Appendix A

Prioritisation of Prevention:
What should we learn from a US approach?

Workshop, Friday 14th December 2007

Appendix A: List of Workshop Participants

Professor Gwyn Bevan, Professor of Management Science	LSE	r.g.bevan@lse.ac.uk
Dr Claire Bradford North East Public Health Observatory	Wolfson Research Institute	Claire.bradford@durham.ac.uk Claire.bradford@nepho.org.uk
Dr Sarah Byford, Senior Lecturer	Institute of Psychiatry	Sarah.byford@iop.kcl.ac.uk
Dr. Ruth Chadwick Programme Manager Research and Evaluations	Department of Health	Ruth.Chadwick@dh.gsi.gov.uk
Dr. Alastair Fisher Director, Public Health Excellence Centre	National Institute for Health and Clinical Excellence	Alastair.fischer@nice.org
Dr. Donald Franklin Senior Economic Adviser	Department of Health	Donald.Franklin@dh.gsi.gov.uk
Prof Alastair Gray Director, Health Economics Research Centre	University of Oxford	Alastair.gray@dphpc.ox.ac.uk
Dr John Henderson Economic Adviser	Health Protection & International Healthcare	John.Henderson@dh.gsi.gov.uk
Dr. Anne Jackson Director for Child Wellbeing	Department for Children, Schools and Families	Anne.jackson@dcfs.gso.gov.uk
Professor Julian Le Grand, Richard Titmuss Professor of Social Policy	LSE	J.Legrand@lse.ac.uk
Dr Anne Mackie, Director, Screening Programs	NHS London	Anne.Mackie@london.nhs.uk
Dr. Hugh Markowe Head of Health Improvement Analytical Team - Monitoring Unit (HIAT-MU)	Department of Health	Hugh.Markowe@dh.gsi.gov.uk

Ms. Christine McGuire, Research and Development	Department of Health,	Christine.McGuire@dh.gsi.gov.uk
Professor Richard Parish, Chief Executive	The Royal Society for the Promotion of Health	
Professor Hilary Pickles Director Public Health	Hillingdon Primary Care Trust	Hilary.Pickles@hillingdon.nhs.uk
Professor David Salisbury, Director of Immunisation	Department of Health	David.Salisbury@dh.gsi.gov.uk
Dr Colin Sanderson Reader in Health Services Research	LSHTM	Colin.sanderson@lshtm.ac.uk
Mr Robert Scott, Assistant Economist	Department of Health	Robert.scott@dh.gsi.gov.uk
Mr Steve Shaffelburg Policy Manager	British Heart Foundation	shaffelburgs@bhf.org.uk
Dr Robert Sherriff Secretary to Health England Associate Director	Health England Public Health Resource Unit	secretary@healthengland.org
Mrs Karen Taylor Director, Health Value for Money Audit	National Audit Office	Karen.taylor@nao.gsi.gov.uk
Professor Peter West Strategy Manager	Healthcare Commission	paw11@york.ac.uk
Prof. Martin White Chair of Public Health and Director, Public Health Research Programme	Institute of Health & Society	martin.white@newcastle.ac.uk
Jude Williams Head of Public Health	Healthcare Commission	Jude.Williams@healthcarecommission.org.uk

APPENDIX B

List of people interviewed

USA

Dr Michael Maciosek, Co-Principle Investigator of US prioritisation project, Research Investigator, HealthPartners Research Foundation, Washington DC

Dr Ashley Coffield, Co-Principle Investigator of US prioritisation project, Senior Policy Fellow and former President of Partnership for Prevention, Washington DC

Dr Anne Haddix PhD, Chief Policy Officer, Office of Strategy & Innovation, Centers for Disease Control and Innovation, Atlanta

Professor Kathleen Lohr, Distinguished Fellow, RTI International, North Carolina

Professor Stephen H Woolf M.D., M.P.H., Professor and Director of research, Departments of Family Medicine, Epidemiology, and Community Health,
Virginia Commonwealth University, Richmond

George J. Isham, M.D. Medical Director & Chief Health Officer, HealthPartners, Minneapolis

Professor Eduardo J Sanchez, Chair of the National Commission on Prevention Priorities; Director of the Institute for Health Policy, University of Texas School of Public Health at Houston and former Commissioner of the Texas Department of State Health Services

England

Professor Brian Ferguson, Yorkshire and Humber PHO & University of York.

Professor Michael Kelly, Director Public Health Excellence Centre, NICE

Dr Anne Mackie, Director, Screening Programs, NHS London

Professor David Salisbury, Director of Immunisation, DH

APPENDIX C

Publications from the 2001 US Prioritisation Exercise

Coffield AB, Maciosek MV, McGinnis JM, Harris JR, Caldwell MB, Teutsch SM, Atkins D, Richland JH, Haddix A (2001) Priorities among Recommended Clinical Preventive Services, *American Journal of Preventive Medicine*, vol 21, no 1, pp 1-9

Maciosek MV, Coffield AB, McGinnis JM, Harris JR, Caldwell MB, Teutsch SM, Atkins D, Richland JH, Haddix A (2001) Methods for Priority Setting Among Clinical Preventive Services, *American Journal of Preventive Medicine*, vol 21, no 1, pp 10-19

Carande-Kulis V, Maciosek MV, Briss PA, Teutsch SM, Zaza S, Truman B, Messonnier M, Pappaioanou M, Harris JR, Fielding JE (2000) Methods for systematic reviews of economic evaluations for the Guide to Community Preventive services; *American Journal of Preventive Medicine*, vol 18, no 1, SUPPL. 1, pp 75-91.

Salinsky E (2005) Clinical Preventive Services: When Is the Juice Worth the Squeeze? National Health Policy Forum

Lawrence DM (2001) Priorities among Recommended Clinical Preventive Services, *American Journal of Preventive Medicine*, vol 21, no 1, pp 66-67

Vogt TM, Aickin M, Ahmed F, Schmidt M (2004) The Prevention Index: Using Technology to improve Quality Assessment, *Health Services Research*, vol 39, no 3, pp 511-529

Holtgrave DR (2002) Extending the Methodology of the Committee on Clinical Preventive Service Priorities to HIV-Prevention Community Planning, *American Journal of Preventive Medicine*, vol 22, no 3, pp 209-210

Yarnall KSH Pollak KL, Østbye T, Krause KM, Michener JL (2003) Primary Care: Is there enough Time for Prevention? *American Journal of Public Health*, vol 93, no 4, pp 635-641

Partnership for prevention, 2001 evidence and calculations: Clinically preventable burden and cost effectiveness for preventive services recommended by the US Preventive Task Forces, Washington DC, www.prevent.org

Appendix D: USPSTF, PfP service definitions & UK policy documents

Preventive services are in the order of the 2006 priority ranking, taking into account the erratum to the article by Maciosek MV, Coffield AB, Edwards NM, Goodman MJ, Flottemesch TJ, Solberg LI (2006) Priorities among effective clinical preventive services: results of a systematic review and analysis. *Am J Prev Med, vol* 31, no 1, pp 52– 61

PfP service definition	USPSTF service definition	Additional specifications by Partnership for Prevention	UK Policy documents
Aspirin Chemoprophylaxis Discuss daily aspirin use with men 40+, women 50+, and others at increased risk for heart disease for the prevention of cardio-vascular events	**Rating: "A" recommendation** **Recommended dose:** Optimum dose of aspirin for chemoprevention is unknown. Primary and secondary prevention trials showed benefits with a variety of regimens, including 75 mg per day, 100 mg per day, and 325 mg every other day. Doses of approximately 75 mg per day appear as effective as higher doses; whether doses below 75 mg per day are effective has not been established. **Recommended target population:** Men older than 40 years, postmenopausal women, and younger people with risk factors for CHD **Recommended time interval:** Although the optimal timing and frequency of discussions related to aspirin therapy are unknown, reasonable options include every 5 years in middle-aged and older people or when other cardiovascular risk factors are detected.	**Target population:** men 40+, women 50+ and high risk individuals **Technology:** The USPSTF did not explicitly recommend detailed CHD risk assessment, thus only costs for brief counselling were included. **Time interval:** The costs of annual counselling were assessed.	**General medical services contract: Quality and outcomes framework for primary care (GP-QOF)** North of England Evidence Based Guidelines Development Project. Evidence based guideline for the use of aspirin for the secondary prophylaxis of vascular disease in primary care. Newcastle upon Tyne: Centre for Health Services Research , 1997 **British National Formulary (BNF), Drug and therapeutics Bulletin**
Childhood Immunization Series Immunize children: Diphtheria, tetanus, pertussis, MMR, inactivated polio virus, haemophilus, Influenza type b, hepatitis B, varicella, pneumo-coccal conjugate, influenza	**Rating:** The USPSTF recognizes the importance of immunizations for primary disease prevention. The Task Force refers to recommendations made by the Centers for Disease Control and Preventions' advisory Committee on Immunization Practices (ACIP). The methods used by ACIP may differ from the methods used by the USPSTF **Schedule for the US's routine childhood immunizations** **At birth** Hepatitis B **1 to 2 month** Hepatitis B **2 month** Diphteria, tetanus , pertusis (whooping cough), polio , Hib , pneumococcal, rota **4 month** Diphtheria, tetanus, pertusis polio, Hib, pneumococcal, rota **6 month** Diphteria, tetanus, pertusis , Hib, pneumococcal, rota **6 to 18 month** Polio, hepatitis B, influenza (from 6th month to 59 month annually) **12 to 15 month** Hib, pneumococcal, MMR, varicella **15 to 18 month** Diphteria (4th dose at 12 to 18 month, provided 6 month have elapsed after the third dose), tetanus, pertusis **12 to 23 month** Hepatitis A (2 doses) Additional immunizations are recommended for high risk groups	Rota was not recommended at the time the prioritisation exercise was done; Also, the age range for influenza has changes since Partnership for Prevention did its recommendation. Pneumococcal vaccination is treated as part of the childhood immunization series	**Statements, advice and recommendations by the Joint Committee on Vaccination and Immunization (JCVI),** e.g. Proposed changes to the routine childhood immunisation schedule **Salisbury, Ramsay, Noakes (Editors) 2006; "The green book" Immunizations against infectious disease**; Published by the stationery office under licence from the Department of Health, Chapter 11 **More recent updates are listed on Dh and HPA websites**

Tobacco Use Screening and Brief Intervention Screen adults for tobacco use, provide brief counselling and offer pharmacotherapy	**Rating: "A" recommendation** - **Recommended technology:** Brief tobacco cessation counselling interventions, including screening, brief counselling (3 minutes or less), and/or pharmaco-therapy. There is a dose-response relationship between quit rates and the intensity of counselling. - **Behavioural interventions:** 5-A behavioural counselling framework provides a useful strategy for engaging patients in smoking cessation discussions. Helpful aspects of counselling include providing problem-solving guidance for smokers to develop a plan to quit and to overcome common barriers to quitting and providing social support within and outside of treatment. Common practices complementing this framework include motivational interviewing; the 5-R's used to treat tobacco use (relevance, risks, rewards, roadblocks, repetition), assessing readiness to change, and more intensive counselling and/or referrals for quitters needing extra help. Telephone "quit lines" are an effective adjunct to counselling or medical therapy. - **Pharmacotherapy:** FDA-approved pharmacotherapy includes several forms of nicotine replacement therapy (i.e., nicotine gum, nicotine transdermal patches, nicotine inhaler, and nicotine nasal spray) and sustained-release bupropion. Other medications, including clonidine and nortriptyline, have been found to be efficacious and may be considered. - **Recommended target population:** Augmented pregnancy-tailored counselling (e.g., 5- 15 minutes) and self-help materials are recommended for pregnant smokers, as brief interventions are less effective in this population. There is little evidence addressing the effectiveness of screening and counselling children or adolescents to prevent the initiation of tobacco use and to promote its cessation in a primary care setting, but clinicians may use their discretion in conducting tobacco-related discussions with this population.	- **Interventions:** Literature review focussed on interventions that "could be conducted in "busy primary care" The exercise did not follow the USPSTF recommendation of 3 minutes counselling, since most studies did not report the same time to deliver the service. Studies investigating the effects of more than one intervention, more intensive counselling, or counselling including follow ups were excluded. Estimates only focussed on cigarette smoke - - The estimates reflect the proportions of individuals counselled who would and would not utilize cessation medications - **Target population:** Aimed at all smokers. Proportion of smokers in a 4 million birth cohort. For base case, portion of "ever smokers" in the current 35-44 year old age group (45.1%) This percentage is applied to the 98.8% of a birth cohort of 4 million who survive to age 18	- **NHS Cancer Plan (2000)** - **NHS Cancer Reform Strategy (2007)** - **General medical services contract: Quality and outcomes framework for primary care (GP-QOF)** - **NICE Public Health Intervention Guidelines 1 and 5** - Brief interventions and referral for smoking cessation in primary care and other settings, NICE Public Health Intervention Guidance no. 1, NICE, 2006. - Workplace health promotion: how to help employees to stop smoking, NICE Public Health Intervention Guidance no. 5, NICE, 2007.
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	**Rating: "B" recommendation** - The USPSTF did not evaluate interventions for alcohol dependence since their benefits are well established and referral or specialty treatment is recommended for those meeting the diagnostic criteria for dependence. - **Recommended technologies (screening):** Alcohol Use Disorders Identification Test (AUDIT).Can be used alone or embedded in broader health risk or lifestyle assessments. The 4-item CAGE (Cut-down, Annoyed, Guilty and Eye opener alcohol use disorders test) is the most popular screening test for Alcohol Misuse. The TWEAK, a 5-item scale, and the T-ACE are designed to screen pregnant women for alcohol misuse. Clinicians can choose screening strategies that are appropriate for their clinical population and setting - **Recommended technologies (counselling):** Effective interventions include an initial counselling session of about 15 minutes, feedback, advice, and goal-setting. Most also include further assistance and follow-up. Multicontact interventions for patients ranging widely in age (12-75 years) are shown to reduce mean alcohol consumption by 3 to 9 drinks per week, with effects lasting up to 6 to 12 months after the intervention. They can be delivered wholly or in part in the primary care setting, and by one or more members of the health care team, including physician and non-physician practitioners. Resources that help clinicians deliver effective interventions include brief provider training or access to specially trained primary care practitioners or health educators, and the presence of office-level systems supports (prompts, reminders, counselling algorithms, and patient education materials). - **Recommended time intervals:** Not specified, less frequent screening may be appropriate at older ages - **Recommended target population:** The benefits of behavioural intervention for preventing or reducing alcohol misuse in adolescents are not known. The benefits of screening this population will need to be evaluated as more effective interventions become available in the primary care setting.	- **Screening tools:** CAGE and AUDIT - **Counselling tools:** Estimates were taken from RCTs of interventions that could be conducted in busy primary care. Trials of more intensive counselling or of interventions that involved many follow-up contacts were eliminated as not feasible in practice and outside the scope of the USPSTF recommendation. - Since no long term follow-up studies were available, the estimates are based upon the assumption that the effectiveness obtained at 12 month was the long term effectiveness of this intervention (with the assumption that repeated screening and counselling would be needed to maintain that level of effectiveness). Costs for annual delivery used to age 54, and biennial screening thereafter. - **Target population:** Aimed at all adolescent and adults	- **Cabinet Office, Prime Minister's Strategy Unit. Alcohol project: interim analytic report. London, 2004.** - **Cabinet Office, Prime Minister's Strategy Unit. Alcohol harm reduction strategy for England. London:, 2004** now superseded by: - **Safe. Sensible. Social. The next steps in the National Alcohol Strategy; Department of Health, Home Office, Department for Education and Skills, Department for Culture, Media and Sport; 5 June 2007** - **National Treatment Agency (NTA) – Models of care for alcohol misusers (MoCAM) D o H June 2006** - **As part of NHS provision commissioning alcohol interventions and treatment is the responsibility of local PCT's**
Colorectal Cancer Screening Screen adults 50+ years routinely with FOBT, Sigmoidoscopy or Colonoscopy	**Rating: "A" recommendation** - **Recommended technology:** Potential screening options include home Fecal Occult Blood Testing (FOBT), flexible sigmoidoscopy (FS), the combination of home FOBT and FS, colonoscopy, and double-contrast barium enema. The choice the screening strategy should be based on patient preferences, medical contraindications, patient adherence, and available resources for testing and follow-up. - **Recommended target population:** Initiating screening at 50 years of age for men and women at average risk for colorectal cancer. In persons at higher risk (e.g., those with a first-degree relative who receives a diagnosis with colorectal cancer before 60 years of age), initiating screening at an earlier age is reasonable. - **Recommended time intervals:** Optimal interval for screening depends on the test. Annual FOBT offers greater reductions in mortality rates than biennial screening but produces more false-positive results. A 10-year interval is recommended for colonoscopy. Shorter intervals (5 years) have been recommended for flexible sigmoidoscopy and double-contrast barium enema because of their lower sensitivity, but there is no direct evidence with which to determine the optimal interval for tests other than FOBT. - **Cost effectiveness:** Initial costs of colonoscopy are higher than the costs of other tests. Fom a societal perspective, compared with no screening, all methods of colorectal cancer screening are likely to be as cost-effective as many other clinical preventive services (less than $30,000 per additional year of life gained)	- **Technologies:** Estimates based on FOBT, FS, and Colonoscopy, weighted by current US-delivery rates - **Time intervals:** FOBT: annual; FS: every 5 years; Colonoscopy: every 10 years - **Target population:** aimed at adults 50+	- **NHS Cancer Plan (2000)** - **NHS Cancer Reform Strategy (2007)** - **National Screening Committee (NSC),** e.g. "commissioning and managing screening programmes in the NHS in England (2004) - **NHS Bowel cancer screening publications (NHSBCSP Publications),** e.g. Reporting lesions in the NHS bowel cancer screening programme - Guidelines from the Bowel Cancer Screening Programme Pathology Group; NHS BCSP Publication No 1, September 2007; NHS Cancer Screening Programmes, 2007

