

Stress at work and cancer

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What is stress?

Stress

Cognitive perception of uncontrollability and/or unpredictability that is expressed in a physiological and behavioral response

Koolhaas et al., Neuroscience and Biobehavioral Reviews 2011

What are the sources of stress?

Stressful circumstances

Ubiquitous, entailing different levels and durations of stress

- Adverse life events such as divorce, loss of a loved one, financial issues, abuse
- Health problems, trauma
- Factors related to the environment (home, workplace, family, neighbourhood)
- Chemical and physical exposures

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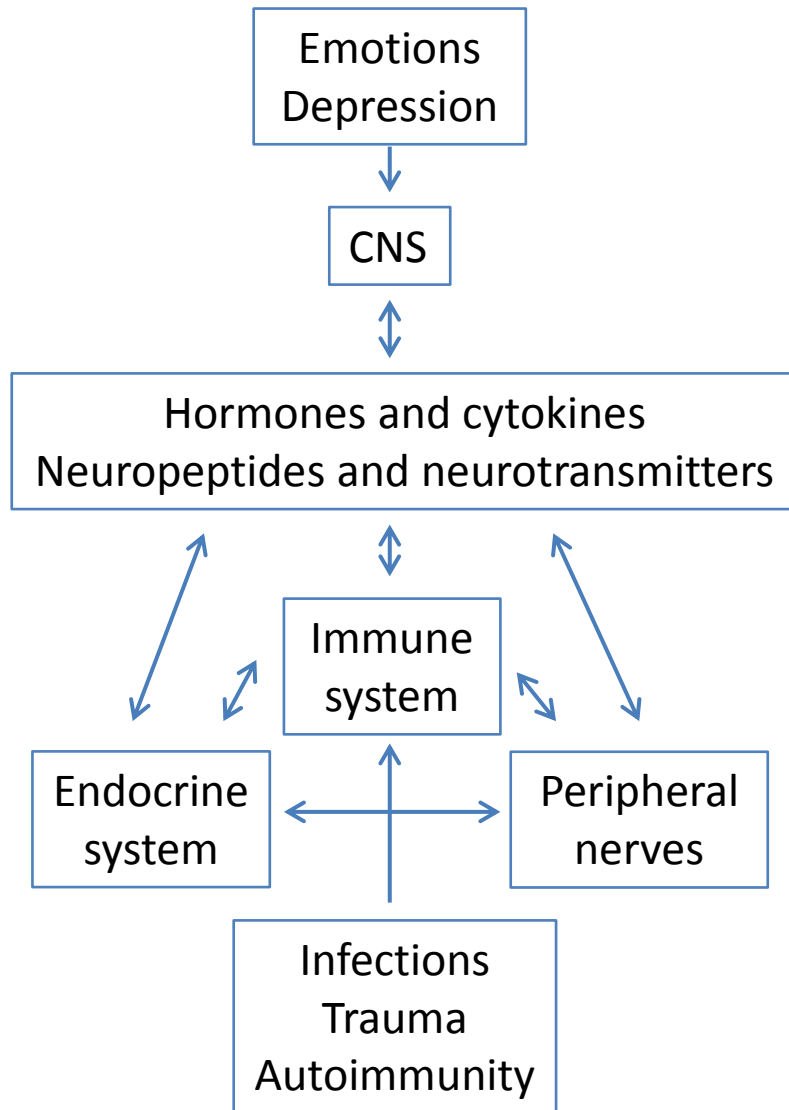
Ability to adjust is determined by the way a situation is perceived and by personality phenotype

It's complicated !!!

