



# Valuing mental health:

how a subjective wellbeing approach  
can show just how much it matters

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## Executive summary

Today's methods for valuing the impact of different health conditions significantly underestimate the impact of mental health conditions on quality of life.

Using an alternative method – the subjective wellbeing approach – provides compelling evidence that mental health is the most important aspect of health for a person's general welfare.

Out of the 11 health conditions looked at, the data suggest that having either depression or anxiety is around five times worse than the worst physical health condition for people's subjective wellbeing.

Further, depression and anxiety are over ten times worse for people than the average impact of all other physical health conditions looked at in the study.

Organisations such as NICE use preference-based methods for estimating the impact of different health states. This asks people to predict how bad having different health conditions would be. But these preference-based methods suffer from a *focusing illusion* whereby people are likely to focus on the most salient aspects of the condition and this may not reflect how they would experience these states in real life.

By contrast, the wellbeing approach draws on people's actual lived experiences with health conditions, and attaches values to them. An advantage of this approach is it captures all aspects of welfare rather than simply health-related ones. This means the effectiveness of health interventions can be compared to non-health interventions including education and employment programmes.

In the UK, the subjective wellbeing approach has become an established alternative to traditional preference-based valuation methods in cost-benefit analysis. Subjective wellbeing is recognised by HM Treasury as a method to judge the value of policy interventions across all domains and also features in recommendations set out by the Organisation for Economic Co-operation and Development (OECD).

This report reveals that good mental health is far more valuable than we once thought. Traditional valuation methods have understated the value of mental health (in relation to physical health) and, as a result, the value and social benefit of mental health interventions too.

## 1 Introduction

Health interventions are currently assessed in terms of impacts on a descriptive set of outcomes such as pain levels and the patient's mobility. The relative value associated with relief of these outcomes is assessed by asking people their preferences over hypothetical health states, which can be used to compute quality of life in these health conditions using quality-adjusted life years (QALYs). This is a measure of the welfare losses associated with different health conditions, the outcome that policy evaluation methods generally seek to measure.

People's preferences for things, however, may not accurately reflect their experiences in real life. We could instead ask people how they feel about their lives through questions on their subjective (ie self-reported) wellbeing, and public policy in the UK is increasingly using these types of data to assess and evaluate policies. Subjective wellbeing (SWB) data can be used with statistical analysis to assess how different health conditions impact on people and their lives as they experience them and we can do this without having to ask people about how they think their lives would be in different health states. This is a significant advantage of using SWB in health evaluation because, when we ask people how they think they would feel in different health states, they are unable to predict correctly how much they will adapt to certain health conditions and they tend to focus on salient aspects of the condition, which do not matter so much in their actual experiences.

Using SWB data, we find evidence that mental health is the most important aspect of health for a person's general welfare and that traditional health valuation methods, which use people's preferences over different hypothetical health states, have tended to understate the importance of mental health.

SWB data can also help us estimate equivalent monetary costs associated with different health conditions. We find depression and anxiety, on average, have a much larger cost to people than any other health problem. These costs can be used to attach values to psychotherapy services and interventions that help people recover from mental health problems. In doing so, we will ultimately be able to guide policy towards affecting those aspects of people's lives that have the greatest impact on how they feel and experience life.

## 2 Policy evaluation

Policy evaluation makes up an important part of the activities and budget of most OECD governments. Arguably, nowhere is this more so than in the UK, where HM Treasury plays a key role in verifying the effectiveness of different policy interventions and in the production of formal guidance on policy evaluation. Health interventions and policies are subjected to formal and highly technical methods of assessment, led by the Department of Health (DH) and the National Institute for Health and Care Excellence (NICE). The fundamental aim of government policy evaluation is to assess whether public funds are spent on activities that provide the greatest benefits to society (HM Treasury 2003).

In the UK, this is assessed through cost-benefit analysis (CBA), as set out in the HM Treasury *Green Book* on policy appraisal (HM Treasury 2003). This entails measuring all of the benefits and costs to society associated with the policy intervention. The preferred option is the one with the highest net social benefits over the full life of the policy and its legacy.

### 2.1 Cost-benefit analysis

CBA has its roots in welfare economics and there are a number of important normative foundations to this approach. First of all, CBA (and welfare economics more generally) is a consequentialist approach. This stipulates that it is the outcomes of an action that matter and get counted, rather than anything to do with the intention or process of the action, in so far as the intentions and processes have no impact on the outcomes of an action. Second, in CBA, welfare is the ultimate outcome that we are interested in, where welfare refers to the very broadest notion of how we are fairing in life. Welfare, in this sense, is the ultimate intrinsic good and all outcomes related to an action are instrumental to welfare. This does not mean to say that within the welfarist framework nothing else is of importance; it just says that something is of importance if and only if it impacts on welfare.

In CBA, therefore, the 'costs' and 'benefits' of an intervention relate directly to changes (ie losses and gains) in terms of human welfare due to the intervention. A policy intervention with a net benefit to society is one leading to an improvement or increase in people's welfare. And any such welfare-improving intervention is worthy of undertaking according to CBA.

Now, most interventions are likely to have impacts on a broad number of outcomes. For example, an employment programme may help people into jobs, improve their health and reduce crime rates, and

an intervention in health may lead to improved mental and physical health, higher self-esteem and better relationships with family members. These are all important factors because they impact on our welfare and so must be included in CBA. In order to be able to relate impacts on differing domains in life to each other, the key process in CBA is to convert all outcomes related to the intervention onto the same metric so the overall net social impact can be calculated. CBA does this through conversion of all outcomes to a monetary scale. In theory, any metric could be used, but monetisation allows us to compare outcomes to the implementation costs, which are in financial or monetary terms from the start.

The conversion metric in CBA should represent only the changes in welfare associated with the intervention (Fujiwara and Campbell 2011):

*A monetary value is, therefore, measured as the equivalent amount of money that would induce the exact same change in welfare as that experienced from the outcomes associated with the intervention.*

In other words, to put it in explicit terms, if a course of physiotherapy that led to reduced knee pain and better mobility improved an individual's welfare by 20%, we would seek the equivalent amount of money that would also induce a 20% increase in welfare. If that happens to be £12,000 (which we have estimated through the type of analytical techniques discussed in detail below), we can stipulate the value of the physiotherapy to that person is £12,000. The technical terms for this valuation methodology are known as compensating surplus and equivalent surplus and they form the foundation of valuation in CBA. They can roughly be interpreted as willingness to pay (WTP) for positive outcomes (eg improved mobility) and willingness to accept (WTA) negative outcomes (eg permanent hearing loss).

For the past 100 years or so, economists have traditionally measured welfare as the satisfaction of preferences. This draws on theories of human welfare stating that people want things that will make their lives better and hence satisfying their preferences improves their welfare. Here we can use market data (ie people's preferences revealed in behaviour) or we can ask people their preferences (people's stated preferences) in order to infer what increases their welfare and how much this is equivalent to in monetary terms. Revealed and stated preference methods are the traditional forms of valuation in CBA.

In revealed preference methods, proxy markets are used to pull out the shadow price of the non-market good in question. For example, to place a value on

green space, we could use the housing market to estimate the price differentials between houses in areas with green space and equivalent types of homes in areas without any green space. These methods are restricted by the number of proxy markets available. Where such markets do not exist, stated preference techniques such as contingent valuation are applied. In a contingent valuation survey, the non-market good (eg green space, reduced crime, cleaner air) is described in detail and people are asked for their maximum WTP for the good (or minimum WTA for a bad outcome such as pollution).

