



Survey of the Value of Life/ Health used in Government Departments

Summary of Findings - Report to the Inter-departmental group on value of life and
health

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1 Introduction

The Institute for Transport Studies was commissioned by the Inter-Governmental group on value of life and health to conduct a series of interviews with governmental departments to assess the current practice in valuing interventions that have an impact upon length or quality of life. This work forms part of a larger project that also involves the University College of London. The key objectives of the whole project in total are:

- 1) To survey the approaches to and the practice of valuation of life and health, specifically with respect to the issues listed below, current in different parts of the public sector;
- 2) To survey current academic thinking and international practice on these issues;
- 3) To characterise issues requiring further research and where appropriate to commission that research;
- 4) To produce guidance on the valuation of health and life in support of the appraisal and evaluation process.

This report focuses on the first of these, with the aim to support the remaining three objectives. This report will be contained within a larger report that will be published later in 2008 by Wolff et al.

This report describes the findings from interviews that were conducted with Governmental Departments and highlights the key issues that have been raised as part of this process.

The next section will provide a summary of the methodology used in this study.

2 Methodology

A two-stage questionnaire was sent to a number of Government Departments in March 2008 designed to aid in the investigation of the key research aim.

Stage 1 of the questionnaire asked departments to provide a summary of the current practice in their respective departments and to illustrate this with an exemplar case study showing an example of an assessment / evaluation of an intervention in practice. A number of these case studies are included as examples within this document. The brief for stage 1 is provided in annex 2

Stage 2 of the questionnaire was designed to look in more depth at the approaches to value of life and quality of life used by the respective departments and considered the following key areas:

- Does your department include values of life/ health in your appraisal/ assessments?
- What is the valuation method used for doing so?
- How is the impact on health or life determined (based on risk/ known cases)?
- Is the impact quantified in terms of years of additional life or the number of lives saved or another method?
- Is any adjustment made for the quality of life of those affected by the intervention (how is quality scaled against longevity?)
- Are equity considerations internalised into the valuation process?
- Where quality of life is assessed, how is the quality determined?
- What methods are used to judge whether an intervention is 'cost effective' and are there any circumstances where this judgement has been overridden?
- Are interventions valued for their impacts on third parties and indirect costs to society?
- Are distinctions made between benefits from an intervention accruing to different government department's budgets?
- Are there different approaches to valuing risk depending on the source of the risk?
- What factors in the field of life and health are important to the respective departments?

The full questionnaire is provided in annex 3

A series of 12 face-to-face interviews took place between the 21st of April and 14th of May 2008 with representatives from the 12 UK departments who completed the questionnaire to consider in more detail the issues surrounding current Government practice in this field. The interviews were conducted by Charlotte Kelly (Institute for Transport Studies, University of Leeds) and Madeleine Hayenhjelm (Department of Philosophy, University College London).

The 12 departments were:

- Department for Environment, Food and Rural Affairs (DEFRA)
- Department for Transport (DfT)
- Department of Health (DH)
- Environment Agency (EA)
- Food Standards Agency (FSA)

- Health Protection Agency (HPA)
- Health and Safety Executive (HSE)
- HM Treasury
- Home Office
- Local Government and Communities
- National Institute of Clinical Excellence (NICE)
- Scotland (Transport and Health Departments)

The full list of interviewees is provided in Annex 1.

Section 3 will provide a summary of the key results from the questionnaire and interviews and Section 4 will discuss the key issues raised by the Departments during the interviews.

3 Results of Stage 1 and 2 of the questionnaire

This section will describe in detail the results of the interviews with the government departments. It looks at each question posed in turn and supplements this with discussions held during the interviews. The full questionnaire is provided in annex 2 and 3.

Question 1: Do you include values of life / health in your appraisals / assessment for interventions?

In answer to this question the majority of departments stated that they did include a specific value of life and or health in their assessments of intervention/ appraisals. The key differences were in the framework within which the values were applied, the scenarios they were applied to and the level of departmental guidance as to how and if they should be applied.

The frameworks in which the values are applied include:

- Cost Benefit Analysis/ Regulatory Impact assessment
 - o e.g. the Value for the Prevention of a Fatality (VPF) forms the basis for the monetary value of road/ rail fatalities in the cost benefit analysis element of the New Approach to Transport Appraisal at the DfT.
 - o e.g. While the Department of Health does not have official values for Health it is sometimes required to place a value on the measure of health that they use within their cost effective analysis framework of a quality adjusted life year (QALY).
- Providing advice to other departments
 - o e.g. the health protection agency uses the DfT VPF in a partial cost benefit analysis to cost out the consequences of fatalities in a nuclear accident as an input to a safety case submission and assessment
- As an input to determine whether a project meets the 'gross disproportion' or principals such as ALARP (as low as reasonably practicable)
 - o e.g. the Health and Safety Executive use values for fatalities, major injuries, other reportable injuries and minor injuries to determine whether the benefits of the intervention are grossly disproportionate to the expected costs.
- Different funding arrangements for the costs
 - o Certain departments are using the values to assess interventions that they will not have to pay for themselves (e.g. HSE - employers may have to pay). Other departments are assessing interventions that they will have to fund (e.g. DfT road scheme).

Table 1 provides a summary of the answers given to this question.

Table 1 Are values of life/ health included in appraisals/ assessments?

Department	Yes	No	Comments
DEFRA	√		Included as values for the health effects from air pollution quality
DfT	√		Included as values for fatal, serious and slight accidents
DH	√		Yes, but they are not official values. Usual procedure is to use cost effectiveness analysis and compare with a threshold– they are sometimes required to put a value on a QALY
Environment Agency		√	Values of life are not routinely included in assessments. There are a few exceptions (e.g. recent Boscastle example)
Food Standards Agency	√		The department uses a mixture of methods. The Food Bourne illness section of the department would use values of life based on the DfT value of life and the dietary health section would focus on the health effects using a QALY based approach. A mixture is used.
Health Protection agency		√	It was noted that they provide risks not values on life – although the department uses both QALY based approaches and values of life values when investigating guidance
Health and Safety Executive	√		The health and safety executive use both values of life (DfT based) and values for QALYs depending on the type of intervention/ regulation.
HM Treasury			They do not conduct appraisals/ assessments directly
Home Office	√		They use both values for life and health in their assessments
Local Government and Communities	√		They use the value of life (from DfT) in the area of fire and flood risk management (e.g. how many lifeboats to fund)
NICE		√	They use a framework of cost effectiveness analysis and thresholds
Scottish Government	√		The transport department uses the DfT values for accidents, the DH use both values of life (DfT values) and QALY based approaches

One of the key features identified from undertaking the interviews was the wide range of scenarios for considering life and health within the different departments. Table 2 presents the departments that were interviewed and some examples of the scenarios within which the values of life and or health were applied.

Table 2 Examples of the use of value of life/ health in Governmental Departments

Department	Context
Department for Transport	Value of Road and Rail Accidents (within general appraisal framework)
Scottish Government (Transport Department)	Value of Road and Rail accidents (within general appraisal framework)
Local Communities and Government	Fire and Resilience Directorate
Department of Health	Interventions and Regulations
Environment Agency	Flood Risk Management, Human related intangible impacts from flooding
DEFRA	Health benefits from air pollution reduction
Food standards agency	Food Bourne illness and dietary health interventions
Health Protection Agency	Value of fatalities/ cancer incidences from nuclear power accidents
HSE	Workplace accidents and regulations
NICE	Evaluation of new pharmaceutical products or medical devises
Home Office	Homicide and crime categories of wounding, sexual offences, common assault and robbery
Scottish Government (Health Department)	Regulations and interventions(e.g. smoking ban)

It was evident from the interviews that certain departments had specific guidelines as to which values should be used and how these values should be used. The most comprehensive is the department for Transport guidance on the New Approach to Transport Appraisal, which is provided in full detail at www.webtag.org.uk. The methodology for using the values for the prevention of a fatality is described in detail in DfT (2005) and its related documents. Other departments do not have specific departmental documents detailing what values should be used and how they should be used. The key documents from the interviewed departments where available are provided in the reference list at the back of this document and a summary of some of the key documents are provided in table 3 below.

