

# ADDENDUM

## Software with artificial intelligence-derived algorithms for analysing CT brain scans in people with a suspected acute stroke: a systematic review and cost-effectiveness analysis

A Diagnostic Assessment Report commissioned by the NIHR HTA Programme on behalf of the National Institute for Health and Care Excellence



**Maastricht University**

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## **Sensitivity analyses specifically focused on accuracy related to AI technology added to current practice and AI technology costs**

One-way and two-way sensitivity analyses were performed focussing on accuracy related to AI technology added to current practice and AI technology costs. These analyses are conditional on the base-case described in the EAG report.

### **One-way sensitivity analyses**

The one-way sensitivity analyses provided in the EAG report were repeated creating figures focussing on accuracy related to AI technology added to current practice and AI technology costs. Specifically, the parameters of interest were  $p_{se\_t2}$  (current practice with AI technology sensitivity),  $p_{sp\_t2}$  (current practice with AI technology specificity) and  $c_{t2}$  (additional costs related to the AI technology). The outcomes considered in these analyses were costs, QALYs and the (incremental) net monetary benefit (iNMB). The (i)NMB was calculated based on willingness to pay values ( $\lambda$ ) of £20,000 and £30,000 per QALY gained.

The one-way sensitivity analyses are presented (Figure 1) with the outcome parameter on the y-axis and the parameter of interest in the x axis. In addition, one-way sensitivity analyses are presented (Figure 2) using optimal strategy plots, showing for different values of the input parameters of interest the optimal strategy in terms of a specific outcome.

Figure 1 indicates that the sensitivity of current practice with AI technology is clearly the most impactful parameter of the three input parameters considered (independently of the outcome considered). Figure 2 illustrates threshold values for input parameters that change the strategy that is most optimal given a specific outcome. Considering the most optimal strategy in terms of costs, current practice with AI technology becomes more expensive than current practice without AI technology with a sensitivity ( $p_{se\_t2}$ ) below 94.4%, specificity below ( $p_{sp\_t2}$ ) 97.0% or AI technology costs of £40 or higher. Moreover, AI technology costs and specificity did not affect the most optimal strategy in terms of effectiveness (i.e. QALYs) and cost effectiveness (i.e. NMB). Adding AI to current practice would become more optimal, compared with current practice (without AI), with sensitivity ( $p_{se\_t2}$ ) values above 93.0% (QALYs), 93.6% (cost effective with  $\lambda$  of £20,000 per QALY) and 93.4% (cost effective with  $\lambda$  of £30,000 per QALY).

### **Two-way sensitivity analyses**

Additional two-way sensitivity analyses were performed focussing on accuracy related to current practice. Specifically, the parameters of interest were  $p_{se\_t2}$  (current practice with AI technology sensitivity) and  $p_{sp\_t2}$  (current practice with AI technology specificity). The outcomes considered in these analyses were costs, QALYs and the NMB. The two-way sensitivity analyses are presented (Figure 3) using optimal strategy plots, showing for different combinations of the input values for  $p_{se\_t2}$  and  $p_{sp\_t2}$  the optimal strategy in terms of a specific outcome.

