

A Different Perspective from the

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**SE**  
**CT** SOCIEDAD  
ESPAÑOLA  
DE CIRUGÍA  
TORÁCICA

# Registry of the Spanish Society of Thoracic Surgery

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ReSECT Scientific Director

Sixth International  
Joint Meeting on  
**THORACIC  
SURGERY**

Barcelona - 20<sup>th</sup>, 21<sup>st</sup> and 22<sup>nd</sup> November 2024  
Auditorio Foment del Treball Nacional, Barcelona (Spain)

- **ReSECT Set-up and Design**
- **Why a Different Perspective...?**
  - ● **Participation**
  - ● **Scientific Report**
  - ● **Continuous Audit**
  - ● **Data-driven Value**
- **What is coming...?**



# Objectives



Quality of Care



Efficient Research



Professional Activity



Collaboration Framework

# Methodology

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- Nationwide
- Voluntary
- Prospective
- Permanent
- Dynamic
- Innovative
- Dual Functionality

## Registry of **Activity**

One Form (15 variables)

Focused on Procedures (not diagnosis)

Pathway to Subsequent Processes

Uncrossed Data (Personal)

Retrospective and Prospective

## Registry of **Processes**

5 Forms (300 variables)

Anatomical Lung Resection

Compatibility with the ESTS Core

Crossed Data (Department)

Prospective (01/01/2023 ....)

# A Different Perspective...

Clinical Registry



Data Science Project

Transparency

Credibility

Data-Driven Value

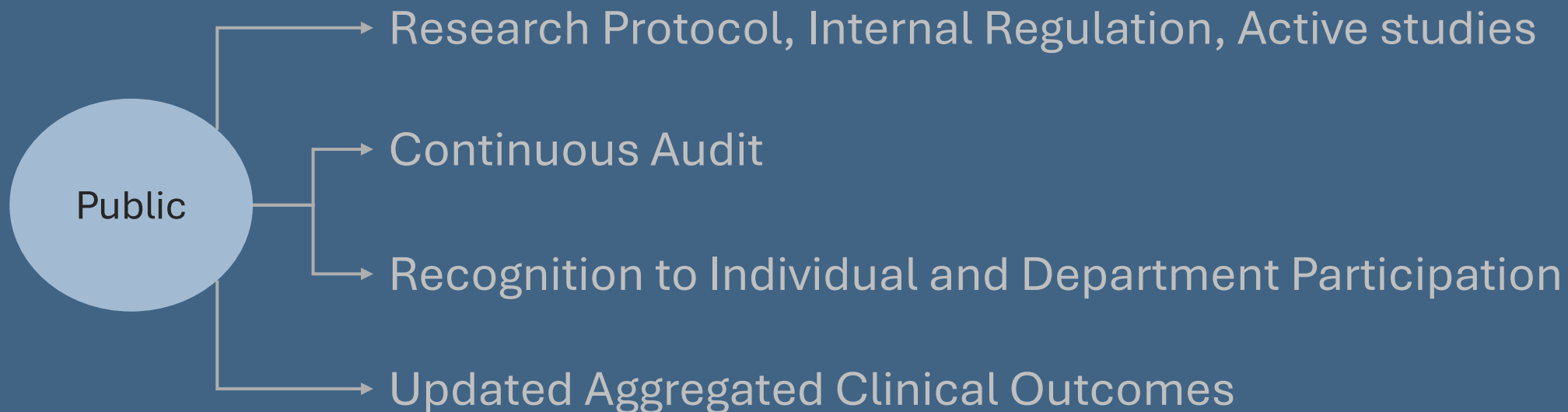
# A Different Perspective...

Clinical Registry

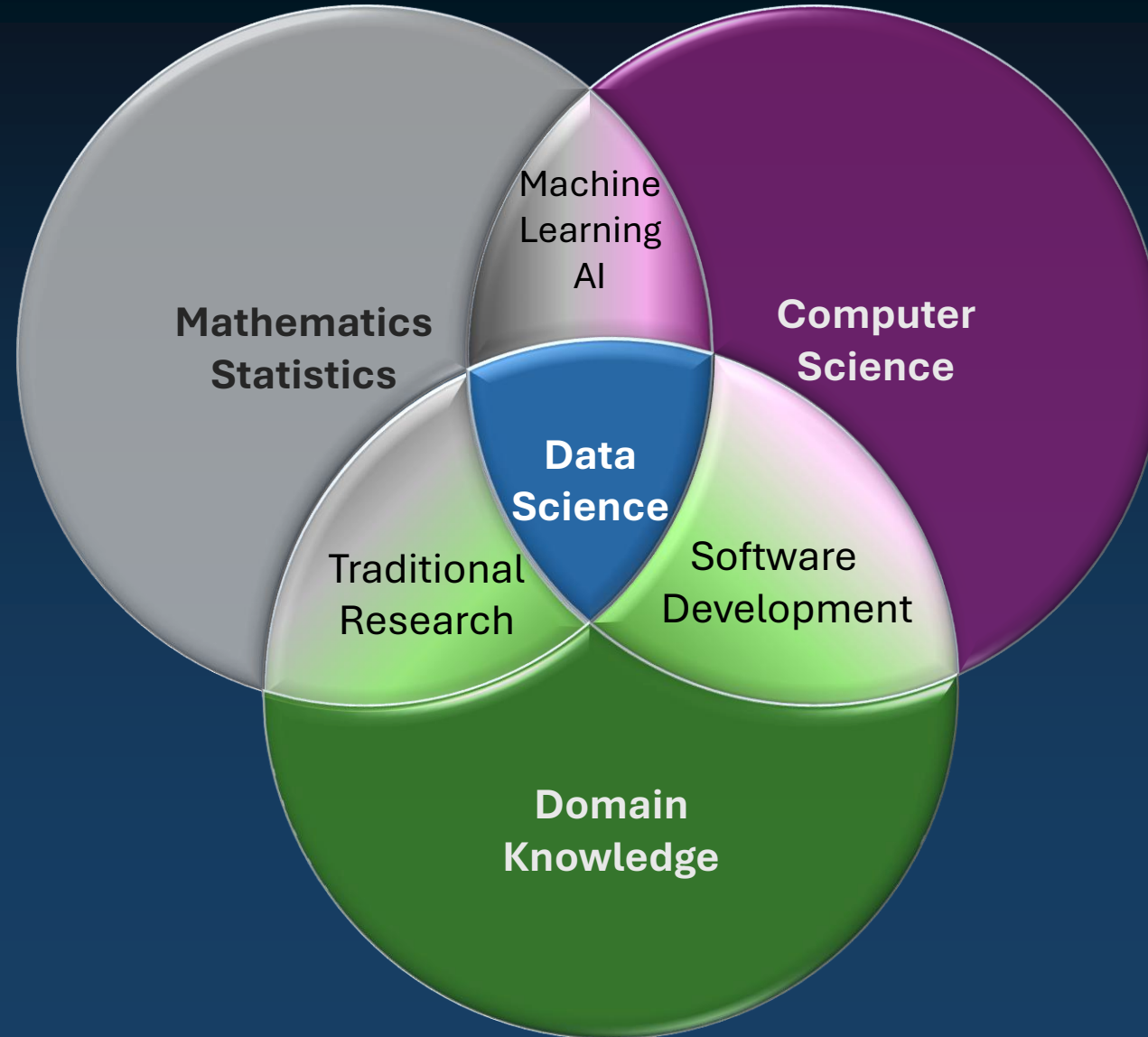


Data Science Project

## Transparency and Credibility







Data  
Science  
Tools

LOCAL



Interface  
Development  
Enviroment



Statistical  
Sowtware



App  
Framework



Data  
Framework

REMOTE



Code  
Repository



APP  
Server



WEB  
Server



Registry of the Spanish Society of Thoracic Surgery

**Join Us Here!**



<https://resect.netlify.app>



Data Model

Joining Forms

Data Mutation

Exploratory Data Analysis

**Functionality**

- ▶ Identification
- ▶ Identification
- ▶ Operative-log
- ▶ Anatomical lung resection process
- ▶ Anatomical lung resection process
- ▶ Anatomical lung resection process
- ▶ Anatomical lung resection process
- ▶ Anatomical lung resection process

**Form**

- Clinical data
- Vital status
- Personal registry
- Preop
- Surgery
- Postop
- Diagnosis
- Follow-up

↑ Back to top



- ▶ Anatomical lung resection process Preop
- ▶ Anatomical lung resection process Surgery
- ▶ Anatomical lung resection process Postop
- ▶ Anatomical lung resection process Diagnosis
- ▶ Anatomical lung resection process Follow-up

Data Model

Joining Forms

Data Mutation

Exploratory Data Analysis



Var_Name	Values	Comment	Dependencies
Patient id	integer autocalculated	Unique number that identifies each patient in the platform	
Patient number	00000-00000 (hospital code-number of patient)	Text string that identifies each patient on the platform. It is constituted from the code of each hospital and the correlative number of each patient in a given hospital. For example, the value 00001-00005 corresponds to the fifth patient included in the hospital with code 00001.	
Hospital	hospital names		
Version id	integer autocalculated		
Procedure identifier	list of self-calculated values that includes date of surgery_main procedure_lung procedure	This variable acts as an identifier to unify the different forms of a procedure included in the process of anatomical lung resections. The	Depends on date of surgery, main procedure and lung procedure from a personal registry form. If



