

**NATIONAL INSTITUTE FOR HEALTH
AND CLINICAL EXCELLENCE**

**Cost Impact Analysis of Workplace-Based
Interventions for Smoking Cessation:
Sensitivity Analysis of Time Lost due to
Smoking**

Supplementary Report

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INVESTOR IN PEOPLE

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Executive Summary

1. INTRODUCTION

For the purposes of this supplementary report, further sensitivity analysis has been carried out surrounding the amount of excess smoking-attributable absence from work per year, for a variety of workplace settings.

2. METHODS

The reader is referred to the previous report for a full description of the model's methods. Table 1 provides details of the workplace settings investigated and their smoking related excess absence from work per year per person.

Table 1: Smoking and absence from work

Source/setting	Excess hours absence per year per person
Base case	12.29
800 largest companies (Taiwan)	3.66
Industry (Israel)	4.50
Petrochemical works (China)	5.06
Large industrial work force (USA)	6.38
Department of Health (USA)	8.44
Wellness Inventory (USA)	13.50
Civil servants (England)	10.97
Airline booking office (USA)	15.23
Postal workers (USA)	16.88
Petrochemical works (USA)	38.25

3. RESULTS AND CONCLUSIONS

The results of this sensitivity analysis show that the majority of the interventions modelled are cost saving for the employer for all the identified workplace settings. Negative cost savings were only found when interventions with a high cost and low quit rate were applied to industries with a low smoking related absence. If 8 or more hours per year are lost due to smoking, then all smoking cessation programmes will be cost saving for an employer in all the scenarios modelled.

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Section 1: Methods

1.1 INTERVENTIONS

The interventions modelled and the associated costs to the employer are shown in Table 1.1. The reader is referred to the previous reports for a full description of the model's methods¹². A lifetime time horizon was used. Table 1.1 shows the costs (as borne by the employer) associated with each intervention.

Table 1.1: Interventions

Intervention	Six month Quit Rate	Intervention Cost
'No intervention'	1.01%	£0.00
'BA'	3.00%	£12.55
'BA plus self-help material'	4.00%	£12.55
'BA plus self help material plus NRT'*	6.00%	£12.55
'BA plus self-help material plus NRT plus specialist clinic'	15.00%	£163.15
'LIC and bupropion'	23.60%	£2.09
'MIC and bupropion'	31.40%	£12.55
'Nicotine patch and weekly group counselling' (NP-GC)	20.54%**	£125.50
'Nicotine patch and weekly individual counselling' (NP-IC)	15.80%**	£125.50
'Nicotine patch and no counselling' (NP-NC)	11.85%**	£125.50
'Nicotine patch and pharmacist consultation' (NP-PC)	24.49%**	£125.50
'Nicotine patch, pharmacist consultation and comprehensive behavioural program' (NP-PCBP)	34.76%**	£251.00

* NRT was assumed to be paid for by a party other than the employer.

** Six-month rates were converted to one-year rates by assuming that 21% of quitters relapse between six and twelve months.

1.1.1 No Intervention

The analysis was run for an annual background quit rate of 2% (or a six-month background quit rate of 1.1%).

1.2 EXCESS DAYS ABSENCE FROM WORK

The smoking related absence, as reported in the literature, associated with a variety of workplace settings are shown in Table 1.2. The annual absence ranges from 3 to 38 hours.

¹ Flack S, Taylor M & Trueman P. *Cost Impact Analysis of Workplace-Based Interventions for Smoking Cessation*. Report to NICE, 2007.

² Flack S, Taylor M & Trueman P. *Cost Impact Analysis of Workplace-Based Interventions for Smoking Cessation: Additional Analysis*. Supplementary Report to NICE, 2007.

Table 1.2: Smoking and absence from work

Source/setting	Excess days absence from work per person per year			Excess hours absence per year per person	Source
	Smokers	Ex-smokers ^a	Difference		
Base case ^b	2.16	0.53	1.64	12.29	See previous report ³
Industry (Israel)	0.65 ^c	0.16	0.49	3.66	Green <i>et al.</i> 1992 [2]
Petrochemical works (China)	0.80	0.20	0.60	4.50	Qun and Dobson 1992 [3]
Large industrial work force (USA)	0.90	0.23	0.68	5.06	Bertera 1991 [4]
800 largest companies (Taiwan)	1.14 ^c	0.28	0.85	6.38	Tsai <i>et al.</i> 2005 [1]
Department of Health (USA)	1.50	0.38	1.13	8.44	Van Tuinen and Land 1986 [5]
Civil servants (England)	1.95 ^c	0.49	1.46	10.97	North <i>et al.</i> 1993 [7]
Wellness Inventory (USA)	2.30	0.50	1.80	13.50	Bunn <i>et al.</i> 2006 [6]
Airline booking office (USA)	2.70	0.67	2.03	15.23	Halpern <i>et al.</i> 2001 [8]
Postal workers (USA)	3.00	0.75	2.25	16.88	Ryal <i>et al.</i> 1992 [9]
Petrochemical works (USA)	6.70	1.60	5.10	38.25	Tsai <i>et al.</i> 2005 [10]

