

Early detection: the paradigm

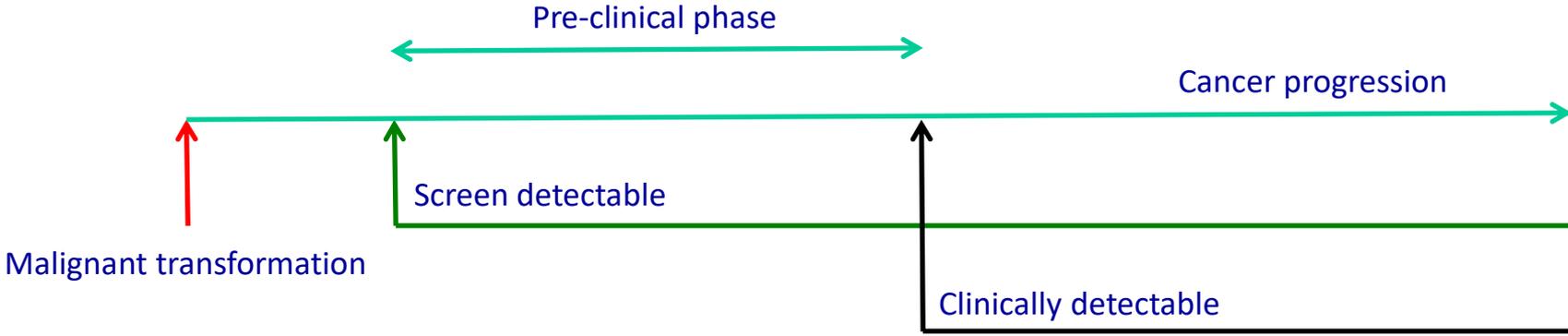
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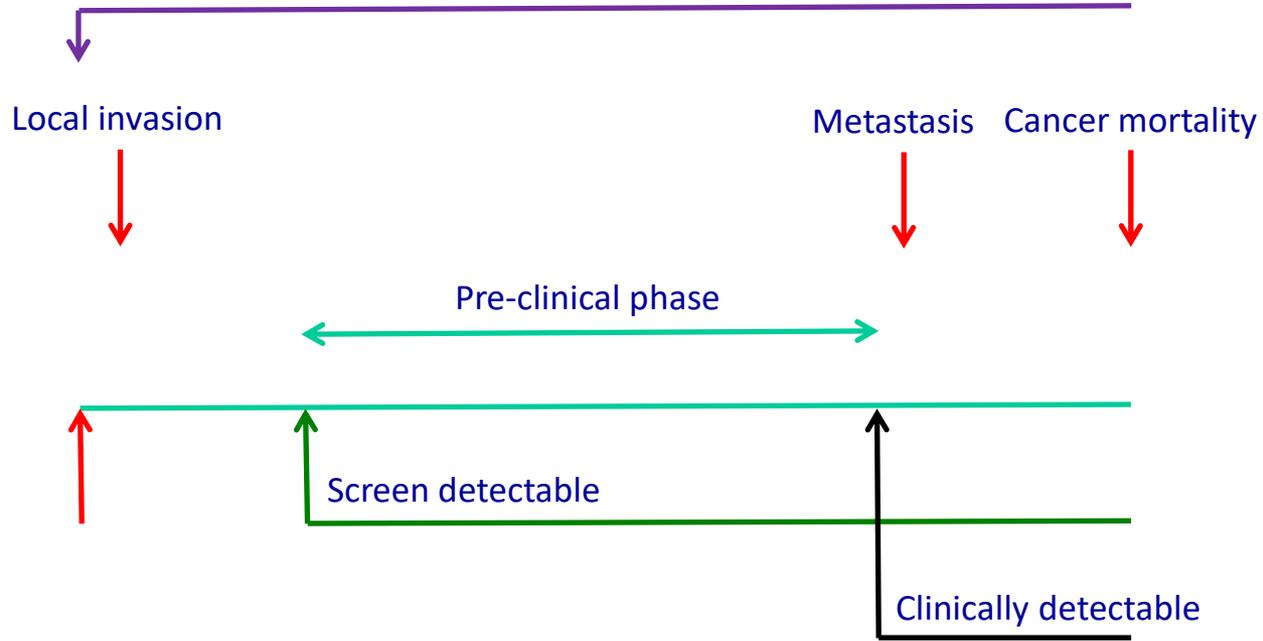
Rationale for early detection

