



Cancer Intervention and Surveillance Modeling Network (CISNET)

Prostate Cancer Working Group

Presented by:

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Fred Hutchinson Cancer
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CISNET Prostate Cancer Collaborators



Grantees

- **University of Michigan:** Alex Tsodikov, Aniko Szabo
- **Erasmus University:** Gerrit Draisma, Harry De Koning
- **Fred Hutchinson:** Ruth Etzioni, Roman Gulati

Clinical collaborator: David Penson

Objectives



- Summarize scientific accomplishments
 - ◆ Highlight collaborative research results
 - ◆ Illustrate insights about disease progression

- CISNET Prostate and clinical trials of PSA screening

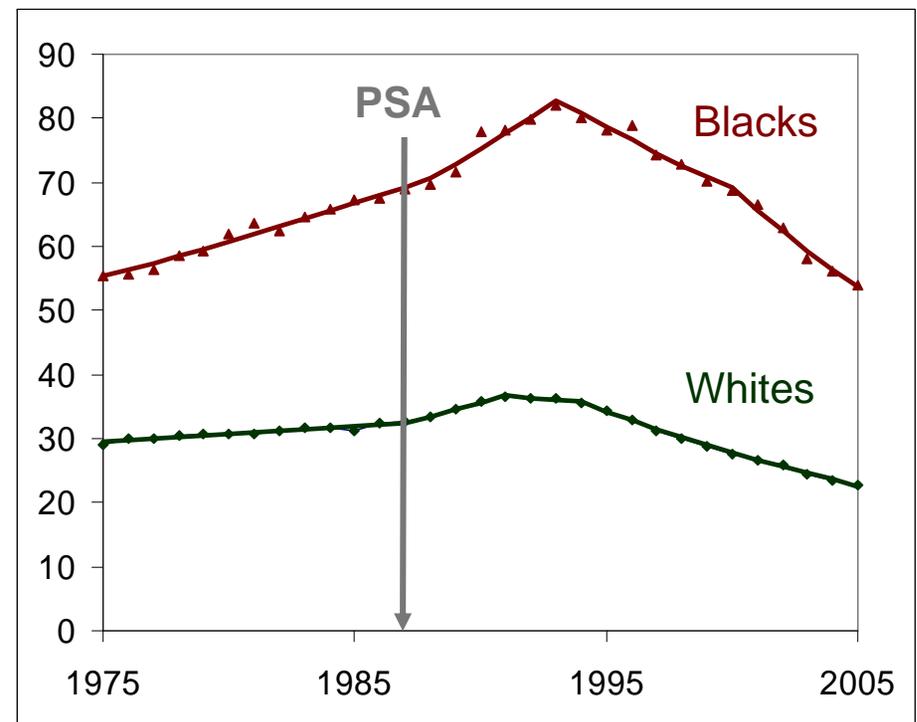
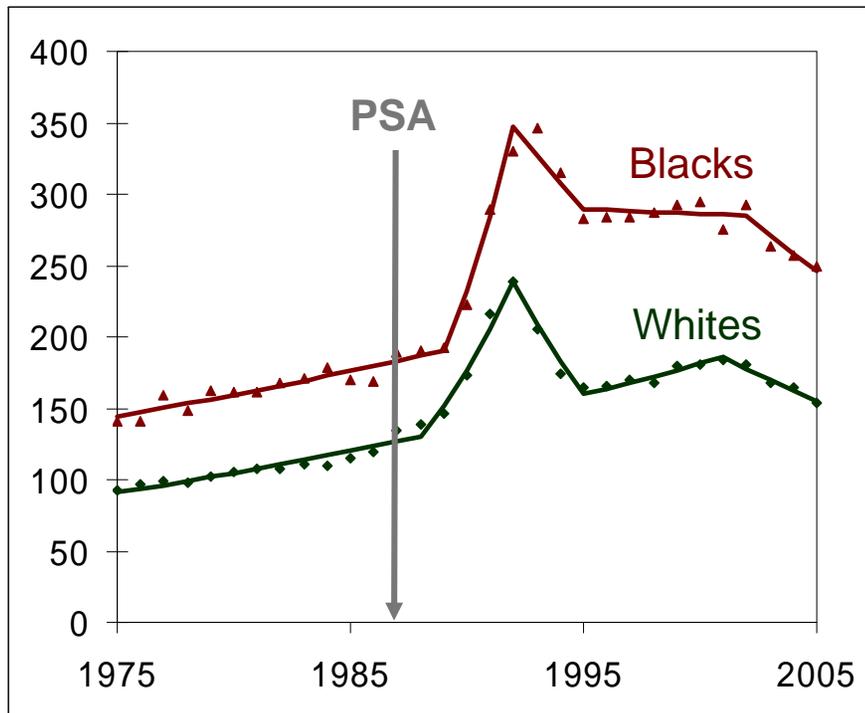
- CISNET Prostate and policy development

