

Working as a doctor when chronically ill or disabled: comments made by doctors responding to UK surveys

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Summary

Objectives: To report a qualitative study of themes doctors raised spontaneously, in a large-scale prospective cohort study covering many aspects of their medical careers, when referring to their own chronic illness or disability.

Design: Questionnaire survey.

Setting: UK.

Participants: Questionnaires were sent one, five and 10 years after graduation to 44,539 doctors who qualified between 1993 and 2012 in the UK: 38,613 questionnaires were returned and 11,859 respondents provided comments made by doctors about their training or work.

Main outcome measures: The comments of 123 doctors about their own chronic illness or disability.

Results: Main themes raised included poor support for doctors with chronic illness or disability, delays in and changes to careers (either planned ahead or imposed), the impact of pressure at work, difficulties returning to work after illness, limitations on career choices and inadequate careers advice for doctors with chronic illness or disabilities.

Conclusions: More needs to be done to ensure that doctors with chronic illness or disability receive appropriate support. Occupational health guidance should be monitored closely, with more support for ill doctors including adjustments to the job, help if needed with morale and mental health, and advice on career options. Further studies should establish the prevalence of long-term health conditions among doctors.

Keywords

Attitude of health personnel, physicians, workforce, medical, disabled persons, cost of illness

Introduction

Physical and mental illness among medical doctors has been documented in several studies. Stress, depression and burnout are common.^{1–4} ‘Sickness presenteeism’, where doctors go to work when they should take time off, is detrimental to the doctor’s own recovery, a risk to their patients’ health⁵ and makes the management

of sickness absence difficult.⁶ However, doctors often feel pressure to continue working while ill,⁷ and this can lead to acute problems becoming chronic.

The UK Medical Careers Research Group conducts prospective cohort studies of UK-trained doctors from a number of year-of-qualification cohorts. The survey questionnaires contain questions on the doctors’ career choice, work and training, and factors that have influenced them; we also invite the doctors to write comments on any aspect of their training and work if they wish. In this paper, we report on doctors’ comments about working as a doctor with, or being affected by, chronic illness or disability. In another recent paper⁷ we reported on doctors’ comments about acute illness. Our aim, in the present paper, is to report on the themes that doctors raised with us when discussing chronic illness or disability. As this was a qualitative study, it was not our intention to quantify the overall scale of problems associated with chronic illness; rather, it was to report on issues raised by the doctors even if numbers affected by them were small. We hope that senior doctors, human resources staff and health service administrators will consider, in respect of these case studies, what, in their view, the right organisational responses to the reported situations should be and whether the right responses would occur in their organisations.

Methods

The Medical Careers Research Group surveyed the UK medical graduates of 1993, 1996, 1999, 2000, 2002, 2005, 2008, 2009 and 2012. The aim in our surveys is to survey each cohort (by email, web and post, offering the doctors the choice of how they would like to reply) one, five and 10 years after qualification. This study uses data from the most recent year-one surveys (cohorts 2002, 2005, 2008, 2009 and 2012), year-five surveys (cohorts 1999, 2000, 2002, 2005) and year-10

surveys (cohorts 1993, 1996, 1999, 2000 and 2002). Non-respondents received several reminders. Full details of the methodology are described elsewhere.⁸

Our surveys were multipurpose and mainly contained closed questions about career choices, about career progression, and about experiences and attitudes. At the end of each survey questionnaire, in a section headed 'Additional Comments', we asked respondents to 'Please give us any comments you wish to make, on any aspect of your training or work'. The request was accompanied by a large blank box for responders to write comments in their own words; the equivalent online version of the surveys featured a large scrolling text box to collect extended comments. The researchers assured doctors that their individual comments would remain confidential, and any identifying information was redacted. All handwritten comments were transcribed into our database exactly as written and were combined with the electronic comments entered directly by web responders.

A strategy based on keyword search, supplemented by inspection of individual comments, was used to identify comments which were relevant to working as a doctor while chronically ill or disabled. The criteria and process used are described in Appendix 1.

The identified comments were read by two researchers and a coding scheme was developed iteratively which reflected the main themes raised. The researchers identified six main themes. Each researcher independently coded the comments, allocating up to five themes per doctor's comment (if more than one theme was raised). Any inter-coder differences were resolved through discussion.

Illustrative quotes for each theme are presented. We have endeavoured to provide quotes which are representative of the themes raised, and we report the frequency with which each theme was raised.

