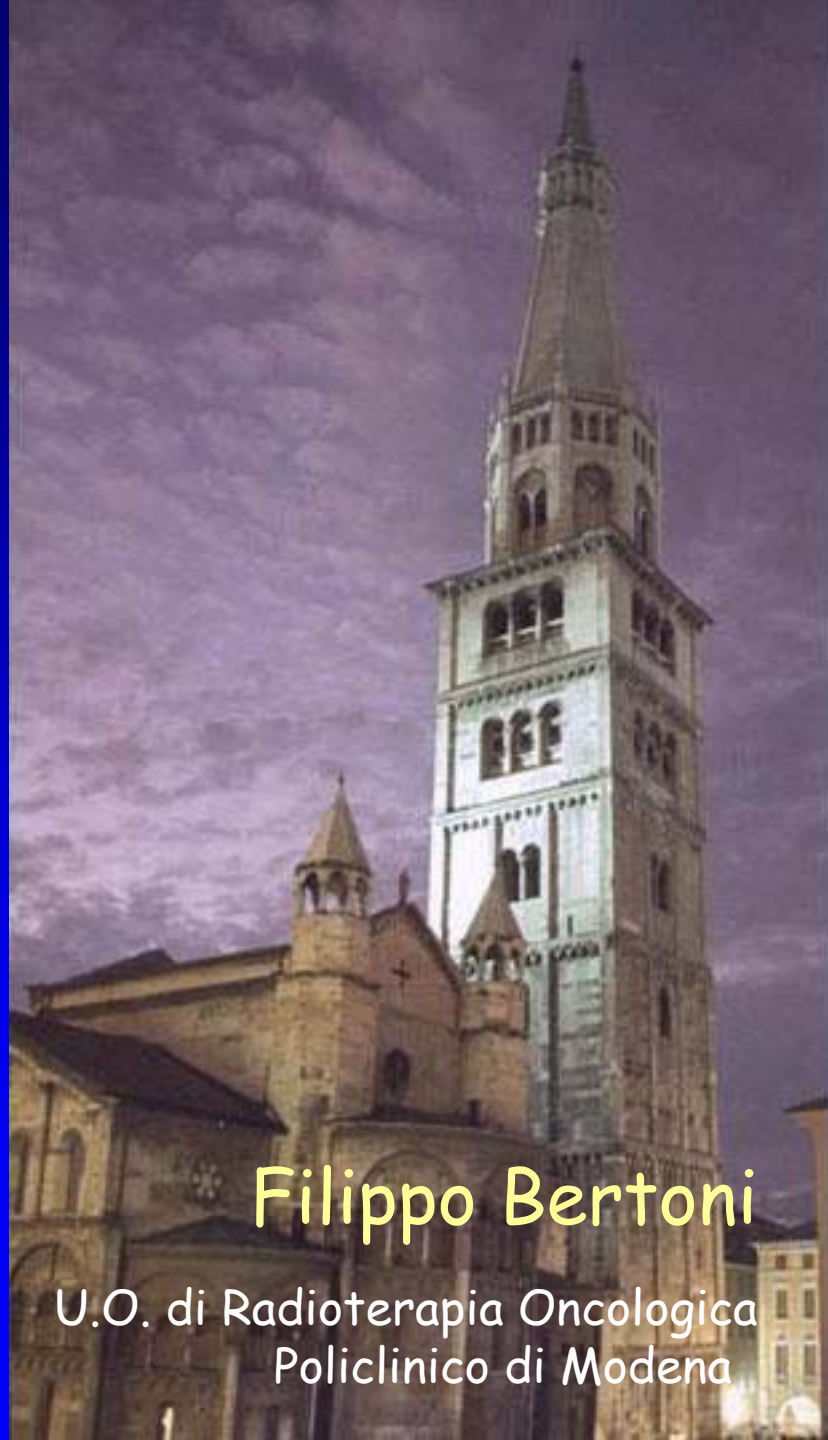


SERVIZIO SANITARIO REGIONALE  
EMILIA-ROMAGNA  
Azienda Ospedaliera Policlinico di  
Modena



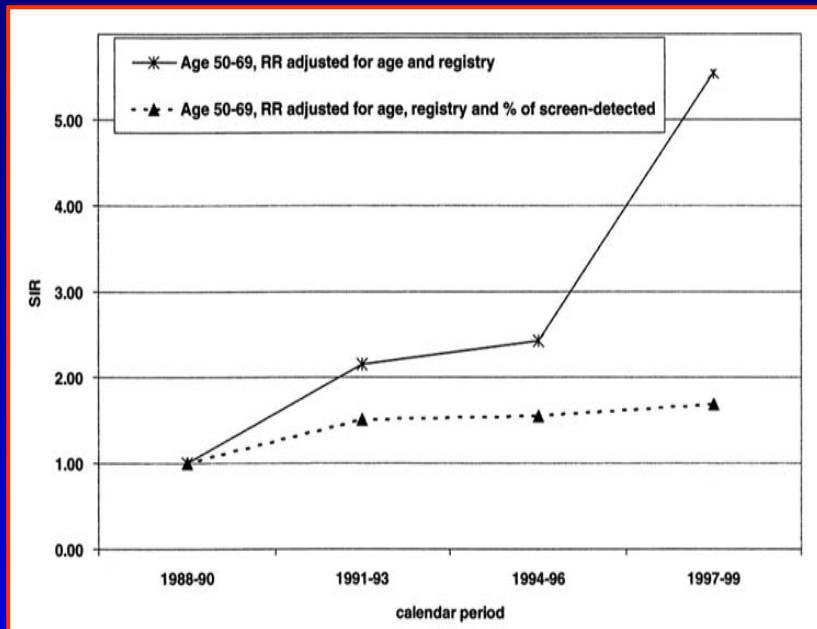
# Indicazioni alla radioterapia nei carcinomi in situ



Filippo Bertoni

U.O. di Radioterapia Oncologica  
Policlinico di Modena

# Tis: Incidenza



## Registro Tumori MO

INCIDENZA	Femmine
Numero casi	528
% sul totale casi	26,3
Tasso grezzo*	154,7
Tasso std (ITA01)*	137,8
Tasso std (ITA81)*	120,6
Tasso std (EUR)*	112,1
Tasso std (MON)*	82,7
Rischio cumulativo (0-74)	8,75%
Età mediana	62
Età media	62,3

**Tis = 19,5%**

- Epoca pre-screening 3% - 5%
- Attualmente 25% - 30%

non palpabile nell'80-90% dei casi e riconoscibile solo alla MX

# Strategie di trattamento:

Mastectomia  
Chirurgia Conservativa  
Chirurgia Conservativa + RT  
Chirurgia Conservativa  $\pm$  RT  $\pm$  Tam



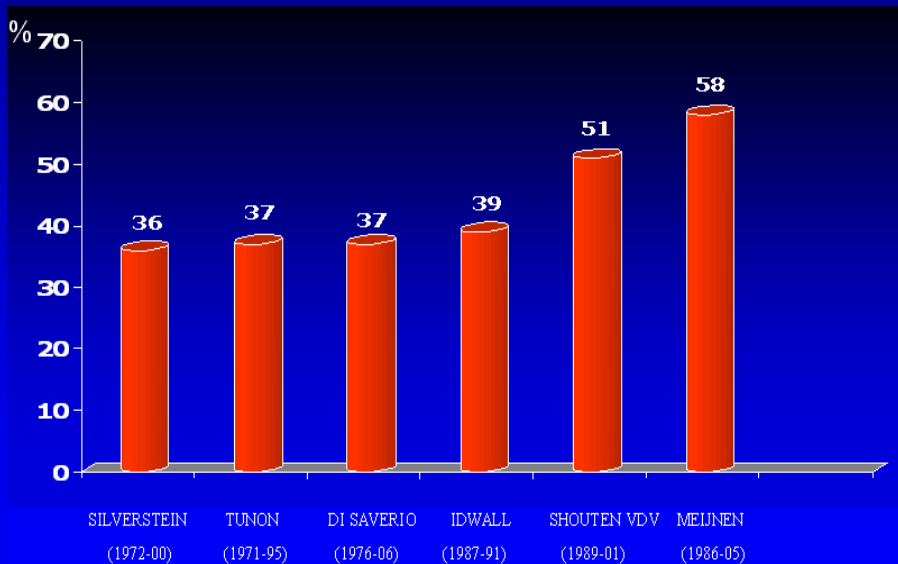
Non completa conoscenza  
storia naturale

