

Prioritisation of prevention services: Determining the applicability of research from the US to the English context

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Executive Summary

This study examined whether the methods used and results obtained in the prioritisation of clinical preventive interventions, conducted by the "Partnership for Prevention" in the US, are applicable in England.

This report to Health England:

- describes the methods and results of the US study;
- examines the use of the US results in policy and practice;
- considers the generalisability of the US methods and results to England;
- considers whether the methods for *clinical* preventive interventions could be extended to *community* preventive interventions;
- considers the options for adapting the US methods to determine priorities for public health in England.

The US prioritisation took as a starting point a 'long list' of interventions categorised as effective by the United States Preventive Services Task Force and the Advisory Committee on Immunization Practices. A systematic literature review on effectiveness, costs, cost-effectiveness and burden of disease was undertaken for each intervention using a pragmatic, hierarchical search strategy. From published data and studies, models for 25 interventions were constructed for cost-effectiveness (CE) and clinical preventable burden (CPB) based on the following definitions:

- CPB = burden of disease multiplied by effectiveness
- CE = average net cost per QALY gained in a typical practice by offering the service at recommended intervals to a US birth cohort over the recommended age range compared with no service provision.

To ensure consistency across interventions and evaluations the US exercise:

- used QALYs;
- measured total potential health effects if delivered to 90% of the target population;
- explicitly accounted for patient adherence;
- related CPB and CE to a hypothetical birth cohort of 4 million;
- assumed services were delivered over the life time expected;
- standardised costs to US\$ year 2000 and through a 'reference case' method.

Results were presented as quintile ranks for CPB and CE and summed to an overall score, so that 10 (the maximum score) reflected the most important priorities. Three interventions (discussing aspirin use with high-risk adults, childhood immunizations and tobacco-use screening and brief intervention) had scores of 10 and were cost saving. Eight others had combined scores of seven or more. For most Americans, the 25 interventions were already potentially available and were reimbursed by public or private insurance. The

results implied that higher ranked interventions should be prioritised and uptake encouraged. The results have been used by employers, health planners, policy makers, consumers and the pharmaceutical industry.

To date, the US exercise has been restricted to clinical preventive services offered on a one-to-one basis in a health-care setting. The extension of the US exercise to community-based preventive services is currently under consideration.

The US exercise is of interest because there appears to be no formal, explicit and transparent process in England that prioritises across the range of clinical preventive services, let alone across community preventive interventions. Whilst evaluations of individual interventions or programmes by the National Institute for Health and Clinical Excellence (NICE), the Joint Committee for Vaccines and Immunisation (JCVI) and the National Screening Committee (NSC) are transparent, the processes of prioritisation are less clear. Although prioritisation by the Department of Health and by Ministers may be explicitly undertaken, it is not externally transparent.

A prioritisation process is needed across the range of clinical and community preventive interventions in England and it should account for the detailed evaluations already undertaken within English organisations. Its formalisation might encourage greater consistency between organisations and might also increase the usefulness of evaluations of public health interventions and programmes to a prioritisation process.

We conclude that an explicit and transparent prioritisation process is needed to set public health priorities in England. However, neither the methods nor the data used in the US exercise are sufficiently relevant to transfer to the English context. The main difficulties are:

- differences in disease prevalence and incidence and risk factor distributions between the US and England;
- differences in the detailed specification of interventions for the US exercise and services provided in England;
- the need for resource use and cost data relevant to England;
- differences in the perspective of the economic evaluation to that explicitly required by NICE;
- the need to consider marginal rather than average cost-effectiveness ratios for services that might require expansion or contraction;
- differences in, and the need for explicitness about, cost-effectiveness threshold values in England;
- the need to include stakeholders, public, patients and service users in the evaluation process;
- the absence of explicit consideration of equity in the US exercise.

If the results cannot be used directly, a variety of intermediate positions could still be adopted as part of a separate exercise for England. In the absence of an existing 'long-list' in England, the US list could form the starting point for an English exercise. We conclude that, whilst a long-list for clinical services for England would probably be similar to one devised for the US (for example including similar interventions but slightly different specifications), an English 'long list' for community-based prevention services may be very different, given differences in social and community structures and preferences between countries. However, where similarities in services exist, the US reviews of evidence (for clinical services, and possibly in future for community services) could provide a useful short cut or at least starting point.

The second possibility is that the methods of the US exercise could be used in England. However, England has more experience of the explicit use of cost-effectiveness to guide priority setting and, in the case of NICE, has developed and adopted a detailed specification of methods. Moreover, we question the validity of summing ranks for CE and CPB, which has the result that some cost-ineffective services are prioritised. CPB is not typically used as an adjunct to economic evaluation. However, we recognise that information on marginal CPB could inform decisions as to which cost-effective interventions should figure most prominently in a focussed national policy. For example, if an 'effort constraint' exists (e.g. gaining ministerial approval and stakeholder acceptance), and there is a limited capacity for adopting policy changes each year, then from a set of cost-effective interventions it may be appropriate to focus national policy change and implementation efforts on those diseases with the largest CPB. However, equity considerations would also be taken into account in English policy making.

The US prioritisation exercise offers useful lessons but a separate exercise would be needed for England. Because of the challenge of achieving consistency and the likelihood that there would be incomplete data on compliance and equity, for example, existing models would have to be adapted and new models developed, particularly for community preventive interventions.

Health England needs to decide what criteria it would use, and to consider the trade-off between a transparent, rigorous and inclusive process (such as undertaken by NICE) and a more informal expert-opinion-based process that could make judgements around the US evidence (and indeed from other such exercises elsewhere). The latter may be quicker and less costly, but perhaps with less subsequent acceptance by stakeholders.

We suggest that a two-stage process may be necessary. First, to identify and promote a small number of priorities for which both the evidence and the professional consensus is strong. For this stage, the US prioritisation exercise could provide useful pointers. Second, to begin a broader, more detailed and

rigorous exercise that would form the basis of an ongoing, robust and transparent priority setting exercise that would not replicate the US methods although would build on their valuable experience.

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Abbreviations

ACIP	Advisory Committee on Immunization Practices
AHRQ	Agency for Healthcare Research and Quality
CDC	Centers for Disease Control and Prevention
CE	Cost-effectiveness
CPB	Clinical Preventable Burden
DH	Department of Health
DPT	Diphtheria, Pertussis and Tetanus (vaccination)
QALYs	Quality Adjusted Life Years
DH	Department of Health
HEDIS	Healthcare Effectiveness Data and Information Set
JCVI	Joint Committee on Vaccinations and Immunisation
MMR	Measles, Mumps and Rubella (vaccination)
NCPP	National Commission on Prevention Priorities
NICE	National Institute for Health and Clinical Excellence
NSC	National Screening Committee
PfP	Partnership for Prevention
TFCPS	Task Force on Community Preventive Services
USPSTF	United States Preventive Services Task Force

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- Professor Stirling Bryan, Professor of Health Economics, University Birmingham.

- Professor Hilary Pickles, Director of Public Health and Health Strategy, Hillingdon PCT and Associate Professor Centre for Public Health Research, Brunel University
- Professor Brian Ferguson, Director Yorkshire & Humber Public Health Observatory
- Professor Mike Kelly, Director, Public Health Excellence Centre, NICE
- Professor Mark Petticrew, London School of Hygiene and Tropical Medicine
- Dr Sarah Byford, Senior Lecturer, Institute of Psychiatry

1.0 Aim and Objectives

The aim of this research was to identify whether the research undertaken by the Partnership for Prevention (PfP) in the US on the cost-effectiveness (CE) and population impact of preventative services is generalisable to the English environment. The objectives were to:

- Describe and critically review the findings and methodology of the Partnership for Prevention research;
- Determine whether the methodology is applicable to the English context;
- Determine whether the results are applicable to English context;
- Determine whether the methodology is applicable to community preventive interventions¹;
- Capture practical lessons for wider policy development;
- Make recommendations to Health England on the options and methodology for future research on prioritisation of public health services².

This report comprises four sections and, after a brief description of the methods used, sets out the context, approach, findings and criticisms of the US prioritisation project followed by a reflection on the English policy context and a critical review of issues that arise in considering the application of the US prioritisation exercise to England. The report concludes with a series of recommendations for various approaches to adapting the US exercise.

2.0 Methods

Completion of this research involved a variety of methods including:

- Collection and critical review of all published papers, reports and on-line publications produced by the authors and steering committee of the US prioritisation exercise. This was supplemented by internal team discussions of findings.
- A systematic review of all published papers citing the US prioritisation exercise
- A workshop presenting and debating the relevance of the policy process and implications as well as methods of the US exercise to England (see Appendix A for list of participants).
- Search and review of relevant policy documents on English national policy for provision of the 25 services evaluated.

¹ defined as those delivered to individual asymptomatic people in a clinical setting by health professionals to prevent disease or reduce risk factors for a disease. It includes: immunisation and preventive care (such as chemoprophylaxis), counselling interventions, and screening tests, but excludes community preventive services provided to populations through community settings such as schools and workplaces (Salinsky, 2005).

² The report was not designed to specify which areas of public health warrant further analysis in terms of cost-effectiveness analysis and therefore the report will not address, for example, the role of burden of disease or value of information in this context.

- Detailed and extended face to face discussions with Dr Mike Maciosek on all aspects of the US project
- Telephone or face to face interviews of 6 US and 4 English policy makers concerning the policy process, use of results and approaches to prioritisation (see Appendix B for list of people interviewed).

3.0 Findings

3.1 US Prioritisation Project:

3.1.1 The broad policy context

The US health care system, in common with many others including the NHS, faces rising costs, rapid advances in biomedicine, increasingly prevalent chronic disease and an aging population (Nussbaum, 2006). However, an additional key characteristic of the US system is the extent and degree of its fragmentation, which affects the private and public insurance systems and care provision at all levels (Maciosek, 2007).

Private insurance is dominated by multiple managed care organisations that purchase health care and in some cases also manage care. Most of the thousands of private insurance products tend to be employer-based, with coverage determined by employers, with guidance from consultants, managed care organisations, and the media etc. The National Committee for Quality Assurance and other quality assurance organisations provide data to help guide employer choice of managed care plans. With respect to public health interventions, employers tend to be motivated by cost and the hope that prevention will pay big dividends.

The system of public insurance is also fragmented. Provision for elderly people, those on low-incomes and those with disabilities is provided by Medicare, with 100% federal funding. Whilst, the coverage rules on treatments are made by the Centers for Medicare & Medicaid Services, Congress itself makes coverage rules for preventive services. The wide array of coverage plans includes compulsory in-patient cover but opt-in clauses, with additional payments, for outpatient care and drugs. Medicaid provides care to children and low-income pregnant women based on 50% federal and 50% state funding and coverage varies significantly by State. In addition to this, there are also a variety of state based insurance programmes that insure the working poor.

