Report on a workshop on methods for the economic evaluation of population health interventions: conceptual and practical challenges

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This workshop was funded by the MRC Population Health Sciences Research Network (PHSRN)
Executive Summary

Aims of the workshop

The aims of the workshop were twofold:

- To bring together a unique combination of multidisciplinary expertise in the form of interested researchers, academics and policymakers to discuss the challenging area of economic evaluation of population health interventions.

- The overall aim was to generate a research consensus on appropriate approaches and methods for the economic evaluation of population health interventions.

Invited audience

- Workshop participants included an international keynote speaker, Dr Alan Shiell who has a distinguished track record in this field, and UK-based researchers and academics from various disciplines, government evaluators, policymakers and public health specialists with an interest in the development and application of methods for the economic evaluation of public health interventions.

Format of workshop

- The workshop was delivered over two days. The format for each day comprised a mixture of methodological and applied sessions. The former focussed on perspective and multisectoral challenges, equity considerations and outcome evaluation. The applied sessions focussed on examples of empirical economic evaluations of population health interventions which have been recently completed or were works-in-progress.

- Each session included 2-3 brief presentations, a session summariser and a chaired discussion on key themes.
Key themes and recommendations

- The methodological challenges as discussed at an earlier workshop at the University of York (2010) remain, however, progress is being made in all areas.

- Many of the challenges faced in the economic evaluation of population health and social interventions are the same as those faced by the non-economic evaluation of these interventions, such as a lack of RCT study designs and use of natural experiments; little or no control over the implementation of the intervention; possibly small, short-term effects or incremental effects detected in an evaluation but where the impacts are expected to manifest intergenerationally.

- Interventions that have the most promise to both improve population health and reduce health inequalities are ‘upstream interventions’ that influence the social determinants of health, often originating from outside of the health sector, where health may be one of a number of policy objectives.

- The specific challenges for economic evaluation of population health interventions relate to the identification, measurement and valuation of all costs and outcomes associated with the intervention.

- As population health interventions may originate from multiple sectors and many interventions are likely to have intersectoral impacts it is important that economic evaluation adopts a (wide) societal perspective when identifying costs and benefits.

- It is useful to begin an economic evaluation by listing all the major expected costs and benefits in a type balance sheet, or what has been referred to by some as a cost consequence analysis.

- A battery of outcome measures should be utilised. Ideally, outcomes should be valued using a generic outcome measure which enables interventions that may have very different impacts to be directly compared against a common measure.

- There are three main approaches to the economic evaluation approach: cost-effectiveness analysis, cost-utility analysis and cost-benefit analysis. Each provides different information and the appropriateness of an approach will depend on the nature of evaluation, funder’s objectives, and information available.

- It is vitally important to incorporate equity considerations into economic evaluation. Indeed many interventions are delivered primarily on equity grounds. There are challenges to include equity and account for the opportunity costs of targeting interventions. This should be taken into consideration at
the design stage with appropriate hypotheses generated around impact upon specific subgroups of populations.

- The importance of context is vital in making valid generalisations regarding the impact of interventions across settings and the generalizability of economic evaluation results to other contexts. Context is an effect modifier. Historical, policy and social context are all likely to influence the success, sustainability and acceptability of interventions. The generation of HTA-style cost-effectiveness tables for population health interventions where the value for money of individual interventions are listed without reference to the context may be misleading.

- The effect of an intervention will also depend on the interactions with existing interventions. It is important, therefore, that effect estimates be accompanied with a full understanding of the context within which an intervention was delivered. Qualitative analysis may facilitate this. Where possible, it is important to explore how variation in context influences effect sizes. In principle, this could be done with study designs such as clustered RCTs or analytical techniques where there is sufficient data. It may be worth exploring system approaches to (economic) evaluation.

- It is recommended that economists work closely with multidisciplinary teams, given the common methodological challenges faced, and need to condition effect estimates on context.

- It is important that academics and policymakers engage early on in the evaluative process and work closely together to translate economic evidence into effective and useful decision-making. Strengthening such networks may also improve the appropriateness of economic methods and generalizability of findings.

- While there are important methodological challenges, it is also necessary to press ahead with economic evaluation of population health interventions. As evidenced by the various applied works at the workshop, there is merit in learning-by-doing.

- Appropriate funding for the comprehensive economic evaluation of population health interventions should be sought in preference to the, often insufficient, ‘add on’ funding allocated to such economic studies.
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We would also like to extend our gratitude to all workshop participants who engaged in two days of intensive and lively discussion leading to the production of this workshop report. The names and email addresses of all workshop participants are appended within this report.
Population health is concerned with the study of social and environmental influences on physical and mental health and well-being, with reference to a range of ‘up-stream’ influences such as early life experiences, the social and economic conditions in which populations live and environmental exposures that affect well-being (Medical Research Council). A key aim of population health research is to improve the health of the public through clinical or public health interventions including those that may be delivered ‘outside conventional health services’.

