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Modelling cost-effectiveness of home injury prevention strategies for children

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on behalf of the “Keeping Children Safe” Project

background

- Unintentional injury major public health challenge in young children
- Falls, poisoning and thermal injuries particular problem
- ED attendances cost £17million/year in UK
- Steep social gradients in deaths and hospital admissions
- “*Better Safe than Sorry*”:
 - “little evidence of a systematic approach to child injury prevention within the NHS”

background

- Evidence on cost effectiveness is needed to inform decision making about injury prevention interventions in the NHS
- Little evidence on cost-effectiveness of interventions to prevent unintentional home injuries in childhood in UK



background

- Keeping Children Safe programme grant
 - Overall aim is to increase evidence-based NHS prevention of falls, poisoning and thermal injuries in young children at home
 - 14 inter-linked multi-centre studies
 - 5 studies will provide evidence for decision analyses
 - Decision analyses will investigate cost-effectiveness of a range of strategies for preventing unintentional falls, poisonings and thermal injuries in children at home
 - Decision analyses will provide evidence-based approach to decisions about whether the NHS should fund injury prevention interventions



What is a decision analysis?

- With limited resources, health care decisions require choices to be made between alternative interventions, e.g.
 - Provide free smoke alarms vs. do not provide smoke alarms
 - Provide free smoke alarms vs. provide & fit free smoke alarms
- Decisions will be taken, with or without “ideal” data
- Delaying choice until better data are available = implicit decision not to fund the intervention
- Decision analysis attempts to make the best use of available data to help the decision making process



What is a decision analysis?

- Method for making decisions using an **explicit, quantitative and systematic approach**
- Increasingly being used to make health care decisions e.g. NICE health technology appraisals
- Decision analysis allows
 - Evidence from a range of sources to be synthesised, including:
 - all relevant and feasible intervention alternatives
 - outcomes resulting from these alternatives
 - resources used by these alternatives
 - Uncertainty about the evidence to be incorporated



What data go in to a decision analysis?

- All relevant and feasible intervention options
 - Should the NHS implement a smoke alarm programme?
 - Relevant and feasible options might be:
 - No smoke alarm programme
 - Education
 - Provide vouchers for low cost alarms
 - Provide vouchers for free alarms
 - Provide low cost alarms
 - Provide free alarms
 - Provide and fit low cost alarms
 - Provide and fit free alarms