The care system itself is also fragmented. There is little communication among providers, whether in primary care, specialist centres, hospitals or

pharmacies. Medical records, for example, are not readily accessible across providers. And, finally, around 17% of people remain uninsured.

One of the key impacts of such a fragmented health care system is that there is no cohesive system for prioritising the use of limited health care resources for treatment and prevention. In practice, resources are prioritised in a variety of ways: by limiting access to insurance; having inadequate time to deliver services and many competing demands; a fascination with and bias to technological solutions to health problems; providing services according to the views of celebrities as well as patients and clinicians; and simple oversight (Woolf and Stange, 2006). This tends to be neither supportive of preventive services nor readily amenable to a formal priority setting process. The fragmentation also means that decisions made among one set of providers or insurers may have downstream impacts on others and therefore there may be incentives to under-provide particular services, particularly in prevention. Added to this is the incentive created by the predominance of employer-based health insurers that typically only cover health insurance to retirement. This increases the likelihood that benefit coverage is centred on financial returns to investment. Rather peculiarly therefore, the majority of arguments about investing in prevention services tend to be couched in terms of cost savings only, rather than cost-per quality of life year gained – clearly a much harder 'hurdle' to pass and another reason for a lower than efficient investment in prevention services (Coffield, personal communication).

For preventive health, three key organisations in the US provide more cohesive guidance: the Advisory Committee on Immunization Practices (ACIP), which publishes official federal recommendations for the use of vaccines and immune globulins through the Centers for Disease Control and Prevention (CDC); the United States Preventive Services Task Force (USPSTF), which makes recommendations on the use of clinical preventive services; and the Task Force on Community Preventive Services (TFCPS), which recommends use of specific population-based preventive services, including interventions to promote the up-take of clinical preventive services (Grosse et al, 2007). As the US prevention priorities exercise began with evidence from the first two, we turn briefly to these organisations.

The ACIP consists of 15 experts in fields associated with immunization appointed by the Secretary of the U. S. Department of Health and Human Services to provide advice and guidance to the Secretary, the Assistant Secretary for Health, and the CDC on the control of vaccine-preventable diseases. It develops written recommendations (including age for vaccine administration, number of doses and dosing interval, precautions and contraindications) for the routine administration of vaccines to children and

adults in the civilian population; recommendations and is the only entity in the federal government to do so

(<http://www.cdc.gov/vaccines/recs/acip/default.htm>).

The USPSTF was established in 1984 to provide advice about prevention for health professionals and it has become the prime source of information on effectiveness of a broad range of clinical preventive services delivered to asymptomatic people in a clinical setting. It therefore covers screening tests, counselling interventions and chemo-prophylactic prevention. The USPSTF receives financial support from the Federal Government's Agency for Healthcare Research and Quality (AHRQ) and academic support from two-evidence based practice centres. In 1996 its guide to clinical preventive interventions covered 200 interventions in 70 areas. It uses highly structured review techniques with assessment of quality of evidence of individual studies, key questions or linkages and evidence supporting the entire study and assesses the magnitude of *net* benefit as substantial, moderate, small or zero/negative, or insufficient (see Box 1).

Box 1: Levels of recommendations by USPSTF

- A. 'Strongly recommends that clinicians routinely provide service', 'good evidence that benefits substantially outweighs harms'
- B. 'Recommends that clinicians routinely provide service', 'fair evidence that benefits outweigh harms'
- C. 'No recommendation for or against routine provision of service', 'balance of benefits and harms too close to justify recommendation'
- D. 'Recommends against routinely providing services to asymptomatic patients', 'fair evidence that service is ineffective or that harms outweigh benefits'
- I. 'Evidence is insufficient to recommend for or against'

The recommendations from the Guide to Clinical Preventive Services do not inform policy *directly* but they do constitute a policy position for AHRQ and the US Public Health Service. It therefore provides a position for others (public and private) to translate evidence into implementation recommendations, guidelines, quality assurance programmes or quality improvement measures.

However, implementation remains a problem. Commentators have noted that implementation and uptake of services is patchy and in some patients groups 'discouragingly low' (Coffield et al 2001, and Woolf & Stange, 2006). Some of the reasons for this are perceived to be limited clinician time and difficulty of integrating preventive services among competing demands. For example, it has been estimated that a primary care clinician would need to spend 7.8 hours per day to deliver the services recommended by the USPSTF as effective (Kimberley et al, 2003). Therefore there is a perceived need to help clinicians and other stakeholders to focus on the most valuable services.

Whilst both the USPSTF and TFCPS base recommendations on standardised methods of reviewing evidence on effectiveness, neither task force routinely uses economic evaluation, although both occasionally incorporate economic evidence and the ACIP is increasingly finding or requesting additional economic analysis. The USPSTF "reserves the right to do so" and has suggested that "CEA results can be used to refine recommendations relative to alternative prevention techniques, such as age-cut-offs and identification of risk groups" (Grosse et al, 2007), and it has guidelines to help systematise the use of economic evaluation within reviews undertaken on its behalf (Pignone et al, 2005). Similarly there is methodological guidance for economic studies presented to the ACIP (ACIP AD Hoc WG, 2007). The TFCPS has not included CE as a criterion but has systematically assessed it in all reviews undertaken, but in practice evidence on CE has rarely been available for the interventions found to be effective (Grosse et al, 2007).

Although there is a substantial amount of economic evaluation undertaken of all types of health-care interventions in the US, there is relatively little explicit and open use of CE as a criterion for provision or coverage, as compared with the UK, Canada or Australia (Neumann and Sullivan, 2006). The decentralised nature of health-care decision-making and very different political and cultural traditions means that economic evaluation is used indirectly and implicitly. Moreover, various reasons have been put forward to explain why economic evaluation has received less attention in public health compared with other health services in the US: limited demand from decision-makers; lack of time and funds to conduct assessments due to disincentives for sponsorship; topics reviewed reflect personal and institutional backgrounds and experience of the reviewers; and quality of studies (Grosse et al, 2007). Whilst some resource allocation models including cost-effectiveness analysis for managed care organisations had been developed, they are considered too complicated for routine use (Haddix, personal communication).

Into this broad context, the US prevention priorities exercise was conceived and led by PfP. It is a separate exercise from all the economic work

performed by the USPSTF and ACIP, although the starting point for choosing which interventions to evaluate began from those recommendations. PfP is a 'not for profit' organisation based in Washington (DC) designed to lobby but also bring together employers, managed care organisations and government agencies to advance evidence-based policies and practices to prevent disease and improve the health of Americans.

In 2001, PfP published a priority ranking of 30 clinical preventive services based on their relative value to the US population (see Appendix C for all references) in terms of each service's health impact and CE. However, the exercise was dominated by expert opinion. Two years later, the National Commission on Prevention Priorities (NCPP) was formed. The NCPP was a 30-member panel consisting of decision makers from health insurers, employers, academia, state and federal health officials. The NCPP took as a starting point the primary and secondary care preventive services for the general population recommended as effective (and graded A or B) by the USPSTF and vaccines recommended by the ACIP up to Dec 2004. In addition, services recommended by USPSTF for persons at high risk for cardiovascular disease were included. We refer to this combination of services as the 'long list', which consisted of 25 clinical preventive services in the 2006 prioritisation exercise. Appendix D sets out the USPSTF descriptions and compares these with the service definitions used in the US prioritisation exercise. This shows that further specification of services was occasionally required (e.g. which age groups received the service or quantifying length and frequency of counselling services) and that some services were excluded within the PfP exercise (e.g. rotavirus vaccine within the routine childhood vaccine schedule). In some cases, the USPSTF recommendations leave the choice of a specific screening or treatment strategy to clinical judgment. Therefore, PfP evaluated commonly used strategies weighted by current US-delivery rates or provided a general estimate of a services value rather than a detailed estimate of a specific screening or treatment strategy.

Based on an evolving evidence base, the aim of the NCPP was to advise decision makers at multiple levels about which clinical preventive services 'matter the most' or were 'most valuable' and therefore to help select which services to emphasise and actively promote. The second exercise produced the 2006 ranking comprising 25 clinical preventive services, including immunization, screening, and counselling programmes, but excluding any community-based programmes (see Appendix E for all references).

3.1.2 Methods

Following more than 2 years discussion of a variety of decision-criteria, the 2006 ranking was based on a combination of two factors; clinical preventable burden (CPB) measuring health impact and CE measuring 'value for money'. Initially other factors such as the ease of increasing delivery rates, patient and physician acceptance of a service were considered but the criteria were interpreted differently by different experts and subject to much variation. Therefore NCPP opted for a data driven approach focussing on burden of disease, effect size of a service, and CE (Coffield, personal communication). This section describes the four main parts of the methods: approaches to finding evidence and achieving consistency of estimates, given the limitations of time and budget; estimations of CPB; calculation of CE; and, method of ranking the interventions.

Approaches to finding evidence and achieving consistency of estimates

A key concern was to derive consistent, evidence-based estimates of CE and CPB across clinical preventive services which differed remarkably regarding the size of their target populations, the frequency of delivery, and the complexity of achieving the intended health benefits. In addition, each evaluation had to be compared against the recommendations set out in the 'long list' to ensure relevance. Therefore standard methods were developed to ensure a systematic and transparent process for searching, tracking, and double-abstraction of literature. As much of the process of searching and abstraction required judgement, Maciosek was responsible for ensuring consistency across intervention areas.

Search for effectiveness and CE data was separated from burden of disease and cost data. Both search strategies started with the 'highest level' of four levels of evidence (in terms of quality and relevance) and, depending on the quantity and usefulness of this data, extended the search to subsequent levels, typically drawing on older and less robust sources of evidence (see Appendix F for search approaches for both types of search strategy). The CE search specifically excluded: papers that had either not accounted for adherence or were unclear on this issue; studies prior to 1980, as resource use patterns were significantly different prior to the introduction of diagnostic related groups; and, in particular for screening programmes, cross-section data as these were considered poor approximations for repeated screening. Non-US studies were not excluded a priori, but attained lower priorities. Only one non-US cost effectiveness study was used in the 2001 ranking and none was used in the current ranking.

Many data points were needed. Therefore the effectiveness abstraction form captured variables such as study design, participant information, exclusion criteria, service descriptions, time frames, estimates of adherence, sensitivity, specificity, efficacy and effectiveness of screening and treatment methods. Separate abstraction forms were completed, per paper, for each condition/disease and sequelae presented. Abstractors also rated the usefulness of the study and whether any (fatal) flaws existed. To give a sense of the complexity of this part of the exercise, the incidence of 20 diseases was attributed to tobacco use alone.

