# Distinct work-related, clinical and psychological factors predict return to work following treatment in four different cancer types

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#### Abstract

*Objective*: Many factors influence return to work (RTW) following cancer treatment. However specific factors affecting RTW across different cancer types are unclear. This study examined the role of clinical, sociodemographic, work and psychological factors in RTW following treatment for breast, gynaecological, head and neck, and urological cancer.

*Methods*: A 12-month prospective questionnaire study was conducted with 290 patients. Cox regression analyses were conducted to calculate hazard ratios (HR) for time to RTW.

*Results*: Between 89–94% of cancer survivors returned to work. Breast cancer survivors took the longest to return (median 30 weeks), and urology cancer survivors returned the soonest (median 5 weeks). Earlier return among breast cancer survivors was predicted by a greater sense of control over their cancer at work (HR 1.2; 95% CI: 1.09–1.37) and by full-time work (HR 2.1; CI: 1.24–3.4). Predictive of a longer return among gynaecological cancer survivors was a belief that cancer treatment may impair ability to work (HR 0.75; CI: 0.62–0.91). Among urological cancer survivors constipation was predictive of longer RTW (HR 0.99; CI: 0.97–1.00), whereas undertaking flexible working was predictive of returning sooner (HR 1.70; CI: 1.07–2.7). Head and neck cancer survivors who perceived greater negative consequences of their cancer took longer to return (HR 0.27; CI: 0.11–0.68). Those reporting better physical functioning returned sooner (HR1.04; CI: 1.01–1.08).

Received: 3 March 2011 Revised: 8 December 2011 Accepted: 21 January 2012 *Conclusion*: A different profile of predictive factors emerged for the four cancer types. In addition to optimal symptom management and workplace adaptations, the findings suggest that eliciting and challenging specific cancer and treatment-related perceptions may facilitate RTW. Copyright © 2012 John Wiley & Sons, Ltd.

Keywords: cancer; oncology; return to work; patient perceptions; treatment beliefs

#### Introduction

Advances in the early detection and treatment of cancers have resulted in an improved prognosis and, thus, an increasing number of people of working age are able to return to usual aspects of life, including work [1]. Along with the obvious financial implications, participation in work is recognised as important for overall psychological and physical well-being [2], and for many cancer survivors, returning to work represents a sign of returning to normality and social reintegration [3].

A recent review reported 41–84% of cancer survivors returned to work following cancer treatment [4]. The high recurrence rate of cancers of the nervous system and reduced life expectancy of lung cancer account for the lower employment rate observed among these cancer types, but generally, there are no conclusive findings regarding the impact of the disease stage and cancer site on the return to work (RTW) of cancer survivors [4]. This is largely because the majority of studies include either a single cancer type or a range of cancer types (analysed as a mixed group), so possible differences between cancer types are not reported. However, it is reported that some factors associated with cancer (i.e. treatment type), as well as sociodemographic and work-related factors, influence employment and work ability [5]. For example being older, having a lower level of education and working in a blue collar job are associated with not working. In contrast, receiving support from occupational health, flexibility within the workplace and a supportive work environment have been shown to be enabling factors [4].

A recent in-depth review suggested four groups of associated factors that could exert an influence on the RTW process, namely the impact of the cancer site, the impact of treatment, occupational status and the role of others [6]. However, it is evident from literature across a range of conditions that a patient's beliefs about their illness are of importance in predicting a range of health-related behaviours. The prominent theoretical model underscoring the importance of illness perceptions is Leventhal's Self-Regulation Model [7,8]. The model proposes that people construct illness representations (or beliefs about their illness) that allow them to make sense of their condition and that these beliefs direct subsequent illness and health-related behaviours. A recent review states the case for the importance of self-regulatory processes (including patients' illness perceptions) in relation to health outcomes, including work behaviour [9]. Using multivariate analysis, one study among patients with a range of chronic diseases suggested that more negative beliefs about the consequences of one's illness were associated with unemployment [10]; a second suggested that holding a belief that one's illness would continue for a longer period was associated with taking longer to RTW [11]. However, illness representations are also important because they have been shown to be modifiable through short cognitive-based programmes that attempt to address misconceptions and improve patient understanding of their condition [12,13]. Therefore, psychological factors that influence RTW could similarly be amenable to interventions to optimise a positive outcome. The aims of this study were to examine the particular psychological, work-related, sociodemographic and clinical factors influencing RTW among four groups of cancer survivors (urological cancer, breast, gynaecological or head and neck) and determine if different profiles of predictive factors emerged across cancer types. Urological (specifically prostate), breast and gynaecological cancers are among the most commonly diagnosed cancer types worldwide but are associated with a range of treatment modalities and treatment burdens for the individual. Breast cancer and prostate cancer survivor samples have independently been included in existing RTW studies [4-6]. One recent study investigated employment and RTW in head and neck cancer survivors as a single group, [14] but this group and gynaecological cancer survivors have been investigated less frequently.