Participation



Users and Centres

User Activity

Centre Activity

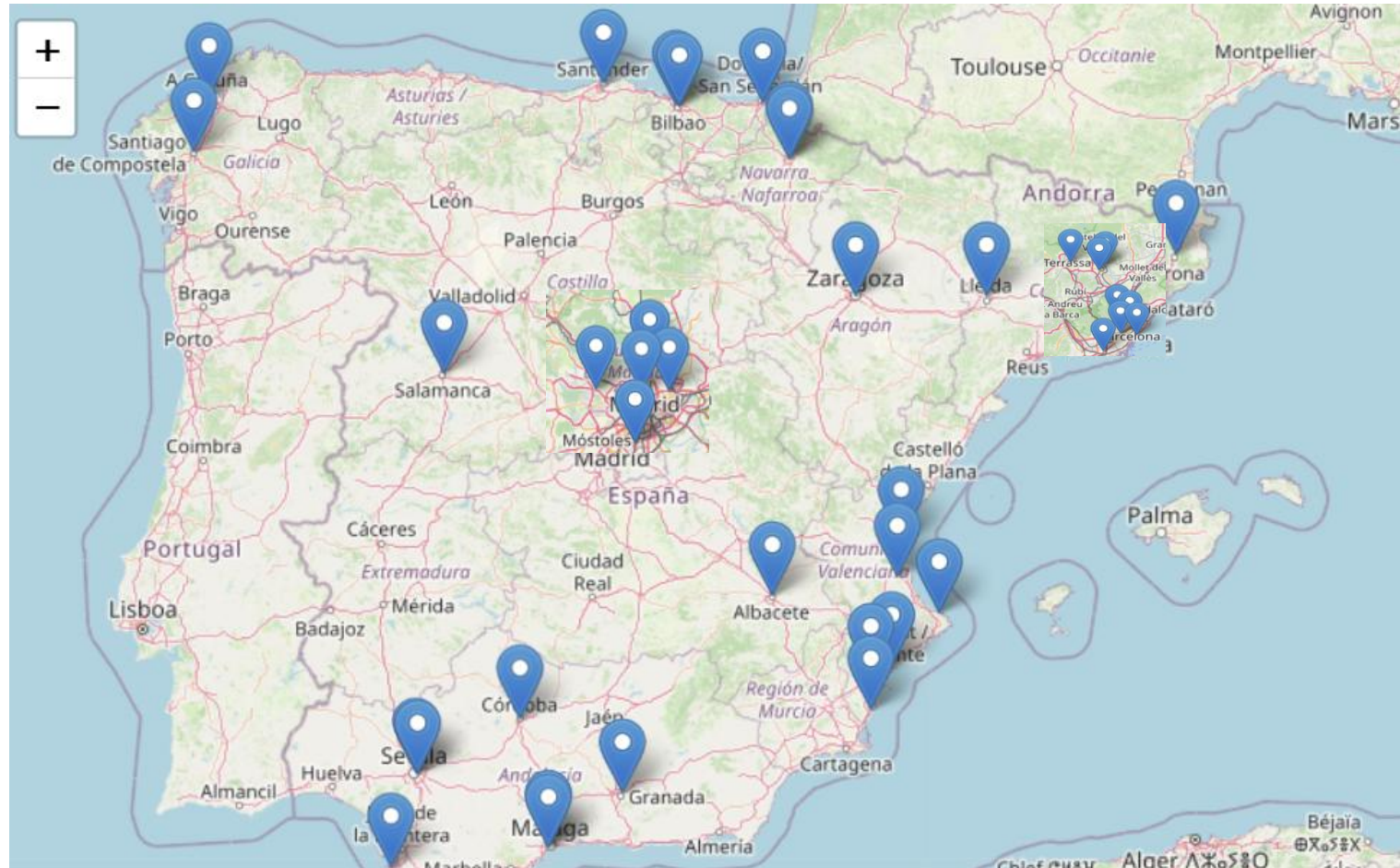
171 professionals

45% ♀

19 % Residents

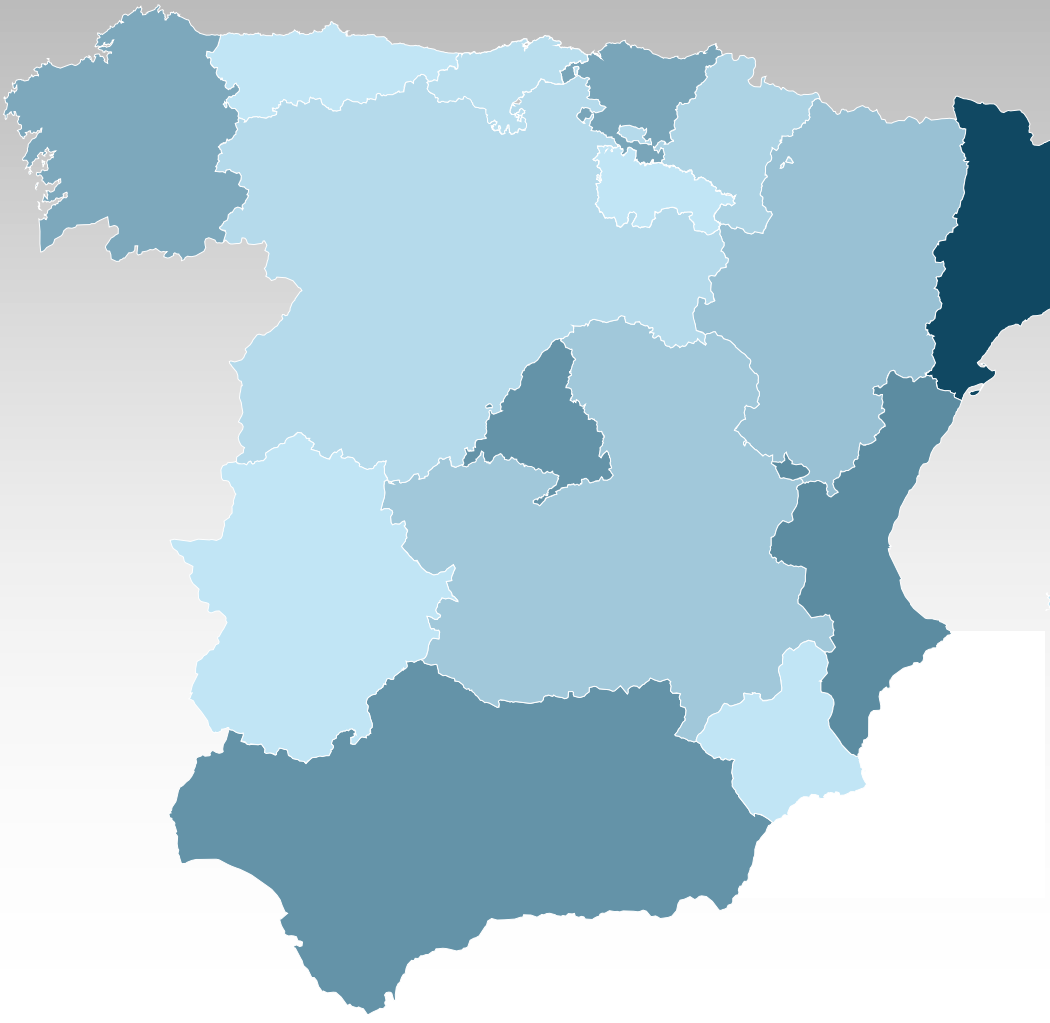
40 Departments

80% Public Centres

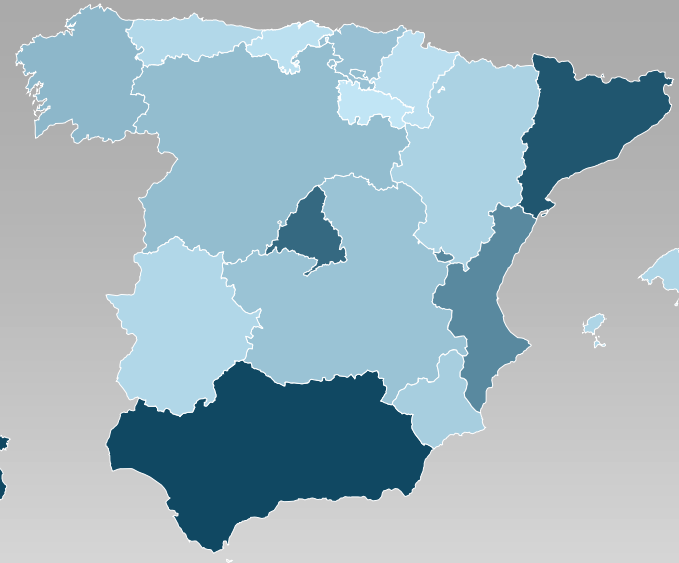


# Geographical Distribution of Users

## Users Participating

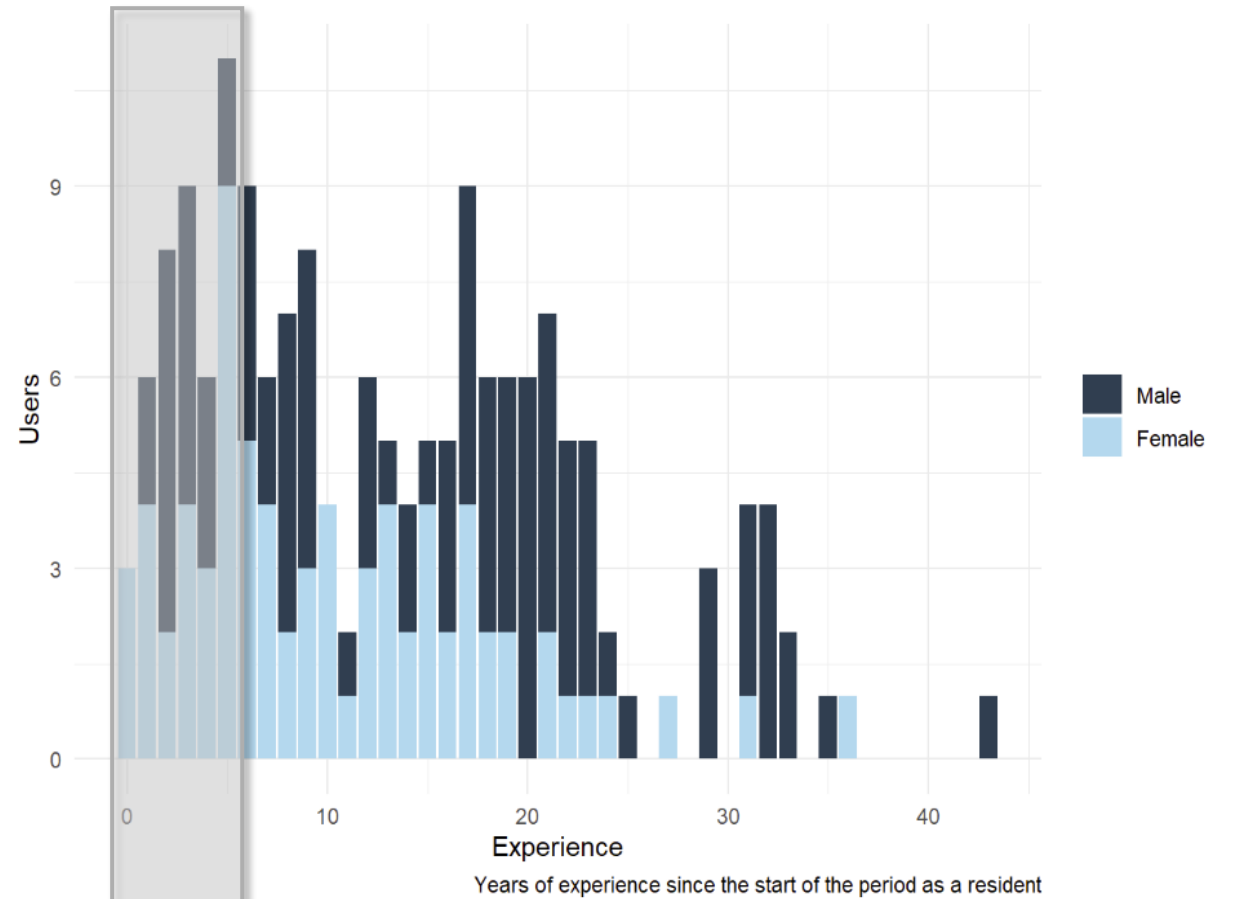
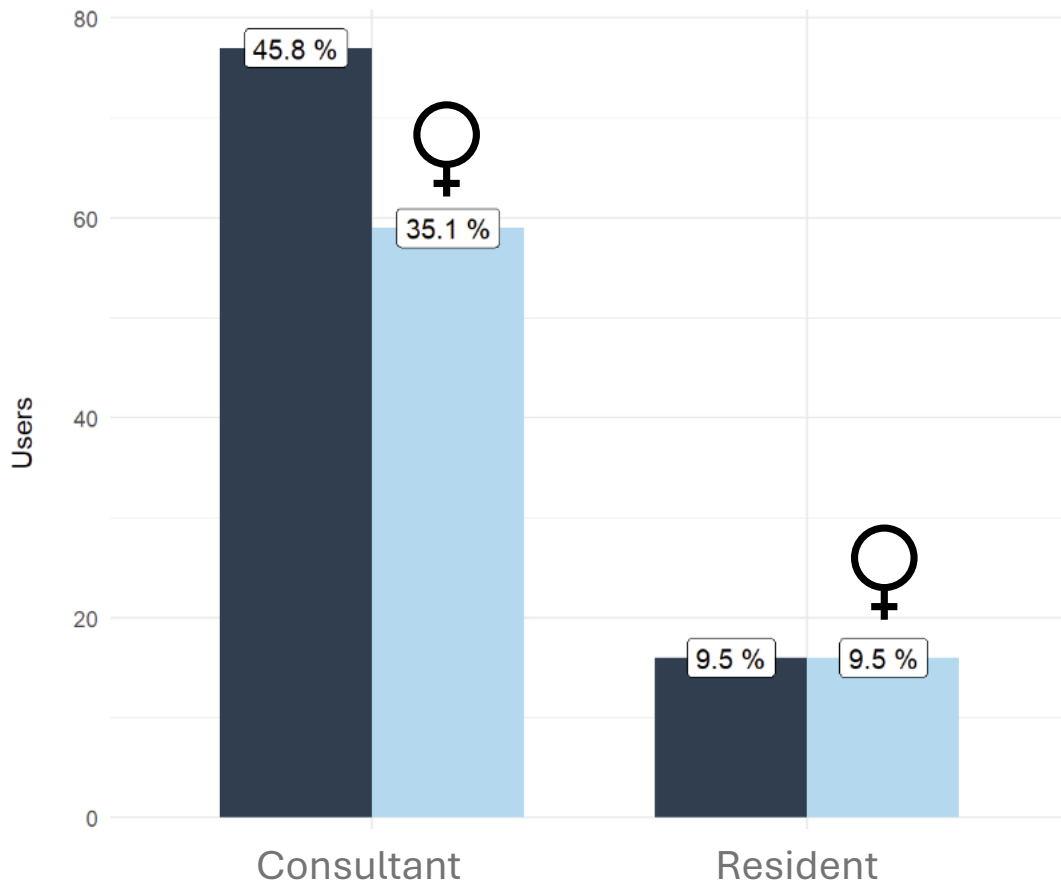


## Spanish Population





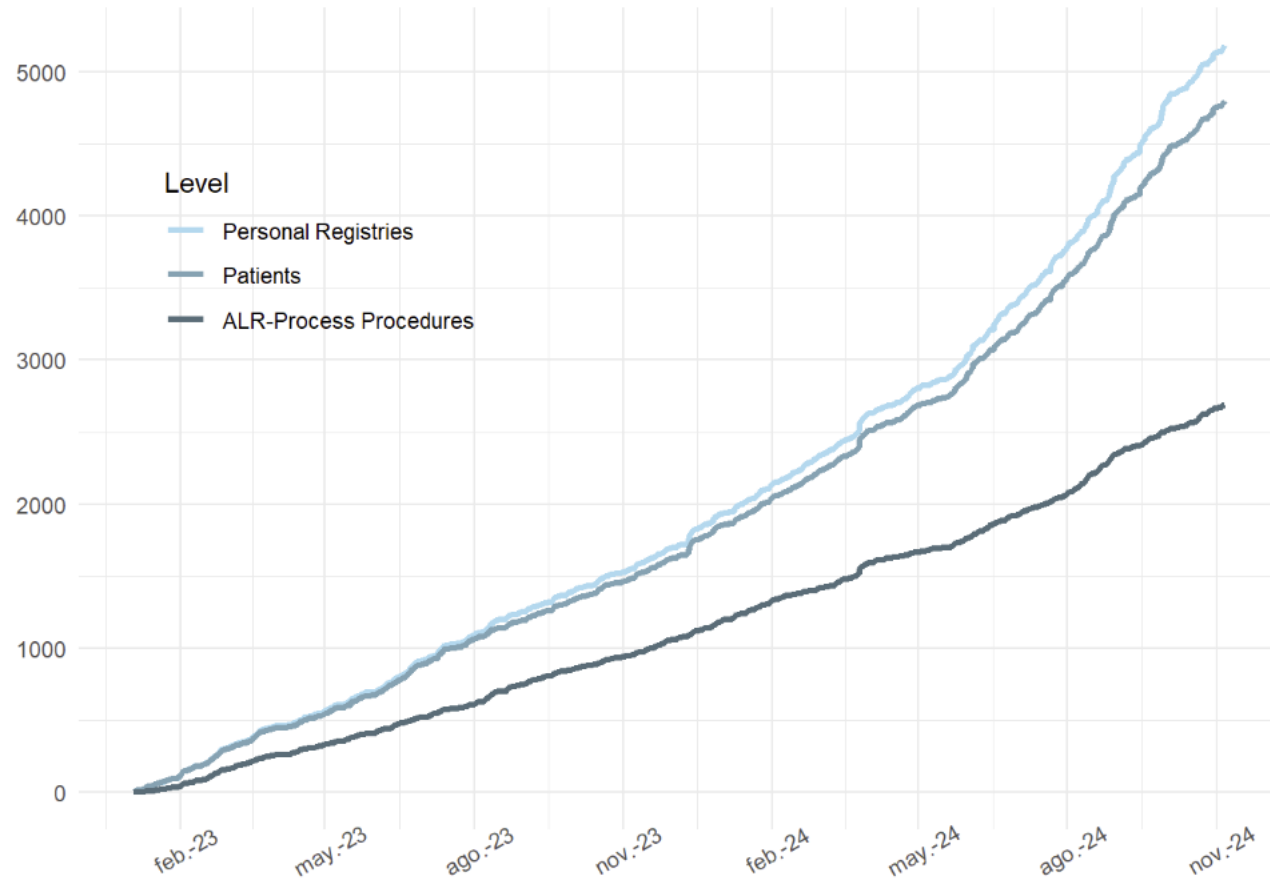
# Profile of Users



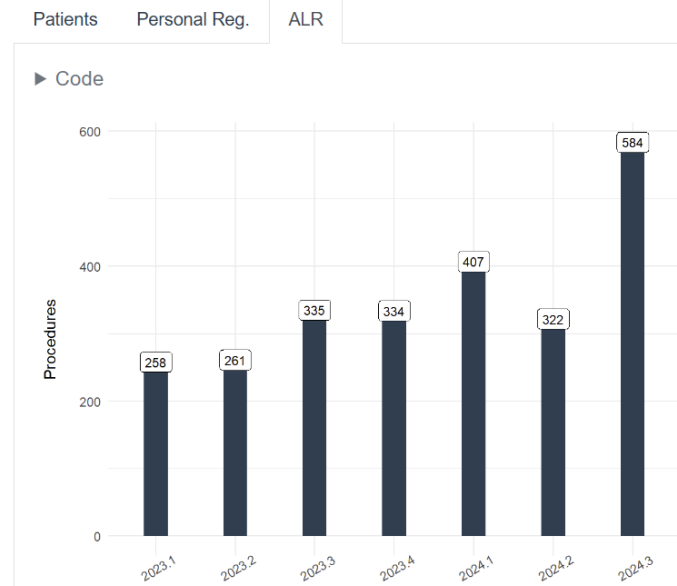
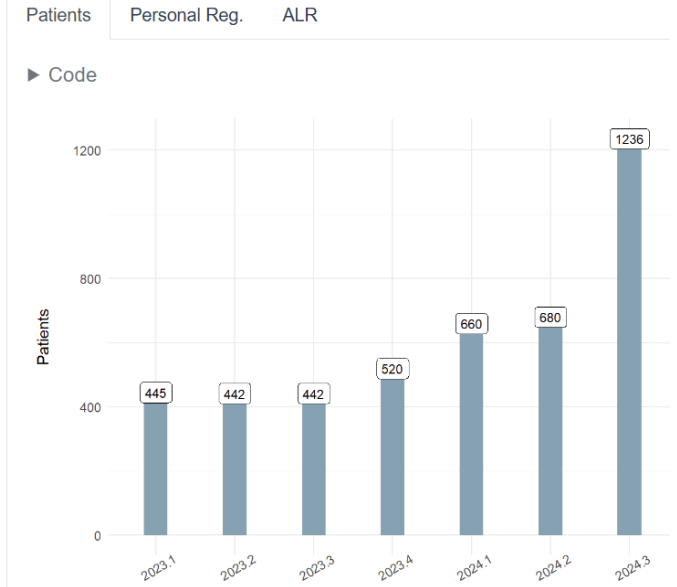


