



# ***Surgical Therapy: Sentinel Node Biopsy and Breast Conservation***

***Stephen B. Edge, MD  
Professor of Surgery and Oncology  
Roswell Park Cancer Institute  
University at Buffalo***

# *Dr. Roswell Park: Tradition in Cancer Research*

- ◆ 1898: Founded NY State Laboratory for the Study of Malignant Disease
  - Re-named Roswell Park Memorial Institute in 1942
    - RPMI 1640 culture media
- ◆ Chair, Dept of Surgery University at Buffalo
- ◆ Performing surgery in Niagara Falls when President McKinley shot at the 1901 Pan American Exposition in Buffalo



# Overview

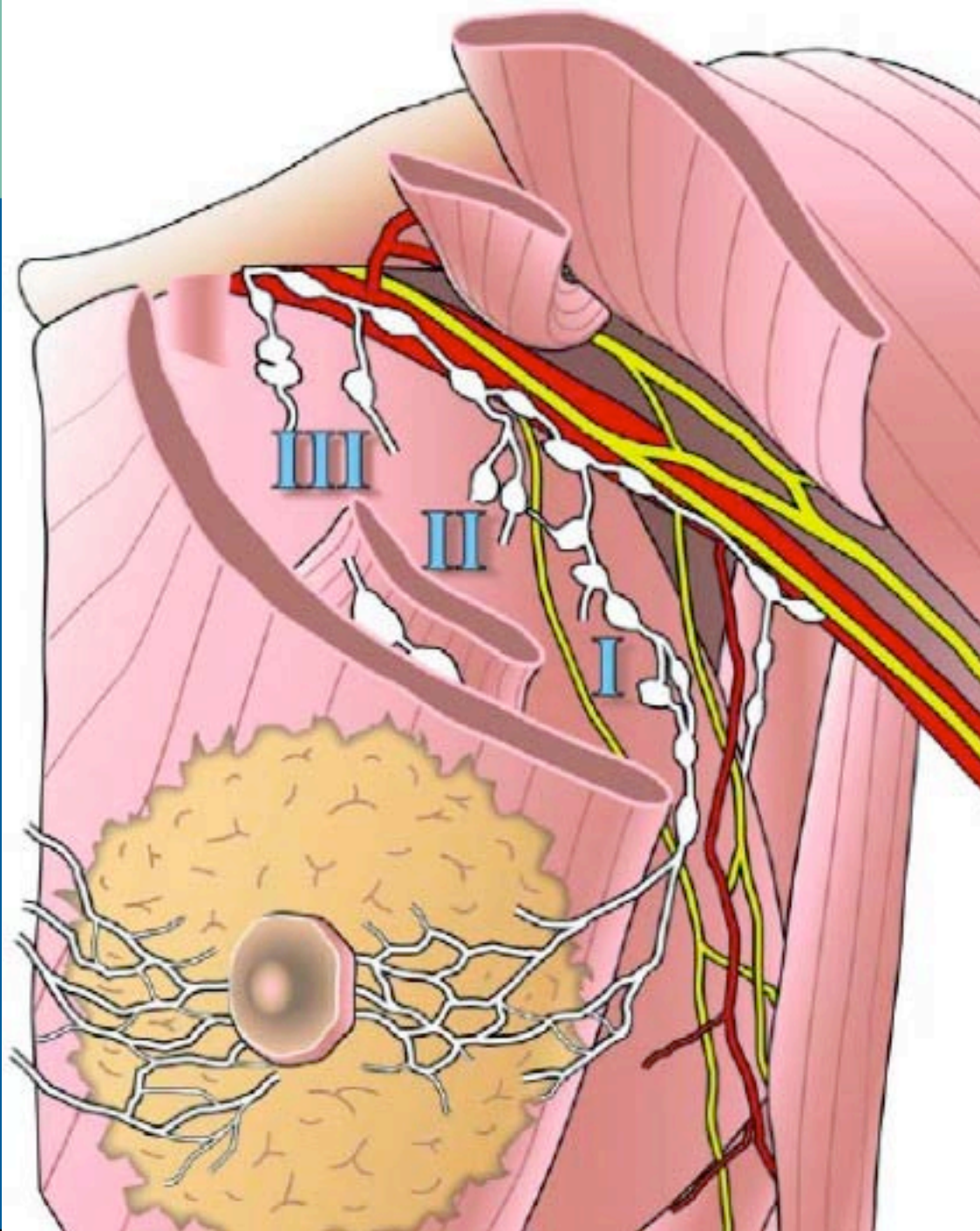
- ◆ **Sentinel Node Biopsy**
  - **Indications for SNB**
  - **Need for completion axillary dissection**
  
- ◆ **Breast conservation**
  - **Techniques for resection of margins**
  - **Extent of resection with PCT**
  
- ◆ **Dr. Collins - Pathologic evaluation of margins**
  
- ◆ **Japanese Comment**

NCCN

National  
Comprehensive  
Cancer  
Network

# Sentinel Node Biopsy

## Indications



# ***SNB with Clinically Negative Nodes***

## ◆ **Invasive breast cancer**

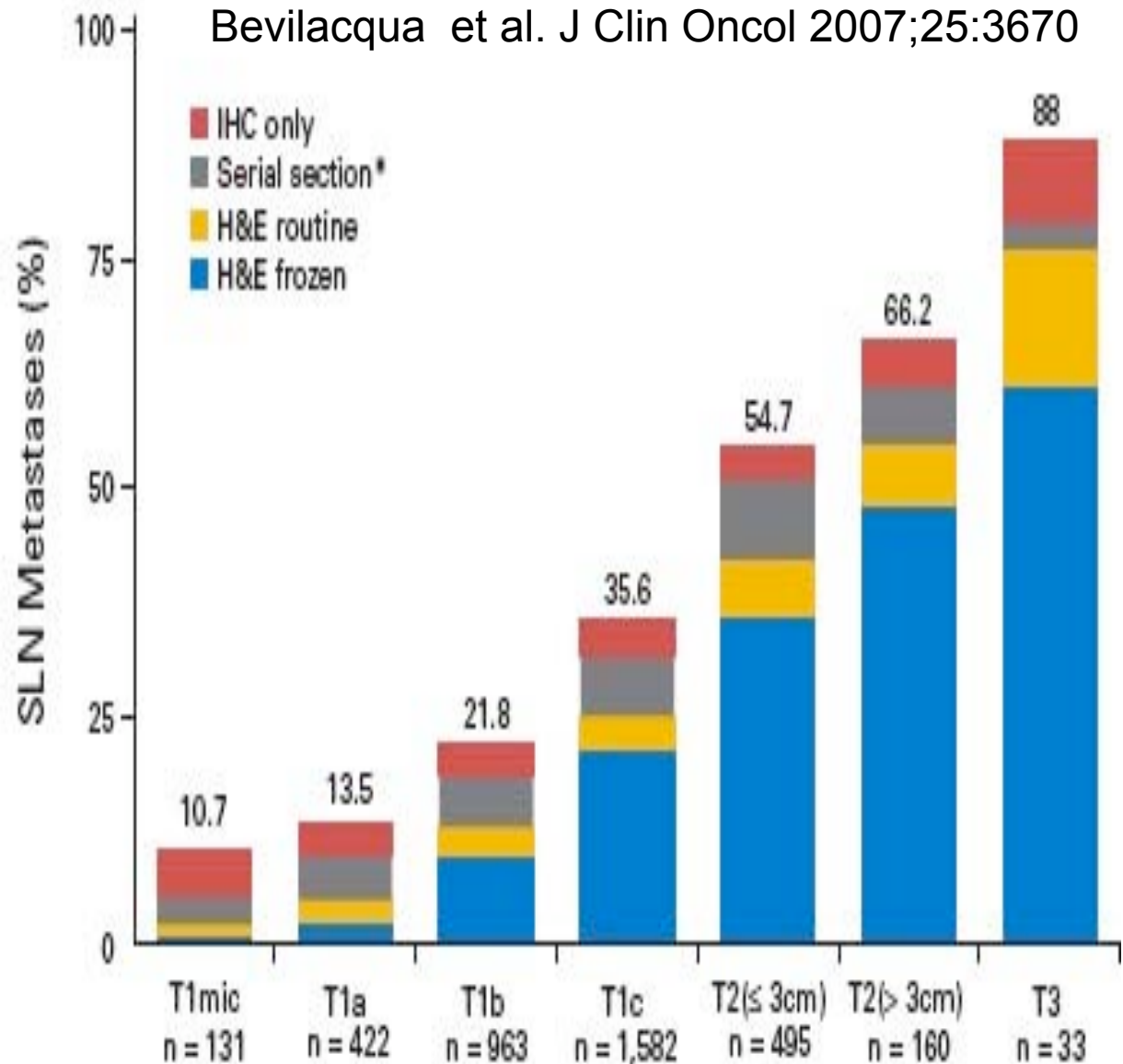
- Any situation requiring lymph node staging
- Primary (neoadjuvant chemotherapy)
- Local recurrence - repeat SNB?

