

Mental wellbeing at work

G: Economic modelling for interventions to prevent poor, promote positive and improve mental wellbeing

NICE guideline <number>

Economic modelling underpinning recommendations in the NICE guideline

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Draft for Consultation

*This report was developed by York Health
Economics Consortium*

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Executive Summary

1. INTRODUCTION

The National Institute for Health and Care Excellence (NICE) commissioned York Health Economics Consortium (YHEC) to produce an economic evaluation to inform an update on the guideline for 'Mental wellbeing at work'.

2. OBJECTIVES

The objective of the economic evaluation, as identified in the NICE guideline scope, was to identify the following:

- What universal, organisational-level interventions, programmes, policies or strategies are effective and cost-effective at:
 - Preventing poor mental wellbeing?
 - Promoting positive mental wellbeing?
 - Improving mental wellbeing?
- What interventions or strategies effectively and cost-effectively help employers and peers to recognise and engage employees who may require support for their mental wellbeing, or to identify periods of high risk within an organisation?
- What approaches to help managers to understand, promote and support mental wellbeing are effective and cost-effective?
- What approaches are effective and cost-effective to help managers to improve their knowledge and skills in recognising employees who experience or are at risk of poor mental wellbeing?
- What approaches are effective and cost-effective to help managers to improve their knowledge and skills in responding to mental wellbeing issues?
- What organisational-level approaches, programmes, strategies or policies targeted to employees who experience or who are identified as being at risk of experiencing poor mental wellbeing at work are effective and cost-effective at:
 - Preventing poor mental wellbeing?
 - Promoting positive mental wellbeing?
 - Improving mental wellbeing?
- What universal, individual-level interventions or programmes are effective and cost-effective at:
 - Preventing poor mental wellbeing?
 - Promoting positive mental wellbeing?
 - Improving mental wellbeing?
- What individual-level interventions targeted to employees who experience or are identified as being at risk of poor mental wellbeing at work are cost effective and:
 - Preventing poor mental wellbeing?
 - Promoting positive mental wellbeing?
 - Improving mental wellbeing?

The aim of this analysis was to conduct economic modelling and provide costs and benefits to employees and to employers who are considering implementing an intervention at work in order to prevent poor wellbeing, promote positive wellbeing and improve mental wellbeing.

3. METHODS

In order to approach the research questions, a simple cost-consequence model was developed. A hypothetical case study was modelled using a combination of published data and assumptions. Several hypothetical scenarios were also considered, which were based on entirely assumption-based inputs. It is intended that the model will be used as an interactive cost-calculator for employers who are considering implementing a mental health intervention at work, or other interested parties. The model allows users to input values and generate bespoke results, specific to their workplace.

4. RESULTS AND DISCUSSION

The review of evidence indicates workplace mental health interventions are likely to influence a range of outcomes. Because of substantial variability in the interventions available and heterogeneity in the employment sector, it is neither possible, nor judicious, to provide 'generalised' results. It is recommended that employers use the model to explore the potential economic and wellbeing implications so that each organisation is able to evaluate its own most likely scenario.

Acknowledgements

The authors would like to thank the Public Health Advisory Committee (PHAC) for their comments and suggestions.

Abbreviations

CPIH	Consumer Price Index including owner occupier's housing costs
ICER	Incremental cost-effectiveness ratio
NICE	National Institute for Health and Care Excellence
ONS	Office for National Statistics
PHAC	Public Health Advisory Committee
QALY	Quality-adjusted life year
YHEC	York Health Economics Consortium

1 Introduction

1.1 Background

The National Institute for Health and Care Excellence (NICE) worked with Public Health England to develop a guideline scope. The guideline will update and replace the NICE guideline PH22: mental wellbeing at work [1]. It may also be used to update the NICE quality standard for healthy workplaces: improving employee mental and physical health and wellbeing.

As stated in the final scope, the proportion of UK employees who are part-time, temporary, agency staff, on zero hours contracts or self-employed has increased since PH22 was published in 2009. In 2017, there was an independent review into how employers can better support the mental health of employees [2]. The review estimates that 15% of UK workers have an existing mental health condition and concludes that the UK faces significant mental health challenges at work. Better mental wellbeing and job satisfaction are associated with increased workplace performance and productivity [3]. However, many employers know the value of positive mental wellbeing but do not know how to promote it. In some cases, interventions aimed at increasing productivity might have harmful effects on an employee's wellbeing and, as such, these consequences can also be important for decision making.

NICE commissioned York Health Economics Consortium (YHEC) to carry out a systematic cost-effectiveness review and conduct an economic evaluation. This document outlines the objectives, methods and results of the economic evaluation.

1.2 Objectives

The Public Health Advisory Committee (PHAC) prioritised questions in the NICE scope for further economic analysis. Research questions were not prioritised if there was sufficient cost-effectiveness evidence available in the published literature. Where cost-effectiveness evidence was insufficient, research questions were prioritised if there was updated and available effectiveness evidence since the publication of the previous guidelines or if economic modelling had previously not been conducted. The aim of this analysis was to conduct economic modelling and provide data on costs and benefits to employers who are considering implementing an intervention at work in order to prevent poor wellbeing, promote positive wellbeing and improve mental wellbeing. Additionally, cost-consequences analysis was used to assess any changes in employee outcomes. Outcomes from the economic model will help to inform the committee's guidance decisions for questions prioritised in the NICE scope and provide an interactive online calculator to help inform employers implementing mental wellbeing interventions in the workplace.

All research questions with an economic element from the NICE scope were prioritised for modelling. These are:

- What universal, organisational-level interventions, programmes, policies or strategies are effective and cost-effective at:
 - Preventing poor mental wellbeing?
 - Promoting positive mental wellbeing?
 - Improving mental wellbeing?
- What interventions or strategies effectively and cost-effectively help employers and peers to recognise and engage employees who may require support for their mental wellbeing, or to identify periods of high risk within an organisation?
- What approaches to help managers to understand, promote and support mental wellbeing are effective and cost-effective?
- What approaches are effective and cost-effective to help managers to improve their knowledge and skills in recognising employees who experience or are at risk of poor mental wellbeing?
- What approaches are effective and cost-effective to help managers to improve their knowledge and skills in responding to mental wellbeing issues?
- What organisational-level approaches, programmes, strategies or policies targeted to employees who experience or who are identified as being at risk of experiencing poor mental wellbeing at work are effective and cost-effective at:
 - Preventing poor mental wellbeing?
 - Promoting positive mental wellbeing?
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- What universal, individual-level interventions or programmes are effective and cost-effective at:
 - Preventing poor mental wellbeing?
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 - Improving mental wellbeing?
- What individual-level interventions targeted to employees who experience or are identified as being at risk of poor mental wellbeing at work are cost effective and:
 - Preventing poor mental wellbeing?
 - Promoting positive mental wellbeing?
 - Improving mental wellbeing?