The Problem: Explaining Prostate Cancer Trends



Incidence: Cases per 100,000

Mortality: Deaths per 100,000



Prostate Cancer Modeling: The Challenge



- No definitive trials of PSA screening benefit (yet)
 - ◆ Need to make assumptions about how early detection might plausibly affect mortality

- Incomplete trials of treatment benefit
 - ✓ Radical prostatectomy vs watchful waiting
 - ✓ Radiation therapy + adjuvant hormone therapy vs radiation
 - ✗ No comparison of radiation vs radical prostatectomy

- Screening dissemination trends not tracked in real time
 - ◆ Trends in biopsy referral patterns also not well understood

CISNET Prostate: Accomplishments



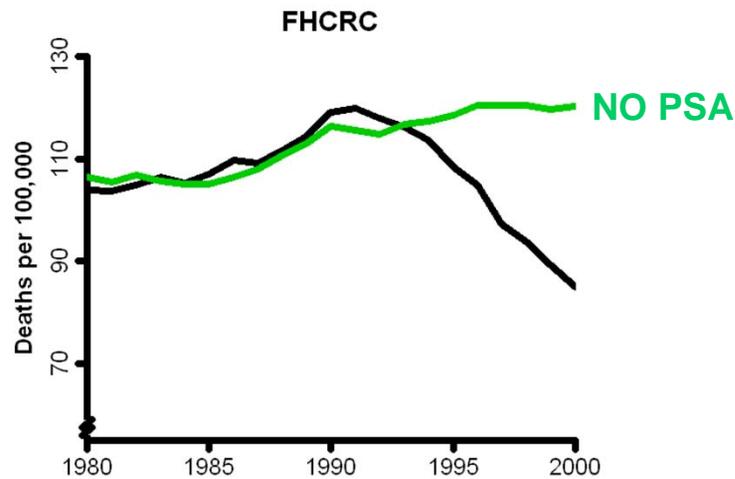
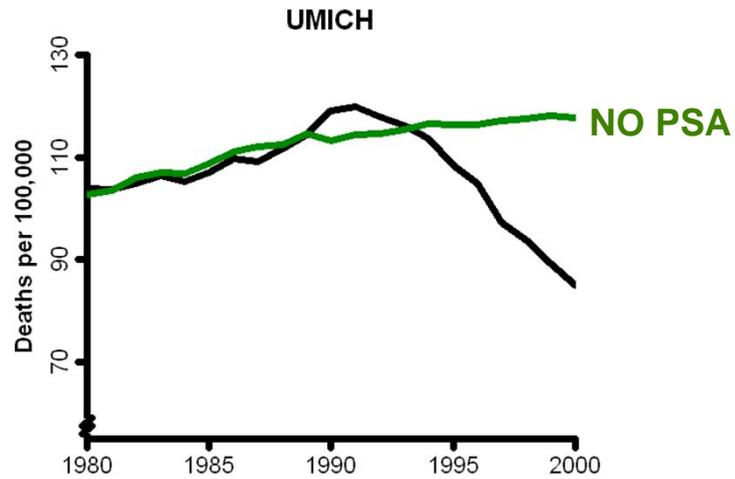
- **Quantified** the mortality decline plausibly due to PSA screening
- **Estimated** overdiagnosis due to PSA screening in the US
- **Reconstructed** trends in screening and treatment
 - ◆ Investigated racial disparities in care
- ★ **Provided** quantitative evidence to address/refute speculations about PSA screening

