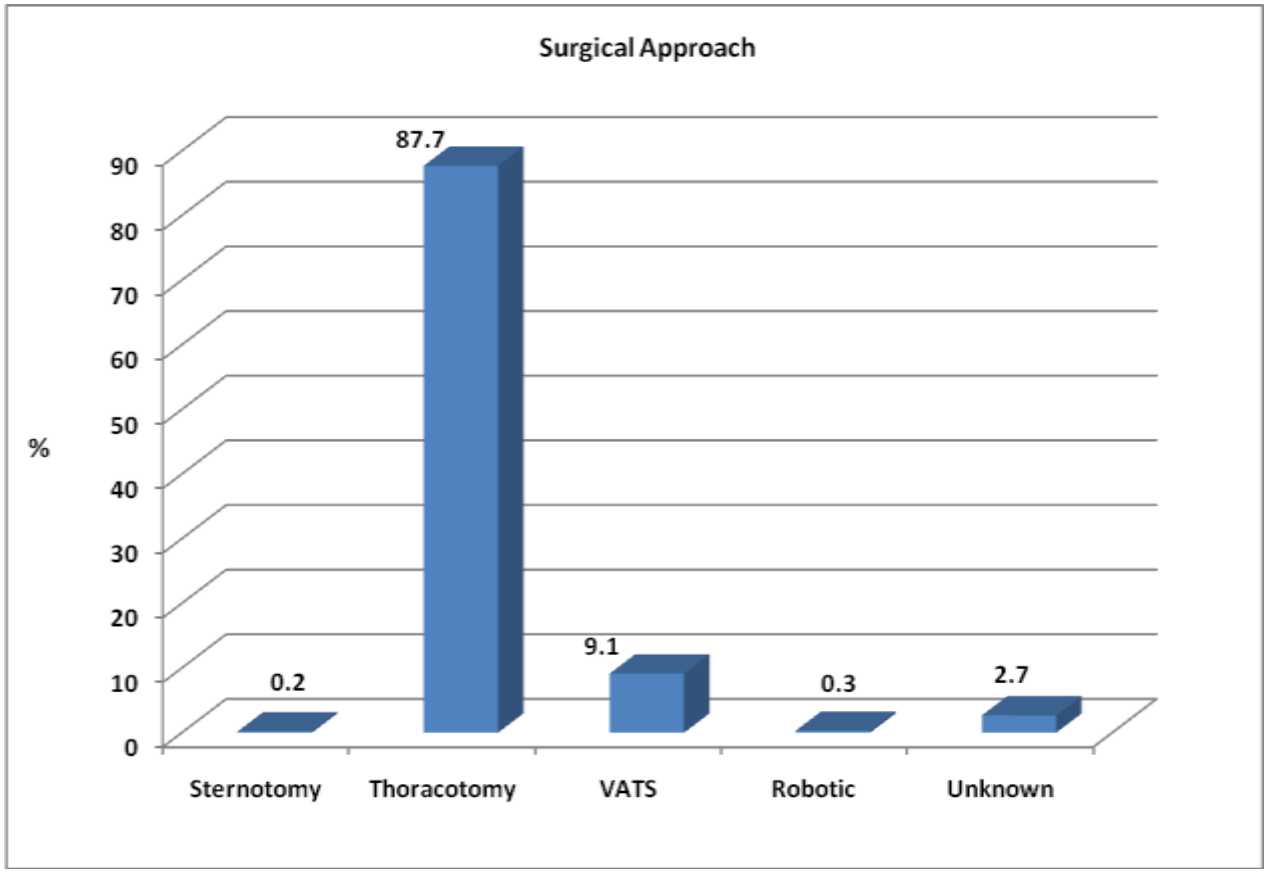
Clinical Resection Status

Clinical Resection Status	Occurrences	Percent
R0	1344	85.3
R1	27	1.7
R2	11	0.7
Unknown	193	12.3
Total	1575	100



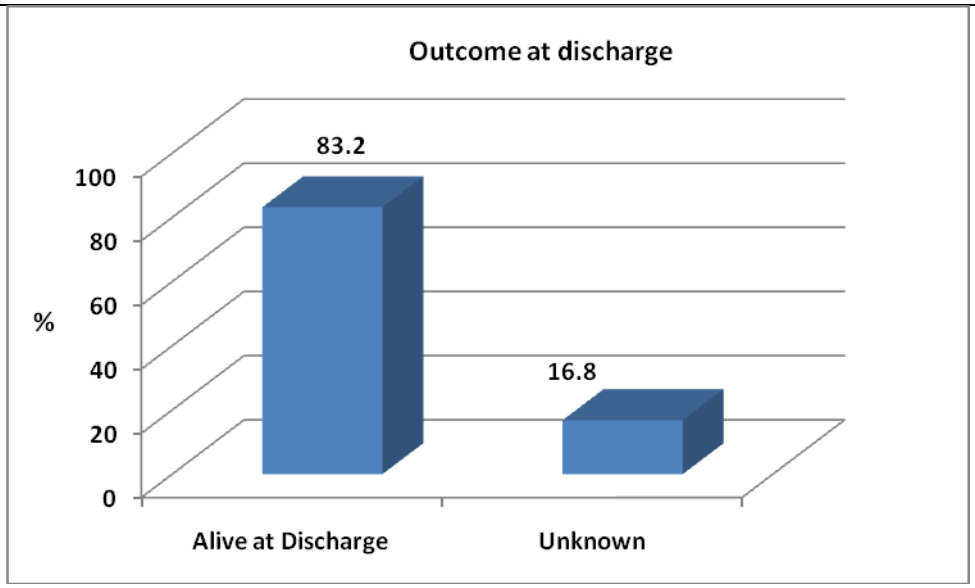
Surgical Approach

Surgical Approach	Occurrences	Percent
Sternotomy	3	0.2
Thoracotomy	1381	87.7
VATS	144	9.1
Robotic	5	0.3
Unknown	42	2.7
Total	1575	100



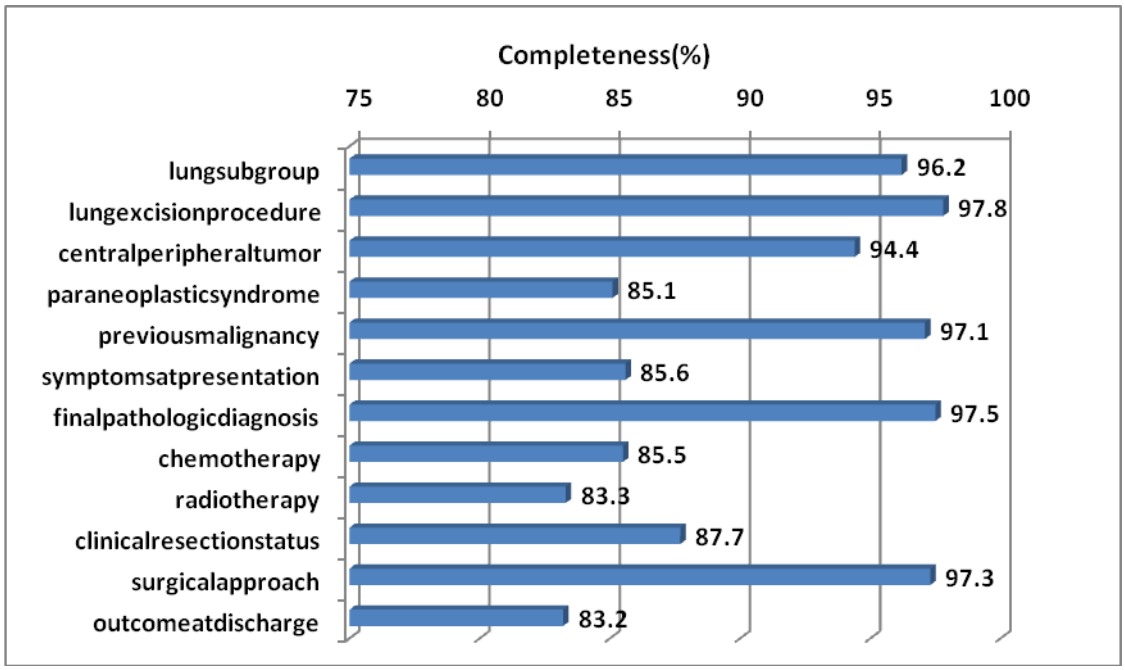
Outcome at discharge

Surgical Approach	Occurrences	Percent
Alive at Discharge	1310	83.2
Unknown	265	16.8
Total	1575	100



Data Completeness

Name of Field	Unknown (%)	Completeness(%)
lungsubgroup	3.8	96.2
lungexcisionprocedure	2.2	97.8
centralperipheraltumor	5.6	94.4
paraneoplasticsyndrome	14.9	85.1
previousmalignancy	2.9	97.1
symptomsatpresentation	14.4	85.6
finalpathologicdiagnosis	2.5	97.5
chemotherapy	14.5	85.5
radiotherapy	16.7	83.3
clinicalresectionstatus	12.3	87.7
surgicalapproach	2.7	97.3
outcomeatdischarge	16.8	83.2



PART 6

CHEST WALL SECTION
(Database users only)

Message from Clinical Leader of ESTS RegistryChest Wall section

Dr Jose Ribas
Chair ESTS Chest Wall Database
jribas@usp.br

Dear Colleagues,

Nice to have the opportunity to present some improvement, even in these last months were the world is upside down, due to the Covid-19 pandemic. Since October 30th, 2018, I was honoured to have being invited to join as Chair of the ESTS Chest Wall Working Group (CWWG). Since then, we have been working together to increase the number of members and participants and wealso started working to improve our dataset, as we had promised before.

We have reached a new total of 1372 chest wall procedures form EU Centres, without counting those form Brazil; this is to be expected as Covid has had a significant impact on some areas. Together with Dra Leticia L. Lauricella, from Hospital das Clinicas, Sao Paulo, Brazil, in the last few months we've worked hard to propose some changes in the overall structure of the dataset, which was divided into three different branches:

1. congenital chest wall deformities,
2. thoracic trauma
3. primary/secondary tumors.

Our goal was to make the chest wall more comprehensive and allow a more detailed and specific data collection for each pathology. It will now be offered for the approval of the ESTS board of directors and, after that, we are completely sure that with these amendments, we'll define the next steps for the forthcoming years. A copy of the new Chest Wall Dataset is available as an Appendix in the ESTS 2021 Full Report.

We recognize that with these changes, we have a real opportunity for all the ESTS members to participate, increase and optimize the current CWWG Database experience. Easy to fill it up, divided by areas of interest, and more importantly, with all the old dataset data imported in it.

I would like to finish these words with almost the same conclusion of our last silver book: “the Database in many Societies” has been the gold standard for clinical outcomes in thoracic surgery for more than 30 years and all conclusions will help it continue as the authoritative expression of our data-driven domain.The completeness of the “CWWG Database” is and will always be the right answer, now and in the near future.

Yours sincerely,

Prof. Dr. Jose Ribas M. de Campos
Chair of the Chest Wall Working Group – ESTS.

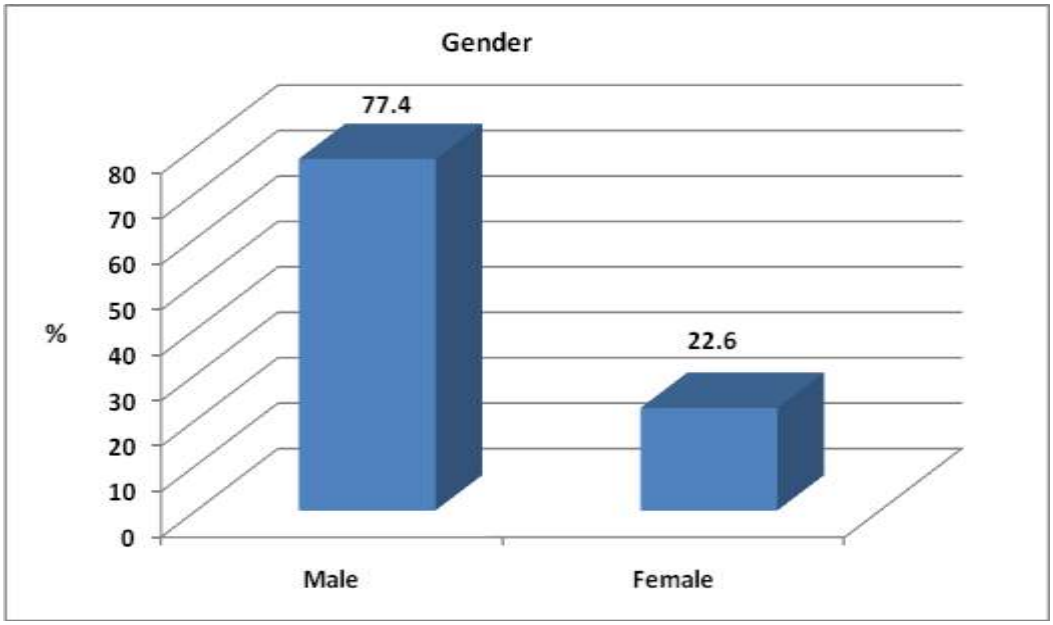
Dra Leticia L. Lauricella,Hospital das Clinicas, Sao Paulo, Brazil

CHEST WALL Section fields

Group Definition Chest Wall
January 2003- December 2020
N=1372

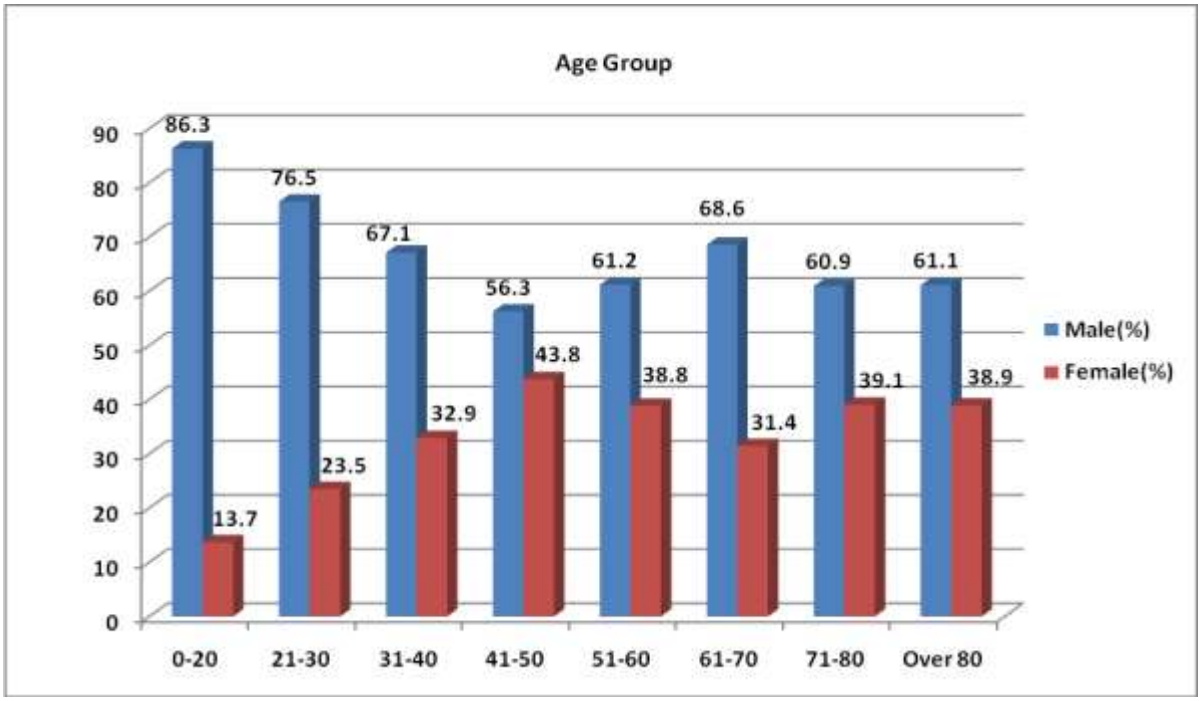
Demographics: gender

Gender	Occurrences	Percent
Male	1062	77.4
Female	310	22.6
Total	1372	100



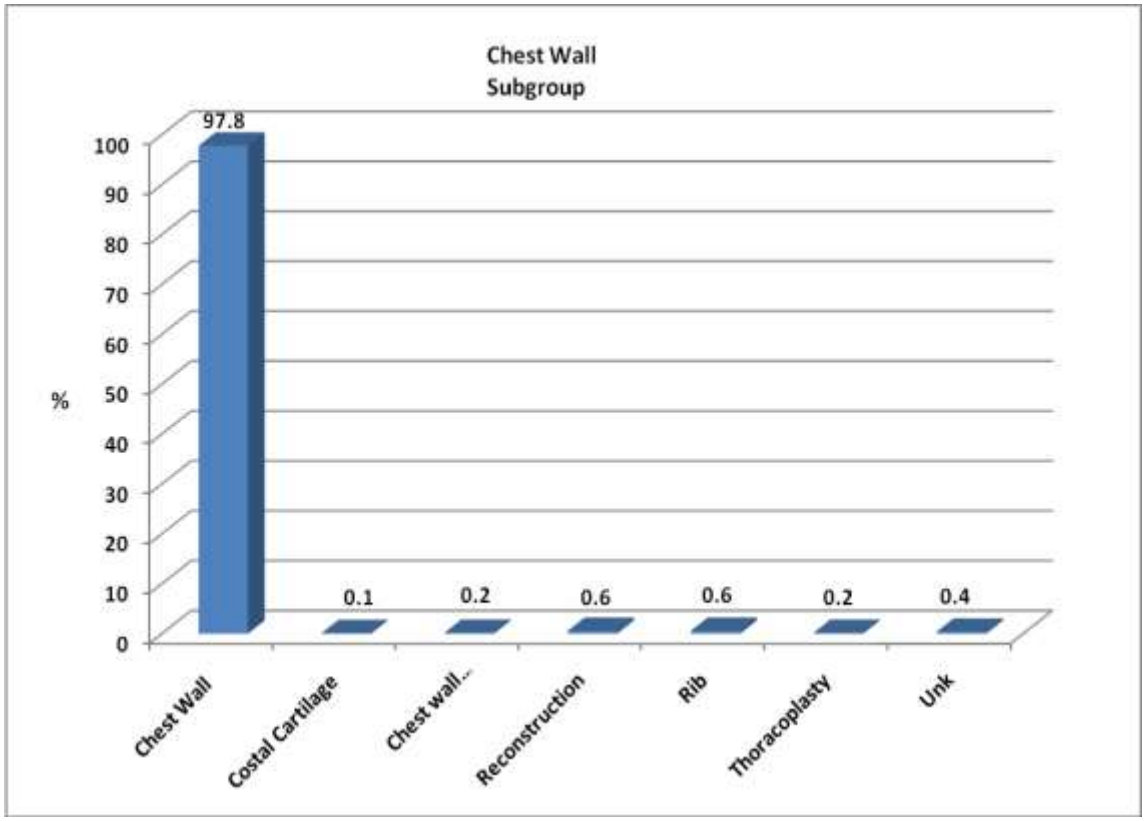
Age Group

Age Group	Male(%)	Female(%)
0-20	86.3	13.7
21-30	76.5	23.5
31-40	67.1	32.9
41-50	56.3	43.8
51-60	61.2	38.8
61-70	68.6	31.4
71-80	60.9	39.1
Over 80	61.1	38.9
Total	1372	



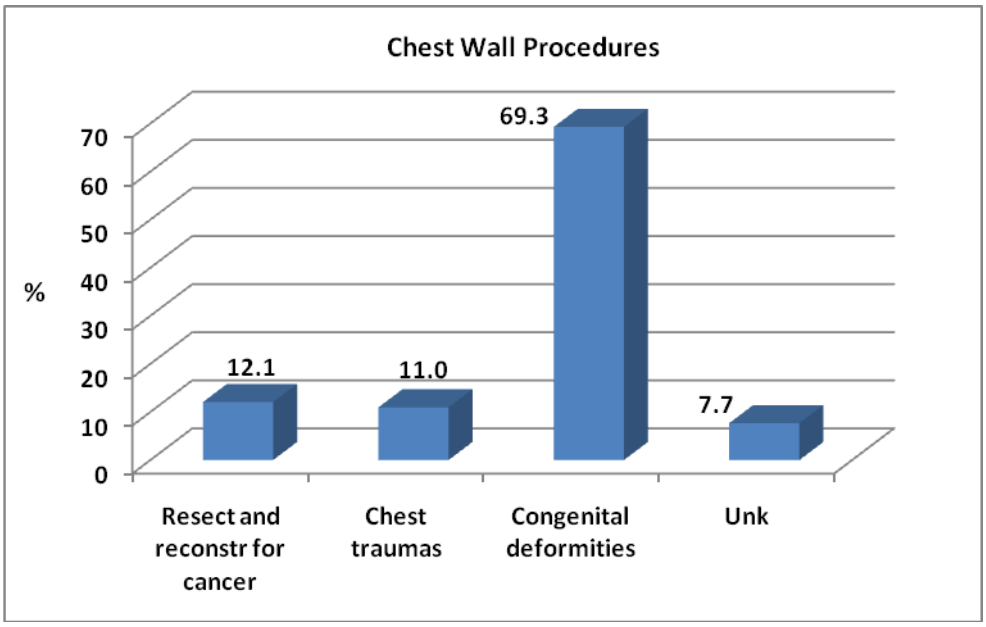
Chest Wall Subgroup

Chestwallsubgroup	Occurrences	Percent
Chest Wall (autosetting)	1342	97.8
Costal Cartilage	2	0.1
Chest wall Incision	3	0.2
Reconstruction	8	0.6
Rib	8	0.6
Thoracoplasty	3	0.2
Unk	6	0.4
Total	1372	100



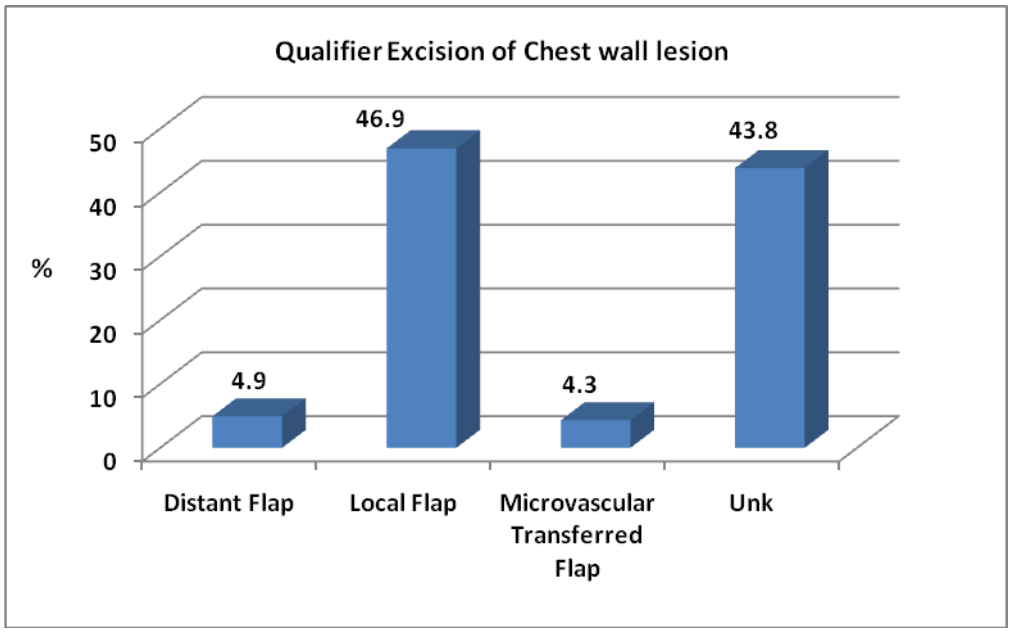
Chest Wall Procedures

Chest Wall procedures	Occurrences	Percent
Resect and reconstr for cancer	162	12.1
Chest traumas	147	11.0
Congenital deformities	930	69.3
Unk	103	7.7
Total	1342	100



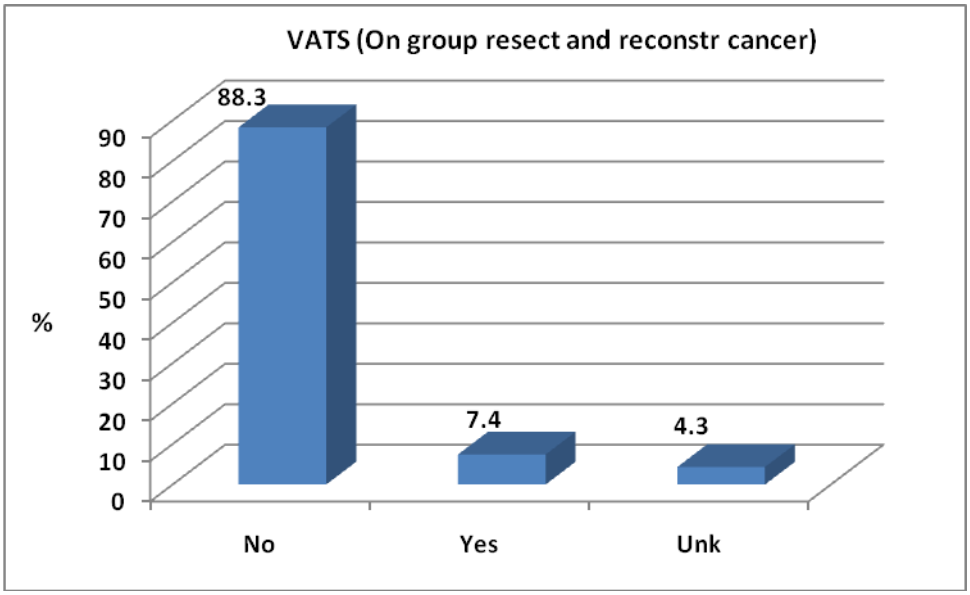
On Group Resect and reconstr Cancer

qualifierexcisionofchestwalllesion	Occurrences	Percent
Distant Flap	8	4.9
Local Flap	76	46.9
Microvascular Transferred Flap	7	4.3
Unk	71	43.8
Total	162	100