## ◆ **Ductal carcinoma *in situ***

- Mastectomy
- Other indications?

# ***SNB Especially Important with Small Cancers***

- ◆ **Tumors < 1 cm**
  - **15% positive nodes by H&E**
  - **Major impact on use of chemotherapy**



# ***SLNB Indication: Repeat SNB with Recurrence***

- ◆ **Uncertain role of systemic therapy**
- ◆ **Uncertain need for lymph node staging with local recurrence**
- ◆ **Repeat SNB technically possible in women with prior SNB**
  - **Breast conserving surgery**
  - **May be possible with prior mastectomy**

# Repeat Sentinel Node Biopsy

Series	Number	Successful mapping	Drainage outside axilla	Repeat SLN Positive
Moffitt	56	45	1	9 (20%)
John Wayne	6	5	2	0
MSKCC	54	40	3	5 (12.5%)
European Institute	65	63	7	7 (11%)
<b>TOTAL</b>	<b>181</b>	<b>152 (84%)</b>	<b>11 (6%)</b>	<b>20 (13%)</b>

Adapted from Cox et al. JACS 2008;207:57



**NCCN**

National  
Comprehensive  
Cancer  
Network

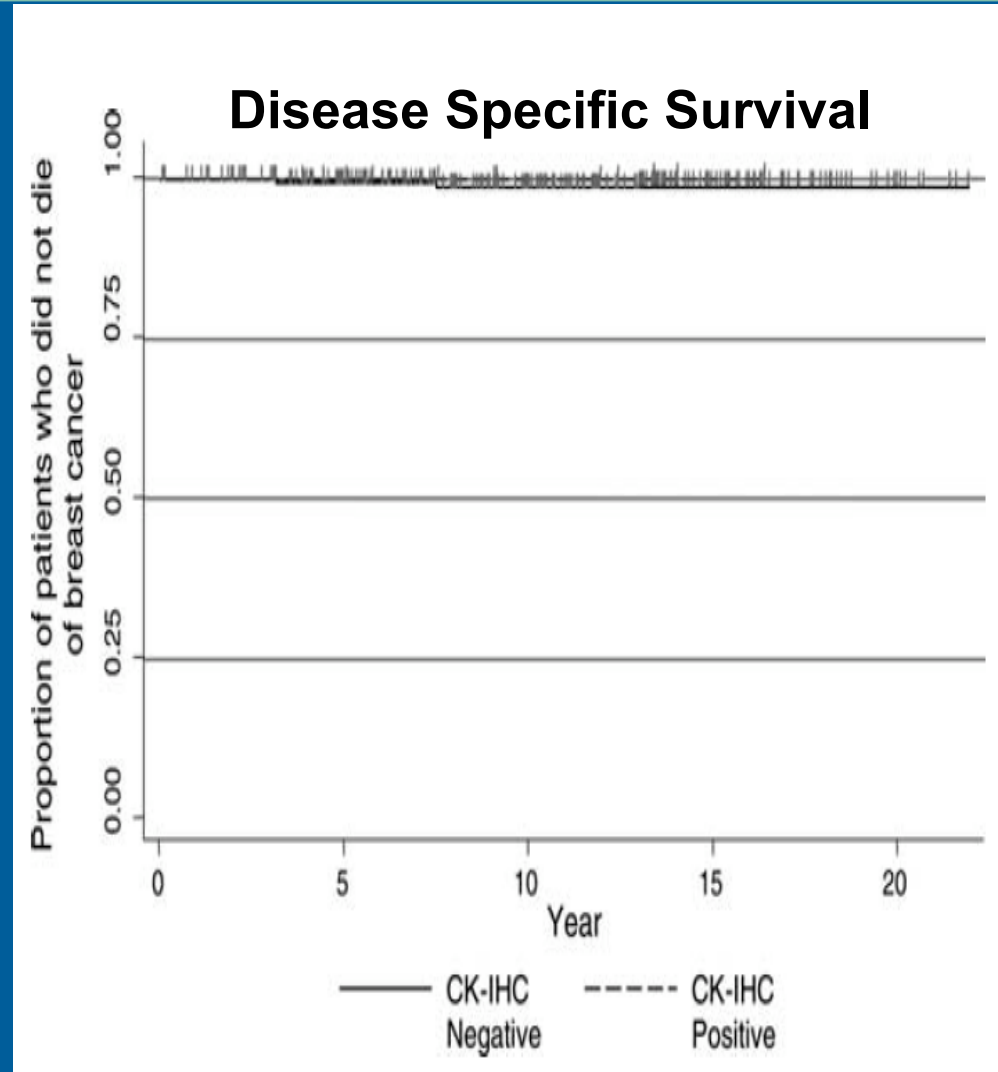
# Lymph Node Surgery with DCIS

# ***Most “Positive Nodes” with DCIS Only by IHC***

<b>Series</b>	<b>N Cases</b>	<b>Positive by H&amp;E</b>	<b>Positive by IHC</b>
<b>Broekhuizen</b>	<b>66</b>	<b>1%</b>	<b>11%</b>
<b>Wilkie</b>	<b>559* All DCIS</b>	<b>1%</b>	<b>5%</b>
<b>Katz</b>	<b>110 High risk</b>	<b>4%</b>	<b>8%</b>
<b>Veronesi</b>	<b>508 All DCIS</b>	<b>2%</b>	<b>1%</b>

# *No survival impact of IHC positive nodes in DCIS*

- ◆ 301 pts with DCIS and negative nodes
- ◆ Median 10 yr follow-up
- ◆ Cytokeratin IHC on archived blocks
- ◆ 18 / 301 positive by IHC