Collaborative Result I

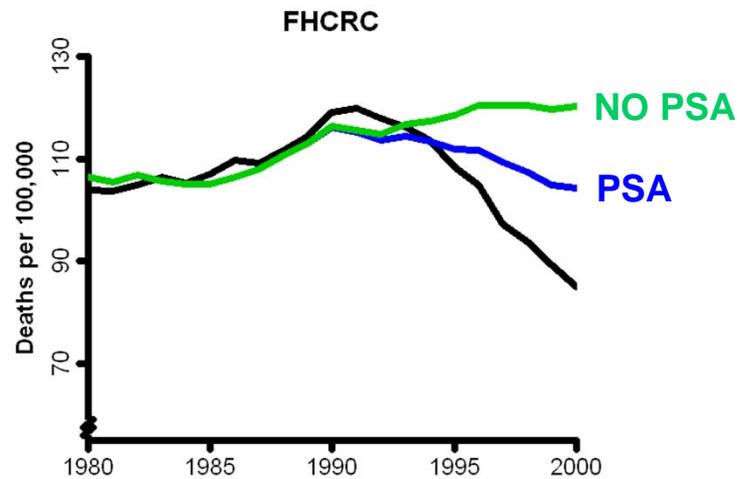
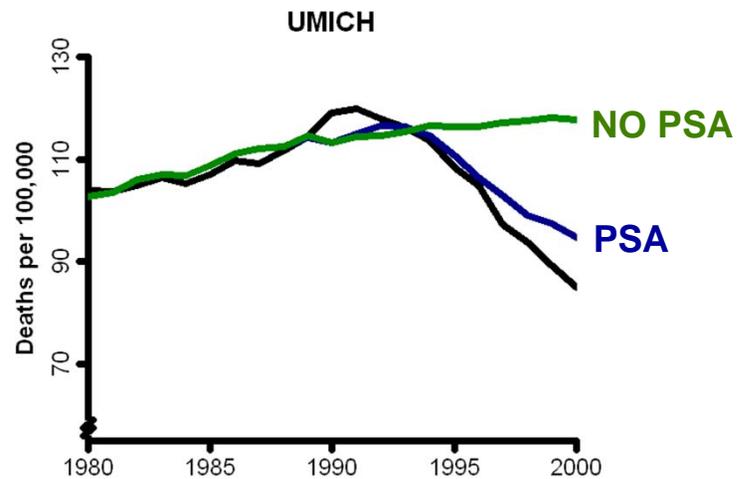