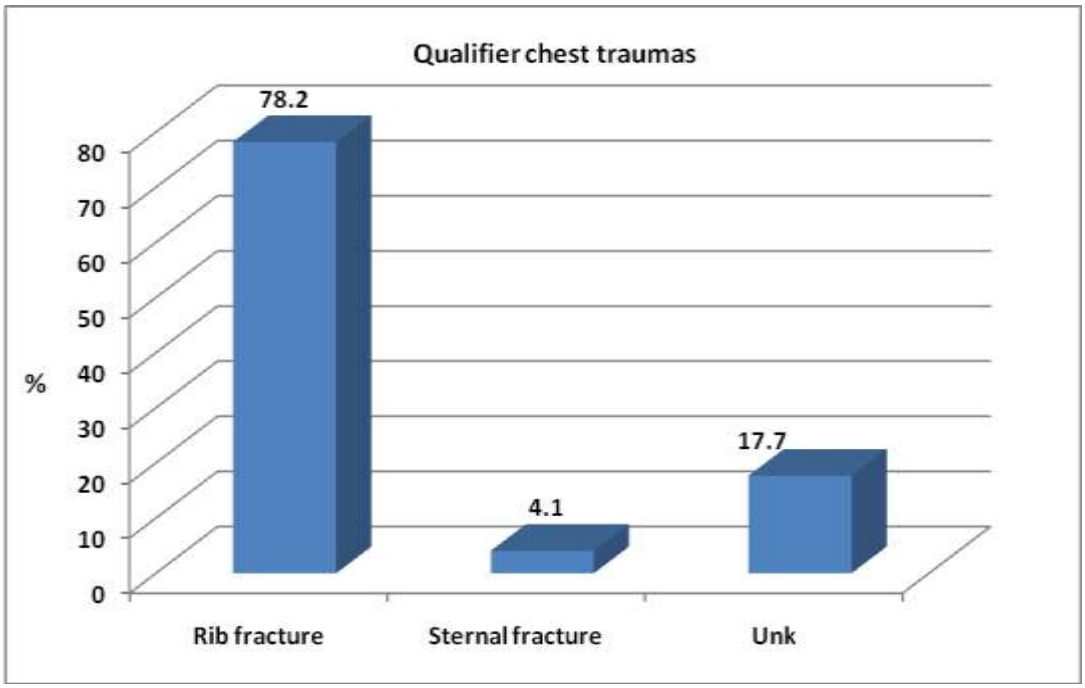
VATS

vats	Occurrences	Percent
No	143	88.3
Yes	12	7.4
Unk	7	4.3
Total	162	100



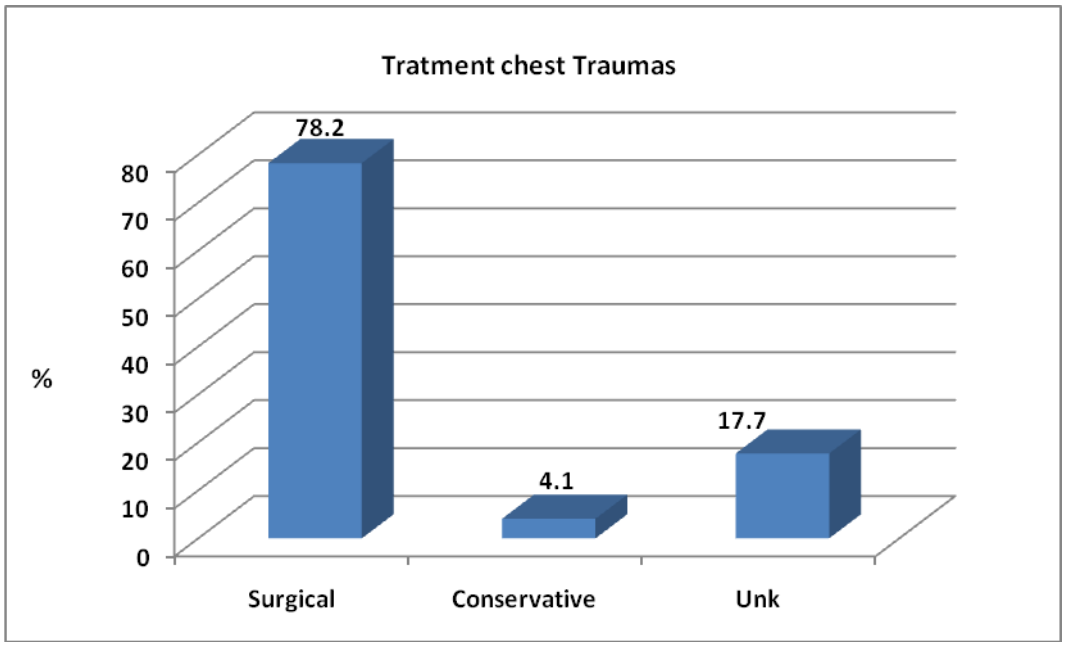
On Group Chest Traumas

qualifierchestrraumas	Occurrences	Percent
Rib fracture	115	78.2
Sternal fracture	6	4.1
Unk	26	17.7
Total	147	100



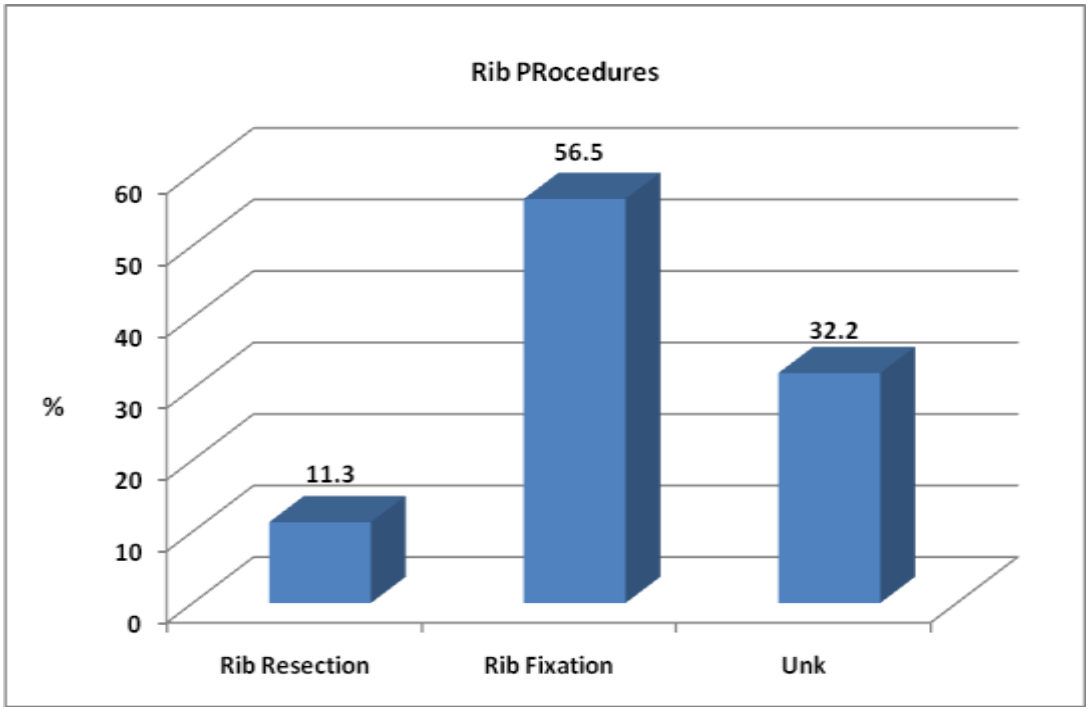
Treatment chest Traumas

Treatment chest traumas	Occurrences	Percent
Surgical	115	78.2
Conservative	6	4.1
Unk	26	17.7
Total	147	100



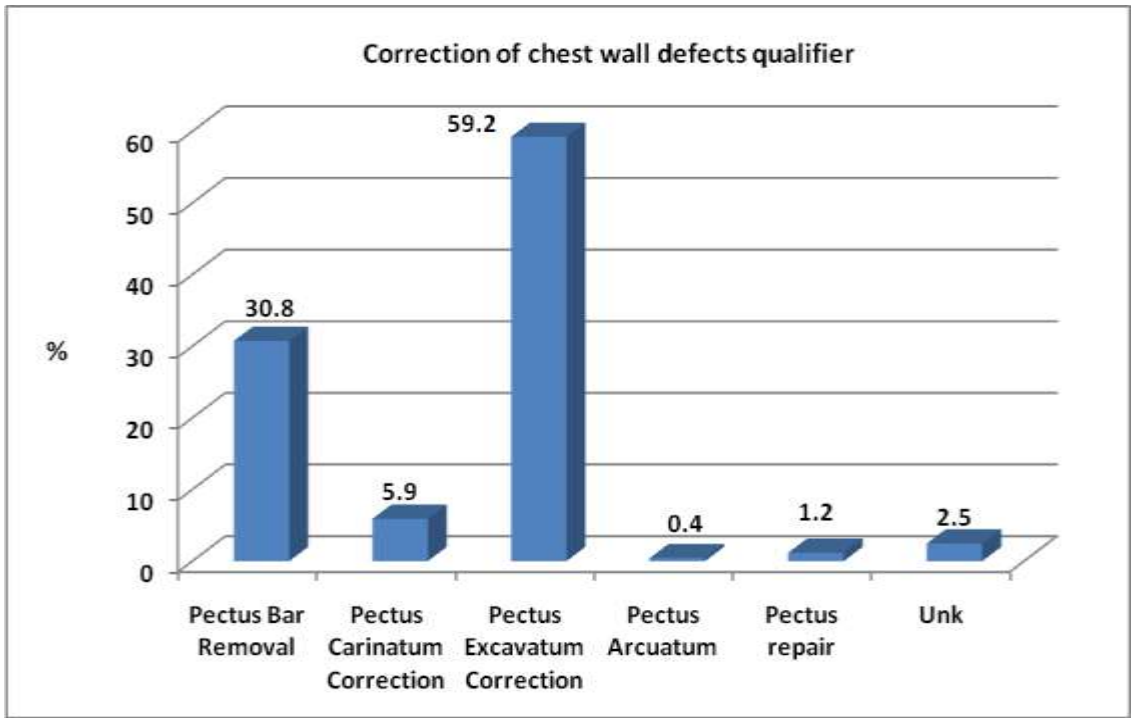
On Group Rib Fracture And Surgical

Rib procedures	Occurrences	Percent
Rib Resection	13	11.3
Rib Fixation	65	56.5
Unk	37	32.2
Total	115	100



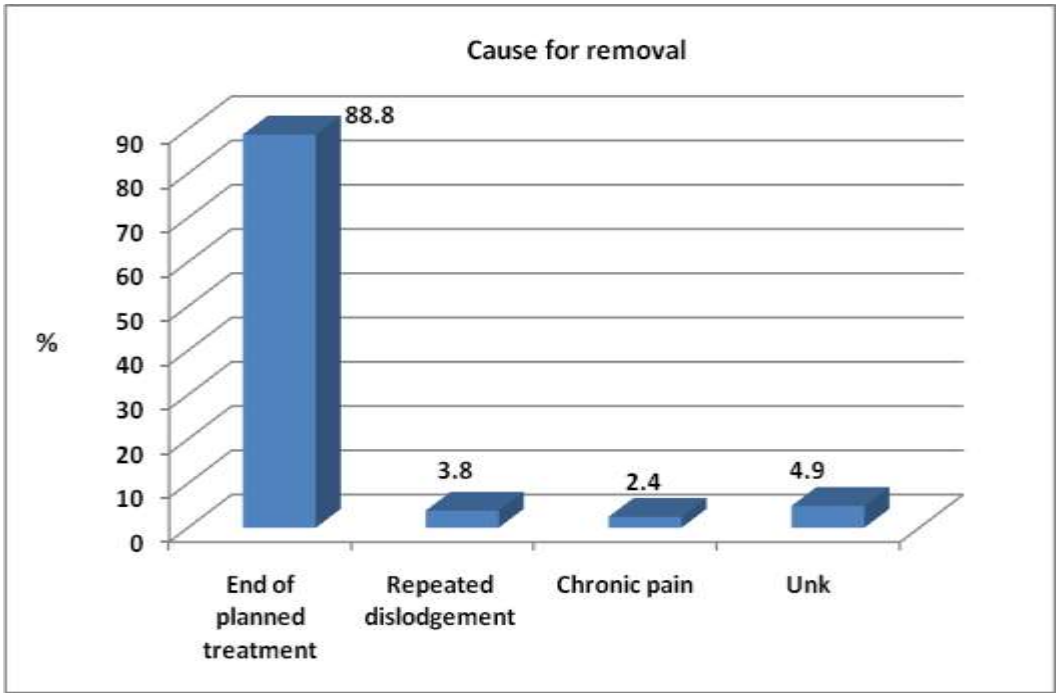
On Group Congenital deformities

Correction of chest wall defectsqualifier	Occurrences	Percent
Pectus Bar Removal	286	30.8
Pectus Carinatum Correction	55	5.9
Pectus Excavatum Correction	551	59.2
Pectus Arcuatum	4	0.4
Pectus repair	11	1.2
Unk	23	2.5
Total	**930**	**100.0**



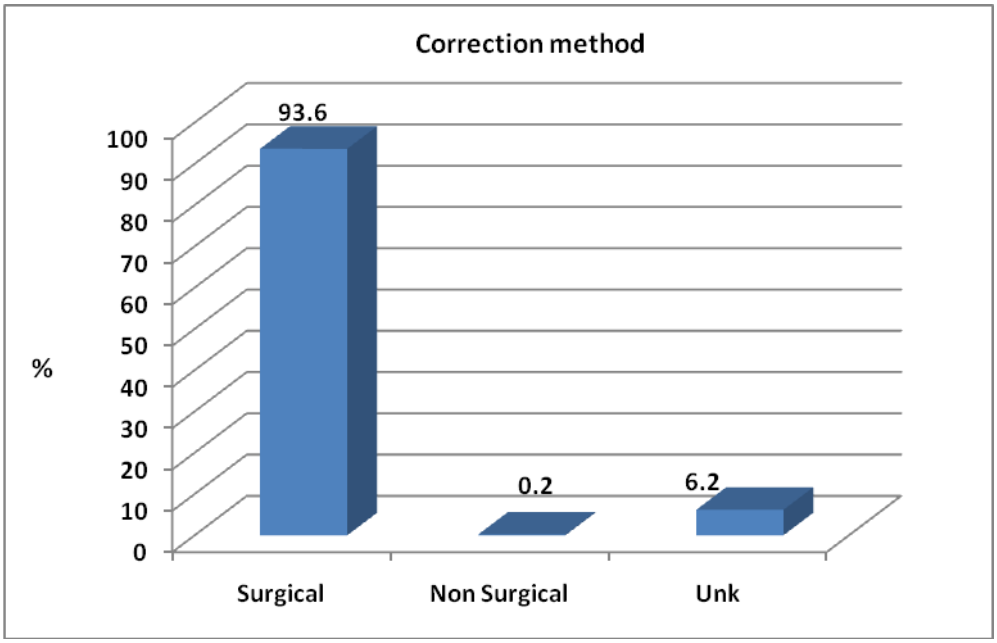
On Group Pectus Bar Removal

Cause for removal	Occurrences	Percent
End of planned treatment	254	88.8
Repeated dislodgement	11	3.8
Chronic pain	7	2.4
Unk	14	4.9
Total	**286**	**100.0**



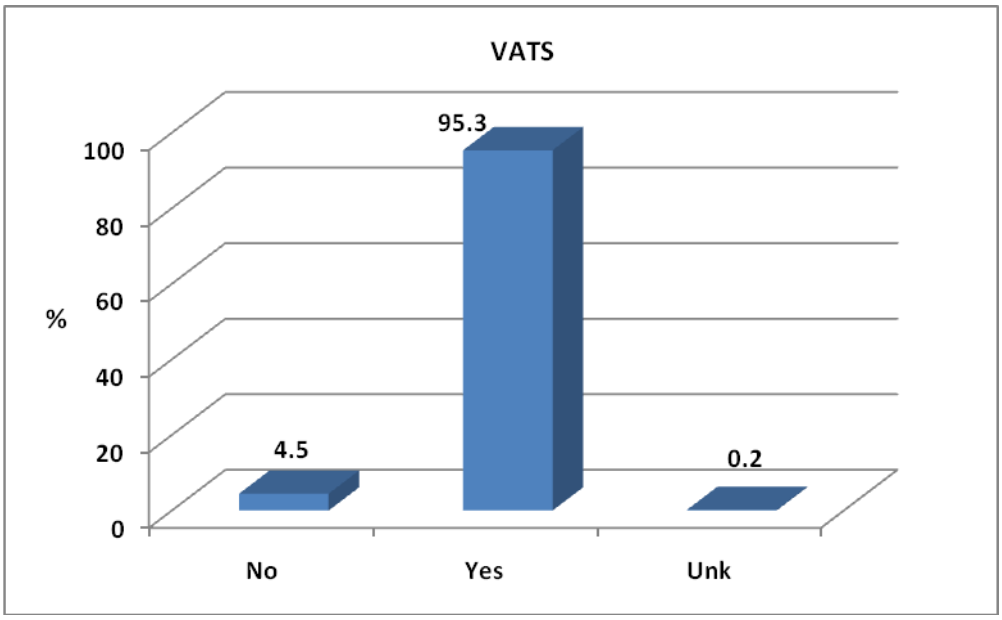
On Group Pectus Excavatum Correction

Correction method	Occurrences	Percent
Surgical	516	93.6
Non Surgical	1	0.2
Unk	34	6.2
Total	551	100



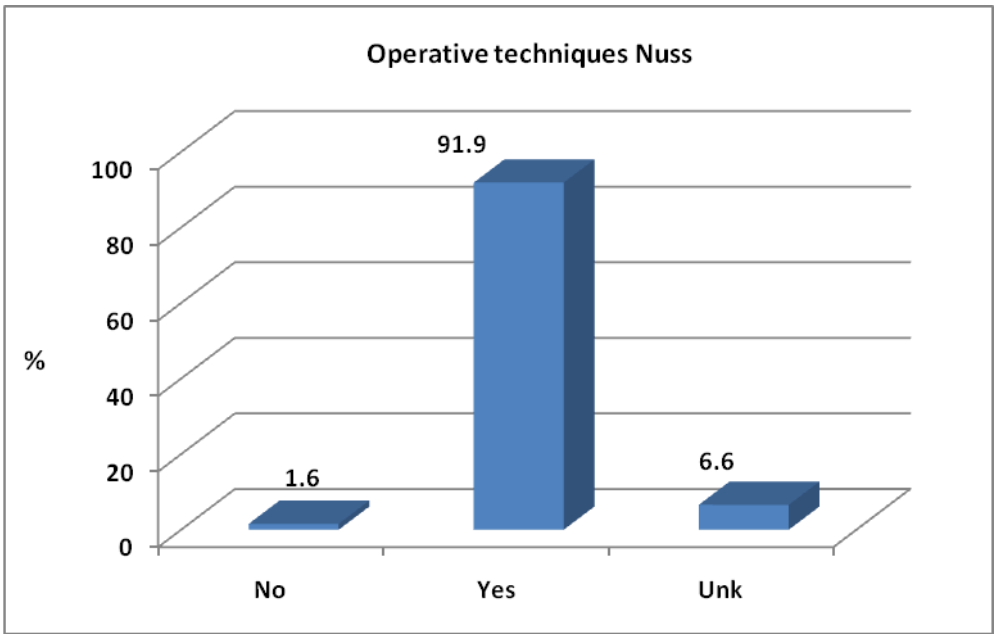
VATS

vats	Occurrences	Percent
No	23	4.5
Yes	492	95.3
Unk	1	0.2
Total	516	100



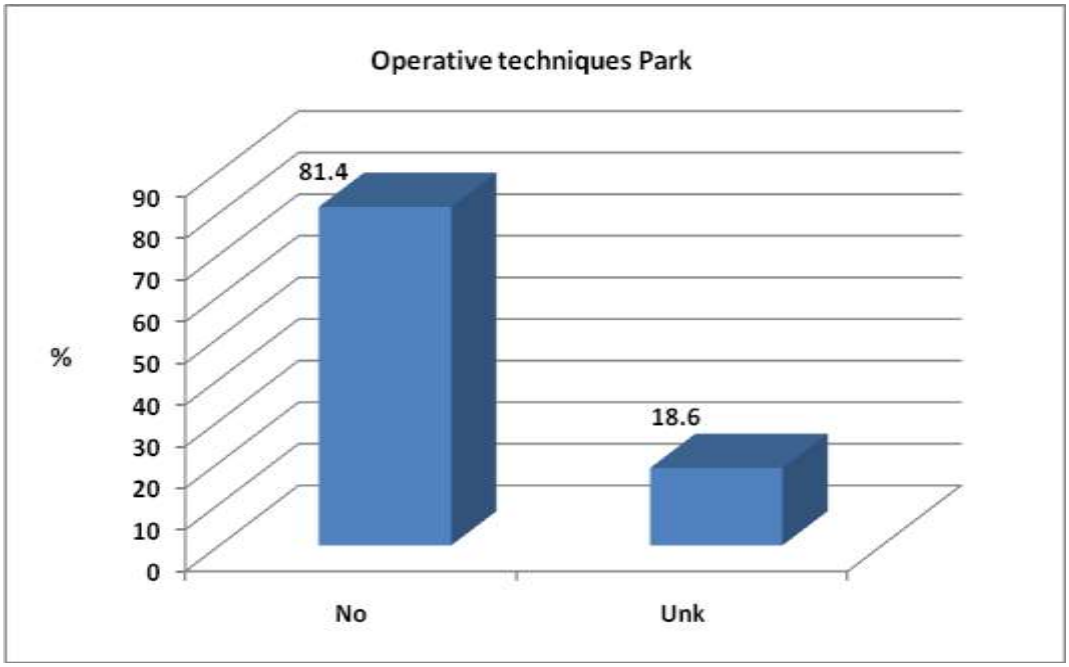
VATS YES
Operative technique Nuss

Operative techniques Nuss	Occurrences	Percent
No	8	1.6
Yes	474	91.9
Unk	34	6.6
Total	516	100



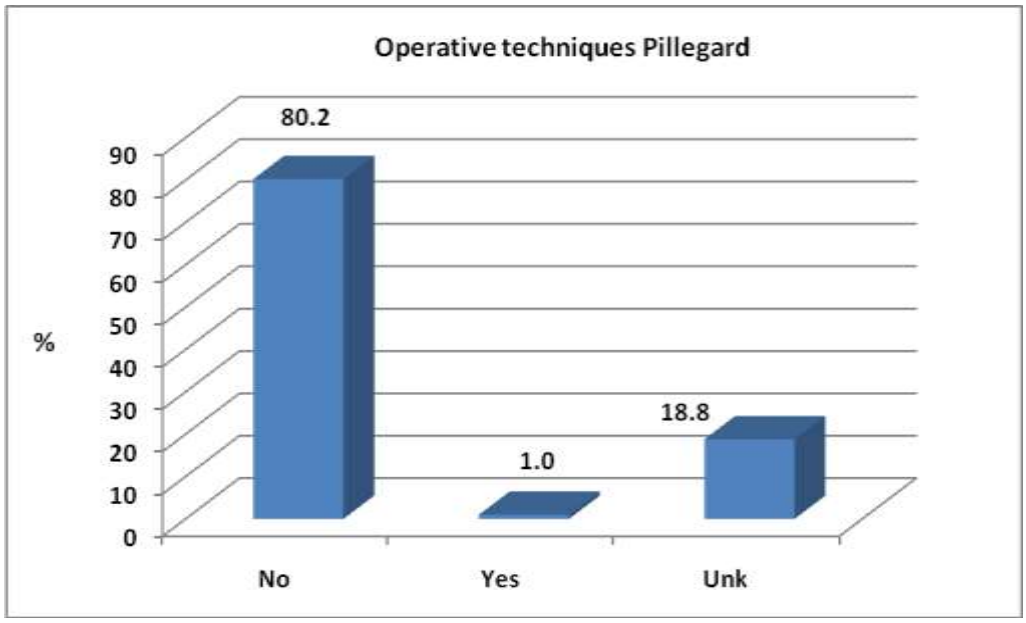
Operative Technique Park

Operative technique Park	Occurrences	Percent
No	420	81.4
Unk	96	18.6
Total	516	100



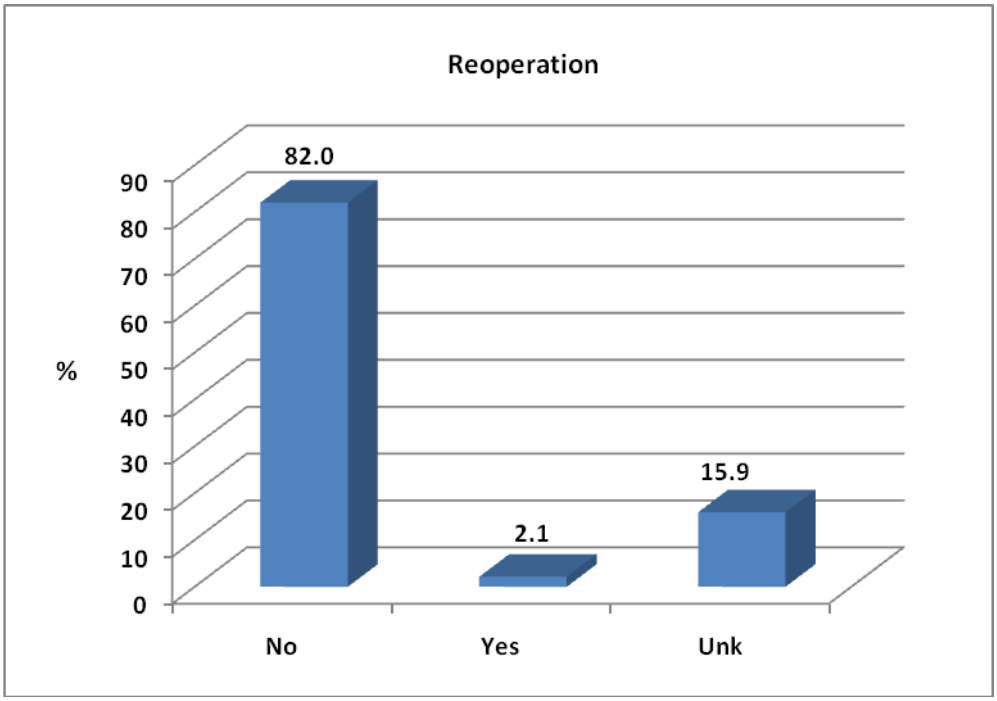
Operative Technique Pillegard

Operative technique Pillegard	Occurrences	Percent
No	414	80.2
Yes	5	1.0
Unk	97	18.8
Total	516	100



