

NICE Request 20/06/2016

High-throughput, non-invasive prenatal testing for fetal rhesus D status in RhD-negative women not known to be sensitised to the RhD antigen

Base Case economic model results

Table 1 (Table 26 of the main report) presents the base case results for each post-partum testing scenario separately against current practice of 'No test and RAADP'. Total costs, total QALYs, incremental costs and incremental QALYs are presented together with incremental cost per QALY gained (ICER) and population net health benefits at £20,000 and £30,000 threshold values.

Results show that all post-partum scenarios are cost saving but also less effective than No test and RAADP. The least effective strategies (NIPT PP2 and PP4) are those that omit cord serology for women who test negative on the NIPT. Without cord serology false negatives are not picked up at delivery and are not provided with post-partum anti-D immunoglobulin. NIPT PP1 has the highest ICER (No test and RAADP vs NIPT PP1, ICER approximately £1,270,000 per QALY gained) and greater NHB (incremental NHB at £20,000 of approximately 14; incremental NHB at £30,000 of approximately 16, vs No test and RAADP).

Table 1 Incremental cost-effectiveness outcomes associated with high-throughput NIPT vs other strategies (base case post-partum scenarios) with NIPT cost of [redacted] + [redacted] royalty fee – probabilistic results

Strategies	Total costs	Total QALYs	Increm. Costs	Increm. QALYs	ICER (£/ QALY gained)	Population NHB (λ=£20,000)	Population NHB (λ=£30,000)
Current clinical practice							
No Test and RAADP	£15,983,725	2,433,756	---	---	---	2,432,957	2,433,223
Post-partum scenario 1 (NIPT PP1)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,400,187	2,433,756	£-583,538	-0.46	£1,269,050	2,432,986	2,433,242
Post-partum scenario 2 (NIPT PP2)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,312,630	2,433,737	£-671,095	-19.13	£35,087	2,432,972	2,433,227
Post-partum scenario 3 (NIPT PP3)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,498,942	2,433,756	£-484,783	-0.46	£1,054,281	2,432,981	2,433,239
Post-partum scenario 4 (NIPT PP4)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,410,610	2,433,737	£-573,114	-19.13	£29,964	2,432,967	2,433,223

NIPT unit cost scenarios

Table 2-6 show the incremental results for five alternative unit costs for NIPT provided through personal communication with IBGRL. These unit costs reflect a range of throughput levels, both above and below compared to the level considered in the base case analysis. For all NIPT prices and compared to all other strategies, NIPT PP1 remains the best strategy with the highest estimated ICER and population NHB. The ICERs for NIPT PP1 or NIPT PP3 when compared to No Test and RAADP remain above £30,000 for all alternative NIPT prices. Irrespective of the NIPT price used, the ICERs for NIPT PP2 or NIPT PP4, when compared to No Test and RAADP, are always substantially lower than the ones estimated for the other two post-partum strategies. The highest estimated NHB is obtained for NIPT PP1 for a threshold of £30,000 per QALY for a NIPT cost of [REDACTED] + [REDACTED] royalty fee. The lowest estimated NHB is obtained for NIPT PP4 for a threshold of £20,000 per QALY for a NIPT cost of [REDACTED] + [REDACTED] royalty fee.

Table 2 Incremental cost-effectiveness outcomes associated with high-throughput NIPT vs other strategies (post-partum scenarios) with NIPT cost of [REDACTED] + [REDACTED] royalty fee – probabilistic results

Strategies	Total costs	Total QALYs	Increm. Costs	Increm. QALYs	ICER (£/ QALY gained)	Population NHB (λ =£20,000)	Population NHB (λ =£30,000)
Current clinical practice							
No Test and RAADP	£15,983,725	2,433,756	---	---	---	2,432,957	2,433,223
Post-partum scenario 1 (NIPT PP1)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,347,124	2,433,756	£636,600	-0.46	£1,384,447	2,432,988	2,433,242
Post-partum scenario 2 (NIPT PP2)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,259,576	2,433,737	£724,149	-19.13	£37,861	2,432,974	2,433,228
Post-partum scenario 3 (NIPT PP3)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,445,880	2,433,756	£537,845	-0.46	£1,169,679	2,432,984	2,433,241
Post-partum scenario 4 (NIPT PP4)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,357,557	2,433,737	£626,168	-19.13	£32,738	2,432,969	2,433,225

Table 3 Incremental cost-effectiveness outcomes associated with high-throughput NIPT vs other strategies (post-partum scenarios) with NIPT cost of [REDACTED] + [REDACTED] royalty fee – probabilistic results