The CE abstraction form looked at costs or CE of the condition/disease, treatment, screening and disease sequelae. The main purpose was to extract the average CE ratio, which most closely represented using a birth cohort starting at the youngest age and delivery frequency recommended by the USPSTF or ACIP, and also adhered to the principles of the Panel of CE in Health and Medicine's 'reference case' i.e. excluding time loss due to illness and death and using a 3% discount rate. Abstractors therefore recorded study design, population, time horizons, perspective of analysis, year of which currency used, discount rates, outcome measures, harms and side-effects, mean costs³ of preventive services, intermediate follow-up and prevented conditions (separated into categories e.g. durable medical equipment, pharmacy, out/inpatient/home visits or long term care, lab/diagnostics, caregiver costs, time/travel costs and co-payments/deductibles), epidemiological parameters (e.g. years, prevalence, incidence, sensitivity, specificity, adherence, effectiveness), methods of valuation used and main results. Abstractors also rated the usefulness of the study here and whether any fatal flaws existed.

Estimating CPB

Clinically preventable burden is defined as the burden of disease multiplied by effectiveness, which includes everything that must happen for the preventive service to have a health benefit. For example, estimates for cancer screening reflect percent sensitivity of the screen and percent effectiveness of early treatment in preventing mortality. If a proportion of a disease cannot be prevented or treated then that portion of the burden of disease would have a CPB of zero. CPB was estimated as the QALYs gained as a result of a clinical preventive service delivered at recommended intervals to a U.S. birth cohort of 4 million individuals over the years of life for which a service was recommended. This definition has five embedded principles to promote consistency in the estimation of CPB across services:

³

unless heavily skewed, in which case median values were used.

1. Using QALYs ensured both life years gained and improvements in health-related quality of life were assessed, based on:
 - Mortality (life expectancy at a specified average age of death);
 - Incidence (with acute episodes proxied by medical encounters in inpatients and outpatients and chronic states taken from individual studies of estimates for 'established market economies' from the Global Burden of Disease exercise (Murray and Lopez 1996a, 1996b; Jamison et al, 1993);
 - Duration (with acute episodes estimated using the National Health Interview Survey and assumptions concerning 'restricted activity days'), and chronic states based on estimates for 'established market economies' from the Global Burden of Disease exercise (Murray and Lopez 1996a, 1996b; Jamison et al, 1993);
 - Utility values for quality of life (with 0.7 adopted for acute states and 0.8 for chronic states, unless good quality evidence suggested different values⁴). Harms or side-effects were included where appropriate but in practice were often missing.

2. CPB measured the total potential health benefits among both those currently receiving the service and the rest of the target population. Thus the overall importance of a service reflected total health benefits from its use, not just the benefits gained from increasing delivery rates. This was considered important for ensuring maintenance of programmes that are currently effective.
 - The estimates of burden of disease in the absence of a service were estimated from historical incidence rates, incidence among those not receiving services and adjusted incidence for the general population.

3. CPB attempted to take into account the expected patient adherence for every service, including the acceptance of offered treatment, completing follow-ups and behavioural adjustments.
 - These estimates were difficult, because adherence was relevant at many points within a services' delivery and because such information is rarely reflected in the effectiveness literature or studies use overly compliant populations. Most estimates were based on the following formula: Effectiveness = [(effect size / trial adherence) x (observational adherence)]⁵.

⁴ Maciosek noted that mortality impacts were most often the main effect. For example, in 18/25 services, the morbidity impact was less than 25% of the health impact. For only 5 services does the QALY weight or duration influence the CPB (but even then it does not change the ranked position by more than 1 point)

⁵ See Data sources and gaps for use of 25 clinical preventive services (<http://www.prevent.org/images/stories/2007/ncpp/appendix.pdf>) for listing of what information was used in practice and the extent to which available data met USPSTF and ACIP recommendations,

4. The size of the population using the service varies over time; therefore a hypothetical average birth cohort of 4 million was applied. The birth cohort approach reflects the benefit of the service going forward in time.
 - Use of estimates of incidence and long terms benefits calculated to the age of death mean that a full estimate of the burden of disease and CPB can be calculated.
5. The cumulative benefits of multiple interventions over the age range or delivery intervals as recommended by the USPSTF and ACIP were estimated to account for a service's full benefit.

Worked examples for calculating CPB are provided in Appendix G for breast cancer, cervical cancer, colorectal cancer, smoking cessation counselling and influenza vaccination.

Estimating CE

CE was defined as the average net cost per QALY gained in a typical practice by offering the service at recommended intervals to a US birth cohort over the recommended age range. Average CE was defined as incremental to no provision of the service, but assuming current delivery rates of any related service in the priority ranking. As with CPB, CE reflected the provision of the service to the entire target population rather than the extension of delivery to those currently not receiving the service. Both costs and QALYs were discounted in the CE ratio and CE was estimated over the lifetime of a US birth cohort.

To produce comparable estimates across services, data entering the CE ratio were adjusted for patient adherence, use of services and standardized to year 2000 dollars. CE was also calculated with regard to the "reference case" defined by the US Panel of CE in Health and Medicine (USPCEHM). This reference case adopts a societal perspective (including time costs involved in receiving the services but not the value of time gained through prevention) and recommends a 3% discount rate for both costs and QALYs⁶. For six services, CE was established by adjusting existing estimates from the literature to reflect the principles outlined above and to make them comparable with other CE estimates in the priority ranking. In the other 19 cases, a CE estimate was produced from a model developed for the exercise.

⁶ Life years gained (LYG) were used instead of QALYs if QALYs increased precision but at the expense of uncertainty (which mainly occurred for cancer screening, where accounting for harms had very little overall impact on final results).

The models on which both CE and CPB were based were 'aggregate cohort' spread-sheet models, not Markov models (see Appendix G for illustrated case studies of CE models for breast cancer, cervical cancer, colorectal cancer, smoking cessation counselling and influenza vaccination). Both CPB and CE were estimated at the population average and cumulative long terms benefits estimated for the whole period, rather than on an annual basis. Each intervention area was based on an average of patient experience and was a weighted mix of interventions used in a general area. Therefore, if three alternative hearing screening programmes existed, the % use of each service would be used to weight each estimate of cost and effect. The comparator was 'doing nothing'.

Method of ranking the interventions

A scoring system was used to group services in order to make distinctions among services without overstating the precision of the CPB and CE estimates. First, services were sorted in descending order by the CPB base-case estimates and in ascending order by the base-case CE ratios. Services were then divided into five groups at the quintiles, and each service was assigned a score from 5 to 1 for CPB and CE according to group. Services with the highest CPB were thus assigned a CPB score of 5. Services with the lowest CE ratio were given the highest score of 5 respectively. The scores for CPB and CE were then summed to give each service a total score between 2 and 10. The values that emerged behind these ranks are shown in Table 1.

Table 1: Values behind the ranked quintiles

Rank	CPB Range (undiscounted QALYs saved)	\$ / Discounted QALYs
5	≥360,000	Cost saving
4	≥185,001 - <360,000	0 - <14,000
3	≥40,001 - <185,000	≥14,001 - <35,000
2	≥15,000 - <40,000	≥35,001 - <165,000
1	<15,000	≥165,001 - <450,000

3.1.3 The resultant priorities

The 2006 ranking (see Table 2) had 11 services with rank scores ≥ 7. Three of these received scores of 10 and were estimated to be cost saving: discussing aspirin use with high-risk adults, childhood immunizations and tobacco-use screening and brief intervention. Four services received a score of 6: among these are two services that have small target populations compared to other services on the list and thus a relatively low CPB, but were estimated to be very cost effective: screening young woman for Chlamydia and screening young children for visual impairments. For seven of the

services ranked high on the list, available data indicate that delivery rates are particularly low. For four services, approximately 50% or fewer in the target population nationally are likely to use them: tobacco-use screening and brief intervention, screening adults aged ≥ 50 years for colorectal cancer, immunizing adults aged ≥ 65 against pneumococcal disease, and screening young women for Chlamydia.

Table 2: The 2006 ranking of clinical prevention priorities

Services (short name)	Service definition by Maciosek	CPB	CE	Total
Aspirin Chemoprophylaxis	Discuss daily aspirin use with men 40+, women 50+, and others at increased risk for heart disease for the prevention of cardiovascular events	5	5	10
Childhood Immunization Series	Immunize children: Diphtheria, tetanus, pertussis, measles, mumps, rubella, inactivated polio virus, Haemophilus influenza type b, Hepatitis B, varicella, pneumococcal conjugate, influenza	5	5	10
Tobacco Use Screening and Brief Intervention	Screen adults for tobacco use, provide brief counselling and offer pharmacotherapy	5	5	10
Problem Drinking Screening and Brief Counselling	Screen adults routinely to identify those whose alcohol use places them at increased risk and provide brief counselling with follow-up	4	5	9
Colorectal Cancer Screening	Screen adults 50+ years routinely with FOBT, sigmoidoscopy or colonoscopy	4	4	8
Hypertension Screening	Measure blood pressure routinely in all adults and treat with anti-hypertensive medication to prevent the incidence of cardiovascular disease	5	3	8
Influenza Immunization	Immunize adults aged 50+ against influenza annually	4	4	8
Vision screening — Adults	Screen adults aged 65+ routinely for diminished visual acuity with the Snellen visual acuity chart	3	5	8
Pneumococcal Immunization	Immunize adults aged 65+ against pneumococcal disease with one dose for most in this population	3*	4	7
Cervical Cancer Screening	Screen women who have been sexually active and have a cervix within 3 years of onset of sexual activity or age 21 routinely with cervical cytology (Pap smears)	4	3	7
Cholesterol Screening	Screen routinely for lipid disorders among men aged 35+ and women aged 45+ and treat with lipid-lowering drugs to prevent the incidence of cardiovascular disease	5*	2*	7
Breast Cancer Screening	Screen women aged 50+ routinely with mammography alone or with clinical breast examination and discuss screening with women aged 40-49 to choose an age to initiate screening	4	2	6
Chlamydia Screening	Screen sexually active women under age 25 routinely	2	4	6
Calcium Chemoprophylaxis	Counsel adolescent and adult women to use calcium supplements to prevent fractures	3*	3*	6
Vision Screening— Children	Screen children less than age 5 routinely to detect amblyopia, strabismus, and defects in visual acuity	2	4*	6
Folic Acid Chemoprophylaxis	Counsel women of childbearing age routinely on the use of folic acid supplements to prevent birth defects	2	3	5
Obesity Screening	Screen all adult patients routinely for obesity and offer	3	2	5

	obese patients high-intensity counselling about diet, exercise or both together with behavioural interventions for at least one year			
Depression Screening	Screen adults for depression in clinical practices that have systems in place to assure accurate diagnosis, treatment and follow-up	3	1	4
Hearing Screening	Screen for hearing impairment in adults aged 65+ and make referrals to specialists	2	2	4
Injury Prevention Counselling	Assess the safety practices of parents of children less than age 5 and provide counselling on child safety seats, window/stair guards, pool fence, poison control, hot water temperature and bicycle helmets	1	3*	4
Osteoporosis Screening	Screen women aged 65+ and women aged 60+ at increased risk routinely for osteoporosis and discuss the benefits and harms of treatment options	2	2	4
Cholesterol Screening—High Risk	Screen men aged 20 to 35 and women aged 20 to 45 routinely for lipid disorders if they have other risk factors for coronary heart disease and treat with lipid lowering drugs to prevent the incidence of cardiovascular disease	1	1*	2
Diabetes Screening	Screen for diabetes in adults with high cholesterol or hypertension and treat with a goal of lowering levels below conventional target values	1	1	2
Diet Counselling	Offer intensive behavioural dietary counselling to adult patients with hyperlipidemia and other known risk factors for cardiovascular and diet-related chronic disease	1	1	2
Tetanus-diphtheria Booster	Immunize adults every 10 years	1	1	2

NB. This table accounts for the erratum published in AJPM 32(5).