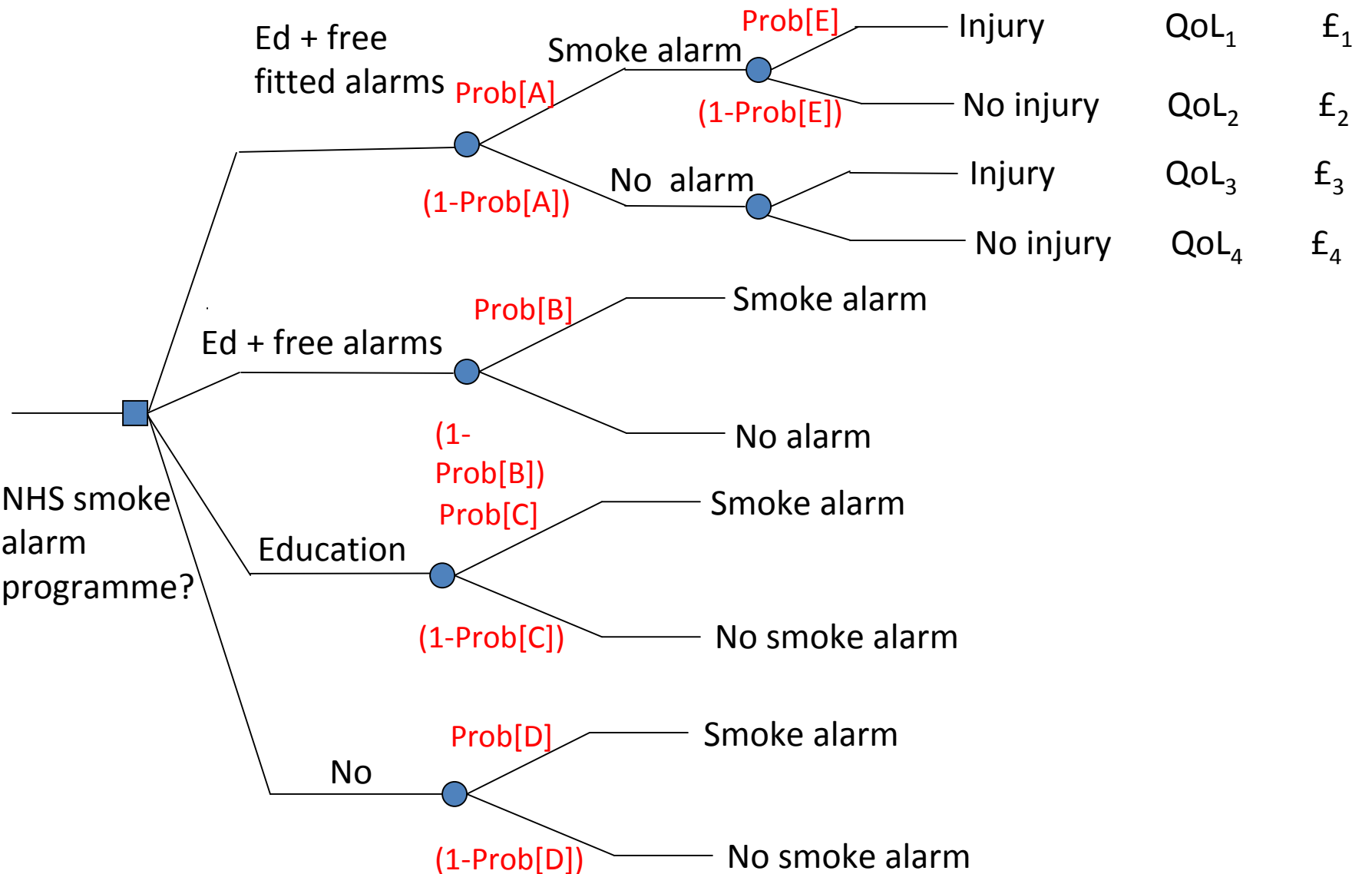
What data go in to a decision analysis?

- Outcomes from each alternative
 - Fire-related injury, quality of life
 - No fire-related injury, quality of life
- Resources
 - Costs of each alternative
 - No programme = £0
 - Education = cost of staff time, educational materials
 - Education + vouchers = cost of staff time, educational materials, cost of vouchers etc
 - Costs of care for those injured