## 2.2 Critiques of cost-benefit analysis

Criticism of CBA has been aimed at both the normative or philosophical foundations of welfarism and at the positive (ie technical/methodological) issues. For example, this might relate to issues of whether there is anything in addition to welfare that should be considered or how to aggregate changes in individual welfare. These types of discussions are worthy ones to have, but we believe human welfare is the right outcome for policy and hence should be the metric against which we measure the success of interventions. The focus of our paper will be on the issue of valuation within this cost-benefit framework, specifically in relation to health. We are interested in whether, given that welfare is the right (and only) thing to maximise and care about, current valuation methods used in health are adequate in capturing the full benefits of health-related interventions such as psychotherapy.

Standard preference-based valuation methods suffer from a number of problems. First, in revealed preference methods, markets have to function well in order for people's values to be revealed. For example, if there is a public cap on rental prices, house prices will not reveal the value people place on living in nicer or greener areas. Second, people may not have sufficient information to make informed choices. And third, a large literature from the decision sciences has shown that preferences can be highly context dependent (see Slovic and Lichtenstein 2006). They can often be biased by irrelevant factors, which means that what people want may not always align well with what is best for them.

For example, numerous experiments have shown that people are unable to accurately predict the pleasure or benefits they will get from different goods and services. This is true even for everyday goods such as yogurt, music and ice cream (Kahneman and Snell 1992; Wilson and Gilbert 2003) and one of the drivers

of this phenomenon is that people are unable to predict how much they will adapt to different things and circumstances. People have also been found to reverse preferences if the same information about the good is presented in slightly different ways (Hsee 2000).

In contingent valuation surveys, respondents systematically anchor their stated values for non-market goods to irrelevant numbers that appear in the environment at the time. For example, Ariely, Loewenstein and Prelec (2003) found that asking people their social security number before asking how much they would be willing to pay for a range of goods tended to anchor participants to the social security number, although it is a randomly generated number with no relation to the value of the goods. Furthermore, non-market goods may be given different values based on the sequence in which they are presented to the respondent and people may strategise to affect policy by, say, stating an extremely high value in order to encourage policymakers to provide the good or service.

Partly due to these difficulties, health evaluation has taken a different path in the UK. Current health valuation methods do not use monetary value and instead value health outcomes in terms of changes in health, more specifically quality-adjusted life years. As we discuss in more detail below, in order to derive QALYs, evaluation in health uses the preference satisfaction account of welfare. But, rather than asking people their WTP to cure a health condition, health valuation looks at the number of life years people would be willing to trade-off or give up in order to return to better health. Section 3 describes the standard preference-based approaches to health valuation used in the UK by NICE.

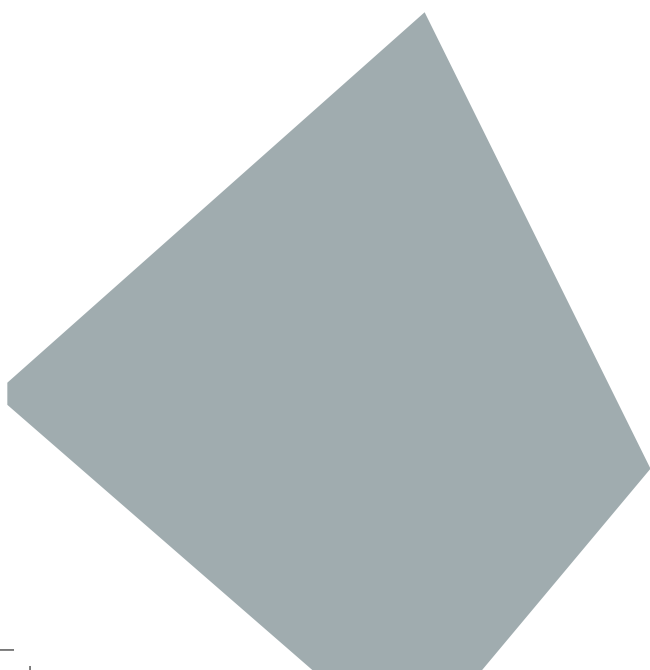
### 2.3 Recent developments in valuation methodology

Increasingly, economists are turning to self-reported measures of welfare instead of preferences in their research. Measures of SWB, such as life satisfaction and happiness, are now available in a large number of national datasets. Indeed, the UK is seen as the world leader in this area, with the National Wellbeing programme run by the Office for National Statistics (ONS) and around ten national-level datasets containing questions on SWB.

The opportunity these data present is that it is now possible to look at the impact of policies or outcomes related to policy interventions on people's SWB. Whereas in traditional health valuation methods we tap into people's preferences about different health states, in the wellbeing approach we look directly at how different health states and conditions impact on people's self-reported levels of wellbeing, such as life satisfaction, and this information could be used to assess the relative importance of different health domains using similar techniques to those used by NICE.

We can also use the wellbeing approach to attach monetary values to non-market goods and services (Fujiwara and Campbell 2011). In other words, we can estimate the value people place on living in good health or recovering from a mental health condition. This is done by looking at how health condition and income impact simultaneously on people's wellbeing. For health this means we could undertake a full CBA for different health interventions. We discuss the wellbeing valuation approach in full in section 4.

This means with wellbeing data we can look at the impacts of different health conditions on people's levels of SWB without asking them specifically about how the condition may impact on them. Asking people about how something will affect their lives or about their preferences between different states of the world (defined by, say, different health conditions) often leads to a 'focusing illusion' (Kahneman, Krueger, Schkade, Schwarz and Stone 2006; Schkade and Kahneman 1998), whereby at the time of preference elicitation people are focusing only on the salient aspects of the condition and this may not reflect in any way how people would actually experience these conditions or states in real life. In wellbeing analysis, we are able to look at people's actual experiences with health conditions when they are living life as they normally do and attach values to these conditions. We discuss the role of focusing illusions in detail in section 3 and we will show how using SWB instead of preferences has significant implications for how we value mental health outcomes.



## 3 Evaluating health

We have discussed how non-market goods and services get valued in CBA. A notable exception is health benefits, which are often valued in health, not monetary, units. The demand for non-monetary values came about partly as a 'push' against WTP and partly as a 'pull' from evaluations in healthcare. We have discussed some of the main empirical concerns related to preference-based valuation methods. The appropriateness of using WTP to value health also raises ethical concerns. For example, because value will be related to ability to pay (and the prevailing income distribution may be seen as inequitable) and because of the signal that using money to value health may send (implying health is just like any other commodity bought and sold in the market place). We focus here on how to value health benefits and do not discuss distributional issues.

Given the problems with eliciting monetary values for health, a different approach has been adopted. This involves retaining the preference-based component of willingness to pay but replacing money as the currency with the risk of death or life years. The standard gamble (SG) requires respondents to consider the combination of the risk of full health ( $p$ ) and the risk of death ( $1-p$ ) that is equivalent to the certainty of a poor health state. If full health is assigned a value of 1, then the value of the poor health state is taken to be  $p$ . The time trade-off (TTO) requires respondents to consider how many years of life in full health,  $x$ , are equivalent to a longer time,  $t$ , in a poor health state. With full health = 1, the value of the poor health state is  $x/t$ . There has been considerable debate among health economists about the relative merits of these methods. As it currently stands, NICE in the UK has a preference for TTO.

### 3.1 Quality-adjusted life years (QALYs)

The attraction of these methods is they can be used in the valuation of QALYs. The QALY approach seeks to express the value of changes in quality of life and length of life in a single number by attaching quality of life weights to different states of health and illness and then multiplying those weights by how long the states last. The 'Q' in the QALY is calibrated on a cardinal scale between 0 (for dead) and 1 (for full health). So one QALY represents one year of life in full health, or two years in 0.5 health, and so on.

