Radiation Therapy as an Effective Tool to fight cancer in Women: Future Trends

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CANCER TREATMENT IN DEVELOPING COUNTRIES

- Vast range in health service infrastructure
- Wide range in health care resources

Problems in

- Availability
- Accessibility
- Affordability

CANCER IN WOMEN: BASIC TREATMENT MODALITIES

Cancer site	*Surgery*	*Radiotherapy*	*Chemotherapy*
Breast	**++++**	**++**	**+++**
Cervix	**++**	**++++**	**++**
Body uterus	**++++**	**++**	
Ovary	**++++**	**+**	**+++**
Vagina	**+**	**++++**	
Vulva	**+++**	**+**	

WORLD-WIDE BURDEN OF WOMEN CANCER: AROUND 2002 AD

- 1 849 000 new cases
- 809 000 deaths
- 6 354 000 prevalent cases

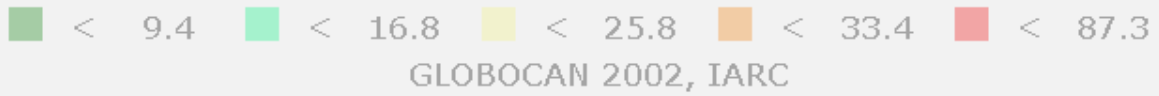
WORLD-WIDE BURDEN OF WOMEN CANCER: AROUND 2015 and 2030 AD

	2015	2030
Cases	2 446 000	3 169 000
Deaths	1 081 000	1 442 000

GLOBOCAN 2002

WORLD-WIDE BURDEN OF CERVICAL CANCER: AROUND 2002 AD

- 493,000 new cases annually
- 274,000 deaths annually
- 1.4 million prevalent cases
- More than 80% in developing countries



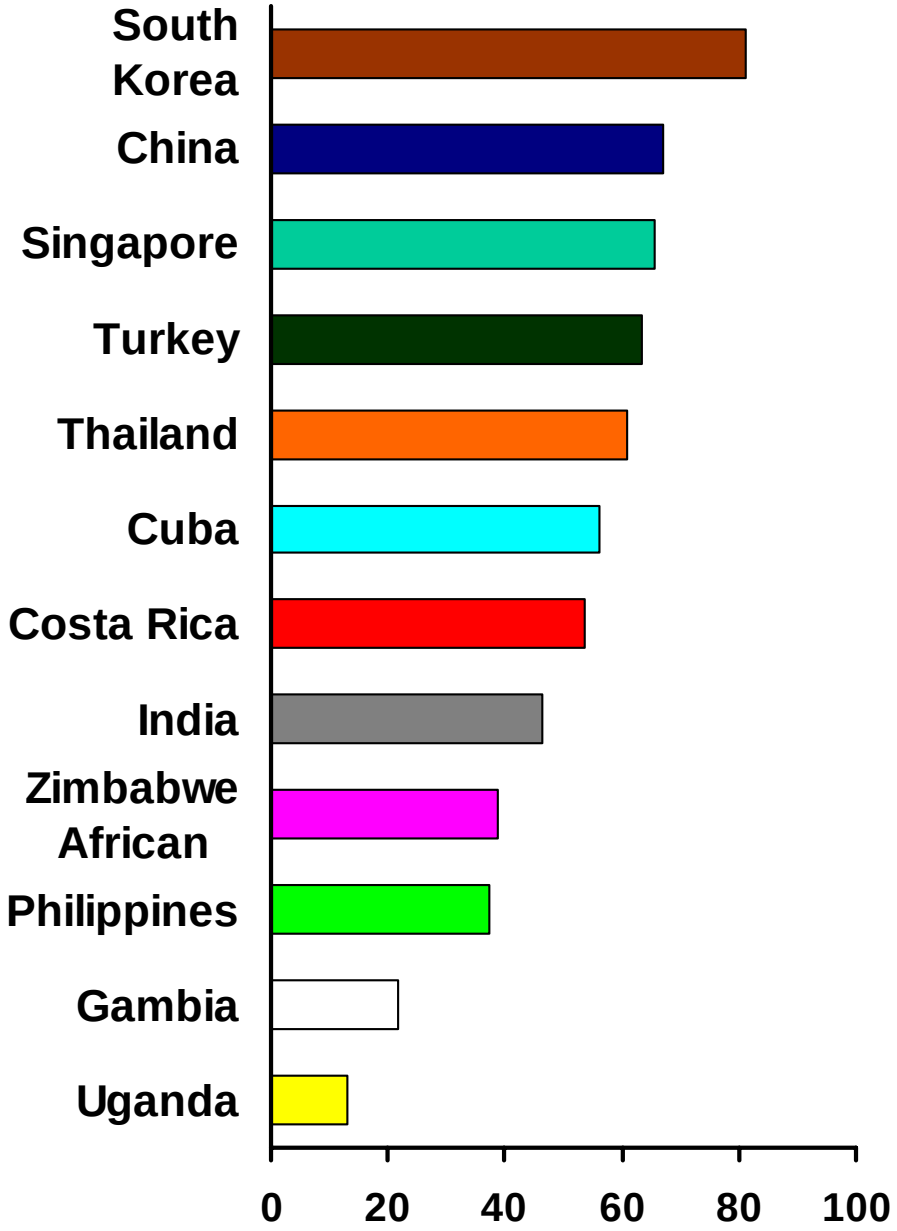
GLOBOCAN 2002, IARC

WORLD-WIDE BURDEN OF CERVICAL CANCER: AROUND 2015 and 2030 AD

	2015	2030
Cases	645 000	810 000
Deaths	365 000	475 500

GLOBOCAN 2002

5-Year Age Standardised Relative Survival (0-74 yrs)



Cervix Cancer (ICD-10:C53)