**Quantified the mortality decline
plausibly due to PSA screening**

Collaborative Result I



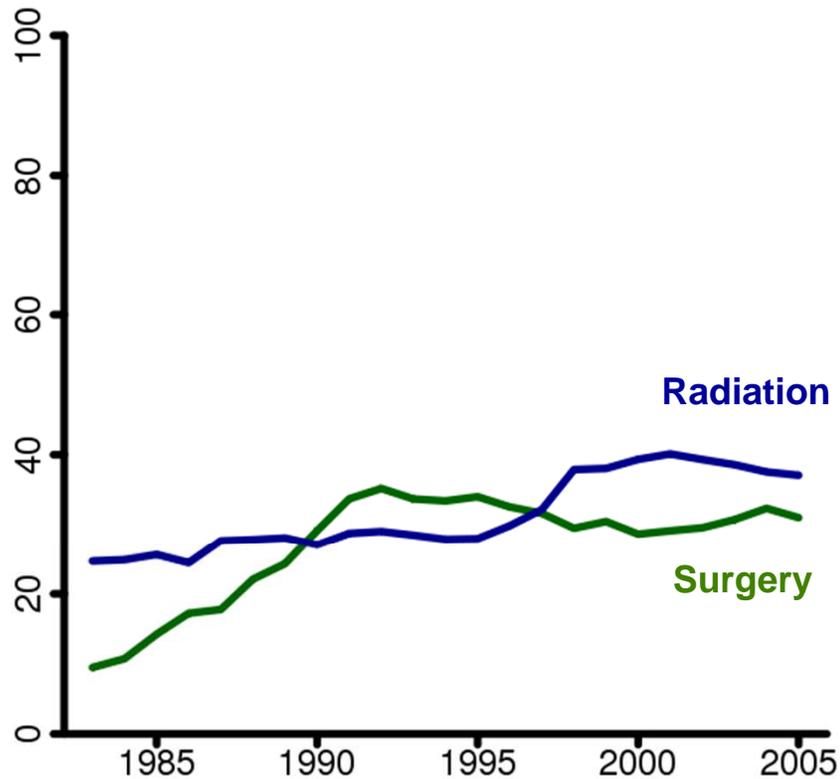
Collaborative Result I



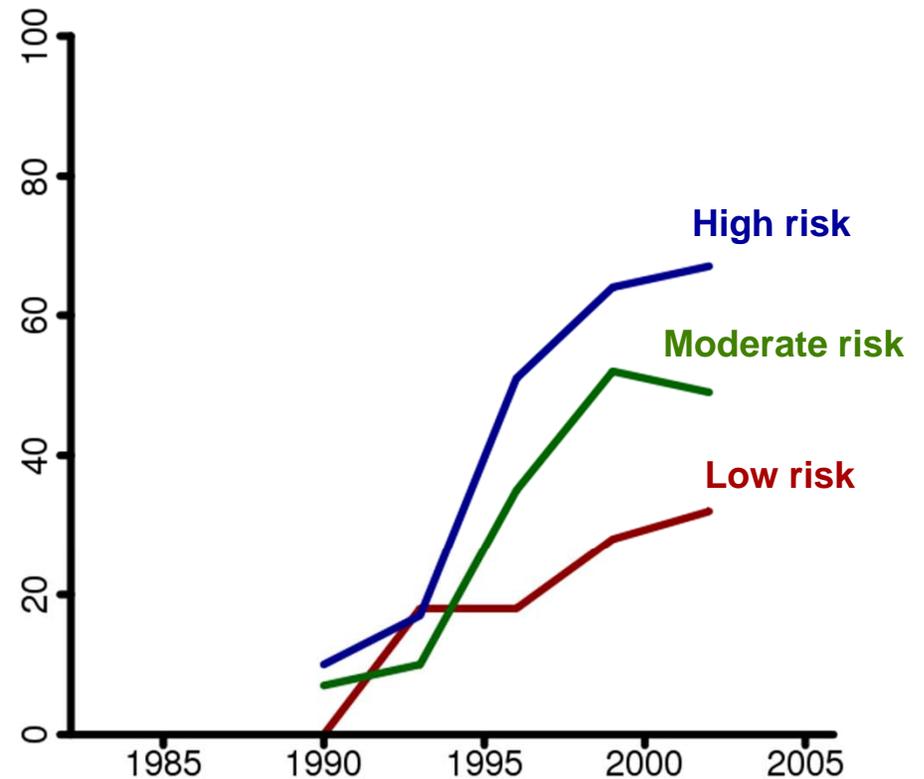
The Next Step: Model Treatment Trends



Percent of local-regional cases treated with surgery or radiation therapy