Economic evaluation is defined broadly as the comparison of costs and outcomes of alternative interventions. Economic evaluation is increasingly used in health care to provide a formal, explicit and transparent framework for informing decisions about allocating public funds in the health care sector. While methods for the economic evaluation of many clinical interventions are well-established, this is not the case for the economic evaluation of population health interventions. As outlined above, with many population health interventions being delivered ‘outside conventional health services’ the economic evaluation of such interventions brings with it some methodological challenges. Economic evaluation of clinical interventions within the health care sector typically uses a framework that aims to maximize health outcomes subject to the health sector budget constraint (see NICE Guidance). This is typically termed an ‘extra-welfarist’ perspective. In recent years, it has become apparent that population health interventions often have a number of objectives beyond health maximization, regularly operating across multiple sectors and budget constraints hence bringing into question the appropriateness of the extra welfarist perspective. Academics in the area of health economics and population health interventions need to consider methodological extensions to this framework so as to enable intersectoral comparisons as well as full consideration of issues such as equity and perspective.

In an attempt to avoid ‘re-inventing the wheel’, recent research in the area (Kelly et al 2005; Owen et al 2011; Weatherly et al 2009; Lorgelly et al 2010, Coast et al 2008; Byford et al 2003) provided the starting point for much of the methodological discussion at this workshop. Recent recommendations for using economic evaluation in population health interventions include beginning with a cost-consequence analysis to either accompany cost-effectiveness or cost-utility analysis focussed on health, or to work towards cost-benefit analysis (Kelly et al 2005). Alternative outcome measures being explored is the capabilities approach (Anand and Dolan 2005; Lorgelly et al 2010). Weatherly et al (2009) outline four key methodological challenges in the economic evaluation of population health interventions: 1) Attribution of effects 2) Measuring and valuing outcomes 3) Intersectoral costs and consequences and 4) Equity considerations. Alternative methodological considerations include the use of decision modeling as well as macroeconomic modeling methods to identify cost-effective alternatives.
Building upon a previous economic evaluation workshop

The Glasgow workshop was built upon an earlier workshop held in 2010 at the University of York (organised by Dr Susan Griffin). We believe this is timely as empirical work in the economic evaluation of population health interventions is burgeoning and practical guidance on the above recommendations and the four key challenges is still urgently required. The economists at York University are progressing with specific issues related to developing a framework for incorporating inequality concerns into cost-effectiveness analysis (1 Day Workshop, 12th March 2012). Our planned workshop intended to explore and develop key issues related to a number of broader challenges specific to the economic evaluation of population health interventions. The idea was that the guidance would not be specific to cost-effectiveness analysis, as we stated at the outset that alternative frameworks including cost-benefit analysis need to be considered (Kelly et al 2005; Lorgelly et al 2010; McIntosh et al 2010).

Topics for consideration at the workshop- and building upon the key issues highlighted in the 2010 York workshop- included:

- Appropriate welfare framework
- Identification, measurement and aggregation of multisectoral costs and outcomes
- Study design and methods of analysis
- Incorporating equity considerations into population health interventions
- The role of evidence synthesis and modelling
- Reporting and presenting results of economic evaluations in population health interventions
- Decision-making

Aims of the workshop

The aims of the workshop were two-fold:

1) To bring together a combination of multidisciplinary expertise in the form of interested researchers, academics and policymakers to discuss the challenging area of economic evaluation of population health interventions. The inclusion of an international keynote speaker (Professor Alan Shiel) was intended to provide an international perspective to this group, given his extensive experience of applying health economics to public health issues in the UK, Canada and Australia.

2) To generate/work towards a research consensus on appropriate methods for the economic evaluation of population health interventions.
Report on workshop

As outlined in the background to the workshop above, the aim of the workshop was to build upon a previous one-day workshop held at the University of York on the same topic in 2010. However the added value of the Glasgow EPH workshop was very much to focus on applied case studies, with the emphasis on the contribution from the multidisciplinary participants. The design of the workshop— with applied sessions; invited summaries of sessions; sufficient time for discussion following presentations as well as a limited number of invited attendees—were all strategies geared towards an interactive, two-day event with the emphasis on multidisciplinary engagement and identifying key areas for development.

Participants

Participants invited to attend the workshop were identified by the workshop applicants (Professor L Bond, Professor Frank Kee, Professor Martin White) and the collaborators (Dr Emma McIntosh, Kenny Lawson, Dr Mark Deverill, Professor Cam Donaldson and Professor Carol Tannahill). The intended participants of the workshop were researchers, government evaluators, policymakers, public health specialists and health economists with an interest in developing the methods for the economic evaluation of public health interventions. From the list of attendees shown in Appendix 2, we believe this mix of attendees was achieved. Participants from academic research institutions represented the majority of attendees. However, there was wider representation from Scottish Government, Health Scotland, Scotland’s Chief Scientist Office, the National Institute for Health and Clinical Excellence (NICE) and Dr Alan Shiell from the Centre of Excellence in Intervention and Prevention Science (CEIPS), Victoria, Australia. The consensus from participants was that a multidisciplinary mix of people was a major contributing factor to the success of this workshop.

Overview of workshop programme

The organisers decided that rather than determine the workshop programme too rigidly at the outset to suit our vision, participants should be given an opportunity to present a topic of relevance to their particular area within the economics of population health (EPH). In doing so, it was hoped that relevant and current topics from all disciplines would come to the fore. Participants attending the workshop were therefore invited to present a paper on a topic of their own choosing. From the responses to this, we identified four key areas:

1. Perspective and multisectoral challenges
2. Equity considerations in population health economic evaluations
3. Outcome evaluation
4. Applied economic evaluations in population health
Since there were a number of participants offering presentations on applied economic evaluations, it was decided to hold two ‘surgeries’ of applied works, each with a nominated discussant to summarise the session prior to open discussion. Appendix 1 illustrates the full workshop programme, and Appendix 2 the participant list.