Non completa conoscenza  
biologia

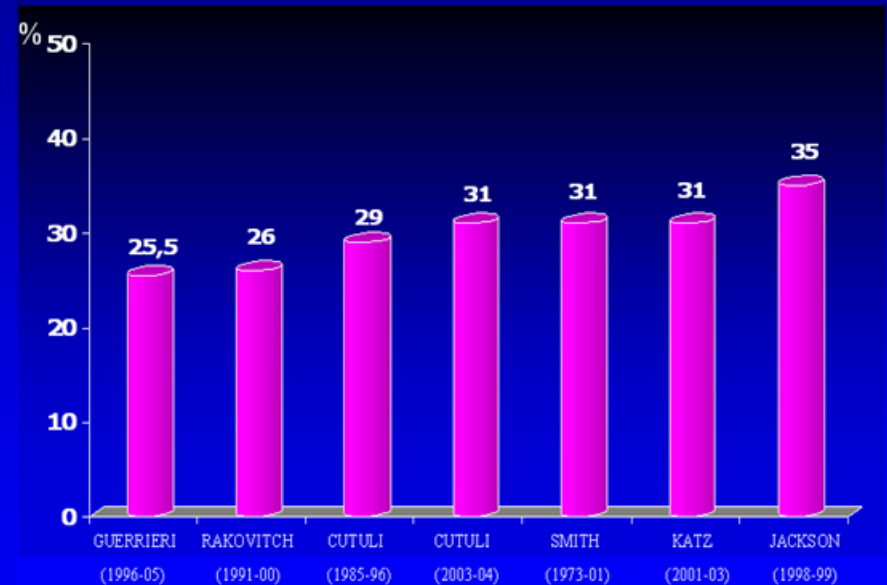
Trattamenti con risultati  
simili

# Tis : INCIDENZA DELLE MASTECTOMIE

**Incidenza Mastectomie ( vecchie casistiche)  
dal 36% al 58%**



**Incidenza Mastectomie (casistiche più recenti)  
dal 25% al 35%**

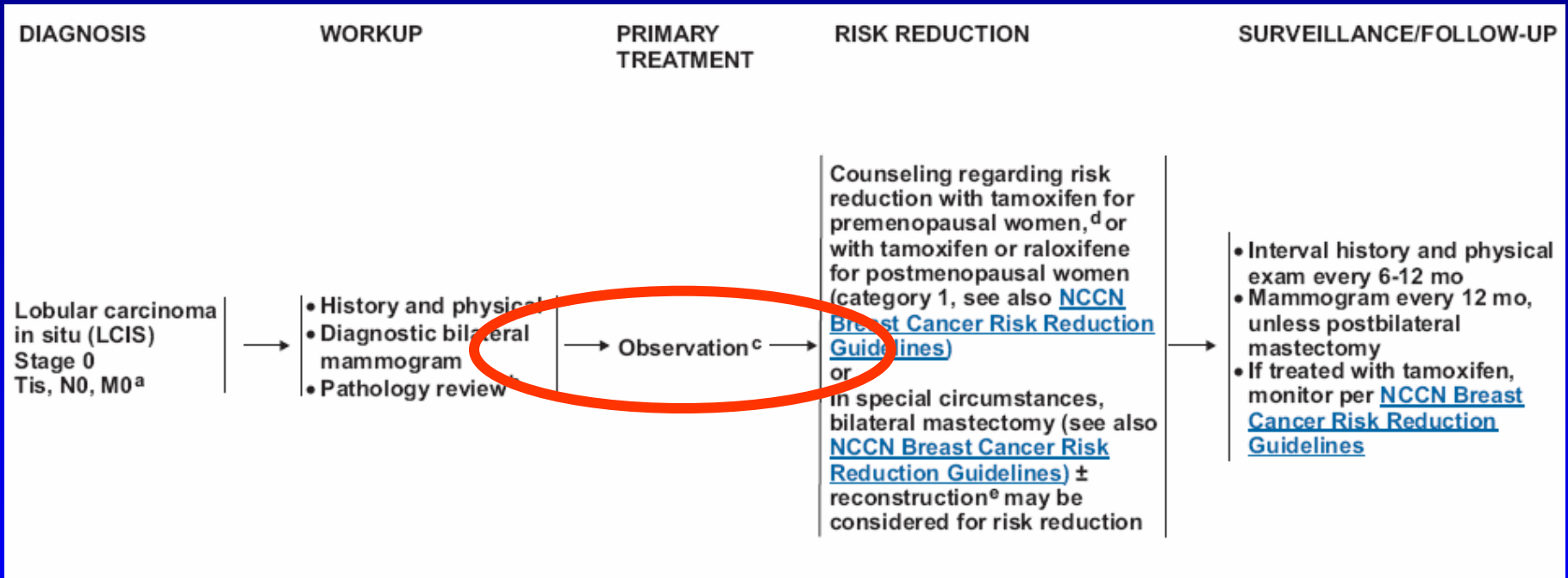


**... progressiva riduzione delle mastectomie a favore della  
chirurgia conservativa....**

Programmi terapeutici proposti :

.... diversi per LCIS e DCIS....

# LCIS



LCIS : non indicazioni alla Radioterapia  
adiuvante dopo BCS.....

## B. Cutulì

After biopsy alone for LCIS, an infiltrating ca. occurs in approximately 15% of cases.

Author (year) [references]	No of cases	FU	Invasive carcinoma			<i>In situ</i> carcinoma				
			Total (%)	IDC	ILC	Total	LCIS	DCIS	LCIS + DCIS	
Carson (1994) [14]	51	50	3	5.9	1	2	7 (3.7%)	7 <sup>a</sup>	–	–
Salvadori (1991) [20]	78	58	5	6.4	5	–	0	–	–	–
Ottesen (1993) [17]	69	61	8	11.6	4	4	4 (5.8%)	–	1	4
Page (1991) [18]	39	138	9	23	NS	NS	0	–	–	–
Fisher (2004) [16]	180	144	9	5	1	8	17 (9.4%)	10	6	1
Haagensen (1986) [7]	266	176	27	10.5	NS	NS	0	–	–	–
Andersen (1977) [47]	44	192	9	20.5	NS	NS	4 (9%)	4	–	–
Goldstein (2001) [37]	82	259	13	15.8	6	7	1	–	1	–
Rosen (1978) [19]	83	288	19	23	NS	NS	0	–	–	–
Ciatto (1992) [15]	32	NS	5	15.6	NS	NS	0	–	–	–

NS, not specified; IDC, infiltrating ductal carcinoma; ILC, infiltrating lobular carcinoma; FU, follow-up in months (median); LCIS, lobular carcinoma *in situ*.

<sup>a</sup> Subsequent biopsy.

Casistica limitata, retrospettiva

25 pazienti trattate con BCS + RT per LCIS

Solo 1 recidiva con F.U. mediano di 153 mesi

“...Classical radiosurgical therapy should represent an interesting alternative both for limited surgery alone and mastectomy, both of which have been proposed as sole treatments for LCIS....”

# DCIS and Radiotherapy

Radiotherapy has been recommended for women with DCIS following BCS, but, more recently, the role of adjuvant radiation for all subgroups has been questioned.

- The natural history of DCIS is poorly understood.
- Limited published information is available
- The clinical nature of DCIS has changed over the years.

## NCCN Guideline !?



# DCIS

DIAGNOSIS	WORKUP	PRIMARY TREATMENT
Ductal carcinoma in situ (DCIS) Stage 0 Tis, N0, M0 <sup>a</sup>	<ul style="list-style-type: none"> <li>• History and physical exam</li> <li>• Diagnostic bilateral mammogram</li> <li>• Pathology review<sup>b</sup></li> <li>• Determination of tumor estrogen receptor (ER) status</li> <li>• Genetic counseling if patient is high risk for hereditary breast cancer<sup>c</sup></li> </ul>	<p>Lumpectomy<sup>d,e</sup> without lymph node surgery<sup>f</sup> + whole breast radiation therapy (category 1)<sup>g,h,i,j,k</sup></p> <p>or</p> <p>Total mastectomy with or without sentinel node biopsy<sup>f,i</sup> ± reconstruction<sup>l</sup></p> <p>or</p> <p>Lumpectomy<sup>d,e</sup> without lymph node surgery<sup>f</sup> without radiation therapy (category 2B)<sup>h,j,k</sup></p>

<sup>g</sup>See [Principles of Radiation Therapy \(BINV-H\)](#).

<sup>h</sup>Complete resection should be documented by analysis of margins and specimen radiography. Post-excision mammography should also be performed whenever uncertainty about adequacy of excision remains.

<sup>i</sup>Patients found to have invasive disease at total mastectomy or re-excision should be managed as stage I or stage II disease, including lymph node staging.

<sup>j</sup>See [Special Considerations Breast-Conserving Therapy \(BINV-F\)](#).

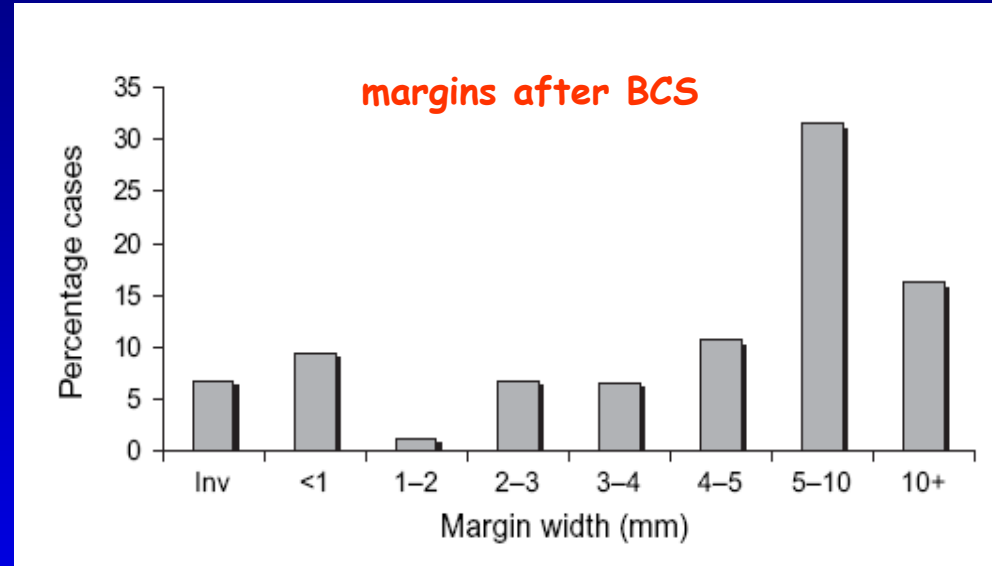
<sup>k</sup>Whole breast radiation therapy following lumpectomy reduces recurrence rates in DCIS by about 50%. Approximately half of the recurrences are invasive and half DCIS. A number of factors determine that local recurrence risk, include size, tumor grade, margin status and patient age. Some patients may be treated by excision alone, if the patient and physician view the individual risks as "low". All data evaluating the three local treatments show no differences in patient survival.

Fattori di rischio .....dimensioni, grading, margini, età

# NATIONAL BREAST CANCER AUDIT: DUCTAL CARCINOMA *IN SITU* MANAGEMENT IN AUSTRALIA AND NEW ZEALAND

RT after BCS reduces recurrences for all women with DCIS, regardless of grade or pathological subgroup'.

Pts. at **high risk** of recurrence (e.g. 'women with high-grade DCIS with necrosis, close margins and larger lesions') **particularly benefit from RT.**



## NBCA database

'**high-risk**' groups (highgrade DCIS (Grade III) and necrosis): **81%** received RT.

'**close**' margins pts (defined as 'involved' or 'less than 1 mm'): RT in only **67.2%**

'**larger lesions**' (defined as lesions >50 mm): RT in **70%**

....i dati in letteratura sono  
tuttavia chiari, a partire dalle....

PRIME METANALISI

...no randomized trials designed to compare mastectomy with BCS for DCIS.

## NSABP B-06 trial

- 76 patients with DCIS had been allocated to the three treatment groups, mastectomy, BCS only, and BCS with adjuvant radiation.
- The majority of lesions were palpable, with an average size of 2.2 cm;
  - Ipsilateral breast cancer recurrence: 43% (9/21) in the BCS only, **7% (2/27) in the BCS+RT**, no local failures in the **mastectomy group (0/28)**.
  - deaths due to breast cancer : 2 in the BCS-only group, 1 death in the mastectomy group, no deaths in the BCS plus radiation group.

Radiotherapy following BCS was the only significant predictor of reduced local breast recurrence (p=0.01).

# J. Boyages Meta-analisi

Treatment	Number of studies	Average of median follow-ups per study (months)	Absolute local recurrence rate*	95% CI
Mastectomy	21	80	1.4%	0.7% to 2.1%
BCS + radiotherapy	19	62	8.9%	6.8% to 11.0%
BCS alone	17	68	22.5%	16.9% to 28.2%

Abbreviations: BCS, breast-conserving surgery; CI, confidence interval.  
\*Patients with high-grade tumours, necrosis, comedo subtype, or positive margins were more likely to benefit from radiotherapy following BCS.

## Recidive locali :

- Solo BCS: 22.5%
- BCS+RT: 8.9%
- Mastectomia : 1.4%

Meno recidive locali con la mastectomia

# Peng Yin Meta-analysis

(24 published reports / 2407 patients)

- At 5 years:
  - local recurrence was higher for patients treated with BCS, with or without radiation, (21.5% [CI, 14.0% to 30.7%]) versus those treated by **Mastectomy (4.6%; 95% CI, 2.3% to 7.6%)**.
  - **BCS + RT: L.R. 10.6% (95% CI, 5.6% to 16.9%)**.

**Mortality rates at five years were similar for patients treated by BCS or mastectomy (4.2%; C.I. 1.4% to 8.5% vs. 3.9%; CI, 1.7% to 6.8%).**

**Mastectomia vs BCS+RT : non sostanziali differenze**

# THE PUBLISHED RANDOMIZED TRIALS



**NSABP B-17**

**1985-1990**



**EORTC 10583**

**1986-1996**



**UK – DCIS TRIAL**

**1990-1998**



**SWEDISH TRIAL**

**1987-1999**



program in  
evidence-based care  
a cancer care ontario program

programme de soins  
fondé sur des preuves  
un programme de action cancer ontario

## *DCIS and Radiotherapy*

- Should breast irradiation be offered to women with DCIS, following breast-conserving surgery (defined as excision of the tumour with microscopically clear resection margins)?
- Are there patients who could be spared breast irradiation post-breast-conserving surgery for DCIS?

