



Overdiagnostik

– en uundgåelig konsekvens af medicinsk screening

John Brodersen

Professor, speciallæge i almen medicin, ph.d.



Center for Forskning & Uddannelse i Almen Medicin, IFSV, KU
Forskningsenheden for Almen Praksis, Region Sjælland
john.brodersen@sund.ku.dk



Overdiagnostik v. screening

- Post-moderne medicin
- Definition
- Overdetektion ved screening
 - Hvorfor?
 - Eksempler
 - Stadieskifte
 - Incidens og mortalitet
- Konsekvenser af overdiagnostik
- Fremtiden?



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Traditionel medicin

symptomer



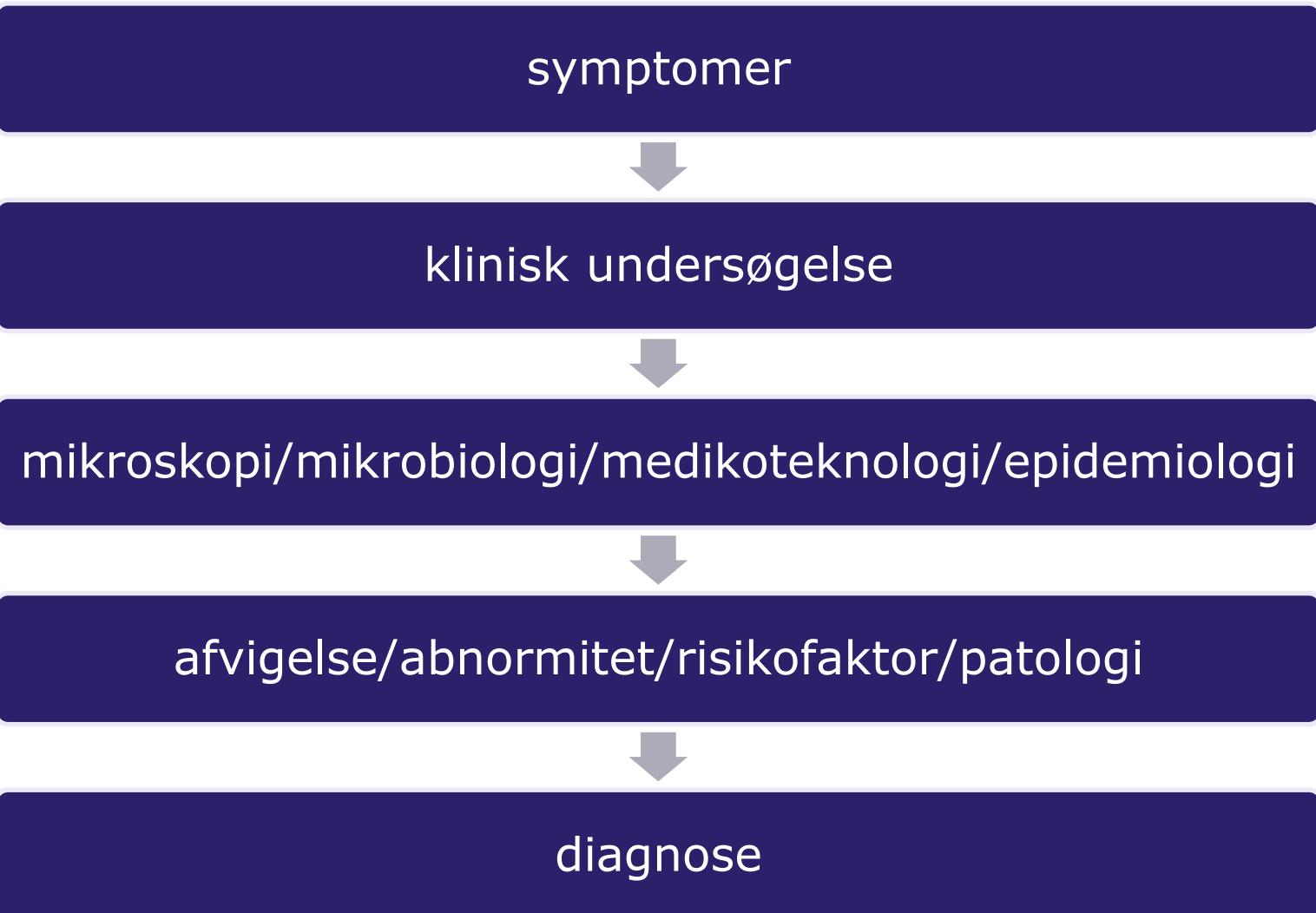
klinisk undersøgelse

Curative Medicine





Moderne medicin



Preventive Medicine





Post-moderne medicin

mikroskopi/mikrobiologi/medikoteknologi/epidemiologi



afvigelse/abnormitet/risikofaktor/patologi



korrekt diagnose + overdiagnostik



illness



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korrekt diagnose + overdiagnostik



illness



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Overdiagnostik - definition

- “Overdiagnosis is the diagnosis of ‘illnesses’ that would never have caused patients harm but potentially exposes them to treatments where the risks outweigh the benefits.”

Doust & Glasziou. Is the problem that everything is a diagnosis?
Australian Family Physician 42:856-859, 2013.



Overdiagnostik - beskrivelse

- “Overdiagnosis occur when individuals are diagnosed with conditions that will never cause symptoms or death”
- “...the ultimate criterion for overdiagnosis: at the end of life, if the person never developed a problem from her condition, she has been overdiagnosed”

Welch, Schwartz, Woloshin. *Overdiagnosed. Making People Sick in the Pursuit of Health*, Boston: Beacon Press, 2011.



Overdiagnostik - min definition

Diagnosticering af afvigelser, abnormiteter, risikofaktorer og/eller patologiske forandringer, som uopdaget eller udiagnosticeret aldrig i sig selv vil;

- give personen symptomer (eks. afvigelser),
- vil medføre sygelighed eller
- vil være årsag til personens død.



Overdiagnostik - 3 områder

- Nedsætte grænseværdier og/eller udvide sygdomsklassifikation
- Opfinde nye "sygdomme" (disease mongering)
- Overdetektion ved screening



Overdiagnostik - 3 områder

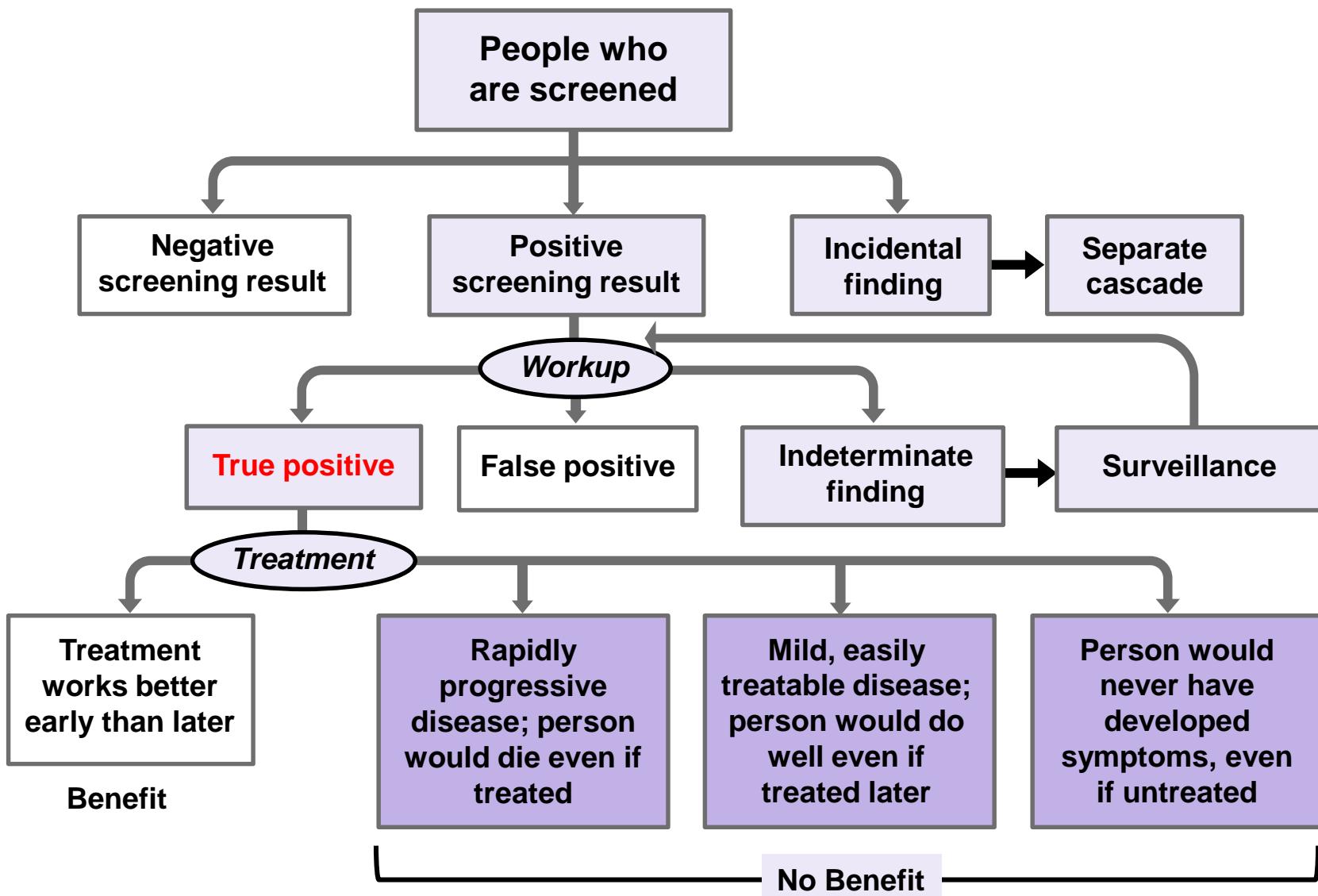
- Nedsætte grænseværdier og/eller udvide sygdomsklassifikation
- Opfinde nye "sygdomme" (disease mongering)
- **Overdetektion ved screening**



Overdiagnostik v. screening

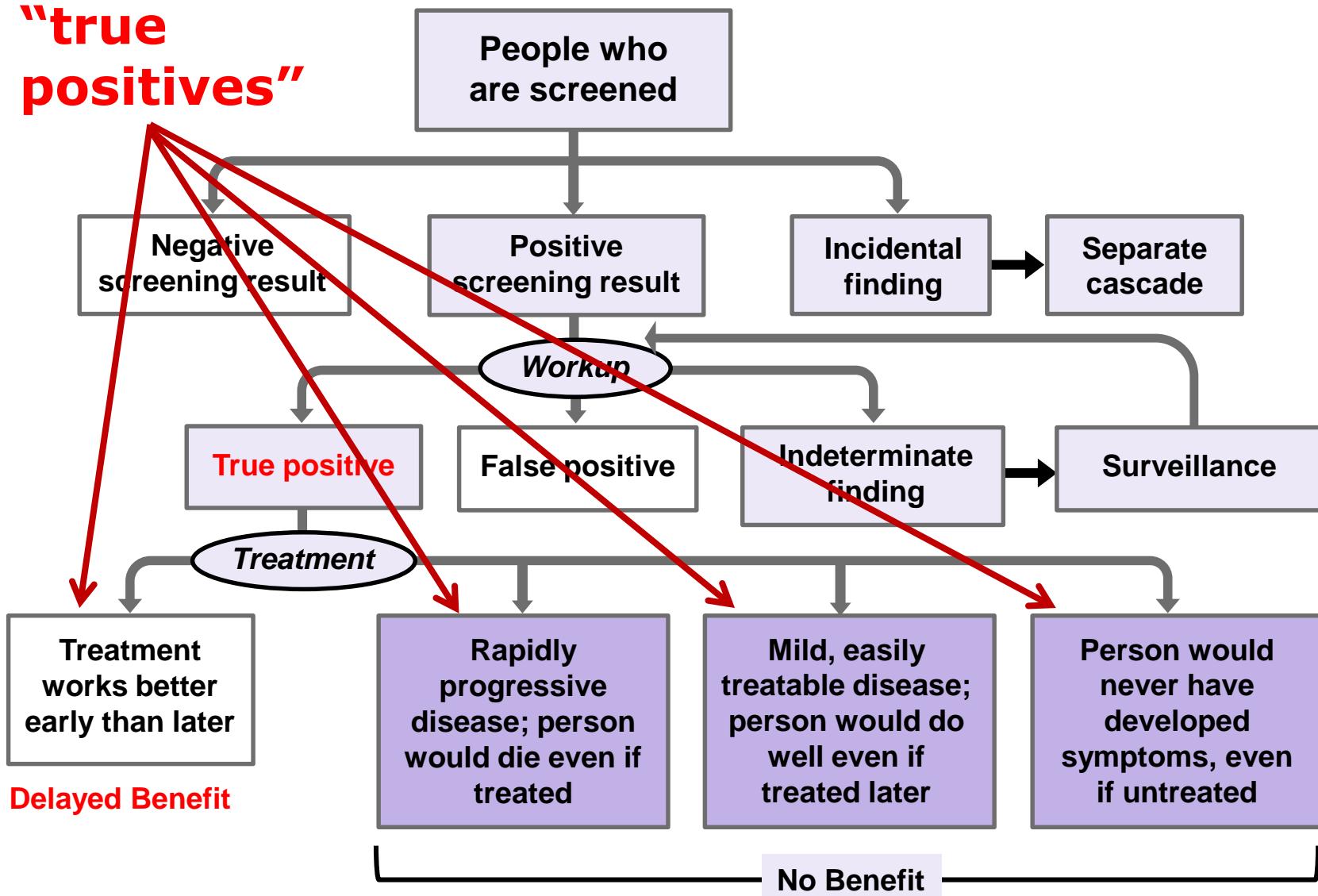
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The Screening Cascade



Types of “true positives”

