National Primary Care Research and Development Centre and University of York Health Economics Consortium (NICE External Contractor)

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Health economic report: net benefit analysis

This paper was prepared by the York Health Economic Consortium/National Primary Care Research and Development Centre (YHEC/NPCRDC) as the external contractor for the NICE QOF process and was considered at the June 2010 Primary Care QOF Indicator Advisory Committee. This paper provides net benefit analysis on the piloted indicator below.

Appendix 1 outlines the approaches used to evaluate the cost effectiveness of existing and potential new indicators.

Indicator area: Mental health (cervical screening)

Indicator ID: NM20

The percentage of women aged 25-64 (in Scotland from 21 to 60) with schizophrenia, bipolar affective disorder and other psychoses who have a record of cervical screening within the last 5 years

Introduction

In the case of recording cervical screening there is a direct link to a screening test which, if positive, is unlikely to be ignored by patient or clinician. There is an indicative evidence base available in terms of the QALY gain from different cervical screening strategies, e.g. Karnon J et al. (2004). If these benefits can be assumed to accrue to patients with serious mental illness problems in the same way as to the general population, then there is scope for this indicator to be cost-effective.

Discussion

Evidence on the costs and health benefits of cervical screening was identified from the study by Karnon J et al (2004); liquid-based cytology in cervical screening: an updated rapid and systematic review and economic analysis. The model developed in Karnon J *et al.* (2004) followed a cohort of women from the age of 15 to 95 years and discounted costs at 6% and life-years at 1.5%. It is assumed the benefits accrued from cervical screening to patients with serious mental health problems are identical as to the general population.

Karnon *et al.* (2004) estimated the lifetime cost of conventional screening to be approximately £6million per 100,000 women. The economic model therefore estimated an additional cost to the NHS of £60.97 per woman screened in comparison to no screening (this also includes the costs of potential treatment; the study reported a unit cost of £21.67 for the cost of a conventional screen which is in alignment with the NICE costing team). Costs in the study included only those associated with screening, diagnosis and treatment therefore it was also assumed that each patient visited their GP once per annum at a cost of £36, taken from Unit Costs of Health and Social Care 2009. The total <u>incremental cost</u> of providing the indicator is therefore estimated to be £96.97.

The health benefit in Karnon *et al.* (2004) was measured in terms of incremental life-days gained. The incremental life-days gained (discounted) from conventional screening at 5 years was 56.77. The lifetime health benefit from conventional screening in QALYs is calculated by dividing this estimate of 56.77 days by 365, the number of days in a calendar year. The <u>incremental lifetime QALYs</u> gained from cervical screening is therefore estimated to be 0.1555 (4.d.p). The incremental cost per QALY gained for women screened for cervical cancer is approximately £726, i.e. a highly cost-effective treatment.

The practice prevalence of patients with mental health problems is estimated to be 0.77% based on calculations from NHS IC, 2009. In the absence of any existing register for this indicator it is estimated that approximately 51.3% of these patients are female based on figures from the 2001 census, and approximately 53.4% fall within the 25-64 age band in England and Wales. This provides an eligible practice population of <u>0.21%</u>. The eligible population is approximately the same for Scotland, i.e. 0.21% (2.d.p.).

The minimum threshold is assumed to be set to <u>40%</u> and the incentive payments increase linearly up to the maximum threshold of <u>80%</u> based on similar indicators currently in the national QOF (CS1). The mean achievement score for 12 practices at the <u>"baseline" was 74.0%</u>; by the end of the pilot 21 practices achieved a mean score of 84.4%.

For this indicator (NM20) the cost-effectiveness was evaluated across a point range of between 6 and 16. This point range was allocated on the basis of *similar* QOF indicator CS1 which is part of the 'additional services' domain in the national QOF (QOF indicator CS1 rewards practices with eleven points for providing screening to eligible patients).

