

**Severe COPD (or Emphysema) Does Not
Increase Post-Operative Risk nor Decrease
Long Term Survival In Patients with NSCLC:
The Impact of Thoracoscopy**

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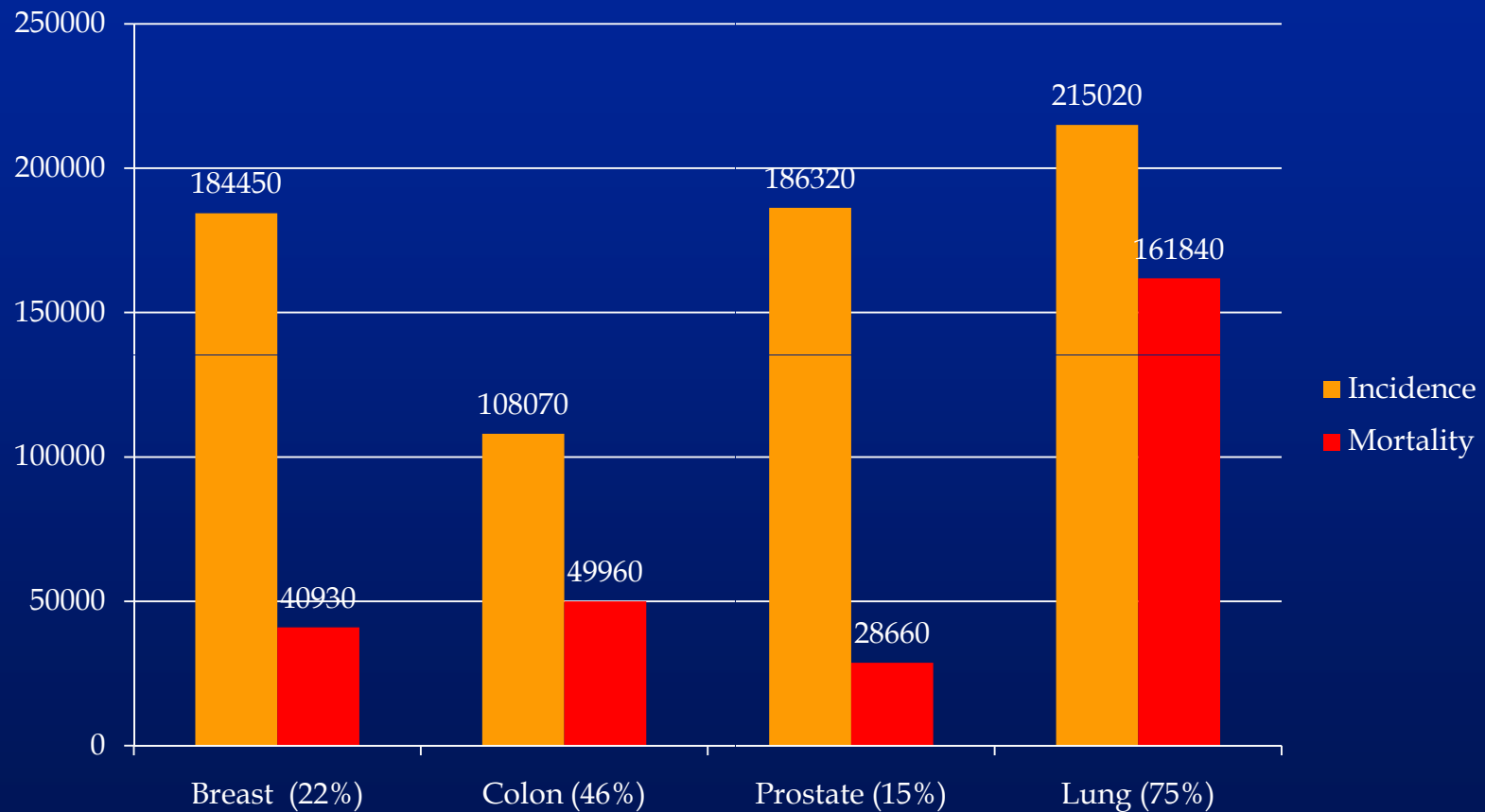
Causes of Death in United States

<u>Cause</u>	<u>Number</u>	<u>Percent</u>
1. Cancer	645,192	30.3
2. Heart Disease	629,838	28.0
3. Stroke	167,366	7.0
4. Emphysema	124,181	5.2
5. Accidents	97,860	4.1
6. Diabetes	68,399	2.9
7. Pneum/Flu	63,730	2.7

Nat'l Vital Statistics, 49:11, 2006

Lung Cancer

High Incidence, High Mortality



Introduction

“We can not correct the problems we currently have using the same thinking that caused the problems.”

