



Health Services
Research Unit



Methods of evidence synthesis for Health Technology Assessments

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Evidence synthesis

Key element of the HTA process

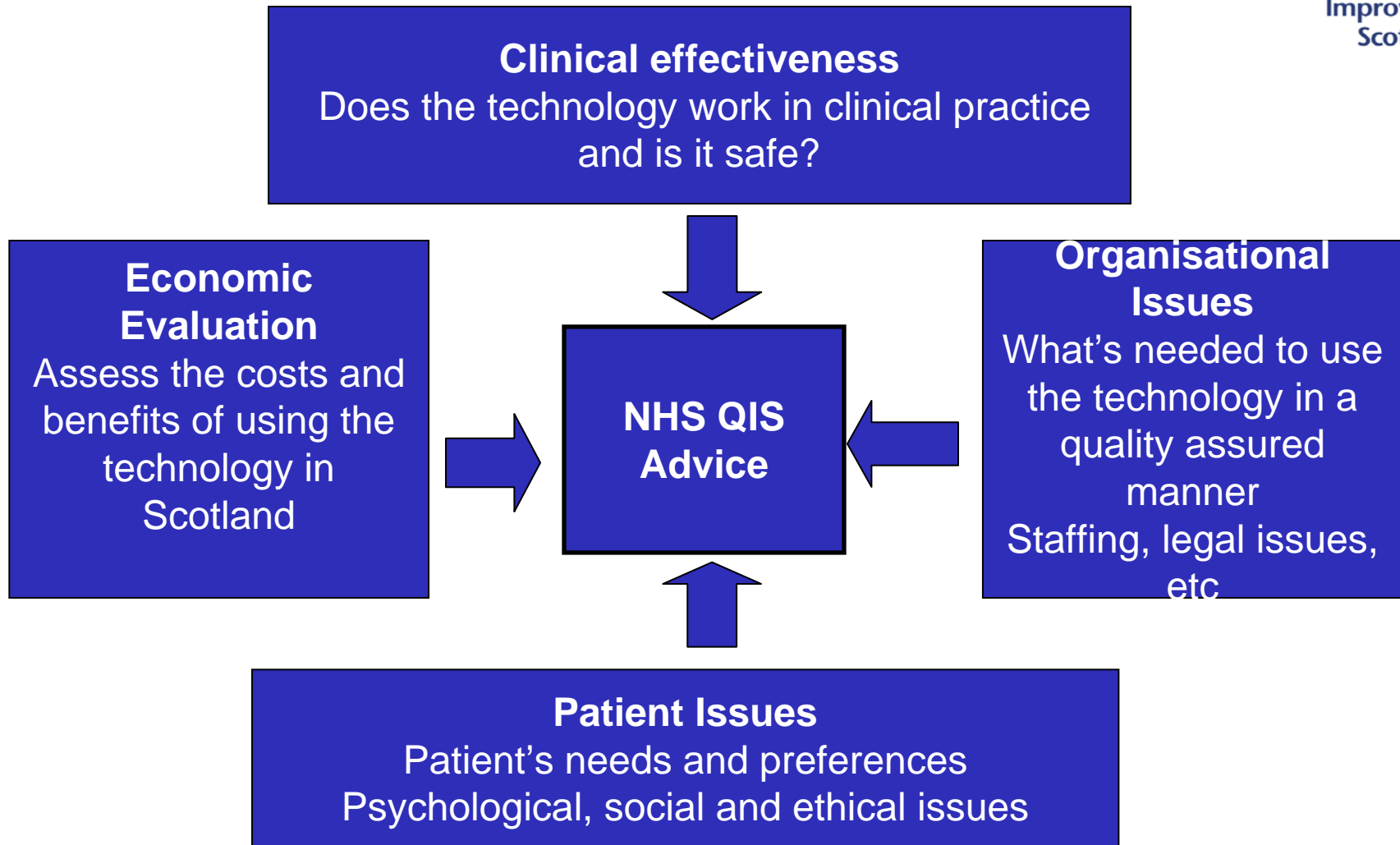
Selection of a method depends on the type of review and available evidence

Types of reviews:

- Reviews to advance understanding
- Reviews to inform decision making

Approaches to evidence synthesis:

- quantitative (statistical analysis)
- qualitative (summarise; conceptualise)
- mix of both



Health Technology Assessment



Project objectives

- To provide an overview of the different methods used for synthesising evidence in HTAs
- To help those new to evidence synthesis understand the use and difference between these methods



Methods

- Data sources
- Criteria for selecting studies
 - methodology papers
- Data extraction
 - reporting template
- Reporting
 - results presented as a summary of each method with key references
 - overall summary of quantitative and qualitative methods.