The analysis was undertaken in Microsoft Excel and SPSS. Quantitative data were analysed by univariate cross-tabulation and χ^2 statistics.

Results

Response

Questionnaires were sent to 44,539 doctors. The cohorts ranged in size from 3671 graduates in 1993 to 6795 graduates in 2008. Excluding doctors who declined to participate, were known to have died, or were untraceable (939 doctors), the response rate was 53.1% in year one (14,560/27,414), 59.4% (12,624/21,254) in year five and 61.6% (11,429/18,556) in year 10.

Of the doctors who provided comments on any topic (11,859), 123 made reference to what we classified as chronic illness (96) or disability (27).

Frequency of themes

The 123 doctors provided 205 comments in total (Table 1). Comments were classified under six themes: *Support from others* (60.2% of commenters who discussed chronic illness or disability raised this), *Career delay/change* (43.1%), *Pressure of work* (29.3%), *Return to work* (13.8%), *Career choices* (10.6%) and *Careers advice* (7.3%). No differences were found in the frequency of themes raised by men and women (Table 2). In the following sections, we summarise key points made by the doctors; we refer to specific comments, reproduced as written by the respondents, in Box 1. Each doctor's sex and number of years from qualification are given alongside each quotation.

Support from others

One doctor who used a wheelchair wrote about many problems with the internal layout of hospitals (Box 1, quote 1). A senior doctor with multiple sclerosis wrote about discrimination that she had experienced across many areas of her professional life (Box 1, quote 2).

On support, it was more common for doctors to write that they had received very little support than to write that they felt well supported, whether when dealing with chronic illness, bereavement, depression, anxiety or stress (Box 1, quotes 3–6).

Doctors suffering from a chronic illness wrote that it was hard to ensure that suitable adjustments were made to their job (Box 1, quotes 5–9).

Doctors complained that guidance from the Occupational Health service within their workplace was either not forthcoming or not acted upon (Box 1, quotes 6–7). For example, one doctor with a chronic knee problem said that recommendations were not followed through (Box 1, quote 7). Another doctor could not get referred to Occupational Health for months until a worsening health condition necessitated attention (Box 1, quote 8).

Some doctors, already with health problems, struggled to cope with pressure. One doctor said that during her first year she worked a minimum 10 h a day as well as doing on-calls, despite being physically disabled (Box 1, quote 9).

Some doctors felt that they were bullied, which exacerbated their health problems (Box 1, quote 10). Another relatively senior doctor said that she had suffered depression caused by her treatment

Table 1. Frequency distribution of coded comments made by the doctors one, five and 10 years after graduation (N = 123[‡]).

Theme	Count				Percentage				Percentage of respondents (N = 38,613)
	Y1	Y5	Y10	Total	Y1 (N = 23)	Y5 (N = 50)	Y10 (N = 50)	Total [‡] (N = 123)	
Chronic illness	15	40	41	96	65.2	80.0	82.0	78.0	0.2
Disability	7	10	10	27	30.4	20.0	20.0	22.0	0.1
Sub-total				123					
Support	18	30	26	74	78.3	60.0	52.0	60.2	0.2
Career delay/change	7	28	18	53	30.4	56.0	36.0	43.1	0.1
Pressure of work	8	14	14	36	34.8	28.0	28.0	29.3	0.1
Return to work	1	5	11	17	4.3	10.0	22.0	13.8	0.0
Career choices	4	3	6	13	17.4	6.0	12.0	10.6	0.0
Careers advice	2	5	2	9	8.7	10.0	4.0	7.3	0.0
Other	1	0	2	3	4.3	0.0	4.0	2.4	0.0
Sub-total				205					

[‡]Some doctors gave more than one reason and we counted each reason.

[†]Number of doctors who commented upon illness or disability, not the number of commenting doctors (N = 11,859).

Table 2. Frequency distribution of coded comments made by the doctors, by sex.

	Percentage		Count	
	Male (n = 23)	Female (n = 100)	Male (n = 23)	Female (n = 100)
Chronic illness	78	77	18	78
Disability	22	22	5	22
Support	52	61	12	62
Career delay/change	39	44	9	44
Pressure of work	35	28	8	28
Return to work	4	16	1	16
Career choices	4	12	1	12
Careers advice	4	8	1	8
Other	4	2	1	2

Box 1. Selected quotations about working as a doctor while chronically ill or disabled.