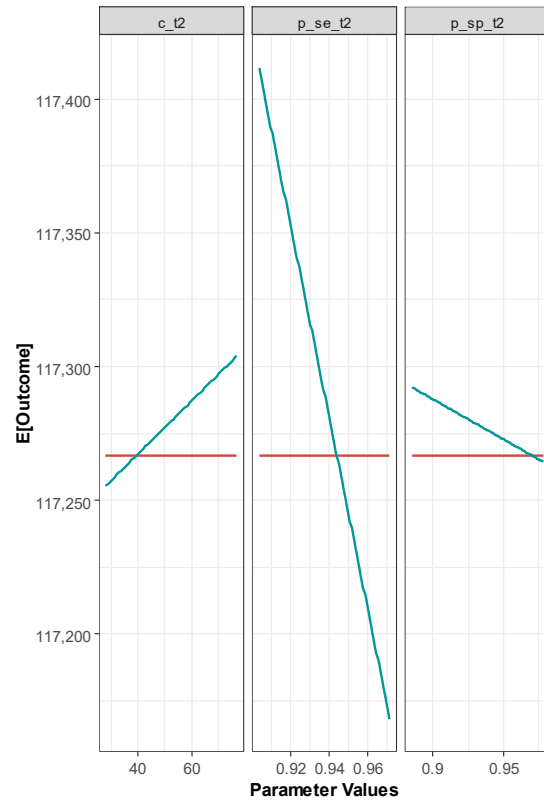
Consistent with the one-way sensitivity analyses, Figure 3 illustrates that current practice with AI sensitivity ( $p_{se\_t2}$ ) is the main driver when considering the most optimal strategy (independently of the outcome considered).

### **Scenario analyses specifically focused on AI technology costs**

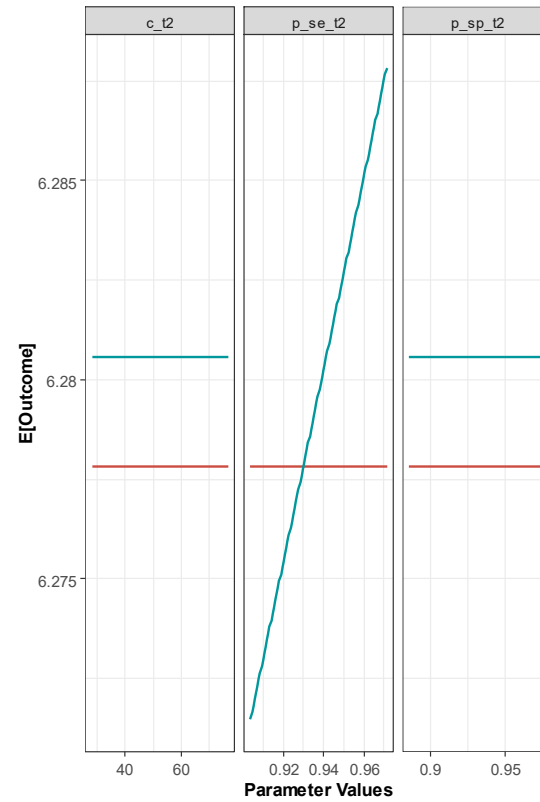
In line with the sensitivity and scenario analyses provided in the EAG report, and Figures 1 and 2 in this addendum. Alternative AI technology costs did not affect the technology that is most optimal in terms of cost effectiveness (Table 1).

**Figure 1: One-way sensitivity analyses: outcome versus input parameter value: current practice with AI sensitivity (p\_se\_t2); current practice with AI specificity (p\_sp\_t2); c\_t2 (additional costs related to the AI technology). Blue and red lines represent current practice with and without AI and the grey line for iNMB represents current practice with AI versus current practice without AI**