Hypertension Screening Measure blood pressure routinely in all adults and treat with anti-hypertensive medication to prevent the incidence of cardio-vascular disease	**Rating: "A" recommendation** - **Recommended technology:** Sphygmomanometer, it is recommended that hypertension be diagnosed only after 2 or more elevated readings obtained on at least 2 visits over a period of 1 to several weeks. - **Recommended screening intervals:** Evidence is lacking to recommend an optimal interval for screening adults for high blood pressure. The sixth report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 6) recommends screening every 2 years for persons with SBP and DBP below 130 mm Hg and 85 mm Hg, respectively, and more frequent intervals for screening those with blood pressure at higher levels. - **Pharmacological therapies:** Not specified, guideline refers to JNC 6 guidelines for treatment of high blood pressure - **Nonpharmacological therapies:** Nonpharmacological therapies, such as reducing dietary sodium intake, potassium supplementation, increased physical activity, weight loss, stress management, and reducing alcohol intake, are likely to reduce blood pressure, but their impact on cardiovascular outcomes has not been studied. For those who consume large amounts of alcohol (more than 20 drinks in a week), studies have shown that reduced drinking decreases blood pressure. There is insufficient evidence to recommend single or multiple interventions or to guide the clinician in selecting among nonpharmacological therapies.	- **Technology:** The prioritisation exercise only assessed the pharmacological treatment with anti-hypertensive medication to prevent the incidence of cardiovascular disease (It did not include counseling regarding diet or physical activlity as USPSTF cited no evidence of effectiveness of these activities – this does not differ from USPSTF recommendation) - **Time interval:** Costs included biennial screening and laboratory tests and follow-up monitoring as recommended in JNC7, (but only portion are assumed to adhere with recommended monitoring) - **Target population:** Aimed at all adults	- **NICE clinical guideline 34;Management of hypertension in adults in primary care- partial update of NICE clinical guideline 18; National Institute for Health and Clinical Excellence, 2006** - **NICE clinical guideline 18: Essential hypertension: managing adult patients in primary care; National Institute for Health and Clinical Excellence, 2004** - **General medical services contract: Quality and outcomes framework for primary care (GP-QOF)**
Influenza Immunization Immunize adults aged 50+ against influenza annually	- **Rating:** The USPSTF recognizes the importance of immunizations for primary disease prevention. The Task Force refers to recommendations made by the Centers for Disease Control and Preventions' advisory Committee on Immunization Practices (ACIP). The methods used by ACIP may differ from the methods used by the USPSTF - The advisory committee on Immunization Practices (ACIP) recommends annual influenza vaccinations for adults 50 or more years of age as part of the adult immunization schedule	- **Target population:** Aimed at adults aged 50+. The main objective was to estimate the CPB and cost effectiveness of offering influenza vaccine to individuals aged ≥50 years; however, separate estimates by age groups (50 to 64 and ≥65) were also produced - Estimates of the deaths attributable to influenza were uncertain due to inherent difficulties in measuring influenza's role as a contributing factor in deaths with other conditions such as respiratory diseases and cardiovascular disease. The current estimate was based on the influenza-associated mortality for all underlying causes of death for persons aged ≥50 years.	**Salisbury, Ramsay, Noakes (Edt.) 2006; "The Green Book" Immunizations against infectious disease**; Published by the Stationery Office under licence from the DH, PCT's have 2 financial mechanisms for the seasonal influenza programme: 1) **Directed Enhanced Services (DESs) for influenza and pneumococcal immunisation:** Payment relates to population aged 65+ and clinical risk groups as defined in the CMO letter 2) **Local Enhanced Service (LES) for carers and chronic liver disease:** PCT determines locally whether to support LESs and any remuneration level for vaccination activity. 3) **Quality and outcomes framework for primary care (GP-QOF):** Further indirect payments for vaccinating patients with CHD, stroke/ transient ischemic attack, diabetes and chronic obstructive pulmonary disease - Influenza policies are examined by the **JCVI** Influenza subgroup. The DH, acting as the Secretariat for the JCVI puts together a detailed submission of the evidence for the Influenza-subgroup to consider. Advice from the JCVI Influenza-subgroup are then sent to main JCVI for consideration and approval - **Source: Spencer, Kenedy (2007),** Review of the arrangements for the Seasonal Influenza Programme in England - Report of an independent panel, COI for DH
Vision screening -- Adults Screen adults aged 65+ routinely for diminished visual acuity with the Snellen visual acuity chart	**Rating: "B" recommendation** - **Target Population and Technology:** Routine vision screening with Snellen acuity testing is recommended for elderly persons ("B" recommendation). Selected questions about vision may be helpful in detecting vision problems in elderly persons, but they do not appear as sensitive or specific as direct assessment of acuity. - **Frequency:** The optimal frequency for screening is not known and is left to clinical discretion. - There is insufficient evidence to recommend for or against routine screening with ophthalmoscopy by the primary care physician in asymptomatic elderly patients ("C" recommendation).	- **Target population**: Adults 65+ years - **Frequency:** Partnership for Prevention used an average of 2 screens after the age of 65 (based on relatively low incidence of new vision impairment after the age of 65)	- **NICE clinical guideline for diabetic screening** - **National Contract for Opticians**

Pneumococcal Immunization Immunize adults aged 65+ against pneumococcal disease with one dose for most in this population	**Rating:** The USPSTF recognizes the importance of immunizations for primary disease prevention. The Task Force refers to recommendations made by the Centers for Disease Control and Preventions' advisory Committee on Immunization Practices (ACIP). The methods used by ACIP may differ from the methods used by the USPSTF The advisory committee on Immunization Practices (ACIP) recommends annual pneumococcal vaccinations (1 dose) for adults 65 or more years of age as part of the adult immunization schedule	Vaccination of infants is included in the evaluation of the childhood immunization series. Younger adults at high risk are outside the scope of the prevention priorities project. Frequency at which people should receive the pneumococcal vaccine is unclear. ACIP recommends that persons age 65+ be vaccinated only when two conditions are met: They last received the vaccine before age 65 and were last vaccinated 5 or more years ago. Therefore, pneumococcal vaccine for people 65 years of age and older was treated as a one time immunization at or near the age of 65	**Joint Committee on Vaccination and Immunisation.** E.g. Minutes of the Pneumococcal subgroup, Friday 7 September 2007 Or: Pneumococcal conjugate vaccine in adults. Draft minutes of the meeting held on 6 June 2003. **Salisbury, Ramsay, Noakes (Editors) 2006; "The Green Book" Immunizations against infectious disease**; Published by the stationery office under licence from the DH
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)	**Rating: "A" recommendation** **Recommended technology:** Pap smear **Recommended target population:** All women between 21 and 65. The USPSTF recommends against routinely screening of women 65+ if they have had adequate recent screening with normal pap smears and are not otherwise at high risk. Screening can be delayed until 3 years after onset of sexual activity or until the age of 21, whichever comes first. **Recommended time intervals:** The USPSTF found no evidence that annual screening is more effective than trienal screening. **Cost effectiveness:** FDA-approved technologies, such as the liquid-based cytology (LBC) may have improved sensitivity over conventional Pap smear screening, but at higher cost and possibly with lower specificity. Modelling studies suggest these methods are not likely to be cost-effective unless used with screening intervals of 3 years or longer. LBC permits testing of specimens for HPV, which may be useful in guiding management of women whose Pap smear reveals atypical squamous cells. HPV DNA testing for primary cervical cancer screening is not FDA approved and its role in screening remains uncertain.	**Target population:** Screening is offered to sexually active women or all women older than 21 in a birth cohort of 4 million people **Time interval:** Since the effectiveness literature used by Maciosek et al analyses populations which have been screened either every two years or every three years, the base case estimate for CE is based on bienall screening. However, estimates for annual and trienall screening are also reported	**NHS Cancer Plan (2000)** **NHS Cancer Reform Strategy (2007)** **National Screening Committee (NSC),** e.g. "commissioning and managing screening programmes in the NHS in England (2004) **NHS Cervical Screening Programme Publications (NHSCSP Publications)** **NICE Technology Appraisal No. 69; Guidance on the use of liquid-based cytology for cervical screening; National Institute for Clinical Excellence, 2003 (guidance replaces Technology Appraisal Guidance No. 5 issued in June 2000)**
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	**Rating: "A" Recommendation** **Recommended technology:** TC and HDL-C can be measured on nonfasting or fasting samples. Abnormal results should be confirmed by a repeated sample on a separate occasion. Average of both results should be used for risk assessment. TC alone is an acceptable screening test if available laboratory services cannot provide reliable measurements of HDL. In conjunction with HDL-C, low-density lipoprotein cholesterol (LDLC) and TC provide comparable information, but measuring LDL-C requires a fasting sample and is more expensive. In patients with elevated risk on screening results, lipoprotein analysis, including fasting triglycerides, may provide information that is useful in choosing optimal treatments. **Recommended target population:** Screen men aged 35+ and women aged 45+ for lipid disorders; treat abnormal lipids in people at increased risk for CHD **Recommended time interval:** Optimal interval for screening is uncertain. Reasonable options include every 5 years, shorter intervals for people having lipid levels close to those warranting therapy, and longer intervals for people with low or repeatedly normal lipid levels. **Recommended treatment technology:** Drug therapy is usually more effective than diet alone, but the choice of treatment should consider overall risk, costs of treatment, and patient preferences. Although diet therapy is an appropriate initial therapy for most patients, a minority achieve substantial reductions in lipid levels. Lipid-lowering treatments should be accompanied by interventions addressing all modifiable risk factors for heart disease, including smoking cessation, treatment of blood pressure, diabetes, and obesity, as well as promotion of a healthy diet and regular physical activity. Long-term adherence to therapies should be emphasized. All patients, regardless of lipid levels, should be offered counselling about the benefits of a healthy diet, regular physical activity, avoiding tobacco use, and maintaining a healthy weight.	The USPSTF does not specify a specific cholesterol measure (LDL-C, HDL-C, TC or a ratio), a specific treatment goal, or an optimal interval for screening. Similarly, the data that are available to build estimates of CPB and CE are based upon various screening measures and treatment goals. Therefore, PfP provides a general estimate of the value of cholesterol screening and treatment that reflects the available data rather than a detailed estimate of a specific screening or treatment strategy. Therapy cannot be prescribed without a fasting lipid panel, so even for those who screened positive based on total cholesterol in the model, the costs of a fasting lipid panel were included. Because the vast majority of treatment in the US is with statins, the estimates largely reflect the cost and effectiveness of statin therapy. Aimed at men aged 35+ and women aged 45+	**General medical services contract: Quality and outcomes framework for primary care (GP-QOF)**

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	**Rating: "B" recommendation** - **Recommended technology**: The USPSTF recommends screening mammography, with or without clinical breast examination - **Recommended target population:** Women aged 40 and older. For women aged 40-49, the evidence that screening mammography reduces mortality from breast cancer is weaker, and the absolute benefit of mammography is smaller, than it is for older women. Most, but not all, studies indicate a mortality benefit for women undergoing mammography at ages 40-49, but the delay in observed benefit in women younger than 50 makes it difficult to determine the incremental benefit of beginning screening at age 40 rather than at age 50. The absolute benefit is smaller because the incidence of breast cancer is lower among women in their 40s than it is among older women. The USPSTF concluded that the evidence is also generalizable to women aged 70 and older (who face a higher absolute risk for breast cancer) if their life expectancy is not compromised by co morbid disease - **Recommended time intervals:** Every one to two years	- **Technology:** The estimates for breast cancer screening in the prioritisation exercise are based on mammography alone. It was not specified whether one view or two view mammography was the technology under study - **Time interval:** The included effectiveness studies had screening intervals of 12 to 36 month, most between 12 and 24 month - **Target population:** Aimed at all women aged 50+, discuss with women 40-49 to choose an age to start screening	- **NHS Cancer Reform Strategy (2007)** - **NHS Cancer Plan (2000)** - **NHS Breast Screening Programme Publications (NHSBSP Publications)** e.g.: Consolidated guidance on standards for the NHS breast screening programme, Advisory committee on breast cancer screening, NHSBSP Publication No 60 (Version 2), 2005 - **National Screening Committee (NSC),** e.g. "commissioning and managing screening programmes in the NHS in England (2004)
Chlamydia Screening Screen sexually active women under age 25 routinely	**Rating: "A" recommendation** - **Recommended technology:** The choice of specific screening technique is left to clinical judgment. Choice of test will depend on issues of cost, convenience, and feasibility, which may vary in different settings. Subsequent to initial release of this recommendation, CDC released laboratory guidelines that outline the advantages and disadvantages of available tests. These guidelines are available at http://www.cdc.gov/STD/LabGuidelines. - **Recommended target population**: All sexually active women aged 25 years and younger, and other asymptomatic women at increased risk for infection, for chlamydial infection - **Recommended time intervals:** The optimal interval for screening is uncertain. For women with a previous negative screening test, the interval for rescreening should take into account changes in sexual partners. If there is evidence that a woman is at low risk for infection (e.g., in a mutually monogamous relationship with a previous history of negative screening tests for chlamydial infection), it may not be necessary to screen frequently. Rescreening at 6 to 12 months may be appropriate for previously infected women because of high rates of reinfection.	- **Target population:** Aimed at sexually active women 25 yrs and younger. PfP Included only sexually active females age 15-25 (due to poor data on 'other asymptomatic women at increased risk' - **Time interval:** PfP assumed that annual screening is needed to maintain the effectiveness level (given possibility of re-infection)	- **National Chlamydia Screening Programme, England – Core requirements, 3rd Edition – 2006, published by: NHSNCSP, online source: http://www.chlamydiascreening.nhs.uk/ps_lowg/core/index.html** - **Legal framework for the supply and administration of medicines for use by NCSP screening sites, NHSCSP, 2007, online source: http://www.chlamydiascreening.nhs.uk/ps/assets/pdfs/ncsp_legal.pdf** - **Choosing Health: Making healthy choices easier, White Paper; DH; 16 2004** - **Our health, our care, our say: a new direction for community services, Command Paper; DH; 30 January 2006** - **NICE public health intervention guidance 3: One to one interventions to reduce the transmission of sexually transmitted infections (STIs) including HIV, and to reduce the rate of under 18 conceptions, especially among vulnerable and at risk groups, NICE February 2007**
Calcium Chemo-prophylaxis Counsel adolescent and adult women to use calcium supplements to prevent fractures	**Rating: "B" recommendation** - See 1996 USPSTF recommendations, Chapter 56: Promoting a Healthy Diet: Women should be encouraged to consume recommended quantities of calcium (adolescents and young adults, 1,200-1,500 mg/day; adults ages 25-50 1,000 mg/day; post-menopausal women, 1,000-1,500 mg/day; pregnant and nursing women, 1,200 to 1,500 mg/day)	- **Target population:** Aimed at adolescents and adult women - **Time interval:** PfP assumed that annual counseling is needed to achieve even minimal adherence - The current USPSTF may not consider this recommendation to be in effect and thus it may not be re-evaluated it in the future.	- **NICE Clinical Guideline (In development) Prevention, assessment and treatment of osteoporosis and osteoporotic Fractures, National Institute for Clinical Excelence,**
Vision Screening - Children Screen children less than age 5 routinely to detect amblyopia, strabismus, and defects in visual acuity	**Rating: "B" recommendation** - Various tests are used in the US to identify visual defects in children, and the choice of tests is influenced by the child's age. During the first year of life, strabismus can be assessed by the cover test and the Hirschberg light reflex test. In children older than age 3 years, stereopsis (the ability of both eyes to function together) can be assessed with the Random Dot E test or Titmus Fly Stereotest; visual acuity can be assessed by tests such as the HOTV chart, Lea symbols, or the tumbling E. Based on their review of current evidence, The USPSTF was unable to determine the optimal screening tests, periodicity of screening, or technical proficiency required of the screening clinician. Based on expert opinion, the American Academy of Pediatrics (AAP) recommends the following vision screening be performed at all well-child visits for children starting in the newborn period to 3 years: ocular history, vision assessment, external inspection of the eyes and lids, ocular motility assessment, pupil examination, and red reflex examination. For children aged 3 to 5 years, the AAP recommends the aforementioned screening in addition to age- appropriate visual acuity measurement (using HOTV or tumbling E tests) and ophthalmoscopy.	- **Target population:** Children <5yrs. The USPSTF found no evidence that screening before age 3 has an added benefit over screening after age 3; and as a practical matter, for many children is probably practical to screen only one-time between ages 3 and 5 in a primary care office. Therefore PfP evaluated 1-time screening.	- **Routine requirement** - **National Contract for Opticians** - **Children and maternity National Service Framework (NSF)**