Table 3 A summary of the Key reference documents for value of life and health

Department	Reference
DfT	Department for Transport (2005) The Accidents Sub – Objective . Tag Unit 3.4.1 http://www.webtag.org.uk/webdocuments/3_Expert/4_Safety_Objective/3.4.1.htm
DH	Department for Health (2004) Policy Appraisal and Health. A guide from the Department of Health Department for Health (2006) Memorandum by the Department of Health http://www.publications.parliament.uk/pa/ld200506/ldselect/ldconaf/183/6012402.htm
HSE	Health and Safety Executive (2007) Economic Analysis Unit (EAU) Appraisal Values http://www.hse.gov.uk/economics/eauappraisal.htm
Home Office	Home Office (2005) The economic and social costs of crime against individuals and households 2003/04 http://www.homeoffice.gov.uk/rds/pdfs05/rdsolr3005.pdf
NICE	NICE (2004) Guide to the Methods of Technology Appraisal. London: NICE, 2004 http://www.york.ac.uk/inst/che/pdf/TAP_Methods.pdf NICE (2008) Guide to the single Technology Appraisal Process http://www.nice.org.uk/aboutnice/howwework/devnicetech/technologyappraisalprocessguides/
Environment Agency	DEFRA (2004) flood and Coastal Defence Project Appraisal Guidance FCDPAG3 Economic Appraisal. Revisions to Economic Appraisal on: reflecting socio-economic equity in appraisal and Appraisal of human related intangible impacts of flooding.
DEFRA	DEFRA (2004) Valuation of health benefits associated with reductions in air pollution. www.defra.gov.uk
HM Treasury	HM Treasury (2002) The Green Book. Appraisal and Evaluation in Central Government. Treasury Guidance. London: TSO http://greenbook.treasury.gov.uk/

Question 2: If yes to Q1, what is the valuation method (s) used for valuing the benefit or harm?

The second question asked interviewees to describe the methods that were being used in their respective departments to value health and or life. A summary of the methods described by the departments are provided in table 4. The first key observation was that the methods and values vary according to whether values of life or values of health are being considered.

Table 4 Methods used for determining / applying value of life/ Health

Department	Methodology	Values
Department for Transport	WTP (SP) for reductions in risk	Fatality and slight and serious injury
Scottish Government (Transport Department)	Transferred from DfT	Fatality and slight and serious injury
Local Communities and Government	Transferred from DfT	Fatalities and injuries
Department of Health	QALY approach + Threshold	¹ Where values are applied for a QALY they are derived from DfT value (£40k used)
Environment Agency	Transferred from DfT DEFRA - WTP study	Fatality, injuries WTP value to avoid health impacts of floods
DEFRA	WTP (SP) to avoid health effects from air pollution (DEFRA study)	Life year gained in normal health Life year gained in poor health Value of avoiding a hospital admission Value of avoiding a days breathing discomfort
Food standards agency	A range including: Transferred from DfT QALY approach DALY approach	Fatalities and injuries (DfT) e.g. QALY approach + “intrinsic value” e.g. Value of a DALY (QALY and DALY values based on NICE threshold of £30K)
Health Protection Agency	A range including: Transferred from DfT QALY approach	Value of a fatality Value of a QALY (derived from DfT VPF)
HSE	Transferred from DfT (Fatalities) HSE study on injuries QALY approach (Noise valuation)	Value of a fatality Major injury, injury over 3 days, minor injury Value of QALY adjusted DfT fatality value (£42K)
NICE	QALY + NICE Thresholds	Values not placed directly on a QALY
Home Office	Transferred from DfT (Homicide) QALY approach for other crimes. Value of QALY taken from Carthy et al; (1999) contingent valuation study	Fatality Crimes of robbery, wounding, sexual offences and common assault. Value of QALY £80k
Scottish Government (Health Department)	A range including: WTP transferred from DfT QALY approaches	Range of values. Current study looking at what the value of a QALY should be.

¹ It is not DH practice to place a value on a QALY, but where this is done the value presented in this table has tended to be used.

Certain departments only use the value of a statistical life based on the DfT value for the prevention of a fatality. For other departments the focus is on the health effects and they tend to use a QALY based approach (e.g. NICE and DH). A number of departments are using both of these approaches (e.g. HSE, FSA, HPA and Health Department Scottish Government) and applying them as and when appropriate.

Not all departments place a direct value on a life or health impact. For example, the Department of Health *"has not itself put a monetary value on human life and health. We have a budget for the NHS and we spend it so as to maximise the health of the population (and to reduce inequalities). However, we do measure health using non-monetary measures....We measure health in QALYs (quality-adjusted life-years) gained.."*DH(2006). Where required to do so a monetary value of £40k has been applied to a QALY. This was derived from the DfT's value for prevention of a fatality representing the average years left to live from the average age used in the DfT value. Similarly it is not in the current guidelines for the Environment Agency in its flood risk management assessments to include the value of life. The one exception where a value has been included is in the assessment of the proposed intervention following the recent Boscastle flooding incident in 2006 where the value of a fatality and injury was transferred from the DfT values.

A number of Departments had or were currently conducting their own study to determine the value of life/ health in their specific context. For example the Department for Transport has their own values for a fatality, serious injury and slight injury based on a study in the 1990s. DEFRA has recently (2004) conducted a study to determine the willingness to pay to avoid certain health effects of air pollution. The valuation of the health impacts of air quality are based on a specially designed study "Valuing the health benefits associated with reductions in air pollution – recommendations for valuation" (DEFRA, 2004). This study assessed willingness to pay (WTP) in the UK for reductions in particular health outcomes, acute mortality, chronic mortality, respiratory and cardiovascular hospital admissions. These values are now applied in their assessments/ appraisals and it is intended that all Government Departments should use these values for this context in their appraisals. The Health Department in the Scottish Government are currently conducting a study to determine what the value of a quality adjusted life year (QALY) should be.

Research has been conducted to look at how the human related intangible impacts (increased stress, health effects and loss of memorabilia) of flooding can be included in appraisal. This is described in DEFRA (2004). The study found that "flooding caused physical effects in the short term and psychological effects in the short and longer term" DEFRA (2004). A national survey of recently flooded and 'at risk' residents conducted using the technique of willingness to pay was used to determine the values that people place on these health impacts. The results found that the WTP in order to avoid the health impacts of fluvial flooding were around £200 (weighted average) per household per year. This study has been used to develop a relationship between the value of avoiding the impacts and the reduction in the likelihood of being flooded. The value of the benefit is included in the appraisal by determining the change in household exposure to the risk before and after the scheme is included and knowing the number of households.

A number of departments were using a combination of methods and values in their appraisals. One example is the Home Office; whereby the value of a homicide is transferred directly from the Department for Transport Value, but values for other crimes such as robbery and sexual assault, use

a value of a QALY of £81K, which was derived from the Carthy et al (1999) WTP/ WTA study. The full methodology is provided in Home Office (2003). For more information see case study 1.

Other departments such as the HSE were using different values for different contexts. For example in the case of workplace fatalities the value was transferred from the DfT value for the prevention of a fatality, whereas when applied to the context of The control of Noise at work regulation a QALY based method was used. For the QALY based approach see case study 3 below.