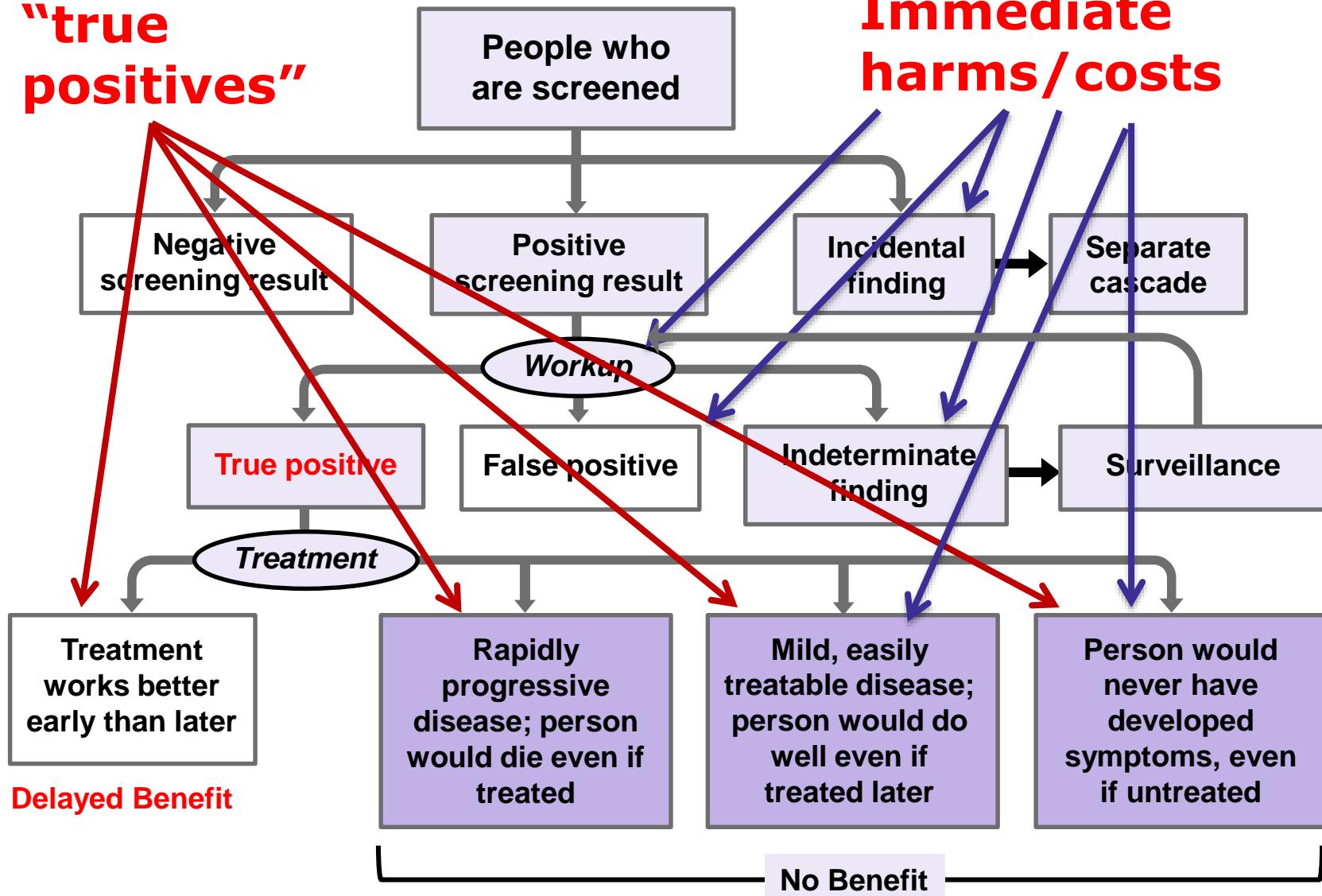
The Screening Cascade



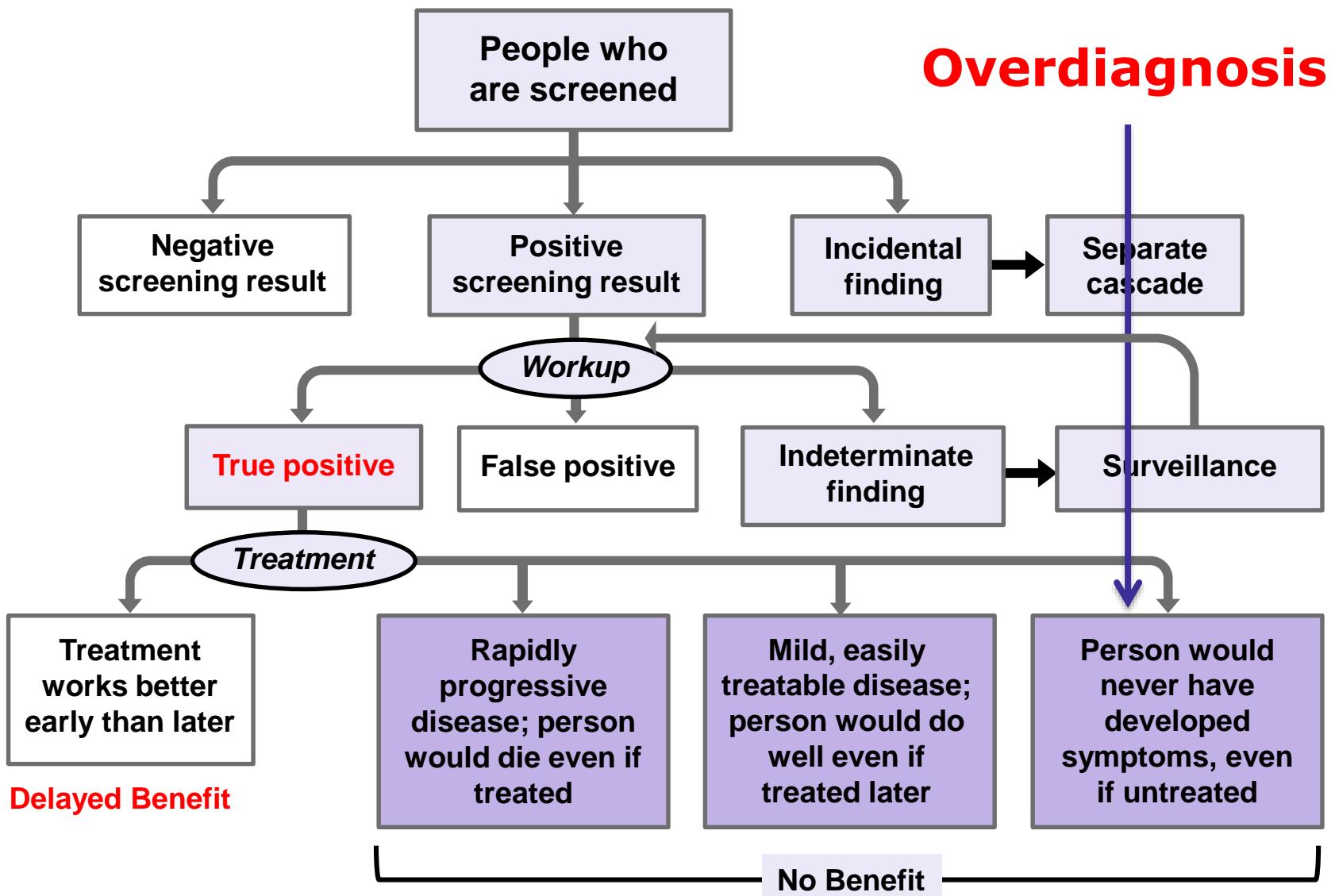
Types of “true positives”

The Screening Cascade

Immediate harms/costs



The Screening Cascade





Screening - på godt og ondt

GODT

- Nedsat morbiditet og mortalitet
- Mere skånsom behandling
- Tryghed for ikke at være syg
- Primær forebyggende effekt

ONDT

- Patienter i flere år
- Overdiagnostik
- Falsk tryghed
- Falsk alarm
- Overbehandling
- Øget morbiditet og mortalitet
- Induceret sygdom



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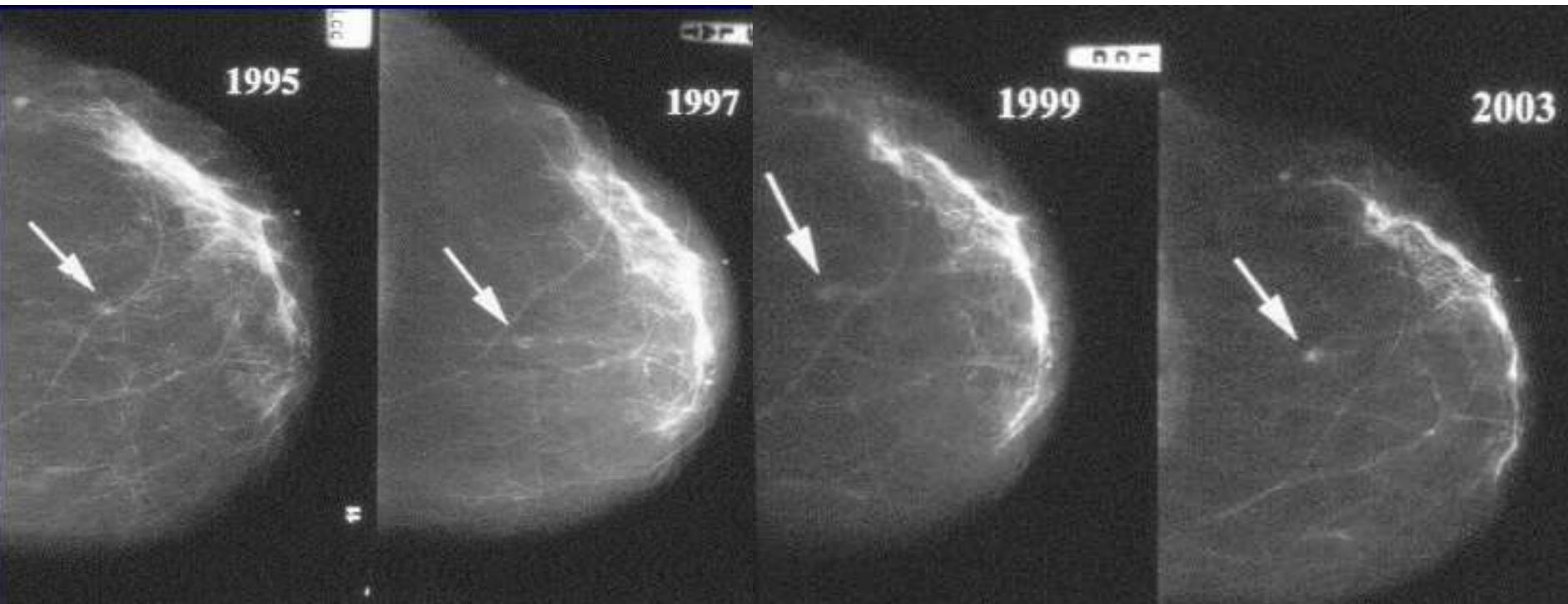


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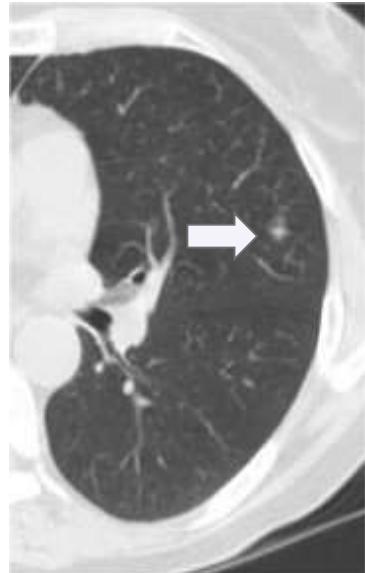


Mammografiscreening

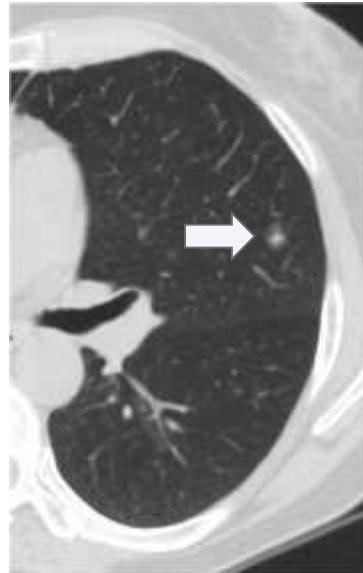


Lungecancerscreening m. CT-skanning

17.08.05



17.11.05



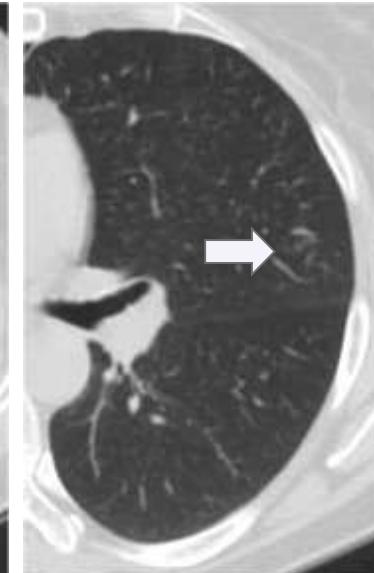
01.03.06



16.10.06



10.10.07



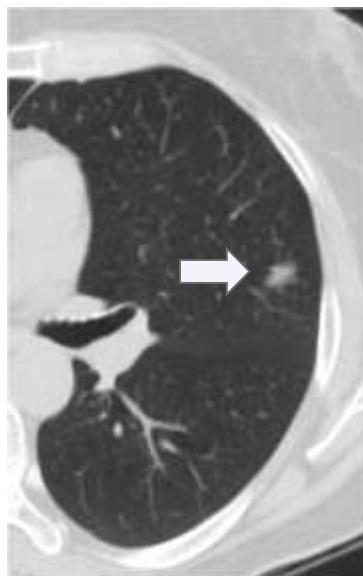
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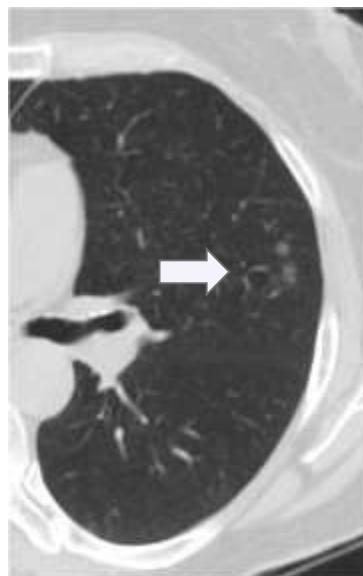
26.02.09



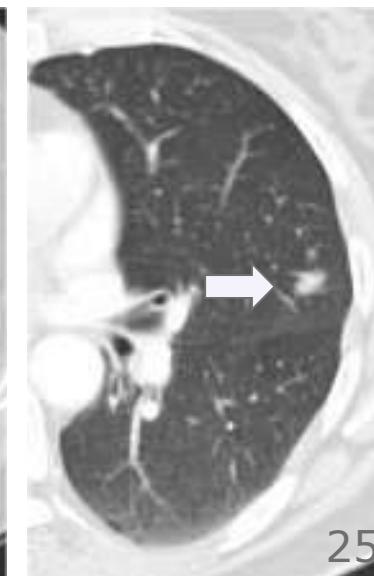
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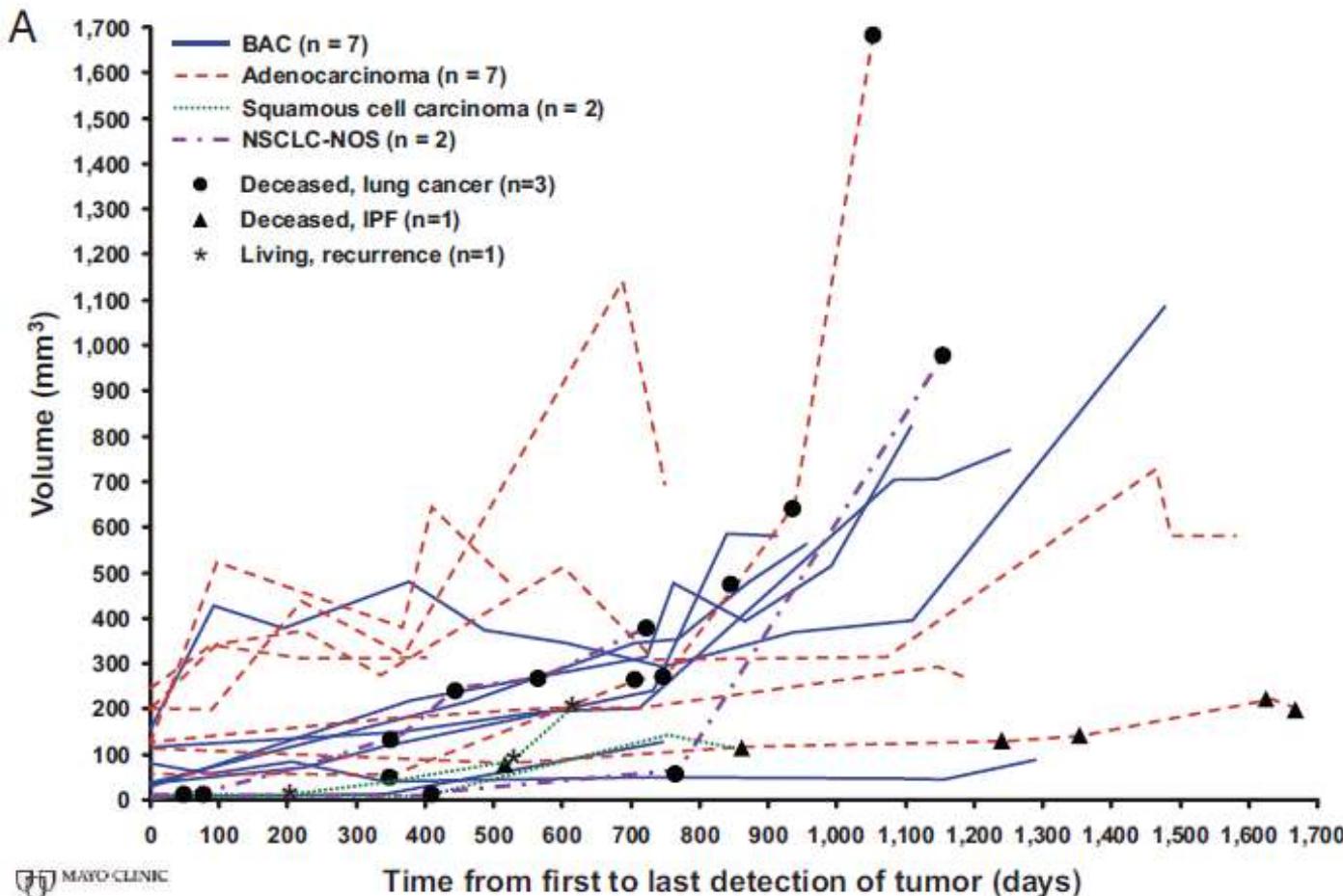


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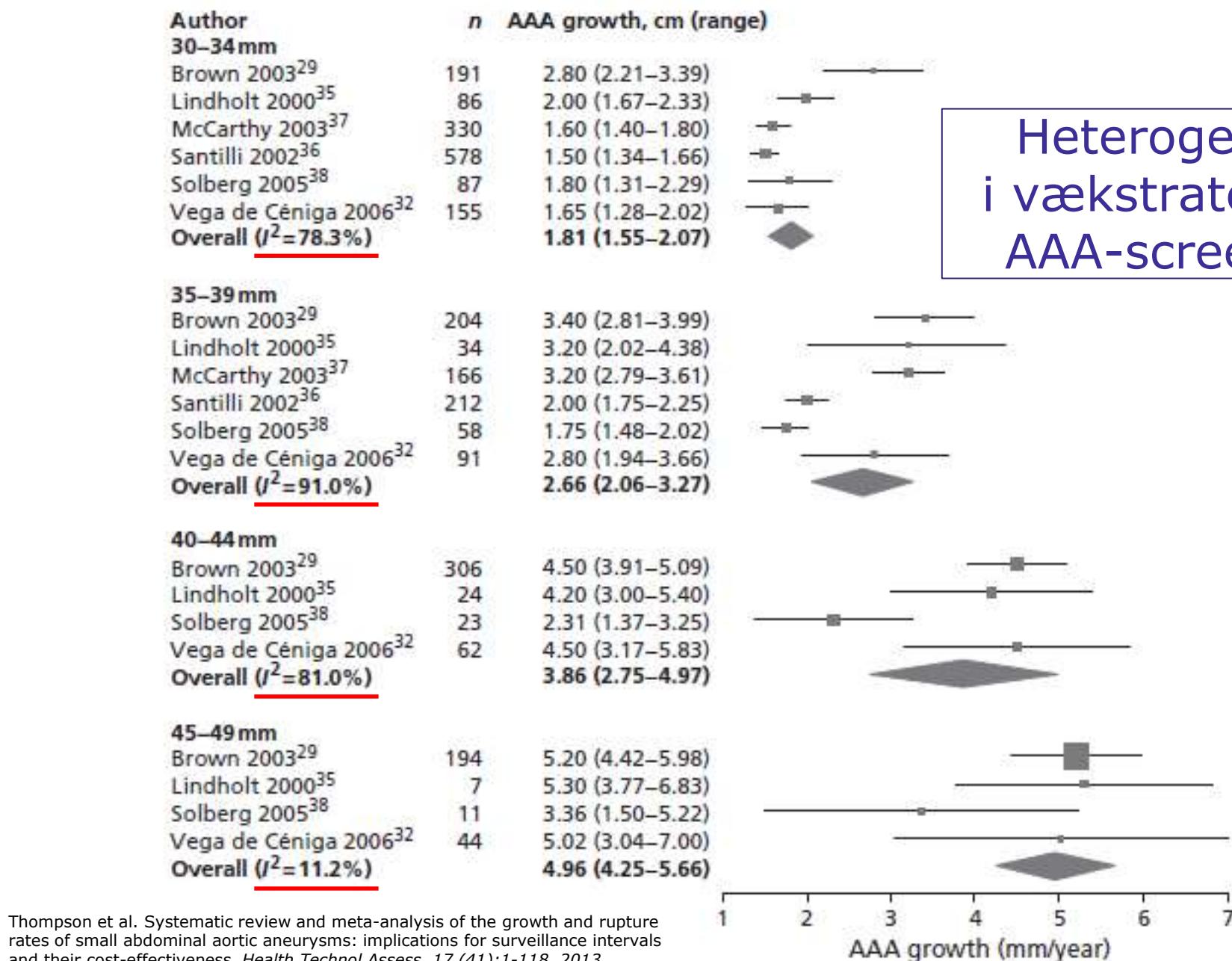


Natural History of Lung Cancer



R. M. Lindell, T. E. Hartman, S. J. Swensen, J. R. Jett, D. E. Midthun, and J. N. Mandrekar. 5-year lung cancer screening experience: growth curves of 18 lung cancers compared to histologic type, CT attenuation, stage, survival, and size. *Chest.* 136 (6):1586-1595, 2009.