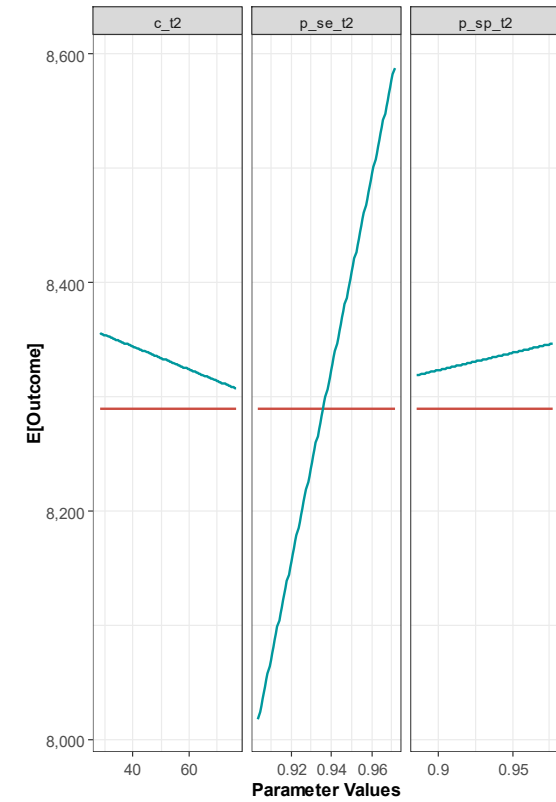
**Outcome = Costs**



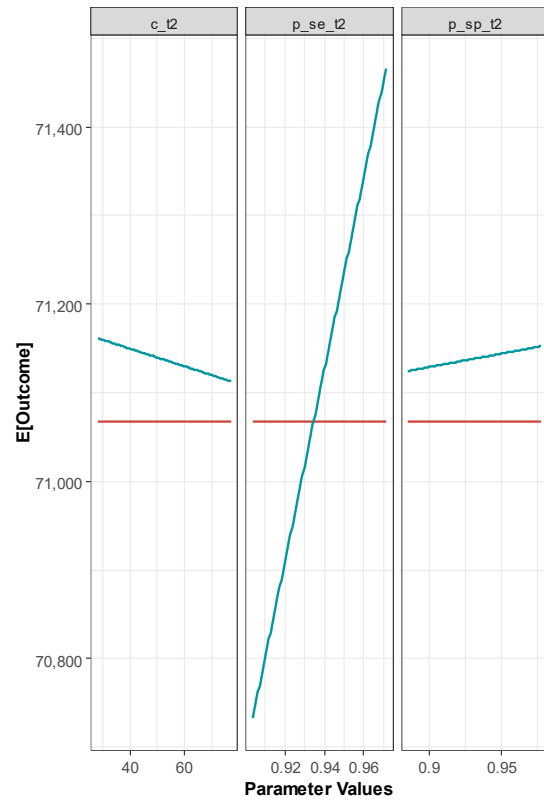
**Outcome = QALYs**



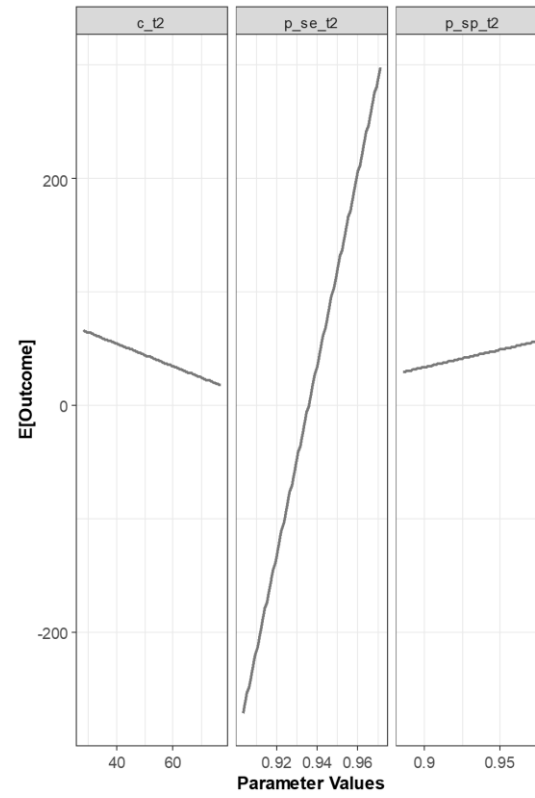
**Outcome = NMB ( $\lambda$ : £20,00 per QALY)**



