

REHABILITATION AND RETURN TO WORK AFTER CANCER: A SYSTEMATIC REVIEW OF THE LITERATURE

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Rehabilitation and return to work after cancer: a systematic review of the literature

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Table of contents

Executive summary	7
1 Background.....	13
2 Objective.....	14
3 Methods	15
4 Results.....	16
4.1 Health and safety implications for workers.....	16
4.2 Costs to employers, workers and society.....	31
4.3 Wider issues that may affect the worker.....	34
4.4 Work-related and occupational cancer.....	42
4.5 Aspects relevant to small and medium-sized enterprises.....	42
4.6 Interventions and resources.....	43
4.7 Synergies and roles of policy areas and (enterprise) actors.....	59
5 Discussion	60
5.1 Strengths and weaknesses of the report.....	60
5.2 Authors' conclusions.....	60
References	63
Appendix.....	67
Methods - Scientific literature.....	67
Methods - Grey literature.....	68
Methods - Online questionnaire.....	69
Search strategies.....	72
Results of search and screening process.....	80
Description of included scientific literature.....	80
Description of online questionnaire participants.....	85
Assessment of quality of included studies.....	85

List of tables

Table 1: Overview of health and safety implications for cancer survivors returning to work identified from the literature	18
Table 2: Overview of factors reported to influence return to work of cancer survivors.....	24
Table 3: Economic impact of cancer.....	32
Table 4: Work motivation/meaning of work for cancer survivors and its influence on return to work ...	35
Table 5: Attitudes and behaviours of others towards cancer and return to work.....	39
Table 6: Overview and examples of interventions and resources for cancer survivors.....	46
Table 7: Overview and examples of available interventions for employers, line managers and human resources.....	54
Table 8: Overview and examples of available interventions and resources for health care professionals.....	57

Table 9: Overview and examples of interventions and resources for the self-employed and small and medium-sized enterprises	58
Table 10: List of relevant networks.....	71
Table 11: Summary of search for literature	72
Table 12: Search strategy for systematic reviews.....	73
Table 13: Search strategy for primary studies - occupational and work-related cancer	75
Table 14: Search strategy for primary studies – small and medium-sized enterprises	78
Table 15: Search strategy for grey literature	79
Table 16: Overview of the included scientific literature	81

Rehabilitation and return to work after cancer: a review of the literature

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Executive summary

The project “Rehabilitation and return-to-work after cancer - instruments and practices” is meant to provide more insight into the problems encountered by workers affected by cancer and their employers. Furthermore, it will provide recommendations for successful instruments, interventions, programmes and practices to support the return-to-work of workers affected by cancer.

Each year, an estimated 3.2 million new cases of cancer are diagnosed in Europe. About half of these are occurring at working age. Even though in Europe geographical differences in cancer occurrence exist, the most frequent form of cancer incidence are breast, colorectal, prostate, and lung cancer. Those types of cancer were estimated to account for over half of the overall burden of cancer in Europe in 2012 (Ferlay et al. 2013).

The impact of cancer on a person’s daily life is immediate and striking. The diagnosis is usually coupled with long periods of sickness absence because of medical treatments. However, overall cancer management has improved during the past three decades and therefore the overall number of people who survive cancer is increasing (de Boer 2014). Many cancer survivors still face long-term symptoms and impairments after treatment ends, such as fatigue.

These symptoms and impairments can affect the work ability of survivors, making it more difficult to remain in or re-enter the job market. Research shows that most cancer survivors are able to stay at or return to work (RTW)¹, but that overall, the risk of unemployment among cancer survivors is 1.4 times higher than among healthy controls² (de Boer et al. 2009).

Optimising the rehabilitation and RTW of workers with cancer is therefore important in order to both improve the well-being of this vulnerable group and to reduce the societal and financial impact of cancer diagnoses on the (European) enterprises and society at large.