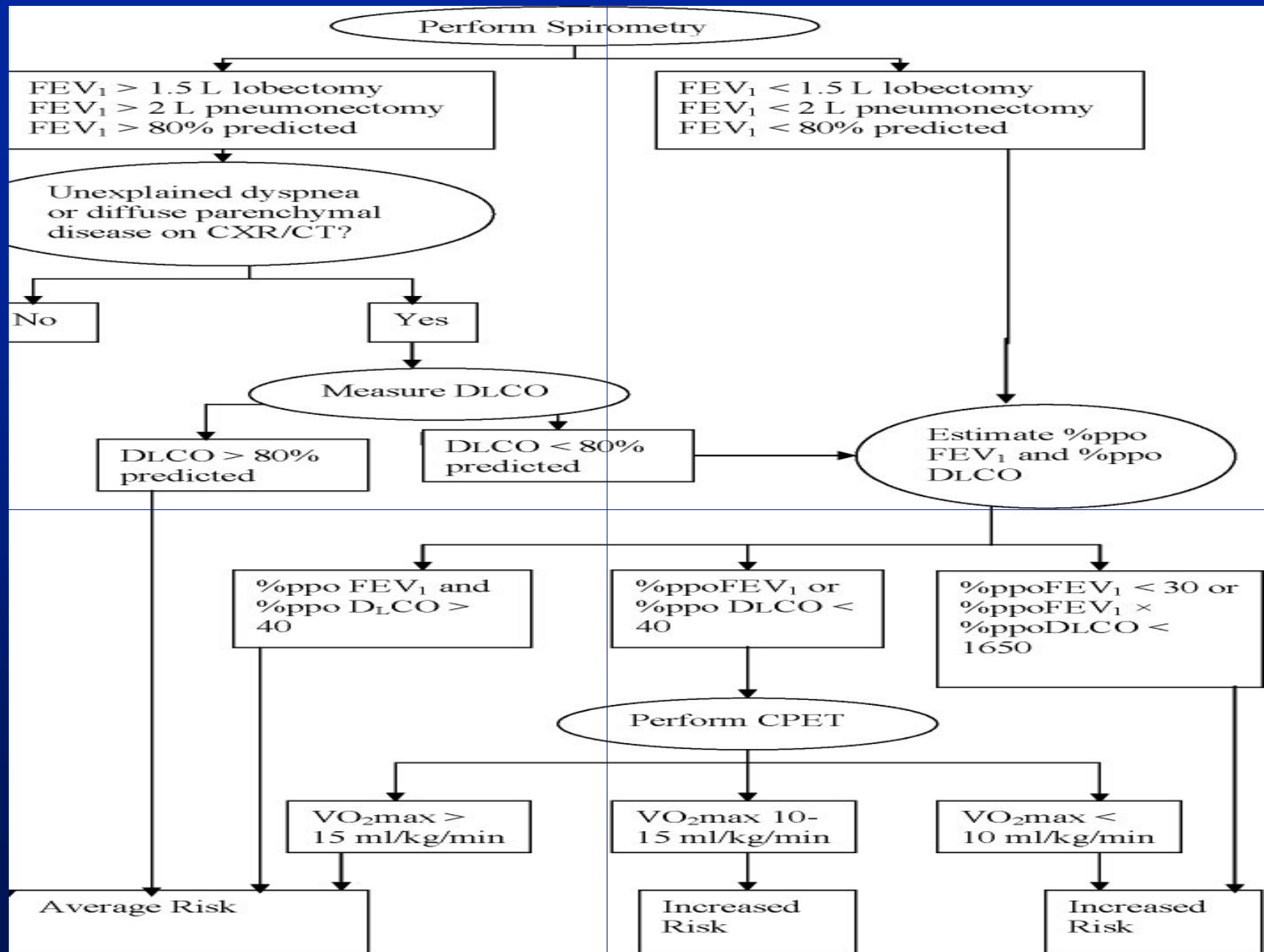
Albert Einstein

Introduction

- **Some of the thresholds used for determining resectability are listed below.**
 - **Preoperative FEV1 >1.5 Liters**
 - **Postoperative FEV1 > 800cc**
 - **Preoperative FEV1% > 40%**
 - **Preoperative DLCO% >40%**
- **We have resected selected patients with poorer pulmonary function and NSCLC, and present our data below.**

