



Cancer research investment should shift from  
late stage treatment to early stage detection

International Agency for Research on Cancer  
Lyon, France

**R. Sankaranarayanan MD**

Special Advisor on Cancer Control & Head, Screening Group (SCR)

International Agency for Research on Cancer

## SEER 5-year survival by stage (2006-2012)

Cancer site	Total cases	Localised (%)	Distant (%)
Breast	332 526	98.8	26.3
Cervix	22 122	91.3	16.8
Colorectal	209 895	90.1	13.5
Corpus uteri	71 625	95.4	16.8
Kidney	73 225	92.5	11.7
Oral cancer	53 633	83.3	38.3

Cancer site	Total cases	Localised (%)	Distant (%)
Ovary	34 144	92.1	28.8
Oesophagus	20 995	41.3	4.5
Lung	266 874	55.2	4.3
Pancreas	58 535	29.3	2.6
Stomach	35 916	66.9	5.0
Bladder	88 593	70.2	5.2

International Agency for Research on Cancer

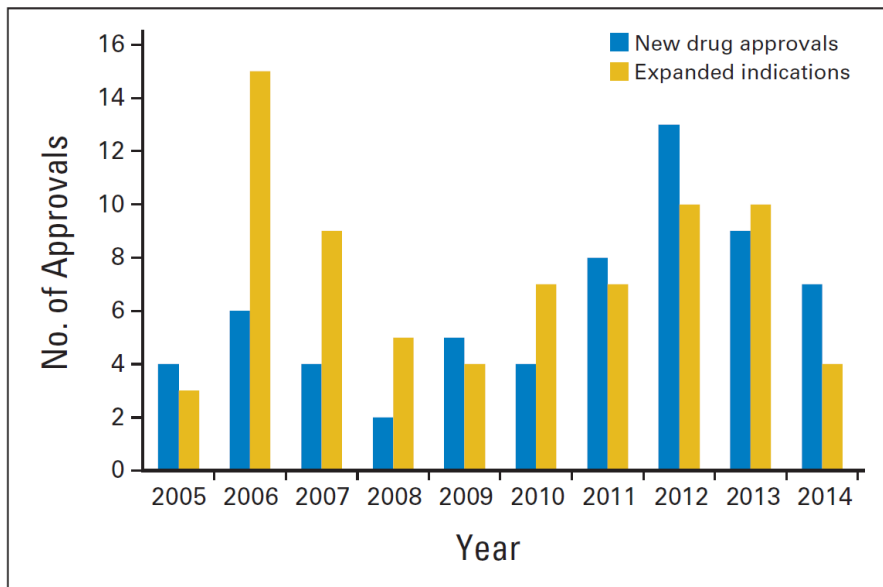
# Cost of treatment by *stage*, excluding the costs of recurrence, NHS, UK

Stage	Colon Cancer	Rectal Cancer	NSCLC	Ovarian Cancer
<b>1</b>	£ 3373	£ 4449	£ 7952	£ 5328
<b>2</b>	£ 7809	£ 6944	£ 8349	£ 10217
<b>3</b>	£ 9920	£ 8302	£ 8733	£ 11207
<b>4</b>	£ 12519	£ 11815	£ 13078	£ 15081

