NEW ECONOMICS FOUNDATION

co op

THE COST OF LONELINESS TO UK EMPLOYERS

FOREWORD

AT THE CO-OP WE'VE LONG CAMPAIGNED ON ISSUES THAT MATTER TO OUR MEMBERS AND WHERE THERE IS A PRESSING SOCIETAL NEED.

In 2015, we launched our latest campaign – to tackle loneliness – after our members raised it as an issue of concern – more than one third of us know someone in our community who is affected by loneliness and it directly affects one in seven of our members.

Research carried out with our charity partner, British Red Cross, has helped us to understand that loneliness doesn't just affect those in later life; it is also experienced by people at six stages of life: becoming a young mum, divorce, experiencing health or mobility changes, retiring, or suffering a bereavement.

These insights led us to explore a number of other aspects of loneliness, including the impact on people's working lives and the impact on employers.

This report, The Cost of Loneliness to UK Employers, launched jointly by the Co-op and New Economics Foundation and issued in conjunction with the Jo Cox National Commission on Loneliness, puts the cost of loneliness to employers at £2.5 billion a year.

For those employers who choose to recognise and respond to loneliness amongst their workforce, there is the potential to improve the health of their colleagues as well as their bottom line: be it in reducing colleague turnover or by increasing productivity.

At the Co-op, this year we're extending our employee assistance programme to provide confidential support service for colleagues who are experiencing loneliness.

Armed with these new findings, we look forward to working with other employers and organisations to find new ways of tackling this important issue.

RUFUS OLINS
CHIEF MEMBERSHIP OFFICER
THE CO-OP

EXECUTIVE SUMMARY

THIS STUDY PROVIDES AN ESTIMATE OF THE COST OF LONELINESS TO UK EMPLOYERS. IT HAS BEEN COMMISSIONED BY THE CO-OP, AND ISSUED IN CONJUNCTION WITH THE JO COX NATIONAL COMMISSION ON LONELINESS.

The research finds that loneliness experienced in the UK represents a significant cost to UK employers, both via its impacts on the health of employees and those they care for, and via its impacts on employee wellbeing and thus on productivity and staff turnover.

In the past decade, loneliness has increasingly come to be regarded as a serious issue affecting wellbeing, health, and a range of other outcomes. Loneliness is a related, but distinct concept from social isolation, focusing on how people feel about their contact with other people. Whilst many people may experience loneliness from time to time, when individuals feel lonely most, or all of the time, the implications in terms of wellbeing and health can be serious. Our focus in this study is on this form of 'extreme' loneliness.

While loneliness is often discussed as an issue relating to older people, studies have shown that loneliness can and does affect people across all age groups. A conservative estimate suggests just over 1 million workers experience loneliness in the UK.

To estimate the costs of loneliness to employers, we have consulted the published academic literature which examines the relationships between loneliness and wellbeing and health outcomes, as well as studies which examine the associations between these wellbeing and health outcomes and impacts on employers. We have also used published national statistics on aspects of employment to produce the costs of these impacts.

We have brought this evidence together in a person-centred impact model quantifying the annual costs to employers of loneliness. The model takes a prevalence-based approach, looking at all cases of loneliness in the relevant populations. It comprises four key pathways:

1. **The impact of loneliness on employee health outcomes and the costs of the associated sickness absence.** We used evidence on the links between loneliness and depression, coronary heart disease, and stroke, and estimated the costs to employers of the proportion of sickness absence due to these conditions which could be attributed to loneliness at £20 million.

2. **The impact of loneliness on the health of those who are cared for by friends or relatives in work, and the costs to employers of the associated caring activity by employees.** We used evidence on the links between loneliness and depression and dementia, and on the number and costs of working carers, to estimate the costs to employers of caring activity by employees caring for people whose health conditions can be attributed to loneliness. We estimated this at £220 million.

3. **The impact of loneliness on employee wellbeing, and the costs to employees of the related reduction in productivity.** We used evidence on the relationship between loneliness and employee wellbeing, and on employee wellbeing and productivity, to estimate the reduction in productivity attributable to loneliness. Using data on average output per employee, we estimated this to cost business £665 million.

4. **The impact of loneliness on employee wellbeing, and the costs to employers of the related increase in voluntary staff turnover.** We used evidence on the relationship between loneliness and employee wellbeing, and on employee wellbeing and voluntary staff turnover to estimate the costs attributable to loneliness. Using a standard methodology to cost staff turnover, we estimated this cost at £1.62 billion.

The costs from these four pathways produce a total cost to UK employers from loneliness of £2.5 billion per year, which includes £2.1 billion to employers in the private sector.

This result represents a conservative estimate because we have chosen the most conservative assumptions in our model at all relevant decision points.

It is notable that 10% of the total costs are derived from the pathways relating to the impact of loneliness on health, compared to 90% from the pathways related to wellbeing. There are several reasons why the costs of the pathways via health are lower than those via wellbeing. First, the model was limited to looking at those health conditions with only the most robust evidence linking them to loneliness, with future research likely to shed much more light on these relationships. Second, many of the costs of health impacts are borne by the state, rather than by employers, especially for chronic conditions that can be managed with medication. And third, while substantial sickness and caring absence because of loneliness will only affect a small number of employees, the impacts of loneliness on reduced wellbeing and therefore on productivity and voluntary turnover will affect a much larger pool of people.

Our findings of substantial costs from loneliness to UK employers strongly suggest that it is in their interests to take both reactive and preventative approaches to minimise the loneliness of their employees. A key first step will be raising awareness of the issue among employers, so that they understand the business case for addressing loneliness among their employees. This could usefully be linked to the wider evidence on the impact employers can have on overall employee wellbeing, and the ways in which the workplace can act as a positive support for overall wellbeing, and employees' levels of social support.

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1. INTRODUCTION

IN THE PAST DECADE, LONELINESS HAS INCREASINGLY COME TO BE REGARDED AS A SERIOUS ISSUE AFFECTING WELLBEING, HEALTH, AND A RANGE OF OTHER OUTCOMES.

For this report, we have defined loneliness as a related, but distinct concept from social isolation. Social isolation, which can be measured by objectively quantifying the amount of social contact someone has with others, does not capture anything about an individual's preferences in terms of how much social contact they would like to have, or the quality of social contact they experience. Surveys that have asked respondents about both social isolation and loneliness have shown that while there is some overlap between the two concepts, they do not map directly onto one another, with loneliness typically more prevalent than social isolation.[1] While social isolation refers to being physically alone, the concept of loneliness is broader. As well as capturing the extent to which someone feels more physically disconnected from other people than they would like, it also includes the extent to which individuals feel more emotionally disconnected from other people than they would like.

Many people experience loneliness from time to time; however, when individuals experience chronic loneliness, or feel lonely most, or all of the time, the implications in terms of health and wellbeing can be serious.[2] In line with existing literature exploring the impact of loneliness, when we refer to loneliness throughout this report, we are referring to these more extreme instances of loneliness, unless otherwise specified.

A growing body of research has uncovered compelling findings about the impact of loneliness in terms of health and wellbeing. For example, a recently published meta-analysis confirmed that loneliness and social isolation are associated with a 29% increased risk of a heart or angina attack and a 32% heightened risk of having a stroke – two major causes of

death and illness in wealthy societies.[3] Loneliness has also been found to be linked to depression, anxiety, declining mobility, high blood pressure, and increased mortality rates.[4] One study has quantified the effect of loneliness as being twice the effect of obesity in terms of its impact on mortality.[5] Further, having strong social connections has been found to be one of the strongest predictors of life satisfaction, overall happiness, fewer depressive symptoms[6-9] as well as faster recovery from ill health.[10] At the same time, people experiencing loneliness are less likely to be very happy and less likely to feel satisfied with life.[11]

These findings have also begun to influence public health and wider policy decisions.[12] For example, the Department of Work and Pensions has developed several policies designed to tackle loneliness in the UK, including the creation of a £1 million fund to help older people most at risk of longer-term loneliness and social isolation to remain active, independent, and positively engaged with society following retirement; the 'Ageing Well' programme, which ran from 2010 to 2012 and was intended to support councils to provide a better quality of life for older people through local services; and a digital strategy to help older people get online.[13] Indicators have also been introduced into Public Health England's Public Health Outcomes Framework[14] and its Adult Social Care Outcomes Framework[15] to monitor the percentage of adult social care users who have as much social contact as they would like.

However, the private sector, which has become highly attuned to interventions designed to benefit employees in terms of wellbeing and health in recent years, [16,17] has not yet shown significant interest in addressing the issue of loneliness. This may be due, in part, to the fact that existing research into the impacts of loneliness has largely tended to focus on the impacts of loneliness in terms of older adults, rather than as an issue that also affects people of working age. In addition, we have only just begun to see research being published which estimates the cost of the impacts of loneliness to the state,[18] including two recent studies by Fulton and Jupp[19] and McDaid et al.[20] To date, however, very little has been published on the cost of loneliness to employers in the UK. As a result, it is unsurprising that few private sector organisations have shown interest in taking action to reduce the direct impacts of loneliness amongst their employees, as well as the indirect routes through which loneliness affects their organisations.

In 2015, The Co-op and the British Red Cross joined forces in a partnership to fundraise and campaign to tackle loneliness in communities throughout the UK and now sits on the Jo Cox National Commission on Loneliness. Concurrently with this campaign, The Co-op commissioned the New Economics Foundation to carry out this study to establish the cost of loneliness to UK employers to fill this knowledge gap, and build support from employers to tackle the issue of loneliness throughout society.

In this paper, we draw together the strongest evidence of how loneliness across all areas of society creates costs for employers. We then use that evidence to calculate how much loneliness in the UK is costing all employers, including in the public, private, and third sectors, and also to private sector employers specifically. We look only at the costs to these organisations that arise in relation to their role as employers (so, for example, we do not look at other costs arising from loneliness to public sector organisations – such as the

costs to the NHS of treating illnesses that are attributable to loneliness). It should also be noted that we are concerned with loneliness across all areas of people's lives, rather than specifically loneliness experienced in the workplace.

Section 2 of the paper begins with a discussion of the scope of the problem, by setting out the loneliness landscape in the UK today, describing the extent of the problem and who is affected.

Section 3 sets out a person-centred framework that depicts the key pathways via which loneliness creates costs to employers.

Section 4 details peer-reviewed evidence that ascertains and quantifies the relationship between loneliness and each of the person-centred outcomes and the impacts of these outcomes detailed in the framework, and sets out how we have used this evidence and other evidence to calculate the costs of loneliness to UK employers.

Section 5 presents the total costs and conclusion.

2. THE LONELINESS LANDSCAPE IN THE UK TODAY

AS NOTED ALREADY, MUCH OF THE EXISTING RESEARCH INTO LONELINESS FOCUSES ON THE PREVALENCE AND IMPACTS OF LONELINESS AMONGST OLDER PEOPLE. WHILE LONELINESS WITHIN THE OLDER POPULATION IS CERTAINLY AN ISSUE THAT MERITS ATTENTION, SOME POPULATION-LEVEL STUDIES ALSO REVEAL THAT LONELINESS IS AN ISSUE THAT AFFECTS PEOPLE AT ALL STAGES OF LIFE.[21]

For example, analysis of the responses of 2,400 adults in the UK to the European Social Survey finds that more than 25% of adults in the UK experience high levels of loneliness, with 6% of the sample reporting feeling lonely most or all of the time.[22] A separate online survey of 2,250 people living in the UK commissioned by the Mental Health Foundation found that 11% of adults in the UK reported feeling lonely'often'.[23] Further, a report into the triggers for loneliness in the UK commissioned by the Co-op and British Red Cross in 2016 found that 18% of a representative sample of adults in the UK reported feeling lonely "often"or"always", with 4% of people within this most extreme"always" group.[24]

Despite the pervasive effects of loneliness, little consensus exists between studies that have attempted to build a more detailed picture of who is experiencing loneliness in the UK.