Introduction

- **The indications for emphysema surgery are different.**
 - **Preoperative FEV1% 18-35%**
 - **Preoperative DLCO% >20%**
 - **Heterogeneous emphysema**
 - **Acceptable cardiac function with no pulmonary hypertension**
 - **Reasonable exercise tolerance**



The Thresholds for Lung Cancer Surgery and Emphysema Surgery are Different

Lung Cancer Surgery

- Preop FEV1 >80%
- >1.5L (lobe)
- Preop FEV1 >2L (lung)
- DLCO% >20%

- Acceptable cardiac function
- Exercise testing for selected patients with FEV1<80%

Emphysema Surgery

- Preop FEV1% 18-35%
- DLCO% >20%
- RV% >200%
- Heterogeneous emphysema
- Acceptable cardiac function
- Exercise testing for all patients

Average Postoperative Mortality

- **Lobectomy** 4.0%
- **Pneumonectomy** 8.0%
- **Lung and Chest Wall Resections** 4-6%
- **CABG** 1-2%

Operative mortality after lobectomy in Medicare series averages 5%.

Pain

Implications in Thoracic Surgery

The Problem

- Pain, or its treatment, causes most of the complications in thoracic surgery.
- Uncontrolled pain leads to poor cough and pneumonia.
- Overtreated pain leads to sedation and aspiration, which is even more dangerous.

Pain of Thoracic Surgery

- Rank of pain of surgical procedures
 1. Thoracic procedures
 2. Upper abdominal surgery
 3. Lower abdominal surgery
 4. Cardiac surgery
 5. Herniorrhaphy
 6. Head, neck, limb surgery