2 Methods

2.1 Model Overview

The following section summarises methods applied during the analysis of interventions relating to mental wellbeing at work.

A simple cost-consequences model was used to establish the impact of mental wellbeing interventions at work over a one-year time horizon from both the employer perspective and a wider perspective including employee outcomes. Economic modelling was undertaken in order to create a simplified representation of both 'real-world case studies' and 'hypothetical scenarios' that were useful in supporting decision-making. The model synthesized evidence from a range of sources including the effectiveness and cost-effectiveness reviews, and other relevant studies. The data populated an evaluation framework that derived estimates for the impact on the costs associated with an intervention.

An incremental cost-effectiveness ratio (ICER) is a summary measure representing the economic value of an intervention, compared with an alternative (comparator). ICERs are compared with a pre-determined threshold in order to decide whether choosing the new intervention is an efficient use of resources. ICERs were not considered in this economic evaluation because the employee outcomes relating to mental wellbeing were measured using a variety of tools and there were no meaningful cost-effectiveness thresholds available for individual outcomes (e.g. similar to the NICE threshold of £20,000 per quality-adjusted life year (QALY)). In addition, QALYs, a measure designed to combine the impact of gains in quality of life and in quantity of life (i.e. life expectancy), were not used as a primary output of the model. This was due to two key reasons: (i) the main intervention cost falls to the employer and not the healthcare system, meaning that opportunity costs (i.e. 'what other benefits might that same money have accrued if it was spent elsewhere') would not necessarily be captured using QALYs, and (ii) the PHAC felt that QALYs would not capture the broader 'wellbeing' benefits arising from some interventions (i.e. wider health benefits as well as non-health benefits).

2.2 Model Structure

The model structure is shown in Figure 2.1. The number of employees receiving the intervention was multiplied by each category in the model: the cost of the intervention, the cost of absenteeism, the cost of presenteeism, and the cost of staff turnover. These figures were then summed in order to produce the net cost impact of the intervention. A mental wellbeing intervention, selected from a predefined list, was compared with no intervention (i.e. current practice) in order to give an overall cost difference. Heterogeneity in the source data meant that direct, head-to-head comparisons of different interventions would not be possible.

From the employer’s perspective, three possible cost savings were identified, reflecting the outcomes of interest where data were likely to be available:

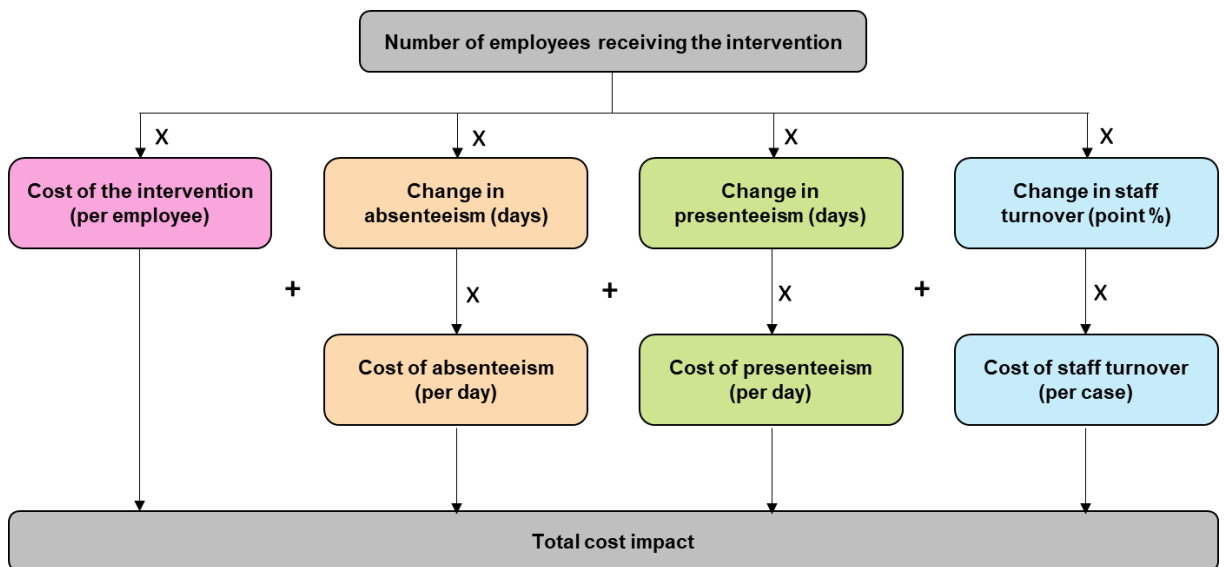
- Absenteeism
- Presenteeism
- Staff turnover

A one-year time horizon was assumed because relevant effectiveness studies, identified in the YHEC cost-effectiveness evidence review, relating to mental health interventions were found to be limited to short time horizons (ranging between 3 and 18 months). Hence, there was large uncertainty regarding the long-term effects. The model calculated the total incremental costs and the incremental cost per employee (i.e. the difference in costs associate with the intervention vs. no intervention (current practice)).

All of the inputs were varied in order to generate tailored results for different settings and scenarios (for example, different settings might be used to reflect sectors where there is a higher – or lower – baseline level of absenteeism, whereas different scenarios might reflect differences in effectiveness inputs). Inputs left blank were excluded from the cost impact.

Appendix A details the model functionality.

Figure 2.1: Model structure



Note: The model assumes a one-year time horizon from an employer’s perspective.

2.3 Model Inputs

The model inputs are based on limited data available or assumptions and, as such, have a high level of uncertainty.

It is encouraged that the user inputs their own values to generate bespoke results, specific to their workplace. The model can be used as tool for decision making, but should be used in conjunction with other information available.

The cost and effectiveness of a mental wellbeing intervention can be affected by many factors. For example, the market sector, employee characteristics, the number of employees receiving the intervention, the type of intervention and factors external to the workplace. The NICE scope allowed for a large range of interventions. This section outlines the model inputs that are used to populate the economic model for the hypothetical case study. **However, it is recommended that model users input their own data.**

2.3.1 Hypothetical case study inputs

The hypothetical case study combines evidence from a variety of sources and assumptions to provide an example of the model in use. It is not based on a specific intervention and is provided for demonstrative purposes only.

The intervention costs and the number of employees used in the hypothetical case study are based on assumption. Intervention costs were found to vary depending on a range of factors such as delivery method, length of implementation and resource usage. A cost-effectiveness evidence review conducted by YHEC and reported in the separate NICE evidence reviews found that intervention costs ranged from free (i.e. the intervention was freely available online and employee time was not considered) to £661 per person. The cost of the mental wellbeing intervention used in the hypothetical case study is assumed to be £100 per person and the number of employees is assumed to be 50. These values are used in the illustrative case study only. Hypothetical scenario analyses use different values for the number of employees and for the cost of an intervention.