Comment [a1]: This conflicts with the arithmetic average now assumed. If you are going to link back, you need to keep the old baseline. What you are now calling 'baseline' could be at the bottom of table as 'Average'

- a Note that excess days absence from work for smokers and ex-smokers was only available for the following industries: Wellness Inventory (USA); Airline booking office (USA); Petrochemical works (USA). For these industries the benefit of giving up was approximately 75% of the benefit of being a non-smoker compared to a smoker. This percentage was applied to all other industries.
- b This is a straight average of the industry figures.
- c Calculated as an average of male and female estimates, which were reported separately.

³ Flack S, Taylor M & Trueman P. *Cost Impact Analysis of Workplace-Based Interventions for Smoking Cessation*. Report to NICE, 2007.

1.3 SENSITIVITY ANALYSIS

Sensitivity analysis was undertaken for each intervention, using a range of 0 to 150 hours excess absence from work per person per year, in increments of 5 hours. Charts were then generated for each intervention, highlighting the workplace settings identified in Table 1.1.

The total hours lost per years consists of two parts (i) a component for sick leave (range 0 to hour 40 per year); and (ii) a component for smoking breaks (range 0 to 90 hours per year).

The above information can be summarised in a matrix showing the total excess hours absence per year per person (see Table 1.3). For the purposes of the calculations, it was assumed that there are 7.5 working hours in a day and 216 working days in a year.

Table 1.3 allows the total smoking attributable absence to be calculated for any combination of sick leave and smoking breaks. The reader can use the resulting number in combination with the charts provided in the Results section, to determine whether an intervention has a positive net financial benefit in any given workplace setting.

Table 1.3: Matrix showing the total smoking excess hours' absence per year per person

	Days off sick per year										
	0	1	2	3	4	5	6	7	8	9	10
0	0	8	15	23	30	38	45	53	60	68	75
1	4	11	19	26	34	41	49	56	64	71	79
2	7	15	22	30	37	45	52	60	67	75	82
3	11	18	26	33	41	48	56	63	71	78	86
4	14	22	29	37	44	52	59	67	74	82	89
5	18	26	33	41	48	56	63	71	78	86	93
6	22	29	37	44	52	59	67	74	82	89	97
7	25	33	40	48	55	63	70	78	85	93	100
8	29	36	44	51	59	66	74	81	89	96	104
9	32	40	47	55	62	70	77	85	92	100	107
10	36	44	51	59	66	74	81	89	96	104	111
11	40	47	55	62	70	77	85	92	100	107	115
12	43	51	58	66	73	81	88	96	103	111	118
13	47	54	62	69	77	84	92	99	107	114	122
14	50	58	65	73	80	88	95	103	110	118	125
15	54	62	69	77	84	92	99	107	114	122	129
16	58	65	73	80	88	95	103	110	118	125	133
17	61	69	76	84	91	99	106	114	121	129	136
18	65	72	80	87	95	102	110	117	125	132	140
19	68	76	83	91	98	106	113	121	128	136	143
20	72	80	87	95	102	110	117	125	132	140	147
21	76	83	91	98	106	113	121	128	136	143	151
22	79	87	94	102	109	117	124	132	139	147	154
23	83	90	98	105	113	120	128	135	143	150	158
24	86	94	101	109	116	124	131	139	146	154	161
25	90	98	105	113	120	128	135	143	150	158	165

Section 2: Results

2.1 SENSITIVITY ANALYSIS: THE NET FINANCIAL BENEFIT COMPARED WITH 'NO INTERVENTION'

Figures 2.1 to 2.11 compare the net financial impact of each intervention with 'no intervention'. The net financial benefit column in the table considers the impact to the employer by subtracting the cost of providing the intervention from the benefits in terms of productivity gains. As such, a positive net financial benefit suggests that the benefits of the intervention outweigh the costs to the employer.

The majority of the interventions are cost savings for all workplace settings. Negative cost savings were only found when interventions with a high cost and low quit rate were applied to industries with a low smoking related absence. See Table 2.1 for details.

