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

July 2009

Health economic report

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 July 2009 Primary Care QOF Indicator Advisory Committee.

This briefing paper is intended to provide a summary of the economic evidence generated on the proposed indicator NM04. 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.

Indicator area: Learning Disability

Proposed indicator

Proposed Indicator: NM04: Percentage of patients on the Learning Disabilities register with Down's Syndrome aged 18 and over who have a record of blood TSH in the past year (excluding those who are on the thyroid register).

Economic rationale for the indicator

Of all patients with learning disabilities, the most common underlying condition encountered is Down's syndrome, affecting approximately 1 in 1,000. DS has many syndrome specific associated conditions, including deafness, congenital heart disease, and biochemical indicators of hypothyroidism, dementia, and celiac disease. Children and adults with Down's syndrome are at increased risk of thyroid dysfunction, particularly hypothyroidism, compared to the general population (Rooney and Walsh, 1997). Poor thyroid function can impair an individual's quality of life as well, as placing an increased demand on healthcare resources. Earlier intervention and management can help to avoid these outcomes.

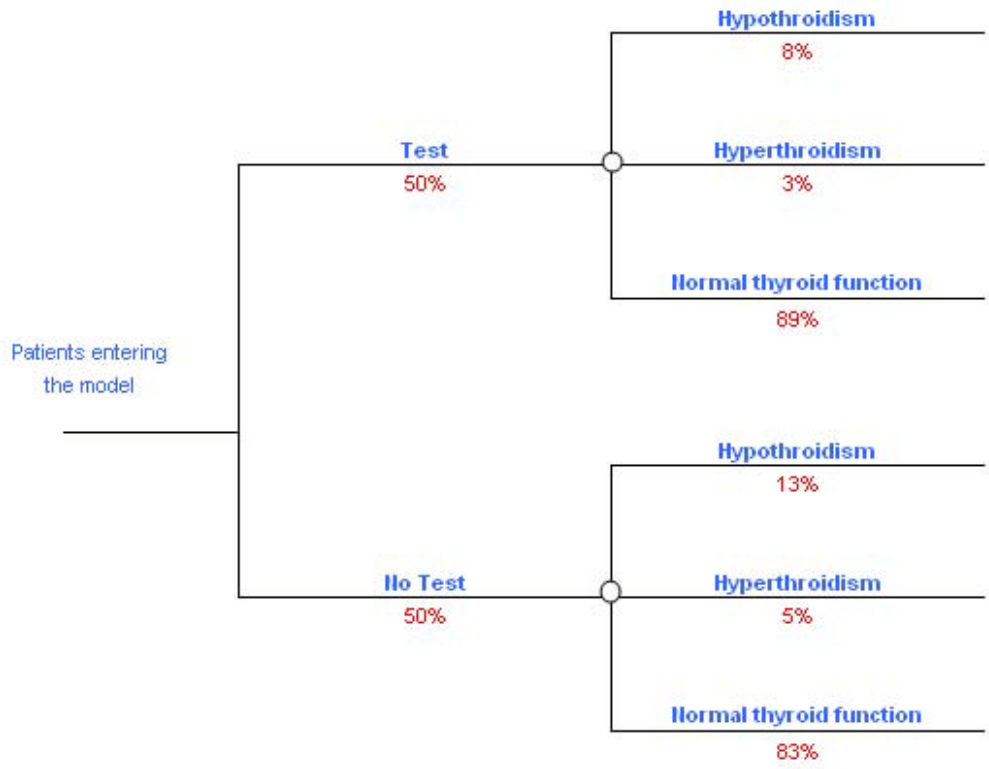
Methods Development of the decision analytic model

In the absence of any published economic evidence on the value of testing for thyroid function in individuals with Down's syndrome, a rapid economic

evaluation was developed to explore the cost effectiveness of the proposed indicator.

A simple decision analytic model was developed to address this. A decision tree was developed that was intended to capture the costs and benefits of annual testing. This is presented below in figure 1.

Figure 1: Graphical illustration of the decision tree



Individuals in the model can have one of three outcomes following testing; hyperthyroidism, hypothyroidism or they can have a normal thyroid function rate. For those who are tested, the prevalence of hyperthyroidism and hypothyroidism in individuals with Down syndrome is assumed to be 3% and 8% respectively (Prasher, 1994).

The consequence of not having the test results in higher rates of hyperthyroidism and hypothyroidism developing and poorer health outcomes. A study recently published which investigated annual thyroid function tests for adults with Down's syndrome over a 10-year period (Prasher, 2007) provides an adjusted prevalence for those with hyperthyroidism or hyperthyroidism of approximately 17%.

In addition to this, patients in the untested arm are assumed to have a lower quality of life than those in the tested arm as they are unlikely to be treated until their condition becomes symptomatic.

Finally, there is an incremental cost associated with testing due to the testing itself, as well as the subsequent treatment. Details of the data used to populate the model are presented below.

Evidence on costs and effects

Delivery costs

A trawl of existing NICE guidelines failed to identify any delivery costs relating directly to learning disabilities or Down's syndrome that may be applicable to the indicator. Available guidelines for the management of Down's recommend yearly screening for thyroid disease, since the frequency increases with age (Roizen and Patterson, 2003).

The degree to which thyroid disease is monitored in patients with Down's is currently unknown as evidence on resource use and consultations is limited. Although people with learning disabilities visit their GPs with similar frequency to the general population, they are less likely to receive regular health checks (Kerr, Richards and Glover, 1996).

For the purposes of this analysis, we have assumed that achievement of the indicator will require an additional consultation with a practice nurse, able to test thyroid function. This cost associated with this is £11 per annum.