An efficient healthcare system will be one that invests in interventions that generate the most QALYs at least cost. Allocations based on QALYs would effectively work down a league table ranking all interventions in terms of their incremental cost-

per-QALY ratio until healthcare resources have been exhausted. NICE strongly endorses a QALY approach to health valuation but recognises that there will be other concerns that might affect the relative ranking of different interventions, such as the characteristics of the recipients, which we do not discuss further here.

Before we can begin valuing health, we need to decide how to describe it. Generic health state descriptive systems have been designed for the specific purpose of calculating QALYs. NICE currently recommends the EQ-5D, which defines health in terms of five dimensions (mobility, self-care, usual activities, pain and mood), with three levels of severity for each dimension; thus generating 243 possible health states. A level of 1 = no problems; level 2 = some problems and level 3 = extreme problems or inability to do the tasks. For example, an index of (2,1,1,2,1) would represent a health state with some mobility problems and moderate pain, but no problems in the other three domains. The SF-6D is another contender, collapsing health state into six dimensions – physical, role, social functioning, pain, mental health and vitality (encompassing notions of energy and zest for life) – with four to six levels of severity (resulting in 18,000 health states).

Once we have decided how to describe and value health, we need to make a decision about from whom the values should be elicited. NICE asks for values to be elicited from the general public in the form of hypothetical preferences, as opposed to individuals who have experienced specific health states. Using the preferences of the general public is broadly consistent with an insurance principle, whereby the ex-ante preferences of those who might be affected by a condition in the future are given weight in allocating resources.

So, NICE's 'reference case' is TTO values for the EQ-5D elicited from members of the general population. The main valuation studies for the EQ-5D were carried out in the early to mid-1990s. This culminated in 3,395 members of the UK general population being asked for TTO values for subsets of 12 EQ-5D states that were each assumed to last for ten years followed by immediate death. From 2,997 respondents with complete data, a tariff of values for all 243 EQ-5D health states has been estimated (Dolan 1997). This research was ground-breaking at the time, being the largest valuation study ever conducted and feeding directly into the valuation of health states for policy purposes. The 'tariff' paper has been cited around 1,700 times.

In the case of the SF-6D, the values attached to the 18,000 states generated by the classification system were derived from SG valuations from 611 members of the UK population (Brazier, Roberts and Deverill 2002).

These recommendations raise some serious concerns. Responses to methods, such as the SG and TTO, are subject to various biases that mean they rarely reflect real experiences. In many ways, our health state preferences more accurately reflect our affective reactions to – or fears about – particular health states rather than considered assessments of what life would actually be like with those conditions. While fear is certainly an important thing to consider in healthcare, it is not what the SG and TTO are designed to tap into; rather, they are intended to reflect a cognitive assessment of the impact a particular health state will have in the future, including how that impact may change over time.

The fundamental problem (from whomever preferences are elicited) is that what we focus on in a preference question is often not what we focus our attention on in the actual experiences of our lives. The general public tends to overestimate the severity of the loss from many (but not all) health conditions, partly because it exaggerates the extent to which patients attend to their health state. Imagine being asked to value walking with a cane. It is almost impossible to avoid imagining that as you walk you will be thinking about the cane much of the time when, in fact, the cane will rarely be the focus of your attention, especially as time passes.

Such focusing effects are an issue for any preference elicitation question for any population, including ‘patients’, since what we focus on in the question may not be focused on to the same extent in the experience of our lives. A person who walks with a cane and is asked to imagine having their walking restrictions alleviated will inevitably imagine actively enjoying the freedom of normal walking, which they would then eventually take for granted.

In recommending the EQ-5D to describe health, NICE and other agencies that are following suit are saying the dimensions of health within it are the only important ones. But there is no good normative or empirical basis for this claim, particularly when other dimensions, such as vitality, affect people every bit as much as the 5D in the EQ-5D. Moreover, since the EQ-5D was designed for use among patient populations, it also is not clear the EQ-5D picks up the impact that conditions have on the families of patients. The impact on others affected by the

condition is increasingly recognised as an important consideration in health technology assessments and we need to do more to accurately capture those effects.

All of this means NICE and other agencies valuing QALYs using preference-based methods may make the wrong decisions about which treatments to recommend: wrong in the sense that more benefit could be gained by making different decisions. Many economists recognise some of the problems with preference-based approaches and are looking for ways of refining conventional QALY methods. Our approach involves looking for more suitable ways of capturing the real experiences associated with the use of new therapies, capturing the whole experience of a healthcare intervention, and accounting for the impact on the family as well as on the patient.

This has led us to focus on subjective wellbeing (SWB): directly elicited reports of how people think about life or feel about particular activities. SWB is elicited from the public, or participants in clinical trials, in the form of paper or electronic questionnaires or telephone interviews. The SWB approach does not necessarily require us to abandon the QALY approach of weighting each health state by its duration. Indeed, some assessments (eg based on daily reports of happiness) relate to short and specific periods of time and so lend themselves directly to duration weighting.

SWB can be measured as ‘evaluation’ and ‘experience’. SWB is measured as an evaluation when people are asked to provide global assessments of satisfaction with their lives overall.

Economists have been using ‘life satisfaction’ for some time. Experience is closely associated with Jeremy Bentham’s view of wellbeing, where pleasure and pain are the only things that are good or bad for anyone. It is increasingly acknowledged that experiences can also include non-hedonic feelings of purpose (fulfilment, meaning, pointlessness, etc) alongside feelings of pleasure and pain (eg happy, anxious, etc), although there are many fewer data on this. For life satisfaction, it appears unemployment is very bad; marriage is pretty good, at least to start with; children have no effect; retirement is pretty good, at least to start with. By contrast, associations between experience-based measures and these events are quite weak; how people use their time matters much more to experience than to evaluation.

The important thing about SWB data is that they allow us to say what is important in people’s lives when they are not thinking about how important those things are. We cannot overstate how important



this is. Using statistical analysis to explain SWB based on a range of factors that cause happiness allows us to examine the effects of a range of causes on the final consequence – and without asking people to do it for us. We can find out how important walking with a cane is alongside all the other things that affect SWB.

### 3.2 Health evaluation with subjective wellbeing (SWB)

We propose two options for using SWB in health valuation. First, we can use statistical analysis with SWB to reweight the different dimensions of the EQ-5D and SF-6D. This would mean leaving the health state descriptive systems intact and using SWB instead of TTO or SG to help us rank the different health state permutations (the 243 health states for EQ-5D and the 18,000+ health states for SF-6D). The second alternative is to discard the current health state descriptive systems and look at the impacts of specific health states on SWB and rank or value these health states accordingly. Here, instead of looking at the impact of, say, a (2,1,1,3,1) health state we would be looking at the impact of specific health states such as severe back pain or digestion problems on SWB. This approach would allow us to look at more dimensions or impacts than the five or six set out in EQ-5D and SF-6D.

#### 3.2.1 EQ-5D and SF-6D weighting based on SWB

Here we present using multivariate regression analysis how different dimensions of the EQ-5D and SF-6D affect SWB and compare the relative weights with those elicited from TTO and SG. It should be said before we proceed that we cannot directly compare the values from preference-based methods with those derived from SWB regression models. For one thing, the former are deliberately anchored against death whereas the latter have no 'natural' endpoint as such. But it is possible to compare the differences in relative values: that is, to compare the impact of, say, mobility, with that of mental health on preference measures and SWB.