- Early stage cancers have better prognosis than late stage cancer
- Thus the earlier cancers are detected the better

Early detection paradigm



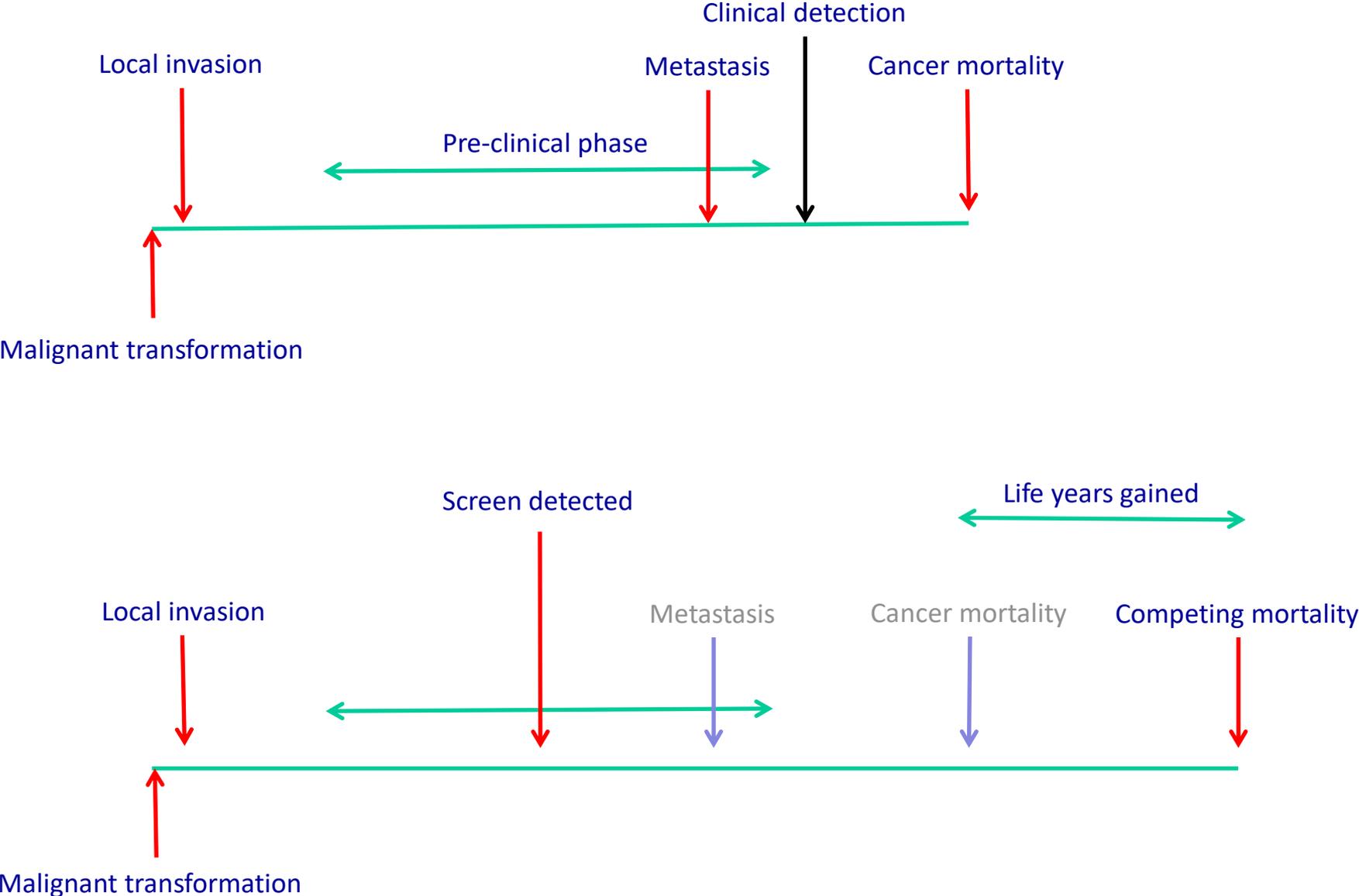
Competing mortality



The truth (disease present)

		+	-
The test	+		
	-		