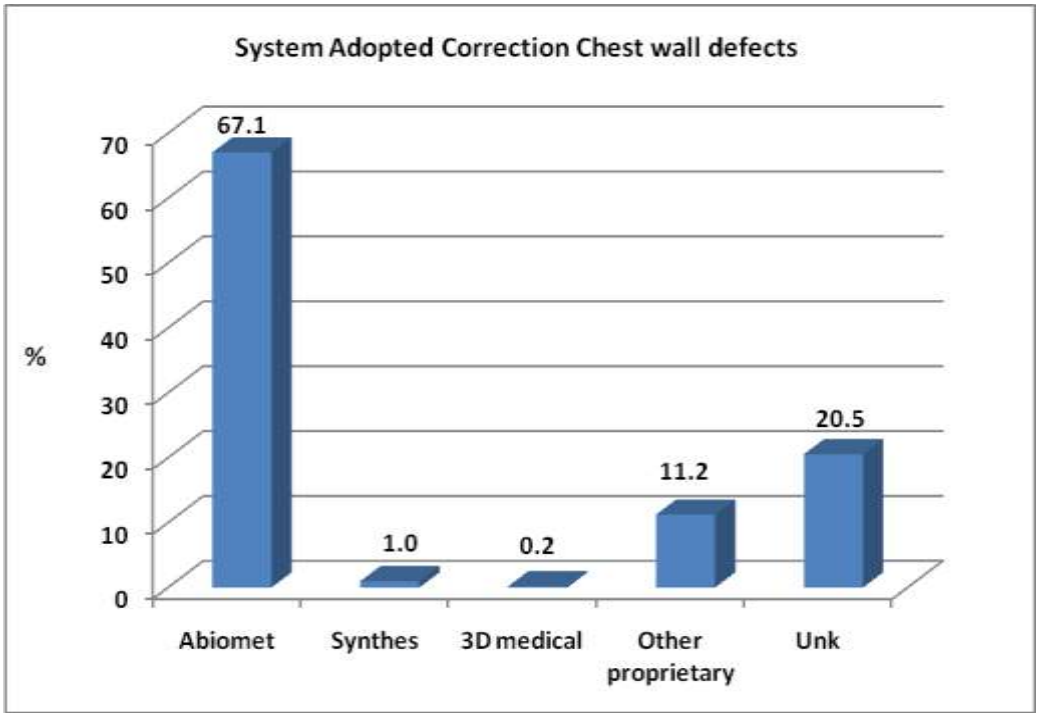
Reoperation

Reoperation	Occurrences	Percent
No	423	82.0
Yes	11	2.1
Unk	82	15.9
Total	516	100



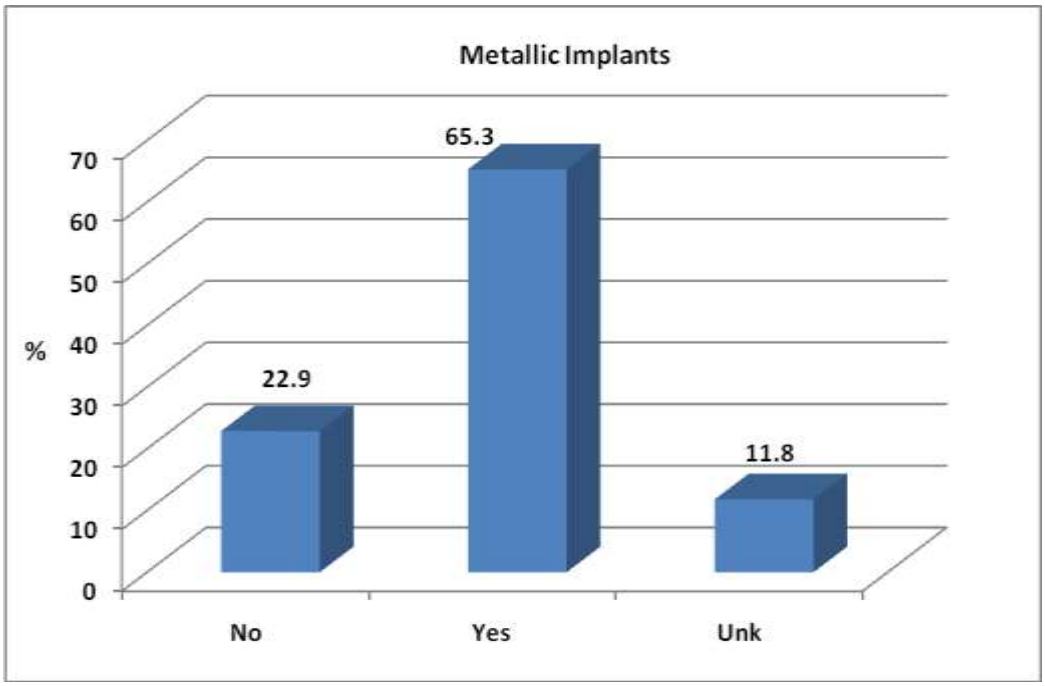
System Adopted Correction chest wall defects

systemadoptedcorrectioncwalldefects	Occurrences	Percent
Abiomet	346	67.1
Synthes	5	1.0
3D medical	1	0.2
Other proprietary	58	11.2
Unk	106	20.5
Total	516	100



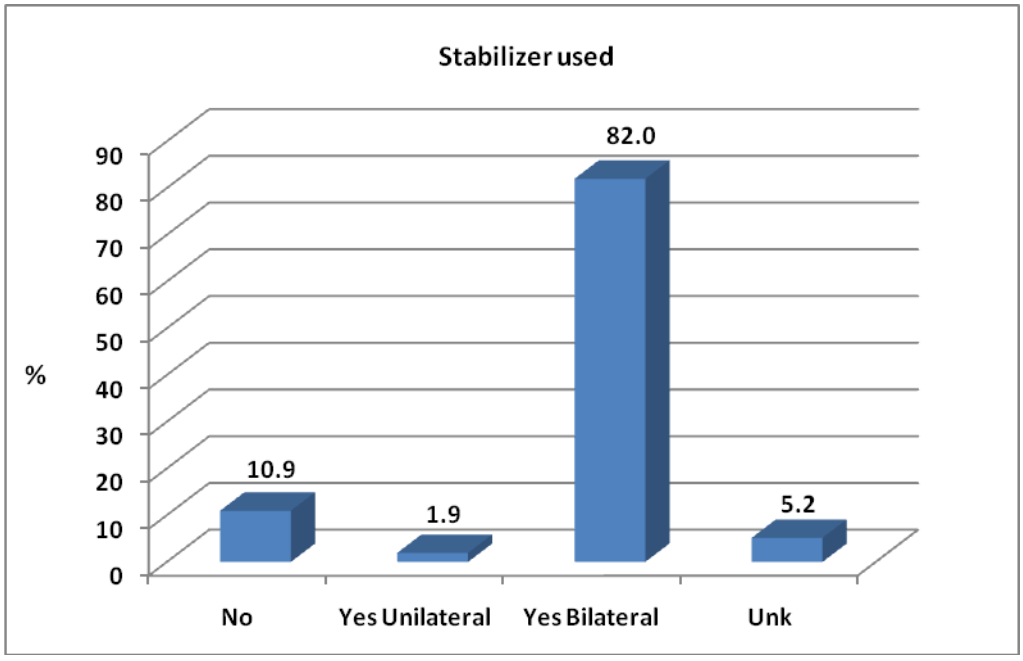
Metallic Implants

Metallic implants	Occurrences	Percent
No	118	22.9
Yes	337	65.3
Unk	61	11.8
Total	516	100



Stabilizer used

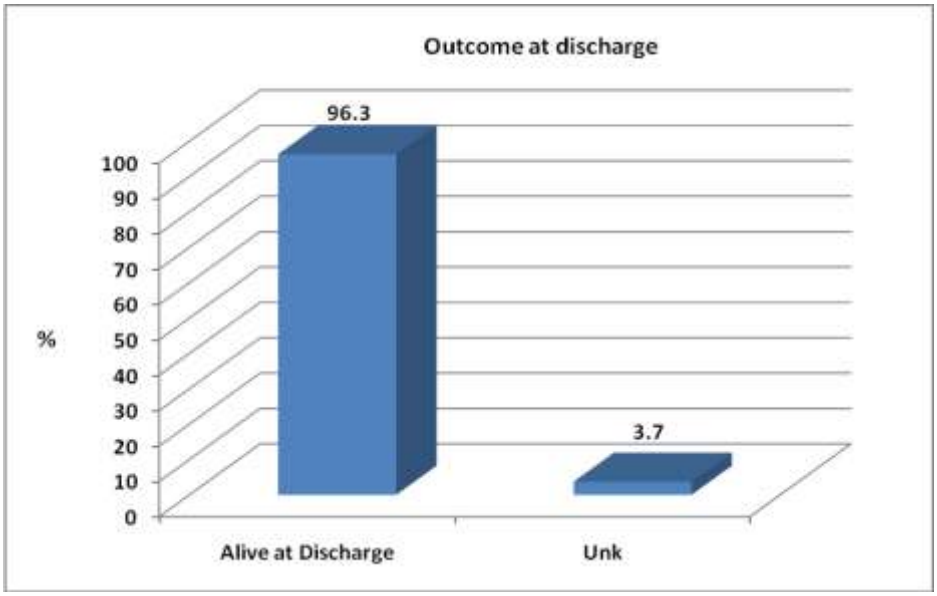
Stabilizer used	Occurrences	Percent
No	51	9.9
Yes Unilateral	11	2.1
Yes Bilateral	389	75.4
Unk	65	12.6
Total	516	100



Outcome at discharge (On Group Pectus Excavatum Correction - Surgical)

Outcome at discharge	Occurrences	Percent
Alive at Discharge°	497	96.3
Unk	19	3.7
Total	516	100

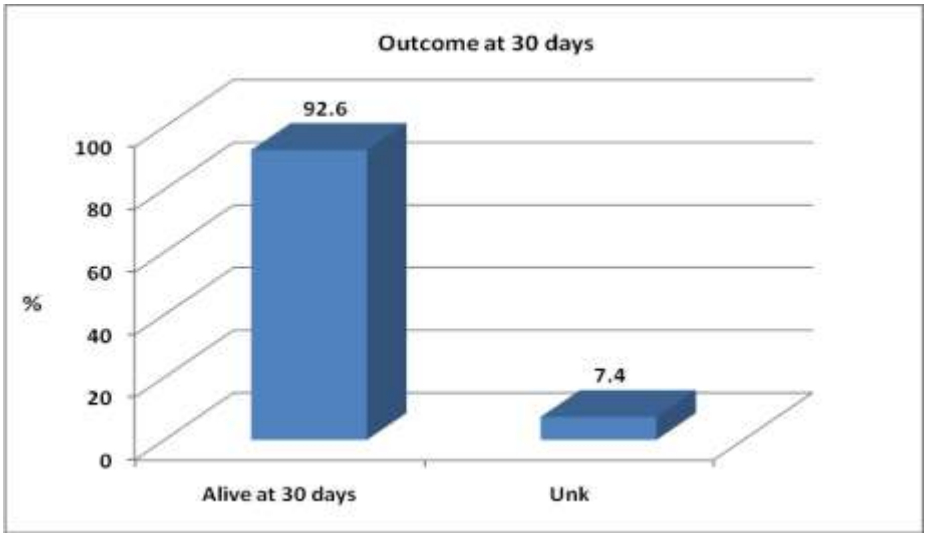
(°): Units with less than 500 patients included, results must be interpreted with caution



Outcome at 30 days (On Group Pectus Excavatum Correction - Surgical)

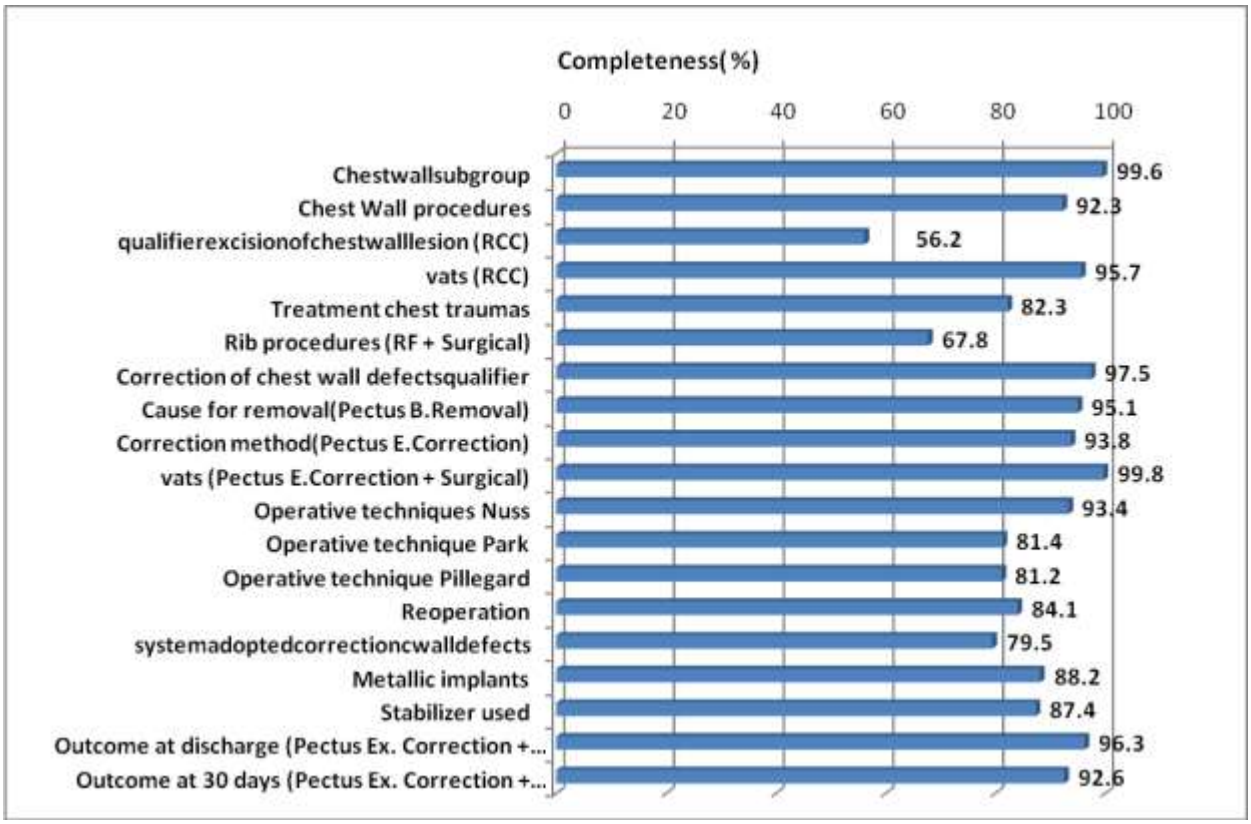
Outcome at 30 days	Occurrences	Percent
Alive at 30 days°	478	92.6
Unk	38	7.4
Total	516	100

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



Data Completeness

Name of Field	Unknown (%)	Completeness(%)
Chestwallsubgroup	0.4	99.6
Chest Wall procedures	7.7	92.3
qualifierexcisionofchestwalllesion (RCC)	43.8	56.2
vats (RCC)	4.3	95.7
Treatment chest traumas	17.7	82.3
Rib procedures (RF + Surgical)	32.2	67.8
Correction of chest wall defectsqualifier	2.5	97.5
Cause for removal(Pectus B.Removal)	4.9	95.1
Correction method(Pectus E.Correction)	6.2	93.8
vats (Pectus E.Correction + Surgical)	0.2	99.8
Operative techniques Nuss	6.6	93.4
Operative technique Park	18.6	81.4
Operative technique Pillegard	18.8	81.2
Reoperation	15.9	84.1
systemadoptedcorrectioncwalldefects	20.5	79.5
Metallic implants	11.8	88.2
Stabilizer used	12.6	87.4
Outcome at discharge (Pectus Ex. Correction + surgical)	3.7	96.3
Outcome at 30 days (Pectus Ex. Correction + surgical)	7.4	92.6



Appendix 1: Database format and submission of data

The first step is to request and obtain a login account through the relevant link found in the ESTS homepage (http//www.ests.org) or by directly sending an email to one of the members of the Database Committee. Once you have a valid login account you can proceed through the following data entry interface (accessible through https://ests.kdataclinical.it).

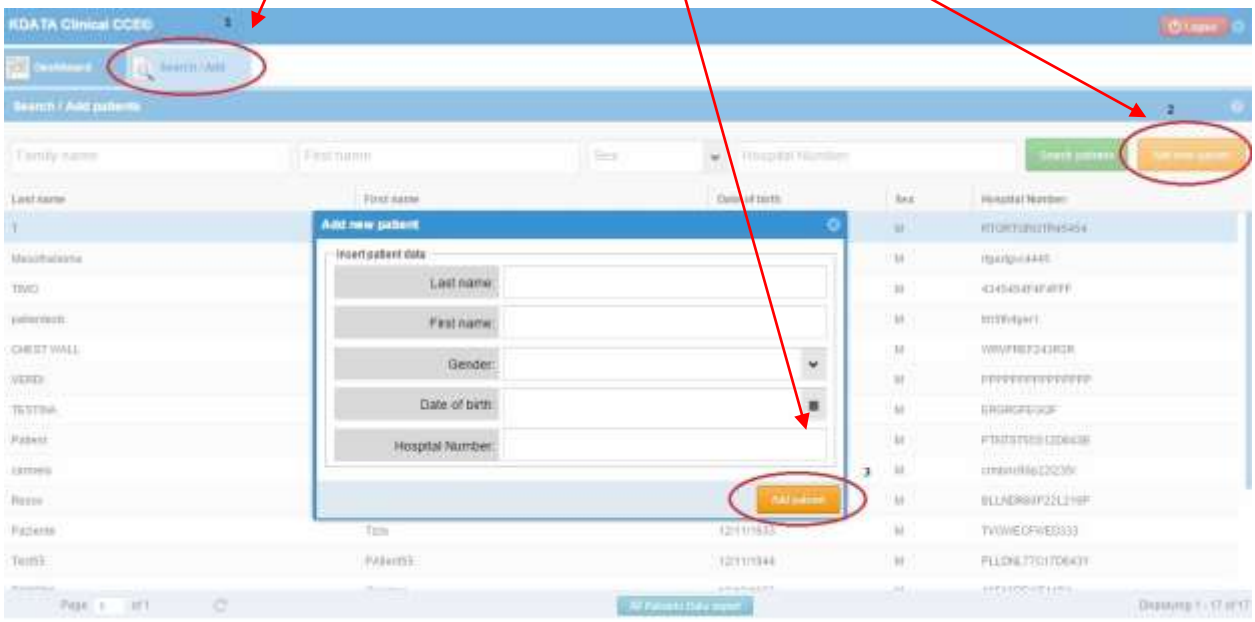
The KData logon screen shown below has been engineered to provide enhanced security facilities:

- Limiting users to 3 logon attempts before locking the user-account
- Giving information on previously successful and unsuccessful logon attempts
- Requiring users to have an eight-character password that contains at least one uppercase character, one lowercase character and one digit.

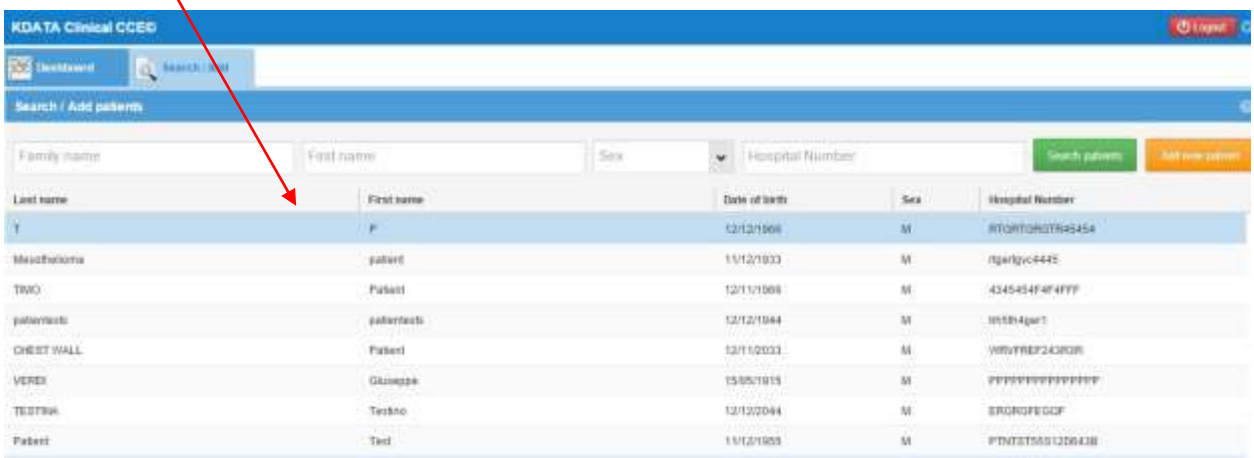
Once you have logged in you are presented with the Database main menu, from which you can add new data, view or edit a procedure, modify your account details, and export your data in Excel for your own purposes.

Clicking on the Search/Add tab opens the next screen “Patient Search”, where it is possible to search for patients already in the database or add new patients.

The function Search/Add (1) is for looking for an existing Patient or adding a new one; the function Add New Patients opens a new screen (2) to collect the unique identifying details of a New Patient where a set of mandatory data is required to add a new patient to the registry; you then save your New Patient by clicking the Add Patient (3) button as shown.



Once you have your New Patient you can select him/her for an appropriate Registry, or access a Patient/Procedure already existing in the Database.



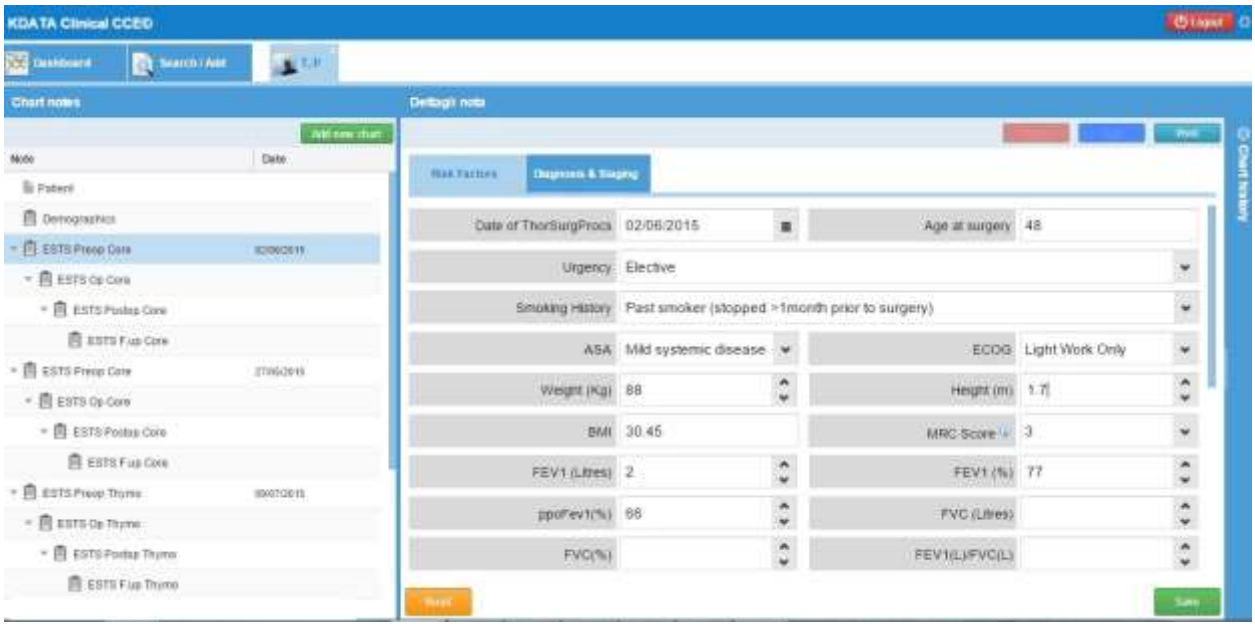
Access to the required Registry (For Example ESTS Core in our case) is obtained by choosing the appropriate “note” from the existing Note List and clicking on the green button “ Add Data to New Note”
Steps: Select the “Note” (1) on Group ESTS

Click on the Add Data to New Note button(2)

These steps will lead you to the Data Collection Section including the routine sections:
Pre-op
Op
Post-Op
Follow-up.