The overall project

The project “Rehabilitation and return-to-work after cancer-instruments and practices” will inform policy on the emerging issue of rehabilitation and return-to-work after cancer and provide national administrations with examples of successful policies and interventions. It is divided into 6 main tasks:

1. Literature review on rehabilitation and return-to-work after cancer
2. Detailed descriptions of policies, systems, programmes or instruments in the field of rehabilitation / return-to-work with / after cancer
3. Company case studies
4. Qualitative research with experts and intermediaries
5. Final report including analysis and policy options
6. Support to EU-OHA stakeholder workshop

This study involves Task 1 and is meant to provide an overview of what is known based on the scientific literature. The specific objectives of this review are:

- 1) To review existing literature to compile knowledge on the health and safety implications for workers who are returning to work after or during cancer treatment, especially from occupational cancer;
- 2) To gather information on wider issues that may impact on the worker (compatibility of treatment and work, employment, etc.);

¹ (Bouknicht et al. 2006, Bradley and Bednarek 2002, Maunsell et al. 2004, Sanchez et al. 2004, Short et al. 2005, Spelten et al. 2002, Spelten et al. 2003)

² This has been shown in a systematic review including a meta-analysis and meta-regression analysis. The analyses included 20,366 cancer survivors and 157,603 healthy control participants and included 16 studies from the United States, 15 studies from Europe, and 5 studies from other countries.

- 3) To gather information on costs to employers and workers, e.g. for days lost, adaptation of equipment, compensation, and
- 4) To gather information on the issues relevant to SMEs.
- 5) To gather information on good practice examples of RTW interventions

Structure of the literature overview

The present report “Rehabilitation and return to work after cancer: a systematic review of the literature” concerns the available scientific literature on rehabilitation and return-to-work after cancer. This report includes an overview of available initiatives, policies and practices on return to work after cancer that are described in the literature.

Other issues included in this report regarding cancer and return to work are: 1) health and safety implications for workers, 2) costs to employers, workers and society, 3) wider issues that may affect the worker, 4) work-related and occupational cancer, 5) aspects relevant to small and medium-sized enterprises, 6) synergies and roles of policy areas and (enterprise) actors.

The results presented in this report are based on a systematic approach to locate, identify and summarize findings from scientific and grey literature in the field of cancer and return-to-work issues. The systematic method ensures a productive and useful overview of the scientific evidence that goes beyond the challenge of relying on individual expert opinions. The methods included a comprehensive search strategy to locate relevant references from a number of databases. From those references significant articles were selected for inclusion in this report using pre-defined criteria. From the articles that were included, information was extracted and summarized in this report using a pre-defined data extraction form. To increase the reliability of the process, two researchers independently screened the references and extracted the information from the articles. Differences in results were discussed until consensus was reached.

Health and safety implications of cancer diagnosis and treatment

The literature shows that workers affected by cancer report various effects of cancer and its treatment on their health including mental, cognitive and physical symptoms. The most frequently reported symptom in the literature was a diminished level of energy, described as fatigue or exhaustion, and emotional strain due to the ongoing battle with cancer. This was common across cancer types. Other implications of cancer and its treatment that are reported to have an effect on occupational and health and safety are diminished mental health including depression and anxiety, diminished physical functioning and symptoms including pain and diminished cognitive capacities including problems with attention and memory.

The explicit occupational implications that authors reported were diminished work productivity, work ability impairments, and decreased functioning at work. This means that, due to one or more of these symptoms, workers treated for cancer are likely to have to report sick because their work capacity is diminished and it is not possible anymore to carry out their usual tasks. These symptoms can occur early in the treatment process or last years after diagnosis when they are especially problematic. For example workers with cancer can be hindered by fatigue or cognitive problems several years after diagnosis and treatment.

The literature provides a long list of factors that are considered to predict return-to-work. However, the studies that report these factors are not of sufficient quality to draw strong conclusion on the strength of the effects. Factors that predict a less successful return-to-work are reported in the literature as:

- socio-demographic factors such as older age and lower educational level
- work-related factors such as high physical work demands, a non-supportive work environment, no flexible working arrangements or no reduced working hours
- disease-related factors such as having head/neck, brain, pancreatic, lung or liver cancer or advanced disease

- treatment-related factors such as having chemotherapy, extensive surgery or endocrine therapy
- other miscellaneous factors such as fear of unemployment, no advice from a doctor regarding work and low quality of life

Comparably little is known of how employers are affected when a worker is diagnosed with cancer.

Costs for workers, employers and society

The return to work of cancer survivors is economically important. Cancer survivors who do not return to work during or after treatment mean a financial loss for the worker, the employer, and society. Adapting the work environment may enable RTW. This may come with costs for the company and the worker, but in the end, these may be less than the costs of long-term sick leave.