Ports for Thoracoscopic Lobectomy



Case Study of a Patient with Lung Cancer

**Elderly
Emphysematous**

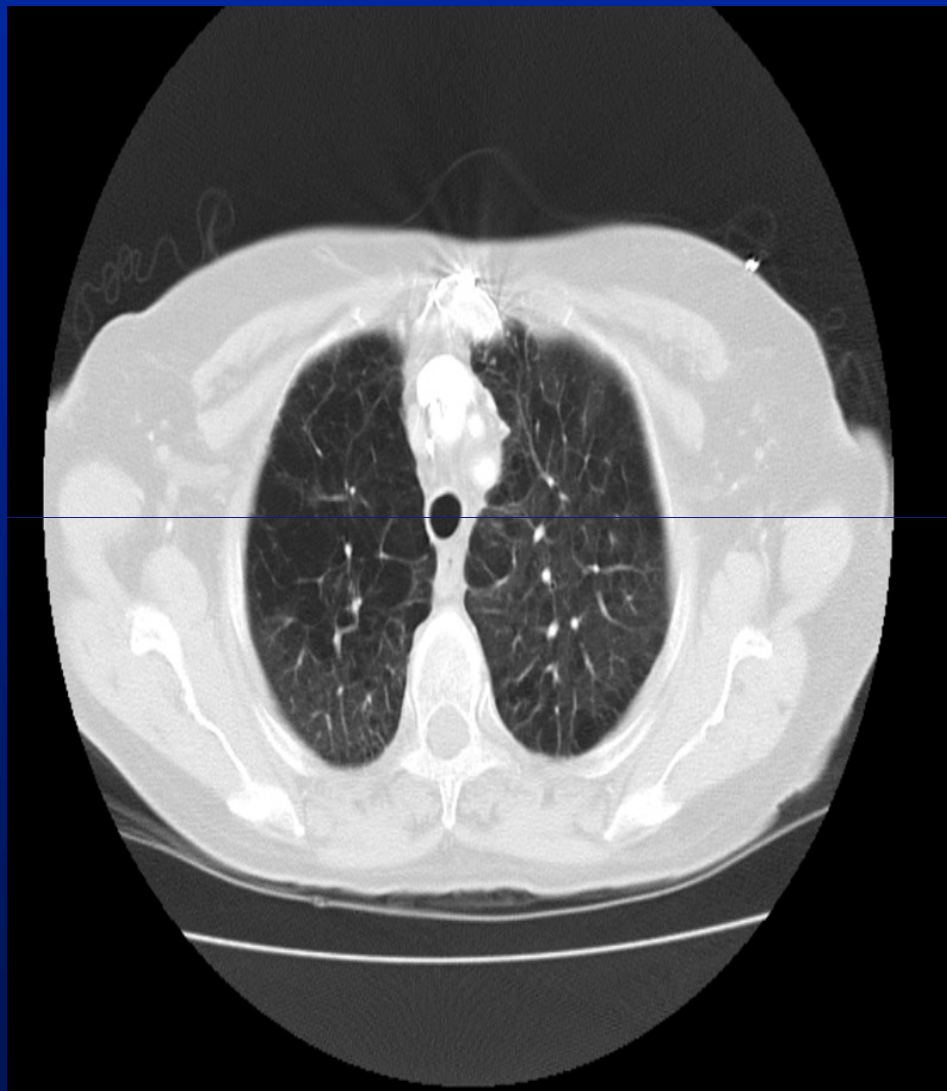
Case Report

- **FM is a 75 YO female with a long smoking history who developed pneumonia and was admitted to hospital for treatment.**
- **CXR revealed a left lower lobe infiltrate, but surprisingly also showed a right lower lobe mass. She was treated for her pneumonia with antibiotics and chest physiotherapy and a chest CT obtained.**

Case Report

- Chest CT confirmed a right lower lobe mass in the superior segment (Figure 1A) and bullous emphysema in both upper lobes, greater on the right side (figures 1B).
- Pulmonary function testing revealed an FEV1% of predicted of 29%, with a residual volume of 235% and a diffusing capacity (corrected for surface area) (DLCO/VA) of 52% of predicted.

Case Report



Case Report

- For many physicians (and surgeons), this patient would appear to be unresectable
- She has severe emphysema in her upper lobe, with a cancer in the lower lobe where her only function is.
- We will present data that patients like her can safely undergo resection.