Table 2.1: Interventions and the associated workplace settings that result in negative cost savings. assuming no time is lost in smoking breaks during the day

Intervention	Workplace setting
'BA + SHM + NRT + specialist smoking service':	Industry (Israel) Petrochemical works (China) Large Industrial Work Force (USA) 800 largest companies (Taiwan)
'NP-IC'	Industry (Israel) Petrochemical works (China) Large Industrial Work Force (USA)
'NP-NC'	Industry (Israel) Petrochemical works (China) Large Industrial Work Force (USA) 800 largest companies (Taiwan)
'NP-PCBP'	Industry (Israel) Petrochemical works (China) Large Industrial Work Force (USA)

Note that if 3 or more additional minutes are lost on average for smoking breaks each day, then the cost to the average employer in lost production due to smoking breaks plus additional sick leave will exceed the cost of the employer paying for smokers to attempt to quit, assuming average quit rates for each intervention.

Table 2.2 shows the minimum number of hours that can be lost each year in order for each smoking cessation programme to be cost saving. (Note that if eight or more hours per year are lost due to smoking – a little over 2 minutes per day – then all smoking cessation programmes will be cost saving for an employer in all the scenarios modelled.)

Table 2.2: Minimum number of hours lost to smoking breaks each year

Intervention	Break even point
'BA'	4.35
'BA plus self-help material'	2.90
'BA plus self help material plus NRT'	1.74
'BA plus self-help material plus NRT plus specialist clinic'	8.06
'LIC and bupropion'	0.06
'MIC and bupropion'	0.29
'Nicotine patch and weekly group counselling' (NP-GC)	4.39
'Nicotine patch and weekly individual counselling' (NP-IC)	5.79
'Nicotine patch and no counselling' (NP-NC)	7.90
'Nicotine patch and pharmacist consultation' (NP-PC)	3.65
'Nicotine patch, pharmacist consultation and comprehensive behavioural program' (NP-PCBP)	5.08