Table 1 shows US general population TTO values for the EQ-5D elicited from 3,773 respondents and evaluation and experience wellbeing data from a representative sample of 1,173 older US residents (Dolan and Metcalfe 2012). (Bear in mind here that the samples are different.) We use life satisfaction as the evaluation measure and daily mood (measured using the question 'Overall, how did you feel yesterday?' where feelings included friendly, lethargic, stressed, happy, sad, calm, angry,

Table 1

#### The impact of the EQ-5D on TTO and SWB in the USA

Health problem	TTO values	Life satisfaction	Daily mood
Some problems walking about	-0.146	-0.011	0.022
Confined to bed	-0.558	0.149	-0.048
Some problems washing or dressing	-0.175	-0.014	-0.026
Unable to wash or dress	-0.471	-0.165	0.059
Some problems performing usual activities	-0.14	-0.023*	-0.026
Unable to perform usual activities	-0.374	-0.323*	-0.07
Moderate pain or discomfort	-0.173	-0.010*	-0.041*
Extreme pain or discomfort	-0.537	-0.129*	-0.145*
Moderately anxious or depressed	-0.156	-0.151*	-0.218*
Extremely anxious or depressed	-0.45	-0.350*	-0.454*
Sample	3,773	1,169	1,166

\* <0.05 significance. Models with health conditions as the control variables

tired, depressed and worried. Daily mood was taken as the difference between the average of positive and negative emotions) as the experience measure. Based on regression analysis with TTO or SWB as the dependent variable and the levels and dimensions of the EQ-5D as independent (explanatory) variables, the negative coefficients show the decrement away from full health associated with each level of each dimension. So, having moderate pain or discomfort represents a 0.173 loss from full health using TTO, a 0.010 loss based on its impact on life satisfaction, and a 0.041 loss according to its impact on daily mood. Although we cannot directly compare the coefficient sizes across the three models, we can conclude that, in terms of relative importance, moderate pain is seen as being much more of a problem when using the preference-based TTO as compared to evaluation- or experience-based measures of SWB because moderate pain ranks higher in comparison to other

health problems under TTO than under the other measures. (Notice there are some positive coefficients for SWB – as if being in worse health is associated with higher SWB – but they can be explained by very small sample sizes for the most extreme level of the dimensions and are never statistically significantly different from zero so we exclude these results from our discussion here.)

Focusing on the comparisons with mental health, the clear finding is mental health matters much more relative to other dimensions of health using life satisfaction or daily mood as compared to TTO. Mobility, pain and anxiety/depression are seen as having roughly the same impact using a (TTO) preference-based approach – about 0.15 for ‘some problems’ and about 0.5 for ‘extreme problems’ in each case. By contrast, moderate anxiety/depression is about 15 times as bad (0.15) as some problems walking about (0.011) or moderate pain (0.010) according to reports of life satisfaction. And extreme anxiety/depression (0.35) is more than twice as bad as being confined to bed (0.15) or in extreme pain (0.13) based on life satisfaction. Similarly wide differences can be seen for daily mood.

Perhaps these findings are a quirk of the data somehow. To be more confident about the conclusions, we need to replicate them for other data, and ideally from the UK. Table 2 shows UK general population SG values for the SF-6D elicited from around 600 respondents and evaluation data from the British Household Panel Survey (BHPS), which contains data from around 10,000 people. Again, bear in mind the samples are different, but, based on regression analysis with SG or life satisfaction as dependent variables (there are no mood-related variables in the BHPS) and the levels and dimensions of the SF-6D as explanatory variables, the negative coefficients show the decrement away from full health associated with each level and dimension as higher levels in the SF score represent worse states in that health domain (notice again there are some positive coefficients for SWB but, as before, these are never statistically different from zero).

These data, using a different descriptive system and valuation method and from a different country, show precisely the same thing: mental health matters more relative to other health problems using SWB as compared to preferences. As one example, the worst level (6) of physical functioning and the worst level (5) of mental health are seen as equally as bad as each other according to SG preferences (0.117 compared to 0.118) but the latter is substantially worse than the former according to SWB (-0.091 for physical

Table 2

**The impact of the SF-6D on SG and SWB in the UK**

Health problem	SG values	Life satisfaction
Physical functioning level 2	-0.035	0.003
Physical functioning level 3	-0.035	-0.009
Physical functioning level 4	-0.044	-0.018
Physical functioning level 5	-0.056*	-0.028
Physical functioning level 6	-0.117*	-0.091
Role functioning level 2	-0.053	0.005
Role functioning level 3	-0.053*	-0.045
Role functioning level 4	-0.053*	-0.038
Social functioning level 2	-0.057	-0.01
Social functioning level 3	-0.059*	-0.023
Social functioning level 4	-0.072*	-0.054
Social functioning level 5	-0.087*	-0.043
Pain level 2	-0.042	-0.001
Pain level 3	-0.042	-0.006
Pain level 4	-0.065	-0.007
Pain level 5	-0.102	-0.013
Pain level 6	-0.171*	-0.048
Mental health level 2	-0.042*	-0.037
Mental health level 3	-0.042*	-0.066
Mental health level 4	-0.100*	-0.09
Mental health level 5	-0.118*	-0.145
Vitality level 2	0.000*	-0.02
Vitality level 3	-0.071*	-0.044
Vitality level 4	-0.071*	-0.085
Vitality level 5	-0.092*	-0.097
Sample	661	10,000

\* <0.05 significance. Models with health conditions as the control variables

functioning at level 6 compared to -0.145 for mental health at level 5).

We should still be cautious about inferring too much from these data, and we certainly need more studies that directly compare preference-based and

SWB-based values in the same respondents, ideally over time, but we are increasingly concerned that problems with mental health may be undervalued relative to other dimensions of health using existing preference-based measures used by agencies such as NICE. While no gold standard exists against which to determine what matters most in our lives, a focus on SWB would more accurately capture the relative effects of different health conditions on people's lives as they experience them and highlight the significant detrimental effects of mental health problems.

A significant part of the explanation of the results we present here is due to differences in how people actually adapt to changes in their health compared to how they imagine doing so. As noted earlier, in a preference study, respondents will focus attention on the change in health and imagine that continuing to be the focus of attention thereafter. If this were the case, mobility problems and mental health problems probably would have about the same impact on people's lives as suggested by the preference data. It has been shown, however, that there is considerable, but certainly not complete, adaptation to the former and much less so, if at all, to the latter. Over time, problems walking about and similar physical health problems essentially become 'part-time' conditions as attention is directed at the health problems on fewer occasions, for example when walking upstairs but not when watching television. This is not to trivialise such conditions but to more accurately place them in the context of the richness of our lives. By contrast, many mental health problems are more 'full-time' in their attention seeking and impact on our lives: you are depressed walking up the stairs and when watching television.

Of course, none of this says anything at all about the relative cost-effectiveness of different treatments. For this we would need to know about the costs involved in prevention and treatment. The greater burden on SWB associated with mental health compared to physical functioning may be uncorrelated with what can be done to alleviate that burden. But the greater relative burden reflected in SWB does at least provide a greater motivation for considering what can be done about it.

As we seek to understand more about the aetiology of wellbeing, a focus on SWB would also allow us to capture more of what might be affecting people's lives because we no longer need to rely on the cognitive capacity of respondents to simultaneously weigh up different levels of different dimensions in a preference elicitation study. Instead, the constraints are in the statistical modelling: are the methods robust to bias

from confounding factors and measurement error? We can therefore remove reliance on crude and narrow descriptive systems such as the EQ-5D and SF-6D that do not pick up everything important about a health state.