Strategies	Total costs	Total QALYs	Increm. Costs	Increm. QALYs	ICER (£/ QALY gained)	Population NHB (λ =£20,000)	Population NHB (λ =£30,000)
Current clinical practice							
No Test and RAADP	£15,983,725	2,433,756	---	---	---	2,432,957	2,433,223
Post-partum scenario 1 (NIPT PP1)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,441,672	2,433,756	£542,053	-0.46	£1,178,830	2,432,984	2,433,241
Post-partum scenario 2 (NIPT PP2)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,354,108	2,433,737	£629,616	-19.13	£32,918	2,432,969	2,433,225
Post-partum scenario 3 (NIPT PP3)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,540,427	2,433,756	£443,297	-0.46	£964,062	2,432,979	2,433,238
Post-partum scenario 4 (NIPT PP4)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,452,089	2,433,737	£531,636	-19.13	£27,795	2,432,965	2,433,222

Table 4 Incremental cost-effectiveness outcomes associated with high-throughput NIPT vs other strategies (post-partum scenarios) with NIPT cost of [REDACTED] + [REDACTED] royalty fee – probabilistic results

Strategies	Total costs	Total QALYs	Increm. Costs	Increm. QALYs	ICER (£/ QALY gained)	Population NHB (λ =£20,000)	Population NHB (λ =£30,000)
Current clinical practice							
No Test and RAADP	£15,983,725	2,433,756	---	---	---	2,432,957	2,433,223
Post-partum scenario 1 (NIPT PP1)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,631,731	2,433,756	£351,993	-0.46	£765,497	2,432,974	2,433,235
Post-partum scenario 2 (NIPT PP2)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,544,137	2,433,737	£439,587	-19.13	£22,983	2,432,960	2,433,219
Post-partum scenario 3 (NIPT PP3)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,730,487	2,433,756	£253,238	-0.46	£550,729	2,432,969	2,433,231
Post-partum scenario 4 (NIPT PP4)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,642,118	2,433,737	£341,607	-19.13	£17,860	2,432,955	2,433,216

Table 5 Incremental cost-effectiveness outcomes associated with high-throughput NIPT vs other strategies (post-partum scenarios) with NIPT cost of [REDACTED] + [REDACTED] royalty fee – probabilistic results

Strategies	Total costs	Total QALYs	Increm. Costs	Increm. QALYs	ICER (£/ QALY gained)	Population NHB (λ=£20,000)	Population NHB (λ=£30,000)
Current clinical practice							
No Test and RAADP	£15,983,725	2,433,756	---	---	---	2,432,957	2,433,223
Post-partum scenario 1 (NIPT PP1)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,704,089	2,433,756	-£279,635	-0.46	£608,137	2,432,971	2,433,232
Post-partum scenario 2 (NIPT PP2)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,616,483	2,433,737	-£367,241	-19.13	£19,200	2,432,956	2,433,217
Post-partum scenario 3 (NIPT PP3)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,802,845	2,433,756	-£180,880	-0.46	£393,369	2,432,966	2,433,229
Post-partum scenario 4 (NIPT PP4)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,714,464	2,433,737	-£269,261	-19.13	£14,078	2,432,951	2,433,213

Table 6 Incremental cost-effectiveness outcomes associated with high-throughput NIPT vs other strategies (post-partum scenarios) with NIPT cost of [REDACTED] + [REDACTED] royalty fee – probabilistic results

Strategies	Total costs	Total QALYs	Increm. Costs	Increm. QALYs	ICER (£/ QALY gained)	Population NHB (λ=£20,000)	Population NHB (λ=£30,000)
Current clinical practice							
No Test and RAADP	£15,983,725	2,433,756	---	---	---	2,432,957	2,433,223
Post-partum scenario 1 (NIPT PP1)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,859,417	2,433,756	-£124,307	-0.46	£270,337	2,432,963	2,433,227
Post-partum scenario 2 (NIPT PP2)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,771,786	2,433,737	-£211,939	-19.13	£11,081	2,432,949	2,433,211
Post-partum scenario 3 (NIPT PP3)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,958,173	2,433,756	-£25,552	-0.46	£55,569	2,432,958	2,433,224
Post-partum scenario 4 (NIPT PP4)							
Test and RAADP (T+ only) vs No Test and RAADP	£15,869,767	2,433,737	-£113,958	-19.13	£5,958	2,432,944	2,433,208