# Materials and methods

# Patients and procedure

Local research ethical approval was obtained. Participants were recruited from out-patient departments of hospitals in three UK Healthcare Trusts (see Figure 1). Patients were eligible for inclusion if aged over 18, employed at the time of diagnosis, had completed treatment and were able to complete a questionnaire in English. Patients with metastatic cancer were excluded. Recruitment was continuous and conducted by two researchers using a similar verbal explanation and invitation. Patient information sheets were provided and written consent was obtained prior to questionnaire completion. The majority of patients completed the questionnaire at home and returned it in a prepaid envelope. Patients were followed up after 6 and 12 months to elicit work status.

## Sociodemographic factors

Participants reported age at study entry, educational level, whether they were the main provider of financial support for their family and gender (head and neck cancer patients) (see Table 1).

# **Clinical factors**

Cancer site, treatment received and comorbidities were obtained from the patient's medical records.

# Work-related factors

Self-reported job descriptions were categorised into occupational groups according to descriptive labels provided in the International Standard Classification of Occupations (ISCO 88-COM) [15]. Regrouping created three categories: white collar (managerial and professional occupations), pink collar (clerical, sales and service occupations) and blue collar (manufacturing and materials handling). Participants indicated the size of their employing company (small <60 employees, medium 60–100 employees or large >100 employees) and the number of hours worked per week (part-time (<35 h/week) or full-time  $(\geq 35 \text{ h/week})$ ). Number of years with company, flexible working allowed (total hours worked, start/finish time) (yes/no), number of months full sick pay allowance and health insurance (yes/no) were also recorded.

# **Psychosocial factors**

*Illness Perceptions Questionnaire [16]:* Adapted for cancer patients, responses are rated on a five-point Likert scale. Subscales assess *timeline* (five items, score range 1–5; Cronbach's alpha 0.70), *consequences* (six items, score range 1–6; Cronbach's alpha 0.61); *personal control* (five items, score range 1–5; Cronbach's alpha 0.62); *treatment control* (seven items, score range 1–7, Cronbach's alpha 0.66); *coherence* (five items, score range 1–5; Cronbach's alpha 0.67) and *emotional impact* (six items, score range 1–6; Cronbach's alpha 0.67) and *emotional impact* (six items, score range 1–6; Cronbach's alpha 0.83). A higher score for the timeline indicates a belief that cancer will be long-lasting; a higher score for the remaining subscales indicates a greater impact (e.g. more consequences, higher level of personal control).

EORTC Quality of Life Questionnaire (QLQ-C30) [17]: This scale comprises 30 items covering physical (Cronbach's alpha 0.71), role (Cronbach's alpha 0.85), emotional (Cronbach's alpha 0.88), cognitive (Cronbach's alpha 0.67) and social function (Cronbach's alpha 0.81), as well as global health status (Cronbach's alpha 0.88). In addition, there are symptom scales for fatigue (Cronbach's alpha 0.84), nausea and vomiting (Cronbach's alpha 0.67), pain (Cronbach's alpha 0.78) and several single-item scales (financial difficulties, dyspnoea,



Figure 1. Screening/recruitment flowchart

*insomnia, appetite loss, constipation, diarrhoea*). A higher score represents a higher ('better') level of functioning or higher ('worse') level of symptoms. All scales range from 0–100.

*Hospital Anxiety and Depression Scale [18]:* This scale comprises 14 items producing separate *anxiety* (Cronbach's alpha 0.84) and *depression* scores (Cronbach's alpha 0.79). Score range is 0–21. A higher score indicates greater anxiety/depression.

*Fear of Recurrence Scale [19]:* This is a five-item measure of fear of cancer recurrence. Responses are rated on a five-point Likert scale ('not at all' to 'very much'). Cronbach's alpha is 0.77. Score range is 5–25. A higher score represents a greater fear of recurrence.

Illness perceptions in relation to work [20]: This is a modified version of the Brief Illness Perceptions Questionnaire [21]. The Brief Illness Perceptions Questionnaire assesses the cognitive and emotional representations of illness. This adapted, eight-item scale assessed beliefs about the effect of cancer on work (e.g. 'How much do you expect your cancer to affect your life at work?' and 'How well do you feel your cancer is understood at work?' (see Table 2)). Each item is treated as an individual score with answers provided on eight-point scales (range 0–7). A higher score represents a greater impact on the subscale.

*Work values [22]:* This comprises three subscales: *extrinsic* work aspects (Cronbach's alpha 0.79), *intrinsic* work aspects (Cronbach's alpha 0.84) and

*social relations* at work scale (Cronbach's alpha 0.80). Responses are rated on a five-point Likert scale ('very unimportant' to 'very important'). Score range is 1–5. A higher score represents stronger work values.

## Return to work

Date of cessation of work was obtained at the time of consent to the study. Patients were asked to recall the precise date of RTW at the sixth-month or 12th-month follow-up interview; the date of return was validated via the participants own diary record (majority of cases) or via employers' records if necessary. Patients were asked whether they had 'returned to work' which was defined as return to paid employment, whether a different job, reduced hours, fulltime or a reduced salary. A proxy total number of days off work (for those who had not returned to work at the study end) was calculated as the number of days between the date they left work and study recruitment and adding 365 (the maximum length of study follow-up).