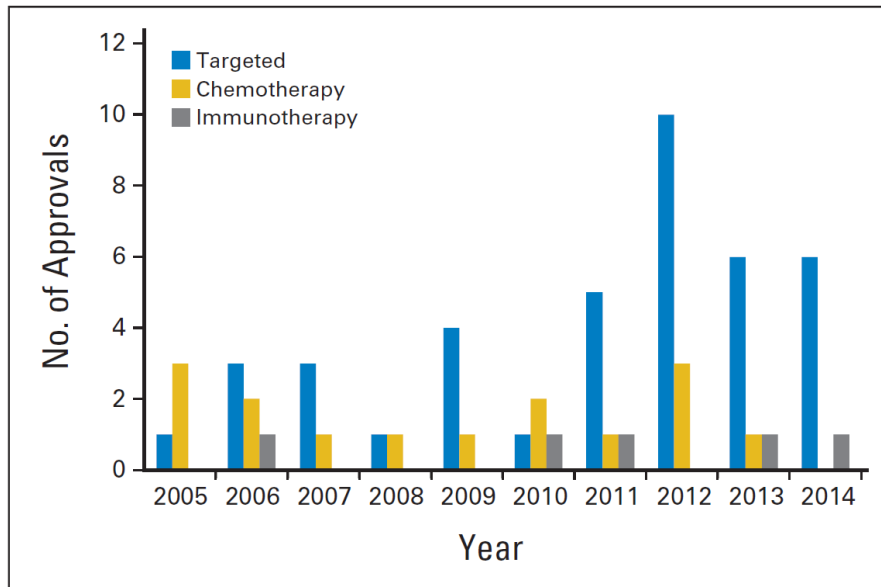
# Average cost per *recurrence*, NHS, UK

Stage	Colon Cancer	Rectal Cancer	NSCLC	Ovarian Cancer
1	£ 376	£ 354	£ 8457	£ 1504
2	£ 2003	£ 1890	£ 10346	£ 8623
3	£ 4757	£ 4490	£ 12251	£ 12276
4	n/a	n/a	n/a	n/a

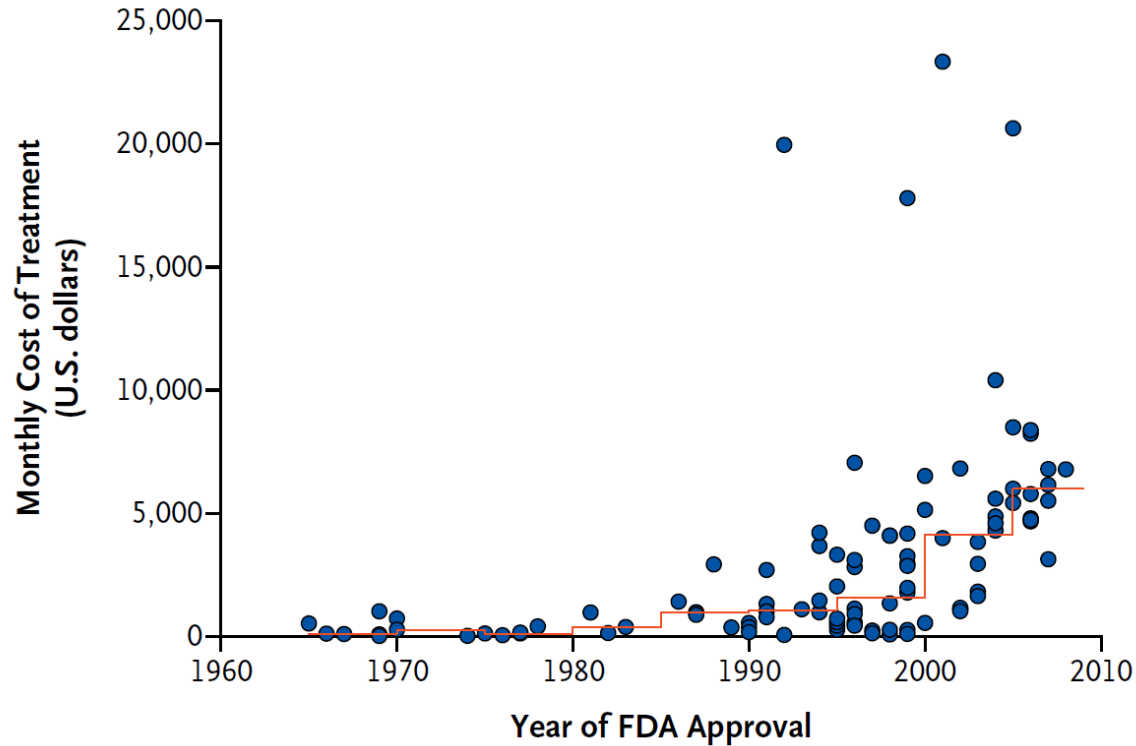
## US Food and Drug Administration (FDA) *cancer drug approvals by year*