For example, there is a great deal of discrepancy in the findings of studies that have attempted to ascertain the prevalence of loneliness across the age spectrum. Several studies have variously found that loneliness is most prevalent amongst the youngest members of society; [25-29] amongst both the youngest and oldest age groups in society; [30-33] or conversely, that middle-aged adults are the most lonely, and the oldest members of the population are the least lonely.[34-37] Some studies have also found no significant differences in loneliness between age groups.[38,39] The evidence relating to the extent to which women and men are affected by loneliness is also mixed, with some studies finding women to be significantly more likely to be affected by loneliness than men,[40,41] and others finding no consistent difference between men and women in terms of their experience of loneliness.[42]

The evidence on the association between employment and unemployment and loneliness is also inconclusive. Jopling and Sserwanja note that it is unclear 'whether worklessness triggers loneliness to any significant degree', and point to a lack of studies investigating this.[43]

For the purposes of this report, we have conducted primary analysis of Wave 6 of the European Social Survey data to better understand how the prevalence of loneliness differs between people who are in work, and the rest of the adult population, including people who are unemployed, people who are retired, and people who are not economically active. Our population-level findings echoed those of Victor and Yang ,[44] that 6% of the adult population in the UK experiences loneliness; however, when we investigated what proportion of the working population experiences loneliness, we found the prevalence was considerably lower, at 3.3%.

When considering how loneliness differs between employees in certain jobs, it is conceivable that the differing nature of work may mean that some employees are more at risk of loneliness than others. For example, those whose jobs require them to spend significant amounts of time away from home, or those who relocate for work. Results of an ICM omnibus survey conducted in July 2016 found that 21% of people have moved house for a job, and 39% of these people felt lonely afterwards (13% very lonely, 26% quite lonely). Another study examined whether seniority at work influenced loneliness, but found that managers are no more or less likely to experience loneliness than non-managers.[45]

This lack of consensus can likely be attributed to the following key factors:

1. As noted earlier, most studies concerned with the prevalence of loneliness have focused on older people – as a result, the number of population-level studies is fairly limited, reducing the likelihood of a consensus position being reached.

2. Discrepancies between the survey items and response scales used to measure loneliness is common – for example, use of the response 'more than half of the time' compared to 'often', or a 3-point compared to a 7-point response scale produces non-comparable results.

3. Discrepancies in age bands used to describe the results are also often inconsistent between surveys, making it difficult to compare results.

Jopling and Sserwanja suggested an alternative approach, which focuses on life transitions or 'trigger points', rather than demographics like age or gender, and may be useful when trying to understand who is most at risk of loneliness, especially given the lack of consensus just discussed. Based on a rapid review of the loneliness literature, Jopling and Sserwanja identified eight key life transitions or trigger points, which they suggest may exacerbate loneliness during the life course – including following retirement, when young people leave care, becoming a parent, becoming a carer, following divorce, after leaving secondary school, during periods of worklessness, and after leaving the armed forces.[46] A further study into the triggers for loneliness in the UK commissioned by the Co-op and British Red Cross in

2016[47] found in a representative survey of the UK population that 73% of people who stated they were "often" or "always" lonely fell into at least one of the six research target groups – young new mums (aged 18-24); people with mobility limitations; people who are recently divorced or separated (within the last two years); those living without children at home ('empty nesters') and retirees; and the recently bereaved (within the last six months to two years).

These studies have started to give a more nuanced understanding of the loneliness landscape in the UK, reinforcing the view that loneliness is prevalent throughout our society and across all ages. Overall, whilst there is a difference in the percentage reported by different studies, we can conclude that loneliness is pervasive, with somewhere in the region of 5–18% of people affected by high levels of loneliness.[48,49]

3. THE KEY PATHWAYS IN OUR COST MODEL AND OVERVIEW OF METHODOLOGY

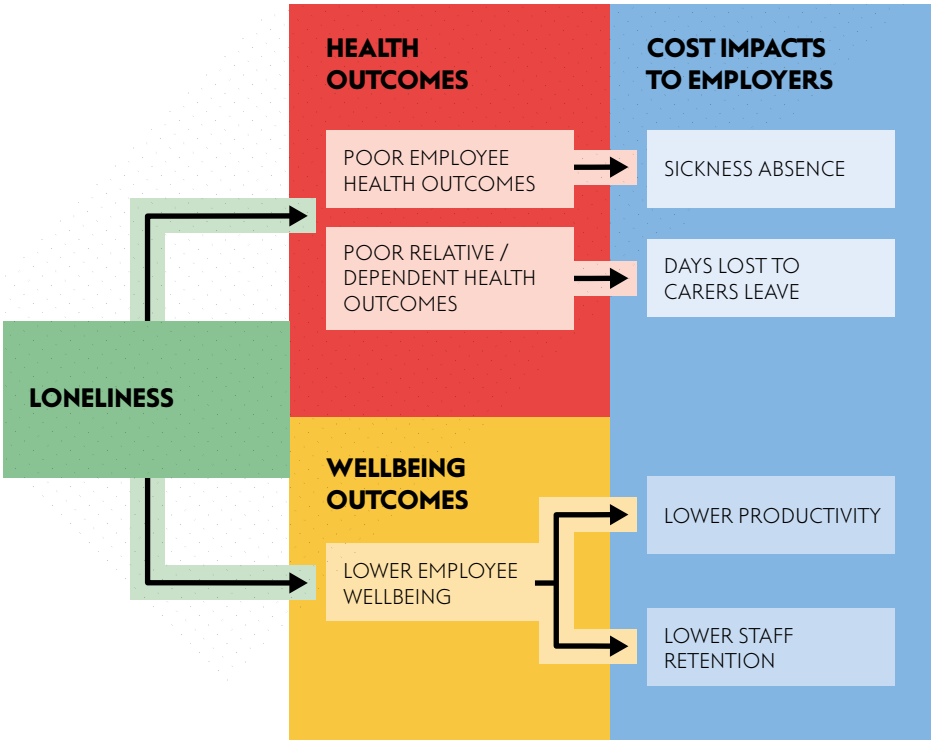
3.1 THE KEY PATHWAYS VIA WHICH LONELINESS IS ASSOCIATED WITH COSTS TO EMPLOYERS

To guide our approach to assessing the evidence on how loneliness is associated with costs to employers, we first developed an initial framework of a person-centred impact model showing possible pathways from loneliness, to person-centred impacts, to costs. We constructed the framework after conducting an initial rapid review of key texts on the associations between loneliness, person-centred outcomes, and the impacts of these outcomes in terms of costs to employers.

We then conducted a deep dive into the published and peer-reviewed evidence base, in parallel to carrying out a series of interviews with experts from the field, and also presented an interim set of findings at an expert roundtable to test our results' validity and fill any gaps (refer to the back page for a list of experts consulted during this process).

Next, we revised our initial framework, so that it included only those pathways where we were able to find robust and appropriately quantified evidence for inclusion in our model of the costs of loneliness to employers. The revised framework is set out in Figure 1. We did not seek to cover all possibilities in building the framework, but instead concentrated on where we were most likely to find evidence for inclusion in the model. As such, our modelling of the costs to business should be treated as a conservative estimate, given that we have included the costs associated with pathways where strong and robust evidence exists, although many more pathways leading from loneliness to costs to employers may exist, which have not been captured in our model.

FIGURE 1. PERSON-CENTRED IMPACT FRAMEWORK



3.2 OVERVIEW OF MODEL METHODOLOGY

In this sub-section, we provide a step-by-step guide to the modelling methodology set out in Section 4. This is intended as a summary for readers who do not wish to engage with the full details set out in Section 4, and as an overview to help guide the reading of those who go on to read that section in detail.

The steps we took under each of our four main model pathways are as follows.

LONELINESS » POOR EMPLOYEE HEALTH OUTCOMES » SICKNESS ABSENCE

1. Identified those health conditions with best evidence linking to loneliness in working age people: depression, stroke, and coronary heart disease.
2. Used existing evidence to estimate the extent to which loneliness increases the relative risk of someone experiencing depression, coronary heart disease, and stroke.
3. Identified Office for National Statistics (ONS) data on days of sickness absence due to 'stress, depression and anxiety' and 'heart, blood pressure, circulation problems'.
4. Used data on the incidence of different types of mental health problems and cardiovascular disease to identify the proportion of days in step 3 which can be attributed specifically to depression, stroke, and coronary heart disease.
5. Used the evidence in step 2, and the prevalence of loneliness among people who work, to model the proportion of days missed due to depression, stroke, and coronary heart disease from step 4 which can be attributed to loneliness.

6. Costed the days calculated in step 5 based on earnings costs per day missed.

LONELINESS » POOR RELATIVES / DEPENDENT HEALTH OUTCOMES » DAYS LOST TO CARERS LEAVE

1. Identified those health conditions among those cared for with best evidence linking to loneliness: depression, dementia.

2. Used data on the number of working carers in the UK and the proportion of carers caring for someone with a mental health problems to calculate the number of working carers caring for someone with a mental health problem.

3. Used estimates of the proportions of mental health problems among cared for people which can be classified as mental health disorders (adjusted for the likely differing care needs of those with common mental disorders versus psychosis), and the proportion of common mental disorders which are depression, to estimate the number of working carers caring for someone with depression.

4. Used data on the number of working carers in the UK, and on the proportion of carers caring for someone with dementia, to estimate the number of working carers likely to be caring for someone with dementia, adjusting this using data on the relationship between carers and the people they care for to account for a different proportion of carers caring for those with dementia among people of working age than among carers of all ages.

5. Used the outcome of step 3 to estimate how many working carers are caring for people whose depression can be attributed to loneliness by using evidence on the extent to which depression is associated with loneliness, treating those aged 65 and over and those aged under 65 separately.

6. Used the outcome of step 4 to estimate how many working carers are caring for people whose dementia can be attributed to loneliness by using evidence on the association between loneliness and dementia.

7. Used the outcomes of steps 5 and 6 to calculate how many fewer working people would need to be carers without the impact of loneliness (including in the private sector only).

8. Used as estimate of the cost of caring to all UK employers, based on a methodology developed by MetLife, to produce a cost of the working carers attributed to loneliness from step 7.

LONELINESS » LOWER EMPLOYEE WELLBEING » LOWER PRODUCTIVITY

1. Estimated the relationship between loneliness and job satisfaction, as a measure of overall employee wellbeing, using data from the European Social Survey.

2. Quantified the relationship between job satisfaction and productivity using evidence from previous studies.

3. Converted the relationship in step 2 into a percentage reduction in productivity.

4. Combined the estimates from steps 1 and 3 to produce an estimate of the extent to which workers who are experiencing loneliness are less productive than those who are not experiencing loneliness, in percentage terms.

5. Applied the percentage reduction from step 4 to a figure for average annual output per employee in the UK, to produce a cost in lost productivity to employers from each worker experiencing loneliness.

6. Using an estimate of the prevalence of loneliness in the working population, use the cost from step 5 to derive a total cost of loneliness to UK employers.

LONELINESS » LOWER EMPLOYEE WELLBEING » LOWER STAFF RETENTION

1. Identified evidence which quantified the impact of employee psychological wellbeing and job satisfaction on voluntary staff turnover.

2. Used evidence from the European Social Survey to estimate the reduction in psychological wellbeing and job satisfaction associated with loneliness, and converted these to the measures used in the evidence in step 1.

3. Combined the evidence from steps 1 and 2 to estimate the percentage increases in the likelihood of voluntarily leaving a job from the reductions in job satisfaction and psychological wellbeing that are attributable to loneliness.

4. Used the estimates in step 3 to produce an overall risk ratio for the extent to which workers experiencing loneliness are more likely to leave their job within the year than workers not experiencing loneliness.

5. Used the risk ratio from step 4 and data on the UK voluntary turnover rate to estimate the reduction in the UK voluntary turnover rate that would have been seen without the impact of loneliness.

6. Converted the reduction in the UK voluntary turnover rate from step 5 to the number of employees voluntarily leaving their jobs that can be attributed to loneliness (including an estimate for the private sector only).

7. Used the estimate in step 6 and an estimate of the cost to employers of an employee leaving their job to produce an overall cost to employers of voluntary turnover attributable to loneliness.

4. EVIDENCE AND CALCULATIONS OF COSTS

IN THE FOLLOWING SECTION, WE DESCRIBE OUR GENERAL APPROACH TO EVIDENCE GATHERING AND MODELLING (SECTIONS 4.1–4.3); THE EVIDENCE WE HAVE FOUND RELATING TO EACH PATHWAY IN THE MODEL AND THE STEPS TAKEN TO MODEL THE COSTS ASSOCIATED WITH EACH PATHWAY (SECTIONS 4.3 AND 4.4); AND THE TOTAL COST OF LONELINESS TO EMPLOYERS IN THE UK (SECTION 4.5).