Improved outcome



The truth

+

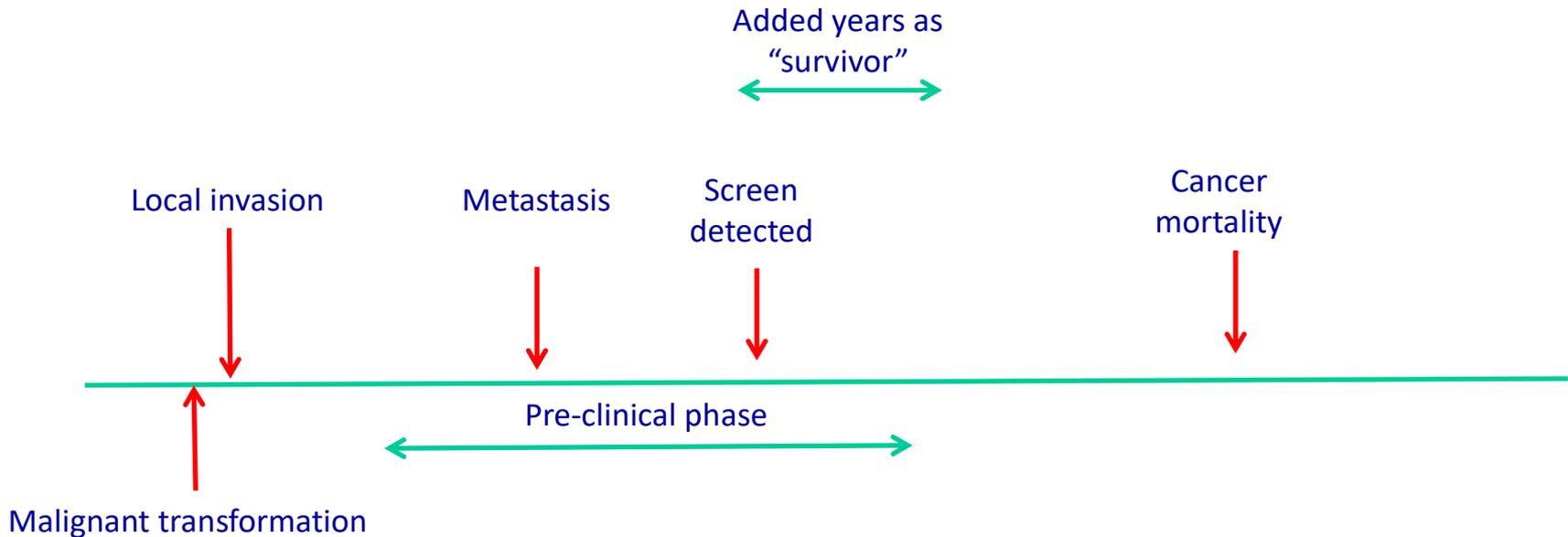
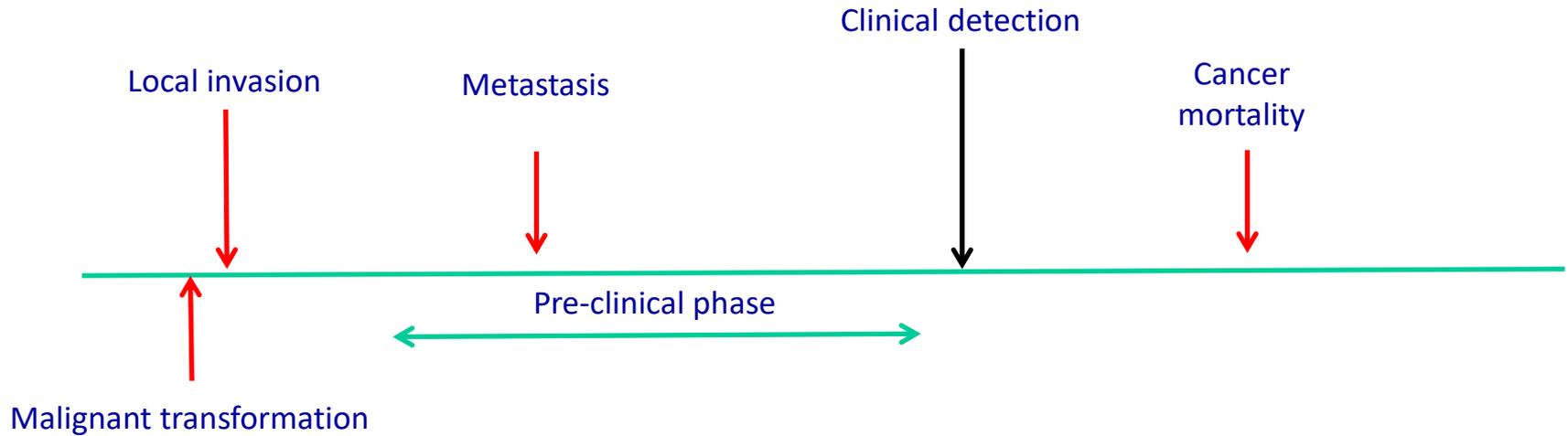
True positives