- Highest in Seoul, South Korea
- Least in Kampala, Uganda

Intra country variation

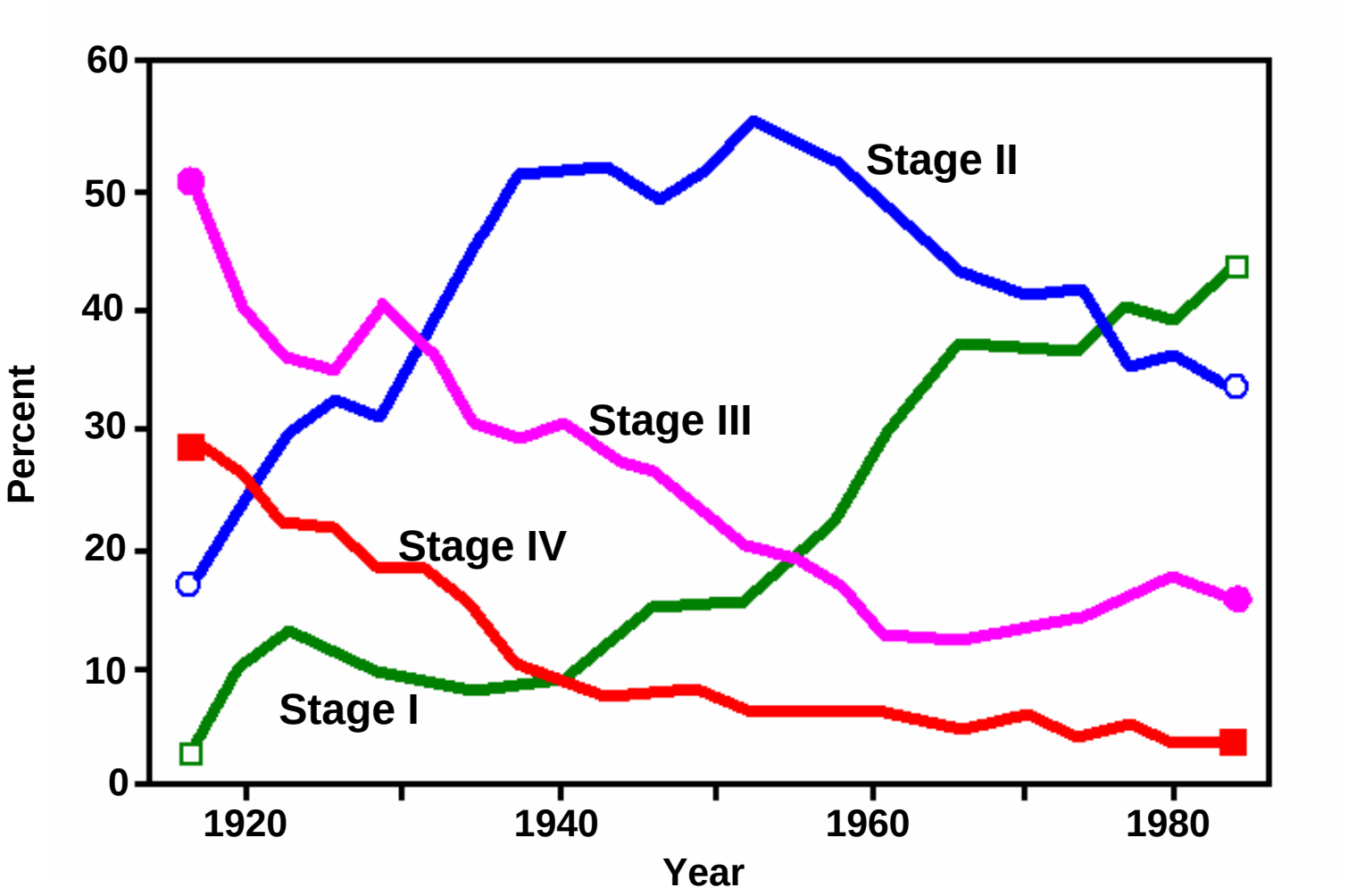
- Pronounced in China (urban ↑ vs rural ↓) & India
- No difference in South Korea & Thailand

Data from developed countries

- US-SEER: 70%
- Eurocare: 62%

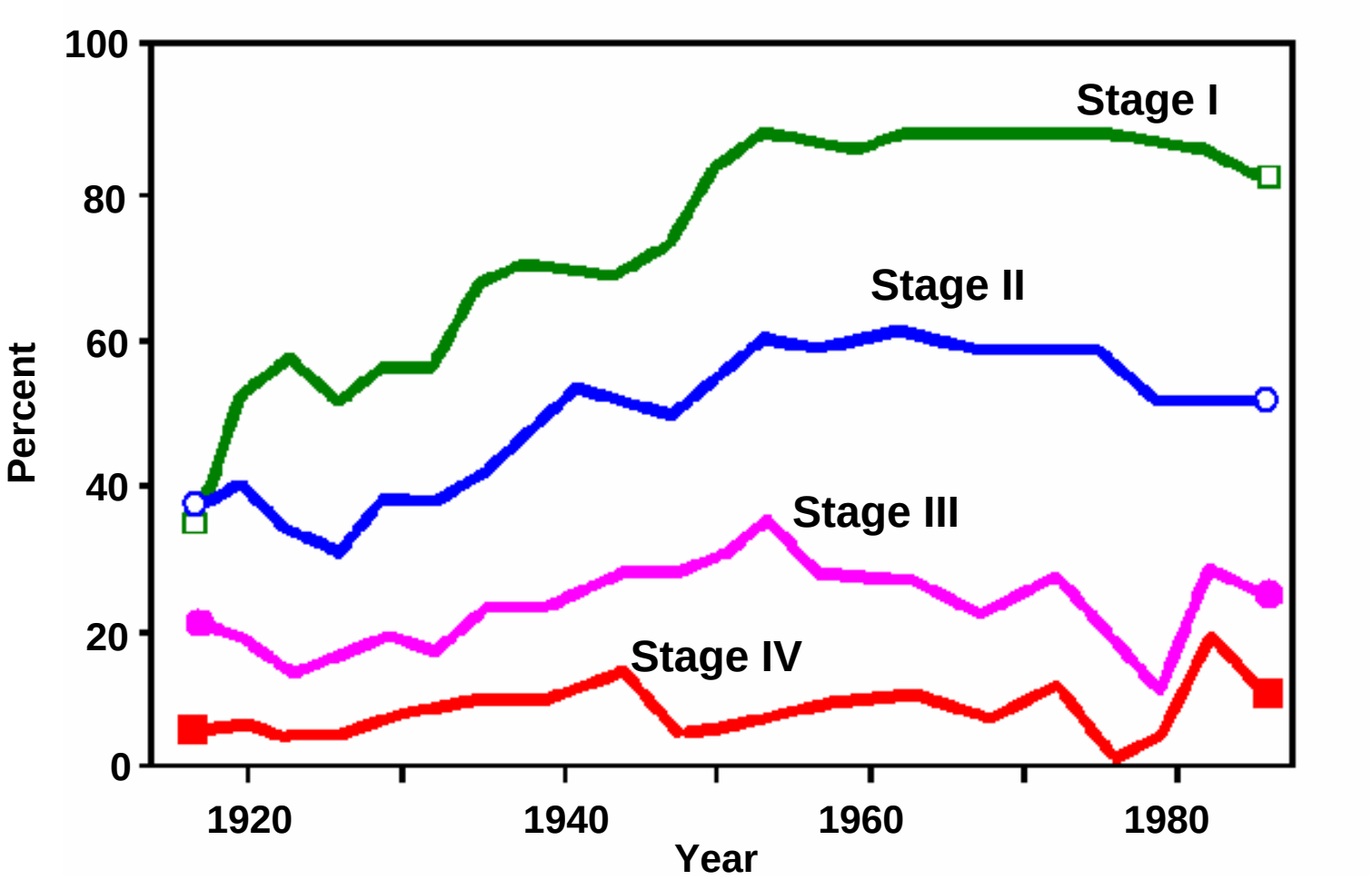
CERVICAL CANCER CONTROL

- Prevention – HPV Vaccines
- Early detection by screening
- Clinical early detection
- Treatment



Data on stage distribution at time of diagnosis at the Radiumhemmet (Heyman, 1937-1952; Heyman, 1953-1955; Kottmeier, 1958-1961; Kottmeier, 1964-1967; Kottmeier, 1973-1976; Kottmeier, 1979-1982; Pettersson, 1988-1991).