** These services are those with scores of 6+ for which data indicate that delivery to the US population eligible for the services is likely $\geq 50\%$*

For most Americans these services, if requested by the patient and agreed by their doctor, were already potentially available and reimbursed by private or public insurance schemes. The import of the conclusions were that the higher ranked preventive services should receive priority in promotion and that patients, health care providers and payers alike should all be encouraged to increase their uptake. It is also important to note that the services ranked at the bottom of the table are not considered candidates for dis-investment. Many other clinical preventive services did not even make the list, either because the service was considered ineffective or harmful, the balance of benefits and harms the service was judged to be too close to justify recommendation or because there is currently insufficient evidence of effectiveness. For the two former reasons, the expected CE ratios are likely to be worse and, if provided, may prevent provision (or reduce promotion) of services higher up the list. For those areas with insufficient information (including seven counselling interventions), it would be unreasonable to consider dis-investment at this stage, unlike the case for services known to harm.

Table 3 shows the expected gains in QALYs, in decreasing order, if services were expanded from their current levels of provision to 90% coverage of the target population. This table shows that benefits tend to be greater for those programmes with low % receiving services nationally. Accounting for the CE ranks suggests that expansion of services might first be targeted at tobacco use, aspirin chemoprophylaxis and problem drinking screening followed by those with CE ranks of 4. The extent to which this expansion is possible would be determined by the size of budget available, the timing of saved costs and the accuracy of assumptions concerning constant returns to scale.

Table 3:

Services (short name) ^a	Current % receiving services nationally	Additional QALYs saved if current % receiving services increased to 90% ^b
Tobacco-use screening and brief intervention	35% ^c	1,300,000
Colorectal cancer screening	35% ^d	310,000
Influenza vaccine—adults	36% ^f among adults aged 50 to 64 years 65% ^e among adults aged ≥ 65 years	110,000
Breast cancer screening	68% ^f	91,000
Cervical cancer screening	79% ^f	29,000
Chlamydia screening	40% ^g	19,000
Pneumococcal vaccine—adults	56% ^e	16,000
Cholesterol screening	87% ^f	12,000
Hypertension screening	90% ^f	0
Based on limited available data, utilization rates of 50% were assigned to the following services:		
Aspirin chemoprophylaxis	50%	590,000
Problem drinking screening and brief counseling	50%	71,000
Vision screening—adults	50%	31,000

Source: Maciosek et al (2006a)

3.1.4 Use of results to date

Keeping track of who uses the results of any research and how is difficult. However, PfP are aware of a number of examples of use from a variety of organisations. Box 2 highlights such uses.

Box 2: Examples of users of the US prevention priorities exercise

Employers / Purchasers

- ❑ Pfp have responded to requests from employers to set out the costs and savings for specific preventive services along with health impact as a result of the rankings.
- ❑ The Purchasers' Guide to Clinical Preventive Services includes a chapter on prioritisation featuring the rankings

Health Plans / Health Care Delivery Organisations

- ❑ The Alliance of Community Health Plans received a CDC award to promote rankings among health plans and employers and used the rankings as a basis for discussion of benefit design
- ❑ HealthPartners have updated prevention guidelines through the Institute for Clinical Systems Improvements guidelines, updated performance measures, reviewed benefits offered, set out an alignment for fully insured benefits, and incorporated findings into Well@Work coaching schemes.
- ❑ Intermountain Healthcare in Salt Lake City used the rankings and the Healthcare Effectiveness Data and Information Set (HEDIS) in deciding how to invest. They have emphasised tobacco cessation, immunizations and cancer screenings.
- ❑ Advice to a large coalition of health care organisations in the State of Oklahoma has led to the selection of five common preventive objectives that will be promoted consistently and in a co-ordinated way by all providers and through the electronic patient records and state-wide marketing.

Policymakers

- ❑ Kentucky General Assembly, in the tobacco growing state, passed a coverage decision on tobacco cessation using evidence from the prioritisation exercise. Medicaid coverage for counselling and medications for smoking cessation is now available to all adults >65 and agreed on the basis that it was covered as treatment for a tobacco related condition (defined broadly to include, for example, anybody with cancer, heart disease, cough).
- ❑ Pfp worked with the Veterans Association and CHAMPUS who recommended to the Department of Defence that military people and veterans should not have to pay out of pocket for preventive services that were ranked highly by the NCPP.

Consumers

- ❑ 235 print, wire, broadcast and internet stories carried the messages from the 2006 prioritisation exercise. Printed messages appeared in Newsweek, The Washington Post, Houston Chronicle, Seattle Times and Denver Post. TV broadcasts appeared on CBS early show and ABC news feed (along with a 6 minute internet podcast).
- ❑ Anecdotal evidence also showed that Pfp's chief financial officer recently heard his own doctor cite the Pfp report and discuss how aspirin use was one of the most important preventive intervention on which they could be spending their time together.

Others

- ❑ Pfp is working with Bayer Health Care to find innovative ways to promote aspirin use and, with the National Committee for Quality Assurance, a draft HEDIS measure has been developed for aspirin counselling.

Sources: Clymer (2007) power point presentation to NCPP April 2007 meeting "Implementation and Dissemination"; Pfp (2007) "Eliminating disparities in the use of high-value preventive services"; Maciosek (2007), power point presentation to Brunel University; Isham G (2007) power point presentation to NCPP April 2007 meeting "Acting on the NCPP"; Coffield and Maciosek, personal communication.

As the rankings were provided with a caution that interpretation needed to account for local circumstances, we were interested to learn how the coalition in the State of Oklahoma approached this issue. State-based surveys of the utilisation of clinical preventive services and state estimates of mortality were reviewed alongside the ranked set of priorities by a select group of decision

makers (from the Governor's office, Public Health Agency, Native American Reservations, hospitals and other parts of the health care system). They began at the top of the list of ranked priorities and if mortality was higher than the national average and utilisation rates were low or not available a service was chosen as a promotion priority. If however, as was the case for childhood immunisation, coverage rates were high, a State-wide registry existed, both parents and paediatricians were considered to be highly engaged and no major disparities existed, it was not considered an appropriate intervention to promote. Discussion along such issues proceeded down the whole list until 5 priority services were identified.

A second example from the State Department of Texas provided a slightly different example of the use of results. For example, different audiences sometimes have different focus. When decisions are focussed only on what preventive service to provide for a specific area e.g. heart health, women's health or immunisations, one approach was just to consider those interventions scoring 7 or more (as there seemed to be a natural break) and use these to set priorities in a specific area. Secondary concerns would also account for locally-specific causes of morbidity and mortality. For example, in Texas cardio-vascular diseases, chronic respiratory disease and diabetes accounted for around 40% of deaths (Sanchez, personal communication). As many of the interventions in the top 11 are relevant to these areas, the priorities were relevant. However, two priorities relevant to Texas not included in this short list of 11 were Chlamydia screening and vision screening so these were considered as special cases for addition.

It is notable that members of the NCPP include health plans and health provider organisations. Some of the organisations represented (e.g. HealthPartners) have used the results of the prioritisation exercise whereas others (e.g. WellPoint) have not, despite the latter even funding and liking the work. Reasons for not using the results were attributed to not only being more interested in community preventive programmes but also needing to respond to the for-profit company's shareholders as well as other concerns held by Boards of Directors.

We also undertook a search and review of published papers for the 2001 and 2006 prioritisation exercises in the academic press (as the academic press has long publishing time lags). The seven published papers searched for were cited 199 times, of which only 9% were self-citations. 56% of papers were in general medical or broad public health journals and 44% in disease- or patient group-specific journals. Most papers (34%) referred to smoking cessation results, followed by cancer screening (18%) and immunisation (14%). Most (87%) of papers focus on the United State and, to date, no

published papers have considered the transferability of the exercise or its results to a UK context. See Appendix H for full details of this review.

3.1.5 Published critiques

The main results and methods papers provided a critical review of the prioritisation exercise. This was followed by critical appreciation of issues by members of the NCPP, further comments by the authors in the detailed papers and reports on specific types of interventions and by external critics.

The challenges, and hence potential critiques, noted early on by Maciosek and colleagues include:

- The limitation to 25 interventions on clinical prevention only
- The choice to specify services in specific ways
- The use of judgments in deciding how far to search for further evidence
- The adjustment of effectiveness data to adherence could be subject to upward or downward biases depending on whether those who adhere are at lower or higher baseline risk for the trial end-point
- Limiting the search to English language papers
- The limitation of decision criteria to CPB and CE only and the fact that the ranking do not reflect patient values at all
- The decision not to measure marginal CE
- The exclusion of patient time in costs and a limited approach to reflecting utility values for health states
- The inadequacy of evidence on efficacy and costs, particularly in population sub-groups
- The provision of single point estimates of CPB and CE, with uncertainty loosely provided through quintiles and deterministic sensitivity analysis used to estimate the impact on rank points only.
- The simplicity and inflexibility of the modelling approach

Any research is a series of compromises, the extent of which are tempered by resources available – and this was constantly referred to throughout, in writing and interviews. In addition to this, their needs to explain results in a relatively simple and accountable way to decision-makers, coupled with frustrations over the lack of relevant or reliable data, are used to justify the pragmatic provision of simple, transparent and accountable results.

