UNIVERSITY OF BIRMINGHAM AND UNIVERSITY OF YORK HEALTH ECONOMICS CONSORTIUM (NICE EXTERNAL CONTRACTOR)

Health economic report on piloted indicator

QOF indicator area: Diabetes Erectile Dysfunction Treatment

Potential output: Recommendations for NICE Menu

Contents

Introduction	2
Piloted indicator(s)	2
Economic rationale for the indicator	2
Objective	2
Type of health economic analysis	2
Delivery cost of indicator	2
Effectiveness of indicator	3
Incremental cost-effectiveness ratio	4
Eligible population	4
Baseline level of achievement	5
Population	5
QOF Payments	5
Societal value of a QALY	5
QOF Points	5
Thresholds	6
Results	6
Discussion	7
References	7
Appendix A: Net Benefit Analysis	9

Introduction

This briefing paper provides a summary of the economic evidence generated on the proposed pilot four diabetes erectile dysfunction (ED) treatment indicator. The format of this paper is intended to provide the QOF Advisory Committee with sufficient information upon which to make a recommendation on whether the indicator is economically justifiable.

Piloted indicator

The percentage of male patients with diabetes who have a record of erectile dysfunction with a record of advice and assessment of contributory factors and treatment options in the preceding 15 months.

Economic rationale for the indicator

ED is reported to be significantly more prevalent in people with diabetes than the general population. It is reported to be a problem in between 20-71% of men with diabetes at some point in their lives [1]. Whilst no evidence could be found that erectile dysfunction in and of itself increases healthcare costs, there is a body of evidence that it significantly impacts on quality of life [1]. The economic rationale for introduction of the indicator is based upon the assumption that treatments for ED can address this reduction in quality of life at acceptable cost [2].

Objective

To evaluate whether the proposed indicator represents a cost effective use of NHS resources.

Type of health economic analysis

An indicative net benefit approach is applied with a one year time horizon at baseline.

Delivery cost of indicator

The cost of delivering the indicator needs to consider the cost of delivering the advice and discussing treatment options as well as the cost of the treatment options.

We have assumed that delivering advice and discussing treatment options is undertaken through a GP consultation which we have assumed lasts 17.2 minutes at a cost of £53, extracted from the Unit Costs of Health and Social Care 2010 [3].

The NICE Guideline on diabetes [2] suggests that people with diabetes with ED are offered pharmacological treatment (PDE-5 inhibitors) for ED. The least expensive PDE-5 inhibitors should be used as a first line treatment and then patients should be referred on to other surgical, psychological or pharmaceutical interventions should PDE-5 inhibitors fail. Our modelling focussed on the costs of the PDE-5 inhibitors and did not consider subsequent treatment should PDE-5 inhibitors fail, although sensitivity analysis does examine an increase of 100% of base case costs.

In estimating the cost of PDE-5 inhibitors per patient offered advice we have assumed that Vardenafil 10mg is offered and that a pack of 8 tablets per month is prescribed at a cost of £28.16 (Source: NHS Electronic Drug Tariff March 2012). The annual prescription cost is therefore £337.92.

Not all patients who are offered treatment will accept it and not all who accept it will find treatment effective. There is no data on the percentage of patients who will accept treatment so we have assumed a figure of 75% at baseline and then used sensitivity analysis to explore how findings vary between values of 50% and 100%.

For effectiveness of treatment, an RCT on Vardenafil in diabetic men was used [4] which reported that 57% of men taking Vardenafil 10mg achieved successful intercourse compared to 13% on placebo. As placebo is not a treatment option we have assumed that 57% of men see an improvement in their ED and so maintain treatment for a full 12 months, whilst 43% of men will cease treatment after the first month.

Using these statistics provides a baseline annual cost of PDE-5 inhibitors per patient offered advice of £153.54.

Side effects of Vardenafil include skin rashes and headaches in under 15% of patients [4]. The costs of treating these side effects are not considered in the model directly but sensitivity analysis increased the costs by 100% and reduced the costs by 50%. The upper bound of the sensitivity analysis can also be seen as an estimate of the additional cost of providing alternative treatment should PDE-5 inhibitors fail.

The incremental annual cost of providing ED advice and treatment to diabetes patients with ED in comparison to usual care was estimated to be £206.54.

Effectiveness of indicator

As stated above, PDE-5 inhibitors are assumed to be effective at improving ED in 57% of men with diabetes. For the purposes of the model, some estimate of what this means for utility and therefore quality of life is required.

A meta analysis of trials of PDE-5 inhibitors [5] in people with diabetes concluded that there was evidence that they improved quality of life in sexual dimensions measured but did not affect overall self reported quality of life.

However, this contradicts with other findings where time trade off techniques have been used with the general population who have rated the inability to attain and maintain an erection (on a five point scale from never to always) with a maximum utility decrement of 0.26. [6]. People with diabetes with ED will be on a spectrum of dysfunction and so applying this disutility would be inappropriate. In addition, the evidence on PDE-5 inhibitors is that ED does not provide a cure for most men but rather improves the condition [5]. As such we have assumed in the model that the average man with diabetes is sometimes failing to attain and maintain an erection which from the report quoted above would suggest a utility decrement of 0.13. This is improved when PDE-5 inhibitors are successful so on average men can most times attain and maintain an erection with a utility decrement of 0.06. The improvement in utility for successful treatment is therefore assumed to be 0.07 and this is maintained for the full year of the model. In sensitivity analysis we explored the impact of a 50% increase and decrease in the estimated utility per successfully treated patient.