A pragmatic literature search was conducted by YHEC for baseline costs associated with absenteeism, presenteeism and staff turnover and for effectiveness estimates. The best available data are used to populate the case study analysis. In most cases, the suggested inputs are representative of the general population and not specific to any workplace or intervention type. All costs are inflated to 2019 prices using the Office of National Statistics (ONS) Consumer Price Index including owner occupier's housing costs (CPIH) 12-month inflation rates.

The case study parameters used in the model are outlined in Table 2.1.

2.3.1.1 Absenteeism

Absenteeism refers to the productivity loss as a result of an employee being absent from work due to sickness, either mental or physical. The reduction in absenteeism is defined as the average number of sick days per year avoided due to the intervention. It is assumed that any reduction in absenteeism is as a direct results of the intervention. The cost of absenteeism (per day) is defined as the estimated cost of a working day. This includes the cost of wage or salary plus additional costs such as national insurance and pension contribution. The estimate used in the model is “adjusted downwards to take account of the evidence given in absence surveys that lower-paid workers tend to take more time off work than those on higher earnings” [4].

2.3.1.2 Presenteeism

Presenteeism refers to the productivity loss as a result of an employee being present at work but at a reduced capacity due to either mental or physical health problems. The reduction in presenteeism is defined as the average number of lost days per year avoided due to the intervention. The cost of presenteeism (per day) is defined as the estimated cost per working day. This includes the cost of wage or salary plus additional costs such as national insurance and pension contribution. However, it is assumed that the cost of presenteeism is higher than the corresponding cost of absenteeism. This is because the inverse association between earnings and rates of sickness absence does not apply to presenteeism [5]

2.3.1.3 Staff turnover

Staff, or employee, turnover refers to the number of employees who leave an organisation and need replacing over a set period of time (usually a year). The reduction in staff turnover is defined as the annual percentage point decrease in staff turnover due to the intervention. For example, if a company had an annual staff turnover of 8% and the intervention reduced this to 7%, the reduction in staff turnover would be 1% point. The cost per case of staff turnover is defined as the cost associated with replacing one employee who had left the organisation. This includes the cost of recruiting, selecting and training a replacement worker.

Table 2.1: Hypothetical case study inputs

Parameter	Value	Source
Number of employees	50	Assumption
Cost of the intervention (per employee)	£100	Assumption
Absenteeism		
Cost of absenteeism per day	£153.98	Mental health at work: The business costs ten years on. 2017 [4] ONS CPHI [6]
Reduction in absenteeism (in days)	4.3	Impact of a Health Promotion Program on Employee Health Risks and Work Productivity. 2007 [7]
Presenteeism		
Cost of presenteeism per day	£307.96	Mental health at work: The business costs ten years on. 2017 [4] ONS CPHI [6]
Reduction in presenteeism (in days)	9.2	Impact of a Health Promotion Program on Employee Health Risks and Work Productivity. 2007 [7]
Staff turnover		
Cost per case of staff turnover	£14,983.71	Mental health at work: The business costs ten years on. 2017 [4] ONS CPHI [6]
Reduction in staff turnover (%)	No evidence	

2.3.2 Intervention types

The results reported in NICE's evidence reviews were used to create a bank of effectiveness data based on a variety of intervention types. Absenteeism and presenteeism were reported in days. There was no evidence relating to staff turnover. For employee outcomes, the standardised mean difference (SMD) was used to express the size of the intervention effect. The SMD was used as it allows the assessment of the same outcome (e.g. mental wellbeing) when it has been measured in a variety of ways (e.g. using different questionnaires with different scales). The formula is:

$$SMD = \frac{\text{difference in mean outcomes between groups}}{\text{pooled standard deviation}}$$

It can be difficult to interpret SMD as it reports units of standard deviation rather than units of a specific measurement. A suggested guideline for interpretation is: small effect, SMD = 0.2; medium effect, SMD = 0.5, large effect, SMD = 0.8 [1]. However, this interpretation should be used with caution. The values included in the model are shown in Table 2.2.

Table 2.2: Employee outcome inputs

	Confidence identifying mental health	Uptake of support services	Communication and awareness of support	Managers mental health knowledge	Destigmatisation	Mental wellbeing	Mental wellbeing (based on non RCTs)	Mental health symptoms	Mental health symptoms (based on non RCTs)	Mental health literacy	Job stress	Job stress (based on non RCTs)	Job satisfaction	Job satisfaction (based on non RCTs)	Work climate	Work climate (based on non RCTs)	Quality of life	Job stress (based on RCTs reporting relative risk)	Job satisfaction (based on RCTs reporting relative risk)
Manager mental health training	0.74	1.34	1.28	1.45	0.31														
Leadership development							-0.09							0.01		0.06			
Peer support						0.58					-0.16		0.57						
Mental health first aider						0.06		-0.02		0.53									
Participatory approach						0.45		0.01	0.14		0.34	0.15	0.19		0.18	0.02		-27%	22%
Targeted cognitive behavioural theory *						0.48		0.36		0.02	0.15		-0.09						
Targeted mindfulness *						0.57		0.61			0.91								
Targeted digital/online stress management *								0.77		0.51	0.83		0.20				0.58		

Source: [LINK TO NICE EVIDENCE REVIEW]

Outcomes are reported as standardised mean difference, unless stated otherwise.

* This intervention type also had evidence relating to employer outcomes (absenteeism, presenteeism, staff turnover) that were included in the data bank.

3 Results

The results of the model should be interpreted with caution given that the model inputs are based on limited data available or assumptions and, as such, have a high level of uncertainty.

It is encouraged that the user inputs their own values to generate bespoke results, specific to their workplace. The model can be used as tool for decision making, but should be used in conjunction with other information available.

3.1 Hypothetical Case Study Results

The following values are used in the case study analysis (further details are provided in Section 2.3):

- Intervention cost per person: £100
- Number of employees: 50
- Cost of absenteeism per day: £153.98
- Reduction in absenteeism (days): 4.3
- Cost of presenteeism per day: £307.96
- Reduction in presenteeism (days): 9.2
- Time horizon: 1 year

The case study results show that the hypothetical intervention would be cost saving to the employer (Table 3). Although the intervention would cost £5,000, this is more than offset by a reduction in absenteeism and a reduction in presenteeism. Because there is unavoidable uncertainty around many of the model's inputs, the specific magnitude of the result should be treated with care and caution. However, the magnitude of the benefit can, to an extent, be used to give an idea of how much reduction in benefit would be needed to change the direction of the results. Sensitivity analysis is used to assess the potential impact on the results when varying each input variable.