Results of Surgery on Lung Cancer Patients with Emphysema

Implications in Thoracic Surgery

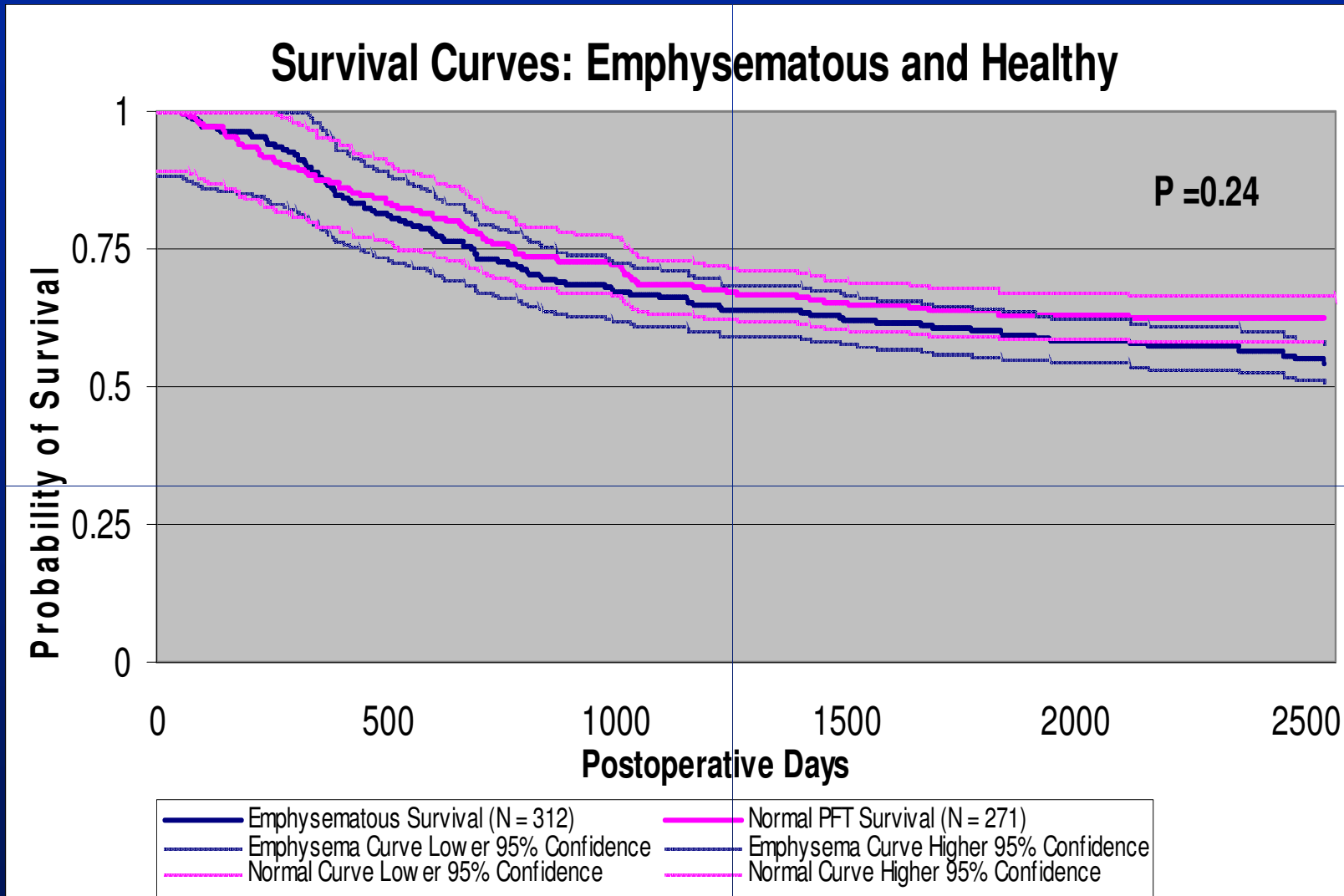
Demographics

Group (by FEV1%)	Mean Age (Years)	Age Standard Deviation (Years)	Size
Under 40	60.8	12.2	102
From 40 to 50	62.2	14.0	56
From 50 to 60	62.4	15.9	64
From 60 to 70	62.8	12.6	101
Over 70	58.5	14.3	276

