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

July 2010

Health economic report: threshold 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 threshold analysis on the piloted indicators below.

Additional information on the approaches used to evaluate the economic implications of existing and potential new indicators is provided in appendix 1.

Indicator areas: Diabetes, Dementia, Mental health

Indicator NM12

The percentage of patients with diabetes with a record of testing of foot sensation using a 10 g monofilament or vibration (using biothesiometer or calibrated tuning fork), within the preceding 15 months

Indicator NM13

The percentage of patients with diabetes with a record of a foot examination and risk classification: 1) low risk (normal sensation, palpable pulses), 2) increased risk (neuropathy or absent pulses), 3) high risk (neuropathy or absent pulses plus deformity or skin changes or previous ulcer) or 4) ulcerated foot within the preceding 15 months

Indicator NM09

The percentage of patients with a new diagnosis of dementia from 1 April 2011 to have FBC, calcium, glucose, renal and liver function, thyroid function tests, serum vitamin B12 and folate levels recorded 6 months before or after entering on to the register

Indicator NM15

The percentage of patients with schizophrenia, bipolar affective disorder and other psychoses who have a record of alcohol consumption in the preceding 15 months

Indicator NM16

The percentage of patients with schizophrenia, bipolar affective disorder and other psychoses who have a record of BMI in the preceding 15 months

Indicator NM17

The percentage of patients with schizophrenia, bipolar affective disorder and other psychoses who have a record of blood pressure in the preceding 15 months

Indicator NM18

The percentage of patients aged 40 and over with schizophrenia, bipolar affective disorder and other psychoses who have a record of total cholesterol: hdl ratio in the preceding 15 months

Indicator NM19

The percentage of patients aged 40 and over with schizophrenia, bipolar affective disorder and other psychoses who have a record of blood glucose level or HBA1c in the preceding 15 months

Indicator 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

These indicators are defined as indicators which change the availability of information available to the treating clinician in a disease where there is a proven therapy. For these indicators it is possible to assume a link with improved patient outcomes, but robust evidence to support this is lacking

The five mental health indicators relating to health checks for people with schizophrenia, bipolar affective disorder and other psychoses (NM15, 16, 17, 18, 19) are indicators requiring the recording of risk factors for cardiovascular disease and other conditions. If the levels of these risks are known it is likely that attempts would be made to modify them, possibly leading to increased health benefits.

The two diabetes indicators monitoring foot health (NM13, 14) might be linked to better outcomes and the dementia indicator (NM09). To do this would require a significant number of assumptions.

Discussion

Each of the above indicators measures a specific clinical variable, e.g. BMI, alcohol consumption. The resulting level or change in this variable can be assumed to affect the treatment decision of the clinician for patients for whom the information was previously unavailable. However, they do not have a direct therapeutic benefit.

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).

Threshold analysis is one possible solution to missing data and this is the approach adopted for these indicators. For example, where the costs of delivering an indicator are known or can be estimated (i.e. primary care delivery costs), but the effectiveness is unknown (in terms of QALYs), then it is possible to identify what the minimum level of effectiveness or cost savings per eligible patient is necessary for an indicator to be considered cost-effective.

Available evidence

Table 1 and **Table 2** highlight the available data for each of the indicators based on the pilots.

The threshold analysis for each of the proposed indicators was conducted based on the total population registered with practices in England - that is 8,372 practices with a mean practice size of 5,891. Each QOF point is assumed to result in a payment of £127.29. The expected increase in quality adjusted life years (QALY) was costed at £25,000 per QALY. These values are consistent throughout this report.

Table 1: List of available evidence

Item	NM09 (Dementia)	NM12 (Diabetes)	NM13 (Diabetes)	NM15 (Serious Mental Illness)
Minimum threshold	40%	40%	40%	40%
Maximum threshold	90%	90%	70%	90%
Eligible population	0.07% (4) – 0.2%	3.96% – 4.29% (253)	3.96% – 4.24% (250)	0.75% (44) – 0.77%
Baseline achievement (pre- pilot)	50.0%*	50.7%	17.3%	41.1%

Final achievement (post-pilot)	50.0%*	63.3%	24.4%	50.1%
Incremental cost of delivery	GP visit + tests	GP visit	GP visit	GP visit
Incremental QALY	Not available	Not available	Not available	Not available

* Qualitative data from pilot feedback for this indicator suggests that provision of a basic dementia screen was established practice in up to a half of practices participating in the pilot

Table 2: List of available evidence

Item	NM16 (Serious Mental Illness)	NM17 (Serious Mental Illness)	NM18 (Serious Mental Illness)	NM19 (Serious Mental Illness)
Minimum threshold	40%	40%	40%	40%
Maximum threshold	90%	90%	90%	90%
Eligible population	0.75% (44) – 0.77%	0.76% (45) – 0.77%	0.73% (43) – 0.77%	0.75% (44) – 0.77%
Baseline achievement (pre-pilot)	51.0%	66.6%	40.5%	40.5%
Final achievement (post-pilot)	61.2%	72.2%	50.2%	50.2%
Incremental cost of delivery	GP visit	GP visit	GP visit	GP visit
Incremental QALY	Not available	Not available	Not available	Not available

The minimum and maximum thresholds for each of the indicators shown in **Tables 1 and 2** are based on similar indicators currently in the national QOF. The eligible population ranges are based on the eligible populations from the pilots (i.e. those with parentheses which represent the average number of patients at each practice eligible for the indicator, these values were divided by the average practice list size of 5,891) and the practice populations calculated by either the NHS IC or NICE. When the baseline achievement was lower than the minimum threshold of 40%, the cost savings were based on providing the indicator at the first level evaluated above the threshold when QOF payments are triggered, i.e. an expected achievement of 45%. The final achievement was not applied at any stage to the threshold analysis; it is reported for the purpose of transparency and to provide an indication of any potential movement in achievement from incentivising the indicators activity or intervention.