## US Food and Drug Administration (FDA) *approvals by cancer drug class and year*



# Rising cost of Cancer Drugs



# Phase 3 Randomized Trials of Frontline Therapy for Advanced Cervical Cancer: Overall (OS) and progression free survival (PFS)

Author	Treatment	Number	PFS (Months)	OS (Months)
Miller <i>et al.</i> , 2008	Cisplatin	134	2.8	8.8
	PC	130	4.8	9.7
Long <i>et al.</i> , 2005	Cisplatin	146	2.9	6.5
	Topotecan/Cisplatin	147	4.6	9.4
Monk <i>et al.</i> , 2009	PC	103	5.82	12.87
	VC	108	3.98	9.99
	GC	112	4.7	10.28
	TC	111	4.57	10.25
Tewari <i>et al.</i> , 2014	Chemotherapy	225	5.9	13.3
	Chemotherapy/ Bevacizumab	227	8.2	17.0
Kitagawa <i>et al.</i> , 2012	PC	121	6.9	18.3
	Carboplatin/Paclitaxel	123	6.21	17.5

GC indicates gemcitabine/cisplatin; NS, not stated; ORR, objective response rate; OS, overall survival; PC, paclitaxel/cisplatin; PFS, progression-free survival; TC, topotecan/cisplatin; VC, vinorelbine/cisplatin.

## Combination

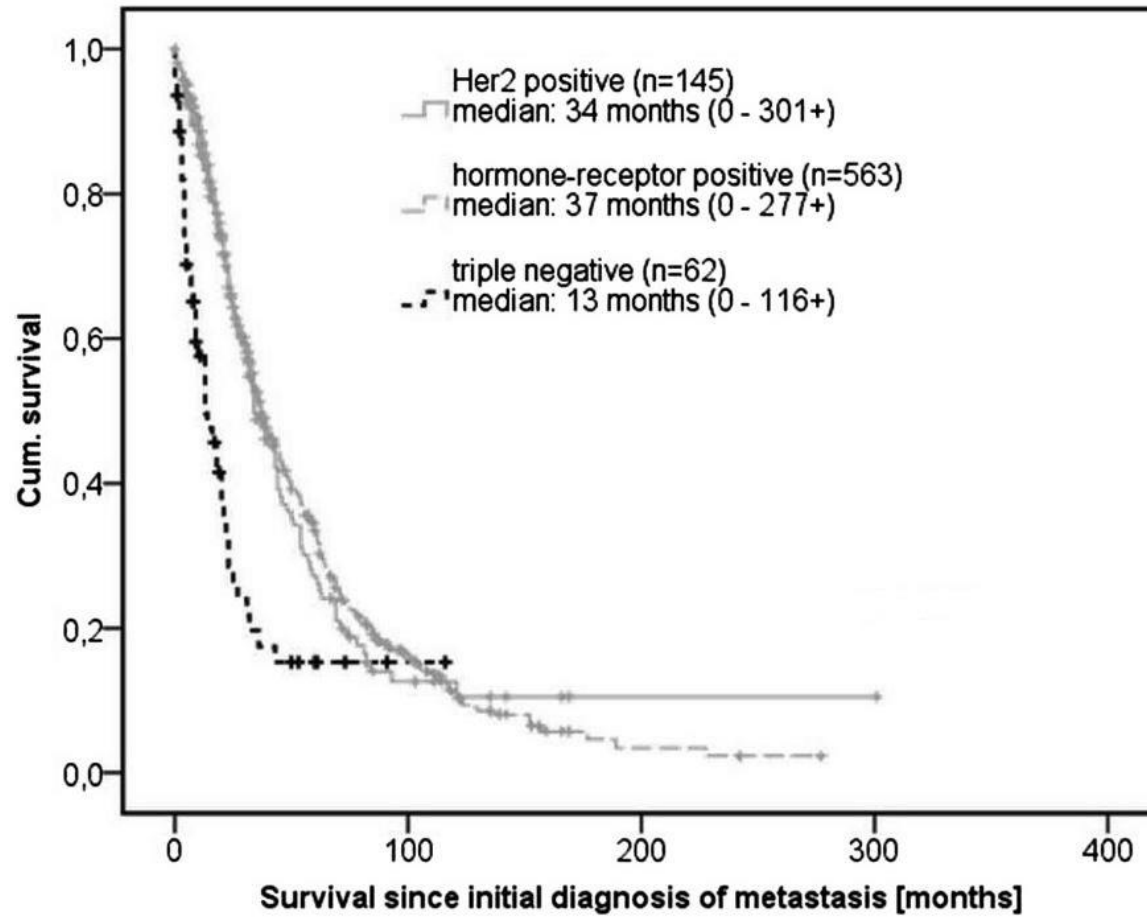
# Front-line Chemotherapy for Metastatic Colorectal Cancer: Overall (OS) and progression free survival (PFS)