To calculate the improvement in utility per patient offered advice, we multiplied the estimated utility gain with successful treatment by the proportion of patients we assumed accepted PDE-5 inhibitor treatment and the proportion where treatment was successful.

The incremental QALY gain of ED advice and treatment for diabetics per patient in comparison to usual care was estimated to be 0.030.

Incremental cost-effectiveness ratio

The NICE Guidance on diabetes that recommended advice and PDE-5 inhibitor treatment for diabetics did not find any cost effectiveness evidence to support the recommendation. An American study [7] reported an ICER for sildenafil for people with diabetes of \$11,230/QALY although it is not how clear how transferable this is to the UK setting.

Figure 1: Incremental cost-effectiveness ratio

$$ICER = \frac{Cost_{Treatment} - Cost_{Alternativ e}}{Effect_{Treatment} - Effect_{Alternativ e}}$$

Eligible population

The eligible population are men with diabetes with erectile dysfunction. The percentage of males over the age of 16 who have been diagnosed with diabetes in the UK is estimated to be 6% by the British Heart Foundation¹. For simplicity we have assumed that 50% of a practice population is male.

The percentage of men with diabetes with ED has been estimated to be between 20% and 71% [1]. At baseline we have used the value of 58% which is the prevalence rate of ED problems in men with diabetes reported in a study of 1,460 Italian men with type 2 diabetes. [8]. Sensitivity analysis varied the ED rate by 20-71% to explore the impact on conclusions.

Men with diabetes are required by the indicator to be provided with advice every 15 months. Strictly speaking the annual eligible population therefore needs to be adjusted to 80% of the total population of men with diabetes and ED. However, in the first year of the indicator for a practice that had not been offering advice the effective population would be all men with diabetes with ED. We therefore have assumed that the eligible population is all the men with diabetes ED population but the size of the eligible population and the impact on cost effectiveness of the indicator is explored in sensitivity analysis.

Using the above assumptions, at baseline the eligible population was assumed to be 1.74%.

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¹ http://www.bhf.org.uk/heart-health/statistics/prevention/diabetes.aspx

Baseline level of achievement

Data from the pilot sites suggested that this was new work so we have assumed that baseline achievement is 25%.

Population

In the base case, the threshold analysis of the proposed indicator was conducted based on the total practice population registered with practices in England, that is, 8,228 practices with a mean practice size of 6,297 [9].

Table 1: Practice information for all UK members

Country	Number of practices	Number of patients
England	8,228	6,297
Scotland	1,014	5,122
Wales	488	6,146
Northern Ireland	357	5,011

QOF Payments

Each QOF point is assumed to result in a payment of £133.76. This is the forecast value per point in England during 2011/12 (source; Information Centre).

Table 2: Value per point for all UK members (most recently available)

Country	Value per point
England	£133.76
Scotland	£130.46
Wales	£133.72
Northern Ireland	£125.04

Societal value of a QALY

The expected increase in quality adjusted life year (QALY) will be costed at both £20,000 and £25,000 per QALY. This is based on the bottom and the middle of the range £20,000 - £30,000, below which NICE generally considers something to be cost effective.

QOF Points

The economic analysis considers the cost-effectiveness of incentivising the proposed activity over a range of QOF points. The range of QOF points evaluated was agreed by NICE, YHEC and the economic sub-group to justify the practice successfully completing the activity.

In the base case analysis, 5 points were allocated to the proposed indicator. Sensitivity analysis will be followed out between the agreed lower and upper bounds of 2 and 10 points (i.e. the range evaluated).

Thresholds

The minimum threshold is set to 40% and the incentivised payments increase linearly up to the maximum threshold of 90%.

Results (assuming a value per QALY of £25,000)

The indicative net benefit analysis suggests that the indicator is highly cost effective, with QOF payments up to the upper bound of 10 points warranted on economic grounds (Appendix A). The increase in quality of life offered by advice and treatment outweighs the additional healthcare costs in a net benefit analysis if the value per QALY is assumed to be £25,000.

Sensitivity analysis shows the findings are highly insensitive to a 100% increase in costs (Appendix B). The cost of intervention would have to rise to £741 per patient before the indicator cannot be recommended on economic grounds at a baseline of 5 points and 90% achievement.

The findings are also insensitive to a 50% reduction in the assumed utility gains (Appendix C). Due to the potential number of people that could benefit from advice and treatment the utility gain per patient offered advice has to fall to 0.009 before the indicator could not be recommended on economic grounds at a baseline of 5 points and 90% achievement.

Sensitivity analysis explored how conclusions changed if the eligible population fell because only 20% of diabetic males had ED (Appendix D). This made no difference to the overall findings. The eligible population would have to fall to 0.03% before the indicator could not be recommended on economic grounds at a baseline of 5 points and 90% achievement.

If the assumptions underpinning this analysis hold, then due to the potential size of the eligible population and the relatively low cost of the intervention compared to potential quality of life gains there is a strong economic case for the indicator at a baseline of 5 points. There are economic grounds to award up to the maximum QOF points appropriate for this indicator, i.e. 10 points.