# Practice and Outcomes

# Recruitment Levels



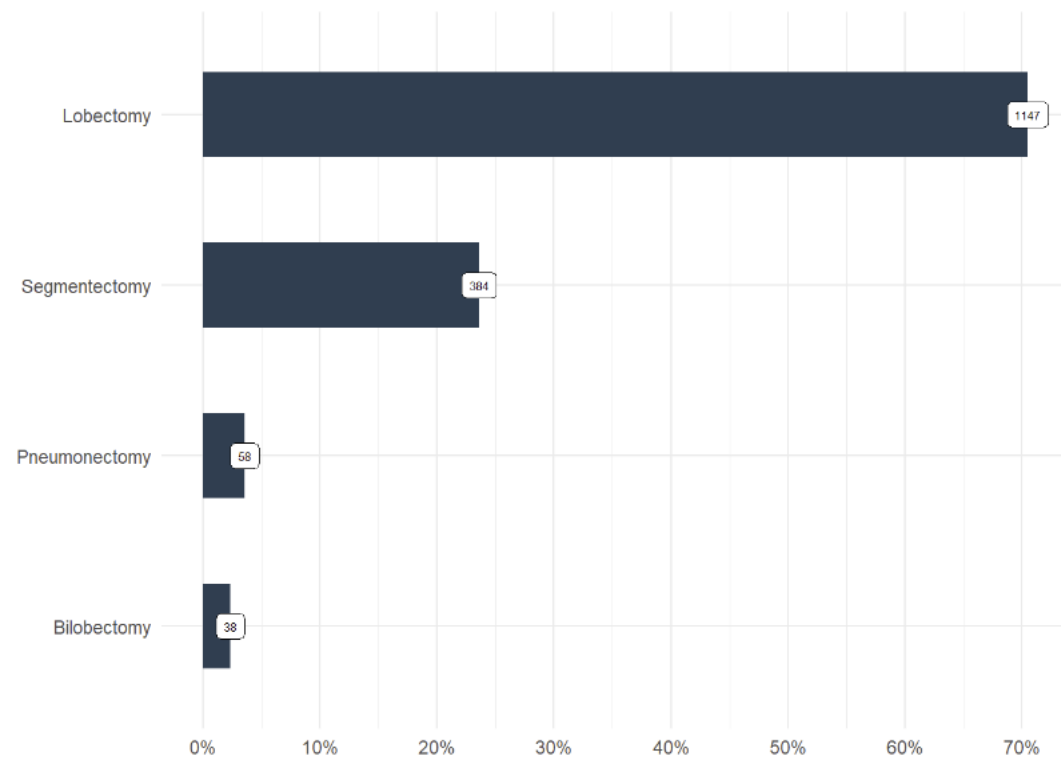
## Recruitment per Quarter



## Type of Lung Resection

Overall **2023** 2024

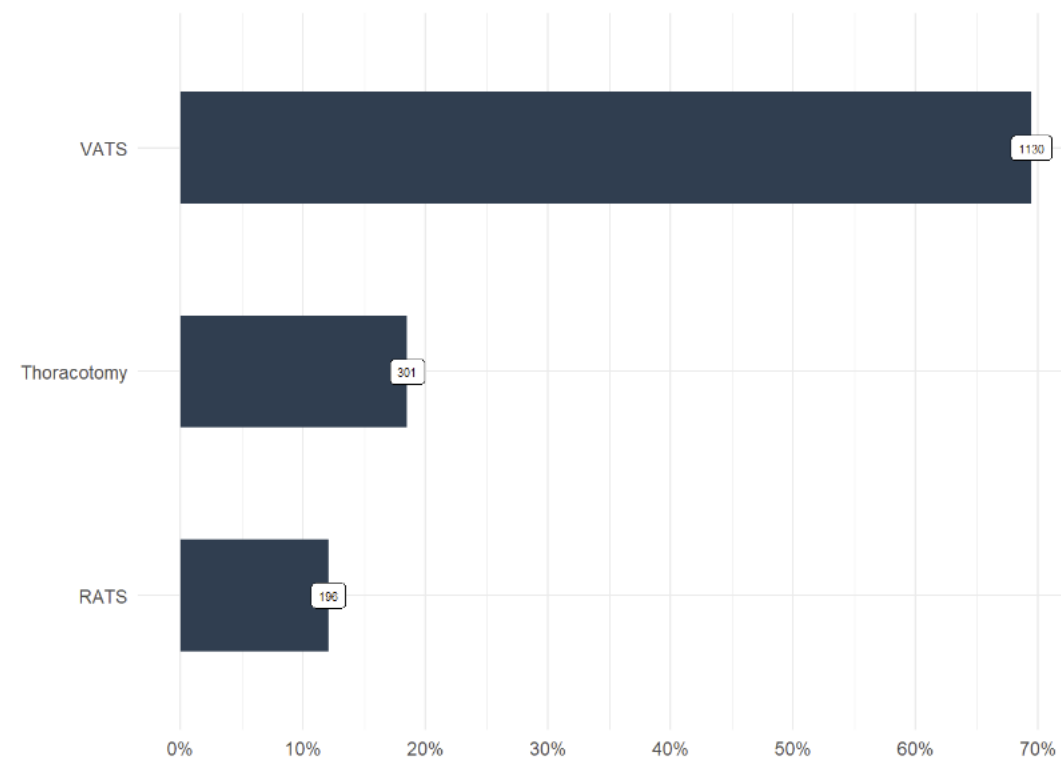
▶ Code



## Type of Surgical Approach

Overall **2023** 2024

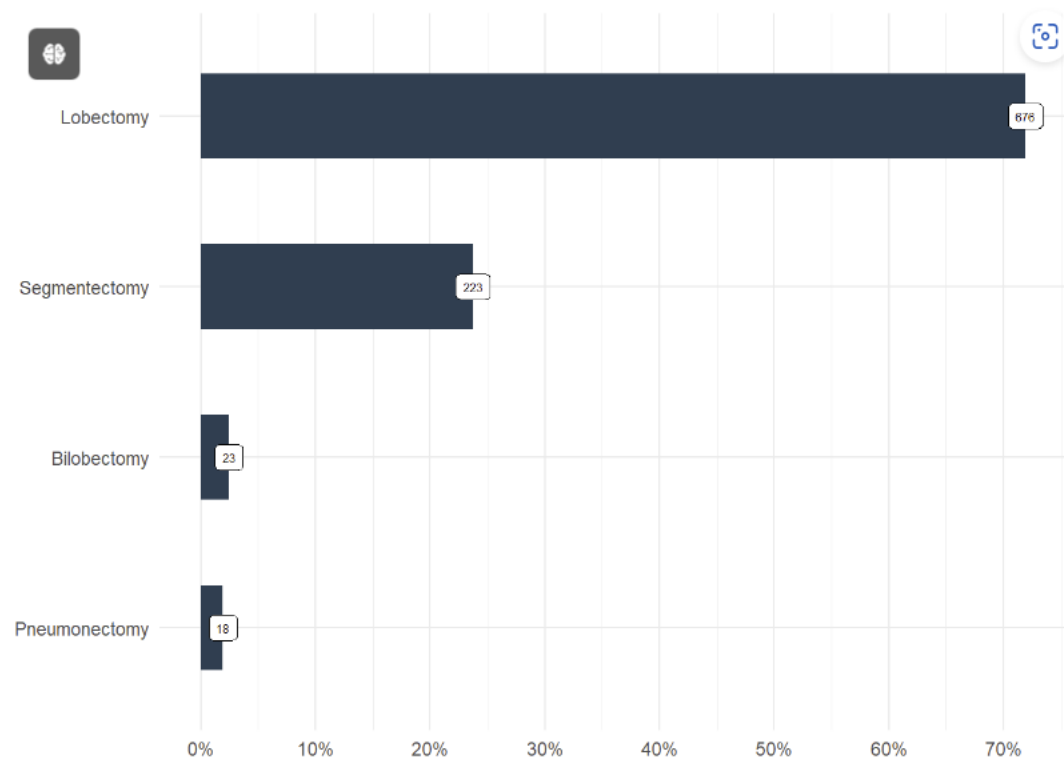
▶ Code



## Type of Lung Resection

Overall 2023 2024

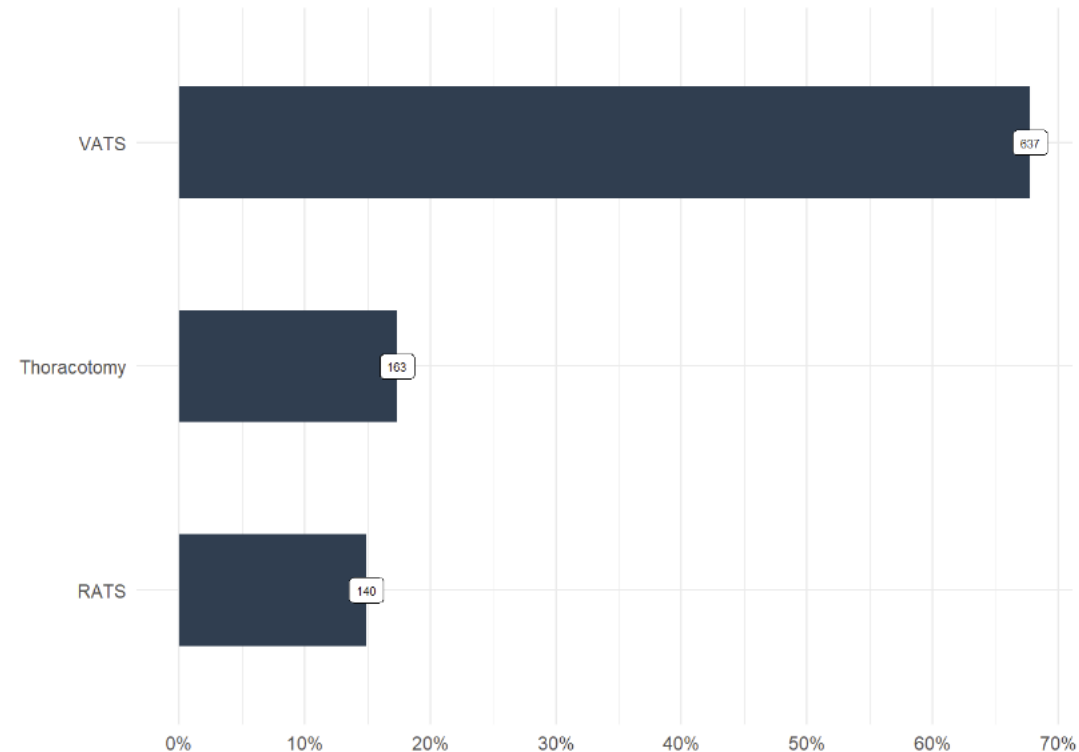
► Code



## Type of Surgical Approach

Overall 2023 2024

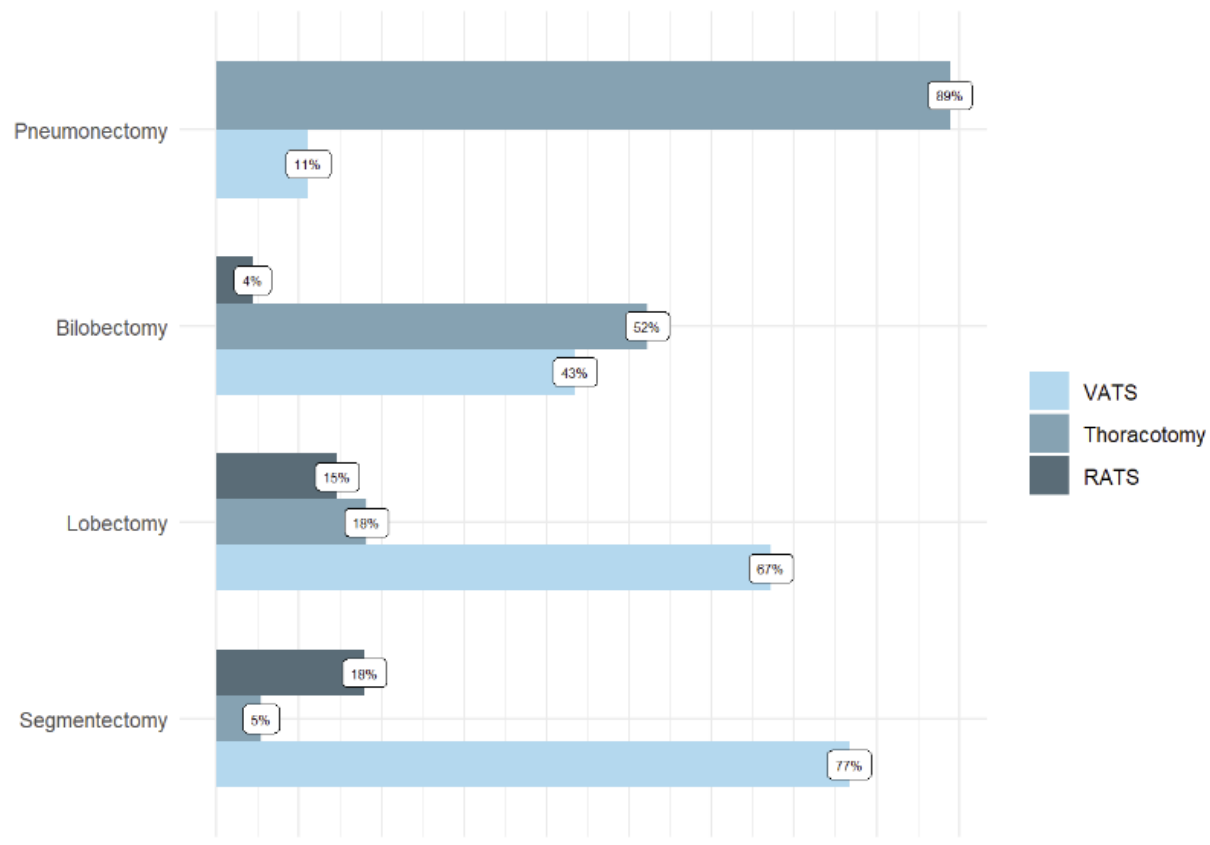
► Code



## Lung Resection and Surgical Approach

Overall **2023** 2024

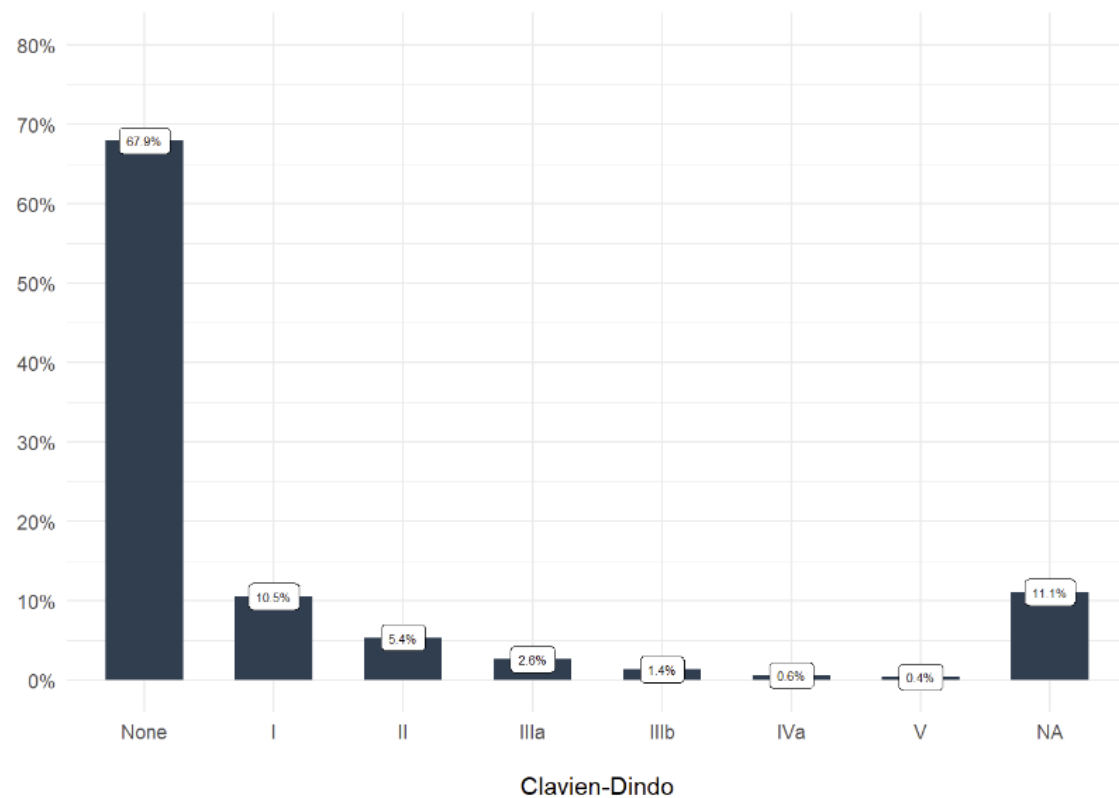
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## Complications