***“Women with DCIS who have undergone breast-conserving surgery should be offered adjuvant breast irradiation.”***



## DCIS : Risultati del Trial NSABP B-17 (1985-1990)

ELIGIBLE PATIENTS WITH DCIS

STRATIFICATION  
Age ( $\leq 50$  ;  $> 50$ )

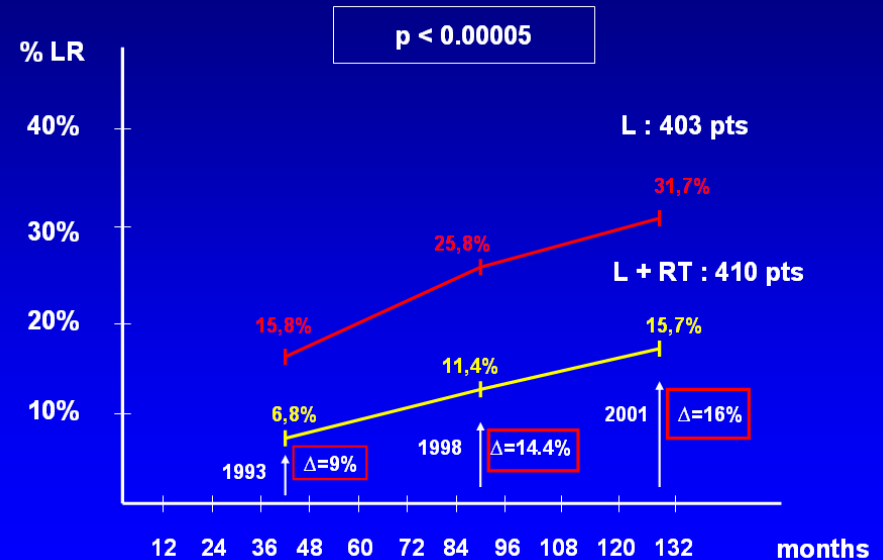
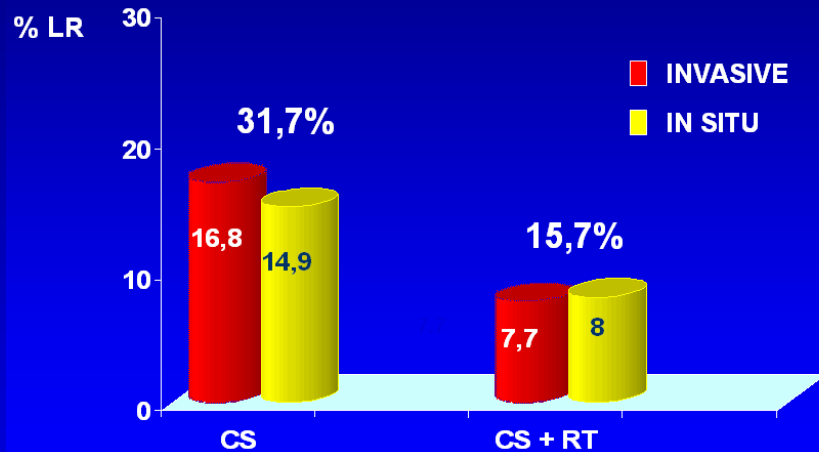
LUMPECTOMY

LUMPECTOMY + RT  
(50Gy/25 f.)

N.B : 818 patients included in 50 centers

# NSABP - B17: Risultati

NSABP B-17 TRIAL : 129-MONTH RESULTS



La RT riduce in rischio annuo di RL del 57%

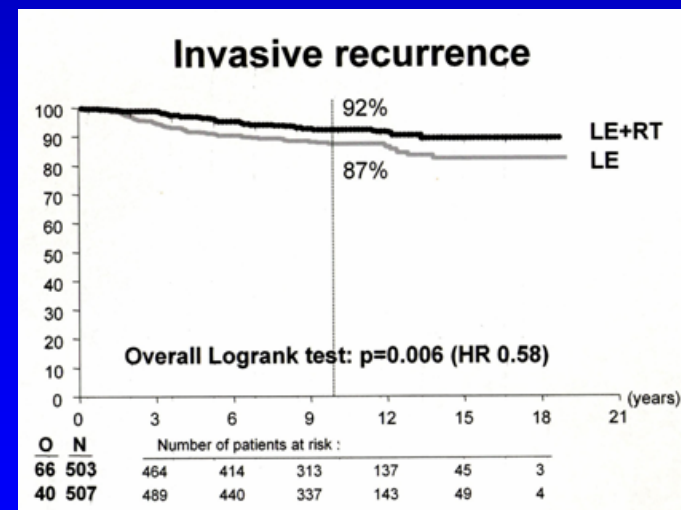
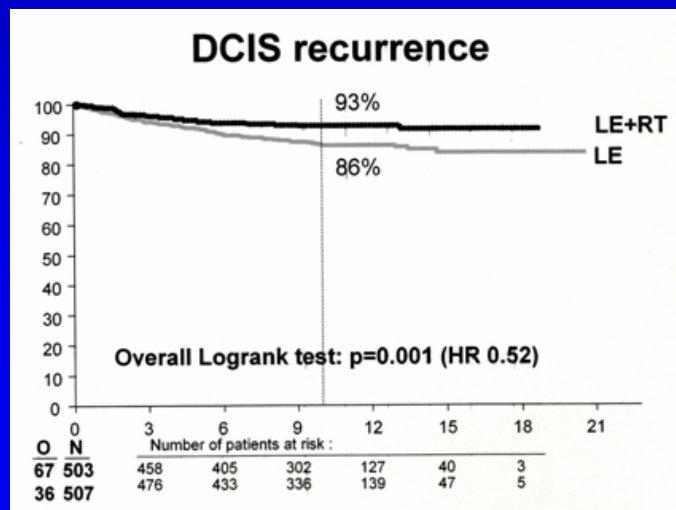
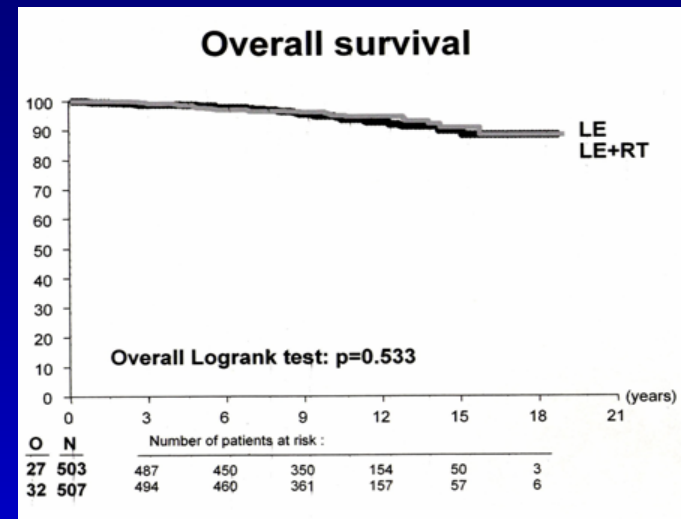
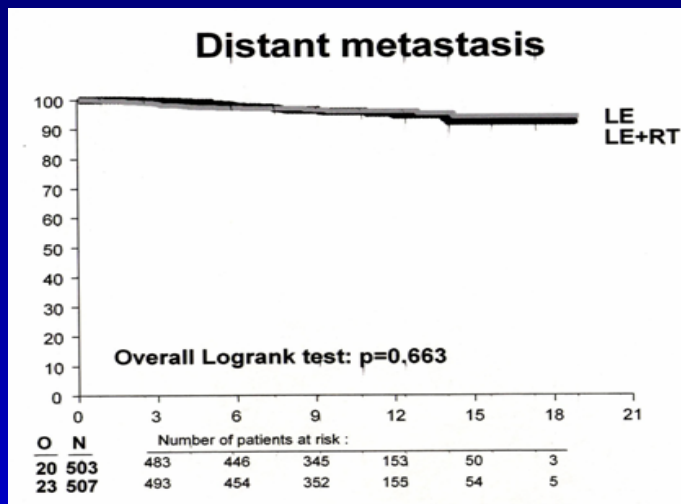
Progressivo aumento del vantaggio in termini di riduzione delle RL

**Δ : dal 9% a 5 aa al 16 % 10 aa**

Non differenze in M1 e O.S. (BCS 86% vs. BCS+RT 87%)

**Vantaggi in tutti i sottogruppi (x mammogr., clinica, istopatol.)**

# DCIS : RISULTATI DEL TRIALS EORTC 10853 (1986-1996)



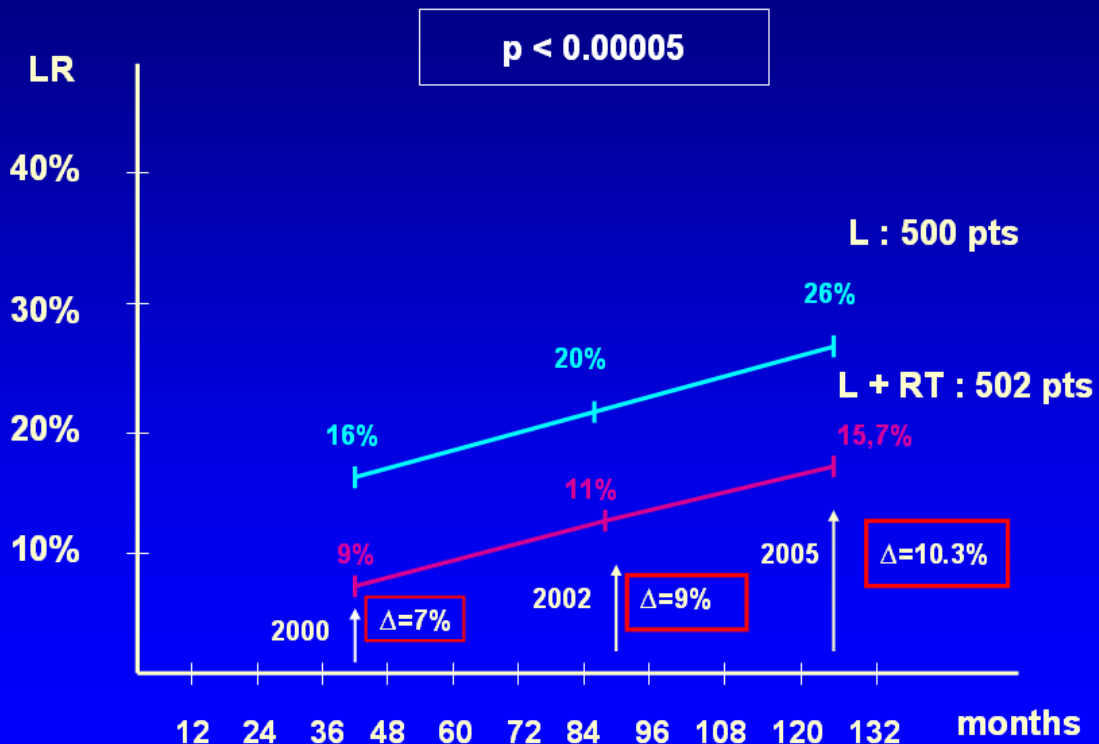
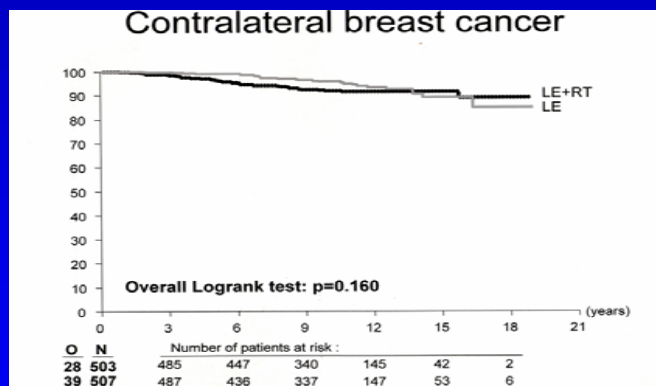
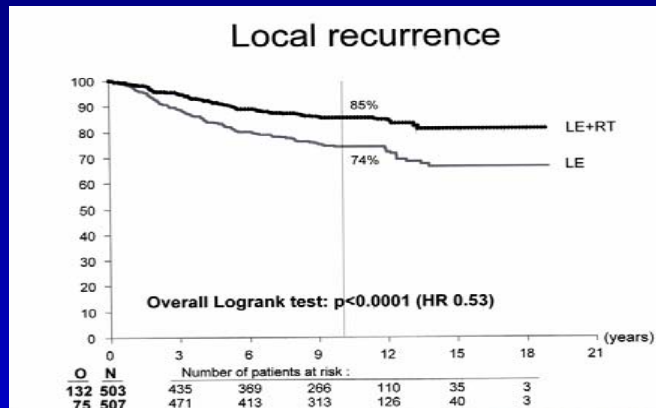
46 Centri Europei; 1010 paz. Randomizzate; Protocollo: simile a NSABP B-17