Percent of radiation therapy cases receiving adjuvant hormonal therapy

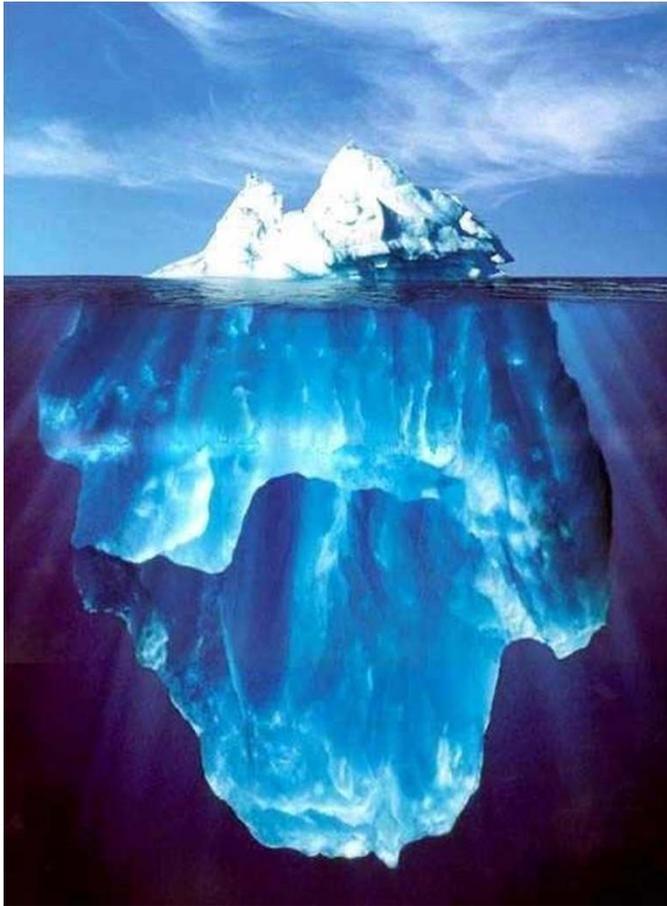


Collaborative Result II

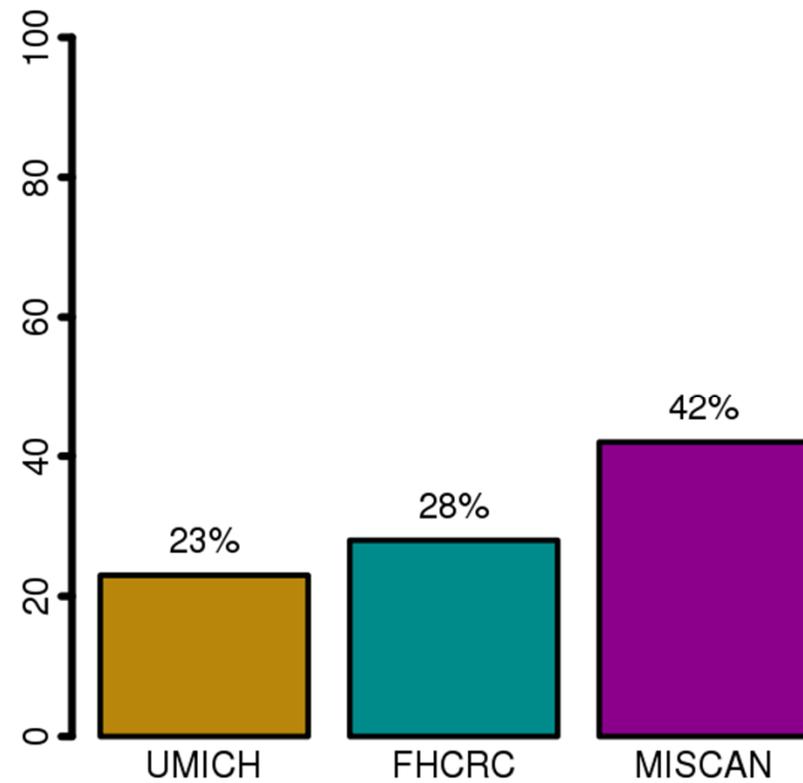


**Estimated overdiagnosis due to PSA
screening in the US**

Collaborative Result II