Results (assuming a value per QALY of £20,000)

The indicative net benefit analysis suggests that the indicator is highly cost effective, with QOF payments up to the upper bound of 10 points warranted on economic grounds (Appendix E). The increase in quality of life offered by advice and treatment outweighs the additional healthcare costs in a net benefit analysis if the value per QALY is assumed to be £20,000. At 5 points and 90% achievement, the value per QALY would have to fall to £7,213 before the indicator could not be justified on economic grounds.

Sensitivity analysis shows the findings are highly insensitive to a 100% increase in costs (Appendix F). The cost of intervention would have to rise from baseline by

almost threefold to £591 per patient before the indicator cannot be recommended on economic grounds at a baseline of 5 points and 90% achievement.

The findings are also insensitive to a 50% reduction in the assumed utility gains (Appendix G). Due to the potential number of people that could benefit from advice and treatment, the utility gain per patient offered advice has to fall to 0.011 QALYs before the indicator could not be recommended on economic grounds at a baseline of 5 points and 90% achievement.

Sensitivity analysis explored how conclusions changed if the eligible population fell because only 20% of diabetic males had ED (Appendix H). This made no difference to the overall findings. The eligible population would have to fall to 0.042% of a practice population (or a quarter of that assumed at baseline) before the indicator could not be recommended on economic grounds at a baseline of 5 points and 90% achievement.

If the assumptions underpinning this analysis hold, which is discussed in the next section, then due to the potential size of the eligible population and the relatively low cost of the intervention compared to potential quality of life gains there is a strong economic case for the indicator at a baseline of 5 points. There are economic grounds to award up to the maximum QOF points appropriate for this indicator, i.e. 10 points.

Discussion

Under the baseline assumptions used in the model and over a substantial range of values for costs and utility the indicator is justified on economic grounds. This finding is based on the assumption of an increase in overall quality of life from PDE-5 inhibitor treatment that is not strongly supported in the identified literature. However, the effectiveness of PDE-5 inhibitors at improving ED and sexual health components of quality of life is robustly evidenced. The modelling also found that only a very small marginal improvement in quality of life was needed for the indicator to be cost effective at baseline.

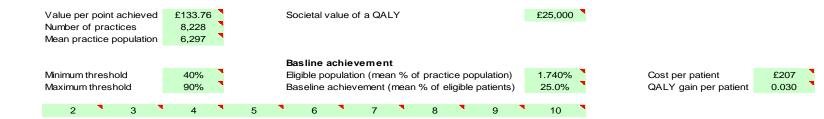
Perhaps of greater challenge to the findings is that we have focussed the analysis solely on PDE-5 inhibitors. The indicator is potentially for advice on a range of treatments and some of these may be substantially more expensive and/or less effective than PDE-5 inhibitors. We have also ignored any increase in mortality or morbidity from taking PDE-5 inhibitors that could increase both costs and decrease utility. It should be considered whether the sensitivity analysis undertaken is adequate to deal with the uncertainty around these assumptions.

References

- [1] Erectile Dysfunction in Diabetic Patients (2004). Penson DF & Wessels H, Diabetes Spectrum October 2004
- [2] National Collaborating Centre for Chronic Conditions. Type 2 diabetes: national clinical guideline for management in primary and secondary care (update). London: Royal College of Physicians, 2008.
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- [4] Vardenafil, a new phosphodiesterase type 5 inhibitor, in the treatment of erectile dysfunction in men with diabetes: a multicenter double-blind placebo-controlled fixed-dose study. Goldstein I, Young JM, Fischer J et al. Diabetes Care 2003;26(3):777–783.
- [5] Phosphodiesterase inhibitors for erectile dysfunction in patients with diabetes mellitus. Vardi M, Nini A. Cochrane Database of Systematic Reviews 2007, Issue 1
- [6] Cost Utility Analysis of Sildenafil Compared with Papaverine-phentolamine Injections, Stolk EA, Busschbach JJV, Caffa M et al, BMJ 2000
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- [8] De Berardis G, Franciosi M, Belfiglio M, Di Nardo B, Greenfield S, Kaplan SH, Pellegrini F, Sacco M, Tognoni G, Valentini M, Nicolucci A: Erectile dysfunction and quality of life in type 2 diabetic patients: a serious problem too often overlooked. Diabetes Care 25:284 –291, 2002
- [9] General Practice Trends in the UK. NHS Information Centre. Published 22 March 2011.

Appendix A: Net Benefit Base Case Analysis

Points



					1	National to	tals				
Expected Achievement					Change in treatment cost (£)	Change in QALYs					
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£9,330,772	1352
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£18,661,544	2705
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£27,992,316	4057
45%	£220	£330	£440	£550	£660	£770	£880	£991	£1,101	£37,323,088	5409
50%	£440	£660	£880	£1,101	£1,321	£1,541	£1,761	£1,981	£2,201	£46,653,860	6761
55%	£660	£991	£1,321	£1,651	£1,981	£2,311	£2,641	£2,972	£3,302	£55,984,632	8114
60%	£880	£1,321	£1,761	£2,201	£2,641	£3,082	£3,522	£3,962	£4,402	£65,315,404	9466
65%	£1,101	£1,651	£2,201	£2,751	£3,302	£3,852	£4,402	£4,953	£5,503	£74,646,175	10818
70%	£1,321	£1,981	£2,641	£3,302	£3,962	£4,622	£5,283	£5,943	£6,603	£83,976,947	12171
75%	£1,541	£2,311	£3,082	£3,852	£4,622	£5,393	£6,163	£6,934	£7,704	£93,307,719	13523
80%	£1,761	£2,641	£3,522	£4,402	£5,283	£6,163	£7,044	£7,924	£8,805	£102,638,491	14875
85%	£1,981	£2,972	£3,962	£4,953	£5,943	£6,934	£7,924	£8,915	£9,905	£111,969,263	16227
90%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£121,300,035	17580
95%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£130,630,807	18932
100%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£139,961,579	20284

