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**Relationship between the data collection approaches and the application of health economics models in practice: a case study approach**

# **Relationship between the data collection approaches and the application of health economics models in practice: a case study approach**

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**Working Paper prepared for:**

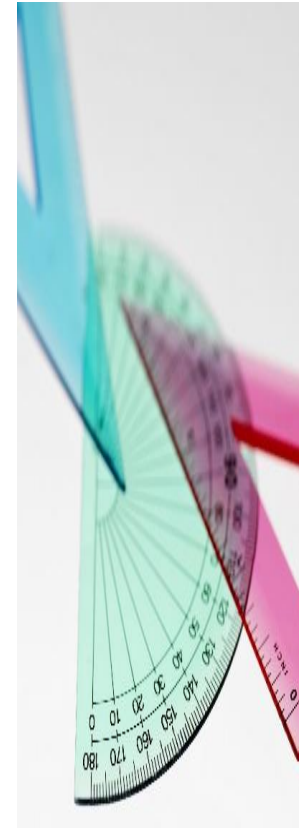
## **Methods for Research Synthesis: A Cross-Disciplinary Workshop**

**Harvard Center for Risk Analysis  
October 3, 2013**

# Overview

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- **Intro/motivation**
- Economic evaluation
- Decision modelling
- Case studies
- Discussion and conclusions



# Intro/motivation

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- Systematic reviews viewed as a first line approach to generate evidence base for economic decision models.
- They can yield poor results given dearth of robust published evidence.

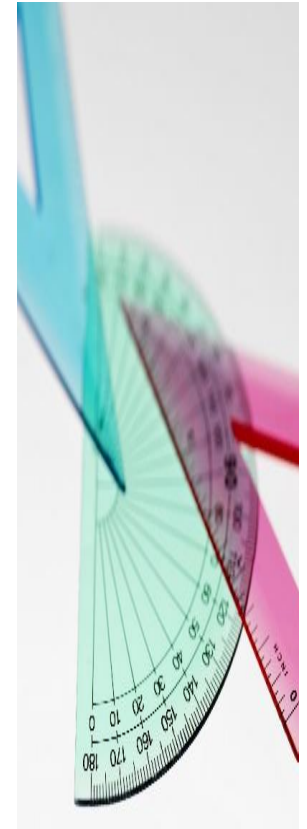
## Three options:

- Stay confined to the results of the systematic review
- Expand the systematic review
- Derive data through the elicitation of expert opinion.

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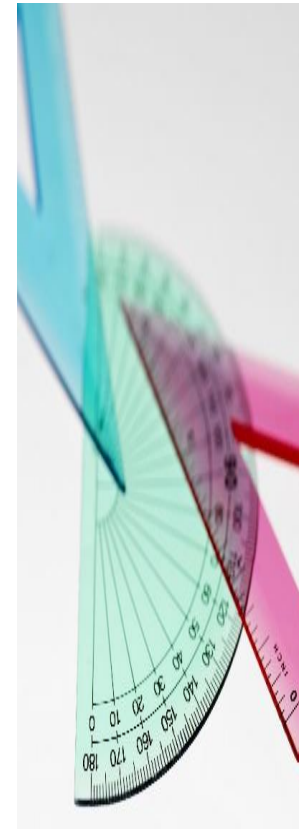
# Economic evaluation

Methods	Description	Positives	Negatives
Cost Effectiveness Analysis	Measures the cost per unit of output or outcome to compare different interventions	A useful tool for deciding between alternatives to achieve the same result.	When multiple outputs or outcomes involved it requires use of techniques like Multi-Criteria Decision Analysis for additional rigour.
Cost Benefit Analysis	Values costs and benefits to enable calculation of net economic value taking into account multiple outcomes	It is easy to understand as there is a single metric to measure and compare net economic value across multiple interventions and outcomes.	It can be controversial as stakeholders find it hard to place monetary values on issues such as health, well-being, reduced fear of crime etc.