Percent of screen detected cases who would not have presented clinically

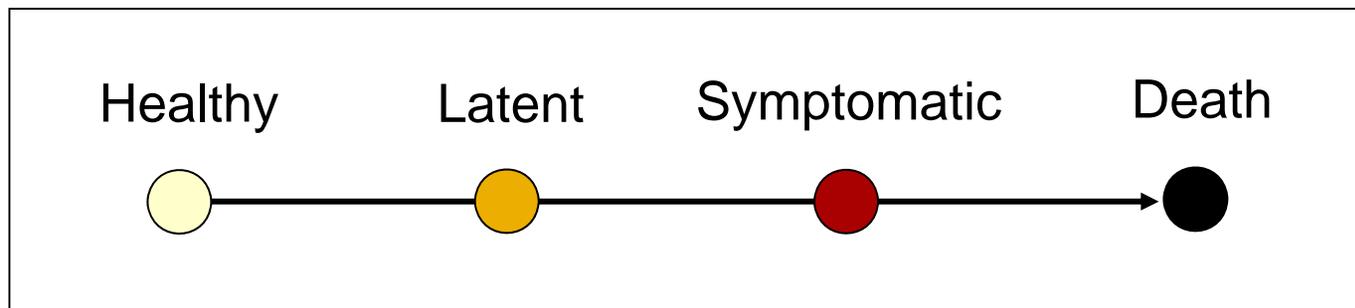


Draisma et al, JNCI in press

Insights About Disease Progression



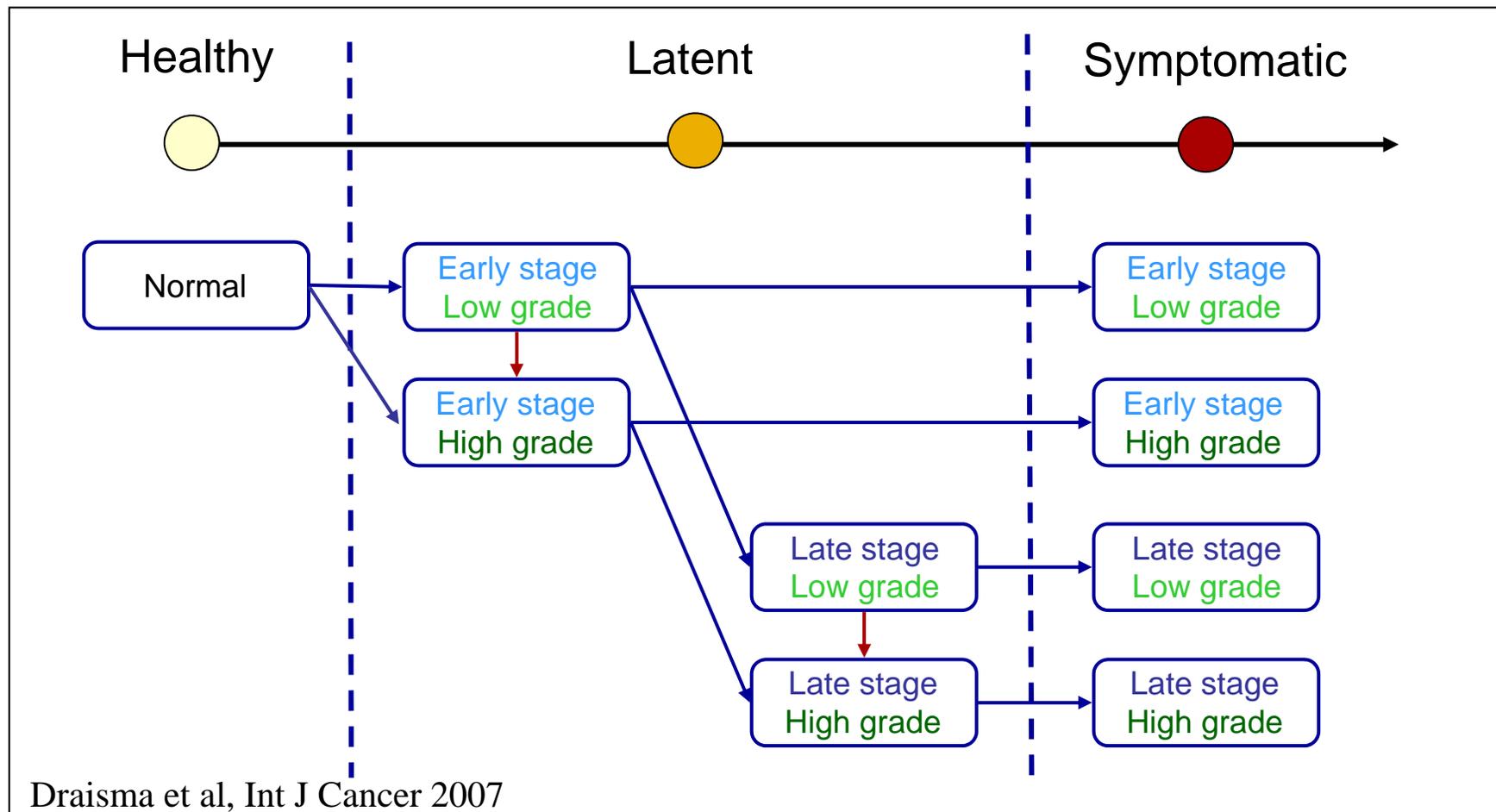
- Each model is built on a concept of disease progression