DCIS < 5 cm, con margini liberi microscopicamente

JULIEN, LANCET 2000  
BIJKER, JCO 2001,  
BIJKER, JCO 2006

# DCIS TRIALS : EORTC 10853 (1986-1996)

## Risultati a 10 anni



Progressivo aumento del vantaggio in termini di controllo locale

$\Delta$  : dal 7% a 5 aa al 10,3 % 10 aa

# UK-ANZ DCIS TRIAL (1990-1998) IPSILATERAL LR

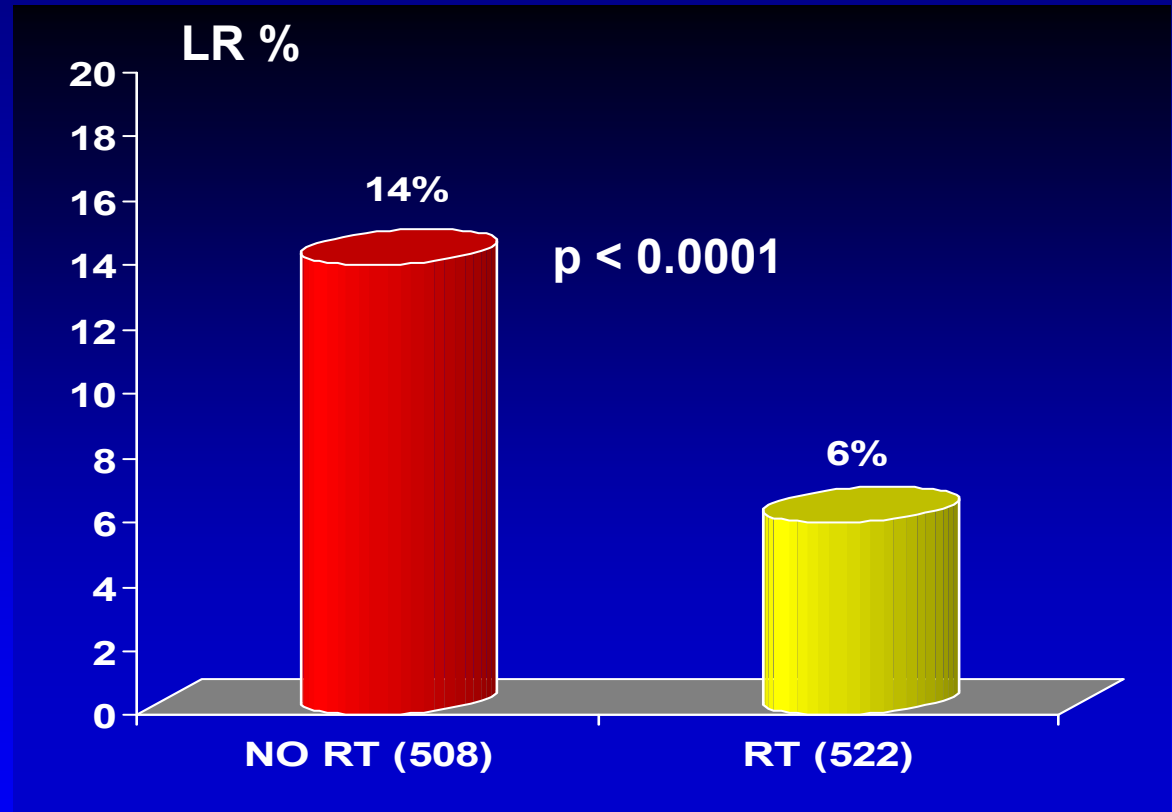
1694 patients included

2x2 factorial design

4 groups (after lumpectomy)

MEDIAN FU : 53 months

CONTROL :	544
TAM ALONE :	567
RT ALONE :	267
RT + TAM :	316



**La RT riduce del 62% il rischio di recidiva locale  
(rapporto LR invasive/ Tis  $\neq$  1)**

# POSTOPERATIVE RADIOTHERAPY AFTER SECTOR RESECTION FOR DCIS OF THE BREAST (SWEDCIS TRIAL)

## Patients and Methods

A total of 1,067 women in Sweden were randomly assigned to either postoperative radiotherapy (RT) or control from 1987 to 1999, and 1,046 were followed for a mean of 8 years. The main outcome was new ipsilateral breast cancer events and distant metastasis-free survival analyzed according to intention to treat.

## Results

There were 64 ipsilateral events in the RT arm and 141 in the control group corresponding to a risk reduction of 16.0 percentage points at 10 years (95% CI, 10.3% to 21.6%) and a relative risk of 0.40 (95% CI, 0.30 to 0.54). There was no statistically significant difference in distant metastasis-free survival. There was an effect modification by age, yielding a low effect of RT in women younger than 50, but substantial protection in women older than 60 years. The age effect was not confounded by focality, lesion size, completeness of excision, or detection mode. There was no group as defined by our stratification variables that had a low risk without radiotherapy.

## Conclusion

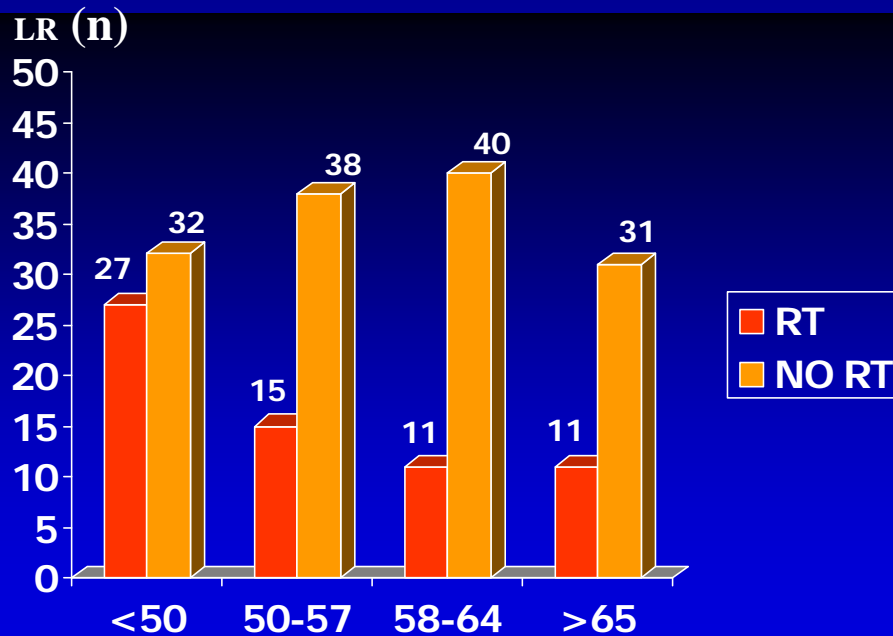
Our results indicate that younger women have a low protective effect of conventional RT after sector resection. Older women benefit substantially. We caution that the age effect was seen in a subgroup analysis. Further search with conventional clinical variables for a low risk group that does not need RT does not seem fruitful.

*J Clin Oncol 26:1247-1252. © 2008 by American Society of Clinical Oncology*

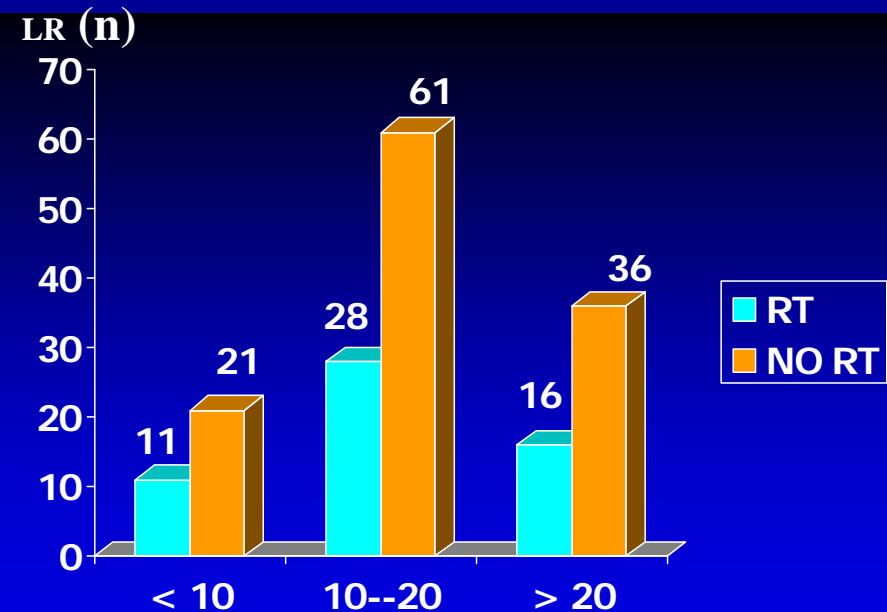
**ABSOLUTE RISK REDUCTION FOR LOCAL RECURRENCE 13 % vs 31% (p < 0.001)**  
**...but....**

# Tassi di recidiva locale in funzione di età e dimensioni di T (follow up mediano 8 anni)

Età (aa)



Dimensioni (mm)



Interazione età/RT (minor vantaggio per le donne giovani)

Non si identificano pazienti con rischio annuo di LR < 1%/ alle quali non proporre RT

**Vantaggi della RT in tutti i sottogruppi**

# HOWEVER...

All patients really need RT ?

What is the « acceptable » LR risk rate ?

What is the real impact of invasive LR ?

An increased dose can improve the local control ?



