

# Contact X-Ray Brachytherapy as an adjunct to a Watch and Wait approach is an affordable alternative to standard surgical management of Rectal Cancer

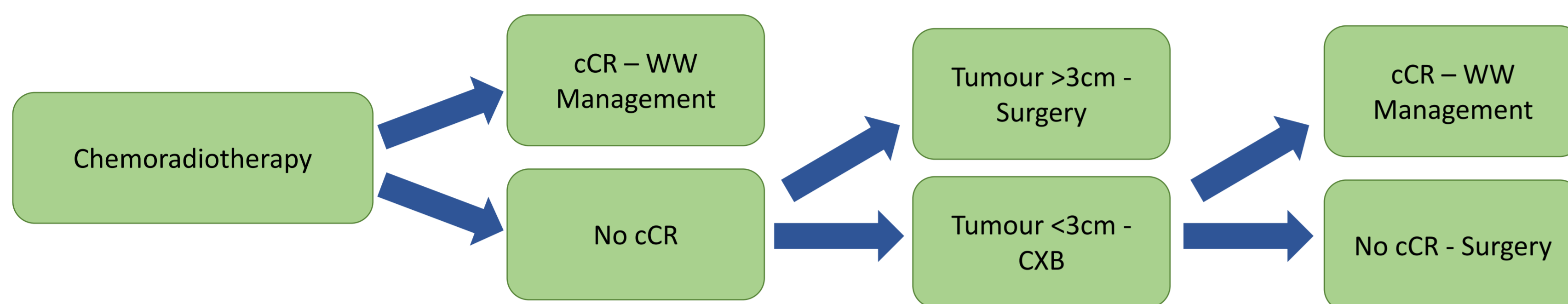
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**Background** Emerging evidence suggests Contact X-ray Brachytherapy (CXB) may increase the clinical complete response rate (cCR) and durability when administered after standard chemoradiotherapy in patients with rectal cancer [1,2]. This increases the number of patients eligible for an organ-preserving watch and wait (WW) approach, avoiding the need for stoma, surgical morbidity and mortality. The addition of CXB in partial responders is therefore probably cost-effective [3]. The affordability of widening access to CXB in the UK, however, has not been evaluated.

**Design** Decision analytical modelling with Monte-Carlo simulation was used to compare long-term costs associated with standard surgical management of rectal cancer following chemoradiotherapy to a watch and wait (WW) approach where CXB boost was used in selected patients when a cCR was not initially achieved following chemoradiotherapy. A third-party payer (NHS) perspective was adopted, probabilistic sensitivity analysis was performed, and scenario analysis was performed to investigate the effect of number of referral centres and number of patients treated with CXB. Details of the model structure, parameters, and assumptions have previously been published [3-5].