Subsequent treatment costs

The costs associated with developing hyperthyroidism, or hypothyroidism, are based on the recommended treatment and the relative cost/dosage information from the British National Formulary. Carbimazole is the preferred treatment for hyperthyroidism and has an associated annual cost of approximately £40 per patient. Hypothyroidism is treated with Levoxyl and has an annual cost of approximately £24. The costs of each treatment have been calculated on the assumption that the patient has reached the maintenance dose, although it is acknowledged that there may be some titration involved at the outset of treatment. The costs of these treatments are a consequence of the testing and will be incurred after the test.

Health benefits of the indicator

The utility of an individual who has a normal thyroid function in the model is assumed to be the utility of an individual who has Down's syndrome live at birth (0.810). A multiplicative approach was adopted to determine the utility of

an individual with Down's and hypo/hyperthyroidism. There are alternative approaches to handling utilities of multiple conditions in an individual (including additive, multiplicative or simply adopting the worst recorded utility), but the multiplicative approach is one of the more conservative approaches.

The utilities (quality of life) associated with hyperthyroidism or hypothyroidism are derived from published literature. Our model assumes that testing leads to earlier identification and treatment of the condition, whereas the absence of testing means that treatment is initiated when the condition becomes symptomatic. One published study (Nolan, 1985) was identified, which reported utilities associated with hyperthyroidism and hypothyroidism diagnosed and treated within 1 year of onset and 2 years of onset. For the purposes of our analysis, we adopt the utility associated with early diagnosis, within one year, for those individuals who are tested and late diagnosis, at 2 years, for those individuals who are not diagnosed. These utility scores are multiplied by the utility associated with Down's to generate the scores necessary to populate the model. The utility estimates used in the model are presented below.

Table 1. Health state utilities

Health state	Utility
Down's syndrome, no thyroid problems	0.810
Down's syndrome, hyperthyroidism identified after testing	0.790
Down's syndrome, hypothyroidism identified after testing	0.695
Down's syndrome, hyperthyroidism identified without testing	0.770
Down's syndrome, hypothyroidism identified without testing	0.693

The model assumes that testing is 100% accurate and that the health state of the individual is maintained at the same level indefinitely. Both are simplifying assumptions.

Eligible population

Estimates suggest that approximately 1 in 1,000 births are affected with Down's syndrome (0.1%). In the absence of any existing register on Down's in primary care, this is taken as a proxy for the eligible population.

Baseline level of achievement

Most GPs agree that they should meet the medical needs of people with learning disabilities as part of the general medical services (Kerr, Dunstan and Thapar 1996). However, current literature does not identify how many of the Down's syndrome population take annual thyroid function tests. The analysis

considers varying levels of baseline level of achievement and their impact on the net benefit output.

Population

A net benefit analysis of the proposed indicator was conductor based on the total population registered with UK practices; that is 8,372 practices with a mean practice size of 5,891.

QOF Payments

Each QOF Point is assumed to result in a payment of £127.27.

Societal value of a QALY

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

Thresholds

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

Results

The rapid economic evaluation suggests that thyroid testing in individuals with Down's syndrome is associated with a net increase in cost of £9.29 per patient and a utility increment of 0.028.

Net benefit analysis

The net benefit analysis suggests that the value of the indicator is dependent on the baseline level of achievement. In the absence of any definitive data on current levels of achievement, the table below presents the maximum number of QOF points which are economically justifiable, based on different levels of baseline achievement. This analysis assumes that all other inputs (e.g. cost, outcomes etc) remain constant and the threshold for payment is 40-90%.

Table 2: Maximum number of QOF points payable according to baseline levels of achievement

Baseline level of achievement	Maximum number of QOF points
10%	30
20%	20
30%	20
40%	20
50%	10
60%	10
70%	5
80%	4
90%	0

Sensitivity analysis shows that the findings are largely insensitive to changes in the estimates of cost and effectiveness. Increasing the incremental cost by 100% to £18.58 does not change the outcome of the model. Similarly, the net benefit table is insensitive to same changes in incremental effectiveness.

Discussion

The analysis presented above suggests that the introduction of indicator NM04 can be justified on economic grounds, based on the assumptions and data adopted. Annual testing for thyroid function is relatively inexpensive and can lead to some modest improvements in quality of life for these individuals through earlier intervention and control of hyper/hypothyroidism. The additional costs associated with management which may result from increased testing are also assumed to be relatively modest.

However, any decision on this indicator should take into account the many assumptions that have had to be made as part of this analysis, as a result of limitations in the evidence base. The analysis assumes that testing is 100% accurate, which is unlikely to be the case and in practice there are likely to be some inaccurate test results that result in delayed treatment or unnecessary treatment. However, this is not expected to have a significant impact on the outcomes. A greater limitation of the analysis is that it adopts a simple decision analytic model, which assumes that inputs remain constant over time. In practice, the development of thyroid problems is likely to be related to the individual's history of thyroid testing and their age. The simple model developed rapidly to inform the committee was unable to take these factors into account and a more complex, patient level simulation model would be required to do so.

The main issue of concern is the assumptions taken with regard to baseline levels of achievement. No evidence was identified on the proportion of individuals with Down's syndrome who currently receive regular, annual thyroid checks. The net benefit calculations are highly sensitive to this input and improved estimates of this parameter are vital to informing the decision

on whether the indicator should be incentivised and if so, how many points should be allocated to it.

On the balance of the evidence considered, the indicator would appear to offer the potential to lead to earlier diagnosis and treatment, resulting in improved outcomes, at a relatively modest cost to the NHS. The main outstanding consideration is the degree to which testing is already embedded in practice and the magnitude of the incentive required to further increase adoption.

References

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– a group practice survey”. *Journal of Applied Research in Intellectual Disability* 9 (1996): 347-52.

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