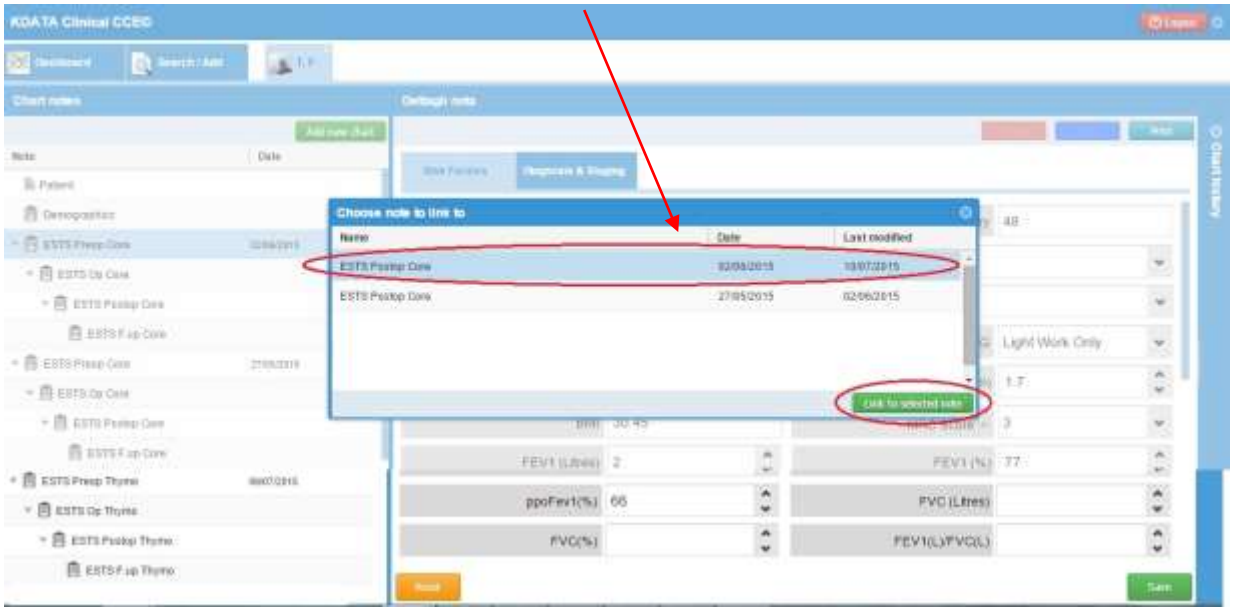
For the following Registries:
Core, Mesothelioma, Thymus, NETTs, Chest Wall Datasets.

PLEASE NOTE that you need to save your data by clicking on the “save” button any time you have completed a section of the registry even if there are some triggers on the application that save the data automatically by default.

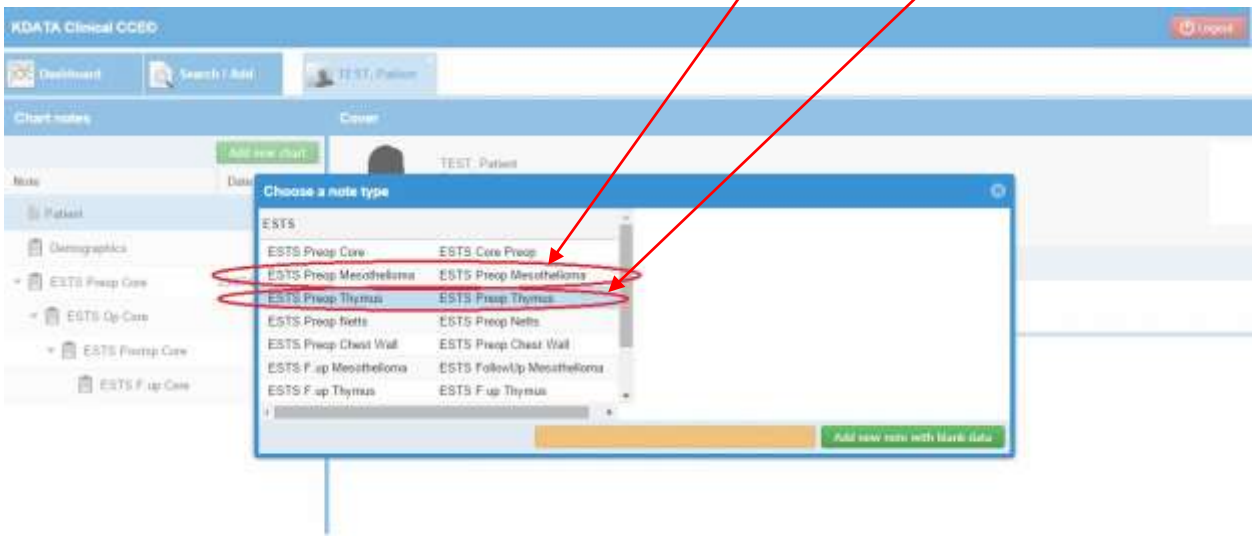


Similar steps are available for the Follow-up section of the Core Dataset section as shown are below:

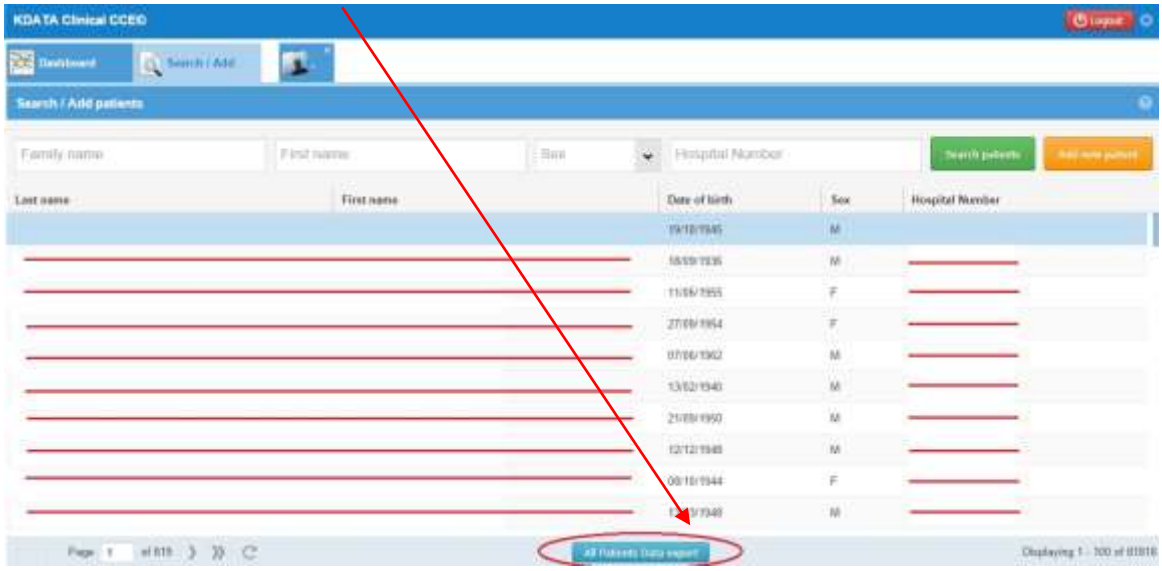
Please note that the User needs to specify to which Procedure the current Follow-up Note is referring to: as shown here below there may be more than one procedure for the same Patient.



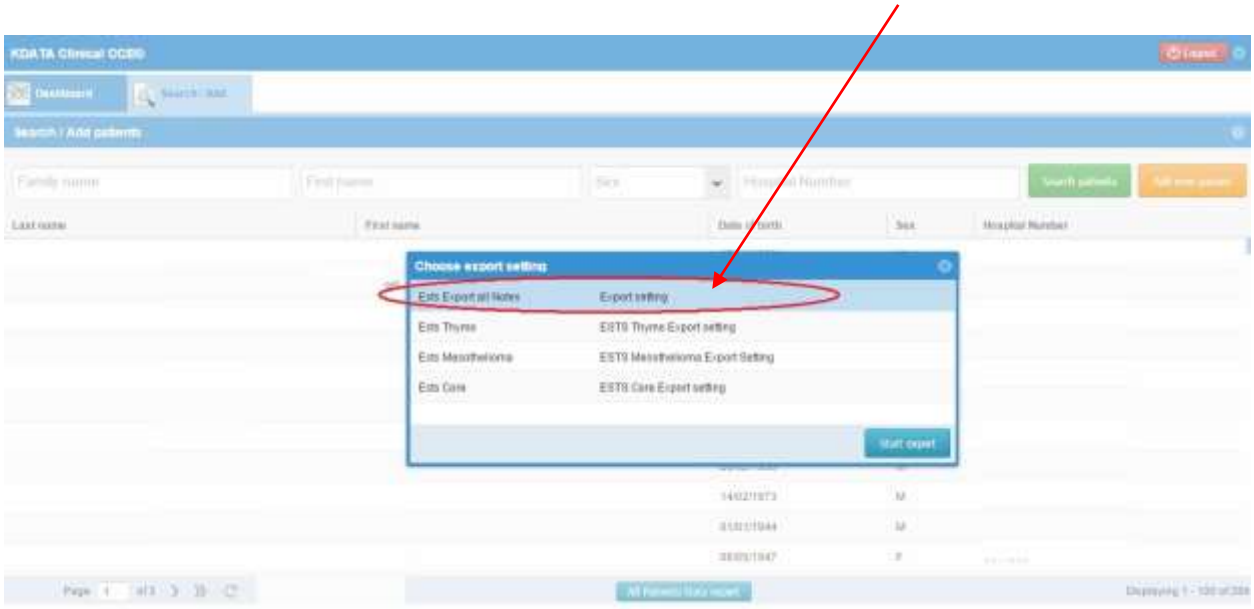
The system permit to select the specific form: Core Dataset, Thymus, Mesothelioma,Netts and Chest Wall . All the form are defined on the ESTS Core Dataset but any type has specific fields.



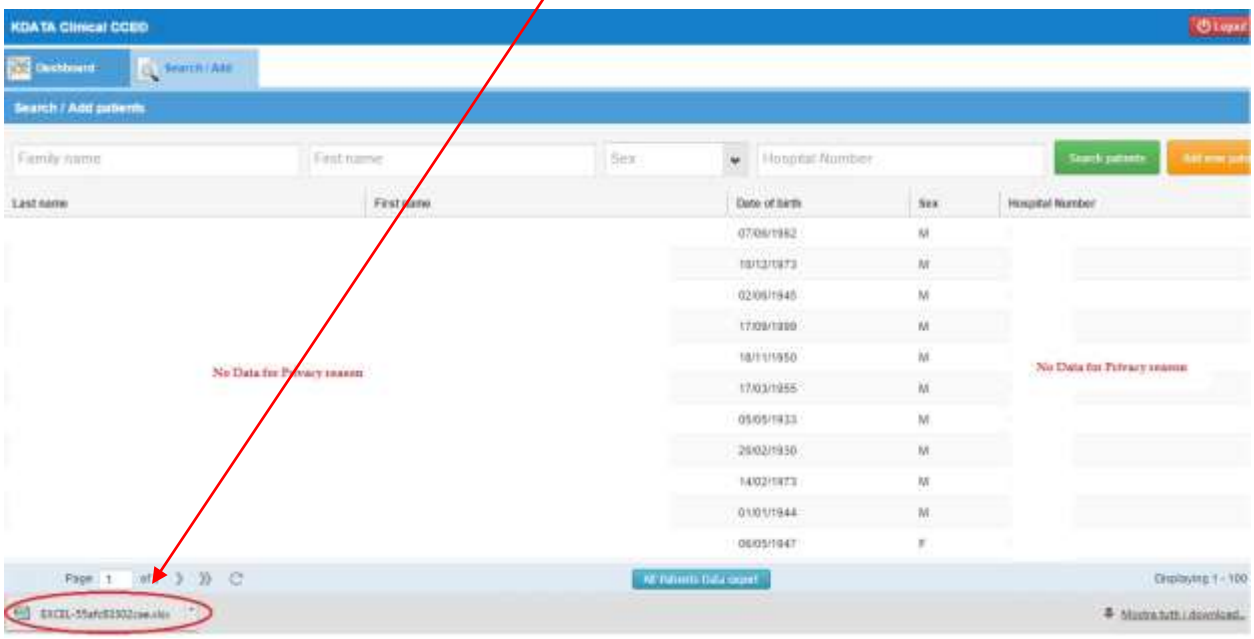
In summary the first step after put in the demographics data or search a patient just saved is to select the specific note and in case of thymo or MEsothelioma or NEtts or chest wall is necessary select the specific note.
In any case the total export permit to have a cumulative file with all type of procedures



After is possible select the type of export : all procedures as in the follow case:



After you can open the file downloaded on the taskbar below



Clinical Care Analysis CCA or System Dashboard.

The first screen after logging in on the system shows a real-time representation of your Centre surgical activities:

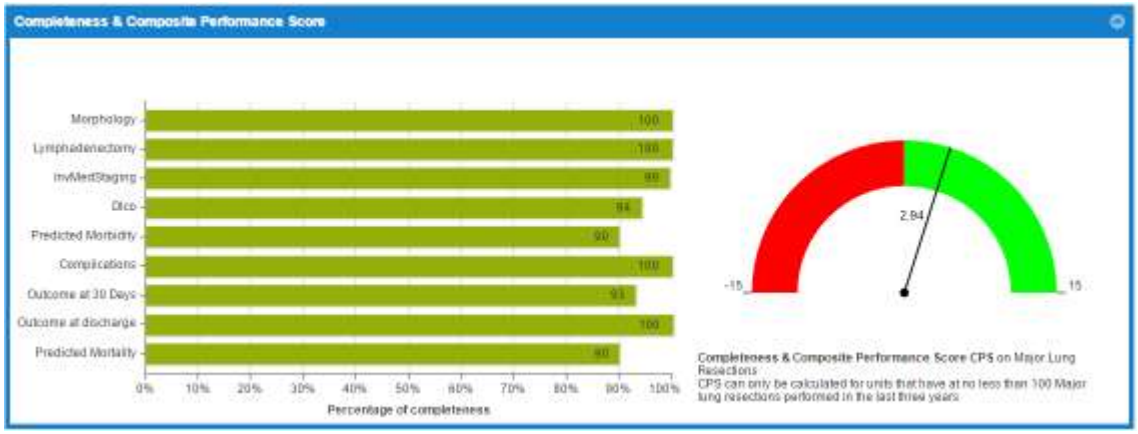
It gets updated each time you add any data into it; it includes an enumeration of the total thoracic surgery recorded activities, with details about lung resections, proportion of VATS and outcome at discharge. Here we have shown the global set visible to the ESTS Database Director only. Each Centre Director can see her/his own Centre data, and nobody else. Specific analysis contents have being developed for the satellite Registries.

Completeness and Composite Performance Score.

The system auto-calculates both the Predicted Mortality (%) and Predicted Morbidity (%).

Early outcomes, including in-hospital morbidity, in-hospital and 30-days mortality should be specified in the final section, before submitting the data.

The system calculates the CPS automatically if there are more than 100 major lung excision procedures, and it shows the percentage of Data Completeness, as illustrated here below.



Appendix 2: Definition of major cardiopulmonary complications listed in the database

ARDS: Adult respiratory distress syndrome defined according to the American-European consensus conference. All of the following criteria should be met:

1. Acute onset
2. Arterial hypoxemia with PaO2/FIO2 ratio lower than 200 (regardless PEEP level)
3. Bilateral infiltrates at chest radiograph or CT scan
4. No clinical evidence of left atrial hypertension or pulmonary artery occlusive pressure < 18 mmHg
5. Compatible risk factors

Initial ventilator support >48 hours: Patient initially was ventilated >48 hours in the postoperative period; ventilator support ends with removal of endotracheal tube or, if the patient has a tracheostomy tube, until no longer ventilator dependent.

Reintubation: Patient was reintubated during the initial hospital stay after the initial extubation; this may include patients who have been extubated in the operating room and require intubation in the postoperative period

Atrial Arrhythmia: new onset of atrial fibrillation/flutter (AF) requiring medical treatment or cardioversion. Does not include recurrence of AF which had been present preoperatively.

Ventricular Arrhythmia: sustained ventricular tachycardia or ventricular fibrillation that has been clinically documented and treated by ablation therapy, implantable cardioverter defibrillator, permanent pacemaker, pharmacologic treatment or cardioversion.

Bronchoscopy for atelectasis: postoperative atelectasis documented clinically or radiographically that needed bronchoscopy.

Pneumonia: defined according to the last CDC criteria. Two or more serial chest radiographs with at least **one** of the following:

- New or progressive and persistent infiltrate
- Consolidation
- Cavitation

And at least **one** of the following:

- Fever (>38°C or >100.4°F) with no other recognized cause
- Leukopenia (<4000 WBC/mm^3) or leukocytosis ($\geq$12,000 WBC/mm^3)
- For adults $\geq$70 years old, altered mental status with no other recognized cause

and at least **two** of the following:

- New onset of purulent sputum, or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements
- New onset or worsening cough, or dyspnea, or tachypnea
- Rales or bronchial breath sounds

Worsening gas exchange (e.g. O_2 desaturations (e.g., $PaO_2/FiO_2 \leq 240$), increased oxygen requirements, or increased ventilator demand).

Pulmonary embolism: confirmed by V/Q scan, angiogram or CT scan.

DVT: deep venous thrombosis confirmed by Doppler study, contrast study or other study and that required treatment.

Myocardial infarct: evidenced by one of the following criteria:

1. transmural infarction diagnosed by the appearance of a new Q wave in two or more contiguous leads on ECG.
2. Subendocardial infarction (non Q wave) evidenced by clinical, angiographic electrocardiographic signs.
3. Laboratory isoenzyme evidence of myocardial necrosis.

Renal failure: defined as the onset of new renal failure in the postoperative period according to one of the following criteria:

1. increase of serum creatinine to greater than 2.0, or 2-fold the preoperative creatinine level.
2. a new requirement for dialysis postoperatively.

Cerebrovascular complications: occurrence of one of the following central neurologic postoperative events not present preoperatively:

1. a central neurologic deficit persisting postoperatively for more than 72 hours
2. a transient neurologic deficit (transient ischemic attack or reversible ischemic neurological deficit) with recovery within 72 hours
3. a new postoperative coma persisting at least 24 hours and caused by anoxic/ischemic and/or metabolic encephalopathy, thromboembolic event or cerebral bleed.

Appendix 3: ESTS Institutional Accreditation Program

By Dr Alessandro Brunelli
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Accreditation program

The ESTS Institutional Accreditation program was initiated in 2011 and is open to all thoracic surgery units participating to the ESTS Database.
The aim of the program is to set standards of good clinical practice across Europe with the intent to improve the quality of care possibly according to published guidelines.

Eligibility Criteria:

- ✓ Participation to the ESTS Database with contribution of at least 150 anatomic lung resections in the last 3 years.This pre-requisite is necessary to calculate a reliable Composite Performance Score, which is the metrics used to evaluate the Institutional performance.
- ✓ The Head of the unit or its Clinical Audit Lead must be an ESTS member.
- ✓ Composite Performance Score greater than 0
- ✓ Completeness of variables used to calculate the Eurolung2 greater than 70%

Based on a similar methodology, ESTS has recently developed and published a Composite Performance Score (CPS) for lung surgery (Brunelli A et al. The European Thoracic Database project: Composite Performance Score to measure quality of care major lung resection. Eur J Cardiothorac Surg 2009; 35: 769-774).
The method consists in developing standardized outcome and process indicators covering all temporal domains of the lung resection care. The indicators were selected based on their evidence-based level. For the preoperative domain, we selected the proportion of patients with DLCO measured before major lung resection, and the proportion of patients with clinically suspicious N2 nodes at CT scan or PET scan submitted to some type of preoperative mediastinal invasive staging. For the intraoperative domain, we selected the proportion of patients with primary neoplastic disease submitted to major anatomic resections and at least lobe-specific (or more extended) nodal dissection. To be defined as at least lobe-specific nodal dissection, station 7 should be always included in the dissection in addition to stations R2-4 for right upper lobectomy, stations 8-9 for lower lobectomies, stations 5 and 6 for left upper lobectomies. For the postoperative domain, we selected the risk-adjusted in-hospital cardiopulmonary and mortality rates.
Each of these indicators has been rescaled according to their standard deviation in the entire population to obtain individual standardized indicators. These were then summed to obtain the composite score for each unit.

The risk adjusted morbidity and mortality rates were calculated using the Eurlung1 and Eurlung 2 risk models. The following model were used:

Eurolung 1 was used to adjust cardiopulmonary morbidity:
Logit= -2.465 + 0.497Xsex male (coded 1 for male and 0 for female) + 0.026Xage + 0.231XCAD (coded 1 for presence of CAD) + 0.371XCVD (coded 1 for presence of CVD) + 0.152XCKD (coded 1 for presence of CKD) – 0.015XppoFEV1 + 0.514X extended resections (coded 1 for presence of extended resection) + 0.497Xthoracotomy (coded 1 for thoracotomy and 0 for VATS).

Eurolung 2 was used to adjust 30 day mortality:
Logit= -5.82 + 0.903Xsex male (coded 1 for male and 0 for female) + 0.044Xage + 0.264XCAD (coded 1 for presence of CAD) + 0.582XCVD (coded 1 for presence of CVD) - 0.064XBMI + 0.300Xextended resection (coded 1 for extended resection) + 0.929X pneumonectomy (coded 1 for pneumonectomy and 0 for lesser resection) + 0.894Xthoracotomy (coded 1 for thoracotomy and 0 for VATS) - 0.009XppoFEV1.

Standardized scores are calculated by subtracting the observed risk-adjusted outcome or process incidence minus the average observed outcome or process incidence. The difference is then divided by the standard deviation of the observed outcome or process in the entire population.

A CPS greater than 0 is the threshold selected by the Database Committee as a minimum criteria for accreditation. An automatic function has been implemented in the ESTS Database, which allow the end-users to calculateand review at any time their own CPS.

In addition to their CPS, units must have certain structural, procedural and professional characteristics to be certified. These characteristics needs to be audited along a sample of data submitted to the database. To this purpose, ESTS has subcontracted an external auditing Company, which together with a thoracic surgeon will visit the applicant units and produce a report, which will be evaluated by the Database Committee. If the report will be judged satisfactory, the Accreditation will be granted by the ESTS Council. The following are the required structural/procedural/professional characteristics (based and modified from Brunelli A, Falcoz PE, D'AmicoT,et al.European guidelines on structure and qualification of generalthoracicsurgery. Eur J CardiothoracSurg. 2014;45:779-86).

Procedures Volume:
A suggested minimum volume of 150 +/- 50 major thoracic procedures per year is recommended.
For esophageal resections a minimum volume of 20 +/- 5 procedures per year is recommended.
For lung transplant a minimum volume of 10 procedures per year is recommended.

Qualification of surgeons:

All surgeons must be qualified to perform thoracic surgery according to individual national or European legislation.
The Head of the unit must have a minimum experience of 5 years of clinical practice as qualified thoracic surgeon.

Costs:
The costs for the inspection and auditing (1500 Euros) are the individual Unit's responsibility.
The accreditation will be valid for a 36 months period. After this period the unit must apply for recertification.

Timeline for the accreditation process

MAY: Central and automatic calculation of the CPS
Eligible units announced during ESTS meeting
JUNE: Invitation letters are sent out to eligible units
JULY: Deadline acceptance for the accreditation process
AUGUST-MARCH: Local Audits
APRIL-MAY: Audit reports reviewed by DB Committee and ESTS Council
MAY: Accredited units announced during ESTS meeting

ESTS Accreditation Process: a brief review to guide "virtual" Visits
Background and Rationale
As COVID19 has generated various ways to contain it across Europe, it is currently not possible to plan adequately to visit prospective ESTS accreditation Centres in person.
Therefore we propose to amend our current guide as per a "virtual" Visit; here below are the usual criteria revamped to per complied with in a "virtual" mode.

CPS Composite Performance Score Factors
These needs to be read by the Audit Person from each of the selected 10 clinical notes, form the 40 KData have requested in advance. Data must be from either clinical notes (paper) or a local DB that substitute paper notes. The Regent will chose 10 notes on live video, and the audit person will also read the results of each heading on live video.
Preoperative care:
-% of pts having DLCO measured
- % of pts with CT enlarged or PET+ med nodes
undergoing preop invasive mediastinal staging
Operative care:
-% of pts operated on for primary neoplastic
disease submitted to systematic lymph node dissection
Postoperative care:
-risk-adjusted cardiopulmonary morbidity rate
-risk-adjusted mortality rate

Milestones of Process

MAY: - Central calculation of CPS-Eligible units announced at ESTSmeeting
JUNE: - Invitation letters are sent out to eligible units
JULY: - Deadline acceptance for accreditation process
AUGUST- MARCH: - Local Audits
APRIL-MAY: - Audit reports reviewed by DB Committee and ESTS Council
MAY: - Accredited units announced during ESTS meeting

Benefits

- Accredited units will be announced during ESTS Annual Meeting and in the ESTS homepage
- Participation to ESTS quality improvement initiatives
- Participation to high-profile scientific projects supported by ESTS
- Accredited units may propose their own clinical research projects based on data in the database
- *Setting up of Personalised dashboard on ESTS Database own log-in page*

Brief Description of Process and Data Checks

All Units who acceptthe ESTS invitation to go through the Accreditation Process will be required to:

a) ESTS PRE-VISIT QUESTIONNAIRE: A copy of the ESTS PRE-VISIT QUESTIONNAIRE will be sent back BEFORE date of visit; it will contain the ESTS PROFESSIONAL, STRUCTURAL & PROCEDURAL replies and it will be sent back fully compiled to the Regent, the ESTS General Secretary & K-Data Clinical BEFORE the PLANNED VIRTUAL VISIT.

b) To make available the from whole 3year's clinical data 40 notes as from the excel fileKData Clinical sent to the Centre; enabling the Regent to choose 10 notes on the day.

A brief PRE-Evaluation Meeting will take place before the proceedings *(Video hosted)*
A Brief POST-Evaluation Meeting All will take place after the proceedings *(Video hosted)*
Data from the notes will be read by the Regent to the KData Clinical person who will record the relevant similarities & discrepancies if any. This method will prevent any untoward breach of Patient Confidentiality. *(Video hosted)*
An Accreditation Visit Report will be circulated to the ESTS General Secretary, to support the final decision to award the actual accreditation to the Unit.

Appendix 4: The Setting of a National Registry in collaboration with ESTS or the "Hungarian Model" Experience

By Dr ZalanZsanto
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The " Hungarian Model" Experience

Introduction and Background

ESTS "open arms" policy has attracted Contributors and Participants from many if not all European Countries to its many initiatives; the key message has always been that Quality is good for everyone! Here we will summarise our progress with the ESTS Database and how to attract more participation from anyone who is willing.

Indeed many non-European Participants have regularly double-entered their data both into a local – National and then on the ESTS Database; it is a time consuming process and can be responsible to introduce unwanted data mistakes. Another common sticky point has often been the lack of funds to run a National Registry that was user-friendly, GDPR compliant as well as "data-compatible" with the ESTS.