Perioperative Complications

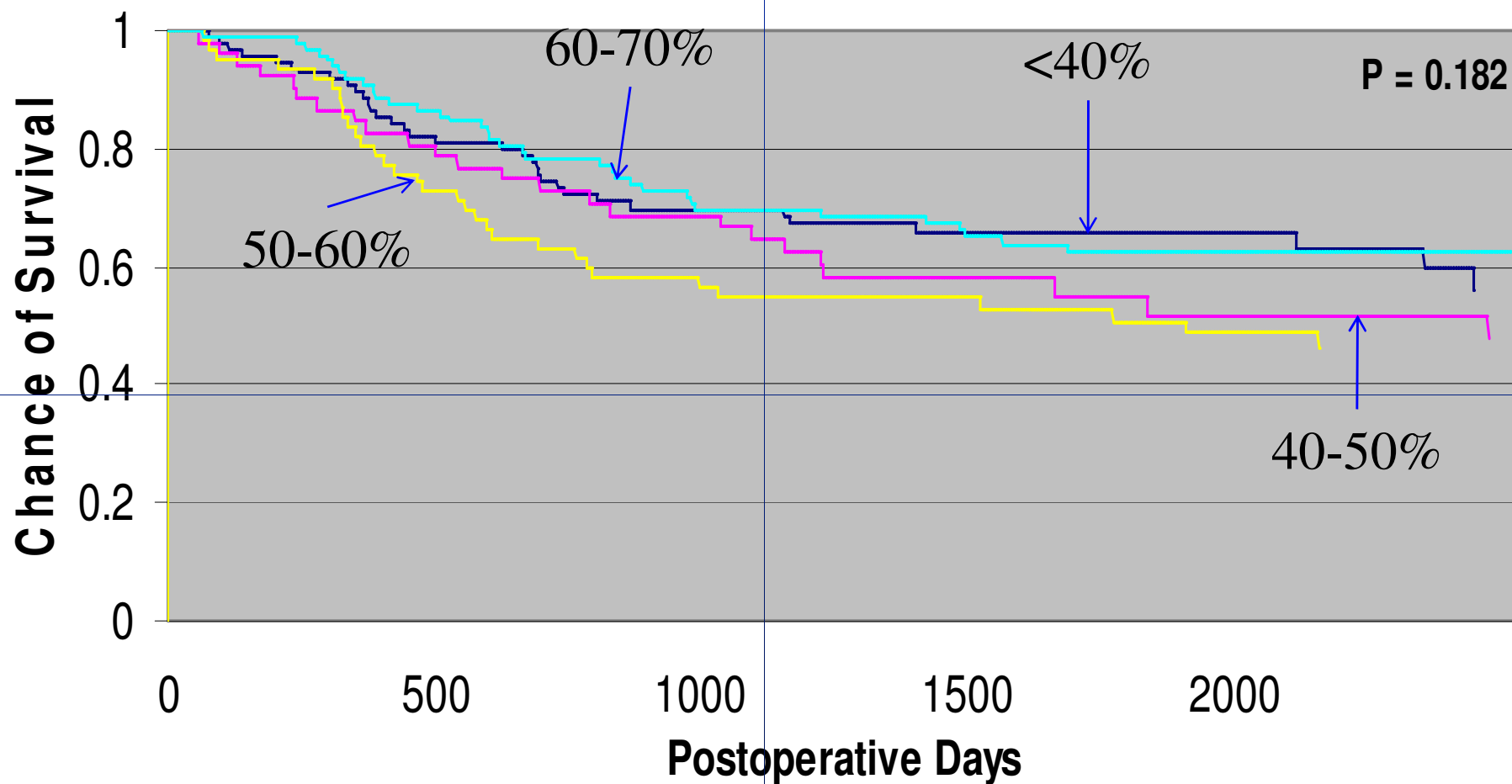
Category	Perioperative Mortality	Life-threatening Complication	Major Complication	Minor Complication
Emphysema	2.76%	7.36%	30.67%	0.30%
Healthy	1.44%	2.53%	15.94%	2.17%
Difference	1.31%	4.82%	14.73%	-1.86%
P Value	0.13	0.0039	<.005	<0.005
Statistically Significant?	No	Yes	Yes	Yes