National  
Comprehensive  
Cancer  
Network

# ***NCCN Guidelines: DCIS***

## ◆ **Lumpectomy:**

**No lymph node surgery**

## ◆ **Mastectomy:**

**Sentinel node biopsy**

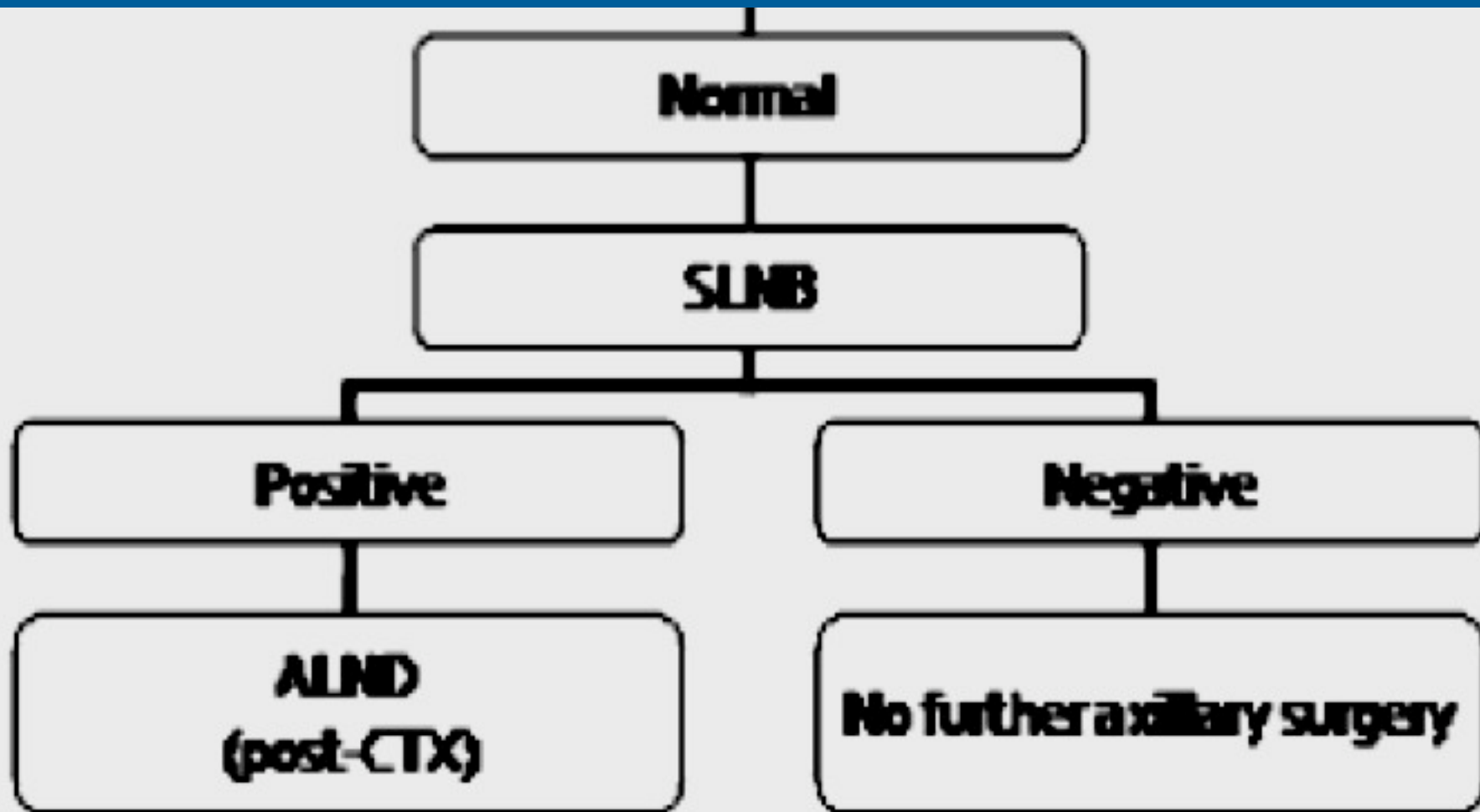
***Lymph Node  
Surgery with  
Primary (Neoadjuvant)  
Chemotherapy***

# *Pre-chemotherapy Sentinel Node Biopsy*

	<b># pts</b>	<b><i>Negative SNB Before Chemo</i></b>	<b><i>Positive SNB Additional Positive Nodes After Chemo</i></b>
<b>Sabel – Michigan</b>	<b>25</b>	<b>12 (48%)</b>	<b>8 / 13 (60%)</b>
<b>Schrenk - Linz, Austria</b>	<b>21</b>	<b>12 (55%)</b>	<b>6 / 9 (66%)</b>
<b>Cox - Moffitt (LABC)</b>	<b>47</b>	<b>7 (15%)</b>	<b>27 / 40 (67%)</b>
<b>Van Rijk – Netherlands</b>	<b>25</b>	<b>14 (56%)</b>	<b>5 / 11 (45%)</b>

# *Axillary Management: Clinically / Ultrasound Negative*

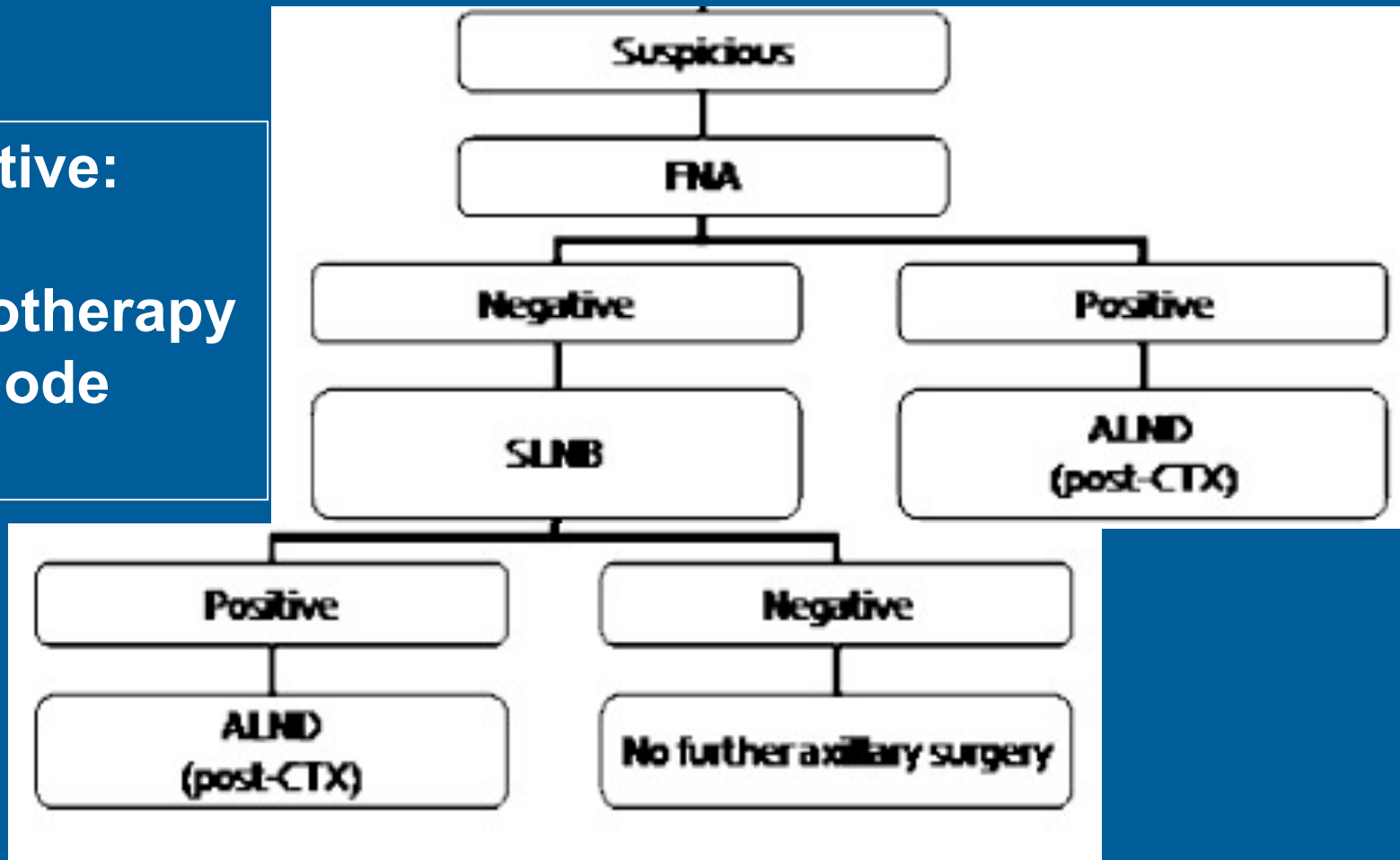
## Pre-chemotherapy Sentinel Node Biopsy