Any additional evidence we have found but have not been able to include in our model of the costs of loneliness to employers due to lack of appropriate quantitative evidence is included in Appendix 1.

4.1 GENERAL APPROACH TO EVIDENCE GATHERING

It should be noted that while the overall evidence of the relationship between loneliness and various outcomes is strong, few studies determine the causality in the relationship between loneliness and associated outcomes – the relationship is often complex and can be difficult to determine. Where we have found evidence of causality, it is highlighted – otherwise, our findings reflect non-causal associations.

It is also important to be aware that the results of the studies that we have included in our analysis are not based on experimental data, as it would be unethical for researchers to induce people to experience loneliness as part of an experimental study design. However, we have followed best practice in the field and have assessed the evidence that we have used for quality, as described herein.

We assessed available evidence against a set of quality standards before including it in the final calculation of the costs of loneliness to employers in the UK, including:

1. **Representativeness of the sample:** As far as possible, we used results of studies that are generalisable to working population in the UK.

2. **Statistically significant findings:** As far as possible, only statistically significant results have been used to build our model, to avoid using

results that may have occurred by chance. In the rare instances where we have had to rely on non-significant results, these are noted in the discussion.

3. **Adequate controls used in the analysis:** to ensure the reported effects were due to loneliness and not to other factors.

At the end of this report, we have included a glossary of the statistical terms most frequently used throughout this report. Where a statistical term is used only once in the report, we have included an explanation of the term in the end notes, for ease of reference.

Finally, where we have used financial information to enable us to quantify the costs associated with loneliness, we have harmonised all figures to 2014/2015 prices to ensure consistency.

4.2 THE PREVALENCE OF LONELINESS

We have taken a prevalence-based approach to calculating the cost of loneliness to employers. In practice, this means that we have determined what proportion of the working population of the UK experiences loneliness in a given year, and have applied that rate of prevalence of loneliness within the working population to the different population segments we are concerned with. For example, if we wanted to estimate the number of women experiencing loneliness in the working population, we would multiply the number of working women by the prevalence of loneliness in the working population. This method assumes that the prevalence of loneliness is uniform between working men and working women.

A prevalence-based approach includes all individuals affected by loneliness in a given year. It is worth noting that this is different from an incidence-based approach, which would count only the number of new instances of individuals experiencing loneliness in a given year.

For an individual, there is likely to be a time-lag between the onset of loneliness and the emergence of a related health condition. But where we have used evidence on the association of health conditions and loneliness, our prevalence approach means that we assume, at any given time, that some of those experiencing loneliness will be recently lonely and therefore cannot be expected to have developed a related condition but will be broadly balanced out by those who are no longer experiencing loneliness, but whose previous loneliness has given rise to an existing health condition.

As noted in the introduction to this paper, estimates of the prevalence of loneliness within the total population of the UK vary from 5 to 18%. We have based the prevalence of loneliness used in our model on data from the 2012 version of the European Social Survey – a highly respected international survey. As reported earlier, within the sample of 2,400 adults in the UK surveyed, when asked how often they felt lonely in the past week, 6% responded that they felt lonely 'almost all of the time' or 'most of the time'. We have used these two most extreme categories of response to calculate our prevalence rate, and have excluded those who responded that they felt lonely 'none or almost none of the time' and 'some of the time'.

The population-wide loneliness prevalence rate of 6% that arises from this interpretation of the European Social Survey data is very near the bottom-end of the 5–18% range referred to in our introduction. The prevalence rates of loneliness in the studies we have drawn on have also tended to be at the lower end of the 5–18% range; therefore, it is technically appropriate to use a similar rate. The decision to take this lower figure ensures that our overall figure is a conservative one, avoiding the risk of over-estimating the cost of loneliness to UK employers. As such, our findings could be best interpreted as the cost of extreme loneliness to UK employers. As we describe in the following sections, our analysis has largely focused on the impacts of loneliness experienced by the working population. Through our analysis of Wave 6 of the European Social Survey, we calculated a prevalence rate of loneliness amongst the working population of 3.3%. This prevalence rate reflects the proportion of working adults in the UK who feel lonely 'all or almost all of the time' or 'most of the time' – in other words, those experiencing the most extreme loneliness. As such, our results should be treated as conservative. In absolute terms, this represents approximately 1.02 million working people experiencing loneliness in the UK, based on a total in-work population of 30.9 million (this figure suggests there are approximately the same number of people experiencing loneliness in the working population, compared to the number of older people experiencing loneliness in the UK).[50] Although it is conceivable that the prevalence and impacts of loneliness may affect full- and part-time workers differently, due to lack of robust evidence, we have not differentiated between the effects of loneliness on full- and part-time employees.

Our analysis also includes the cost to employers of employees' absence from work because of caring for individuals suffering from an illness that can be attributed to loneliness. For these estimates, we have used a prevalence of loneliness rate of 6.1% for those being cared for who are aged 65 and older, and 5.3% for those being cared for who are under 65 – also based on the number of UK-based respondents in each age group who said they feel lonely 'all or almost all of the time' or 'most of the time' in response to Wave 6 of the European Social Survey. Note that here, we have assumed the same prevalence of loneliness amongst those being cared for, and not being cared for, in each age group.

BOX 1. KEY MODEL ASSUMPTION

Prevalence rate of loneliness in the working population: 3.3%

Prevalence rate of loneliness of those being cared for aged 65 and older: 6.1%

Prevalence rate of loneliness of those being cared for under 65: 5.3%

4.3 PATHWAYS VIA HEALTH OUTCOMES

LONELINESS » POOR EMPLOYEE HEALTH OUTCOMES AND POOR RELATIVE/DEPENDENT HEALTH OUTCOMES

Much of the research that has been carried out on loneliness and levels of social support has looked at the impact on health outcomes. There is good evidence that loneliness affects overall health. A recently published meta-analysis by Holt-Lundstad et al. reviewed 70 papers and found that loneliness increased the likelihood of mortality (death) by 26%.[51] They found separate but similar effects for

social isolation, which increased the likelihood of mortality by 29%, and for living alone, which increased the likelihood by 32%.[52]

There is also considerable evidence of the links between loneliness and specific health conditions. In terms of impact on employers, this evidence is key, as it allows us to link loneliness to specific categories of sickness absence and to reasons for absence from work of working carers. In-line with Fulton and Jupp[53] and McDaid et al.[54] – two key studies that have sought to establish an estimate of the cost of loneliness to the public sector in the UK – we have focused on those conditions where the evidence most robustly establishes a link with loneliness. Thus, the four main health conditions included in our model are depression, coronary heart disease, stroke, and dementia.

BOX 2. KEY MODEL ASSUMPTION

The four health conditions of which there is good evidence of their links to loneliness and which are therefore included in our model are depression, coronary heart disease, stroke, and dementia.

It is worth noting that there is evidence of relationships between social isolation and a range of other health conditions. Given that there is a degree of overlap between social isolation and loneliness, this indicates that loneliness is likely to impact on a range of additional health conditions. For example, the charity Macmillan Cancer Support has found that more than half of healthcare professionals report some cancer patients have decided to skip treatment altogether because of a lack of social support.[55] As such, our estimate of the costs of loneliness to employers in terms of health is likely to be a significant underestimation, and should be treated as being conservative.

The vast majority of research we have reviewed on the links between loneliness and these four main health conditions was carried out in samples of older people (though with varying age boundaries). Our results should therefore be treated with caution. Applying evidence based largely on the links between loneliness and health outcomes in older segments of the population to the wider population could have been problematic for our research in the cases of depression, coronary heart disease, and stroke, given our interest in the pathway via health outcomes in working-age people. However, the Holt-Lundstad et al. meta-analysis of loneliness and mortality found that loneliness and social isolation were more predictive of death in younger rather than older groups, and note that this should 'call into question the assumption that social isolation among older adults places them at greater risk'.[56] This suggests that using estimates of the effects of loneliness on health from research carried out in older people is likely to be a conservative estimate of the effects on the working-age population (though of course, we base our rates of incidence of loneliness from evidence of those in work). On the other hand, it may be the case that loneliness is as common or more common among younger adults, but that its health implications are not as serious because younger adults are more resilient or because it is the 'only' risk factor they have, whereas older adults may have a range of risk factors which are much more common in old age, including high blood pressure, cholesterol, diabetes, etc. Similarly, it could be the case that for loneliness to affect health, it must be experienced over a relatively prolonged amount of time, i.e., that the health effects of loneliness when in employment only manifest later in life. To address these challenges, we have where possible preferred studies whose samples

overlap with the ages of the working population. Key findings on the links between loneliness and each of these health conditions is detailed in the following sections.

Depression

Several studies have found that loneliness is predictive of depression, and some find this effect while controlling for the effects of the degree of social support. Peerenboom et al. find that 'emotional loneliness' was independently associated with depression in a sample of people aged 60 and over in the Netherlands with an odds ratio of 5.06 (95% confidence interval 1.81–14.18), in a model controlling for social support as well as incidence of depression and other socio-economic characteristics.[57] Golden et al. find that loneliness is independently associated with persistent depressed mood in a sample of Dublin residents aged 65 and over, with an odds ratio of 2.5.[58] And Cacioppo et al. similarly find that loneliness has a relatively small but significant impact on depressive symptoms, independent of other factors including extent of social support.[59] One of the data sources used by Cacioppo et al. is a sample of Americans aged 54 and older from the Health and Retirement Study; given that this sample overlaps with the working age population, we have used this data in calculating the odds ratio included in our model.

BOX 3. KEY MODEL CALCULATION

As the odds ratio was not given in the original Cacioppo et al. paper, we accessed the same data used by the authors, which came from the Health and Retirement Study, to carry out a logistic regression. Our regression model was based on Cacioppo et al.'s Model 5,[60] which we used to calculate the odds ratio, controlling for gender, ethnicity, age, education, marital status, household income, perceived stress and social isolation. We used categorical dummy variables for level of education rather than years of education as in the Cacioppo model, included dummy variables for all marital statuses, and defined individuals as experiencing depression if they scored 5 or above on the 0–8 short-form of the CES-D scale (equivalent to 11.8% of the sample), minus its loneliness item, and as experiencing loneliness if they scored 7 or above on an index where 3 was the minimum score and 9 the maximum (equivalent to 6.5% of the sample). We calculated an odds ratio of 3.02 (95% CI 1.96–5.26).

However, one of our expert reviewers pointed out that this odds ratio is likely to be an overestimate, given that, in some cases, depression is likely to lead to loneliness, as well as loneliness leading to depression. We addressed this by revisiting the Cacioppo et al. study, which reports two longitudinal models – one showing the extent to which loneliness at time 1 (T1) predicts a future trend in depression in the individual, and one showing the extent to which depression at T1 predicts the future trend in loneliness in the individual. Both effect sizes are of roughly the same magnitude (though the effect we are interested in, i.e., loneliness to depression, is slightly larger). Based on this, we have assumed that eliminating loneliness would only eliminate half of the effect. We therefore halved the beta coefficients in our model, and calculated an odds ratio based on these, giving us a new odds ratio of 1.74. (Note that this does not halve the odds ratio, as the odds ratio is calculated using an exponential formula).

BOX 4. KEY MODEL STATISTIC

Odds ratio of loneliness to depression: 1.74

Coronary heart disease, stroke

Good evidence for the links between loneliness and both coronary heart disease and stroke is provided by the recent meta-analysis carried out by Valtorta et al.[61] Across 11 studies, Valtorta et al. found that poor social relationships (i.e., high versus low loneliness or social isolation) were associated with a 29% increase in risk of incidence of coronary heart disease (95% confidence interval 4% to 59%). And across 9 studies, loneliness/social isolation was associated with a 32% increase in risk of stroke (95% confidence interval 4% to 68%). It should be noted that this study combines loneliness and social isolation rather than examining their separate effects, but the authors note that they found no significant difference in results for social isolation and loneliness.

BOX 5. KEY MODEL STATISTICS

Odds ratio for loneliness and coronary heart disease = 1.29.

Odds ratio for loneliness and stroke = 1.32.