Figure 2.1: Brief advice (BA) – sickness absence only

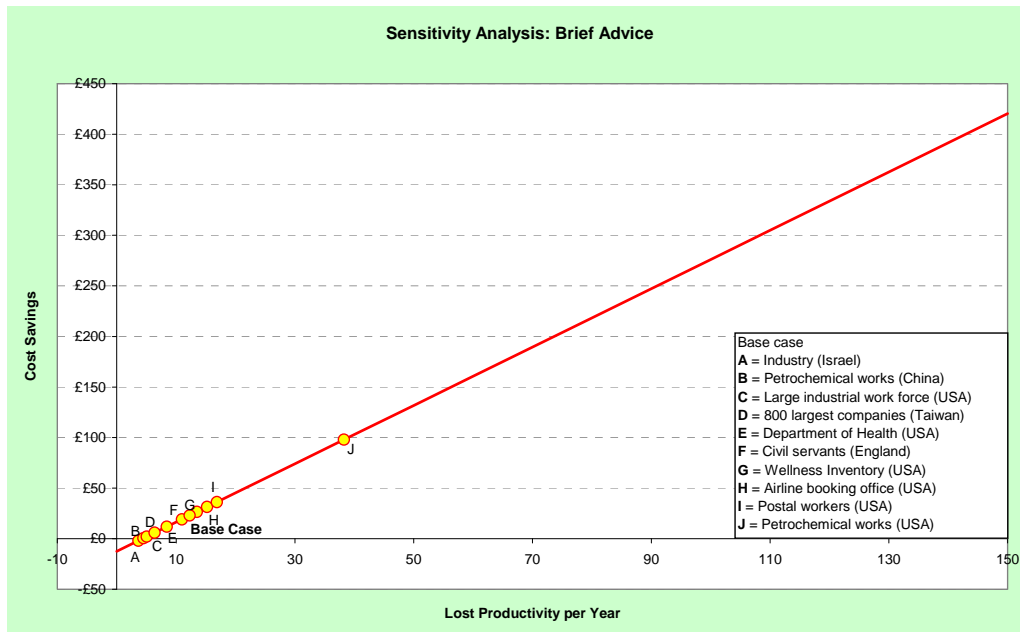


Figure 2.2: BA + self-help material (SHM) – sickness absence only

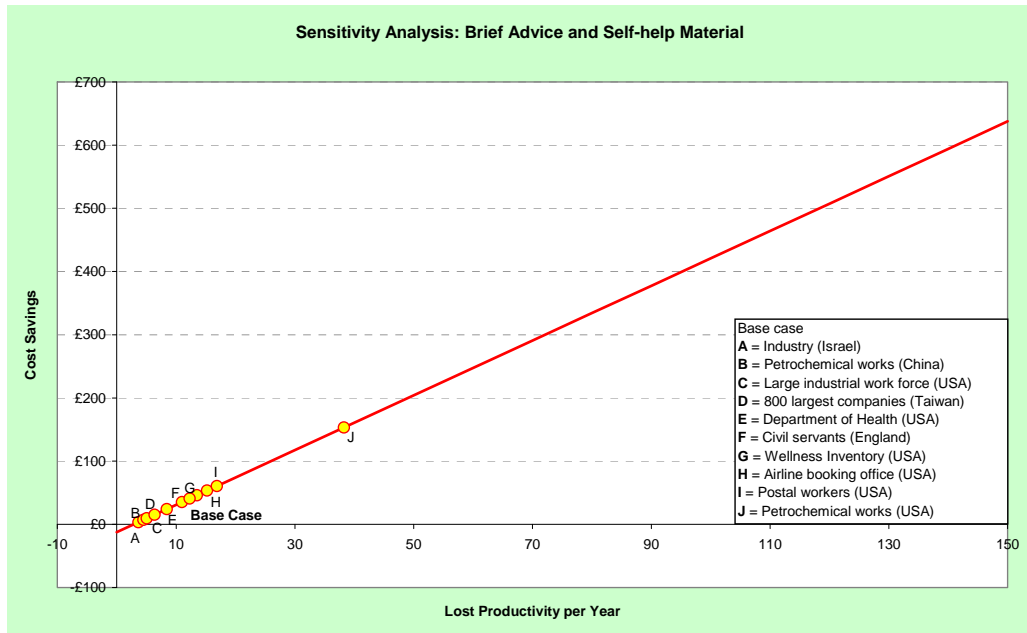


Figure 2.3: BA + SHM + advice for NRT – sickness absence only

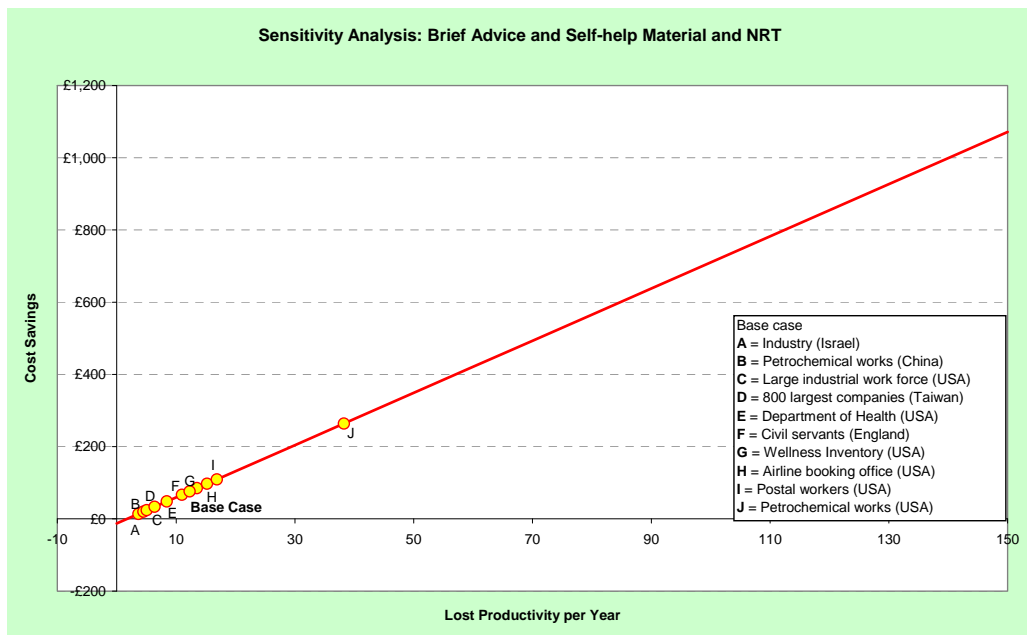


Figure 2.4: BA + SHM + NRT + specialist smoking service – sickness absence only

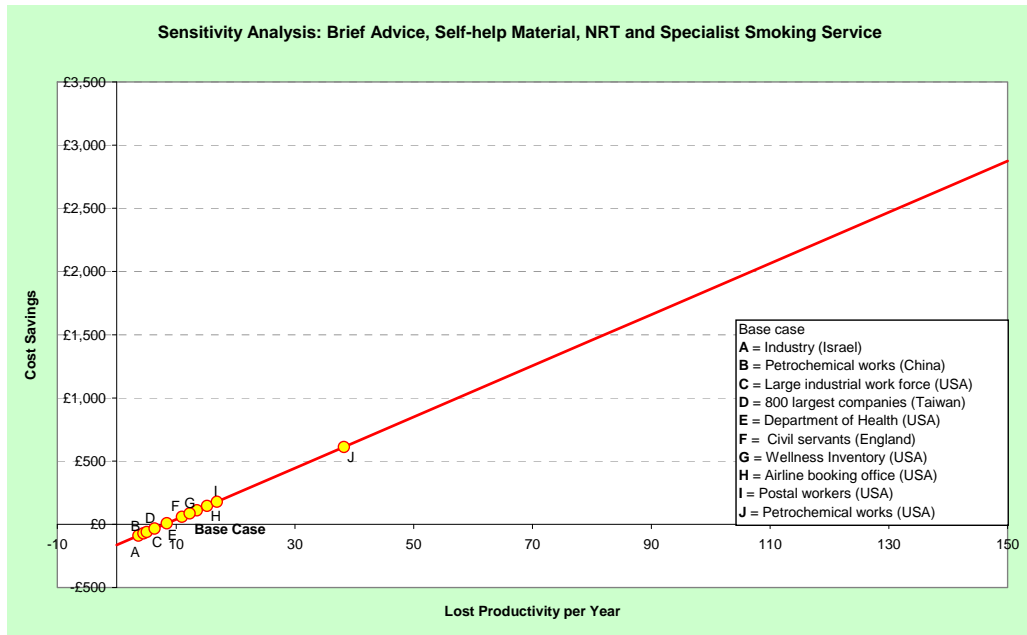


Figure 2.5: Less intensive counselling and bupropion – sickness absence only