Introduction
Professor Lyndal Bond opened the workshop. It was reaffirmed that this is an important area for development and that this workshop was building upon previous work, much of which was conducted by those participating in the workshop. Professor Bond emphasised that the focus was on open discussion where the presentations are to be seen as a means for stimulating debate rather than showcasing particular research.

Session 1  Perspective and multisectoral challenges

Chair: Professor Cam Donaldson

11.00  Professor Martin White ‘Cost-effective for whom and under what circumstances? Reflections on economic evaluation of population health interventions’

11.30  Dr Helen Weatherly ‘Key challenges for the economic evaluation of population health interventions’

12.00  Dr Alan Shiell ‘What does public health ask of economics?’

Session 1 comprised invited keynote speakers who were asked to cover the important topic of perspective and the multisectoral challenges that face researchers in EPH. Professor Martin White (co-applicant), a non-economist and expert in evaluation of public health/social interventions, opened the session with an overview about ‘what do we know’ and ‘what do we need to know’? Professor White highlighted a recent report by Owen et al (JPH, 2011) ‘Extent of cost-effectiveness evidence for public health interventions’ and showed that the majority of population health interventions to date did, in fact, show evidence of being highly cost-effective. These interventions ranged from smoking cessation programmes, physical activity and substance misuse programmes to healthy diet advice. Professor White finished his presentation with the following summary points:

- That there is much to learn by examining existing research.
- Assess what can be done with existing evidence – the challenge for public health commissioning
- That there appears to be the need to develop guidance for economic evaluation of public health interventions, especially the more challenging upstream interventions where the aims of policy are wider than health, but where the impacts on health can be considerable.
- Debate how much evidence we need and appropriate ways to deal with equity considerations
Dr Helen Weatherly from the University of York presented her pivotal paper on: "Assessing the challenges of applying standard methods of economic evaluation to public health interventions’. This paper was the product of a review of the literature in this area. The main study perspectives taken by economic evaluations in this area are as shown in Figure 1 below.

Figure 1 Study Perspective in EPH evaluations (2000-2005)

Dr Weatherly then focussed on the key analytic challenges posed by the evaluation of population health interventions, as follows:

1. Estimates of relative effects of interventions
2. Measurement and valuation of outcomes
3. Equity
4. Multisectoral effects

On the topic of multisectoral effects, Dr Weatherly commented that:

- The current literature does not cast the net very broadly, with a focus on downstream and health sector funded interventions
- That evaluations of public health interventions need to consider both public and private costs as impacts are often wide-ranging
• There may be a need to explore the knock-on or ‘ripple effects’ of policies, rather than assessing the immediate impacts.

Advice given on attribution of outcomes was as follows:
• Conduct RCTs, and, where this is not possible, look for natural experiments
• Match outcomes in RCTs with those available in long-term observational studies
• Build on quantitative methods for data synthesis and extrapolation
  - extending time frames
  - synthesise evidence from different designs
  - econometric modelling
• Perform a cost-consequences analysis alongside cost-effectiveness analysis, to capture outcomes beyond health.
• Continue research on developing a more general measure of well-being.

Dr Weatherly summarised as follows:
• In principle the general methods of economic evaluation can be applied to public health interventions
• The literature at the time of the review was disappointing, representing many missed opportunities
• Efforts need to be made in improving the effectiveness evidence base, through RCTs and observational studies
• Economic evaluations in this area need to pay a lot more attention to multisectoral effects and equity considerations

Finally, in this session Dr Alan Shiell, the Director of CEIPS in Australia discussed the fact that economics is about the search for a ‘social value’ and that:

• The (normative) aim of economic evaluation is to make decisions better, not necessarily simpler or more consistent
• Validity depends on capturing all that is of significant value from a societal perspective
• Consistency of decision-making from any particular perspective is a secondary objective

Very much in line with the earlier talks, using examples from total spend figures from American beverage manufacturers, Professor Shiell emphasised the importance of equity as follows:

• Cannot separate the production of health from its distribution
• There is no trade off between equity and efficiency
• Focusing only on the cost of achieving health gains (with equity treated as a secondary consideration) says more about what economics values
• Get where the action is … tackling social determinants

The importance of context was also emphasised, where the effectiveness of interventions that are aimed at influencing the social determinates of health is conditional upon the historical, social and policy influences. A successful intervention in one context will not necessarily work elsewhere. Further, the effectiveness of interventions also depends on how they interact with existing interventions. Generating cost-effectiveness tables listing the value for money of single interventions is overly reductionist. Policymakers are seeking to develop the right mix of interventions. Economic evaluation needs to respond to this need.

Session 2 was the first of the two surgeries on applied economic evaluations in the area of population health. The first three presentations covered neighbourhood regeneration, housing reform and population health, an economic evaluation of a housing modification for children with asthma and closed with a presentation on priority setting. These were case studies of upstream public health interventions, delivered outside the health sector, in contrast to economic evaluations which are of downstream interventions, delivered by the health sector where health is principle objective.