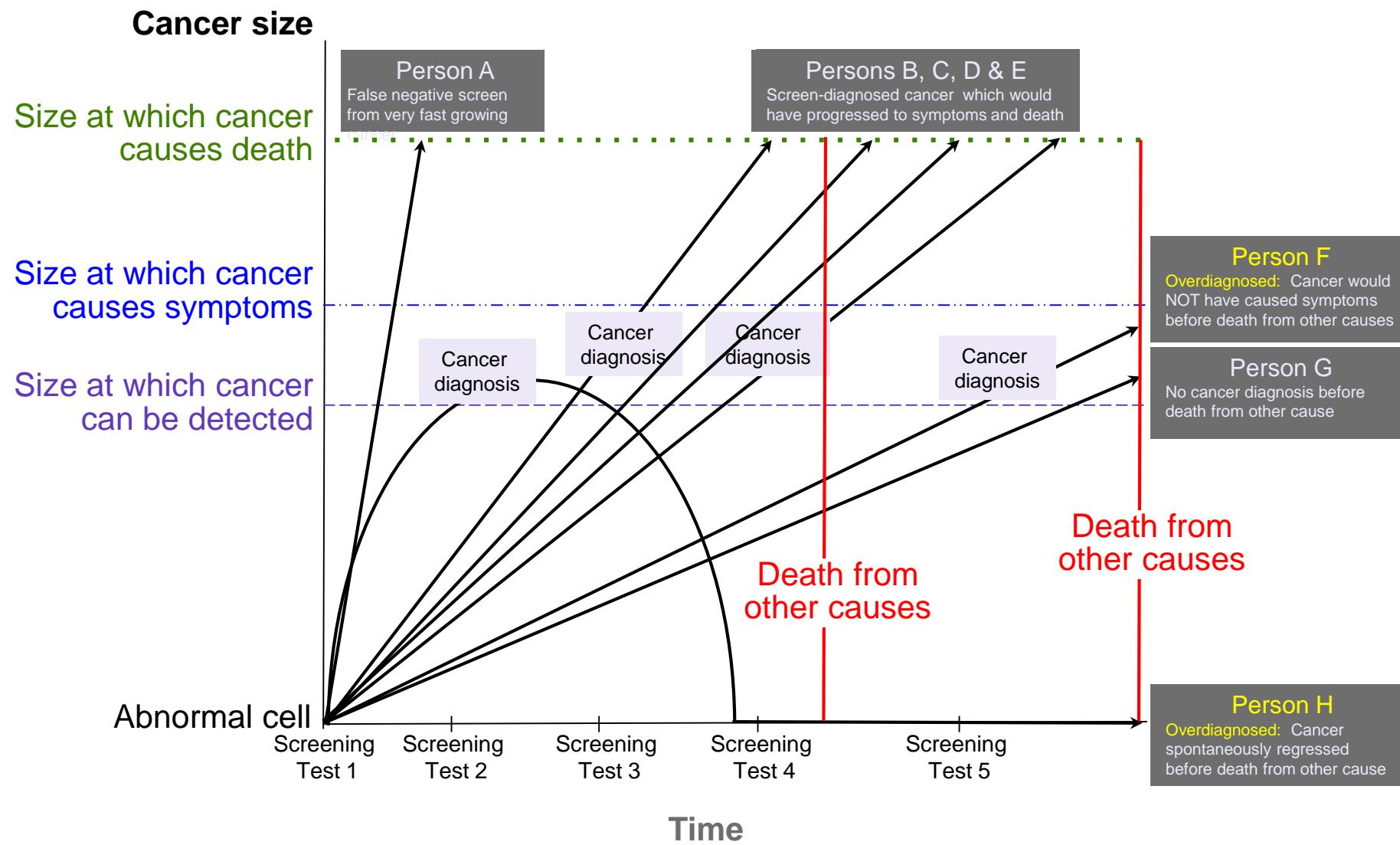
Heterogenitet i vækstrater ved AAA-screening



Thompson et al. Systematic review and meta-analysis of the growth and rupture rates of small abdominal aortic aneurysms: implications for surveillance intervals and their cost-effectiveness. *Health Technol Assess.* 17 (41):1–118, 2013.

FIGURE 3 Aneurysm growth rate by 5-mm size ranges of baseline aneurysm diameter: random-effect meta-analyses conducted within subgroups.

Model: what happens at cancer screening?



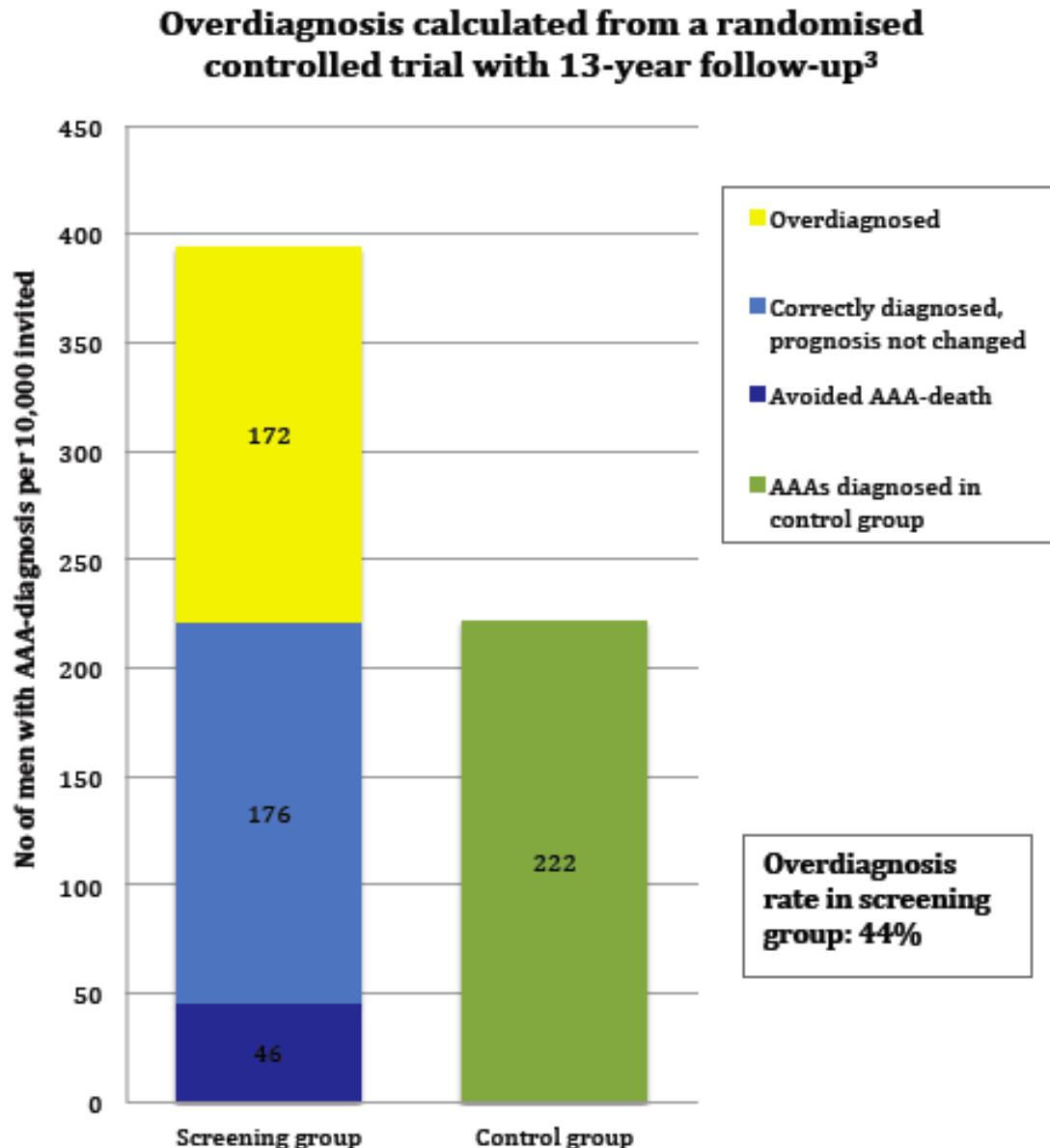
Brodersen J., Schwartz L.M., Woloshin S. Overdiagnosis: How cancer screening can turn indolent pathology into illness. APMIS 122, 2014.



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AAA screening: 38-44% ODX

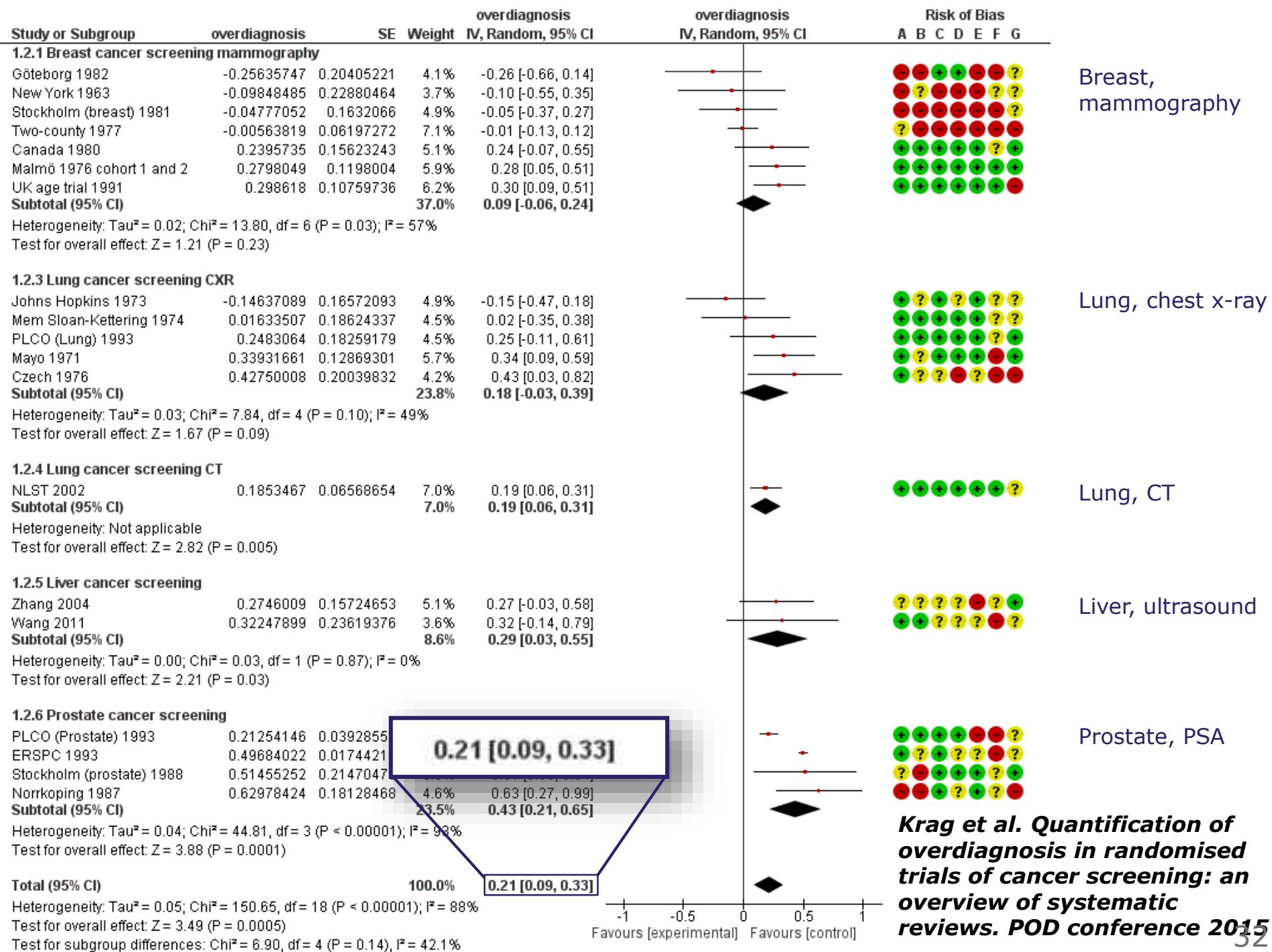


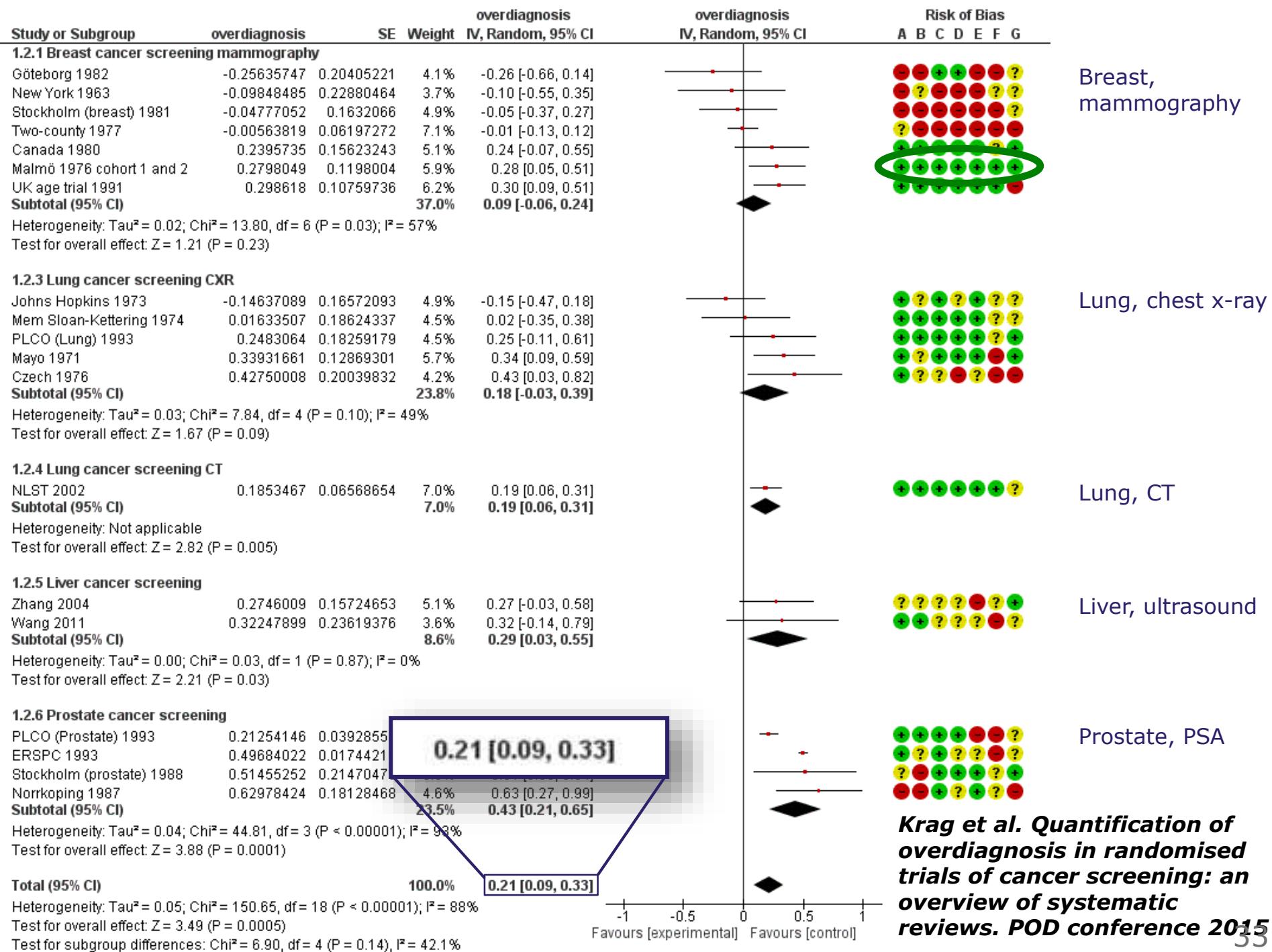
M. Johansson, A. Hansson, and J. Brodersen. Estimating overdiagnosis in screening for abdominal aortic aneurysm: could a change in smoking habits and lowered aortic diameter tip the balance of screening towards harm? *BMJ* 350:h825, 2015.