Search strategy

- Databases searched-
 - MEDLINE, EMBASE, CINAHL, ASSIA, PSYCHINFO, SSCI,
 - CMR, CDSR, DARE, HTA Organisations and other networks.
- Search produced 3301 hits (1966 -2008)
- 128 abstracts identified as relevant
- 30 abstracts were multiple publications
- 15 full papers not available
- 83 full papers assessed for inclusion
- 47 papers from search included in the review
- 24 articles obtained from secondary references, other HTA organisations and networks
- Total of 71 papers included.



Reporting template

- Purpose
- Theoretical basis
- Method of weighting
- Quality assessment
- When to use
- When not to use
- Process
- Combination of qualitative and quantitative evidence
- Strengths
 - Weaknesses
- Similarities with other methods
- Successful use – example
- Challenges
- References



Overview of quantitative methods

- **Frequentist method (1)**
 - **Meta-analysis:** uses statistical techniques to pool the results from similar studies (RCTs) to provide a single quantitative estimate of effect
 - Compares effect of an intervention versus control
- **Bayesian methods (5)**
 - Confidence profile method; cross design synthesis; generalised evidence synthesis; indirect/mixed treatment comparisons; decision modelling
 - Combine evidence from multiple sources (RCTs, case control/cohorts, routine data)
 - Basic similarities in all the methods



Frequentist methods

- Strengths
 - Objective
 - Provides a measure of statistical significance
- Weaknesses
 - heterogeneity can cause meaningless findings
 - bias can result in misleading results
- Widely used in HTAs, Cochrane reviews etc



Bayesian approaches

- Strengths
 - provides probability statements to be made directly
 - easily incorporated into decision making framework
- Weaknesses
 - subjective prior beliefs
 - complex to implement
- Widely used in NICE Interventional Procedures
- Decision models are commonly required for HTAs
eg: NICE TARs, SMC submissions



Overview of qualitative methods

- Aggregative methods (5)
- Summarise/describe/explain evidence around ‘what works’ - narrative synthesis, best evidence synthesis,
 - Meta-summary - qualitative, quantitative and mixed methods studies
 - Convert qualitative data to quantitative – content analysis, quantitative case summaries
 - Process is linear or sequential, explores heterogeneity descriptively



Overview of qualitative methods

- Interpretive methods (8)
 - Build/generate theory or develop new insights
 - may have umbrella term: meta-synthesis
 - meta-ethnography; grounded theory; meta-study; critical interpretive synthesis; cross case analysis; meta-interpretation; meta-narrative, thematic synthesis



Overview of qualitative methods

- Built on theory to establish what works, in what context, for whom and why?
 - realist synthesis;
 - harvest plot (graphical synthesis & display of evidence)
 - Process is iterative, not explicit, outputs more complex than aggregative methods



Qualitative methods

- Aggregative approaches
 - Strengths
 - Useful for interpreting and highlighting findings of quantitative research
 - summarises both qualitative and quantitative data
 - Weaknesses
 - unclear how decisions are made about methods used for synthesis
 - reviewer bias affect conclusions,
 - interpretation and judgements not transparent



Qualitative methods

- Interpretive approaches
 - Strengths
 - tests or generate a hypothesis, explore or aid conceptualisation
 - suitable for a broad range of qualitative studies from different contexts using different methods
 - Weaknesses
 - Debate continues on the use of quality assessment and searching techniques
 - Cannot summarise both qualitative and quantitative data



Conclusions

- Wide variety of quantitative and qualitative methods are available
- Some methods are complementary eg: meta-analysis; decision modelling
- Many variants of qualitative methods developed but substantive differences often not clear
- Applicability of the range of qualitative methods for HTA requires evaluation
- Catalogue of methods will be published Autumn 2009



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