# Axillary Management: Clinically / Ultrasound Suspicious

**FNA Negative:**

**Pre-chemotherapy  
Sentinel Node  
Biopsy**



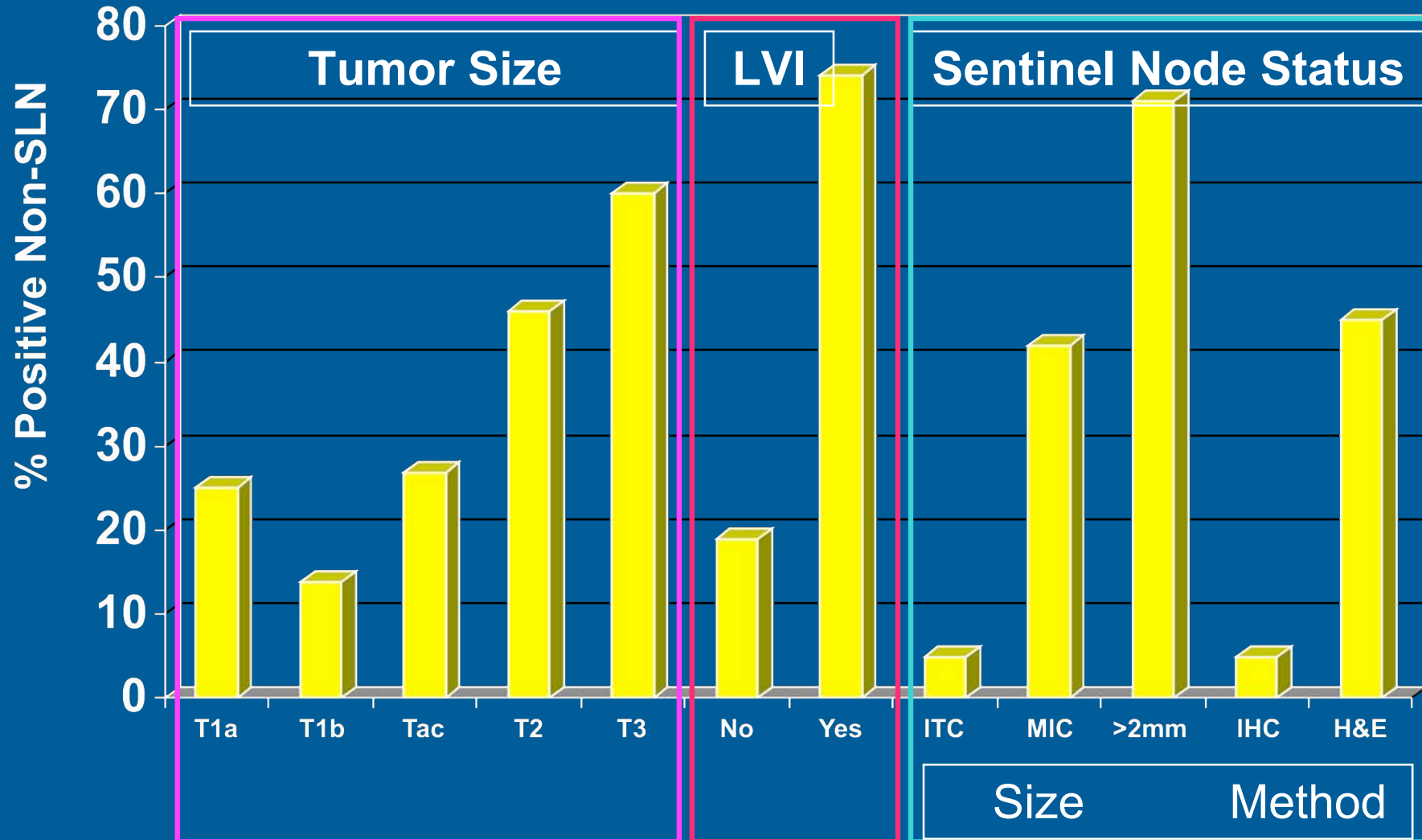


***Is Axillary Dissection  
Needed with  
Positive Sentinel Node?***

# ***Axillary Dissection with Positive Sentinel Node?***

- ◆ **What is the probability of additional positive nodes?**
  - Is there a rate so low that dissection not warranted?
  
- ◆ **Therapeutic impact of dissection**
  - Do additional positive nodes alter choice of chemotherapy?
  - Control of cancer in axilla: Surgery vs. Radiation

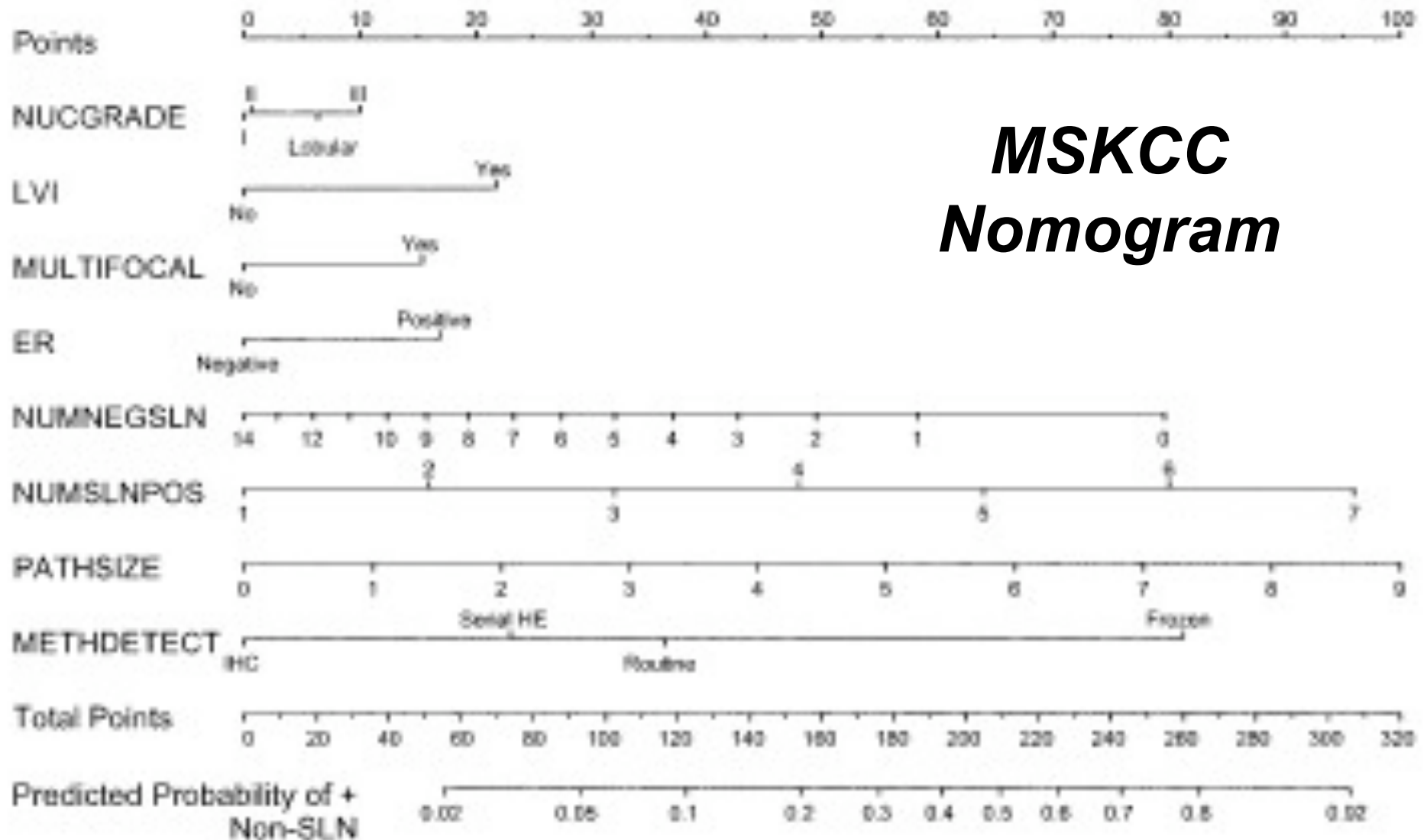
# Probability of Additional Positive Nodes