Dementia

Good evidence of the association between loneliness and dementia comes from the systematic review and meta-analysis carried out by Kuiper et al.[62] They investigate a number of measures of social relationships, and identify three studies looking specifically at loneliness and dementia, from which they find that individuals experiencing loneliness have a significantly higher risk of developing dementia than those individuals who are not experiencing loneliness (Relative Risk=1.58, 95% confidence interval 1.19–2.09).[63] Given our methodology, it was preferable to base our model on a single study, allowing us to identify the proportion of the population defined as experiencing loneliness according to the study. Kuiper et al. noted that one of these three studies – Wilson et al.[64] – was of a considerably higher quality, and so we used these data for our model.

BOX 6. KEY MODEL CALCULATION

To calculate the reduction in Alzheimer's disease that might be produced by eliminating loneliness, we modelled a scenario whereby everyone in that top 10% benefited from a reduction of loneliness of 0.9 points, thus meaning that those who were at the 10th percentile would have a score of 2.3 on a scale of 1 to 5 (2.3 being the mean), whilst those with the highest levels of loneliness (4.6), would have a score of 3.7. This means that a 0.9-point decrease in loneliness is associated with a change in the risk of developing Alzheimer's disease of 1.36. Applying this reduction to 10% of the population would reduce the prevalence of Alzheimer's disease by 3.5%.

The study followed a group of older people in the Chicago area over a number of years, and tracked the development of Alzheimer's disease (a common form of dementia) in the group.[65] They estimate that the increased risk of developing dementia from a 1-point increase in loneliness (on a 1 to 5 scale) is 41% (Relative Risk= 1.41; 95% confidence interval 0.97–2.06), controlling for the effect of depression – note that this is not a statistically significant finding. The study reports that the loneliest 10% of the population had a loneliness score of 3.2 or higher. These findings enabled us

to estimate a reduction in Alzheimer's disease that might be associated with largely eliminating loneliness.

LONELINESS » POOR EMPLOYEE HEALTH OUTCOMES » SICKNESS ABSENCE

To link poor health outcomes in employees to sickness absence, we examined data produced by the ONS on working days lost to sickness by reason for absence.[66] Comparing the ONS list of reasons to our four main health conditions, we identified the following ONS reasons for sickness absence as those containing absences attributable to loneliness: 'stress, depression, anxiety' which contains the depression condition, and as a whole accounted for nearly 15.2 million working days lost in 2013, and 'heart, blood pressure, circulation problems' which contains both the coronary heart disease and stroke conditions, and as a whole accounted for over 5 million working days lost in 2013.

BOX 7. KEY MODEL ASSUMPTION

Health conditions associated with loneliness for which we can measure rates of sickness absence: depression, coronary heart disease, and stroke.

We calculated the costs of loneliness to UK employers from sickness absence, as well as the costs to the subsection of employers in the private sector. To do so, we used statistics published in the ONS 'Public and private sector employment' release, which show that there were 30,921,000 people employed in the UK, of which 25,526,000 were employed in the private sector in 2014/2015, representing 83.1% of employees overall. We applied this proportion to the number of working days lost to estimate the working days lost due to these health conditions in the private sector (Box 8).

BOX 8. KEY MODEL CALCULATIONS

Total working days lost due to stress, depression, and anxiety (all sectors) = 15,158,139

Working days lost due to stress, depression, and anxiety in the private sector = 15,158,139 * 83.1% = 12,596,413

Working days lost to heart, blood pressure, and circulation problems (all sectors) = 5,025,017

Working days lost to heart, blood pressure, and circulation problems in the private sector = 5,025,017 * 83.1% = 4,175,789

To calculate the proportion of these working days lost in each of the ONS reason categories that relate to the main health conditions of interest to our study, we consulted two further sources of evidence. To determine how many of the days in the reason category 'stress, depression, anxiety' represent only days of sickness absence due to depression, we examined the results of the latest Adult Psychiatric Morbidity Survey (APMS) in England described by McManus et al., which provides data on the relative incidence of 'common mental disorders'.[67] The APMS study shows that 16.2% of all adults experience common mental disorders, with 9.0% of people with mixed depression and anxiety disorder, and 2.3% who have experienced depressive episodes. McManus et al. explain that 'the symptoms of depression and anxiety frequently co-exist, demonstrated for example by the high proportions meeting the criteria for more than one common mental disorder or for mixed anxiety and depressive disorder.'[68] We therefore treat 'mixed depression and anxiety disorder' as equivalent to the main health condition we have referred to

elsewhere as 'depression', together with the separate category of depressive episodes. Summing the incidence of conditions rather than individuals (as individuals can experience more than one condition) gives us a total of 11.3% incidence of depression, over a total of 19.3% incidence of any type of common mental disorder – which produces an estimate of 58.5% of the proportion of common mental disorders which we can attribute to depression.

We used this proportion to calculate the number of working days lost due to depression, and then, converted the odds ratio (Box 4) into a risk ratio, which describes the risk of experiencing depression because of loneliness, to calculate the number of these days that can be attributed to loneliness.

BOX 9. KEY MODEL CALCULATIONS

Total working days lost due to stress, depression, and anxiety (Box 8) = 15,158,139

Private sector working days lost due to stress, depression, and anxiety (Box 8) = 12,596,413

Proportion of 'stress, depression, anxiety' attributed to depression = (9.0%+2.3%) / 19.3% = 58.5%

Total working days lost due to depression = 58.5% x 15,158,139 = 8,867,511 days

Private sector working days lost due to depression = 58.5% x 12,596,413= 7,375,102 days

Odds ratio for loneliness and depression (Box 4) = 1.74

Proportion who are not lonely but depressed = 0.08

Odds ratio for loneliness and depression converted to a risk ratio for loneliness and depression:[69] 1.74 / ((1.0 – 0.08) + (0.08 x 1.74)) = 1.64

Prevalence rate of loneliness of working adults in the UK (Box 1): 3.3%

Modelled number of all working days that would be lost to depression without the impact of loneliness = 8,684,086

Modelled number of private sector working days that would be lost to depression without the impact of loneliness = 7,222,547

Total working days lost to depression attributable to loneliness = 183,580

Private sector working days lost to depression attributable to loneliness = 152,555

To calculate the proportions of the ONS 'heart, blood pressure, circulation problems' category which are attributable to coronary heart disease, and to stroke, we examined the British Heart Foundation's Cardiovascular Disease Statistics.[70] This shows that of the total 1,690,931 inpatient episodes in NHS hospitals in 2013/2014 due to diagnoses of 'diseases of the circulatory system' in adults in the UK (which we treat as equivalent to the ONS reasons category), 491,647 were due to coronary heart disease as a main diagnosis (a proportion of 29.1%), and 233,261 were due to stroke as a main diagnosis (a proportion of 13.8%). By using data that reflect the proportion of cases of coronary heart disease and stroke which have led to inpatient episodes only, we can be more confident that the allocation of sick days lost to each illness has not been inappropriately skewed as a result of high prevalence of a higher number of

less acute instances of either condition, which may not have led to any sickness absence. For example, it is possible that there are many individuals suffering from coronary heart disease who do not need to take any time off work. By using the proportion of inpatient episodes attributable to each condition to apportion days of sickness absence, we have avoided relatively minor instances of each condition from skewing that apportioning. We use these proportions to calculate the number of working days lost due to coronary heart disease and stroke, and then the numbers of these days which can be attributed to loneliness, using the odds ratios noted herein converted into risk ratios.

By applying the methodology described, we have assumed the same average number of working days lost due to both coronary heart disease and stroke. In addition, it seems likely that, in the case of loneliness leading to a condition such as coronary heart disease, an individual would have had to experience chronic loneliness. However, by using the prevalence of loneliness in a given year, rather than the incidence of loneliness within the population, we remove the need to consider whether an individual is experiencing long-term or short-term loneliness.

BOX 10. KEY MODEL CALCULATIONS

Total working days lost due to heart, blood pressure, and circulation problems (Box 8) = 5,025,017

Private sector working days lost due to heart, blood pressure, and circulation problems (Box 8) = 4,175,789

Proportion of 'heart, blood pressure, circulation problems' accounted for by coronary heart disease = 491,647 / 1,690,931 = 29.1%

Total working days lost due to coronary heart disease = 29.1% x 5,025,017 = 1,461,050

Private sector working days lost due to coronary heart disease = 29.1% x 4,175,789 = 1,214,133

Proportion of heart, blood pressure, and circulation problems accounted for by stroke = 233,261 / 1,690,931 = 13.8%

Total working days lost due to stroke = 13.8% x 5,025,017 = 693,192

Private sector working days lost due to stroke = 13.8% x 4,175,789 = 576,043

Odds ratio for loneliness and coronary heart disease (Box 5) = 1.29

Prevalence of coronary heart disease = 0.007

Odds ratio for loneliness and coronary heart disease converted into a risk ratio = 1.29 / ((1.0 – 0.007) + (0.007 x 1.29)) = 1.29 (note, this appears the same as the odds ratio, due to rounding)

Odds ratio for loneliness and stroke (Box 5) = 1.32

Prevalence of stroke = 0.004

Odds ratio for loneliness and stroke converted into a risk ratio = 1.32 / ((1.0 – 0.004) + (0.004 x 1.32)) = 1.32 (note, this appears the same as the odds ratio, due to rounding)

Prevalence rate of loneliness used for this calculation (Box 1): 3.3%

Number of total working days lost to coronary heart disease attributable to loneliness = 13,716

Number of private sector working days lost to stroke attributable to loneliness = 11,398

Number of private sector working days lost stroke attributable to loneliness = 7,210

Number of private sector working days lost to stroke attributable to loneliness = 5,991

Total working days lost due to health conditions attributable to loneliness =183,580 (Box 9) + 13,716 + 7,210 = 204,506

Total private sector working days lost due to health conditions attributable to loneliness = 152,555 (Box 9) + 11,398 + 5,991 = 169,944

To cost the working days lost from the incidence of health conditions attributable to loneliness, we followed the approach taken by the Confederation for British Industry (CBI) in its 2013 absence and workplace health survey.[71] This collects costs of absence as reported by employers, but the CBI notes wide variations in these figures between organisations, pointing out that for some this will include costs such as hiring temporary staff and extra overtime of other staff. The CBI also outlines a methodology to calculate the 'direct costs' of absence using figures for average absence per employee, average earnings figures and workforce size. We have applied the principles of this direct costs approach in our model, as it allows us to use ONS earnings data and use a standard methodology. We have therefore used the most recent ONS average earnings figure of all employees (i.e., public, private, and third sectors) £454 weekly earnings (excluding bonuses and arrears) and £446 in the private sector as the basis of our costings[72] This represents a conservative costing, given that sickness absence may imply additional costs to employers beyond the salary costs of the absent individual – including the cost of paying replacement staff, or the cost of lost profits due to lower output. It should also be noted that we have not attempted to factor into our analysis the scenario that after an extended period, sick pay is often paid at less than 100% of usual earnings; however, the need to employ replacement staff under such circumstances is likely to largely negate this issue.

One limitation that should be noted is that we have not been able to rigorously ascertain whether individuals earning higher or lower incomes are more or less at risk of experiencing loneliness, which could skew the weekly earnings figure we have used.

BOX 11. KEY MODEL CALCULATIONS

Average weekly earnings (all employees in the public, private, and third sector) = £454

Average weekly earnings in the private sector = £446

Average actual days worked per week = 32.17 hours per week / 7-hour standard working day= 4.6 days

Average daily earnings = £454 / 4.6 = £98.79

Average daily earnings in the private sector = £446 / 4.6 = £97.05

Costs of total working days lost due to health conditions attributable to loneliness = 204,506 (Box 10) x £98.79 = £20,202,639

Costs of total private sector working days lost due to health conditions attributable to loneliness = 169,944 (Box 10) x £97.05 = £16,492,563

It is conceivable that early retirement taken because of poor health attributable to loneliness might represent a further health outcome that creates a cost to employers; however, early retirement is classified as a form of 'voluntary turnover' in our analysis in Section 4.4 (sub-section Loneliness » Lower employee wellbeing » Lower staff retention), where the costs of early retirement to employers are captured.