Folic Acid Chemoprophylaxis Counsel women of childbearing age routinely on the use of folic acid supplements to prevent birth defects	**Rating (1996): "A" Recommendation for women planning pregnancy. "B" Recommendation for women capable of pregnancy** (Screening for neural tube defects during pregnancy is currently considered part of standard prenatal care. The USPSTF has decided to update its recommendation on folic acid supplementation. This work is in progress) **Recommended technology:** Folic acid supplementation at a dose of 4 mg/day beginning 1–3 months prior to conception and continuing through the first trimester for women planning pregnancy who have previously had a pregnancy affected by a neural tube defect, to reduce the risk of recurrence ("A" recommendation). Also, all women planning pregnancy should take a daily multivitamin or multivitamin-multimineral supplement containing folic acid at a dose of 0.4–0.8 mg, beginning at least 1 month prior to conception and continuing through the first trimester, to reduce the risk of neural tube defects ("A" recommendation). Taking a daily multivitamin containing 0.4 mg of folic acid is also recommended for all women capable of becoming pregnant, to reduce the risk of neural tube defects in unplanned pregnancies ("B" recommendation).	**Time interval:** It was assumed that annual counselling would be necessary to maintain the minimal adherence that the literature suggests is possible.	**Children and maternity national service framework (NSF)** **British National Formulary (BNF), Drug and Therapeutics Bulletin** **NICE Public health programme guidance: Guidance to improve the nutrition of pregnant and breastfeeding mothers and children in low income households for midwives, health visitors, pharmacists and other primary care services, National Insitute for Health and Clinical Excelence, (In progress)**
Obesity Screening Screen all adult patients routinely for obesity and offer obese patients high-intensity counselling about diet, exercise or both together with behavioural interventions for at least one year	**Rating: "B" recommendation** **Recommended screening technology:** Several techniques, such as bioelectrical impedance, dual-energy x-ray absorptiometry, and total body water can measure body fat, but it is impractical to use them routinely. Body Mass index (BMI) is a more practical and widely-used method to screen for obesity. **Recommended counselling strategy:** The USPSTF defined intensity of counselling by the frequency of the intervention. A high-intensity intervention is more than 1 person-to-person (individual or group) session per month for at least the first 3 months of intervention **Recommended target population:** The evidence on the effectiveness of interventions with obese people may not be generalizable to adults who are overweight but not obese. The evidence for the effectiveness of interventions for weight loss among overweight adults, compared with obese adults, is limited.	Partnership for Prevention used annual screen and brief counsel to engage in intensive intervention and, given the current organization of the US health care sector, all intensive intervention of the type the USPSTF found to be effective would be by referral outside of the primary care office.	**NICE clinical guideline no 43: Obesity: Prevention, identification, assessment and management of overweight and obesity in adults and children, NICE, 2006** **General medical services contract: Quality and outcomes framework for primary care (GP-QOF)**
Depression Screening Screen adults for depression in clinical practices that have systems in place to assure accurate diagnosis, treatment and follow-up	**Rating: "B" recommendation** **Recommended technology:** Little evidence to recommend one screening method over another, so clinicians can choose the method that best fits their personal preference, the patient population served, and the practice setting. All positive screening tests should trigger full diagnostic interviews that use standard diagnostic criteria (i.e., those from the DSM-IV) to determine the presence or absence of specific depressive disorders, such as major depression and/or dysthymia.The severity of depression and co morbid psychological problems (e.g., anxiety, panic attacks, or substance abuse) should be addressed. **Recommended interval and target population:** The optimal interval for screening is unknown. Recurrent screening may be most productive in patients with a history of depression, unexplained somatic symptoms, co morbid psychological conditions (e.g., panic disorder or generalized anxiety), substance abuse, or chronic pain. The benefits of routinely screening children and adolescents for depression are not known. **Recommended treatment strategy:** Treatment may include antidepressants or specific psychotherapeutic approaches (e.g., cognitive behavioural therapy or brief psychosocial counselling), alone or in combination.	Annual screening (because for many patients depression is an acute illness)	Personal communication with Sarah Byford: UK policies on depression are generally focussed on treatment rather than prevention. The National service framework for mental health: modern standards and service models: DH (1999) may be relevant, although its focus is on targeting suicide. **NICE clinical guideline 23:** Depression: management of depression in primary and secondary care, NICE, 2004 **NICE Clinical Guideline 28:** Depression in Children and Young People: Identification and management in primary, community and secondary care, NICE, 2005
Hearing Screening Screen for hearing impairment in adults aged 65+ and make referrals to specialists	**Rating: "B" recommendation** **Recommended technology**: An otoscopic examination and audiometric testing should be performed on all persons with evidence of impaired hearing by patient inquiry. Although hand-held devices for audiometry testing (audioscopes) are also sensitive screening tools for hearing deficits, patient inquiry is likely to be a more rapid and less expensive way to screen. There is therefore insufficient evidence to recommend for or against routinely screening older adults for hearing deficits using audiometry testing ("C" recommendation). **Recommended time interval:** Optimal frequency has not been determined and is left to clinical discretion. **Recommended target population:** Screening older adults for hearing impairment by periodically questioning them about their hearing, counselling them about the availability of hearing aid devices, and making referrals for abnormalities when appropriate, is recommended. There is insufficient evidence to recommend for or against routinely screening asymptomatic adolescents and working-age adults for hearing impairment ("C" recommendation). Routine hearing screening of asymptomatic children beyond age 3 years is not recommended ("D" recommendation). There is insufficient evidence to recommend for or against routine screening of asymptomatic neonates for hearing impairment using evoked oto-acoustic emission (EOE) testing or auditory brainstem response (ABR) ("C" recommendation). Recommendations to screen high risk infants may be made on other grounds, including the relatively high prevalence of hearing impairment, parental anxiety or concern, and the potentially beneficial effect on language development from early treatment of infants with moderate or severe hearing loss.	Partnership for Prevention used an average of 3 screens after the age of 65 (based on incidence of new hearing impairment after age 65)	**General medical services contract: Quality and outcomes framework for primary care (GP-QOF)**

Injury Prevention Counselling Assess safety practices of parents of children age <5. provide counselling on child safety seats, window/stair guards, pool fence, poison control, hot water temperature and bicycle helmets	• See 1996 USPSTF recommendations. Chapers 57 (motor vehicle injuries) and 58 (household and recreational injuries	• Partnership for Prevention assumed annual assessment and counseling would be needed to sustain the effectiveness indicated by the literature	
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	**Rating: "B" recommendation** • **Recommended screening technology:** Bone density measured at the femoral neck by dualenergy x-ray absorptiometry (DXA) is the best predictor of hip fracture and is comparable to forearm measurements for predicting fractures at other sites. Other technologies for measuring peripheral sites include quantitative ultrasonography (QUS), radiographic absorptiometry, single energy x-ray absorptiometry, peripheral dual-energy x-ray absorptiometry, and peripheral quantitative computed tomography. Recent data suggest that peripheral bone density testing in the primary care setting can also identify postmenopausal women who have a higher risk for fracture over the short term (1 year). Further research is needed to determine the accuracy of peripheral bone density testing in mcomparison with dual-energy x-ray absorptiometry (DXA). • **Recommended target population:** All women aged 65+ and routine screening for women 60+ at increased risk for osteoporotic fractures. No recommendation for or against routine osteoporosis screening in postmenopausal women < 60 or women aged 60-64 at average risk for osteoporotic fractures. *Rating: C* • **Recommended treatment technology**: Estimates of the benefits of detecting and treating osteoporosis are based largely on studies of bisphosphonates. Some women, however, may prefer other treatment options (for example, hormone replacement therapy, selective estrogen receptor modulators, or calcitonin) based on personal preferences or risk factors. • **Recommended time intervals:** No evidence on the optimal intervals for repeated screening, a minimum of 2 years may be needed to reliably measure a change in bone mineral density; however, longer intervals may be adequate for repeated screening to identify new cases of osteoporosis. Yield of repeated screening will be higher in older women, those with lower BMD at baseline, and those with other risk factors for fracture. There are no data to determine the appropriate age to stop screening and few data on osteoporosis treatment in women older than 85.	• **Time interval:** Screening every 3 years (chosen because sensitivity analysis showed that increasing frequency to 1 year from 3 years would only identify about 10% more women at risk for 3 times the screening costs) • Note: estimates may be out of date due to new pharmacotherapy that needs only be taken once per month and may dramatically improve adherence	• **NICE clinical guideline (In development) Prevention, assessment and treatment of osteoporosis and osteoporotic Fractures, National Institute for Clinical Excelence**
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 lipidlowering drugs to prevent the incidence of cardiovascular disease	**Rating: "B" Recommendation (men 20-35 and women 20-45 yrs)** • **Recommended technology:** TC and HDL-C can be measured on nonfasting or fasting samples. Abnormal results should be confirmed by a repeated sample on a separate occasion. Average of both results should be used for risk assessment. TC alone is an acceptable screening test if available laboratory services cannot provide reliable measurements of HDL. In conjunction with HDL-C, low-density lipoprotein cholesterol (LDLC) and TC provide comparable information, but measuring LDL-C requires a fasting sample and is more expensive. In patients with elevated risk on screening results, lipoprotein analysis, including fasting triglycerides, may provide information that is useful in choosing optimal treatments. • **Recommended target population:** Screen men aged 20-35 and women 20-45 in the presence of Diabetes, a family history of cardiovascular disease before age 50 years in male relatives or age 60 years in female relatives. A family history suggestive of familial Hyperlipidemia, Multiple coronary heart disease risk factors (e.g., tobacco use, hypertension). • **Recommended time interval:** Optimal interval for screening is uncertain. Reasonable options include every 5 years, shorter intervals for people having lipid levels close to those warranting therapy, and longer intervals for people with low or repeatedly normal lipid levels • **Recommended treatment technology:** Drug therapy is usually more effective than diet alone, but the choice of treatment should consider overall risk, costs of treatment, and patient preferences. Although diet therapy is an appropriate initial therapy for most patients, a minority achieve substantial reductions in lipid levels. Lipid-lowering treatments should be accompanied by interventions addressing all modifiable risk factors for heart disease, including smoking cessation, treatment of blood pressure, diabetes, and obesity, as well as promotion of a healthy diet and regular physical activity. Long-term adherence to therapies should be emphasized. All patients, regardless of lipid levels, should be offered counselling about the benefits of a healthy diet, regular physical activity, avoiding tobacco use, and maintaining a healthy weight.	• **Technology:** The USPSTF does not specify a specific cholesterol measure (LDL-C, HDL-C, TC or a ratio), a specific treatment goal, or an optimal interval for screening. • Similarly, the data that are available to build estimates of CPB and CE are based upon various screening measures and treatment goals. • Therefore, Partnership for Prevention provides a general estimate of the value of cholesterol screening and treatment that reflects the available data rather than a detailed estimate of a specific screening or treatment strategy.	• **General medical services contract: Quality and outcomes framework for primary care (GP-QOF)**

Diabetes Screening Screen for diabetes in adults with high cholesterol or hypertension and treat with a goal of lowering levels below conventional target values	**Rating: "B" Recommendation (for adults with high cholesterol or hypertension)** - **Recommended technology:** Three tests have been used to screen for diabetes: fasting plasma glucose (FPG), 2-hour post-load plasma glucose (2-hour PG), and haemoglobin A1c (HbA1c). The American Diabetes Association (ADA) has recommended the FPG test (>126 mg/dL) for screening because it is easier and faster to perform, more convenient and acceptable to patients, and less expensive than other screening tests. The FPG test is more reproducible than the 2- hour PG test, has less intraindividual variation, and has similar predictive value for development of microvascular complications of diabetes. Compared with the FPG test, the 2-hour PG test may lead to more individuals being diagnosed as diabetic. HbA1c is more closely related to FPG than to 2- hour PG, but at the usual cut-points it is less sensitive in detecting lower levels of hyperglycemia. The random capillary blood glucose (CBG) test has been shown to have reasonable sensitivity (75% at a cut-point of >120 mg/dL) in detecting persons who have either an FPG level >126 mg/dL or a 2-hour PG level >200 mg/dL, if results are interpreted according to age and time since last meal; however, the random blood glucose test is less well standardized for screening for diabetes. The ADA recommends confirmation of a diagnosis of diabetes with a repeated FPG test on a separate day, especially for patients with borderline FPG results or with normal FPG levels for whom suspicion of diabetes is high. - **Recommended time interval:** The optimal screening interval is not known. The ADA, on the basis of expert opinion, recommends an interval of every 3 years but shorter intervals in high-risk persons.	- Diabetes screening is limited to screening in adults with hypertension or hyperlipidemia per the USPSTF recommendation and, consistent with the evidence found in the USPSTF review, included only the marginal cardiovascular benefits of lowering blood pressure in people with diabetes below conventional target values.	
Diet Counselling Offer intensive behavioural dietary counselling to adult patients with hyperlipidemia and other known risk factors for cardiovascular and diet-related chronic disease	**Rating: "B" Recommendation** - **Recommended technology:** Effective interventions combine nutrition education with behaviourally-oriented counselling to help patients acquire the skills, motivation, and support needed to alter their daily eating patterns and food preparation practices. The largest effect of dietary counselling in asymptomatic adults has been observed with more intensive interventions (multiple sessions lasting 30 minutes or longer). Effective interventions include individual or group counselling delivered by nutritionists, dietitians, or specially trained primary care practitioners or health educators in the primary care setting or in other clinical settings by referral. Most studies of these interventions have enrolled selected patients, many of whom had known diet-related risk factors such as hyperlipidemia or hypertension. - **Recommended target population:** Patients with hyperlipidemia or hypertension, and others at increased risk for diet-related chronic disease. Similar approaches may be effective with unselected adult patients, but adherence to dietary advice may be lower, and health benefits smaller, than in patients who have been told they are at higher risk for diet-related chronic disease.	- Partnership for Prevention could find no chronic conditions other than cardiovascular diseases for which the evidence consistently showed an association between diet and disease risk. Therefore, only persons with risk factors for cardiovascular disease were included in the analysis	- **NICE Public Health Programme Guidance no 6: Behaviour change at population, community and individual level; National Institute for Health and Clinical Excellence, 2007**
Tetanus-diphtheria Booster Immunize adults every 10 years	- **Rating:** The USPSTF recognizes the importance of immunizations for primary disease prevention. The Task Force refers to recommendations made by the Centers for Disease Control and Preventions' advisory Committee on Immunization Practices (ACIP). The methods used by ACIP may differ from the methods used by the USPSTF - The advisory committee on Immunization Practices (ACIP) recommends Tetanus-diphteria immunization for the general adult population once every ten years as part of the adult immunization schedule	- As specified by ACIP (once every 10 years)	

APPENDIX E

Publications from the 2006 US Prioritisation Exercise

Maciosek MV, Coffield AB, Edwards NM, Flottemesch TJ, Goodman MJ, Solberg LI, (2006) Priorities Among Effective Clinical Preventive Services: Results of a Systematic Review and Analysis, *American Journal of Preventive Medicine*, vol 31, no 1, pp 52-61

Solberg LI, Maciosek MV, Edwards NM, Khanchandani HS, Goodman MJ (2006) Repeated Tobacco-Use Screening and Intervention in Clinical Practice: Health Impact and Cost Effectiveness, *American Journal of Preventive Medicine*, vol 31, no 1, pp 62-71

Maciosek MV, Solberg LI, Coffield AB, Edwards NM, Goodman MJ, (2006) Influenza Vaccination: Health Impact and Cost Effectiveness among Adults Aged 50 to 64 and 65 and older, *American Journal of Preventive Medicine*, vol 31, no 1, pp 72-79

Maciosek MV, Solberg LI, Coffield AB, Edwards NM, Goodman MJ, (2006) Colorectal Cancer Screening: Health Impact and Cost Effectiveness, *American Journal of Preventive Medicine*, vol 31, no 1, pp 80-89

Maciosek MV, Edwards NM, Coffield AB, Flottemesch TJ, Nelson WW, Goodman MJ, Solberg LI (2006) Priorities Among Effective Clinical Preventive Services: Methods, *American Journal of Preventive Medicine*, vol 31, no 1, pp 90-96

Satcher D (2006) Priorities Among Effective Clinical Preventive Services: A Commentary, *American Journal of Preventive Medicine*, vol 31, no 1, pp 97-98

Woolf SH, Stange KC (2006) A Sense of Priorities for the Healthcare Commons, *American Journal of Preventive Medicine*, vol 31, no 1, pp 99-102

Nussbaum SR (2006) Prevention: The Cornerstone of Quality Health Care, *American Journal of Preventive Medicine*, vol 31, no 1, pp 107-108

Solberg LI,. Maciosek MV, Edwards NM (2008) Primary Care Intervention to Reduce Alcohol Misuse Ranking Its Health Impact and Cost Effectiveness, *American Journal of Preventive Medicine*, vol 34, no 2, pp 143-152

Maciosek MV, Coffield AB, Edwards NM, Flottemesch TJ, Goodman MJ, Solberg LI (2006) Methods for Prioritizing Clinical Preventive Services: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

Solberg LI, Maciosek MV, Edwards NM, Khanchandani HS, Butani AL, Rickey DA, Goodman MJ (2006) Tobacco Use Screening and Counseling: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

Maciosek MV, Solberg LI, Coffield AB, Edwards NM, Khanchandani HS, Butani AL, McGree DA, Goodman MJ (2006) Influenza Immunization for Adults 50 Years and Older: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

Maciosek MV, Solberg LI, Coffield AB, Edwards NM, Khanchandani HS, Butani AL, McGree DA, Goodman MJ (2006) Colorectal Cancer Screening: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

Maciosek MV, Edwards NM, Davis MK, Butani AL, McGree DA, Solberg LI (2006) Cervical Cancer Screening: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

Maciosek MV, Edwards NM, Davis MK, Khanchandani HS, Butani AL, McGree DA, Solberg LI (2006) Breast Cancer Screening: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

Maciosek MV, Edwards NM, Solberg LI, McGree DA (2007) Pneumococcal Immunization: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

Maciosek MV, Solberg LI, Edwards NM, McGree DA (2007) Alcohol Missuse Screening and Behavioral Counselling: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

Maciosek MV, Edwards NM, Nelson WW, Davis MK, McGree DA, Solberg LI (2007) Lipid Disorder Screening in the General Population: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

APPENDIX F: Search strategies used in the US 2006 prioritisation exercise

Table 1. Standardized search strategies: effectiveness and cost effectiveness

Level 1	Level 2	Level 3[a]	Level 4[a]
Search PubMed Limit to English language. Limit to MeSH major terms, title word terms, and phrases. Back to 1992 (01/01/92). Exclude publication types—editorial, comment, news, and letter.	Search PubMed Limit to English language. Limit to text word terms. Back to 1992 (01/01/92). Exclude publication types—editorial, comment, news, and letter.	Search PubMed Limit to English language. Limit to MeSH major terms, title word terms, and text word terms. Back to 1987 (01/01/87). Exclude publication types—editorial, comment, news, and letter.	Search PubMed Limit to English language. Limit to text word terms.
Search Cochrane back to 1992.	References from major articles identified in Level 2.	Other knowledge-based information databases (literature databases).	Search general web
Obtain systematic review articles published back to 1992.			Association websites (American Heart Association, American Cancer Society, etc.)
Obtain articles used as part of the review that were published back to 1987.			
References from major articles identified in Level 1.			Search PubMed for English abstracts from all languages.

[a]Search one or more of the options listed in level.

Table 2. Standardized search strategies: burden of disease and cost

Level 1	Level 2	Level 3	Level 4[a]
National data sets	Search PubMed Limit to English language. Limit to MeSH terms and phrases. Back to 1998 (01/01/98). Exclude publication types—editorial, comment, news, and letter.	Search PubMed Limit to English language. Limit to MeSH major terms, title word terms, MeSH terms and phrases. Back to 1990 (01/01/90). Exclude publication types—editorial, comment, news, and letter.	Search PubMed Limit to English language. Limit to text word terms (search only as appropriate i.e., if it would represent current health status).
Government websites (CDC, NIH, AHRQ, etc.)	Association websites (American Heart Association, American Cancer Society, etc.)	Data sources referenced by articles identified in Level 2.	Other knowledge-based information databases (literature databases).
Search PubMed Limit to English language. Limit to MeSH major terms and title word terms. Back to 1998 (01/01/98). Exclude publication types—editorial, comment, news, and letter.	Data sources referenced by articles identified in Level 2.		Search general web.
Data sources referenced by articles identified in Level 1			HealthPartners' data.

[a]Search one or more of the options listed in level.
AHRQ, Agency for Healthcare Research and Quality; CDC, Centers for Disease Control and Prevention; NIH, National Institutes of Health.

Appendix G

Case studies of cost-effectiveness and clinical preventable burden models

Partnership for Prevention calculated its estimates for the 2006 priority ranking using spreadsheet models. Models of services, for which a technical report is available online at www.prevent.org, are summarised in this appendix. Each service is first presented in terms of the clinical preventive burden model and then the cost-effectiveness model, with formulas providing a synopsis for each model reviewed. Then the actual estimates used for clinical preventive burden and cost-effectiveness are presented.