## Statistical analysis

Statistical analysis was undertaken using SPSS version 15.0 (SPSS Inc. Chicago, II, USA). Variables were entered singly (univariately) into the first Cox regression to identify independent psychological, sociodemographic, work-related and medical variables related to delay in RTW. These variables (excluding treatment type) were then included as covariates in a multivariate Cox regression model using forward stepwise procedure. Significant variables were entered into a final Cox regression model (Block 2, forward stepwise procedure) with

Table	١.	Demographic	and clinical	characteristics	of the	e participants
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		Number (%)/mean (SD)				
	Breast n = 89	Gynaecological n=56	Urological n = 88	Head and neck n=47		
Time to return to work (in weeks)						
Median	30.0	17.9	5.0	18.3		
25th-75th percentile	6.4–51.8	11.0-31.3	2.9-13.4	7.7–38.4		
Sociodemographic factors						
Gender						
Female	89 (100)	56 (100)	—	12 (25.5)		
Male	_	_	88 (100)	35 (74.5)		
Mean age at study entry (years)	49 (7)	48 (10)	54 (11)	52 (9)		
Ethnicity			. ,			
White	74 (83.1)	51 (91.1)	70 (79.5)	42 (89.4)		
Black Caribbean	5 (5.6)	0 (0)	9 (10.2)	2 (4.3)		
Black African	4 (4.5)	(1.8)	2 (2.3)	1 (2,1)		
Asian	0 (0)	3 (54)	3 (34)	0 (0)		
Other	6 (67)	1 (18)	4 (4 6)	2 (4 3)		
Marital status	0 (0.7)	1 (1.0)	1 (1.0)	2 (1.5)		
Married	53 (59 6)	37 (64 3)	73 (83)	35 (745)		
Not married/diversed/widewed	36 (40.4)	20 (35.7)	15 (17)	12 (25 5)		
Financially responsibility for family	20 (45 0)	20 (33.7)	15 (17)	12 (23.3)		
	JO (TJ.O)	10 (27.6)	тэ (эт.7)	17 (17.2)		
	0 (0 0)	0 (142)		0 (10 1)		
INO qualifications	8 (9.0)	8 (14.3)	19 (21.6)	9 (19.1)		
GSCE/equivalent	21 (23.6)	8 (14.3)	20 (22.7)	14 (29.8)		
A level/equivalent	19 (21.3)	8 (14.3)	15 (17.0)	9 (19.1)		
Degree or higher	41 (46.1)	32 (57.1)	34 (38.6)	15 (31.9)		
Clinical factors						
Treatment type (total)						
Radiotherapy (r/therapy)	78 (87.6)	19 (33.9)	5 (5.7)	39 (83)		
Chemotherapy (c/therapy)	66 (74.2)	12 (21.4)	14 (15.9)	13 (27.7)		
Surgery	88 (98.9)	53 (94.6)	66 (75)	33 (70.2)		
Treatment combinations						
Radiotherapy only	( . )	2(3.6)	4 (4.5)	8(17.0)		
Chemotherapy only	0	0	0	0		
Surgery only	3 (3.4)	31 (55.4)	51 (58.0)	8(17.0)		
Surgery and c/therapy	8 (9.0)	8 (14.3)	4 ( 5.9)	0		
Surgery and r/therapy	19 (21.3)	10 (17.9)	( . )	18(38.3)		
Surgery and c/therapy and r/therapy	58 (65.2)	4 (7.1)	0	7(14.9)		
Chemotherapy and radiotherapy	—	(1.8)	0	6 (12.8)		
Hormonal therapy	69 (77.5)	_	_	_		
Brachytherapy	_	_	18 (20.5)	_		
One or more comorbidities	35 (39.3)	24 (42.9)	44 (50.0)	21 (44.7)		
Work-related factors						
Size of company						
Small (<60 employees)	21 (23.6)	9 (16.1)	4 ( 6.5)	5 (10.6)		
Medium (60–100 employees)	14 (15.7)	5 (8.9)	5 (5.9)	5 (10.6)		
Large (>100 employees)	39 (43.8)	35 (62.5)	46 (54.1)	28 (59.6)		
Self-employed	15 (16.9)	7 (12.5)	20 (23.5)	9 (19.1)		
Number of years with company	10.1 (8.3)	10.3 (10.3)	15.1 (11.7)	13.4 (13.7)		
Hours worked		× /	· · · ·			
Full-time (>35 h/wk)	57 (64.8)	37 (68.5)	71 (87.7)	35 (76.1)		
Part-time (<35 h/wk)	31 (352)	17 (31 5)	10 (12 3)	11 (239)		
Collar grouping	· · · · · · · · /	()	· (·)	()		
White	56 (62.9)	39 (69 6)	43 (494)	25 (532)		
Pink	21 (23.6)	12 (21 4)	9 (103)	6 (12 8)		
Blue	12 (135)	5 (89)	35 (40.2)	16 (340)		
Elexible working allowed	4 (46 1)	9 (339)	4  (48.8)	20 (42 6)		
Number of months full sick pay	36 (37)	34 (29)	2.2 (2.8)	34 (30)		
Health insurance available	18 (20 5)	11 (196)	27(21)	10 (21 3)		
risalar mooranee avanable	10 (20.0)		27(31)	10 (21.3)		