EXAMPLE: Decision Tree

Outcomes Costs





Stages in decision analyses

1

- Find the evidence

2

- Synthesise the evidence

3

- Estimate cost-effectiveness with decision analysis

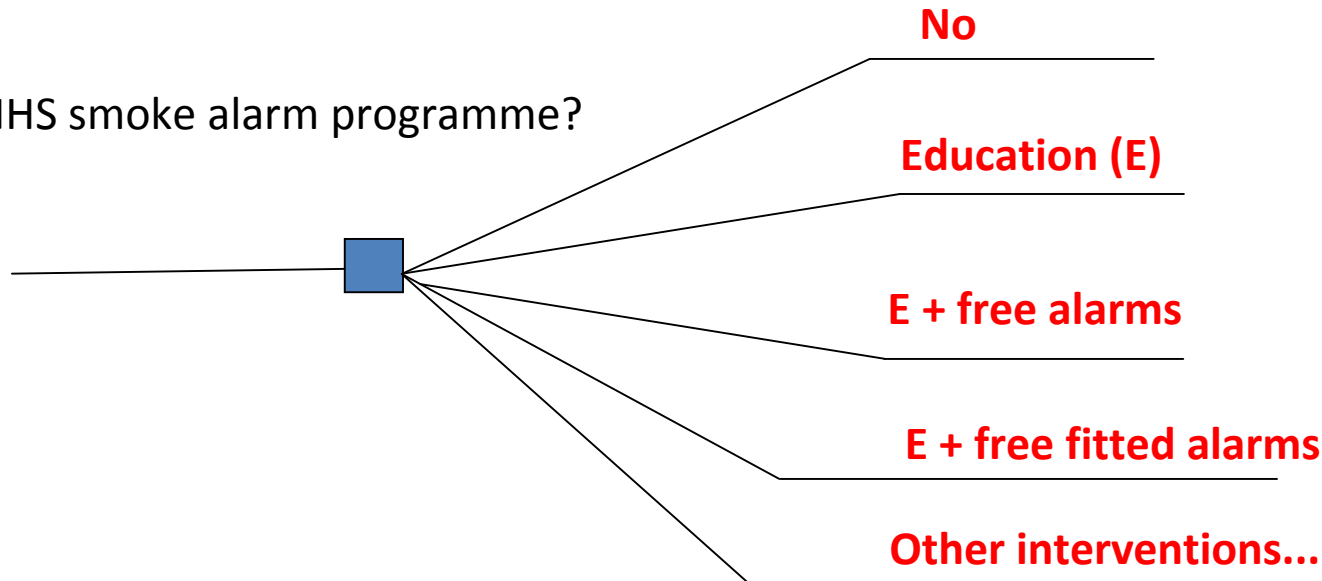


1a. Finding the evidence

Relevant and feasible interventions

- National survey of Children's Centres

NHS smoke alarm programme?