Adapted from Kohrt HE et al BMC Cancer 2008;8:66

# Risk of Additional Involved Nodes with Positive SNB

## MSKCC Nomogram



# ***Omit Axillary Dissection with Positive SNB?***

- ◆ **What risk of additional positive nodes is low enough?**
- ◆ **Most American oncologists perform axillary dissection for any positive nodes**
- ◆ **Major question is in cases of ITC and micrometstases detected by cytokeratin immunohistochemistry**

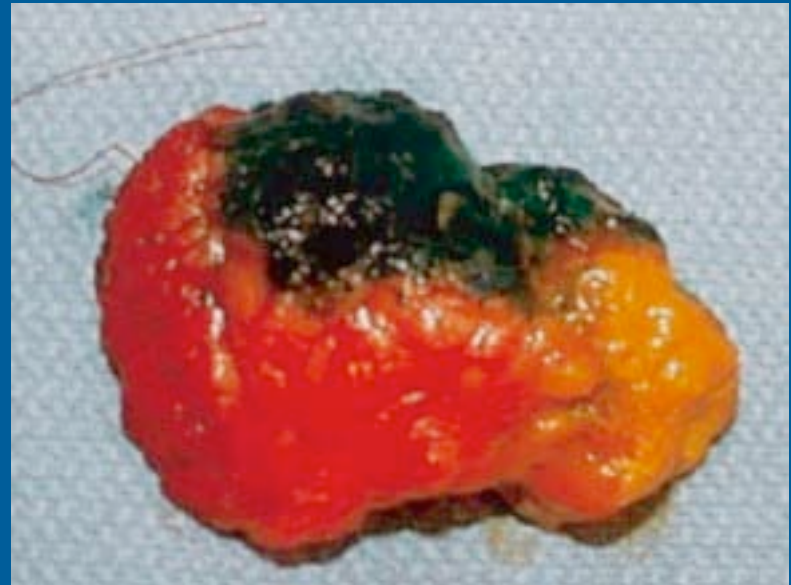
NCCN

National  
Comprehensive  
Cancer  
Network

# *Surgical Margins*

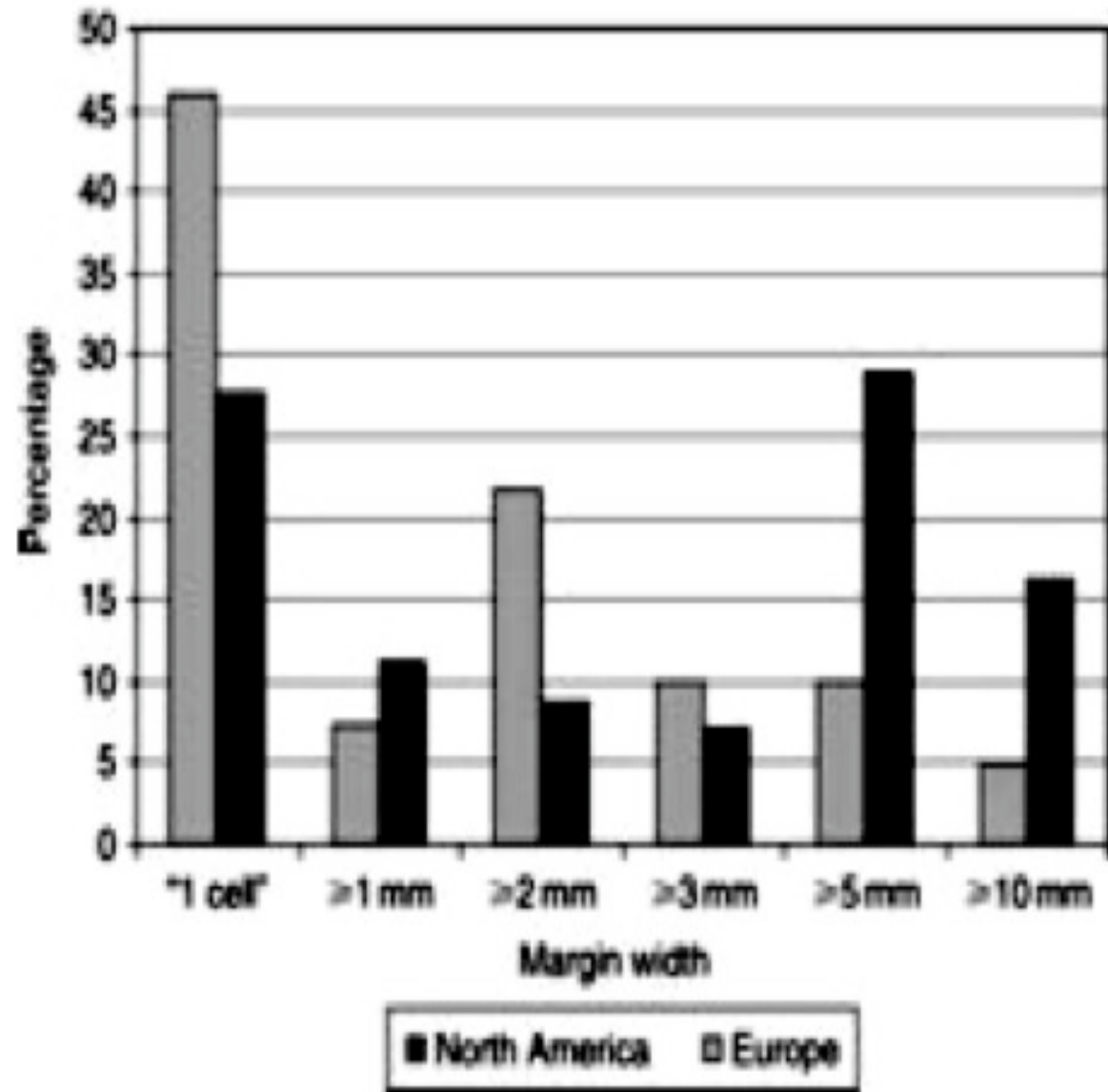
# *Surgical Margins*

1. Techniques
2. Resection after Primary Chemotherapy
3. Pathology Evaluation  
Dr. Collins



# Surgeons' Definition of Negative Margins

Survey of surgeons  
in North America  
and Europe on  
what is accepted as  
“negative margin”.