In any case, there is a lack of clarity about what dimensions and levels to use in a health state description, which arises partly out of confusion over what it is we are ultimately trying to value. The literature demonstrates the common tendency to make distinctions among the often-confused terms of health-related quality of life, quality of life and wellbeing. The distinctions are very blurred and they miss the point.

We contend that SWB should be seen as the final consequence of policy intervention in any area of public policy. We may quite legitimately decide that particular determinants of SWB are the main responsibility of different government departments, but we should not seek to decompose the overarching objective of policy, not least because something quite significant may end up falling into the gaps. Constructing descriptive systems often clouds the central issue of these endeavours, which should be to accurately capture the effects of treatments on people's lives.

With greater freedom and more licence to capture the important determinants of SWB, we can think more generally about what really affects how people feel. It is recognised that one of the reasons that mental health problems impact so greatly on people's lives is the stigma that is still associated with many types of mental illness, but these cannot readily be captured in current health state descriptions used in EQ-5D and SF-6D. Moving away from a narrow and rather arbitrary focus on 'health-related quality of life' will also allow us to pick up more of the impact on others affected by a condition and its treatment. When valuing any intervention, we should seek to measure and value the impact on all those affected. We may subsequently decide that some impacts are worth more or less than others when we account for concerns for distributive justice but we should start by valuing all the splashes and ripple effects that come about when the pebble of policy is thrown in the pond. The burden of many mental health conditions is borne at least as much, and sometimes more, by those living with and caring for the person directly affected.

We need to do more to capture these larger-scale effects and this is possible by moving away from

current health description systems in favour of direct valuation through SWB.

**3.2.2 Direct health valuation with SWB**

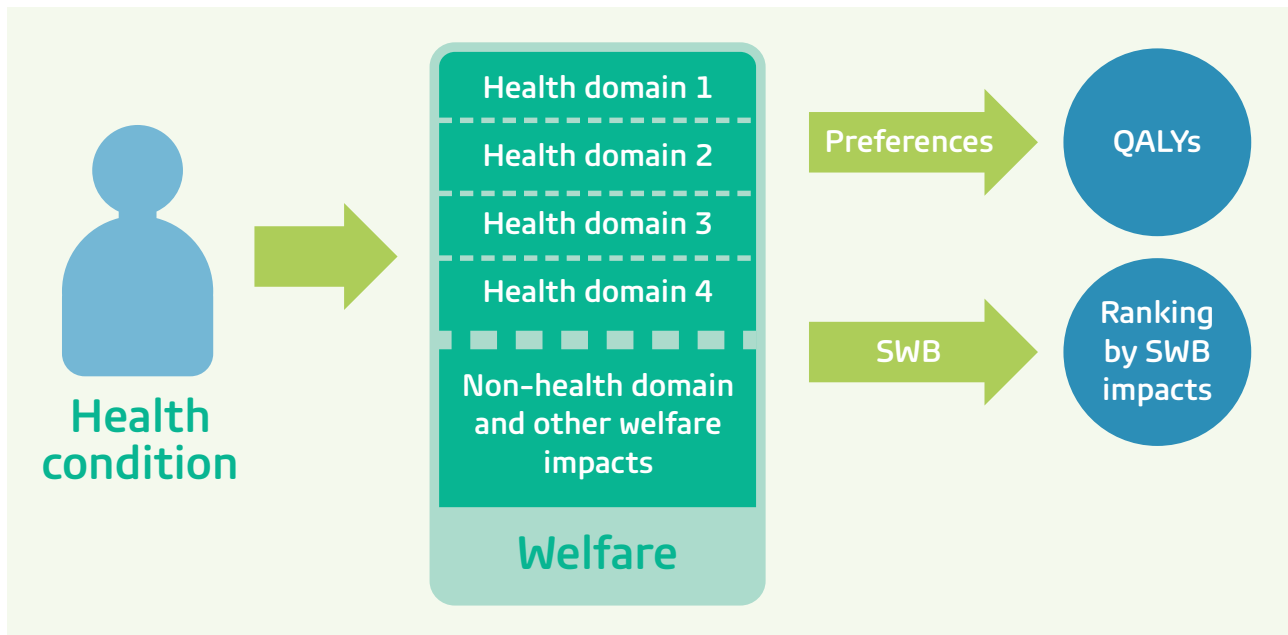
A second and more novel approach to health valuation is to measure the effect of different health states directly on SWB. This would mean we do not attempt to measure health states through five or six mediating health measures, such as mobility and pain, and instead look directly at the impact of conditions such as, say, back pain, mental health or vision

problems on SWB. Figure 1 shows the theoretical concepts underlying the different possible approaches to health valuation.

Figure 1a depicts how health is currently valued. We assess the impacts of different health conditions on a set of health domains, such as pain levels and mobility (here we show four different domains: 1 to 4), and then rank these domains based on a measure of welfare. The conversion of specific health conditions such as diabetes to the health domain is what

Figure 1  
Different possible approaches to health valuation

1a: Current health valuation under preferences and subjective wellbeing



1b: Direct health valuation under subjective wellbeing



happens with health description systems such as EQ-5D. The white dotted line in the second box partitions welfare into health domains and all other aspects of welfare, where anything under the dotted white line is not captured by valuation methodologies that use health description systems. Under current methods, only the impacts on health domains are measured and hence other welfare impacts (such as stigmatisation due to the health condition) are ignored or excluded from the analysis.

We can scale or rank the impacts on the health domains by using preferences, which would derive QALY estimates, or, as shown in section 3.2.1, we could do this by using SWB, which could for example give us a general ranking of health conditions based on the severity of their impacts on SWB. We showed above that using SWB instead of preference measures under the current health description system framework would attach greater weight to mental health outcomes and interventions.

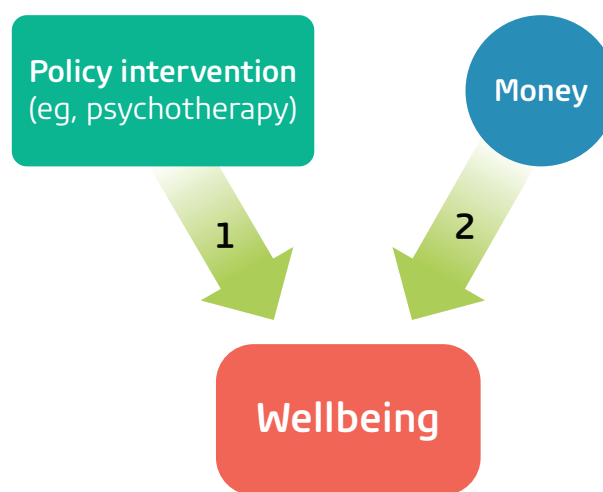
Alternatively, figure 1b shows the full wellbeing approach without a health description system framework. Here we measure the impact of health conditions such as diabetes or depression directly on SWB. By dropping the restriction of viewing health states only in terms of a small set of domains such as pain, this approach is able to capture the full impact of health on welfare, including if we wished the impact of an individual's health on the welfare of his/her family. In 1b we use SWB measures such as life satisfaction to quantify the impacts of different health conditions and this information can be used to rank these conditions by their overall impact on welfare (which would include impacts on any health domain as well as on things such as associated stigma) or more important to value the impacts in monetary terms. This would attach costs to different health conditions, which would resemble the notion of WTA as it would calculate the hypothetical compensation required to keep people just as satisfied with life (or just as happy) with the health condition as they would be without it. These values could then be used in CBA to estimate the full impacts and effectiveness of different health interventions on people's lives in line with HM Treasury *Green Book* guidance (HM Treasury 2003).