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# Decision modelling

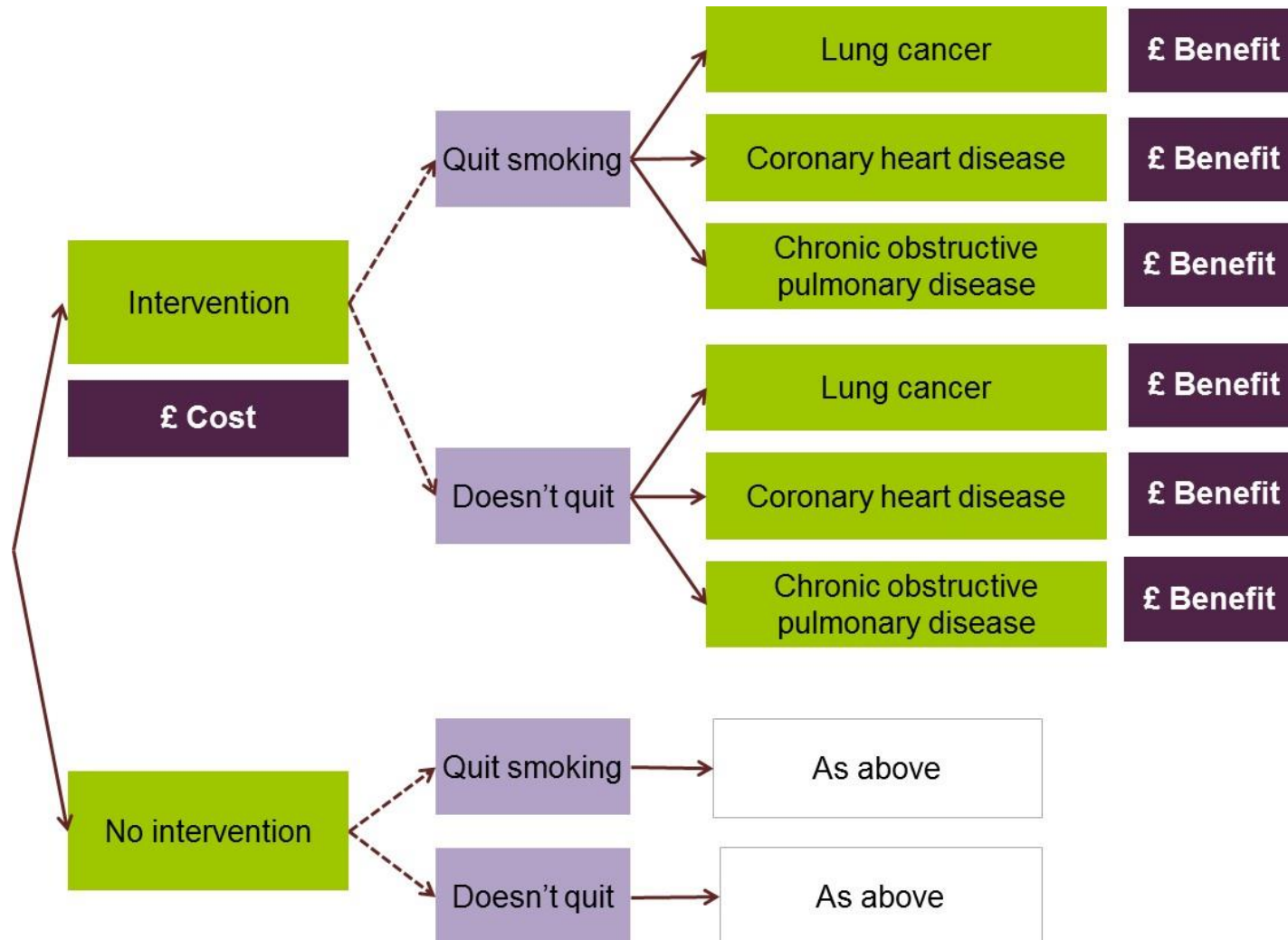
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- Provides a structured way of demonstrating consequence.
- Involves the construction of a mathematical representation of the relationships between inputs and results.
- Provides an explicit way to synthesize disparate evidence available on the outcomes and costs of alternative (mutually exclusive) interventions.
- Is a socio-technical process combining quantitative evidence and deliberative techniques.





## Decision modelling



# Types of evidence (NICE, 2012)

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- **Scientific evidence:** defined as 'explicit (codified and propositional), systemic (uses transparent and explicit methods for codifying), and replicable (using the same methods with the same samples will lead to the same results). It can be context-free (applicable generally) or context-sensitive (driven by geography, time and situation).
- **Colloquial evidence:** essentially derided from expert testimony, stakeholder opinion and necessarily value driven and subjective.



# Best practice guidelines (Philips et al 2004)

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Methods for identifying data should be **transparent**.

It should be clear that the data identified are **appropriate** given the **objectives** of the model.

There should be **justification** about any **choices** that have been made about which specific data inputs are included in a model.

Particular attention needs to be paid to identifying data for those parameters to which the results of the model are particularly **sensitive**.

Identification of all available data for every parameter may not represent the best use of research resources.