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<tr>
<td>13.30</td>
<td>Kenny Lawson ‘Economic evaluation of GOWELL (neighbourhood regeneration and housing investment programme)’</td>
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<tr>
<td>13.50</td>
<td>Dr Andy Park ‘Linking housing reform to population health’</td>
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<tr>
<td>14.10</td>
<td>Professor Rhiannon Tudor-Edwards ‘Can we use RCTs in the economic evaluation of public health interventions? Case study: Economic evaluation of housing modification for children with asthma (The CHARISMA trial)’</td>
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<td>14.30</td>
<td>Professor David Hunter, Dr Linda Marks ‘Shifting the gravity of spending? Exploring methods for supporting public health commissioners in priority-setting to improve population health and address health inequalities’</td>
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<td>14.50</td>
<td>Summarise (Dr Emma McIntosh) and open discussion</td>
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Kenny Lawson, a health economist at the University of Glasgow and collaborator, began the session by describing the approach to a work-in-progress economic evaluation of Glasgow’s housing and regeneration interventions. A pragmatic approach to the economic evaluation is being adopted consistent with the range of perspectives of the funders of the evaluation (including Glasgow Housing Association, Glasgow City Council, NHS Scotland and Scottish Government):
Summary of presentation:

• Rather than dogmatically choosing a certain approach, the analysis is beginning with a cost consequence (balance sheet) approach. Following a cost consequence analysis, a cost-utility and cost-benefit analysis is being conducted. The former then focuses on health related quality of life (consistent with a health perspective), and the latter values all major outcomes (consistent with a societal perspective).

• All major outcomes are detected through four cross-sectional surveys, which include an embedded, longitudinal cohort. Costs included are interventions and hospitalisations.

• Attribution is being established by using the longitudinal cohort and the natural “waiting list” effect, where households receive the intervention at different times.

Key messages/discussion points:

• Many population health interventions are not amenable to perfect study design. This should not be a barrier to conducting economic evaluation. The evidence base for upstream intervention is very limited.

• It is important to go beyond the standard practice of “within-trial” evaluations. For housing and regeneration interventions, the costs are up-front, while the benefits are likely to be long-term and inter-generational.

• An evaluation (whether it is evaluating the effectiveness of the intervention or cost-effectiveness) may best capture short-term or intermediate outcomes. There is a need to develop testable intervention theories which, if corroborated by short-term evaluation findings, can be used in modelling to project long-term outcomes.

• The need for theory and modelling represents an additional methodological challenge to that discussed by Weatherly et al.

The second presentation was delivered by Dr Andy Park an economist in the Scottish Government. He discussed how housing interventions could be linked to population health, and so can be conceptualised as public health interventions. Following a background discussion on the historical associations found between housing conditions and health outcomes, Dr Park provided several examples where housing could be considered as aimed at preventing ill-health.

Summary of presentation:

• Focussing on the housing conditions of the disabled and elderly, Dr Park noted that by 2018, 113,000 households in Scotland will require adaptations to facilitate a safe living environment.

• A policy of publically funded adaptations would pay for itself. The average cost of adaptation is £2,000, which will avoid/delay the need for residential care (saving £700-800 per week per person); remove /
reduce the need for home care (saving £1,200 - £29,000 per year); and reduce admissions for hip fractures by 5% (where average cost of fractured hip is £28,000).

- Dr Park also illustrated the savings to the Government from reductions in housing subsidy for those living in under-occupied housing.

Key messages/discussion points:
- It is important to capture the benefits of housing not only in amenity value, but as a public health intervention that can significantly reduce the costs to social and NHS services.
- This is particularly important in the present context, given fiscal pressures.

The third presentation was delivered by Professor Rhiannon Tudor-Edwards, a health economist at the University of Bangor. The topic of the presentation was an RCT of a housing intervention with the aim to improve asthma outcomes. Professor David Hunter closed the session by introducing a project that was about to commence (July 2012) exploring methods to support public health commissioners to make decisions to invest or disinvest in intervention areas designed to increase population health.

Summary of presentation:
- What are the main decision-making tools that local authority commissioners find useful for prioritising public health investment?
- What are the enablers and barriers for using economic evidence in decision-making?
- What difference does the use of tools make to funding of interventions?

Key messages/discussion points:
- The need for decision tools to be able to contrast upstream interventions concerned with the social determinants of health, with more traditional downstream interventions funded by health sector.
- The need to include equity in the prioritisation criteria of existing tools
- The importance of economists paying more attention to upstream interventions that may face disinvestment in times of fiscal tightness, with the funding focus being on curative, “fire-fighting” interventions.