	Number of Patients	Regimens	Median PFS (months)	Median OS (months)
<b>Saltz et al</b>	226	5-FU/LV	4.3	12.6
	231	IFL	7.0	14.8
	226	Irinotecan	4.2	12
<b>Doulliard et al</b>	198	CI 5-FU/LV	4.4	14.1
	188	FOLFIRI	6.7	17.4
<b>Giachetti et al</b>	100	CI 5-FU/LV	6.1	19.9
	100	FOLFOX 6	8.7	19.4
<b>de Gramont et al</b>	210	CI 5-FU/LV	6.2	14.7
	210	FOLFOX 4	9.0	16.2
<b>Goldberg et al</b>	264	IFL	6.9	14.1
	267	FOLFOX	8.8	18.6
	264	OXIRI	N/A	N/A

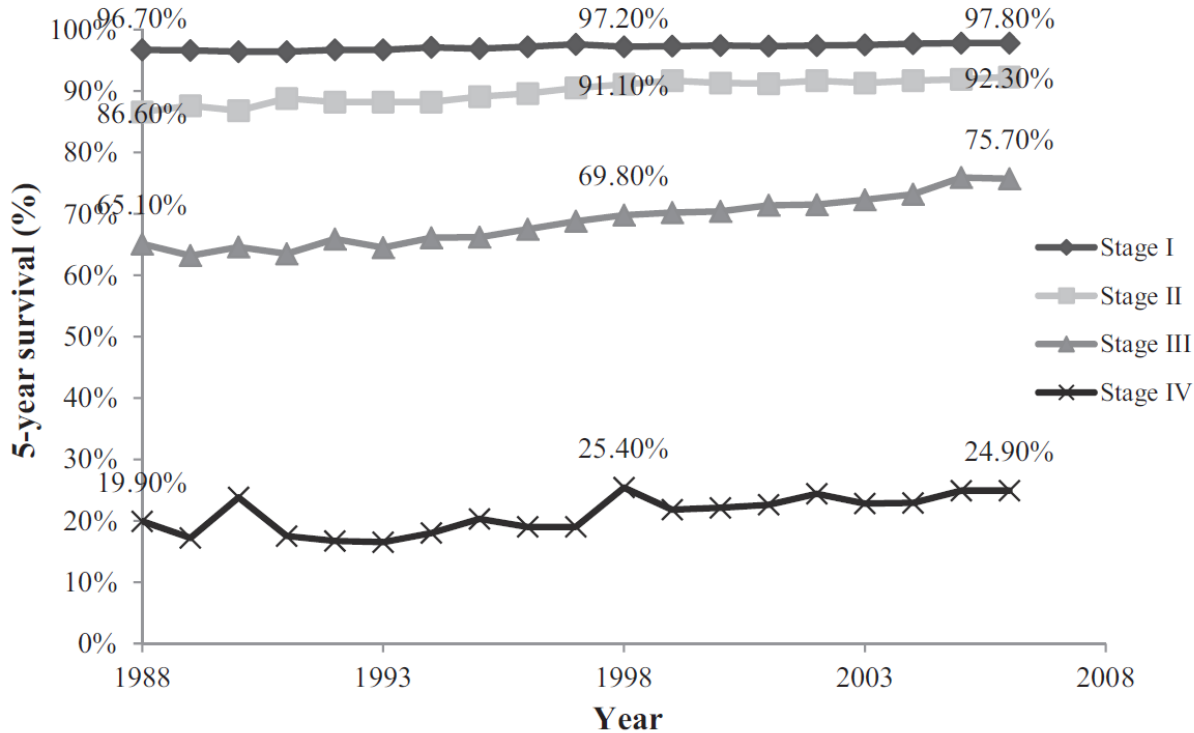
CI = continuous infusion; 5-FU = 5-fluorouracil; FOLFIRI = leucovorin, continuous infusion 5-fluorouracil, irinotecan; FOLFOX = 5-fluorouracil, leucovorin, oxaliplatin; IFL = irinotecan, bolus 5-fluorouracil, leucovorin; LV = leucovorin; N/A = Not available; OS = overall survival; OXIRI = oxaliplatin, irinotecan; PFS = progression-free survival.