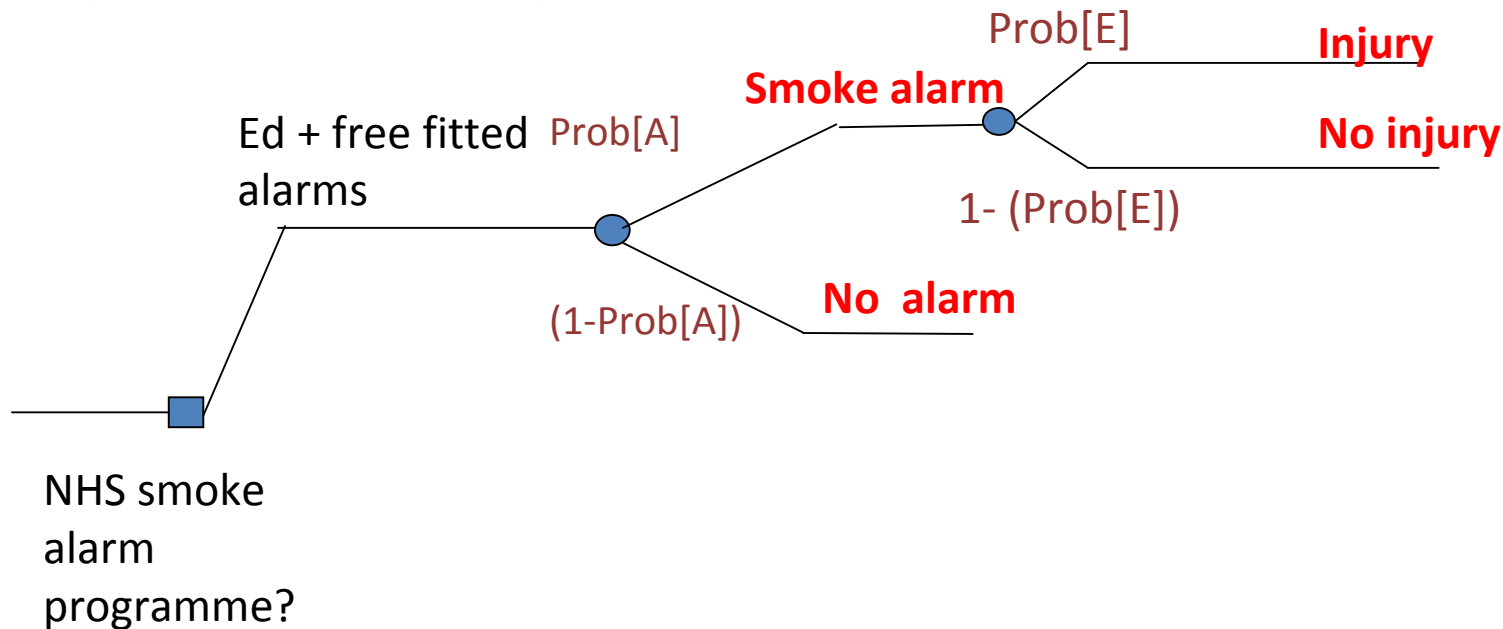




1b. Finding the evidence

Effectiveness of smoke alarm programmes

- Overview of reviews
- Update of Cochrane review of home safety education + safety equipment
- Systematic review of studies (RCTs + observational studies) published since latest review