Overall **2023** 2024

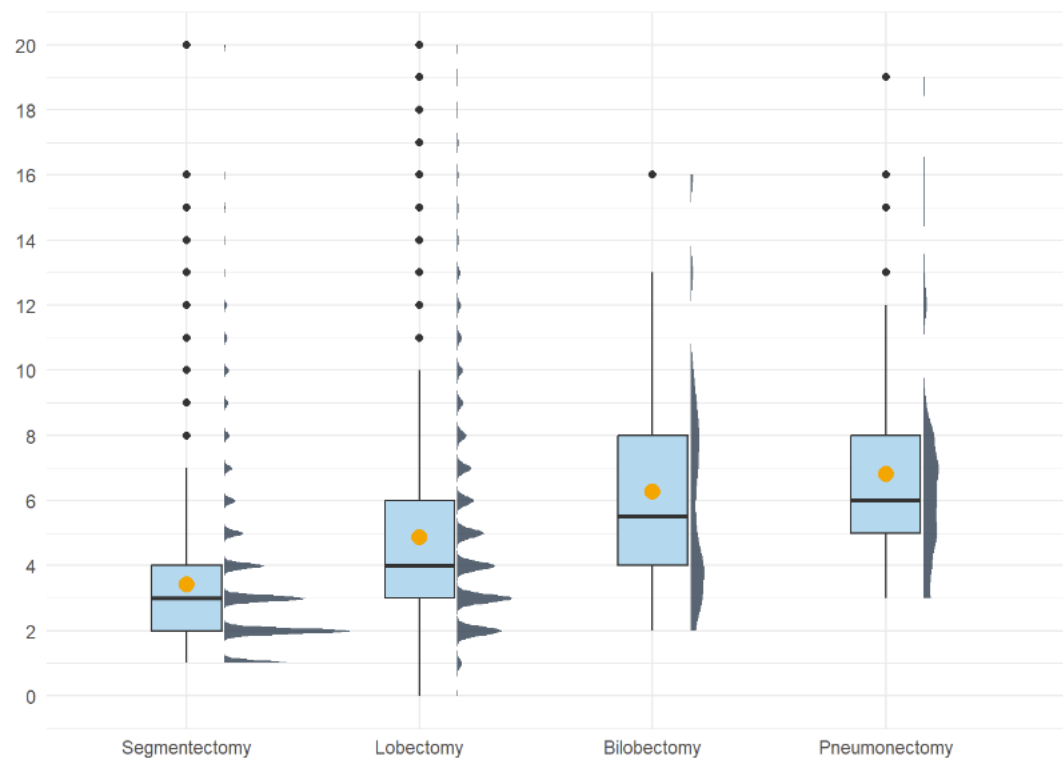
► Code



## Postop. Stay and Type of Resection

Overall **2023** 2024

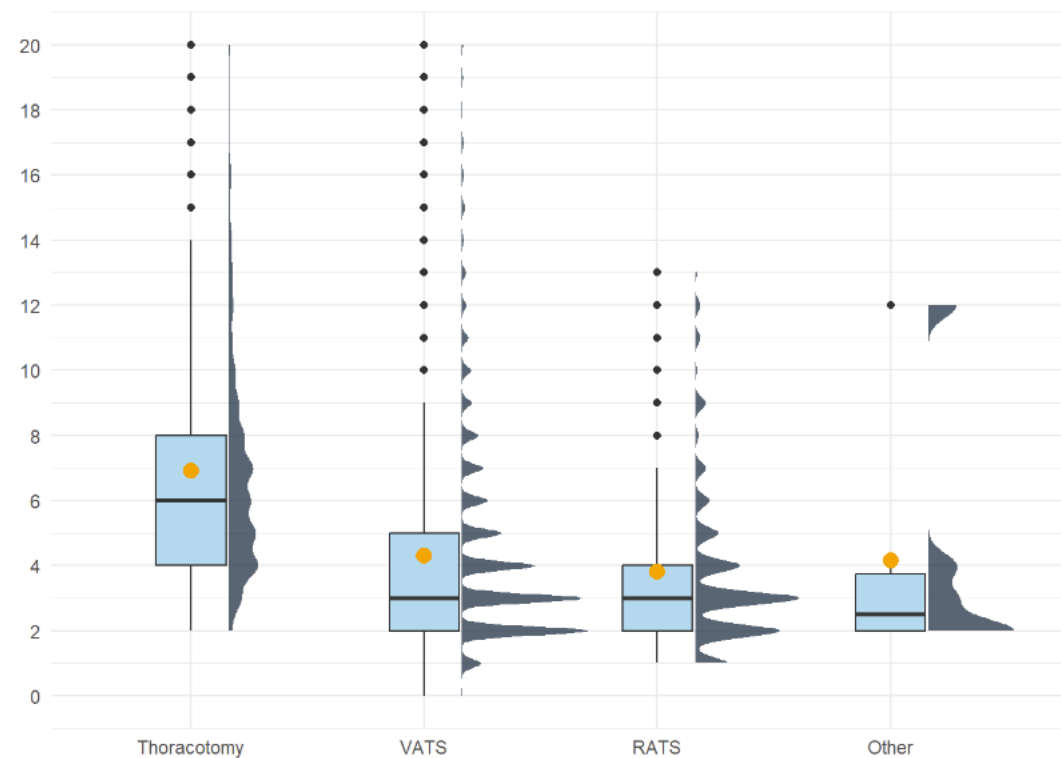
▶ Code



## Postop Stay and Surgical Approach

Overall **2023** 2024

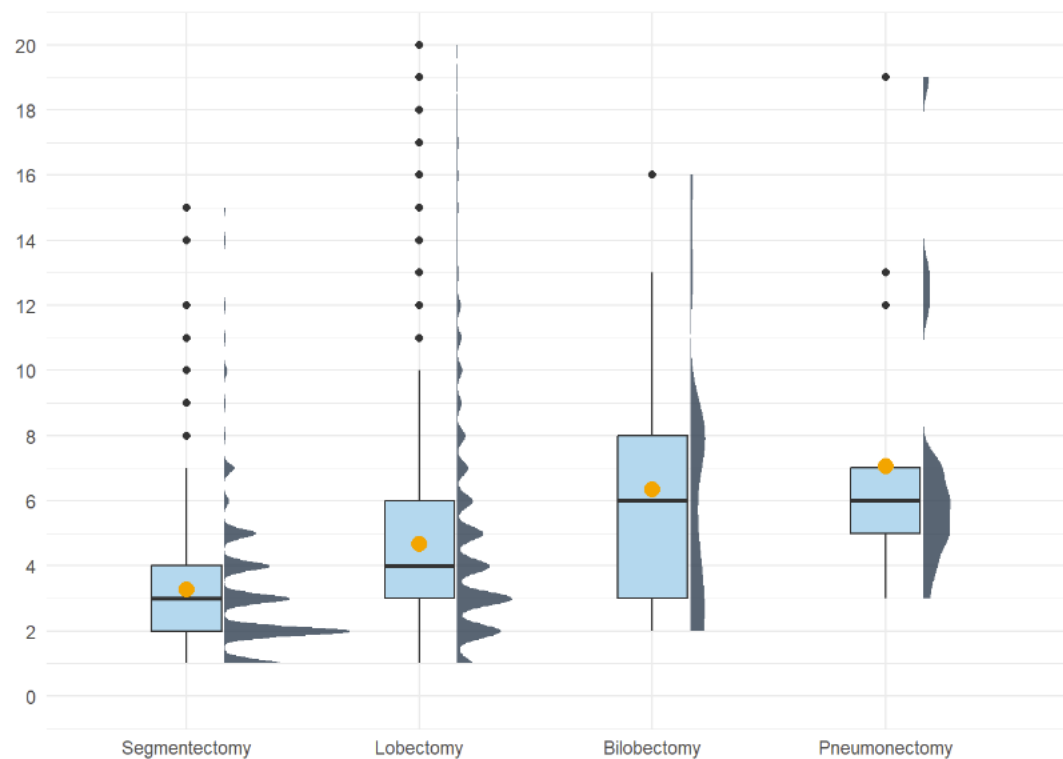
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## Postop. Stay and Type of Resection

Overall 2023 2024

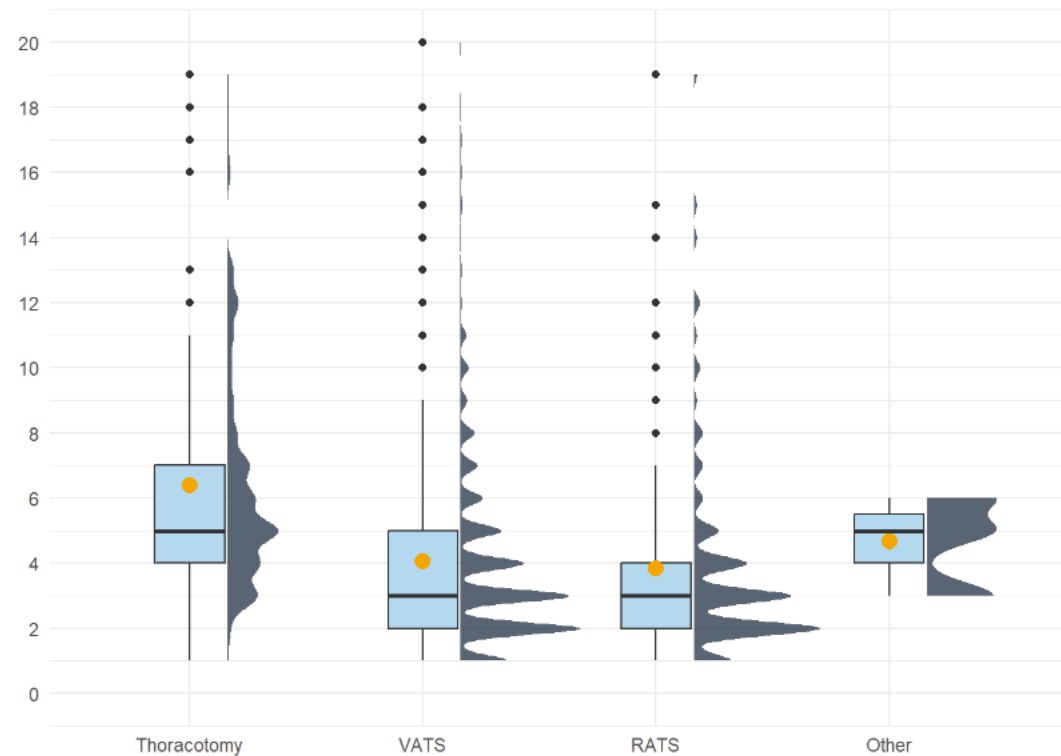
▶ Code



## Postop Stay and Surgical Approach

Overall 2023 2024

▶ Code

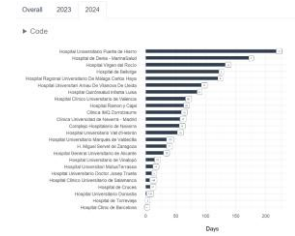
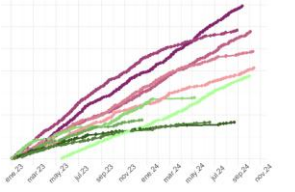
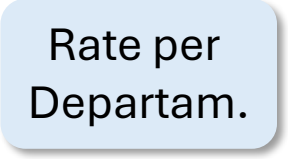
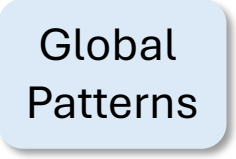
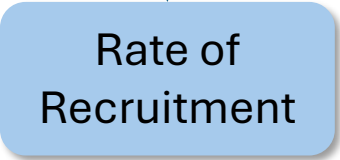
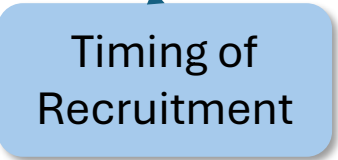
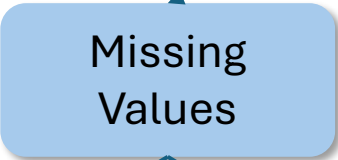
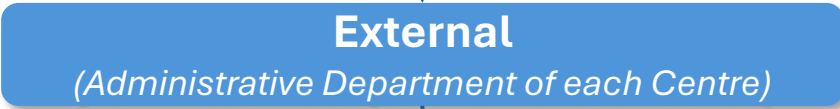




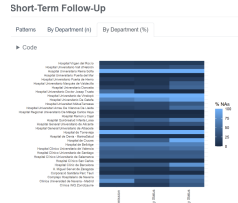




# Continuous Audit



Hospital	Loche-Recurso	Seguimiento	Fecha	Casos	Recruitment (%)	Valor
Hospital General de Castellón	100	10	2023-01-01	100	97.4	200
Hospital General Universitario de Salamanca	100	10	2023-01-01	100	95.9	197
H Hospital General de Zaragoza	100	10	2023-01-01	100	92.3	187
Hospital General Universitario de Alicante	80	10	2023-01-01	100	77.2	160
Hospital Universitario de Extremadura	80	10	2023-01-01	80	94.7	159
Hospital General Universitario de Salamanca	10	1	2023-01-01	100	12.7	149
Hospital General de Toledo	10	1	2023-01-01	80	12.1	147
Hospital Universitario de La Rioja	80	5	2023-01-01	80	7.9	87
Hospital de Girona - Hospital de Girona	20	5	2023-01-01	20	100	20
Clinica Universitaria de Navarra - Hospital	10	10	2023-01-01	10	100	20



Recruitment

Missing Values

Pre-OP Surgery Post-OP Diagnosis Short-Term Follow-Up

Global Patterns

Patterns By Department (n) By Department (%)

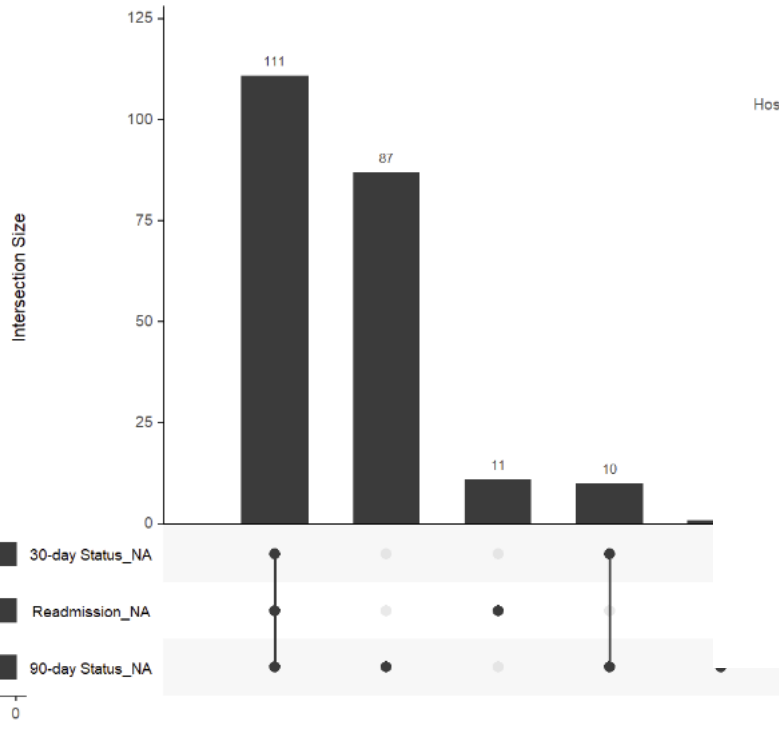
Code

Pre-OP Surgery Post-OP Diagnosis Short-Term Follow-Up

Rate per Departam.