adjustment for treatment type, where this was identified univariately. Treatment type comprised of radiotherapy, chemotherapy, surgery, brachytherapy (urology patients), hormonal therapy (breast cancer patients), and the responses were dichotomised (yes/no). Hazard ratios (HR) are reported along with 95% confidence intervals. A hazard ratio of above 1 indicates a faster RTW.

#### Table 2. Mean scores on measures

	Mean (SD)				
	Breast n = 89	Gynaecological n = 56	Urological n=88	Head and neck n=47	
Illness perceptions questionnaire					
Consequences	4.1 (0.6)	4.0 (0.7)	3.9 (0.6)	4.1 (0.4)	
Emotional impact	3.3 (0.7)	3.4 (1.1)	3.1 (0.9)	2.9 (0.7)	
Timeline	3.0 (0.8)	2.8 (0.7)	3.0 (0.7)	3.0 (0.7)	
Treatment control	3.8 (0.4)	3.9 (0.5)	3.8 (0.6)	3.9 (0.5)	
Coherence	3.8 (0.7)	3.8 (0.7)	3.8 (0.7)	3.6 (0.8)	
Personal Control	3.7 (0.7)	3.4 (0.8)	3.6 (0.7)	3.8 (0.5)	
Fear of Recurrence	13.6 (3.3)	13.5 (4.6)	12.0 (3.8)	12.3 (3.8)	
Hospital Anxiety and Depression Scale					
Anxiety (total score)	6.3 (3.9)	6.6 (4.1)	4.4 (3.4)	4.8 (3.9)	
Depression (total score)	3.0 (2.5)	4.9 (3.4)	3.2 (2.9)	3.4 (3.8)	
Quality of life (EORTC)					
Global health status	70.8 (18.3)	64.2 (21.0)	67.7 (21.3)	67.7 (23.6)	
Physical functioning	80.2 (16.8)	76.2 (19.9)	82.0 (16.8)	85.3 (16.6)	
Role function	77.6 (21.4)	65.4 (32.2)	70.8 (29.5)	77.6 (27.4)	
Emotional functioning	73.2 (22.2)	65.1 (27.6)	78.3 (19.7)	74.2 (24.1)	
Cognitive functioning	72.1 (25.1)	72.0 (24.9)	83.7 (19.1)	84.5 (25.8)	
Social functioning	68.9 (29.5)	62.4 (30.7)	62.1 (29.3)	72.0 (28.5)	
Fatigue	39.0 (24.8)	42.2 (21.6)	34.0 (24.1)	38.2 (29.8)	
Nausea	4.5 (10.8)	6.2 (13.5)	7.5 (14.8)	3.2 (22.3)	
Pain	24.9 (24.5)	25.6 (24.3)	23.3 (25.3)	22.4 (27.9)	
Dyspnoea	15.2 (22.4)	8.0 (17.0)	15.6 (26.4)	12.4 (20.6)	
Insomnia	41.0 (33.2)	42.8 (33.5)	30.0 (31.4)	30.2 (36.9)	
Appetite	7.7 (18.4)	13.0 (22.8)	10.6 (22.1)	33.3 (35.3)	
Constipation	10.3 (21.5)	22.2 (31.7)	13.0 (22.0)	20.2 (30.9)	
Diarrhoea	6.1 (14.9)	3.6 (22.9)	11.8 (24.2)	4.7 (11.6)	
Financial difficulties	36.6 (37.3)	28.4 (36.9)	23.6 (33.0)	29.5 (37.2)	
Illness perceptions in relation to work					
Life at work affected by cancer	2.7 (1.8)	2.3 (2.0)	1.9 (1.7)	2.1 (1.9)	
How long work will be effected	2.5 (1.8)	1.9 (1.7)	1.8 (1.6)	2.4 (2.0)	
Control over effects of cancer at work	3.8 (2.2)	3.9 (2.2)	4.6 (1.9)	4.6 (2.1)	
Treatment impairs ability to work	2.3 (1.9)	1.9 (1.6)	1.5 (1.5)	2.0 (2.0)	
Experience symptoms at work	2.0 (1.8)	1.5 (1.4)	1.5 (1.6)	1.5 (1.5)	
Concern over cancer returning	2.6 (2.0)	2.7 (2.2)	2.1 (1.9)	2.4 (2.1)	
Cancer is understood at work	5.0 (1.8)	4.5 (2.0)	4.5 (1.9)	4.8 (2.1)	
Affected emotionally at work	2.6 (2.0)	2.8 (1.9)	1.8 (1.7)	2.0 (2.1)	
Work values					
Intrinsic	4.1 (0.5)	4.0 (0.8)	4.0 (0.6)	3.9 (0.5)	
Extrinsic	3.9 (0.6)	3.7 (0.7)	3.7 (0.6)	3.6 (0.6)	
Social	4.5 (0.6)	4.3 (0.7)	4.1 (0.6)	4.1 (0.5)	

EORTC, European Organisation for Research and Treatment of Cancer.