Ponten *et al.*, Int J Cancer, 1995; 60: 1-26



Crude stage-specific 5-year survival compiled from the material followed at the Radiumhemmet (Heyman, 1937-1952; Heyman, 1953-1955; Kottmeier, 1958-1961; Kottmeier, 1964-1967; Kottmeier, 1973-1976; Kottmeier, 1979-1982; Pettersson, 1988-1991)

Ponten *et al.*, Int J Cancer. 1995; 60: 1-26

CANCER OF THE UTERINE CERVIX: RADIOTHERAPY

- **Radical radiotherapy: Delivered with a curative intention; for stages I-IIIB; selected cases of IVA**
- **Concurrent Chemoradiotherapy is an option for stage II and III disease**
- **Dose delivery reference points: Points A & B**
- **Post OP RT in high risk early stage disease after surgery**
- **Palliative radiotherapy**

CANCER OF THE UTERINE CERVIX: RADICAL RADIOTHERAPY

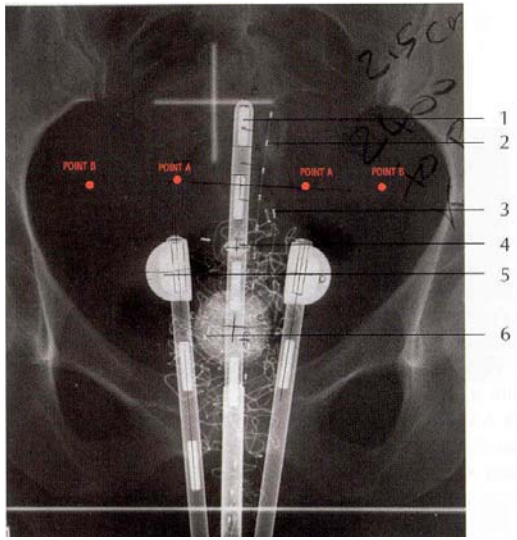
- A combination of external-beam pelvic irradiation covering the uterus, parametria and the lymphnodes and intracavitary irradiation for the central disease is used
- The aim is to deliver a total dose of around 80 Gy to point A

CANCER OF THE UTERINE CERVIX: EXTERNAL RADIOTHERAPY

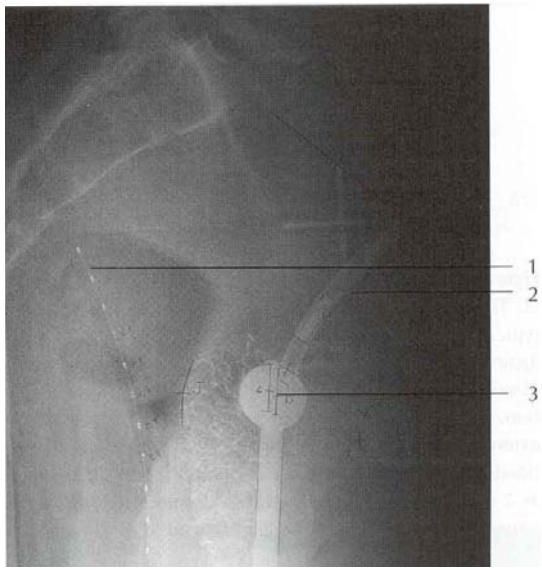
- Parallel pair of portals
- Four-field beam arrangement
- Special midline shields (after 20 Gy in stages I & II; after 40 Gy in stage III)
- 40-50 Gy in 20-25 F over 4-5 weeks

CANCER OF THE UTERINE CERVIX: INTRACAVITARY RADIOTHERAPY

- **LDR: 1 (for stage III) or 2 (for stages I & II if midline shield is used) applications of 30 Gy to point A**
- **HDR: 5 weekly applications of 7 Gy to point A (for stages I and II if midline shield is used) or 3 applications of 7 Gy to point A (for stage III)**



1 – Tandem
2 – Rectal marker
3 – Marker seeds
4 – Flange
5 – Right ovoid
6 – Urinary catheter balloon



1 – Rectal marker
2 – Tandem
3 – Ovoids

CANCER OF THE UTERINE CERVIX: PALLIATIVE RADIOTHERAPY

- In most cases of IVA and IVB
- 30 Gy in 10 F over 2 weeks

BREAST CANCER IN THE WORLD

- **1.15 million new cases**
- **Incidence increasing in most countries**
- **470 000 deaths**
- **Half of the global burden in low- and medium-resourced countries**

WORLD-WIDE BURDEN OF BREAST CANCER: AROUND 2015 and 2030 AD

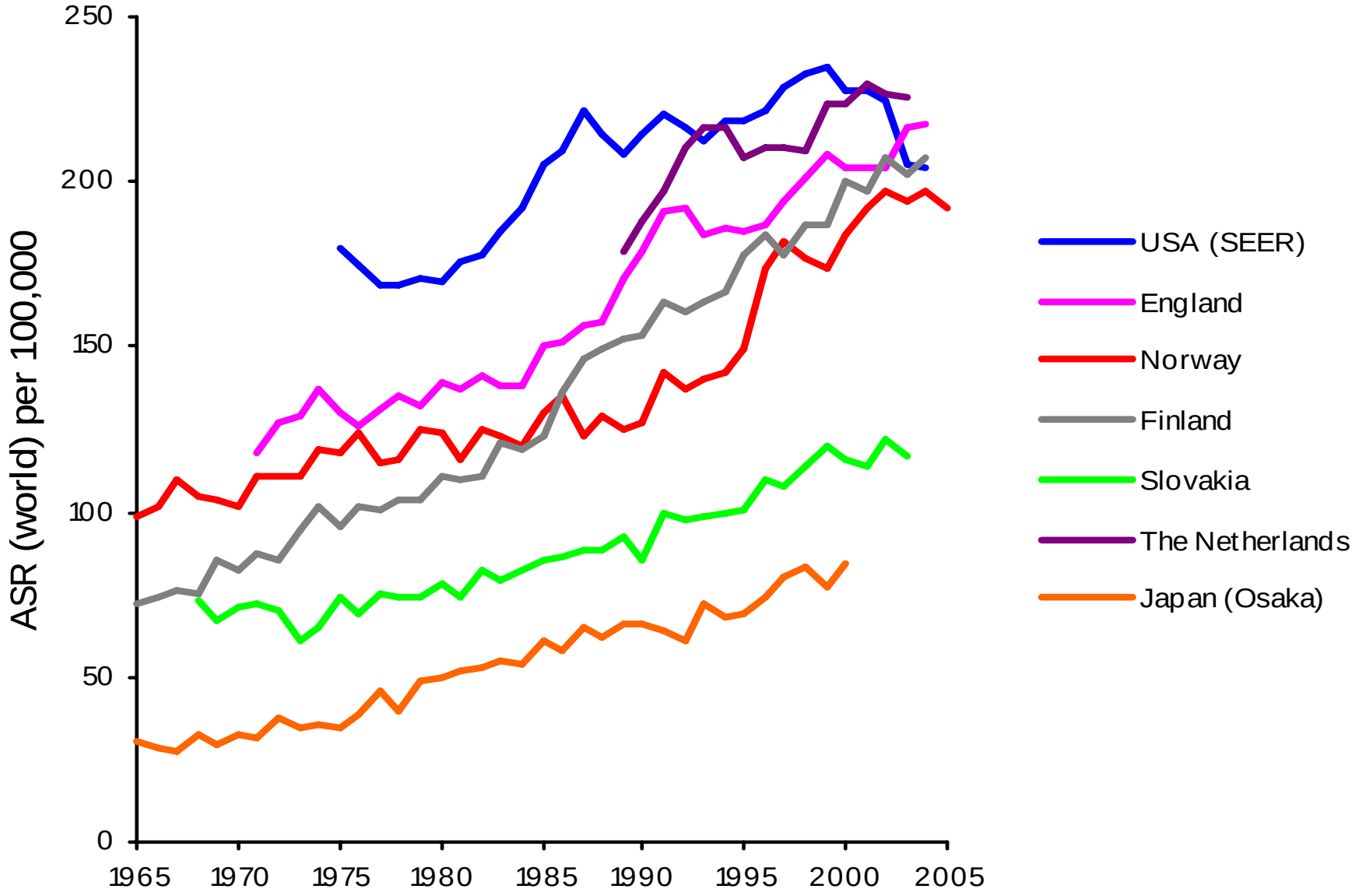
	2015	2030
Cases	1 531 000	2 004 000
Deaths	549 000	737 500