## 4 Wellbeing valuation

If we look at the direct impacts of health on SWB, we can use this information to attach values to different health conditions using the wellbeing valuation approach. To do this we need to estimate the impact of the health condition and of income on SWB as set out in figure 2.

In wellbeing valuation we estimate the impact a policy intervention and income has on a measure of SWB (usually life satisfaction) and then estimate the marginal rate of substitution (MRS) between income and the policy. In other words, we are trying to estimate the strength of the two arrows from the policy and money on wellbeing in figure 2. The MRS is the rate at which money can be substituted or compensated against health states in order to keep wellbeing constant; in other words, how much money is needed to compensate an individual just enough so that he or she would be indifferent between (i) having the health condition and the monetary compensation and (ii) not suffering from health condition.

Figure 2  
The wellbeing valuation approach



The amount of money that would make an individual indifferent between these two states is the monetary value associated with the health state and relates directly back to measures of compensating and equivalent surplus used in CBA. As we will show later, this amount of money can be calculated from the ratio of impact sizes depicted in arrows (1) and (2).

In this model we can look directly at the impacts of an intervention (if data are available) or we can look at the impacts and value of outcomes typically related to the intervention. For example, in the latter we could look instead at the impact on SWB and value of improved mental health and relate this general

value back to outcomes from a specific psychotherapy service or intervention. In this sense the wellbeing valuation approach is very flexible.

#### 4.1 Estimation in wellbeing valuation

The model set out in figure 2 is estimated using large datasets and statistical analysis. The key task is to understand cause-and-effect relationships between the variables. In other words, to estimate value we need to model the causal effect of income and the intervention (or health state) on SWB. Also of importance is that we use a valid measure of SWB in the models. We shall discuss these two issues in turn starting with measures of SWB.

##### 4.1.1 Life satisfaction as a measure of SWB

Life satisfaction has been the predominant SWB measure used in the wellbeing valuation approach. A typical survey question would be as follows: 'Overall how satisfied are you with your life nowadays?' Where responses are on a scale of 1 to 7 or 0 to 10, with the highest number representing totally satisfied and the lowest number representing not at all satisfied. Other measures of SWB such as happiness or how worthwhile the things in life are could also be used in wellbeing valuation but we shall stick to the standard life satisfaction measure here.

Life satisfaction can be seen as being made up of a balance of affect (positive and negative emotions and feelings) together with a cognitive assessment of how well one's life measures up to aspirations and goals (Diener 1984; Kahneman and Krueger 2006). A life satisfaction response will incorporate to some extent a retrospective judgment of one's life together with how one feels now (Kahneman and Krueger 2006).

There is some evidence that this can be problematic as people do not always correctly remember past experience and their present feelings can be influenced by contextual factors present at the time of the interview (Bertrand and Mullainathan 2001; Kahneman and Krueger 2006; Schwarz 2010; Schwarz and Strack 1999). Biases can also arise in the stage of verbally reporting life satisfaction scores (Schwarz and Strack 1999). For example, life satisfaction can be affected by the question order in surveys, people may provide socially desirable answers to not look too happy or sad and life satisfaction responses can be affected by factors that we would expect to be too insignificant to really have any meaningful impact on how our lives are going overall, such as the weather on the day of the interview.

On the other hand, there is also a variety of evidence to suggest that overall life satisfaction is a good measure of wellbeing. Pavot and Diener (1993), Eid and Diener (2004), Fujita and Diener (2005) and Schimmack and Oishi (2005) find mood and contextual effects to be limited. Sandvik et al (1993) and Shizgal (1999) demonstrate that there is a strong positive correlation between wellbeing ratings and emotions such as smiling and frowning. Research shows that Duchenne smiles (ie a type of smiling that involves a muscle near the eye called orbicularis oculi, pars laterali, which can distinguish between true and feigned enjoyment) are correlated with subjective wellbeing (Ekman et al 1990). Urry et al (2004) show that reports of life satisfaction are correlated with activity in the left pre-frontal cortex of the brain, which is the area associated with sensations of positive emotions and pleasure. Furthermore, wellbeing is a good predictor of health, such as heart disease (Sales and House 1971) and strokes (Huppert 2006). Cohen et al (2003) find that people who report higher life satisfaction were less likely to catch a cold and would recover quicker if they did. Kiecolt-Glaser et al (2002) find that people with higher life satisfaction heal more quickly from wounds. Krueger and Schkade (2008) assess the test-retest reliability of life satisfaction responses and conclude that retest reliability levels 'are probably sufficiently high to yield informative estimates for ... research'.<sup>\*</sup> Finally, we should note that life satisfaction, a global measure of wellbeing, that respondents usually take but a minute or so to answer in large surveys is extraordinarily responsive to the things in life we would expect to be impactful on us. Life satisfaction, even measured on simple 7- or 11-point scales, varies in the direction and kind of magnitude we would expect with, for example, marital status, income, employment, housing conditions, environment and crime levels and even at a more micro-level with cinema visits, playing football and levels of PM10 in the air. We believe that life satisfaction responses can provide informative information about how a person's life is going for them and ultimately about their welfare.

##### 4.1.2 Estimating impacts on life satisfaction

We would like to assess the causal impacts on wellbeing or life satisfaction in figure 2. This is best achieved through studies where treatment (or the intervention of interest) has been randomly assigned across different groups. This is rarely achieved in

<sup>\*</sup> For all of the references quoted here regarding arguments for and against life satisfaction and a more detailed discussion of this area of research see Fujiwara and Campbell (2011).

many health and social policy interventions and so wellbeing valuation is usually employed using data gleaned from large national surveys that contain data on SWB. Statistical methods such as regression analysis are used to control for as many of the possible confounding effects so that we can attribute causality. In other words, statistical methods are employed in order to replicate as closely as possible the study setting of a randomised trial.

The main problem is that these quasi-experimental methods can usually only account for observable differences between the groups. So, for example, when exploring the impact of income on SWB we may be able to control for differences in education levels and employment status across high-earning and low-earning groups, but there may be unobservable factors such as motivation that drive people to both earn more and be satisfied with life anyway. The same types of problems are also clearly applicable when we are seeking to find the casual effect of different health conditions on SWB. With quasi-experimental methods that try to control for observable differences across groups we can never be sure that we have estimated a fully valid (or unbiased) causal effect. However, these methods are used routinely in public policy making at the highest level in the UK and are the methodological basis of most empirical studies in the social sciences literature; hence we believe that they can be informative and are of value here.

Table 3 shows estimates of the impact of different health conditions on life satisfaction taken from table 3 of Powdthavee and van den Berg (2011: 1038) after controlling for a large set of other SWB determinants in regression analysis. The data come from BHPS and the authors use all the main health questions asked in the survey. The results in table 3 are estimates of figure 1b – ie the impact of health conditions on SWB.

This model is different from the two models shown in tables 1 and 2 because we are now looking at mental health compared to other specific health conditions. We use the variable on depression and anxiety to broadly capture mental health. We acknowledge that other conditions will also fall into the mental health category, but unfortunately the data do not allow us to capture these more specific conditions. The coefficients show the impact sizes on life satisfaction as measured on a scale of 1 to 7 and are comparable to each other. Here all health conditions have a negative impact on life satisfaction, although hearing difficulties and diabetes are statistically insignificant at the 10% level.