## Results

#### Participants

Of the 332 patients who consented to participate in the study, 290 (87%) returned the questionnaire. Participants had a mean age of 55 years (SD 10.5 years) and a range of 28–65 years. Baseline sociodemographic, clinical characteristics and work-related factors are presented in Table 1, along with return to work data. The median duration from start of treatment to completion of the questionnaire was 119 days, and the median number of days off work to the time the questionnaire was completed was 144 days. Six participants had worked

through their treatment, and four patients were lost to follow-up. Results pertaining to univariate and adjusted multivariate prognostic indicators are presented for the remaining 280 participants in Table 3.

Breast cancer survivors took longest to RTW, median 30.0 weeks (interquartile range (IQR) 45.4 weeks), followed by head and neck and gynaecology cancer survivors, median 18.3 weeks (IQR 30.7) and 17.9 weeks (IQR 20.3), respectively. Urology cancer survivors returned the soonest (median 5.0 weeks (IQR 10.6)). After controlling for age and treatment type, with urology as the reference group, the other three cancer types took approximately twice as long to return to work: breast cancer (HR 0.57; 95% CI Table 3. Univariate, multivariate and adjusted multivariate prognostic indicators for return to work in cancer survivors (only significant variables shown)

	Independent unadjusted variables		Multivariate mutually adjusted		Multivariate adjusted for treatment type	
	HR	95% CI	HR	95% CI	HR	95% CI
Breast cancer						
Academic attainment						
None versus degree/higher	0.40*	0.17-0.94				
GCSE equivalent versus degree/higher	0.32**	0.13-0.79				
Hours worked						
Full-time versus part-time	1.59*	0.99-2.53	2.1**	1.243.4	N/A	N/A
Total hours worked	1.02*	1.00-1.05				
Illness perceptions						
Consequences	0.64*	0.40-0.98				
Fear of recurrence	0.91*	0.84-0.98				
EORTC quality of life						
Fatigue	0.99*	0.98-1.00				
Illness perceptions in relation to work						
Control over effects of cancer at work	1.16**	1.04-1.30	1.2***	1.09-1.37	N/A	N/A
Gynaecological cancer						
Hours worked						
Full-time versus part-time	1.86*	0.99-3.46				
Illness perceptions						
Personal control	1.42*	0.99-2.03				
Illness perceptions in relation to work						
Treatment impairs ability to work	0.77**	0.64–0.94	0.74**	0.61-0.91	0.75**	0.62-0.91
Head and neck cancer						
Illness perceptions						
Consequences	0.25***	0.12-0.58	0.27**	0.11-0.68	N/A	N/A
Hospital Anxiety and Depression Scale						
Depression	0.89*	0.81-1.00				
EORTC Quality of life						
Global health score	1.02*	1.00-1.03				
Physical function	1.03**	1.01-1.06	1.04**	1.01-1.08	N/A	N/A
Social function	1.02*	1.00-1.03				
Illness perceptions in relation to work						
Life at work affected by cancer	0.82**	0.72-0.94				
How long work will be affected	0.81*	0.69–0.97				
Urological cancer						
Flexible working versus not flexible working	1.65*	1.05-2.7	1.67*	1.02-2.67	1.70*	1.07-2.7
EORTC Quality of life						
Role function	1.01**	1.00-1.02				
Emotion function	1.02*	1.00-1.03				
Social function	1.01*	1.00-1.02				
Nausea	0.98*	0.97-1.00				
Constipation	0.98**	0.97–0.99	0.98**	0.97–0.99	0.99*	0.97-1.00
Illness perceptions in relation to work						
Life at work affected by cancer	0.82**	0.72-0.94				
Treatment impairs ability to work	0.86*	0.74-0.99				
Experience symptoms at work	0.85*	0.73-0.99				
I reatment type	1.0.1					
Brachytherapy versus none	1.86*	1.08-3.2				

HR, hazard ratio; Cl, confidence interval.

Reference group for continuous variables: a higher score on that variable is related to a faster (if HR > I) or slower (if HR < I) return to work.

\*p < 0.05;

\*\*\*p<0.01;

\*\*\*\*\*p < 0.001.

0.36–0.91; p = 0.19), gynaecological cancer (HR 0.53; 95% CI 0.36–0.78; p < 0.001) and head and neck (HR 0.52; 95% CI 0.334–0.81; p < 0.01). At the 12th-month follow-up, 23 participants were not working.