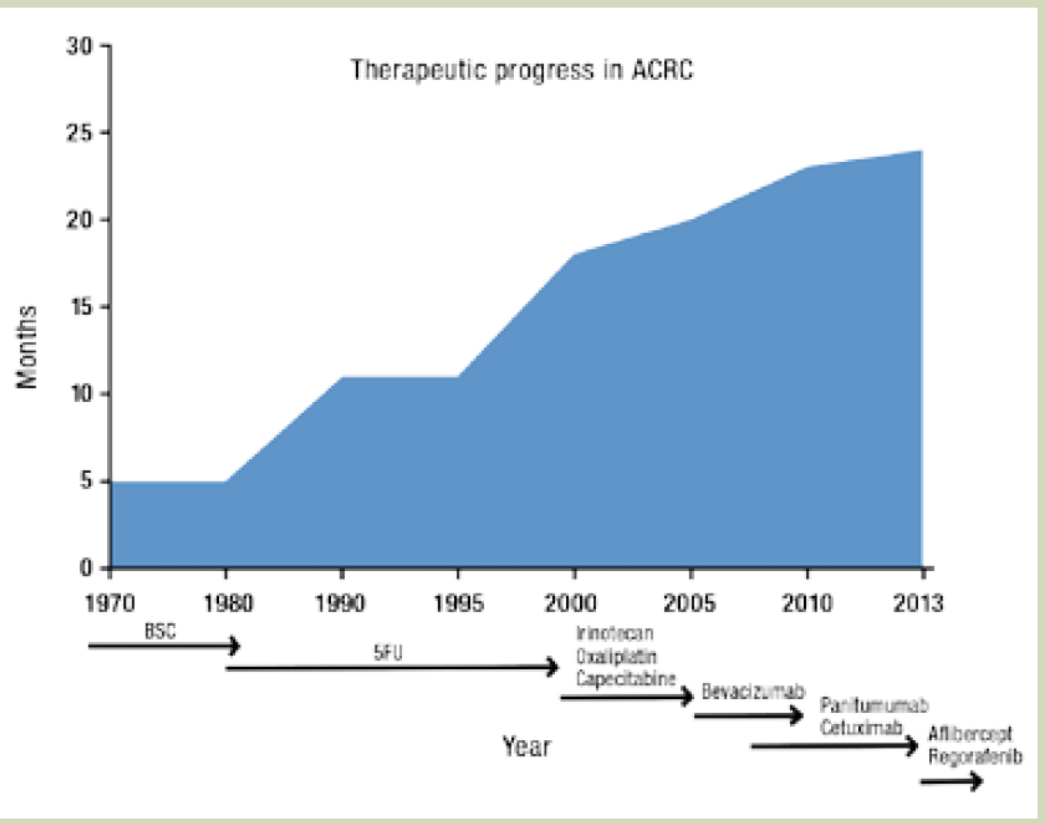


## Overall survival from advanced breast cancer



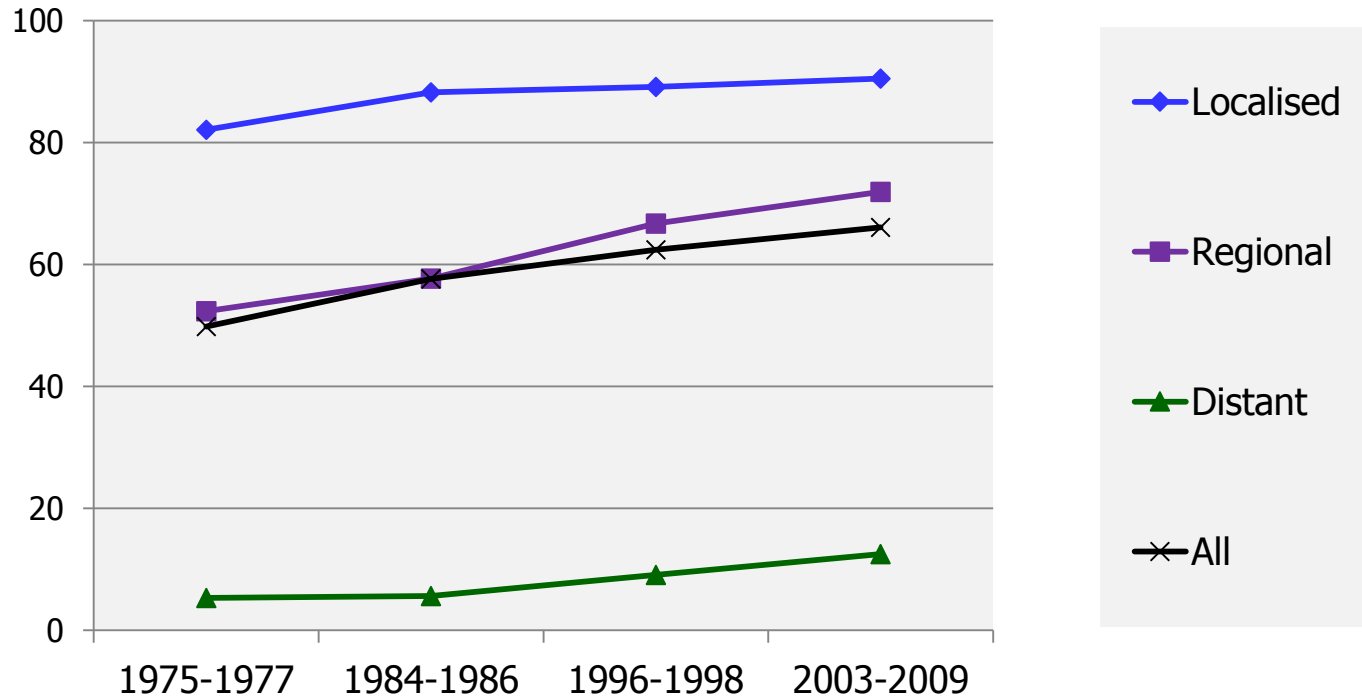
Trends in 5-Year  
survival for stages I–IV  
breast cancer in  
US White population:  
SEER, 1988–2006