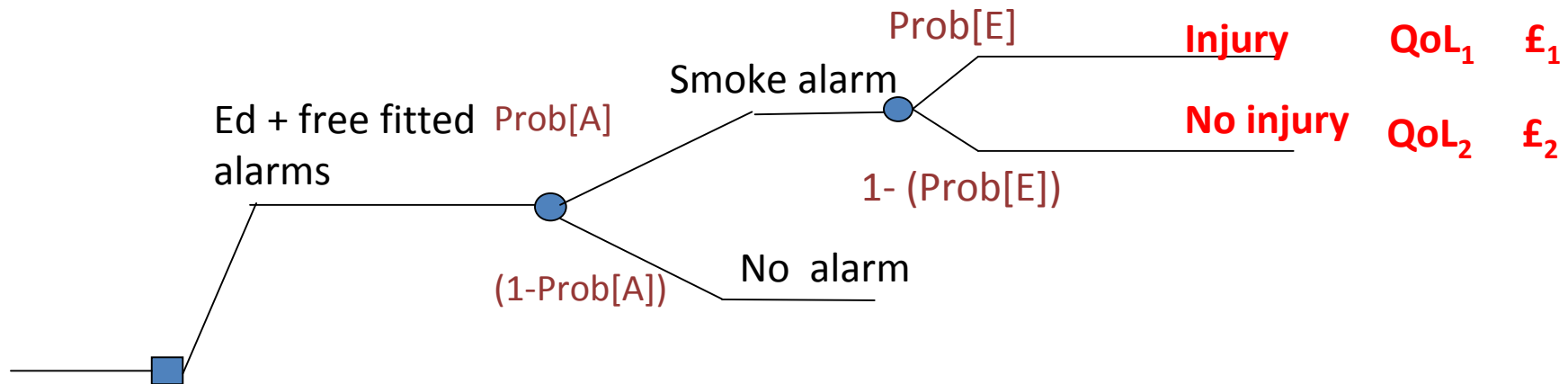




1c. Finding the evidence

Data on outcomes & costs

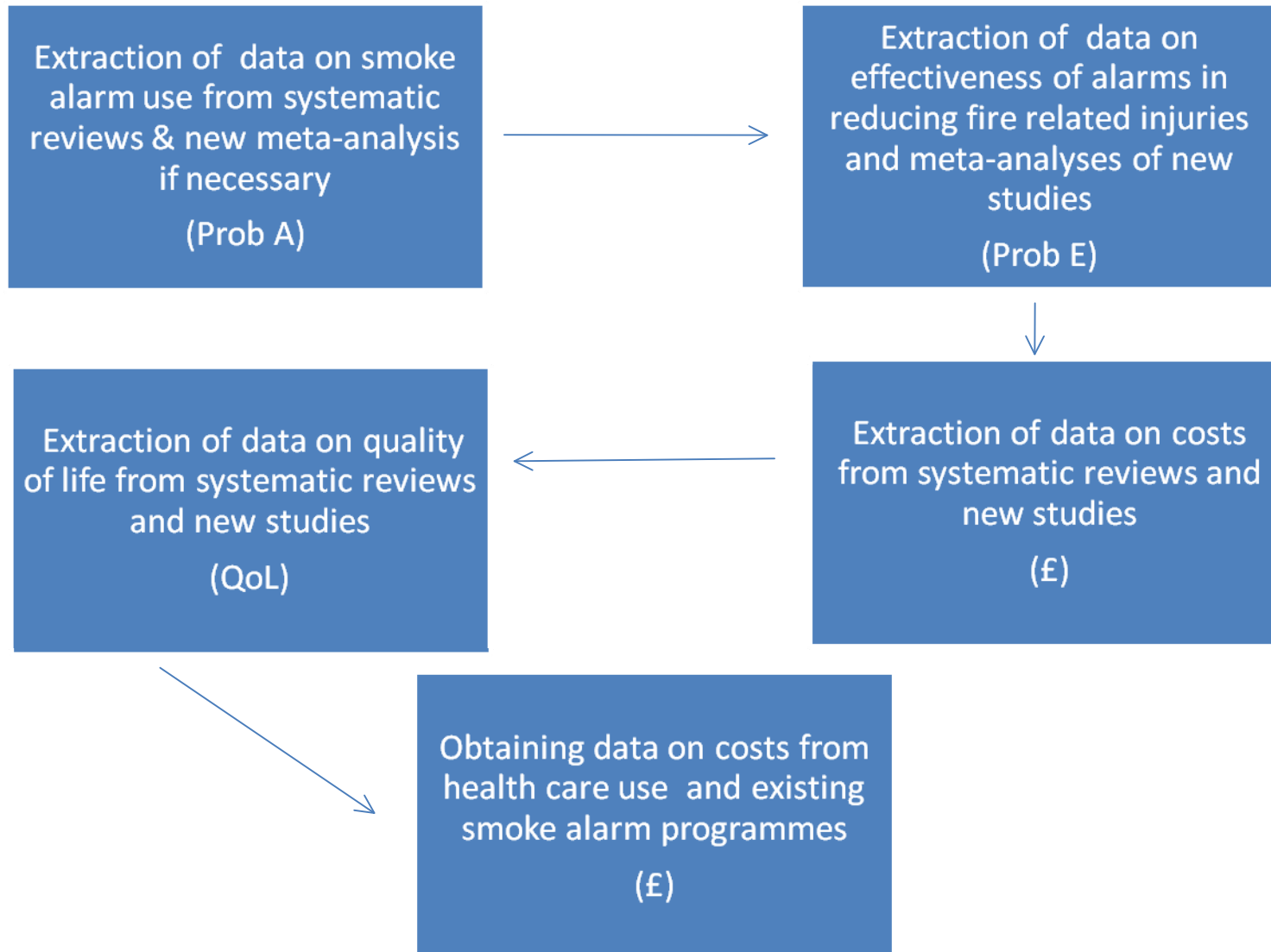
- Fire and Rescue Service data on house fires
- Quality of life & cost data from studies identified above
- Cost data from health care utilisation
- Cost data from existing smoke alarm programmes



NHS smoke alarm programme?