The test

+

Lead time bias



The truth

+

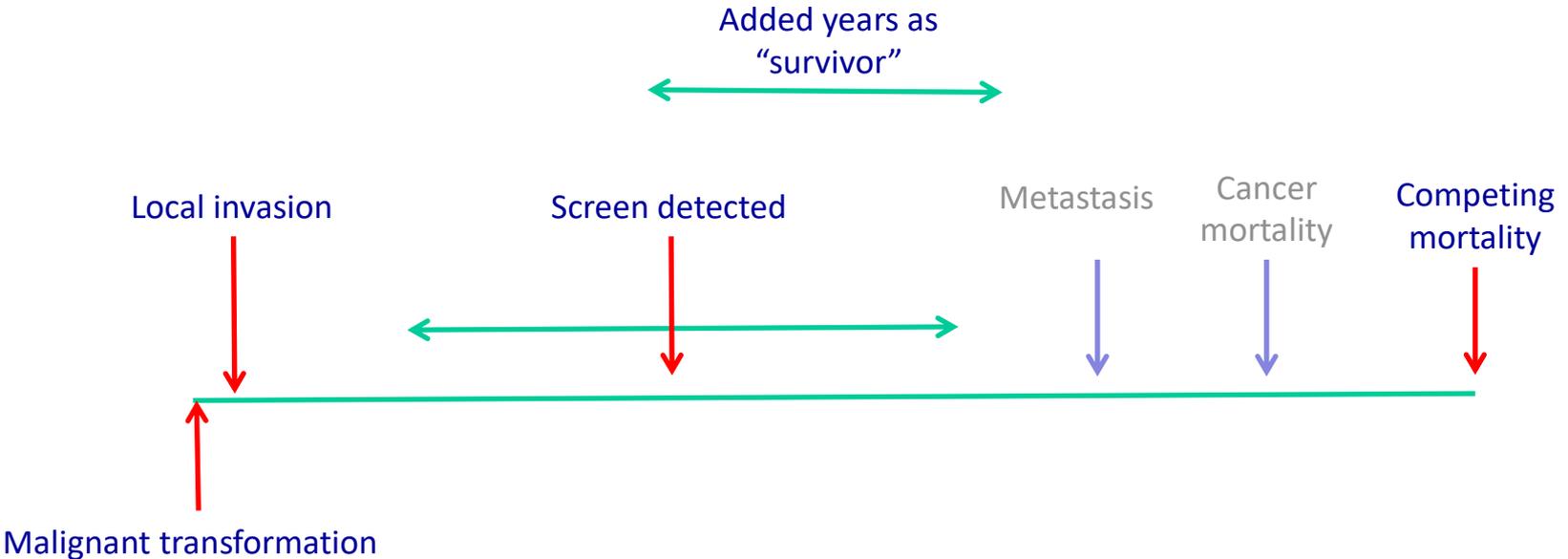
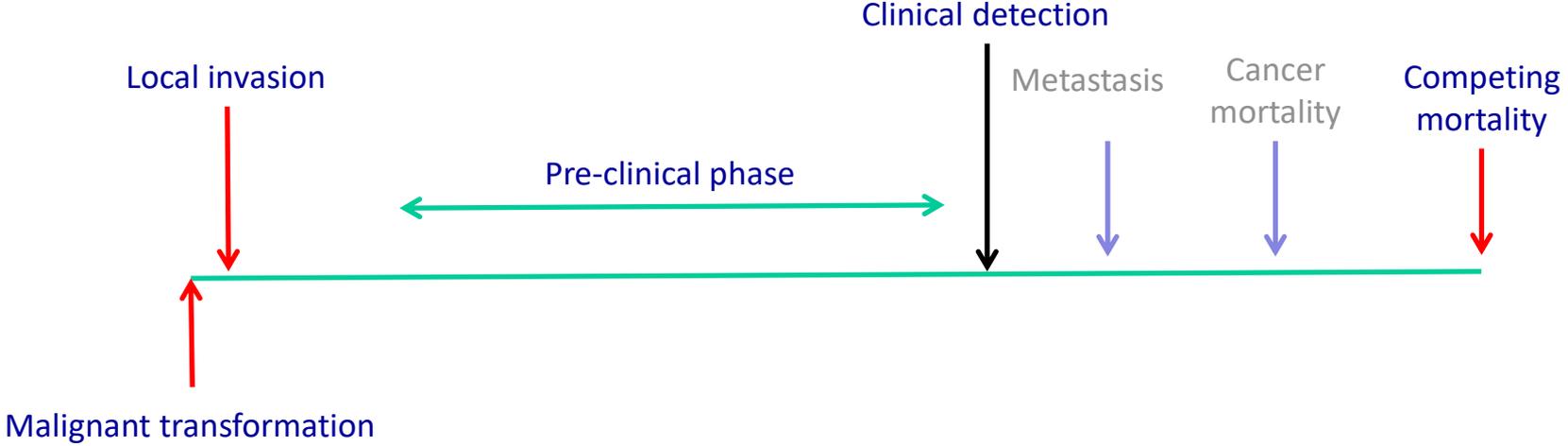
True positives