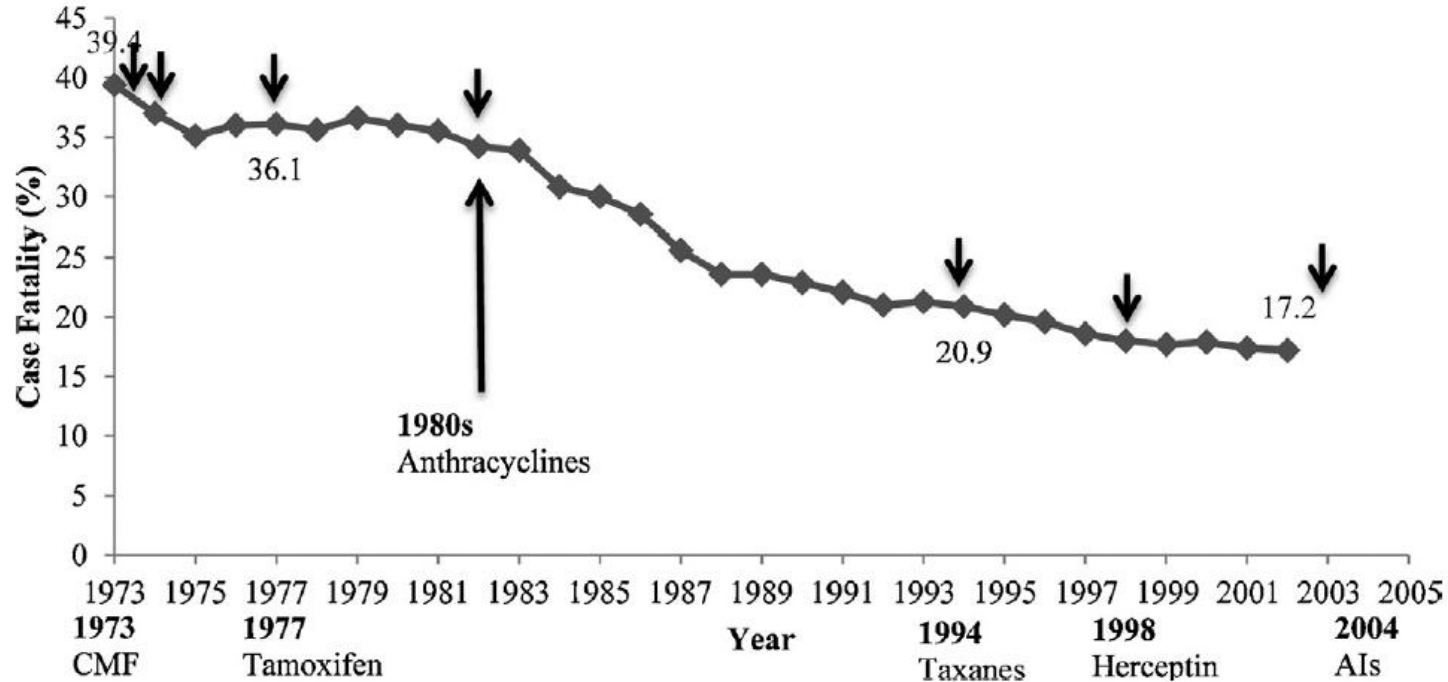


Therapeutic progress in  
advanced colorectal  
cancer and  
improvements in overall  
survival over time in  
clinical trial settings

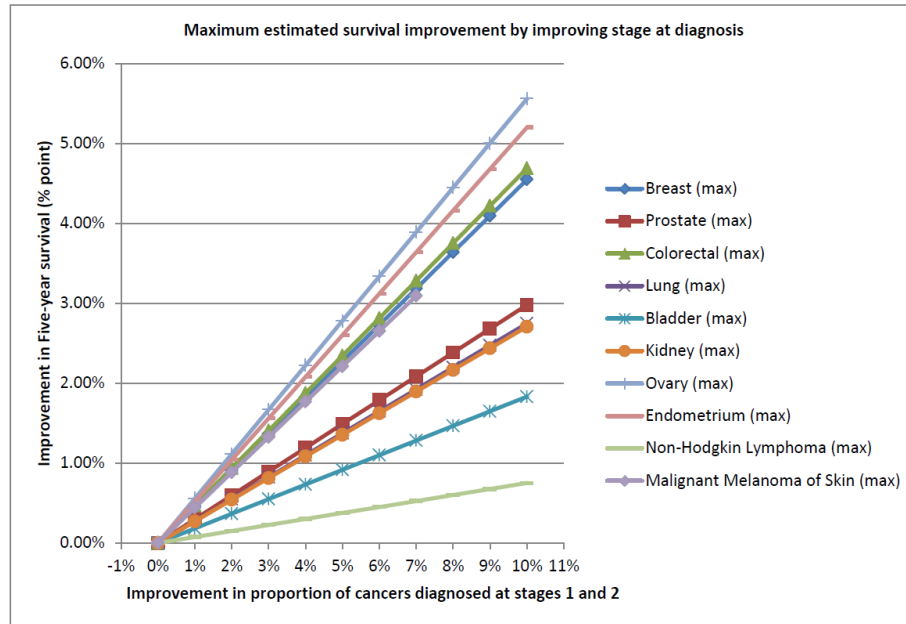
# Trends in 5-year survival rates for colorectal cancer by stage, USA, SEER 1975-2009