The practice populations estimated by the NHS IC and NICE were taken as the default eligible population (i.e. the percentages without parentheses). All but one of the indicators presented in **Tables 3, 4 and 5** was deemed to be

costed at the expense of a one annual GP visit, taken from the Unit Costs of Health and Social Care 2009, valued at £36 per visit.

Threshold analysis (dementia, diabetes – foot risk assessment)

Table 3 presents the threshold analysis for the indicators NM09 (Dementia), and NM13 (Diabetes foot risk assessment). For these indicators, the threshold analysis was evaluated across a point range of between 10 and 30. This point range was allocated on the basis of *similar* indicators currently in the national QOF.

The Dementia QOF related evidence was based on analysis carried out by NICE commissioning team. It is suggested there is an annual incidence of suspected dementia of 0.2% of the whole population, this takes into account diagnosed dementia and people who may present with symptoms suggestive of dementia. The pilot for this indicator suggests that provision of basic dementia screen was established practice in up to a half of practices participating in the pilot. This is based on qualitative data from the pilot practices, i.e. not on a coded extract from the GP practices systems. The dementia indicator (NM09) was the only indicator that included additional costs. It is assumed that a basic dementia screen would involve one additional consultation with a GP practice nurse and the additional costs of the tests, this equates to an additional £10 and £9.03 respectively, as estimated by the NICE costing team.

Table 3: The minimum cost savings required per eligible patient per year to render the indicators cost-effective

NICE Menu Indicator	Baseline Uptake	Cost savings to justify 10 points	Cost savings to justify 20 points	Cost savings to justify 30 points
NM09 (Dementia)	50.0%	£703	£1,351	£2,000
NM13 (Diabetes foot risk assessment)	17.3%	£40	£45	£49

Threshold analysis (diabetes – foot sensation)

Table 4 presents the threshold analysis for indicator NM12 (Diabetes foot sensation). For this indicator, the threshold analysis was evaluated across a point range of between 1 and 11. This point range was allocated on the basis of *similar* indicators currently in the national QOF (Thyroid 2 – which rewards practices with six points for providing a 'test').

Table 4: The minimum cost savings required per eligible patient per year to render the indicator cost-effective

NICE Menu Indicator	Baseline Uptake	Cost savings to justify 1 point	Cost savings to justify 6 points	Cost savings to justify 11 points
NM12 (Diabetes foot sensation)	50.7%	£40	£59	£78

Threshold analysis (mental heath - schizophrenia, bipolar affective disorder and other psychoses)

Table 5 presents the threshold analysis for the five mental health indicators, NM15-NM19. For these indicators, the threshold analysis was evaluated across a point range of between 1 and 5. This point range was allocated on the basis of *similar* indicators currently in the national QOF (Diabetes 2, 3, 11 and 16 – which rewards practices with three points for recording BMI, HbA1c, blood pressure and cholesterol levels). It is suggested by data reported from the NHS Information Centre that approximately 80% of individuals with a record of psychosis, schizophrenia or bipolar affective disease attend their GP on four or more occasions in a given year. Despite the reality that recording a patient's alcohol level or BMI will only take a small amount of additional time it is assumed that each indicator, NM15-NM19, is costed at £36 each, i.e. one GP visit. This assumption follows that the majority of the target population will

be able to complete the indicator on an opportunistic basis without the need for *additional* GP attendances. Although this can be interpreted as a conservative estimation as it is also assumed that no other activity or intervention separate from the indicator is performed during the consultation.

Table 5: The minimum cost savings required per eligible patient per year to render the indicators cost-effective

NICE Menu Indicator	Baseline Uptake	Cost savings to justify 1 point	Cost savings to justify 3 points	Cost savings to justify 5 points
NM15 (alcohol consumption)	41.1%	£43	£58	£72
NM16 (blood pressure)	51.0%	£57	£99	£141
NM17 (BMI)	66.6%	£86	£185	£284
NM18 (cholesterol)	40.5%	£42	£55	£67
NM19 (bllod glucose)	40.5%	£42	£55	£67

Conclusions

The cost-effectiveness of these indicators cannot be easily determined with existing data. Threshold analysis has been carried out, which presents the range of cost savings needed to justify the use of the indicators on cost-effectiveness grounds. In the absence of reliable data a judgement must be made as to whether the achievement of cost savings at these levels is likely achieved through reduced resource consumption, in both primary and secondary care.

Application of expert clinical opinion can be used to judge the likely cost-effectiveness of these process indicators.

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 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.