Insights About Disease Progression



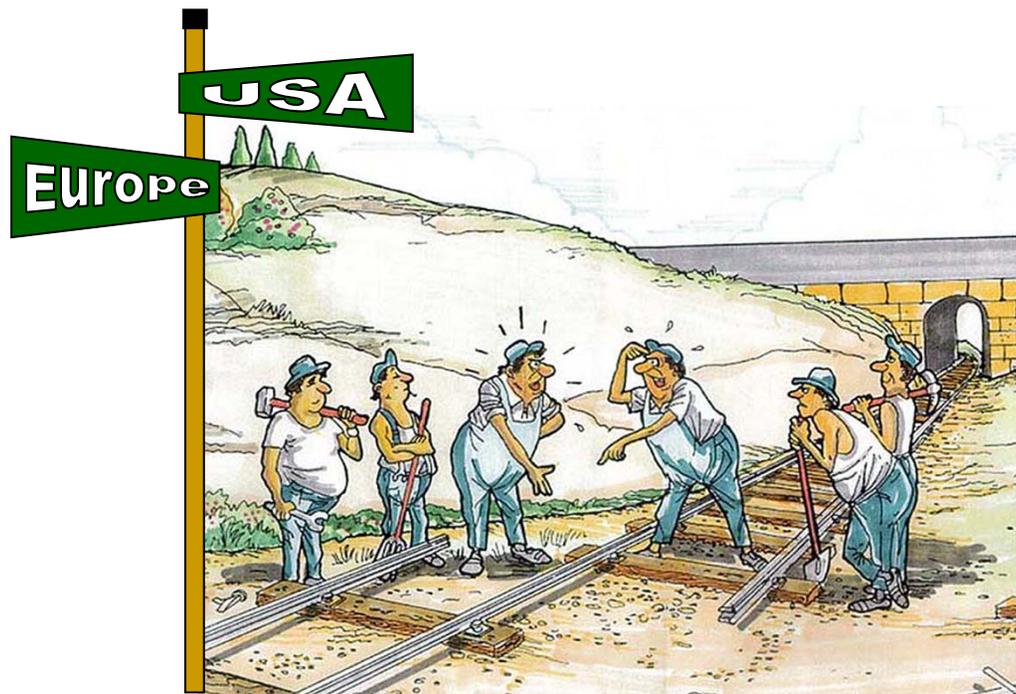
Example: The MISCAN model suggests that prostate tumors de-differentiate over time



Potential to Use Models to Reconcile Trials Performed In Different Settings



- European (ERSPC) and US (PLCO) screening trials differ with respect to:
 - ◆ Screening protocols, test positive criteria, compliance with biopsy recommendations
 - ◆ Treatment patterns in the screening trial population



Conclusions: Towards Policy



- There is a tremendous need for evidence-based prostate cancer screening and treatment policies
- CISNET models integrate available data sources to do the best we can with information we have today
 - ◆ Once clinical trials mature, findings will be integrated as well
- Three prostate models have been developed to:
 - ◆ Explain declines in prostate cancer mortality
 - ◆ Learn from patterns of prostate cancer incidence
- Models are now poised to address pressing policy questions