Table 3.1: Case study results

	Incremental costs
Cost of absenteeism	-£33,106
Cost of presenteeism	-£141,662
Intervention cost	£5,000
Total costs	-£169,767
Cost per person	-£3,395

These results cannot be generalised to all organisations because the inputs will vary by organisation and setting.

3.2 Sensitivity Analysis

Figure 3.1 shows one-way sensitivity analyses for each input variable within the model using the case study data. These allow the model user to see how the results change when the value of an input changes and to determine which input variables are the key drivers of the model results. A negative incremental cost indicates cost saving. Each input variable is varied independently assuming all other input variables remain the same.

The graphs demonstrate that an increase in intervention costs results in a decrease in the cost savings (Fig 3.1a) whereas an increase in the daily cost of absenteeism (Fig 3.1b) and presenteeism (Fig 3.1d) results in an increase in cost savings. The cost of presenteeism per day has a larger influence than the cost of absenteeism per day. While negative effects on absenteeism (i.e. increasing the number of sick days per employee) reduce the amount of cost savings to the employer, the overall cost saving remains positive at an increase of 5 days. Similar is true for staff turnover. A negative effect on presenteeism (i.e. increasing the number of days lost to presenteeism per employee) increases the incremental costs to the extent that the intervention is no longer cost saving at an increase of approximately 1.9 days. The significant impact of presenteeism on results is likely due to the higher cost of presenteeism per day and the larger effect size. It should also be noted that, where the baseline input for an outcome is zero (for instance, in the case of staff turnover in the examples below), the sensitivity analysis for the cost of that outcome will show a flat line. This can be seen in Fig 3.1f where the cost of turnover has no effect, since there is no turnover included in the base case.

The graphs below are for one-way sensitivity analysis. That is, only one input is changed in each graph and it does not represent *combinations* of changes in the value of inputs. An example of a two-way sensitivity analysis is provided in Figure 3.2, where the intervention cost and the effectiveness in reducing absenteeism are

both varied. This shows (as expected) that the greater the intervention cost, the greater the level of effectiveness that is required in order to demonstrate cost savings. Of course, each employer will have a unique set of inputs, and this would require multi-way sensitivity analysis. This is covered separately, with the use of different scenarios to represent different settings (see Section 3.3).