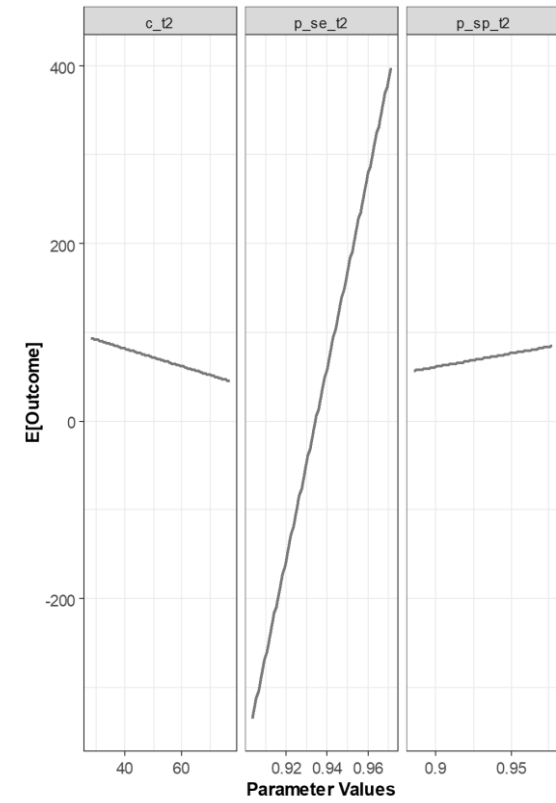
Outcome = NMB ( $\lambda$ : £30,00 per QALY)



Outcome = iNMB ( $\lambda$ : £20,00 per QALY)

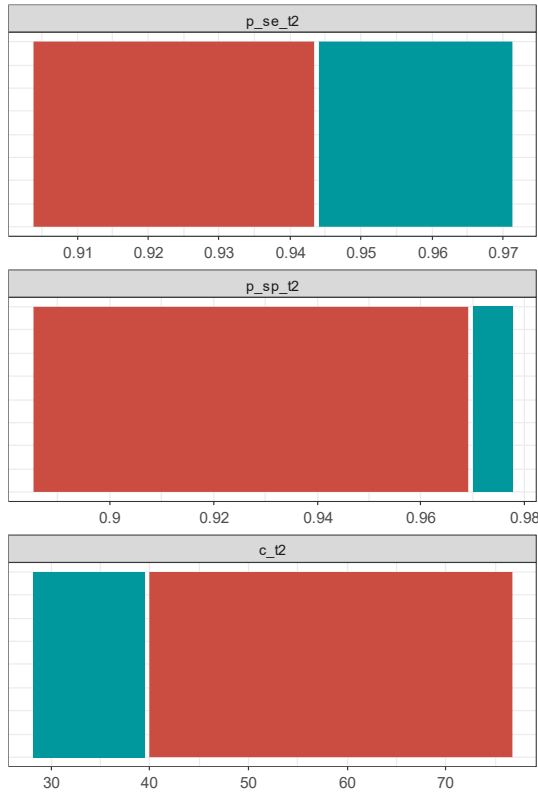


Outcome = iNMB ( $\lambda$ : £30,00 per QALY)