Patterns By Department (n) By Department (%)

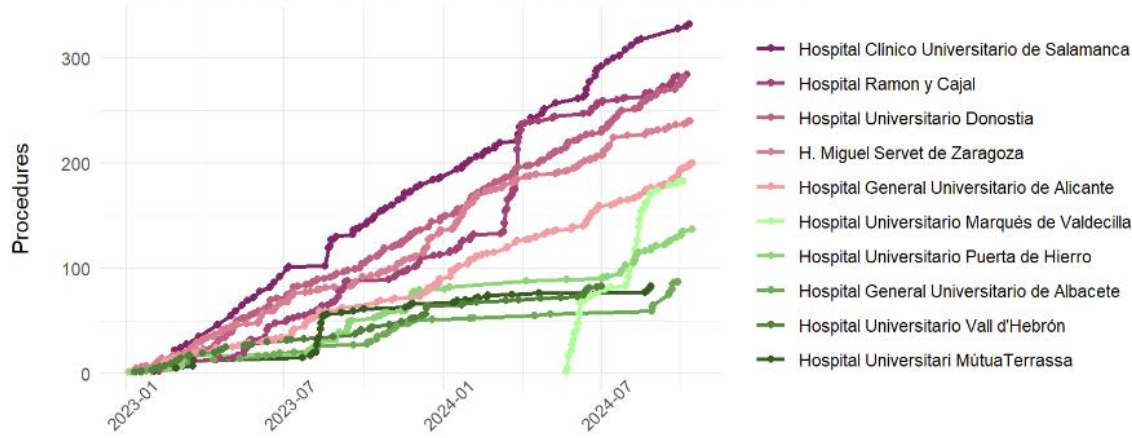
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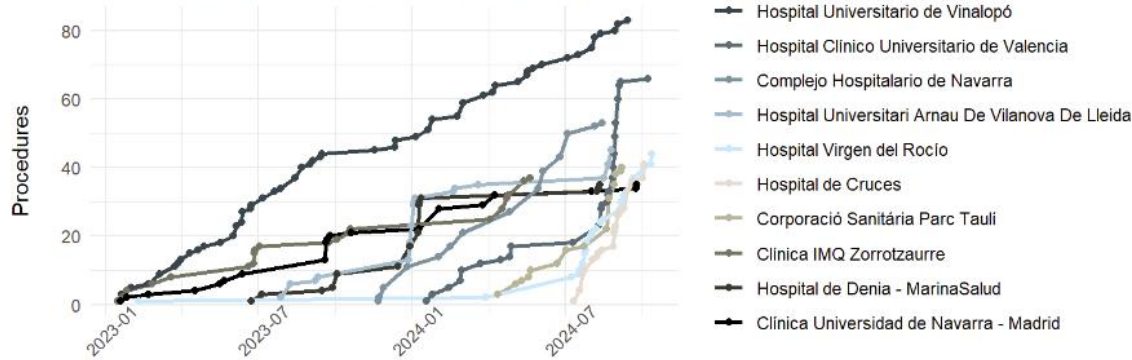
## Timing of Recruitment

► Code

Centres in position 1 to 10 according to number of procedures registered



Centres in position 11 to 20 according to number of procedures registered



Date of Registration

## Prospective Nature

Recruitment

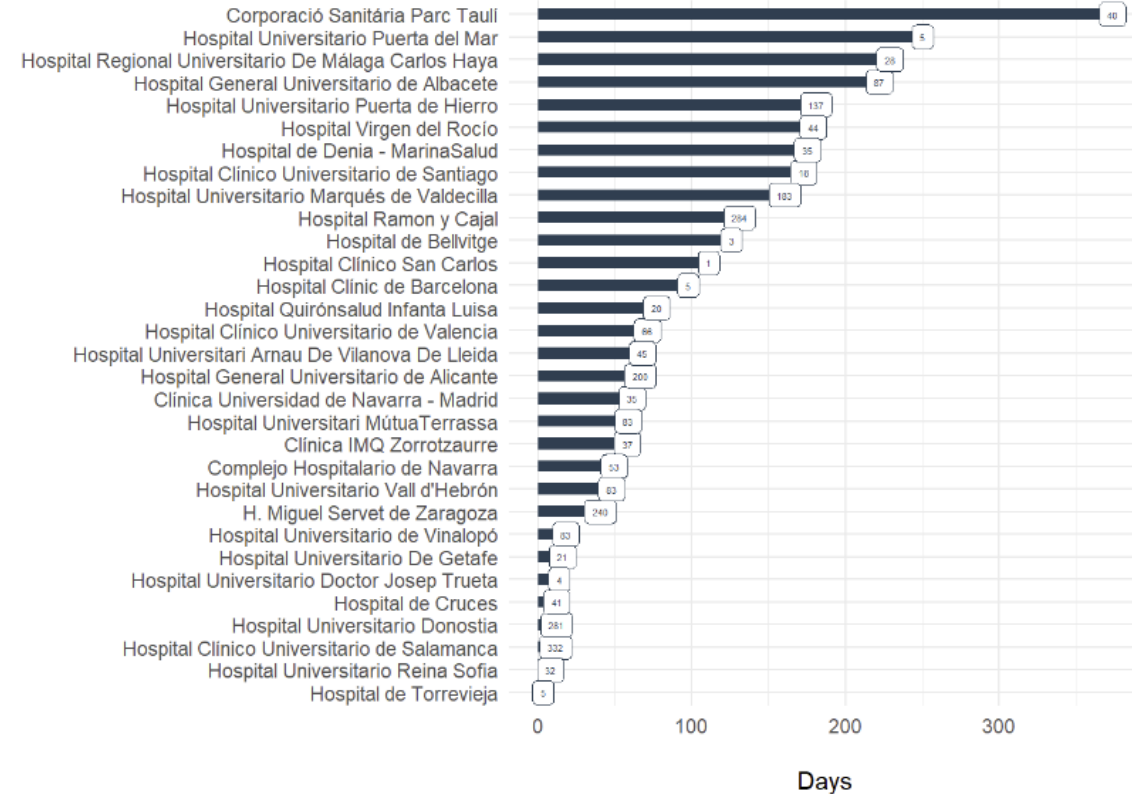
Missing Values

Overall

2023

2024

► Code



Days

*time elapsed from the date of surgery to the date of registration*

# A Different Perspective...

Clinical Registry



Data Science Project

## Data-Driven Value

## Interactive Web Applications

Public

ReSECT  
Users

### ReSECT Risk

Public app with real-world data to better understand our practice and outcomes

Assisting in  
Decision-Making



### ReSECT Benchmarking

Private app to know how your department is performing compared to the whole Registry.

Promoting  
Quality of Care



### ReSECT Operative-log

Private app to control acquisition of surgical skills and assumption of responsibilities

Serving your  
Professional Career



# ReSECT Applications

## ReSECT Risk

Public app with real-world data to better understand our practice and outcomes

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Decision-Making**



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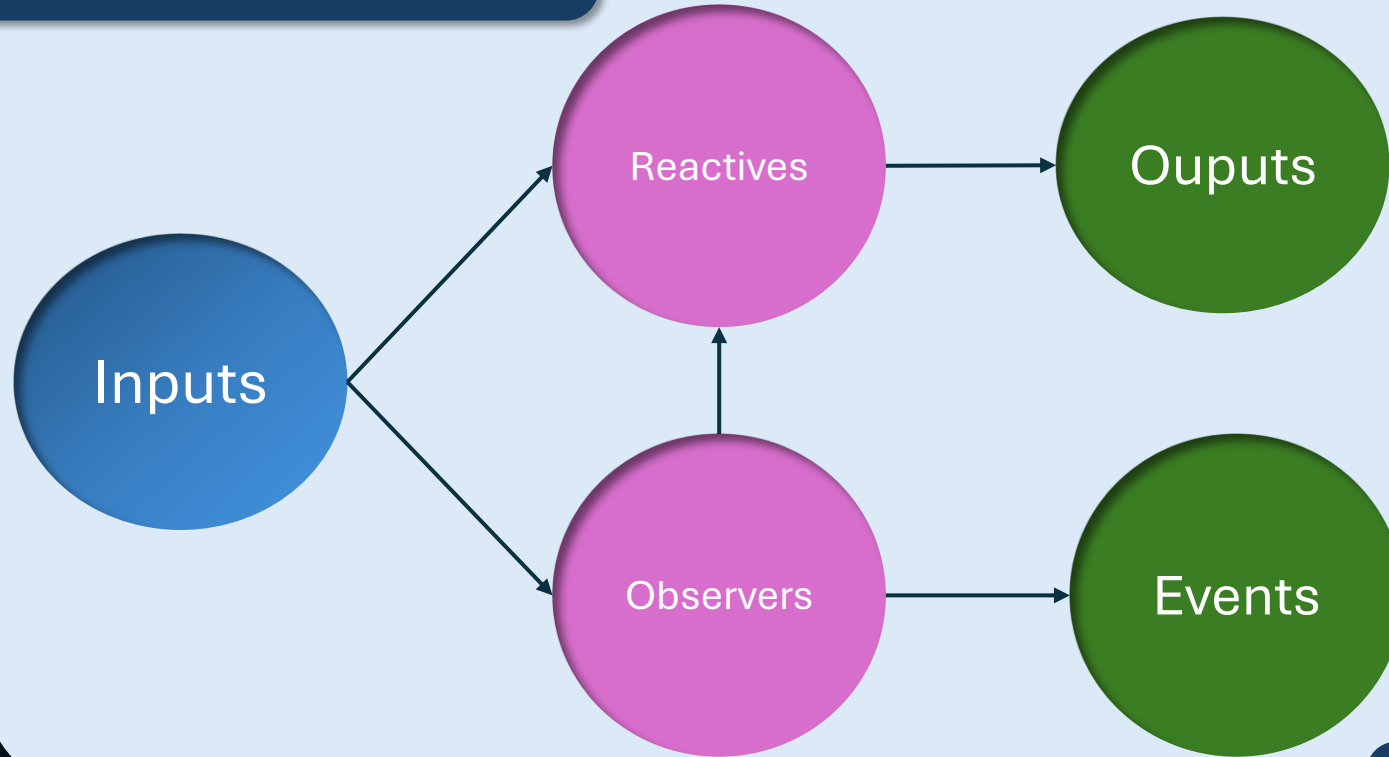
**Serving your  
Professional Career**



A Different Perspective...