In general, the subscales do not differ greatly between the cancer types; the head and neck cancer survivors experienced greater problems regarding appetite (EORTC QLQ-C30) (a difference in EORTC score of 10–20 may represent a moderate subjective difference) [14]. Mean Hospital Anxiety and Depression Scale scores were not clinically significant in any of the groups (see Table 2).

## Univariate analysis

For all cancer groups, sociodemographic, clinical and psychological variables were important in relation to RTW (see Table 3).

With regard to treatment type, in gynaecological cancer patients, there was a trend for those who underwent radiotherapy (n=19) to take longer to RTW (median 25.4 weeks; IQR 36.0) than those who did not (n=37) (median 14.1 weeks; IQR 13.6); (HR 0.05; CI 0.27–1.00; (p=0.06)).

For urological cancer patients, men undergoing brachytherapy (n = 18) returned to work sooner (median 2.9 weeks (IQR 3.1)) than those who did not (n = 70) (median 7.7 weeks (IQR 10.6)); (HR 1.86; CI 1.08–3.2; (p < 0.05)).

#### Multivariate analysis

Adjusted (mutually and for treatment type) multivariate analyses are also shown in Table 3.

#### **Breast cancer patients**

Those who perceived greater control over the effect of their cancer at work were more likely to RTW sooner (HR 1.20; 95% CI 1.09–1.37; p < 0.01). The median rate of RTW for those in the 75th percentile was 9.5 weeks (IQR 38.6) versus 35.9 weeks (IQR 29.4) for those in the 25th percentile. Furthermore, those who worked full-time were twice as likely to RTW sooner (median 20.4 weeks (IQR 35.9) vs 40 weeks (IQR 40.9); HR 2.1; 95% CI 1.24–3.4; p < 0.001).

#### Gynaecological cancer patients

Those who perceived a greater impact of the effect of their cancer treatment at work took longer to RTW than those who did not (median for those in the 75th percentile was 21.9 weeks (IQR 45.6) vs 12.8 weeks (IQR 13.6) for those in the 25th percentile (HR 0.75; 95% CI 0.62–0.91; p < 0.01)).

#### Head and neck cancer patients

Those who perceived greater consequences as a result of their cancer took longer to RTW (median for those in the 75th percentile 42.3 weeks (IQR 58.1) versus 16.0 weeks (IQR 17.4) for those in the 25th percentile; HR 0.27; 95% CI 0.11–0.68; p < 0.01). Those who reported a greater level of physical functioning returned to work sooner than those who did not (75th percentile median 13.6 weeks (IQR 19.4) vs 38.4 weeks (IQR 59.9) for 25th percentile; HR 1.04; 95% CI 1.01–1.08; p < 0.01).

#### **Urology patients**

On adjusted multivariate analysis, one symptom was significant. Those who reported constipation took longer to RTW (median 13.4 weeks (IQR 29.0) weeks vs 4.4 weeks (IQR 7.4); HR 0.99; 95% CI 0.97–1.00; p < 0.05).

Those who were able to undertake flexible work were likely to return sooner (median 3.6 weeks (IQR 6)) than those who were not (median 9.8 weeks (IQR 12)); (HR 1.70; CI 1.07–2.7 (p = <0.05)).

## Discussion

This study set out to examine predictors of the length of time to RTW within four cancer types and include the role of psychological factors. Results suggest that different predictors of RTW, including psychological factors, may be relevant to individual cancer types, independent of treatment type.

Overall, the majority of patients within each cancer type returned to work; just over 10% of patients recovering from head and neck cancer did not RTW, whereas between 6% and 8% of patients with urological cancer, gynaecological cancer and breast cancer had not returned to work by the 12-month follow-up. As may be expected, with different disease and treatment burden, the time to RTW varied between the cancer types; those recovering from urological cancer returned soonest, a finding similar to previous reports [23], with the other cancer types taking approximately twice as long. Treatment may have been less onerous, comprising either day-case keyhole surgery, surgery only or brachytherapy in the majority of cases.

In line with other literature, treatment type was related to RTW. In the univariate analysis, there was a trend for those undergoing radiotherapy to take longer to RTW for people recovering from gynaecological cancer. Radiotherapy may specifically be associated with stiff joints and muscles, localised swelling and skin soreness in the affected area, which could have an impact on work-related physical demands. In the prostate cancer patients, men undergoing brachytherapy were more likely to return to work sooner, perhaps reflecting the minimal treatment burden associated with this single dose/single day therapy. In the same patient group, the experience of constipation was associated with time to RTW on the adjusted multivariate analysis. Managing changes in bowel function resulting from treatments such as surgery (decreased mobility may lead to changes in bowel function) and radiotherapy (self-medication for diarrhoea may cause constipation) is clearly of prime importance for these men.

Among the breast cancer sample, those who worked full-time returned sooner than those who worked parttime. The majority were white collar workers, highly educated and approximately half were single—factors shown to be related to a faster RTW in previous studies [4]. In addition, a prompt return to work could be the result of financial pressure, and it is possible that some women may have returned to work too soon. A long-term follow-up would determine satisfaction with the RTW process and possible subsequent withdrawal from the workplace. A recent qualitative study of the experiences of working among gynaecological cancer survivors indicated a need to address unrealistic expectations regarding ability to work and to help manage long-term residual symptoms [24].