GLOBOCAN 2002

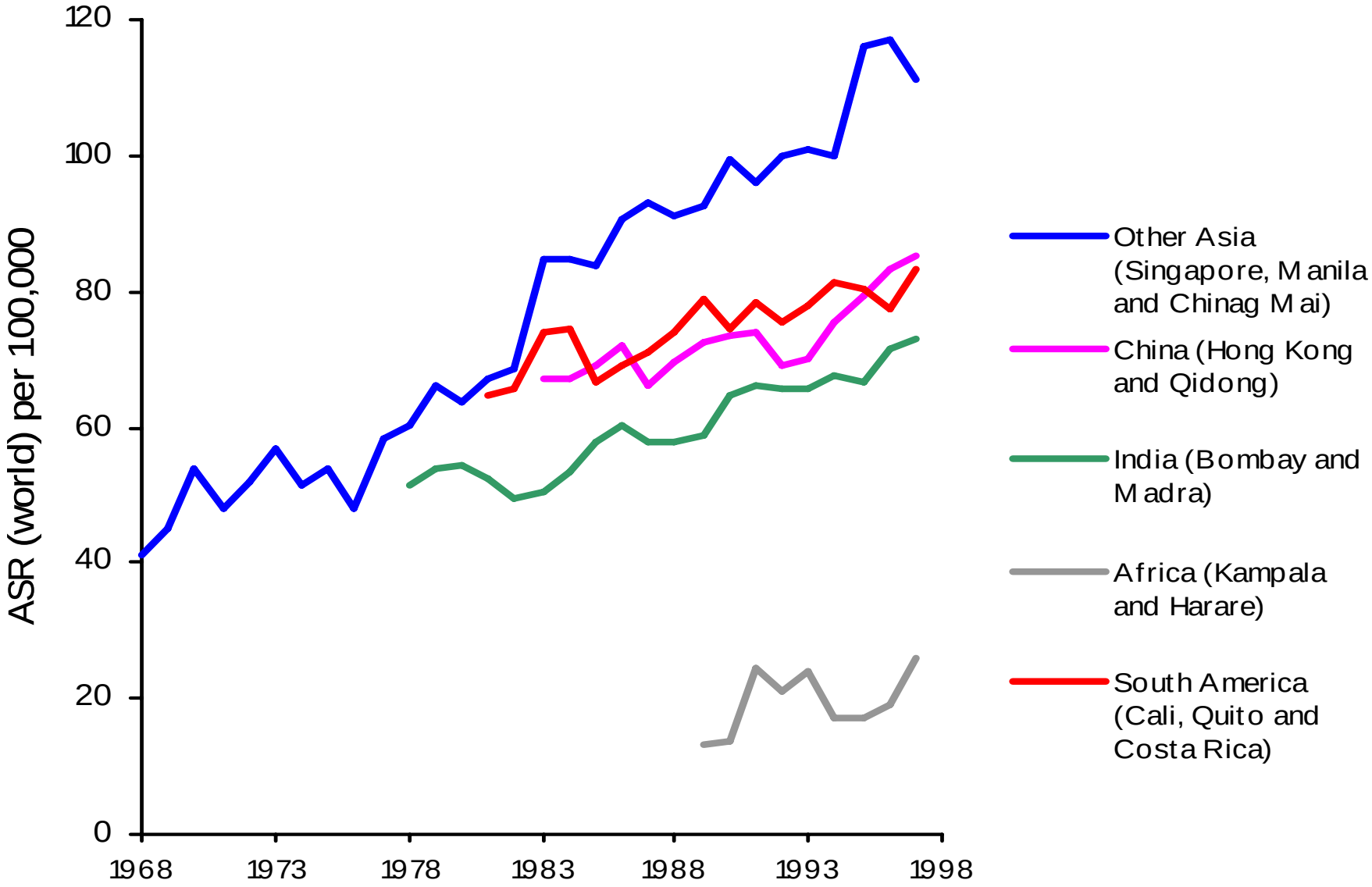
ROLE OF RADIOTHERAPY IN BREAST CANCER

- Breast conservation
- Adjuvant radiotherapy
- Palliative radiotherapy

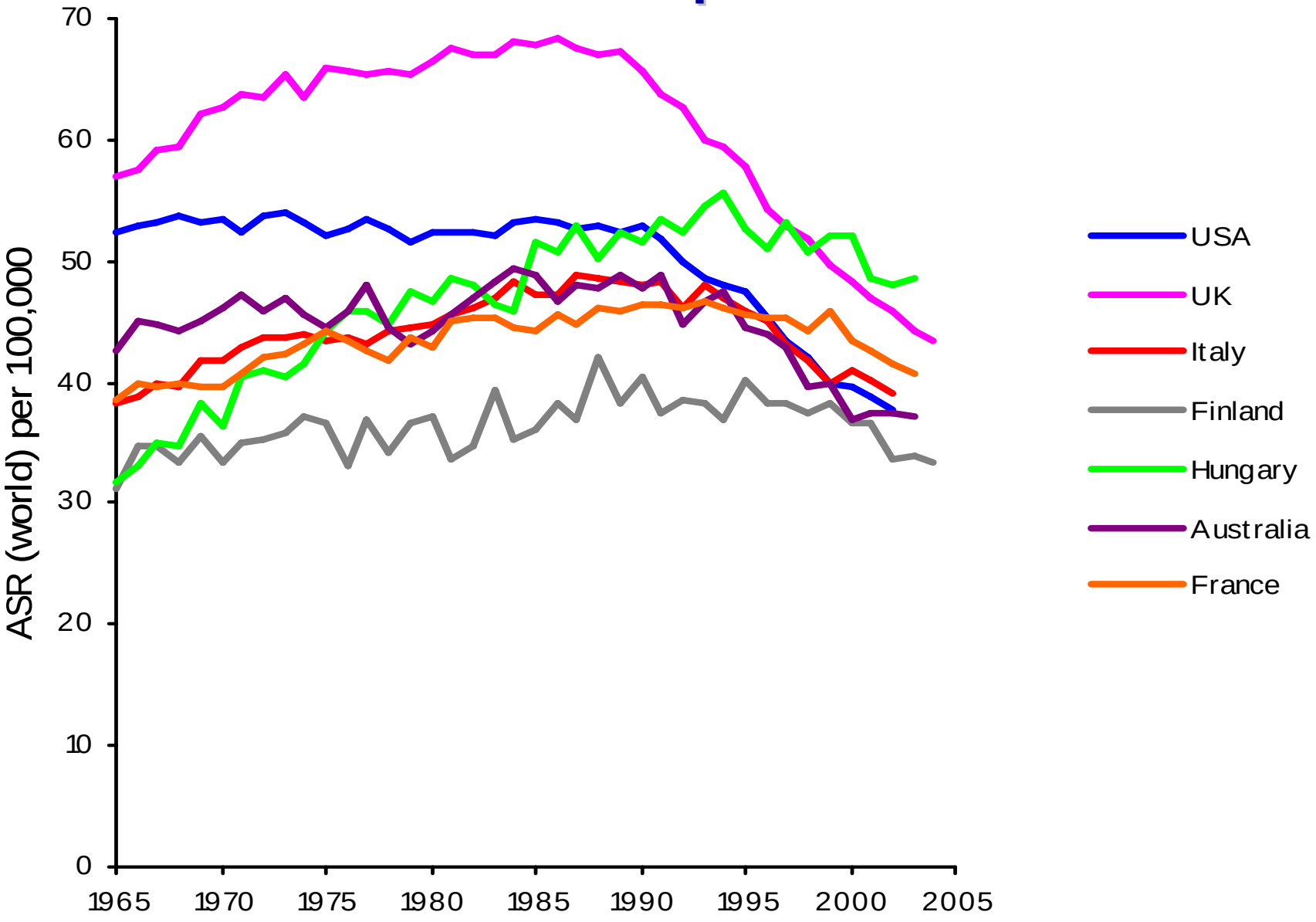
Breast cancer incidence rates (age 35-74) in selected developed countries