# of Data Driven Value

# Reactive Programming



On-Demand Knowledge



Period ^

Date of Surgery i

01-01-2023 to 24-10-2024

Demographics v

Lung Function v

Procedure ^

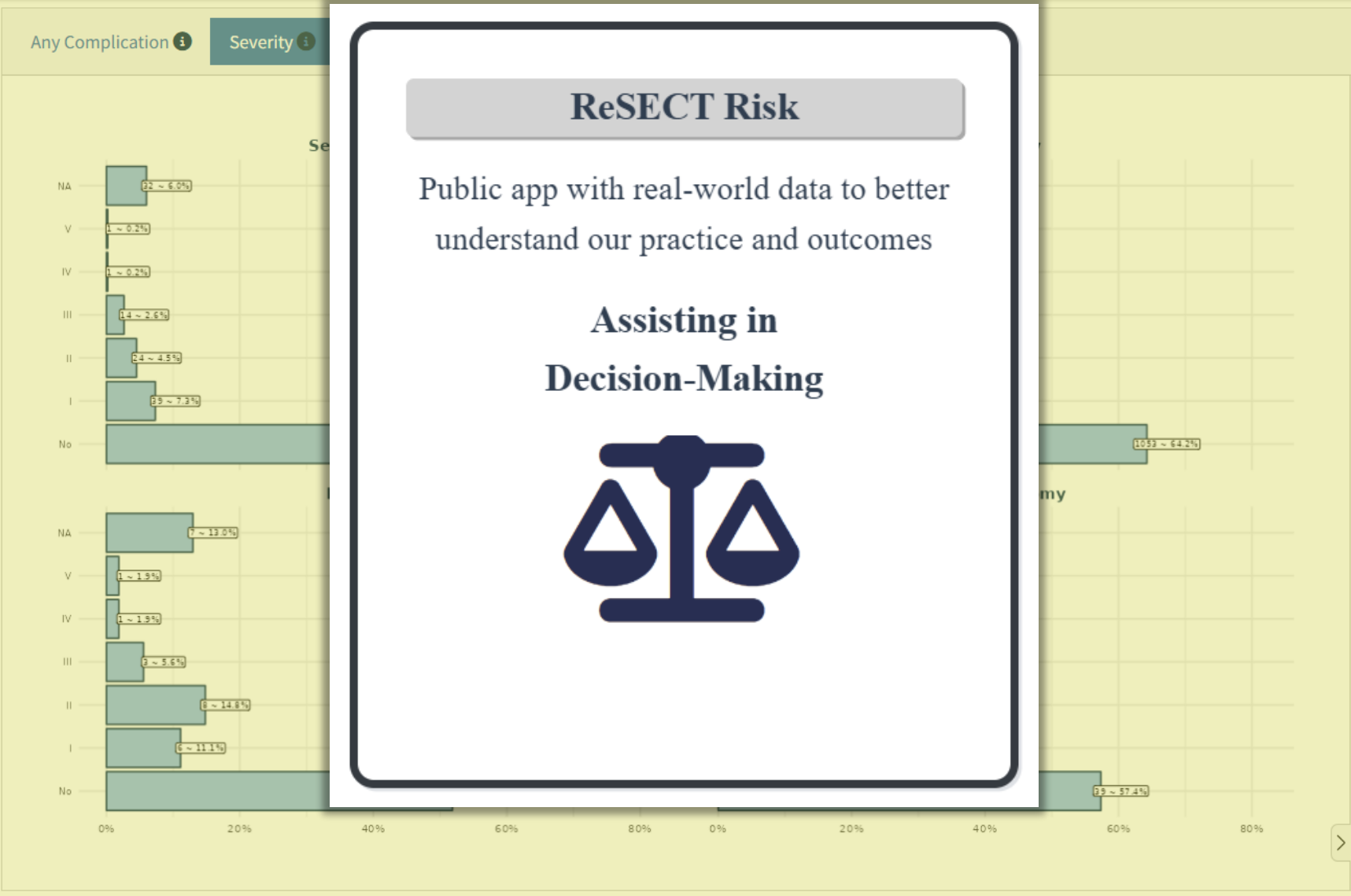
Lung Resection i

- Segmentectomy
- Lobectomy
- Bilobectomy
- Pneumonectomy

Surgical Approach i

- Thoracotomy
- VATS
- RATS

ReSET



## ReSECT Risk

Public app with real-world data to better understand our practice and outcomes

### Assisting in Decision-Making

Group by

Resection v

Percentages

Overall

By Group

Plot Columns

1

2

3

Period ^

Date of Surgery ⓘ  
01-01-2023 to 24-10-2024

Demographics v

Lung Function v

Procedure ^

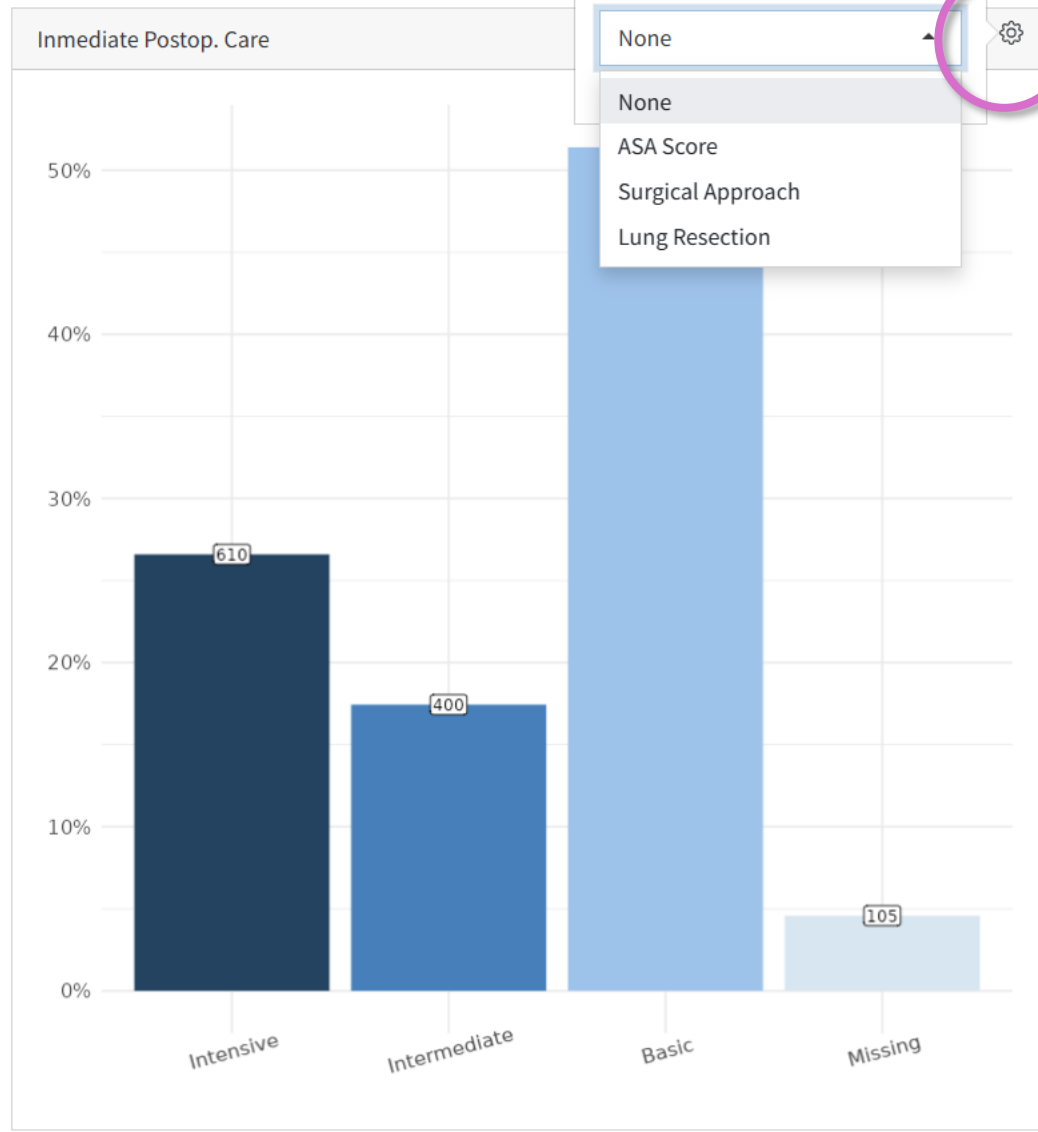
Lung Resection ⓘ

- Segmentectomy
- Lobectomy
- Bilobectomy
- Pneumonectomy

Surgical Approach ⓘ

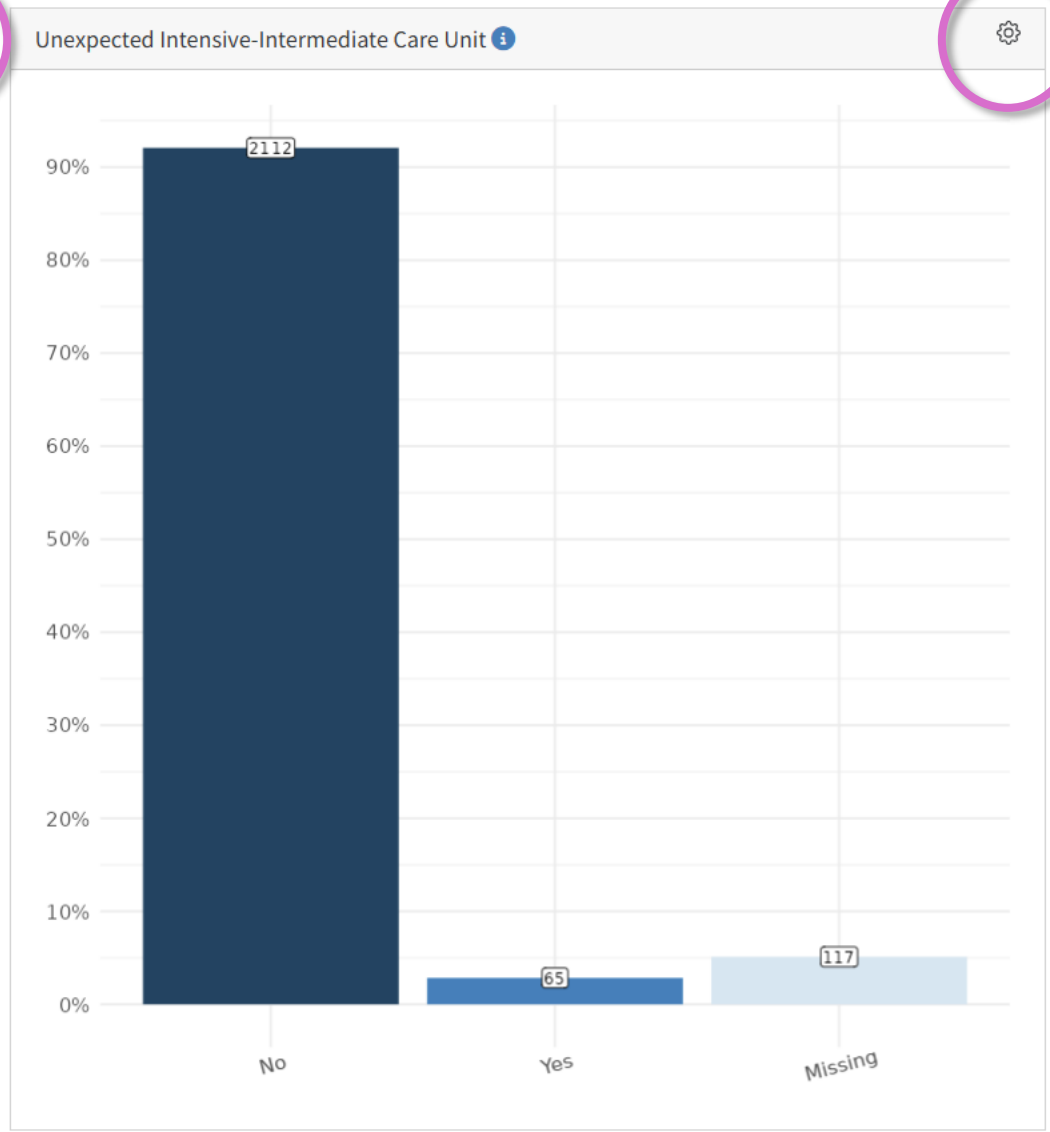
- Thoracotomy
- VATS
- RATS

ReSET



### Group By

- None
- None
- ASA Score
- Surgical Approach
- Lung Resection



Period ^

Date of Surgery ⓘ  
01-01-2023 to 24-10-2024

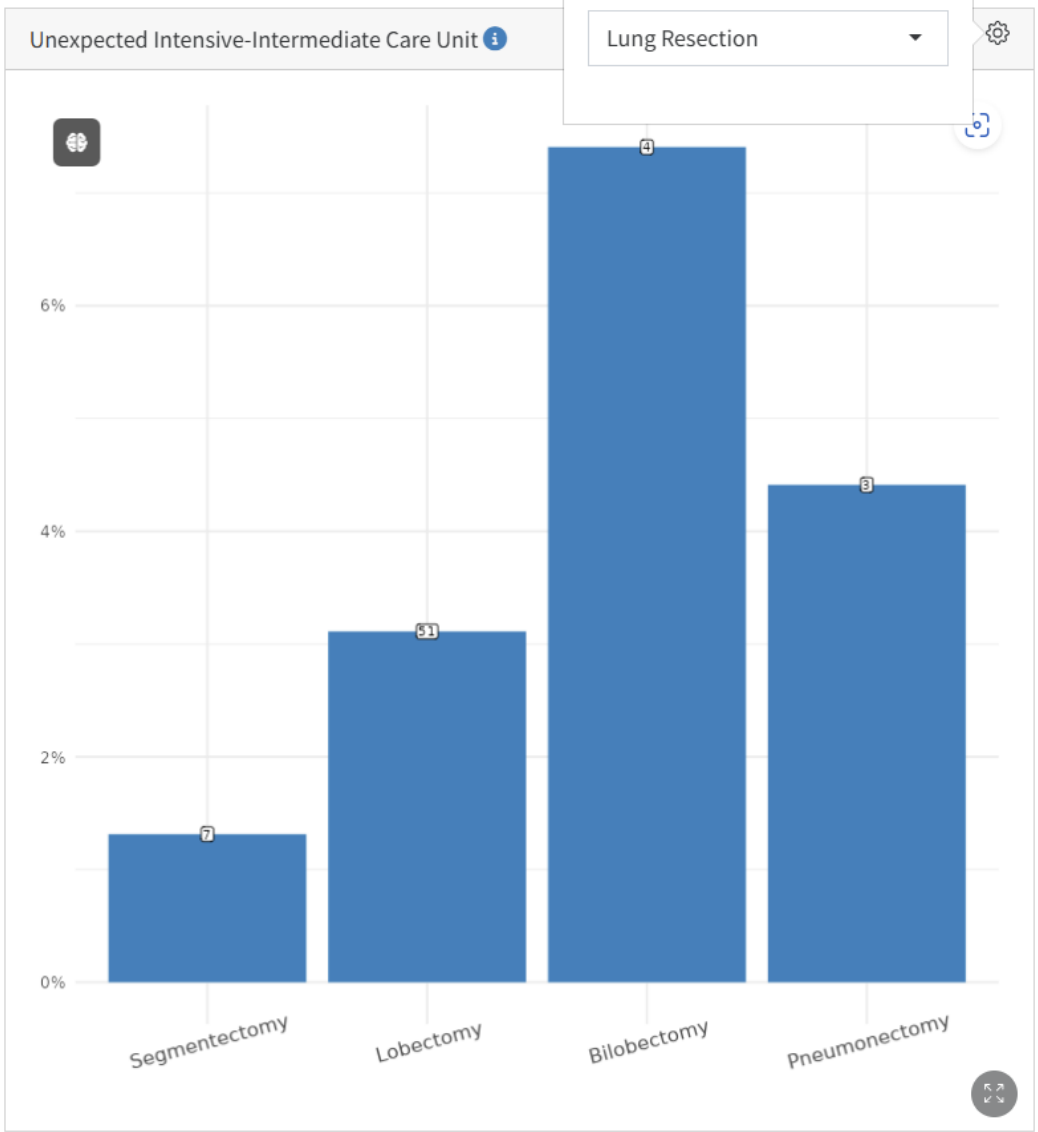
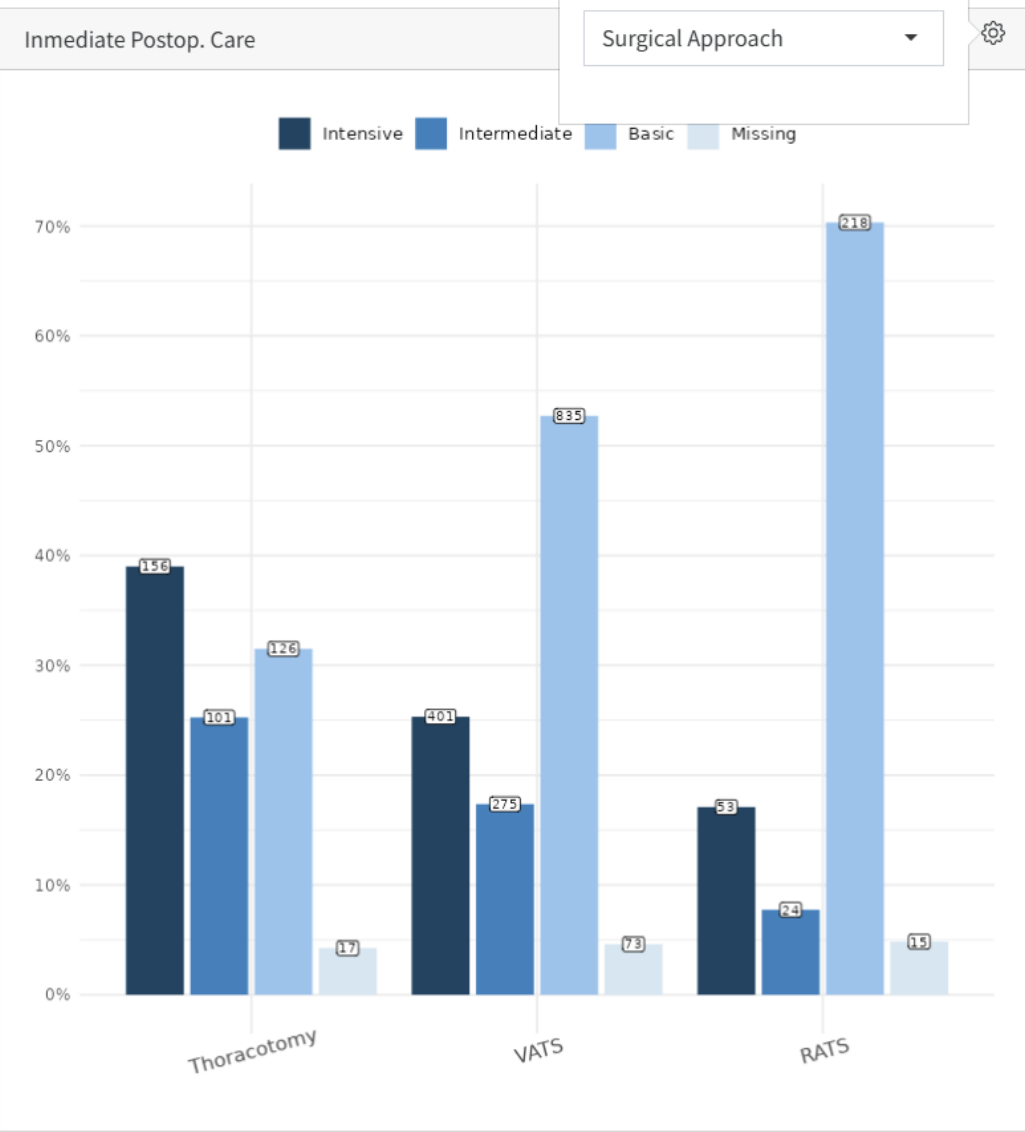
Demographics ∨

Lung Function ∨

Procedure ^

Lung Resection ⓘ  
 Segmentectomy  
 Lobectomy  
 Bilobectomy  
 Pneumonectomy

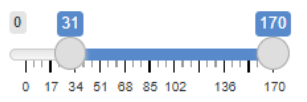
Surgical Approach ⓘ  
 Thoracotomy  
 VATS  
 RATS



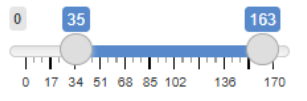
Demographics

Lung Function

FEV1 (%)



DLCO (%)