In recent work conducted by the Food Standards Agency they presented the case using both a QALY based approach and compared this with the value of life based approach. In looking at the use of value of a QALYs the FSA department has considered the work by Jones Lee et al on the “pure value of living”. They quote Jones- Lee as saying “ its seems pretty clear both intuitively and from the empirical evidence that some sort of pure value of living exists for most people, so to ignore it completely and treat the extension of a sick 80 year olds life by, say, two years as being only ‘worth’ two times the value of a QALY just seems to me to be misguided” taken from FSA (2006, p 21). This intrinsic value refers to studies of willingness to pay for extra life years by those at a later stage in life and suggests that people would be willing to pay more in those scenarios. In the interview it was reported that this pure value of living or ‘intrinsic value’ could be of the magnitude of £400,000 per person. When applying the value of a QALY this “intrinsic value” would also have to be added to the QALYs gained per person. This value had been included as a potential methodology in recent work completed for OFCOM and was added in addition to the number of QALYs gained per person multiplied by the value of a QALY of £30,000 derived from the NICE threshold guidelines.

To illustrate the different approaches used a number of case studies have been provided below. The contexts are:

- Case Study 1: Home Office example - Combination of values
- Case Study 2: Food Standards Agency – Use of DALYs
- Case Study 3: Health and Safety Executive – Use of QALYs
- Case Study 4: Scottish Department for Health – Use of a modified VPF.

Case Study 1- Home Office (Combination of approaches)

This methodology is described in Home Office (2005). In the case of Homicide the Home Office applies the DfT value for the prevention of a fatality. The key difference is in how it has determined the values that it places on non fatal crimes. The key victim costs are: the emotional and physical (‘intangible’) costs to victims, the costs of the loss of output through a victim of violence being required to take time off work to convalesce and the health costs of treating injuries and other health impacts of violence. A Quality Adjusted Life Year approach using known health states has been applied to determine the costs for the crime types of wounding, sexual assault, common assault and robbery.

The health states for each of the crime types covered are:

Physical health states: Broken bones, broken nose, minor bruise/ black eye, severe bruising, scratches, cuts, broken or lost teeth, chipped teeth, concussion, other injury, HIV diagnosis

asymptomatic, gonorrhoea, Chlamydial infection, Trichomoniasis, Bacterial vaginosis, abortion, miscarriage

Psychological health states: Acute stress disorder, mild/moderate PTSD, Severe PTSD, Drug abuse, Depression, Suicide, Obesity/eating disorder, Anxiety, sexual dysfunction

Estimates for the incidence of a particular health state for the case of wounding was taken from the British crime survey. Estimates for the other crime types were taken from work done by Dolan et al (2003). This data provides the probability of a particular health state happening for every crime type. For example there is a 0.0801 chance of a broken bone in the case of a wounding crime. A range of sources were used to derive the figures for the duration of and QALY weights for the health states. These included The Global Burden of Disease study Murray and Lopez (1996). Weights for Post Traumatic Stress Disorder (PTSD) were taken from Stouthard et al (1997) and the long term impacts of wounding were weighted using the EQ5D health state index. For example, broken bones as a result of a crime would lead to a QALY loss of 0.0228 equivalent years at full health state. The probability of each health state by crime type is then multiplied by the QALY loss for that health state and summed for the crime type. This means that for example, the total loss from a wounding crime is 0.033 of a QALY.

This loss of a QALY is then translated into a monetary value by applying a monetary estimate of a QALY. The value of a QALY applied is £81K (per QALY), which was derived from the Carthy et al (1999) study and reflects the fact that crime is a willingness to accept concept as it involves the removal of property rights.

The result is a monetary value for each of the categories of crime as shown in Table 5. The probability and duration of health states were also used to calculate the lost output. The total number of days that was estimated to be lost for each health state was multiplied by £51 an estimate of the average daily output per head in the UK in 2003 to get lost output. The health service costs are determined based on how much each health state costs the NHS for each crime type.

Table 5 Value of life/ health of crime (£, 2003 prices)

Crimes	Physical and Emotional Impact	Lost Output	Health Service
Homicide	771,511	451,110	770
Wounding	13,219	1,166	1,348
Sexual Offences	13,219	4,430	916
Common Assault	264	269	123
Robbery	2,644	1,011	483

Source: Home Office (2003/04)

Case Study 2 – Food standards Agency (Use of DALYs)

Case Study –Inclusion of Folic Acid in Flour

This describes the assessment of whether folic acid should be included in flour. The key reasons for this proposed intervention were that there is insufficient folate consumption by certain key people. The current policy is to advise and inform pregnant women and those planning a pregnancy to take a

supplement. The problem with this is that the information gets there too late and roughly 50% of pregnancies are unplanned. A number of options were assessed to reduce this problem.

- Continue with this policy,
- A targeted health education campaign
- Further encourage voluntary fortification of food
- Mandatory fortification of food

The key issue with including folic acid in food is that a link has been found between taking folic acid in pregnancy and Neural tube defects (NTD). These are when “the bones in the spinal column of a foetus fail to form properly resulting in damage to the Central Nervous system”. It is estimated that it occurs in 700- 900 pregnancies per year and that mandatory fortification could prevent 77 of these cases. It was estimated that of these 77 cases prevented; 11 would be averted still births/ neonatal deaths avoided, 8 cases of spina bifida would be avoided and 58 terminations would be avoided.

The key issue is how to monetise these benefits. They decided against using the DfT value of prevention of a fatality, as it was difficult to monetise reduced morbidity. But decided to use disability adjusted life years (DALYs) due to high quality disability weights available (0 perfect health 1 death). The weight of a still birth/ neonatal death was set at 1 and the weight applied to a spina bifida case was 0.52. No weighting was applied to terminations of pregnancies. The cut off point of age was 25 years. Therefore someone born with spina bifida would be estimate to live for 25 years with each year having a DALY weight of 0.52. These calculated DALYs are then discounted. The DALYs were monetised by using a value per DALY of £30K (transferred from the NICE thresholds). The terminations were monetised using the standard NHS cost reference costs for abortions of £542. It was noted that the policy would have become even more beneficial (from a monetary aspect) if the terminations had been treated in the same way as the still birth / neonatal death (i.e. given a value of life). The result of the benefits calculations was a total benefit of £13.1m. In contrast the total costs were calculated as being £516,000. Other than the ethical issues of mandatory fortification of flour there were some other reservations for the policy including whether there was a potential risk in increasing in bowel cancer risk through the mandatory fortification of food. In addition there was another worry that the folate acid could impact on the problem of anaemia in older people.

Case Study 3 – Health and Safety Executive (Use of QALYs)

Case Study – The control of Noise at work

This case study is described in HSE (2005). The Control of Noise at Work Regulations 2006 aim to protect workers from risks to their health (specifically, noise induced hearing loss), arising from exposure to noise at work. This intervention introduces an exposure action value of 5 decibels lower than previous regulations and a new exposure limit value. The level at which employers must provide hearing protection and hearing protection zones is now 85 decibels (daily or weekly average exposure) and the level at which employers must assess the risk to workers' health (health surveillance) and provide them with information and training is now 80 decibels. There is also an exposure limit value of 87 decibels, taking account of any reduction in exposure provided by hearing protection, above which workers must not be exposed. The Health and Safety Executive was the decision making body for implementation of the regulations in Great Britain. The regulations are

based on European Union Directives requiring similar basic laws throughout the Union on protecting workers from the health risks caused by noise.

