Appendix A (online only). *Derivation of Utilities*

Derivation of joint utilities

Stewart et al[24] describe several single state utilities and some joint health state utilities. Several models were used to impute values for the known joint health state values (from Stewart et al) using combinations of the single state utilities in order to test which model was most valid. Models included minimum, multiplicative, additive and fractional combinations thereof. The absolute values of the difference between the known and imputed joint utilities were summed for each model. The model with the smallest deviation from the known joint utilities (additive model) was chosen. This model was then applied to derive the unknown joint utilities.

Derivation of probabilities of each health state

The adverse effects of erectile dysfunction, urinary obstruction, urinary incontinence, and bowel dysfunction were considered to be independent of each other. The known probability of developing an adverse effect was drawn from the literature.[8, 27] This probability was considered to represent the sum of the probability of having this adverse effect in isolation plus this adverse effect in combination with one, two or three of the other adverse effects. For the example of erectile dysfunction (ED) in the first year after radical prostatectomy alone (no radiation) which has a probability of 0.88, this represented the probability of ED alone, plus ED and urinary incontinence (UI), plus ED and urinary obstruction (UO), plus ED and bowel dysfunction (BD), plus ED and UI and

UO, plus ED and UI and BD, plus ED and UO and BD, plus all four together. The same was done for UI (probability 0.03), UO (probability 0.1) and BD (probability 0.05). The probabilities of all 16 single and joint health states summed to 1. The same series of steps was repeated for radical prostatectomy-treated patients in years 2 and 3 then for radical prostatectomy plus RT-treated patients for years 1 through 3. Consistent with the reference study we assumed the probability of these adverse effects remained constant after 3 years. The following table depicts the probabilities used in this calculation:

	RP Year 1	RP Year 2	RP Year ≥3	RP+RT Year 1	RP+RT Year 2	RP+RT Year ≥3
Bowel Dysfunction	0.05	0.05	0.05	0.32	0.17	0.14
Urinary Obstruction/Irritation	0.1	0.1	0.1	0.22	0.22	0.22
Urinary Incontinence	0.03	0.03	0.03	0.07	0.07	0.07
Erectile Dysfunction	0.88	0.85	0.84	0.91	0.9	0.89

Final utility of health states

For a man on observation this was calculated as the product of the probability of each of the 16 single and joint health states and the utility of each of these states. For a man receiving RT he experienced the disutility of radiation administration for 6/52 of the weeks of the first year. A PSA recurrence without evidence of metastasis was given a utility equivalent to the utility of a man with a 40% chance of disease spread (0.81)[24] plus the utility of hormone therapy (0.83; because all men with PSA recurrence after RT were assumed to be managed with androgen suppression therapy) plus the utility of the adverse effects of surgery with or without radiation. This yielded a maximum possible utility of 0.64 which was then reduced to varying degrees based on the probability of adverse effects. The health state “metastatic disease” was assigned the utility of 0.25[24]

plus the utility of the adverse effects of surgery with or without radiation. We did not further reduce the utility of metastatic disease by the utility of androgen deprivation therapy as this would have resulted in an unreasonably low utility of 0.08, only barely better than death.