Session 3 ended day 1 of the workshop and was focussed on the discussion of equity. Professor Marc Suhrcke, Chair in Economic Evaluation of Public Health at the University of East Anglia, opened the session to consider whether public health interventions can reduce inequalities.
### Session 3  Equity considerations in population health economic evaluations

**Chair:** Dr Susan Griffin

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<tr>
<td>15.15</td>
<td><strong>Professor Marc Suhrcke</strong></td>
<td>‘Can population health interventions reduce health inequalities?’</td>
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<td>15.45</td>
<td><strong>Dr Jean Adams</strong></td>
<td>‘Equity in receipt of healthcare, why cost-effectiveness is unlikely to be “one size fits all”’.</td>
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<td>16.15</td>
<td><strong>Dr Richard Cookson</strong></td>
<td>‘Incorporating inequality concerns into cost-effectiveness analysis: a proposed analytical framework’.</td>
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<tr>
<td>16.45</td>
<td>Summarise (Dr Rachel Baker)</td>
<td>and open discussion</td>
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**Summary of presentation:**

- Using empirical examples from the literature, Professor Suhrcke showed that public health interventions, with known effectiveness, have the ability to reduce inequalities where the prevalence of risk and disease is higher in disadvantage groups.
- Examples included reducing risk factors for coronary heart disease and tobacco control initiatives

**Key messages/discussion points:**

- Several fundamental practical and ethical issues were raised with regard to the means to reduce inequalities and the opportunity cost of targeting resources on the most disadvantaged.
- Among the points made was whether price is the best mechanism to reduce harmful behaviours, and whether unintended impacts may be reduction in consumption in other areas which may be harmful to health.
- Further, it is important to make explicit the trade-off between reducing inequalities and raising average health.

The second presentation was by Dr Jean Adams, a Public Health Researcher from the University of Newcastle. The presentation explored the process of how health inequalities are generated and whether the current approach recommended by NICE of applying a single threshold to judge the cost-effectiveness of interventions is likely to help or hinder reducing inequalities:

**Summary of presentation:**

- Deprived groups were at greater risk of ill health but good medical care is less available.
- The poorest are less likely to engage with services. Examples given were for lung cancer, antenatal care and bowel cancer screening.
Unequal outcomes are present at all stages of an intervention process, including needs assessment, engagement with interventions, and long-term adherence. The consequence is that interventions will be less cost-effective for disadvantage groups.

However, NICE recommends applying a single cost-effectiveness threshold to assess whether an intervention is value for money. NICE does not recommended that interventions are targeted by social position.

Key messages/discussion points:

- An argument was made that having a single standard of what is value for money may reinforce inequalities, given incremental cost-effectiveness ratios will inevitably be higher for the most disadvantaged.
- If the NICE paradigm were to continue to apply, then there is a need to design universal interventions that can also reduce inequalities.
- Perhaps “one size doesn’t fit all” and interventions should be allowed to be targeted on deprived groups.

The final presentation of the session by Dr Richard Cookson, a health economist from the University of York, centred on how health economics may then respond to the challenge of incorporating equity considerations in economic evaluation, which was a central theme throughout the workshop.

Summary of presentation:

- Dr Cookson is part of a York team, which is in the process of developing an analytical framework, with the initial focus on interventions delivered by the health sector.
- The key principles of the framework are that it should make explicit value judgements, clarify the meaning of inequality and separate out the personal responsibility that individuals have regarding their choices that impact on health outcomes, and focus on “unfair” inequalities.
- The framework is information-intensive and requires modelling the distribution of inequalities in the general population, stratified by sub-groups of interest.
- The key steps are to rank sub-groups in terms of inequality, and to then quantify the impact of intervention on changing the distributions; with a key focus on quantifying the opportunity cost of health sector interventions on health forgone elsewhere in the population by targeting certain groups.

Key messages/discussion points:

- The framework is a work-in-progress and considerations to extend the framework to non-health sector interventions may be considered in the future.
- Given the likely costs in applying the framework (time/effort), the framework can best be used selectively. Certain interventions are likely to have a greater impact on inequalities than others. Dr
Cookson illustrated this with examples, including screening for bowel cancer, raised earlier in the session by Dr Adams.

Session 4  **Outcome evaluation in population health interventions**

**Chair: Professor Alastair Gray**

**9.00**  
**Professor Anne Ludbrook**  ‘Cost-benefit analysis for the economic evaluation of population health evaluations: challenges and potential solutions’

**9.30**  
**Dr Hareth Al-Janabi**  ‘Valuing population health outcomes using the capability approach’

**10.00**  
**Dr Alastair Fischer**  ‘A fresh approach to the economic appraisal of public health interventions’

**10.30**  
**Summarise (Kenny Lawson) and open discussion**

Session 4 was devoted to a discussion of outcome evaluation in population health and how interventions can best be appraised. Professor Anne Ludbrook, a health economist from the University of Aberdeen opened the session.

**Summary of main points:**

- While NICE adopts a cost-effectiveness analysis/cost-utility approach, these methods have been developed for NHS funded intervention with a health aim. Public health interventions may have broader aims. It was argued that cost-effectiveness analysis cannot cope with this.
- Cost-benefit analysis was proposed as the most appropriate framework, with all outcomes accounted for through a cost consequence analysis, and then valued in monetary terms through surveys of intervention recipients. This enables benefits and costs to be compared in a single metric and an assessment of net benefit to be inferred.
- Examples of a CBA approach were given including a weight-loss intervention and breast-feeding intervention.