The most consistent criticism by NCPP and external commentators is that the ranking exercise matches no one provider's views, given the fragmentation of the US system. Therefore any user has to adapt the results and should not take the rankings per se. Whilst producing an additional analysis to account

for different viewpoints, such as a health insurer's perspective recommended by Gandjour and Lauterbach (2002) would be possible, it would also involve more funding. Another important concern raised is that multifaceted interventions may be more cost-effective than the single-risk practice as it is reflected in the US-priority ranking. As the majority of patients show two or more behavioural risk factors, single-risk practice guidelines provide little help for the management of those individuals (Gandjour and Lauterbach, 2002; Orleans, 2005). Finally, it is difficult to see what Maciosek and colleagues can do about the criticism that long-term adherence data is lacking (Orleans, 2005) as they were limited to existing evidence. Whilst it is clearly an important issue and may have a significant impact on results, the only solution is for more empirical studies to be undertaken or for assumptions on adherence to be more thoroughly subject to sensitivity analysis. (See Appendix H for a more detailed review of the positive and negative views of commentators).

3.1.6 Current and planned developments

Current work is developing in two directions. First, a feasibility study funded by the CDC is exploring the possibility of conducting a similar exercise for community preventive interviews, with results available in 2009. Key issues being considered are:

- What the final decision criteria should be. Can it remain as CPB and CE, for example? Work has begun by interviewing local practitioners about: how they make decisions currently; how they would ideally like to make decisions; what they think they need to be more accountable to the public about; and needs for transparent decision-making.
- Does a primary national audience exist for this work in the US? If the final set of target decision-makers remain at a local level only, the exercise is unlikely to be considered feasible.
- What interventions should be considered? The range of interventions might include, for example; clinical reminder schemes, performance measurement systems, laws and regulations, education campaigns, work site interventions.
- How can comparability between interventions and evaluations be achieved? Current thinking entertains the possibility that comparability might only be maintained between similar interventions or those delivered by similar institutions (e.g. work places).

Secondly, there is a move towards the development of Markov simulation models. The move to simulating individual risks rather than average population risks and the summing of annual events to long term effects will

allow much greater flexibility. The main advantage will be seen in the move to modelling the CPB and CE of interventions within sub-populations specified, for example, in terms of age-groups or ethnicity and within these differing levels of adherence. This is expected to help with tailoring results to different localities and analysis of disparities.

3.1.7 Resources behind project

The 2006 prioritisation exercise was sponsored by the CDC and AHRQ to around \$US 2million, equating to around \$80,000 per intervention area evaluated and took around 4 years to complete. However, the principal investigators noted that many additional and unpaid working hours were put into the project. A recent extension to this work, on eliminating disparities in the use of high-value preventive services added additional sponsors, the WellPoint Foundation and Robert Wood Johnson Foundation (totalling around \$700,000) and the most recently funded feasibility study for community preventive services is sponsored by the CDC.

The 2006 prioritisation exercise was led by 2 principal investigators; a technical lead responsible for monitoring and ensuring comparability of methods across models (Dr Maciosek) and a policy lead responsible for planning meeting agendas, keeping policy makers engaged through regular communication, managing the advisory group as well as dissemination of results (Dr Coffield). In addition to the PIs, there was a full time project manager plus 7 50%-time analysts / abstractors with training in economics, statistics, medicine or pharmacy (3 with PhDs and 4 with Masters) who reviewed each paper and contributed to the modelling.

Guiding this team was the National Commission on Prevention Priorities, with a group of 30 eminent people meeting once a year and particular individuals contributing further by email and phone.

3.2 Critical review of issues arising in applying US exercise to England

This section considers a number of issues concerning the methodology and processes likely to be involved in using the US exercise in England. It covers criticisms of the US methods, anticipates problems of US methods meeting different practices in England, critically appreciates the difference in the nature of the US task to what is usually done in England and suggests some future approaches.

3.2.1 Policy Context in UK

In principle, the policy and institutional context in the UK is much more amenable to a formal and explicit process for prioritising spending on public health/preventive services. The overall policy thrust and stated political positions favours spending on public health. The Wanless Reports (Wanless, 2002 and 2004) emphasised the importance of engaging the public in improving the determinants of their health, and the importance of this continues to be reflected in the rhetoric of national health policy. More recently, the Local Government White Paper 'Strong and Prosperous Communities (2006) set out to remove barriers to enable local authorities to work better with the NHS and other partners 'to meet local expectations for healthier, happier lives' delivery of ... a world class health service'.

The Government White Paper 'Our Health, Our Care, Our Say: a new direction for community services' (2006) stated that '*an increased commitment to spending on prevention should be part of the shift in resources from secondary to primary and community care. England spends on prevention and public health is relatively low compared to that of other advanced economies. should lead local primary care services and PCTs to increase their spend on prevention*' (and that) '*the accessibility and use of the evidence base for interventions that support health and well-being will be overseen through a new National Reference Group for Health and Wellbeing*'. This new National Reference Group - '*Health England*' - was established in early 2007 with the principle remit to establish a 10-year plan by April 2009 for prevention and preventative spending, based on a comparison with other OECD countries. Since then Lord Darzi's Interim Report (2007) looks forward to a second stage of his review that will include 'Staying Healthy' as one of eight areas of care necessary to endure delivery of his vision for a world class health service.

However in his recent review of NHS funding and performance for the King's Fund, Wanless implies that the reality may not quite match the rhetoric. He notes that the local NHS public health budgets have regularly been raided for pressing short-term priorities and that progress on improving health determinants has not been adequate. (Wanless et al, 2007). His call in 2004 to take forward public health in a systematic way based on a conceptual framework of quantified national objectives to change the prevalence of important determinants of medium- to long-term health status has not been taken forward. Instead, health policy has remained focused on short-term imperatives: a view echoed by public health specialists at a local level.

Our discussions and interviews suggest to us that within public health/preventive services decision-making about priorities is generally relatively clear and thorough *within* the separate bodies concerned. But it is much more opaque at a broader more strategic level. Thus, for example, the Joint Committee on Vaccination and Immunisations (JCVI) has a system to ensure that it is well aware of new developments in the field can address and review them with substantial expert scientific and economic support from the Health Protection Agency (reviewed by external experts) and can ensure that appropriate advice is given from the committee of experts to the Department of Health (DH) and Ministers.

The National Screening Committee (NSC) also has a number of routes to try to ensure that it is aware of changing opportunities and possibilities for screening (and these routes include specific requests from any of the four UK Chief Medical Officers). It is well-supported by the NHS Health Technology Assessment programme who can undertake research on effectiveness and CE of programmes specifically for the Committee. It has explicit criteria for assessing putative screening programmes which include 'value for money', although they do not directly use CE as a formal criterion. Again there is a clear process for providing recommendations to DH/Ministers.

Similarly the public health arm of NICE has a process of topic selection which includes ideas from regular workshops with key stake holder groups, suggestions proposed to the NICE website, and suggestions from the DH or indeed any other government department. Appropriate topics are prioritised by an independent advisory panel. These suggestions are then brought together with others from different parts of NICE and a final list of possibilities for future NICE work is put forward to the DH and ministers. Once matters are referred back to NICE, formal procedures and methods of assessment exist, with cost per QALY a key criterion.

What is not so transparent is the process by which the DH coordinates and prioritises its various requests for formal review by these committees, not how priorities are made once formal recommendations for policies have been made by these and other bodies or interest groups concerned with preventive services. There is at present no transparent process of overall priority setting.

This is one of the key roles of Health England. It aims to recommend: how to decide on priorities for prevention, what priorities should be set for prevention and how decisions on prevention should be made in the future. This study is in support of that task.

3.2.2 Choice of perspective

The perspective taken in the US study is not comparable to a societal view, as costs such as time costs on patients' use of non-health services e.g. exercise facilities are not included. The US study is also not consistent with the NICE perspective, as costs falling on personal social services and other public sectors (e.g. education) were excluded. If an exercise in England were to include community preventive services there would be an even greater need to consider a broader perspective than that adopted by the US study. Beginning with a narrower perspective for clinical preventive services would complicate comparisons with any future exercise including community preventive interventions.

3.2.3 Choice of interventions

The basis for selection of clinical preventive interventions for the US prioritisation exercise was the USPSTF and ACIP recommendations for effective interventions. An important question for England is whether this is something other than recommendations from US task forces should form the basis from which to begin the prioritisation exercise. Appendix I compares the services evaluated in the US with current policy in England for screening of breast cancer and cervical cancer and routine childhood immunisation. This shows quite significant differences between the policies evaluated in the US exercise and those recommended in England. For example,

- the US prioritisation exercise evaluated breast cancer screening every 1-2 years for women aged >40 whereas UK policy is based on a 1 per 3 year screening with a two view mammography for women >50 years;
- the US prioritisation exercise assumed screening for cervical cancer in all women >21yrs using Pap smears every 2 years whereas national policy in England screens women 25-64 years using liquid based cytology every 3-5 years, depending on age, and those 65+ only following abnormal results or lack of screening since age 50; and,
- the US prioritisation exercise included hep B, DPT, polio, Hib, pneumococcal, MMR, varicella, Hep A, and influenza in the routine childhood vaccination schedule with vaccines delivered at 9 intervals from birth to 23 months. In England, however, the routine schedule involves DPT, polio, Hib, pneumococcal, meningococcal serogroup C and MMR delivered at 6 intervals from 2 to 13 months (with DPT again between 13-18 years). (see Appendix I)

This suggests that, whilst the US list of effective interventions may be a useful contributor to a 'long list for England, it should not remain the sole source.

Therefore, a key starting point could be to include all currently recommended preventive services by the JCVI, NICE and NSC. If community preventive interventions were included, then results of evaluation from the Social Care Institute of Excellence as well as Cochrane and Campbell Collaborations would be important to include. The inclusion of community preventive interventions also raises questions about how useful it is to transfer the very narrow US definition of services provided by a health care professional in a clinical setting.

It is important to note that the inclusion of community preventive interventions may provide sufficient evidence of effectiveness but the main challenge will be finding economic evaluations. This could lead to an inbuilt bias against community preventive interventions in favour of clinical preventive interventions as there is more evidence available for the latter (because it is easier to evaluate using the criteria set in the US prioritisation exercise). One possible outcome could be that Health England also undertakes a process for recommending R&D in the area.

One of the implications of developing a list of priority interventions in this way is that each is treated independently when in reality some are (or could be) provided at the same time, either singly or as a package of services. This has two consequences. First, total benefit is not necessarily additive. For example, just because a physical activity programme that reduces CHD risk by 10% and counselling to a new diet reduced CHD also by 10% does not mean doing both programmes will reduce CHD risk by 20%. Secondly, treating programmes independently can overestimate total costs if services are packaged together. If either of these issues are material to decision-making they would need to be accounted for. As one of the workshop participants noted, one strategy would be to use the shopping list approach to choose a shortlist of promising items, and then, with further analysis of the shortlist look at the costs and benefits of different combinations. This would not guarantee an optimal choice, but it might bring the scale of the search problem within bounds and reduce the transaction costs of policy change by increasing possible policy change subject to an 'effort constraint'.