Little is reported about the costs for workers, employers or society and what is reported does not have consistent results. For individuals, both serious financial difficulties and no effects on annual household income levels have been reported. There were no reports of the costs to companies of workers being diagnosed with cancer. Total economic loss to the European Union due to lost work days as a result of cancer was estimated at €9.5 billion in 2009 but this is not all related to unsuccessful RTW.

Wider issues that may affect the worker

Wider issues that may affect the worker and that influence successful return-to-work that are reported in the literature are the meaning of work and motivation to work. Some of these issues enhance the return to work such as when work is perceived as a return to normal life or when it is perceived as a marker of being healthy. On the other hand the issues can also hinder return-to-work for example when work is not economically necessary and a person has re-evaluated the meaning of work as the result of a cancer diagnosis. In this case, workers often decide that return-to-work is not worthwhile.

Another group of factors that affect successful return-to-work are the attitude and behaviour of colleagues and other persons involved as experienced by the cancer survivor. Workplace accommodations that have been requested by the worker are appreciated but unwanted workplace accommodations are experienced as negative. For example, deciding on behalf of the worker that work tasks have to be changed even though the worker did not ask for this, is usually not appreciated. Negative experiences are feeling stigmatised or labelled as cancer patient and feeling discriminated by unfair dismissal. On the other hand, unsolicited support for return-to-work by health care professionals is usually appreciated by cancer survivors because they feel it is understood that work issues are important to them.

Work-related and occupational cancer

The development of cancer may be caused by work and its environment. Occupational cancer can be defined as cancer that is mainly caused by exposure at work, whereas work-related cancer is considered multifactorial and work exposure plays a smaller role among other factors.

There are no studies focusing on return-to-work of workers with occupational and work-related cancer. This could either mean that this is not a problem that should be looked at separately from other types of cancer or that the problem simply has not been studied. As most occupational cancers have long latency times and occur after working life it could be that return-to-work is not a desired outcome. For other work-related cancers, the exposure to carcinogens at work may be unnoticed and thus return-to-work issues are not different than with other non-work-related cancers.

Small and medium sized enterprises

The size of the company seems to have an impact on cancer survivors' possibilities to return to work.

In companies with less than 250 workers (SMEs) information and resources for RTW strategies or programmes are lacking, and support and education are needed. The problems seem to relate especially to small enterprises with fewer than 50 workers, and to micro enterprises with fewer than 10 workers (EU-OSHA 2016).

It has been reported that return-to-work of cancer survivors seems more problematic for self-employed and those working in small enterprises. This is because being off work for treatment and necessary rest is more difficult in small companies, they have limited access to occupational health services and there is lack of experience in the management of sickness absence. Advantages were seen in the small size of SME enterprises which provide a more family like atmosphere. This may create a more supportive environment for workers with cancer in the RTW process. However, only little has been reported in the literature and the conclusions are not strong due to the small evidence base.

Interventions to enhance and support return-to-work

For this overview of the literature the term 'intervention' is understood in a broad way, including both very active approaches of support, such as training, but also less active approaches, such as providing information by phone, online or paper-based.

There was a limited number of studies that had evaluated the effect of interventions to help cancer survivors to return to work. Most interventions have been developed for cancer survivors. Some interventions are especially for employers, human resource professionals, line managers, or health care professionals. Only a few interventions are available for SMEs and the self-employed affected by cancer. Hence the evaluation was done rather on the individual interventions targeted at the worker than on organisational interventions such as a RTW plan or a workplace intervention with for instance a reduction of working time or avoidance of heavy physical work.

The RTW support could be in the form of psycho-educational interventions such as counselling combined with providing information about social security issues, or physical training to increase physical and mental capacity. For these interventions there was no effect on return-to-work in evaluation studies. With or without the intervention, the same fairly high number of cancer survivors returned to work. However, there were only few studies that properly evaluated these interventions and it could be that future studies provide new information.

There were also medical interventions that aimed to make treatment less burdensome but this did not affect return-to-work rates. No studies were identified that had evaluated the effect of interventions to make changes at work or in employment.

Only multi-disciplinary interventions that combined vocational counselling with patient counselling and physical training increased return-to-work rates though it was only to a small extent. For workers that did not get the intervention return-to-work rates were on average 79% and this increased to 87% with the multidisciplinary interventions. This was based on five randomised studies with 450 participants and judged to be moderate quality evidence for the presence of a small beneficial effect of the interventions. The interventions did not have a considerable positive or negative affect on the quality of life in general.