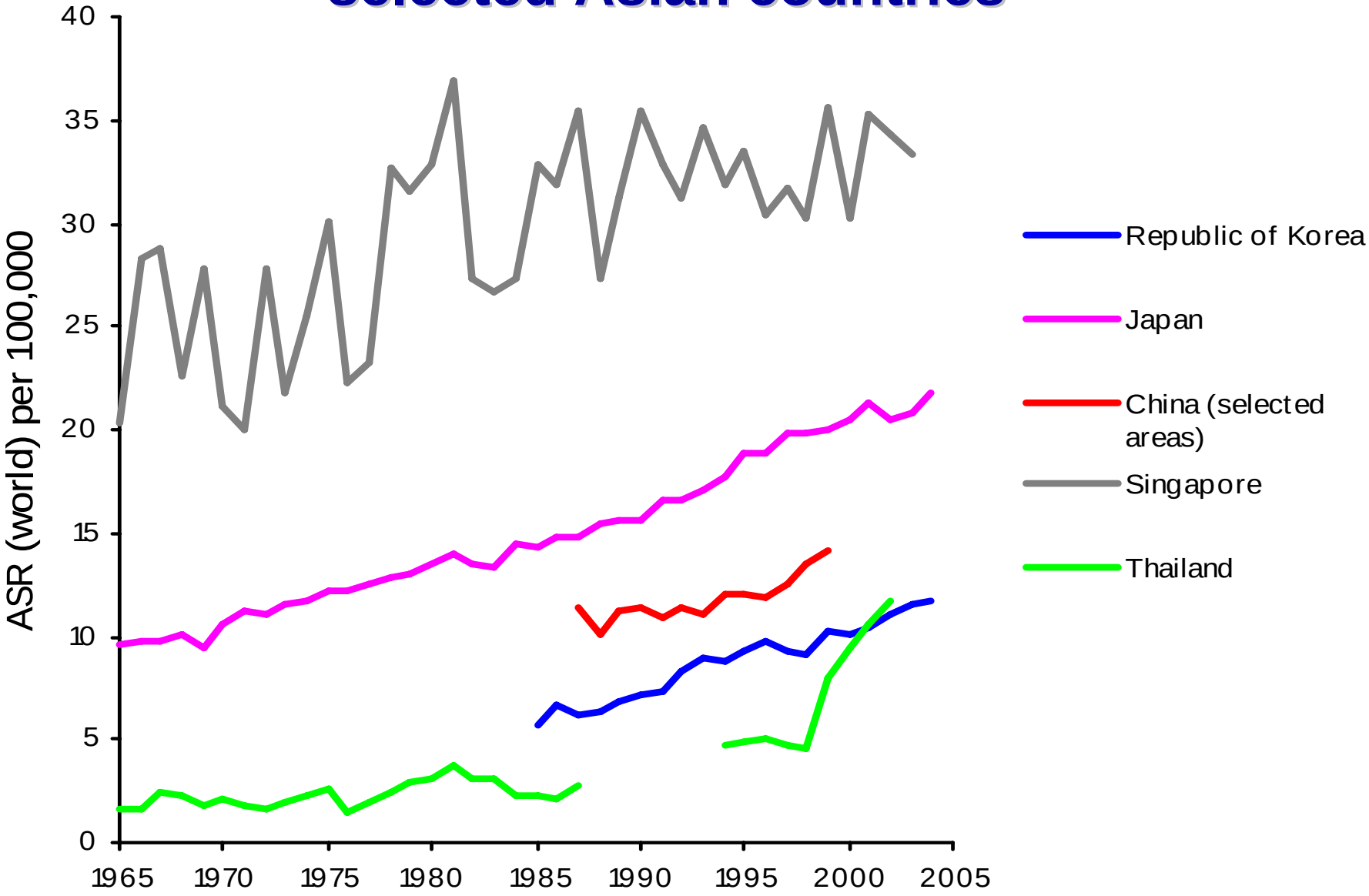
Breast cancer incidence rates (age 35-74) in selected developing countries



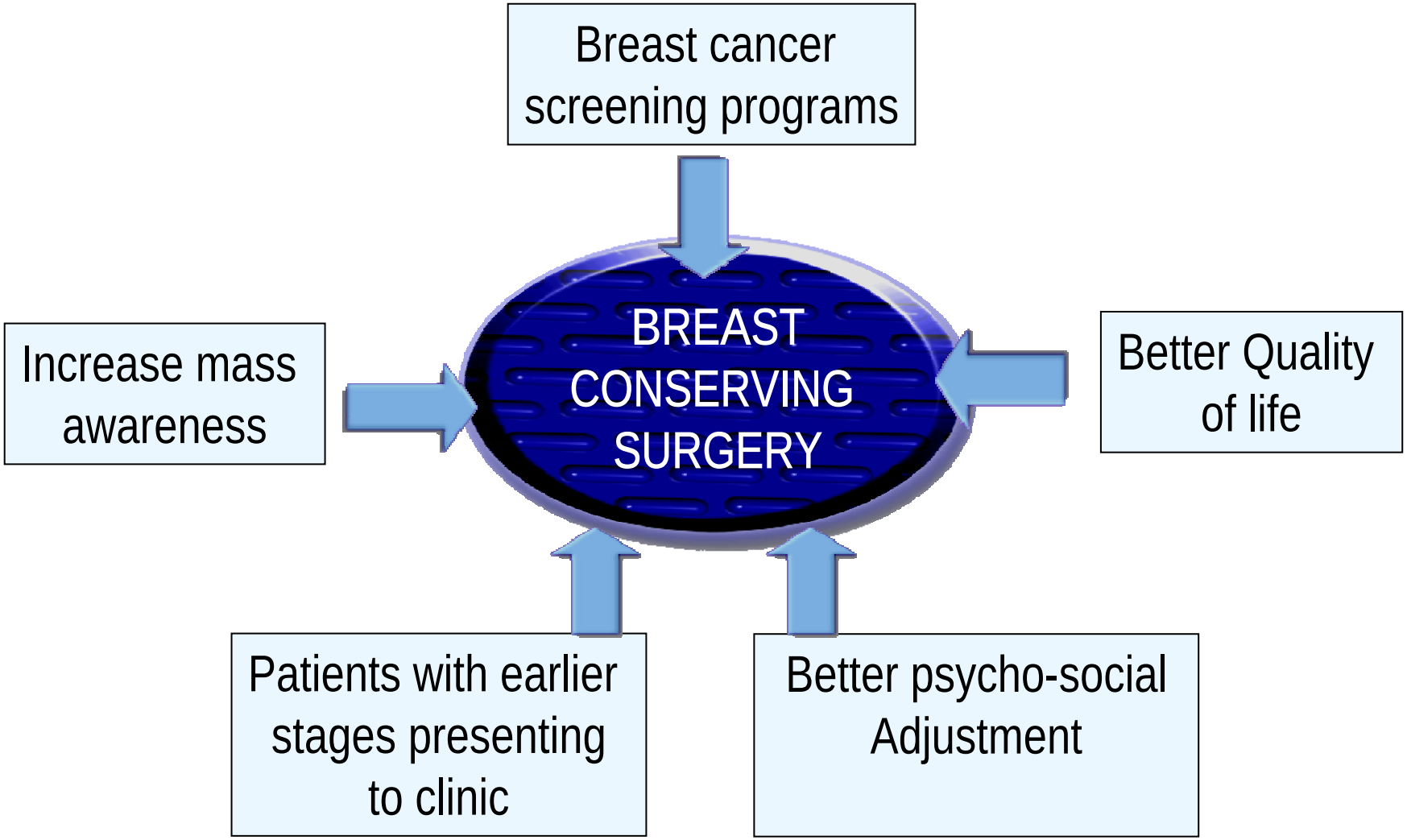
Breast cancer mortality rates (age 35-74) in selected developed countries



