

## 1 **Supplementary material**

### 2 **Screenener questions**

#### 3 **Questions regarding patient background details**

5 S.1) What is your age?

6 (Select one)

- 8 • Under 18 (discontinue)
- 9 • 18–24
- 10 • 25–39
- 11 • 40–59
- 12 • Over 60

14 S.2) Which of the following conditions do you suffer from?

15 (Select all that apply)

- 17 • Arthritis
- 18 • Asthma (discontinue if asthma is not chosen)
- 19 • Chronic obstructive pulmonary disease (COPD)
- 20 • High blood pressure
- 21 • High cholesterol
- 22 • Osteoporosis
- 23 • Type 2 diabetes
- 24 • None of these (discontinue)

26 S.2a) Have you been given the diagnosis of your asthma by a healthcare professional?

27 (Select one)

- 28 • Yes
- 29 • No (discontinue)

31 S.3) Which of the following best describes your current situation?

32 (Select one)

- 33 • Currently employed full-time (working for pay)
- 34 • Currently employed part-time in a paid role (working for pay)
- 35 • Not currently employed (discontinue)
- 36 • None of the above (discontinue)

S.4) Thinking specifically now about your asthma, which of the following treatments are you currently on?

(Select all that apply)

- None
- Long-term asthma control inhaler / preventer medication (discontinue if this option is not chosen)
- Quick symptom relief inhaler / quick reliever / rescue medication
- Other

**Questions regarding asthma control (RCP3Q) (Reproduced from: Pearson MG and Bucknall CE (eds).**

**Measuring clinical outcome in asthma: A patient-focused approach. London: RCP, 1999. Copyright © 1999**

**Royal College of Physicians. Reproduced with permission.)<sup>21</sup>**

S.5) In the past month, have you had any difficulty sleeping because of your asthma symptoms (including cough)?

(Select one)

- Yes (If Yes is selected, skip questions S.6 and S.7)
- No

S.6) In the past month, have you had your usual asthma symptoms during the day?

(Select one)

- Yes (If Yes is selected, skip question S.7)
- No

S.7) In the past month, has your asthma interfered with your usual activities?

(Select one)

- Yes
- No (discontinue)

**Work Productivity and Activity Impairment (WPAI) Specific Health Problem (SHP)**

**Questionnaire version 2.0. (Copyright ©2013 Margaret Reilly Associates, Inc.)<sup>23</sup>**

The following questions ask about the effect of **your asthma** on your ability to work and perform regular activities. *Please fill in the blanks or circle a number, as indicated.*

1) Are you currently employed (working for pay)? \_\_\_\_\_NO \_\_\_\_ YES

*If NO, check "NO" and skip to question 6.*

The next questions are about the **past seven days**, not including today.

2) During the past seven days, how many hours did you miss from work because of **your asthma**? *Include hours you missed on sick days, times you went in late, left early, etc., because of your asthma.*

\_\_\_\_\_ HOURS

3) During the past seven days, how many hours did you miss from work because of any other reason, such as vacation, holidays?

\_\_\_\_\_ HOURS

4) During the past seven days, how many hours did you actually work?

\_\_\_\_\_ HOURS (If "0", skip to question 6.)

5) During the past seven days, how much did asthma affect your productivity while you were working?

*Think about days you were limited in the amount or kind of work you could do, days you accomplished less than you would like, or days you could not do your work as carefully as usual. If asthma affected your work only a little, choose a low number. Choose a high number if asthma affected your work a great deal.*

Consider only how much asthma affected  
productivity while you were working.

Asthma had no  
effect on my work

0 1 2 3 4 5 6 7 8 9 10

Asthma completely  
prevented me from  
working

CIRCLE A NUMBER

6) During the past seven days, how much did asthma affect your ability to do your regular daily activities, other than work at a job?

*By regular activities, we mean the usual activities you do, such as work around the house, shopping, childcare, exercising, studying, etc. Think about times you were limited in the amount or kind of activities you could do and times you accomplished less than you would like. If asthma affected your activities only a little, choose a low number. Choose a high number if asthma affected your activities a great deal.*

Consider only how much asthma affected your ability  
to do your regular daily activities, other than work at a job.