AAA screening: 38-44% ODx

<http://www.bmj.com/content/350/bmj.h825/infographic>





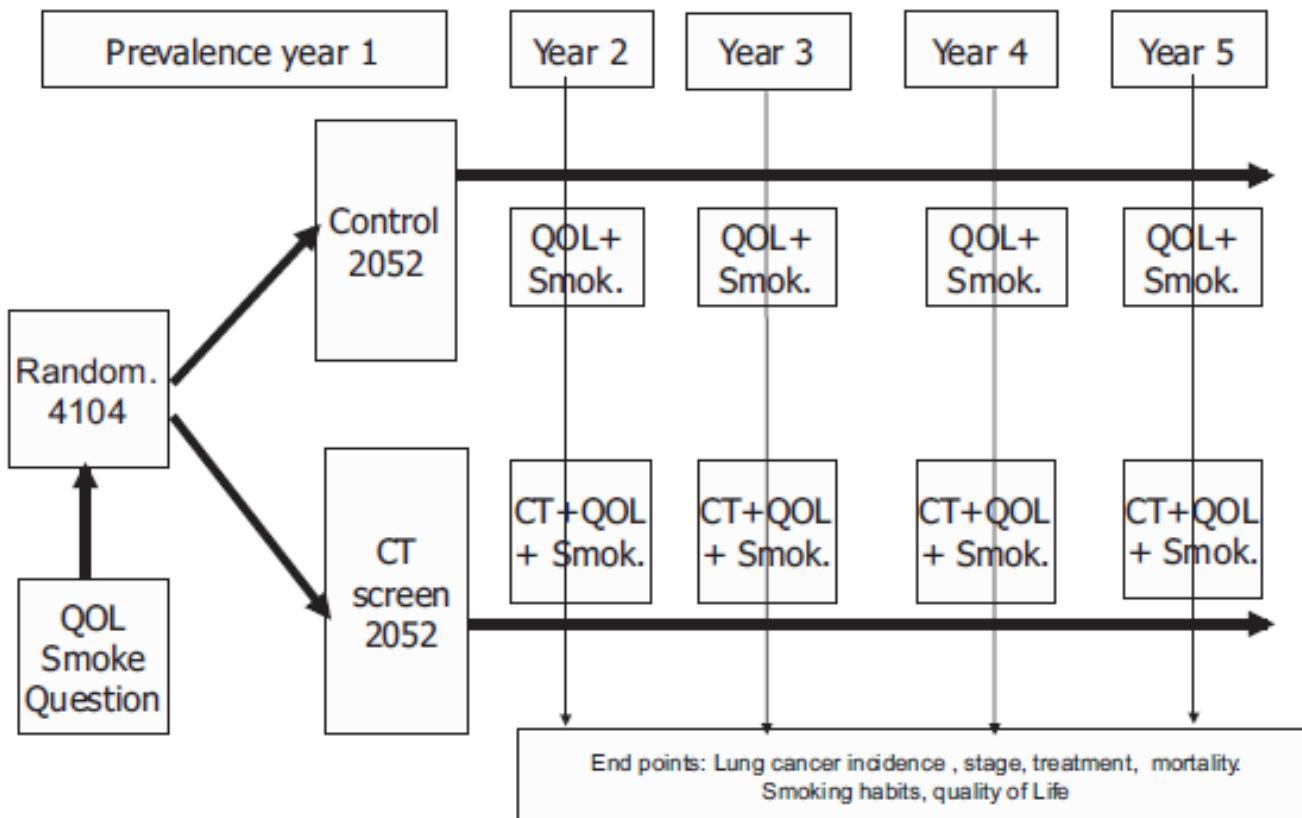


Overdiagnostik (ODx) ved lungecancer CT screening

- NLST: 18,5% ODx
 - Kontrolgruppen: Rtg. af thorax
- Mayo Lung Project: 51% ODx
- **Best case: 18,5% ODx**
- **Worst case: 40,3% ODx**



Danish lung cancer screening trial (DLCST): design



Pedersen et al. The Danish Randomized Lung Cancer CT Screening Trial – Overall Design and Results of the Prevalence Round. *Journal of Thoracic Oncology* 4 (5):608-614, 2009.



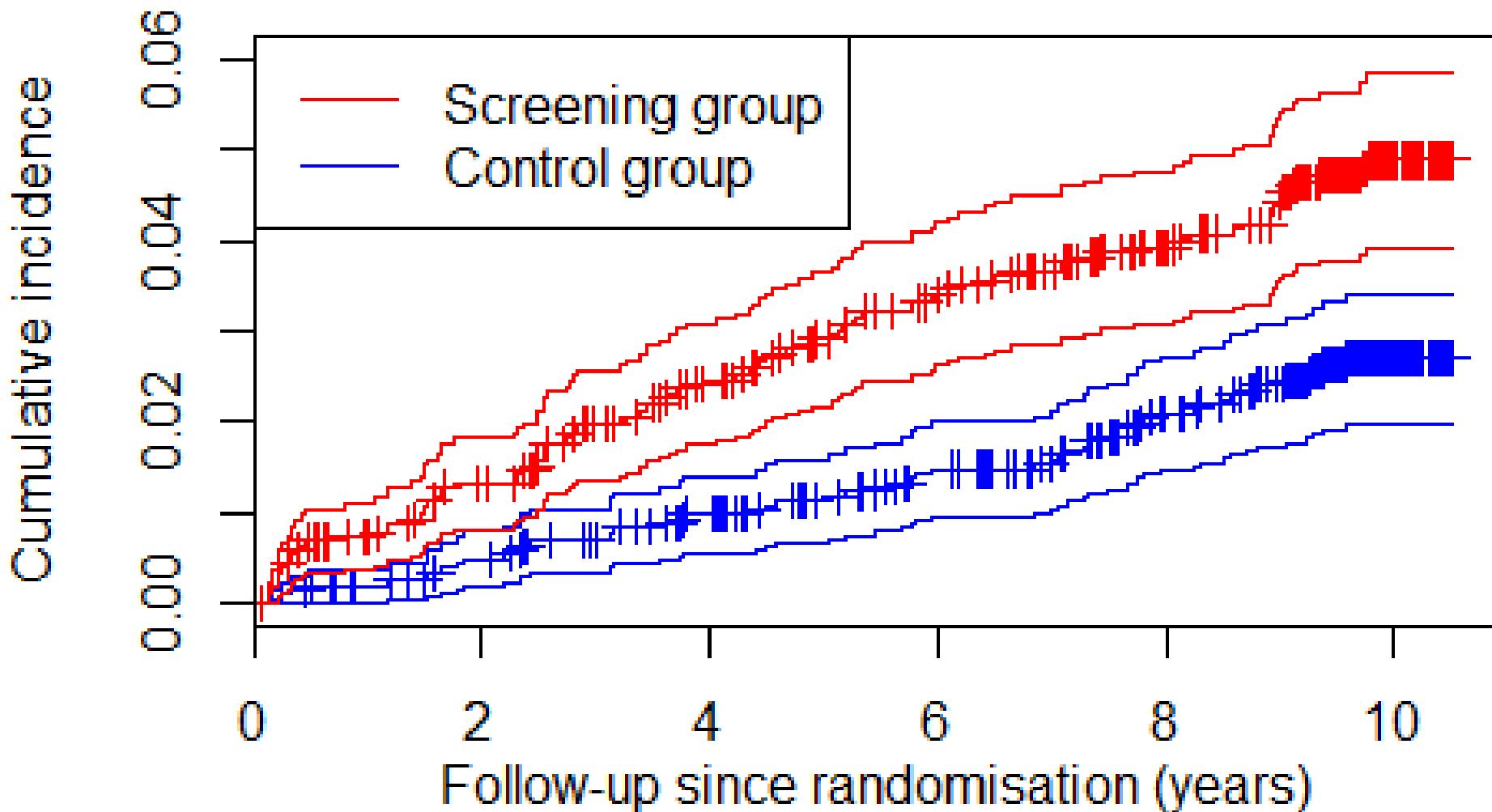
Hvor meget ODx i DLCST?

- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%

Best case: 18,5% ODx
Worst case: 40,3% ODx

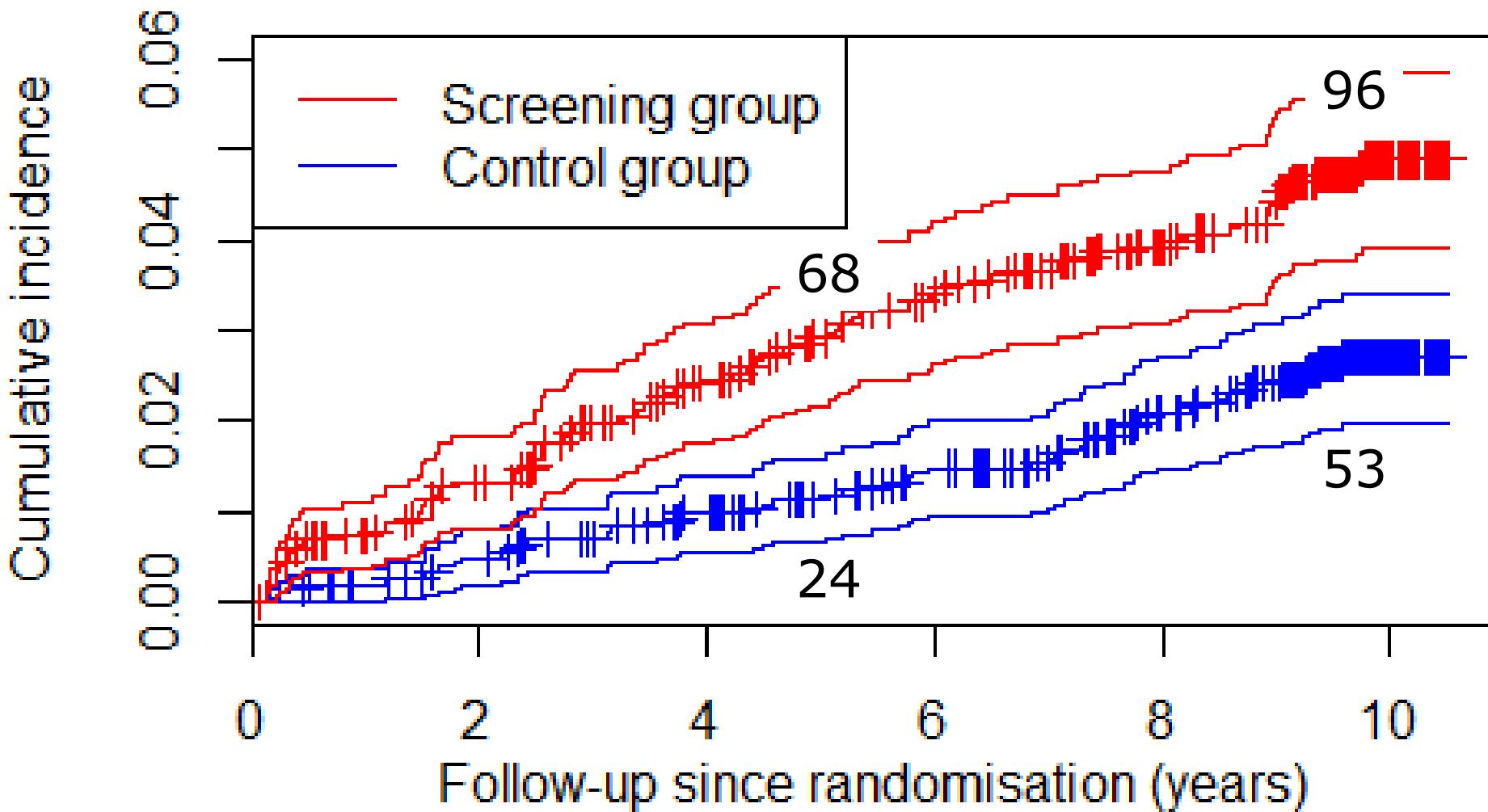
Overdiagnosis in DLCST at 5 year follow-up

Cumulative incidence of lung cancer



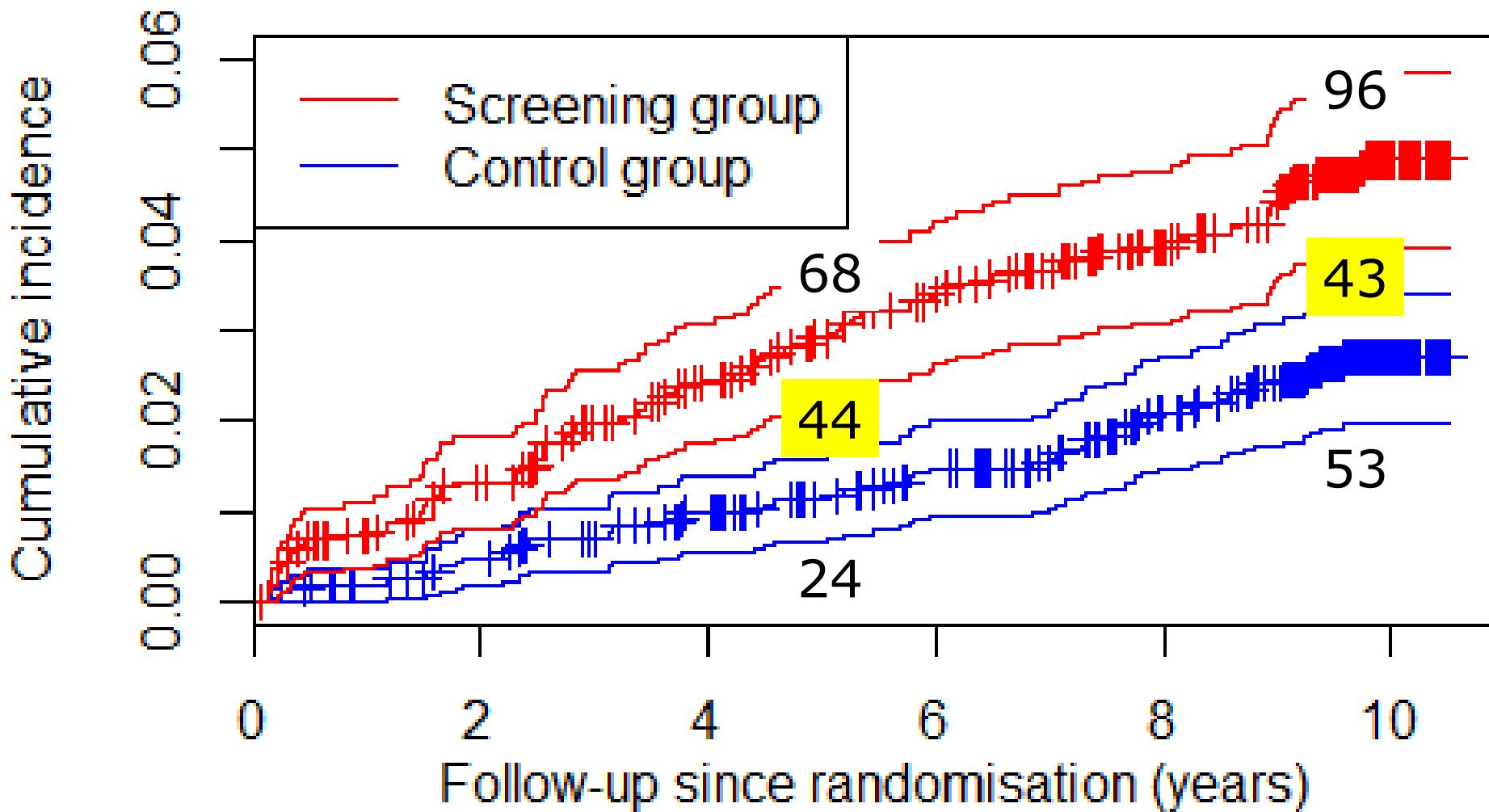
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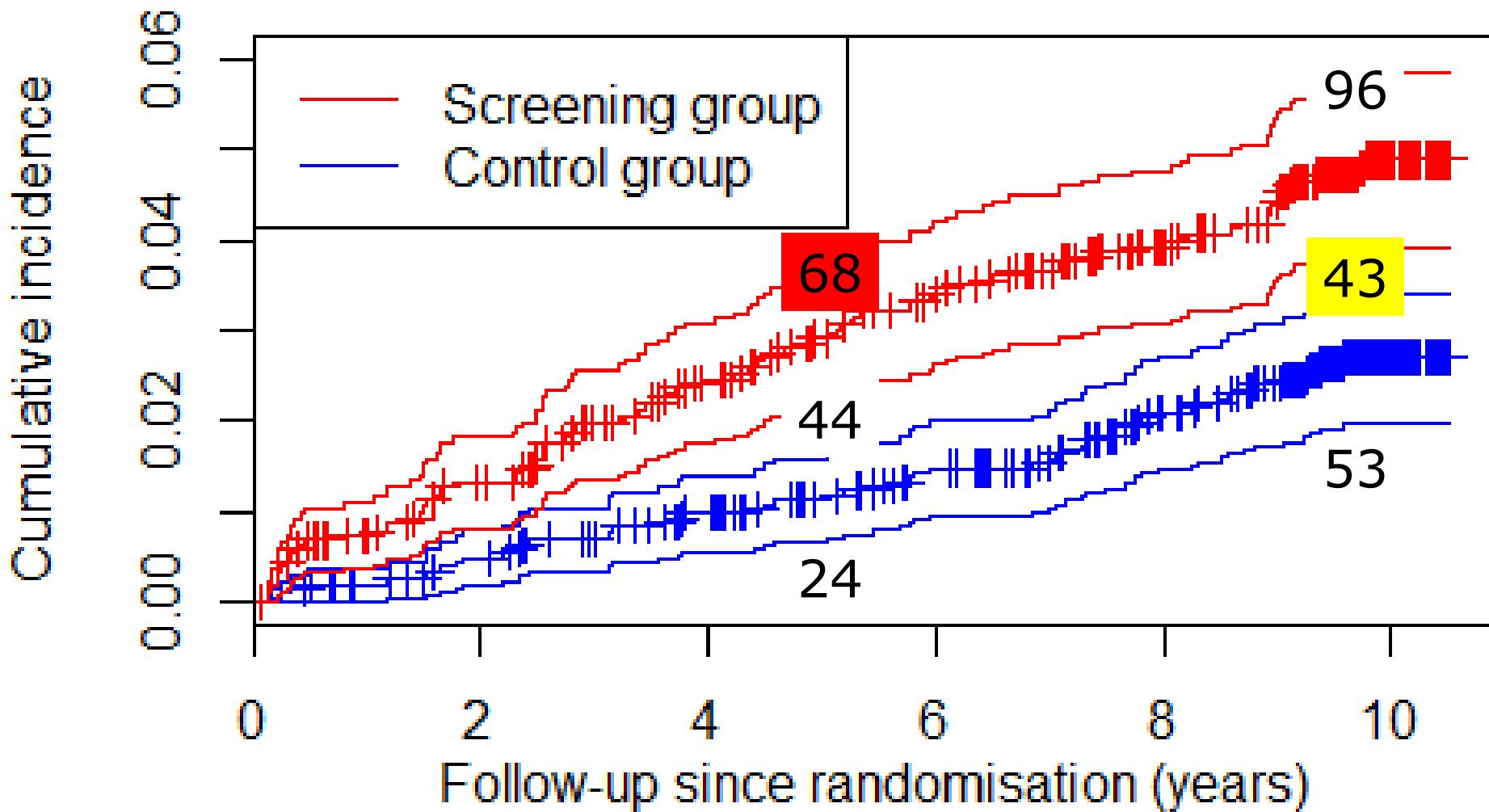
Overdiagnosis in DLCST at 5 year follow-up