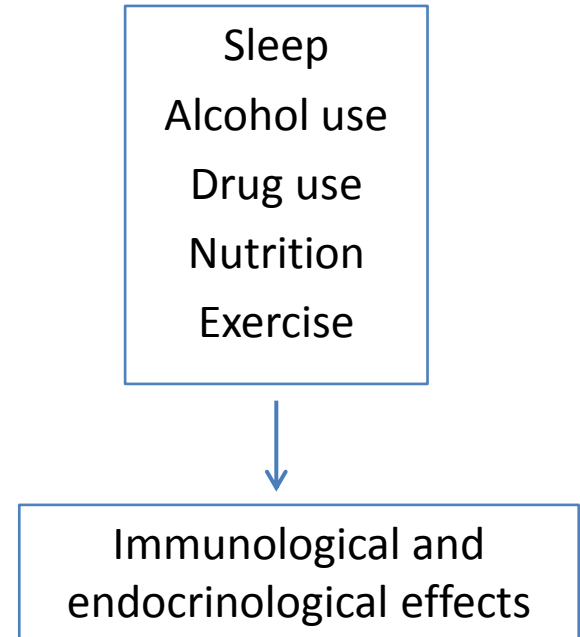
What happens when there is stress?

Effects from stress

Physiological functions



Lifestyle



Stress and chronic diseases

Coronary heart diseases?

Cancer onset and/or progression??

“Stress” was set as a high-priority exposure for upcoming reviews (2010-2014) by the International Agency for Research on Cancer

Non-occupational psychological stress and cancer

Breast cancer

- Meta-analysis (1999) of 29 studies (28 cc) assessing adverse life events : no association
- Four prospective studies assessing stress: inconsistent

Reverse causality? Recall bias? Publication bias?

Lung, endometrial, prostate cancers

- Limited data, mostly no association

Exposure assessment to workplace stress

Two job stress models

Job strain (Karasek)

High demands / low control

Effort / reward imbalance

- Individual attributes considered - need for control
- Workload
- Rewards - \$, esteem, occupational status control (promotion prospects, job security)

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Job strain questionnaire

High demands / low control model (Karasek)

7 dimensions	
Psychological workload (5 items)	Working fast, working very hard, excessive amount of work, enough time to get job done, free from competing demands
Job decision authority (3)	Make decisions on my own, very little freedom to decide how to do work, a lot to say on what happens on job
Skill discretion (6)	Learn new things, repetitive work, creative, high level of skill, do a variety of different things, opportunity to develop own special abilities
Supervisor support (4)	Supervisor is concerned about welfare, pays attention, helpful, gets people to work together
Co-workers support (4)	Competent co-workers, take a personal interest, friendly, helpful
Job security (3)	Security good, work steady, likelihood lose job ≤ 2 yrs
Physical exertion (1)	Lots of physical effort

Workplace stress and cancer

	Design	Study pop	Measure	Timing	Assoc.
Breast Achat 2002	Cohort Nurses Health Study	219 cases	Job strain	Baseline	(-)
Breast Schernhammer 2004	Cohort Nurses Health Study	1030 cases	Job strain	4 & 8 yrs earlier	-
Breast Kruk 2004	Case-cont	247 ca / 565 hosp co	Job stress	Interview	(+)
Breast Kuper 2007	Cohort Swedish Lifestyle & Health	767 cases	Job strain	Baseline	(+)
Breast Pudrovska 2013	Cohort Wisconsin Longitudinal study	297 cases	Managerial jobs with authority	Age 36	+
Colorectal Spiegelman 1985	Case-cont	343 ca / 626 co	Job strain	Interview	+
Colon Courtney 1996	Case-cont	744 ca / 744 co	Job strain	5 & 30 yrs earlier	(+)
Esophagus / cardia Jansson 2004, 2007	Case-cont	451 ca / 820 co	Job strain	20 yrs earlier	(+)
			Job strain JEM	Longest job	+

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Meta-analysis of work stress and cancer risk

Heikkila et al., BMJ 2013

- 12 European cohorts
- 5,700 incident cancers, 116,000 European men and women
- Common study protocol
- Participants aged 17-70 yrs at baseline
- Job strain (Karasek) assessed at baseline
- Job strain: Yes/No, and High strain/Active job/Passive job/No strain
- Median follow-up: 12 yrs
- Covariates: age, sex, SEP, BMI, smoking, alcohol
- Modelled associations in each cohort, then applied meta-analysis