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Asthma had no  
effect on my daily  
activities

Asthma completely  
prevented me from  
doing my daily  
activities

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0 1 2 3 4 5 6 7 8 9 10

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CIRCLE A NUMBER

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120 **Additional question asked**

121 7) How does your asthma at work make you feel? (*Open question*)

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**Table S1 Descriptors based on participant responses to the open question “How does your asthma at work make you feel?”**

<b>Descriptors based on responses from ≥3 study participants<sup>a</sup></b>	<b>Category</b>
Suffocated / unable to breath; Dyspnea / short of breath; Heavy / difficulty breathing; Wheezing; Coughing (when performing strenuous tasks); Coughing (continuously); Sneezing; Suffer from allergic asthma; Sweating / flushed / hot; Having to clear my throat frequently / trouble talking; Phlegm; Tight chest / chest pain	Respiratory symptoms
Tired / exhausted / fatigue; Tired more quickly; Fatigue side effects from medication; Depleted; Weak / no energy; Feeling heavy; Sleeping problems / feeling sleepy	Tired / weak
Isolated / anti-social (go home ASAP); Want to go home / rest / sit down; Lacking in concentration / slow thinking; Easily distracted; Inefficient / not capable; Helpless; Overtaxed; Disturbed / disrupted; Stressed; Listless / apathetic / discouraged; Depressed / sad; Overwhelmed; I cannot control the situation sometimes; Accustomed; Desperate / frustrated / upset; Self-conscious / awkward; Expressions of self-pity; I just want to get better quickly	Mentally strained
Slow / sluggish; (Physically) restricted / impaired; Disabled; Can't walk far / fast; Need to take breaks; I had to take sick leave / leave work; Need to be careful (sometimes); Feel ill / awful; Strained / work feels strenuous; Difficult to speak (with people / on the phone); Unable to move (when having an attack)	Physically impaired
Depends / only feel impaired when exposed to certain triggers (unspecified); Depends on the day / stress levels; I suffer from seasonal asthma (pollen / harvesting); Only suffer when the office is not clean / being cleaned; (Only) affects me when I have acute attacks; Struggle with / breathless after climbing stairs; (Only) feel impaired when performing strenuous tasks; Affected when I exercise / unable to exercise; Only able to perform seated tasks / sedentary jobs; Always have to carry an inhaler (or I worry / panic); Feel reminded to use spray; It affects me sometimes but can continue working; Affected by some scents / fumes; Affected by dusty environments; Affected by the air conditioning / cold environment; Affected by certain weather conditions; Only affects me when I have a cold; Only affects me if there are pets around	State depends on other factors
Positive comments: Minimal effect due to the nature of my job (office, driver)	

Embarrassed (of heavy breathing / coughing); Need to go somewhere else to take med / don't feel good taking med in front of others; I am letting my colleagues down / colleagues have to cover for me; Boss or colleagues are not supportive; Cough is disturbing for colleagues; Cough is unpleasant for colleagues / customers; Colleagues think I am having a cold / spreading a cold virus	Perception of / impact on colleagues
Positive comments: Boss / colleagues are supportive	
Fearful / worried; Anxious / panicky; Scared of having an attack; Nervous; Insecure; Worried that it will affect my work	Fearful / nervous
Voice loss / huskiness / hoarseness; Aching / pain (unspecified); Itchy eyes / nose; Watering eyes; Congested; Blocked nose / rhinitis; Dizzy / shakiness	Other symptoms
Irritable; Annoyed; Impatient	Irritable / annoyed
Inferior; Useless / a failure; Guilty / responsible / bad; Unable to be my best / work to my best ability / effectively	Inferior / disadvantaged

<sup>a</sup>This table shows the descriptor for responses provided by more than three participants surveyed.