Cumulative incidence of lung cancer



Overdiagnosis in DLCST at 5 year follow-up

Cumulative incidence of lung cancer





Overdiagnostik i DLCST efter 5 års follow-up

- Extra antal af LC: 43 (96-53)
- ODx: $43/68 = \mathbf{63\%}$ [95% CI;33%-88%]

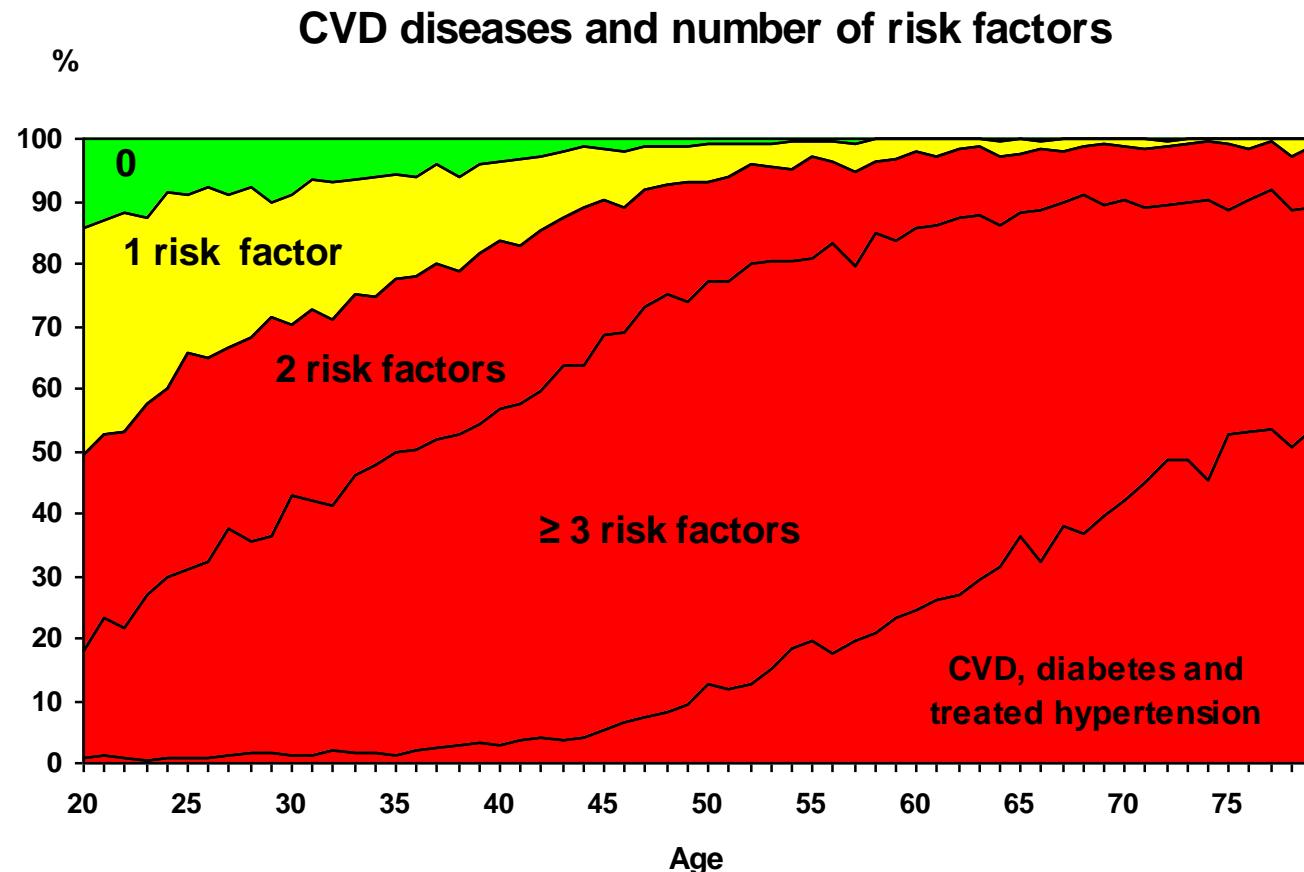
Wille MMW et al. Results of the randomized Danish Lung Cancer Screening Trial with focus on high-risk profiling. Accepted for publication August 2015 in AJRCCM



Styrker & svagheder

- Ingen screening i kontrolgruppen
 - Lille kontaminering i kontrolgruppen
-
- Participation bias i DLCST?
-
- For kort follow-up?
 - Ulige fordeling af storrygere efter randomiseringen?

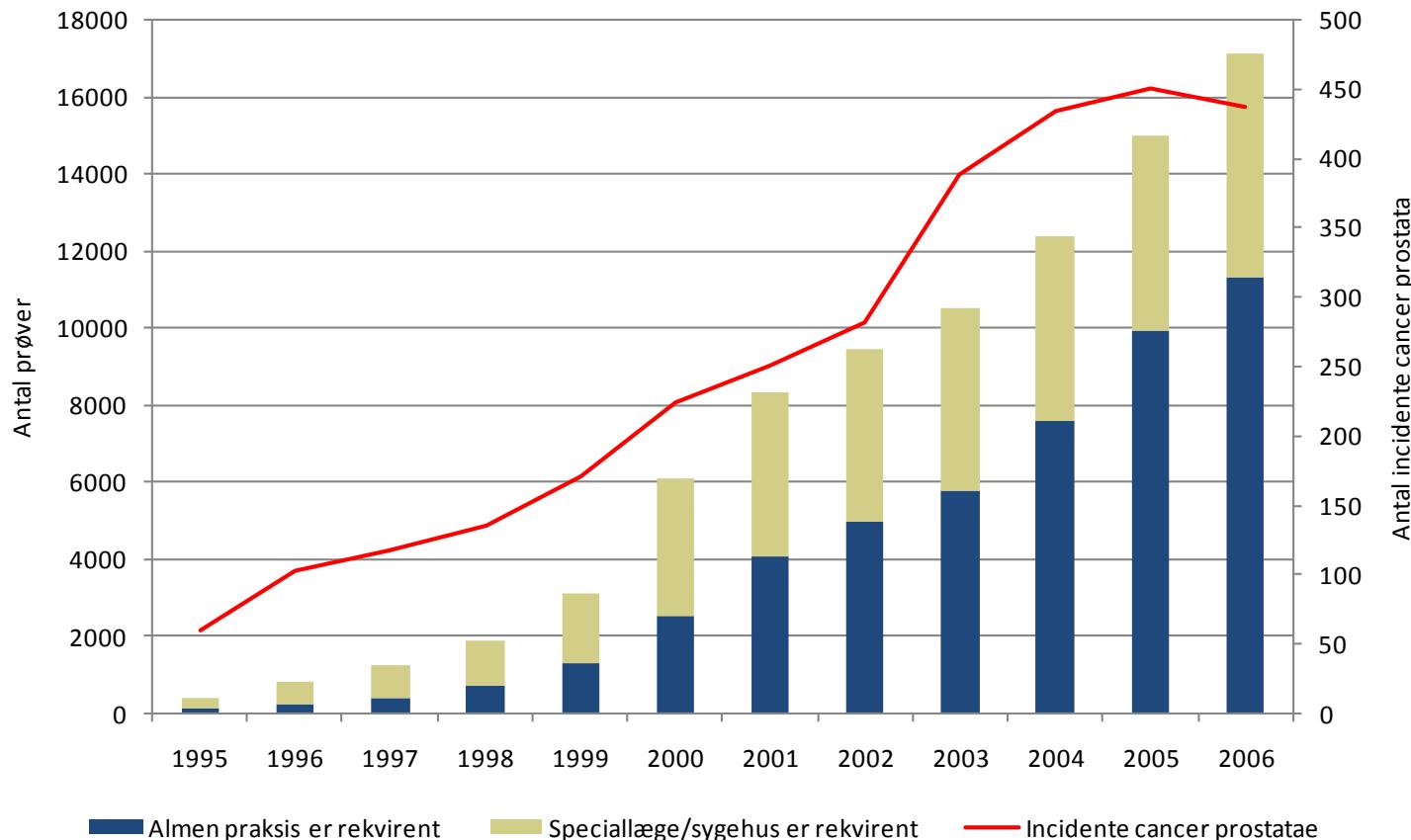
Kardio-vaskulær risiko



H. Petursson et al. Can individuals with a significant risk for cardiovascular disease be adequately identified by combination of several risk factors? *J.Eval.Clin.Pract.* 15 (1):103-109, 2009.



PSA-test and Pca in DK



T. O. Mukai, F. Bro, K. V. Pedersen, P. Vedsted. Brug af undersøgelse for prostataspecifikt antigen . Ugeskr.Laeger 172 (9):696-700, 2010.

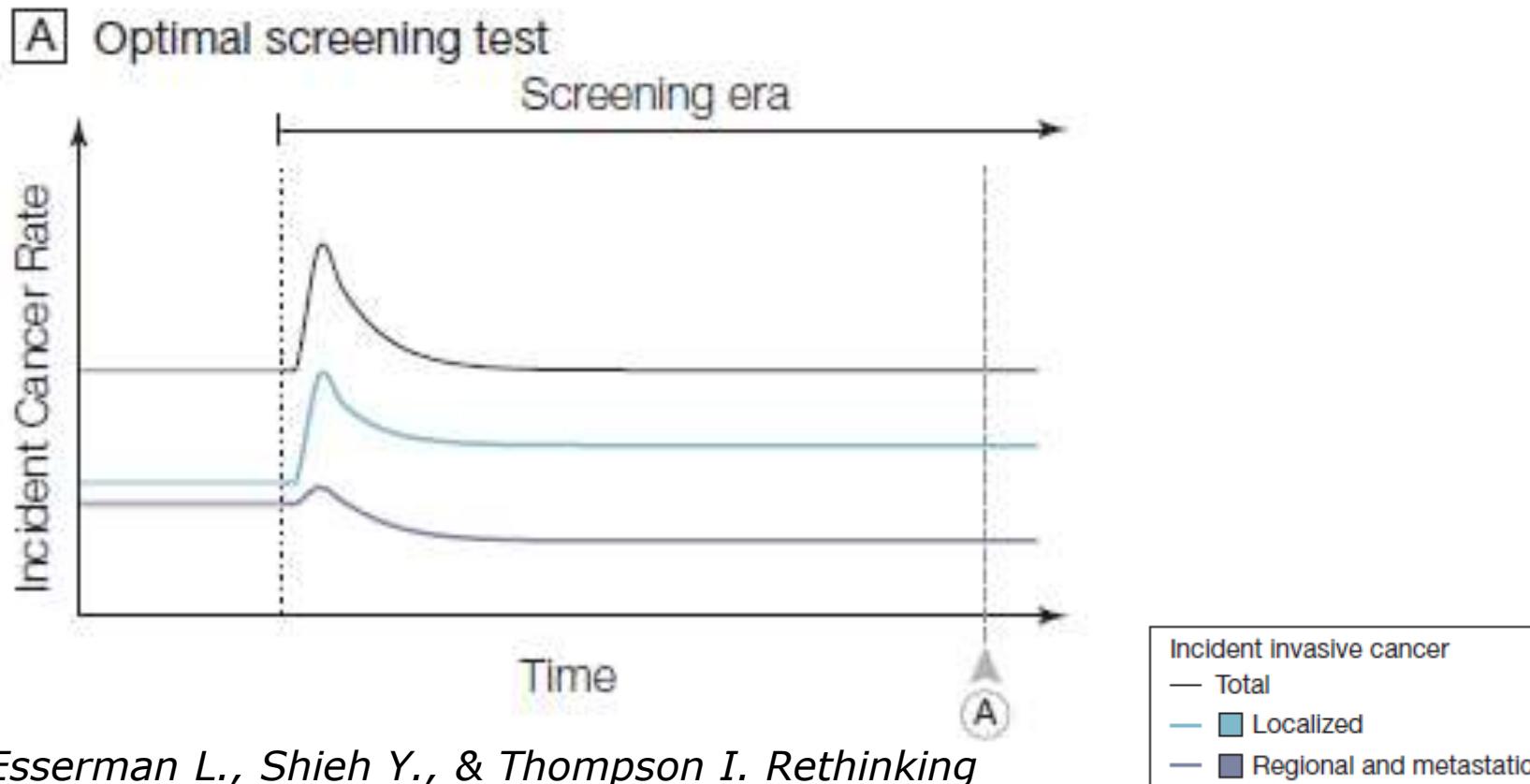


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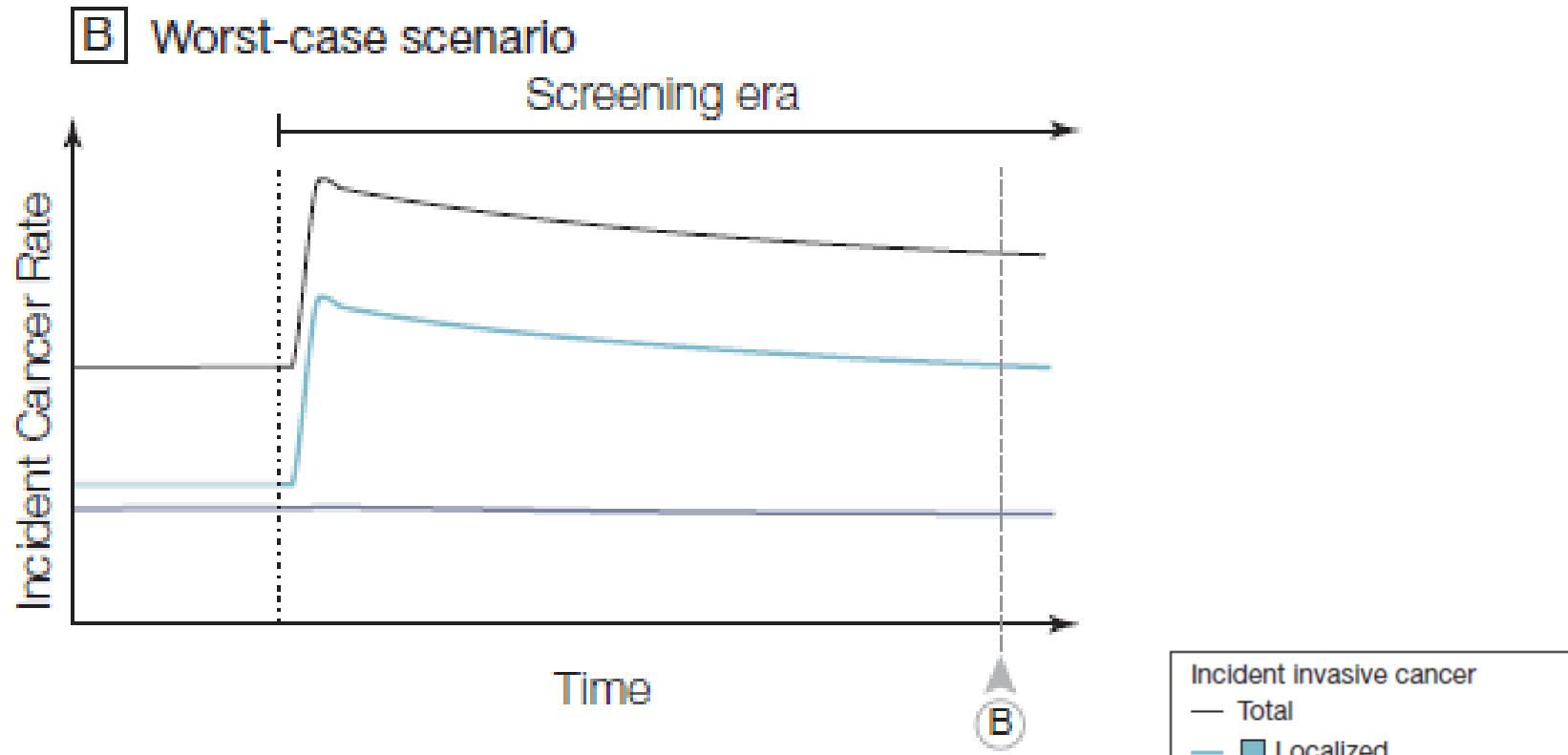
A: Optimalt scenarium



Esserman L., Shieh Y., & Thompson I. Rethinking Screening for Breast Cancer and Prostate Cancer. JAMA: 302 (15):1685-1692, 2009.