# *Margin Management*

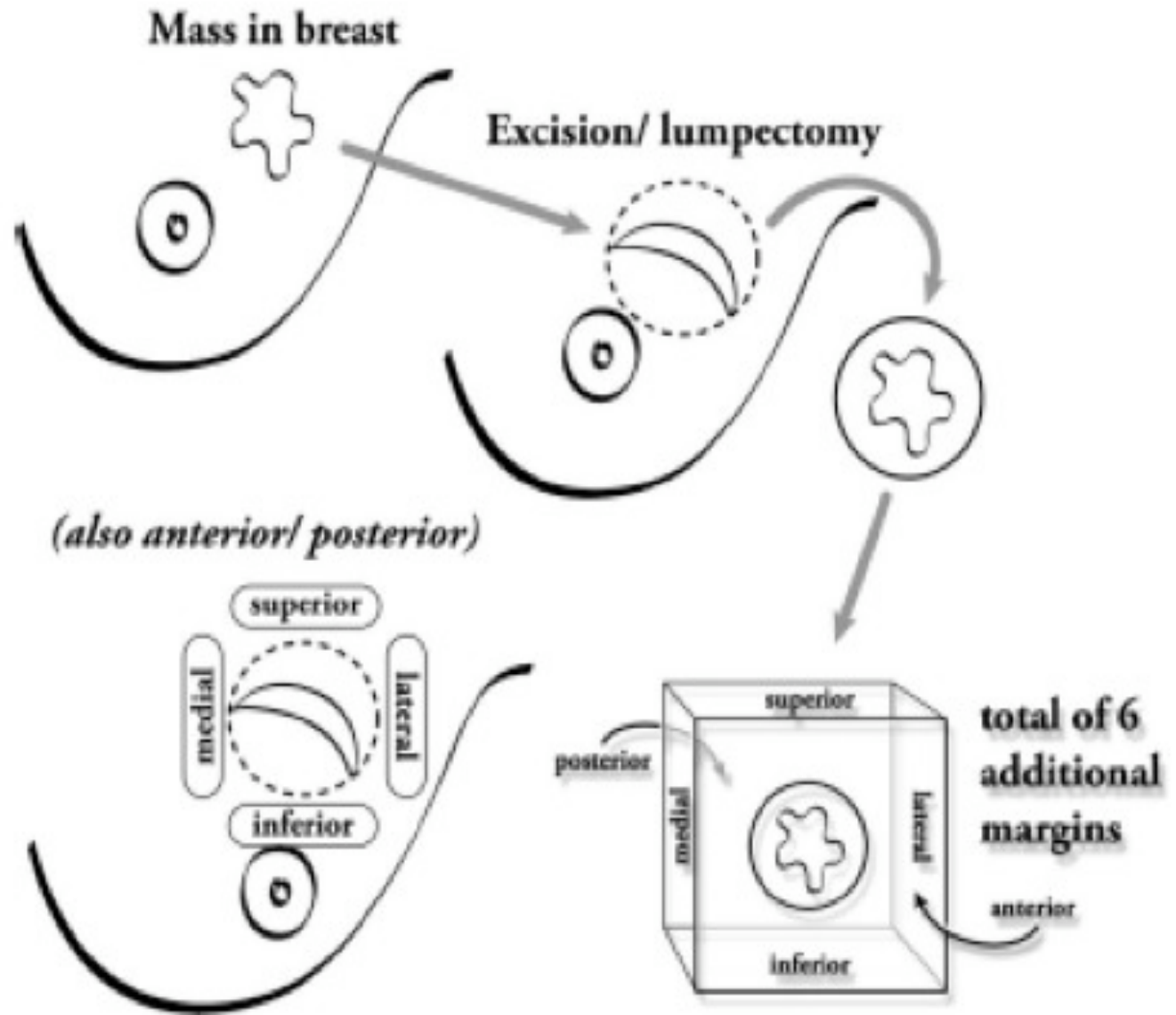
- ◆ **Careful surgical planning**
  - Pre-operative diagnosis of cancer
- ◆ **Orient specimen**
- ◆ **Specimen mammography**
  - Key for calcifications

# *Techniques for Margin Excision*

- ◆ **Primary excision**
  - Single specimen versus
  - Shave margins after primary excision
  
- ◆ **Re-excision**
  - Whole cavity versus
  - Directed excision of specific margin
  
- ◆ **Intraoperative evaluation**
  - Specimen mammography
  - Gross
  - Microscopic - generally NOT performed

# Separate Cavity Margin Sampling

- ◆ Excision of cancer
- ◆ Resection of additional tissue at each of 6 margins



# Cavity Margin Sampling

- ◆ Residual cancer in cavity margin sample in many cases
- ◆ Factors associated with residual cancer
  - Extensive intraductal component
  - High grade
  - Extent of margin involvement
- ◆ Reduced re-excision by 60%

Primary Lumpectomy Margin	Cavity Margin Sample Contained Residual Cancer
Positive (n=233)	30%
Negative (n=281)	10%

# *Pre-Surgical Diagnosis Improves Margin Management*

- ◆ Re-excision after lumpectomy common
- ◆ Negative margin more likely with pre-surgical diagnosis - FNA or core biopsy
- ◆ NCCN study of re-excision

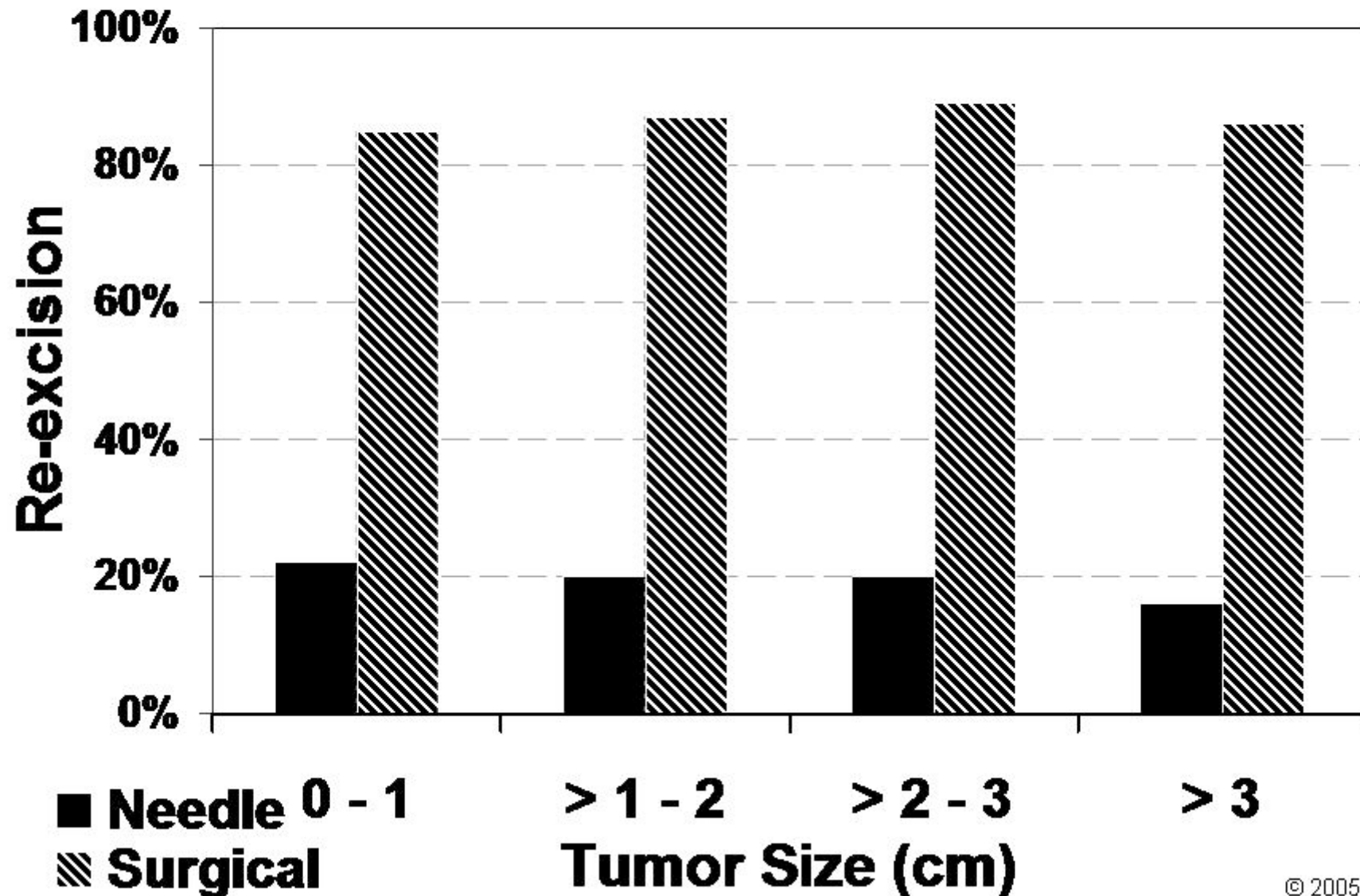
Frequency of re-excision among 6,131 women from 1997 - 2001 based on the type of initial biopsy

## Re-excision by Type of Initial Biopsy

Type of Initial Biopsy	N	Percent Re-excision
<b>Needle</b>	<b>3,481</b>	<b>23%</b>
<b>Surgical</b>	<b>2,650</b>	<b>92%*</b>

\*Using univariate logistic regression, association between the type of initial biopsy and re-excision is statistically significant (p-value <0.0001).