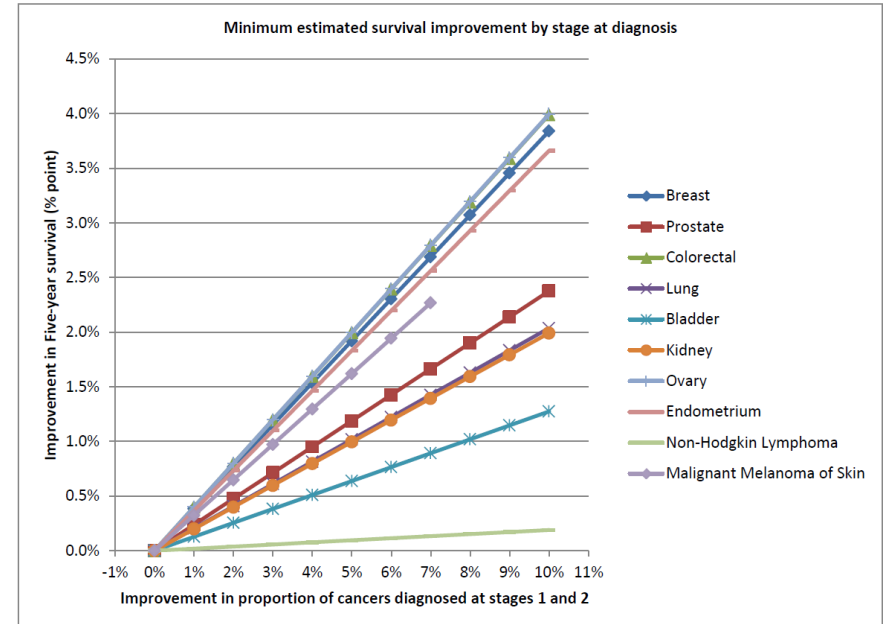
# 10-Year breast cancer case fatality and historical timeline of breast cancer systemic treatments



## Maximum estimated survival improvement by improving stage at diagnosis



## Minimum estimated survival improvement by stage at diagnosis



# Research on how to put in place enablers for achieving earlier diagnosis and its benefits *(including reducing harms!)*

- If they exist, how to put in place effective screening programs to diagnose early cancer among people who do not yet have symptoms?
- How to ensure high levels of participation in cancer screening, maximizing the opportunity for early diagnosis, while supporting informed choice?
- How to avoid/reduce over diagnosis and over treatment?
- How to make the public aware of the signs and symptoms of potential cancer?

# Research on how to put in place enablers for achieving earlier diagnosis and its benefits (*including reducing harms!*)

- How to translate *awareness and knowledge* of symptoms into *motivation to seek care and early diagnosis*?
- How to educate primary care professionals on the signs and symptoms of potential cancer and support them in investigating signs and symptoms and referring patients promptly?
- How to ensure rapid access to diagnostics and specialist expertise, ensuring that the system does not impose delays once cancer is suspected?
- Augmented research on how to make new potentially promising modalities of early detection (e.g. liquid biopsy new biomarkers) feasible, affordable and safe for the population at large?