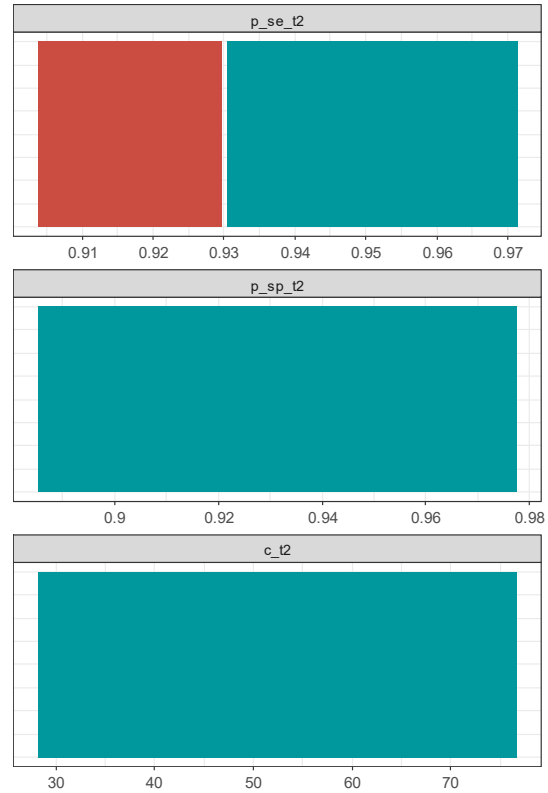


**Figure 2: Optimal strategy plots (one-way): input parameter value: current practice with AI sensitivity ( $p_{se\_t2}$ ); current practice with AI specificity ( $p_{sp\_t2}$ );  $c_{t2}$  (additional costs related to the AI technology). Coloured areas represent the most optimal strategy either current practice with (blue) or without (red) AI**