From the grey literature a number of interventions addressing the workplace were found. However, those were only descriptions without an evaluation of their effectiveness. Interventions were described as workplace accommodations and mostly meant to accommodate fatigue and to provide more flexibility in working time or a reduction of working time, which could also take the form of paid leave for health care appointments. Interventions included proposals for adjustments to workload, modifications to duties, provision of assistance, and changes in personnel.

An extensive number of psycho-educational interventions such as advising cancer survivors by telephone or providing information on a dedicated website were found to be used in practice but none of these had been evaluated for their effect on return-to-work. Available interventions are, for example, information and training on cancer and return-to-work issues, rehabilitation services, guidelines, and workplace accommodations.

For employers, support interventions have been developed and are used in practice. These

interventions aim at supporting employers in constructing return-to-work plans for employees with cancer, ideas for workplace accommodations to facilitate return-to-work, improving communication with the employee and providing factual information about diagnosis and treatment of cancer. No information on the effectiveness of these interventions could be retrieved.

In some countries, as in the Netherlands and the UK, there are also guidelines and policies for health care professionals on how to support their patients in return-to-work. Even though these efforts are appreciated by cancer survivors, it is unclear if they affect return-to-work rates.

Very few interventions and resources were identified that are specifically for unemployed people diagnosed with cancer, self-employed people diagnosed with cancer or small and medium-sized enterprises.

From this overview of the literature, a selection of good practice examples of RTW interventions will be made to be described in more detail in other tasks of this project. Then, company case studies will provide an overview of what is used in practice and how this is experienced and carried out in companies. A qualitative study will provide information on the opinions of experts and professionals that are involved with return-to-work problems in cancer survivors. Together, this will allow for an assessment of discrepancies and similarities between research, practice in companies and practice of professionals. Furthermore, it will provide policy options that can be considered by decision makers to improve and support the return-to-work of workers diagnosed with cancer.

Synergies between policies and actors

Synergies and collaboration between policy areas seem to be important as developing and implementing efficient and effective interventions to promote return-to-work has been noted to require close collaboration between relevant actors. In the literature the following key actors are discussed: the cancer survivor, health care professionals, employers and professionals in human resource departments, colleagues, professionals in legal rights, employment and social services, trade unions, NGOs, and the government. However, no evaluations of the possible impact of these collaborations specifically for cancer survivors were found.

Conclusion

Surviving cancer can limit one's work ability for various reasons. The implications of cancer and its treatment can affect all aspects of human health and well-being, and include physical, mental, and cognitive symptoms. These implications can be either short- or long-term. When returning to work, survivors may face difficulties in balancing work and treatment demands, including negative attitudes or behaviour among their colleagues and employers. All of this may lead to a reassessment of work and life goals, and thus hinder RTW.

Various factors may influence a cancer survivor's ability to work or to resume work. However, it is unclear which of these factors are the most important and should be addressed in policies or best practices. Return-to-work is considered to be predicted both by disease-related factors such as fatigue after treatment, workplace-related factors such as heavy physical work and the specific type of treatment such as chemotherapy. Addressing these factors might improve return-to-work rates and point to workers who are specifically at risk for not returning to work. In general, work accommodations provided by employers and support for return-to-work from health care professionals are appreciated by cancer survivors.

With the rising number of cancer survivors, effective interventions are needed to enable RTW and to reduce the costs to individuals, companies and society at large. But to date, little is known about the effectiveness of these interventions, making it difficult to recommend 'best practices'. Only for multidisciplinary interventions there is evidence that RTW has been improved when compared to care as usual. These interventions include physiotherapy, occupational therapy, speech therapy, vocational rehabilitation, and psychology in relation to RTW (delivery of e.g. education, counselling, training).

The vast number of educational interventions that is available in practice, does probably not affect

return-to-work rates. The effect of other available interventions remains unclear, and more evaluation studies are needed to analyse their effect. Research that specifically addresses employer's views and needs as well as differences of return to work issues for small and medium sized enterprises are needed.