Sensitivity analysis

The results of the pilot for this indicator suggest that baseline achievement for indicator NM20 is 74%, If a threshold of 80% were to be adopted this would warrant up to 3 points provided each practice achieved very small improvements in outcomes and up to 16 points for moderate improvements, i.e. 1% point and 6% point improvements in achievement respectively. When the baseline is changed to reflect the final practice pilot scores of 84.4% the indicator only warrants one point, provided each practice on average achieves very small improvements in achievement.

Conclusions

The results of the pilot for this indicator suggest that baseline achievement is 74%, lower than that achieved in the general population as reported for QOF indicator CS1. However, there remains scope for further improvements in health outcomes for this indicator.

References

Karnon J., Peters J., Platt J., Chilcott J., McGoogan E., Brewer N (2004). Liquid-based cytology in cervical screening: an updated rapid and systematic review and economic analysis. *Health Technol Assess*; 8(20); iii, 1–78.

Appendix 1   Background to cost-effectiveness evidence (QOF)

The approach to evaluating the economic implications of existing and potential new indicators has been developed by economists at the Universities of York and East Anglia, and presented previously to the QOF Advisory Committee. To summarise, the approach to cost effectiveness considers two issues:

1. Is the activity/intervention described by the indicator cost effective?

2. What level of payment is economically justifiable to increase the activity?

The first question seeks to determine whether an activity or intervention will result in benefits which are greater than the costs of undertaking the activity. In this analysis, health benefits are assumed to be measured in Quality Adjusted Life Years (QALYs) which can be valued in monetary terms at £25,000 each. The net benefit calculation subtracts the delivery costs and the QOF payments from the monetarised health benefits

Net benefit = (monetised benefit – delivery cost) – QOF payment

The second question relates to the level of QOF payments which can be justified to increase levels of desired activities whilst retaining net benefits to the NHS. This is directly relevant to negotiations relating to the implementation of indicators and decisions on the number of QOF points to be allocated to a particular indicator. Where sufficient data are available, detailed sensitivity analysis on QOF points and uptake levels can be undertaken within the cost-effectiveness model. This paper provides information on the cost-effectiveness of the pilot indicators, to inform the decisions of the QOF Advisory Committee.

Nature of cost-effectiveness evidence

A couple of conditions must hold for an indicator to be deemed cost-effective:

1. The intervention/activity itself must be cost-effective. In the UK, NICE use an implicit threshold of £20,000 to £30,000 per QALY gained.

2. The intervention/activity must lead to an increase in the number of eligible patients receiving the intervention/activity.

The main challenge associated with cost-effectiveness analyses of the indicators is the availability of data on the costs and health benefits of implementing the targeted activities. The main source of this has been the review of NICE clinical guidelines and published literature. For several

indicators there is the additional problem of linking them directly to changes in patient outcomes so that net health benefits can be assessed.

Many of the indicators relate to areas of clinical management which have been shown to be cost-effective if correctly carried out. However, the indicators themselves do not always measure the delivery of treatment; they frequently require the assessment and documentation of a patient's disease status, or whether they have had a particular diagnostic test. These type of indicators may lead to changes in treatment and improvement in patient outcomes, but it is not certain to happen. In reviewing the piloted indicators we have applied a three-way classification:

i. Indicators which relate directly to a change in treatment;

ii. Indicators which change the availability of information available to the treating clinician in a disease where there is a proven therapy;

iii. Indicators which change the availability of information but which do not directly inform a treatment decision.

Indicators in category (i) are most amenable to cost-effectiveness analysis as they can lead directly to a change in outcome. Those in category (ii) may also lead to a change in outcomes if the new information is acted upon. To carry out the cost-effectiveness an assumption must be made on the likelihood of such a change in management taking place. The third category is least amenable to cost-effectiveness analysis as improvement in the process of information collection is unlikely to change the patient outcome.