LONELINESS » POOR RELATIVES / DEPENDENT HEALTH OUTCOMES » DAYS LOST TO CARERS LEAVE

The 2011 Census, as reported by Carers UK, shows that there are around 3 million working carers in the UK.[73] The cost of juggling full-time work with caring has been estimated as costing UK employers 0.24% of GDP (Gross Domestic Product) every year,[74] in research by Carers UK who applied a methodology used in a US study conducted by MetLife.[75] The MetLife study estimated the average worktime lost each year due to each of staff turnover, absenteeism, workday interruptions, dealing with crises, additional time required by supervisors, unpaid leave, and moving from full-time to part-time employment, and multiplying the estimated time lost by median salary, to calculate what proportion of the USA's GDP that cost represented (0.24%). Applying that proportion to the GDP of the UK produces an estimate for the UK. Our understanding is that this is an estimate of the cost to all employers of full-time (but not part-time) employed caregivers (as the source research by MetLife[76] did not distinguish between private and public sectors), and we have therefore treated it as such. We believe that it represents a conservative figure, given that any costs to employers created by part-time staff with caring responsibilities are not included in the calculation. We have treated these figures as our starting point for estimating the cost of caring to UK employers that can be attributed to loneliness, first calculating an estimate of the number of working carers in the private sector using the proportion of employees overall in the private sector, as used in earlier calculations.

BOX 12. KEY MODEL STATISTIC AND CALCULATION

Cost of caring to total employers = 0.24% of £1822 billion GDP = £4.4 billion

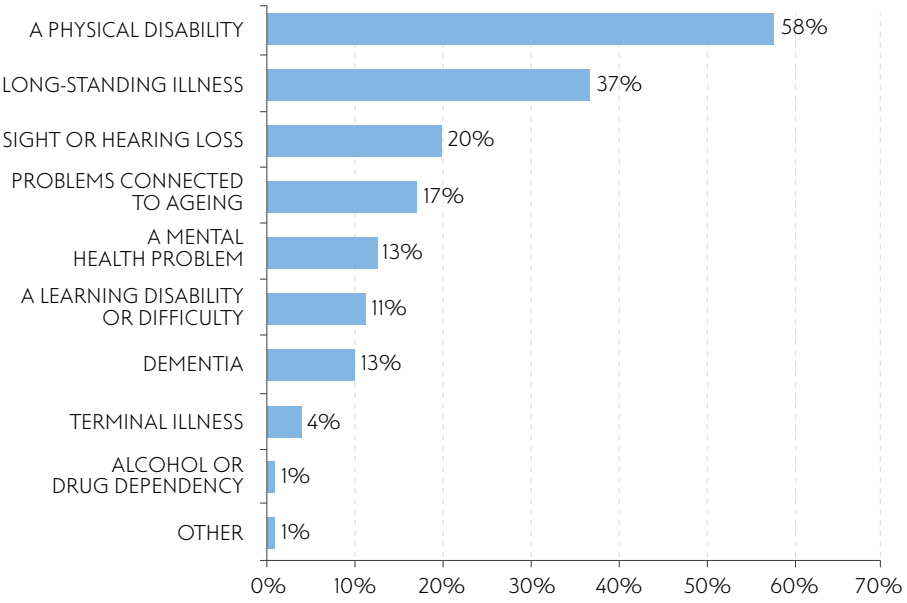
Total number of working carers in the UK = 3,000,000

Number of working carers in the UK private sector = 3,000,000 x 83.1% = 2,493,000

The NHS Information Centre for Health and Social Care Survey of Carers in Households 2009/2010 provides information on the health conditions of people being cared for, as shown in Figure 2.[77]

Of these conditions, we could confidently link mental health problems (which include depression) and dementia to our list of the four health conditions with good evidence of their links to loneliness. Therefore, calculating the extent to which the incidence of these conditions in people who are being cared for by working carers can be attributed to loneliness will allow us to produce our estimate.

FIGURE 2. HEALTH CONDITIONS OF THOSE BEING CARED FOR BY CARERS IN HOUSEHOLDS



Source: *NHS Survey of Carers in Households 2009/2010.*
Note: Base=2,200 surveyed carers. Percentages sum to more than 100% as carers could report more than one health condition in those cared for.

BOX 13. KEY MODEL ASSUMPTION

Health conditions which we can link to loneliness in people being cared for by working carers: mental health problems (depression) and dementia.

To link the caring evidence to the loneliness evidence, we need to know the proportion of carers caring for someone with a mental health problem who are caring for someone with depression specifically. To do this, we first calculated the proportion of mental health problems that are mental health disorders (the subset of mental health problems that depression belongs to). The APMS breaks mental health disorders down into psychosis (2.4% of all mental health disorders) and neurosis and common mental disorders (including depression) (97.6% of all mental health disorders). Based on our judgement that the caring needs of people with psychoses are much higher than other mental health problems, we assume that 75% of cared-for people with mental health problems have a problem which can be classified as a mental health disorder.

To link the caring evidence to the loneliness evidence, we needed to know the proportion of carers caring for someone with a mental health disorder who are caring for someone with depression specifically. To find this, we used the same estimate of the proportion of people with common mental disorders who have depression as used earlier in this paper (i.e., 58.5%), based on findings from McManus et al.[78]

We did not require equivalent evidence for dementia as the category within the NHS survey results matches what we have identified as a key condition for this study. However, one of our expert commenters pointed out that people with dementia may be more likely to be cared for by a spouse of similar age, and therefore that the assumption that 10% of working carers are caring for people with dementia may not hold.

The Alzheimer's Society data shows that 95% of those with dementia in the UK are aged 65 or above,[79] so this is clearly an issue that requires consideration.

BOX 14. KEY MODEL CALCULATION

Total number of working carers in the UK = 3,000,000

Working carers in the UK caring for someone with a mental health problem: 13% x 3,000,000 = 390,000

Working carers in the UK caring for someone with a mental health disorder: 390,000 x 75% = 292,500

Working carers in the UK caring from someone with depression: 292,500 x 58.5% = 171,256

Working carers in the UK private sector caring from someone with depression: 171,256 x 83.1% = 142,314

The NHS survey results do not show a breakdown of the conditions of those being cared for by the age of the carer; they show a breakdown of the relationship of the carer to the main person being cared for. This showed that 33% of carers are parents of the person cared for, 26% are their spouse/partner, 13% their child, 9% their friend/neighbour, 7% their parent-in-law, 7% another relative, 4% a grandparent, and 1% are someone else. We judged that, given the age profile of dementia sufferers, they would be extremely unlikely to have a living parent, parent-in-law, or grand-parent to care for them. We therefore assumed that no-one caring for people with dementia is likely to be their parents or grandparents. Further, we assumed that spouses/partners of those with dementia are likely to not be of working age given that they are likely a similar age to their spouse/partner. Hence carers of those with dementia who are likely to be of working age are the children of those cared for, their friends/neighbours, other relatives, and someone else, which as a proportion of all carers excluding parents, parents-in-law, and grandparents (who we assume do not care at all for people with dementia) represent 54.5% of working age carers.

BOX 15. KEY MODEL CALCULATIONS

Total number of working carers in the UK = 3,000,000

Number of total carers caring for someone with dementia = 3,000,000 x 10% = 300,000

Carers, caring for dementia, that are likely to be of working age: = 300,000 x 54.5% = 160,714

Number of carers working in the private sector caring for someone with dementia = 160,714 x 83.1% = 133,554

To estimate how many working carers are caring for people whose depression and dementia can be attributed to loneliness, we used evidence from studies linking loneliness to these conditions, as previously described. Unlike earlier in the paper, here we are interested in the links between those in the cared-for population, rather than the working-age population.

For those being cared for with depression, we looked at evidence from the Health and Social Care Information Centre (now NHS Digital) on the age profile of those being cared for by carers in households (i.e., people who are not caring as their paid employment), which shows a strong skew towards older people, with 63% of those cared for aged 65 and

over, and an average age of 65.[80] We therefore split the group of those cared for with depression into those who were 65 and over and those who were under 65.

We repeated our analysis to derive an odds ratio for depression and loneliness (based on Cacioppo et al.[81]) with a split-file methodology which allowed us to look at under-65s and those aged 65 and over separately. For under-65s, we found an odds ratio of 5.26 (95% CI 2.44–11.32). The ratio was lower for those aged 65 and over, 1.96 (95% CI 0.97–3.98). This reflected evidence cited earlier, that the scale of impact of loneliness on health conditions is bigger in younger age groups. Following our earlier reasoning that in some cases, depression is likely to lead to loneliness, as well as loneliness leading to depression (Box 3), we halved the Beta coefficients used in these odds ratios to obtain odds ratios of 2.3 for under-65s and 1.4 for those aged 65 and over. We used an estimate of the prevalence of loneliness for the 65-and-over age group from the European Social Survey, showing that 6.1% of this age group experience loneliness 'most' or 'all' of the time,[82] whilst 5.3% of under-65s (including those in or out of work) experience loneliness (Box 1).

Using these risk ratios and prevalence rates, we were able to calculate the number of carers caring for people with depression that could be attributed to loneliness.

To estimate the number of working carers caring for someone with dementia that can be attributed to loneliness, data limitations meant that we had to use a different method than the one employed other parts of the model. In other parts of the model, we were able to calculate or use odds ratios based on a measure of loneliness which could be in one of two states: categorising people as experiencing

BOX 16. KEY MODEL CALCULATIONS

All working carers in the UK caring for someone with depression (Box 14): 171,259

Working carers in the UK private sector caring for someone with depression (Box 14): 142,314

Carers caring for those aged 65+

All working carers in the UK caring for someone with depression aged 65+: 171,259 x 63% = 107,892

Working carers in the UK private sector caring for someone with depression aged 65+: 142,314 x 63% = 89,658

Odds ratio for loneliness to depression in those aged 65+ (Box 3): 1.401

Prevalence of depression in those aged 65+: 7.1%

Odds ratio for loneliness to depression in those aged 65+ converted into a risk ratio: 1.401 / ((100% - 7.1%) + (7.1% x 1.401)) = 1.363

Prevalence of loneliness in those aged 65+ (Box 1): 6.1%

Modelled number of all working carers caring for people with depression aged 65+ without the impact of loneliness: 105,557

Modelled number of carers working in the private sector caring for people with depression aged 65+ without the impact of loneliness: 87,718

Carers caring for those aged under 65

All working carers in the UK caring for someone with depression aged under 65: 171,259 x 37% = 63,365

Working carers in the UK private sector caring for someone with depression aged under 65: 142,314 x 37% = 52,656

Odds ratio for loneliness to depression in those aged under 65 (Box 3): 2.293

Prevalence of depression in those aged under 65: 9%

Odds ratio for loneliness to depression in those aged under 65 converted to a risk ratio: 2.293 / ((100% - 9%) + (9% x 2.293)) = 2.054

Prevalence of loneliness in those aged under 65 (Box 1): 5.3%

Modelled number of all working carers caring for people with depression aged under 65 without the impact of loneliness: 60,012

Modelled number of carers working in the private sector caring for people with depression aged under 65 without the impact of loneliness: 49,870

loneliness or not experience loneliness based on a threshold. The study we used to model the relationship between loneliness and dementia[83] did not use a binary measure of loneliness. Instead, loneliness was measured on a continuous 1–5 scale, and the study reported the increased risk of dementia for a 1-point increase in this scale.

To model 'eliminating' loneliness, as we had done in other pathways, we needed to find an alternative approach. As elsewhere in the model, we used the prevalence of loneliness based on the European Social Survey. We assumed that most people with dementia are 65+, and therefore that the prevalence of loneliness in this population was 6.1% (Box 1). The next question was how much we would need to reduce loneliness by for that 6.1% to consider we had eliminated loneliness. Wilson et al. tell us that the highest score on the 1–5 loneliness scale was 4.6.[84] We used a normal distribution to crudely estimate the score on the scale which would correspond to the 93.9th percentile in the distribution, i.e., the point below which someone would not count as experiencing loneliness if 6.1% of the population is experiencing loneliness. We estimated this to be a score 3.4 on the 1–5 scale. Note that Wilson et al. tell us that the 90th percentile is 3.2.[85] We therefore treat eliminating loneliness as reducing the loneliness of the 6.1% who are experiencing loneliness by 1.2 points (which is 4.6–3.4), such that those who were the loneliest are now just on the threshold of experiencing loneliness, whilst others were in the worst 6.1% also have lower levels of loneliness, some of whom are now close to the mean.