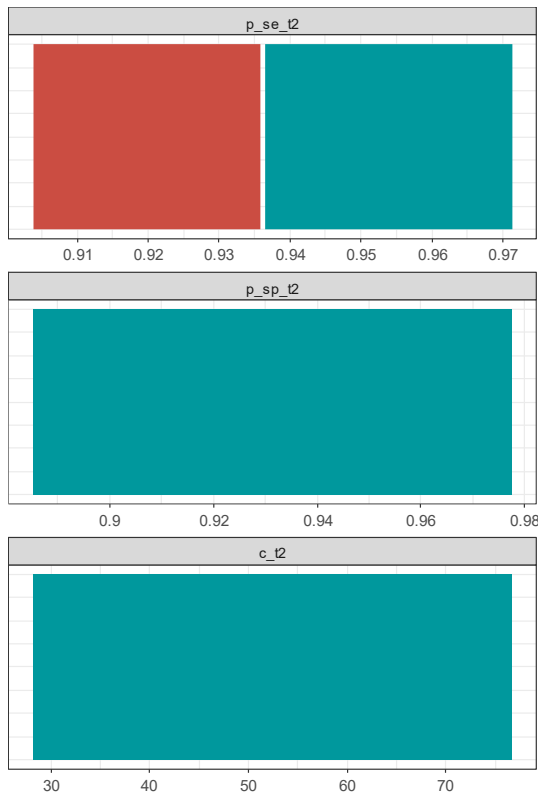
**Outcome = Costs**



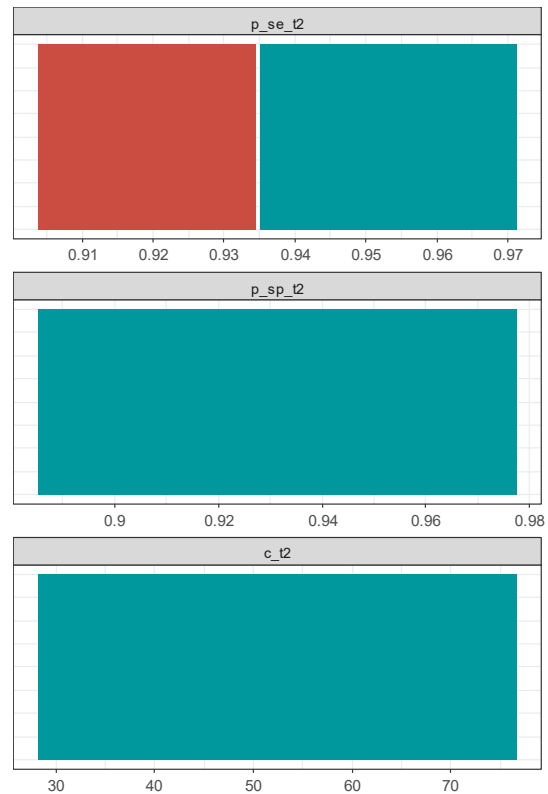
**Outcome = QALYs**



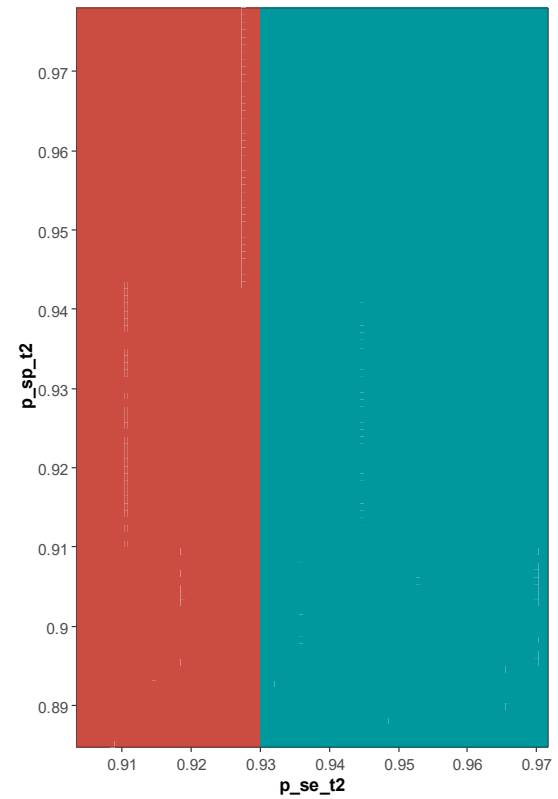
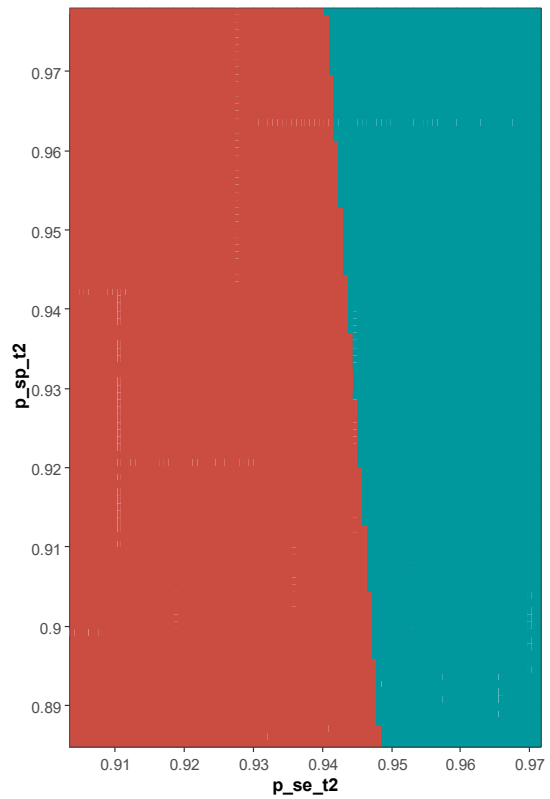
**Outcome = NMB ( $\lambda$ : £20,000 per QALY)**



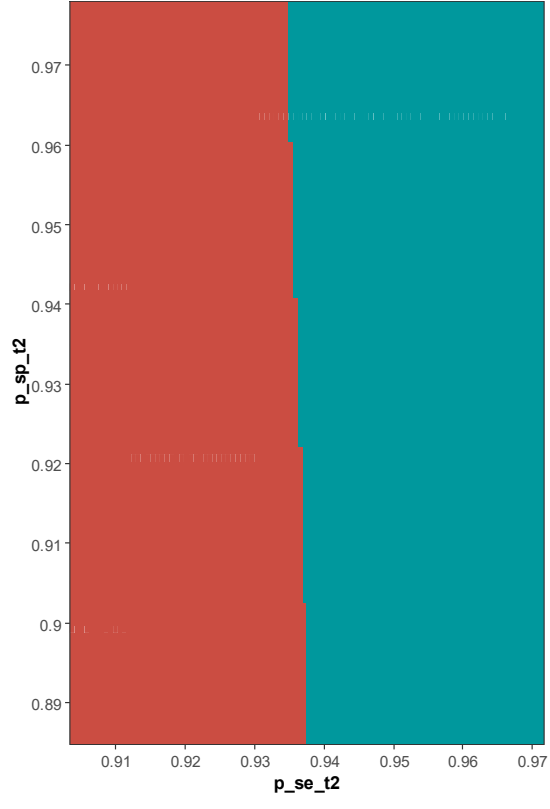
**Outcome = NMB ( $\lambda$ : £30,000 per QALY)**