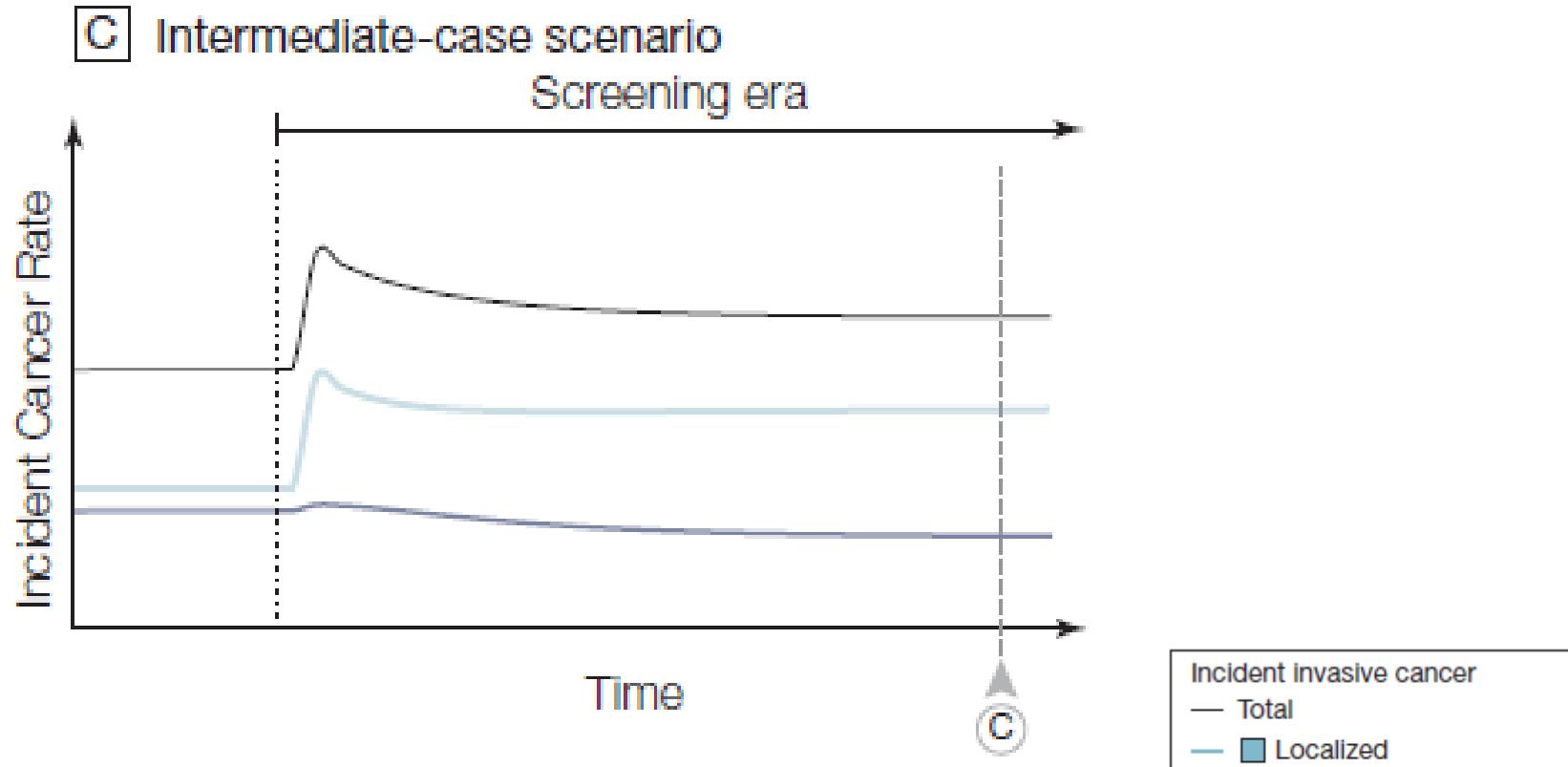


B: Værste scenarium



Esserman L., Shieh Y., & Thompson I. Rethinking Screening for Breast Cancer and Prostate Cancer. JAMA: 302 (15):1685-1692, 2009.

C: Intermediært scenarium

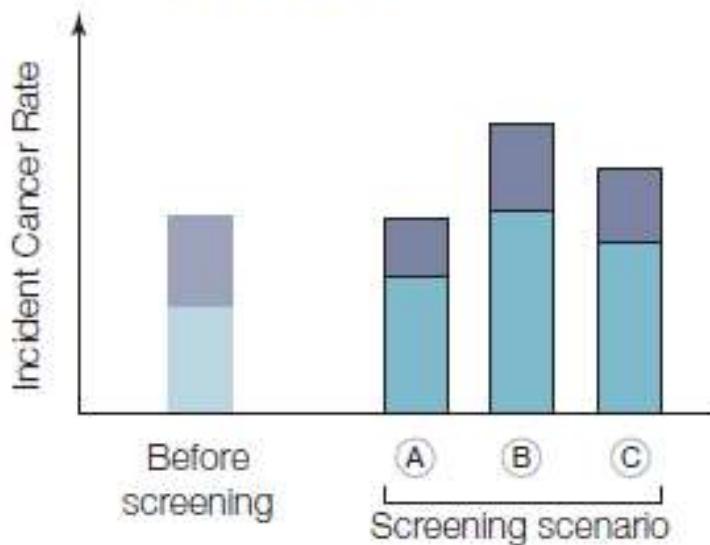


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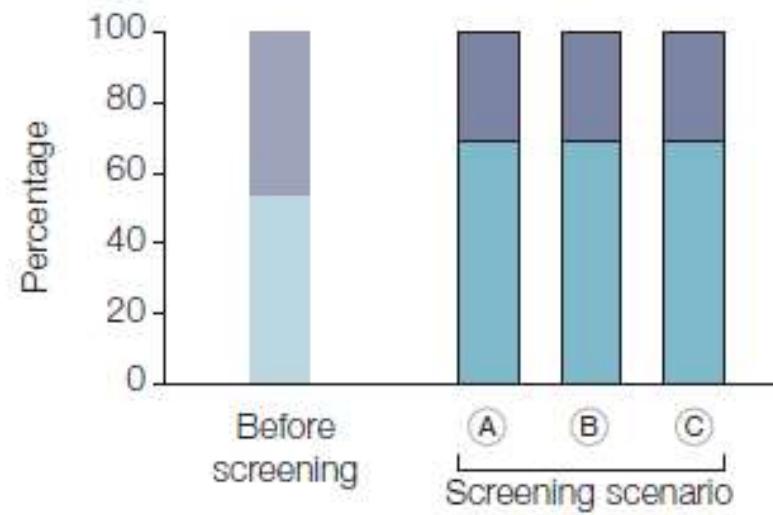


Stadieskifte

D Incident invasive cancer rates in scenarios A, B, and C



E Localized cancers as a percentage of total incident invasive cancers in scenarios A, B, and C



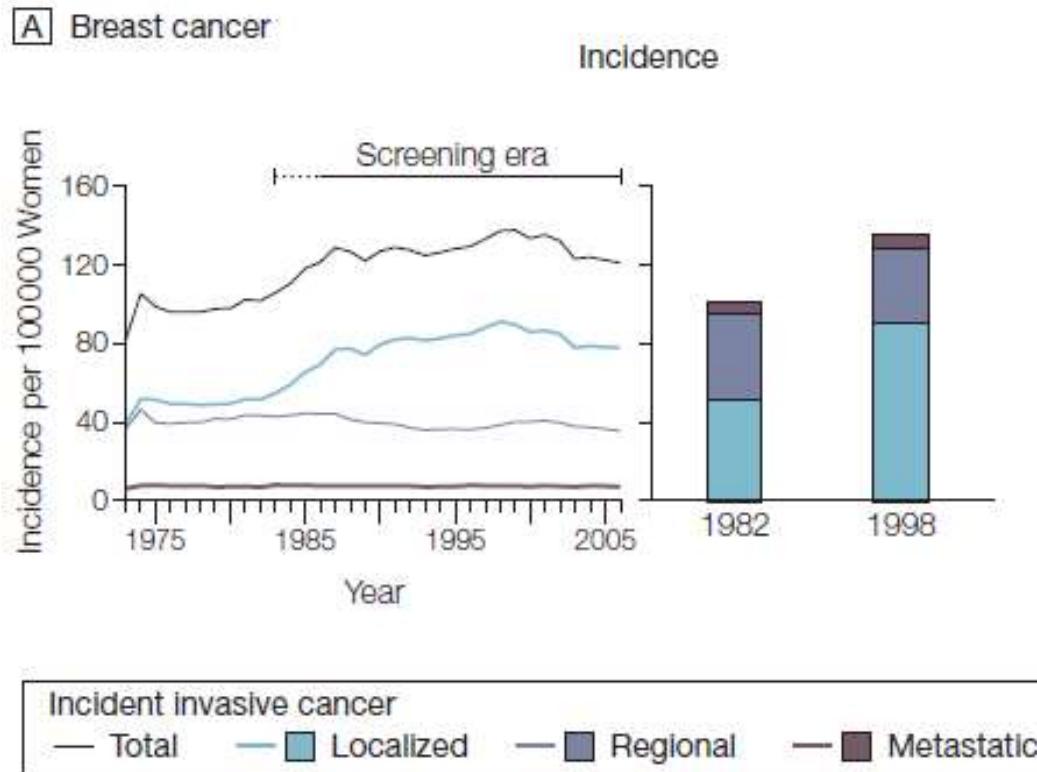
Incident invasive cancer

- Total
- Localized
- Regional and metastatic

Esserman L., Shieh Y., & Thompson I. Rethinking Screening for Breast Cancer and Prostate Cancer. JAMA: 302 (15):1685-1692, 2009.



Breast cancer screening

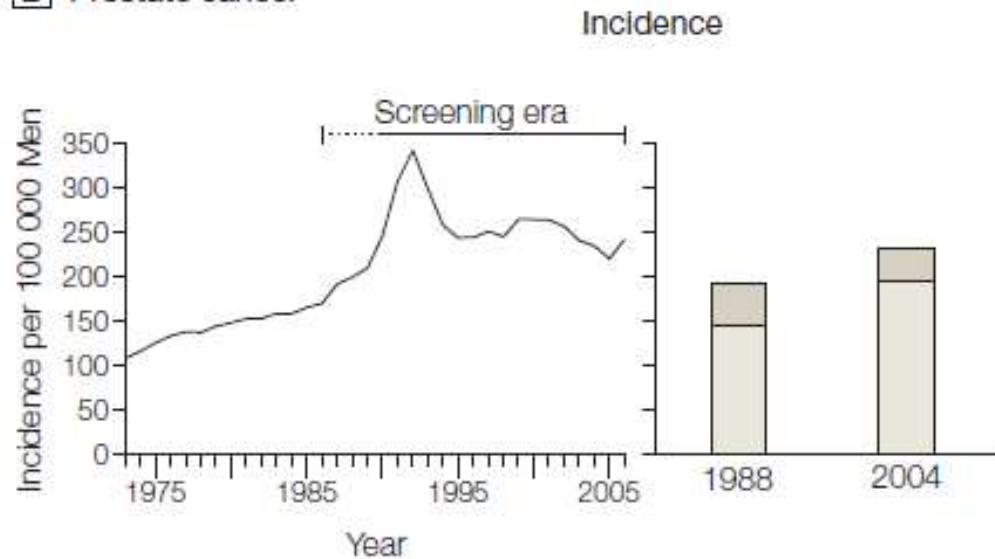


Esserman L., Shieh Y., & Thompson I. Rethinking Screening for Breast Cancer and Prostate Cancer. JAMA: 302 (15):1685-1692, 2009.



PSA-screening

B Prostate cancer



Incident invasive cancer

— Total □ Gleason grade 2-7 ■ Gleason grade 8-10

Esserman L., Shieh Y., & Thompson I. Rethinking Screening for Breast Cancer and Prostate Cancer. JAMA: 302 (15):1685-1692, 2009.



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Incidens og mortalitet

A

Incidence and mortality



B
Incidence and mortality

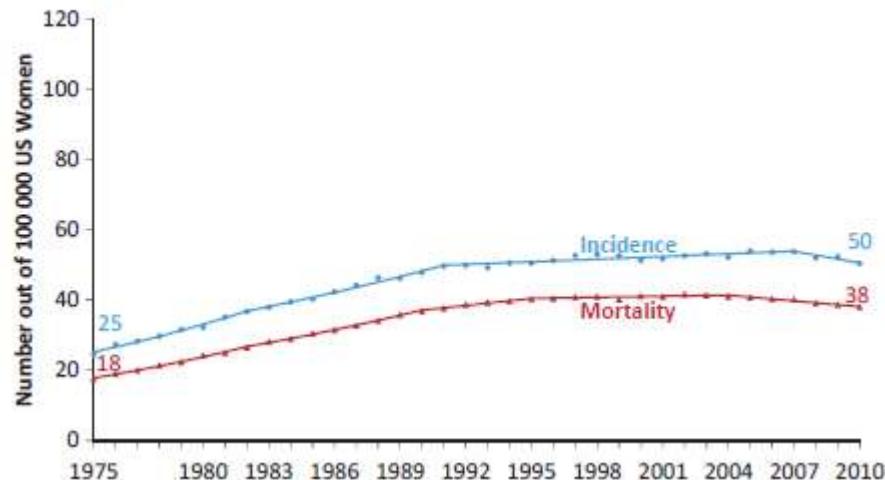
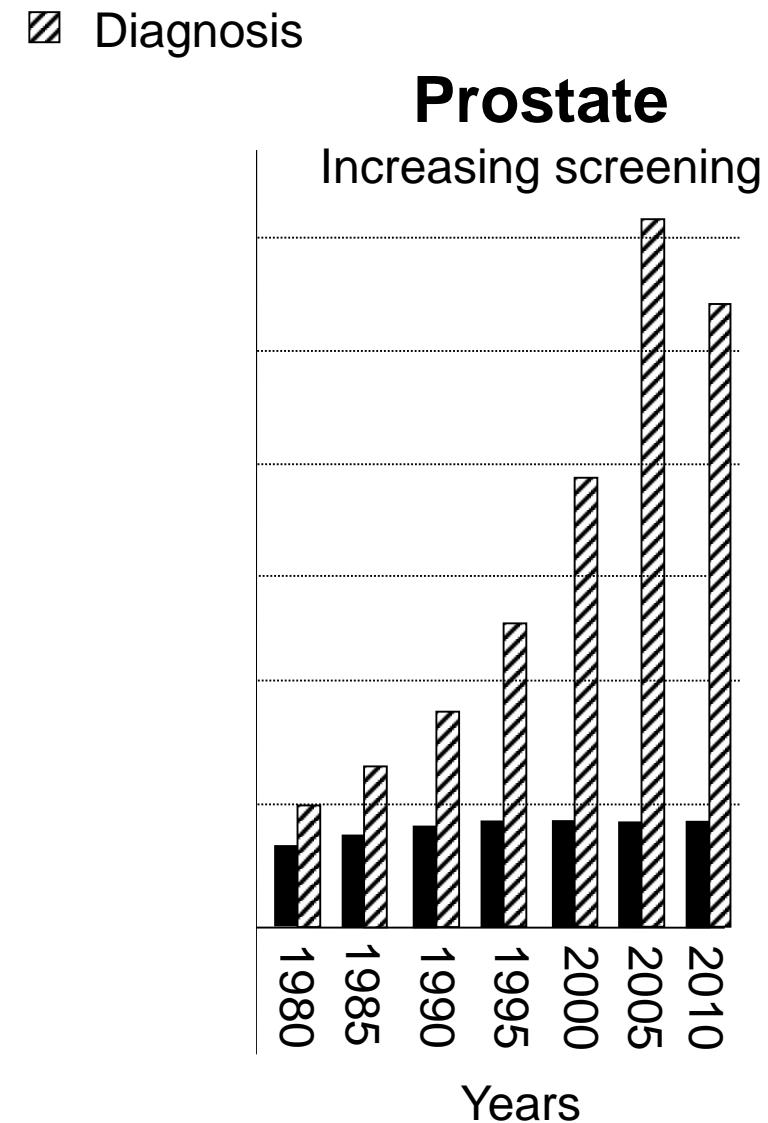
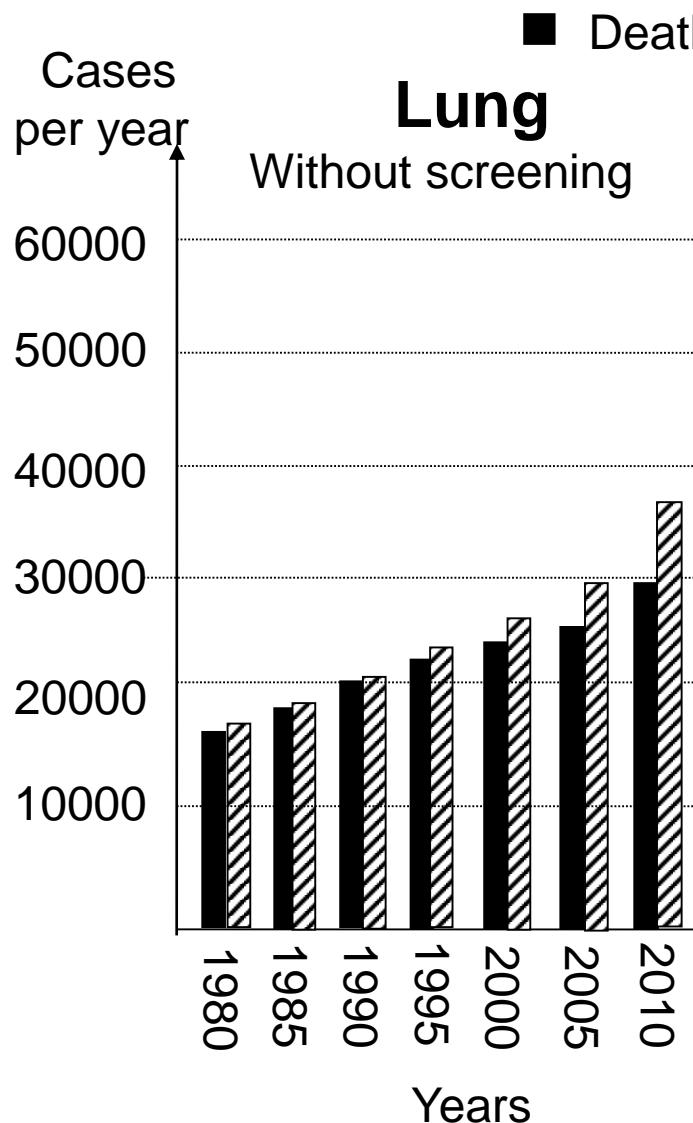