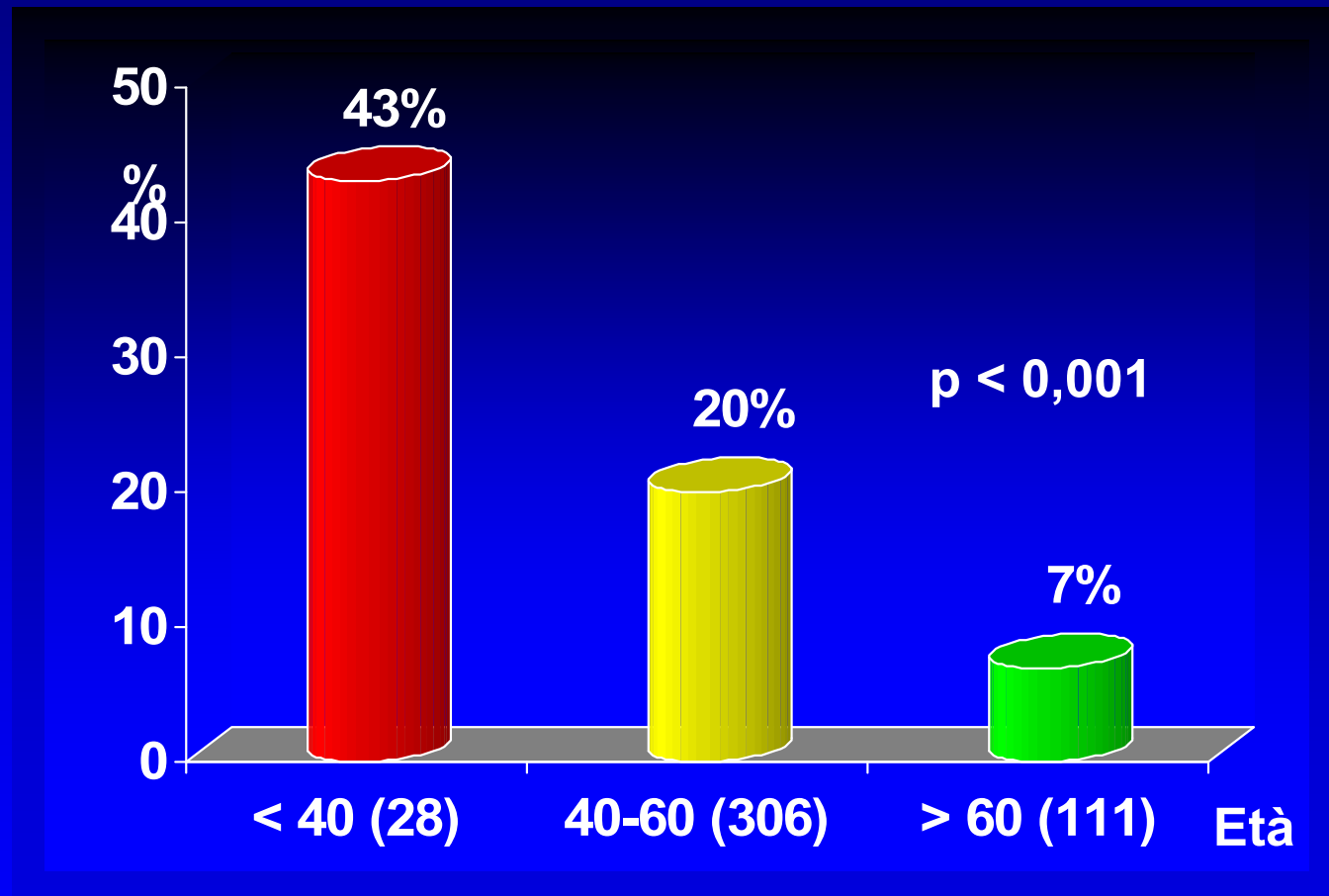
# Van Nuys Prognostic Index (VNPI)

Punteggio	1	2	3
T	≤ 15 mm	16-40 mm	>41 mm
Margini	≥ 10 mm	1-9 mm	<1 mm
Anatomia Patologica	Basso grado senza necrosi	Basso grado con necrosi	Alto grado con o senza necrosi
Età	>60 aa.	40-60 aa .	<40 aa.

Punteggio	4-5-6	7-8-9	10-11-12
Trattamento consigliato	Escissione	Escissione + RT	Mastectomia