Breast cancer mortality rates (age 35-74) in selected Asian countries



BREAST CONSERVING THERAPY (BCT)



MRM Vs BCT

Randomized trials

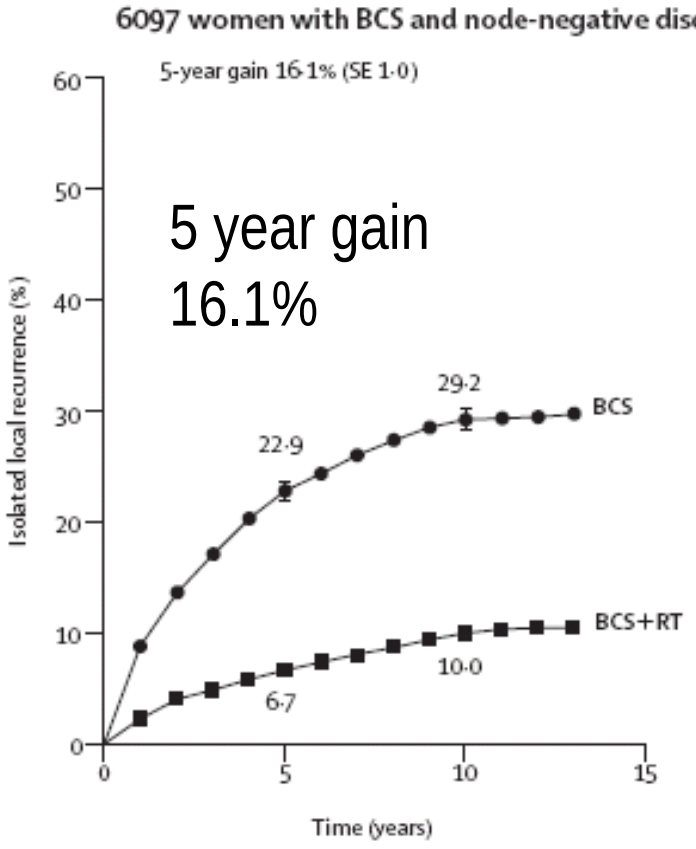
Meta-analysis

↓

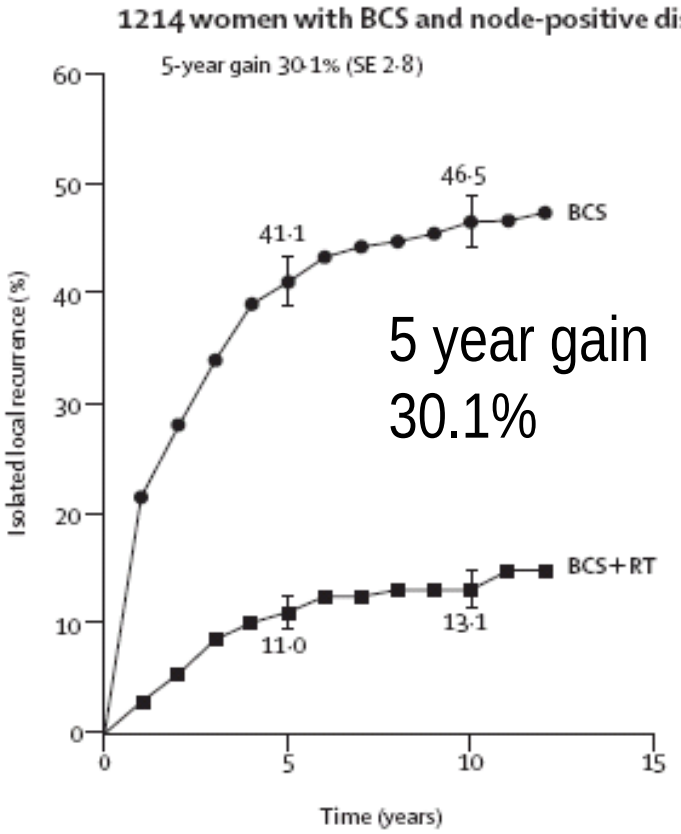
Comparable local control, Overall survival