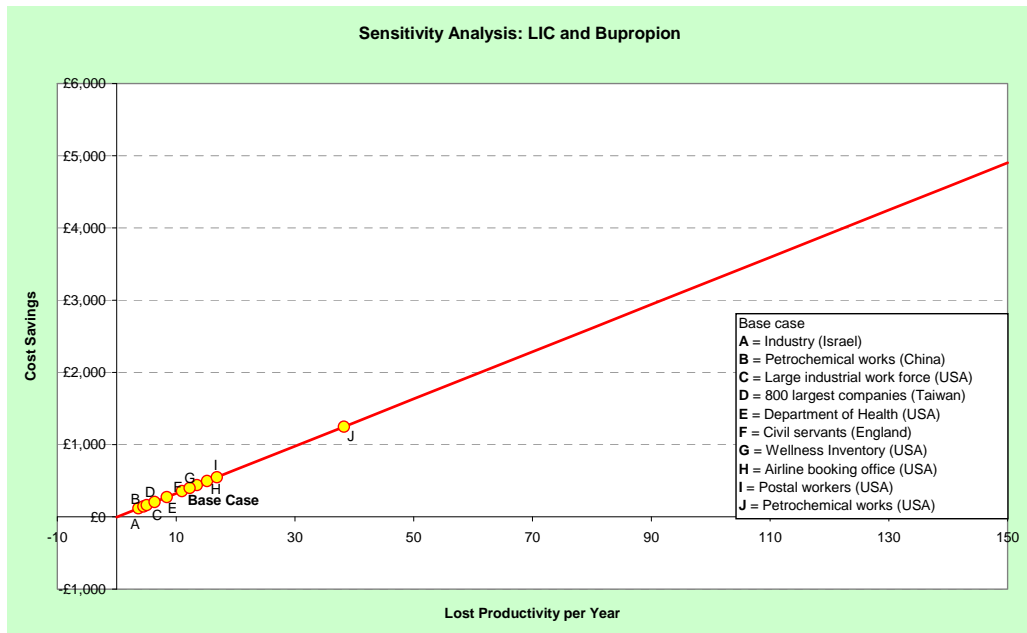


Figure 2.6: More intensive counselling and bupropion – sickness absence only

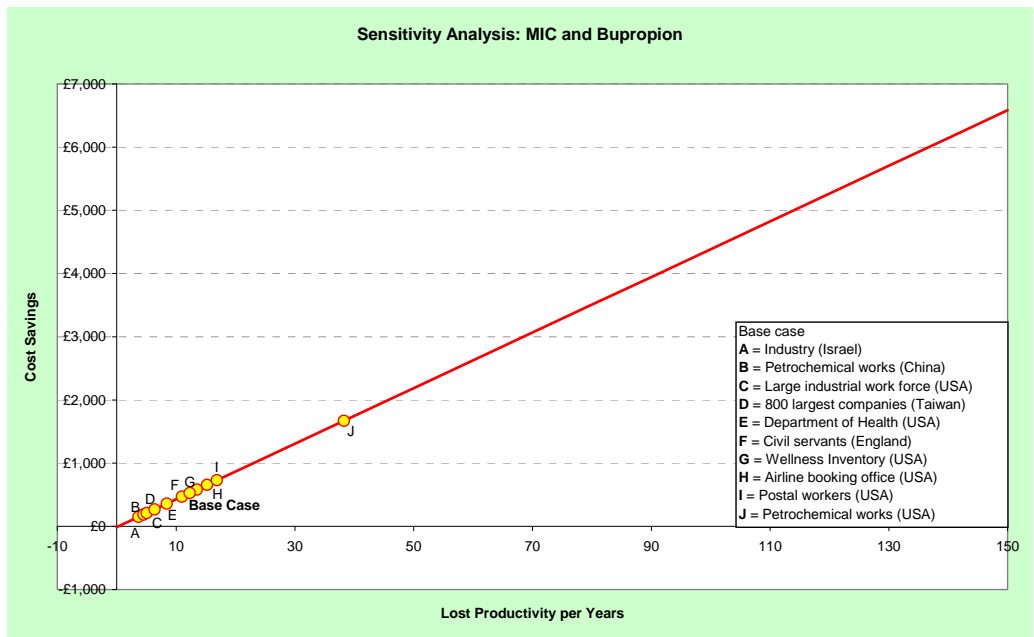


Figure 2.7: Nicotine patch + group counselling – sickness absence only

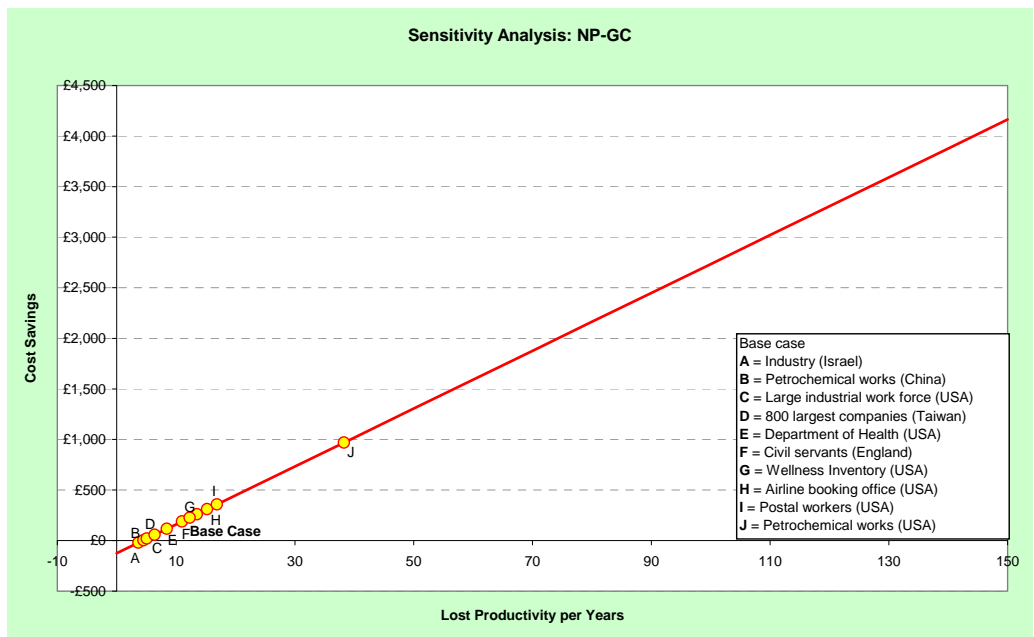


Figure 2.8: Nicotine patch + individual counselling – sickness absence only

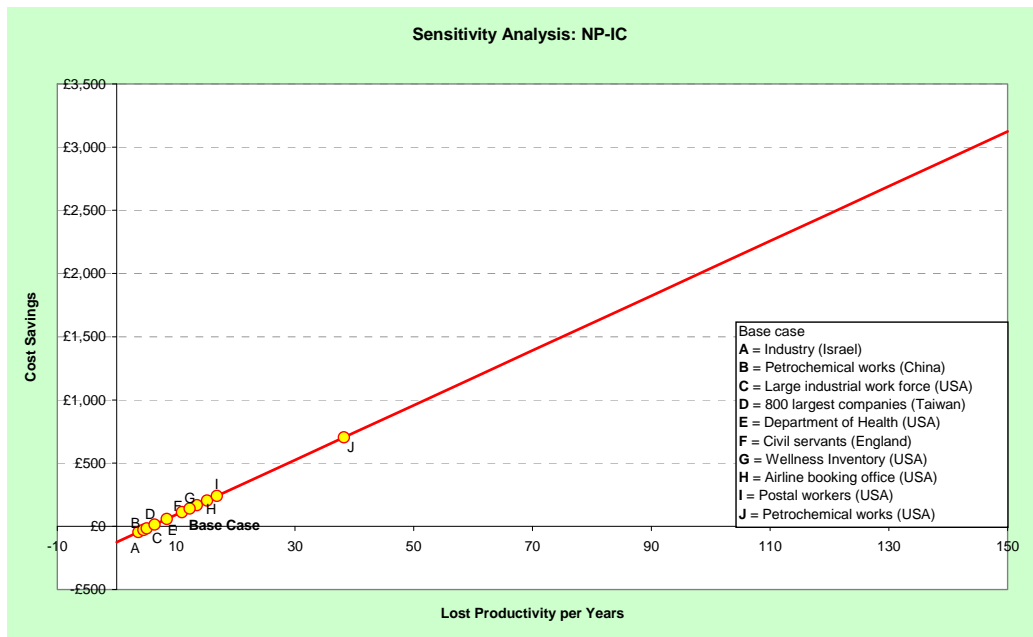


Figure 2.9: Nicotine patch + no counselling – sickness absence only