Fig. 3. Population changes in incidence and mortality (A) thyroid and (B) lung cancer for US women, 1975–2010.

Brodersen J., Schwartz L.M., Woloshin S. Overdiagnosis: How cancer screening can turn indolent pathology into illness. APMIS 122, 2014 63

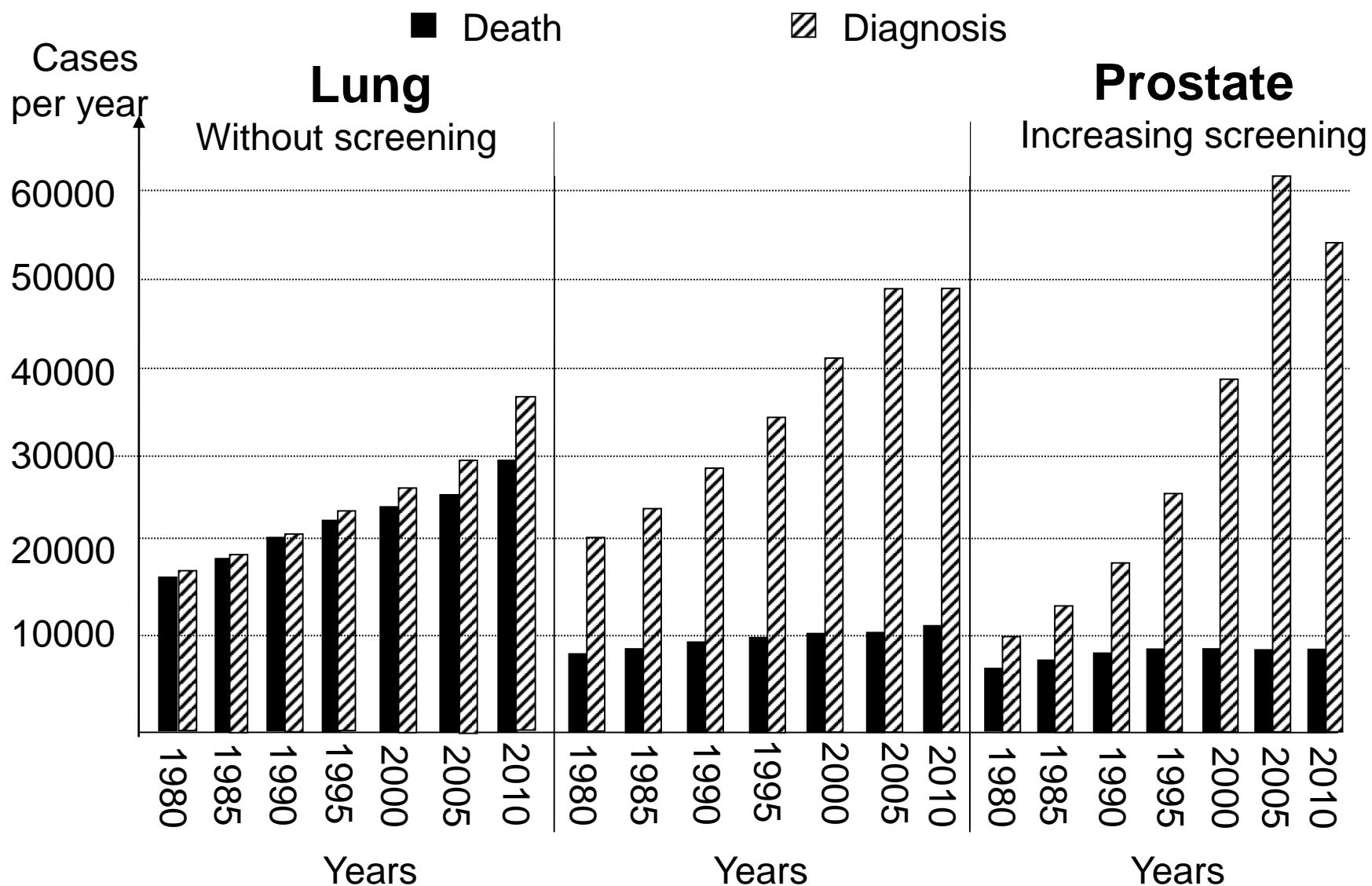
Cancer death and invasive cancer diagnosis with and without screening

Lung,
and prostate. France 1980-2010



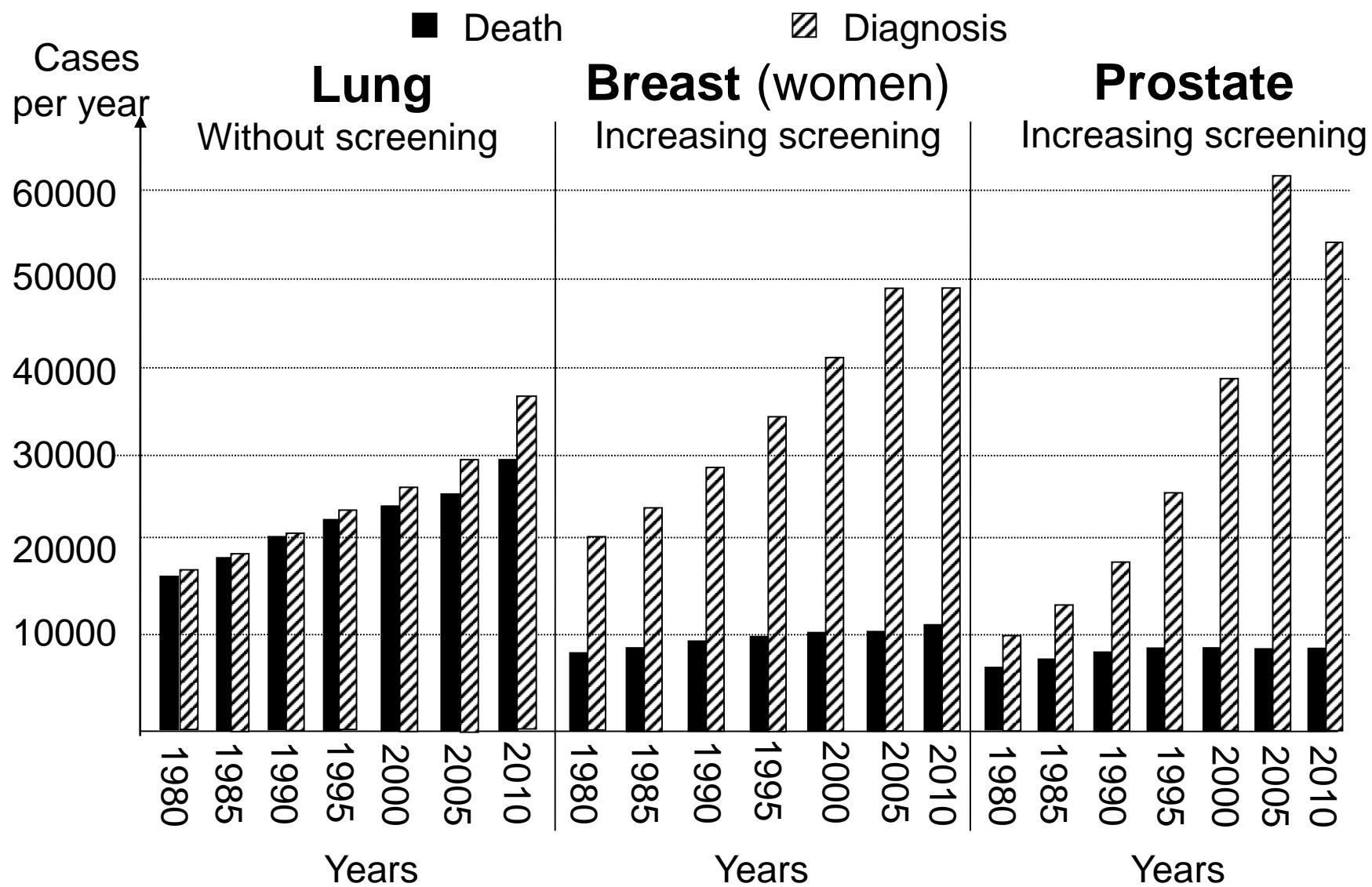
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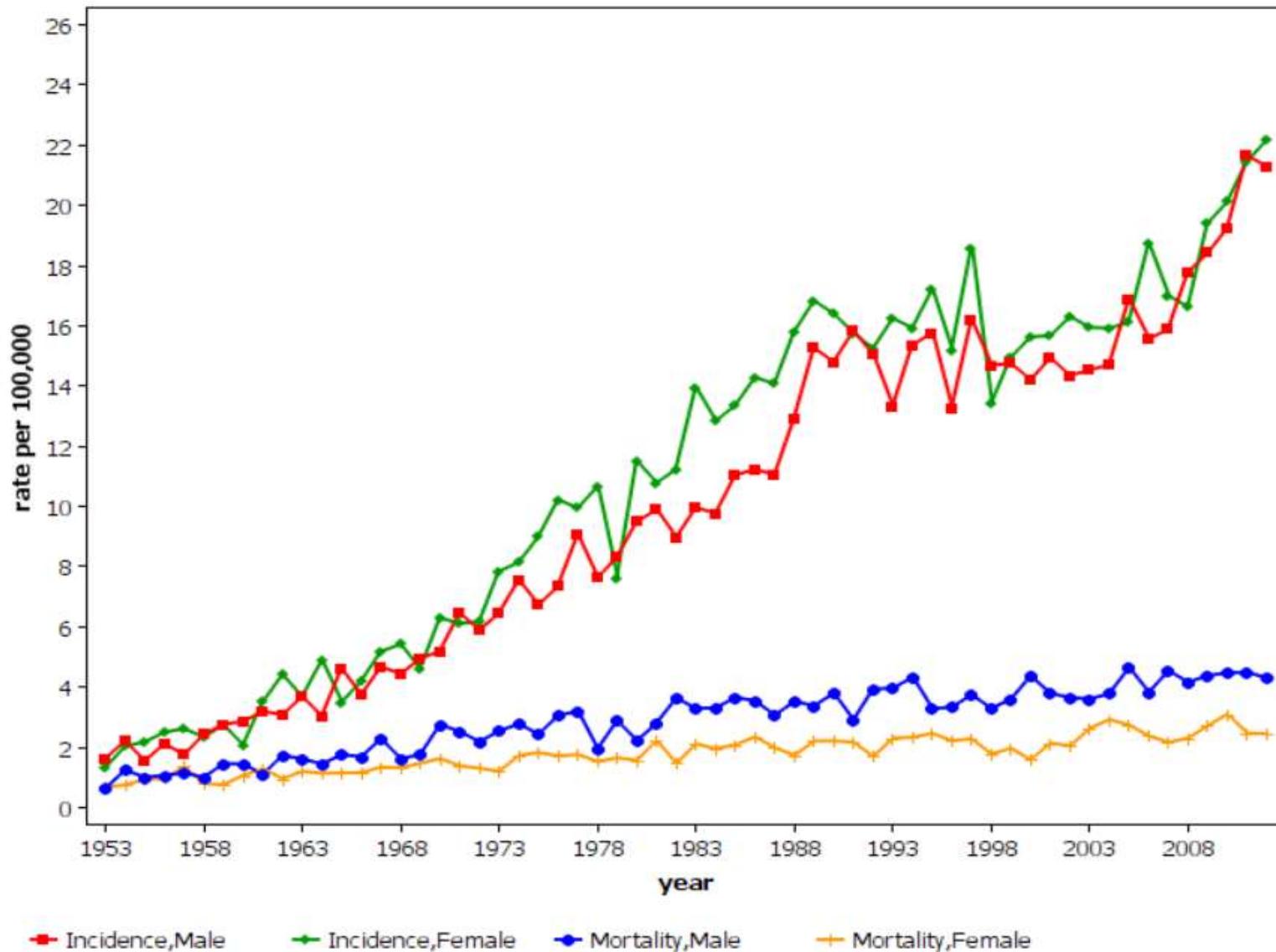


Cancer death and invasive cancer diagnosis with and without screening

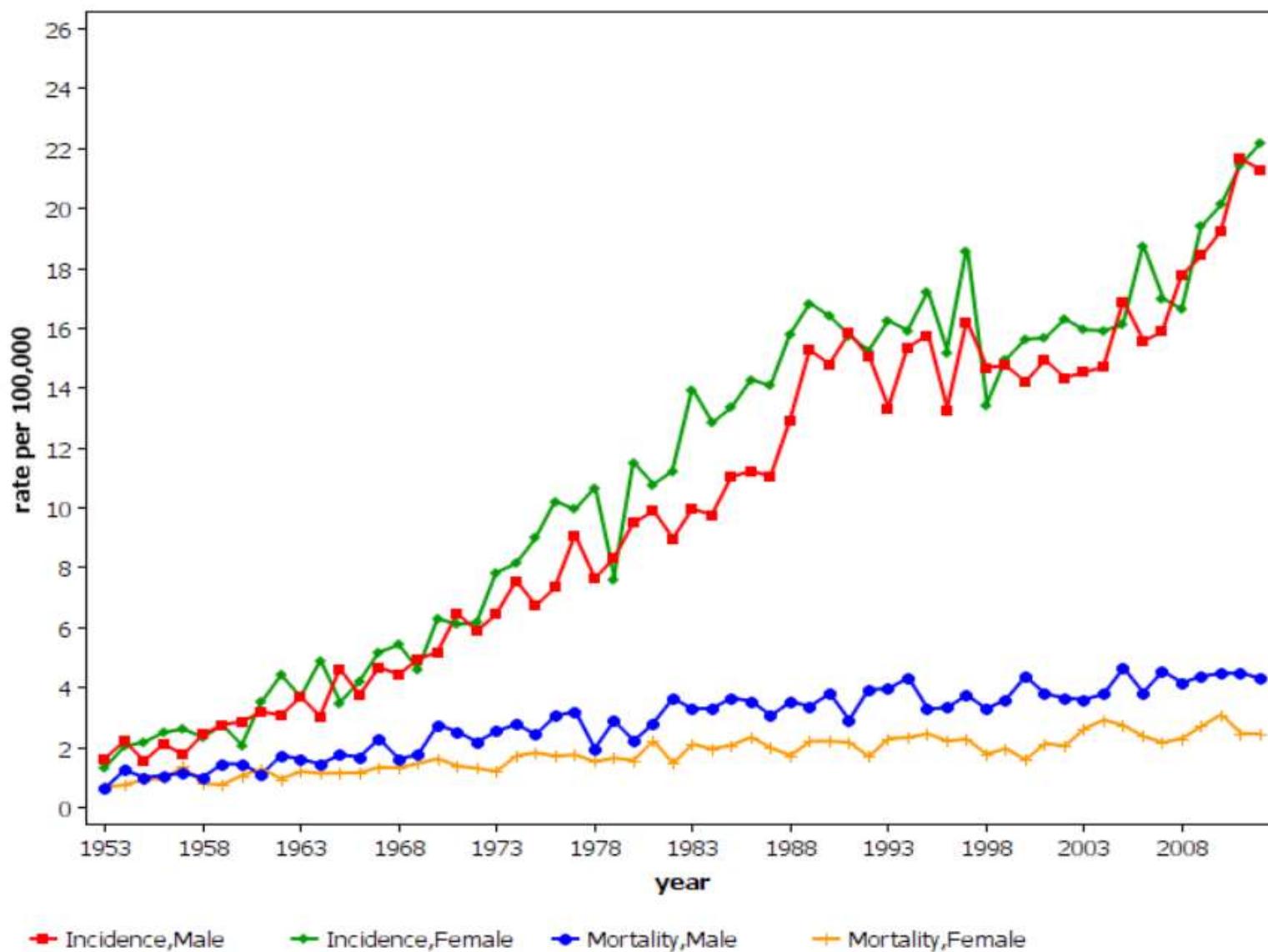
Lung, breast and prostate. France 1980-2010



Hvilke kræftsygdom er dette?