BOX 17. KEY MODEL CALCULATIONS

Number of working carers, caring for people with dementia, (Box 15): = 160,714

Number of working carers employed in the private sector, caring for people with dementia (Box 15) = 133,554

Reduction in loneliness counted as eliminating loneliness: 1.22

Odds ratio for this adjusted reduction: 1.52

Prevalence of dementia in UK (for 65+): 7%

Odds ratio for this adjusted reduction converted into a risk ratio: 1.52 / ((100% - 7%) + (7% x 1.52)) = 1.47

Prevalence of loneliness in 65+ (Box 1): 6.1%

Modelled umber of working carers caring for people with dementia without the impact of loneliness: 156,270

Modelled numbers of carers caring for people with dementia working in the private sector without the impact of loneliness: 129,861

BOX 18. KEY MODEL CALCULATION

Total number fewer working carers needed without the impact of loneliness = 300,000 (all carers caring for dementia) + 171,256 (carers caring for depression) – 156,270 (carers caring for depression without the impact of loneliness) – 105,557 (carers caring for depression in those aged 65 and over without the impact of loneliness) – 60,012 (carers caring for depression in under-65s without the impact of loneliness) = 149,417

Total number carers working in the private sector needed without the impact of loneliness: = 249,300 (all carers caring for dementia) + 142,314 (carers caring for depression) – 129,861 (carers caring for depression without the impact of loneliness) – 87,718 (carers caring for depression in those aged 65 and over without the impact of loneliness) – 49,870 (carers caring for depression in under-65s without the impact of loneliness) = 124,166

To calculate the costs of the number of these private sector workers who we can regard as caring for people with health conditions attributed to loneliness, we used the Carer's UK estimate of the cost to UK employers of caring activities by employees. We calculated a cost per working carer using the total number of working carers, and then calculated the costs of carers caring for people with health conditions attributed to loneliness using the calculations above. We then calculated a cost to private sector employees only, using the proportion of UK employees in the private sector as used in earlier calculations (83.1%).[86]

BOX 19. KEY MODEL CALCULATIONS

Cost of caring to all employers (Box 12) = £4.4 billion

Cost of caring per employee with caring responsibilities = £4.4 billion/3,000,000 (Box 12) = £1,472

Costs of caring due to total employees caring for those with health conditions attributed to loneliness = 149,418 (Box 18) x £1,472 = £219,943,296

Costs of caring due to private sector employees caring for those with health conditions attributed to loneliness = 124,166 (Box 13) x £1,472 = £182,772,352

4.4 PATHWAYS VIA LOWER EMPLOYEE WELLBEING

LONELINESS » LOWER EMPLOYEE WELLBEING

NEF's dynamic model of wellbeing[87] (Figure 3), which summarises the key links in the literature on the factors most strongly associated with wellbeing, places social connectedness at the heart of components essential to high wellbeing

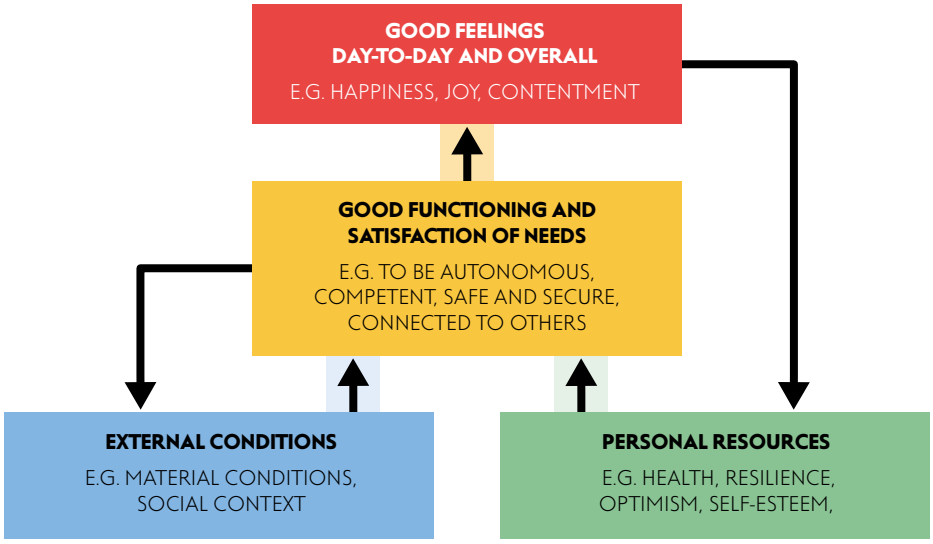
There is a strong evidence base to show that having strong social networks and spending time socialising is positively associated with wellbeing.[88] Indeed, evidence suggests that having strong social connections is one of the most robust predictors of wellbeing.[89] Bigger social networks, with strong connections between individuals, and more time spent socialising are all associated with higher levels of life satisfaction and overall happiness and fewer depressive symptoms.[90-93] On the other hand, experiencing loneliness and having a non-integrated social network has been found to be associated with a lower probability of being very happy or being satisfied with one's life – including when controlling for age, physical disability, living alone, and never having married.[94]

During our discussion with expert reviewers, it was pointed out that it is possible that part of the association between wellbeing and loneliness might partly arise from low wellbeing producing loneliness, rather than loneliness causing lower overall wellbeing. We searched for, but did not find, evidence which directly addresses this point. Our understanding of the literature is that loneliness is conceptualised as a sub-component of the broader concept of wellbeing, and therefore the question of whether low wellbeing might lead to loneliness has not been regarded as a clear research question. In the absence of evidence, we have therefore not made an adjustment to the findings on the association between loneliness and wellbeing.[95]

LONELINESS » LOWER EMPLOYEE WELLBEING » LOWER PRODUCTIVITY

Our approach to estimating the impact of loneliness on productivity has necessarily been one of linking the evidence on loneliness and wellbeing, and wellbeing and productivity, as we were unable to find any direct evidence on the impact of loneliness on productivity.[96]

FIGURE 3. THE DYNAMIC MODEL OF WELLBEING



Evidence suggests that loneliness is associated with lower productivity at work. In an omnibus survey conducted by market research firm, ICM, in July 2016, a representative sample of 930 adults working in the UK were asked: 'Do you ever feel lonely when at work?' Of the 45% who responded that they 'always', 'often', or 'sometimes' feel lonely at work, more than half (59%) said that feeling lonely at work 'somewhat' lowers their productivity, and 10% said that it lowers their productivity 'a great deal'. One explanation for this could be that poor psychological health – a condition closely connected to loneliness – has a negative impact on memory, recall, and recognition; causes distraction because of negative thoughts; weakens judgement; inhibits self-control or assertiveness; and reduces motivation – all of which are likely to contribute to lower overall productivity.[97]

This finding is supported by a study which shows a negative association between loneliness and job performance.[98] The authors of the study hypothesised that employees who felt less connected to their co-workers are less likely to feel a sense of obligation to their colleagues to perform highly in their role. The authors also hypothesised that people who experience loneliness at work are likely to experience a lower sense of belonging, which in turn makes their experience of work less psychologically rewarding, reducing their levels of commitment and motivation.[99] However, the results of this study do not allow us to quantify the effect of loneliness in terms of reduced performance at work. As such, we have considered the pathway: Loneliness » Lower employee wellbeing » Lower productivity.

Various studies have found positive associations between wellbeing and productivity,[100-102] including in UK-based employees in a wide range of private and public sector occupations.[103,104] However, there is some inconsistency in the literature regarding the size of this association,[105] which some have suggested is a result of assessing wellbeing at the individual level, and productivity at the 'unit level' – where a unit is a team of staff, a branch, or an organisation.[106]

To estimate the cost of loneliness through lower productivity, we took three steps. First, we estimated the relationship between loneliness and job satisfaction using data from round 6 of the European Social Survey (here, we followed standard practice by using job satisfaction as a proxy for wellbeing in the context of employment). Indeed, job satisfaction as a measure of wellbeing has been said to be 'one of the most useful pieces of information an organization can have about its employees', given the strong association between job satisfaction and a range of workplace performance factors, including improved memory, evaluative, and problem-solving skills.[107,108] We ran an ordinary linear regression with job satisfaction as the dependent variable, and loneliness as an independent variable.

BOX 20. KEY MODEL CALCULATIONS

To estimate the relationship between loneliness and job satisfaction we performed an ordinary linear regression, using data from Wave 6 of the European Social Survey.

To ensure a large sample size, we used the survey as a whole to create the model, rather than limit the model to UK respondents.

Dependent variable: Job satisfaction, measured on a 0–10 scale

Independent variable: Loneliness (with 'lonely' defined as feeling lonely most or all of the time)

Controlled for gender, age, age squared, household income, education level, country, job autonomy, job influence

We found loneliness to be a strongly significant predictor of job satisfaction. People experiencing loneliness had a job satisfaction of 0.41 less than people not experiencing loneliness – equivalent to 0.2 in standard deviation units.

The second step was to estimate the impact of this reduction in job satisfaction on productivity. As discussed earlier, some studies did this at business unit level, but given that our approach is based on individual employee effects, we based our calculations on a meta-analysis by Judge et al.,[109] which looked at the relationship between job satisfaction and productivity for individuals. It found an overall corrected effect size (p)[110] between individual job satisfaction and job performance of 0.30, based on 312 correlations in 254 studies. Of these studies, 34 used 'objective records' as a measure of performance instead of supervisory ratings. These studies found a slightly lower effect, 0.26 – nevertheless the result was significant.

Another meta-analysis, this one by Whitman et al., [111] carried out further analysis looking at the mediating effect of OCB (organisational citizenship behaviours). Controlling for these mediating factors reduced their effect size somewhat, from 0.34 to 0.27. Given that these are unlikely to be affected by individual changes in loneliness, we wanted to do the same, so we assumed the same proportionate decrease in effect size, leaving us with a beta coefficient of 0.21.

The third step was to convert a reduction in productivity measured in terms of standard deviations into a percentage decrease in productivity, which could be related to a monetary figure. Four studies had sufficient information: Koys,[112] Huselid,[113] Sun et al.,[114] and Dollinger and Golden.[115] Koys measured productivity in terms of profit as a percentage of sales.[116] Sun et al.[117] and Huselid [118] measured it in terms of sales per employee. Dollinger and Golden measured it in terms of operating margin.[119]

Based on our estimate that loneliness reduces productivity by 0.2 standard deviations, we were able to estimate percentage reductions in productivity: -0.7% based on Koys,[120] -0.9% based on Sun et al.,[121] -4.0% based on Huselid,[122] and -2.3% based on Dollinger and Golden.[123] We treated the figure from Huselid as an outlier, and took the average of the other studies, which was -1.3%. In summary, we estimated that workers experiencing loneliness are 1.3% less productive than those who are not experiencing loneliness.

We applied this -1.3% to the average annual output per employee in the UK, which is £50,342 (based on the overall Gross Value Added for the UK in 2015 divided by the total number of jobs), estimating that on average, each worker experiencing loneliness creates an opportunity cost of £652 a year due to lower productivity.

Here, we assumed that an increase in job performance (as measured by 'objective records' in Judge et al.)[124] is equivalent to the same increase in the measures used in Koys,[125] Sun et al., [126] and Dollinger and Golden.[127]

BOX 21. KEY MODEL CALCULATIONS

Experiencing loneliness reduces job satisfaction by 0.41 points, which is 0.2 standard deviations

Beta coefficient for the association between job satisfaction and productivity: 0.21

Reduction in productivity (standard deviations): 0.2 x 0.21 = 0.042

Which is a % reduction of 1.3%

Output per job: £50,342

Opportunity cost of lower productivity per employee: £50,342 x 1.3% = £652

Using the prevalence of loneliness in the working population estimated from the European Social Survey (3.3%), we derive a total cost of loneliness through reduced productivity of £665 million per year to all employers, and £549 million per year for the private sector.