Appendix G1

Clinical preventable burden model for breast cancer screening

$$CPB = n + o$$

n	Life years saved from screening ages 40-49	$n = \frac{a * g * i * l}{1 - c * g}$
o	Life years saved from screening ages 50+	$o = \frac{b * h * i * m}{1 - d * h}$

Cost-effectiveness model for breast cancer screening

$$CE = \frac{q + a}{d}$$

q	Costs of screening including patient time costs	$q = k * l * o + \frac{b}{f} * (1 - h) + a$
a	Net treatment costs	a = -1050000 (ages 40 to 69) a = 1040000 (ages 70 to 79)
d	Life years saved	$d = 393$

The overall CE ratio is a weighted average of each age group according to the number of screens in each age group

$$CE = \frac{q_a + a_a}{d_a} * \frac{l_a}{l_a l_b} + \frac{q_b + a_b}{d_b} * \frac{l_b}{l_a l_b}$$

G1-Table 1: CPB estimate for breast cancer

Row	Variable	Base case	Data source	Range for sensitivity analysis
a	Deaths in birth cohort between ages 40-49, and 50% ages 50-54	5,947	3	+/- 20%
b	Deaths in birth cohort 50% of ages 50-54, and ages 55+	52,569	3	+/- 20%
c	Frequency of screening in last two years ages 40-49	57%	120	65% to 75%
d	Frequency of screening in last two years ages 55+	63%	120	70% to 80%
e	Predicted deaths in the absence of screening ages 40-49, and 50% ages 50-54	7,139	a/(1-c*g)	
f	Predicted deaths in the absence of screening 50% of ages 50-54, and ages 55+	69,230	b/(1-d*h)	
g	Efficacy of mammography screening in preventing mortality ages 40-49	29.30%	8;9;15;27;43;48;54;58	0% to 40%
h	Efficacy of mammography screening in preventing mortality ages 50+	38.20%	8;10;15;18;27;42;44;48; 54;58;62;81	20% to 50%
i	Adherence all ages	85%	120;156-166	75% to 95%
j	Deaths prevented by screening ages 40-49	1,778	e*g*i	
k	Deaths prevented by screening ages 50+	22,479	f*h*i	
l	Life expectancy at average age of breast cancer death ages 40-49, and 50% ages 50-54	33.4	166	+/- 20%
m	Life expectancy at average age of breast cancer death 50% of ages 50-54, and ages 55+	13.2	166	+/- 20%
n	Life years saved from screening ages 40-49	59,387	j*l	
o	Life years saved from screening ages 50+	296,722	k*m	
p	Total Life years saved (CPB)	356,109	n+o	

G1-Table 2: Cost-effectiveness estimate for breast cancer screening

Row	Variable	Base case ages 40-69	Base case ages 70-79	Data source	Range for sensitivity analysis
a	Net treatment costs	-1,050,000	1,040,000	109	+/- 25%
b	Screening costs	14,850,000	3,950,000	109	+/- 25%
c	Net costs	13,800,000	4,990,000	109	
d	LYs saved	393	67.7	109	+/- 25%
e	$/LY saved	35,115	73,708	.= c/d	
f	Price index to $2000	0.845475	0.9283		
g	$/LY saved in $2000	41532.27927	79400.55288	.= (c/f)/d	
h	Compliance adjustment	25%	25%		
i	Adjusted screening costs	13,173,068	3,191,317	.= (b/f)*(1-h)	
j	Adjusted CE ratio in $2000	30,848	62,501	.= (i+a)/d	
k	Time cost per trip	42	42	169	+/- 50%
l	Screening and follow-up visits during age range per 10,000	126,203	30,999	see text	
m	Time costs for screening	5300526	1301958	.= k*l	
n	Median years to discount additional screening costs (from beginning age of respective models)	11	9	167	
o	Discount factor for time costs	0.722	0.766	present value tables	+/-10%
p	Time costs discounted 3%	3826979.772	997299.828	.= m*o	
q	Costs of screening including patient time costs	17,000,048	4,188,617	.= i+p	
r	Final CE ratio ($/LY saved)	40,585	77,232	.= (q+a)/d	
s	Weighted CE ratio (weighting the CE ratio for each age group according to the number of screens in each age group)	47811.82481		s= r1*L1/(L1+L2)+r2 *L2/(L1+L2)	

Appendix G2

Clinical preventable burden model for cervical cancer screening

$$CPB = i * j$$

i	Number of cervical cancer deaths prevented	$i = \frac{a * c/d * g}{1 - b * c/d}$
j	Average life years lost per cervical cancer death	j=27

Cost-effectiveness model for cervical cancer screening

$$CE = \frac{n}{c/365}$$

n	Total lifetime costs per woman screened, discounted	$n = b * e + a * h * i * l$
c	Additional days of life, discounted	c = 26.56

G2-Table 1: CPB estimate of screening for cervical cancer in average risk women

Row	Variable	Base case	Data source	Range for sensitivity analysis
a	Total cervical cancer mortality in a birth cohort of 4,000,000 between the ages of 20 and 75 yrs (women)	3,811	2;60;61	+/- 20%
b	% receiving cervical cancer screening	77.50%	62	70%-85%
c	Effectiveness of screening in reducing cervical cancer deaths	66.20%	20;26	50%-80%
d	% adherence in studies of effectiveness in reducing mortality	76.70%	14;20;26	
e	Efficacy of screening in reducing cervical cancer deaths	86.31%	= c/d	
f	Predicted cervical cancer deaths in the absence of screening	11,510	.= a/(1-b*e)	
g	% of patients accepting screening	85%	assumed, see text	75%-95%
h	Effectiveness of screening in preventing cervical cancer deaths in usual practice	73%	.= e*g	
i	Number of cervical cancer deaths prevented	8,444	.= f*h	
j	Average life years lost per cervical cancer death	27	2;61	+/- 20%
k	Number of life years saved (CPB estimate)	227,998	.= i*j	

G2-Table 2: Cost-effectiveness estimate of conventional Pap Smears

Row	Variable	Annual Pap with 10% random rescreen	Biennial Pap with 10% random rescreen	Triennial Pap with 10% random rescreen	Source	Range for sensitivity analysis
a	Number of screens	46	23	16	31	
b	Lifetime costs per woman screened, discounted	1,955	939	614	31	.=+-50%
c	Additional days of life, discounted	26.56	25.72	24.93	31	.=+/-25%
d	Average CE in $1996 ($/LY saved)	26,867	13,326	8,990	.=b/(c/365)	
e	Inflation adjustment from 1996 to 2000	1.143	1.143	1.143		
f	Lifetime costs per woman screened in $2000, discounted	2,235	1,073	702	.=b*e	
g	Average CE in $2000 ($/LY saved)_	30,708	15,231	10,275	. =f/(c/365)	
Add patient time and travel						
h	Cost per visit	42.32	42.32	42.32	69	.=+-50%
i	% attributable to screening	33%	33%	33%	assumed	.=25%-50%
j	Costs of patient time, undiscounted	642.4176	321.2088	223.4496	. =a*h*i	
k	Median year from age 20	22	22	22	61	
l	Discount factor for 3%	0.522	0.522	0.522	present value tables	.=+/-10%
m	Costs of patient time, discounted	335.3419872	167.6709936	116.6406912	. =j*l	
n	Total lifetime costs per woman screened, discounted	2,570	1,241	818	. =f+m	
o	Final CE ratio ($/LY Saved)	35,317	17,611	11,983	.=n/(c/365)	

Appendix G3

Clinical preventable burden model for colorectal cancer screening

$$CPB = q * b$$

q	Deaths prevented	$q = \frac{a*(g+k+h*l+i*m)*p}{1-c*(g*d+h*e+i*(1-d-e)}$
b	Weighted life expectancy at death	b=10,72

Cost-effectiveness model for colorectal cancer screening

$$CE = \mathrm{h.} * \mathrm{y} + \mathrm{p.} * \mathrm{z.} + \mathrm{x.} * \mathrm{aa.}$$

h	Adjusted CE (LYS) Annual FOBT, all estimates are per person	$h = \frac{b/0.9283 + f}{a/365}$
y	Percent of screening by FOBT in 2003	$y = 48.4\%$
p	Adjusted CE (LYS) Flexible Sigmoidoscopy every 5 years	$p = \frac{j/0.9283 + n}{i/365}$
z	Percent of screening by sigmoidoscopy in 2003	$z = 8.7\%$
x	Adjusted CE (LYS) Colonoscopy every 10 years	$x = \frac{r/0.9283 + v}{q/365}$
aa	Percent of screening by colonoscopy in 2003	$aa = 42.8\%$

Net change in QALYS from screening, diagnostic tests, treatment, and complications

net QALYs=∑d*e*c
d=Quality of Life Weight of health event
e=Duration of Effect on Quality of Life
c=Number in 3,740,000 Lifetimes* *Adjusted to reflect incomplete adherence and portion choosing FOBT, Sigmoidoscopy, and Colonoscopy for screening from rows d-f of Table 1.

G3-Table 1: CPB estimate for colorectal cancer screening

Row Label	Variable	Base Case	Data Source	Range for sensitivity analysis
a	2000 Colorectal cancer deaths ages 50+	90,785	3;88	+/- 20%
b	Weighted life expectancy at death	10.72	3;88	+/- 20%
c	Delivery rate for any recommended screening	17.60%	82	15% to 25%
d	Percent of screening by FOBT in 1990's	47.80%	83	30% to 70%
e	Percent of screening by sigmoidoscopy in 1990's	19.10%	83	15% to 30%
f	Percent of screening by colonoscopy in 1990's	0.331	f=1 - d - e	
g	Efficacy of FOBT	37.80%	7;9;12;13;15;17-21;23;24;26	25% to 60%
h	Efficacy of sigmoidoscopy	50.00%	16;17;20;22;28-30	25% to 75%
i	Efficacy of colonoscopy	70.00%	16;28-30	40% to 85%
j	Weighted efficacy of screening in 1990's	0.507884	j= g*d + h*e + i*f	
k	Percent of screening by FOBT in 2003	48.40%	89	30% to 70%
l	Percent of screening by sigmoidoscopy in 2003	8.70%	89	5% to 15%
m	Percent of screening by colonoscopy in 2003	42.80%	89	
n	Weighted efficacy of screening in 2003	0.526052	n= g*k + h*l + i*m	
o	Predicted deaths in the absence of screening	99696.64196	o= a/(1-c.*j)	
p	Adherence with offers to receive screening	60.00%	7-9;18;39-41;43;46;48;51-55;57;70;71;74	40% to 75%
q	Deaths prevented	31467.37074	q= o*n*p	
r	Life years saved (CPB)	337330.2143	r.= q * b	

G3-Table 2: Cost-effectiveness estimate for colorectal cancer screening

Row Label	Variable	Base case	Data source	Range for sensitivity analysis
Annual FOBT, all estimates are per person				
a.	Discounted days of gained LE	8	29	+/- 25%
b.	Discounted net costs	170	29	+/- 40%
c..	Original average CE (LYS)	7756.25	c..= b./ (a./365)	
d.	Discounted net costs adjusted to $2000	183.1304535	d.= b./ 0.9283	
e.	Inflation adjusted avg. CE (LYS)	8355.326942	e.= d./(a./365)	
f.	Personal time costs of screening	109	32;98	+/- 75%
g.	Discounted net costs w/ time adjustment	292.1304535	g.= d.+f.	
h.	Adjusted CE (LYS)	13328.45194	h.= g./(a./365)	
Flexible Sigmoidoscopy every 5 years				
i.	Discounted days of gained LE	10.7	29	+/- 25%
j.	Discounted net costs	430	29	+/- 40%
k.	Original avg. CE (LYS)	14,668	k.= j./(i./365)	
l.	Discounted net costs adjusted to $2000	463	l.= j./ 0.9283	
m.	Inflation adjusted avg. CE (LYS)	15,801	m.= l./(i./365)	
n.	Personal time costs of screening	108	32;98	+/- 75%
o.	Discounted net costs w/ time adjustment	571	o.= l.+n.	
p.	Adjusted CE (LYS)	19,482	p.= o./(i./365)	
Colonoscopy every 10 years				
q.	Discounted days of gained LE	15.6	29	+/- 25%
r..	Discounted net costs	300	29	+/- 40%
s.	Original average CE (LYS)	7,019	s.= r../(q./365)	
t.	Discounted net costs adjusted to $2000	323	t.=r../ 0.9283	
u.	Inflation adjusted avg. CE (LYS)	7,561	u.=t./(q./365)	
v.	Personal time costs of screening	55	32;98	+/- 75%
w.	Discounted net costs w/ time adjustment	378	w.=t.+v.	
x.	Adjusted CE (LYS)	8,840	x.= w./(q./365)	
Weighted Average CE ratio				
y.	Percent of screening by FOBT in 2003	48.40%	Table 1, row k	30% to 70%
z.	Percent of screening by sigmoidoscopy in 2003	8.70%	Table 1, row l	15% to 30%
aa.	Percent of screening by colonoscopy in 2003	42.80%	Table 1, row m	Varies with y andz
bb.	Weighted CE (based on current delivery patterns) (LYS)	11,947	bb.= h.*y.+p.*z.+x.*aa.	

G3-Table 3: Net change in QALYS from screening, diagnostic tests, treatment, and complications

Event	Possible quality of life impact	Number in 3,740,000 lifetimes*	Quality of iife weight	Duration of effect on quality of life	QALYs per occur-rence (= d x e)	Total QALYs (= c x f)	Notes on estimate of lifetime incidence of screening, treatment or events (column c)
a	b	c	d	e	f	g	h
FOBT Screens	Discomfort, Anxiety	26,436,153	-0.05	2 days	-0.00027	-7,243	Based on Sonnenberg, 2000 model results.[1]
Sigmoidoscop y Screens	Discomfort, Anxiety	2,672,762	-0.05	2 days (result only matches if e=4 days)	-0.00027	-1,465	Based on Sonnenberg, 2000 model results.[2]
Colonoscopy	Discomfort, Anxiety	3,407,062	-0.3	4 days	-0.00027	-11,201	Based on Sonnenberg, 2000 model results.[2]
Cancers Prevented		42,208	0.2	3.9 years	0.78	32,142	Based on cancers prevented in Sonnenberg 2000.[2] Assume polypectomies 90% effective in avoiding cancer treatments
Bleeding Complications	Treatment & Recovery Discomfort, Anxiety	10,354	-0.3	1 month	-0.025	-259	Based on Sonnenberg, 2000 model results.[2]
Perforation Complications	Treatment & Recovery Discomfort, Anxiety	6,318	-0.5	3 months	-0.125	-790	Based on Sonnenberg, 2000 model results.[2]
Deaths from Complications	Death	290	-1	15 years	-15	-4,353	Based on Sonnenberg, 2000 model results.[2]
Approximate Net QALYs:						**-6,832**	

*Adjusted to reflect incomplete adherence and portion choosing FOBT, Sigmoidoscopy, and Colonoscopy for screening from rows d-f of Table 1.

[1] Sonnenberg A , Delco F, Inadomi JM (2000) Cost-effectiveness of colonoscopy in screening for colorectal cancer, *Ann Intern Med*, vol. 133, no 8, pp 573-584.

Appendix G4

Clinical preventable burden model of influenza vaccination

$$CPB = bb + gg + LL$$

bb	Years of life saved through prevented mortality	$\left(\left(\frac{a * \frac{c}{1 - f * h}}{100{,}000}\right) * Z + \left(\frac{b * \frac{d}{1 - g * h}}{100{,}000}\right) * aa\right) * r * h$
gg	QALYs saved due to reduced non-hospitalized cases	$gg = ff * dd * (a + b) * L * r * u$
LL	QALYs saved due to reduced hospitalized cases	$LL = kk * ii * (a * n + b * p) * r * w$

Cost-effectiveness model of influenza vaccination

$$CE = \frac{xx - (pp + tt)}{LL + gg + bbb}$$

xx	Lifetime vaccination costs	$xx = (a + b) * r * (vv + ww)$
pp	Total hospitalization case savings	$pp = a * n * r * w * nn + b * p * r * w * oo$
tt	Outpatient case savings	$tt = ((a + b) * L - a * n - b * p) * qq * ss * r * u$
LL	QALYs saved due to reduced hospitalized cases	$LL = kk * ii * (a * n + b * p) * r * w$
gg	QALYs saved due to reduced non-hospitalized cases	$gg = ff * dd * (a + b) * L * r * u$
bbb	Discounted life years saved	$bbb = aaa * \left(\frac{a * \frac{c}{1 - f * h}}{100{,}000} + \frac{b * \frac{d}{1 - g * h}}{100{,}000}\right) * r * h$

G4-Table 1: CPB estimate of the influenza vaccine being offered to a birth cohort of 4,000,000, starting at age 50

Row	Variable	Base Case Estimate	Source	Range for sensitivity analysis
Person-years in target population from birth cohort of 4,000,000				
a	Number of person-years between ages 50-64	53,357,760	45	
b	Number of person-years after age 64	58,699,920	45	
Influenza mortality after age 49 in birth cohort of 4,000,000				
c	Annual influenza-related mortality rate per 100,000 ages 50-64	12.5	44	+/- 25%
d	Annual influenza-related mortality rate per 100,000 ages 65+	132.5	44	+/- 25%
e	Total unadjusted influenza related deaths after ages 49	84447.114	=(a×c + b×d) / 100,000	
f	Vaccination rate in ages 50-64 in 1990s	34.20%	48;51	+/- 25%
g	Vaccination rate in for ages 65+ in 1990s	57.40%	48;50;51	+/- 25%
h	Efficacy of influenza vaccine in preventing influenza-related mortality	42.90%	3;10;19;22;26	35% to 55%
i	Predicted annual influenza mortality rate per 100,000 ages 50-64 in the absence of vaccinations	14.65	= c / (1- f×h)	
j	Predicted annual mortality rate per 100,000 in the absence of vaccinations ages 65+	175.79	= d / (1- g×h)	
k	Predicted influenza-related mortalities after age 49 in birth cohort	111003.26	=(a×i + b×j) / 100,000	
Influenza-like illness after age 49 in birth cohort of 4,000,000				
l	Annual incidence of influenza-like illness in unvaccinated individuals	0.1511	7;9;13;23;52	0.09 to 0.25
m	Influenza cases after age 49 in unvaccinated individuals	16931915.45	= (a+b) × l	
Influenza-related hospitalizations after age 49 in birth cohort of 4,000,000				
n	Annual hospitalization rate for pneumonia or influenza ages 50-64 in unvaccinated individuals	0.001	7;54	0.000 to 0.0020
o	Number of hospitalizations for pneumonia or influenza ages 50-64 in unvaccinated individuals	53357.76	= a×n	
p	Annual hospitalization rate for pneumonia or influenza after age 65+ in unvaccinated individuals	0.009	22;24;25	.0085 to .0111
q	Number of hospitalizations for pneumonia or influenza after age 65+ in unvaccinated individuals	528299.28	= b×p	
Vaccine effectiveness				
r	Adherence with vaccine	85.00%	61	75% to 95%
s	Efficacy of influenza vaccine in preventing influenza-related mortality	42.90%	3	
t	Effectiveness of offering vaccine in preventing mortality	36.47%	= r×h	
u	Efficacy of vaccine in preventing influenza-like illness	18.90%	7;9;13;17;23;26;27	10% to 30%
v	Effectiveness of offering vaccine in preventing influenza-like illness	16.07%	= r×u	
w	Efficacy of influenza vaccine in preventing hospitalizations for influenza and pneumonia	36.60%	5;6;10;12;19;22;24-26	25% to 50%
x	Effectiveness of offering vaccine in preventing hospitalizations for influenza and pneumonia, ages 50+	31.11%	= r×w	
QALYs Saved after age 49 through prevented mortality				
y	Predicted mortalities prevented	40477.34	= k×t	
z	Average life expectancy at death ages 50-64	16.40	45;65	5.05 to 10.1
aa	Average life expectancy at death ages 65+	5.60	45;65	

bb	Years of life saved	257456.38	= ((a×i/100,000) ×z+(b×j/100,000) ×aa) ×t	
QALYs saved after age 49 through prevented influenza-like Illness				
cc	Predicted non-hospitalized cases prevented	2720112.22	= m×v	
dd	Duration of illness in years (= 1 week)	0.02	23	0.5 to 2 weeks
ee	Year-equivalents of illness prevented by reduced non-hospitalized cases	52226.15	= cc×dd	
ff	Quality of life reduction per year (QALY weight)	0.30	Study methods (see techn. report)	0.20 to 0.40
gg	QALYs saved due to reduced non-hospitalized cases	15667.85	= ee×ff	
QALYs saved after age 49 through prevented hospitalizations				
hh	Predicted hospitalizations for pneumonia or influenza prevented	180953.51	= (o+q)×x	
ii	Duration of illness in years (= 2 weeks)	0.04	Assumed	1 to 3 weeks
jj	Year-equivalents of illness prevented by reduced hospitalized cases	6966.71	= hh×ii	
kk	Quality of life reduction per year (QALY weight)	0.30	Study methods (see techn. reportt)	0.20 to 0.40
ll	QALYs saved due to reduced hospitalized cases	2090.01	= jj×kk	
mm	Total QALYs saved after age 49 in birth cohort of 4,000,000 (CPB)	275214.24	=bb+gg+ll	