Whilst the focus of the US exercise was based solely on clinical preventive interventions, given considerations to extend the exercise to community preventive interventions in the US and the institutionalisation of economic evaluation for appraising medical technologies in England, it is pertinent to ask whether such an exercise should be limited to the boundaries of public health in any future exercise in England. Indeed it is important to recognise that any presentation of cost per QALY for a range of public health interventions is likely to draw immediate comparisons with the cost per QALY

for medical interventions assessed by NICE. The advantage is, of course, that this would facilitate understanding of how prevention compares with treatment. However, this also sharpens the points made in section 3.2.6 on the choice of outcome measures. If outcomes of clinical and community preventive interventions are not as relatively well captured by QALYs as treatments, then results would be biased in favour of treatment rather than prevention. If however, broader outcome measures were developed more suited to capturing the public health interventions and were also used in the comparison with treatments, then comparisons may occur on a 'level playing field'. Unfortunately this could only happen in the relatively long term if such outcome measures were developed and subsequently used (or at least mapped on to QALY outcomes).

3.2.4 Average, marginal or incremental CE

The US exercise compares typical practice recommended by the USPSTF to 'no provision of the service', thus giving an average CE ratio of recommended services. This differs from the prevailing belief of health economists in England that the best comparator for decision-making is routine practice. For example, the current draft of the methods guidance for NICE (NICE, 2007) suggests that all suitable comparators should be identified and that this would include routine practice in the NHS (including technologies regarded as best practice). However, there *is* also an allowance that the natural history of a condition without suitable treatment (which may include best supportive care) is a viable comparator although no guidance is given as to when and how to choose between these types of comparators.

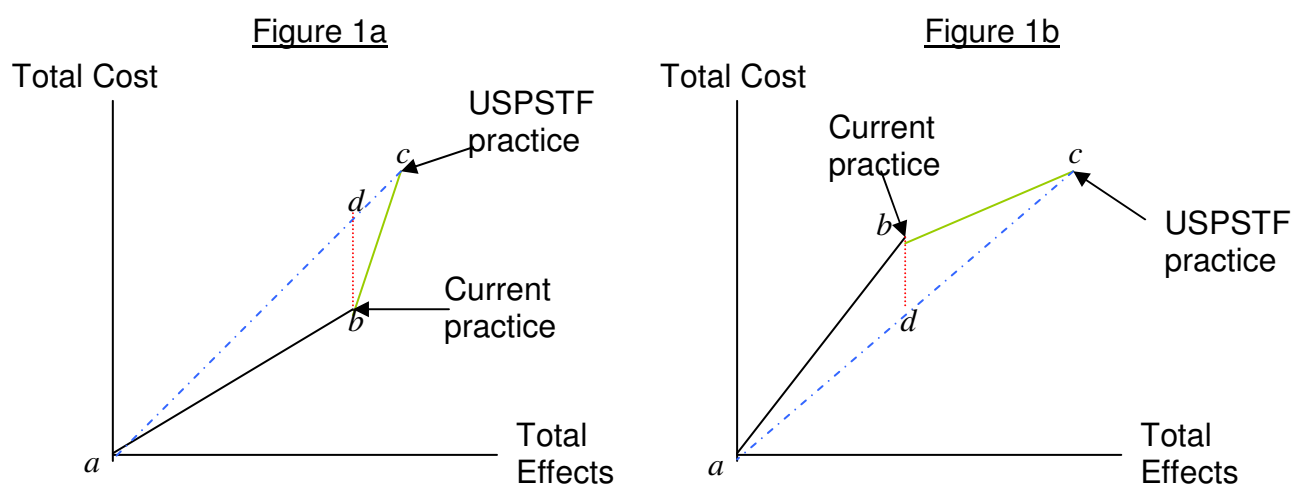
As the focus of the US study is evaluating the CE of recommended practice across very different interventions, it could explain why the next most likely alternative is 'doing nothing', because the next alternative would have to have been the next less effective intervention. This would have involved an additional and extensive search of effectiveness literature across all possible alternative interventions and introduced plenty of scope for judgement. The choice would have had a significant impact on the resulting ratios, and not necessarily to the same degree across interventions.

Two other arguments were forwarded for using 'doing nothing' in the US exercise. First, that an incremental or marginal analysis "might make it appear that a highly effective, well-delivered service such as childhood immunisations, was less valuable" (Maciosek 2006a, p59) simply because it is well delivered (Anne Haddix, personal communication). This could be interpreted as needing to reduce current service provision when the analysis

was intended to help physicians focus on which high value preventive services to offer. Second, the fragmentation of the US system was believed to reflect many different starting points for 'current practice', seen for example in a wide array of delivery rates. Choosing one particular representation of current practice would not get over the problem of different incremental costs existing in practice. Choosing an option of 'doing nothing' could be conceived as being more widely interpretable across different contexts.

This issue indicates that the focus of any exercise in England needs to clarify whether the purpose is to help decide what the total preventive service package offered should be or whether it should focus on how to spend additional money or additional efforts allocated to preventive services. An average approach is arguable for the former and an incremental approach for the latter and either may be relevant at a national, regional or PCT levels of decision-making. It also relates to comments raised by decision-makers during the project workshop – that most decisions in practice in the NHS consider total costs and total benefits. A third approach would be to consider the possibilities of areas for additional investment as well as areas for dis-investment (even if budgets themselves were not changed) and could therefore rely on a marginal approach. The US researchers were extremely sensitive to criticisms that the exercise was designed to cut services and worked strenuously to avoid this image in the very careful writing up of results. The third approach would be less able to avoid this issue.

One particular difficulty with interpreting the results of the US exercise is that it is not clear how results relate to current practice. Figures 1a and 1b illustrate two alternative possibilities. Current practice may achieve benefits at a more (Fig. 1a) or less (Fig. 1b) costly rate than USPSTF practice, with the distance *b-d* showing the additional costs (Fig. 1a) or savings (Fig. 1b) possible if the USPSTF service were offered to the same number of people as current practice. Facing different incremental CE ratios (distance *b-c*) could stimulate different responses in policy and practice.



Further assumptions behind the US prioritisation project is that CE is subject to constant returns to scale and no transaction costs. Thus, advice for interpreting results is to consider how delivery rates differ from national rates. The findings of additional QALYs saved by increasing current service use to 90% is based on assumptions that costs rise from point *d* to *c* in Figures 1a and 1b. Nevertheless, Figures 1a and 1b assume constant returns to scale for both current and USPSTF practice and, in practice, it is extremely rare to see evidence on marginal costs of producing health care within economic evaluations. It also unlikely that policy changes are 'frictionless', with no transaction costs (Marini and Street, 2006; Williamson, 1985). Whilst economic theory would predict rising marginal costs with increased service provision to a target population (particularly where the last percentages of a population are considered 'hard to reach'), it behoves researchers (and funders) to supply evidence.

3.2.5 What should the decision criteria be?

The combination of CPB and CE is not frequently used in England as the basis for allocating health resources. It challenges both current policy and practice. An example of how close an individual organisation comes to using a combination of CPB and CE is the Centre for Public Health Excellence within NICE. To guide service provision, the criteria used by NICE includes effectiveness, CE and occasionally budget impact. However, burden of disease is also built into the discussion process of the Topic Selection Consideration Panel. Nevertheless, NICE uses burden of mortality and morbidity not preventable mortality or preventable morbidity and it is not used as criteria directly, or in combination only with CE. However, it is interesting to

note that the draft methodological guidance by NICE for the technology appraisals (outside of public health) recognised the desirability of assessing impacts on populations⁷, which implies a move towards CPB

During the workshop held in December, participants felt that a broader range of decision criteria should be considered, including equity, budget impact, and quality of services. Indeed, NHS decision-makers often have to prioritise between concentrating resources on people who: are expected to benefit the most, given resources (CE); live in the most deprived areas (equity); wait longest for treatment (temporal access or time); or who travel the furthest to receive health services (geographical access) (Dolan et al, 2003). It is also the case that formulas used to promote equity in resource allocation to PCTs have aimed at tackling 2 objectives; 'equal opportunity of access for people at equal risk' (laid out in 1976 by the RAWP formula) and 'reducing "avoidable" health inequalities' (introduced in 1997 as a result of widening outcomes such as standard mortality ratios). Therefore it is likely that a prioritisation exercise in England would need to reflect such factors.

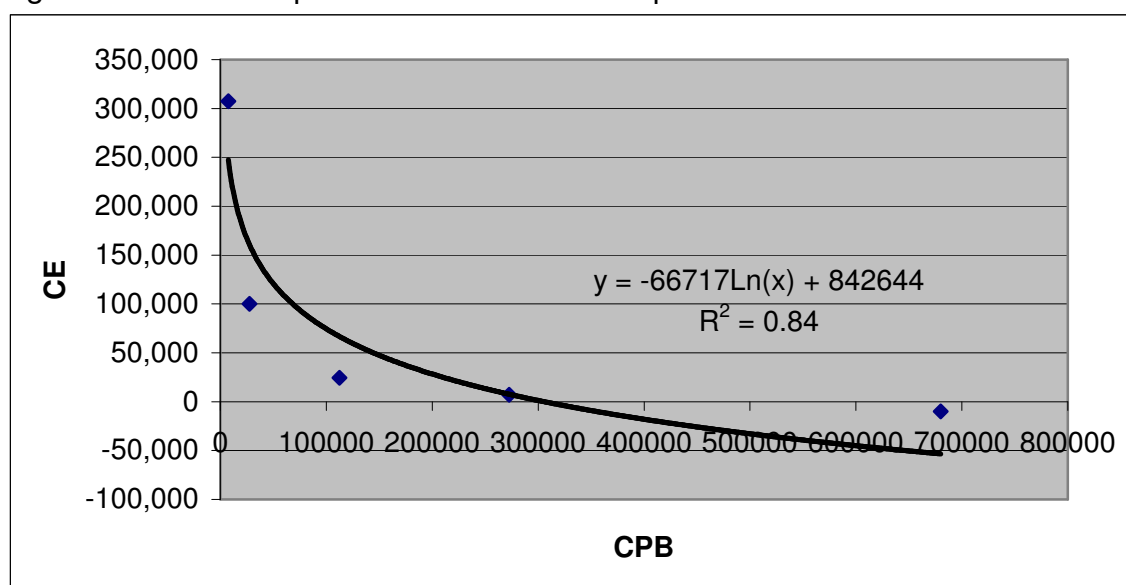
The specific issue of equity is interesting and important for a number of reasons. First, this was not proposed as a criterion in the US exercise and issues of 'disparities' is only now being built into their prioritisation exercise in terms of efficiency i.e. it is sometimes more efficient to target specific sub-populations. Secondly, whilst participants in the workshop argued strongly for its inclusion as a criterion, they also noted a number of conceptual and practical problems of doing so. For example, the lack of a unified view on both what aspect of equity to consider and how best it would be measured challenged how to create an easily measurable indicator. In addition to this, participants noted that, in practice, whilst some areas on the 'long list' have some evidence of distributive effects (e.g. links between smoking and poverty) others have not often been associated with equity and that experimental and quasi-experimental studies rarely included any dimension of equity in an outcome measure. Therefore any exercise seeking to use effectiveness data with these study designs are missing key outcomes and it raised the question of how feasible equity would be as a decision-criteria for empirical studies. As this situation is likely to remain for some time, one solution could be to assume that unless measures are taken to mitigate adverse effects, inequalities are likely to worsen for most interventions, particularly where access is inequitable unless specific efforts are built into their implementation to make access and take-up more equitable. A final conceptual challenge is highlighted in trying to explain why resource allocation formulas have failed to