**Key messages/discussion points:**

- Economic evaluation should not be equated with cost-effectiveness analysis. Cost-benefit analysis offers a framework to capture and value all health and non-health outcomes.
- Key issue raised: concerns about the monetary values that survey respondents place on outcomes, including what recipients are valuing and whether there is double-counting; how funders could best use evaluation using cost-benefit analysis if they are required to deliver particular outcomes and in the face of budget constraints.
The second presentation was delivered by Dr Hareth Al-Janabi, a health economist from the University of Birmingham. The focus of the presentation was the ongoing development of the capability approach - an alternative outcome measure to either cost-effectiveness or the monetary valuation of outcomes as traditionally used in cost-benefit analysis.

Summary of main points:

- A measure of capability is trying to capture the opportunity to achieve things in life that a person has reason to value. The key distinction is that capabilities are about the opportunity or freedom to achieve certain outcomes; contrasted with the standard approaches in economic evaluation (e.g. CEA) which focus on realised outcomes.
- There have been various attempts at developing a practical capability measure, and Dr Al-Janabi, as part of a wider team, is developing a version known as the ICE-CAP_A measure.
- Qualitative work identified five key capability dimensions of importance to people: stability, attachment, autonomy, achievement and enjoyment. The capability to experience each of these dimensions are then quantified and indexed.
- The measure is currently being validated in terms of construct validity, comparing the consistency of responses with existing health related quality of life measures.

Key messages/discussion points:

- The capability approach provides an alternative outcome measure to both quality adjusted life years, and the willingness to pay approach of cost-benefit analysis.
- There is emerging evidence that the ICECAP_A is a valid measure of capabilities and there is practical interest from policymakers, including NICE, in using this in the evaluation of public health interventions.

The final presentation of the session was delivered by Dr Alistair Fischer, a health economist at NICE. Dr Fischer sought to introduce a fresh approach to how interventions are evaluated.

Summary of main points:

- When considering evidence of cost-effectiveness, NICE may be overly concerned with single studies and requiring evidence of statistical significance.
- A Bayesian approach to evaluation, using a combination of prior expectations updated with study evidence, may be more appropriate than relying on single studies; and decisions to fund an intervention should be taken on the mean expectation, rather than concerns regarding statistical non-significance.
- It was contended that NICE has rejected certain interventions incorrectly. The risks of incurring negative health outcomes may be considerable.
Key messages/discussion points:

- A Bayesian approach is routinely practiced, and while decisions may best be taken using means, statistical uncertainty is important for determining research priorities. These lessons have been learned and applied in health technology assessment.
- If the intervention can be delivered relatively inexpensively and it is known not to be harmful, then it may be worth funding an intervention even with the absence of statistical significance.

**Session 5  Applied economic evaluations in population health (Surgery 2)**

**Chair: Dr Richard Cookson**

11.00 **Miqdad Asaria** ‘A comparison of univariate, bivariate and multivariate approaches to analysing health inequality in population health evaluations’

11.20 **Dr Jane Wolstenholme** ‘Obesity E-tool: an economic evaluation instrument’

11.40 **Mary Dallat, Professor Frank Kee** ‘Environmental interventions to change physical activity in the population - a case study’

12.00 **Neil Craig**: ‘What do we need to translate economic evidence on population health interventions into policy and practice? Lessons from recent experience’

12.20 **Summarise (Dr Helen Weatherly) and open discussion**

Session 5 was the penultimate session; the second round of applied case studies. The session was opened by Dr Miqdad Asaria, a health economist from the University of York who presented a technical discussion on different methods to measure health inequalities in the population.

Summary of main points:

- The concept of inequalities can become complicated, with the need for conceptual precision regarding the policy focus of reducing inequality. For instance, should the focus be relative or absolute inequality; and is the focus on shifting the whole distribution of the population or more on raising health for a certain group? Clarity with respect to these issues then allows economists to assess and value the intervention that may involve trading-off the health of different groups, given the opportunity cost of funds.
- Theoretically, fully specified social welfare functions can provide a complete ranking of inequality across society. In practice, however the information constraints may be unrealistic and this approach may require technicians imposing important value judgements.
Key messages/discussion points:

- In practice, there are a variety of ways to look at inequality, and an important concept is “unfair inequality”. To incorporate inequality into economic evaluation, policymakers need to be clear regarding what kind of inequality is important to decision-making.
- Further, while economists can develop detailed models of the inequality from a practical viewpoint, policymakers need to be clear regarding what change in the distribution of health is desirable.

The second presentation was delivered by Dr Jane Wolstenholme, a health economist from the University of Oxford. Dr Wolstenholme’s study is funded by the National Obesity Observatory (NOO) and the aim is to develop an e-tool to help support commissioners to choose between interventions to combat obesity. This project is in its early stages, and the talk introduced the approach taken.

Summary of main points:

- The project has three-stages: a rapid review of existing methods and tools to support decision-making in obesity; to develop a set of recommendations for the features a tool should contain; to then develop, apply the tool and update it, based on feedback from users.
- From the rapid review, 7 models were identified. Models were broadly similar in the modelling structure adopted (projecting from exercise risk factors such as BMI and exercise behaviours to clinical outcomes), final outcomes used (life years, quality adjusted life years, disability adjusted life years), and all used a lifetime time horizon. Models varied in certain key assumptions such as the adherence, which can make a significant different to cost-effectiveness results.
- Stage 2 and 3 of the project will commence shortly.