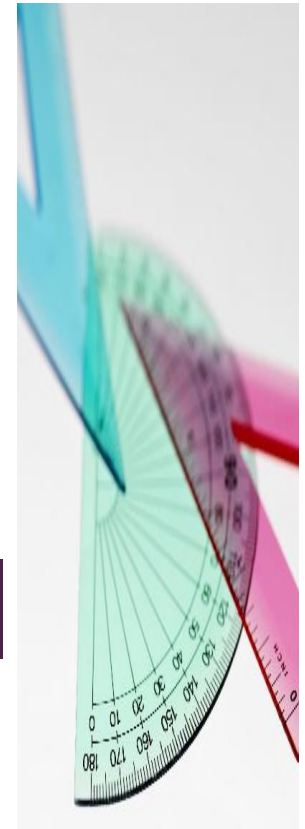
There should be a description of the **quality** of the data identified for use in the model.

Where **expert opinion** has been used to estimate particular parameters, sources of opinion and methods of elicitation should be described.

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# Case studies

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## **Domestic violence**

Generate evidence on the economic value of interventions for preventing and reducing domestic violence.

Commissioned by National Institute for Health and Care Excellence (NICE)

## **Play provision**

Generate economic evidence on the benefits of providing staffed play interventions.

Commissioned by Play England, part of the National Children's Bureau, a leading children's charity.

# Case study 1: Domestic Violence

Cost-utility analysis

Economic model

- Use of expert opinion to define the scope of the models

Effectiveness data

- Use of a systematic review and interpretation of limitations when populating economic models




# Use of expert opinion

**Initial scope:** economic analysis to include the short and long-term impacts experienced by adult victims as well as children witnessing domestic violence.



Lack of data on impacts on children.

**Decision made:** the economic model should include short and long-term impacts only for adults.



Stakeholder feedback that data on long term impacts would not be identified from published literature.

**Decision made:** undertake a case-study approach to modelling long-term component.

# Use of expert opinion

Stakeholder feedback that experts would not be able to identify the required data.

**Decision made:** exclude the long term analysis and focus purely on the short-term impacts.



Assessment of potential interventions for the economic models presented to the Stakeholders.

**Decision made:** Two short term models to be built - one for reducing the incidence of domestic violence and one for reducing harm associated with domestic violence.



# Systematic Review Criteria

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- Relevance
- Intervention type
- Outcome measured
- Feasibility



# Limitations of studies used to populate the economic models

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1. Before-after evaluation which did not provide any control group.
2. Study based on provider reported outcomes on behalf of victims.
3. Data from 2009 therefore not completely reflective of situation in the UK at the time of research.



## .....More Limitations

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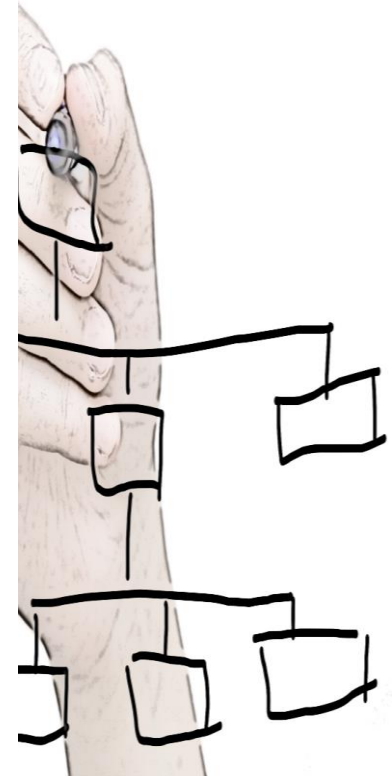
4. Intervention not offered in the UK, although clinical staff required to deliver it available.
5. Small sample size.
6. Interventions provided to a very specific population group.