				Net Be	enefit (£000	s)			
30%	£24,476	£24,476	£24,476	£24,476	£24,476	£24,476	£24,476	£24,476	£24,476
35%	£48,953	£48,953	£48,953	£48,953	£48,953	£48,953	£48,953	£48,953	£48,953
40%	£73,429	£73,429	£73,429	£73,429	£73,429	£73,429	£73,429	£73,429	£73,429
45%	£97,685	£97,575	£97,465	£97,355	£97,245	£97,135	£97,025	£96,915	£96,805
50%	£121,942	£121,722	£121,501	£121,281	£121,061	£120,841	£120,621	£120,401	£120,181
55%	£146,198	£145,868	£145,538	£145,207	£144,877	£144,547	£144,217	£143,887	£143,557
60%	£170,454	£170,014	£169,574	£169,133	£168,693	£168,253	£167,813	£167,373	£166,932
65%	£194,710	£194,160	£193,610	£193,060	£192,509	£191,959	£191,409	£190,858	£190,308
70%	£218,967	£218,306	£217,646	£216,986	£216,325	£215,665	£215,005	£214,344	£213,684
75%	£243,223	£242,453	£241,682	£240,912	£240,141	£239,371	£238,600	£237,830	£237,060
80%	£267,479	£266,599	£265,718	£264,838	£263,957	£263,077	£262,196	£261,316	£260,435
85%	£291,735	£290,745	£289,754	£288,764	£287,773	£286,783	£285,792	£284,802	£283,811
90%	£315,992	£314,891	£313,791	£312,690	£311,589	£310,489	£309,388	£308,288	£307,187
95%	£340,468	£339,367	£338,267	£337,166	£336,066	£334,965	£333,865	£332,764	£331,663
100%	£364,944	£363,844	£362,743	£361,643	£360,542	£359,442	£358,341	£357,240	£356,140

Where the net benefit produces a nonnegative outcome then it is <u>cost effective</u> for the NHS to adopt the indicator.

Appendix B: Net Benefit Analysis Assuming 100% Increase in Costs of Treatment

Points

Value per point achieve Number of practices Mean practice population	8,228	7		Societ	al value	ofaQA	ALY					£25,000) \			
Minimum threshold Maximum threshold	40% 90%			Eligible		ion (me	nt an % of p (mean %					1.740% 25.0%	7	Cost per patient QALY gain per patient	£414 0.030	1
2 7 3	· 4	•	5	٠ .	•	7	•	8	4	Q	•	10	-			

					1	lational to	tals				
Expected Achievement	QOF payments (£000s)									Change in treatment cost (£)	Change in QALYs
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£18,661,544	1352
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£37,323,088	2705
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£55,984,632	4057
45%	£220	£330	£440	£550	£660	£770	£880	£991	£1,101	£74,646,175	5409
50%	£440	£660	£880	£1,101	£1,321	£1,541	£1,761	£1,981	£2,201	£93,307,719	6761
55%	£660	£991	£1,321	£1,651	£1,981	£2,311	£2,641	£2,972	£3,302	£111,969,263	8114
60%	£880	£1,321	£1,761	£2,201	£2,641	£3,082	£3,522	£3,962	£4,402	£130,630,807	9466
65%	£1,101	£1,651	£2,201	£2,751	£3,302	£3,852	£4,402	£4,953	£5,503	£149,292,351	10818
70%	£1,321	£1,981	£2,641	£3,302	£3,962	£4,622	£5,283	£5,943	£6,603	£167,953,895	12171
75%	£1,541	£2,311	£3,082	£3,852	£4,622	£5,393	£6,163	£6,934	£7,704	£186,615,439	13523
80%	£1,761	£2,641	£3,522	£4,402	£5,283	£6,163	£7,044	£7,924	£8,805	£205,276,983	14875
85%	£1,981	£2,972	£3,962	£4,953	£5,943	£6,934	£7,924	£8,915	£9,905	£223,938,526	16227
90%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£242,600,070	17580
95%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£261,261,614	18932
100%	£2,201	£3,302	£4,402	£5,503	£6,603	£7.704	£8,805	£9,905	£11,006	£279,923,158	20284