Norway
Melanoma of skin
ASR (World) age 0-85+



You ain't seen nothing yet

B-b-baby you just ain't seen

n-n-nothing yet

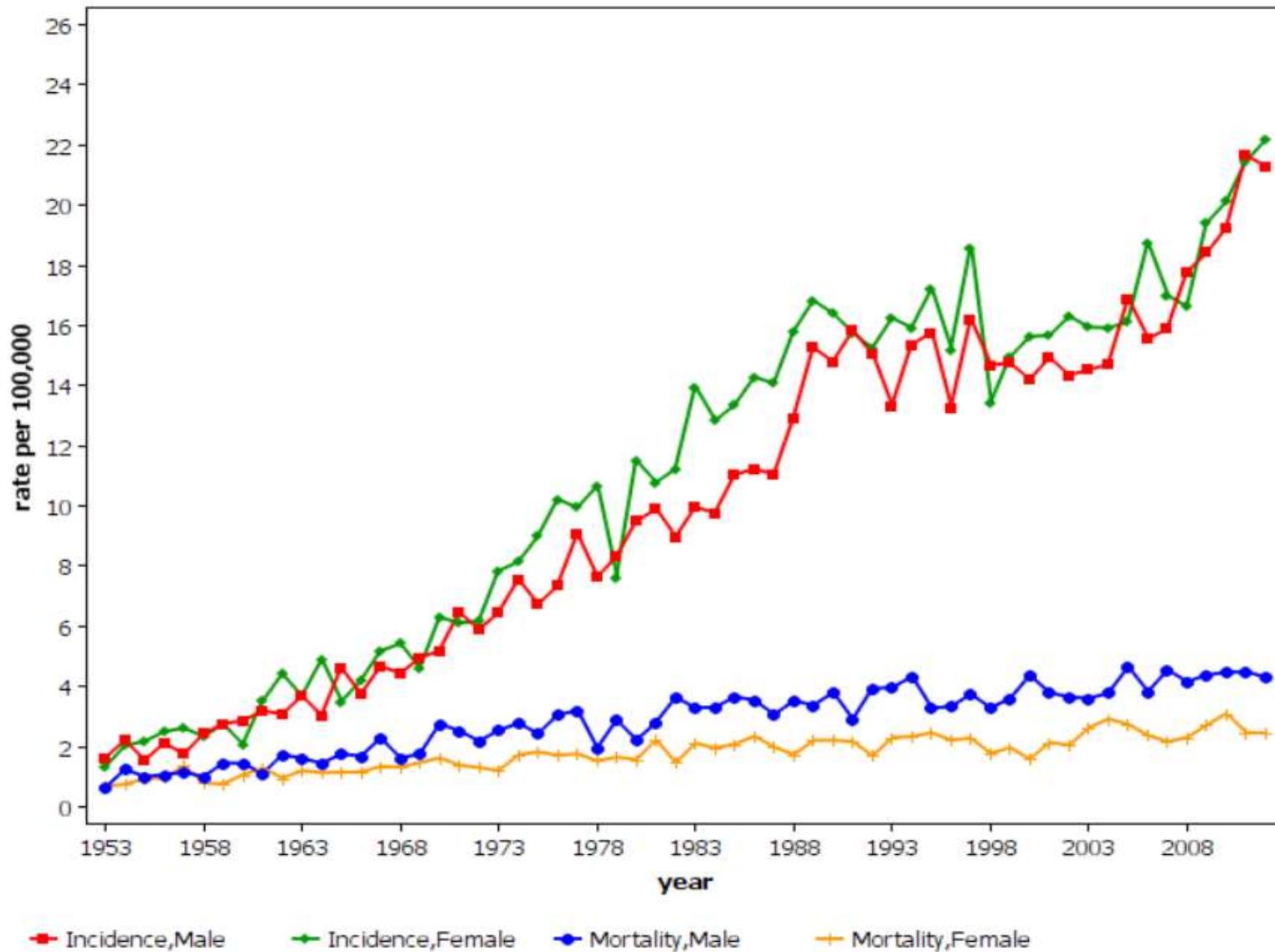
Here's something,

Here's something

that you're never

gonna forget

Norway
Melanoma of skin
ASR (World) age 0-85+





Screening med smartphone

teleskin.dk/en/

TeleSkin

Home | skinScan app | Melanoma | Blog | About TeleSkin | Q | ☰ | ☰

It's not about being afraid
it's about being aware
and react in time

eSkinScan
powered by TeleSkin

Available on the
App Store

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Skadenvirkning af overdiagnostik

- Overundersøgelse
- Overbehandling
- Overforbrug



Skadenvirkning af overdiagnostik

- financial strain
- hassles/inconveniences
- medical costs
- opportunity costs
- physical harms
- psychological harms
- societal costs
- + work-related costs

Harris R.P. et al. The Harms of Screening: A Proposed Taxonomy and Application to Lung Cancer Screening, JAMA 2014



Overdiagnostik v. screening

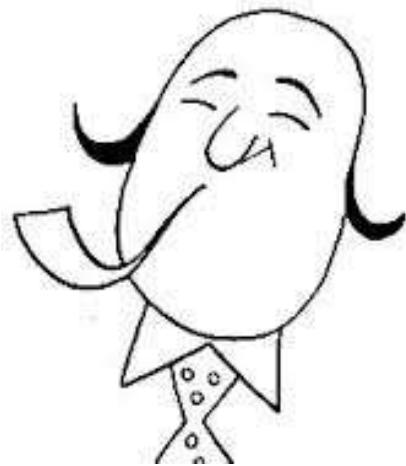
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Fremitiden?

Storm P:

"Det er svært at spå – især om fremtiden"





Fremtiden?

- Mere screening:
 - Befolkningsundersøgelser og højrisiko
- Quantified Self
- Big data & Personalised Medicine



Nye screeningsprogrammer?

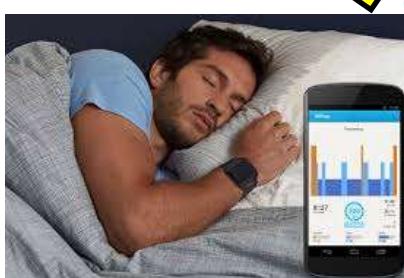
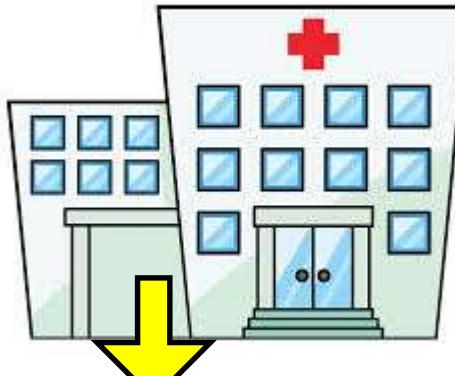
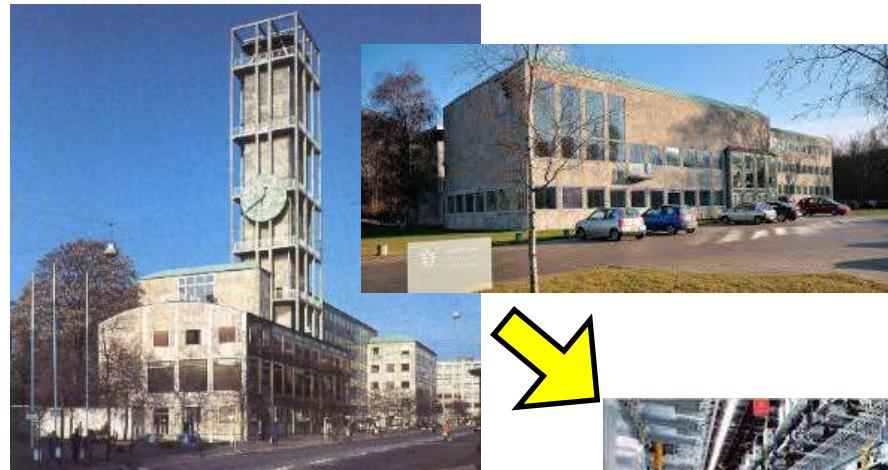
- CT-screening for lungekræft blandt storrygere
- Abdominalt aorta anuerisme:
 - Befolkningsundersøgelse eller storrygere?



Quantified Self



Big data & Personalised Medicine





P4 or Personalised medicine

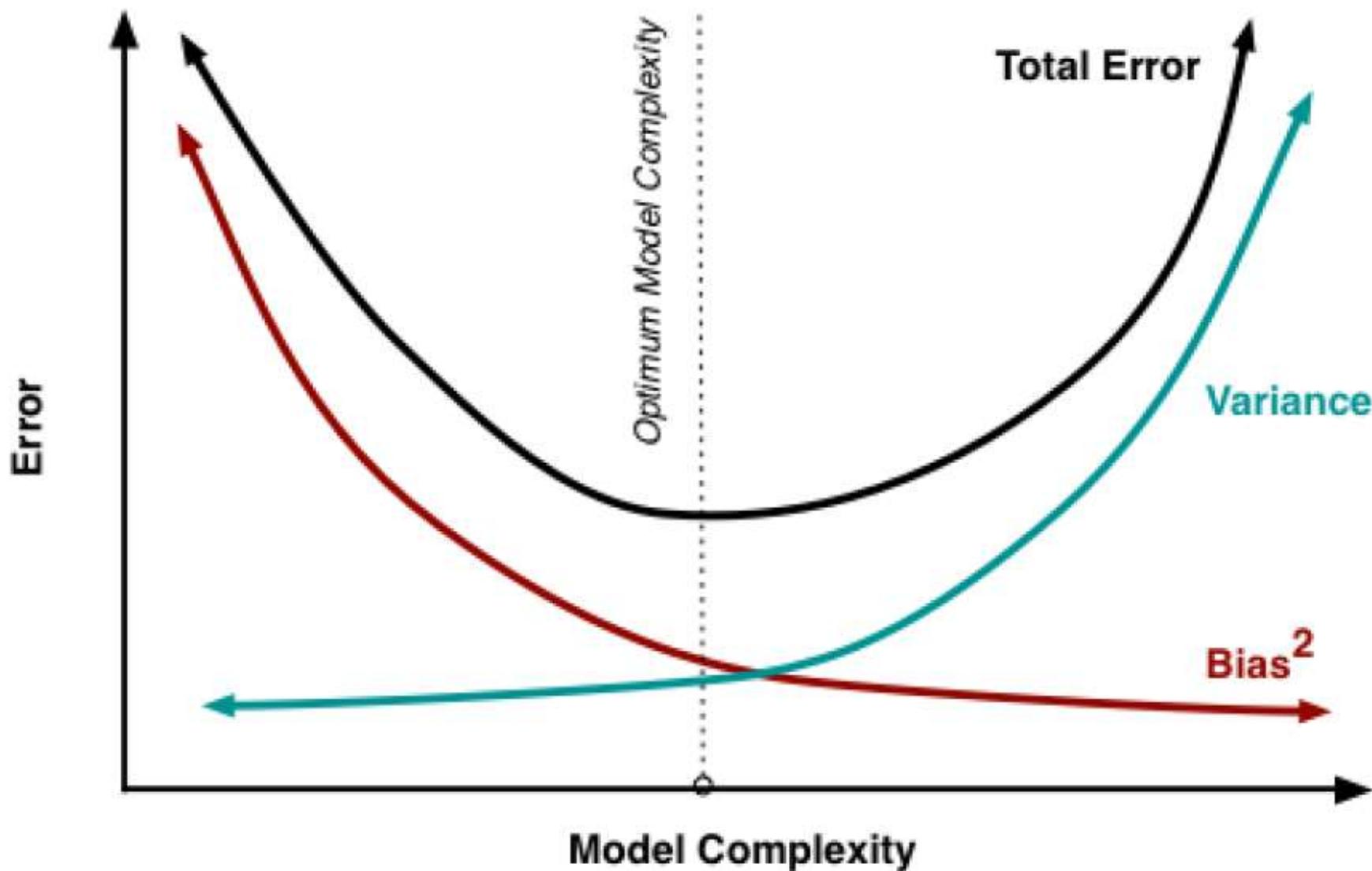
- Predictive
- Preventive
- Personalised
- Participatory



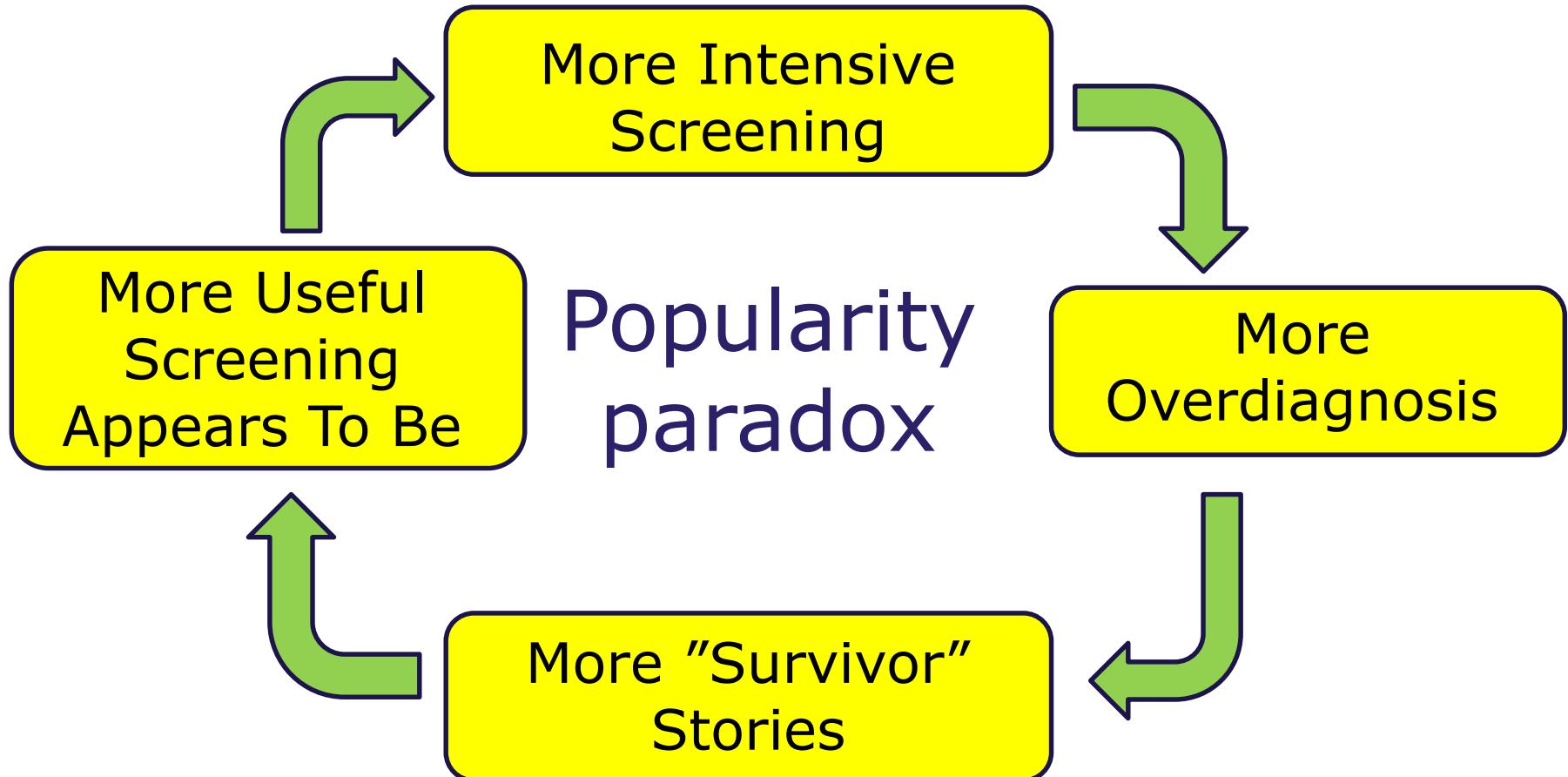
P4 among healthy

- Predictive & Preventive = Screening Incognito

Big data & Personalised Medicine



Survivors stories drive screening towards more overdiagnosis





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BARCELONA 2016 – 20th to 22nd September 2016

Following successful conferences in Dartmouth in 2013, the University of Oxford in 2014 and the NIH in 2015, we are pleased to announce the dates for the 2016 international Preventing Overdiagnosis conference, to be held in Barcelona. Please let your colleagues and networks know about the announcement of these dates, and that abstract submission and registration will be open soon. Innovations to ... [Read More....](#)