Although ESTS will accept data (compliant with prescribed validation criteria) from any Active ESTS Member via yearly data imports and prospective data entry on the ESTS Database, one of the recurrent suggestions we have collected over time has been to offer the ESTS Registry in other Languages than English, so all the members (not just the Surgeons) of any clinical Team could participate in the data collection process, with inputting their "bit" of data, entered into the database at the right time, once only; this could mirror the patient journey from admission to discharge and everything else in between.

It was felt that this would particularly benefit those Countries where there is no National Registry or if the format of data adopted from the existing registry is not suitable for importing into the ESTS database. In addition to this some ESTS Colleagues believe that a few more questions in the Core ESTS Dataset may be necessary to facilitate data collection about procedures / pathologies that are more common in some European Countries than others.

Contents and Implementation

These discussions took a leapfrog jump when the Society of the Hungarian Thoracic Surgeons proposed the synergy of national and the European data collection. In a fruitful cooperation with KData Clinical a not done before idea was born: what if ESTS was to supply a copy of it Core Lung Registry in Hungarian, with additional questions short-listed from the many proposed, at a most competitive rate?

If this new Registry was to succeed, it would have to become THE Hungarian National Registry omitting "the start from nothing" creation of a sophisticated database and enabling European benchmarking in several layers. We called it the "ESTS Hungarian Model" and achieved the inclusion of all Hungarian thoracic Centers who register and share the whole spectrum of their surgical activity for 6 years now. The cooperation resulted benefits for both sides; a nationwide mixed case dataset highly enriches the European Database, on the other hand a national database gains power from the summarized data of the continent.

KData was to supplythe ESTS, therefore the whole ESTS Membership, with an up-grade of the Lung Registry with enhanced capabilities consisting of:

1. **Automatic switch from English to User Language; available to ESTS Users, it includes System command buttons and Dataset's Questions & Answers.** Available for ESTS Members who's Countries have a group of centers on common denominator to register their surgical data on the same platform and ordered for this "up-grade" via the ESTS. It will be available free of charge to all ESTS Members, who belong to that Country and send a written requires to KData to receive UN & PW for accessing it.
2. **Inclusion of Additional Questions to the Core ESTS Dataset,** to reflect variations of local epidemiology and clinical practice. We think it serves the extra interest of the national centers plus highlight the direction in which the database can develop. This "additional section" will be available selectively for the named Country ESTS Users.
3. **Involvement of designated ESTS Member (the Regent or someone designated to the task),** to assist KData with the translation of the ESTS Dataset from English into the required Language. We would welcome this approach as in some Countries the ESTS "customized" Registry may be adopted as or instead of the current National Registry.
4. **Free and Regulated Access:** As for all ESTS Educational & Quality Initiatives, there will be free and regulated access to the Registry reserved for ESTS Members according to the following Operating Standards:

    a. Access to the ESTS Registry in the local Language, available for those Countries where we have implemented it.
    b. Access to own data to each ESTS Registry Contributor,

c. Centre Director will be able access to the whole data of her/his Centre (including any Contributor's data that belongs to that Centre)
d. KData will make available User Name & Password to each ESTS fully subscribed Member who makes a written request to KData, once her/his request is approved.

This financially prudent approach underpins the whole process: after all it is participation that would make or brake this innovative proposal.

KData proposed to integrate the ESTS National Registries (like "Hungarian Model") into the existing ESTS Database; there would be no actual change visible to the End User, and the access would continue to be by User Name & Password with the customary modalities:

- Each User has a personal account accessed by UN & PW and can see & download her-his data only
- System Administrator can monitor clinical data for all hospitals
- Each User can see only his/her procedures,
- Director of each Unit can see and download all of her/his Unit Data)
- Full GDPR compliance

Lessons Learned and adoption by the SBTC (Brazilian Society of Thoracic Surgery)

The scaffold of the "ESTS Hungarian Model" was created carefully to become a possible Database for nationally or locally connected centers using the same language. By doing so, a national dataset summary will highlight all the negative and positive alterations from the European results in clinical practice as well as epidemiology giving precise recipe to catch up to the standards or have a beam of satisfaction. By incorporating the viewpoints of the ESTS Database into the daily treatment protocols even the newest care giving advantages are easily adopted to institutional or national level. As an example elaborating the hints of the data benchmarking in the last 5 years Hungary could enhance its VATS lobectomy program gradually by 22,4% and subsequently decrease the postoperative morbidity and mortality using the compatible and clear guidelines at hand. On the other hand incorporating the structure of the Dataset 30 percent of the Hungarian Thoracic Centres are eligible for the ESTS Institutional accreditation ensuring high quality standards of patient care and provoking other centers to improve. The National Registry scaffold also enables the 24/7 data access of all patient data for unlimited analysis. In Hungary an annual summary and discussion of the dataset builds the main core of the Society meeting comprehensively describing the results and complications of the previous year.

Conclusions

Since the implementation of the “ESTS Hungarian Model” has been adopted by all the Thoracic Surgery Centres in Hungary and has superseded the previously used national register. After construing the Dataset questionnaire the Hungarian Society could include all national centers to contribute and is able to benefit from the continuous benchmarking and cooperation on different levels. Finally the idea was proven again as a useful tool by the Brazilian Thoracic Surgery Society (SBCT), who has implemented 4 years ago and has attracted over 20 Centre in it.

The same contributing system could be the first step to extend the idea of the ESTS National Dataset which is now open to all Societies willing to share their results and gaining back valuable feedback from the family of the European thoracic surgeons.

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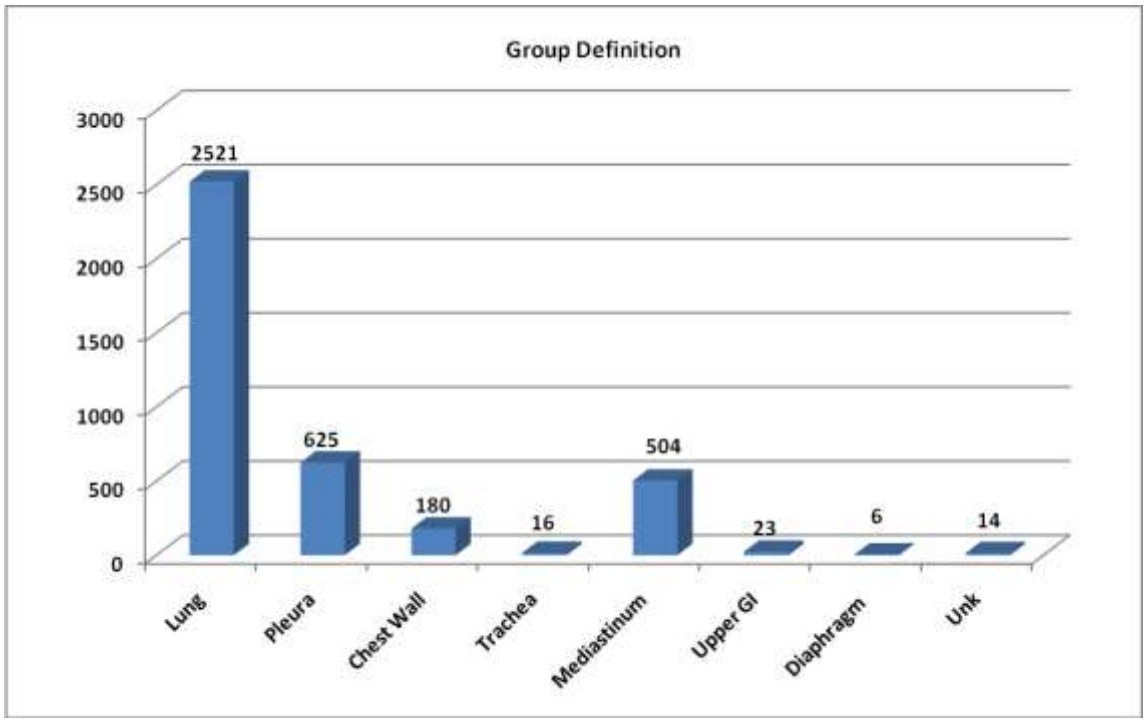
Hungarian 2020 Data

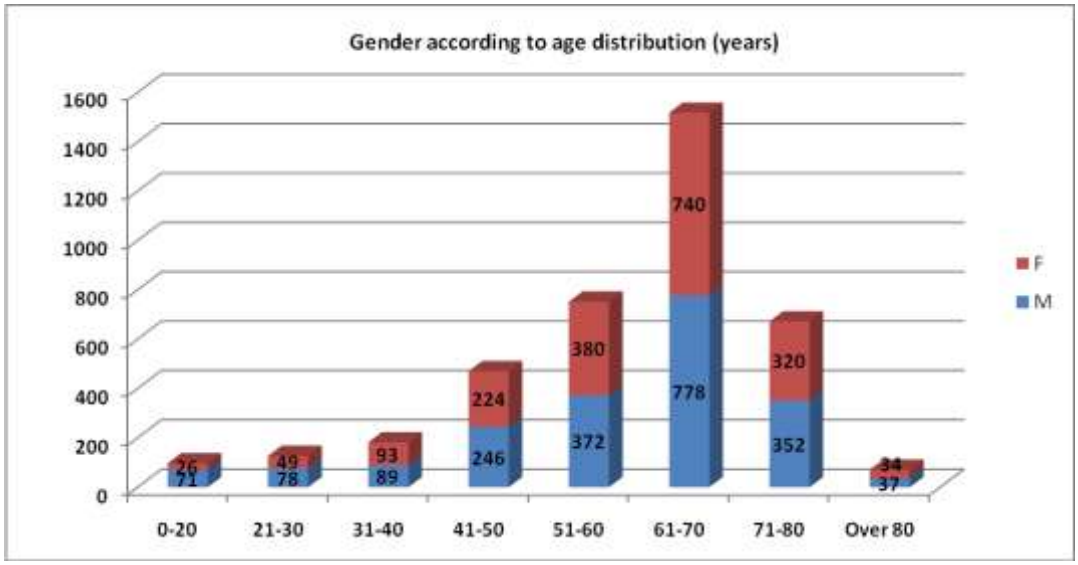
Group Definitions

Group Definition	Occurrences	Percent
Lung	2521	64.8
Pleura	625	16.1
Chest Wall	180	4.6
Trachea	16	0.4
Mediastinum	504	13.0
Upper GI	23	0.6
Diaphragm	6	0.2
Unk	14	0.4
Total	**3889**	**100**



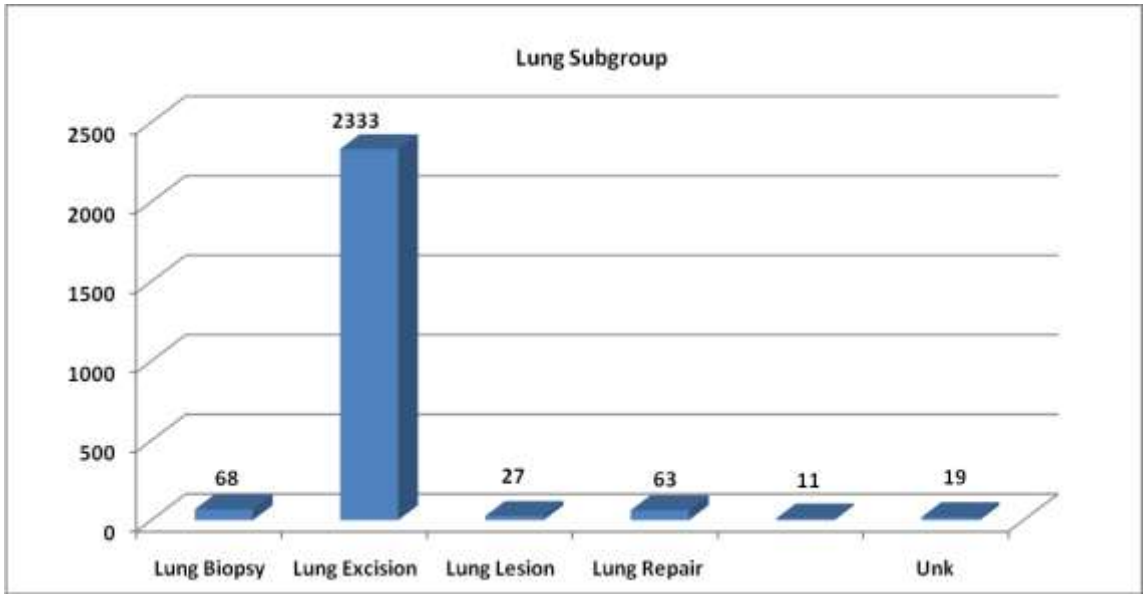
Gender according to age distribution (years)

Age (years)	Male (N)	Female (N)
<=20	71	26
21-30	78	49
31-40	89	93
41-50	246	224
51-60	372	380
61-70	778	740
71-80	352	320
>80	37	34



Lung Subgroup

	Occurrences	Percent
Lung Biopsy	68	2.7
Lung Excision	2333	92.5
Lung Lesion	27	1.1
Lung Repair	63	2.5
Lung Transplant	11	0.4
Unk	19	0.8
Total	**2521**	**100**

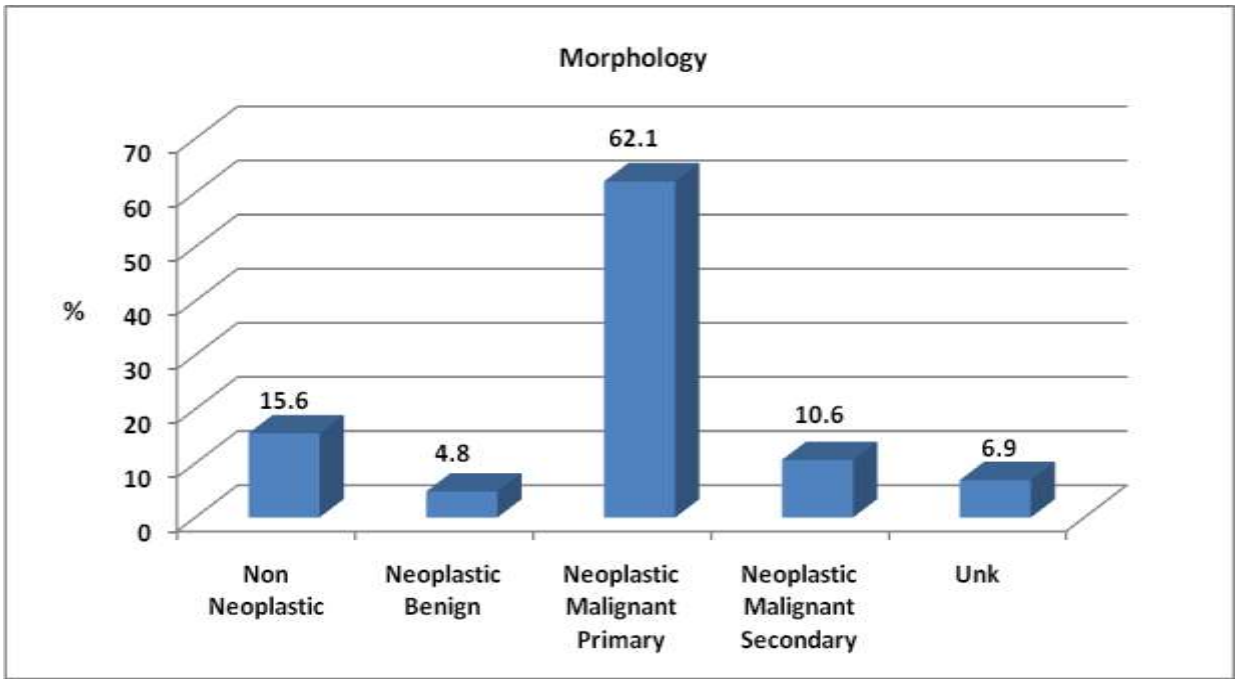


Lung Excision Procedure

	Occurrences	Percent
Bilobectomy	31	1.3
Lobectomy	1123	48.1
Lung Volume Reduction	2	0.1
Pneumonectomy	102	4.4
Segmentectomy	150	6.4
Wedge	904	38.7
Unk	21	0.9
Total	**2333**	**100**

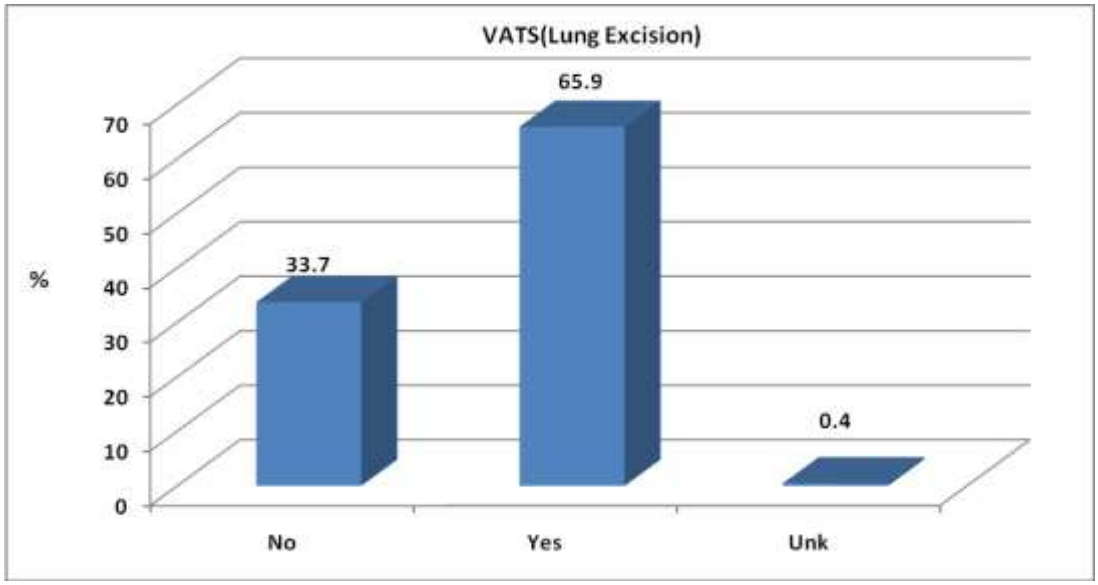
Lung resections pathology

Morphology	Occurrences	Percent (%)
Non Neoplastic	363	15.6
Neoplastic Benign	112	4.8
Neoplastic Malignant Primary	1449	62.1
Neoplastic Malignant Secondary	248	10.6
Unknown	161	6.9
Total	**2333**	**100**



Lung resections pathology (Lung Excision)

VATS	Occurrences	Percent (%)
No	786	33.7
Yes	1537	65.9
Unknown	10	0.4
Total	**2333**	**100**

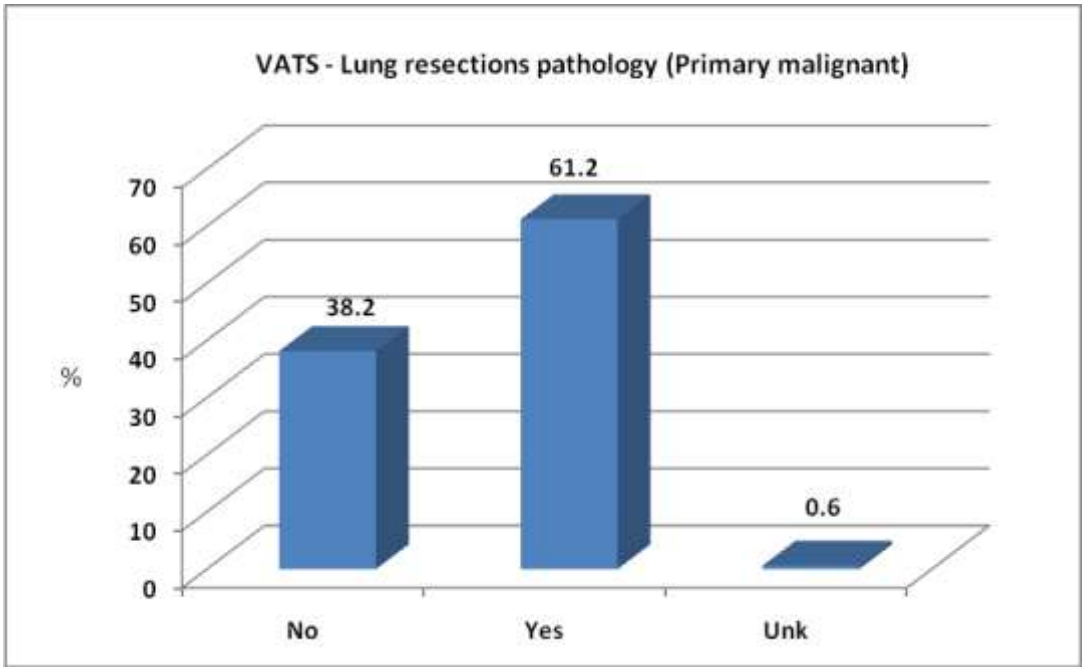


Lung resections pathology (Only Lobectomy)

VATS	Occurrences	Percent (%)
No	419	37.3
Yes	700	62.3
Unknown	4	0.4
Total	**1123**	**100**

Lung resections pathology (Primary malignant)

VATS	Occurrences	Percent (%)
No	553	38.2
Yes	887	61.2
Unknown	9	0.6
Total	**1449**	**100**



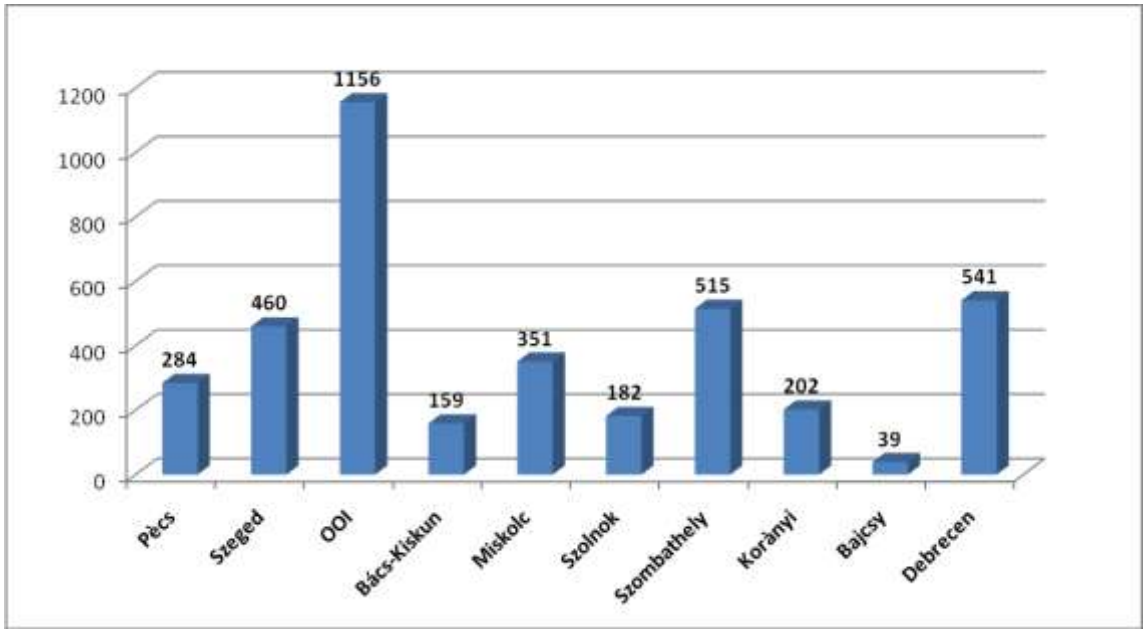
Unadjusted in-hospital mortality rates in lung excision procedures

Outcome at Discharge - Died in Hospital	N	Died in Hospital	Percent(%)
Bilobectomy	29	1	3.4
Lobectomy	1050	7	0.7
Lung Volume Reduction	2	0	0.0
Pneumonectomy	93	6	6.5
Segmentectomy	147	0	0.0
Wedge	852	3	0.4
Total	**2173**	**17**	**0.8**

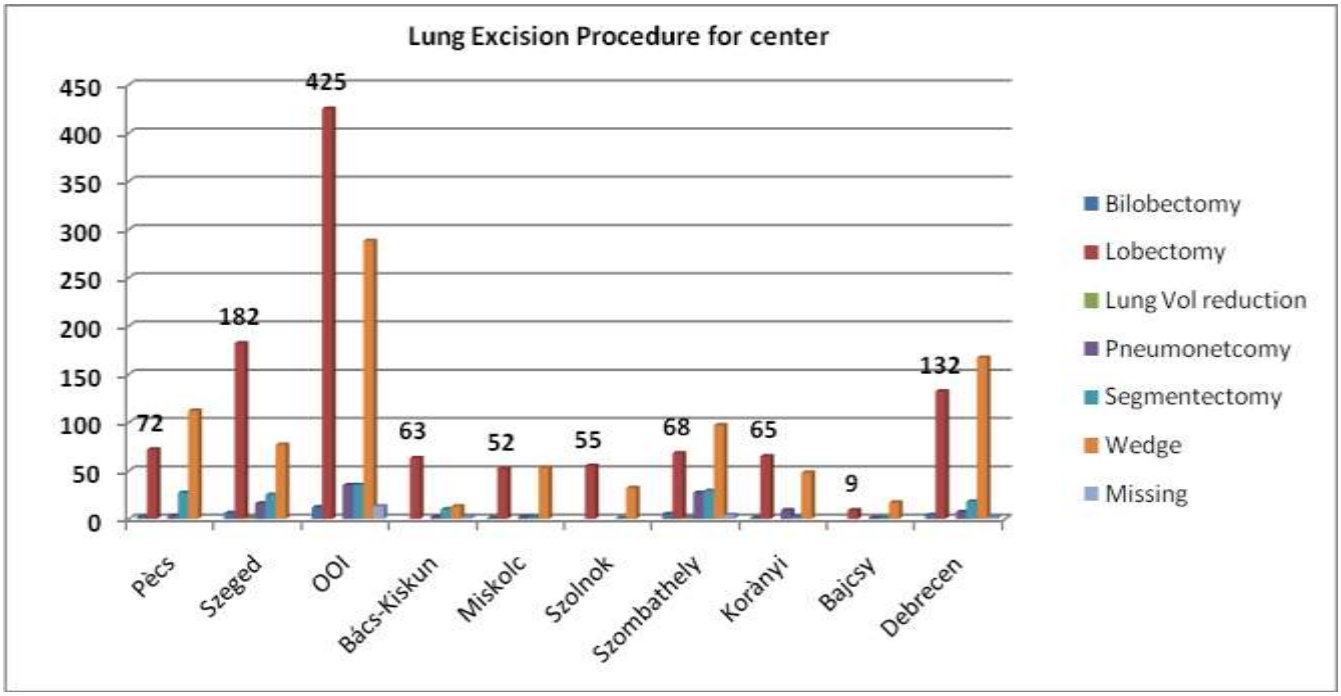
% Missing on outcome at discharge (6%)