Table 3  
Impacts of different health conditions on life satisfaction

Health condition	Coefficient
Depression, anxiety	-1.180***
Stomach/liver/kidneys or digestive problems	-0.238***
Migraine or frequent headaches	-0.149***
Difficulty in seeing (other than needing glasses to read)	-0.126***
Epilepsy	-0.122*
Chest/breathing problems, asthma, bronchitis	-0.094***
Heart/blood pressure or blood circulation problems	-0.066**
Problems connected with arms, legs, hand, feet, back	-0.056**
Skin conditions/allergies	-0.042*
Difficulty in hearing	-0.054
Diabetes	-0.051
Sample	22,169

Note: \* $<0.10$ ; \*\* $<0.05$ ; \*\*\* $<0.01$ . Fixed effects OLS model with a set of standard controls including gender, age, marital status, education, employment, children, region and year

Table 3 presents the health conditions in order of adverse impact on life satisfaction (with non-significant health conditions at the end of the list). Confirming what we saw in tables 1 and 2, mental health is again the biggest detriment to life satisfaction. Suffering from depression or anxiety is about five times worse for life satisfaction than the next worst health condition, which is stomach and digestive problems. The average effect of all other significant health conditions in table 3 is -0.112. This means mental health problems are over ten times worse for people than the average impact of all other health conditions.

#### 4.1.3 Valuing health impacts

Table 4 presents the values (ie costs) associated with each of the health conditions in table 3, derived from the wellbeing valuation method. We use the income model estimated in table 5 of Fujiwara (2013) to provide estimates of the impact of income on life satisfaction (arrow (2) in figure 2) and the value

Table 4  
**Monetary equivalent costs associated with different health conditions**

Health condition	Monetary equivalent
Depression, anxiety	-£44,237
Stomach/liver/kidneys or digestive problems	-£5,556
Migraine or frequent headaches	-£3,336
Difficulty in seeing (other than needing glasses to read)	-£2,791
Epilepsy	-£2,698
Chest/breathing problems, asthma, bronchitis	-£2,052
Heart/blood pressure or blood circulation problems	-£1,422
Problems connected with: arms, legs, hand, feet, back	-£1,201
Skin conditions/allergies	-£895

*Note: Values estimated at around UK median income of £23,000*

calculation method set out in the annex of Fujiwara (2013).

These are annual 'costs' to the individual. The way of interpreting these values is as follows. If, for example, you have skin conditions or allergies, this has a negative impact on your life satisfaction and this is the equivalent to the impact that £895 in income has on your wellbeing. In other words, with skin and allergy problems you would need an extra £895 income per year to return you to the same level of life satisfaction you would have if you did not suffer from the conditions. This resembles the notion of willingness to accept (WTA) the health condition or compensation for the condition. In technical terms, table 4 derives the compensating surplus for different health conditions. Although we have not done so here, we could also pick up the costs of the individual's health condition for family members by looking at the impact on the wellbeing of the family.

There are few things to note. First, these are values after controlling for the other health conditions. So if for instance vision problems lead to depression, this would not be captured in the value of -£2,791, but if there was a deterministic relationship from vision problems to depression we could add the full cost of

depression to the cost of vision problems to get an overall figure.

Second, the values in table 4 may not necessarily be what people would actually be willing to accept in monetary compensation if asked in, say, a legal tort case. Rather they calibrate the negative impact of these conditions on life satisfaction onto an equivalent monetary metric. When asking people what they would be willing to accept in monetary compensation this relies on people's preferences, which as we have discussed above can be biased and context dependent.

Third, these are values for health conditions that capture all of the mechanisms through which they impact on welfare (indirect mediating factors such as stigmatisation would not usually be controlled for in regression models that are typically used in this field of research, but we have highlighted above that indirect effects through other health conditions would need to be picked up separately in table 4). The values are not restricted to impacts of health conditions on a handful of domains such as pain, mobility and self-care and so would pick up for example any stigmatisation associated with a health condition.

Fourth, after monetisation, the impact of mental health (depression and anxiety) is now much greater relative to the other health conditions. In monetary terms the adverse impact of depression is now about eight times larger than the effect of stomach and digestive problems (-£44,237 compared to -£5,556). This is because of the relationship between income and wellbeing. The positive marginal effect on life satisfaction of every extra pound in income decreases and so for impacts or health conditions that have large effects on life satisfaction each marginal pound in income that we compensate loses some value to the individual. In other words, the pound in (hypothetical) compensation from £44,236 to £44,237 is less impactful on the individual's wellbeing than the pound in compensation from £5,555 to £5,556. Hence the magnitude of differences across coefficient sizes for health conditions can be different to in size from the magnitude of differences in monetary values for the same conditions.

Finally, in the original paper, Powdthavee and van den Berg (2011) also monetise the health conditions using the wellbeing valuation approach (see table 5 in their paper), but their results are very different from the values we have estimated here. Generally, they estimate much higher values than those presented here and this is because there are a number of technical problems related to the way they estimate



the effect of income on life satisfaction (eg they estimate the costs associated with depression and anxiety to be over £450m). In this paper we use a robust causal effect for income based on data on lottery winners from Fujiwara (2013). Lottery wins provide an ideal setting for estimating the causal effect of income because, among lottery players, money is essentially randomly allocated just as in an experimental setting. We can therefore conclude that the valuation results derived here in table 4 are more robust than previous estimates.

#### 4.2 Wellbeing valuation and cost-benefit analysis

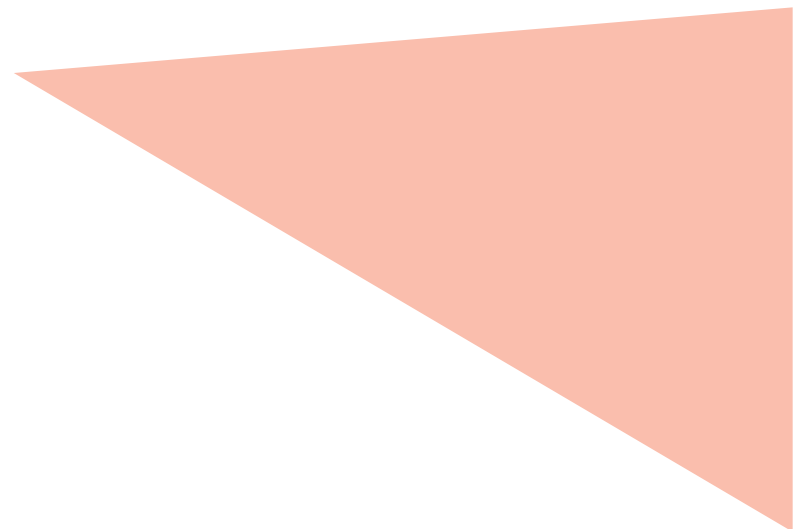
The values in table 4 can be used in CBA because they provide in monetary terms estimates of the benefits that would be associated with the prevention or cure of different health conditions that can be related directly to the costs of a health intervention. There are four key advantages of the wellbeing valuation approach over current QALY methods:

- 1 In wellbeing valuation, we can assess the full impact of a health condition on an individual's welfare rather than using a restrictive health description system like EQ-5D.
- 2 We assess the impact of health conditions as people actually experience them in real life rather than based on their predicted preferences over a set of different hypothetical health conditions. This allows us to avoid problems related to focusing illusions and we can assess adaptation to health conditions with longitudinal data.
- 3 In wellbeing valuation, health conditions are monetised so they can be used in CBA rather than cost-utility analysis (CUA). Using QALY measures allows us to compare the relative worthiness of different health interventions as we can look at the QALYs generated per unit of expenditure. This is done in CUA but only CBA allows us to examine whether any policy should be undertaken outright in the first place because it allows us to directly compare the costs and benefits of an intervention on the same metric. Importantly, through CBA, the effectiveness of health interventions can also be compared against non-health interventions such as education and employment programmes.
- 4 It is also possible to derive monetary costs associated with different health conditions for family members in the wellbeing valuation approach. Although not shown here in BHPS, for example, because it is a household survey, we

can look at how the health condition of an adult impacts on the wellbeing of his or her children, partner and other members of the household.