Better cosmetic outcome

BCT: EFFECT OF RADIOTHERAPY ON LOCAL RECURRENCE



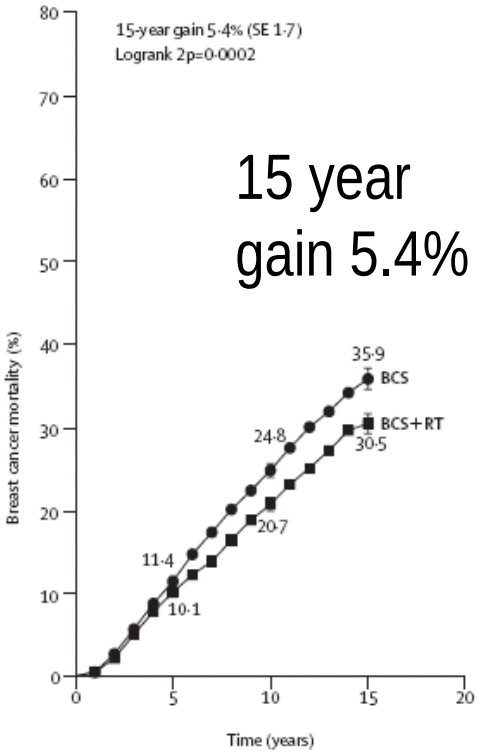
Node Negative Women



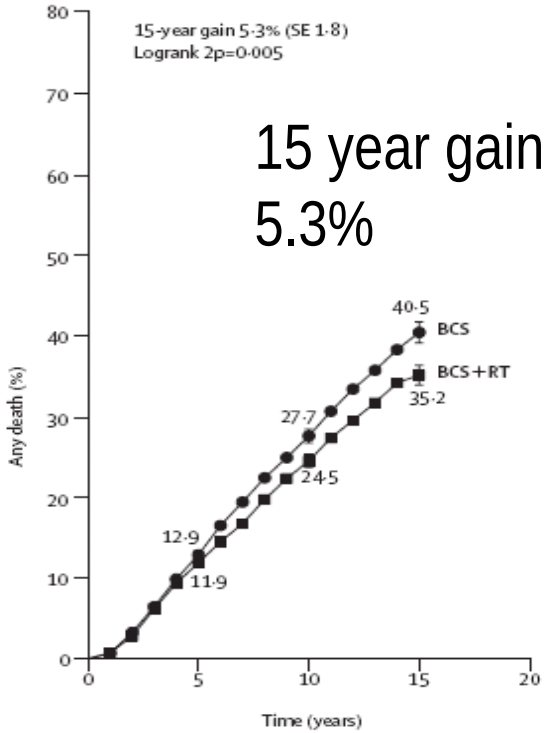
Node Positive Women

EBCTCG meta-analysis. Lancet 2005; 366: 2087–2106

BCT: BREAST CANCER AND OVERALL MORTALITY



Breast Cancer Mortality



Overall Mortality

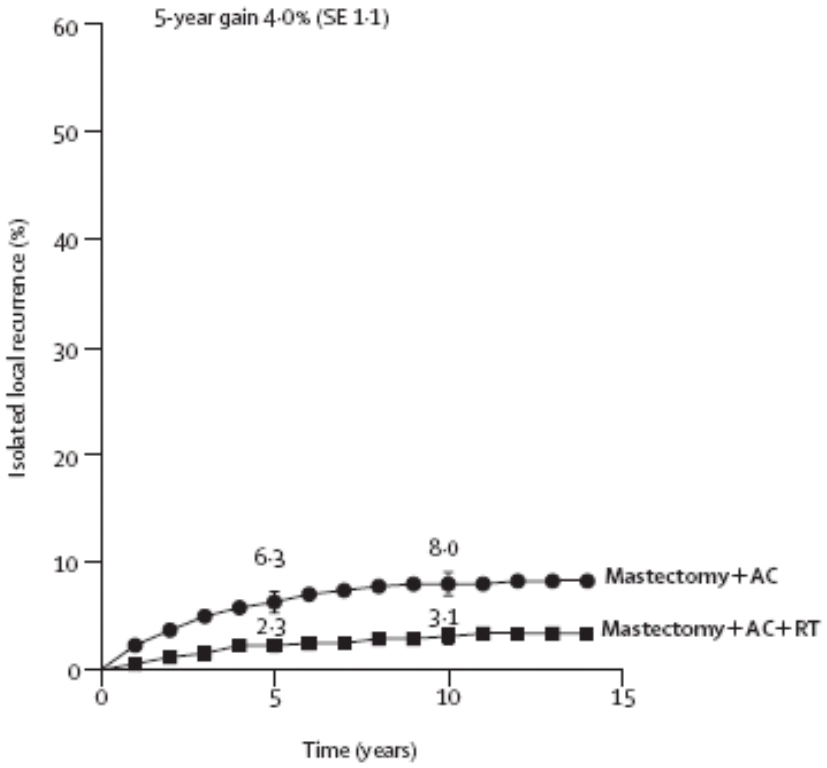
EBCTCG meta-analysis. Lancet 2005; 366: 2087–2106

ADJUVANT RADIOTHERAPY

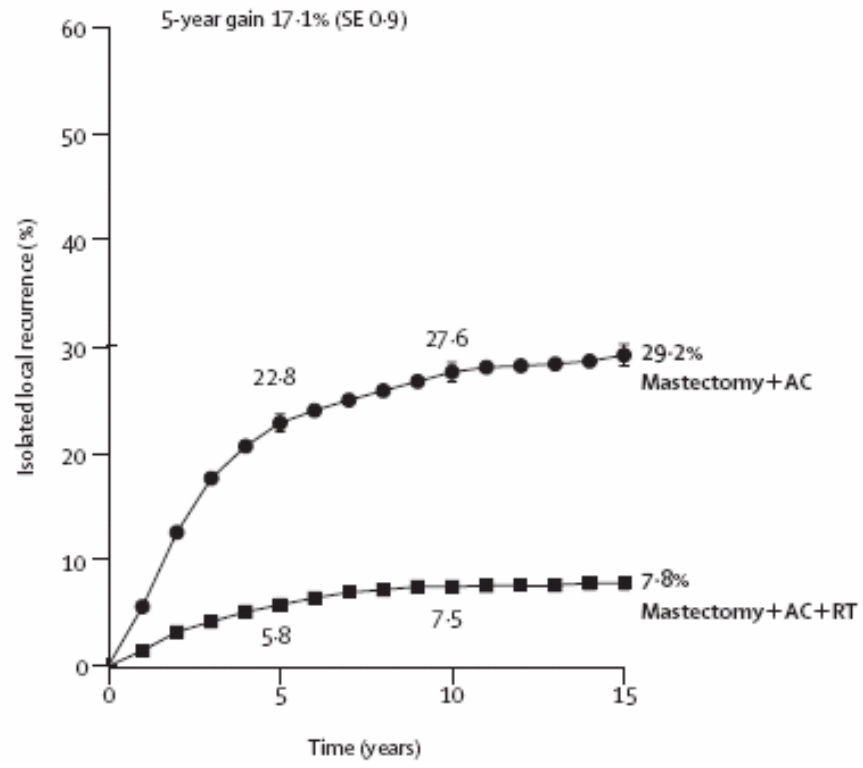
Indications of Radiation therapy

- **Patients with 4 or more positive lymph nodes**
- **Presence of extracapsular extension, positive or close margins**
- **T3 tumors with positive lymph nodes, medial quadrant tumors**
- **Any T4 tumors and pectoral fascia involvement**

MASTECTOMY: EFFECT OF RADIOTHERAPY ON LOCAL RECURRENCE



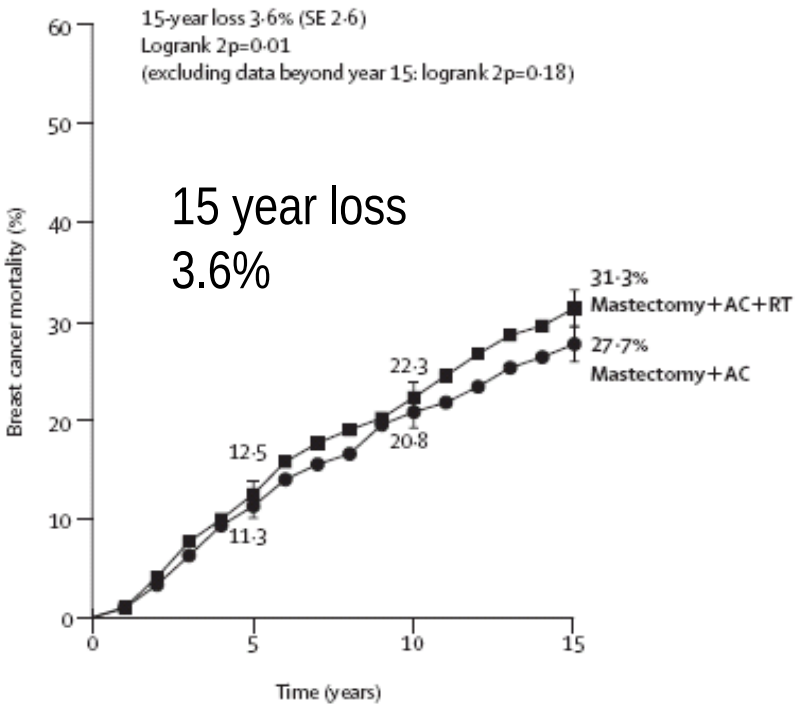
Node negative disease
(1428 women)

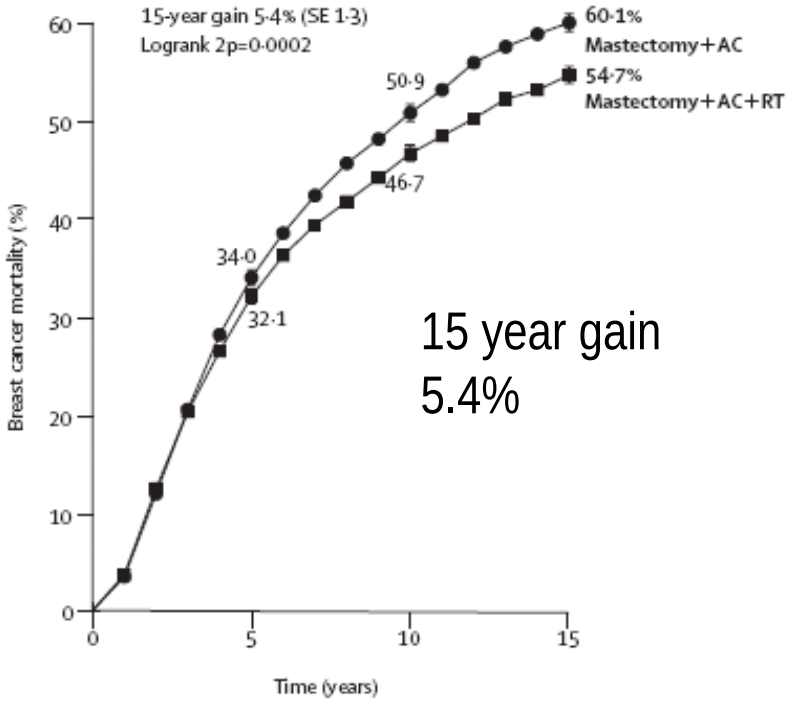


Node positive disease
(8505 women)