BOX 22. KEY MODEL CALCULATIONS

Prevalence of loneliness (Box 1) = 3.3%

Opportunity cost of lower productivity for all employers, attributable to loneliness: £652 x 3.3% x 30,921,000= £664,846,114

Opportunity cost of lower productivity for private sector employers, attributable to loneliness: £652 x 3.3% x 25,526,000 = £548,845,830

EXTREME LONELINESS » LOWER EMPLOYEE WELLBEING » LOWER STAFF RETENTION

Evidence suggests that lower wellbeing is associated with lower staff retention. We therefore sought to estimate the impact of loneliness on staff retention via the pathway of lower wellbeing. We searched for research that had similarly attempted to estimate the impact of health conditions on staff turnover, but were unable to find any relevant studies. We therefore produced the described methodology, linking evidence on the impact of employee wellbeing on turnover to evidence on the relationship between loneliness and wellbeing.

In one key study, Wright and Bonnet[128] analysed the relationship between both psychological wellbeing and job satisfaction of 112 managerial-level staff at a large private firm in the USA, and the turnover within that group of staff. The employees' psychological wellbeing was scored using an 8-item Index of Psychological Well-Being, calculated using respondents' answers to questions about how often they felt experiences such as feeling 'very lonely or remote from other people', 'depressed or very unhappy', and

'on top of the world'. Job satisfaction was assessed using a combination of three widely recognised job satisfaction dimensions: degree of satisfaction with the work itself, degree of satisfaction with co-workers, and degree of satisfaction with supervision. Respondents were asked to rate how satisfied they were with each of these dimensions of work on a 5-point scale ranging from 1 (very unsatisfied) to 5 (very satisfied).[129] Turnover was measured by counting how many staff voluntarily stopped working for the company within two years of the psychological wellbeing measurement being taken. The study found that the best model for predicting turnover included both psychological wellbeing and job satisfaction, as well as an interaction term between them. The study found that job satisfaction on its own was unlikely to lead to voluntarily leaving a job, but when coupled with low psychological wellbeing, the effect was very strong (job satisfaction – odds ratio = 0.62; personal wellbeing – odds ratio = 0.57, $p \leq 0.05$; interaction – odds ratio =1.84, $p \leq 0.05$).[130] The results held even when employee age, gender, ethnicity, and job performance were controlled for. Others in the field have corroborated this result.[131]

BOX 23. KEY MODEL STATISTICS

The effects on voluntarily leaving a job of:

Job satisfaction: odds ratio = -0.48 (not significant)

Psychological wellbeing: odds ratio = -0.56, $p \leq 0.05$;

Interaction between job satisfaction and personal wellbeing: odds ratio =1.84, $p \leq 0.05$).

The noticeable thing about the effect sizes in Box 23 is that the odds ratios for job satisfaction and psychological wellbeing are negative, indicating that lower psychological wellbeing and lower job satisfaction are both associated with higher turnover. The positive term for the interaction is a little more complex. In effect, if someone is lonely, they will have low psychological wellbeing (negative) and low job satisfaction (negative), and the interaction term will be a large positive number. Multiplied by a positive beta coefficient, this means higher turnover. Table 1 lays out four different hypothetical patterns of psychological wellbeing and job satisfaction and what they mean for the signs (positive or negative) related to each term in the regression model. This shows that only in the scenario where someone has both low psychological wellbeing and low job satisfaction (first row) is the only one where there are three positive terms, and therefore higher turnover. All the other rows have the same balance (two negative terms and one positive term), explaining how people in those three conditions have roughly similar levels of turnover.

We used the results from Wright and Bonnet's [132] findings to quantify the relationship between loneliness and staff turnover via wellbeing. As with productivity, we used data from the European Social Survey to estimate reduction in wellbeing associated with loneliness. Here, however, as well as the impact on job satisfaction (which we know to be a reduction of 0.41 on a 0–10 scale, or 0.20 standard deviations), we also wanted to estimate the impact of loneliness on psychological wellbeing given the importance of this concept in the Wright and Bonnet findings. The European Social Survey does not include exactly the same measure of psychological wellbeing

TABLE 1. HOW PSYCHOLOGICAL WELLBEING AND JOB SATISFACTION INTERACT IN THEIR ASSOCIATION WITH LONELINESS.[133]

	PWB	JOB SAT	INTER -ACTION TERM	PWB * REGRESSION BETA COEFFICIENT	JOB SAT * REGRESSION BETA COEFFICIENT	INTERACTION * REGRESSION BETA COEFFICIENT
Low PWB, Low job sat	–ve	–ve	+ve	+ve	+ve	+ve
Low PWB, High job sat	–ve	+ve	–ve	+ve	–ve	–ve
High PWB, Low job sat	+ve	–ve	–ve	–ve	+ve	–ve
High PWB, High job sat	+ve	+ve	+ve	–ve	–ve	+ve

as that used by Wright and Bonnet, but we were able to identify a subset of eight questions which mirrored the eight questions they used. As the psychological wellbeing scale included an equal balance of positively and negatively worded questions, we did the same. One of the questions in Wright and Bonnet's scale asked about loneliness directly, so we also used the loneliness question included in the European Social Survey as part of the scale. The questions we used to generate our scale used different response scales, so to combine them we calculated z-scores for each question and then averaged all the z-scores. We found that people experiencing loneliness scored 1.05 points lower on our personal wellbeing scale then those who were not lonely. This equates to 1.6 standard deviations – a much larger effect than on job satisfaction.

Wright and Bonnet report the standard deviations for both job satisfaction and personal wellbeing in their study as 0.8 and 1.5, respectively.[134] Based on these, we can estimate that loneliness would reduce job satisfaction by 0.16 and psychological wellbeing by 2.40, according to their measures.

We could then apply these figures to their logistic regression model predicting turnover. We found that the reduction in job satisfaction from being extremely lonely increases the likelihood of voluntary turnover by 8%, the reduction in personal wellbeing increases likelihood by 283%, whilst the interaction between the two increases likelihood by a further 27%. Combining these effects produces an overall risk ratio of 3.88 – i.e., workers experiencing loneliness are almost four times more likely to leave their job within the year than workers not experiencing loneliness.

According to Labour Force Survey data cited by the Chartered Institute of Personnel and Development, the voluntary turnover rate in the UK in the last quarter of 2012 was 6.4%.[135] We can estimate that without the impact of loneliness, the rate would have been only 5.8%.

BOX 24. KEY MODEL CALCULATION

Odds ratio for voluntary turnover employees experiencing loneliness compared to not experiencing loneliness: 4.84

Average voluntary turnover rate in UK: 6.4%

Odds ratio converted into a risk ratio (using the UK average as our 'control' population): 4.84 / ((100% - 6.4%) + (6.4% x 4.84)) = 3.88

Modelled voluntary turnover rate with no people experiencing loneliness: 5.8%

Turnovers (all employers) that can be attributed to loneliness: (6.4% – 5.8%) x 30,921,000 = 172,011

Turnovers in private sector that can be attributed to loneliness: (6.4% – 5.8%) x 25,526,000 = 141,999

We were able to translate the size of the effect of staff turnover into a cost to employers by applying a typical cost for each member of staff that leaves an organisation. The Wright and Bonnet study cited a finding by Cascio (2003) that 'turnover costs can easily run between 1.5 and 2.5 times the annual salary of the incumbent job holder', composed of separation costs, replacement costs, and training costs.[136] While it is certainly conceivable that the loss of a highly skilled or a highly qualified member of staff could reflect costs to their employer in this range, we were dubious that the replacement of unskilled or fairly junior staff would be as costly to employers (even when factoring in their lower annual salary). Indeed, research by MetLife suggests that turnover costs per employee are equivalent to 50% of median annual salary in the USA[137] and the Sainsbury Centre for Mental Health suggests that turnover costs in the UK are typically 40% of average annual pay, once the costs of recruiting, selecting, and training a replacement worker have been taken into account.[138] In the interests of making a conservative estimate, we have used the lower these estimates in our model, i.e., 40% of average annual salary.

BOX 25. KEY MODEL CALCULATIONS

Weekly average salary cost of employees (all sectors) (Box 11): £454

Weekly average salary cost in the private sector only (Box 11): £446

Annual average salary cost of employees (all sectors): £454 x 52 = £23,608

Annual average salary cost in the private sector: £446 x 52 = £23,192

Average cost of an employee voluntarily leaving their job (all sectors): £23,608 x 40% = £9,443

Average cost of an employee voluntarily leaving their job in the private sector: £23,192 x 40% = £9,277

Total cost to all employers of =voluntary turnover attributable to loneliness: £9,443 x 172,011 = £1.624 billion

Total cost to private sector employers of voluntary turnover attributable to loneliness: £9,277 x 141,999 = £1.317 billion

5. TOTAL COSTS AND CONCLUSION

5.1 TOTAL COSTS

In this report, we have estimated the cost of loneliness to employers in the UK. We have used the best available evidence to ascertain the nature and scale of the impacts of loneliness on all our lives, and estimated the costs of these impacts to employers. Our final estimate based on the incidence loneliness is that it costs employers in the UK £2.5 billion per year, including costs of £2.1 billion to the private sector. As noted throughout this report, this result represents a conservative estimate of the costs of loneliness to employers in the UK, because we have chosen the more conservative assumptions in our model at all relevant decision points.

Four key impacts contribute to those costs:

- Absence from work because of illness associated with loneliness: £20 million per year
- Absence from work because of the need to care for someone with a loneliness-related illness: £220 million per year
- Lower productivity, because of lower job satisfaction associated with loneliness: £665 million per year
- Staff turnover, because of lower job satisfaction associated with loneliness: £1.62 billion per year

We also re-ran the model, having adjusted our key assumptions to make even more conservative (alternative scenario 1), and less conservative assumptions (alternative scenario 2). Re-running the model using these alternative assumptions gives us a cost range of £2.23 billion (most conservative) to £3.70 billion (least conservative) for all employers, and £1.82 billion to £3.02 billion for private sector employers only.

With 30.7 million individuals employed in the UK today, 25.5 million of whom are employed in the private sector, this translates into an average cost of £82 per year per employee, representing a cost of approximately £5.8 million per year for an organisation the size of the Co-op, which has 70,000 employees (Table 2 shows the cost implications for employers of different sizes).

TABLE 2. ANNUAL COSTS OF LONELINESS FOR DIFFERENT SIZED EMPLOYERS

NUMBER OF EMPLOYEES	ANNUAL COST OF LONELINESS
Up to 250	Up to £20,586
250 – 1,000	£20,586 – £82,342
1,000 – 10,000	£82,342 – £823,423
10,000 – 100,000	£823,423 – £8.2 million

Box 26 details the breakdown of the costs of loneliness to employers in the UK.

BOX 26. THE TOTAL COST OF LONELINESS TO EMPLOYERS IN THE UK

We have arrived at a total cost of loneliness to employers in the UK of £2.53 billion which consists of the following four key costs:

1. Costs of total working days lost due to health conditions attributable to loneliness (Box 7): £20 million
2. Costs of caring from employees with caring responsibilities for those with health conditions attributed to loneliness (Box 13): £220 million
3. Costs of lower output of employees, resulting from the impact of loneliness on job satisfaction and productivity (Box 14): £665 million
4. Costs of all voluntary staff turnover attributable to loneliness (Box 15): £1.62 billion

We estimate the total cost of loneliness to employers in the private sector in the UK is £2.10 billion, which consists of the following four key costs:

1. Costs of total private sector working days lost due to health conditions attributable to loneliness (Box 7): £16.5 million
2. Costs of caring from private sector employees with caring responsibilities for those with health conditions attributed to loneliness (Box 13): £183 million
3. Costs of lower output of private sector employees, resulting from the impact of loneliness on job satisfaction and productivity (Box 14): £549 million
4. Costs of all voluntary staff turnover in the private sector attributable to loneliness (Box 15): £1.32 billion

Of the total costs we calculated, 10% are attributable to the health pathways ('poor employee health outcomes' and 'poor relative/dependent health outcomes') with 1% of the costs arising as a direct result of staff absence from sickness, and 9% from the impact of working carers. There are several reasons why the costs in terms of the health pathways have a lower relative impact on the overall costs than the wellbeing pathways.

First, as noted in Section 4.3, there is a dearth of robust evidence relating to the effects of loneliness on health beyond the four health conditions included in our model. As such, there are potentially numerous health outcomes resulting from loneliness that we have not captured. This is an area that would benefit from further study.

Second, it is worth emphasising that our model has focused on the costs of loneliness borne by employers, while many of the wider the health impacts associated with loneliness are borne by the state, such as the cost of treating or caring for health conditions. An example given by one of our expert reviewers is that many people with forms of heart disease can manage their conditions via medication, and while this represents a cost to the NHS, the working lives of such heart patients are largely undisrupted.

