# 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: Mental health

### *Indicator NM21*

*The percentage of patients on lithium therapy with a record of serum creatinine and TSH in the preceding 9 months*

### *Indicator NM22*

*The percentage of patients on lithium therapy with a record of lithium levels in the therapeutic range within the previous 4 months*

## Introduction

The two mental health 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

## Discussion

Each of the above indicators measures a specific clinical variable (serum creatinine, TSH and lithium levels). 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.

Threshold analysis for each of the 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. The minimum QOF threshold and maximum thresholds for the three indicators were set to 40% and 90%.

Table 1 presents the threshold analysis for the indicators MH4. For this indicator, the threshold analysis was evaluated across a point range of between 1 and 3. This point range was allocated on the basis of the previous number of points rewarded to provide this activity currently in the national QOF (i.e. 1 point). The baseline uptake is assumed to be 50%, which is consistent with the analysis provided by the NICE costing team.

The eligible population for this indicator is estimated to be 0.77%, which is the average practice prevalence for mental health (source: NHS IC). The unit costs of laboratory tests for serum creatine and blood TSH was estimated at £1.34 based on 2008/09 reference costs. Although it is anticipated the completion of this indicator is possible on an opportunistic basic without the need for additional GP attendances, it has been conservatively assumed that one additional nurse visit will be required, costed at £10. The incremental cost to the NHS for MH4 is estimated to be £11.34.

Table 1: The minimum cost savings required per eligible patient per year to render the indicator cost-effective

| Indicator | Baseline Uptake | Cost savings to justify 1 point | Cost savings to justify 2 points | Cost savings to justify 3 points |
|---|---|---|---|---|
| MH4 | 50.0% | £28 | £45 | £62 |

Table 2 presents the threshold analysis for the indicators MH5. For this indicator, the threshold analysis was evaluated across a point range of between 1 and 3. This point range was allocated on the basis of the previous number of points rewarded to provide this activity currently in the national QOF (i.e. 2 points). The baseline uptake is assumed to be 50%, which is consistent with the analysis provided by the NICE costing team.

The eligible population for this indicator is estimated to be 0.77%, which is the average practice prevalence for mental health (source: NHS IC). The unit costs of laboratory tests for serum creatine and blood TSH was estimated at £1.34 based on 2008/09 reference costs. Although it is anticipated the completion of this indicator is possible on an opportunistic basic without the need for additional GP attendances, it has been conservatively assumed that one additional nurse visit will be required, costed at £10. The incremental cost to the NHS for MH5 is estimated to be £11.34.

Table 2: The minimum cost savings required per eligible patient per year to render the indicator cost-effective.

| Indicator | Baseline Uptake | Cost savings to justify 1 point | Cost savings to justify 2 points | Cost savings to justify 3 points |
|---|---|---|---|---|
| MH5 | 50.0% | £28 | £45 | £62 |

## 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.