Units specific activity & Comparative Analysis between contributing units

Unit	N	%
Pècs	284	7.3
Szeged	460	11.8
OOI	1156	29.7
Bács-Kiskun	159	4.1
Miskolc	351	9.0
Szolnok	182	4.7
Szombathely	515	13.2
Korànyi	202	5.2
Bajcsy	39	1.0
Debrecen	541	13.9
Total	3889	

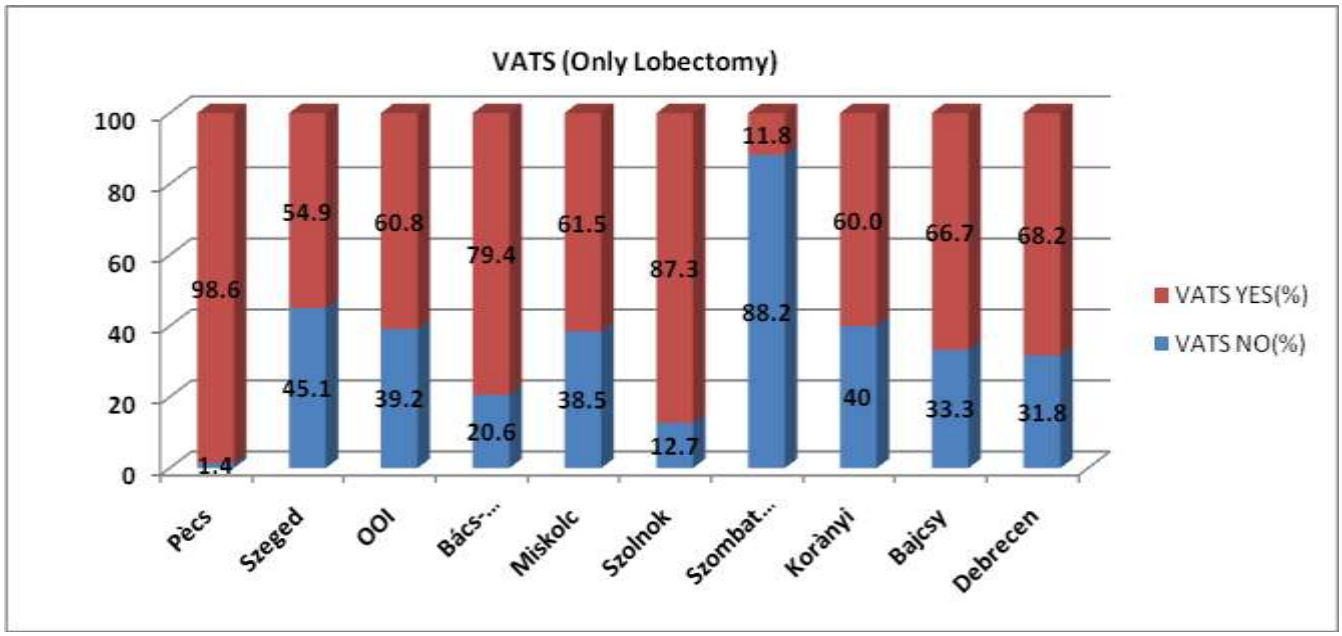


	Bilobectomy	Lobectomy	Lung Vol reduction	Pneumonetcomy	Segmentectomy	Wedge	Missing
Pècs	2	72		3	27	112	
Szeged	6	182	1	16	25	77	
OOI	12	425		35	35	288	13
Bács-Kiskun		63		2	10	13	2
Miskolc	1	52		2	2	53	
Szolnok		55			1	32	
Szombathely	5	68	1	27	29	97	4
Korànyi	1	65		9	2	48	
Bajcsy		9		1	1	17	
Debrecen	4	132		7	18	167	2
Tot	31	1123	2	102	150	904	21



Lung resections pathology (Only Lobectomy)

Unit	VATS NO(%)	VATS YES(%)
Pècs	1.4	98.6
Szeged	45.1	54.9
OOI	39.2	60.8
Bács-Kiskun	20.6	79.4
Miskolc	38.5	61.5
Szolnok	12.7	87.3
Szombathely	88.2	11.8
Korànyi	40.0	60.0
Bajcsy	33.3	66.7
Debrecen	31.8	68.2



Appendix 5 :Report from SBTCSocietadeBrasilera de CirurgiaThoracica (Brazilian Model)

Banco de Dados da SBCT
Relatório Anual 2020

Diretoria da SBCT2015-2020

Presidente

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SecretáriodeAssuntosInternacionais

FernandoVannucci
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Mensagem do Coordenador do Banco de Dados da SBCT

Ricardo Mingarini Terra
Secretario Científico da Sociedade Brasileira de Cirurgia Torácica
Coordenador do Banco de Dados da SBCT

Nosso Banco de Dados da Sociedade Brasileira de Cirurgia Torácica (SBCT) completa 5 anos! Apesar das dificuldades que muitas das instituições enfrentam em suas rotinas para manter o registro das informações, a perseverança dos centros que contribuem para o Banco é comprovada neste Relatório Anual. Nossos números vêm crescendo de forma consistente, o que confirma a solidez deste projeto institucional da SBCT.

A missão do Banco de Dados da SBCT de ser uma fonte de informações sobre a prática da cirurgia torácica no Brasil, bem como de instrumento científico para nossos associados é extremamente relevante e necessária. Este documento reflete a realidade dos resultados da cirurgia torácica em nosso país e pode ser usado como ferramenta de *benchmarking* por todos. Além disso, nossa atividade científica tem sido consistente incluindo trabalhos publicados e apresentações em congressos nacionais e internacionais.

Em 2019, outros projetos como nossa contribuição para a planilha de Cirurgia da Parede Torácica e o desenvolvimento da planilha de Cirurgia das Vias Aéreas se consolidaram e alavancaram o protagonismo de nossa Sociedade em um contexto de colaboração internacional. Esperamos que muitos frutos venham destes subprojetos e que possamos entender melhor a prática nestas áreas da cirurgia torácica.

Nosso projeto segue com novos desafios. A grande crise provocada pela pandemia de COVID-19 atrasou as ações previstas para 2020, que incluíam iniciativas de melhoria de qualidade dos dados e recrutamento de novos centros participantes. Mas não nos intimidamos com esta intempérie e o Banco de Dados segue firme e sólido. Tenham um boa leitura e considerem colaborar com o Banco de Dados da SBCT!

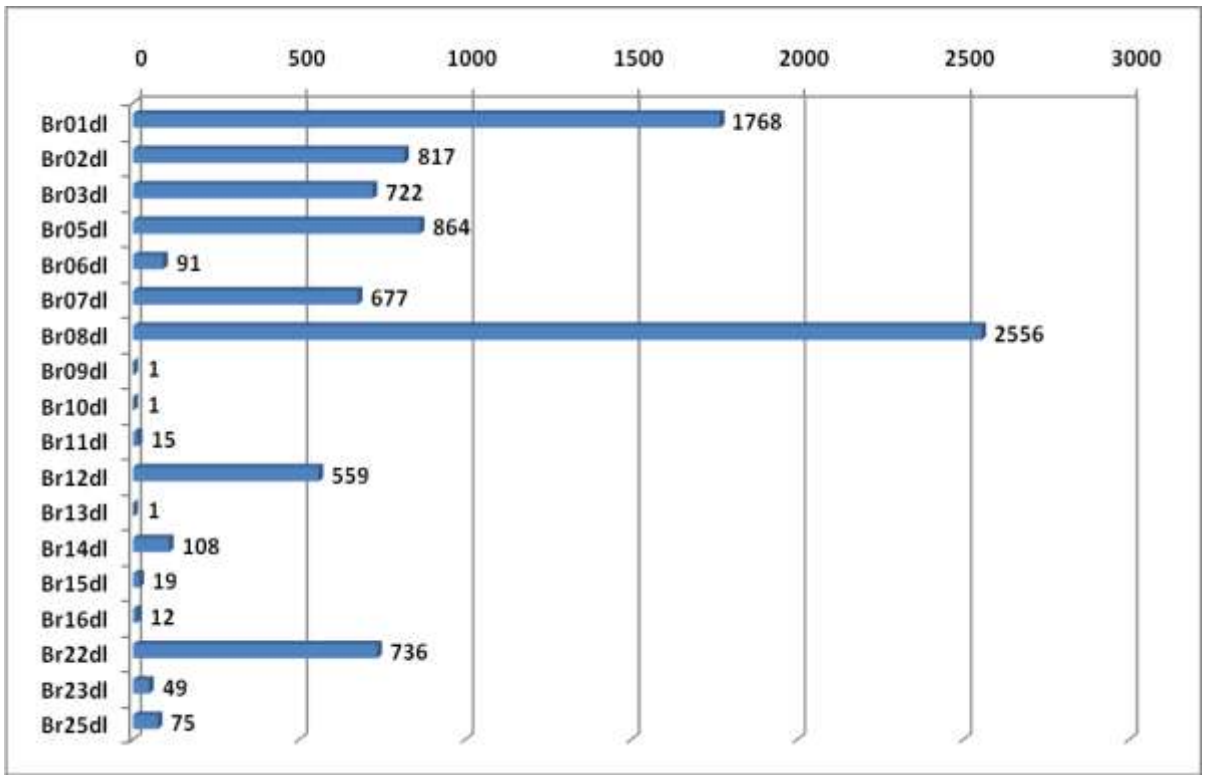
Um grande abraço,

Ricardo

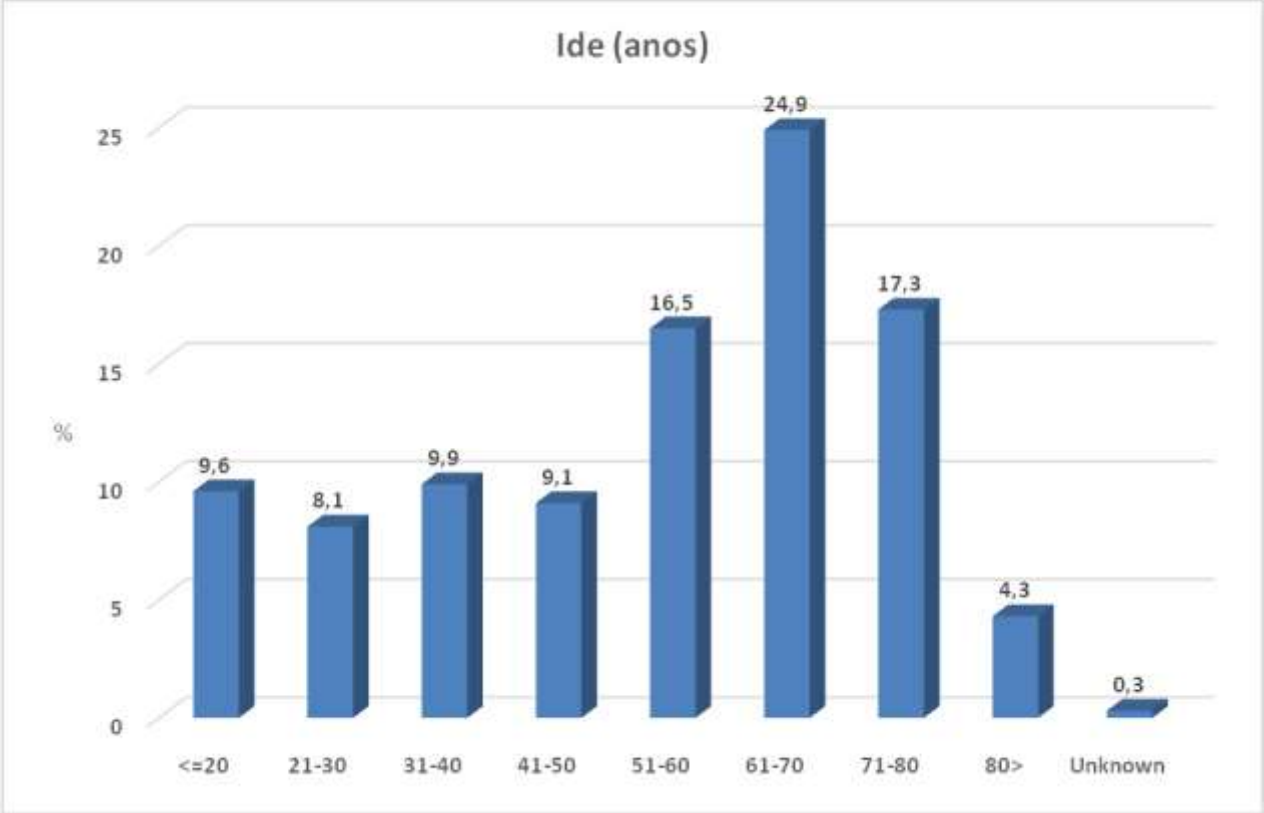
Instituições que contribuíram com o Banco de Dados da SBCT de 2015 a 2020

Instituição	Estado	Responsável local pelo banco de dados
Instituto do Coração (InCor) - USP	São Paulo	Ricardo M. Terra / Leticia Leone Lauricella
Instituto do Câncer do Estado de São Paulo (ICESP) - USP	São Paulo	Ricardo M. Terra / Leticia Leone Lauricella
Hospital Universitário Pedro Ernesto	Rio de Janeiro	Carlos Eduardo Teixeira Lima
Hospital Júlia Kubitschek - FHEMIG	Minas Gerais	Leonardo Brand Rodrigues
Hospital Madre Teresa	Minas Gerais	Leonardo Brand Rodrigues
Hospital Porto Dias	Pará	Geraldo Roger Normando
Hospital Universitário Onofre Lopes - UFRN	Rio Grande do Norte	Carlos Alberto A. Araujo
Hospital São Lucas - PUCRS	Rio Grande do Sul	Maria Teresa Ruiz Tsukazan / José Antonio de Figueiredo Pinto
Hospital Universitário de Brasília	Distrito Federal	Guilherme Cançado Rezende / Nuno Ferreira de Lima
Hospital Brasília	Distrito Federal	Guilherme Cançado Rezende / Nuno Ferreira de Lima
Hospital Universitário Lauro Wanderley	Paraíba	Petrucio Abrantes Sarmento
Hospital de Messejana	Ceará	Antero Gomes Neto
Hospital Santa Luzia Rede D'or	Distrito Federal	Humberto Alves de Oliveira
Hospital de Base do Distrito Federal	Distrito Federal	Joaquim Euclides Melo Araújo / Humberto Alves de Oliveira
Santa Casa de Misericórdia da Bahia	Bahia	Gustavo A. Fortunato
Pavilhão Pereira Filho - Santa Casa de porto Alegre	Rio Grande do Sul	Spencer Marcantonio Camargo
Hospital Sancta Maggiore Higienopolis	Sao Paulo - SP	Julio Mott
Torre Medica Clinica Portoazul	Consultorio	Diego Pardo
Hospital de Clínicas de Porto Alegre - Serviço de CirurgiaTorácica-HCPA	Porto Alegre,	Mauricio Guidi Saueressig

Número de unidades envolvidas no Banco de dados SBCT/ESTS até dezembro de 2020 (Unidade/procedimentos)



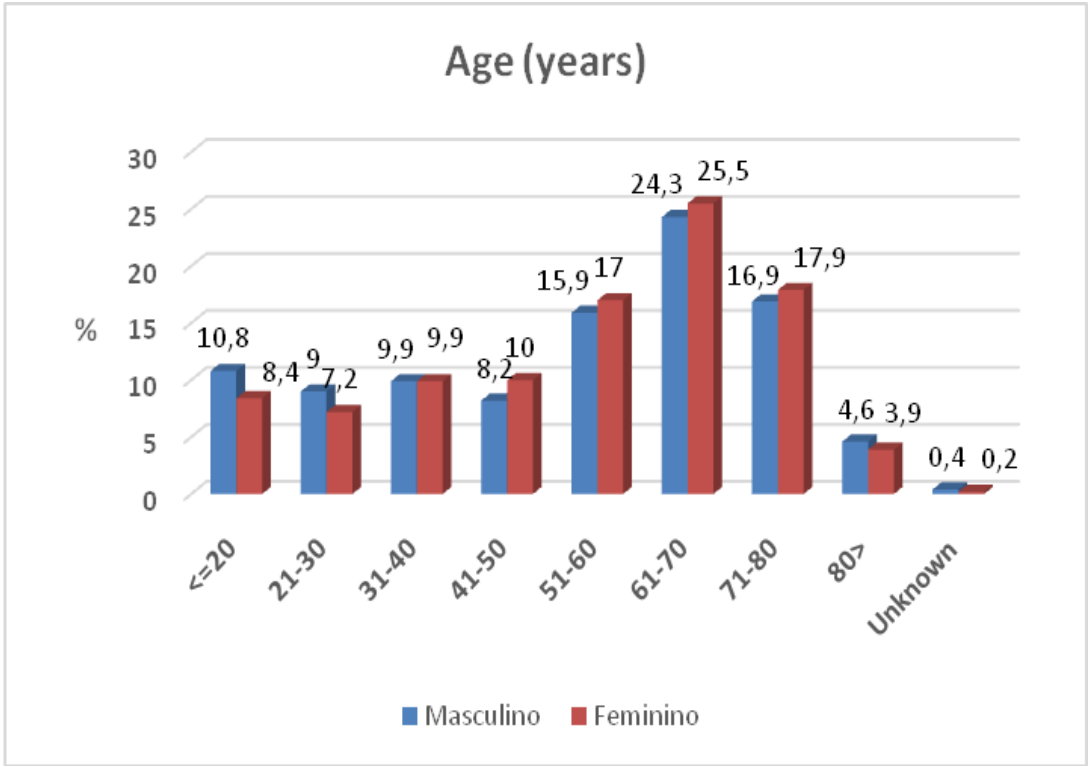
Distribuição de idade e gênero



Idade (anos)	Pacientes	%
<=20	868	9.6
21-30	732	8.1
31-40	896	9.9
41-50	829	9.1
51-60	1496	16.5
61-70	2264	24.9
71-80	1574	17.3
>80	388	4.3
Desconhecido	24	0.3
Total	9071	100

Distribuição de gênero por faixa etária (anos)

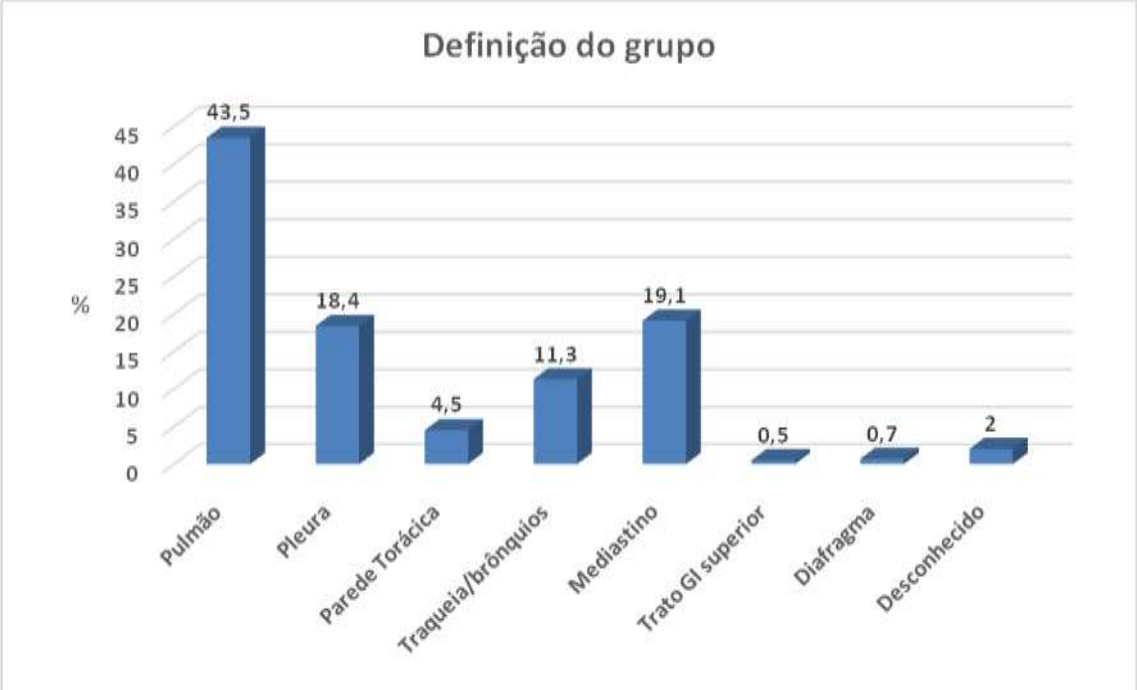
	Masculino (%)	Feminino (%)
≤ 20	10.8	8.4
21-30	9	7.2
31-40	9.9	9.9
41-50	8.2	10
51-60	15.9	17
61-70	24.3	25.5
71-80	16.9	17.9
>80	4.6	3.9
Desconhecido	0.4	0.2



Total de cirurgias realizadas

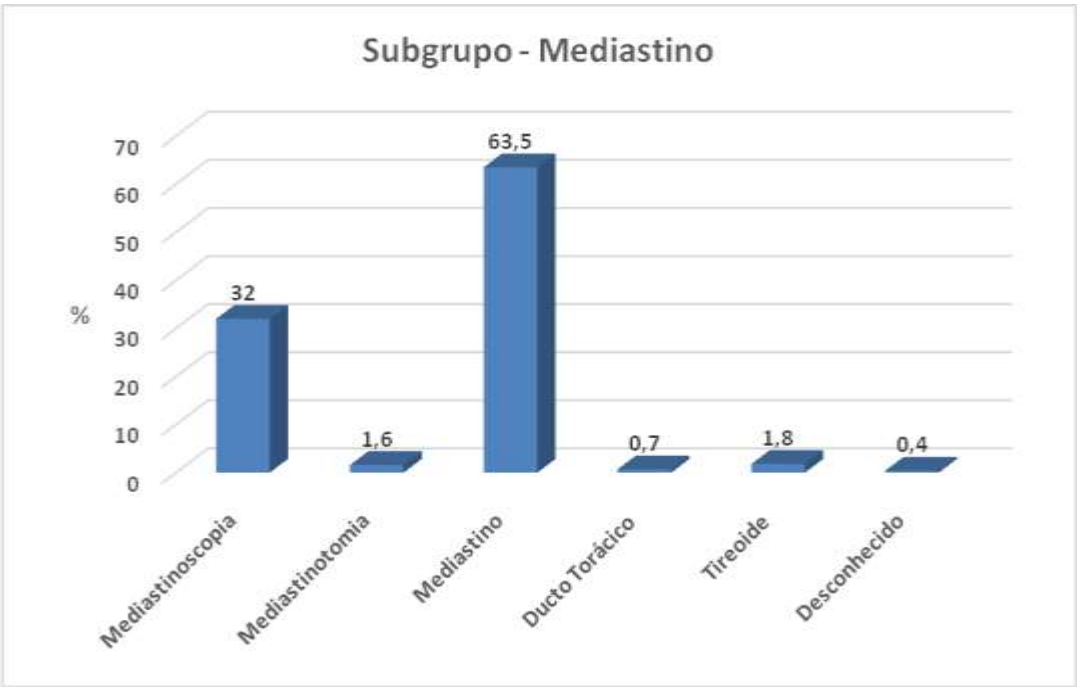
definição dos grupos

Definição do grupo	Procedimentos	%
Pulmão	3946	43.5
Pleura	1668	18.4
Parede Torácica	407	4.5
Traqueia/brônquios	1024	11.3
Mediastino	1732	19.1
Trato GI superior	46	0.5
Diafragma	63	0.7
Desconhecido	185	2
Total	9071	100



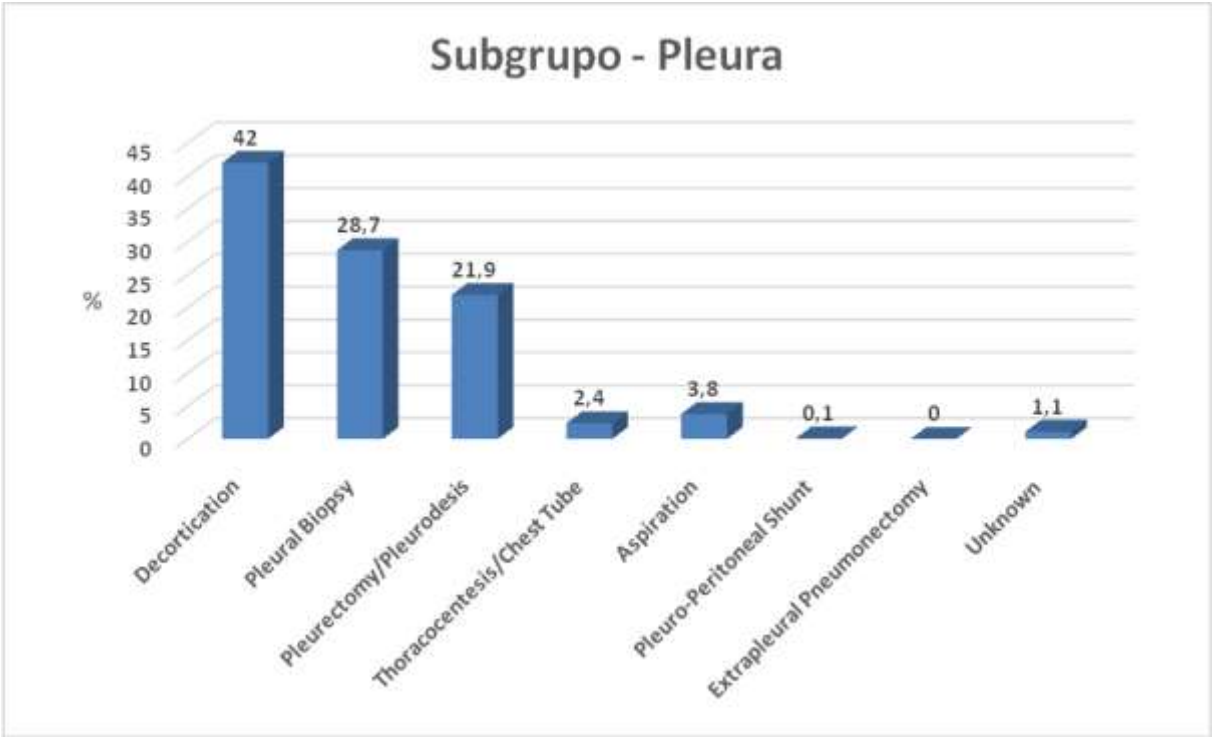
Subgrupo - Mediastino

	Procedimentos	%
Mediastinoscopia	555	32
Mediastinotomia	27	1.6
Mediastino	1099	63.5
Ducto Torácico	13	0.7
Tireoide	31	1.8
Desconhecido	7	0.4
Total	**1732**	**100**