Finally, and perhaps most significantly, the costs associated with health pathways are likely to be considerably lower than the costs associated with the wellbeing pathways because only the health conditions that are severe enough to require people to take time off work have been costed into the model. By contrast, the wellbeing pathways in the model include costs from across the full distribution of those affected by loneliness. For example, the wellbeing pathways in the model include costs from people who are affected by loneliness but do not take time off work (a very large pool of people, compared to those whose health conditions are severe enough to cause an absence).

5.2 THE COSTS IN CONTEXT

We can help put our calculated costs into context by comparing them to costs to employers of other conditions. This shows that the cost to employers of just the working days lost due to sickness absence attributable to loneliness, £20 million, represents a small fraction (less than 0.1%) of the total cost of sickness absence to employers, £29 billion, though the total cost of loneliness to employers of £2.5 billion approaches 10% of this cost.[139] The full costs of loneliness to employers is also equivalent to approximately 8% of the total costs to employers of mental ill-health each year (£2.5 billion compared to £30 billion).[140]

It is also provides an interesting contextual note to look at the per head costs of loneliness we have calculated to employers in light of those which emerge from the recent study by McDaid et al. into the costs of loneliness to the public sector,[141] although the two studies of course look at very different populations and are not strictly comparable. McDaid et al. found that 'if effective action could be taken to avoid loneliness in a general population cohort, some of whom will already be lonely, net present value costs of more than £1,700 (2015 values) per person over ten years might be averted' and that 'if it is possible to target efforts so that actions only affect those who are lonely most of the time, these avoidable costs increase to £6,000 per person over ten years.'[142] Our costs of £82 per year per employee, equate to a per head cost to employers over ten years of £820. This backs up our earlier observation that many of the costs of loneliness are borne by the public sector, rather than by employers, though as we have seen, the costs to employers are themselves substantial.

What is more, the true costs of loneliness to employers are likely to be significantly larger than the fairly conservative estimates detailed in this report. In addition to making conservative assumptions at key decision points in the model, our overall approach was to focus on the more direct costs of loneliness to employers. However, it is possible to imagine many more indirect costs to employers because of loneliness. For example, the increased cost to the NHS of treating ill-health that is attributable to loneliness – if funded by increased taxes across the board – would result in higher corporation tax. Furthermore, there may be a range of other direct

impacts on employers that we have been unable to take account of, because robust evidence for them does not exist, given that the issue of loneliness and employment is a very new area of research.

5.3 WHAT THE FINDINGS MEAN FOR EMPLOYERS

Our findings of substantial costs from loneliness to UK employers strongly suggest that it is in their interests to use both reactive and preventative approaches to minimise the loneliness of their employees – an issue which is largely neglected by employers today. A key first step will be raising awareness of the issue among employers, so that they understand the business case for addressing loneliness among their employees. This could usefully be linked to the wider evidence on the impacts employers can have on overall employee wellbeing, and the ways in which the workplace can act as a positive support for overall wellbeing, and employees' levels of social support.[143]

Hence while loneliness is a society-wide issue with society-wide causes, employers have both a strong incentive and good opportunities to take steps to prevent and address it among their employees.

GLOSSARY OF KEY STATISTICAL TERMINOLOGY USED THROUGHOUT THIS REPORT

95% confidence interval: If an experiment were repeated, we can be 95% certain that the result of the experiment would fall within the lower and upper bounds of the 95% confidence interval. In other words, if the experiment were repeated 100 times, we would expect the result to fall within the lower and upper bounds of the 95% confidence interval 95 times.

Associations (e.g. 'x is associated with y'): A general term used to describe any statistical relationship between two variables (e.g. the relationship between job satisfaction and productivity). A positive association suggests that as one variable increases, so does the other (e.g. a positive association between job satisfaction and productivity would suggest that as job satisfaction increases, so does productivity – though not necessarily at the same rate). A negative association suggests that as one variable increases, the other decreases (e.g. a negative association between job satisfaction and productivity would suggest that as job satisfaction increases, productivity decreases – though again, not necessarily at the same rate). Associations are often derived from statistical modelling techniques such as regression analyses, where other factors have been controlled for, therefore giving a truer view of the relationship between two variables than a correlation, and holding the influence of any other factors constant. In this report, we state if an association comes from a model that controls for other factors.

Beta coefficient: The extent to which the independent variable influences the dependent variable, measured in units of standard deviation. For example, in an experiment that seeks to understand the association between experiencing loneliness and contracting heart disease, a beta coefficient of 1.5 would indicate that an increase in the variable

used to measure the extent to which a person is experiencing loneliness of one standard deviation, would result in an increase in the variable used to measure the extent to which a person is understood to be contracting heart disease by 1.5 units, or 150%. In other words, the larger the beta coefficient, the greater the impact of the independent variable on the dependent variable.

Control (e.g. 'when controlling for…'): When an independent variable is controlled for, the effect of changes in the independent variable on the dependent variable are considered, while all other independent variables are held constant. This is done in an attempt to reduce the effect of confounding variables on the result of an experiment. For example, if we want to understand the effect of job satisfaction on productivity, we might control for other factors that we expect to influence productivity – such as investment in machinery or hours worked per week – by holding the value of those other variables constant, while changing the value of our 'job satisfaction' variable. This allows us to understand the effect of job satisfaction on productivity in isolation from the effects that investment in machinery or hours worked per week might also have on productivity.

Correlation: A term used to describe any statistical relationship between two variables (e.g. the relationship between job satisfaction and productivity). A positive correlation suggests that as one variable increases, so does the other (e.g. a positive correlation between job satisfaction and productivity would suggest that as job satisfaction increases, so does productivity – though not necessarily at the same rate). A negative correlation suggests that as one variable increases, the other decreases (e.g. a negative correlation between job satisfaction and productivity would suggest that as job satisfaction increases, productivity decreases – though again, not necessarily at the same rate). The strength of a correlation is measured on a scale between -1 and 1, with -1 being the strongest possible negative correlation, 1 being the strongest possible positive correlation, and 0 representing the weakest possible relationship between the two variables.

Dependent and independent variables: A dependent variable represents the result or outcome of an experiment whose variation is being studied. An independent variable represents the input or cause whose effect on the dependent variable we want to understand. For example, if a study seeks to understand the extent to which experiencing loneliness is associated with heart disease, 'experiencing loneliness' would be the independent variable, and 'heart disease' would be the dependent variable.

Interaction effect: Describes the effect of two independent variables on a third variable, when the effect of the two independent variables are not additive. In other words, when the size of the effect of each dependent variable is influenced by the other dependent variable. For example, when considering the effect of psychological wellbeing and job satisfaction on employee turnover, there could be said to be an interaction effect if the two variables together produced a different effect than the sum of the effect of each of the variables independently.

Mean: Average, calculated by summing all value and dividing by the number of values summed together.

Meta-analysis and meta-analytic correlation: In meta-analyses, research from numerous statistical studies is combined. To produce the statistic known as a meta-analytic correlation, correlations from independent studies are weighted according to the features of each study, combined with the

weighted correlations from other studies. An average of the weighted correlations is then calculated. This technique offers the benefit that anomalies contained within single studies are averaged out across a wide range of studies. For this reason, meta-analytic correlations are judged to be stronger at lower correlation levels than standard correlations. There is, however, some risk of over-generalisation in meta-analyses, because the combined studies do not all use the same methodologies (although the sources of information used are always explicitly defined, and can therefore be referred to in the event of any uncertainty).

Odds ratio: The extent to which the presence or absence of one quality is associated with presence or absence of another quality, within a given population. For example, an odds ratio for loneliness to depression in people aged 65 and over of 1.4, denotes that within the group of individuals assessed, each person experiencing loneliness is 1.4 times (or 140%) more likely to experience depression than each person not experiencing loneliness within the sample.

p-value (e.g. p≤ 0.05): Represents the likelihood of obtaining the observed result of an experiment, or a more extreme result, if the null hypothesis of that experiment is true. The null hypothesis usually refers to a general statement or default position that there is no relationship between two variables (or two groups of variables). For example, p≤ 0.05 indicates that there is a probability equal to or less than 0.05 (or 5%) that there was no association between two variables. In other words, p≤ 0.05 indicates that the result obtained is 95% likely to be due to an association between the independent and dependent variables.

Regression: Used to model the relationship between a dependent variable and an independent variable. For example, running a regression with 'job satisfaction' as the dependent variable, and 'experiencing loneliness' as an independent variable determines the extent to which experiencing loneliness is associated with depression for each individual in a sample, and then calculates the average strength of association for all subjects.

Risk ratio: The probability of a certain outcome in an 'exposed group', compared to the probability of the same outcome occurring in a 'non-exposed group'. For example, a risk ratio for loneliness and stroke of 1.32 indicates that those who experience loneliness have a risk of suffering from a stroke that is 1.32 times greater than the risk of those who do not experience loneliness.

Significant findings: Findings are usually deemed to be significant if a p-value ≤ 0.05, or in some cases, ≤ 0.01 is obtained. A finding that is said to be significant with a p-value ≤ 0.05 indicates that there is a probability of at least 95% that the finding is not the result of random fluctuation or change. A finding that is said to be significant with a p-value ≤ 0.01 indicates that there is a probability of at least 99% that the finding is not the result of random fluctuation or change.

Standard deviation: A measure used to indicate variation within a set of data from the mean. A higher standard deviation indicates that data points are spread out over a wider range of values.

Z-scores: A score used to standardise different values, so that they are made comparable. For example, a z-score of 2.0 would result in a value that is 2 standard deviations above the mean result. A z-score of -0.5 would indicate a result that is half a standard deviation below the mean result. A z-score of 0.0 would indicate the result is equivalent to the mean result.

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95. Another point raised by our reviewers was whether the two pathways we include via the loneliness-wellbeing link might cancel each other out to some extent. The argument was that while employees who are experiencing loneliness may be more likely to leave their jobs and therefore cost their employers money in terms of recruitment and so on, if employees who are experiencing loneliness and remain employed represent an opportunity cost to their employers by being less productive than other employees, then in the long-term, employers might gain by employees who are experiencing loneliness leaving their jobs, if they are replaced by new, employees who are not experiencing loneliness. However, our view is that because we are taking a prevalence approach, this argument becomes less relevant, because at any given point in time, employers will have both employees who are experiencing loneliness and are less productive than others, and employees who are experiencing loneliness leaving their jobs. We also judged that the likelihood of replacing employees who are experiencing loneliness who leave with no further employees experiencing loneliness was very unlikely.

96. We looked at studies which have examined the impact of health conditions on productivity to examine whether it would be possible to use a similar methodology, but found that the methods used would not be appropriate for our study. We found two types of these studies. One type estimated the impact of health at work on national GDP and GDP growth, such as in a study by Frontier Economics for the Health and Safety Executive (Ridge, M., Bell, M., Kossykh, Y. & Woolley, N. (2008). An empirical analysis of the effect of health on aggregate income and individual labour market outcomes in the UK. Research Report RR639. Health and Safety Executive. Retrieved from http://www.hse.gov.uk/research/rrpdf/rr639.pdf) This examined the contribution of work-related ill health to the overall health of the population and then linked this to GDP growth. However, in the context of our study, it does not make sense to simply look at work-related ill-health, as the impacts of loneliness will impact all sorts of health conditions; and this methodology did not fit well with a focus on costs to employers. Therefore, we did not attempt to use this methodology in our study. The other type of study used self-reports by employees of their own chronic health conditions and their impacts on absenteeism and presenteeism, where the latter is measured in terms of ability to carry out one's job effectively or hours of effective work-time lost, and these results are used to estimate the impact on overall productivity for employers. This approach was taken by Collins *et al*. (Collins, J.J., Baase, C.M., Sharda, C.E., Ozminkowski, R.J., Nicholson, S., Billotti, G.M., Turpin, R.S., Olson, M., & Berger, M.L. (2005) The assessment of chronic health conditions on work performance, absence, and total economic impact for employers. *Journal of Occupational and Environmental Medicine, 47*(6), 547–557) and Loeppke *et al*. (Loeppke, R., Taitel, M., Richling, D., Parry, T., Kessler, R.C., Hymel,

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