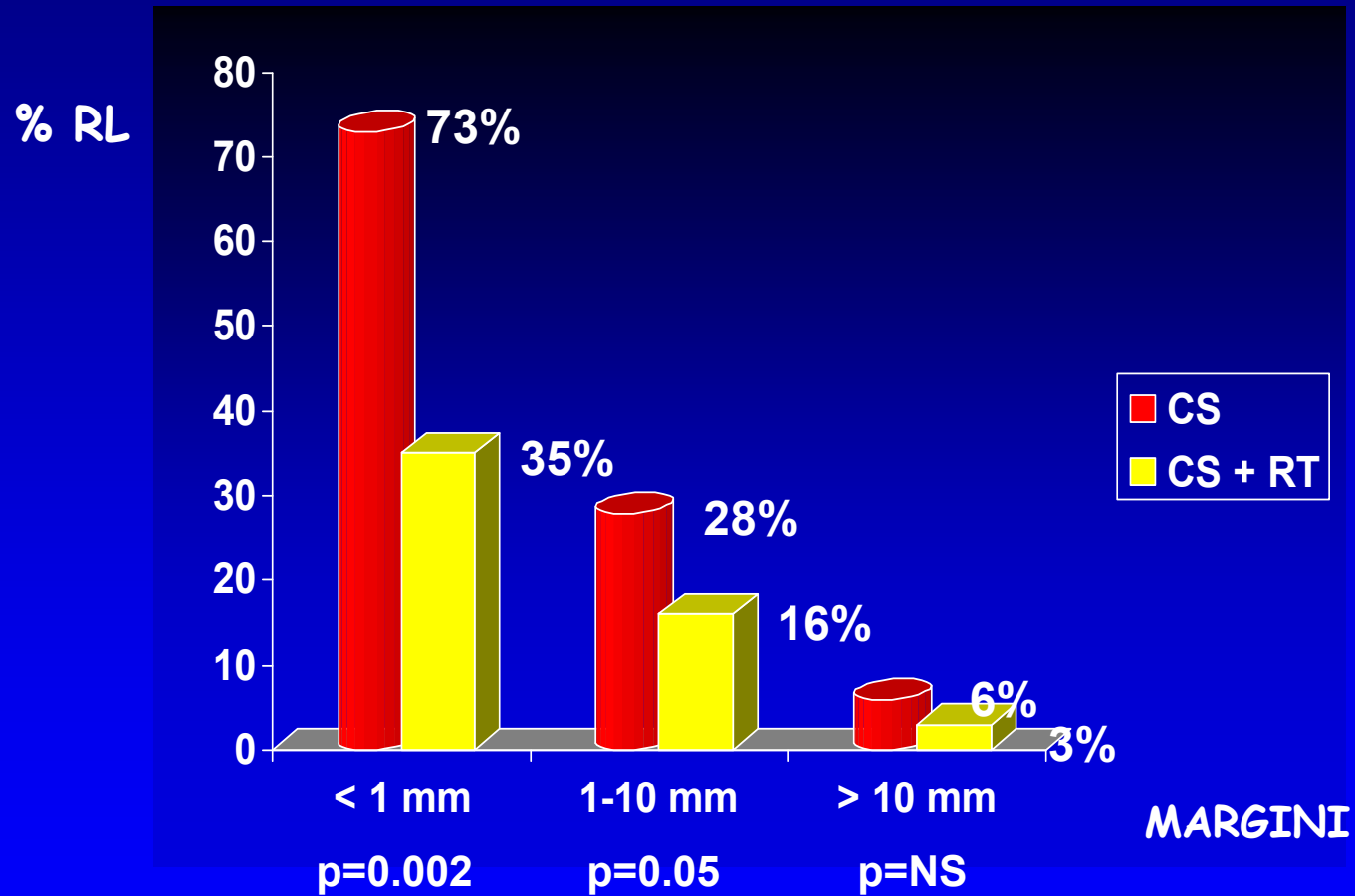


## Rischio di recidiva ed età



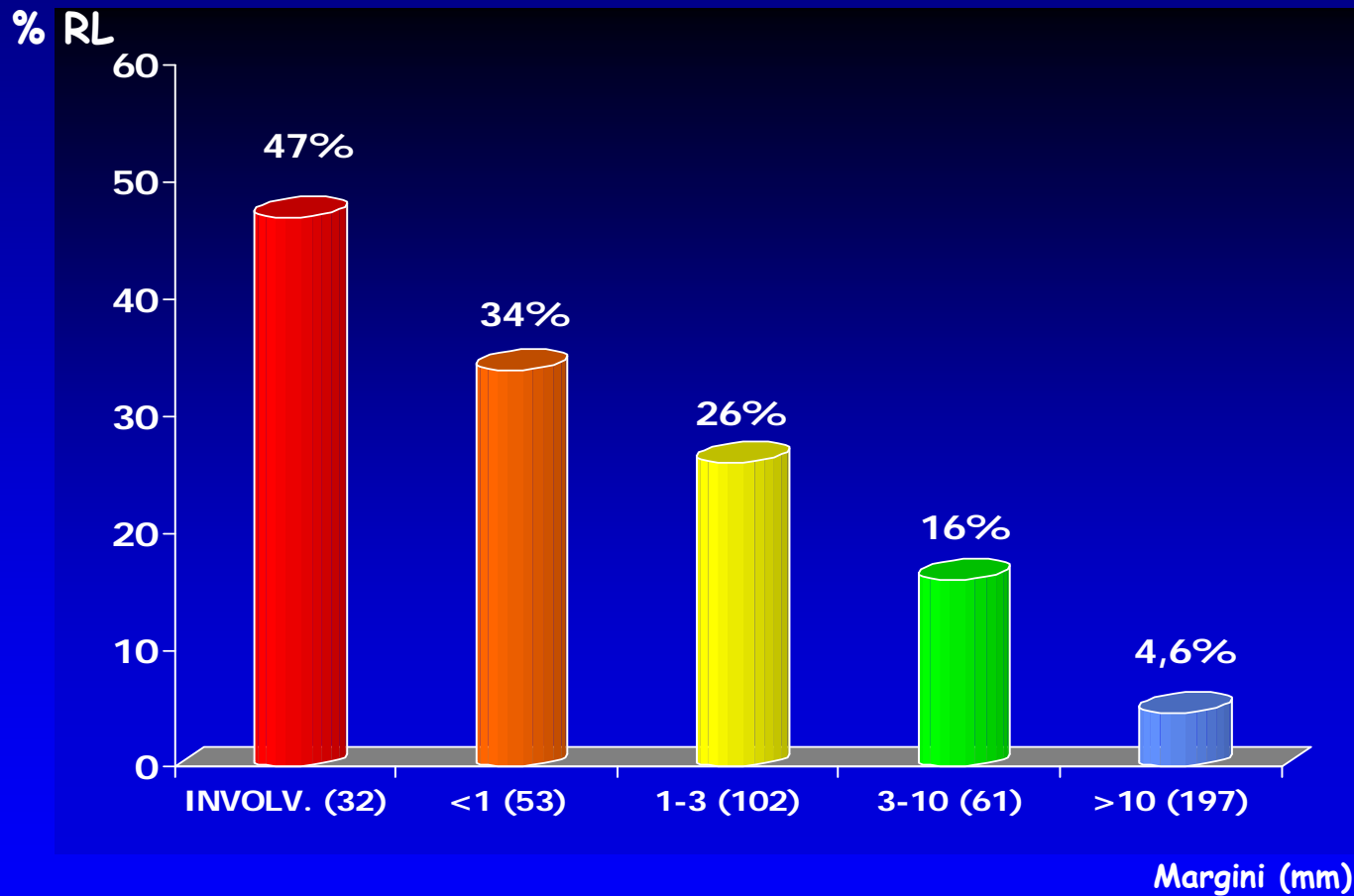
# The Southern California experience

## Risultati

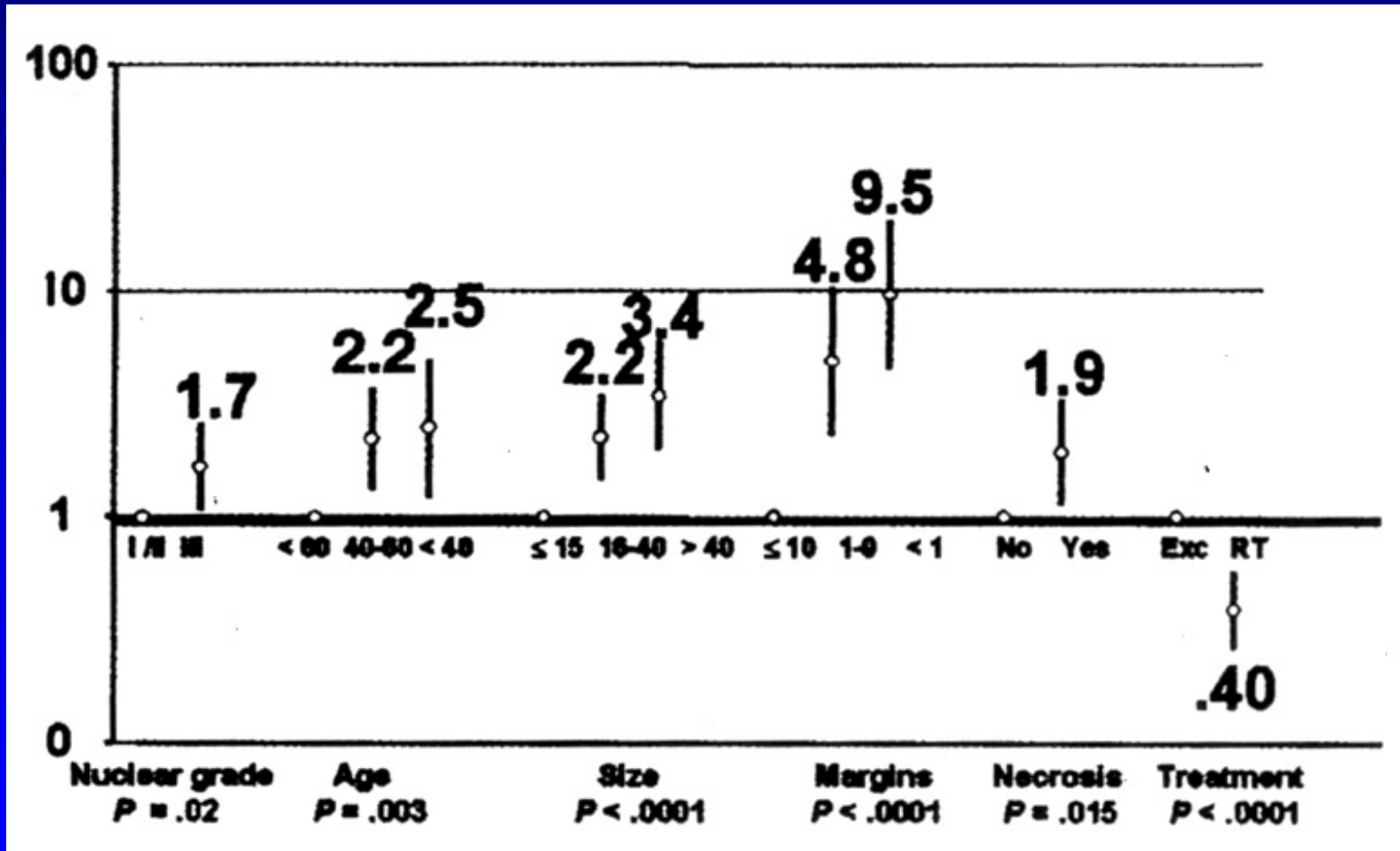


*Silverstein MJ In: Ductal Carcinoma in Situ of the Breast 2<sup>nd</sup> ed. 2002*

## Correlazione tra margini e rischio di recidiva locale



# Recurrence-Free Survival Cox multivariate analysis



# Van Nuys Prognostic Index (VNPI) ?

## SCARSA RIPRODUCIBILITA'

Differenti metodi di campionamento dei pezzi operatori  
per definire lo stato dei margini

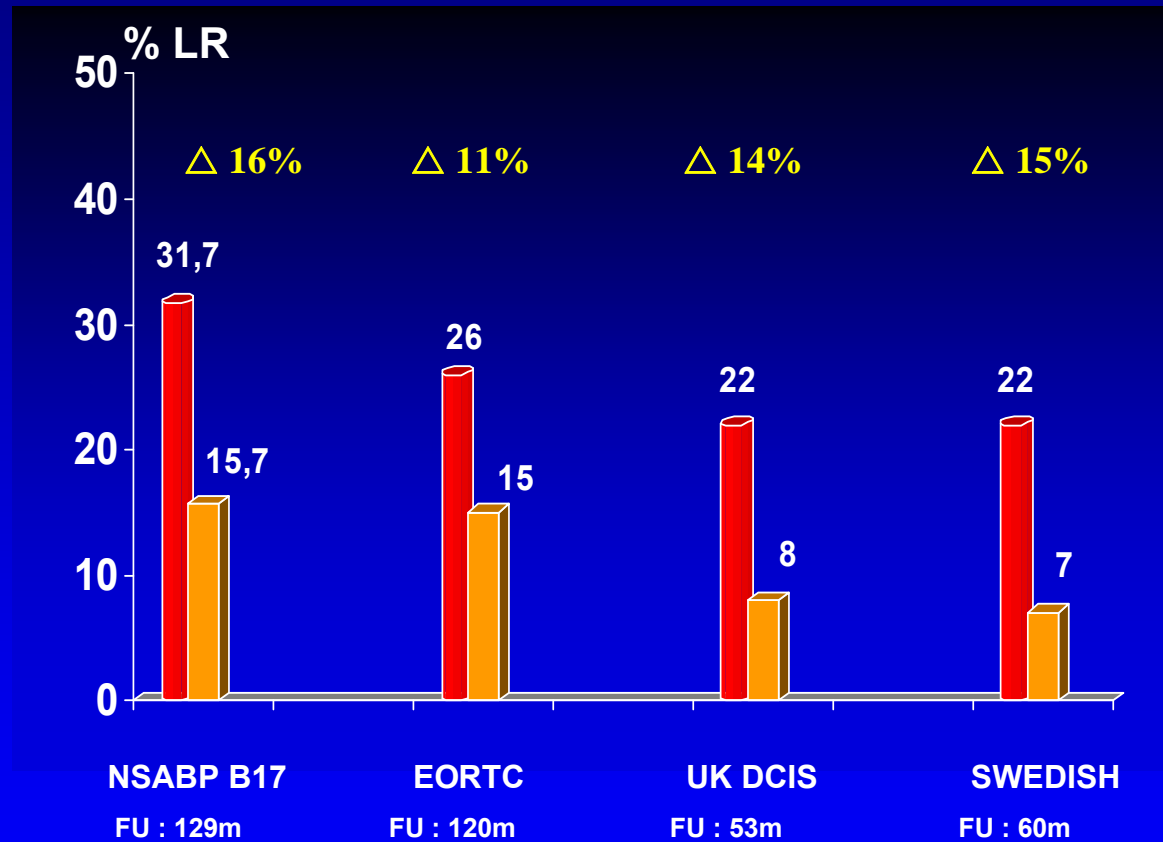
Valutazione dei margini non standardizzata

Non tiene conto di altre variabili prognostiche

Non validato in modo prospettico

.... **New Randomized Trials !!**

# SUMMARY OF RANDOMIZED TRIALS WITH OR WITHOUT RT RESULTS



Tutti gli studi confermano vantaggi con RT

# Recenti metanalisi

## Caratteristiche delle pazienti incluse nei trial analizzati

	EORTC	NSABP	UKCCCR	SweDCIS
Women under age 50 years (% trial participants)	NA	33.5%	9.5%	24.1%
Women under age 40 years (% trial participants)	6.4%	NA	0.7%	NA
Women over age 65 years (% trial participants)	NA	NA	9.9%	22.9%
Presence of comedo necrosis (% trial participants)	29.7%	56%	63%	NA
Mammographic lesion only (% trial participants)	71%	80.4%	71%	78.7%



Figure 4. Forest plot of comparison: 1 Post-operative radiotherapy versus surgery alone, outcome: 1.3 Ipsilateral DCIS recurrence.

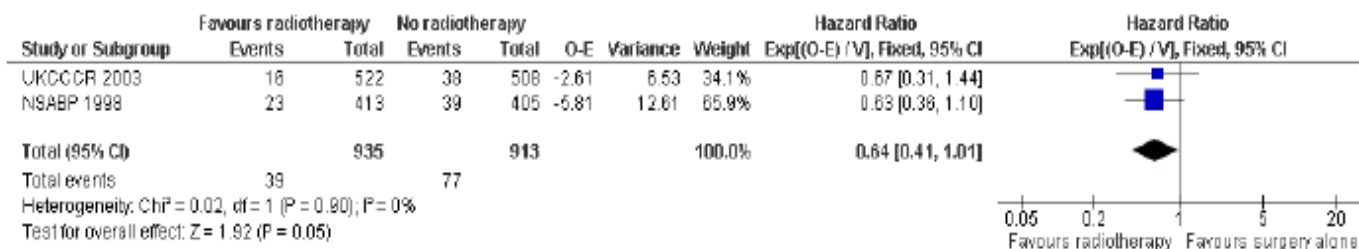
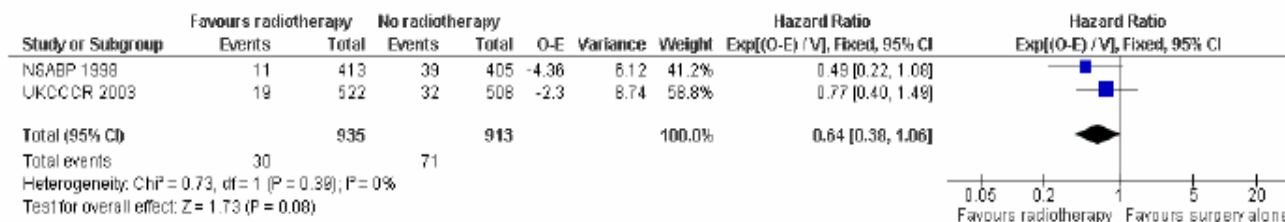
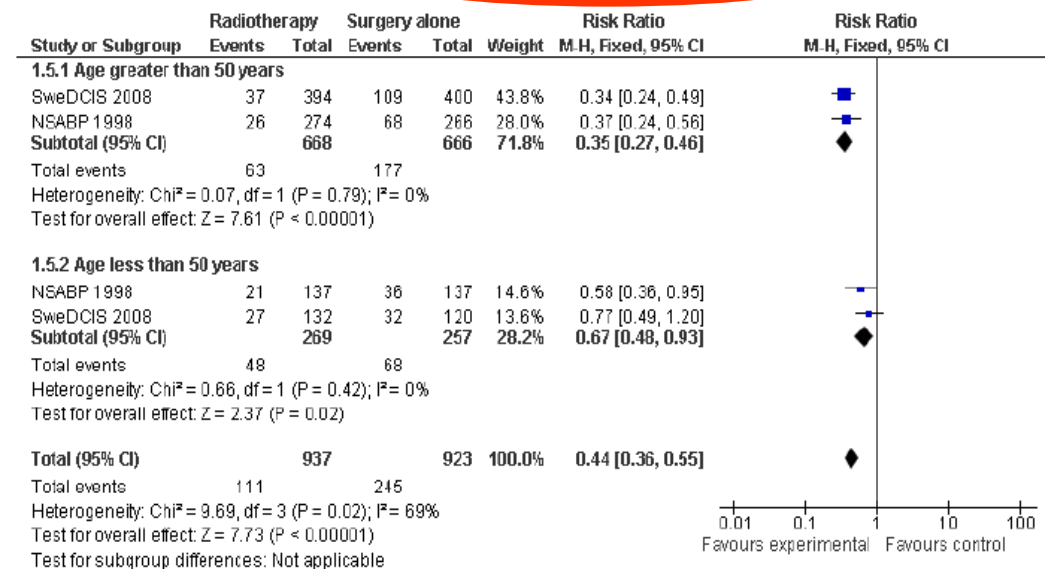


Figure 3. Forest plot of comparison: 1 Post-operative radiotherapy versus surgery alone, outcome: 1.2 Ipsilateral Invasive recurrence.