There is a gap between the descriptions and evaluations of interventions that aim to enhance RTW in the scientific literature and that which is available in practice. In other words, only little can be found in the scientific literature about the existing RTW interventions. Most information displayed in this overview comes from grey literature. Available interventions and resources are, for example, information and training on cancer and RTW issues, rehabilitation services, guidelines, and workplace accommodations. Most interventions have been developed primarily for cancer survivors, followed by interventions for employers and health care professionals. Very few interventions are available that are specifically for the self-employed or small and medium-sized enterprises.

1 Background

Each year, an estimated 3.2 million new cases of cancer are diagnosed in Europe. About half of these are occurring at working age. Even though in Europe geographical differences in cancer occurrence exist, the most frequent form of cancer incidence are breast, colorectal, prostate, and lung cancer. Those types of cancer were estimated to account for over half of the overall burden of cancer in Europe in 2012 (Ferlay et al. 2013). In men prostate cancer is most frequently diagnosed in North, West and South Europe, while lung cancer is most frequently diagnosed in Central and Eastern Europe. For women the most common type of cancer is breast cancer in each European country.

The impact of cancer on a person's daily life is immediate and striking. The diagnosis is usually coupled with long periods of sickness absence because of medical treatments. However, overall cancer detection and care management have improved during the past three decades. Cancer mortality rates show a north-west to south-east gradient, with better outcomes in north-western Europe (Znaor et al. 2013), but the overall number of people who survive cancer is increasing (de Boer 2014). Even though treatment focuses on curing the disease and preventing recurrence, many cancer survivors still face long-term symptoms and impairments after treatment ends, such as fatigue (Feuerstein et al. 2010, Silver et al. 2013).

These symptoms and impairments can affect the work ability of survivors, making it more difficult to remain in or re-enter the job market. Research shows that most cancer survivors are able to stay at or return to work (RTW)³, but that overall, the risk of unemployment among cancer survivors is 1.4 times higher than among healthy controls⁴ (de Boer et al. 2009). This is unfortunate, as cancer survivors often perceive RTW as an important part of their recovery.

Optimising the rehabilitation and RTW of workers with cancer is important in order to improve the well-being of this vulnerable group and to reduce the societal and financial impact of cancer diagnoses on (European) society at large.

³ (Bouknicht et al. 2006, Bradley and Bednarek 2002, Maunsell et al. 2004, Sanchez et al. 2004, Short et al. 2005, Spelten et al. 2002, Spelten et al. 2003)

⁴ This has been shown in a systematic review including a meta-analysis and meta-regression analysis. The analyses included 20,366 cancer survivors and 157,603 healthy control participants and included 16 studies from the United States, 15 studies from Europe, and 5 studies from other countries.

2 Objective

The project “Rehabilitation and return-to-work after cancer-instruments and practices” will provide more insight into the problems encountered by workers affected by cancer and their employers. Furthermore, it will provide recommendations for successful instruments, interventions, programmes and practices to support the return-to-work of workers affected by cancer.

The project “Rehabilitation and return-to-work after cancer-instruments and practices” is divided into 6 main tasks:

1. Literature review on rehabilitation and return-to-work after cancer
2. Detailed descriptions of policies, systems, programmes or instruments in the field of rehabilitation / return-to-work with / after cancer
3. Company case studies
4. Qualitative research with experts and intermediaries
5. Final report including analysis and policy options
6. Support to EU-OHA stakeholder workshop

This report concerns Task 1: Literature review on rehabilitation and return-to-work after cancer. In this report, an overview of available initiatives, policies and practices on return to work after cancer has been produced. From this overview, a selection of good practice examples will be made to be described in detail in Tasks 2 and 3.

The objective of this report is to provide an up-to-date literature review of the available knowledge regarding rehabilitation and RTW after cancer, in view of the following items:

- Background information on the impact of cancer on work, regarding:
 - o health and safety implications
 - o costs to employers and workers (and to society)
 - o wider issues, e.g. compatibility of treatment and work or the meaning of work.
- Available interventions and examples:
 - o available initiatives, policies, programmes, instruments, and practices
 - o examples of tool kits, guides, training tools, and other instruments.
- Synergies between different policy areas and/or (enterprise) actors, including:
 - o employment and social services
 - o general physicians
 - o health services
 - o NGOs.

The review also intends to identify aspects that are relevant to small and medium-sized enterprises (SMEs) and the differences in RTW outcomes according to sector, occupation, size of enterprise, age, income, and gender.