Subgrupo - Pleura

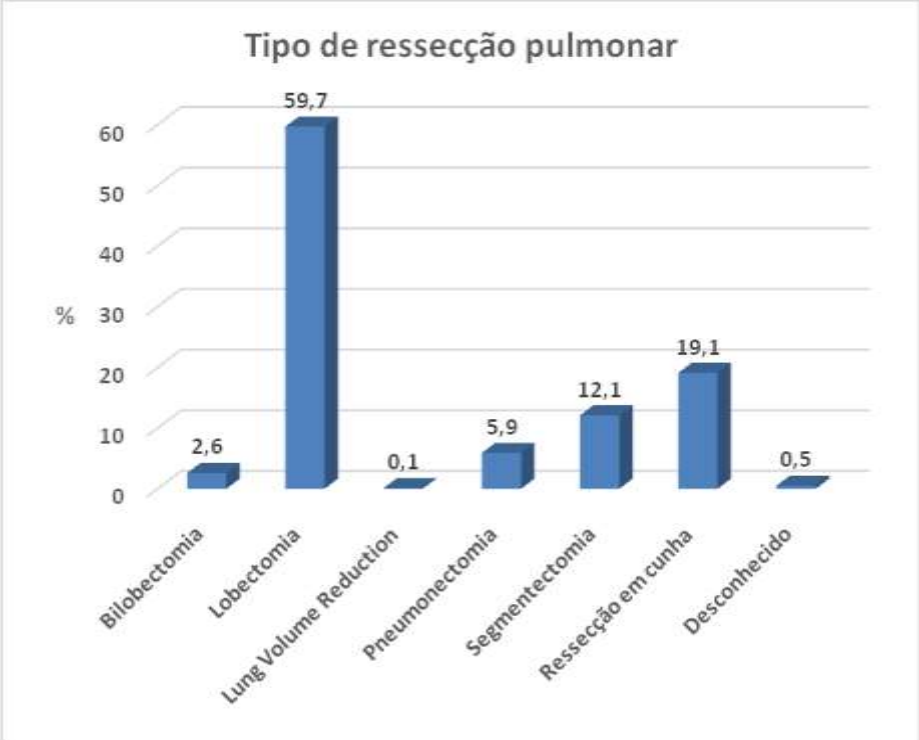
	Procedimentos	%
Descorticação	700	42
Biópsia pleural	479	28.7
Pleurectomia/Pleurodese	365	21.9
Toracocentese/Toracostomia	40	2.4
Aspiração	63	3.8
Shunt pleuro-peritoneal	2	0.1
Extrapleural Pneumonectomy	1	0
Desconhecido	18	1.1
Total	**1668**	**100**



Ressecções Pulmonares

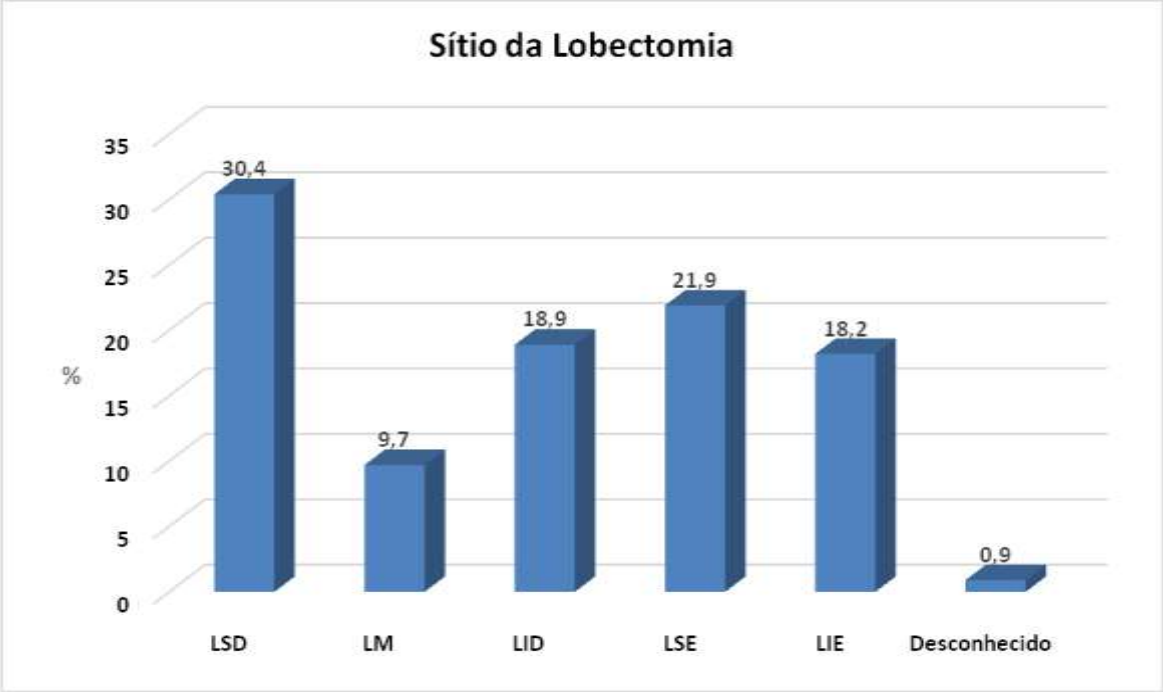
Tipo de ressecção pulmonar realizada, incluindo todos os diagnósticos

	Procedimentos	%
Bilobectomia	83	2.6
Lobectomia	1901	59.7
Cirurgia Redutora do Volume pulmonar	2	0.1
Pneumonectomia	189	5.9
Segmentectomia	386	12.1
Ressecção em cunha	608	19.1
Desconhecido	17	0.5
Total	**3186**	**100**



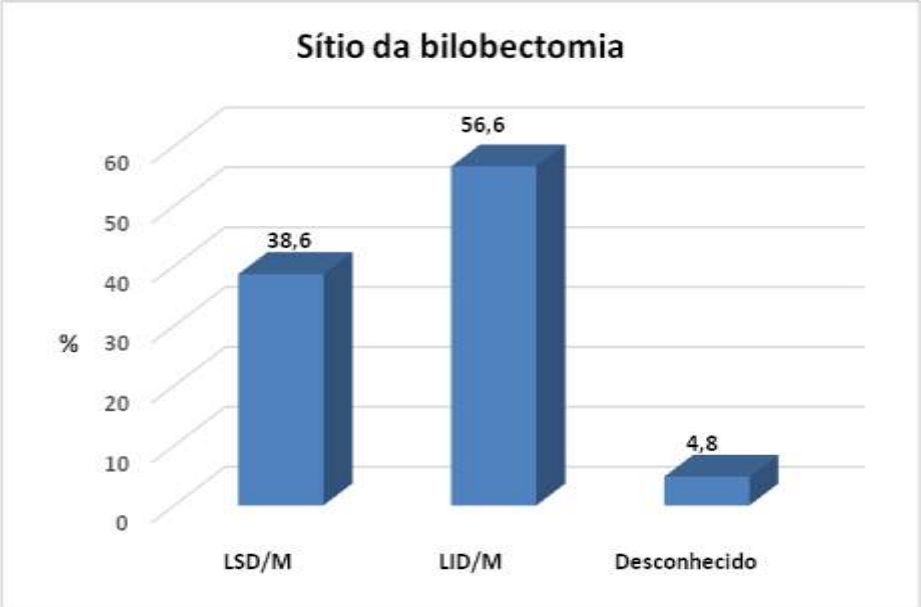
Distribuição das lobectomias por sítio de ressecção

Sítio da Lobectomia	Procedimentos	%
LSD	578	30.4
LM	185	9.7
LID	360	18.9
LSE	416	21.9
LIE	345	18.2
Desconhecido	17	0.9
Total	**1901**	**100**



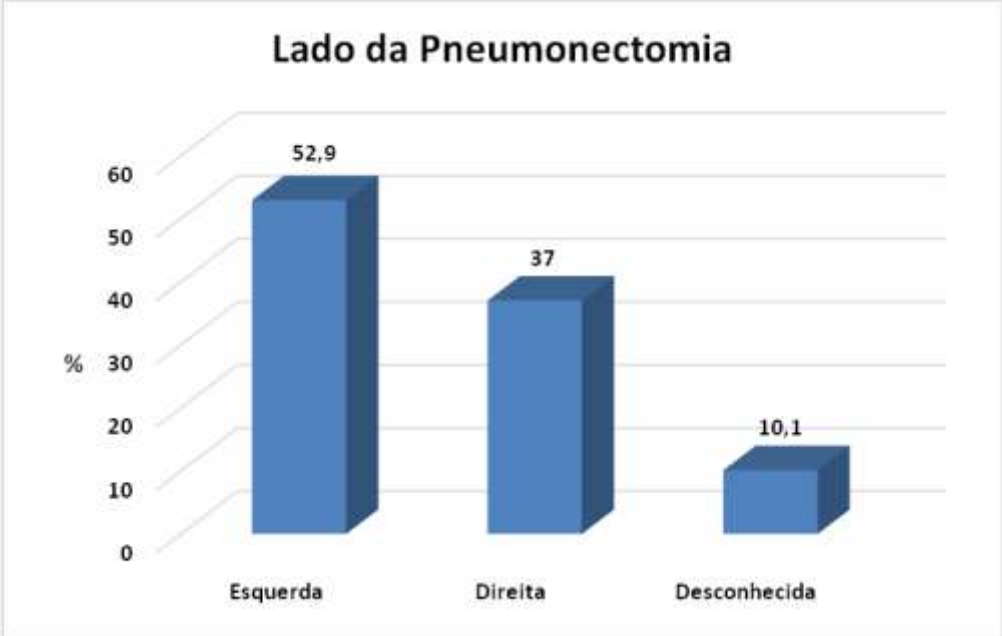
Distribuição da bilobectomiaú pelo sitio de ressecção

Sítio da bilobectomia	Procedimentos	%
LSD/M	32	38.6
LID/M	47	56.6
Desconhecido	4	4.8
Total	**83**	**100**



Distribuição da Pneumonectomia pela lateralidade

Lado da Pneumonectomia	Procedimentos	%
Esquerda	100	52.9
Direita	70	37
Desconhecida	19	10.1
Total	**189**	**100**

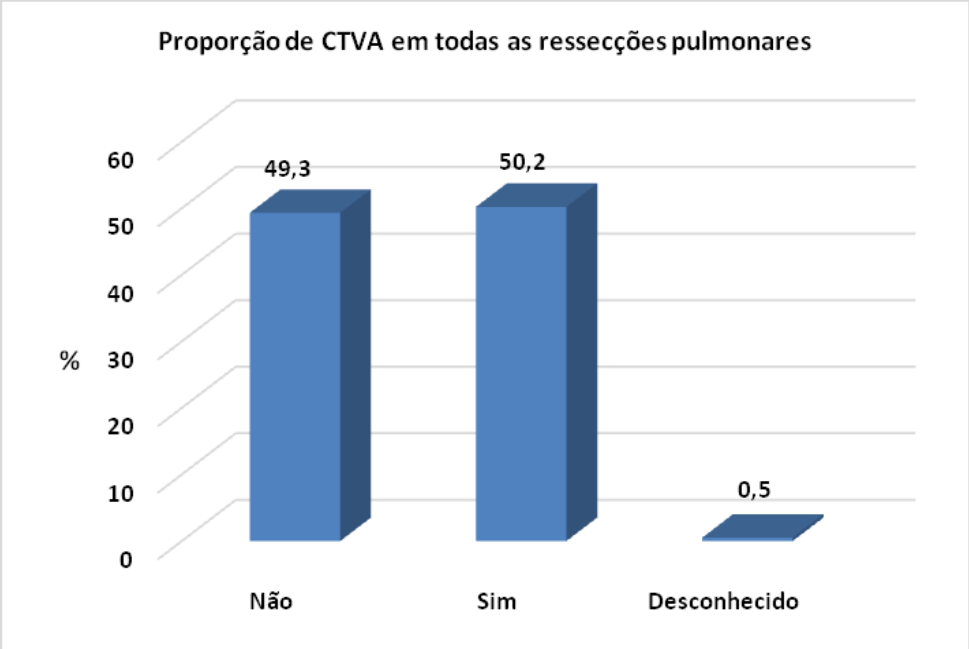


Tipo de Pneumonectomia	Procedimentos	%
Alone	125	66.1
Completion	14	7.4
Intrapericardial	18	9.5
Pleuropneumonectomy	9	4.8
Sleeve Resection	0	0
Diaphragm Resection	0	0
Atrial Resection	3	1.6
SVC Resection/Reconstruction	0	0
Vertebral Resection	1	0.5
Unknown	19	10.1

Total	**189**	**100**

Proporção de CTVA em todas as ressecções pulmonares

CTVA	Peocedimentos	%
Não	1572	49.3
Sim	1598	50.2
Desconhecido	16	0.5
Total	**3186**	**100**

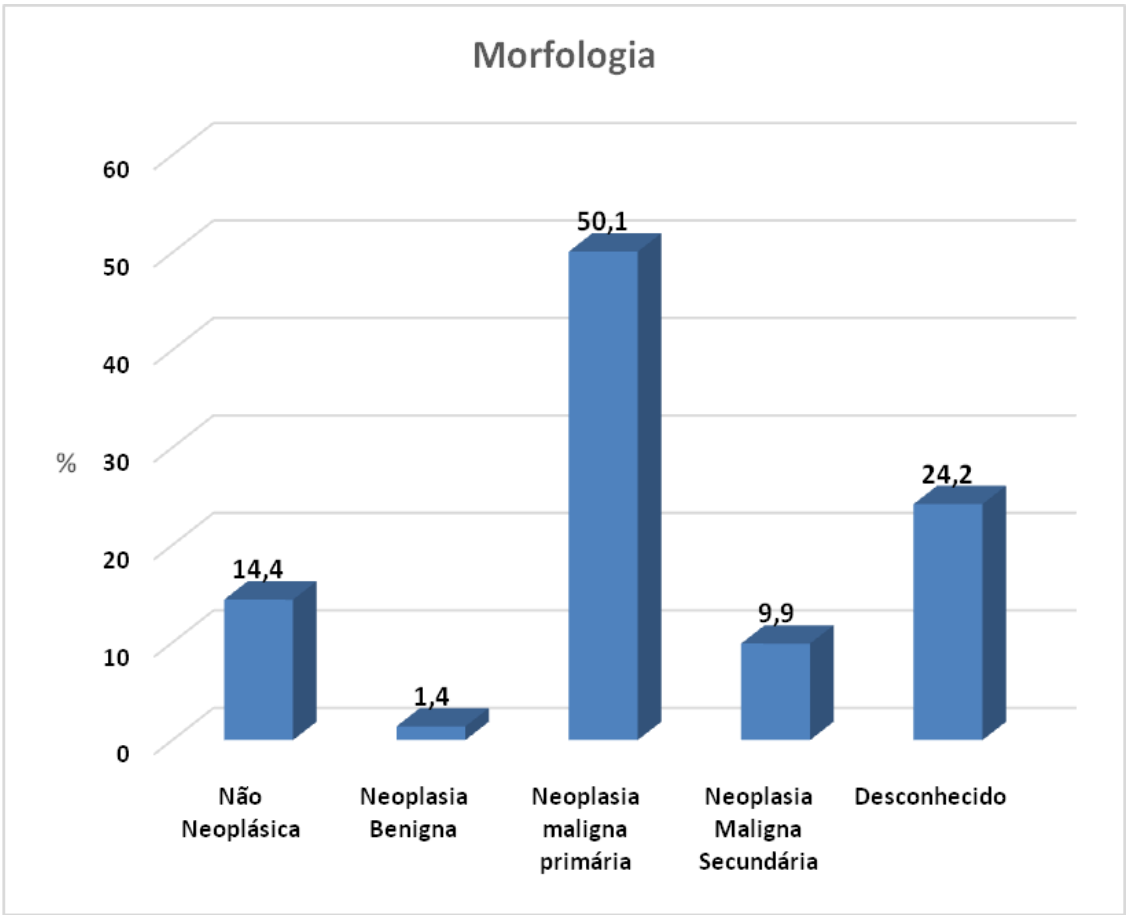


Proporção de lobectomias por CTVA

CTVA (lobectomia)	Procedimentos	%
Não	919	48.4
Sim	974	51.2
Desconhecido	8	0.4
Total	**1901**	**100**

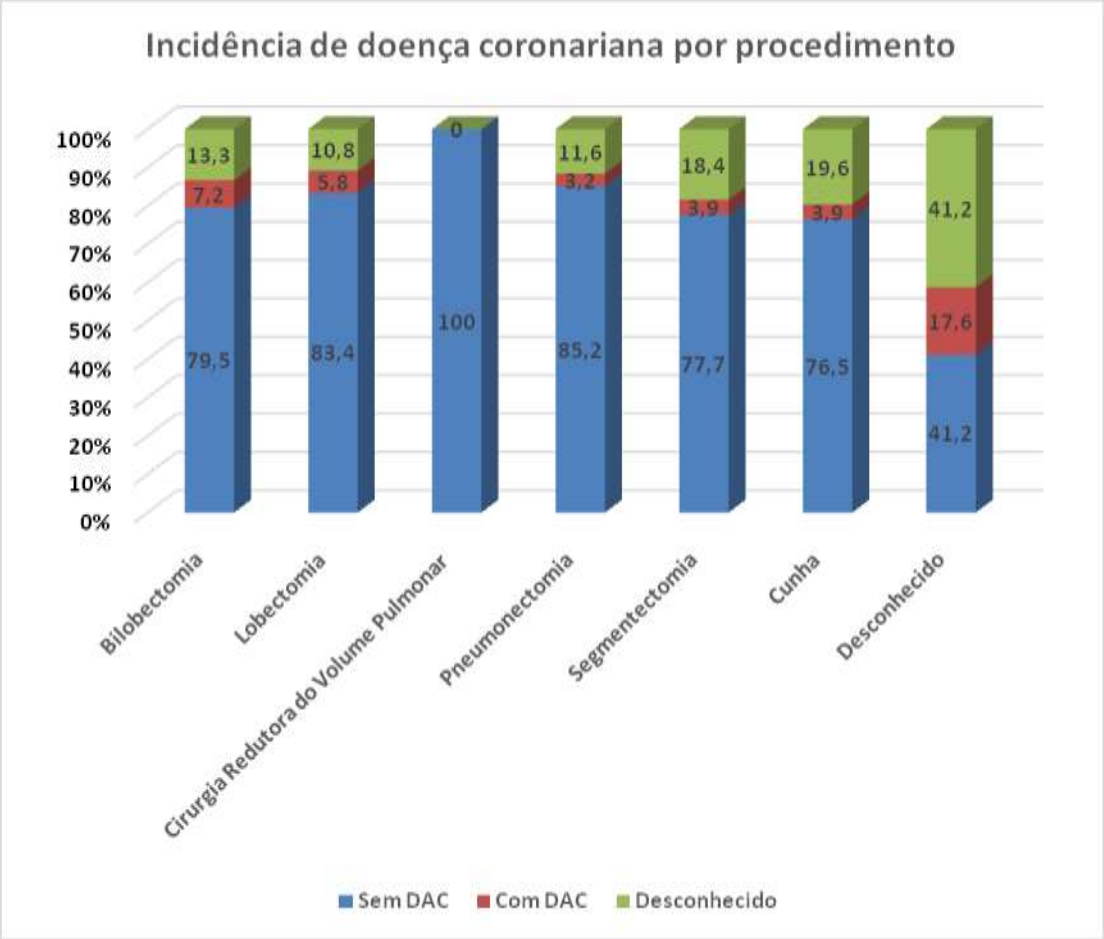
Patologia das ressecções pulmonares

Morfologia	Procedimentos	%
Não Neoplásica	460	14.4
Neoplasia Benigna	44	1.4
Neoplasia maligna primária	1597	50.1
Neoplasia Maligna Secundária	314	9.9
Desconhecido	771	24.2
Total	**3186**	**100**



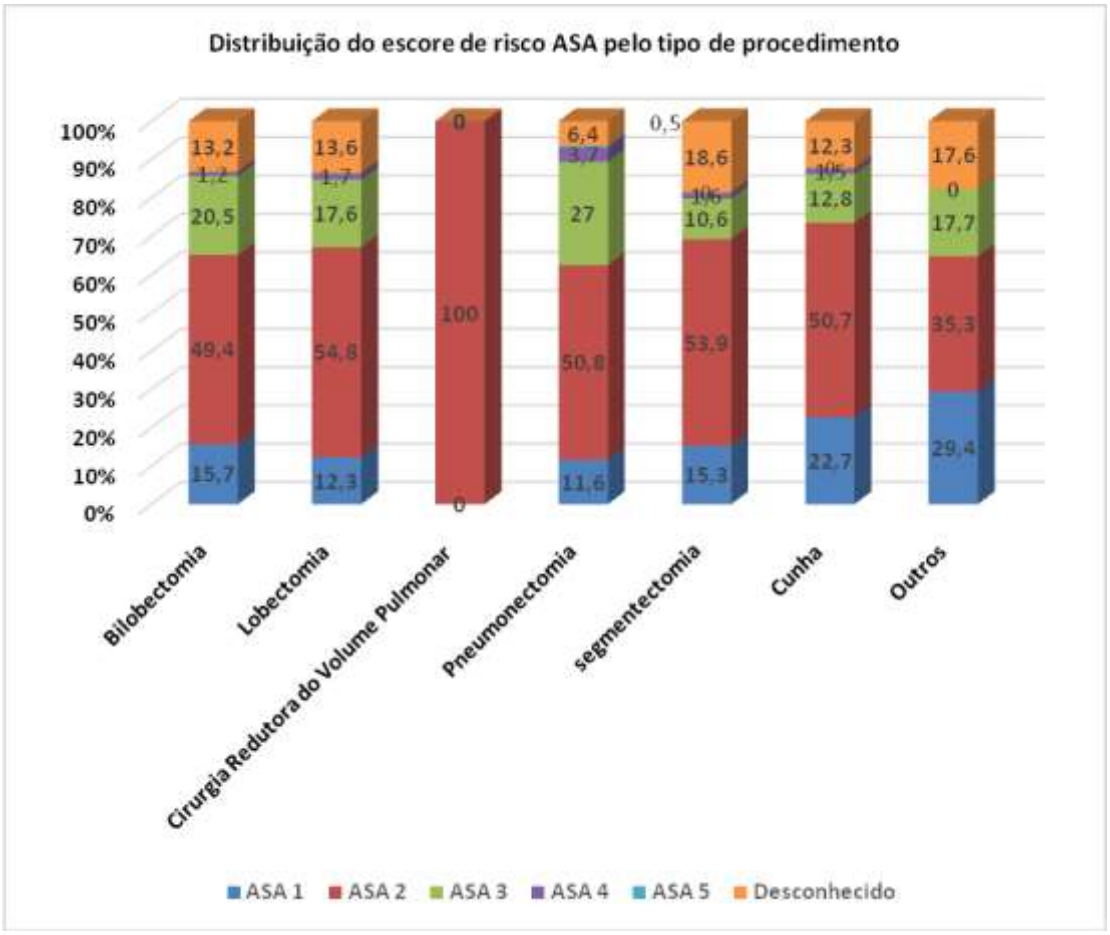
Incidência de doença coronariana por procedimento

Procedimento de excisão pulmonar	C/ DAC	S/DAC	Desconhecido	Total
Bilobectomia	66	6	11	83
Lobectomia	1586	110	205	1901
Cirurgia Redutora do Volume Pulmonar	2	0	0	2
Pneumonectomia	161	6	22	189
Segmentectomia	300	15	71	386
Cunha	465	24	119	608
Desconhecido	7	3	7	17
Total	**2587**	**164**	**435**	**3186**