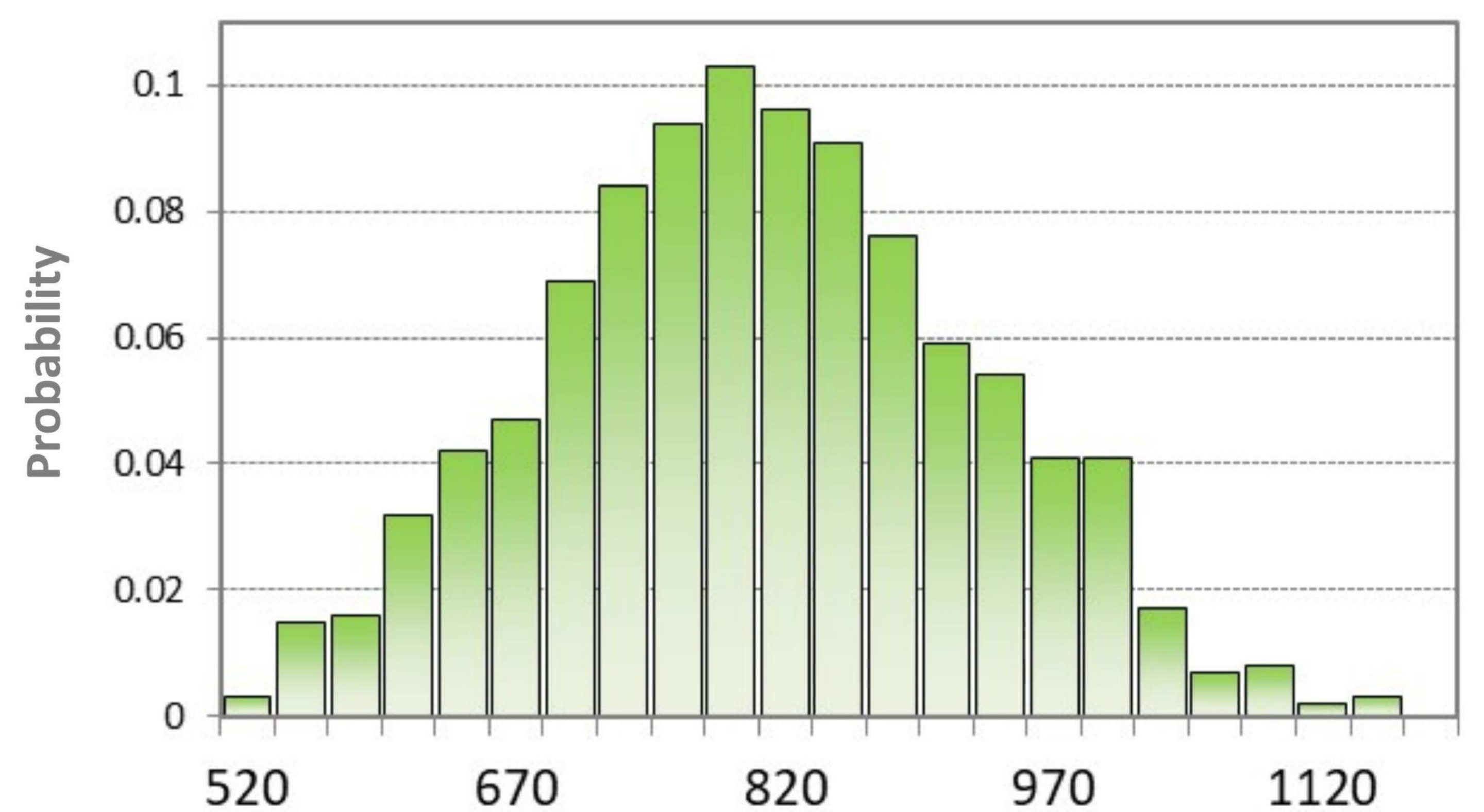
Patient Management Pathway for WW<sub>CXB</sub>



◀ The patient treatment pathway for patients managed in the WW<sub>CXB</sub> group, in the surgical group all patients would have resection with curative intent following chemoradiotherapy

**Results** We estimate 818 (95%CI 628-1021) patient per year are eligible for CXB as an adjunct to a WW approach in England and Wales. As this management is less costly than surgical management for each individual patient, the more patients treated, the more affordable the technology ▶

Even if as few as 125 patients are treated nationally in 15 centres, the cost of implementing this technology would be less than £4 million. If the average number of patients treated in each centre is 30, this technology would be cost-saving within 5 years ▼