130 **Table S2. Analysis of overall impairments due to asthma and total work productivity loss by COPD, age and country**

Endpoint	Model	p-value					
Overall impairments due to asthma by COPD and country		COPD	COUNTRY	COPD*COUNTRY			
	With interaction factor	<.0001	<.0001	0.1693	Factor	LS means (95% CI)	Difference between means
	Without interaction factor	<.0001	<.0001	n/a	COPD no	8.6 (7.7,9.5)	
					COPD yes	19.9 (16.8,23.0)	11.3 (8.1, 14.5)
Overall impairments due to asthma by age and country		AGE	COUNTRY	AGE*COUNTRY			
	With interaction factor	0.0110	0.0118		Factor	LS means (95% CI)	Difference between means (versus lowest age group)
	Without interaction factor	0.0015	<.0001	n/a	Age 18-24	9.0 (6.1,11.9)	n/a
					Age 25-39	11.5 (10.2,12.9)	2.5 (0.7, 5.7)
					Age 40-59	7.7 (6.3, 9.1)	-1.3 (-4.5, 2.0)
					Age ≥60	7.8 (4.6, 11.1)	-1.1 (-5.4, -3.2)

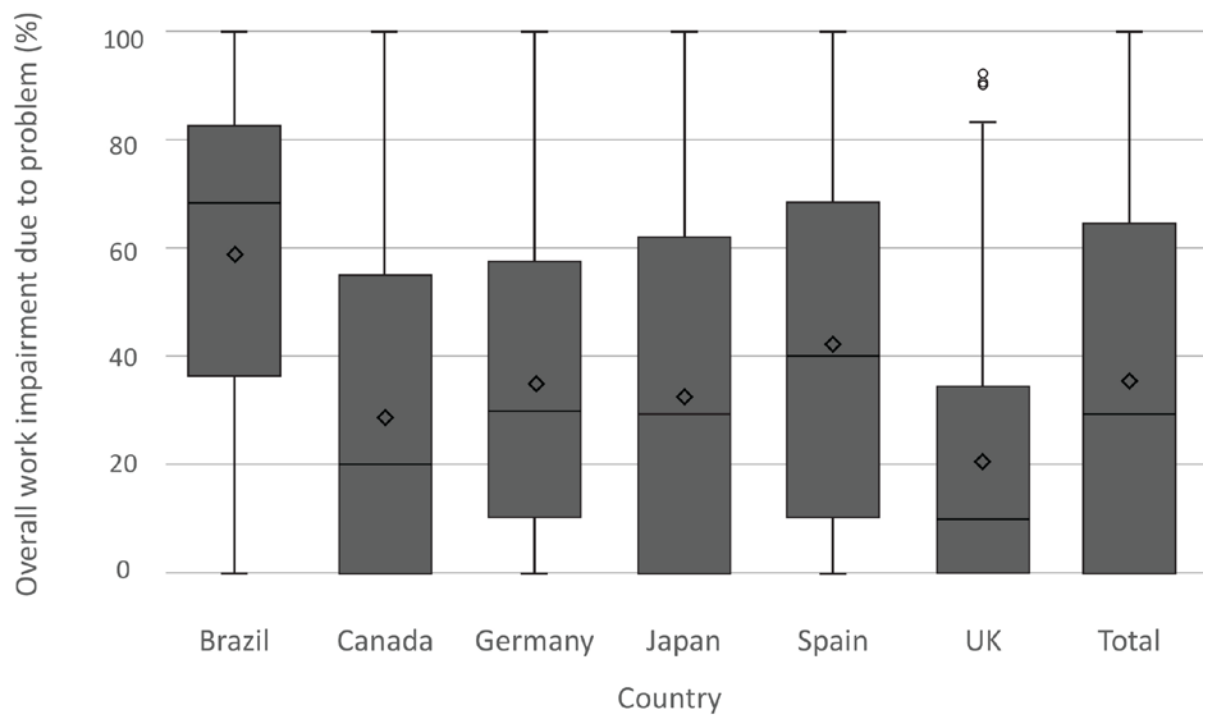
<b>Total work productivity loss by COPD and country</b>		COPD	COUNTRY	COPD*COUNTRY			
	With interaction factor	<.0011	<.0001	0.6309		LS means (95% CI)	Difference between means
	Without interaction factor	<.0011	<.0001	n/a	COPD no	34.9 (33.3, 36.4)	
					COPD yes	56.11 (50.9, 61.3)	21.2 (15.8, 26.7)
<b>Total work productivity loss by age and country</b>		AGE	COUNTRY	AGE*COUNTRY			
	With interaction factor	<0.001	<0.001	0.8597			
	Without interaction factor	<0.001	<0.001	n/a	Factor	LS means (95% CI)	Difference between means (versus lowest age group)
					Age 18-24	39.9 (35.0, 44.7)	n/a
					Age 25-39	41.2 (38.9, 43.5)	1.4 (-4.0, 6.7)
					Age 40-59	32.2 (29.8, 34.6)	-7.6 (-13.1, -2.1)
					Age ≥60	28.0 (22.6, 33.5)	-11.8 (-19.1, -4.5)