Figure 3.1: One-way sensitivity analyses

Figure 3.1a: Cost of intervention



Figure 3.1b: Cost of absenteeism

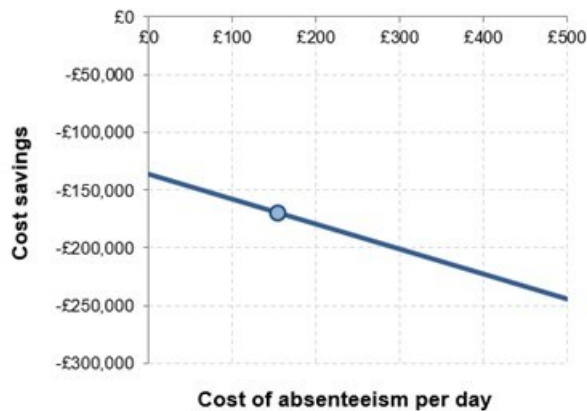


Figure 3.1c: Reduction in absenteeism

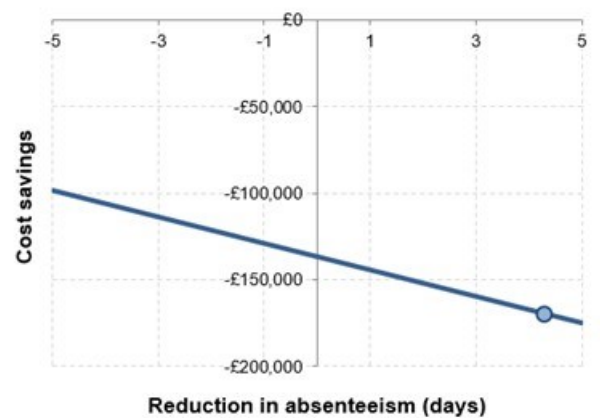


Figure 3.1d: Cost of presenteeism

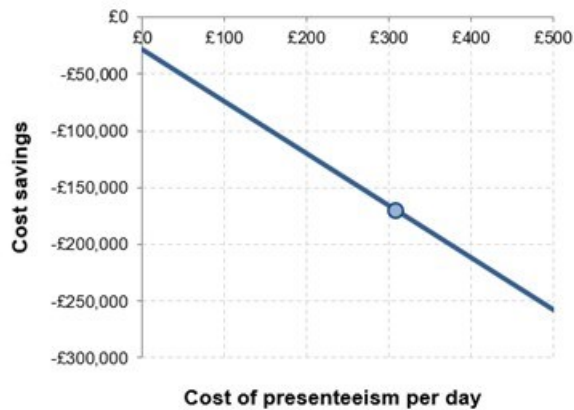


Figure 3.1e: Reduction in presenteeism

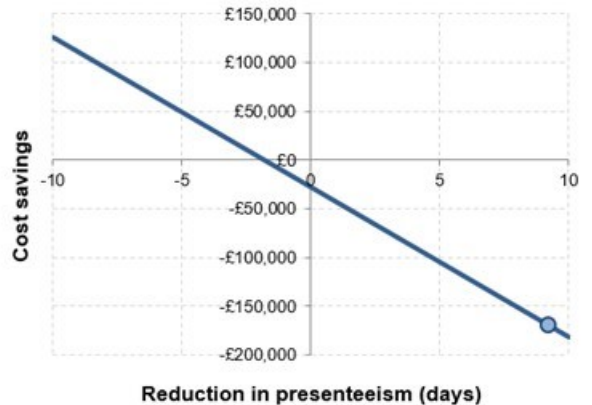


Figure 3.1f: Cost of staff turnover



Figure 3.1g: Reduction in staff turnover

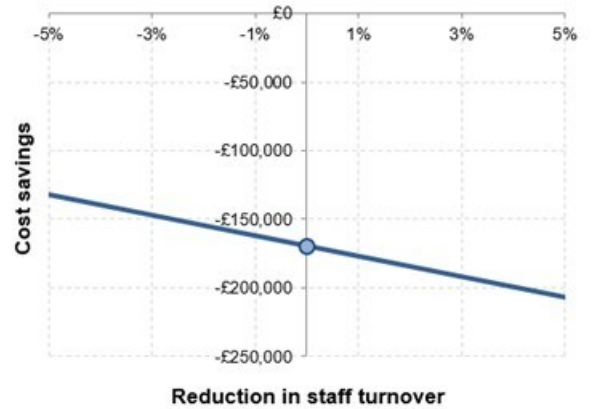


Figure 3.2: Two-way sensitivity analysis

		Cost of intervention								
		£0	£25	£50	£75	£100	£125	£150	£175	£200
Reduction in absenteeism (days)	0	£0	£100	£200	£300	£400	£500	£600	£700	£800
	1	-£154	-£54	£46	£146	£246	£346	£446	£546	£646
	2	-£308	-£208	-£108	-£8	£92	£192	£292	£392	£492
	3	-£462	-£362	-£262	-£162	-£62	£38	£138	£238	£338
	4	-£616	-£516	-£416	-£316	-£216	-£116	-£16	£84	£184
	5	-£770	-£670	-£570	-£470	-£370	-£270	-£170	-£70	£30
	6	-£924	-£824	-£724	-£624	-£524	-£424	-£324	-£224	-£124
	7	-£1,078	-£978	-£878	-£778	-£678	-£578	-£478	-£378	-£278
	8	-£1,232	-£1,132	-£1,032	-£932	-£832	-£732	-£632	-£532	-£432
	9	-£1,386	-£1,286	-£1,186	-£1,086	-£986	-£886	-£786	-£686	-£586
	10	-£1,540	-£1,440	-£1,340	-£1,240	-£1,140	-£1,040	-£940	-£840	-£740

3.3 Hypothetical Scenario Analysis

The following scenarios are included to demonstrate hypothetical examples of the cost-calculator and show the approximate results. These **scenarios are not based on evidence** but rather hypothetical values in order to explore how the findings of the model might vary across different settings and with different assumptions around inputs. This reflects the fact that all employers are different, and no results from the model will be generalizable to all settings. Some measurement instruments are specified as an example of instruments used in real-life studies. Two examples case studies using company data can be found in Appendix B.

Large sized company with high levels of absenteeism and presenteeism

A large sized company of 600 employees hoped to reduce job stress by offering all employees access to an online stress reduction programme. The total cost of purchasing and maintaining the online programme was £5,000 per year regardless of the number of users. To encourage uptake, the company allowed 1 working day, spread across the year, for each employee to engage in the programme. It was not possible to monitor uptake; therefore, the company assumed that all employees utilised this time at an average cost of £105,000 per year (i.e. the cost of participation in terms of wage). The cost of absenteeism and presenteeism was assumed to be equal at an average cost of £175 per day. The company considered HR reported absenteeism and self-reported presenteeism assessed using the Work Limitations Questionnaire. The intervention showed an annual reduction of 1.3 days in absenteeism and an annual reduction of 2.5 days in presenteeism.

The cost results were as follows:

	Cost
Cost of absenteeism	$-1.3 \times £175 \times 600 = -£136,500$
Cost of presenteeism	$-2.5 \times £175 \times 600 = -£262,500$
Intervention cost	$£5,000 + £105,000 = £110,000$
Total costs	-£289,000
Cost per person	-£481

Overall, the intervention saved costs of £482 per employee. Employee outcomes were not included, because data were not available.

Medium sized company with low levels of absenteeism

A medium sized company of 250 employees hoped to improve mental wellbeing by offering all employees 5 sessions of cognitive behavioural therapy (CBT). An opt in approach was assumed to target those who would most benefit. 75 employees opted to take part in the intervention. To reduce costs, the CBT was offer by an experienced nurse outside of work hours. The average cost per participant was £160 assuming that an average of 4 sessions were attended. The average cost of absenteeism was £210 per employee per day. The company considered HR-reported absenteeism and mental wellbeing assessed using the Short-Form Health Survey. The intervention showed an annual reduction of 0.6 days in absenteeism and a 4-point improvement in mental wellbeing.

The cost results were as follows:

	Cost
Cost of absenteeism	$-0.6 \times £210 \times 75 = -£9,450$
Intervention cost	$£160 \times 75 = £12,000$
Total costs	-£2,550
Cost per person	-£34

Overall, the intervention increased costs by £34 per employee but showed a positive improvement in the employee's mental wellbeing.

Small sized company with medium levels of absenteeism and staff turnover

A small sized company of 100 employees hoped to improve mental health and work ability by offering all employees' participatory training sessions alongside self-monitoring. The average cost per participant was £300 and all employees took part. The average cost of absenteeism was £300 per person per day and the average cost per case of staff turnover was £18,500 (i.e. it was expected that the additional cost associated with replacing a staff member would be £18,500). The company considered HR reported absenteeism and turnover, mental wellbeing assessed using the Short-Form Health Survey and work ability assessed using the Work Ability Index. The intervention showed an annual reduction of 1.1 days in absenteeism, a 0.5% decrease in staff turnover and a 0.2 improvement in work ability. The intervention also showed a 2-point reduction in mental wellbeing suggesting the intervention may have generated poorer wellbeing for employees.

The cost results were as follows:

	Cost
Cost of absenteeism	$-1.1 \times £300 \times 100 = -£33,000$
Cost of staff turnover	$-0.5 \times £18,500 = -£9,250$
Intervention cost	$£300 \times 100 = £30,000$
Total costs	-£12,250
Cost per person	-£123

Overall, the intervention saved costs of £123 per employee, had a positive impact on work ability but worsened employee's mental wellbeing.

Small sized company with high levels of staff turnover

A small sized company of 40 employees hoped to improve mental wellbeing by encouraging employees' physical and mental fitness. The company offered exercise and nutrition programmes, flexible working and implemented celebrating achievements events. The average cost per employee was £52. The average cost per case of staff turnover was £7,400 (i.e. it was expected that the additional cost associated with replacing a staff member would be £7,400). The company considered HR reported staff turnover and mental wellbeing assessed using a self-reported questionnaire. The intervention showed an annual decrease of 2% in staff turnover and a small, 1-point improvement in mental wellbeing.

The cost results were as follows:

	Cost
Cost of staff turnover	$-2 \times £175 \times 600 = -£262,500$
Intervention cost	$£5,000 + £105,000 = £110,000$
Total costs	-£289,000
Cost per person	-£481

Overall, the intervention saved costs of £96 per employee and had a positive impact on employee's mental wellbeing.

Micro sized company with low levels of absenteeism and medium levels of presenteeism

A micro sized company of 5 employees hoped to improve mental wellbeing by hosting a half-day participatory training session for all employees. The average cost per participant was £165. The average cost of absenteeism and presenteeism were assumed to be equal at £120 per person per day. This was substantially lower than the cost of wage but reflects the likelihood that tasks would be completed by other employees during short-term absence. The company considered HR reported absenteeism, self-reported presenteeism assessed using the Work Limitations Questionnaire and mental wellbeing assessed using the Short-Form Health Survey. The intervention showed that an annual increase of 0.3 days in absenteeism, an annual reduction of 1.8 days in presenteeism and a 1.0 improvement in mental wellbeing. An increase in absenteeism may suggest that employees were taking necessary sick leave resulting in improved mental wellbeing and reduced presenteeism.