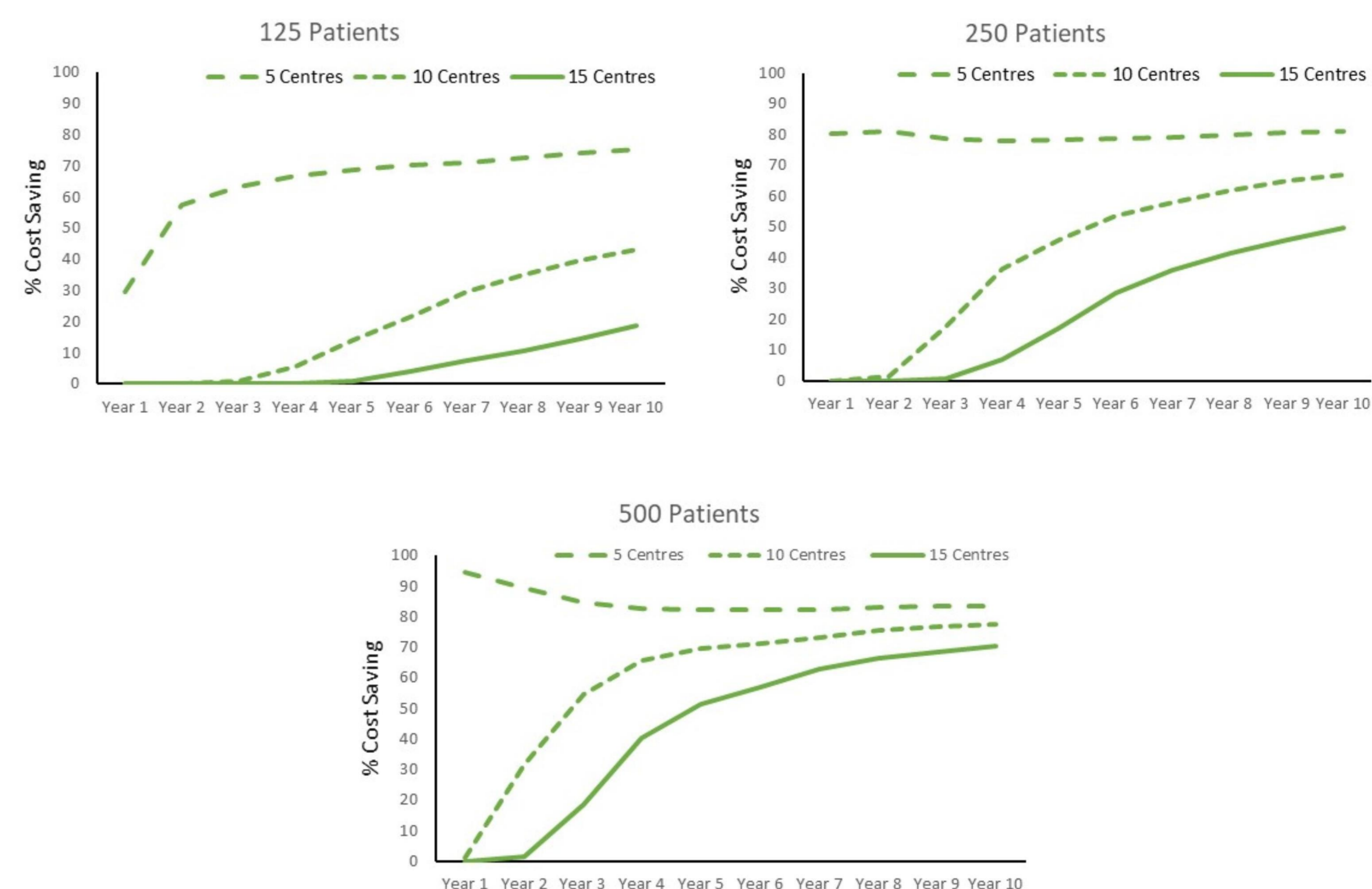
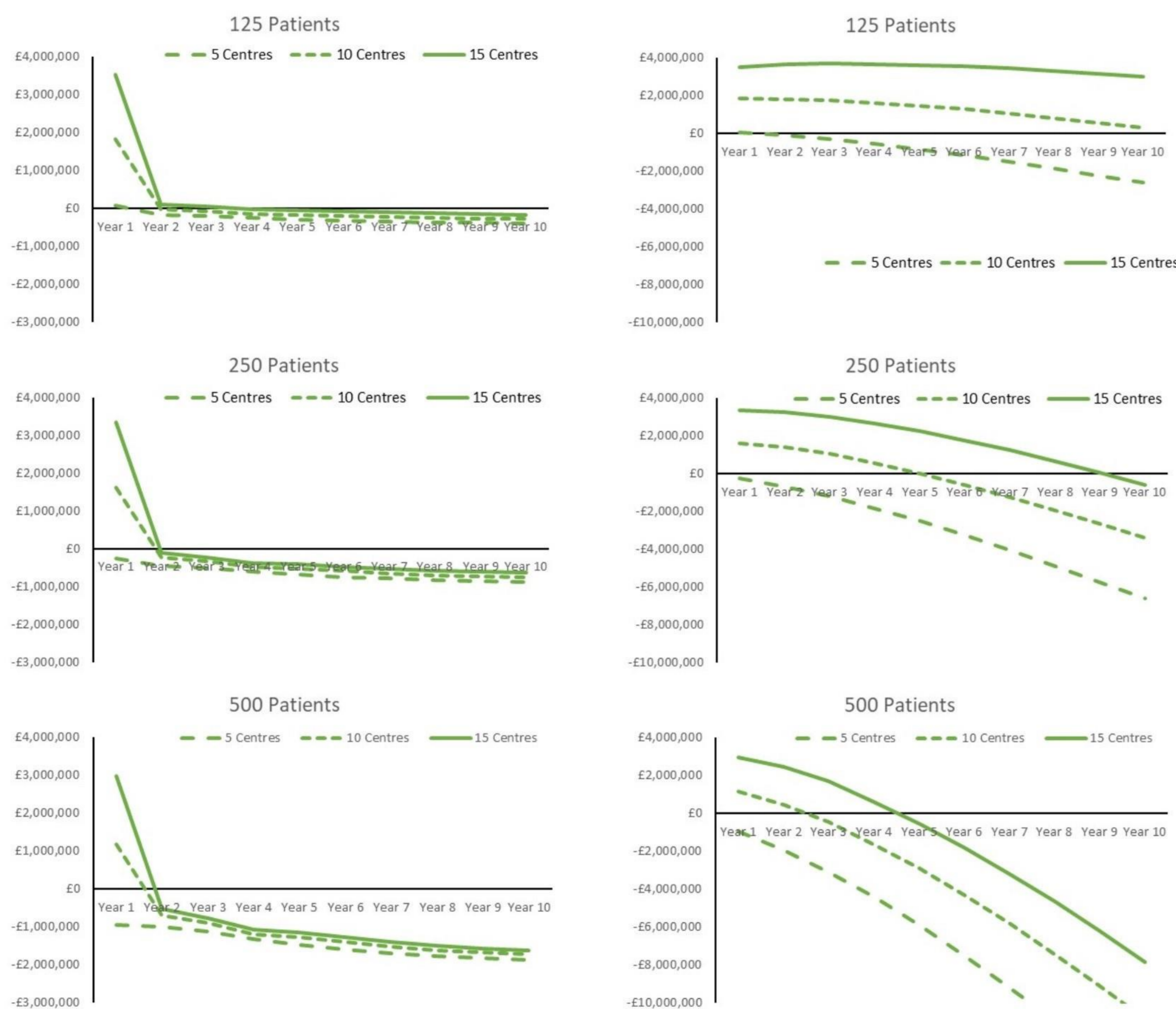