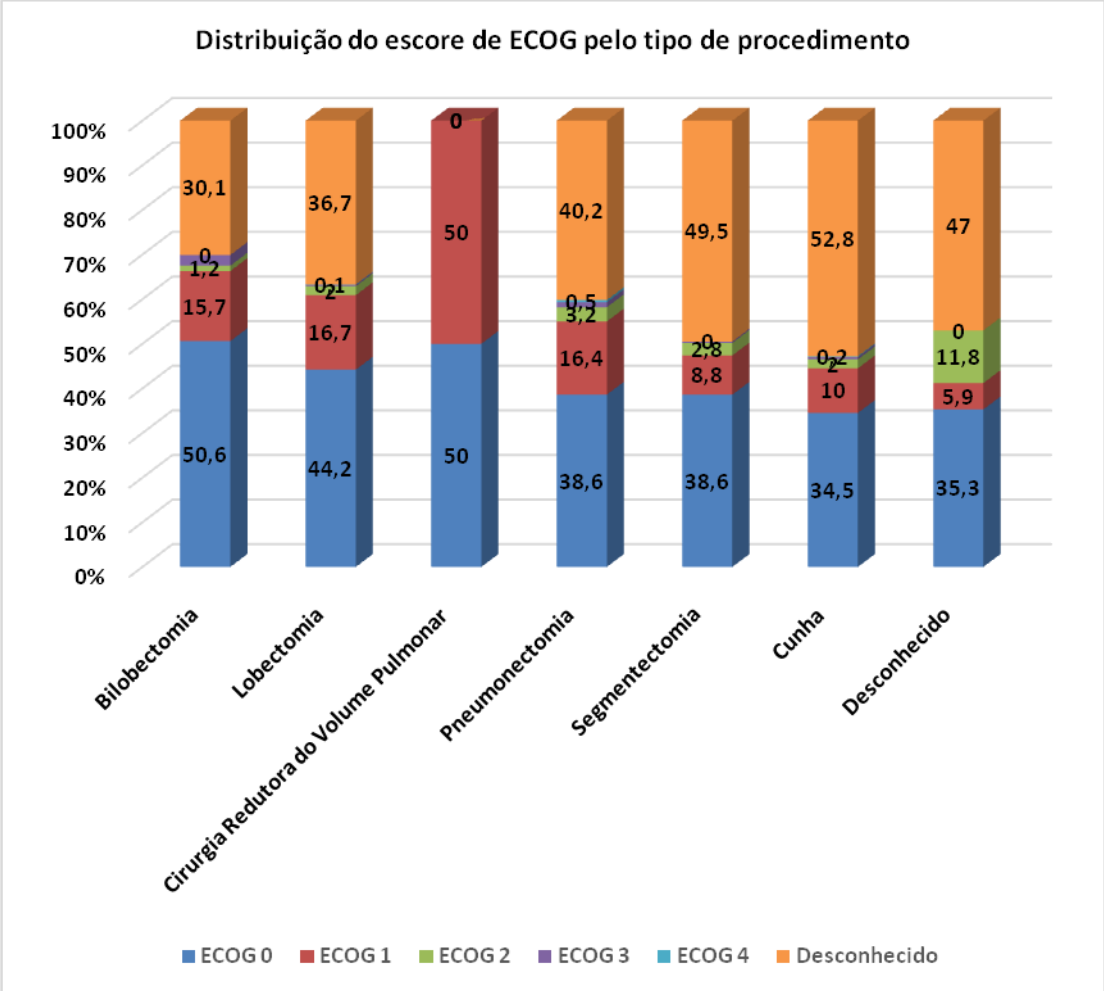
Distribuição do escore de risco ASA pelo tipo de procedimento

Tipo de ressecção pulmonar	ASA 1	ASA 2	ASA 3	ASA 4	ASA 5	Desconhecido	Total
Bilobectomia	13	41	17	1	0	11	83
Lobectomia	233	1042	335	32	1	258	1901
Cirurgia Redutora do Volume Pulmonar	0	2	0	0	0	0	2
Pneumonectomia	22	96	51	7	1	12	189
segmentectomia	59	208	41	6	0	72	386
Cunha	138	308	78	9	0	75	608
Outros	5	6	3	0	0	3	17
Total	**470**	**1703**	**525**	**55**	**2**	**431**	**3186**



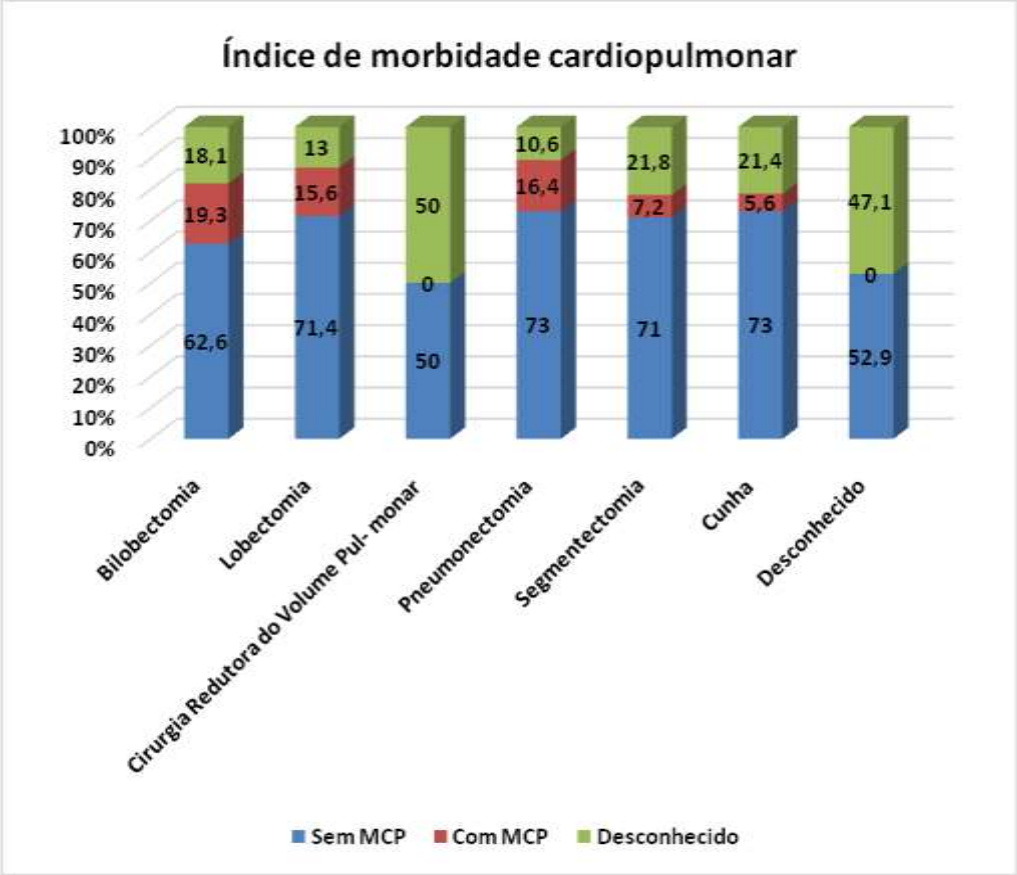
Distribuição do escore de ECOG pelo tipo de procedimento

Tipo de ressecção pulmonar	ECOG 0	ECOG 1	ECOG 2	ECOG 3	ECOG 4	Desconhecido	Total
Bilobectomia	42	13	1	2	0	25	83
Lobectomia	840	318	38	6	2	697	1901
Cirurgia Redutora do Volume Pulmonar	1	1	0	0	0	0	2
Pneumonectomia	73	31	6	2	1	76	189
Segmentectomia	149	34	11	1	0	191	386
Cunha	210	61	12	3	1	321	608
Desconhecido	6	1	2	0	0	8	17
Total	**1321**	**459**	**70**	**14**	**4**	**1318**	**3186**



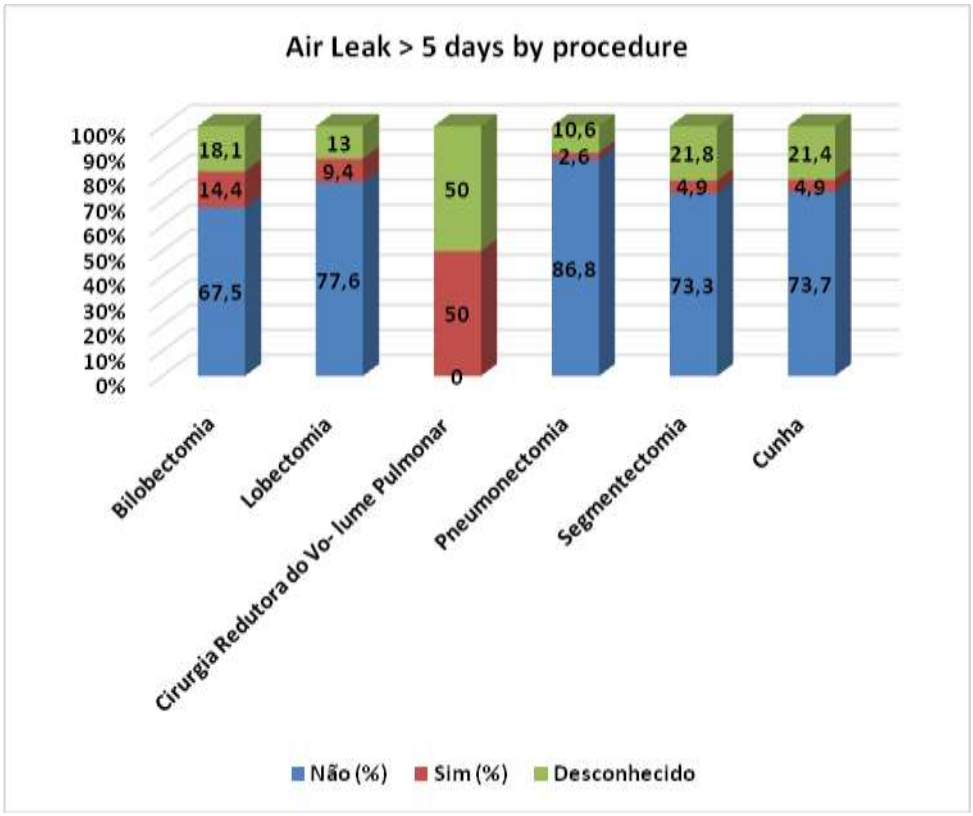
Índice de morbidade cardiopulmonar (MCP) nos diferentes tipos de ressecções pulmonares

	Sem MCP	Sem MCP (%)	Com MCP	Com MCP (%)	Desconhecido	Desconhecido (%)	Total
Bilobectomia	52	62.6	16	19.3	15	18.1	83
Lobectomia	1357	71.4	297	15.6	247	13	1901
Cirurgia Redutora do Volume Pul-monar	1	50	0	0	1	50	2
Pneumonectomia	138	73	31	16.4	20	10.6	189
Segmentectomia	274	71	28	7.2	84	21.8	386
Cunha	444	73	34	5.6	130	21.4	608
Desconhecido	9	52.9	0	0	8	47.1	17
Total	**2275**		**406**		**505**		**3186**



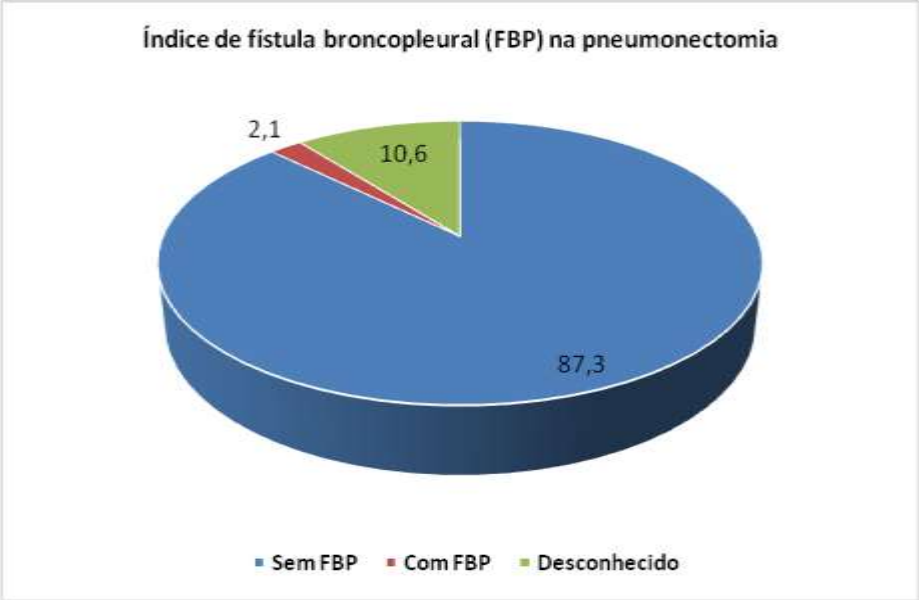
Índice de escape aéreo prolongado (> 5 dias) nos diferentes tipos de ressecções pulmonares

	Escape aéreo > 5 dias		
Tipo de ressecção pulmonar	**Não (%)**	**Sim (%)**	**Desconhecido (%)**
Bilobectomia	67.5	14.4	18.1
Lobectomia	77.6	9.4	13
Cirurgia Redutora do Volume Pulmonar	0	50	50
Pneumonectomia	86.8	2.6	10.6
Segmentectomia	73.3	4.9	21.8
Cunha	73.7	4.9	21.4
Total	**76.5**	**7.7**	**15.8**



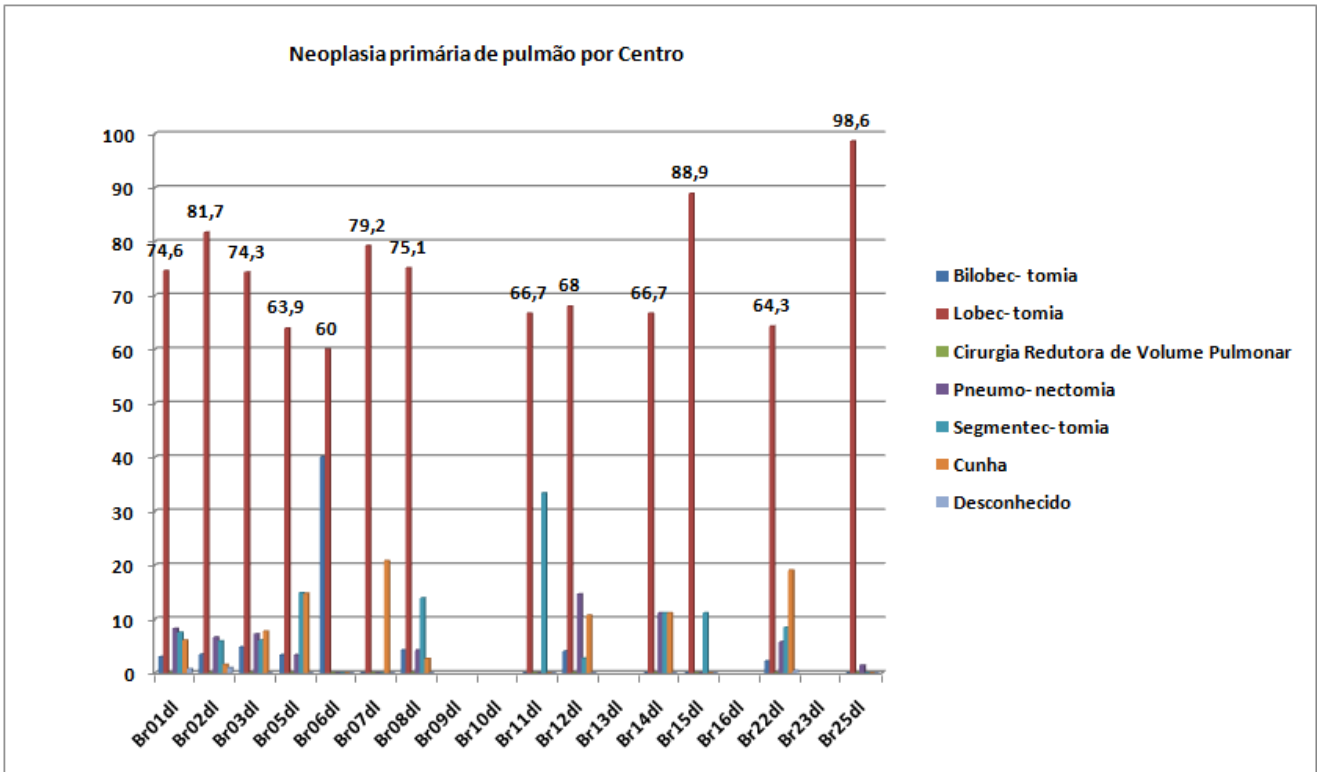
Índice de fístula broncopleural (FBP) na pneumonectomia

Fístula broncopleural	Sem FBP	Com FBP	Desconhecido
Pneumonectomia	165	4	20
Pneumonectomia (%)	87.3	2.1	10.6



Neoplasia primária de pulmão por Centro

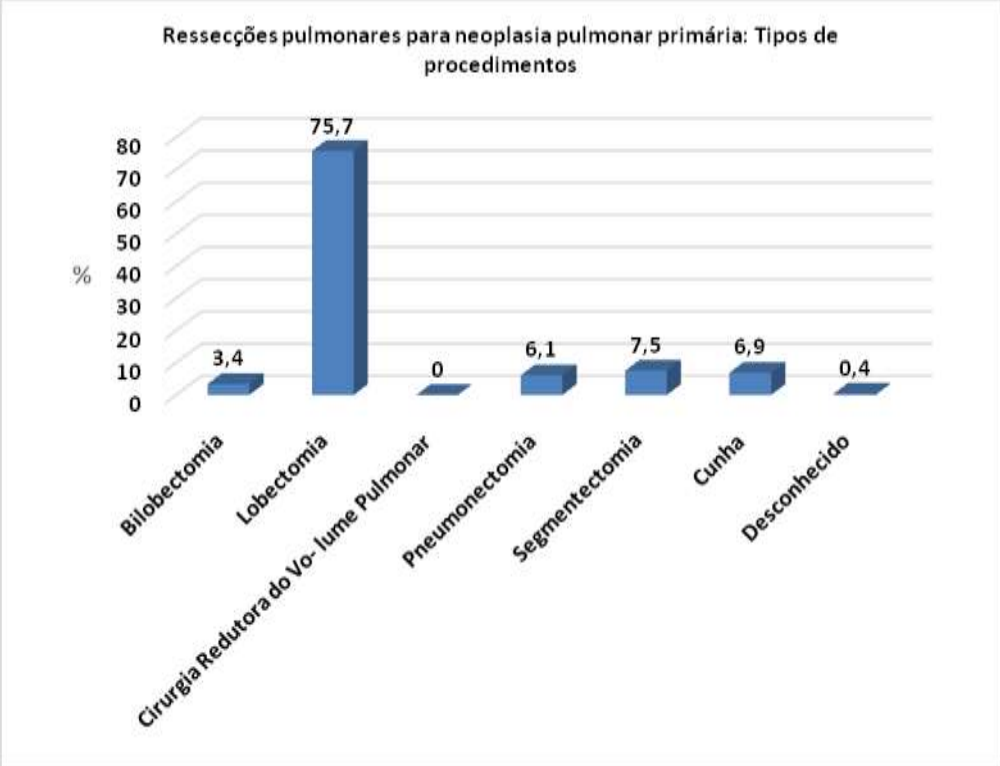
Unit	Total	Bilobec- tomia	Lobec-tomia	Cirurgia Redutora de Volume Pulmonar	Pneumo-nectomia	Segmentec-tomia	Cunha	Desconhecido
Br01dl	134	3	74.6	0	8.2	7.5	6	0.7
Br02dl	471	3.4	81.7	0	6.6	5.9	1.5	0.9
Br03dl	249	4.8	74.3	0	7.2	6	7.7	0
Br05dl	61	3.3	63.9	0	3.3	14.8	14.7	0
Br06dl	5	40	60	0	0	0	0	0
Br07dl	48	0	79.2	0	0	0	20.8	0
Br08dl	237	4.2	75.1	0	4.2	13.9	2.6	0
Br09dl								
Br10dl								
Br11dl	3	0	66.7	0	0	33.3	0	0
Br12dl	75	4	68	0	14.6	2.7	10.7	0
Br13dl								
Br14dl	9	0	66.7	0	11.1	11.1	11.1	0
Br15dl	9	0	88.9	0	0	11.1	0	0
Br16dl								
Br22dl	227	2.2	64.3	0	5.7	8.4	19	0.4
Br23dl								
Br25dl	69	0	98.6	0	1.4	0	0	0
Total	1597	3.4	75.7	0	6.1	7.5	6.9	0.4



Neoplasia primária de pulmão

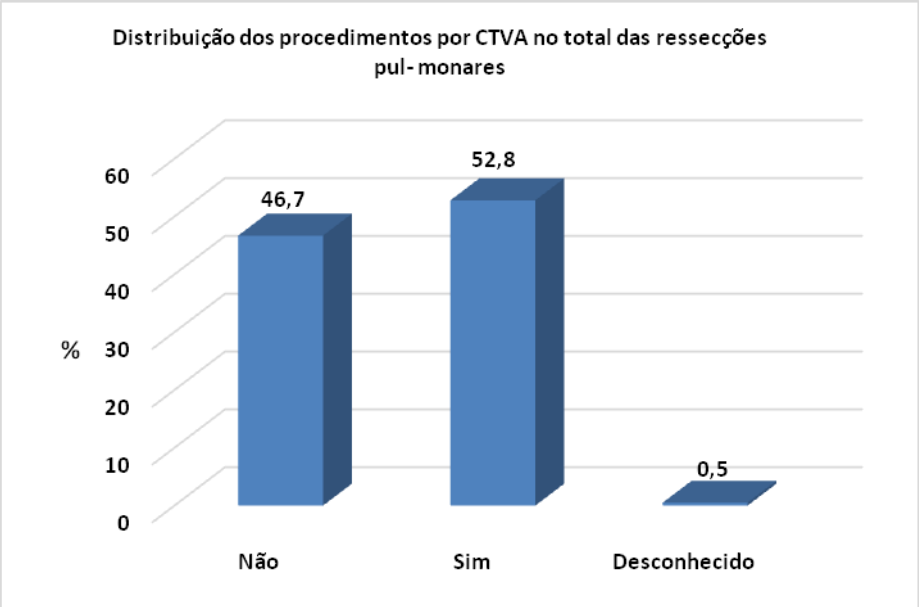
Ressecções pulmonares para neoplasia pulmonar primária: Tipos de procedimentos

	Procedimentos	%
Bilobectomia	54	3.4
Lobectomia	1209	75.7
Cirurgia Redutora do Volume Pulmonar	0	0
Pneumonectomia	98	6.1
Segmentectomia	119	7.5
Cunha	111	6.9
Desconhecido	6	0.4
Total	1597	100



Distribuição dos procedimentos por CTVA no total das ressecções pul-monares

CTVA	Procedimentos	%
Não	745	46.7
Sim	844	52.8
Desconhecido	8	0.5
Total	**1597**	**100**



Distribuição dos procedimentos por CTVA nas lobectomias/bilobectomias

CTVA	Procedimentos	%
Não	591	46.8
Sim	668	52.9
Desconhecido	4	0.3
Total	**1263**	**100**

Índice de mortalidade hospitalar não ajustado por ressecçõespul- monares para neoplasia pulmonar primária

Tipo de ressecção Pulmonar	N	Óbito Hospitalar	%
Bilobectomia	51	2	3.9
Lobectomia	1186	34	2.9
Cirurgia Redutora do Volume Pulmonar	0	0	0
Pneumonectomia	95	12	12.6
Segmentectomia	118	2	1.7
Cunha	108	4	3.7
Total	**1558**	**54**	**3.5**

Appendix 6 : General Data Protection Regulation - UE 2016/679

STUDIO LEGALE MAGLIO & PARTNERS
LUCERNA IURIS – INTERNATIONAL LEGAL NETWORK

***
In collaborazione con

Siegert & Kollegen – Friburg
Alan Bensoussan Avocats – Paris
Pinsent Masons Law Firm – London
PLMJ Sociedade de Advogados – Lisboa
Landwell Global Abogados – Barcelona
Singewald Consultants Group – Amsterdam
Guilmot – Bassine Avocats – Bruxelles
Engstorm Advokats – Stockolm
Procopé & Hornborg Law Offices Ltd – Helsinki
Traple Konarski Podrecki Kancelaria Prawna – Kraków
Spohn Richter & Partners Rechtsanwälte OEG – Wien
VJT & Partners – Budapest
A. & K. Metaxopoulos & Partners Law Firm -Athens

CMS von Erlach Henrici AG Rechtsanwalt - Zürich
Randa Havel Legal advocátní kancelár s.r.o.- Praha
A&L Goodbody - Dublin
Alrud Law Firm -Moscow
Angela Wang & Co. Sollicitors – Honk Kong – Shanghai
Holding Redlich Law Firm – Sydney
Russell McVeagh Law Firm – Auckland
Avish Kalicharan & Associates - Pretoria
Veirano Advogados – São Paulo
Marval O'Farrell Mairal – Buenos Aires
Portilla Ruy-Diaz y Aguilar, S.C. -México D.F.
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

Piazza Sant'Agostino, 24 – 20123 Milano – tel. +39.02.43510840 – fax + 39.02.45075007
e.mail: avvocato@maglio.eu – www.lucernairis.eu

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.

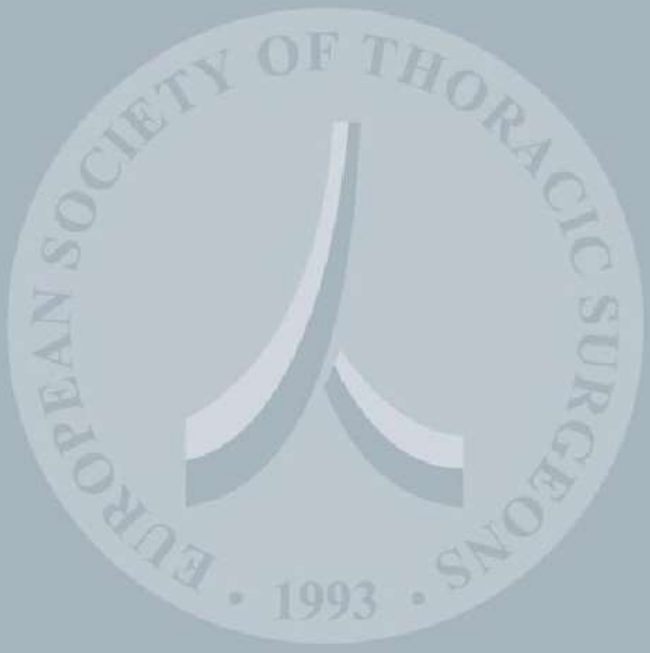
Feel free to contact me to ensure the continuation of the adaptation and updating process and of your organizational procedures with respect to the frequent innovations that characterize this delicate subject, taking into account in particular the new rules introduced by the General Regulations for the 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

Marco Maglio

Attachment– GDPR How to approach the change


EUROPEAN SOCIETY OF THORACIC SURGEONS
1993