G4-Table 2: Cost-effectiveness estimate of the influenza vaccine being offered to a birth cohort of 4,000,000 starting at age 50

Row	Variable	Base Case Estimate	Source	Range for sensitivity analysis
Health care costs savings				
nn	Cost per hospitalized case, ages 50-64	7276	37	+/- 25%
oo	Cost per hospitalized case, ages 65+	8278	37	+/- 25%
pp	Total hospitalization case savings	1481300317	= o×x×nn + q×x×oo	
qq	Percent of non-hospitalized cases receiving care	47%	37	35% to 60%
rr	Number outpatient treated cases all ages	7684621.452	=(m–o–q) × qq	
ss	Cost per outpatient treated case all ages	198.00	37	+/- 25%
tt	Outpatient care case savings	244437818.4	= rr×ss×v	
uu	Total Savings	1725738136	pp+ tt	
Vaccination Costs				
v v	Per vaccination healthcare costs	12.59	7;19;20;37	$6 to $18
ww	Per vaccination patient time and travel costs	21.16	67	$10.58 to $35.27
xx	Lifetime vaccination costs	3214654695	= (a+b)×r ×(vv+ww)	
Cost Effectiveness				
yy	Net Costs	1488916559	xx - uu	
zz	Discount Rate	3%	see text	
aaa	Average present value of LY saved per death from year of immunization	5.85	see text	4.77 to 8.86
bbb	Discounted LY saved	236792.4242	= y×aaa	
ccc	Discounted QALYs saved	254550.2836	bbb+gg+ll	
ddd	CE	5849.204089	yy/ccc	
eee	Net costs per vaccination	15.63182943	=yy/((a+b)×r)	

Appendix G 5:

Clinical preventable burden model for smoking cessation

$$CPB = a * (b + h) * j$$

a	Number of ever smokers in birth-cohort of 4,000,000	$a = 1781449$
b	Average gains in LE per quit	$b = 5{,}65$
h	QALYs saved from avoided morbidity per smoker counseled	$h = \frac{c/a}{e * f = (1-e)} - \frac{c/a}{e * f = (1-e)} * f$
j	Long-term effectiveness of repeated counseling in inducing additional quits among ever smokers (sub model)[2]	$j = 23{,}1\% - - > sub\,\mathrm{mod}\,el$ [1]

Cost-effectiveness model for smoking cessation

$$CE = \frac{nn - oo}{pp}$$

nn	Discounted lifetime counseling and smoking cessation aid costs per ever-smoker counseled	$nn = ((l + m) * n + q * p) * s * ii$
oo	Discounted lifetime savings per ever-smoker counselled	$oo = (\frac{u}{(1-v) * y + (v-w) * z + w} - \frac{y * \frac{u}{(1-v) * y + (v-w) * z + w}}{z}) * ee * j * mm$
pp	Discounted QALYs saved per ever-smoker counseled	$pp = ((\frac{c/a}{e * f + (1-e)} - \frac{c/a}{e * f + (1-e)} * f) * mm + b * kk) * j$

QALYs lost to smoking attributable morbidity

a	QALYs lost to smoking attributable morbidity	h=∑a*b*c*f*g
A	years of life lived after the age of 35 in a birth cohort of 4 million OR the number of years of life lived from birth	
B	Incidence Rate of disease / 100.000	
C	percentage of disease attributable to smoking	
F	Duration of the disease	
G	quality of life when suffering from the disease	

[2] A sub-model was developed to the CPB model estimate which tried to answer the question "what long term quit rate for repeated counselling is consistent with: 1) trends in counselling delivery rates 2) trends in total quit rates among smokers 3) trends in spontaneous quits, and 4) the 12-month counselling effectiveness of brief to medium counselling obtained from the literature review. This sub-model is explained in: Solberg L, Maciosek M, Edwards N, Khanchandani H, Butani A, Rickey D, Goodman M (2006) Tobacco Use Screening and Counseling: Technical Report Prepared for the National Commission on Prevention Priorities; Health Partners Research Foundation; Partnership for Prevention

G5-Table 1: CPB estimate of repeated tobacco cessation counselling for a birth cohort of 4,000,000 individuals

Row	Variable	Base Case	Data Source	Range for sensitivity analysis
Gains in life expectancy				
a	Number of ever smokers in birth-cohort of 4,000,000	1,781,449	62;63	1,590,000 to 2,040,000
b	Average gains in LE per quit	5.65	62;64;65	+/-25%
Gains in Quality of life				
c	QALYs lost to smoking attributable (SA) illness in birth cohort	709,063	Table 3	+/-50%
d	QALYs lost to SA illnesses per ever-smoker	0.398025989	= c ÷ a	
e	Portion of ever-smokers who are former smokers	51.90%	62	+/- 5 % points
f	Relative risk of SA disease for former smokers compared to current ones	0.392	65;86-88	0.20 to 0.56
g	QALYs lost from SA morbidity per continuing smoker	0.581528456	= d ÷ (e×f + (1-e)	
h	QALYs saved from avoided morbidity per smoker counseled	0.353569302	= g - g×f	
Effectiveness and CPB				
i	Short-term (1 year) effectiveness of primary care interventions with/without medications	5.0/2.4%	4-6;8-10;12;14;15;15-20;24-26	2.0 to 8.0%/ 1.0 to 4.0%
j	Long-term effectiveness of repeated counseling in inducing additional quits among ever smokers	23.10%	sub-model[1]	2.9% to 69.3%
k	CPB (total QALYs saved)	2470557.134	= a × (b+h) × j	

G 5-Table 2: Cost-effectiveness estimate of repeated tobacco cessation counselling

Row	Variable	Base Case	Source	Range for sensitivity analysis
Cost of counselling				
l	Cost of 10-minute office visit	44	97	+/- 33%
m	Cost of patient time and travel for office visit	42	98	+/- 50%
n	Portion of office visit needed for counseling	25%	assumed	10% to 50%
o	Total cost of counseling per occasion	21.5	(l + m) * n	
p	Average cost of smoking cessation aids per quit attempt	170	study data	+/- 50%
q	Portion of counseled who use a smoking cessation aid	16.30%	sub-model[1]	10% to 30%
r	Number of years as smokers in birth-cohort of 4,000,000	47,261,827	62	+/- 20%
s	Average years as smoker, per ever-smoker	26.5299916	r ÷ a	
t	Lifetime costs of counseling and smoking cessation aid use per ever-smoker counseled, undiscounted	1305.540886	(o + q×p) × s	Cost-savings
u	Per capita personal health care expenditures (PHE) if 19+ in 2000	6,957	112;113	0.40 to 0.55
v	Ever-smokers as % of population	0.466	62	0.20 to 0.27
w	Current smokers as % of population	0.224	62	+/- 20%
x	Former smokers as % of population	0.242	v - w	
y	Ratio of average PHE for never compared to current smokers	0.76	86	0.65 to 0.85
z	Ratio of average PHE, for never compared to former smokers	0.86	86	0.75 to 0.95
aa	Average annual PHE of current smokers	8302.305599	u ÷ ((1-v) × y + x×z + w)	
bb	Average annual PHE of never smokers	6309.752255	y × aa	
cc	Average annual PHE of former smokers	7336.921227	bb ÷ z	
dd	Annual cost savings per additional year as former smoker	965.384372	aa - cc	
ee	Number of current smoker years converted to former smoker years by counseling per smoker	24.6	63 65	+/- 25%
ff	Average lifetime savings per additional former smoker	23748.45555	dd × ee	
gg	Average savings per ever-smoker counseled	5485.893232	ff × j	
Discounting and CE calculation				
hh	Median year of counseling after age 18	26	62	
ii	Corresponding discount factor	0.464	3	+/- 20%
jj	Median year of life year saved after age 18	56.1	63-65	
kk	Corresponding discount factor	0.191	3	+/- 20%
ll	Median year of morbidity & cost prevention after age 18	51.1	jj - 5	
mm	Corresponding discount factor	0.221	3	+/- 20%
nn	Discounted lifetime counseling and smoking cessation aid costs per ever-smoker counseled	605.7709713	t × ii	
oo	Discounted lifetime savings per ever-smoker counselled	1212.382404	gg × mm	
pp	Discounted QALYs saved per ever-smoker counseled	0.267333716	(h×mm + b×kk) × j	
qq	CE	-2269.116822	(nn - oo) ÷ pp	--
rr	Discounted net cost per ever-smoker	-606.611433	nn - oo	--

G5-Table 3: QALYs lost to smoking attributable morbidity

- Years of life lived after the age of 35 in a birth cohort of 4 million: 164,596,352
- The number of years of life lived from birth: 304596352 (for fire injuries)
- The number of years of life lived from birth: 4000141.849 (paediatric diseases)

A	b	c	d	e	f	g	h
Condition	**Incidence Rate**	**SAF**	**SA Disease**	**Type of Incidence Data**	**Duration (yrs)**	**QALY Weight**	**SA QALYs Lost**
Cancers							
Oral Cavity, Pharynx	0.00021	0.646	22,329	New cases	4.3	0.2	19,203
Esophagus	0.0000949	0.681	10,637	New cases	1.8	0.3	5,744
Stomach	0.000151	0.207	5,145	New cases	3	0.2	3,087
Pancreas	0.000216	0.222	7,893	New cases	1.24	0.3	2,936
Larynx	0.0000727	0.805	9,633	New cases	2	0.3	5,780
Lung, Bronchus	0.00124	0.803	163,892	New cases	2	0.3	98,335
Urinary Bladder	0.000424	0.404	28,195	New cases	4.7	0.2	26,503
Kidney, Renal Pelvis	0.000242	0.259	10,317	New cases	4.7	0.2	9,698
Acute Myeloid Leukemia	0.0000788	0.17	2,205	New cases	4.6	0.2	2,029
Cervix Uteri	0.000151	0.12	1,555	New cases	4	0.2	1,244
Circulatory Diseases							
Ischemic Heart Disease	0.0147	0.164	396,809	Hospital stays	0.058	0.3	6,904
Other Heart Disease	0.00797	0.125	163,979	Hospital stays	0.058	0.3	2,853
Congestive Heart Failure	0.00387	0.125	79,623	New cases	2.3	0.2	36,627
Strokes	0.00352	0.102	59,097	1st strokes	7.8	0.4	184,382
Transient Ischemic Attack	0.00147	0.102	24,680	Hospital stays	0.058	0.3	429
Atherosclerosis	0.000774	0.143	18,218	Hospital stays	0.058	0.3	317
Aortic Aneurysm	0.000443	0.575	41,927	Hospital stays	0.058	0.3	730
Other Arterial Disease	0.000711	0.134	15,682	Hospital stays	0.058	0.3	273
Respiratory Diseases							
Pneumonia, Influenza	0.0429	0.169	1,193,340	Self-reported	0.038	0.3	13,604
Bronchitis, Emphysema, Chronic Airways Obstruction	0.00169	0.785	218,362	New cases	6.6	0.2	288,238
Injuries							
Fire Injuries	0.0000485	0.25	3,693	Injuries	0.077	0.3	85
Childhood Diseases							
Short Gestation/Low Birth Weight	0.015	0.0907	5,442	Hospital stays	0.25	0.3	408
Respiratory Distress Syndrome	0.00815	0.0346	1,128	Hospital stays	0.167	0.3	57
Other Respiratory – newborn	0.0244	0.0472	4,607	Hospital stays	0.167	0.3	231
						TOTAL	**709,695**

APPENDIX H

Review of academic literature referring to the Partnership for Prevention Prioritisation of Clinical Preventive Services

Methodology

In order to assess the relevance of the US prioritisation exercise to the UK, part of our analysis reviewed academic publications citing the Partnership for Prevention work since their first paper on prevention priorities was published in 2001. Several databases, including Scopus, Medline, Econlit, Embase and Pubmed were searched for articles, reviews, conference papers, notes, editorials and short surveys which cited at least one of the seven articles on prevention priorities published between 2001 and 2006 in the American Journal of Preventive Medicine (Table 1). Publications were grouped according to several categories, including the type of journal (general medical journal, disease specific journal etc.), the type of paper (empirical or non-empirical), the research area (smoking cessation, cancer screening etc.), and the degree to which the work refers to the methodology applied by Partnership for Prevention. Papers which critically appraised the methods used to rank clinical preventive services were assessed in greater detail in order to obtain useful comments on the Partnership for Prevention prioritization approach.

Table 1: Partnership for Prevention publications on prevention priorities

Authors	Title	Source	No. of citations	export date
Coffield, A.B., Maciosek, M.V., McGinnis, J.M., Harris, J.R., Caldwell, M.B., Teutsch, S.M., Atkins, D., Richland, J.H., Haddix, A.	Priorities among recommended clinical preventive services	Am J Prev Med (2001), 21 (1), pp. 1-9	157	04.Oct 2007
Maciosek, M.V., Coffield, A.B., Edwards, N.M., Flottemesch, T.J., Goodman, M.J., Solberg, L.I.	Priorities Among Effective Clinical Preventive Services. Results of a Systematic Review and Analysis	Am J Prev Med (2006), 31 (1), pp. 52-61	31	18.0ct 2007
Maciosek, M.V., Coffield, A.B., McGinnis, J.M., Harris, J.R., Caldwell, M.B., Teutsch, S.M., Atkins, D., Richland, J.H., Haddix, A.	Methods for priority setting among clinical preventive services	Am J Prev Med (2001), 21 (1), pp. 10-19	30	04.Oct 2007
Maciosek, M.V., Edwards, N.M., Coffield, A.B., Flottemesch, T.J., Nelson, W.W., Goodman, M.J., Solberg, L.I.	Priorities Among Effective Clinical Preventive Services. Methods	Am J Prev Med (2006), 31 (1), pp. 90-96.	12	18.0ct 2007
Solberg, L.I., Maciosek, M.V., Edwards, N.M., Khanchandani, H.S., Goodman, M.J.	Repeated Tobacco-Use Screening and Intervention in Clinical Practice. Health Impact and Cost Effectiveness	Am J Prev Med (2006), 31 (1), pp. 62-71.e3	10	18.0ct 2007
Maciosek, M.V., Solberg, L.I., Coffield, A.B., Edwards, N.M., Goodman, M.J.	Colorectal Cancer Screening. Health Impact and Cost Effectiveness	Am J Prev Med (2006), 31 (1), pp. 80-89	9	18.Oct 2007
Maciosek, M.V., Solberg, L.I., Coffield, A.B., Edwards, N.M., Goodman, M.J.	Influenza Vaccination. Health Impact and Cost Effectiveness Among Adults Aged 50 to 64 and 65 and Older	Am J Prev Med (2006), 31 (1), pp. 72-79.	7	18.0ct 2007

Results

199 publications cited at least one of the papers related to either the 2001 or the 2006 priority ranking. 188 of these papers (95%) were accessible. 17 papers (9%) were written by authors also involved in at least one of the Partnership for Prevention publications on prioritisation. A further 22 papers (11%) stem from current or former members of the National Commission on Prevention Priorities which guided the US-prioritisation exercise.

59 papers (30%) were published in journals of general medical sciences, whereas 51 papers (26%) appeared in journals for public health, 39 papers (20%) in disease specific journals and 26 papers (13%) in patient group specific journals. Empirical work formed the majority of publications (86%) and most of this empirical work focussed on the United States (87%) So far, no publication considers the value of the US-prioritisation exercise for the UK or even its transferability to the UK. Of the papers reviewed, 116 refer to a particular area of prevention or a preventive technology (Table 2). The majority of papers referred to smoking cessation (34%), followed by screening programmes (28%) and immunization programes (14%) respectively. Most of the papers in table 2 simply make a reference to the US-prioritisation exercise to emphasize a technologies importance to the US-population. None of these papers refers to the priority ranking as a whole or assess the methodology applied in the exercise.

Table 2: Academic impact by prevention areas

Smoking cessation	**39**
Screening programmes	**33**
cancer screening	21
Colorectal cancer screening	14
Breast cancer screening	2
Cervical cancer screening	1
Chlamydia screening	8
newborn screening	2
other screening	2
Immunizations	**16**
childhood immunization	5
influenza vaccination	2
Alcohol misuse	**9**
Obesity	**3**
Infectious diseases and HIV prevention	**3**
eye care	**2**
annual physical examination	**2**
other	**9**

A few papers have critically assessed the methods used to rank clinical preventive services. The most consistent criticism was that priorities were assessed for the general population at a national level. Therefore, it was argued that the exercise at best provides little guidance for local decision makers and at worst, that it is potentially misleading since an interventions cost-effectiveness can alter significantly if services are targeted to a specific subgroup rather than the general population [4-7, 9]. Hence, decision makers

may need to replicate cost-effectiveness studies with local data and include preventive services for which cost-savings are confirmed into health insurance packages [4].Woolf and Stange (2006) suggest that an electronic tool could be developed by the NCPP, which may help policymakers to tailor priorities to local population characteristics [9].