Number of Patients in England and Wales Suitable for Treatment Annually

◀ The left-hand panel shows the effect that patient volume and the number of centres have on the annual incremental costs associated with implementation of a WW<sub>CXB</sub> strategy. The right-hand panel shows the effect that patient volume and the number of centres have on the cumulative costs associated with implementation of a WW<sub>CXB</sub> strategy.

Annual incremental costs associated with implementation of a WW<sub>CXB</sub>

Cumulative costs associated with implementation of a WW<sub>CXB</sub>



The effect that patient volume, the number of centres, and time-horizon have on the certainty that implementation of a WW<sub>CXB</sub> strategy will be cost-saving. ▶

**Conclusions** The cost of CXB is not prohibitive according to the NICE threshold for implementation of new technology and may even be cost-saving within 5 years compared to standard surgical management depending on the uptake of the technology and number of referral centres.

[1] Sun Myint A, et al. Dose Escalation Using Contact X-ray Brachytherapy After External Beam Radiotherapy as Nonsurgical Treatment Option for Rectal Cancer: Outcomes From a Single-center Experience. *Int J Radiat Oncol Biol Phys*. 2017. [2] Sun Myint A, et al. Dose escalation using contact x-ray brachytherapy (Papillon) for rectal cancer. Does it improve the chance of organ preservation? *Br J Radiol*. 2017;20170175. [3] Rao C, et al. A Cost-Effectiveness Analysis of Contact X-ray Brachytherapy for the Treatment of Patients with Rectal Cancer Following a Partial Response to Chemoradiotherapy. *Clin Oncol (R Coll Radiol)*. 2017. [4] Rao C, et al. Avoiding Radical Surgery in Elderly Patients With Rectal Cancer Is Cost-Effective. *Dis Colon Rectum*. 2017;60:30-42. [5] Smith FM, et al. Avoiding radical surgery improves early survival in elderly patients with rectal cancer, demonstrating complete clinical response after neoadjuvant therapy: results of a decision-analytic model. *Dis Colon Rectum*. 2015;58:159-71.