# Re-excision by Tumor Size for Patients Receiving BCS



# ***Factors Associated with Re-excision***

## **Odds Ratio**

<b>Use of surgical biopsy</b>	<b>3.35</b>
<b>Smaller breast</b>	<b>2.7</b>
<b>Lobular histology</b>	<b>1.93</b>
<b>Adjuvant vs. neoadjuvant</b>	<b>2.49</b>



# *Re-Excision: Impact on Recurrence*

**Re-Excision Among 2,770 patients at Fox Chase**  
**Overall Re-Excision Rate 60%**

Number of Re-excisions	Number of patients	Local Recurrence	
		5 yr (%)	10 yr (%)
0	1119	2.5%	5.6%
1	1514	1.9%	5.7%
0 and 1	2633	2.1%	5.6%
2 or more	137	5.5%	10%

# *Technique of Re-excision: Prefer Ink-Directed*

## Whole Cavity versus Ink Directed Resection of Positive Margin

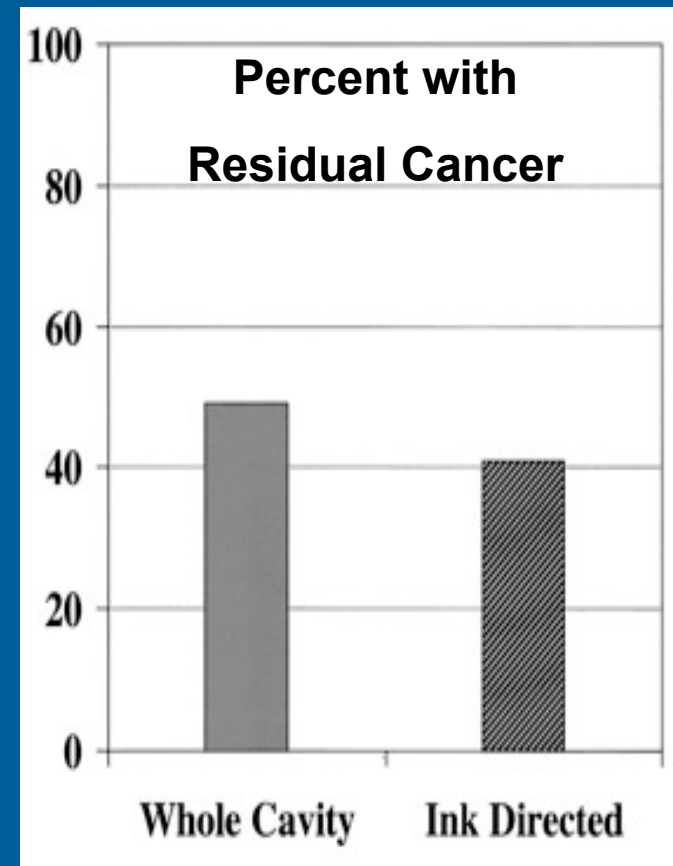
**546 lumpectomy**

**245 (45%) - No re-excision**

**181 Whole Cavity**

**120 Directed Resection**

- ◆ **Less tissue removed**
- ◆ **Better cosmetic result**
- ◆ **No difference recurrence**



