| Characteristic | FHCC | Erasmus | UMICH | Cambridge |
|---|---|---|---|---|
| **Model type** | State-transition<br>Microsimulation | State-transition<br>Microsimulation | State-transition<br>Analytic | State-transition<br>Analytic and microsimulation |
| **Natural history** | | | | |
| Main states | Healthy, preclinical, clinical | Healthy, preclinical, clinical | Healthy, preclinical, clinical | Healthy, preclinical, clinical, death |
| PSA | Mixed effects model • PSA velocity increases at onset | PSA not currently modeled | PSA not currently modeled | Frailty model, time-varying PSA incorporated into multistate model |
| Onset | Risk increases with age<br>Min age of onset 35 | Risk increases with age<br>Min age of onset 40 | Risk increases with age<br>Min age of onset 35 | Risk increases with age<br>Min age of onset 40 |
| Stages | Localized, metastatic<br>Progression risk ↑ with PSA | Localized, regional, distant | Localized, metastatic | Stage not currently modeled |
| Grades | Low, moderate, high<br>Grade ↑ with age at onset<br>No grade progression | Low, moderate, high<br>Grade progression | Low, moderate, high<br>Grade progression | Early (Gleason score <7) and late (Gleason score ≥ 7) preclinical and clinical states. Early to late state progression |
| **Calibration** | | | | |
| Target | US incidence 1975-2000 by age, year, stage, grade | ERSPC-Rotterdam and then US incidence 1980-2000 by age, stage, year, grade | US incidence 1975-2000 by age, year, stage, grade | Flexible. Simulation based on MSM-based estimated transition parameters |
| Method | Simulated Poisson maximum likelihood | Nelder-Mead least squares optimization | Maximum likelihood | Maximum likelihood |
| **Survival** | | | | |
| Baseline | SEER diagnoses 1980-1986 | SEER diagnoses 1980-1986 | SEER diagnoses 1980-1986 | Control arm of screening trial |
| Intermediate states post diagnosis | Not currently modeled | Not currently modeled | Metastasis | Not currently modeled |
| **Screening benefit** | | | | |
| Mechanism | Stage shift, cure rate, hazard ratio | Stage shift, cure rate, hazard ratio | Stage shift, cure rate, hazard ratio | Cancer mortality reduction<br>Other outcomes: interval cancers, overdiagnoses |
| When applied | Post lead time | Post lead time | Post lead time | Sojourn time |
| **Treatment benefit** | | | | |
| Primary treatment | Hazard ratio based on clinical trials/comparative effectiveness studies | Hazard ratio based on clinical trials/comparative effectiveness studies | Hazard ratio based on clinical trials/comparative effectiveness studies | Cancer death |
| Salvage treatment | No | No | No | No |

FHCC = Fred Hutchinson Cancer Center, Erasmus = Erasmus University Medical Center, UMICH = University of Michigan, Cambridge = University of Cambridge