# Case study 2: Play

## Cost-benefit analysis

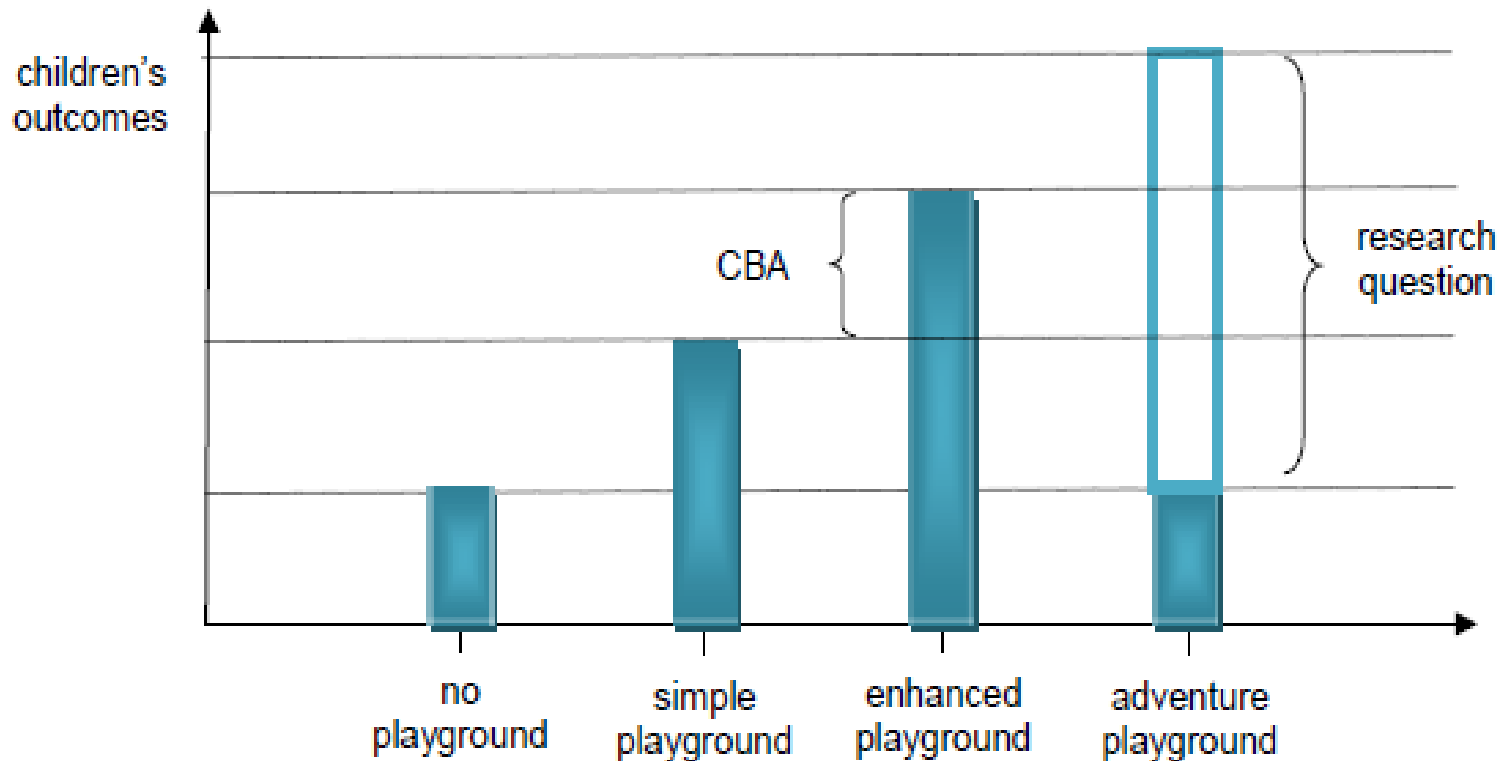
**Effectiveness data intervention 1:** *adventure playground vs. no playground.* Use of a systematic review and interpretation of limitations when populating economic models

**Effectiveness data intervention 2:** *after school club staffed with qualified play personnel vs. after school play club not staffed with qualified play personnel.* Use of expert opinion to populate an economic model



# Intervention 1: Adventure Playground

Mismatch between evidence available and research question



## Intervention 2: After School Club

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### Systematic review did not identify suitable evidence

- Didn't consider training
- Not play specific
- Age group not relevant



### The economic model relied fully on expert opinion

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# Discussion and conclusion

**It is possible that systematic review methods will not provide the data required to answer the research question?**



This was the case in the two models of play presented. In one case, this lack of data was supplemented by the use of expert opinion. In the other case, despite the mismatch between the research question and the evidence found, a model was built using the data that most closely matched the analysis. Both models were subject to limitations and sensitivity analysis was undertaken to account for the potential overestimation and underestimation of the benefits associated with the intervention.



# Discussion and conclusion

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**Both the quality of the evidence and its relevance in terms of population, intervention, comparator, and outcome are important when selecting data to populate models.**

The two models of play provide examples of **limitations in the evidence base** and how to deal with them when interpreting results. The two models of domestic violence also provide examples of limitations in the **quality of the data** (before-after study) and **relevance** in terms of population (specific targeted group) and intervention (clinical staff required not available in the UK).



# Discussion and conclusion

**Regardless of the use of more or less scientific data available, there is great value in engaging experts and stakeholders in the design and development of models and identification of data.**

The domestic violence example showed that stakeholders had a key role in shaping the scope of analysis so that the results would be 'trusted' by those using them to make decisions.



# Discussion and conclusions

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Balanced approach brings benefits

Transparency is vital

Flexibility is required



## Contact details

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