No association between job strain at baseline and cancer risk

Meta-analysis of work stress and cancer risk - BMJ 2013

Study cohort	Nb incident cancer cases			
	Colorectal	Lung	Breast	Prostate
1	10	6	18	3
2	20	16	39	21
3	41	26	300	38
4	66	55	86	252
5	25	10	108	34
6	8	10	32	7
7	44	22	2	29
8	10	8	26	6
9	70	107	105	85
10	145	71	216	245
11	32	18	16	66
12	51	25	62	79

Previous studies on workplace stress

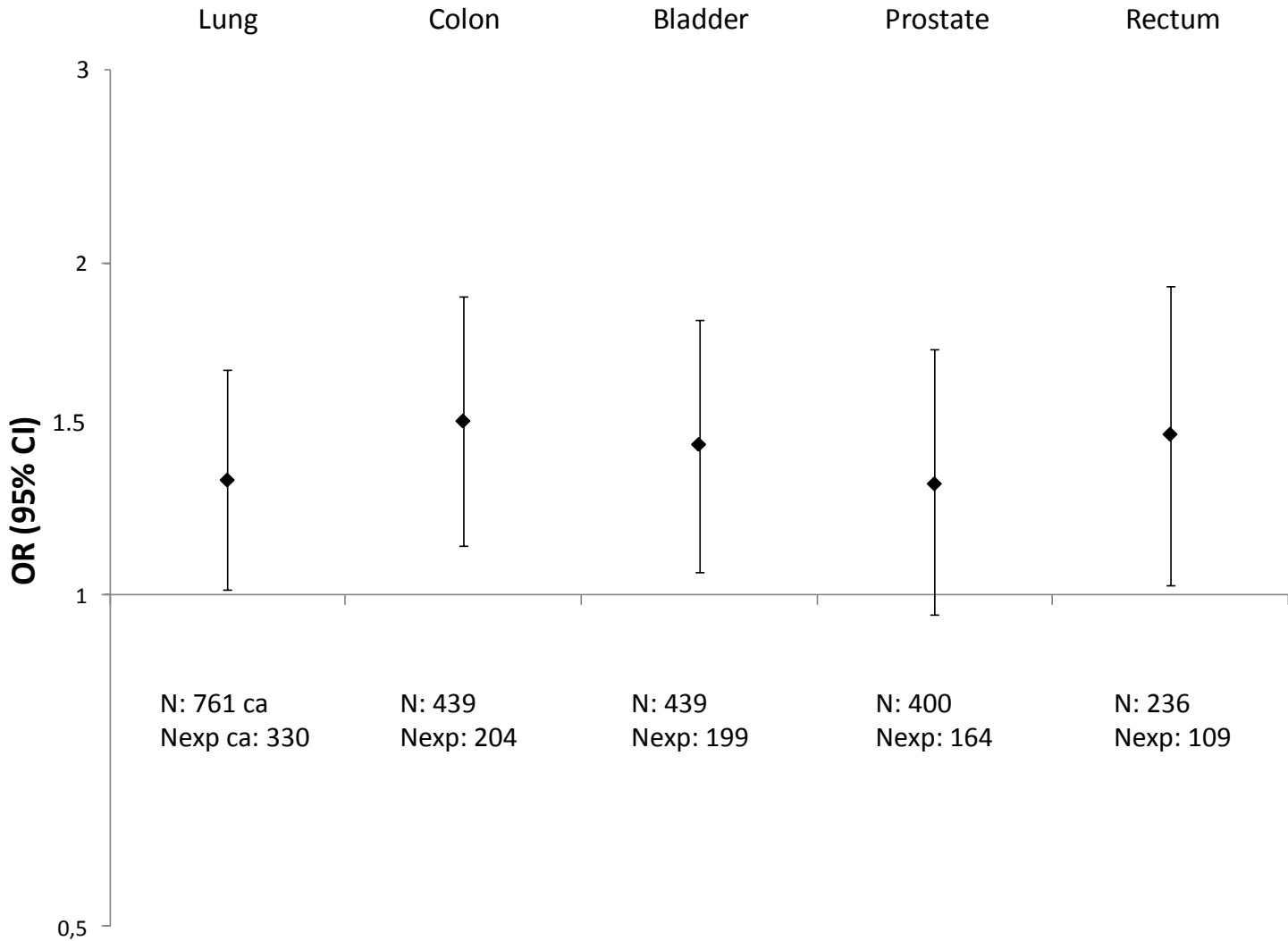
- Job strain model - High demands / low control (Karasek)
- Job strain assessed at one point in time (baseline)
- None assessed stress duration
- None assessed changes in stress level in different jobs
- Most overlooked professional circumstances such as security, personal conflicts, adverse chemical & physical work environment
- Few looked at other personal stressful circumstances
- None considered personality phenotypes
- Most considered some lifestyle factors
- Most were quite small