The cost results were as follows:

	Cost
Cost of absenteeism	$0.3 \times £120 \times 5 = £180$
Cost of presenteeism	$-1.8 \times £120 \times 5 = -£1,080$
Intervention cost	$£165 \times 5 = £825$
Total costs	-£75
Cost per person	-£15

Overall, the intervention saved costs of £15 per employee and had a positive impact on employee's mental wellbeing.

A collaborative approach for a micro sized company

A collection of micro sized companies hoped to reduced job stress and improve job satisfaction. A collaborative approach was used to take advantage of economies of scale (i.e. to reduce average costs of the intervention for each business) and to share learning. A multicomponent intervention was implemented across a year at an average cost of £250 per participant. Each company measured job stress and satisfaction using a self-reported questionnaire. The companies reported a significant reduction in job stress and improvement in job satisfaction. Job stress reduced by an average of 4 points and job satisfaction improved by an average of 3 points.

Overall, the intervention cost £250 per employee and showed a positive impact on employee's mental wellbeing. Employer outcome, such as reductions in absenteeism, were not considered.

4 Discussion

The review of evidence indicates that workplace mental health interventions are likely to influence a range of outcomes. While some of these are more readily translatable into monetary value, such as absenteeism, modelling outcomes that demonstrate a mental wellbeing benefit to employees is more challenging. The large range of interventions on offer and the circumstances in which an intervention is implemented make it difficult to draw robust conclusions in regards to the effectiveness of an intervention and the economic impact.

The hypothetical case study analysis (based on a combination of published evidence and assumptions) demonstrates that mental health interventions at work can be cost saving for an employer. However, this result is driven by the cost saving associated with employer benefits which are derived from one source and have a high level of uncertainty. Hypothetical scenarios show that the results can vary for different interventions in different settings depending on a myriad of factors and generalising the results is difficult – and should not be recommended – when each organisation has its own unique characteristics. Some of the factors that can affect results include the size of the organisation (e.g. economies of scale when delivering interventions) and the cost of absenteeism (where there is a greater cost impact associated with absenteeism, there is generally a greater potential for monetary benefit from interventions). It is also likely that external factors will affect the results such as individual's personal life and workplace culture.

From an employer's perspective, an intervention is more likely to result in cost savings when: (i) the baseline level of absenteeism is high, (ii) baseline presenteeism is relatively low, (iii) baseline staff turnover is high, (iv) the intervention is low cost, and (iv) the intervention is demonstrated to have a positive influence on absenteeism, presenteeism or turnover. Every single employer will, of course, have a unique set of characteristics and, therefore, it is not possible to make a generalised statement about which interventions are likely to be cost-effective.

A common method to estimate the productivity costs (i.e. the cost of absenteeism and presenteeism per day) is to use the human capital approach. This approach uses gross wage (plus additional costs such as National Insurance and pension benefits) to estimate costs per day. However, alternative approaches, such as friction cost or multiplier methods, should also be considered. A variety of factors may influence productivity costs including, but not limited to: statutory sick-pay, employee sick-pay benefits, internal labour reserves and the ability for employees to make up for lost work. In addition, average productivity costs may be influenced by potential variation in the prevalence of absenteeism and presenteeism based on role or salary within an organisation.

It is important to consider that an intervention may be cost saving to an employer but have a negative impact on employee wellbeing outcomes. A review of literature

1 found that negative effects of mental health interventions at work are observed in
2 some instances [8]. This may be due to the additional demands of participating in an
3 intervention alongside usual workload. An employer has a legal responsibility to
4 support their employees' health, safety and wellbeing. Hence, any results produced
5 by the model should be interpreted with caution, particularly when the findings
6 demonstrate cost savings to the employer but do not report wellbeing outcomes from
7 the perspective of the employee. Importantly, just because wellbeing outcomes are
8 not available in some cases, it should not be assumed that the intervention has a
9 neutral impact on those outcomes. Considering employee outcomes such as mental
10 ill-health incidence or resource utilisation can be difficult to interpret. While some
11 may deem an increase in these measure as a negative impact, others may consider
12 an increase as an improvement since it demonstrates an environment where
13 employees are able to discuss issues and seek help without judgement. Hence,
14 companies that aim to create a positive mental health culture in the workplace may
15 see an increase in incidence and/or utilisation but this is deemed to be a positive
16 outcome.

17 Implementing mental health interventions at work can have wider ramifications
18 across society. This could include benefits to the health care system and local
19 authorities. These factors are not quantified in the model due to the lack of data to
20 capture these benefits in different settings (e.g. organisation type and for also each
21 individual employee). However, it can be assumed in general that, where the
22 evidence suggests a positive outcome for the employer *and* employee, the societal
23 benefits are likely to be greater still, since any externalities will also be likely to be
24 positive.

25 The economic model described in this report is designed to be as flexible as
26 possible. The aim is to provide a simple, user-friendly calculator to allow
27 organisations to add their own specific inputs. Some of these input values are likely
28 to be estimates and, as such, inbuilt sensitivity analysis has been included into the
29 model so that users can see how changes in their parameters will affect their results.
30 The model does not provide a definitive decision on whether to implement an
31 intervention in the workplace but provides one tool to support decision making that
32 can be used in conjunction with other information available.

33 It is impossible to draw broad conclusions from the scenarios evaluate in this study
34 because there is substantial variability in the interventions available and
35 heterogeneity in the employment sector. However, it is recommended that decision
36 makers make use of the model to understand the potential economic and wellbeing
37 implications when considering the introduction of new intervention in the workplace.