3 Methods

Three different methods were used to search, appraise, and collect evidence for this literature review.

First, a search for scientific evidence was performed and systematic reviews were selected that reported on:

- the health and economic impact of cancer on the worker and employer;
- interventions and examples of how to facilitate RTW.

A lack of systematic reviews was anticipated in the field of occupational cancer and the impact of cancer cases on SMEs. Therefore, a literature search was performed to identify qualitative and quantitative studies that complement the results of the systematic reviews.

Thirdly, grey literature was searched (e.g. publications from NGOs) to compile a broad overview of existing programs and interventions.

In addition, data was collected via an online questionnaire to complement the list of interventions and to identify unpublished programs and interventions.

A detailed description of the search strategy, the screening method for eligible publications, and the data extraction process can be found in the Appendix

4 Results

4.1 Health and safety implications for workers

Work can be physically, cognitively, emotionally, and interpersonally demanding, and workers need to have sufficient work capacity to be able to meet these demands. Disease can affect this capacity, making it impossible to meet demands, and lowering a worker's functioning at work. As long as work capacity is reduced, RTW will be impeded. Cancer survivors in particular may have long-term or even permanent health complaints, which can have implications for their personal ability to return to work.

This chapter is about the impact of cancer diagnosis and treatment on the work ability of survivors during or after treatment (e.g. the ability to concentrate or to cope with stress) and about the sociodemographic, job characteristic-, or disease-related factors that influence the RTW process (e.g. age, physical job demands, tumour site).

4.1.1 Cancer survivors' personal capacity to meet work demands

The literature included in this literature review shows that survivors report various effects of cancer and its treatment on their health including mental, cognitive and physical symptoms (Table 1). Also some cancer survivors may be symptom free, others have to live with cancer-related symptoms and impairments for years after treatment ends (Feuerstein et al. 2010, Silver et al. 2013). In these cases, symptoms can be long term and interfere with work performance for 10 years or more after the initial diagnosis (Silver et al. 2013).

The most frequently reported symptom in the literature was a diminished level of energy, described as fatigue or exhaustion, and emotional strain due to the ongoing battle with cancer. This was common across cancer types⁵.

Mental health implications were either described as diminished mental health, psychological symptoms or as mental disorders. Specific examples of mental health problems were depression, lower stress tolerance, anxiety, distress, fear of recurrence, sleep problems, loss of confidence, feelings of inadequacy and one's own limitations regarding re-employability⁶.

Cognitive implications were described by review authors as diminished cognitive capacities; problems, limitations, difficulties, or impairments in cognitive functioning; or even as cognitive disability⁷. These problems are attributed to cancer treatments such as chemotherapy and radiotherapy across cancer types. Specific examples were problems in focusing and memorising (Fitch 2013, Fitch and Nicoll 2014).

The physical health implications of cancer and its treatment were described in the literature as either diminished physical and functional capacity or as physical problems, impairment or even disability⁸. The most frequently reported physical health implication was (chronic) pain⁹. Some of the specific examples of decreased physical capacity can be related to particular types of cancer and its location in the body. Problems such as bladder and bowel problems were reported in reviews focusing on

⁵ (Aaronson et al. 2014, Amir and Brocky 2009, Campbell et al. 2012, Duijts et al. 2014b, Feuerstein et al. 2010, Fitch and Nicoll 2014, Horsboel et al. 2012, Islam et al. 2014, Molina and Feliu 2013, Munir et al. 2009, Peteet 2000, Richardson et al. 2011, Silver et al. 2013, Stergiou-Kita et al. 2014, Wells et al. 2013)

⁶ (Aaronson et al. 2014, Amir and Brocky 2009, Banning 2011, Duijts et al. 2014b, Duijts et al. 2014a, Feuerstein et al. 2010, Fitch and Nicoll 2014, Horsboel et al. 2012, Mehnert 2011, Munir et al. 2009, Richardson et al. 2011, Wells et al. 2013)

⁷ (Amir and Brocky 2009, Banning 2011, Duijts et al. 2014b, Feuerstein et al. 2010, Fitch 2013, Fitch and Nicoll 2014, Munir et al. 2009, Richardson et al. 2011, Silver et al. 2013, Stergiou-Kita et al. 2014, Wells et al. 2013)

⁸ (Amir and Brocky 2009, Duijts et al. 2014b, Richardson et al. 2011, Wells et al. 2013)

⁹ (Aaronson et al. 2014, Duijts et al. 2014b, Feuerstein et al. 2010, Horsboel et al. 2012, Islam et al. 2014, Richardson et al. 2011, Silver et al. 2013)

haematological malignancies. Other physical problems were described as limitations in upper body movements and were mainly reported for breast cancer patients. Other physical problems were reported to be hot flushes and nausea and were linked in some reviews to the type of treatment (e.g. chemotherapy).