Key messages/discussion points:

- In developing a model, the intention is to produce an e-tool that can go beyond cost-effectiveness analysis.
- A societal perspective, as opposed to a health perspective currently recommended by NICE, is required. This is due to likely intersectoral impacts and wider impacts, including productivity.
- A key issue is for an e-tool to produce information of immediate use to commissioners of interventions who are incentivised to assess impacts after 1-2 years. Further, the need to conduct local evaluation of interventions is crucial, where the e-tool can be used to project long-term impacts and undertake sensitivity analysis regarding key variables such as adherence.

The third presentation was by Dr Mary Dallat from Queen’s University, Belfast. This study reported on an economic evaluation of the Greenways intervention, a large scale project to regenerate green space and walkways on expansive waterways in Belfast.
Summary of main points:
- Dr Dallat is using and updating the PREVENT model to project the potential long-term impact on exercise/physical activity as a result of the intervention.
- An evaluation has not been undertaken to assess short-term impacts, and so three scenarios were presented regarding how the intervention may shift the exercise habits of the local population.
- A health perspective was adopted, the cost per disability adjusted life year (DALY) averted was used, and a horizon of 41 years was adopted. All costs of delivering the intervention (mainly construction) were included.
- Under all scenarios, it would appear that the intervention is cost-effective.

Key messages/discussion points:
- This is a good example where an upstream intervention may offer value for money as a population health intervention.
- There was general consensus that an approach of cost-effectiveness analysis with health as a sole outcome may have underestimated the potential impacts of the interventions. Wider outcomes may include the amenity value of the intervention, improvements in social capital, reduction in crime etc. Given the funder was not the health sector a different approach to economic evaluation could have been adopted.

The final presentation of the workshop was from Dr Neil Craig who is a senior public health consultant, at NHS Health Scotland. Dr Craig’s presentation focussed on how evidence can be (better) translated into policy-making.

Summary of main points:
- The initial part of the presentation focussed on interpreting the ACE-prevention work and how this may inform policy-making in Scotland\(^1\). The broad inference is that public interventions may offer greater value for money than individually targeted interventions.
- Further, caution is required in generalising estimates of cost-effectiveness of single interventions between different contexts, that can differ according to existing policy mixtures for instance.
- Type of evidence needed goes beyond only a single numerical value in cost-effectiveness or cost-benefits analysis. Policymakers are interested in efficiency but also equity, resources savings and affordability.

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Key messages/discussion points:

- In addition to developing economic evidence there remains a need for knowledge brokering between academic researchers and policymakers.
- There is also a need for not only producing more evidence, but using the bank of knowledge available more effectively. Decision support tools are a part of this translation process, in addition to making valid generalisations from economic evaluations.

**Session 6  Conclusions and recommendations**

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<tr>
<th>Time</th>
<th>Speaker/Presenter</th>
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<tr>
<td>14.00</td>
<td>Dr Alan Shiell</td>
<td>‘Practical recommendations for a way forward’</td>
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<tr>
<td>14.30</td>
<td>Wrap up – final discussion</td>
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Dr Alan Shiell then closed the workshop by collating some key themes from the previous two days and offered recommendations to move forward.

**Where are we now?**

A key observation made by Dr Shiell was that there is now an increasing critical mass of researchers in the UK with an interest in the economic evaluation of population health interventions. The main weakness is that the vast majority of the focus of economic evaluation is on the “low-hanging fruit” of health sector funded interventions. These are primarily downstream interventions focussed on individuals (e.g. screening). The interventions which have the greatest potential to improve population health and reduce health inequalities do not reside in the health sector, but originate from sectors such as education, and include legal and regulatory changes.

There is important work in identifying methodological challenges and key amongst these is the importance of equity. Equity is the main reason why interventions are delivered; however economics has concentrated on developing measures of efficiency. Without making progress on this issue public health practitioners may not use economic evidence.

The importance of context should not be underestimated. Economic evaluation seeks to evaluate interventions by isolating the effect sizes of an intervention from its social and policy context. However, it is the interaction with context which determines the impacts of an intervention and the generalisability of the evidence.
Moving forward

While important methodological challenges remain it is necessary to press ahead with the economic evaluation of population health interventions. Researchers may disagree about the appropriate approach (cost-effectiveness analysis, cost-utility analysis, or cost-benefit analysis), but one size is unlikely to fit all in any case. It is important to apply the most appropriate tools available for a particular intervention within any particular context.

It is important that economic evaluation is done well and this requires appropriate funding. The norm for public health is for economic evaluation to be a poorly funded add-on to a wider evaluation. Economists should consider rejecting this role, if it means compromising quality, and seek bespoke funds to conduct broader, more comprehensive, cross-sector economic evaluations.

Finally, working closer with policymakers and key stakeholders on population health economic evaluations is vitally important and open dialogue with economists should be encouraged. Economists can then best understand what population health wants from economic evaluation, and how best to conduct economic evaluation, including the methodological approach taken. This may then enable greater success in translating evaluation findings into actual policy.
Appendix 1: Detailed workshop programme outline

| Methods for the Economic Evaluation of Population Health Interventions: Conceptual and Practical Challenges |
| University of Glasgow: 3rd & 4th May 2012 |
| Wolfson Medical Building, Yudowitz Seminar Room 1 |
| University Avenue, Glasgow |
| This workshop was funded by the MRC Population Health Sciences Research Network (PHSRN) |

Along with Professor Lyndal Bond, MRC Social and Public Health Sciences Unit (SPHSU) our grant-holding partners are Professor Martin White, Centre for Translational Research into Public Health, University of Newcastle and Professor Frank Kee, Centre for Excellence in Public Health, Queens University Belfast.