⁷ For example, page 74 states „In additionan estimate of the resulting health impact (for example QALYs or life years_ in a given population should ideally be attempted. These should take account of the condition's epidemiology and the appropriate levels of access to diagnosis and treatment in the NHS. It should also highlight any key assumptions or uncertainties”

narrow gaps in inequalities, and in some cases for preventive services have worsened as the well educated take up such services. One possible reason is that more attention needs to be paid to needs that are not expressed as demands.

Trade-offs also have to be made between such competing priorities. The US prioritisation exercise assumed an equal trade-off in ranked positions for CPB and CE, although Figure 2 shows the absolute trade-off between midpoints of the CPB and CE ranks to be logarithmic not constant. Recent research in England indicated the nature of trade-offs between CE, access and equity made by decision-makers differ by type of service (Dolan et al, 2003).

Figure 2: Relationship between mid of ranked points for CPB and CE



A further difficulty in transferring the results to a UK context is that the quintiles produced don't necessarily relate to the accepted threshold values adopted by NICE. Three ranks for CE in the US prioritisation exercise relate (at current exchange rates) to values considered likely to be very cost-effective by NICE (i.e. cost saving to \$35,000). However, a rank of 1 (\$165,000-\$450,000) is very unlikely to be considered cost-effective and a service very unlikely to be accepted, if ever. Rank 2 has a very wide range (\$35,000-\$165,000) and falls into 3 different categories; likely to be considered cost-effective, unlikely to be considered cost-effective and very unlikely to be considered cost-effective (Fox-Rushby et al 2006). If we take a conservative approach and suggest that NICE would only accept the top 3 ranks using the CRE criterion, it would suggest that cholesterol screening (ranked 11), breast cancer screening (ranked 12), obesity screening (ranked 17), depression screening (ranked 18) and hearing screening (ranked 19) and all other services with overall ranks of 20-25 would be rejected as unsuitable

recommendations for service provision by NICE. It is notable however, that the top 10 priorities would all still be recommended.

Creating combined ranks for CPB and CE would not necessarily be a requirement for an exercise in England. There are a number of potential alternatives, and each would give a different ordering of priorities:

1. Rank only with CE;
2. Rank first with CE and then select those programmes first on the basis of the largest CPB;
3. Place a £ value for each QALY gained per case of clinically preventable burden and create a net present value. This would account for both CE and CPB⁸;
4. Use actual values, ideally with an estimate of the uncertainty around point values. As the US models produced point estimates from models, uncertainty was not fully represented (although deterministic parameter uncertainty was evaluated) and this is one of the reasons why they moved to representing findings in terms of rankings so that discussions remained at considering interventions within 'broad orders of magnitude'. There are examples of how ranks in league table might account for uncertainty (Hutubessy et al 2001; O'Brien and Sculpher, 1999) which have also been debated (e.g. Coyle, 2002).

3.2.6 Choice of outcome measure

The US exercise measures health gain in terms of QALYs, which is recommended approach by NICE and would allow any preventive intervention to be compared with treatments. However, the approach to selecting utility values differs to that recommended by NICE. Draft guidance by NICE (NICE, 2007) recommends that measurement of change is taken from patient-completed EQ5D states and utility values from general population samples (using the time trade-off method) from England. It may be possible to re-estimate the US QALY gain using UK values, although this is only likely to make a difference in 20% of the results.

Whilst QALYs are the obvious starting point for any prioritisation exercise, there is a clear problem in their ability to capture the benefits of some public health interventions, especially the more complex community preventive interventions. QALYs do not, for example, assess benefits in terms of a sense of safety, privacy or ownership that might be provided through social housing projects, for example. Indeed, as they are less able to capture benefits, they are less frequently used to measure benefits and therefore

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This suggestion was raised in an email by John Henderson, Economic Advisor, UK Department of Health

evaluations would less often produce papers that would be admissible into such a review. A broader range of benefits may require a broader measure of well-being, in particular to mitigate a bias against community preventive interventions from the start of such a prioritisation exercise. Input from the recent DH review of national outcomes and accountability framework could suggest some directions, although this is likely to remain at the level of indicators rather than measures.

The timing of outcomes raises two further issues, both of which lie outside of the scope of this report and the US work does not specifically address either issues. However, for complete reporting, these issues include the selected discount rate for benefits (and whether it should match costs) and the challenges raised in convincing local NHS decision-makers to invest in preventive services where time horizons are 'off the scale' as far as they are concerned. Treating health as a capital investment may go some way to addressing the latter point.

3.2.7 What would be the appropriate evidence base?

The 2006 US prioritisation exercise did not use any CE analyses from England. Differences in; the pattern of resource use, absolute and relative prices, demography, epidemiology, incentives, as well as scale, specification and packing of interventions all contribute to differences in CE ratios (Mulligan et al, 2003). Therefore, there is reason to question the transferability of both absolute values and rankings from the US prioritisation exercise, despite there being a view during the workshop that the rankings held no surprises. Nevertheless, armed with specific (unpublished) data on the prices and quantities used in the US models, it would be possible to re-estimate costs and CE for England and assess the impacts on rankings. Indeed, even without this there are a number of other possible methods (see Mulligan et al, 2003). However, re-estimating costs would not cope with any differences in the type of interventions delivered in England or with new/additional interventions, for example community preventive interventions.

Appendix J sets out an extensive list of factors likely to affect the generalisability of results including economic (e.g. absolute and relative prices, incentives), epidemiologic (e.g. casemix), demographic (non-clinical characteristics) and production differences across different health systems (e.g. joint production, organisational structures, levels of training) based on Sculpher et al (2004) and outlines their relevance to this exercise. The provision of single point estimates, with uncertainty simply provided through quintiles and deterministic sensitivity analysis used to estimate the impact of

parameter uncertainty on rank points only, might not be sufficient to account for the combined effect of the range of factors likely to cause variability when transferring the exercise to a UK context.

It is also important to consider the extent of data available in England, especially as economic evaluation of health interventions already has a specific role in developing policy, practice and guidance – arguably more so than in the US. The prevailing view of the workshop participants was that UK data would be preferred, but if it wasn't available, then it would be appropriate to look elsewhere (much as the US prioritisation set out). This may however, be better judged on a case by case basis as the decision of relevance of data needs to account both for variance and bias.

There are key sets of resources available in England in the form of reports to NICE, NSC and JCVI in addition to a wealth of other publications (many of which may now be brought together in the specialist library for public health⁹). However, it is important to remember that this is unlikely to be an exhaustive representation of even all clinical preventive services and that having such data to hand is only a starting point. A key challenge facing the US prioritisation team was the comparability across studies. NICE may have reduced the methodological variation. Nevertheless, it is not eliminated and not only may many important pieces of information still not be clear within these studies (e.g. adherence rates) but also there may be key differences in views about what constitutes an appropriate methodological stance for economic evaluations of public health interventions. Another challenge likely to be faced is the paucity of studies on community preventive and mental health interventions.

3.2.8 Who should be involved in the process?

The process of the US prioritisation exercise ensured involvement, through the NCPP, of key stakeholders from health plans, employers, providers and policy makers and thus reflected the fragmentation within the US health system. With a more cohesive national health system, not only is the range of stakeholders likely to be different but the results of a prioritisation exercise considered potentially more threatening to current national policies because there could conceivably be pressure to implement results throughout the NHS. It was interesting to observe the questions and concerns that arose within the workshop of how a prioritisation process in England would relate, for example, to the NHS Operating Framework and the Health Care Commission's recent

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<http://www.library.nhs.uk/publichealth/Page.aspx?pagename=CDSTRATEGY>

work designed to evaluate and improve take up of public health interventions provided by PCTs.

Another important difference in moving or adapting a prioritisation to England, will be to include service users views, recognised in England as critical to helping improve the quality of services. The primary relationship of the health service user in the USA is an exchange one, with the individual as customer or consumer. This has influenced understandings of and approaches to patient and user engagement/involvement in health care. In the USA, treatments are advertised to the consumer and patient/service user organisations can be associated with and sometimes funded by pharmaceutical and other organisations. Service users in the US are more able to reflect their views by moving their own funding arrangements, thus allowing their preferences to be noticed and accounted for. Users were not, however, represented on the NCPP.

The creation of the UK NHS led to the establishment of a different 'public service' based ethos and relationship with patients and service users. More recently this has come in for wide criticism as encouraging a passive and reactive role and relationship for the patient/service user (Giddens, 1999; Beresford, 1997). As a result, over recent years there has been pressure and in some cases legal requirements for there to be 'public, patient and user involvement or 'engagement' (PPI) in health, social care and public health policy and provision. Moreover health care and related services have increasingly been framed in terms of being 'patient-led' or 'patient-centred' (DH, 2005 and 2006). The inference has been that they should be organised and provided primarily to meet the needs and provide the outcomes valued by patients and service users.

These two developments in the UK context have significant implications for how the US prioritisation exercise might be transposed to the UK in a way consistent with local requirements, values and policy pressures for public, patient and service user involvement and for this involvement to be fair and equitable. While rhetoric of choice and control has developed in UK policy and there have been significant moves to develop a mixed economy of care, 'exit' does not offer the majority of patients an effective means of expressing their views because of the continuing centrality of the NHS.