Some reviews reported that health implications may result in the termination of employment, an increase in the amount of sick leave and a diminished ability to meet work demands¹⁰. This means that any of the reported symptoms and impairments may reduce a cancer survivor's personal capacity to meet work demands, although not all reviews explicitly reported a decrease in cancer survivors' work ability.

The explicit occupational implications that the review authors reported were diminished work productivity, work ability impairments, and decreased functioning at work. However, these were not described in any further details, except that the symptoms interacted with cognitive, physical and mental work ability or functioning at work¹¹.

¹⁰ (Feuerstein et al. 2010, Fitch and Nicoll 2014, Mehnert 2011, Molina and Feliu 2013, Munir et al. 2009, Silver et al. 2013)

¹¹ (Feuerstein et al. 2010, Fitch and Nicoll 2014, Mehnert 2011, Molina and Feliu 2013, Munir et al. 2009, Silver et al. 2013)

Table 1: Overview of health and safety implications for cancer survivors returning to work identified from the literature

Category	Sub-category	Implications that have been reported in reviews	Literature (Evidence base)	Cancer type
General findings	Survivors can be symptom free	individuals can be asymptomatic despite an active disease status (Feuerstein 2010)	Narrative review: Feuerstein 2010 (Feuerstein et al. 2010)	Any
	Symptoms can be long-term	many participants reported that symptoms were long term (more than one year after treatment ended). Symptoms and impairments may continue to interfere for 10 years or more after the initial diagnosis (Silver 2013) presence and severity of symptoms that can accompany cancer diagnosis and treatment may exist for years following treatment at varying levels of frequency and severity (Feuerstein 2010)	Narrative review: Feuerstein 2010 (Feuerstein et al. 2010) Silver 2013 (Silver et al. 2013)	Any
	Lack of energy	fatigue (Aaronson 2014, Amir 2009, Campbell 2012, Duijts 2014a/b, Feuerstein 2010, Fitch 2014, Horsboel 2012, Islam 2014, Molina 2013, Munir 2009, Peteet 2000, Richardson 2011, Silver 2013, Stergiou-Kita 2014) Exhaustion (Islam 2014) treatment toxicity (Horsboel 2012) emotional strain of ongoing battle with cancer (Wells 2013)	Qualitative synthesis: Stergiou-Kita 2014 (Stergiou-Kita et al. 2014) Wells 2013 (Wells et al. 2013) Narrative review: Aaronson 2014 (Aaronson et al. 2014) Amir 2009 (Amir and Brocky 2009) Campbell 2012 (Campbell et al. 2012) Duijts 2014a (Duijts et al. 2014a)	Any, breast cancer, haematological malignancies

			<p>Duijts 2014b (Duijts et al. 2014b) Feuerstein 2010 (Feuerstein et al. 2010) Fitch 2014 (Fitch and Nicoll 2014) Horsboel 2012 (Horsboel et al. 2012) Islam 2014 (Islam et al. 2014) Molina 2013 (Molina and Feliu 2013) Munir 2009 (Munir et al. 2009) Peteet 2000 (Peteet 2000) Richardson 2011 (Richardson et al. 2011) Silver 2013 (Silver et al. 2013)</p>	
<p>Mental health implications</p>	<p>Diminished mental health</p>	<p>General descriptions in reviews: psychological symptoms (Horsboel 2012, Amir 2009) diminished mental health (Wells 2013) mental disorders (Mehnert 2011) Specific examples in reviews: distress (Aaronson 2014, Duijts 2014b, Feuerstein 2010, Fitch 2014, Horsboel 2012, Mehnert 2011, Richardson 2011) depression (Aaronson 2014, Amir 2009, Duijts 2014b, Fitch 2014, Horsboel 2012, Munir 2009, Richardson 2011) anxiety (Aaronson 2014, Amir 2009, Duijts 2014b, Fitch 2014, Horsboel 2012, Richardson 2011) fear of recurrence (Richardson 2011)</p>	<p>Qualitative synthesis: Banning 2011 (Banning 2011) Wells 2013 (Wells et al. 2013) Narrative review Aaronson 2014 (Aaronson et al. 2014) Amir 2009 (Amir and Brocky 2009) Duijts 2014b (Duijts et al. 2014b) Feuerstein 2010 (Feuerstein et al. 2010) Fitch 2014 (Fitch and Nicoll 2014) Horsboel 2012 (Horsboel et al. 2012) Mehnert 2011 (Mehnert 2011) Munir 2009 (Munir et al. 2009)</p>	<p>Any, breast cancer, haematological malignancies</p>

