

The value of investing in implementation activities: A case study in natriuretic peptide testing for diagnosing suspected heart failure

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Introduction

In 2010 NICE released a clinical guideline recommending that natriuretic peptide (NP) testing in patients with suspected heart failure without previous myocardial infarction can accelerate diagnosis of heart failure and also avoid unnecessary echocardiography. A framework for the evaluation of the value of implementation activities is applied to this recommendation for NP testing.

Clinical Guideline 108

- If NP testing shows high levels (BNP>400pg/ml or NTproBNP>2000pg/ml) then the patient is referred directly to specialist assessment and echocardiogram within 2 weeks.
- If NP testing shows raised levels (BNP 100-400pg/ml or NTproBNP 400-2000pg/ml) then the patient is referred to specialist assessment and echocardiogram within 6 weeks.
- If NP testing shows normal levels (BNP<100pg/ml or NTproBNP<4000pg/ml) heart failure is unlikely.

Methods

The following quantities were estimated:

- **expected value of perfect implementation** (the maximum the NHS can invest on implementation activities whilst still accruing some positive value from the intervention);
- **expected value of the implementation activity** (the additional value of the specific implementation activity given its expected costs and effectiveness).

Cost-effectiveness data

The economics of the diagnostic section of the NICE CG108 was informed by the HTA report by Mant et al 2009. For this research the Mant model was adapted to produce estimates of greater relevance to CG108. For 1,000 persons with suspected heart failure CG108 versus 'do nothing': incremental costs=£3,881, incremental QALYs= 76.4

Utilisation data

Data on the current utilisation of NP testing was derived from the NHS Atlas of variation in diagnostic services. Maximum utilisation rate was assumed to be 8.6 tests per 1,000 practice population per year (the level of utilisation achieved in over 10% of PCTs). Current utilisation(2012) was 4.4 tests (51% of maximum).

Implementation interventions

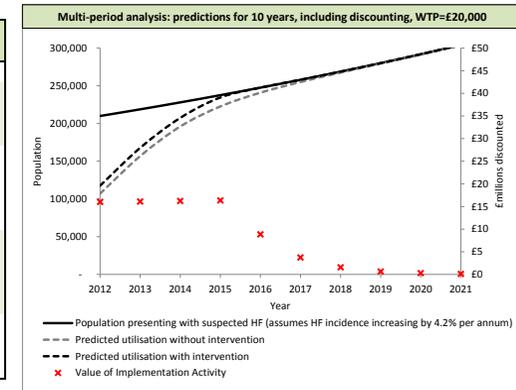
It was not possible to estimate the effectiveness of the London BNP initiative as utilisation data was only available from two trusts. Hence estimates of effect size from the O'Brien et al study were used (5% base case, 9% scenario analysis). An estimate of the cost of the BNP London implementation initiative workshop was developed by EEPUR and validated by S Radford and includes staff time and consumables costs: £4,172 for London (£28,187 for England and Wales)

Diffusion curves were estimated based on historic data to produce predictions of future utilisation. Both a static population analysis and multi-period analysis were undertaken and results are presented for cost-effectiveness thresholds of £20,000 and £30,000 per quality-adjusted life year (QALY) gained.

Results

There appears to be value in additional implementation efforts directed towards encouraging the utilisation of NP testing for persons with suspected HF. At a threshold of £20,000 per QALY gained, additional investment in an activity that increases utilisation by 5% (absolute increase in utilisation rates) would generate an additional 799 QALYs (£16 million in terms of monetary equivalent) across England and Wales compared to the use of these resources in other (health generating) NHS activities.

Static population analysis	WTP=£20000	
	NMB	NHB
Net Benefit to the NHS (per patient)	£1,524	0.076
Current value of technology given current utilisation and population size for England and Wales. Population= 210000, current utilisation= 4.43	£164.6m	8,230
Expected Value of Perfect Implementation. Value of increasing utilisation from current to desirable maximum. Current utilisation=4.43, Desirable maximum=8.62 (100%)	£155.5m	7,774
Expected Value of Actual Implementation. Value of increasing utilisation from current to achievable. Current utilisation=4.43, Achievable utilisation with intervention=4.86 (56%)	£16.0m	800
Value of the implementation activity. Expected value of actual implementation minus cost of intervention (£28,187)	£16.0m	799



Conclusion

This framework can be applied to any existing cost effectiveness analysis thus helping a decision maker to quantify the value of investing resources in increasing utilisation in a manner consistent with the value assessment of new interventions conducted by NICE.

This case study provides a useful demonstration of the practical challenges faced in populating such a model. The main limitations of the analysis were a lack of evidence on: cost effectiveness, effectiveness of implementation intervention, utilisation, diffusion of utilisation and population size. In particular, as the comparator in the economic analysis is 'do nothing' rather than ECG the cost-effectiveness is likely to be overestimated; hence these results will overestimate the value of implementation activities. The importance of publishing incremental costs and QALYs related to clinical guidelines compared to current care is thus highlighted.



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