The test

+

Length time bias



The truth

+

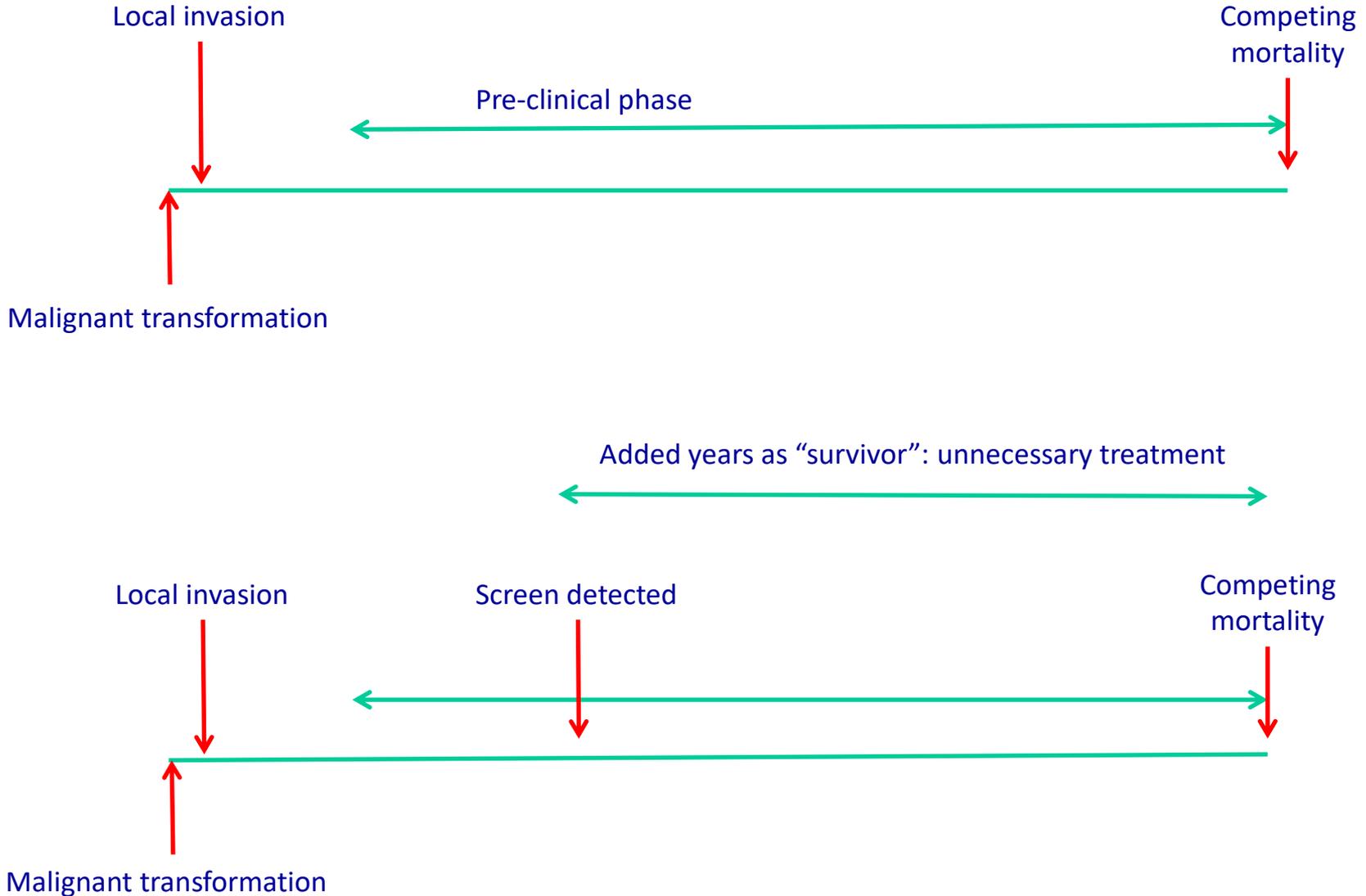
True positives



The test

+

Overdiagnosis



The truth

+

True positives



+



The test

The consequence of overdiagnosis

“As a results of screening I was diagnosed with DCIS. This...meant two wide excisions, one partial mutilation (sorry mastectomy), one reconstruction, five weeks radiotherapy, four bouts of cellulitis at the donor site, one nipple reconstruction, seven general anaesthetics and more than a year off work...I expect I have been classified as a screening success. Yet everything about my experience tells me the opposite. I am quite clear in my mind that screening has caused me considerable and lasting harm. It has certainly not saved or prolonged my life, which is the purpose of screening.”