NCCN

National  
Comprehensive  
Cancer  
Network

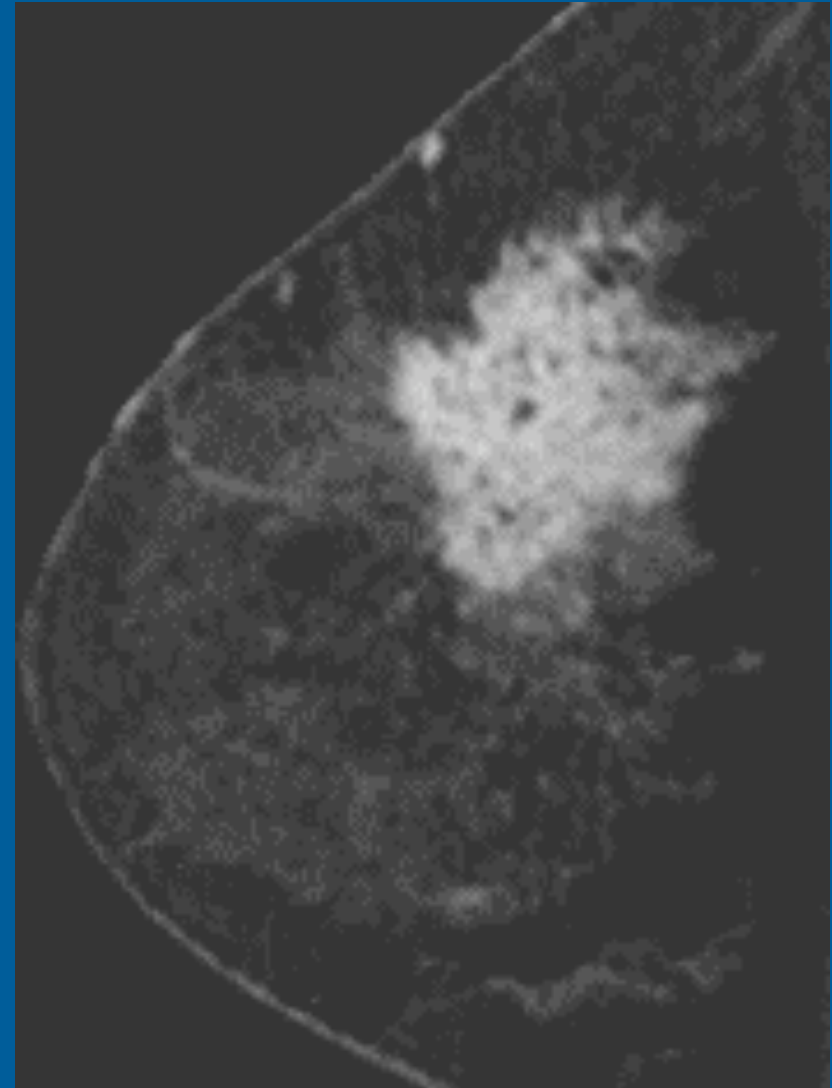
# ***Neoadjuvant Chemotherapy***

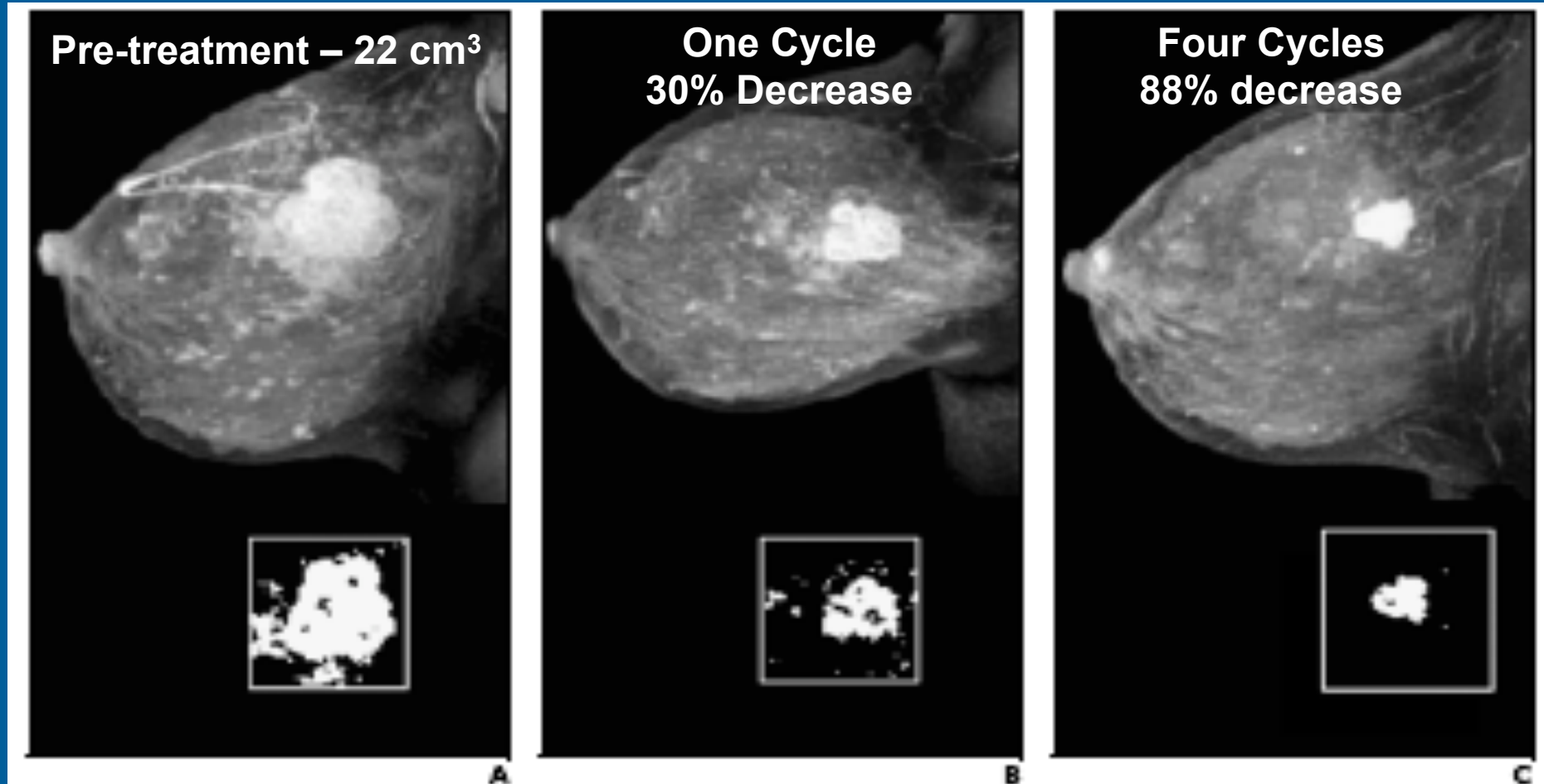
## ***Defining Extent of Resection***

- ◆ Use imaging to define extent of cancer prior to and after chemotherapy
- ◆ Place marker to allow radiological localization
- ◆ Extend surgery around area of original cancer
- ◆ Experience and judgment

# ***MRI Useful to Define Extent of Cancer***

- ◆ **Define size of cancer:  
supplements  
mammography**
- ◆ **May help define  
extent of DCIS**
- ◆ **Identify 2<sup>nd</sup> cancers**



***Staging and Response to Pre-surgical Therapy***

# MRI underestimates residual disease

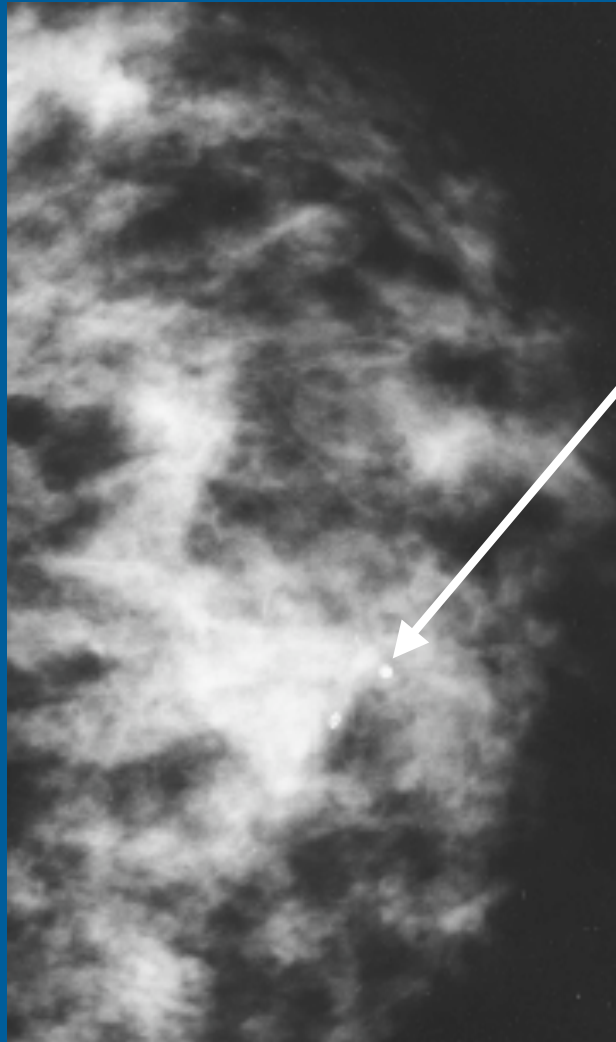
Pathologic Response	Response by MRI			
	CR	PR	NR	Prog
CR	12	0	0	0
PR	10	37	0	0
NR	1	1	7	1
Prog	0	0	0	0

NCCN

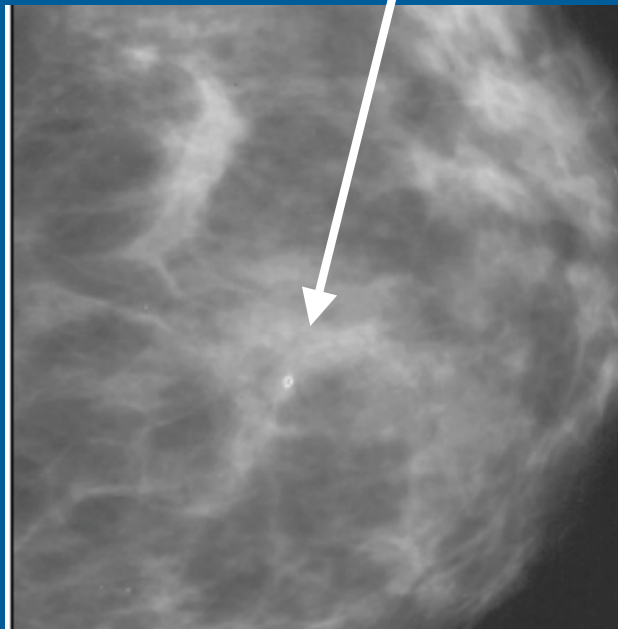
National  
Comprehensive  
Cancer  
Network

# ***REMEMBER TO PLACE CLIP!!!***

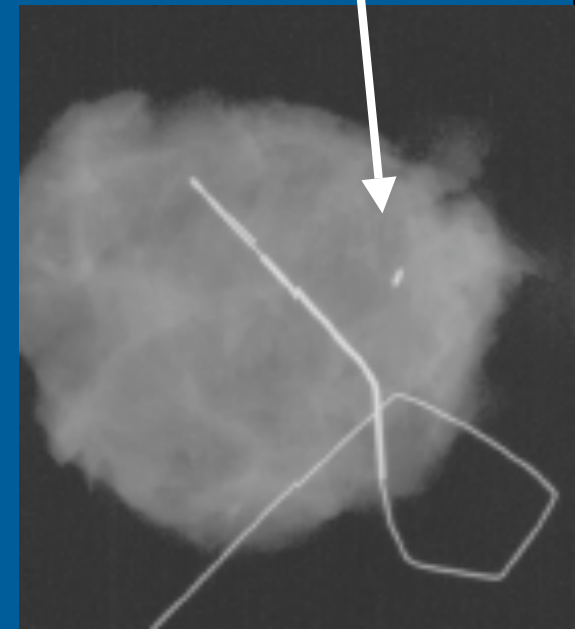
**Before Chemotherapy**



**After Chemo**



**Specimen**





# *Rate of Positive Margin with Neoadjuvant Therapy*

## Positive Margins:

Neoadjuvant	21%
Not neoadjuvant	18%

## Factors affecting positive margins:

Lobular cancer	43%
Ductal cancer	16%

# *Neoadjuvant Therapy: Impact on Extent of Surgery*

- ◆ Neoadjuvant therapy reduces the extent of surgery
- ◆ Does not increase positive margins or re-excision

	<u>Neoadjuvant</u>	<u>Primary Surgery</u>
Volume	113 cm <sup>3</sup>	213 cm <sup>3</sup>
Re-excision	13%	16%

# *Japanese Experience*

- ◆ Sequential anthracycline / taxane
- ◆ 10% complete pathologic response
- ◆ 38% had lumpectomy
- ◆ 25% with positive margins