Patients With COPD and NSCLC vs. NSCLC Alone



There is no statistically significant difference in survival between patients with emphysema and those without.

Survival Curves For Emphysematous Patients



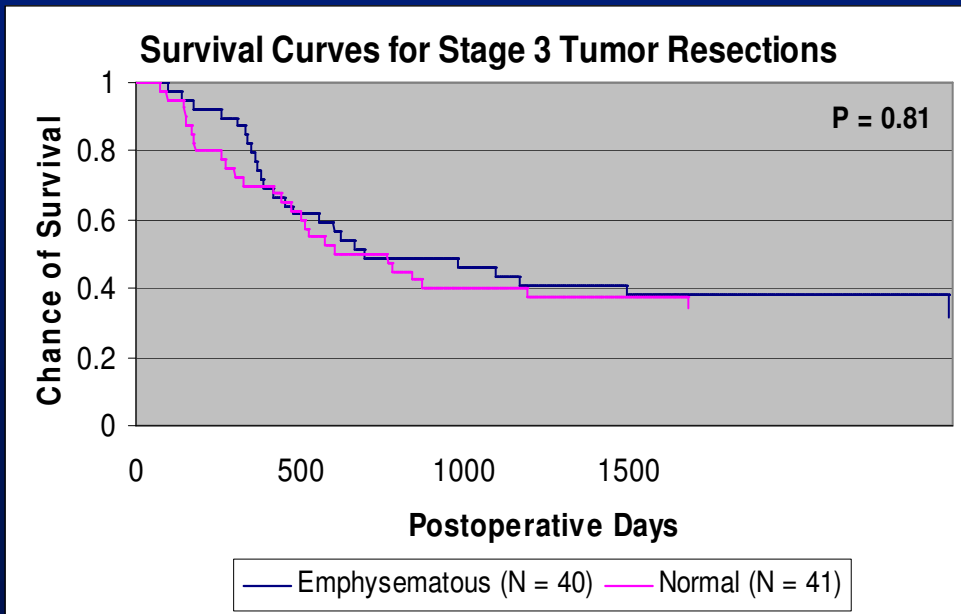
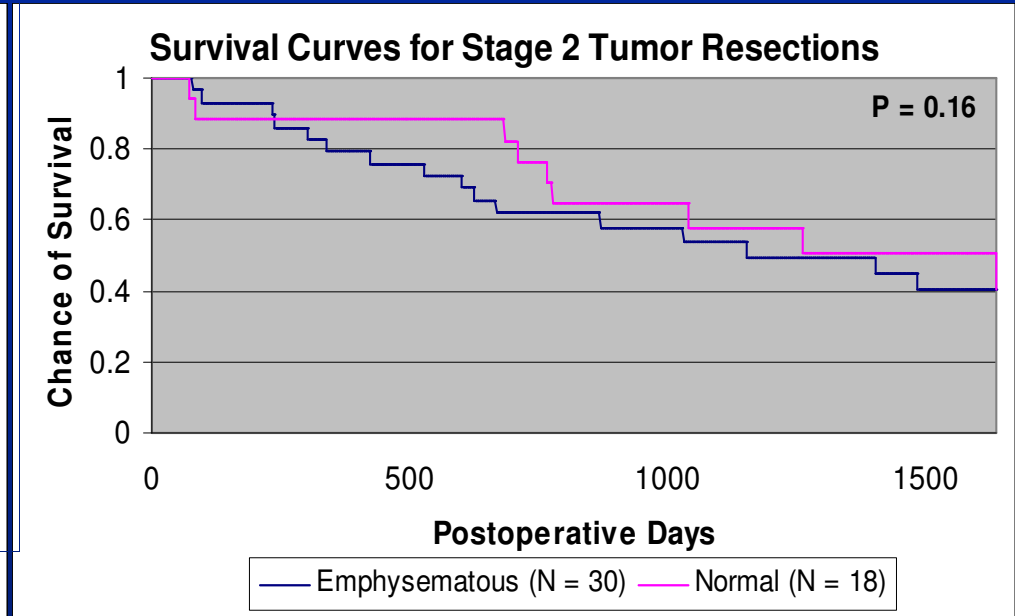
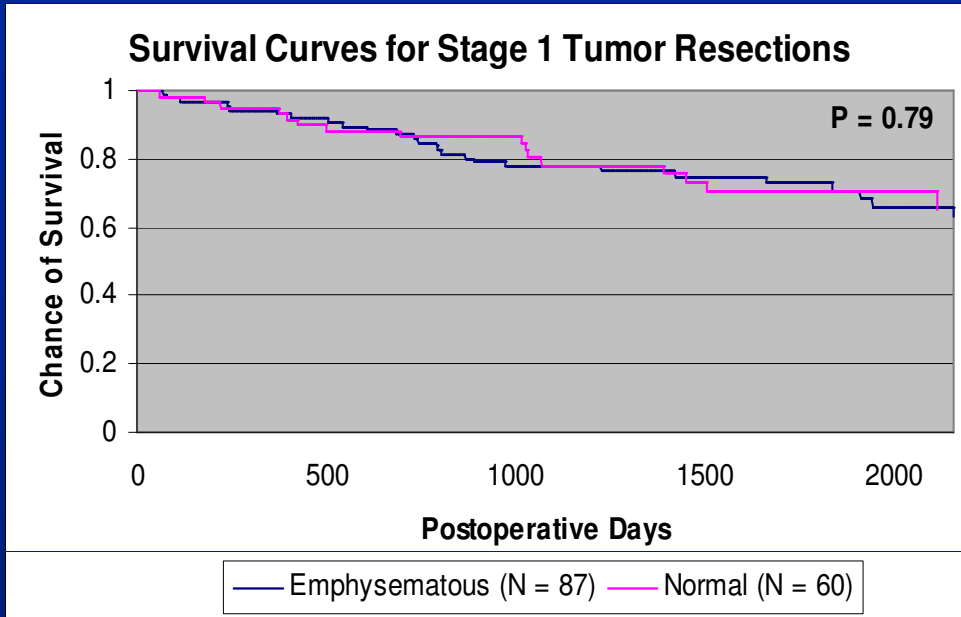
— Under 40 (N = 97)