The costs included in the assessment were: estimated baseline cost to society (before the implementation of the proposed regulations) of hearing loss to workers caused by occupational exposure to noise and the compliance costs to businesses of implementing the regulation. The main benefits of the regulation are identified to arise from the quality of life benefits generated by a lower incidence of hearing loss caused by occupational exposure to noise. The change in incidence of hearing loss is estimated on the basis of the projected reduction in the number of workers exposed to noise levels above the exposure action value and the exposure limit value. This is applied to estimates of median hearing loss at different noise levels, assuming 10 years and 40 years exposure to noise. The value of these benefits are calculated as the difference between the estimated “current” (i.e. pre-regulation) total cost to society of hearing loss from occupational exposure to noise, and the projected cost to society from hearing loss when the regulation is in place. The benefits are estimated in terms of the aggregate increase in quality of life years (QALYs). Monetary savings to employers, the NHS, and individual workers, in the diagnosis and treatment of hearing loss are also estimated.

The main beneficiaries were identified at the time of the valuation, as workers exposed to noise levels above 85 decibels (in sectors such as construction, manufacturing, agriculture, entertainment) for prolonged periods, estimated at 1.1 million. This estimate was based on an adjustment of a HSE survey carried out in 1995. Benefits are also estimated to be generated for employers, the health service, and the exchequer (Department for Work and Pensions). The direct costs (of reducing exposure to noise) are expected to fall predominantly on employers in industries with noisy work environments (i.e. that exceed the new exposure action value and/or exposure limit value).

A cost benefit analysis approach was used. Numbers of workers currently exposed to various noise levels were estimated, on the basis of a previously existing survey, and information on median hearing loss at different noise levels, assuming 10 years and 40 years exposure to noise was applied to estimate projected hearing loss both pre and post implementation of the regulation.

The value of health related costs and benefits were estimated via quality adjusted life years (QALYs). Monetary values were assigned to different levels of hearing loss exposure (based on a value of £42,000 per quality adjusted life year, extrapolated from the Department of Transport’s estimate of the Value of Preventing a Fatality (VPF), and assuming specific reductions in QALYs attributable to defined levels of hearing loss). These were then multiplied by the number of workers affected at each level of hearing loss. The calculated monetary values for hearing loss are presented below:

Table 4: Monetary values for different levels of hearing loss

Reduction in QALY		Value
10 %	50 dB Hearing loss	£4,200
5 %	30 dB Hearing loss	£2,100
2.5 %	20-30 dB Hearing loss	£1,050
1 %	15-20 dB Hearing loss	£ 420
0.25%	10-15 dB Hearing loss	£ 105
0	<10 dB Hearing loss	£ 0

The estimation method reflects the view that hearing loss is likely to be valued more highly at higher levels of hearing loss. These values were discounted (over the relevant number of years for ten and forty years of exposure to noise).

Costs are discounted to present value using the standard 3.5% discount rate that is usually applied to public policy appraisals. However, health benefits are also assumed to increase in value by 2% per year in line with the estimated average annual increase in real GDP per capita. Health benefits are thus discounted by a net factor of 1.5% per year.

This intervention was to implement a European Commission Directive. The criteria, therefore, was set out so that it could be identified whether or not the costs were grossly disproportionate to the benefits. The RIA states in its final recommendation that “on the basis of the assumptions made in the calculations, the costs do not appear to be grossly disproportionate to the benefits.”

Case Study 4 – Scottish Government Health Department (altered DfT VPF value)

Case study – Regulatory Impact assessment for the Smoking Ban

The ban on smoking in public places was contained in the smoking and Health and Social Care (Scotland) bill 2005. The RIA set out the expected range of costs and benefits associated with each of the policy options being considered. The economic impacts were based on a study described in HERU (2004). The key costs were; costs to the Scottish Administration (e.g. implementation and enforcement costs), Costs to local authorities (e.g. enforcement costs), costs to the UK exchequer (e.g. reduction in tax duty), costs to other bodies , individuals, businesses (e.g. signage costs), Impact on the hospitality sector. The key benefits were health benefits (lives saved as a result of reduced exposure to smoke and reduced levels of active smoking), resource savings - reduction in NHS treatment costs, reduced sickness absence, productivity gains and reductions in fire hazards, reductions in cleaning and decorating costs.

The economic values for lives saved were calculated using the Highways Economic Note 1 (WTP VPF values). These were then adjusted to take account of the average age of death from various smoking related diseases (as apposed to death from a motor vehicle accident) which tends to be higher.

The impact assessment was presented in terms of NPV figures based on a 30 year period. This was completed to reassure ministers that it would not have an adverse economic impact.

In summary the key differences with the approaches identified are between those that focus on value of life and those that focus on value of health. These two approaches will now be briefly summarised below.

Value of life

Departments frequently apply the DfT values for the prevention of a fatality for instances where death is estimated to occur. For example, deaths from fire, Homicide, transport accidents (road and rail), floods, nuclear accidents, workplace deaths and certain health effects. The values used are provided below in Table 6 for 2005 prices.

Table 6 Average value of prevention per casualty by severity and cost element (£, June 2005)

Injury Severity	Lost Output	Human Costs	Medical and Ambulance	Total
Fatal	490,960	936,380	840	1,428,180
Serious	18,920	130,110	11,460	160,480
Slight	2,000	9,530	850	12,370

Source: DfT, 2007 (HEN 1)

Reasons why the departments were using these values are because:

- They are available
- The cost of producing new values would be prohibitive
- They are relevant in terms of their basis on marginal risk reduction
- They are values of safety which reflect “pure preferences for safety”

Value of Health

In the context of the value of health the most common method used has tended to be based on a quality adjusted life year (QALY) approach based on valuing health states. Over half of the departments interviewed use QALYs in some aspect of the work that they do. Examples include, in the context of cancer, in the case of wounding, sexual offences, common assault and robbery, as a result of a change in dietary input and in the context of changes in the noise regulations.

It should be noted again that the Department for Health (and NICE) have not put a specific value on a QALY. However, values have been applied to a QALY from a number of sources including:

- Derived from the department for transport value for the prevention of a fatality (e.g. 40k and 42K). These values have been derived from the DfTs value for prevention of a fatality

representing the average years left to live from the average age used in the DfT value. In certain cases this has been calculated with and without health costs included.

- Justified on the grounds of the level of the NICE thresholds (£20k and £30k)
- Taken from the Carthy(1999) WTP/WTB study (£80k)
- Recent study by Mason et al (2008) which focused on modifying the derivative of the DfT value to include a “basic value of living per se” (e.g. QALY value of £30k + this extra amount that people would be willing to pay)

There have been a number of alternative approaches to considering the value of health. These include the DEFRA study on health benefits from reductions in air pollution which used a willingness to pay approach to derive value for years of life lost in good and poor health and described in DEFRA (2004). This study derived a value in the region of £31k per life year gained in normal health and a figure of ¼ of this for a life year gained in poor health. In addition to this is the DEFRA study that used willingness to pay principals to place a value on the human intangible impacts of floods (e.g. stress and health impacts).

Question 3 asked : *Was the impact upon health or life valued based on known individuals (a certain impact) or probabilistically (e.g. as an increase/reduction in the risk of suffering in a specific way).*

All departments surveyed stated that it was done probabilistically. A number of departments highlighted the issue that the problem was not in putting a value on a fatality or injury (as these values could be transferred), but rather how do you calculate the probability of it happening when it is a low frequency event (e.g. workplace death or death due to flooding). A key issue is how do you determine the risk.

Question 4: *When the impact involves deferral or advancement of death, is the impact quantified in terms of years of additional life conferred, or the number of lives saved, or otherwise; and what considerations motivate this choice of technique?*

A range of responses were received. The majority of departments classified the impact in terms of number of lives saved. Where the impact was being judged in terms of health impacts it was commonly used to quantify the impact in terms of years of additional life (e.g. the Department of Health uses quality adjusted life years QALYs). One exception was DEFRA who used the approach of life years lost. In this case the choice of life years lost is based on the epidemiological evidence that links exposure to life years lost. This metric is also preferred as it is seen to provide a better reflection of the potential averse health impacts.