Quote number	Quote	Sex and Year
1	'from access to the patient bedside, reaching curtains around beds, access into clinical rooms, access to side-rooms, staff changing rooms, rest rooms, wall-mounted computers, inadequate space behind nursing desks to access phones, computers, printers, paperwork. . .Even wall-mounted hand gel dispensers are often inaccessible or squirt in your eye. . .I understand the cost implications are significant, but if the NHS wants to reduce discrimination it needs to look seriously at the barriers staff with disabilities must face on a daily basis'	Female, Y1
2	'There has been strong resistance to my being on the on-call rota, working full time and choice of specialty [specialty given]. Problems with sick pay when I was in research post. Problems with disabled parking. Blatant, overt, discrimination and insults about my walking frame from consultants. Problems with on-call accommodation. Generally discriminated against by senior medical colleagues in the profession, who, I feel should know better'	Female, Y10
3	'not a very supportive medical school. I had a lot of life experiences (3 close family deaths, the diagnosis of a life limiting disease for me) which I was not supported with—no real allowances made, no physical/practical/emotional support offered'	Female, Y1
4	'[I] nearly had a mental breakdown because I felt unsupported clinically on numerous occasions. I've felt suicidal on one occasion at least. We were never shown how to deal with stress and I think this is disgraceful'	Male, Y5
5	'I have struggled with ill health during my postgraduate training following major heart surgery. I returned to work in a LTFT [<i>less than full time</i>] capacity. . .in my first core medical post. I was placed in a team where the consultant was a locum, there was no registrar and I was working 3 days a week. However, I was expected to do full time job in 3 days. I struggled with this. . . During which time my health deteriorated further leading to hospital admission with heart failure. This to me was very disappointing'	Female, Y5
6	'I find there is little or no support for doctors working who have a disability from the NHS as an employer. There seems to be no information or advice given from occupational health at work'	Male, Y5
7	'Prior to starting work I contacted the hospital to arrange an occupational health appointment. They made numerous recommendations, none of which were put in place'	Female, Y1
8	'Whilst training I had numerous problems due to a longstanding health condition. I informed the Trust before starting but it took months to be referred to Occupational Health and this only happened after I sustained an injury/flare up'	Female, Y1
9	'Worked a minimum 10 hours a day as well as doing on-calls, despite being physically disabled. . .The work could be physically exhausting & emotionally draining. I had to deal with a physical disability when I first started & I needed to use a walking aid for the first 2–3 months of the job. Although in theory the Occupational Health doctors said I was supposed to be on light duties, this did not filter through to the people I was actually working for'	Female, Y1
10	'I feel that my physical problems (endometriosis/ovarian cysts and low mood) were definitely exacerbated by years of working in NHS junior jobs where hard work/perfectionism were rewarded by a culture of abuse and bullying from medical establishment and management'	Female, Y10

(continued)

Box 1. Continued.

Quote number	Quote	Sex and Year
11	While in this job I was bullied by 2 serial bullies, one of whom was a consultant. He refused to provide me with a reference, causing a job I had already been appointed to be withdrawn. I suffered a severe blow to my confidence and self-esteem. Last year I was again bullied by a consultant, resulting in a major depressive illness. This consultant tried to have me sacked, and would have succeeded had not the Post-Grad Dean intervened. The Dean literally saved my life, as I was suicidal. I saw a Psychiatrist, who diagnosed me as having Post-Traumatic stress disorder (this is not uncommon after severe bullying)	Female, Y10
12	'I have had several episodes of illness resulting in time off work. On every occasion my employer [has] been fantastic allowing [me] to return on full pay and then graded return to work'	Female, Y5
13	'when I finished house jobs ended up in ENT because it was a job and almost immediately went off sick with a 1st demyelination. My consultants and colleagues were incredibly nice about it, I realised how much medicine means to me and how important working is and on returning to work was filled with enthusiasm'	Female, Y5
14	'I am aware that as I have a long term health problem I am now thinking to the future and planned to develop the outside interest of palliative medicine to protect myself and to build an alternative career if needed'	Female, Y10
15	'whilst the deanery and Trust were willing to do a lot to improve things—the main option I was offered was less-than-full-time training. I had no interest in spending more years training, earning less money or working shorter hours. I decided that I needed to move away from hospital medicine to optimise and maintain my own health'	Male, Y5
16	'I am. . . working part-time & in general practice. . . I would much rather have carried on training to be a breast surgeon, but there was not the flexibility in the system to allow for this with my health problems'	Female, Y10
17	'I felt very unsupported when I had difficulties working in A&E [<i>accident and emergency</i>] due to sickness. Rather than finding me an alternative job in the hospital that I could do, I felt forced to take extended sick leave which has prolonged my training'	Female, Y5
18	'I finished [foundation training] got CT [<i>core training</i>] in surgery, then was ill for 8 months of CT1 so had to repeat CT1/CT2 Surgery. I was competent at work but could not pass MRCS [<i>Membership of the Royal College of Surgeons</i>] Part B. . . an appeal got rejected by the Royal College of Surgeons, so I'm currently trying to figure out next stage in my life. . . I had real confidence issues after my illness'	Male, Y5
19	'We are treated as though we are unskilled labourers working for foremen who are the hospital managers. They arrange dreadful rotas, make it almost impossible to take leave, we have to swap calls just to take a week off so end up working ridiculous hours around our holidays just to take time off we are entitled to, they almost do it with a smile on their face. To say I am tired, stressed and swiftly heading towards depression is an understatement'	Female, Y1
20	'Have been off work for over a year with severe mental health problems. Contributing factors likely work stress, poor working conditions, fatigue and exhaustion from shift work and poor social support/network from having moved around the country so much for training'	Female, Y5