There is, however, a trade off between targeting the prioritisation exercise to local populations and the need for valid estimates to rank clinical preventive services. One study calls the results of the US-priority ranking into question because of the lack of long-term adherence and cost-effectiveness data for most health behaviour counselling services. [5]. But replicating the rankings on a local level could be even more difficult since data availability is usually higher on a national level.

In contrast to the societal perspective for the reference case as recommended by the United States Public Health Service's Panel on Cost Effectiveness in Health and Medicine, Gandjour and Lauterbach (2002) suggest a health insurer's perspective and introducing copayments for preventive services. As the authors state, copayments can be justified by assuming that the public gives less priority to healthy persons or those who do not suffer from severe diseases [4]. It was also stated that preventive services for all individuals, i.e. treatment without the necessity of screening, and preventive services conducted only once were missing in the US-priority ranking [4].

Two articles state that multifaceted interventions may be more cost-effective than the single-risk practice as it is reflected in the US-priority ranking [4, 5]. It was argued that, since the majority of patients show two or more behavioural risk factors, single-risk practice guidelines provide little help for the management of those individuals. A further improvement of a services cost-effectiveness ratio is likely to occur if benefits arising from preventive care on comorbid disorders as well as a compression of morbidity from unrelated diseases during added years of life are taken into account [4, 8]. In addition, one article suggests differential discounting for costs and benefits in the cost-effectiveness ratio [4]. A lower discount rate for benefits would decrease the cost-effectiveness ratio and strengthen the relative value of those interventions for which health benefits usually occur far in the future. On the other hand, it was stated that implementation costs as well as cost arising from a change in provider incentives, which have been ignored in the US-priority ranking, are likely to increase the cost-effectiveness ratio of clinical preventive services [4].

Despite all these criticism, some articles emphasize that the priority rankings provided by Partnership for Prevention carry important implications for policymakers, clinicians, and patients [9-15]. For example, Woolf and Stange (2006) argue that, although the "science of prioritisation requires further leavening before it can be applied as a tool of precision", the society should not continue to over-invest in services on the bottom of the ranking at the expense of under-used high-tier services [9, 14]. This statement is in accord with

Lusk (2001), who argues that, at a minimum, the top 14 services of the 2001 priority ranking should be provided by employers and insurance companies [10].
Policy makers can use the priority ranking very productively within, as well as across, disease areas when setting priorities [13-15]. Further, it is stated that the ranking provides useful information for investments in the promotion of a preventive service [9, 13]. Given that most Americans already have access to the majority of the services ranked, health outcomes could be maximized by investing in the fidelity with which a service is delivered rather than the effectiveness of the technology applied to provide the service [9]. Increasing the delivery rate by promoting a recommended service often can do more to improve health outcomes than making the services more effective [9]. With respect to the rankings value for health policy makers it is also argued that, although the report focuses on clinical preventive services, "The greatest advances in prioritized delivery may be possible by supporting collaboration between clinicians and community groups in systems that integrate clinical and community preventive services and the unique strengths that each brings to preventive care" [9].

For primary care professionals and specialists, the Partnership of Prevention priority ranking helps to clarify the relative importance of services which fall in their domain. [9]. As argued, "both primary care clinicians and specialists should use the NCPP report as a reference point for exploring whether their office systems and patient care procedures accommodate the delivery of first-tier preventive services."

Finally, healthcare consumers can benefit from the ranking because it provides information on a services value based on a reasoned method driven by science and effectiveness rather than some "crafted messages" about the importance of a specific healthcare service [9, 15]. And even if individual priorities might differ from the society as a whole, the ranking helps to inform consumer decisions on the purchase of preventive care [9, 12].

References

[1] Maciosek MV, Coffield AB, McGinnis JM, Harris JR, Caldwell MB, Teutsch SM, Atkins D, Richland JH, Haddix A (2001) Methods for Priority Setting Among Clinical Preventive Services, *American Journal of Preventive Medicine*, vol 21, no 1, pp 10-19

[2] Maciosek MV, Coffield AB, Edwards NM, Flottemesch TJ, Goodman MJ, Solberg LI, (2006) Priorities Among Effective Clinical Preventive Services: Results of a Systematic Review and Analysis, *American Journal of Preventive Medicine*, vol 31, no 1, pp 52-61

[3] Maciosek MV, Edwards NM, Coffield AB, Flottemesch TJ, Nelson WW, Goodman MJ, Solberg LI (2006) Priorities Among Effective Clinical Preventive Services: Methods, *American Journal of Preventive Medicine*, vol 31, no 1, pp 90-96

[4] Gandjour A, Lauterbach KW (2002) Preventive care and the prospect of cost savings; *European Journal of Health Economics*, vol 3, no 1, pp. 1-2

[5] Orleans CT (2005) The behaviour change consortium: Expanding the boundaries and impact of

health behaviour change research; *Annals of Behavioural Medicine*, vol 29 (suppl.), pp 76-79

[6] Valdiserri RO (2007) Late HIV diagnosis: Bad medicine and worse public health; *PLoS Medicine*, vol 4, no 6, pp 975-976

[7] Theuer CP, Taylor TH, Brewster WR, Anton-Culver H. (2006) Gender and race/ethnicity affect the cost-effectiveness of colorectal cancer screening; *Journal of the National Medical Association*, vol 98,no 1, pp 51-57

[8] Gandjour A, Lauterbach KW (2005) Does prevention save costs? Considering deferral of the expensive last year of life; *Journal of Health Economics*, vol 24, pp 715-724

[9] Woolf SH, Stange KC (2006) A Sense of Priorities for the Healthcare Commons; *American Journal of Preventive Medicine*, vol 31, no 1, pp 99-102

[10] Lusk SL (2001) Priorities for preventive services; *AAOHN Journal*, vol 49, no 12, pp 540-541

[11] Woolf SH (2007) Potential health and economic consequences of misplaced priorities; *Journal of the American Medical Association*, vol 297, no 5, pp 523-526

[12] Nussbaum SR (2006) Prevention. The Cornerstone of Quality Health Care; *American Journal of Preventive Medicine*, vol 31, no 1, pp 107-108

[13] Holtgrave DR (2002) Extending the methodology of the Committee on Clinical Preventive Service Priorities to HIV-prevention community planning; *American Journal of Preventive Medicine*, vol 22, no 3, pp 209-210

[14] Charatan F (2001) Half of Americans miss out on preventive services; *BMJ*, vol 323 (7303), 10

[15] Lawrence DM (2001) Priorities among recommended clinical preventive services; *American Journal of Preventive Medicine*, vol 21, no 1, pp 66-67

Appendix I: Case studies of 3 preventive services in the US and England

Appendix I1:Cervical cancer screening

	Cervical cancer screening in England	Cervical cancer screening in the USA
Description of service	- National policy for the screening programme is that eligible women should be invited for screening every 3 or 5 years (this varies according to age, women aged 25-49 are invited every 3 years, those aged 50-64 every 5 years). Since 2003, women have been eligible for routine screening from age 25 (previously age 20). Women aged 25 to 64 will authomatically receive an invitation. - In 2003, The NHS Cervical Screening Programme announced the introduction of liquid based cytology (LBC) **Age group (years)** — **Frequency of screening** 25 — First invitation 25 - 49 — 3 yearly 50 - 64 — 5 yearly 65+ — Only screen those who have not been screened since age 50 or have had recent abnormal tests *Source: National Statistics; Cervical Screening Programme England 2006-0; NHS-The Information Centre, 2007*	- The U.S. Preventive Services Task Force (USPSTF) strongly recommends screening for cervical cancer in women who have been sexually active and have a cervix. *Rating: A Recommendation.* - The USPSTF recommends against routinely screening women older than age 65 for cervical cancer if they have had adequate recent screening with normal Pap smears and are not otherwise at high risk for cervical cancer. *Rating: D Recommendation.* - The USPSTF recommends against routine Pap smear screening in women who have had a total hysterectomy for benign disease. *Rating: D Recommendation.* - The USPSTF concludes that the evidence is insufficient to recommend for or against the routine use of new technologies to screen for cervical cancer. *Rating: I Recommendation* - .The USPSTF concludes that the evidence is insufficient to recommend for or against the routine use of human papillomavirus (HPV) testing as a primary screening test for cervical cancer. *Rating: I Recommendation.* - The optimal age to begin screening is unknown. Data on natural history of HPV infection and the incidence of high-grade lesions and cervical cancer suggest that screening can safely be delayed until 3 years after onset of sexual activity or until age 21, whichever comes first. - Although there is little value in screening women who have never been sexually active, many U.S. organizations recommend routine screening by age 18 or 21 for all women, based on the generally high prevalence of sexual activity by that age in the U.S. and concerns that clinicians may not always obtain accurate sexual histories. *Source: The Guide to clinical preventive services 2007 – Reccomendations of the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, 2006*
Which technology is recommended to provide the service	- Cervical screening in the UK is done either with a smear test or Liquid based Cytology (LBC). The use of liquid based cytology (LBC) began in April 2001 with three pilot laboratories. In October 2003 the National Institute for Clinical Excellence recommended its use nationally. It was expected that the use of LBC would substantially reduce the proportion of inadequate samples, and figures for recent years confirm this. *Source: National Statistics; Cervical Screening Programme England 2006-0; NHS-The Information Centre, 2007*	- The USPSTF could not determine whether the benefits of new screening devices such as liquid-based cytology, algorithm based screening, and computerized rescreening were sufficient to justify any potential increase in harms or costs. Pap smears are therefore recommended to screen for cervical cancer. *Source: The Guide to clinical preventive services 2007 – Reccomendations of the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, 2006*
Which technologies are most frequently used to provide the service	- During 2004- 05, a number of laboratories began the conversion to LBC and by the end of 2006-07 around 85% of labs had converted or had firm plans in place to convert in the near future. Most laboratories had inadequate results of less than 6%, around a quarter had between 6% and 9%, the remainder (20 labs) lay between 9% and 15%, less than last year's peak of 17% *Source: National Statistics; Cervical Screening Programme England 2006-0; NHS-The Information Centre, 2007*	- PfP only evaluated cervical cancer screening using Pap smear. *Maciosek et al (2006): Cervical Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006*
Service in benefit package (NHS only)	Yes	
What is the target population (if not general population)	- All women from the age of 25 to 64. Women from the age of 65 are only screened if they have not been screened since age 50 or have had recent abnormal tests *Source: National Statistics; Cervical Screening Programme England 2006-0; NHS-The Information Centre, 2007*	- The optimal age to begin screening is unknown. Data on natural history of HPV infection and the incidence of high-grade lesions and cervical cancer suggest that screening can safely be delayed until 3 years after onset of sexual activity or until age 21, whichever comes first. Although there is little value in screening women who have never been sexually active, many U.S. organizations recommend routine screening by age 18 or 21 for all women, based on the generally high prevalence of sexual activity by that age in the U.S. and concerns that clinicians may not always obtain accurate sexual histories. *Source: The Guide to clinical preventive services 2007 – Reccomendations of the U.S. Preventive*

<table>
<tr><td></td><td></td><td>Services Task Force, Agency for Healthcare Research and Quality, 2006</td></tr>
<tr><td>Which time intervals are recommended (e.g. for screenings)</td><td>Age group (years) | Frequency of screening
25 | First invitation
25 - 49 | 3 yearly
50 - 64 | 5 yearly
65+ | Only screen those who have not been screened since age 50 or have had recent abnormal tests

Source: National Statistics; Cervical Screening Programme England 2006-0; NHS-The Information Centre, 2007</td><td>- The USPSTF found no direct evidence that annual screening achieves better outcomes than screening every 3 years. Modeling studies suggest little added benefit of more frequent screening for most women. The majority of cervical cancers in the United States occur in women who have never been screened or who have not been screened within the past 5 years; additional cases occur in women who do not receive appropriate follow-up after an abnormal Pap smear

Source: The Guide to clinical preventive services 2007 – Reccomendations of the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, 2006

- The USPSTF found no direct evidence that annual screening is more effective than triennial screening. Since the effectiveness literature on which Maciosek et al. (2006) base their base case estimate on includes populations which have been screened either every two or every five years, they calculate the cost effectiveness in the base case on biennial screening. However, CE ratios for annual and triennial screening (with 10% random rescreen) are also presented.

Source: Maciosek et al (2006): Cervical Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006</td></tr>
<tr><td>% receiving cervical cancer screening (row b in CPB model)</td><td>5 year coverage (2007): 79.2%
3 to 3.5 year coverage (2007); 69.4%

- Coverage is defined as the percentage of women in a population eligible for screening at a given point in time who were less than a specified period [the headline coverage figure relates to 5 years] since their last test producing an adequate test result. Women ineligible for screening, and thus not included in the numerator or denominator of the coverage calculation, are those whose recall has been ceased for clinical reasons (most commonly due to hysterectomy).
- About 79.2% of eligible women, aged 25-64 at 31st March 2007 were recorded as being less than 5 years since their last adequate test result. Coverage has been falling slightly over the last ten years and this is the second year it has dropped below 80% since the early 1990s The falling coverage is mainly evident in the lower age groups, however those aged 50-64 show very little change over the last few years.

Source: National Statistics; Cervical Screening Programme England 2006-0; NHS-The Information Centre, 2007</td><td>3 Year Coverage: 77.5%

- Estimated from the Behavioral risk factor Surveillance Survey (BRFSS) as the delivery rate of screening to the service population (defined as coverage by the NHS information Centre)
- Estimate reflects the portion of women who had a pap smear test in the last 3 years, multiplied by the proportion of women whose last pap smear test was for screening purposes

Source: Maciosek et al (2006): Cervical Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006</td></tr>
<tr><td>Efficacy of screening (Rows c-e CPB model)</td><td colspan="2">- PfP included five estimates from five different countries (Denmark, England, Finland, Iceland, and Sweden) reported in two articles (1,2) The mean and median reduction in mortality from these five estimates is 66.2% and 67.0%. The mean was used as estimate of the effectiveness of screening in reducing cervical cancer deaths (row c). These estimates of effectiveness reflect the level of adherence observed in national screening programs with systems for period invitations (typically mail or phone invitations) for screening every 2 to 5 years. In these countries, approximately 70%-85% of invited women are up-to-date with each country's planned screening interval (mean 77%, median 77%) (row d).
- For comparison purposes, an effectiveness of 66% when adherence is 77% implies an efficacy of screening among participants of roughly 86% (77%/66% = 85.7%). Maciosek et al (2006) use this as the estimate of efficacy in predicting deaths that would occur without any screening (row f). This estimate of efficacy is consistent with the odds ratio from a case-control analysis of screening in Scotland in which individuals with at least one screen in the last five years are compared with individuals with no history of screening. (3) In addition, this efficacy estimate appears to be consistent with modelled estimates that indicate that screening every 1-5 years reduces cases of invasive cancer by about 85% to 95% (higher with more frequent screening) (4,5)

Source: Maciosek et al (2006): Cervical Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006
(1) Quinn M, Babb P, Jones J, Allen E. Effect of screening on incidence of and mortality from cancer of cervix in England: evaluation based on routinely collected statistics. BMJ 1999 Apr 3;318(7188):904-8.
(2) Sigurdsson K . The Icelandic and Nordic cervical screening programs: trends in incidence and mortality rates through 1995. Acta Obstet Gynecol Scand 1999 Jul;78(6):478-85.
(3) Macgregor JE , Campbell MK, Mann EM, Swanson KY. Screening for cervical intraepithelial neoplasia in north east Scotland shows fall in incidence and mortality from invasive cancer with concomitant rise in preinvasive disease. BMJ 1994 May 28;308(6941):1407-11
(4) Eddy DM. The frequency of cervical cancer screening. Comparison of a mathematical model with empirical data. Cancer 1987 Sep 1;60(5):1117-22
(5) Screening for squamous cervical cancer: duration of low risk after negative results of cervical cytology and its implication for screening policies. IARC Working Group on evaluation of cervical cancer screening programmes. Br Med J (Clin Res Ed) 1986 Sep 13;293(6548):659-64.</td></tr>
</table>

Patient adherence	- Although imperfect, the most generalizable estimates of adherence are the uptake rates observed in countries with comprehensive screening programs that include invitation systems. However the summary adherence estimate from national programs noted above (77%) is lower than the BRFSS estimate of US women who are currently up to date with screening (82%). If less than 100% of women receive offers for screening and the self-report data of the BRFSS are accurate, then 82% is a lower bound on acceptance of offers to screen. Therefore we use the 85% (row g) as base-case estimate of the uptake of cervical cancer screening at recommended intervals when offered to all women. Similar issues and similar overall adherence estimates are found in estimating adherence with breast cancer screening. We use the same adherence estimate for both services so that their relative ranking does not reflect differences in adherence that are not supported by good evidence *Source: Maciosek et al (2006): Cervical Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006*

UK – cancer reform strategy 2007 (published 03.Dec. 2007)

Liquid based cytology (LBC) was recommended by the National Institute for Health and Clinical Excellence (NICE) in 2003 as the preferred technology for cervical screening. By November 2007, 88% of laboratories in England had converted to LBC. The benefits of LBC are already becoming apparent. Of the four million tests taken each year, the number of inadequate tests fell from 370,000 (9%) in 2004/05 to 173,000 (4.7%) in 2006/07.
Goals of the UK – cancer reform strategy 2007

- Reducing the variation of coverage between PCTs
- Minimising the time taken to get results back to women, aiming to inform women of the result of their cervical screening test within two weeks of it being taken
- Using new technologies, such as the automation of cytology reporting and the use of Human Papilloma Virus (HPV) testing as and when the research evidence supports this; and
- Action to tackle the falling participation of younger women aged 25 to 35

To incentivise services to encourage higher coverage we will explore moving to an activity based system for funding screening services. NHS Cancer Screening Programmes will also encourage the sharing of best practice in improving accessibility of screening for all groups.
In September 2007, the government announced its intention to speed up the results of cervical screening, as set out in the manifesto for the 2005 general election. Women can expect to receive the results for their cervical screening test within 14 days of it being taken. The implementation of Liquid Based Cytology will go a long way to achieving this further opportunities for improvements have been identified by formal options appraisals:

- Better use of Information Technology;
- More Advanced Biomedical Scientist Practitioners in Cervical Cytology;
- Posting results letters by first class mail;
- Reconfiguring laboratories to make them larger and more efficient; and
- Larger call/recall offices would also reduce turnaround times and allow better facilities to improve coverage such as telephone help lines.