— Between 40 and 50 (N = 53)

— Between 50 and 60 (N = 63)

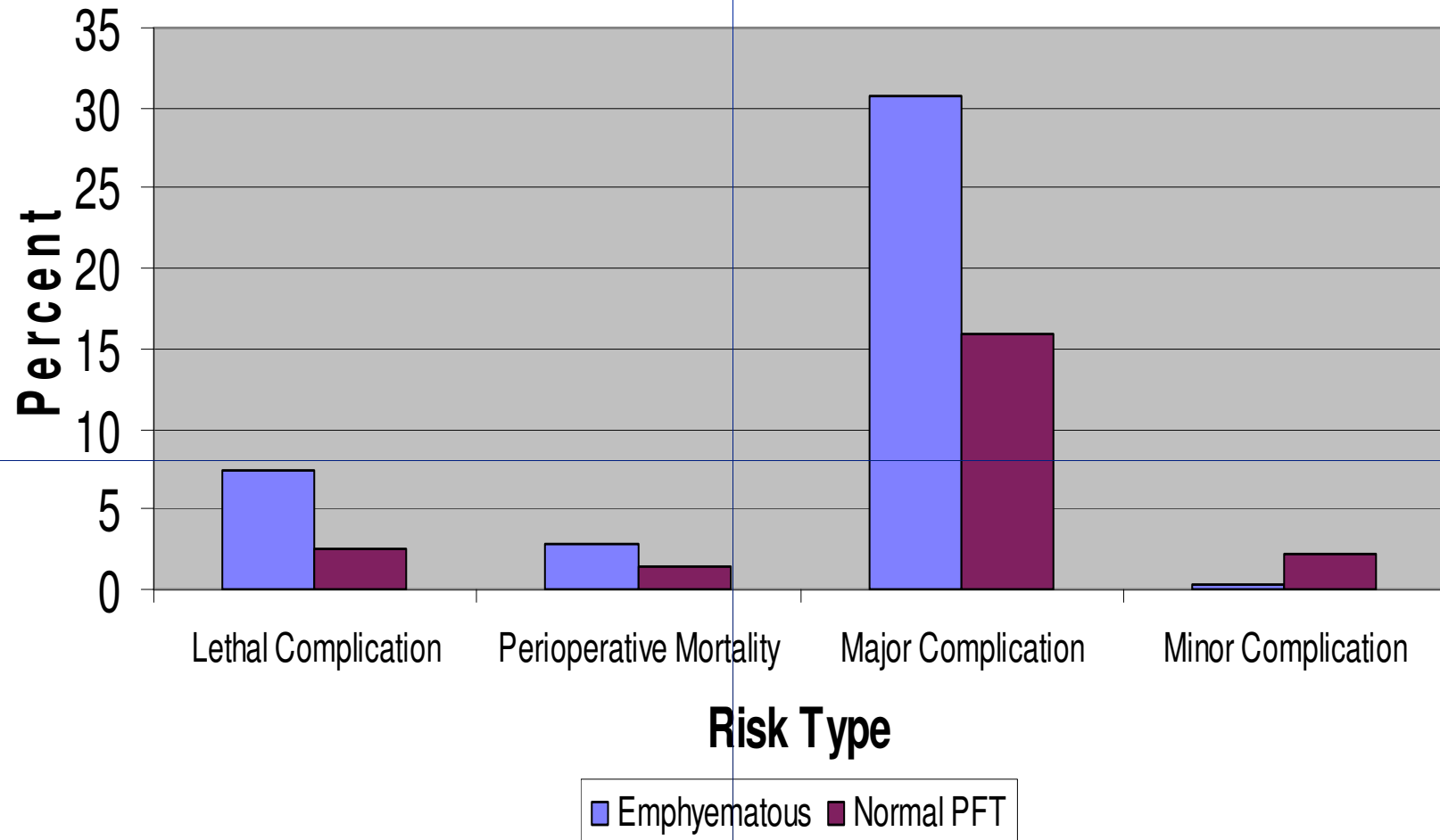
— Between 60 and 70 (N = 99)

Does Survival for Patients with Emphysema and Those Without Differ By Stage?



- No. The differences in survival are not statistically significant.

Perioperative Risk Rates - Emphysematous vs Healthy



Radiotherapy

5-year survival

Summary of Radiotherapy for Early Lung Cancer-1990

Author	Year	Two or three-year survival	Five year-survival
Noordijk	1988	56%	15%
Rosenthal	1990	54%	12%
Talton	1990	36%	17%
Sandler	1990	17%	~10%
Dosoretz	1992	40%	10%
Kaskowitz	1993	19%	6%
Hayakawa	1993		27%
Koukourakis	1995		30%
Furuta	1995	28.2%(average)	11%
Furuta	1996	40%	16%
Hayakawa	1996	40%	20%
Hayakawa	1999	42%	23%
Hayakawa	2001	30% (elderly)	9% (elderly)
Okamota	2004	35%	3%
Jeremic	2005	50%	36%
Averages		37.5%	16.3%

Summary of Radiotherapy for Early Lung Cancer-1990

- Analyzing the entire group reveals
 - Overall 16.3% 5 year survival for early lung cancer

Case Report

- **FM underwent a thoracoscopic right lower lobe superior segmentectomy and right upper lobe bullectomy.**
 - **Path revealed a stage IB NSCLC**
- **Her postoperative course was complicated only by an air leak for five days.**
- **She was discharged home, and is functioning well.**
 - **Currently considering chemotherapy.**

Conclusions

- **Thoracic Surgery is more painful than other procedures**
- **Patients with poor lung function and emphysema can safely undergo resection in experienced hands**
- **Resection offers higher five-year survival than does radiotherapy**

Conclusions

- Minimally invasive surgery is not a gimmick
- Pain remains the central problem around thoracic surgery
 - It causes much of the risk
- Pain is the central memory our surgical patients have

Thanks

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