(continued)

Box 1. Continued.

Quote number	Quote	Sex and Year
21	'work in A&E is hell. Most doctors showed signs of depression—some with marked lethargy, anhedonia [social withdrawal] and suicidal thoughts. I would actively discourage any doctor from working in A&E or Paediatrics. Working a full shift pattern is very damaging to one's mental health!'	Male, Y10
22	'There is no retraining or support network in place to help doctors back to work after illness. I had neurosurgery. I have made an extremely good physical recovery but emotionally I am currently exhausted and unable to work. . . the NHS set up doesn't allow for doctors to be ill'	Female, Y5
23	'My current boss was very unhelpful when I had radiotherapy. Didn't want a disabled doctor on the team and was as difficult as possible about organising my phased return to work'	Female, Y5
24	'I was off work through ill health (depression). The support and assistance I received from the postgraduate deanery, to return to work initially as a flexible trainee, was invaluable. Returning to work full time immediately would have been much harder and more stressful and would probably have prolonged my recovery'	Female, Y5
25	'took six months out after graduation because of an episode of ill health (depression) in final year of medical school. Postgrad office at medical school very helpful in arranging jobs after break and student counselling service really made sure I got any other help I needed'	Female, Y1
26	'my hearing impairment does impose limitations on my career choices—for example surgery is excluded due to my inability to lip read through masks'	Female, Y1
27	'At times, I have rather despaired at my apparent inability to balance family life and career progression but. . . following my illness, I realised that it was just a question of making choices. Being a trust grade, I do often feel like a minion on the very bottom rung of the ladder, particularly as a part timer. It is also hard to get good training, essential for ongoing CPD [<i>continuing professional development</i>]. But the flip side is that I have been in the same place for 7 years, I know the consultants, nursing, auxiliary and admin staff well and feel like a permanent fixture in the department rather than the transient doctors in training'	Female, Y10
28	'I work in a very large, busy, prestigious hospital. . . Workload on-call and at weekends has been far too heavy. . . This has of course led to an extreme steep learning curve in spite of the toll it has taken on my mental health wellbeing. Whether this trade-off has been worth it remains to be seen—it has certainly influenced my decision to leave hospital medicine as soon as I can'	Female, Y1
29	'Access to information, career options, support etc is poor/non-existent for trainees/doctors with health problems/disabilities. There is no way I could be (e.g.) an A&E doctor but am perfectly able to be a reporting histopathologist sitting at a microscope. I know several trainees who have left medicine due to a lack of support after disabling injuries and MS [<i>multiple sclerosis</i>] diagnosis. This shouldn't be a problem—the right career advice and support is all that is needed'	Female, Y5
30	[no-one in my foundation school] 'was able to give me guidance on where best to work/which specialties to avoid or any information/advice re starting work with a disability'	Female, Y1

(continued)

Box 1. Continued.

Quote number	Quote	Sex and Year
31	'There was little advice or support available and the university careers service told me to apply for foundation [first year post after qualification] because it was "a guaranteed job". I took the advice and struggled to cope... ending up at and repeatedly being told to go to the GP to see if I was depressed'	Female, Y5
32	'...there seems to be an ingrained "fear" or distrust of any career path outside of the norm'	Male, Y5
33	'When I was making my decision to leave the NHS after a long spell of illness trying to get any career advice about alternative careers was practically non-existent. I went to see the local postgraduate career adviser who said – "why don't you become a GP?'"	Female, Y10

Quote number cross-refers to 'Results' section.