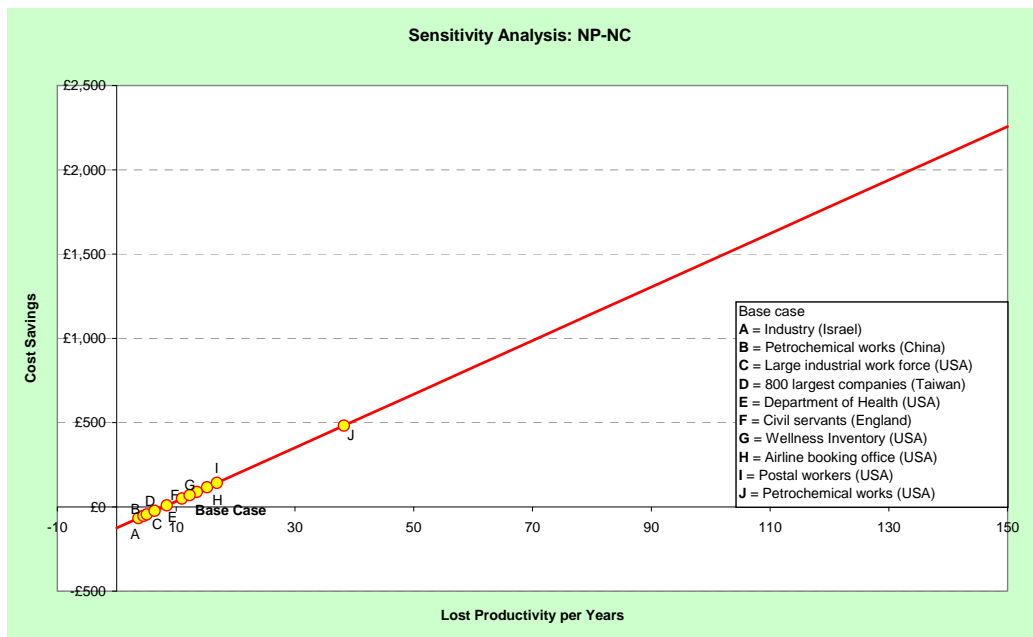


Figure 2.10: Nicotine patch + pharmacy-based counselling – sickness absence only

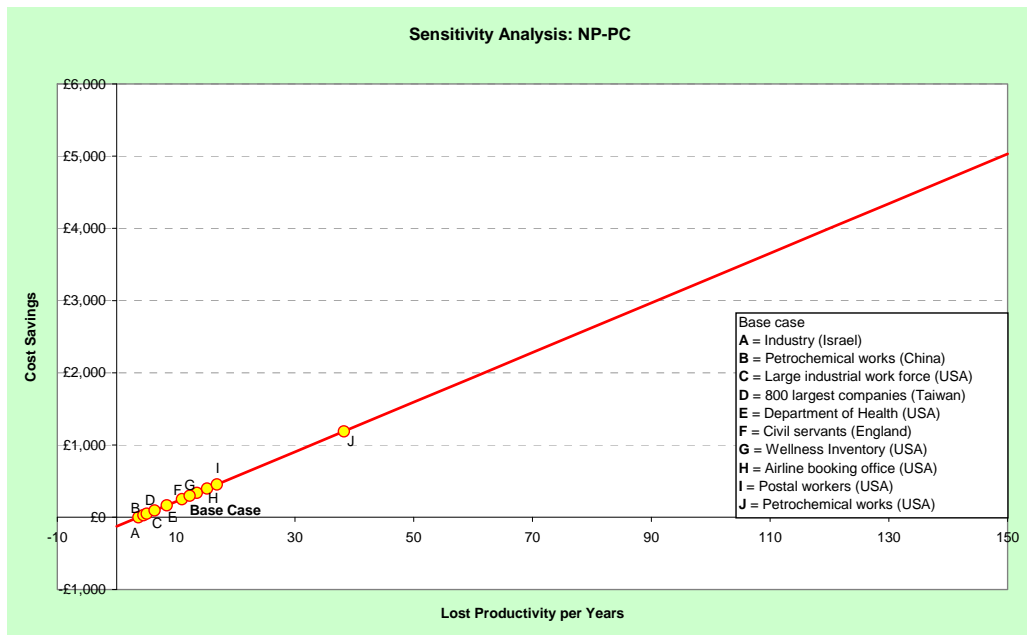
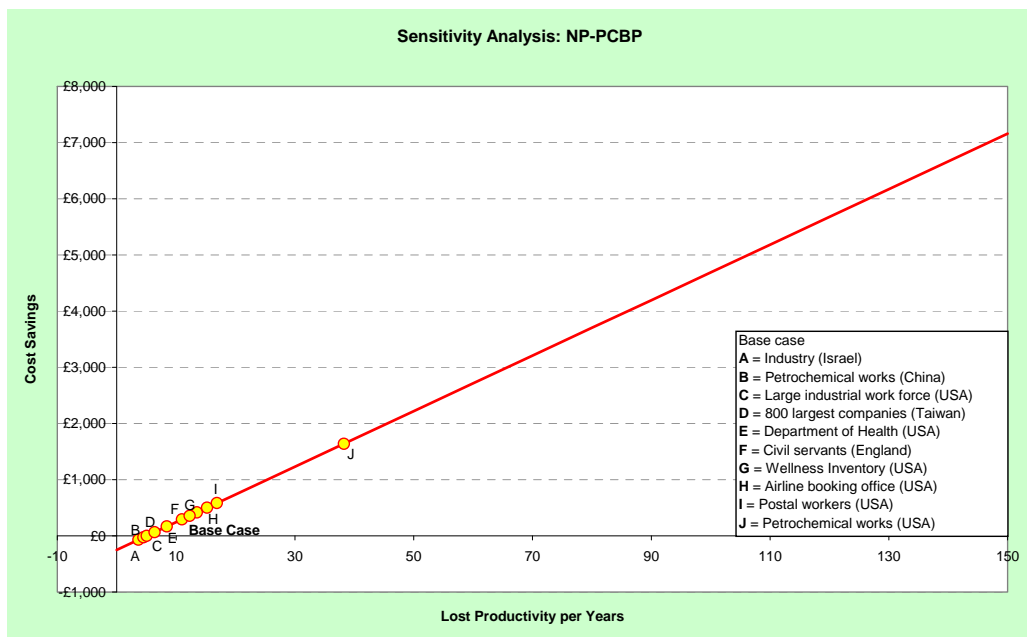


Figure 2.11: Nicotine patch + pharmacy-based counselling + behavioural program – sickness absence only



Section 3: Discussion and Conclusions

3.1 MAIN FINDINGS AND CONCLUSIONS

The results of this sensitivity analysis show that the majority of the interventions modelled are cost saving for employers for all the identified workplace settings for the sick leave absences reported, and without considering any additional time lost in smoking breaks during the day. Negative cost savings (i.e. increased costs) for employers were only found when interventions with a high cost and low quit rate were applied to industries with a low smoking related absence. If 8 or more hours per year are lost due to smoking, then all smoking cessation programmes will be cost saving for an employer in all the scenarios modelled.

Without considering additional time off for smoking breaks, gains of up to £1,670 per smoking employee treated could be expected to accrue to the employer in terms of increases in economic product. If, in addition, smoking breaks represent an additional 25 minutes break per day; cost savings per treated employee of approximately £6,000 could be expected to accrue.

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