A key finding is that perceptions of the impact of cancer (or its treatment) on work, as well as general illness perceptions, were independently predictive of length of time to RTW in three of the four cancer types. A perception of more severe consequences (and a longer course for the illness) has been shown to predict work behaviour among myocardial infarction patients [25]. Similarly, maladaptive illness perceptions have been observed among work-disabled patients with various chronic diseases [10]. However, this is one of the first studies examining the role of patient illness and treatment perceptions in people recovering from cancer. Furthermore, we have shown that perceptions of cancer, specifically in relation to work, are relevant to the behaviour of cancer survivors, a finding similar to that reported previously, which indicated that self-assessed work ability was an important prognostic factor for RTW among employed cancer patients who underwent treatment with curative intent [26].

Illness representations are important not just because of their predictive value but also because they are modifiable through short cognitive-based programmes. Such interventions have been successful in addressing maladaptive beliefs and perceptions [12,13]. In addition, a recent review of RTW interventions concluded that successful interventions should include person, environment and work-directed components [27]. These interventions elicit individual patterns of belief in either an individual or a group format; therefore, such interventions would be suitable across cancer types. Individualising and tailoring the programmes would make them shorter and more attainable. Our findings suggest that, for head and neck cancer patients, an important focus for intervention may be coping with practical issues. This may help address the concern regarding the perceived consequences of the cancer and physical functioning, which were predictive of length of time to RTW. Similarly, increasing perceptions of control over the effects of cancer at work and minimising the perceived impact of treatment on ability to work are relevant for breast cancer and gynaecological cancer survivors respectively. The optimal management of symptoms (e.g. constipation) comprising of appropriate, timely verbal and written information, thus, maximising clinical support, appears to be warranted among prostate cancer patients. The importance of the involvement of health professionals, including oncology specialists and allied health professionals, in the delivery of such interventions should not be underestimated. To date, the role of such professionals in the RTW process has been largely neglected, [6] but evidence suggests that even simple advice regarding RTW, when delivered by an oncologist, is effective in improving work outcomes [27]. Furthermore, among patients recovering from myocardial infarction, their physician's advice was strongly associated with RTW and remained the only predictor in the multivariate model [28]. Therefore, healthcare professionals working with cancer patients may benefit from an understanding of how cognitive processes influence patient outcomes,

such as RTW, and may benefit from a skill base to elicit individual patient beliefs in order to support patients both during and after treatment. This skill is important as recent research has shown that both health professionals [29] and employers [30] report illness perceptions that are discordant with those reported by cancer survivors. Communication skills training that incorporates cognitive (i.e. examination of clinicians' beliefs about their role) and behavioural aspects (i.e. practical training in the elicitation of the beliefs of patients) leads to improved confidence in the ability to elicit patients' beliefs and an increase in this behaviour in clinical practice [31].

With regard to study limitations, the sample sizes in our study are relatively small compared to retrospective questionnaire studies utilising large cancer registries for recruitment. Although questionnaire burden was limited as much as possible, some patients chose not to participate so soon following treatment. The small head and neck patient sample limits exploration of gender differences. Furthermore, although used in other studies, there is limited data regarding validation for the Fear or Recurrence (19) and Illness Perceptions in Relation to Work Scales (20) in this population. The use of multiple univariate tests to choose candidate predictor variables for the multivariate analysis increased the probability of finding a significant candidate predictor variable by chance at the 5% significance level (Type I error). However, as Table 3 shows, all but one of the multivariate predictor variables were significant at the 0.01 level or lower. Finally, RTW dates were provided by participant recall and personal diary check, verified in some cases with employer records, and there is the potential that this difference may have introduced variability in measurement.

However, the findings of this study do highlight the importance of illness and treatment-related perceptions. The differences between cancer types should also be given consideration by those delivering interventions. Who is best placed to do this has received little attention but physicians, cancer nurse specialists and allied health professionals are likely to be trusted by patients. Furthermore, such interventions should contain a cognitive component, addressing possible misconceptions and apprehensions regarding cancer and treatmentrelated factors that affect the RTW process.

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### **Conflict of interest**

No conflict of interest to be declared by any author.