Procedure

Lung Resection

- Segmentectomy
- Lobectomy
- Bilobectomy
- Pneumonectomy

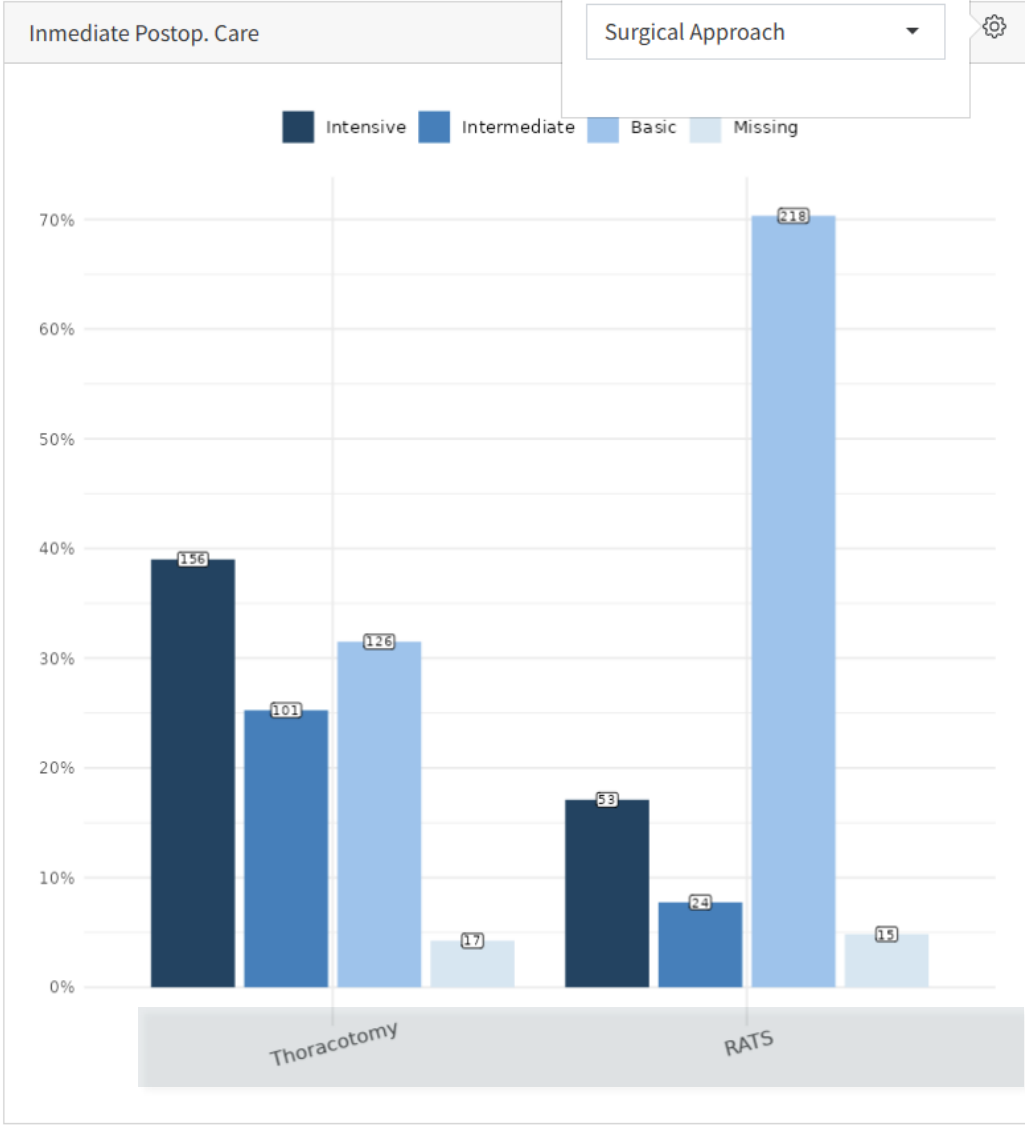
Surgical Approach

- Thoracotomy
- VATS
- RATS

Health Care

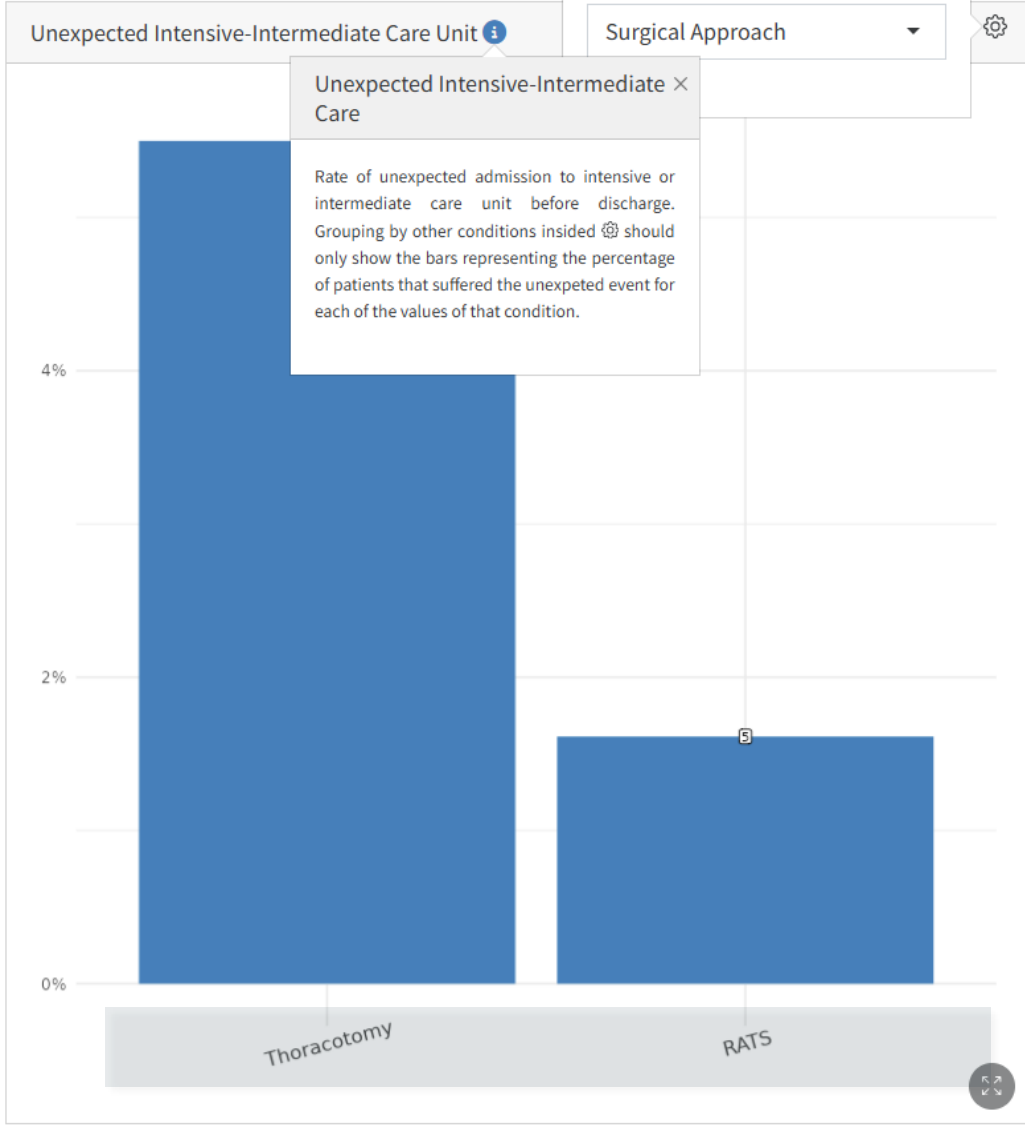
Group By

Surgical Approach



Group By

Surgical Approach



Unexpected Intensive-Intermediate Care

Rate of unexpected admission to intensive or intermediate care unit before discharge. Grouping by other conditions insided should only show the bars representing the percentage of patients that suffered the unexpeted event for each of the values of that condition.

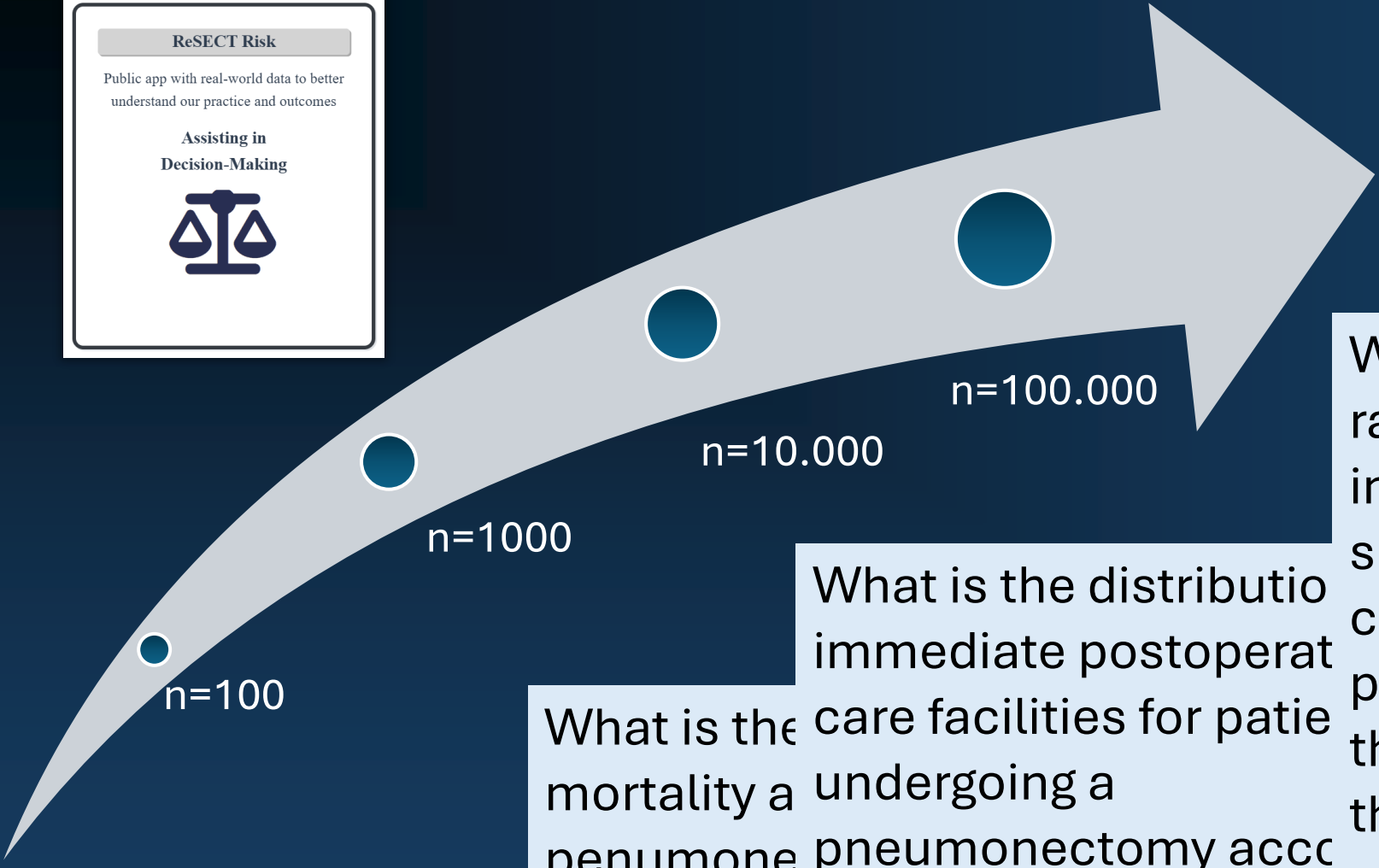
**ReSECT Risk**

Public app with real-world data to better understand our practice and outcomes

Assisting in Decision-Making



# Risk Prediction Pragmatic New Tool



What is the average length of stay for patients over 60 years old undergoing lobectomy?

What is the mortality rate for patients undergoing a pneumonectomy according to ASA classification?


What is the distribution of immediate postoperative care facilities for patients undergoing a pneumonectomy according to ASA classification?

What is the readmission rate after VATS lobectomy in male patients who suffered from grade III complications and had a postoperative stay longer than 10 days according to the type of surgical approach performed?

**ReSECT Risk**

Public app with real-world data to better understand our practice and outcomes

Assisting in  
Decision-Making



Answers to countless questions



Continuous source of hypotheses



Patient counseling and decision making

Log In

**Type of Log In**

Demo

Demo

Credentials

Upload

Global Filter

**Date of Surgery**

01/01/2023 to 24/10/2024

**Cohort**

My Centre: 26 patients

ReSECT: 128 patients

Copy Excel PDF

Show All entries

**Index**

- Days on Waiting List (median, IQR)
- Determining DLCO (%)
- FEV1 o DLCO preop. < 60 %
- Exercise Test with or without vO2 (%)
- VATS-RATS (%)
- Conversion to Open Approach (%)
- Clavien-Dindo III-V before discharge(%)
- Clavien-Dindo IV-V before discharge (%)
- Persistent Airleak (%)
- Postop. Length of Stay (median, IQR)
- Discharge on Weekend Days (%)
- Re-admissions (%)
- In-hospital Mortality (%)
- 30-day Mortality (%)
- 90-day Mortality (%)

**ReSECT Benchmarking**

Private app to know how your department is performing compared to the whole Registry.

**Promoting Quality of Care**

Search:

	My Centre	ReSECT
	29 (20-46)	31 (21-44)
	92.3	95.3
	16.7	21.5
	24	21.6
	84.6	80.5
	8.3	11.1
	4.2	4.1
	0	0.8
	16.7	7.4
	4 (3-6.25)	3 (2-5)
	26.1	31.9
	3.8	6.2
	0	0.78
	0	2.13
	0	2.67

Log In

Type of Log In *i*

Demo

Global Filter

Date of Surgery *i*

01/01/2023 to 09/11/2024

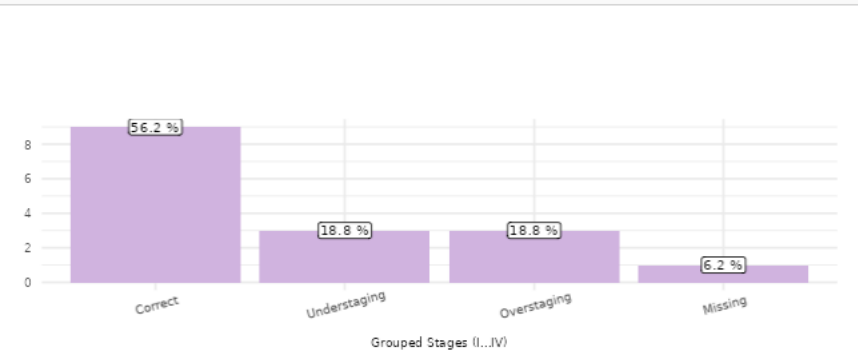
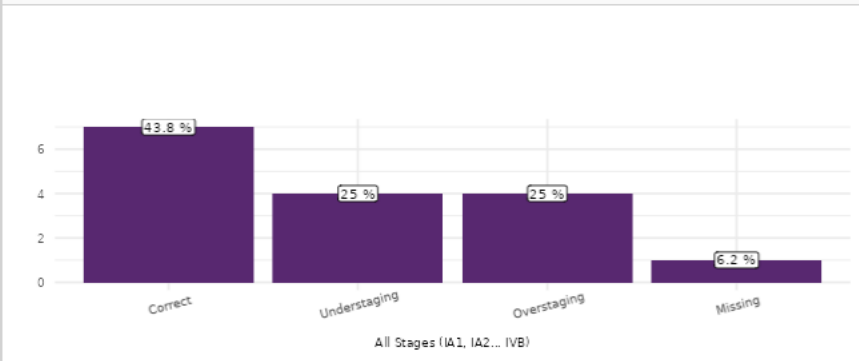
Cohort

*i*

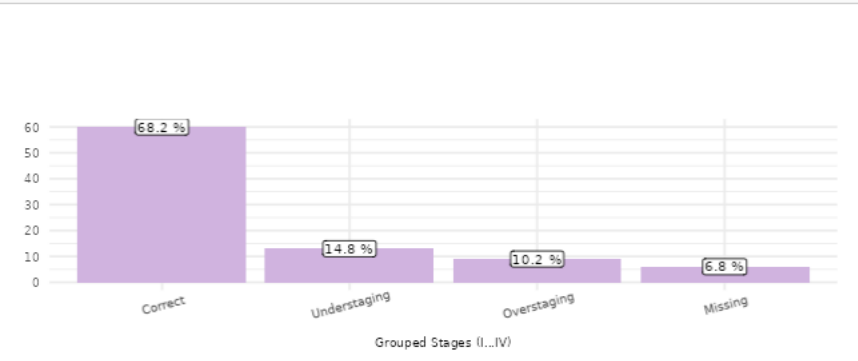
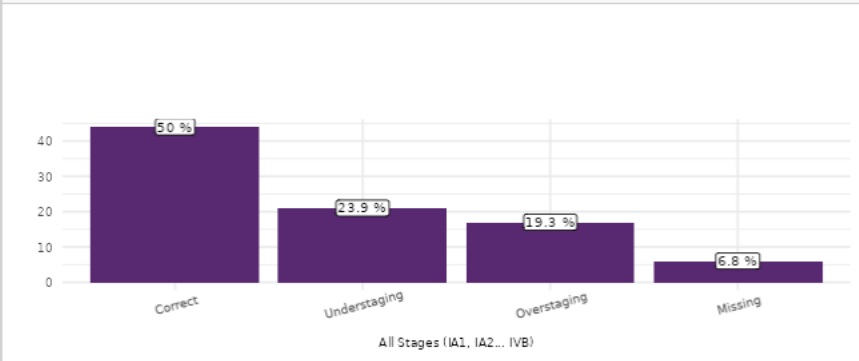
My Centre: 27 patients  
ReSECT: 137 patients

Pathology c-Staging p-Staging **Accuracy**

My Centre: 16 patients



ReSECT: 88 patients



*i* Home

**Tumour Size (mm)**

0 150

0 15 30 45 60 75 90 105 120 135 150

**Location**

Central Periférico Missing

**Hemithorax**

Derecha Izquierda Missing

**Invasive Mediastinal Staging**

No Realizado N0 N1 N2 N3 Ni Missing

**Neoadjuvant Therapy**

No Sistémica RT Sistémica + RT Missing

**Surgical Approach**

Toracotomía VATS RATS Other Missing

**Lung Resection**


Segmentectomía Lobectomía Bilobectomía Neumonectomía Missing



**ReSECT Benchmarking**

Private app to know how your department is performing compared to the whole Registry.