Montreal multi-site case-control study of occupation and cancer (Siemiatycki et al., 1970s)

- Population-based
- Incident cancers, 533 population controls
- Men aged ≤ 75 yrs
- In-person interviews
- Detailed description of each job held over lifetime
- For each job held: *“How stressful was the job? Did this job make you feel tense or anxious most of the time?”*
- Workplace stress exposure index: Yes/No, cumulative duration
- Covariates: socio-demographics and lifestyle, tailored for each cancer site

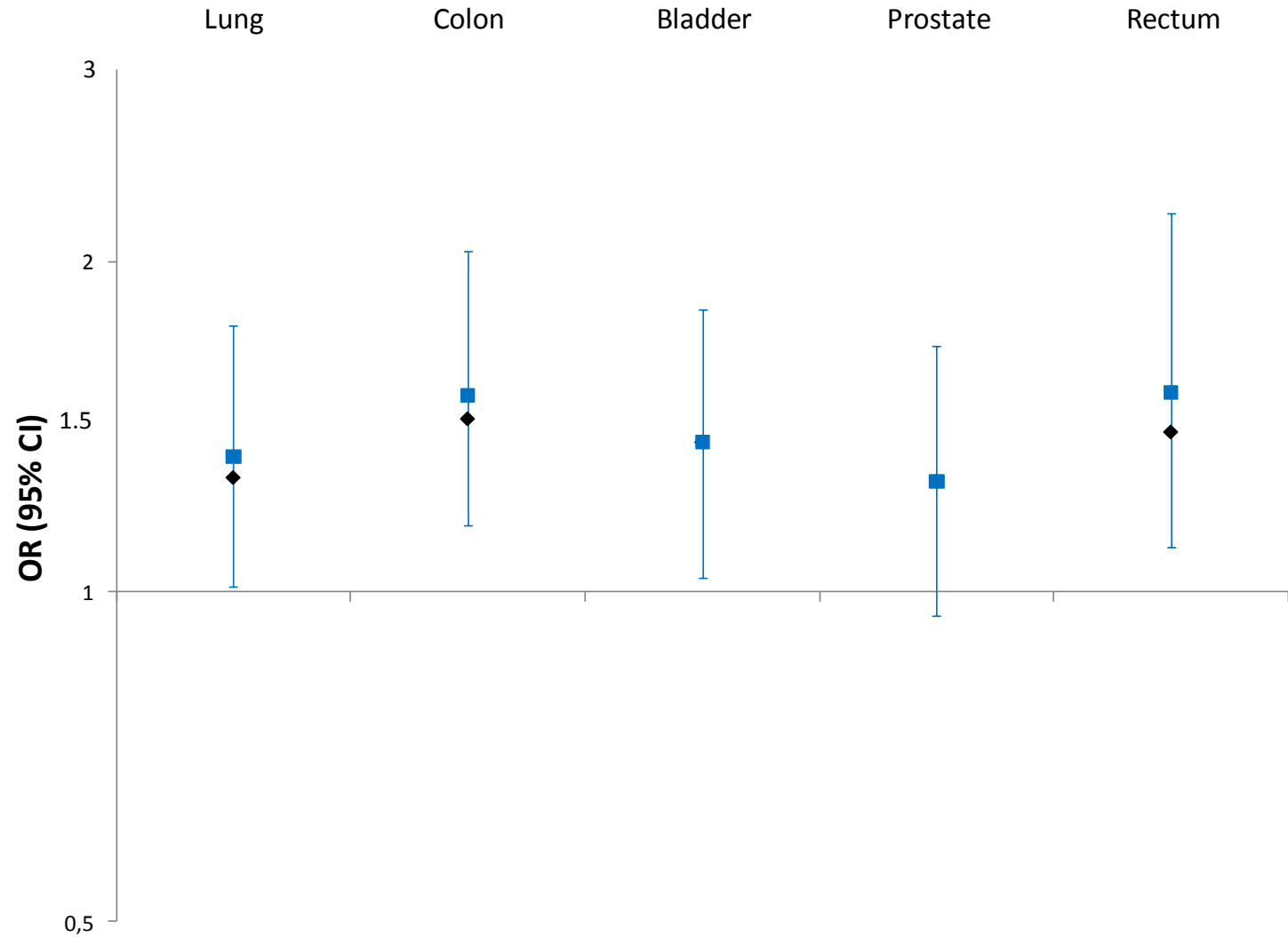
Ever workplace stress and cancer

Age adjusted



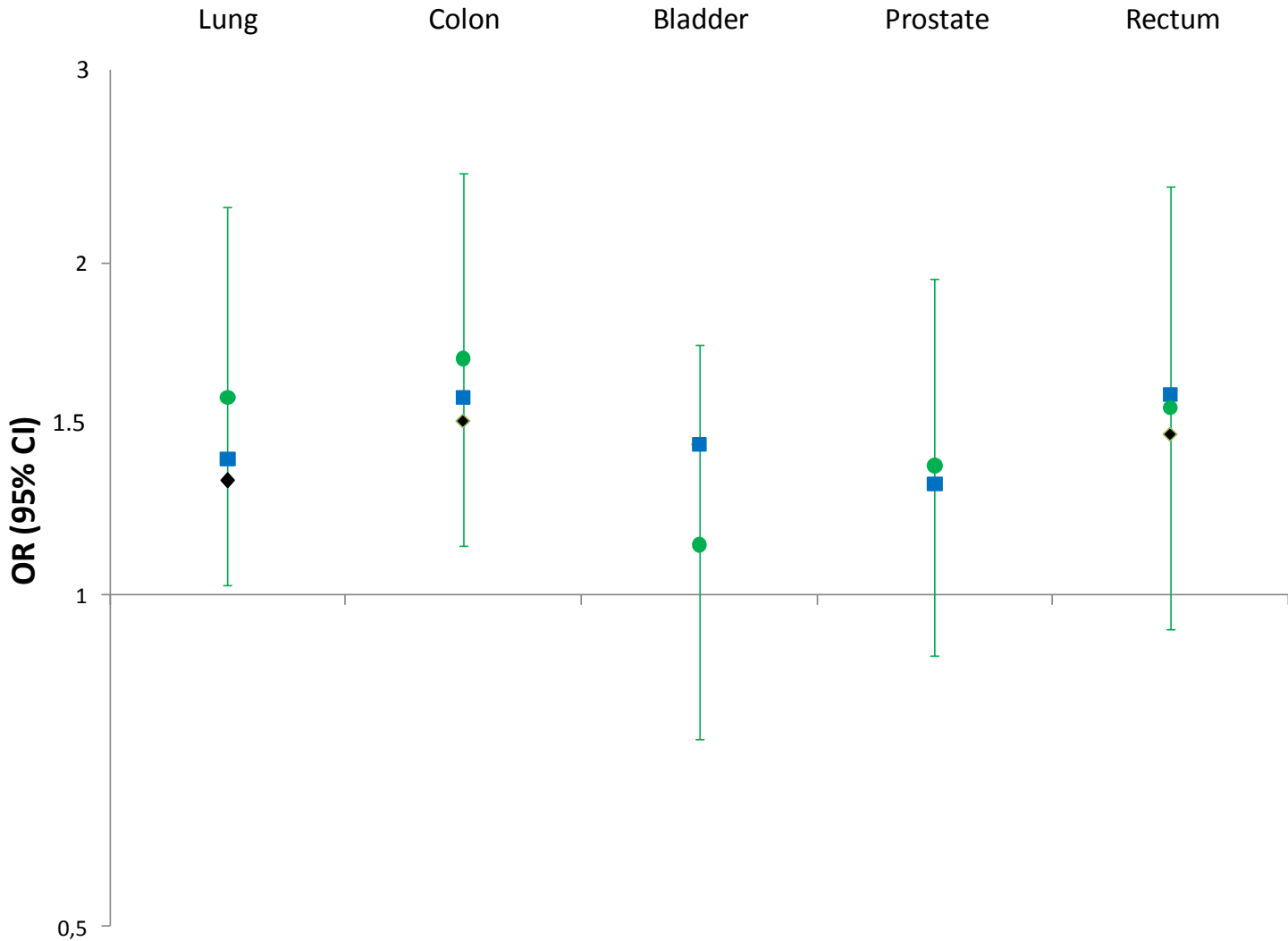
Ever workplace stress and cancer

Adjusted for sociodemo & lifestyle



Workplace stress for ≥ 30 yrs and cancer

Adjusted for sociodemo & lifestyle



Conclusions Mtl study

- Weak excess risks for some cancer sites
- Crude assessment of workplace stress
- Stress assessment captured sources other than job strain
- About 40% of cases reported stress in ≥ 1 job
- Subjects had 5 jobs, on average
- Subjects could discriminate stress level from one job to the next
- Stress-cancer associations appeared to be independent from socio-demo & lifestyle

What do we need to do?

Develop exposure assessment protocol that can capture the whole picture, over personal and work histories

- Sources of stress
- Dimensions