38

39

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Appendices

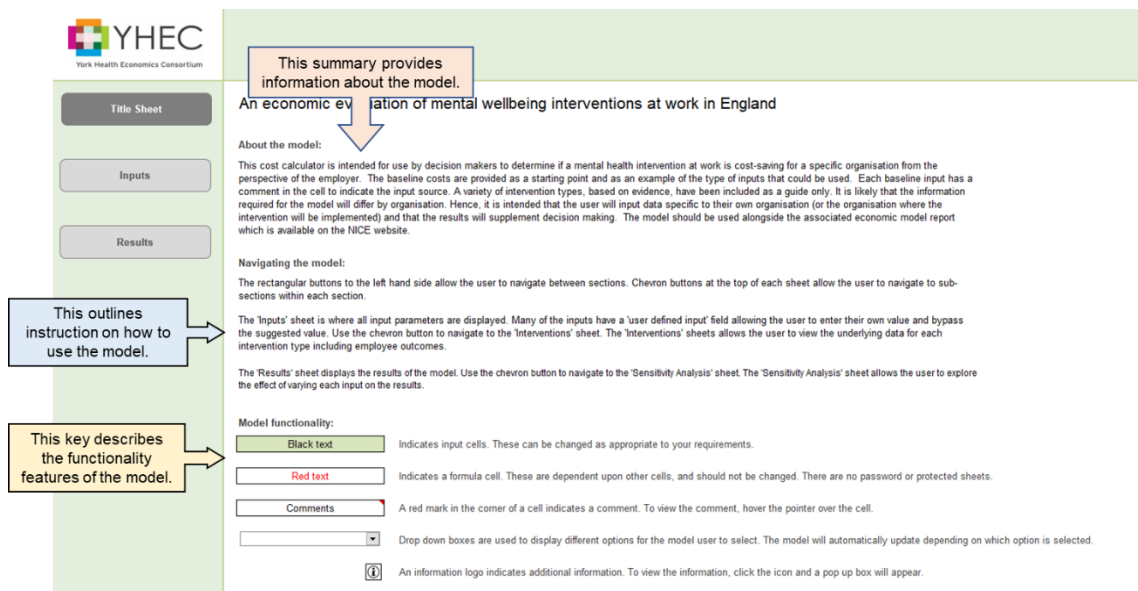
Appendix A – Model User Guide

This user guide is intended to support the use of a cost-calculator to aid decision making relating to mental health interventions at work.

Title Sheet

The title sheet, shown in Figure A.1, contains a description of the model including limitations and brief instructions on model use. The title sheet also provides a description of model functionality.

Figure A.1: Model title sheet



Inputs

The model input sheet is shown in Figure A.2. The user is able to replace input variables with their own values using the green cells. The results will automatically update. It is recommended that the user enters their own data to ensure the most realistic results are generated for their organisation. The user can select from three options to input the cost of the intervention; total, per employee or using cost breakdown. The cost breakdown button is optional and should be used to input a variety of costs associated with implementing the intervention, if known. This could include the cost of a facilitator, the cost associated with participation (e.g. employee pay whilst attending training), resource usage and so forth. It should be noted that employee outcomes are not displayed on the model inputs sheet.

The intervention sheets, shown in Figure A.3, provides the underlying data for each intervention type including employee outcomes. The information button provides links to the underlying evidence used to populate the table. The user defined row allows the user to

input their own data. Note, there is no specific scale for each employee outcome as this will likely vary depending on the data available to the user. Prepopulated employee outcomes are reported as the standardised mean difference unless otherwise stated. Further information regarding the standardised mean difference is provided on the results page, where necessary.

Figure A.2: Model inputs

The screenshot shows the 'Model Inputs' section of the YHEC interface. It includes a sidebar with 'Title Sheet', 'Inputs', and 'Results' buttons. The main area contains several input fields:

- Number of employees:** 50
- Intervention type:** Case study: Multicomponent health promotion (select from dropdown list)
- Cost of intervention:** £100
- Cost breakdown:** Total (selected), Per person, Using cost breakdown
- Baseline vs User defined table:**

	Baseline	User defined
Cost of absenteeism per day	£154	
Cost of presenteeism per day	£308	
Cost per case of staff turnover	£14,984	
- Effectiveness vs User defined table:**

	Effectiveness	User defined
Reduction in absenteeism (in days)	4.3	
Reduction in presenteeism (in days)	9.2	-1.9
Reduction in staff turnover (%)	No evidence	

Figure A.3: Interventions

The screenshot shows the 'Interventions' section of the YHEC interface. It includes a sidebar with 'Title Sheet', 'Inputs', and 'Results' buttons. The main area contains a table of interventions with the following data:

ID	Intervention type	Description	Employer outcomes			Confidence identifying mental health	Uptake of support services	Communication and awareness of support	Managers mental health knowledge	Destigmatisation	Mer
			Reduction in absenteeism (days)	Reduction in presenteeism (days)	Reduction in staff turnover (point %)						
1	Case study: Multicomponent health promotion	Mills (2007)	4.3	9.2							
2	User defined	User defined									
3	Manager mental health training	Universal manager-level				0.74	1.34	1.28	1.45	0.31	
4	Leadership development	Universal organisational-level									
5	Peer support	Universal organisational-level									
6	Mental health first aider	Universal organisational-level									
7	Participatory approach	Universal organisational-level									
8	Targeted cognitive behavioural theory	Targeted individual-level	1.8	4.0							
9	Targeted mindfulness	Targeted individual-level	2.3								
10	Targeted digital/online stress management	Targeted individual-level	0.7	1.8							

Results

The results sheet is shown in Figure A.4. The costs associated with employer outcomes are summarised to provide total incremental costs and incremental cost per employee. Note that a negative incremental cost indicates costs savings. A text box provides a summary of employee outcomes which are reported as the standardised mean difference (SMD), unless stated otherwise. An information button is provided as guidance on how to interpret the SMD (also see section 2.3.2).

The sensitivity analysis sheet, shown in Figure A.5, allows the user to explore uncertainty. The user can select the input variable they would like to explore from the dropdown list. The graphs show one-way sensitivity analysis meaning only one input is changed in each graph. Hence, it does not represent combinations of input changes. A green downward arrow indicates a positive direct.