La RT riduce il rischio di recidive DCIS e infiltranti omolaterali (H.R. 0,64)

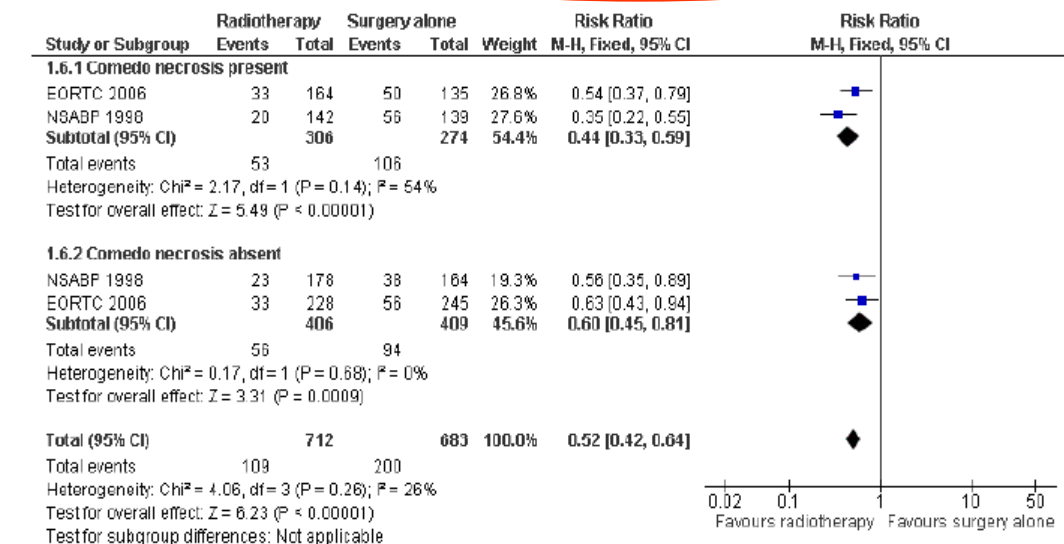
Figure 6. Forest plot of comparison: I Post-operative radiotherapy versus surgery alone, outcome: 1.5 Incidence of ipsilateral breast recurrence by age.



Cochrane 2009

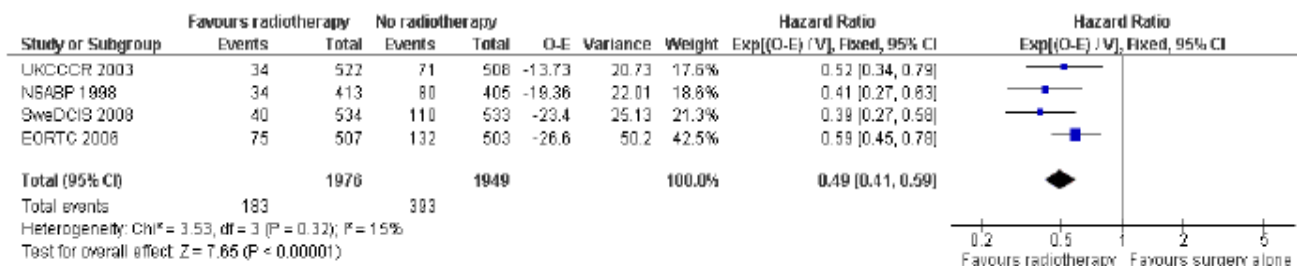
- x Età : H.R. 0,44

Figure 7. Forest plot of comparison: I Post-operative radiotherapy versus surgery alone, outcome: 1.6 Incidence of ipsilateral Recurrence by histology.

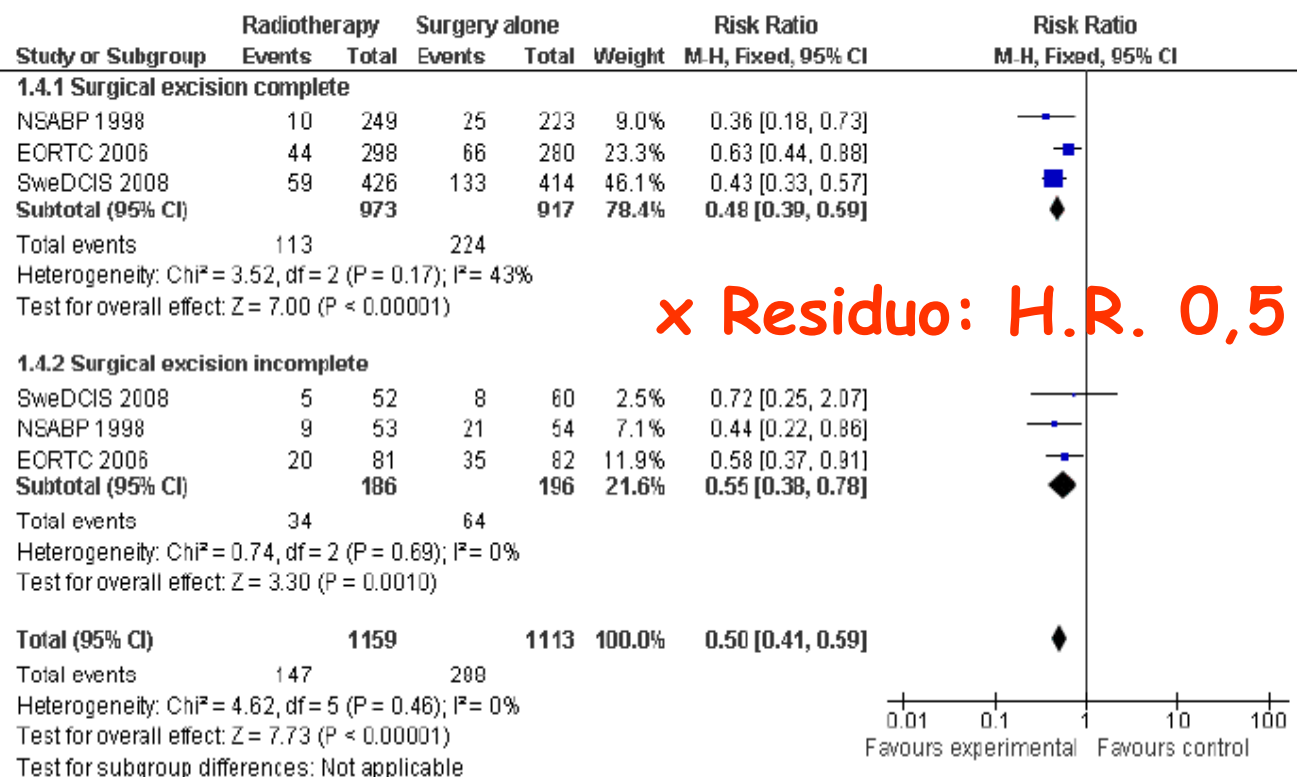


- x Istologia : H.R. 0,52

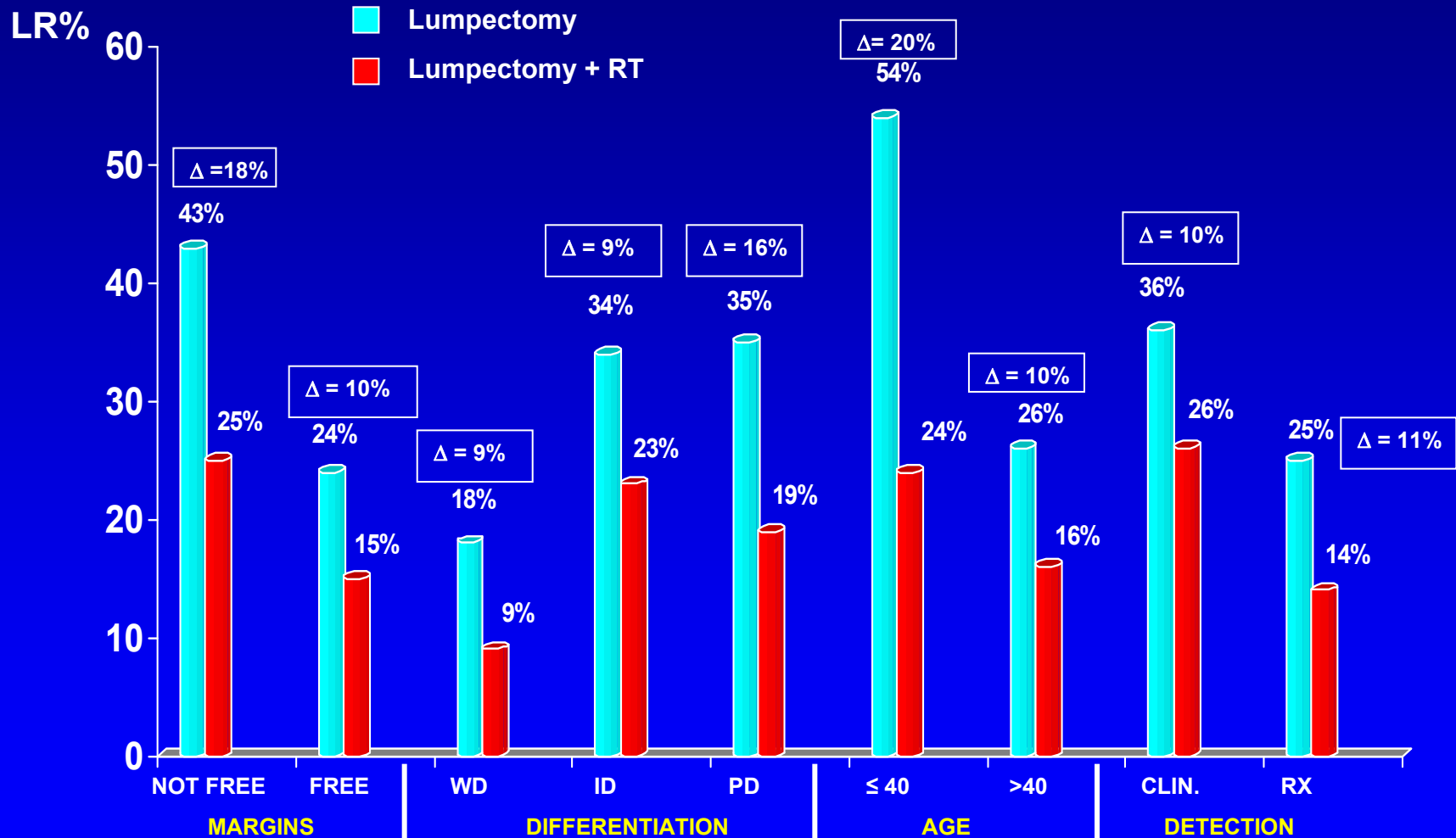
**Figure 2. Forest plot of comparison: I Post-operative radiotherapy versus surgery alone, outcome: I.1 All ipsilateral recurrence.**