	Ben		

30%		£15,146	£15,146	£15,146	£15,146	£15,146	£15,146	£15,146	£15,146	£15,146	
35%		£30,291	£30,291	£30,291	£30,291	£30,291	£30,291	£30,291	£30,291	£30,291	
40%		£45,437	£45,437	£45,437	£45,437	£45,437	£45,437	£45,437	£45,437	£45,437	
45%		£60,362	£60,252	£60,142	£60,032	£59,922	£59,812	£59,702	£59,592	£59,482	
50%		£75,288	£75,068	£74,848	£74,627	£74,407	£74,187	£73,967	£73,747	£73,527	
55%		£90,213	£89,883	£89,553	£89,223	£88,893	£88,562	£88,232	£87,902	£87,572	
60%		£105,139	£104,699	£104,258	£103,818	£103,378	£102,938	£102,497	£102,057	£101,617	
65%		£120,064	£119,514	£118,964	£118,413	£117,863	£117,313	£116,762	£116,212	£115,662	
70%		£134,990	£134,329	£133,669	£133,009	£132,348	£131,688	£131,028	£130,367	£129,707	
75%		£149,915	£149,145	£148,374	£147,604	£146,834	£146,063	£145,293	£144,522	£143,752	
80%		£164,841	£163,960	£163,080	£162,199	£161,319	£160,438	£159,558	£158,677	£157,797	
85%		£179,766	£178,776	£177,785	£176,795	£175,804	£174,814	£173,823	£172,833	£171,842	
90%		£194,692	£193,591	£192,491	£191,390	£190,289	£189,189	£188,088	£186,988	£185,887	
95%		£209,837	£208,737	£207,636	£206,536	£205,435	£204,334	£203,234	£202,133	£201,033	
100%		£224,983	£223,882	£222,782	£221,681	£220,581	£219,480	£218,379	£217,279	£216,178	

Where the net benefit produces a nonnegative outcome then it is <u>cost effective</u> for the NHS to adopt the indicator.

Appendix C: Net Benefit Analysis Assuming 50% Reduction in Utility

Points

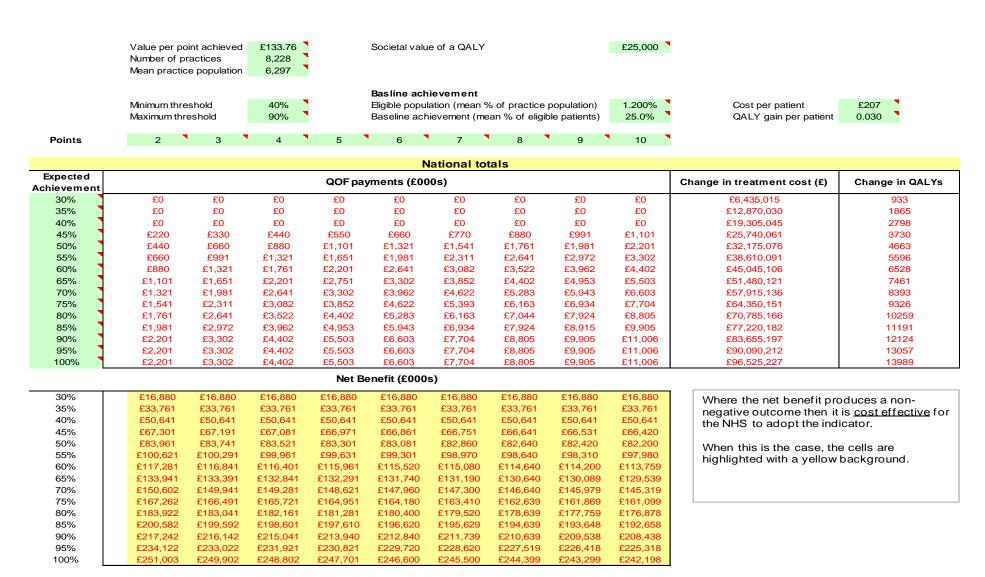
Value per point achieved Number of practices Mean practice population	£133.76 8,228 6,297	Societal value	e of a QALY		£25,000 ¯		
Minimum threshold Maximum threshold	40% 90%	0 , ,	ievement ation (mean % of practice ievement (mean % of elig		1.740% 25.0%	Cost per patient QALY gain per patient	£207 0.015
2 3	4	5 6	7 7 8	7 9 7	10		

					1	National to	tals				
Expected Achievement				QOF pay	yments (£00	00s)				Change in treatment cost (£)	Change in QALYs
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£9,330,772	676
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£18,661,544	1352
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£27,992,316	2028
45%	£220	£330	£440	£550	£660	£770	£880	£991	£1,101	£37,323,088	2705
50%	£440	£660	£880	£1,101	£1,321	£1,541	£1,761	£1,981	£2,201	£46,653,860	3381
55%	£660	£991	£1,321	£1,651	£1,981	£2,311	£2,641	£2,972	£3,302	£55,984,632	4057
60%	£880	£1,321	£1,761	£2,201	£2,641	£3,082	£3,522	£3,962	£4,402	£65,315,404	4733
65%	£1,101	£1,651	£2,201	£2,751	£3,302	£3,852	£4,402	£4,953	£5,503	£74,646,175	5409
70%	£1,321	£1,981	£2,641	£3,302	£3,962	£4,622	£5,283	£5,943	£6,603	£83,976,947	6085
75%	£1,541	£2,311	£3,082	£3,852	£4,622	£5,393	£6,163	£6,934	£7,704	£93,307,719	6761
80%	£1,761	£2,641	£3,522	£4,402	£5,283	£6,163	£7,044	£7,924	£8,805	£102,638,491	7438
85%	£1,981	£2,972	£3,962	£4,953	£5,943	£6,934	£7,924	£8,915	£9,905	£111,969,263	8114
90%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£121,300,035	8790
95%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£130,630,807	9466
100%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£139,961,579	10142