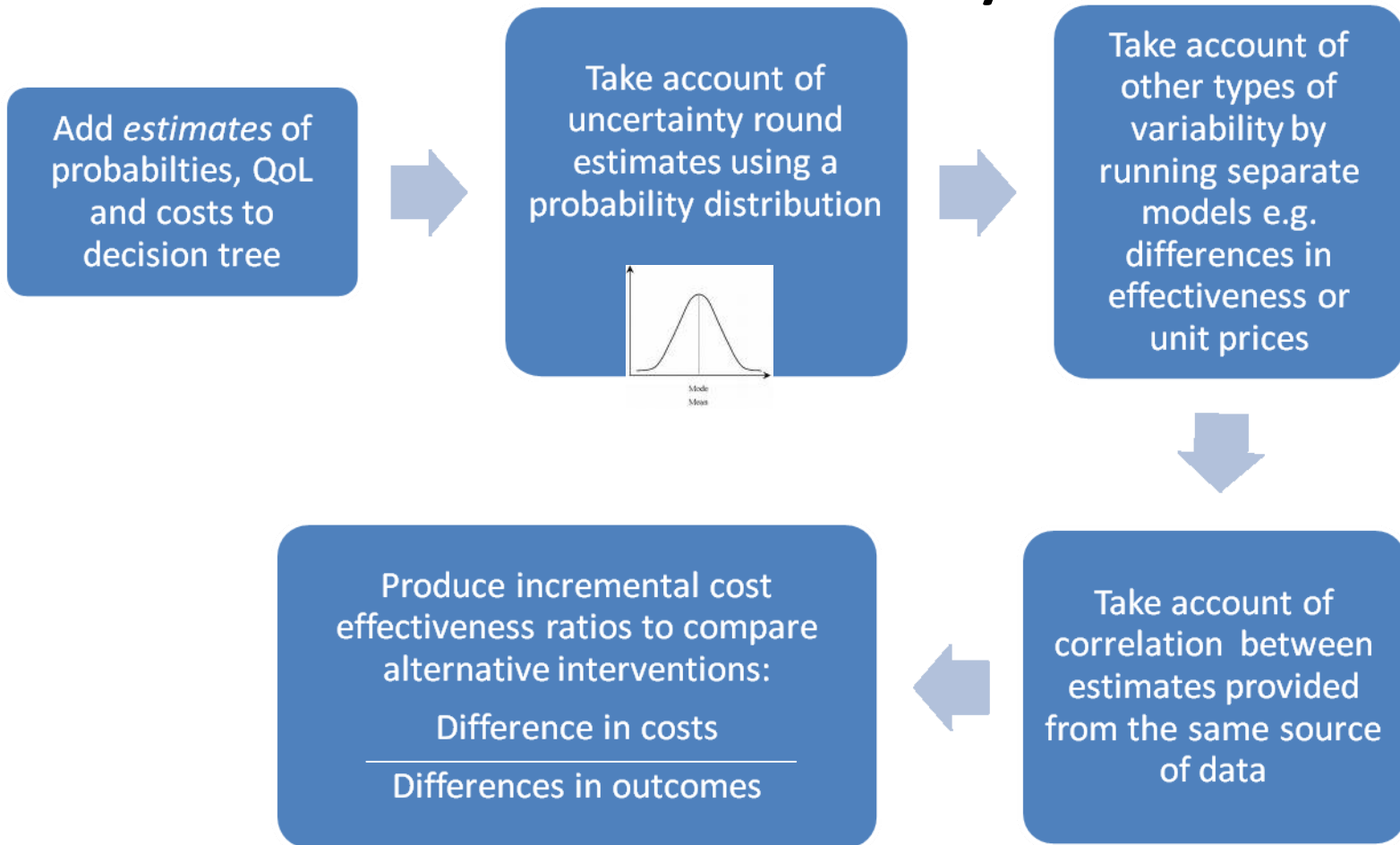


2. Synthesising the evidence





3. Estimating cost-effectiveness with decision analysis



Challenges in decision analyses in injury prevention

- Routinely used for drug interventions
 - RCT data, “simple” interventions, highly selected populations, QoL and cost data available
- Less commonly used for public health interventions
 - Few RCTs, complex interventions, broader population groups, little QoL and cost data available
 - More uncertainty in model and more assumptions needed
 - Multiple models required to take account of other sources of variability
 - Sensitivity analyses to test assumptions

How will the results of the decision analysis be used?

- Provide evidence on the most cost effective strategy to increase smoke alarm use and prevent fire related injury
- Smoke alarm model adapted for interventions to prevent other thermal injuries, falls & poisonings
- An Injury Prevention Briefing will be developed including cost-effective interventions for preventing fire related injuries
- A facilitation package will be developed for delivering the IPB in Children's Centres and tested using an RCT



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