131 CI, confidence intervals; COPD, chronic obstructive pulmonary disease; LS, least squares

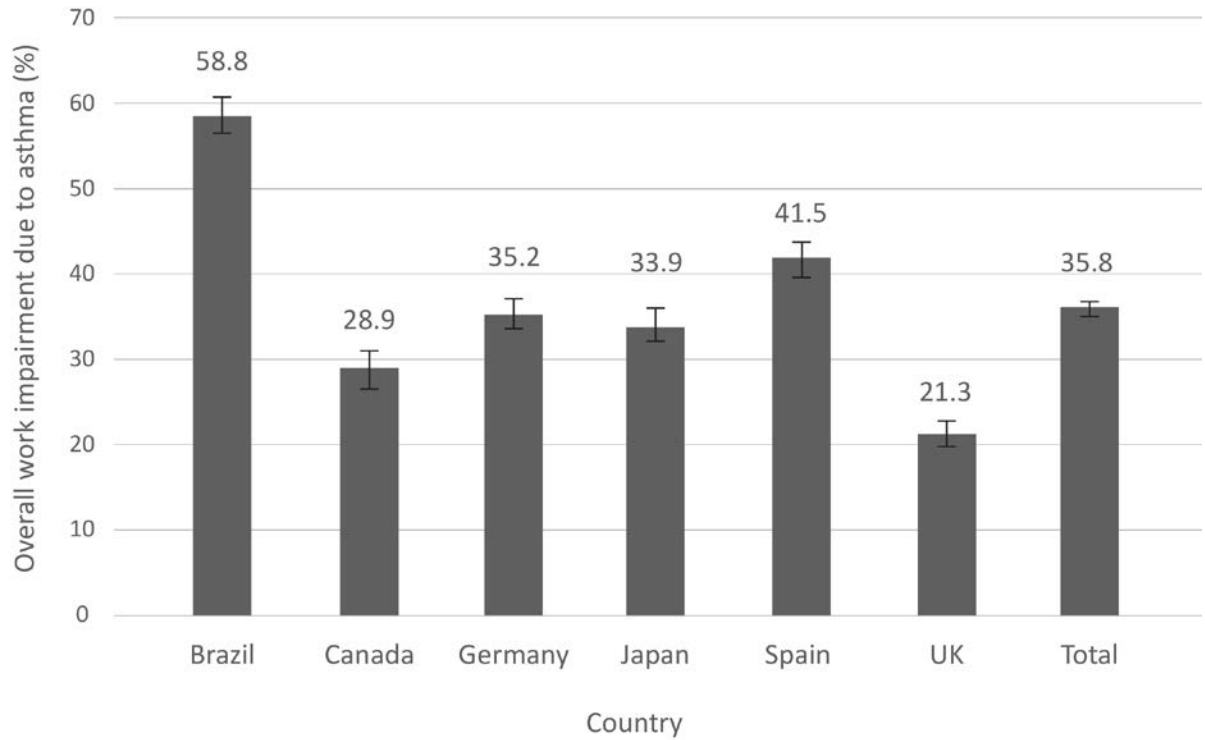


**Figure S1 Graphical representation of overall work impairment due to asthma:**

a) Box-and-whisker plot

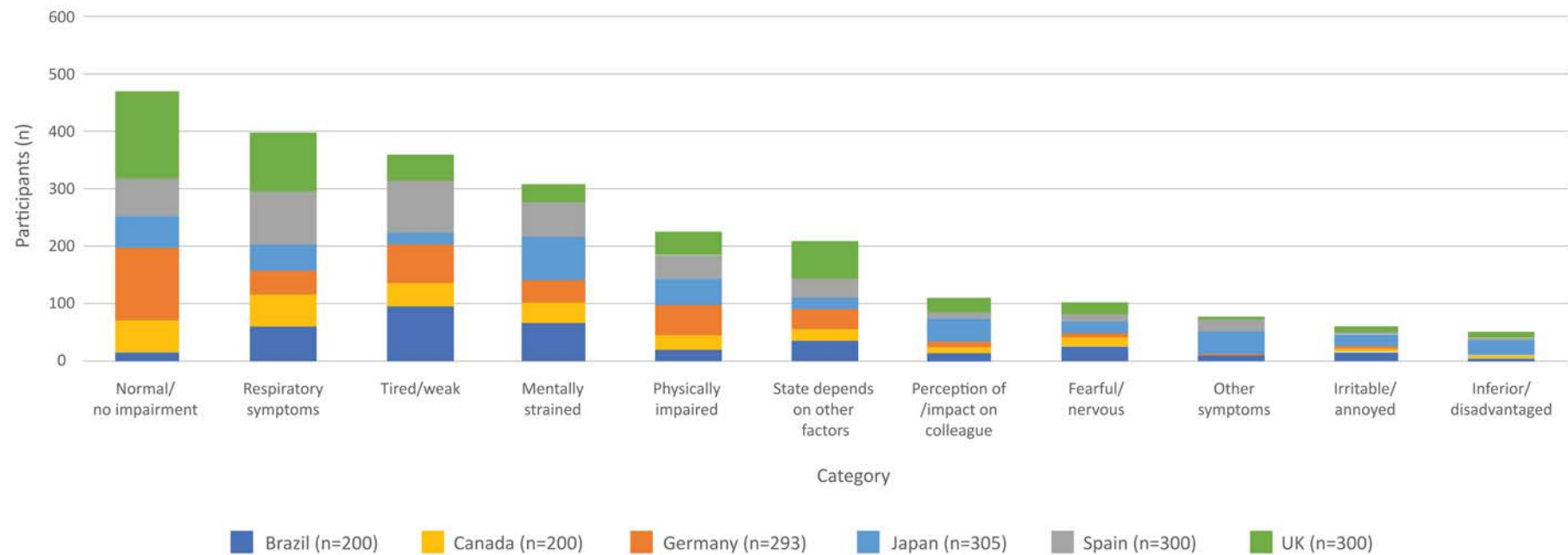


b) Histogram



137 Total work productivity loss takes into consideration the amount of time lost (absenteeism)  
138 and the degree of impairment whilst working to produce an overall percentage that  
139 summarizes the work impairment due to asthma; its calculation is detailed in the  
140 methodology. In the box-and-whisker plot, the length of the box represents the  
141 interquartile range (25<sup>th</sup>–75<sup>th</sup> percentile), the diamond symbol represents the mean, the  
142 horizontal line within the box represents the median, and outliers are plotted as separate  
143 points beyond the whiskers. In this histogram, mean values are plotted with error bars to  
144 represent standard error of the mean. All respondents (N=1,540); Brazil (n=197); Canada  
145 (n=187); Germany (n=284); Japan (n=295); Spain (n=294); UK (n=283).

146 **Figure S2** Patient insights into the effects of asthma at work: by country



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148 WPAI-SHP Q7 (open question). “How does asthma at work make you feel?” 1,598 participant responses were recorded; each individual could  
 149 raise more than one challenge.

150 **Abbreviation:** WPAI-SHP, Work Productivity and Activity Impairment – Specific Health Problem.