The main challenge associated with the analyses outlined above, is the availability of evidence on the costs and health benefits of existing and new clinical indicators. Two economic approaches have been derived:

- Approach one – Net benefit analysis. A net benefit approach has been recommended as the most appropriate means of evaluating whether an indicator can be considered cost effective. Cost effectiveness is intended to consider whether the costs associated with an indicator are outweighed by the benefits accrued by the health service. When a robust evidence base is available for an indicator, they can be identified as a category (i) indicator. When an indicative evidence base is available for category (ii) indicators it is possible to apply the net benefit approach.

- Approach two – Threshold analysis. Threshold analysis has been identified as the approach when considering indicators with a thin evidence base, i.e. missing data. For example, where the costs of delivering an indicator are known or can be easily estimated, but the effectiveness is

unknown, then it is possible to identify the minimum level of effectiveness necessary for an indicator to be considered cost effective, in terms of quality-adjusted life years (QALYs) per patient per annum. This can also be expressed in terms of a minimum cost-saving (£) per patient per annum. This approach is applied to the category (ii) indicators with a thin evidence base.

Data on costs of implementation can be estimated from descriptions of the actions required to meet the potential indicator targets. The nature and extent of any QOF payment is unknown at this stage. Judgement can be made on the potential cost-effectiveness of an indicator if the difference between the costs and benefits of implementation is known. If this is relatively small, then there will be little scope for incentive payments if positive net benefits are to be achieved.

Piloted indicators are reviewed to determine which are associated with a therapeutic benefit that can be measured in QALY terms. Indicators which do not have a direct link to therapeutic benefit (process indicators) are subject to a preliminary economic appraisal. The danger of attributing a therapeutic benefit to a process indicator is that the necessary assumptions may be seen, in some cases, as tenuous. **Although the cost-effectiveness of indicators that do not have a direct link to therapeutic benefit may be unclear, this does not mean that they are poor value for money, but rather that new studies are required to produce the data needed to determine their cost-effectiveness** (Walker *et al.* 2010).

References

Walker S., Mason A.R., Claxton K., Cookson R., Fenwick E., Fleetcroft R., Sculpher M (2010). Value for money and the Quality and Outcomes Framework in primary care in the UK NHS. *British Journal of General Practice*; May 2010, e213-220.

Appendix 2   Net benefit analysis model: NM20

The percentage of women aged 25-64 (in Scotland from 21 to 60) with schizophrenia, bipolar affective disorder and other psychoses who have a record of cervical screening within the last 5 years

Net Benefit Analysis: Indicator NICE Menu NM20

Value per point achieved	£127.29	
Number of practices	8372	
Mean practice population	5891	

Societal value of a QALY	£25,000	

Basline achievement

Minimum threshold	40%	
Maximum threshold	80%	
Eligible population (mean % of practice population)	0.21%	
Baseline achievement (mean % of eligible patients)	74.0%	

Cost-effectiveness estimates

Incremental cost (£ per patient)	£96.97
Incremental effect (QALYs per patient)	0.1555