				Net Be	enefit (£000	s)			
30%	£7,573	£7,573	£7,573	£7,573	£7,573	£7,573	£7,573	£7,573	£7,573
35%	£15,146	£15,146	£15,146	£15,146	£15,146	£15,146	£15,146	£15,146	£15,146
40%	£22,718	£22,718	£22,718	£22,718	£22,718	£22,718	£22,718	£22,718	£22,718
45%	£30,071	£29,961	£29,851	£29,741	£29,631	£29,521	£29,411	£29,301	£29,191
50%	£37,424	£37,204	£36,984	£36,763	£36,543	£36,323	£36,103	£35,883	£35,663
55%	£44,776	£44,446	£44,116	£43,786	£43,456	£43,126	£42,795	£42,465	£42,135
60%	£52,129	£51,689	£51,249	£50,808	£50,368	£49,928	£49,488	£49,048	£48,607
65%	£59,482	£58,932	£58,381	£57,831	£57,281	£56,730	£56,180	£55,630	£55,080
70%	£66,835	£66,174	£65,514	£64,853	£64,193	£63,533	£62,872	£62,212	£61,552
75%	£74,187	£73,417	£72,646	£71,876	£71,106	£70,335	£69,565	£68,794	£68,024
80%	£81,540	£80,659	£79,779	£78,898	£78,018	£77,138	£76,257	£75,377	£74,496
85%	£88,893	£87,902	£86,912	£85,921	£84,930	£83,940	£82,949	£81,959	£80,968
90%	£96,245	£95,145	£94,044	£92,944	£91,843	£90,742	£89,642	£88,541	£87,441
95%	£103,818	£102,717	£101,617	£100,516	£99,416	£98,315	£97,215	£96,114	£95,013
100%	£111 391	£110 290	£109 190	£108 089	£106 989	£105 888	£104 787	£103 687	£102 586

Where the net benefit produces a nonnegative outcome then it is <u>cost effective</u> for the NHS to adopt the indicator.

Appendix D: Net Benefit Analysis Assuming Lower Estimate for Eligible Population



Appendix E: Net Benefit Base Case Analysis

Points

£133.76 £20,000 Societal value of a QALY Value per point achieved Number of practices 8,228 Mean practice population 6,297 Basline achievement 1.740% Minimum threshold 40% Eligible population (mean % of practice population) Cost per patient Maximum threshold 90% Baseline achievement (mean % of eligible patients) 25.0% QALY gain per patient 10

	National totals													
Expected Achievement				Change in treatment cost (£)	Change in QALYs									
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£9,330,772	1352			
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£18,661,544	2705			
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£27,992,316	4057			
45%	£220	£330	£440	£550	£660	£770	£880	£991	£1,101	£37,323,088	5409			
50%	£440	£660	£880	£1,101	£1,321	£1,541	£1,761	£1,981	£2,201	£46,653,860	6761			
55%	£660	£991	£1,321	£1,651	£1,981	£2,311	£2,641	£2,972	£3,302	£55,984,632	8114			
60%	£880	£1,321	£1,761	£2,201	£2,641	£3,082	£3,522	£3,962	£4,402	£65,315,404	9466			
65%	£1,101	£1,651	£2,201	£2,751	£3,302	£3,852	£4,402	£4,953	£5,503	£74,646,175	10818			
70%	£1,321	£1,981	£2,641	£3,302	£3,962	£4,622	£5,283	£5,943	£6,603	£83,976,947	12171			
75%	£1,541	£2,311	£3,082	£3,852	£4,622	£5,393	£6,163	£6,934	£7,704	£93,307,719	13523			
80%	£1,761	£2,641	£3,522	£4,402	£5,283	£6,163	£7,044	£7,924	£8,805	£102,638,491	14875			
85%	£1,981	£2,972	£3,962	£4,953	£5,943	£6,934	£7,924	£8,915	£9,905	£111,969,263	16227			
90%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£121,300,035	17580			
95%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£130,630,807	18932			
100%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£139,961,579	20284			

Net Benefit (£000s)

30%	£17,715	£17,715	£17,715	£17,715	£17,715	£17,715	£17,715	£17,715	£17,715
35%	£35,430	£35,430	£35,430	£35,430	£35,430	£35,430	£35,430	£35,430	£35,430
40%	£53,145	£53,145	£53,145	£53,145	£53,145	£53,145	£53,145	£53,145	£53,145
45%	£70,640	£70,530	£70,420	£70,309	£70,199	£70,089	£69,979	£69,869	£69,759
50%	£88,134	£87,914	£87,694	£87,474	£87,254	£87,034	£86,814	£86,594	£86,374
55%	£105,629	£105,299	£104,969	£104,639	£104,309	£103,978	£103,648	£103,318	£102,988
60%	£123,124	£122,684	£122,244	£121,803	£121,363	£120,923	£120,483	£120,043	£119,602
65%	£140,619	£140,069	£139,518	£138,968	£138,418	£137,868	£137,317	£136,767	£136,217
70%	£158,114	£157,453	£156,793	£156,133	£155,472	£154,812	£154,152	£153,491	£152,831
75%	£175,609	£174,838	£174,068	£173,297	£172,527	£171,757	£170,986	£170,216	£169,445
80%	£193,103	£192,223	£191,343	£190,462	£189,582	£188,701	£187,821	£186,940	£186,060
85%	£210,598	£209,608	£208,617	£207,627	£206,636	£205,646	£204,655	£203,665	£202,674
90%	£228,093	£226,993	£225,892	£224,791	£223,691	£222,590	£221,490	£220,389	£219,288
95%	£245,808	£244,707	£243,607	£242,506	£241,406	£240,305	£239,205	£238,104	£237,003
100%	£263,523	£262,422	£261,322	£260,221	£259,121	£258,020	£256,920	£255,819	£254,718

Where the net benefit produces a nonnegative outcome then it is <u>cost effective</u> for the NHS to adopt the indicator.