Collaborators on this workshop are Dr Emma McIntosh (HEHTA, University of Glasgow), Kenny Lawson (HEHTA, University of Glasgow) Professor Carol Tannahill (GCPH), Professor Cam Donaldson (GCU), and Dr Mark Deverill (Newcastle University).

All presentations during the workshop will be held at the Wolfson Medical Building, Yudowitz Seminar Room 1, University Avenue (C8 on campus map).

Coffee and lunch will be held in the Atrium next to the Yudowitz Seminar room.

[http://www.gla.ac.uk/services/cvso/conferenceevents/venues/wolfsonmedicalbuilding/](http://www.gla.ac.uk/services/cvso/conferenceevents/venues/wolfsonmedicalbuilding/)
Day 1  Wolfson Medical Building, Yudowitz Seminar Room 1

10.00 - 10.45  Coffee and Registration (Wolfson Medical Building, Atrium)
10.45 – 11.00 Welcome and Introduction: Professor Lyndal Bond

Session 1  Perspective and multisectoral challenges  Chair: Professor Cam Donaldson

11.00  Professor Martin White ‘Cost-effective for whom and under what circumstances? Reflections on economic evaluation of population health interventions’
11.30  Dr Helen Weatherly ‘Key challenges for the economic evaluation of population health interventions’
12.00  Professor Alan Shiell ‘What does public health ask of economics?’
12.30 -13.30  Lunch (Wolfson Medical Building, Atrium)

Session 2  Applied economic evaluations in population health (Surgery 1)  Chair: Professor Anne Ludbrook

13.30  Kenny Lawson ‘Economic evaluation of GOWELL (neighbourhood regeneration and housing investment programme)’
13.50  Dr Andy Park ‘Linking housing reform to population health’
14.10  Professor Rhiannon Tudor-Edwards ‘Can we use RCTs in the economic evaluation of public health interventions? Case study: Economic evaluation of housing modification for children with asthma (The CHARISMA trial)’
14.30  Professor David Hunter, Dr Linda Marks ‘Shifting the gravity of spending? Exploring methods for supporting public health commissioners in priority-setting to improve population health and address health inequalities’
14.50  Summarise (Dr Emma McIntosh) and open discussion
15.00 – 15.15 Coffee

Session 3  Equity considerations in population health economic evaluations  Chair: Dr Susan Griffin

15.15  Professor Marc Suhrcke ‘Can population health interventions reduce health inequities?’
15.45  Dr Jean Adams ‘Equity in receipt of healthcare, why cost-effectiveness is unlikely to be “one size fits all” ’
16.15  Dr Richard Cookson ‘Incorporating inequality concerns into cost-effectiveness analysis: a
proposed analytical framework’.

16.45  **Summarise (Dr Rachel Baker) and open discussion**

18.30  **Drinks Reception**

MRC Social and Public Health Sciences Unit
4 Lilybank Gardens, Glasgow G12 8RZ
(Near D16 on campus map)

19:15  **Dinner**

The Curlers Rest, 256-260 Byres Road
Glasgow, G12 8SH
(Next to Hillhead Underground ‘U’ on campus map)

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**Day 2 Wolfson Medical Building, Yudowitz Seminar Room 1**

**Session 4  Outcome evaluation in population health interventions**

**Chair: Professor Alastair Gray**

9.00  **Professor Anne Ludbrook**  ‘Cost-benefit analysis for the economic evaluation of population health evaluations: challenges and potential solutions’

9.30  **Dr Hareth Al-Janabi**  ‘Valuing population health outcomes using the capability approach’

10.00  **Dr Alastair Fischer**  ‘A fresh approach to the economic appraisal of public health interventions’

10.30  **Summarise (Kenny Lawson) and open discussion**

10.40 -11.00  **Coffee**

**Session 5  Applied economic evaluations in population health**

**(Surgery 2)**

**Chair: Dr Richard Cookson**

11.00  **Miqdad Asaria**  ‘A comparison of univariate, bivariate and multivariate approaches to analysing health inequality in population health evaluations’

11.20  **Dr Jane Wolstenholme**  ‘Obesity E-tool: an economic evaluation instrument’

11.40  **Mary Dallat, Professor Frank Kee**  ‘Environmental Interventions to change physical activity in the population - a case study’

12.00  **Neil Craig:**  ‘What do we need to translate economic evidence on population health
interventions into policy and practice? Lessons from recent experience'

12.20 Summarise (Dr Helen Weatherly) and open discussion
12.45-13.45 Lunch (Wolfson Medical Building, Atrium)

Session 6 Conclusions and recommendations

Chair: Professor Lyndal Bond
14.00 Professor Alan Shiell ‘Practical recommendations for a way forward’
14.30 Wrap up – final discussion
15.00 CLOSE
### Appendix 2: Participant list

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Appendix 3: References


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