Year denotes the number of years after graduation.

during a Senior House Officer job, which had only been alleviated by the intervention of her postgraduate dean (Box 1, quote 11).

By contrast, several doctors reported receiving a great deal of support when they were ill (Box 1, quotes 12 and 13).

Career delay/change

Several doctors wrote about changing their careers to accommodate their illness. A female general practitioner was considering palliative medicine (Box 1, quote 14). One doctor, with insulin-dependent diabetes, found that shift work made control of his blood sugars extremely difficult. He moved from hospital medicine to general practice so that he could maintain his health (Box 1, quote 15).

Other doctors wrote that they were forced to change their career because the system was too inflexible to cope with their health needs (Box 1, quote 16).

Doctors also commented that their illness had led to delays in training (Box 1, quote 17). Another doctor who was ill for a long period had serious problems achieving professional qualifications (Box 1, quote 18).

Pressure of work

Some doctors commented that pressure of work and inflexible rotas were making them feel stressed, and in some cases, mentally and physically ill (Box 1, quote 19). A few doctors reported taking time off work, reducing hours or changing careers due to stress or mental health problems (Box 1, quote 20). One doctor also commented that, for junior doctors, work in emergency medicine was particularly difficult (Box 1, quote 21).

Return to work

Some doctors who wanted to return to work after illness reported a lack of support (Box 1, quote 22) or that they faced barriers and discrimination (Box 1, quote 23).

However, a similar number of doctors had positive stories to tell about their return to work (Box 1, quotes 24 and 25).

Career choices

Doctors commented on how their illness or disability had limited their career choices. For some, the issues were specific and practical (Box 1, quote 26) while for others, they were more general (Box 1, quote 27).

Other doctors were concerned about the effect of certain career choices upon their health in the future (Box 1, quote 28).

Careers advice

Doctors at all stages of their career, from medical school through to senior level, bemoaned the lack of good career advice available to those with chronic illness or disability (Box 1, quote 29). One doctor with a disability wrote that no one had advised her about working in medicine with a disability (Box 1, quote 30).

One doctor had not been formally diagnosed with a depressive illness but had sought career advice in her last year at medical school to identify non-medical career options because she wasn't sure she would be able to cope with a ward-based medical job (Box 1, quote 31).

Some doctors felt that career advice was limited to standard choices (Box 1, quote 32): '... there seems to be an ingrained "fear" or distrust of any career path

outside of the norm'. A senior doctor commented similarly about the lack of alternative careers (Box 1, quote 33) and was advised to opt for general practice, but finally found a job she enjoyed after searching in the *British Medical Journal* special appointments pages.

Discussion

Main findings

Doctors with chronic illness or disability were most concerned about lack of support in the workplace. This included poor facilities for the disabled, experiencing insensitive working practices or colleagues, lack of offering or implementing Occupational Health guidance, bullying and discrimination. Doctors also discussed decisions to alter their career plans to fit in with their illness, but, for some, these changes felt imposed, not sought. Pressure at work was discussed as both a cause of chronic illness and as an extra stressor for doctors who were already ill. However, some chronically ill or disabled doctors commented that they had experienced very supportive and imaginative working practices from their employers, and some had found work colleagues to be adaptive and positive.

Strengths and weaknesses of the study

Our surveys were nationwide and we drew on the comments of many thousands of doctors over a number of survey years and at a range of career stages during their training and the early part of their careers. We did not specifically ask about experiences of working while chronically ill or disabled. Hence the comments we used for this study were those which arose spontaneously from the doctors, when asked to comment on any issue of importance to them about their career. Only a small number of doctors wrote about the topic, and we have no way of knowing if others have been similarly affected and have had similar experiences. The results should not be over-interpreted in that, of necessity, the findings are somewhat historical; some might pertain to situations that have now improved. If so, we hope that senior clinicians and human resources staff can assure themselves of this in respect of their own institutions.