£207

0.030

Appendix F: Net Benefit Analysis Assuming 100% Increase in Costs of Treatment

Points

85%

90%

95%

100%

£98,629

£106,793

£97,639

£105,693

£114,077

£122,461

£96,648

£104,592

£112,976

£121,360

Value per point achieved Number of practices Mean practice population	£133.76 8,228 6,297	777		Societal v	alue of	a QAL	Y					£20,000	, •			
Minimum threshold Maximum threshold	40% 90%	7		Bas line a Eligible po Baseline a	pulation	(mear	n % of p			,		1.740% 25.0%	7	Cost per patient QALY gain per patient	£414 0.030	7
2 3	4	•	5	6	•	7	•	8	•	9	•	10	•			

	National totals													
Expected Achievement				Change in treatment cost (£)	Change in QALYs									
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£18,661,544	1352			
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£37,323,088	2705			
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£55,984,632	4057			
45%	£220	£330	£440	£550	£660	£770	£880	£991	£1,101	£74,646,175	5409			
50%	£440	£660	£880	£1,101	£1,321	£1,541	£1,761	£1,981	£2,201	£93,307,719	6761			
55%	£660	£991	£1,321	£1,651	£1,981	£2,311	£2,641	£2,972	£3,302	£111,969,263	8114			
60%	£880	£1,321	£1,761	£2,201	£2,641	£3,082	£3,522	£3,962	£4,402	£130,630,807	9466			
65%	£1,101	£1,651	£2,201	£2,751	£3,302	£3,852	£4,402	£4,953	£5,503	£149,292,351	10818			
70%	£1,321	£1,981	£2,641	£3,302	£3,962	£4,622	£5,283	£5,943	£6,603	£167,953,895	12171			
75%	£1,541	£2,311	£3,082	£3,852	£4,622	£5,393	£6,163	£6,934	£7,704	£186,615,439	13523			
80%	£1,761	£2,641	£3,522	£4,402	£5,283	£6,163	£7,044	£7,924	£8,805	£205,276,983	14875			
85%	£1,981	£2,972	£3,962	£4,953	£5,943	£6,934	£7,924	£8,915	£9,905	£223,938,526	16227			
90%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£242,600,070	17580			
95%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£261,261,614	18932			
100%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£279,923,158	20284			

30%	£8,384	£8,384	£8,384	£8,384	£8,384	£8,384	£8,384	£8,384	£8,384	ı
35%	£16,768	£16,768	£16,768	£16,768	£16,768	£16,768	£16,768	£16,768	£16,768	ı
40%	£25,153	£25,153	£25,153	£25,153	£25,153	£25,153	£25,153	£25,153	£25,153	l
45%	£33,317	£33,207	£33,096	£32,986	£32,876	£32,766	£32,656	£32,546	£32,436	ı
50%	£41,481	£41,261	£41,040	£40,820	£40,600	£40,380	£40,160	£39,940	£39,720	ı
55%	£49,645	£49,315	£48,984	£48,654	£48,324	£47,994	£47,664	£47,333	£47,003	ı
60%	£57,809	£57,369	£56,928	£56,488	£56,048	£55,608	£55,167	£54,727	£54,287	ı
65%	£65,973	£65,423	£64,872	£64,322	£63,772	£63,221	£62,671	£62,121	£61,570	ı
70%	£74,137	£73,477	£72,816	£72,156	£71,495	£70,835	£70,175	£69,514	£68,854	ı
75%	£82,301	£81,531	£80,760	£79,990	£79,219	£78,449	£77,678	£76,908	£76,138	ı
80%	£90 465	£89 585	£88 704	£87 824	£86 943	£86,063	£85 182	£84 302	£83 421	ı

£103,491

£111,876

£120,260

Net Benefit (£000s)

£94,667

£102,391

£110,775

£119,159

£93,676

£101,290

£109,674

£118,059

£92,686

£100,190

£108,574

£116,958

Where the net benefit produces a nonnegative outcome then it is <u>cost effective</u> for the NHS to adopt the indicator.

When this is the case, the cells are highlighted with a yellow background.