**Promoting Quality of Care**



Log In

Type of Log In  
Demo

Global Filter

Date of Surgery  
01/01/2023 to 09/11/2024

Cohort

My Centre: 27 patients  
ReSECT: 137 patients

Copy   Excel   PDF

Show All entries

Index	My Centre	ReSECT
Days on Waiting List (median, IQR)	29 (20-46)	31 (21-44)
Determining DLCO (%)	95.3	95.3
FEV1 o DLCO preop. < 60 %	16.7	21.5
Exercise Test with or without vO2 (%)	24	21.6
VATS-RATS (%)	84.6	80.5
Conversion to Open Approach (%)	8.3	11.1
Clavien-Dindo IV-V before discharge (%)	4.2	4.1
Clavien-Dindo IV-V before discharge (%)	0	0.8
Persistent Airleak (%)	16.7	7.4
Postop. Length of Stay (median, IQR)	4 (3-6.25)	3 (2-5)
Discharge on Weekend Days (%)	26.1	31.9
Re-admissions (%)	3.8	6.2
In-hospital Mortality (%)	0	0.78
30-day Mortality (%)	0	2.13
90-day Mortality (%)	0	2.67



Be aware of our strengths and weaknesses



Planning the allocation of resources and efforts.

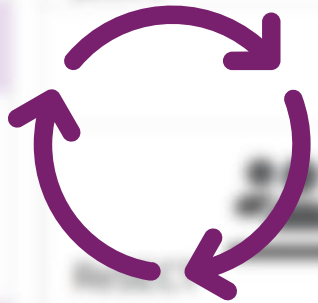


Evaluate the impact of our measures

ReSECT Benchmarking

Private app to know how your department is performing compared to the whole Registry.

Promoting Quality of Care



# Quality Improvement



Log In

Global Filters

Date of Surgery

2023-01-01 to 2024-11-10

Responsibility

Main Surgeon First Assistant

Second Assistant Third Assistant

My Centres

demo

Compare to Other Professionals

Yes No

Type

Lung

Lung-Groups

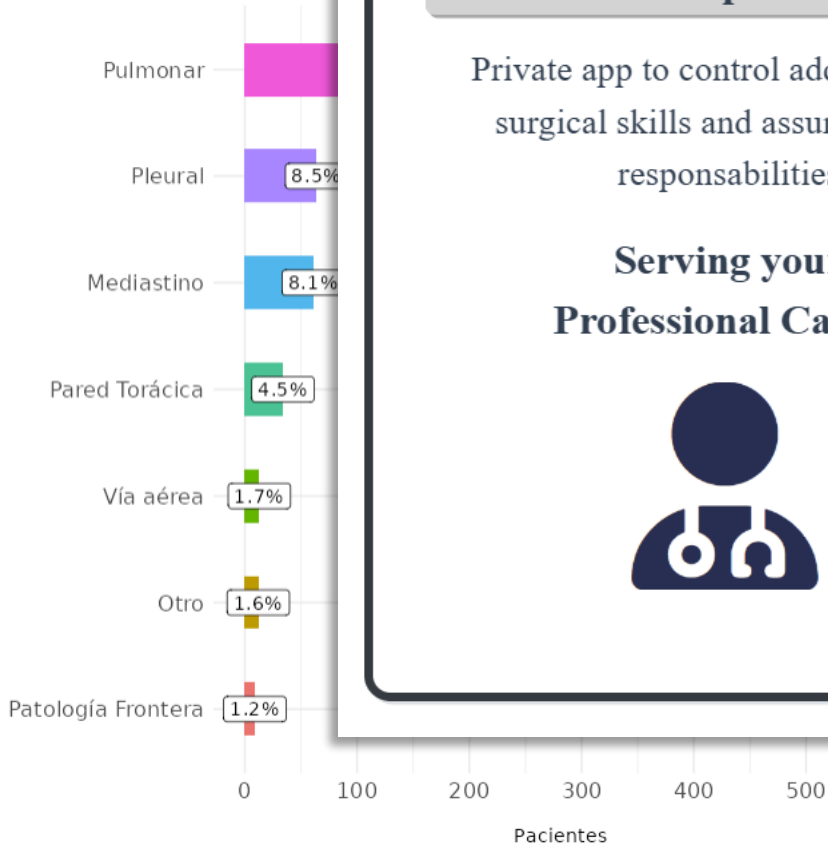
Pleura

Mediastinum

Chest Wall

Air Way

Frontier

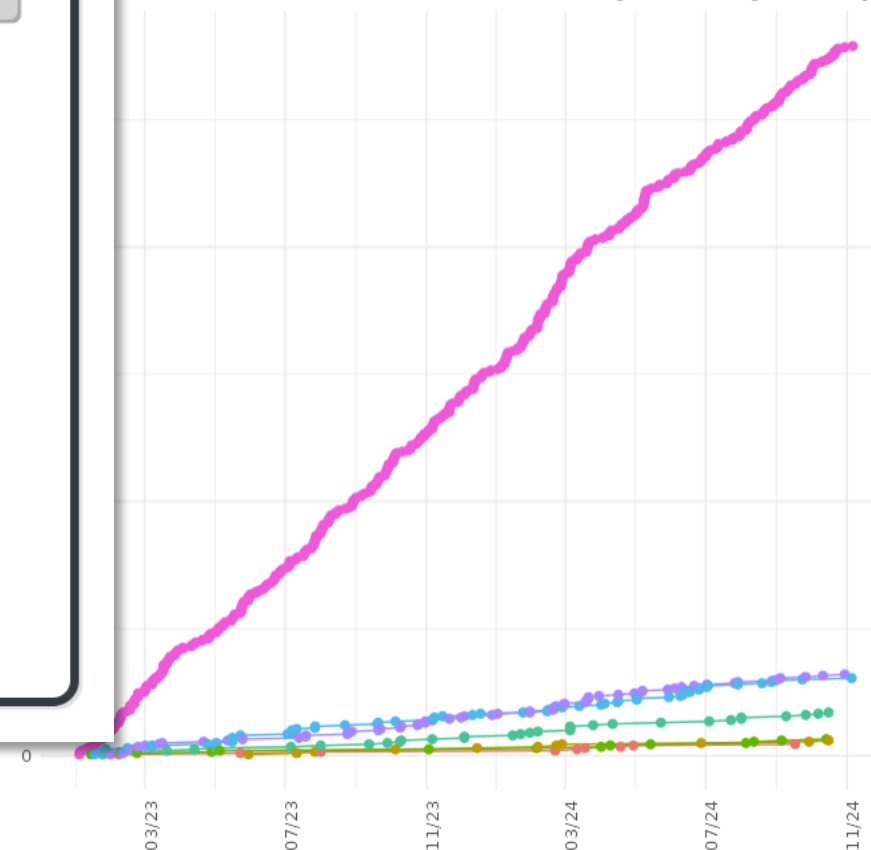


**ReSECT Operative-log**

Private app to control acquisition of surgical skills and assumption of responsibilities

**Serving your Professional Career**

My Activity: 751 p.



Log In

Global Filters

**Date of Surgery**

2018-01-01 to 2024-11-10

**Responsibility**

Main Surgeon First Assistant  
Second Assistant Third Assistant

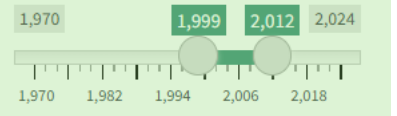
**My Centres**

demo

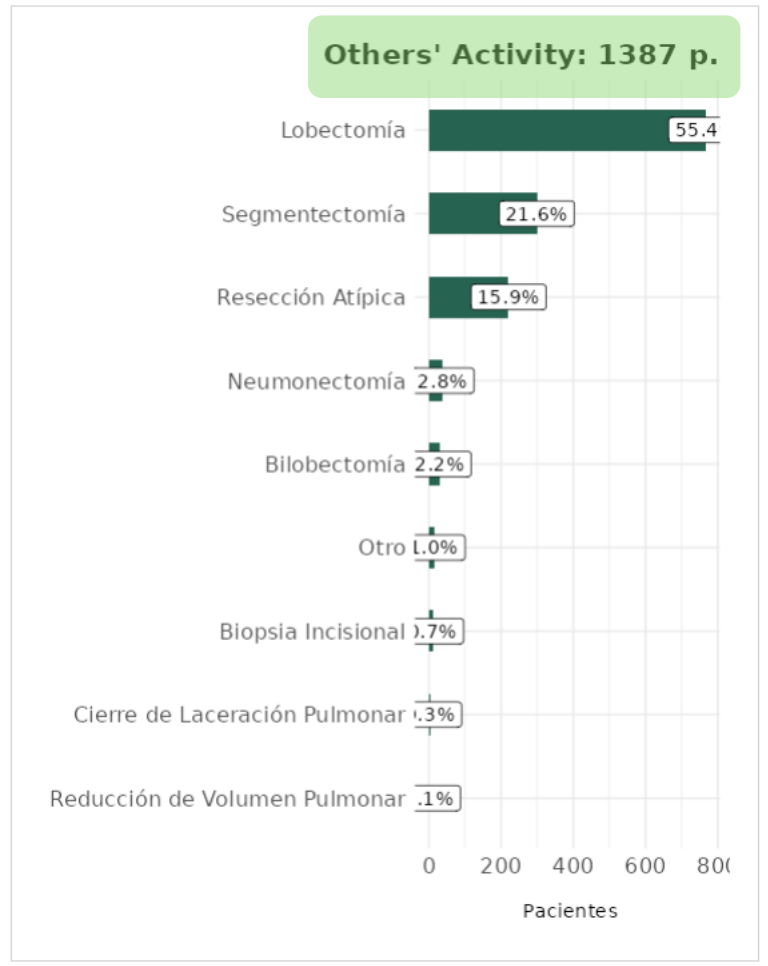
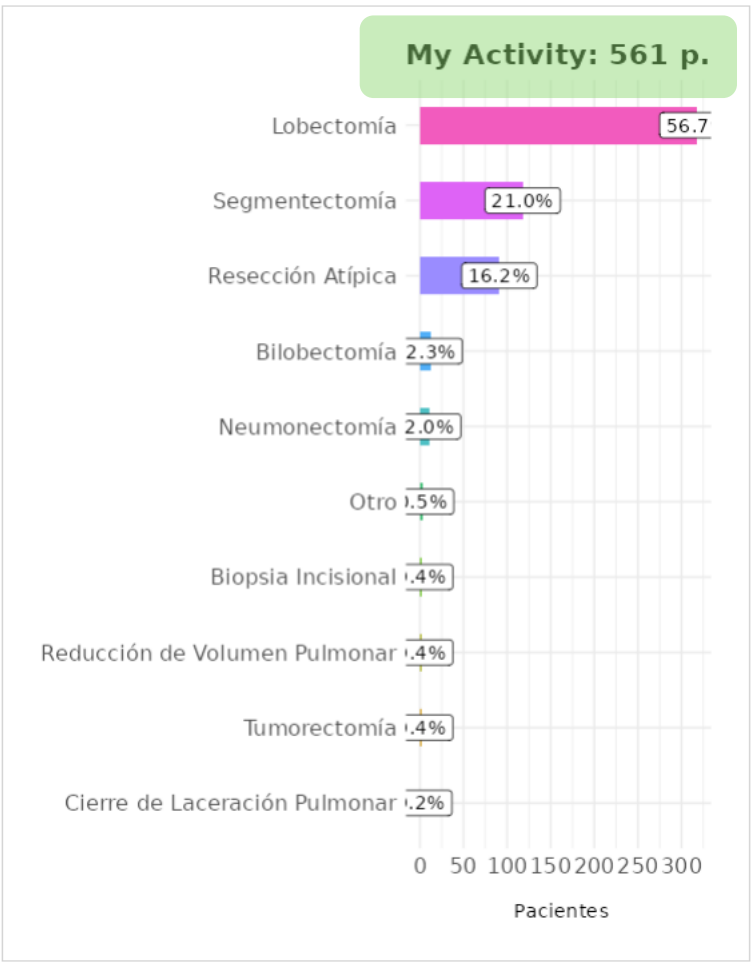
**Compare to Other Professionals**

Yes  No

**Start of Residency (Range)**



Type Lung Lung-Groups Pleura Mediastinum Chest Wall Air Way Frontier



**Approach**

VATS Toracotomía RATS  
Videotoracoscopia (Missing)  
Otro Abordaje Abierto Otro  
Otro Abordaje Endoscópico  
Esternotomía Hemi-Clamshell

**Number of Ports**

(Missing) 1 2 3 4 5 6  
Not Applicable

**Complications**

Grado I Grado II Grado IIIa  
Grado IIIb Grado IVa Grado IVb  
Grado V=Exitus No (Missing)

Reset



# Acquisition of Skills

# Asumption of Responsibilities

# Benchmarking of your surgical activity

# Justify your expertise for curricular purposes



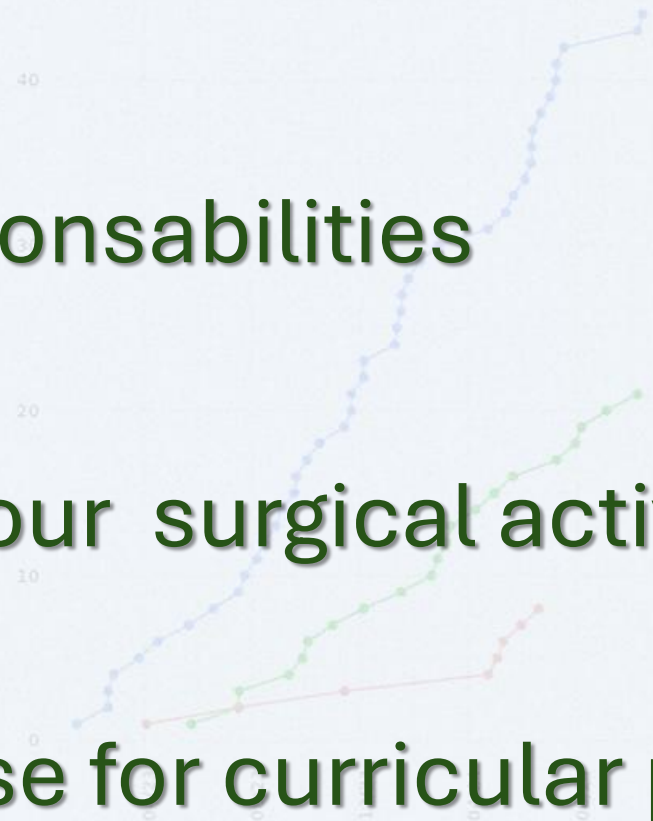
Type T Thoracotomy V VATS R RATS Conversions Approach-Groups

My Activity: 73 p.

Lobectomía 60.3%

Segmentectomía 28.8%

Resección Atípica 11.0%



Procedure

All

Pulmonar

Number of Ports

(Missing) 2 3 4 5 6

Sub-Procedure

Lobectomía Resección Atípica

Segmentectomía Bilobectomía

Biopsia Incisional Otro

Log In

Global Filters

Date of Surgery

2018-01-01 to 20

Responsability

Main Surgeon First Assistant

Second Assistant Third Assistant

My Centres

demo

Compare to Other Professionals

Yes No

What is coming?

## Data Transfer Agreement

July 2024

SE  
CT  
SOCIEDAD  
ESPAÑOLA  
DE CIRUGIA  
TORÁCICA



→ One-way Data Transfer on an annual basis (January)

→ Content: Anatomical Lung Resection Process

→ ReSECT representative on the ESTS committee

→ Same User Rights as Direct Participation.

→ Apply for studies

→ Proposal for Department Accreditation

**ReSECT-ESTS DB Agreement**

**Exchange Ideas**

**Improve Scientific Production**

**Joint Meetings**

**Share Common Data Core**

**ESCC**  
**Closer Relationship SECT-ESTS**

**Collect More Data**

**Design Shared Interactive Apps**

**National Registries oriented towards ESTS**

**Benchmarking Initiatives between Countries**





# Ground-Breaking Applications

Continue Innovating

Interactive Machine Learning

Built-in Pretrained Natural Language Models



Shaping the FUTURE of Clinical Registries

THANK YOU  
FOR YOUR ATTENTION