#### References

- Rowland J, Aziz N, Tesauro G et al. The changing face of cancer survivorship. Semin Oncol Nurs 2001;17:236–240.
- Waddell G, Burton AK. Is Work Good for Your Health and Well-being. The Stationery Office: London. ISBN: 9780117036949, 2006
- 3. Steiner JF, Cavender TA, Main DS *et al.* Assessing the impact of cancer on work outcomes: what are the research needs? *Cancer* 2004;**101**:1703–1711.
- Taskila-Abrandt T, Lindbohm L. Factors affecting cancer survivors' employment and work ability. *Acta Oncol* 2007;46(4):446–451.
- 5. Spelten ER, Sprangers MAG, Verbeek JHAM. Factors reported to influence the return to work of cancer survivors: a literature review. *Psycho-Oncology* 2002;**11**:124–131.
- 6. Amir Z, Brocky J. Cancer survivorship and employment: epidemiology. *Occup Med* 2009;**59**:373–377.
- Leventhal H, Meyer D, Nerenz D. The common sense representation of illness danger. In *Contributions to Medical Psychology*, Rachman S (ed.). Pergamon Press: New York, NY, 1980;17–30.
- Leventhal H, Meyer D, Steele D. Illness representations and coping with health threats. In *A Handbook of Psychology and Health*, Baum A, Singer J (eds). Lawrence Erlbaum Associates, 1984;219–252.
- 9. Hoving JL, van der Meer M, Volkova AY *et al.* Illness perceptions and work participation: a systematic review. *Int Arch Occup Environ Health* 2010. DOI: 10.1007/s00420-010-0506-6.
- Boot CR, Heijmans M, van der Gulden JW *et al.* The role of illness perceptions in labor participation of the chronically ill. *Int Arch Occup Environ Health* 2008;82:13–20.
- McCarthy SD, Lyons AC, Weinman J et al. Do expectations influence recovery from oral surgery? An illness representations approach. *Psychol Health* 2003;**18**(1):109–126
- Hunter MS, Coventry S, Hamed H *et al.* Evaluation of a cognitive behavioural intervention for women suffering from menopausal symptoms following breast cancer treatment. *Psycho-Oncology* 2009;18:560–563.
- 13. Petrie KJ, Cameron LD, Ellis CJ *et al.* Changing illness perceptions after myocardial infarction: an early intervention randomised controlled trial. *Psychosom Med* 2002;**64**:580–586.

- Verdonck-de Leeuw IM, van Bleek WJ, Leemans CR et al. Employment and return to work in head and neck cancer survivors. Oral Oncol 2010;46:56–60.
- International Labour Organisation. International standard classification of occupations (ISCO-88). Available from: http://www.ilo.org/public/english/bureau/stat/isco/isco88/ index.htm
- Moss-Morris R, Weinman J, Petrie K *et al.* The revised Illness Perception Questionnaire (IPQ-R). *Psychol Health* 2002;**17**(1):1–16.
- Aaronson NK, Ahmedzai S, Bergman B *et al.* The European Organisation for Research and Treatment of Cancer QLQ-C30: A quality-of-life instrument for use in international clinical trials in oncology. *J Natl Cancer Inst* 1993;85: 365–376.
- 18. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand* 1983;67:361–370.
- Greenberg DB, Kornblith AB, Herndon JE *et al.* Quality of life for adult leukemia survivors treated on clinical trials of cancer and leukemia group B during the Period 1971– 1988 predictors for later psychologic distress. *Cancer* 1977;80:1936–1944.
- 20. Grunfeld EA, Cooper AF. Cancer survivors' and employers' perceptions of working following treatment for cancer. *Occup Med* 2010. DOI: 10.1093/occmed/kqq143.
- Broadbent E, Petrie KJ, Main J, Weinman J. The Brief Illness Perception Questionnaire. J Psychosom Res 2006;60:631–637
- Taris R, Feij JA. Longitudinal examination of the relationship between supplies-values fit and work outcomes. *Appl Psychol* 2001;50(1):52–80.
- Spelten ER, Verbeek JHAM, Uitterhoeve ALJ *et al.* Cancer, fatigue and the return of patients to work—a prospective cohort study. *Eur J Cancer* 2003;**39**:1562–1567.
- Grunfeld EA, Cooper AF. A longitudinal qualitative study of the experience of working following treatment for gynaecological cancer *Psycho-Oncology* 2012;21:82–89.
- Petrie KJ, Weinman J, Sharpe N *et al.* Role of patients' view of their illness in predicting return to work and functioning after myocardial infarction: longitudinal study. *BMJ* 1996;**312**:1191–1194.
- de Boer AGEM, Verbeek JHAM, Spelten ER *et al.* Work ability and return-to-work in cancer patients. *Br J Cancer* 2008;**98**:1342–1347.
- 27. Tamminga SJ, de Boer AGEM, Verbeek JHAM *et al.* Return to work interventions integrated into cancer care: a systematic review. *Occup Environ Med* 2010;**67**:639–648.
- Farkas J, Cerne K, Lainscak M *et al*. Return to work after acute myocardial infarction—listen to your doctor! *Int J Cardiol* 2008;**130**:e14–e16.
- Giris P, Poole J, Nightingale P *et al.* Perceptions of illness and their impact on sickness absence. *Occup Med* 2009; 59(8):550–555.
- Grunfeld EA, Rixon L, Eaton E *et al.* The organisational perspective on the return to work of employees following treatment for Cancer. *J Occup Rehabil* 2008;18:381–388.
- Jenkins V, Fallowfield L. Can communication skills training alter physicians' beliefs and behaviour in clinic? *J Clin Oncol* 2002;20:765–769.