£90,705

£97,988

£106,373

£114,757

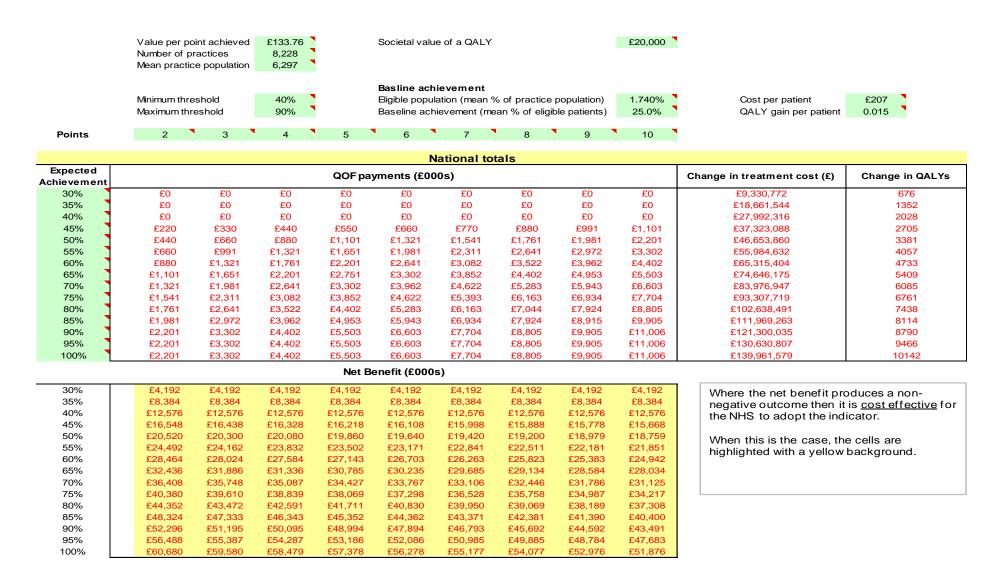
£91,695

£99,089

£107,473

£115,857

Appendix G: Net Benefit Analysis Assuming 50% Reduction in Utility



Appendix H: Net Benefit Analysis Assuming Lower Estimate for Eligible Population

	Number of p	oint achieved ractices ce population	£133.76 8,228 6,297		Societal valu	ie of a QALY	,		£20,000		
	Minimum thre		40% 90%			lation (mean	% of practice		1.200%	Cost per patient	£207
	Maximum thr	esnoia	90%		Baseline acr	nevement (m	nean % of eligib	pie patients)	25.0%	QALY gain per patient	0.030
Points	2	3	4	5	6	7	8	9	10		
					N	National to	otals				
Expected Achievement				QOF pa	yments (£00	00s)				Change in treatment cost (£)	Change in QALYs
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£6,435,015	933
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£12,870,030	1865
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£19,305,045	2798
45%	£220	£330	£440	£550	£660	£770	£880	£991	£1,101	£25,740,061	3730
50%	£440	£660	£880	£1,101	£1,321	£1,541	£1,761	£1,981	£2,201	£32,175,076	4663
55%	£660	£991	£1,321	£1,651	£1,981	£2,311	£2,641	£2,972	£3,302	£38,610,091	5596
60%	£880	£1,321	£1,761	£2,201	£2,641	£3,082	£3,522	£3,962	£4,402	£45,045,106	6528
65%	£1,101	£1,651	£2,201	£2,751	£3,302	£3,852	£4,402	£4,953	£5,503	£51,480,121	7461
70%	£1,321	£1,981	£2,641	£3,302	£3,962	£4,622	£5,283	£5,943	£6,603	£57,915,136	8393
75%	£1,541	£2,311	£3,082	£3,852	£4,622	£5,393	£6,163	£6,934	£7,704	£64,350,151	9326
80%	£1,761	£2,641	£3,522	£4,402	£5,283	£6,163	£7,044	£7,924	£8,805	£70,785,166	10259
85%	£1,981	£2,972	£3,962	£4,953	£5,943	£6,934	£7,924	£8,915	£9,905	£77,220,182	11191
90%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£83,655,197	12124
95%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£90,090,212	13057
100%	£2,201	£3,302	£4,402	£5,503	£6,603	£7,704	£8,805	£9,905	£11,006	£96,525,227	13989
				Net B	enefit (£000	s)					
30%	£12,217	£12,217	£12,217	£12,217	£12,217	£12,217	£12,217	£12,217	£12,217	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
35%	£24,434	£24,434	£24,434	£24,434	£24,434	£24,434	£24,434	£24,434	£24,434	Where the net benefit pro	
40%	£36,652	£36,652	£36,652	£36,652	£36,652	£36,652	£36,652	£36,652	£36,652	negative outcome then it	
45%	£48,649	£48,539	£48,429	£48,319	£48,208	£48,098	£47,988	£47,878	£47,768	the NHS to adopt the indi	icator.
50%	£60,646	£60,426	£60,206	£59,985	£59,765	£59,545	£59,325	£59,105	£58,885		
55%	£72,643	£72,313	£71,983	£71,652	£71,322	£70,992	£70,662	£70,332	£70,001	When this is the case, the	
60%	£84,640	£84,200	£83,759	£83,319	£82,879	£82,439	£81,999	£81,558	£81,118	highlighted with a yellow	background.
65%	£96,637	£96,087	£95,536	£94,986	£94,436	£93,886	£93,335	£92,785	£92,235		
70%	£108,634	£107,974	£107,313	£106,653	£105,993	£105,332	£104,672	£104,012	£103,351		
75%	£120,631	£119,861	£119,090	£118,320	£103,993 £117,550	£116,779	£116,009	£115,238	£114,468		
80%	£132,628	£131,748	£130,867	£129,987	£129,106	£118,775	£127,346	£126,465	£125,585		
85%	£144,625	£143,635	£142,644	£141,654	£140,663	£139,673	£138,682	£137,692	£136,701		
90%	£156,622	£155,522	£154,421	£153,321	£152,220	£151,120	£150,019	£148,918	£147,818		
95%	£168,840	£167,739	£166,639	£165,538	£164,437	£163,337	£162,236	£161,136	£160,035		
100%	£181,057	£179,956	£178,856	£177,755	£176,655	£175,554	£174,453	£173,353	£172,252		
100 /6	2101,007	2173,330	2170,000	2177,733	2170,000	2175,554	£174,433	2170,000	2112,232	I	