Comparison with existing literature

A UK study of doctors who had been away from work for more than six months with physical or mental health problems reported that regulatory processes in the UK were detrimental to their mental

health and did not aid their return to work.⁹ Swedish research has found that doctors who took long-term sick leave were expected to take charge of their own treatment and rehabilitation.¹⁰ Some doctors told us that, in their view, they experienced bullying behaviour and discrimination. In other studies, group interviews with trainee doctors found similar concerns regarding bullying, namely belittling, threats and unreasonable expectations.¹¹ A recent national survey found that disabled doctors were twice as likely as others to report bullying (15% versus 8%).¹² Research on a recent cohort of first-year doctors included the statement that 'the NHS is a good equal opportunities employer for doctors with disabilities': 13% disagreed, 57% agreed and the remainder had no view.¹³

Implications

Doctors with chronic illness and disabilities present challenges for employers. Acceptance is needed, by doctors whose capacity for work is restricted, that there may be limits on what is possible for employers to achieve. However, our study indicates that, in the view of some affected doctors, work practices can fall short of what could reasonably be expected. There seems to be inconsistency in the level of support offered to sick or disabled doctors by employers. Sometimes poor support seemed to be due to a lack of communication and liaison between the employer's occupational health function and its senior hospital management, or a reluctance to tailor support to the individual doctor. In other cases, the comments implied a high level of indifference on the part of management, or, occasionally, work colleagues, to the health issues of doctors.

Managers also need to be more proactive and effective at arranging the return to work of doctors who have taken long-term sick leave. There is clearly a need for good careers advice to help doctors assess which career paths to take and to mitigate the impact of delays to careers. Health organisations should have a culture of enablement whereby doctors with chronic disease or disability are supported, according to their needs, to continue their medical careers to the limit of their ability.

It was not the purpose of this study to quantify the level of chronic illness or disability among doctors. However, we note that only 1% of the commenting doctors wrote about working with a chronic illness or disability, while the *Long term Conditions Compendium of Information: Third Edition* published by the Department of Health in 2012¹⁴ showed that approximately 15–25% of the general population of the approximate age of these doctors, between 25 and

35 years of age, suffered from a long-term condition. We suggest therefore that there may be a much larger volume of chronic illness and disability among doctors than that reported by us, and that formal further study of the prevalence of chronic illness and disability in doctors would be justified.

Declarations

Competing interests: All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and all authors want to declare: (1) financial support for the submitted work from the policy research programme, Department of Health. All authors also declare: (2) no financial relationships with commercial entities that might have an interest in the submitted work; (3) no spouses, partners, or children with relationships with commercial entities that might have an interest in the submitted work; (4) no non-financial interests that may be relevant to the submitted work.

Funding: The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This is an independent report commissioned and funded by the Policy Research Programme in the Department of Health (project number 016/0118). Michael Goldacre was part-funded by Public Health England. The views expressed are not necessarily those of the funding bodies.

Ethical approval: National Research Ethics Service, following referral to the Brighton and Mid-Sussex Research Ethics Committee in its role as a multicentre research ethics committee (ref 04/Q1907/48 amendment Am02 March 2015).

Guarantor: All authors are guarantors.

Contributorship: TWL and MJG designed and conducted the surveys. FS carried out the analysis, designed the coding scheme and wrote the first draft of the paper. All authors contributed to further drafts and all approved the final version.

Acknowledgements: We thank Janet Justice and Alison Stockford for data entry. We are very grateful to all the doctors who participated in the surveys.

Provenance: Not commissioned; peer-reviewed by Raymond Chadwick.

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Appendix 1: Keyword search method

The list of keywords used was as follows:

absent, accident, addict, alcohol, ‘back to work, bipolar, blind, burnout, cancer, chronic, condition, deaf, death, deficienc, depress, diabetes, disab, discrimination, disease, disorder*, drink, drugs, drunk, exhaust, fatigue, handicap, hearing, heart, HIV, injur, ill*, ‘long term’, long-term, mental, misuse, mobility, mood, ‘multiple sclerosis’, MS, ‘my health’, ‘off work’, ‘own health’, ‘progressive condition’, psychiatric, psychologi, recurrent, ‘reduced health’, relapse, respiratory, ‘return to work’, schiz, sick, sight, stigma, stress, suicid, symptom, ‘to leave’, unwell, vision, visual, wheelchair.*

In some cases a word stem was used so that the search would include variations of a word (e.g. ‘disab’ was used to search for ‘disability’ and ‘disabled’). This method also therefore included plurals of words. A preceding space was included for certain

words (such as 'vision') to reduce false positives (such as 'supervision').

The process was iterative. Any keywords which resulted in over 100 'hits' were examined for false positives (as in the aforementioned vision/supervision

example) and were altered or deleted accordingly. A random 2% of comments which were not hits in the keywords search were examined for relevance to the topic of the paper: this did not yield any more relevant comments.