- Durations
- Changes

Conduct studies that take into account

- Socioeconomic & lifestyle factors potentially involved
- Personality phenotypes

Stress at work and cancer?



~~We know what we don't know~~

We know that we don't know



Review and Special Articles

Behavioral Research in Cancer Prevention and Control: A Look to the Future

William M.P. Klein, PhD  , Michele Bloch, MD, PhD, Bradford W. Hesse, PhD, Paige G. McDonald, PhD, MPH, Linda Nebeling, PhD, MPH, RD, Mary E. O'Connell, MA, William T. Riley, PhD, Stephen H. Taplin, MD, MPH, Gina Tesauro, MSW

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<http://dx.doi.org/10.1016/j.amepre.2013.10.004>

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Abstract

Human behavior is central to the etiology and management of cancer outcomes and presents several avenues for targeted and sustained intervention. Psychosocial experiences such as stress and health behaviors including tobacco use, sun exposure, poor diet, and a sedentary lifestyle increase the risk of some cancers yet are often quite resistant to change. Cancer screening and other health services are

Work stress and cancer researchers: an exploration of the challenges, experiences and training needs of UK cancer researchers

F. KENNEDY, PHD, MSC, BSC (HONS), RESEARCH FELLOW, *Centre for Health and Social Care Research, Faculty of Health & Wellbeing, Sheffield Hallam University, Sheffield*, B. HICKS, BSC (HONS), RESEARCH OFFICER, *Bournemouth University Dementia Institute (BUDI), Bournemouth*, & J. YARKER, CPSYCHOL, PHD, MSC, BSC (HONS), DIRECTOR, *Affinity Health at Work, London, UK*

KENNEDY F., HICKS B. & YARKER J. (2013) *European Journal of Cancer Care*

Work stress and cancer researchers: an exploration of the challenges, experiences and training needs of UK cancer researchers

Work stress is a significant issue for many UK healthcare professionals, in particular those working in the field of oncology. However, there have been very few attempts to explore the challenges, experiences or training needs of researchers working in cancer research. In doing so, we will be better positioned to support and develop these researchers. Eighteen UK oncology researchers from a variety of backgrounds took part in a semi-structured interview. Interviews were transcribed and analysed using thematic analysis. The analysis identified two overarching themes: logistical research issues (workload, accessing/recruiting participants, finances) and sensitive research issues (emotional demands, professional boundaries, sensitivity around recruitment). One cross-cutting theme, supportive strategies (support and training, coping mechanisms), was