To apply such an approach to prioritisation in the UK would require the involvement of service users and through that the development and employment of 'user defined' outcome measures. (Shaping Our Lives et al, 2003). Three different approaches to user involvement have developed in the UK and elsewhere in recent years. These are:

- *Consultation/market research approaches*, primarily concerned with information gathering to feed into existing structures and arrangements as a basis for improved decision-making and tend to be based on individual input (Beresford and Croft, 1993);
- *Deliberative approaches*, which involve setting up structured groupings, like 'citizen's juries' or panels with a representative composition with the aim of exploring key public policy issues or concerns in an informed and reflective way to feed into the policy-making process (Davies et al, 2007);
- *Collective involvement approaches*, that build on the movements and organisations of service users/patients that have developed in the UK and internationally since the 1970s and 1980s concerned with improving the conditions and status of such groups and securing their rights and needs. These approaches are usually essentially collective in nature. It is currently UK government policy to develop a network of such local user controlled organisations (Campbell and Oliver, 1996; Beresford, 1999).

While there may be overlaps between these approaches, each has its own distinct history, culture and methodology. They may be used to inform or to influence processes and decision-making – or both. It is important to be clear which is intended. Each has its strengths and weaknesses. These different approaches can be used in concert, to overcome their individual limitations, so long as their potentially different purposes are understood. Participation can have regressive implications and these need to be recognised (Cook and Kothari, 2001).

A major issue raised in relation to all participatory processes and initiatives is the degree to which they are capable of overcoming potential exclusions inhibiting the involvement of particular groups. Groups highlighted in this discussion as 'hard to reach' or marginalised groups, include long term users of health and social care services, particularly members of black and minority ethnic communities, people with learning difficulties and/or who communicate differently/non verbally and people identified as having multiple or 'profound' impairments (Oliver and Barnes, 1998; Begum, 2006; Branfield et al, 2006). A combination of approaches to involvement can help ensure their involvement as can the use of existing experience to identify effective methods to provide access (communication, environmental and cultural access) and support, to ensure people's involvement on as equal terms as possible. Such involvement can also helpfully be evaluated in ways which themselves include

the perspectives and engagement of patients and service users (Lowe and Hulatt, 2005).

During the workshop, there was much discussion of the fact that listing priorities is only a first step and that processes of implementation and the nature of incentives are vitally important. The outcomes of such an exercise would be interpreted as guidance rather than a set of instructions as factors such as local epidemiology, provision and take-up of existing services would need to be accounted for. However, accounting for local differences also raised the challenge of potential conflicts of short and medium term objectives particularly in the context of increasing decentralisation. Participants noted that public policy was often not very supportive of preventive interventions, but that a prioritisation exercise could boost public health if comparisons are made in a way that is not inconsistent with all other clinical interventions considered by NICE.

Health England would need to consider how priorities would be implemented.

Possible tools included:

- Use of the QOF
- Monitoring local authority spending on specific prevention services targets
- Advertising of services (as immunisation programme does)
- Local ring-fenced funding, based on estimates of need (by ward?)
- Treating public health as a capital investment rather than only as an expenditure stream

3.2.9 How sophisticated or pragmatic should a prioritisation exercise be?

As very many adaptations to data and judgements needed to be made to facilitate comparison of evidence across the different interventions, the US exercise adopted a relatively pragmatic approach to modelling and interpretation of results, preferring to deal with 'broad orders of magnitude' rather than fully characterising uncertainty through using probabilistic sensitivity analysis, for example. The models were also relatively simple, compared with Markov models but carried a degree of inflexibility in moving to estimates of CE for sub-populations. These conditions facilitated a quicker provision of results and easily replicable (and therefore transparent) models.

Thought of only as a series of individual models, it would be difficult for their structure to compare favourably with current NICE guidance, which favours probabilistic sensitivity analysis. However, not only has NICE methodological

guidance largely been developed with health technologies in mind, rather than public health and community preventive interventions, but it was written as guidance for researchers developing a limited number of models for specific interventions or conditions. The models for the US prioritisation exercise were designed from the outset for comparative purposes with a relatively low budget per model, so a degree of pragmatism was required. It could have been considered too risky to spend the amount of money required to produce comparable probabilistic models for an exercise that did not necessarily have sufficient political backing. However, this decision did appear to affect the location for publishing the final papers. It is also noteworthy that the future direction by the US researchers is to developing Markov models and it would be interesting to see whether this has a material impact on any future ranking. It is possible that accounting for uncertainty has a larger impact on those diseases with large burdens because the consequences of uncertainty may be larger.

How sophisticated a model needs to be is a moot point. A relatively simple comparative model might be adequate, especially for those services where extensive sensitivity analysis showed that incremental CE ratios fall well below or above the threshold range of £20-£30,000 per quality adjusted life year (QALY).

3.2.10 Issues of running an exercise like this in England

To replicate or adapt the US prioritisation exercise in England would require significant funding. Given the timetable facing Health England is to provide a strategic plan by April 2009, the feasibility of undertaking a broad exercise on the scale of that in the US is highly questionable and unlikely to engage sufficiently with the full range of stakeholders. To achieve comparability, it is recommended that any modelling is the responsibility of one research group.

3.2.11 Should this be the only prioritisation model considered?

We are aware of a number of prioritisation exercises involving economic evaluation from other countries (Jamison et al 2005, Tan-Torres Edejer et al 2004, Evans D et al 2005, Andrews et al 2004, Hutubessy et al 2003, Dalziel et al 2005a-c, Mortimer et al 2005a&b USOTA 1992) and within England (Bate et al, 2007; Heller et al, 2006, Bevan et al 2007, Doherty 2000¹⁰). Prior to any exercise being undertaken in England, it would be useful to undertake a review of these alternative approaches, even if they don't focus on public

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This prioritisation exercise includes socio-economic burden and preventability. It does not include costs of provision.

health interventions, to ascertain whether other approaches could help or offer particular cautions¹¹.

4.0 Conclusions

The first question to ask is 'Is the US prioritisation exercise doing something that is not being done elsewhere in England?'. Our conclusion is that there is no formal, explicit and transparent process that prioritises across even the range of clinical preventive services, and certainly not across the range of community-based services. The prioritisation that does occur involves the DH and Ministers implicitly prioritising across proposals from a variety of sources. Whilst the final decisions formally rest with Ministers, other decision-makers might like to consider that an explicit broad prioritisation could be a useful addition to informing this political process and would ensure that decisions were based on more strictly comparable information. Prioritisation within bodies, including NICE, JCVI and the NSC, use methods that are defensible but which are not transparently consistent. An overall process needs to be consistent with the more detailed evaluations subsequently undertaken and its formalisation might encourage greater consistency between the various bodies.

We conclude, therefore that an exercise of this broad sort is appropriate and would improve, or at least make more transparent, the setting of priorities for preventive services and public health in England.

But it is apparent that neither the methods, nor the data, used in the US exercise are directly transferable to the English context, and so the results cannot safely be used directly. Even if the priorities look similar to those that might be expected from an English exercise, the priorities cannot be defended simply on the basis of what has been produced in the US.

We therefore consider whether there are elements of the exercise that can be used. The first possibility is whether to use the US 'long list' rather than create an English 'long list', from which CE and CPB (or other criteria) might be evaluated. To the extent that the long-list of effective services draws on a thorough review of an international literature on effectiveness, an English list if undertaken from scratch might look very similar (or possibly a little shorter if public acceptability of specific items differed). Certainly, for any particular service the evidence search already undertaken in the US would be a useful start. But the pragmatic search strategy used in the US focussing mainly on US evidence might not lead to the same conclusions about effectiveness as

¹¹ Such work was beyond the remit of this contract specification.

one looking particularly for UK evidence, particularly for community as opposed to clinical preventive services, on the basis that the US and England may have more in common in terms of biomedicine than in social/community structures.

The second possibility is that the detailed methods used in the US could be used in England. It is the case that CE is better accepted as a policy tool and more developed methodologically in England than it was at the inception of the US project. However England has much more experience of explicit use of CE to guide priority setting, and, in the case of NICE, has adopted and used a detailed specification of appropriate methodology. CPB is, however, not currently used routinely to guide policy or practice in conjunction with CE. Nevertheless, it could be a useful second stage prioritisation, to decide which of the most cost-effective interventions are likely to have the biggest impact and so warrant a national policy focus, although this would also be dependent on the degree of uncertainty attached to CPB estimates. Cost-effective interventions with a smaller impact should not be discouraged but may not warrant national policy attention, particularly if an 'effort constraint' exists limiting the number of policies that could be promoted in any one year. A potential alternative to this would also be to consider how cost-effective interventions might be 'bundled together' to save both transaction and delivery costs and increase the feasibility of more policy change at any one time.

However, the two greatest concerns with adopting the US approach are first, that equity is not accounted for within the decision criteria and secondly, that the approach ties one into using average CE ratios. We need to be sensitive both to the marginal costs of take-up among different population sub-groups and the impact on incremental costs of moving from one intervention approach to another but also to clarify whether the purpose is to help decide what the total preventive service package offered should be or whether it should focus on how to spend additional money or additional efforts allocated to preventive services. An average approach is arguable for the former and an incremental approach for the latter and either may be relevant at a national, regional or PCT levels of decision-making. If budgets are not likely to change, then a third approach relying on a marginal approach would need to consider not only the possibilities of areas for additional investment but also areas for dis-investment and the political feasibility of doing so should be considered.

Looking forward, the US prioritisation exercise offers some useful ideas and lessons, but a quite separate exercise would be needed for England. It is important also to note that prioritisation exercise in England is likely to need to build new models rather than simply be based on a compilation of existing

economic models because not only are CPB, adherence rates and equity impacts rarely accounted for within existing models but it will be important to ensure comparability actively across interventions and evaluations. The desire in England to include community preventive interventions (as is expected to be done in future in the US) will add significant complexity to the process, most obviously in the selection of an appropriate outcome measure for interventions where QALYs may not seem appropriate. The advantage of attempting to integrate community preventive interventions is that this difficult thinking is begun earlier rather than having to redesign what may become an insufficiently flexible prioritisation methodology at a later date. The very narrow US definition of services provided by a health care professional in a clinical setting raises questions not only about how helpful it is to transfer the US definition to England but also whether more data might be available. Depending on the outcome of the US feasibility study, there may be scope for sharing the effort in reviewing the literature with PpP.

Any resulting priorities will need to be defensible and this will take a significant research effort. Health England need to consider the extent to which they are prepared to trade-off between how important is it to have a firm underpinning to demonstrate, as firmly as NICE has felt the need to demonstrate, rigour in academic and policy processes with an approach which relies on US lists and UK expert views but produces a set of priorities much quicker. To account for a time horizon of April 2009, an alternative approach would be for Health England to identify some unambiguously beneficial short-term priorities and to propose a strategy for more fully developing priorities in the future.

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