Turnaround times should be monitored locally and commissioners should intervene if the two week turnaround time is not being met. Turnaround times will also be monitored nationally via the Office for National Statistics / NHS Information Centre annual cervical screening statistical bulletin. The computer system will be amended to measure date of dispatch of the results letter and expected date of delivery

The Cancer Services Collaborative Improvement Partnership will offer focused service improvement resources across the cervical screening pathway to support the delivery of faster turnaround times. Advice to the NHS on achieving the two week turnaround time standard will be issued in early 2008. All women should receive the results of their cervical screening tests within two weeks by 2010

The NHS Cervical Screening Programme is likely to continue for many years after the introduction of the HPV vaccine. This is because the vaccines do not offer protection against all cancer causing HPV types and it will be a decade before the first girls vaccinated will be eligible for cervical screening. Screening will also still need to be offered to women up to the age of 65 who may have already been exposed to the virus. The Department of Health is considering commissioning further research to look at the implications for the screening programme

Appendix I2: Breast Cancer Screening

	Breast cancer screening in England	Breast cancer screening in the USA
Description of service	- The NHSBSP began in 1988 employing single view mammography and inviting women aged 50–64 years for screening once every three years. By 2005, the programme was using two-view mammography and screening 1.3 million women aged 50–70 years annually, about 75% of those invited. Currently, it diagnoses 10 000 breast cancers annually. - The NHS Breast Screening Programme provides free breast screening every three years for all women in the UK aged 50 and over. Women aged between 50 and 70 are routinely invited for breast screening every three years. Over the age of 70, women are encouraged to make their own appointments. - Every woman registered with a GP will receive her first invitation to attend for a mammogram at her local breast screening unit some time between her 50th and 53rd birthdays. She will then be invited every three years until her 70th birthday. The NHS call and recall system holds up-to-date lists of women compiled from - About 95 per cent of women are reported as normal after the first mammogram and will be routinely invited for screening three years later. Of those recalled for further investigation around one in six will be found to have cancer. *Source:* - *Screening for Breast Cancer in England – Past and Future; Advisory Committee on Breast Cancer Screening; NHSBSP Publication No 61; February 2006* - *NHS Breast Screening Programme, Annual Review 2007, NHS Cancer Screening Programmes, Sheffield*	- The U.S. Preventive Services Task Force (USPSTF) recommends screening mammography, with or without clinical breast examination (CBE), every 1-2 years for women aged 40 and older. B Reccomendation - The USPSTF found fair evidence that mammography screening every 12-33 months significantly reduces mortality from breast cancer. Evidence is strongest for women aged 50-69, the age group generally included in screening trials. For women aged 40-49, the evidence that screening mammography reduces mortality from breast cancer is weaker, and the absolute benefit of mammography is smaller, than it is for older women. Most, but not all, studies indicate a mortality benefit for women undergoing mammography at ages 40-49, but the delay in observed benefit in women younger than 50 makes it difficult to determine the incremental benefit of beginning screening at age 40 rather than at age 50. The absolute benefit is smaller because the incidence of breast cancer is lower among women in their 40s than it is among older women. The USPSTF concluded that the evidence is also generalizable to women aged 70 and older (who face a higher absolute risk for breast cancer) if their life expectancy is not compromised by comorbid disease. - The USPSTF recommends screening for breast cancer using mammography with or without clinical breast examination, but found insufficient evidence to conclude that clinical breast exam has an incremental benefit when added to mammography - The Estimates for breast cancer screening by Maciosek et al. 2006 are based on mammography alone *Source:* - *The Guide to clinical preventive services 2007 – Reccomendations of the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, 2006* - *Maciosek et al (2006): Breast Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006*
Which technology is recommended to provide the service	Two view mammography *Source: Screening for Breast Cancer in England – Past and Future; Advisory Committee on Breast Cancer Screening; NHSBSP Publication No 61; February 2006*	- The U.S. Preventive Services Task Force (USPSTF) recommends screening mammography, with or without clinical breast examination (CBE), every 1-2 years for women aged 40 and older. - The Estimates for breast cancer screening by Maciosek et al. 2006 are based on mammography alone. It is not defined whether one view or two view mammography was the technology under study. *Source:* - *The Guide to clinical preventive services 2007 – Reccomendations of the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, 2006* - *Maciosek et al (2006): Breast Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006*
Which technologies are most frequently used to provide the service	- A randomised trial conducted within the NHSBSP showed that two view mammography is significantly better than one view mammography at detecting breast cancer at women's first screen. As a result, two view mammography for a woman's first attendance at screening became policy in 1995. Subsequently, it was shown that two view mammography was particularly effective at detecting small invasive breast cancers, and hence that two view mammography should also increase breast cancer detection at women's subsequent screens. Since 2003, two view mammography at all screens has been policy in the NHSBSP, and this has had a major impact on the programme's cancer detection rate without any increase in the assessment rate. *Source: Screening for Breast Cancer in England – Past and Future; Advisory Committee on Breast Cancer Screening; NHSBSP Publication No 61; February 2006 and* *Wald NJ, Murphy P, Major P et al. UKCCCR multicentre randomised controlled trial of one and*	?

<table>
<tr><td></td><td>two view mammography in breast screening. British Medical Journal, 1995, 311: 1189–1193</td><td></td></tr>
<tr><td>Service in benefit package (NHS only)</td><td>Yes</td><td></td></tr>
<tr><td>What is the target population (if not general population)</td><td>- The NHS Breast Screening Programme provides free breast screening every three years for all women in the UK aged 50 and over.
- Women aged between 50 and 70 are routinely invited for breast screening every three years. Over the age of 70, women are encouraged to make their own appointments.

Source: Screening for Breast Cancer in England – Past and Future; Advisory Committee on Breast Cancer Screening; NHSBSP Publication No 61; February 2006</td><td>- The U.S. Preventive Services Task Force (USPSTF) recommends screening mammography, with or without clinical breast examination (CBE), every 1-2 years for all women aged 40 and older.

Source: The Guide to clinical preventive services 2007 – Reccomendations of the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, 2006</td></tr>
<tr><td>Which time intervals are recommended (e.g. for screenings)</td><td>- Every woman registered with a GP will receive her first invitation to attend for a mammogram at her local breast screening unit some time between her 50th and 53rd birthdays. She will then be invited every three years until her 70th birthday

Source: NHS Breast Screening Programme, Annual Review 2007, NHS Cancer Screening Programmes, Sheffield</td><td>- every 1-2 years

Source: The Guide to clinical preventive services 2007 – Reccomendations of the U.S. Preventive Services Task Force, Agency for Healthcare Research and Quality, 2006</td></tr>
<tr><td>% receiving breast cancer screening (row b in CPB model)</td><td>- The reported coverage of women aged 53-64 was 75.9%
- The coverage of the screening programme is the proportion of women resident and eligible* who have had a test with a recorded result at least once in the previous 3 years. (*Excluding those ineligible e.g. those who have had a bilateral mastectomy). Coverage of the screening programme is best assessed using the 53-64 age group as women may be first called at any time between their 50th and 53rd birthdays.

<table>
<tr><td></td><td>2004/5</td><td>2005/6</td></tr>
<tr><td>Total number of women invited</td><td>2074572</td><td>2381122</td></tr>
<tr><td>Acceptance rate (50-70)</td><td>74.6%</td><td>74.9%</td></tr>
<tr><td>Number of women screened (invitation)</td><td>1584695</td><td>1782381</td></tr>
<tr><td>Number of women screened (self/GP referral)</td><td>129306</td><td>107666</td></tr>
<tr><td>Total number of women screened</td><td>1713897</td><td>1891408</td></tr>
<tr><td>Number of women recalled for assessment</td><td>86774</td><td>87469</td></tr>
<tr><td>% women recalled for assessment</td><td>5.2</td><td>4.7</td></tr>
</table>
Source: NHS Breast Screening Programme, Annual Review 2007, NHS Cancer Screening Programmes, Sheffield and Source: National Statistics; Breast Screening Programme England 2005-06; NHS-The Information Centre, 2007</td><td>- Frequency of screening in last two years ages 40-49: 57%
- Frequency of screening in last two years ages 55+: 63%
- These rates reflect self-reported receipt of mammography within the last two years, adjusted by self-report as to whether or not the mammography was for screening purposes.

Maciosek et al (2006): Breast Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006

-</td></tr>
<tr><td>Effectiveness / Efficacy of screening (Rows c-e CPB model)</td><td>
<table>
<tr><td>Number of benign biopsies</td><td>1792</td><td>1751</td></tr>
<tr><td>Number of cancers detected</td><td>13809</td><td>14841</td></tr>
<tr><td>Number of situ cancers detected</td><td>2872</td><td>3019</td></tr>
<tr><td>Number of invasive cancers <15mm</td><td>5748</td><td>6148</td></tr>
<tr><td>Standardised detection ratio (invited women 50-70 only)</td><td>140</td><td>141</td></tr>
</table>
Source: NHS Breast Screening Programme, Annual Review 2007, NHS Cancer Screening Programmes, Sheffield and Source: National Statistics; Breast Screening Programme England 2005-06; NHS-The Information Centre, 2007</td><td>“The primary distinction between efficacy and effectiveness is that effectiveness reflects the level of patient adherence that can be expected in every-day practice, while efficacy reflects 100% patient adherence.
- CPB is based on effectiveness, where patient adherence is defined as the percent who accept the service once offered and adhere with follow-up treatment or advice to change behavior.”
- Efficacy = effectiveness ÷ adherence
- Efficacy of mammography screening in preventing mortality ages 40-49: 29.3%
- Efficacy of mammography screening in preventing mortality ages 50+: 38.2%

Maciosek et al (2006): Breast Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006</td></tr>
</table>

Patient adherence	- The uptake of the screening programme is the proportion of women invited for screening for whom a screening test result is recorded. - *Uptake:* Uptake rates varied considerably according to the type of invitation: - 71% of women receiving their first invitation were screened. - 89% of women who had already been screened and received a routine invitation were screened. - 21% of women who received a routine invitation, having failed to respond to a previous invitation, were screened *National Statistics; Breast Screening Programme England 2005-06; NHS-The Information Centre, 2007*	- The mean adherence in the randomized control trials, measured as percent of scheduled screens attended is about 75% (range 55% to 90%). All but one of these trials occurred outside the United States and all trials started before the benefits of mammography were well documented. Therefore the current adherence with clinician advice to receive breast cancer screening in the US may be different. - In 2003, approximately 85% of women ages 40+ who responded to the BRFSS questionnaire received a mammogram with in the last two years, and 80% of women had received a mammogram for screening purposes Source: - *Maciosek et al (2006): Breast Cancer Screening: Technical Report prepared for the National Commission on Prevention Priorities, Health Partners Research Foundation and Partnership for Prevention, 2006* - *Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System. [Web Page]; http://www.cdc.gov/brfss/. [Accessed 13 Jun 2005].*

UK – Cancer Reform Strategy 2007 (published 03.Dec. 2007)

- The interval between screens will be maintained at 3 years.
- At present, women are invited for screening seven times at three yearly intervals between 50 and 70 years. Over time, this will be extended to nine screening rounds between 47 and 73 years with a guarantee that women will have their first screening before the age of 50. Over 400,000 more women will be screened each year as a result. Women over the eligible age range will be able to self refer for screening every three years, as at present. This extension of the breast screening programme will start from April 2008 and will be managed by NHS Cancer Screening Programmes in partnership with local health services. As with the previous extension (involving women 65 to 70 years) this will take several years to implement fully, as more staff will need to be recruited and trained and more equipment purchased. Full implementation is expected by the end of 2012.
- Breast screening mammography is the last area of imaging in the NHS where film is still routinely used. Breast screening units should work with the NHSBSP to develop business cases for digital mammography. PCTs will need to give high priority to full implementation, with all units having at least one full-field digital mammography set by 2010. All women under 50 routinely screened should have Direct Digital available for assessment visits by 2010. Currently the surveillance of all women identified as being at high risk is managed at a local level to varying protocols. The NHSBSP offers the opportunity to manage such surveillance to national standards, ensuring women receive a consistent and high quality service. The NHSBSP will take on this surveillance, which will include access to MRI scanning as stated in the NICE partial update of the Familial Breast Cancer Guideline (October 2006). It is expected that this new system will be in place from 2009. There is also a need to ensure that health inequalities are tackled with targeted programmes that increase the uptake of screening in poor communities and in BME communities. Commissioners in PCTs with low coverage levels will wish to develop these programmes

Appendix I 3: Childhood immunization

<table>
<tr><th></th><th>Childhood immunization in England</th><th>Childhood immunization in the USA</th></tr>
<tr><td>Description of service</td><td>
Shedule for the UK's routine childhood immunizations

when — what
2 month — diphteria, tetanus, pertusis (whooping cough), polio, Hib — One injection
Pneumococcal — One injection
3 month — diphteria, tetanus, pertusis (whooping cough), polio, Hib — One injection
meningococcal serogroup C — One injection
4 month — diphteria, tetanus, pertusis (whooping cough), polio, Hib — One injection
meningococcal serogroup C — One injection
Pneumococcal — One injection
12 month — Hib, meningococcal serogroup C — One injection
13 month — Measles, Mumps, Rubella — One injection
Tetanus, diphtheria and polio recommended at ages 13 to 18

• DTP, Polio and Hib vaccines are combined into one injection - the DTP/Polio/Hib vaccine.
• Pneumococcal (PCV) is a separate injection and was added to the routine immunisation schedule in September 2006.
• Meningococcus group C vaccine (MenC) is sometimes given as a separate injection but is combined with Hib for one injection.
• Td/Polio is Tetanus, low dose Diphtheria and Polio vaccines combined as one injection.
• Polio immunisation changed in 2004. The polio vaccine is now combined with DPT/Hib or Td and given by injection. It used to be given by mouth (oral vaccine) as a few drops of vaccine on the tongue.
• Measles, mumps and rubella vaccines are combined into one injection - the MMR vaccine.
• BCG immunisation to protect against tuberculosis (TB) is no longer given routinely to all schoolchildren. It was offered to all children at about aged 13 up until autumn 2005. BCG is now offered only to those at increased risk of catching TB.
• Other immunisations are given to certain 'at risk' groups of children. For example, immunisation against flu is given each year to children with certain medical conditions.
• Vaccines against some other infections are being developed and tested, and may be added to the routine schedule in the future

Source: D Salisbury, M Ramsay, K Noakes (Editors) 2006, Immunization against infectious disease, Published by The Stationery Office under licence from the Department of Health
</td><td>
Shedule for the US's routine childhood immunizations

when — what
At birth — Hepatitis B
1 to 2 month — Hepatitis B
2 month — diphteria, tetanus, pertusis (whooping cough), polio, Hib, pneumococcal — One injection
Rota — Not evaluated by PfP
4 month — diphteria, tetanus, pertusis (whooping cough), polio, Hib, pneumococcal — One injection
Rota — Not evaluated by PfP
6 month — diphteria, tetanus, pertusis (whooping cough), Hib, pneumococcal — One injection,
Rota — Not evaluated by PfP
6 to 18 month — Polio, Hepatitis B, Influenca — From 6th month to 59 month annually
12 to 15 month — Hib, Pneumococcal, Measles, Mumps, Rubella, Varicella
15 to 18 month — diphteria, tetanus, pertusis (whooping cough) — 4th dose at 12 to 18 month, provided 6 month have elapsed after the third dose
12 to 23 month — Hepatitis A — 2 doses
Additional immunizations are recommended for high risk groups
</td></tr>
</table>

Provision of service

- All children in the UK are offered vaccinations against key diseases as part of the national childhood immunisation schedule

Source: D Salisbury, M Ramsay, K Noakes (Editors) 2006, Immunization against infectious disease, Published by The Stationery Office under licence from the Department of Health

- CPB and CE were estimated under the premise that 100% of the target population is offered each service. (Maciosek, results of a systematic review and analysis, 2006)

Source: Maciosek et al (2006): Priorities among effective clinical preventive services – Results from a Systematic Review and analysis; American Journal of preventive Medicine, 31(1):52-61

Which technologies are most frequently used to provide the service

Vaccine	Dose	Route	Brand/trade	Cost	Manufacturer
Diphteria, Tetanus, Pertussis	0.5ml at 2 month, second dose after 4 weeks, 3rd dose after 4 weeks	IM or DS			Available from Health Authorities or (in England only) direct from Farillon as Evans Vaccines brand, or Aventis Pasteur MSD Ltd
	0.5ml at 2 month, second dose after 4 weeks, 3rd dose after 4 weeks	IM or DS	Infanrix	Net price 0.5 ml prefilled syringe = £11.00	Glaxo Smith Kline
Diphteria and tetanus	0.5 mL at 2 months, second dose after 4 weeks and third dose after another 4 weeks, booster at school entry	IM or DS			Available from Health Authorities or (in England only) direct from Farillon as Evans Vaccines brand, or Aventis Pasteur MSD Ltd
Haemophilus influenza type B	0.5 ml	Injection	HibTiter	net price 0.5-mL vial = £10.20	Wyeth
	0.5 ml	Injection	ACT-HIB	net price per vial with diluent (0.5 mL) = £8.83	Aventis Pasteur MSD Ltd
Haemophilus influenza type B plus Diphteria, Tetanus, Pertussis		*Injection*, powder for reconstitution	**ACT-HIB ®DTP** dc	net price per dual-chamber prefilled syringe = £10.41	Aventis Pasteur MSD Ltd
		Injection, powder for reconstitution	**Infanrix**	net price 0.5-mL vial = £19.00	Glaxo Smith Kline
Hepatitis B	20 micrograms/mL adsorbed onto aluminium hydroxide	*Injection*, suspension of hepatitis B surface antigen	**Engerix B`**	net price 0.5-mL (paediatric) vial = £9.85, 1-mL vial = £13.27, 1-mL prefilled syringe = £13.97	Glaxo Smith Kline
	10 micrograms/mL adsorbed onto aluminium hydroxide	*Injection*, suspension of hepatitis B surface antigen	**H-B-Vax II**	net price 1-mL prefilled syringe = £12.13, 1-mL vial = £11.41, 0.5-mL prefilled syringe (*HB-Vax® II Paediatric*) = £8.99	Aventis Pasteur MSD Ltd
MMR Vaccine	0.5 mL	*DS ort IM*			Available from Health Authorities or (in England only) direct from Farillon as *MMR II®* (Aventis

Currently licensed childhood vaccines, as of December 1, 2006, for children aged 7–18 years. Information taken from the guidelines of the Department of health and human services - Center for Disease control and Prevention (CDC): http://www.cdc.gov/vaccines/recs/vac-admin/default.htm#guide

Administering Vaccines: Dose, Route, Site, and Needle Size

Vaccines	Dose	Route
Diphtheria, Tetanus, Pertussis (DTaP, DT, Tdap, Td)	0.5 mL	IM
***Haemophilus influenzae* type b (Hib)**	0.5 mL	IM
Hepatitis A (HepA)	≤18 yrs: 0.5 mL ≥19 yrs: 1.0 mL	IM
Hepatitis B (HepB) **Persons 11–15 yrs may be given Recombivax HB® (Merck) 1.0 mL adult formulation on a 2-dose schedule.*	≤19 yrs: 0.5 mL* ≥20 yrs: 1.0 mL	IM
Human papillomavirus (HPV)	0.5 mL	IM
Influenza, live attenuated (LAIV)	0.5 mL	Intranasal spray
Influenza, trivalent inactivated (TIV)	6-35 mos: 0.25 mL ≥3 yrs: 0.5 mL	IM
Measles, mumps, rubella (MMR)	0.5 mL	SC
Meningococcal, conjugated (MCV4)	0.5 mL	IM
Meningococcal, polysaccharide (MPSV4)	0.5 mL	SC
Pneumococcal conjugate (PCV)	0.5 mL	IM
Pneumococcal polysaccharide (PPV)	0.5 mL	IM or SC
Polio, inactivated (IPV)	0.5 mL	IM or SC
Rotavirus (Rv)	2.0 mL	Oral
Varicella (Var)	0.5 mL	SC
Zoster (Zos)	0.65 mL	SC
Combination Vaccines		
DTaP+HepB+IPV (Pediarix™) **DTaP+Hib (Trihibit™)** **Hib+HepB (Comvax™)**	0.5 mL	IM
MMR+Var (ProQuad®)	≤12 yrs: 0.5 mL	SC
HepA+HepB (Twinrix®)	≥18 yrs: 1.0 mL	IM

Injection Site and Needle Size

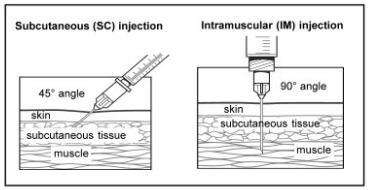
Subcutaneous (SC) injection
Use a 23–25 gauge needle. Choose the injection site that is appropriate to the person's age and body mass.