Figure A.4: Results

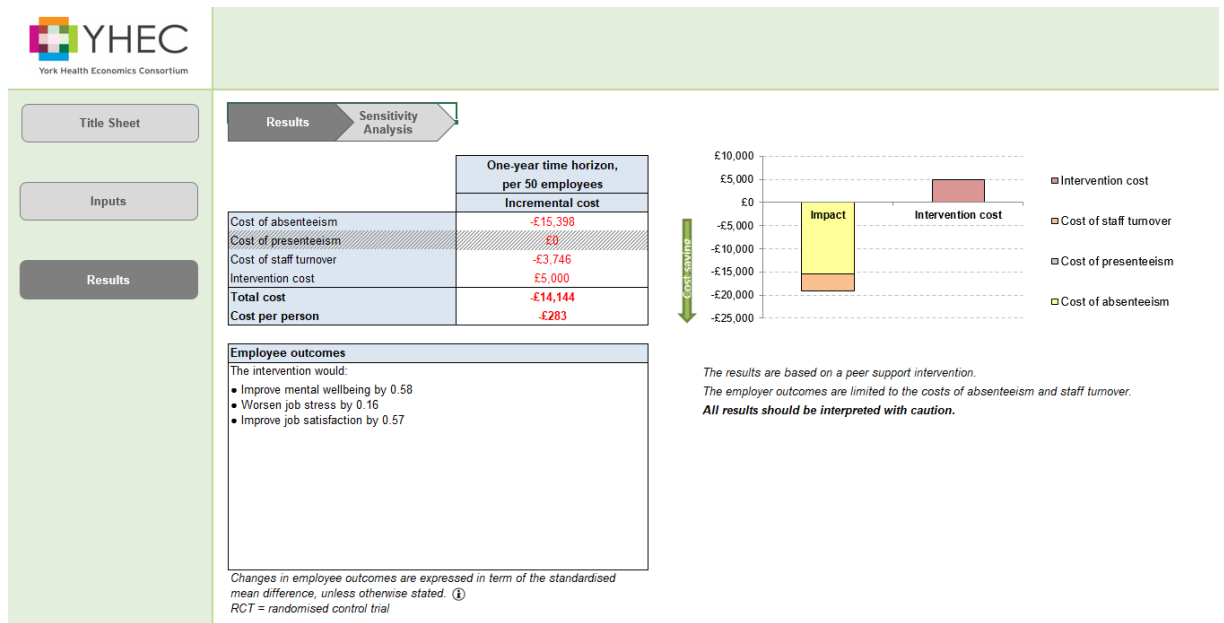
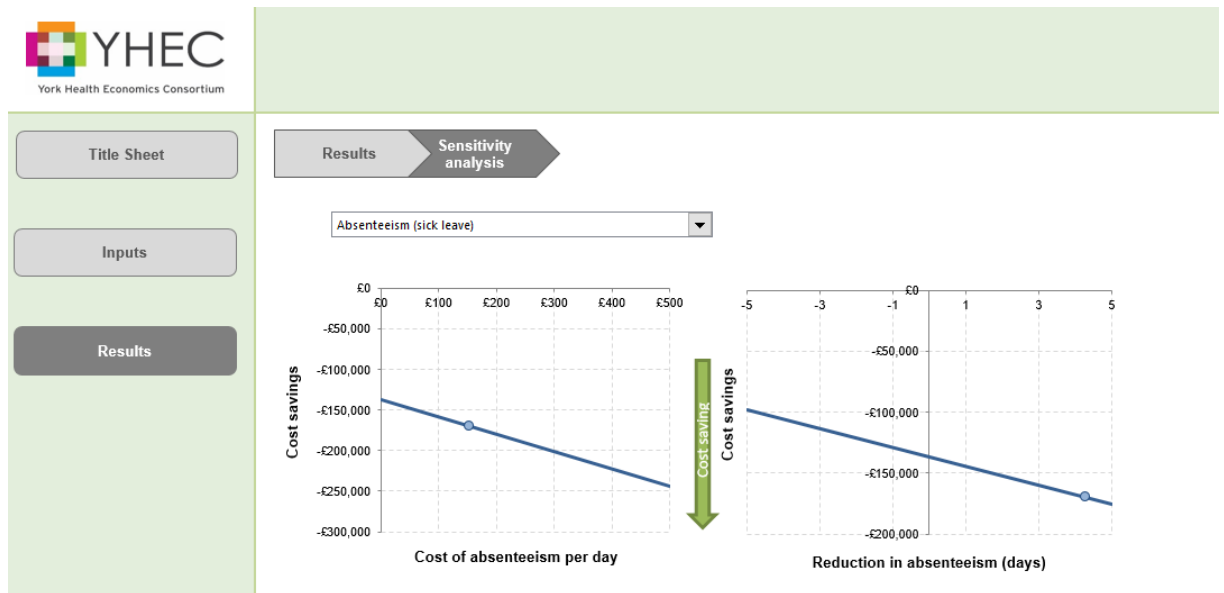


Figure A.5: Sensitivity analysis



Appendix B – Examples

Data were provided from two companies who had implemented mental wellbeing interventions into their work places. YHEC was not involved in the selection process and all information was gained directly from the companies (i.e. the data are not published).

Example 1

Sector: Aviation industry with a diverse range of disciplines and ages.

Intervention: A 24/7 peer support program run by specially trained colleagues in crisis incident stress management and mental health first aid.

Inputs: The data provided by the company is summarised in Table A1. The values reported are per year, unless otherwise stated. Note, the cost of employing 2 dedicated program staff (a program manager and coordinator) and the proportion of employees benefiting from a reduction in absenteeism were not provided. Hence, these two parameters were based on assumption and explored in sensitivity analysis. The cost of employing two dedicated employee was assumed to be £100,000 and the proportion of employees reporting mental health illness was assumed to be 10%.

Table A1

Parameter	Value
Number of employees	4200
Cost of the intervention	£35,000 + 2 full time employees
Absenteeism	
Cost of absenteeism per day	£295
Reduction in absenteeism (per person)	8 days per employee reporting mental health illness
Other outcomes	
Mental health incidents	27.7% increase
'Excellent' rating	93%

Example 1: continued

Results: The intervention produced a total cost saving of £856,200 or £204 per employee. The intervention increased mental health incidence by 27.7%. Of the 43% of staff that responded to the intervention assessment, 93% rated the peer support program as excellent.

Sensitivity Analysis: Assuming a minimum *total* cost of the intervention of £105,000 and that only 1% of employees benefited from the reduction in absenteeism resulted in the intervention no longer being cost saving. Assuming more than 1% of employees benefited from the reduction in absenteeism resulted in cost saving at any reasonable intervention cost.

Conclusions: It is likely that the peer support intervention is cost saving when considering the reduction in absenteeism only. The intervention increased mental health incidence. However, it is assumed that is due to a change in culture in reporting mental health incidents and, therefore, indicates the 'true' reporting of mental health.

Limitations: It is not possible to disentangle the effects of the intervention from other wellbeing interventions that were implemented across the company or other factors that might influence mental health.

Example 2

Sector: Utilities sector with skilled operational and office based workers aged from 16 to 75.

Intervention: An ongoing 'Time to Talk' strategy based on SPOT principles (spotting the signs; providing opportunity to talk; offering a listening ear; talking to professional support services early) and two training course that include a series of specially filmed virtual reality scenes.

Inputs: The data provided by the company is summarised in Table A2. The cost of the intervention and the reduction in absenteeism as reported cumulatively, covering a period of 3 years.

Table A2

Parameter	Value
Number of employees	5000 to 6500
Cost of the intervention (cumulative total)	~£100,000
Absenteeism	
Cost of absenteeism per day	£125
Reduction in absenteeism (cumulative total)	1612 days
Other outcomes	
Mental health contacts	30 per month
Annual utilisation	
Employee Assistant Program	1.6% increase
Counselling	0.56% increase

Example 2: continued

Results: The intervention produced a total cost saving of £101,500. Since data were collected cumulatively and the number of employee varied across the time period, it was not possible to assess a cost per employee. The intervention increased mental health contacts to 30 per month. The annual utilisation of the employee assistant program and counselling services increased by 1.6% and 0.56%, respectively.

Conclusions: It is likely that the 'Time to Talk' strategy is cost saving when considering the reduction in absenteeism only. The intervention increased mental health contacts and annual utilisation of mental wellbeing resources. This is deemed to be due to removing the stigma round mental health at work and enabling open, effective conversation about mental health across the company.

Limitations: It is not possible to disentangle the effects of the intervention from other wellbeing interventions that were implemented across the company or other factors that might influence mental health.

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