**Figure 5. Forest plot of comparison: I Post-operative radiotherapy versus surgery alone, outcome: I.4 Incidence of ipsilateral recurrence by surgical excision.**



# TRIAL EORTC 10583 : Risultati a 10 anni in base alle caratteristiche cliniche e istopatologiche



# Cochrane: Conclusion

.....This result confirms the benefit of radiotherapy ...for DCIS and supports its use for all women as **the overall benefit was large**

- All subgroups analysed showed benefit.
- There was no reported longterm toxicity
- **No excess deaths** from any cause

# Linee Guida: A.C. of Radiology

## Results of Conservative Surgery + Radiation (Mammographically Detected DCIS)

	No. of Pts.	Actuarial Breast Recurrence %			Cause-specific Specific Survival %			Median Follow-Up Years
		5 yr	8 yr	10 yr	5 yr	8 yr	10 yr	
NSABP B17 [63,65]	411	10	12.1		96		7.5 mean	
Kuske et al [80]	44	7					4	
Fowble et al [77]	110	1		15	100	100	5.3	
Kestin et al [79]	146	8.0		9.2	100	99.2	7.2	
Hiramatsu et al [81]	54	2		23		96	6.2	
Sniece et al [74]	31	0		8			7.2	
Silverstein et al [86]	33*	7		19		97	7.8	
Collaborative Group [69,70]	110	7		14	100	96	9.3	

\*89 mammo detected

Tassi di recidiva contenuti con aggiunta della Radioterapia

**Sopravvivenza Determinata : 96% - 100% a 10 aa**

*American College of Radiology guideline: J Am Coll Surg 2007;*

# *American College of Radiology guideline:* (J Am Coll Surg 2007)

## Elements in the Technique of Irradiation

- Exclude the presence of **residual calcifications**.
- RT usually can **begin within 2 to 4 weeks** of uncomplicated BCS
  - **Assure reproducibility** of patient set-up, treatment simulation, treatment planning, and choice of supervoltage equipment to assure dose homogeneity.
  - The tumor bed, surrounding tissue, and most of the ipsilateral breast are encompassed in paired **tangential photon fields**.
- Higher energy photons (**10 MV**) may be indicated for **very large-breasted** women or patients with significant dose **inhomogeneity of 10%** on treatment planning using lower energy photons.
- Not more than 3-3.5 cm of lung (as projected on the radiograph at isocenter) should ordinarily be treated, and a minimum of 1-1.5 cm of lung is required.
- For left-sided lesions, efforts should be made to minimize the amount of heart in tangential fields.
- Wholebreast RT is delivered using opposed tangential fields to **a dose of 45-50 Gy at 1.8-2 Gy per fraction**.

# *American College of Radiology guideline:* (J Am Coll Surg 2007)

## BOOST ?

- Impiego controverso: spesso è proposto , ma non esistono precise indicazioni
- Si utilizzano fasci di elettroni o brachiterapia per dosi complessive in sede di T di 60 - 66 Gy.

La tossicità non è significativa

Il Boost può non essere erogato in presenza di exersi ampie e margini negativi, in tal caso sono previste dosi sulla mammella in toto di 50 Gy ( 2 Gy/frazione)



# PBI per DCIS ??

## NSABP B-39/RTOG 0413 Trial

Phase III

(3000 → 4300 patients)

Stage 0, I-II breast cancer treated by lumpectomy

Randomization

WBI

- 50-50.4 Gy (1.8-2.0 Gy)  
Fractions to the whole breast  
followed by boost to 60 -66.6 Gy

PBI

- 34 Gy in 3.4 Gy fxs bid  
Mammosite® or  
Multicatheter brachytherapy  
OR  
• 38.5 Gy in 3.85 Gy fxs bid  
3D-CRT

## RAPID Trial : NCT00282035

Phase III ( OCOG, Canada)

Ontario Clinical Oncology Group: 2128 patients, start Date 1/2006

Stage 0-I-II breast cancer treated by lumpectomy

Randomization

WBI

- 42Gy/15 fr or 50Gy/25 fr  
to the whole breast  
followed +/- boost to 60 Gy

PBI

- 38.5 Gy - 3.85 Gy/ fr. bid  
3D-CRT

Esistono esperienze preliminari

Sono in corso studi di fase III di conferma

RT sempre indicata ?

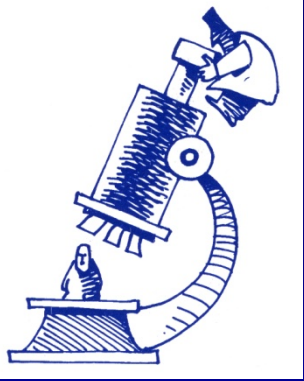
# Ongoing phase III Trials

Protocol	First Published	Trial Sponsor	Projected Accrual	Purpose
RTOG-9804, 1790 pts	Jun. 1, 1999	NCI	Accrual Stopped 7/2006 after 636 patients randomized	<ul style="list-style-type: none"> <li>□ good-risk DCIS.</li> <li>□ WB radiotherapy vs. observation with or without optional tamoxifen.</li> <li>1. decreasing local failure and preventing mastectomy</li> <li>2. distant disease-free survival</li> </ul>
NSABP-B-35, 3000 pts	Jan. 26, 2003	NCI	Accrual complete	<ul style="list-style-type: none"> <li>□ postmenopausal women with DCIS</li> <li>□ anastrozole vs. tamoxifen in preventing recurrence after lumpectomy and radiotherapy</li> <li>1. subsequent disease occurrence, in terms of invasive ipsilateral and contralateral breast cancer (invasive and DCIS), and non-breast second primary malignancies</li> <li>2. quality of life and symptoms</li> <li>3. quality-adjusted survival</li> <li>4. osteoporotic fractures</li> <li>5. disease-free and overall survival</li> </ul>
CRUK-IBIS-II-DCIS, 4000 pts	Oct. 25, 2003	C.R. UK	4,000 within 4 years	<ul style="list-style-type: none"> <li>□ postmenopausal women with locally excised DCIS.</li> <li>□ efficacy of adjuvant tamoxifen vs. anastrozole:</li> <li>1. local control</li> <li>2. prevention of contralateral disease,</li> <li>3. side effect</li> </ul>

# Studio Prospettico di Harvard (studio prospettico ad un braccio)

DCIS: sottogruppo favorevole

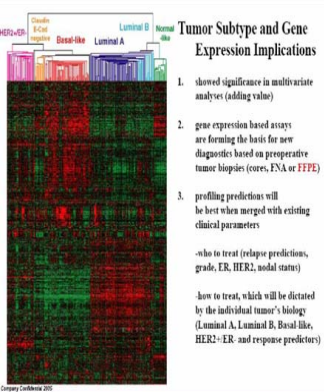
- Sola escissione ampia per DCIS favorevole:
  - Margine => 1 cm
  - Dimensioni < 2.5 cm
  - Grado nucleare G1 -G2
- Interruzione precoce dello studio per condizioni di "stopping rules"
  - 158 Paz. totali
    - Rate/anno di recidive : 2.4 %/aa
    - Rate a 5 aa: 12% (31% erano invasivi)



# Ricerca di fattori biologici di significato prognostico

- Gene soppressore T p53
- *HER2/neu*: il 50% di DCIS RE- lo esprimono ed è iperespresso in >60% dei comedo-DCIS
- Proteine regolatrici del ciclo cellulare (p21, p53, Ki-67, Ciclina A e D1)
- Neo-angiogenesi
- COX-2: il DCIS con G elevato e RE- si associa ad un'espressione elevata di COX-2

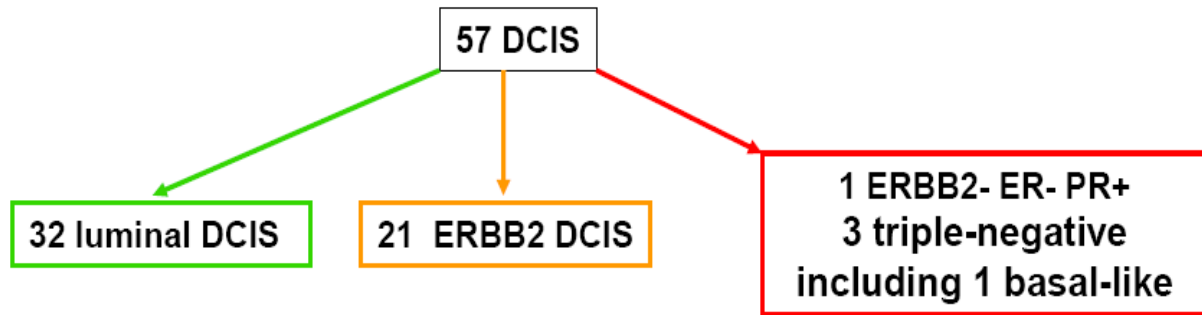
Non sono ancora in grado di modificare l'impostazione terapeutica del DCIS...



# La ricerca traslazionale

## *Integrated Genomic and Transcriptomic Analysis of Ductal Carcinoma In situ of the Breast*

Vincent-Salomon A et al. Clin Cancer Res 2008



<b>High Grade</b>	<b>28%</b>	<b>81%</b>	<b>100%</b>
<b>ER+</b>	<b>100%</b>	<b>10%</b>	
<b>PR+</b>	<b>95%</b>	<b>10%</b>	
<b>TP53 Mutation</b>	<b>3% (1 case)</b>	<b>28% (6/21cases)</b>	<b>33% (1/3 cases)</b>

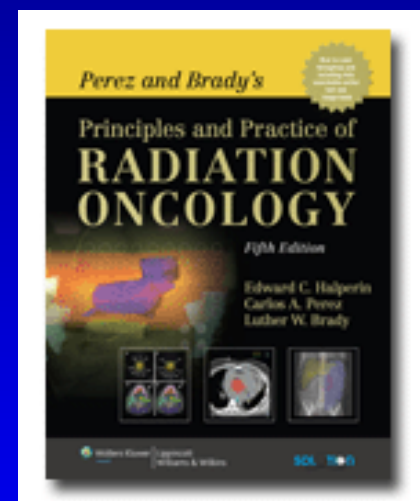
# Possibilità di omettere la RT dopo CS ?

in presenza di tutte le seguenti condizioni:

- dimensioni  $T \leq 10$  mm
- margini neg.  $\geq 10$  mm
- G1
- unicentrico

La resezione completa dovrebbe essere documentata da:

- Stato dei margini
- Rx pezzo operatorio
- Mammografia post-chirurgia



# CONCLUSIONI

- La radioterapia permette una riduzione delle recidive locali del 50-60%
- La sua efficacia è confermata in tutti i sottogruppi nei diversi trials randomizzati
- L'utilizzo del boost è attualmente valutato in un nuovo studio (BOMBIS)
- Con le tecniche moderne di trattamento gli effetti secondari sono praticamente assenti

La RT è, di fatto, sempre indicata !





## Breast-conserving surgery

Minimum margin > 2 mm and no residual MCA

- Standard: Radiotherapy to the whole breast
- Option: 16 Gy boost in young women
- No radiotherapy only if:
  - Clinical trial
  - Informed patient's choice
  - Radiotherapy not possible according to RT guidelines (discuss mastectomy)



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# Breast-conserving surgery

Margins close (<2 mm) or margins involved,  
and/or residual MCA

- Standard: reexcision with free margins or mastectomy
- Options

Radiotherapy + boost, if focal or minimal involvement and re-excision not possible

Grazie per l'attenzione