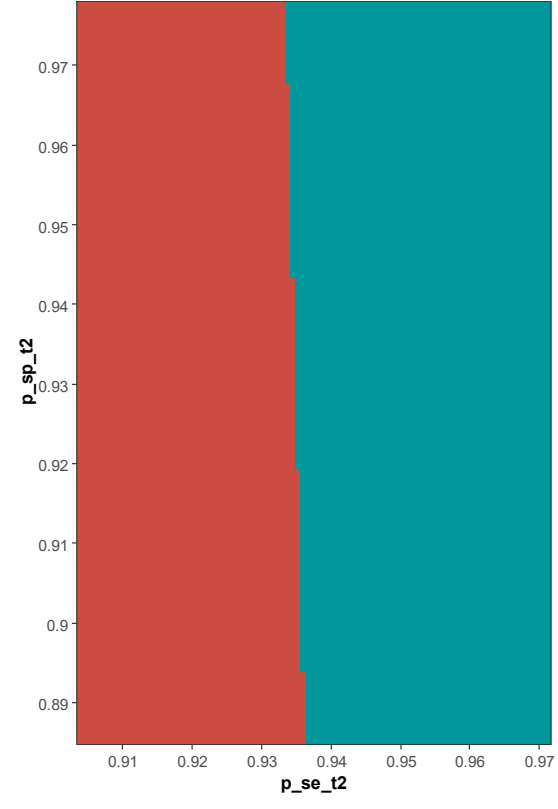
**Figure 3: Optimal strategy plots (two-way):  $p_{se\_t2}$  (current practice with AI technology sensitivity; x-axis) and  $p_{sp\_t2}$  (current practice with AI technology specificity; y-axis); coloured areas represent the most optimal strategy either current practice with (blue) or without (red) AI**  
**Outcome = Costs** **Outcome = QALYs**



**Outcome = NMB ( $\lambda$ : £20,00 per QALY)**



**Outcome = NMB ( $\lambda$ : £30,00 per QALY)**





**Table 1: Deterministic scenario analyses focused on AI technology costs (c\_t2)**

Technology	Costs (£)	QALYs	Δ Costs (£)	Δ QALYs	Δ Costs (£) / Δ QALYs
<b>Deterministic base-case (AI technology costs of £49.24)</b>					
Current practice without AI	117,267	6.2778	NA	NA	NA
Current practice with AI	117,276	6.2806	10	0.0027	3,490
<b>Rapid CTA costs (£57.63)</b>					
Current practice without AI	117,267	6.2778	NA	NA	NA
Current practice with AI	117,285	6.2806	18	0.0027	6,561
<b>Viz LVO costs (£80.73)</b>					
Current practice without AI	117,267	6.2778	NA	NA	NA
Current practice with AI	117,308	6.2806	41	0.0027	15,018
<b>Brainomix e-CTA costs (£51.53)</b>					
Current practice without AI	117,267	6.2778	NA	NA	NA
Current practice with AI	117,279	6.2806	12	0.0027	4,328
<b>Avicenna CINA LVO costs (£7.08)</b>					
Current practice without AI	117,267	6.2778	NA	NA	NA
Current practice with AI	117,234	6.2806	NA	NA	Dominance