In one of the interviews it was highlighted that “saving a life does not in principle differentiate between whether you have saved a life where the life expectancy is 6 months or a couple of years? The idea should be that you don’t ever just save a life you extend life by your intervention.” Ultimately we are not extending life indefinitely.

Question 5 asked: *When the impact involves deferral or advancement of death, is any adjustment made for the quality of life of those affected by the intervention? How is quality scaled against longevity? If adjustments are made is further differentiation made according to those with a greater*

capacity to benefit from the intervention (e.g. does the process discriminate against those who are irretrievably handicapped) and what methods are used?

The responses from the interviews were that over half of the departments used QALYs in some areas of the assessment of interventions that they oversee. A summary of the results is provided in Table 7.

Table 7 Which departments use QALYs?

Does your department use QALYs/ adjustments for Quality of life in any assessment?	Departments
Yes	DH, HSE, HPA ² , Home Office, NICE, Scottish Government(Health), FSA, DEFRA ³
No	Environment Agency, DfT ⁴ Local Communities and Government

The response from the department for health was “Yes, quality of life following intervention is fully incorporated. Health function is determined with/without intervention according to a standardised measure of health state (covering mobility, self-care, usual activities, pain and anxiety/depression) [e.g.EQ5D]. Function levels are valued relative to death by survey of general population asking what risk of death would they be willing to take to shift from each of a wide range of hypothesized health states back to full health (or alternatively how many years at full health would they swap for ten years in the hypothesized state). The standard methodology employed would attribute greater value to an intervention that saved the life of someone with an independent disorder that either reduced post intervention longevity or quality of life. However, in practice the department would not endorse discrimination between different groups of patients with the same ailment on such a basis”.

The common method for determining the level of a QALY was to use the EQ5D index methodology. The response from NICE was that their focus was in presenting a cost effective analysis with health effects expressed in terms of QALYs. The key justification for using the cost effective analysis and QALY approach is due to “the focus of the Institute on maximizing health gains from a fixed NHS/PSS budget...” and “the QALY is considered to be the most appropriate generic measure of health benefit that reflects both mortality and HRQL effects” (NICE, 2004 p22). The QALY approach is used as the method for determining the changes in health states. The method commonly applied within NICE to determine the number of QALYs is the EQ5D index. This index is a descriptive questionnaire, which is comprised of 5 dimensions of health (mobility, self-care, usual activities, pain/discomfort anxiety/depression). For each of these 5 health states there are three possible levels (no problems, some/moderate problems/extreme problems). A unique EQ-5D health state is defined by combining 1 level from each of the 5 dimensions. This unique health state is then translated into a score of between 0 and 1 where 0 represents death and 1 full health. The expected survival duration of a patient is then weighted using this index, which represents their quality of life. This method allows practitioners to determine the quality of life of a person/ population before and

² Testing of a methodology to include the effects of people surviving, but with cancer from a nuclear reaction

³ While DEFRA do not use QALYs in the traditional sense they do have WTP values for a year in good and poor health.

⁴ Currently no, but are considering using the DEFRA guidance on air quality.

after an intervention. Typically the approach will be to determine the health benefits in terms of QALYs and the costs are the health system costs as a result of the new product or device resulting in a cost per QALY.

In certain departments QALYs were modified according to the age of a person (as a person got older the starting value for a QALY was factored down). It was suggested in a number of the interviews that this may lead to some degree of discrimination in policy outcomes. In other departments (e.g. Home Office) the QALYs were not altered according to the age of the person in question and the same QALY level was applied to all incidences. One of the reasons for this was due to a lack of disaggregated population data.

The DEFRA approach has different values for life years lost in good and poor health using stated preference methodology to determine this.

Question 6 asked: *How, if at all, are objectives to reduce inequalities internalised into the valuation processes. (e.g. is additional weight attributed to an intervention that benefits those whose life chances or current quality of life would otherwise be low?)*

None of the departments interviewed stated that they internalised inequalities into the valuation method. Although it was recognised that certain policy decisions may be implemented to reduce inequalities in society. For example the response from the department of Health was “No explicit additional weight is given to benefiting those with low health expectations, notwithstanding a departmental commitment to reduce health inequalities. However, inequalities impact is assessed and may influence policy determination in an informal way”. The Health Protection Agency reported that “When we assess things we use the concept of the “the critical group” as the reference person. Therefore if they are protected we are then protecting the bulk of the population”.

Question 7 asked - *Where quality of life is assessed (either as the object of the intervention, or as an adjustment to the impact conferred through life-extension/truncation), how is it implicitly or explicitly assessed?*

The responses to this question were mixed. The question considered the issue of where quality of life was being considered how was it conceptualised. For departments where quality of life adjustments were not being used the question was less relevant. This question will be developed further in the work being completed by UCL in the main report.

Question 8 asked: *Are there any circumstances in which the normal threshold of cost-effectiveness (or other capital budgeting methods) are over-ridden due to a duty of compassion or rescue in a particular context? If so, what limits effectively protect the public purse from generalisation from these contexts?*

A number of departments reported that they did not use thresholds or capital budgeting requirements in their decision making process. Arguments given for this were that it is not possible to quantify all the benefits from a particular scheme. Also where the known costs and benefits are used to inform the ranking of projects the department's total budget essentially then determines how many of these ranked projects are funded. For example, in the Environment Agency the capital budgeting methods

only account for one element of an assessment as to whether a project should go ahead. Using the DEFRA priority scoring system they split up the key factors into economic, people and the environment the benefit costs ratio only came under the economic category. Meaning that other factors such as the number of people who would benefit (people) or the environmental consequences (environment) could equally lead to the project being put forward. As with the previous example the department's total budget will then ultimately determine what can/ can't be funded.

The Department for Transport uses a multi- criteria analysis methodology for project appraisal. One of the elements of this process is the production of a benefit cost ratio (BCR) of which the value of life in terms of changes in accidents contributes. The department has an unofficial threshold and it was noted in the interview that not much has gone through that is below this threshold and nothing recently.

Departments such as the HSE and HPA use the ALARP (As low as is reasonably practicable) and gross disproportion principals to determine what should/ should not go ahead. The HSE highlighted that in their context that Case law and statute requires health and safety duty holders to weigh the costs of a proposed control measure against its risk reduction benefits. Specifically, following the principle of "gross disproportion", a proposed control measure must be implemented if the "sacrifice" (or costs) are not grossly disproportionate to the benefits achieved by the measure. There is no authoritative guidance as to what factors should be taken into account in determining whether a cost is grossly disproportionate, or that can be used, in any specific case, to judge whether the extent of disproportion is gross.

The discussion from the NICE interview considered that there had been cases where the usual NICE thresholds (£20,000 and £30,000) had been overridden, but they tended to be around issues where there is nothing left for that particular patient group apart from the treatment that is being considered. It was argued that by overriding the threshold was a problem as it was "a failure to recognise that you are taking healthcare away from other people to deliver this, so you are comparing a known patient group ...with a unknown group for whom care is removed" To put it into context "At NICE they have come to understand that a project that costs £50,000 per QALY on average that means that it would have to value the health gain from that health population at over 2 times the value of the population whose health had been reduced and that is being recognised as being extremely difficult to do and so it is happening less".

The Department of Health reported that some life-extending cancer treatments have allegedly been approved by local health bodies on this basis. Ultra-orphan drugs are probably in the same category and have been exempted from the normal valuation process. Added to this is the example of a new test for testing hepatitis C in donor blood. The arguments for doing this would be based on the outrage from the public if transferred blood were to be contaminated with this disease.