In table 4, we have estimated values associated with different health conditions. These can be applied to outcomes of health interventions in CBA. So, if we find that a course of physiotherapy leads to a reduction in the number of people complaining of problems connected with arms and legs, or that a psychotherapy service helps reduce depression, we can attach values to the physiotherapy and psychotherapy directly.

Richards and Borglin (2011) assess the impact of empirically supported psychological therapies by measuring the outcomes of patients referred to improving access to psychological therapies (IAPT) services in the UK. They find that recovery rates for patients receiving one IAPT treatment service for anxiety and depression in routine practice are 40 to 46% respectively. If we take the mid-point and assume a recovery rate of 43% for depression and anxiety, we can calculate the expected annual value per person of a routine IAPT service as 43% of £44,237, which equals £19,022. This figure should be multiplied by the number of people who have used the service and then compared against overall implementation and running costs of IAPT services to derive the overall net benefits to society. So, for 100 people using IAPT for depression or anxiety, we would expect on average an improvement in welfare for them equivalent to about £1.9m per year that they stay healthy.



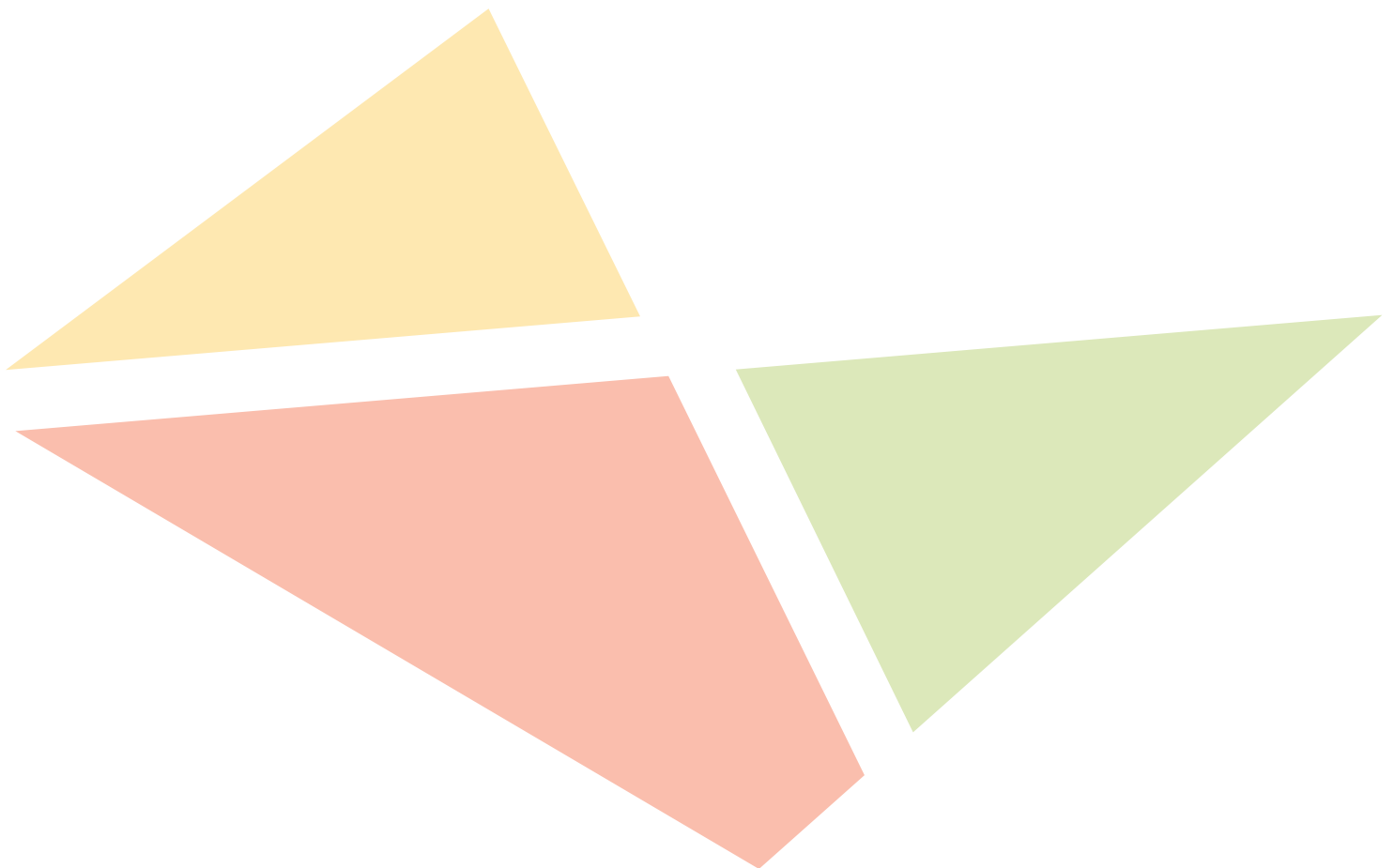
## 5 Discussion

In this paper we have used measures of subjective wellbeing to re-assess the impact of mental health on people's lives. We generally find that mental health matters greatly and that current health valuation methods that look at people's predicted preferences over hypothetical health states tend to put too much weight on physical health. By looking at the impact of mental health on life satisfaction, we are able to value health conditions directly for use in CBA. This is clearly very exciting work as we can now compare benefits and costs of psychotherapy services directly in terms of how they impact on people's welfare in the very broadest sense.

In order to derive values for psychotherapy services overall, there are of course some implicit assumptions we are making when extrapolating findings from studies such as Richards and Borglin (2011) to our results in table 4, as we are working with results from two different datasets. This can be avoided through primary data collection. For future research, we believe it is important to track measures of SWB in people who use psychotherapy services and the best way to address this is by incorporating SWB measures into mandatory returned data under existing programmes in the


NHS. SWB data need to be routinely gathered in trials and surveys, ideally from the same individuals over relatively short time periods, and from relatives and carers as well as patients. This would allow us to get a better handle on the direct effects of the therapy on life satisfaction and we could use the wellbeing valuation method as set out here (taking the income model from Fujiwara's (2013) lottery approach) to derive a more refined estimate of the value of psychotherapy services in the UK.

In the meantime, we can make inferences about the likely benefits of healthcare interventions by applying the weights we have presented here for the EQ-5D and SF-6D, where these descriptive systems are deemed appropriate and adequate, or by using the wellbeing values estimated in this paper. We believe we have provided important steps in assessing the value of psychotherapy given the UK data currently at our disposal. Ultimately, with more data and research in this field, we will be able to guide policy towards affecting those aspects of people's lives that have the greatest impact on how they feel. Mental health surely matters and it is likely to matter even more when considered through the lens of SWB.



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UKCP upholds the highest standards in psychotherapy and psychotherapeutic counselling. It holds a national register of psychotherapists and psychotherapeutic counsellors, listing those practitioner members who meet exacting standards and training requirements. It also holds a specialist register for psychotherapists working with children and young people. These are accredited voluntary registers with the Professional Standards Authority.



UK Council for Psychotherapy  
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