Jane Flanders

DCIS: the reality from the patient's perspective

BMJ.com February 2009

“The major harm of [breast cancer] screening, which is overdiagnosis and subsequent overtreatment of healthy women, is not mentioned in any of 31 invitations used by 31 publicly funded breast screening programmes in six countries”

Peter Gotzsche

Breast screening the facts - or maybe not

BMJ 2009

The truth

-

False positives



+



The test

The truth

+

False
negatives

The test

-



The downside of a false negative

- False reassurance may lead to delay in presentation when symptoms develop
- Later diagnosis rather than earlier diagnosis

The truth

-

True negatives

The test

|



Evaluating the effectiveness of screening

- Benefits are not self-evident
- Potential for harm real
- Randomised controlled trials necessary

Randomised controlled trials of screening



International Journal of Epidemiology, 2015, 264–277

doi: 10.1093/ije/dyu140

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Original article



Public Health Policy

Does screening for disease save lives in asymptomatic adults? Systematic review of meta-analyses and randomized trials

Nazmus Saquib,¹ Juliann Saquib¹ and John PA Ioannidis^{1,2,3*}

Screening trial meta-analysis results

Intervention	Cancer	Cause specific RRR (%)	All cause RRR (%)
Mammography	Breast	10 (-2 – 21)	1 (-3 – 5)
	Breast	25 (17 – 33)	1 (-1 – 3)
FOBT	Colorectal	16 (10 – 22)	0 (-1 – 1)
Flexi sig	Colorectal	29 (19 – 39)	1 (-7 – 9)
Chest XR	Lung	-11 (-23 – 0)	-1 (-8 – 6)
Lung CT	Lung	-23 (-87 – 19)	-34 (-93 – 7)
CA125	Ovarian	-8 (-38 – 16)	0 (-6 – 4)
PSA	Prostate	0 (-17 – 14)	0 (-3 -4)

RRR = relative risk reduction = $1 - RR$

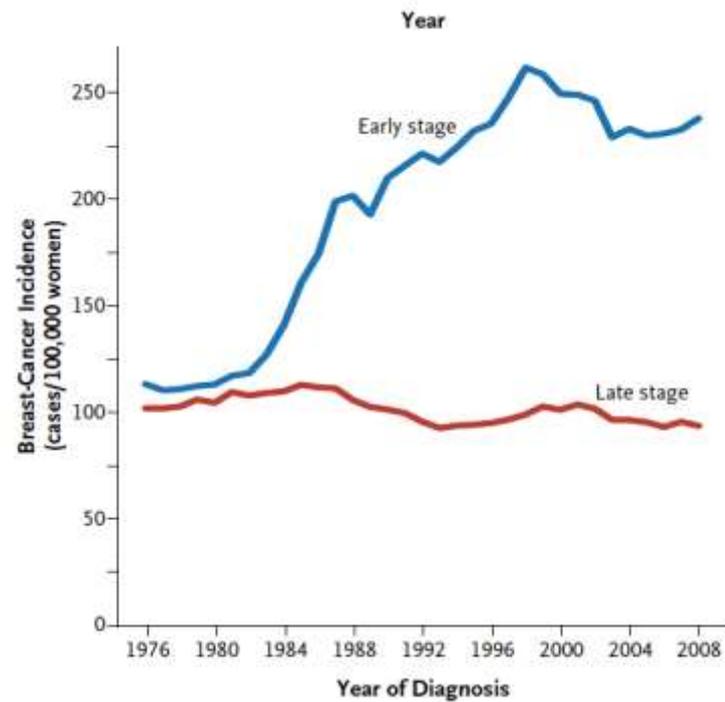
Red numbers are increase in RR

Ongoing debate

ORIGINAL ARTICLE

Effect of Three Decades of Screening Mammography on Breast-Cancer Incidence

Archie Bleyer, M.D., and H. Gilbert Welch, M.D., M.P.H.



Bleyer A, Welch HG. *N. Engl. J. Med.* 2012;367(21):1998-2005.

- Abnormal mammograms that do not result in cancer diagnoses are opportunities for physicians to stress the importance of regular screening
 - De Frank, J Med Screening 2012
- Close encounters with lions that do not result in death are opportunities for game wardens to stress the pleasures of wandering around in the national parks of Kenya unarmed