Question 9 asked : *Are interventions valued for their impact upon third parties and indirect benefits or costs to the public purse as well as for the value to the principal or direct beneficiary? If so, how is double counting avoided (given that the value that an individual attributes to her own life may in part reflect the good that she believes her life confers on others), and are there limits to the scope of valuation?*

On the whole departments concluded that they didn't value the impacts on third parties and indirect benefits. One element of the DfT value for the prevention of fatal, serious and slight casualties are the human costs which are based on the willingness to pay values. This represents the "pain grief and suffering to the casualty, relatives and friends" (DfT, 2007, p4) and so showing that the impact on third parties is considered, but from the perspective of the potential casualty.

The department for Health reported that benefits beyond those to the beneficiary of treatment are not routinely assessed. There is an equity concern that clinicians give equal treatment to equal need; inhibiting for example favouring cancer patients with dependents or in work.

It was noted in the NICE interview that the process of using cost effective analysis worked well when the evaluation was only concerned with the NHS budget (given that the thresholds are based on what the NHS can afford). The scenario in which this framework starts to fall down is when trying to include impacts from other budgets in the assessment (other than the NHS). For example in the case of Altsheimers disease the assessment would consider the health benefits of carers, but not the resource costs of carers. The only solution with a "fixed budget is that you would have to reallocate budgets elsewhere in the system otherwise you have a system where the health budget is implicitly cross subsidising budgets elsewhere and generating benefits elsewhere which are not explicitly valued". A paper published by Claxton et al (2007) proposes a method for how you could transfer 'benefits' from one department to another.

Question 10 asked : *Is a distinction made between benefits accruing to a department's own agenda and those accruing to other government Departments' (OGDs)' objectives? Likewise is a distinction made between costs incurred on own and OGDs' budgets?*

One the whole in response to this question the departments said no.

A paper published by Claxton et al (2007) proposes a method for how you could transfer costs of benefits from one department to another. This could be used to justify expenditure in one department that wholly benefits another department.

Question 11 asked: *Is a different approach taken to valuing benefits from mitigating risks or avoiding harms according to the source of the harm (e.g. whether from government or business or Act of God or the subject of the risk). Where do the boundaries lie when the intervention covers more than one department? Where are the boundaries between individual risk and government intervention?*

A number of departments stated that this could not politically happen.

The department of Health stated that one example was with the additional expenditure on tests for contaminated donor blood.

Summary

This section has provided a summary of the key answers to the questionnaire. The next section focuses on some of the key issues raised during the interviews by the departments.

4 Key issues raised by the interviews

A number of critical issues were raised from the interviews some in addition to the questions in the questionnaire in relation to health and life. These will now be discussed. Firstly focusing on the value of life and then the value of health.

4.1 Value of life

The question of whether when applying a value directly from one context (Department) to another context (Department) can it be directly comparable to the new context and department arose in a number of the interviews. For example the Department for Communities and Local Government raised the issue of whether dying in a fire should be valued at a higher level than dying on the road. Currently the Department for Transport VPF is applied. Equally is a homicide in the case of the home office 'worse' than a road accident and a workplace death in the case of HSE 'worse' than a road accident. All of these departments questioned whether the mode of death should lead to a different value being used. All are currently using the DfT value for the prevention of a fatality in these contexts.

In the recent OfCOMM work completed by the Food Standards Agency an internal discussion was had as to whether the DfT value could be applied directly to health benefits that will accrue to the UK given a policy designed to restrict the broadcast promotion of core category foods to children. The issues with using the DfT value were that in the context of dietary related deaths the average age of a death would occur much later in life than the average age of a road accident. In relation to this it was queried whether the productivity and health costs would translate to dietary related diseases. It was also queried whether it was appropriate to use a willingness to pay approach regarding risk reduction where people's life expectancy would be reduced by a few years, but not approximately half of their lifetime. The use of the value transferred directly was justified on the grounds that while the productivity of those with dietary problems were likely to be lower than the DfT value, the health costs were likely to be higher, so offsetting the two against each other.

A number of departments while transferring the DFT value have altered the value to make it more applicable to their particular situation. For example, in the Regulatory Impact assessment for the Smoking Ban in Scotland the economic values for lives saved were calculated using the Highways Economic Note 1 (WTP values) (DfT, 2007). These were then adjusted to take account of the average age of death from various smoking related diseases (as apposed to death from a motor vehicle accident), which tend to be higher. Another example is the HSE who apply directly the values for fatality, but for non-fatal injuries the human cost element is based on the DfT Human cost estimates, but uses different injury state classifications that are more relevant to the context. In the HSE context the DfT values have also been modified for a specific death scenario for example a cancer death is valued at 2 times the DfT standard value.

Related to the issue of transferability was the question of whether it was practical to transfer a full value for the prevention of a fatality to a context with an old person, who may only have a limited number of years to live.

A question raised by the Food Standards Agency in relation to its folic acid study (see case study 2) was whether an unborn child should have a value of life. In the context of that study this was not applied.

The DEFRA study on Valuing the health benefits associated with reductions in air pollution (DEFRA, 2004), produced a range of values in terms of health impacts from reductions in air pollution. They used the DfT value for the prevention of a fatality for justifying the values that they had produced. The argument used was “if a figure in the region of £31,200 per life year gained in normal health is deployed in the evaluation of road safety measures, such a figure for evaluating the chronic health benefits of reducing air pollution seems entirely defensible” (DEFRA, 2004, p44). The DfT are currently considering whether they can use these values in their appraisal methodology.

There were also examples of using the DfT value of life as the methodology for determining what the value for a QALY should be. For example the Department for health had applied a QALY value of £40k in the Impact of faster referral for cancer work based on the assumption of dividing the DfT VPF by 40. The HSE had applied a value of £42K for a QALY in the assessment complete for the Noise at Work Regulation in 2006, which was also derived from the DfT VPF.

One example of a case where the values were not directly comparable with the data that was being produced was at the Health Protection Agency. It was noted that it is not currently possible to apply different values for the prevention of a fatality by age group, as there is only one value. “it would be useful to have a value of a fatality that was age dependent – we have models that look at radiation doses to all ages, but currently can’t use the data to the full extent” (HPA).

The key issues raised were:

If the majority of departments are using the DfT values:

- Can we have a central value of life?
- Are the values fit for purpose outside of the DfT?
- Should we have a new study to validate the values?
- Ultimately are the DfT values the rights ones to use across Government?

Does a life equal a life or should certain deaths be worth more?

- is a homicide worth more than a road fatality?
- Should we be paying more to prevent one terrorist killing 1000 people than for an alternative public programme that saves 1000 lives

Should we be valuing lives saved or lives extended?

- Ultimately we are just extending a persons life
- Does the length of time it takes to die have an impact (e.g. DfT apply a fatality as someone who has died within 30 days of the accident from causes due to the accident)

Should values be disaggregated by population characteristics?

- Can the VPF be applied to the context of a project where the majority of people benefiting are retired?
- Do the productivity and health costs transfer directly?
- Suppose motorcyclists tend to be young – is it legitimate to use a different value of death prevention for motorcyclists as a category when considering safety projects
- We currently have data that is disaggregated but have to apply the mean value

How should we deal with low frequency events that make determining the risk problematic? A number of departments stated that the problem was not in applying the values but in determining the risk factors.

Should an unborn baby have a value of life / should a child have a different value of life if based on a WTP method.

How do political decisions affect the evaluation? – they may have the same value of life but due to political pressure gain a higher weighting

One interviewee stated that one of the key issues surrounding this work is that we “Would like a clearer view of how we should be valuing life across government”. What should be the drivers of the values? – size of risk, preferences of risk or valuation of risk?