Age	Needle Length	Injection Site
Infants (1–12 mos)	⅝"	Fatty tissue over anterolateral thigh muscle
Children (≥12 mos), adolescents, & adults	⅝"	Fatty tissue over anterolateral thigh muscle or fatty tissue over triceps

Intramuscular (IM) injection
Use a 22–25 gauge needle. Choose the injection site and needle length appropriate to the person's age and body mass.

Age	Needle Length	Injection Site
Newborn (1st 28 days)	⅝"*	Anterolateral thigh muscle
Infant (1–12 mos)	1"	Anterolateral thigh muscle
Toddler (1–2 yrs)	1"–1¼" ⅝"*–1"	Anterolateral thigh muscle or deltoid muscle of arm
Children 3–18 yrs	⅝"*–1" 1"–1¼"	Deltoid muscle of arm or anterolateral thigh muscle
≥19 yrs (Sex/Weight)		
Male/Female less than 130 lbs	⅝"*–1"	Deltoid muscle of arm
Female (130–200 lbs) Male (130–260 lbs)	1"–1½"	Deltoid muscle of arm
Female (200+ lbs) Male (260+ lbs)	1½"	Deltoid muscle of arm

**If skin is stretched tight and subcutaneous tissue is not bunched.*



Please note: Always refer to the package insert included with each biologic for complete vaccine administration information. CDC's Advisory Committee on Immunization Practices (ACIP) recommendations for the particular vaccine should be reviewed as well.

					Pasteur MSD Ltd) or *Priorix*® (SmithKline Beecham)
Meningo coccal		Injection	**Meningitec**	net price 0.5-mL vial = £17.95	Wyeth
		Injection, powder for reconstitution	Menjugate ®		Chiron
	0.5-mL		NeisVac-C ®		Baxter
		Injection, powder for reconstitution	AC Vax ®	net price single-dose vial (with diluent) = £7.37	Glaxo Smith Kline
		Injection, powder for reconstitution	Mengivac (A+C) ®	net price single-dose vial (with syringe containing diluent) = £6.39	Aventis Pasteur MSD Ltd
		Injection, powder for reconstitution	ACWY Vax ®	net price single-dose vial (with diluent) = £17.14	Glaxo Smith Kline
Pneumo coccal	*by subcutaneous or intramuscular injection*, 0.5 mL CHILD under 2 years, not recommended		**Pneumovax II**	net price 0.5-mL prefilled syringe = £10.00	Aventis Pasteur MSD Ltd
	by subcutaneous or intramuscular injection, 0.5 mL CHILD under 2 years, not recommended		Pnu-Imune ®	net price 0.5-mL vial = £9.94	Wyeth
	by intramuscular injection, INFANT under 6 months 3 doses each of 0.5 mL separated by intervals of 1 month and a further dose in second year of life; 6 months–1 year 2 doses each of 0.5 mL separated by an interval of 1 month and a further dose in second year of life; CHILD 1–2 years 2 doses each of 0.5 mL separated by an interval of 2 months		**Prevnar** ®	net price 0.5-mL vial = £39.25	Wyeth
Polio	**Live (oral) (Sabin)** *:* 3 drops from a multidose container or the total contents of a single-dose container; for primary immunisation 3 doses are required		Poliomyelitis Vaccine, Live (Oral) Pol/Vac (Oral)[1].		

Pediatric/VFC Vaccine Price List

Vaccine	Brandname/ Tradename	Packaging	CDC Cost/ Dose	Private Sector Cost/ Dose	Contract End Date	Manufacturer
DTaP/	Tripedia® DAPTACEL®	10 pack - 1 dose vials 10 pack - 1 dose vials	$12.25 $12.75	$21.40 $22.04	3/31/07	sanofi pasteur
DTaP/	Infanrix®	10 pack - 1 dose vials 5 pack - 1 dose T-L syringes. No Needle	$13.25 $13.25	$20.96 $21.44	3/31/07	GlaxoSmithKline
DTaP-Hep B-IPV*	Pediarix®	10 pack - 1 dose vials 5 pack - 1 dose T-L syringes. No Needle	$43.75 $43.75	$70.72 $70.72	3/31/07	GlaxoSmithKline
DTaP-Hib #	TriHIBit®	5 pack - 1 dose vials	$24.94	$44.72	3/31/07	sanofi pasteur
e-IPV•	IPOL®	10 dose vials 10-pack – 1 dose syringes, No Needle	$10.82 $10.82	$22.80 $26.34	3/31/07	sanofi pasteur
Hepatitis B-Hib^	COMVAX®	10 pack - 1 dose vials	$26.25	$43.56	3/31/07	Merck
Hepatitis A Pediatric•	VAQTA®	10 pack - 1 dose vials	$12.10	$30.37	3/31/07	Merck
Hepatitis A Pediatric•	Havrix®	10 pack - 1 dose vials 5 pack - 1 dose T-L syringes. No Needle	$12.25 $12.25	$28.74 $28.74	3/31/07	GlaxoSmithKline
Hepatitis A-Hepatitis B 18 only^	Twinrix®	10 pack - 1 dose vials 5 pack - 1 dose T-L syringes, No Needle	$38.57 $38.57	$78.16 $78.42	3/31/07	GlaxoSmithKline
Hepatitis B• Pediatric/Adolescent	ENGERIX B®	10 pack - 1 dose vials 5 pack - 1 dose T-L syringes, No Needle	$9.10 $9.10	$21.37 $21.37	3/31/07	GlaxoSmithKline
Hepatitis B• Pediatric/Adolescent	RECOMBIVAX HB®	10 pack - 1 dose vials	$9.00	$23.20	3/31/07	Merck
Hepatitis B 2 dose• Adolescent (11-15)	RECOMBIVAX HB®	10 pack - 1 dose vials	$24.25	$59.09	3/31/07	Merck
Hib•	PedvaxHIB®	10 pack - 1 dose vials	$10.62	$22.77	3/31/07	Merck
Hib•	ActHIB®	5 pack - 1 dose vials	$7.92	$22.53	3/31/07	sanofi pasteur
HPV - Quadrivalent Human Papillomavirus Types 6, 11, 16 and 18 Recombinant	Gardasil®	10 pack – 1 dose vials	$96.00	$119.75	3/31/07	Merck
Measles, Mumps, Rubella and Varicella (MMR-V) #	ProQuad®	10 pack – 1 dose vials	$74.85	$117.60	3/31/07	Merck
Meningococcal Conjugate (Groups A, C, Y and W-135)	Menactra™	1 dose vials 5 pack - 1 dose vials	$68.00 $68.00	$82.00 $82.00	3/31/07	sanofi pasteur
Measles, Mumps and Rubella (MMR)/	MMRII®	10 pack - 1 dose vials	$17.28	$42.85	3/31/07	Merck
Pneumococcal 7-valent• (Pediatric)	Prevnar®	10 pack – 1 dose syringes, No Needle	$57.59	$73.70	3/31/07	Wyeth/Lederle

		Inactivated (Salk) *by subcutaneous injection*, 0.5 mL or as stated on the label, for primary immunisation 3 doses are required at intervals of 4 weeks		Poliomyelitis Vaccine, Inactivated Pol/Vac (Inact).		Available direct from Farillon
	Rubella	*by deep subcutaneous or by intramuscular injection*, 0.5 mL		Rubella Vaccine, Live Rub/Vac (Live)		Available from Health Authorities or (in England only) direct from Farillon as SmithKline Beecham brand (*Ervevax*®)
	Tetanus	*by deep subcutaneous or by intramuscular injection*, 3 doses each of 0.5 mL separated by intervals of 1 month	*Injection*, suspension of tetanus formol toxoid adsorbed on a mineral carrier		et price 0.5-mL single-dose syringe = £1.40)	from Evans Vaccines as *Closter*®,
					net price 0.5-mL amp = 74p; 0.5-mL single-dose syringe = £1.50	Aventis Pasteur MSD Ltd

- IM= intramuscular DS=deep subcutaneous injection
- Information obtained from: http://www.whale.to/v/meninguk.html British national formulary: Vaccines UK (BNF 42 2002)

Rotavirus, Live, Oral, Pentavalent •	RotaTeq ®	10 pack - 1 dose 2mL tubes	$52.00	$63.25	3/31/07	Merck
Tetanus & Diphtheria Toxoids^	DECAVAC™	10 pack – 1 dose syringes No Needle 10 pack – 1 dose vials	$16.62 $16.62	$18.30 $18.30	3/31/07	sanofi pasteur
Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis/	BOOSTRIX	10 pack - 1 dose vials 5 pack - 1 dose TL syringes, No Needle	$30.75 $30.75	$36.25 $36.25	3/31/07	GlaxoSmithKline
Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis/	ADACEL	10 pack - 1 dose vials	$30.75	$35.75	3/31/07	sanofi pasteur
Varicella•	Varivax®	10 pack - 1 dose vials	$56.90	$71.11	3/31/07	Merck

/ Vaccine cost includes $2.25 dose Federal Excise Tax
Vaccine cost includes $3.00 per dose Federal Excise Tax
^ Vaccine cost includes $1.50 per dose Federal Excise Tax
* Vaccine cost includes $3.75 per dose Federal Excise Tax
• Vaccine cost includes $0.75 per dose Federal Excise Tax
¤ Vaccines which contain Thimerosal as a preservative

- These price lists are current as of October 31, 2006 Find current Vaccine Price Lists online at www.cdc.gov/nip/vfc/cdc_vac_price_list.htm

Service included in benefit package (NHS only)	Yes *Source: D Salisbury, M Ramsay, K Noakes (Editors) 2006, Immunization against infectious disease, Published by The Stationery Office under licence from the Department of Health*	
What is the target population (if not general population)	- All children in the UK are offered vaccinations against key diseases as part of the national childhood immunisation schedule. See row 2 for details. *Source: D Salisbury, M Ramsay, K Noakes (Editors) 2006, Immunization against infectious disease, Published by The Stationery Office under licence from the Department of Health*	- CPB and CE were estimated under the premise that 100% of the target population is offered each service. See row 2 for details. *Source: Maciosek et al (2006): Priorities among effective clinical preventive services – Results from a Systematic Review and analysis; American Journal of preventive Medicine, 31(1):52-61*
recommended time intervals	See row 2	See row 2

Appendix J

Conceptual factors causing variability in economic studies

Factor	Definition	Relevance to prioritisation results	Explanation
Absolute and relative prices	Unit costs/prices of inputs into healthcare	yes	To increase relevance to the US-healthcare system and to avoid completely arbitrary results, only US-cost estimates (discounted to year 2000 US$) were taken into account. In the methods paper it is stated that: "non-US cost-effectiveness studies were not excluded a priori, but they were not considered until US studies were reviewed and found to be inadequate, no non-US CE study was used in the 2006 ranking
Artificial study conditions:	research environment versus routine practice	yes (through effectiveness estimates)	Depends on where effectiveness data comes from (see report specific references)
Capacity utilisation	Level of utilisation of inputs into healthcare	yes	Depends on where effectiveness data comes from (see report specific references)
Case mix	Clinical and socio-demographic characteristics of patients undergoing treatment	yes, through effectiveness estimates	Estimates of effectiveness and cost-effectiveness depend on study population which may differ between the general population in the US and UK. Hypothetical cohort of 4 million people was not stratified for clinical characteristics.
Clinical practice variation	Variation in how healthcare is delivered	yes, e.g. through weights for types of colorectal cancer screening delivered in the US or 1990 vaccination rates in influenza model)	There are some significant differences between the US and the UK with respect to delivery of preventive services.
Compliance	Adherence to treatment regimen	yes, each CPB and CE estimate was adjusted for patient adherence	Maciosek stated this was the most difficult part of the whole assessment to get data on. Sometimes estimates of patient adherence were rough and not just taken from US evidence (e.g. breast cancer screening). It is likely that adherence (as a behavioural factor) differs between settings (and also depends on access to services)
Culture/ attitudes	As affecting clinical practice	yes, through effectiveness estimates, adherence rates, delivery rates etc.	Probably impacts effectiveness estimates as well as adherence rates taken from the literature
Demography	Patient non-clinical characteristics	yes, through birth cohort and effectiveness estimates	Hypothetical birth cohort of 4 million people was stratified for age and sex, but not for socioeconomic or ethnic characteristics etc
Disease interaction	Association of primary disease with risk factors, other morbidity, mortality	yes, through effectiveness estimates as taken from the literature	Incidence/prevalence rates of co-morbidities certainly differ between locations. The effects of prevention on co-morbidities were not taken into account (which could have improved a service's CE-ratio). However, this may have affected Macioseks results indirectly since effectiveness data were taken from different studies and locations with specific sample characteristics.
Economies of scale	Greater levels of production leads to lower costs	not accounted for	Delivery rates of preventive services differ between locations. The CE estimate reflects average cost effectiveness assuming that the service is offered to 100% of the population but that less than 100% adhere to the service. Economies of scale may have affected cost estimates as taken from the literature, but it was not accounted for explicitly within the models.
Epidemiology	Incidence, prevalence of the disease	Yes, Incidence/prevalence rates are parameters in the models	Depends on were the estimates are taken from (see report specific references)

Exchange rates	Conversion rate of different currencies	Yes, through cost estimates	The prioritisation exercise was based solely on US-cost effectiveness literature to avoid the problem of inaccurate conversion of cost estimates to US-Dollars. To transfer results to the UK, estimates from different years (all discounted to US$ 2000) should be converted to UK£. However, differences in relative prices would still need to be accounted for.
Geographical setting	Location such as country, type of facility	Yes	May affect adherence rates, effectiveness estimates and other model parameters (e.g. % of in-patient / out patient care)
Health state valuations	Individuals preferences for particular levels of health	through effectiveness estimates	UK and US weights for EQ5D differ
Healthcare resources	Inputs into health delivery, e.g. personnel equipment	through cost estimates	US costs were not collected from literature prior to introduction of DRGs because of differences in patterns of resource use. The difference between the US and UK could be just as great. With unpublished data on assumptions of resource inputs, it would be possible to estimate changes when transferring to England.
Healthcare system	Regulatory and organisational infrastructure	Yes	The whole context of the study is based in another system which is far more fragmented that the UK health care system and which is know to have relatively high administration costs.
Historical differences	History of organization/ practice	Not addressed	Not addressed
Incentives	Financial and other factors which affect individuals and organizational behaviour	affects effectiveness and costs. Cost to change delivery rates (i.e. change incentives) were not taken into account.	Since providers in the US are reimbursed by many different health plans, a change in incentives (through one specific health plan) has to be large enough to change the provider's behaviour. Different incentives facing consumers (e.g. taxes on alcohol) may also stimulate very different demand responses.
Industry related bias	Sponsor influence on study results	indirectly through included literature	Partnership for prevention is a non-for profit organization. However, bias could have been introduced through the estimates for different model parameters depending on the literature accessed.
Joint production	Inputs into healthcare delivery are shared between different units/departments	all interventions assumed to be produced independently	Interventions may be packaged together in similar or different ways in countries. No account is taken for the possibility of joint production and therefore it is likely that costs are over estimated.
Opportunity cost	Health benefits forgone by use of a resource in a particular way	Yes, implicitly but results not presented in this way	Most preventive services are currently offered to (most) US citizens. The report emphasises changing the degree of promotion rather than changing coverage plans. In England, it depends on how the focus of the exercise would be set up.
Perspective	Viewpoint of economic analysis	affects costs	Maciosek et al adopt a provider and part consumer perspective but NICE adopt a Public sector perspective for public health interventions
Skills/ experience	Level of training and experience of health professional	may influence effectiveness and cost estimates	Increasing delivery rates is most likely associated with increasing marginal costs. However, if a service is delivered more frequently by the same staff, than routine might increase which may positively affect the services effectiveness and costs (e.g. time costs). This is not accounted for and the models provide average rather than marginal estimates for cost-effectiveness.
Technological innovation	Advancement of technology/practice	All services evaluated at technology diffusion level	Only effective services as recommended by the USPSTF & ACIP were ranked.
Timing of economic evaluation	Stage of conduct of study in the development of the technology	All services evaluated at technology diffusion level	Only services recommended by the USPSTF and ACIP with evidence of effectiveness are evaluated.
Treatment comparators	Available treatment options	The comparator was do nothing	Only in a few models different treatment options were taken into account (e.g. different technologies for colorectal cancer screening). Preventive interventions were compared with doing nothing. As neither USPSTF interventions nor doing nothing are provided in the UK, it is not clear how CE ratios should be transferred.

Source: Columns 1 and 2 from Sculpher et al (2004)