EBCTCG meta-analysis. Lancet 2005; 366: 2087–2106

MASTECTOMY: EFFECT OF RADIOTHERAPY ON BREAST CANCER MORTALITY





Node negative disease

(1428 women)

Node positive disease
(8505 women)

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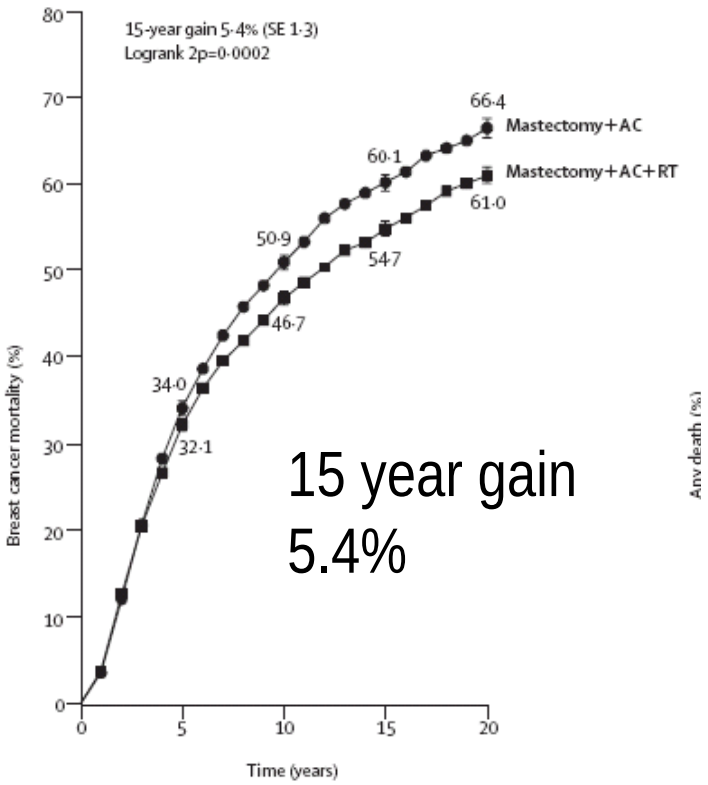
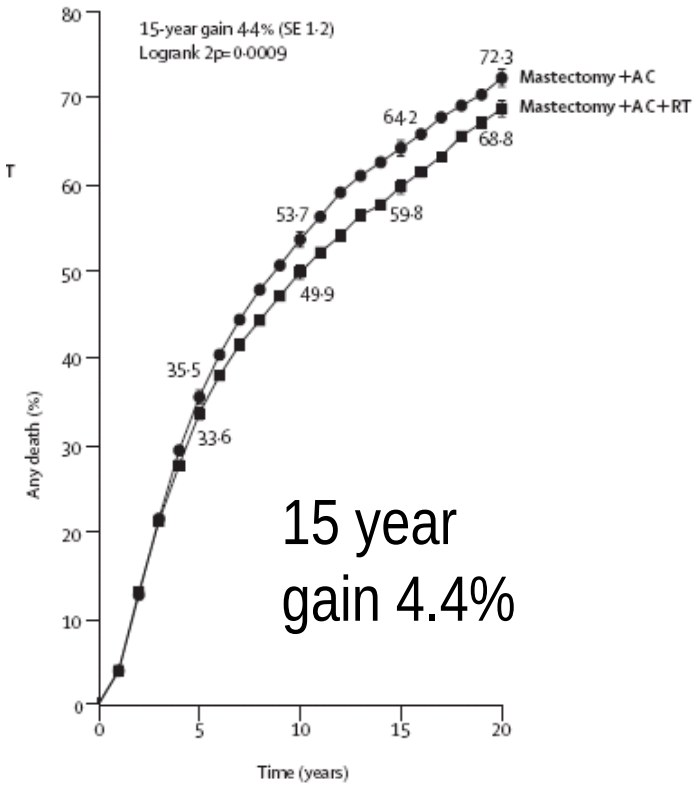
MASTECTOMY: BREAST CANCER AND OVERALL MORTALITY NODE POSITIVE WOMEN



Breast Cancer Mortality



Overall Mortality

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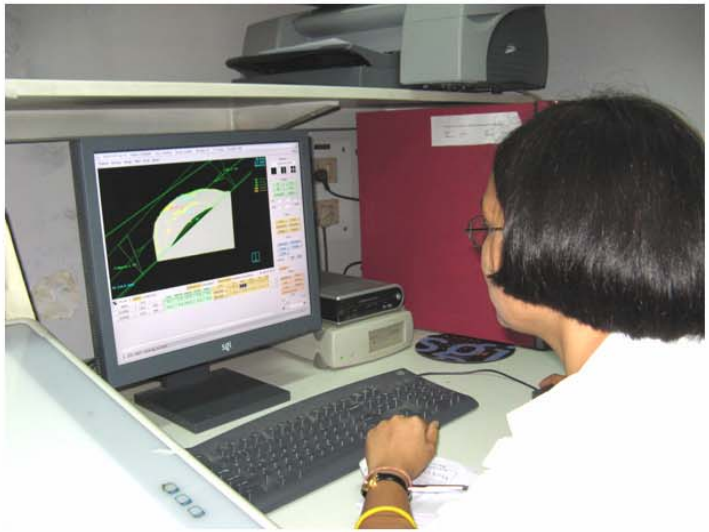

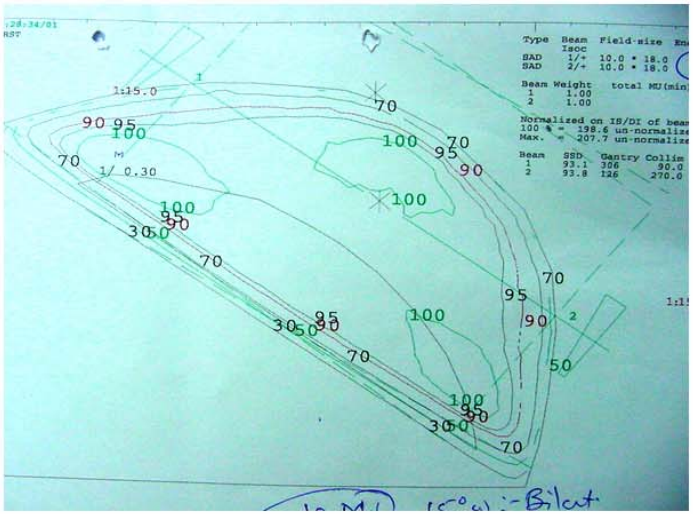

Dose: 45Gy/25#/5 wks with 6/10MV LA or telecobalt

RECENT ADVANCES IN RADIOTHERAPY

- CT simulators and Portal imaging
- 3DCRT
- IMRT
- IGRT
- Portable LA for IORT
- Only 20% of population has access to RT in Africa; 40 % in Asia and 50 % in Latin America

EARLY DETECTION APPROACHES

- **Screening: mass application of screening test in asymptomatic populations at regular intervals**

- **Early clinical diagnosis: detection of early clinical stages of disease in symptomatic or high-risk subjects**

HOW TO DEVELOP CANCER TREATMENT SERVICES IN DEVELOPING COUNTRIES

- National policy - NCCP
- Resource allocation/ Phased development
- Human resource development
- Investments in diagnosis/ treatment
- Comprehensive basic services
- Team approach
- National guidelines of Rx