4.2 Value of wellbeing /Health

In looking at the use of QALYs the FSA department has considered the work by Jones Lee on the “pure value of living”. They quote Jones- Lee as saying “ it seems pretty clear both intuitively and from the empirical evidence that some sort of pure value of living exists for most people, so to ignore it completely and treat the extension of a sick 80 year olds life by, say, two years as being only ‘worth’ two times the value of a QALY just seems to me to be misguided” (taken from FSA (2006 p 21). In the interview it was reported that this pure value of living or ‘intrinsic value’ could be of the magnitude of £400,000 per person. When applying the value of a QALY this “intrinsic value” would also have to be added to the value of a QALY. It was noted that it would be interesting to know of other cases where this had been applied and whether this methodology should/ could be applied in different contexts.

A number of departments were taking the value of a QALY from the NICE thresholds. For example in the OFCOM study (FSA, 2006) one of the examples provided had used a value of a QALY at £30K. The reasons given for using the £30,000 for a QALY are; “it is the value that NICE is widely believed to apply as a passmark in appraisal of health technologies; a recent study of air pollution for DEFRA and a study for DoH of willingness to pay for a QALY, which takes as its starting point the DfT value of a statistical life (FSA, 2006 p24).

It could be argued that values from these NICE thresholds should not be transferable to other departments other than health given the basis from which they have been determined which is - the thresholds reflect the opportunity costs (in terms of health forgone) of spending additional resources

on a new (as yet unfunded) intervention and spending less on something that is currently funded. The threshold is about comparing the costs of new technology and its benefits with what you would have to give up in the healthcare system to be able to deliver it and therefore relate directly to the NHS budget.

As described in the previous section a value of a QALY was also derived from other sources such as the DfT value for the prevention of a fatality.

There are a number of different applications of a QALY for example the home office applies a QALY value that assume that the affected population are of average age as a result of a crime. In other departments the QALY is factored according to the age of the person (e.g. an older person has a lower QALY start due to deteriorating health compared to a younger person). Should these approaches in different departments have to tally up?.

In a number of departments it was noted that the method and values used were those based on what is currently available for the context and not necessarily best practice.

The key issues raised were:

Does it matter that there are a range of QALY values?

- £20k - £80k
- Should we have a central QALY value?
- Does it matter that there are issues with different contexts / budgets?
- Are these the right QALY values?

Why would you expect that the Department for Transport value of a prevention of a fatality could be modified and applied as the value of a QALY?

There are data constraints where it is not always possible to differentiate from the average person.

4.3 Should the value of health or well-being be equal to the value of life

A number of interviews touched on the link between value of life and value of well being. In the HM Treasury interview the view posed was that “there should be different approaches to valuing health and life. A QALY/ well-being is not the same as risk. However one life should equal one life and there is some need for consistency there. There is every reason to believe that you may be sometimes concerned more with risk and in others more with quality of life”.

There are obviously examples as to where the value of life based on the DfT value has been applied to the context of a QALY bringing them more inline. One interviewee highlighted the issue of why would you expect the value of a QALY and the VPF on a road to be the same? And there is no reason why it is important for them to be the same because what that 20-30,000 should reflect is shadow price and that is the amount of money that government want to give to healthcare and this is the productivity if healthcare gives deliver health. Whereas the VPF is conducted on a completely different basis and estimated in different ways”.

4.4 Should values be determined by the size of the risk?

When asked question 3 in the questionnaire *Was the impact upon health or life valued based on known individuals (a certain impact) or probabilistically (e.g. as an increase/reduction in the risk of suffering in a specific way)* all departments answered the question that it was done probabilistically.

How a risk of a fatality/ change in health state occurs was one of the recurring themes of the interviews. For example the Environment Agency highlighted that the issue was not in putting a value on a fatality or injury in the case of flood risk management, but rather how do you calculate the probability of it happening when a death due to flooding so seldom happens in any one area. This was also raised by the HSE who highlighted that they also had relatively low risk events with 212-workplace death in 2005/06. The health protection industry raised the issue that one of the problems that they have is "on what basis can you assign a value if you only know the instance but not the numbers".

The interview at the Environment Agency raised the issue that a community (e.g. in the scenario of flood risk management) is more than the sum of its parts. Therefore should we be considering a different value for the case of risks that cover larger areas of population rather than individuals?.

4.5 Does it matter if values differ across departments?

A number of interviewees posed the question whether it mattered if different values were used across government given that different departments have different budgets.

A number of the interviewees stated that they would like to know whether there are any scenarios when the values should be different – different risks different values.

One department had concerns over a standard value of life applied across departments they raised the issues that "there is a slight concern over the potential impacts of a harmonised approach to valuing life particularly where cost effectiveness and cost benefit analysis are currently being used. For example while tight hospital budgets might create particularly high implied value of life (as resources to lower values would be rationed). This may not be appropriate in other areas where such a strict constraint may not exist, such as managing environmental health risks. If it were the case that a lower value from environmental risks were identified it may create an unrealistic expectation of the health service and consequently the government expenditure in this area".

One department suggested, "We are adopting values from other government expenditure which implies that the values for one government policy should be equal to the values implied in other areas". It is all public money.

5 Conclusions

This summary report has sought to consider the use of value of life/ health across government departments. It has highlighted some critical issues, which are now being taken forward by the work being conducted at UCL over the next couple of months.

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Annex 1 Participants in the survey

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Annex 2: Questionnaire – Stage 1

Survey of Departmental Practice in the Valuation of Life and Health

The Interdepartmental Group on the Valuation of Life and Health invites you to participate in a survey designed to assess current practice in valuing interventions that have an impact upon length or quality of life. This survey is in support of the aims of the group, set up by DH and DfT, with support of HMT and reporting to the Chief Economists group. The Terms of Reference of the group are attached, with contact details.

This survey had been designed as a two-stage process. The first stage involves you providing a summary of the current practice in your department in the area of valuation of life and health and providing us with an exemplar example of an assessment/ evaluation of an intervention. The second stage will involve an interview with researchers working on this study to consider in more detail the information from stage 1 and the questions included in stage 2

Stage 1: Example case study

For the first stage we would like you as far as is possible to illustrate the current practice in your department in the area of valuation of life and health by describing one or more exemplar interventions that has included an appraisal of / evaluated its impact upon health-related quality of life and/or life expectancy and/or risk of death, morbidity or injury. If you do not include these factors in your assessments, please could you state this and provide an exemplar case study showing how you do value an intervention in your area and if possible indicate how you would consider health or mortality impacts within this.

Please could you indicate whether the methodology illustrated is common practice across your whole department? If a different approach or different types of case are assessed across your department or by agencies or Arms Length Bodies, then each should submit its own example.

So far as is possible, this example should be typical of the interventions that are evaluated by your Department or Agency. In addition could you:

- Please provide a prefatory commentary outlining the extent to which other interventions and/or other valuation approaches diverge from that of the exemplar intervention evaluation. If there is variation in approach, what determines which approach is taken? (Where there is notable variation in the approach relating to a specific question relating to the example, this should be noted in the response to that question with cross reference in the prefatory commentary.)
- Please give references to any relevant research and policy documents that describe the approaches used in your department, whether published or unpublished, and whether commissioned by your department or elsewhere

For your chosen exemplar assessment(s), we would like in particular to know the following information:

- a. A description of the intervention
- b. Who is the decision-making agency
- c. What costs and benefits were included in the assessment
- d. Who were the beneficiaries and what is known about them (including whether they were identifiable at the time of valuation, and at the proposed time of intervention)
- e. Where do the costs fall? Public Purse? Industry? Those who benefit? Individuals who do not benefit? Does the incidence of the costs of the policy affect its appraisal?
- f. What type of appraisal /assessment of the intervention was used?
- g. What criteria were used for assessing whether this intervention went ahead?
- h. How important is the valuation of health and life to the overall priorities of your area?