Points: 6   7   8   9   10   11   12   13   14   15   16

National totals

Expected Achieveme	QOF payments (£000s)											Change in treatment cost (£)	Change in QALYs
	6	7	8	9	10	11	12	13	14	15	16		
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£4,419,037	-7086
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£3,916,873	-6281
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£3,414,710	-5476
45%	£799	£932	£1,066	£1,199	£1,332	£1,465	£1,599	£1,732	£1,865	£1,998	£2,131	-£2,912,547	-4671
50%	£1,599	£1,865	£2,131	£2,398	£2,664	£2,931	£3,197	£3,463	£3,730	£3,996	£4,263	-£2,410,384	-3865
55%	£2,398	£2,797	£3,197	£3,597	£3,996	£4,396	£4,796	£5,195	£5,595	£5,994	£6,394	-£1,908,220	-3060
60%	£3,197	£3,730	£4,263	£4,796	£5,328	£5,861	£6,394	£6,927	£7,460	£7,993	£8,525	-£1,406,057	-2255
65%	£3,996	£4,662	£5,328	£5,994	£6,660	£7,326	£7,993	£8,659	£9,325	£9,991	£10,657	-£903,894	-1449
70%	£4,796	£5,595	£6,394	£7,193	£7,993	£8,792	£9,591	£10,390	£11,190	£11,989	£12,788	-£401,731	-644
75%	£5,595	£6,527	£7,460	£8,392	£9,325	£10,257	£11,190	£12,122	£13,054	£13,987	£14,919	£100,433	161
80%	£6,394	£7,460	£8,525	£9,591	£10,657	£11,722	£12,788	£13,854	£14,919	£15,985	£17,051	£602,596	966
85%	£6,394	£7,460	£8,525	£9,591	£10,657	£11,722	£12,788	£13,854	£14,919	£15,985	£17,051	£1,104,759	1772
90%	£6,394	£7,460	£8,525	£9,591	£10,657	£11,722	£12,788	£13,854	£14,919	£15,985	£17,051	£1,606,922	2577
95%	£6,394	£7,460	£8,525	£9,591	£10,657	£11,722	£12,788	£13,854	£14,919	£15,985	£17,051	£2,109,086	3382
100%	£6,394	£7,460	£8,525	£9,591	£10,657	£11,722	£12,788	£13,854	£14,919	£15,985	£17,051	£2,611,249	4187

Net Benefit (£000s)

	6	7	8	9	10	11	12	13	14	15	16
30%	-£172,739	-£172,739	-£172,739	-£172,739	-£172,739	-£172,739	-£172,739	-£172,739	-£172,739	-£172,739	-£172,739
35%	-£153,109	-£153,109	-£153,109	-£153,109	-£153,109	-£153,109	-£153,109	-£153,109	-£153,109	-£153,109	-£153,109
40%	-£133,480	-£133,480	-£133,480	-£133,480	-£133,480	-£133,480	-£133,480	-£133,480	-£133,480	-£133,480	-£133,480
45%	-£114,650	-£114,783	-£114,916	-£115,050	-£115,183	-£115,316	-£115,449	-£115,582	-£115,716	-£115,849	-£115,982
50%	-£95,820	-£96,086	-£96,353	-£96,619	-£96,885	-£97,152	-£97,418	-£97,685	-£97,951	-£98,217	-£98,484
55%	-£76,990	-£77,389	-£77,789	-£78,188	-£78,588	-£78,988	-£79,387	-£79,787	-£80,187	-£80,586	-£80,986
60%	-£58,159	-£58,692	-£59,225	-£59,758	-£60,291	-£60,824	-£61,356	-£61,889	-£62,422	-£62,955	-£63,488
65%	-£39,329	-£39,995	-£40,661	-£41,327	-£41,993	-£42,659	-£43,325	-£43,992	-£44,658	-£45,324	-£45,990
70%	-£20,499	-£21,298	-£22,098	-£22,897	-£23,696	-£24,495	-£25,295	-£26,094	-£26,893	-£27,692	-£28,492
75%	-£1,669	-£2,601	-£3,534	-£4,466	-£5,399	-£6,331	-£7,264	-£8,196	-£9,129	-£10,061	-£10,994
80%	£17,161	£16,096	£15,030	£13,964	£12,899	£11,833	£10,767	£9,702	£8,636	£7,570	£6,505
85%	£36,791	£35,725	£34,659	£33,594	£32,528	£31,462	£30,397	£29,331	£28,265	£27,200	£26,134
90%	£56,420	£55,354	£54,289	£53,223	£52,157	£51,092	£50,026	£48,960	£47,895	£46,829	£45,763
95%	£76,050	£74,984	£73,918	£72,853	£71,787	£70,721	£69,656	£68,590	£67,524	£66,458	£65,393
100%	£95,679	£94,613	£93,548	£92,482	£91,416	£90,351	£89,285	£88,219	£87,154	£86,088	£85,022

Where the net benefit produces a non-negative 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.