We would like you to e-mail Charlotte Kelly c.e.kelly@its.leeds.ac.uk the results of stage 1 by the 14th of April 2008. If you have any questions please send me an e-mail or telephone on 0113 3435343.

End of stage 1

Annex 3 Questionnaires – stage 2

Stage 2: Interview Questions

This stage will involve an interview with researchers working on this study to consider in more detail the exemplar case study that you have provided us with from stage 1 and to look in detail at the questions provided below. In certain cases an illustrative example has been provided for the questions based on interventions in the field of cancer at the DH.

Q1 Do you include values of life / health in your appraisals / assessment for interventions? If yes what is the method used for including them in the assessment? If not, are you considering doing so?

Q2 If yes to Q1, what is the valuation method (s) used for valuing the benefit or harm:

- stated preference of general population
- stated preference of subset of population
- revealed preference
- expert group (how selected)
- judgement
- some combination of these
- other
- and whether the valuation was
- *ad hoc* (i.e. empirical work to value the specific impact envisaged)
- transferred from elsewhere (and if so, where)

Example answer (illustrative)...

Impact of faster referral for cancer will be measured in terms of Quality Adjusted Life Years, based upon an estimate, for the group benefiting from faster treatment, of any impact upon quality of life (positive or negative) from treatment plus total number of life years added adjusted for the expected quality of those years. (Level of quality of life for any identified healthstate is assessed as described below). A calculation of quality adjusted life years (QALYs) saved is made. QALYs are valued at some £40k each, a figure derived from DfT valuation of a prevented fatality.

Q3 Was the impact upon health or life valued based on known individuals (a certain impact) or probabilistically (e.g. as an increase/reduction in the risk of suffering in a specific way). What considerations motivate this choice of technique?

Example answer (illustrative)...

Implicitly, via the transferred valuation from Transport, the valuation is of reduction of the risk of bad outcome consequent upon contracting cancer, with an assumption that this is of similar value for expected cancer death as for Transport death

Possible motivation for use of this indirect technique:

- *difficult to get ethical approval for a study asking cancer sufferers how much they would be willing to pay to reduce their risk of death through faster treatment*
- *direct questions of this sort would be constrained by individuals' budget constraints, whereas the social value of cure may properly be constrained only by society's budget constraint.*

However the assessment of quality of life is via a direct assessment of the disutility of a particular health state (see below).

Q4 When the impact involves deferral or advancement of death, is the impact quantified in terms of years of additional life conferred, or the number of lives saved, or otherwise; and what considerations motivate this choice of technique?

Example answer (illustrative)...

Number of years saved – this helpfully distinguishes between interventions adding but a few months to life and those that add substantially to life expectancy.

Q5 When the impact involves deferral or advancement of death, is any adjustment made for the quality of life of those affected by the intervention? How is quality scaled against longevity? If adjustments are made is further differentiation made according to those with a greater capacity to benefit from the intervention (e.g. does the process discriminate against those who are irremediably handicapped) and what methods are used?

Example answer (illustrative)...

Yes, quality of life following intervention is fully incorporated. Health function is determined with/without intervention according to a standardised measure of health state (covering mobility, self-care, usual activities, pain and anxiety/depression). Function levels are valued relative to death by survey of general population asking what risk of death would they be willing to take to shift from each of a wide range of hypothesized health states back to full health (or alternatively how many years at full health would they swap for ten years in the hypothesized state).

The standard methodology employed would attribute greater value to an intervention that saved the life of someone with an independent disorder that either reduced post intervention longevity or quality of life. However, in practice the department would not endorse discrimination between different groups of patients with the same ailment on such a basis.

Q6 How, if at all, are objectives to reduce inequalities internalised into the valuation processes. (e.g. is additional weight attributed to an intervention that benefits those whose life chances or current quality of life would otherwise be low?)

Example answer (illustrative)...

No explicit additional weight is given to benefiting those with low health expectations, notwithstanding a departmental commitment to reduce health inequalities. However, inequalities impact is assessed and may influence policy determination in an informal way.

Q7 Where quality of life is assessed (either as the object of the intervention, or as an adjustment to the impact conferred through life-extension/truncation), is it implicitly or explicitly assessed according to:

- a. the pleasure accruing to the beneficiary (a utilitarian model); is this assessed from (i) preference elicitation of potential beneficiaries, or (ii) direct psychic response of beneficiaries?
- b. the capability enhancement conferred upon the beneficiary, including both ability to enjoy life and other valued aspects of human flourishing; is this assessed from (i) preference elicitation of potential beneficiaries, or (ii) direct assessment of capability gain

- c. the satisfaction of the preferences of the beneficiary as measured by willingness to pay (or where appropriate, willingness to accept) without questioning the value of ultimate objectives sought
- d. the satisfaction of the preferences of citizens for conferring benefits without questioning ultimate values informing judgements
- e. other (please specify)

In particular we would like to know whether you are using these methods, whether they have in the past / are currently being discussed in your department and whether you are concerned whether you are using the right methodology.

Example answer (illustrative)...

The approach to valuation of quality used in health is consistent with a(i), but not a(ii): To be precise: when establishing the value of faster recovery from the pain associated with cancer, it is healthy members of the public who are asked the value of recovery from a hypothetical ailment, rather than questioning let alone measuring pain response of people who currently suffer from the ailment.

The valuation of movement between health states is based upon judgments of the general public: to the extent that members of the public themselves value capability improvements this is derived from their expressed preference, as in b(ii).

However, what is in the minds of those completing the surveys (see answer on question 5) on the basis of which quality is assessed is uncertain, hence is hard to differentiate between a capability approach by the public (b(i)) and uninterpreted preference satisfaction. (c).

There is no explicit attempt to measure citizen valuation of others' improvement at present (d), though research is in progress on this issue. (Reference available.).

Q8 Are there circumstances in which the normal threshold of cost-effectiveness (or other capital budgeting methods) are over-ridden due to a duty of compassion or rescue in a particular context? If so, what limits effectively protect the public purse from generalisation from these contexts?

Example answer (illustrative)...

Some life-extending cancer treatments have allegedly been approved by local health bodies on this basis. Ultra-orphan drugs are probably in the same category and have been exempted from the normal valuation process.

Q9 Are interventions valued for their impact upon third parties and indirect benefits or costs to the public purse as well as for the value to the principal or direct beneficiary? If so, how is double counting avoided (given that the value that an individual attributes to her own life may in part reflect the good that she believes her life confers on others), and are there limits to the scope of valuation?

Example answer (illustrative)...

Benefits beyond those to the beneficiary of treatment are not routinely assessed. There is an equity concern that clinicians give equal treatment to equal need; inhibiting for example favouring cancer patients with dependents or in work.

Q10 Is a distinction made between benefits accruing to a department's own agenda and those accruing to other government Departments' (OGDs)' objectives? Likewise is a distinction made between costs incurred on own and OGDs' budgets?

Q11 Is a different approach taken to valuing benefits from mitigating risks or avoiding harms according to the source of the harm (e.g. whether from government or business or Act of God or the subject of the risk). Where do the boundaries lie when the intervention covers more than one department? Where are the boundaries between individual risk and government intervention?

Example answer (illustrative)...

No distinction according to the cause of cancer is made. Elsewhere distinctions are made: efforts to avoid risk of contamination of blood for transfusion have been subject to a much higher cost-effectiveness threshold than other interventions. Other similar examples may include efforts to reduce nosocomial infections (MRSA) and iatrogenic harm (Shipman). This difference of approach is not however codified into appraisal methodology

Q12 Are there any other factors that you think are important in the valuation of life and health from both your own and your department's perspective?

End of stage 2