Rehabilitation and return to work after cancer: a review of the literature

		<p>diminished stress threshold (Wells 2013)</p> <p>sleep problems /disturbance (Aaronson 2014, Amir 2009, Feuerstein 2010, Munir 2009)</p> <p>lower level or loss of confidence, or problems with confidence (Duijts 2014b, Fitch 2014, Munir 2009, Wells 2013)</p> <p>diminished self-esteem, feelings of inadequacy/limitation (re-employability) (Wells 2013), feelings of reduced competence and physical ability, fear of job loss, worries over appearance (Banning 2011)</p> <p>frustration (Wells 2013)</p>	Richardson 2011 (Richardson et al. 2011)	
Cognitive health	Diminished cognitive capacity	<p>General descriptions in reviews:</p> <p>cognitive problems described as: cognitive limitations, cognitive difficulties, diminished cognitive capacity, cognition impairments, cognitive disability, problems with cognition, cognitive functioning or cognitive problems related to chemotherapy (Amir 2009, Banning 2011, Duijts 2014b, Feuerstein 2010, Fitch 2014, Munir 2009, Richardson 2011, Silver 2013, Stergiou-Kita 2014, Wells 2013)</p> <p>Specific examples in reviews:</p> <p>cognitive impairment including concentration and memory (Fitch 2014)</p>	<p>Qualitative synthesis:</p> <p>Banning 2011(Banning 2011)</p> <p>Stergiou-Kita 2014 (Stergiou-Kita et al. 2014)</p> <p>Wells 2013 (Wells et al. 2013)</p> <p>Narrative review:</p> <p>Amir 2009 (Amir and Brocky 2009)</p> <p>Duijts 2014 (Duijts et al. 2014b)</p> <p>Feuerstein 2010 (Feuerstein et al. 2010)</p> <p>Fitch 2014 (Fitch 2013, Fitch and Nicoll 2014)</p> <p>Munir 2009 (Munir et al. 2009)</p> <p>Richardson 2011 (Richardson et al. 2011)</p> <p>Silver 2013 (Silver et al. 2013)</p>	Any, Breast cancer
Physical	Diminished physical	<u>General descriptions in reviews:</u>	Qualitative synthesis:	Any, Breast cancer,

Rehabilitation and return to work after cancer: a review of the literature

<p>health</p>	<p>capacity</p>	<p>lower physical capacity/functioning described as: physical problems, impairment in physical functioning, functional limitations, physical limitations, diminished physical/functional capacity, physical impairment, physical disability, physical and functional disabilities (Amir 2009, Campbell 2012, Duijts 2014b, Fitch 2014, Mehnert 2011, Peteet 2000, Richardson 2011, Wells 2013)</p> <p><u>Specific examples in reviews:</u></p> <p>nausea (Amir 2009)</p> <p>bladder/bowel: constipation (Horsboel 2012), incontinence (Fitch 2014)</p> <p>lymphoedema (Fitch 2014), upper arm lymphoedema (Stergiou-Kita 2014)</p> <p>upper body: breast and arm symptoms (Silver 2013), arm disability (Duijts 2014b), limitations in upper body movement (Silver 2013)</p> <p>hot flushes: hot flushes as treatment-induced menopausal symptoms (Duijts 2014b) (Fitch 2014)</p> <p>pain (Silver 2013, Richardson 2011, Islam 2014, Horsboel 2012, Aaronson 2014, Duijts 2014b), chronic pain (Feuerstein 2010)</p>	<p>Stergiou-Kita 2014 (Stergiou-Kita et al. 2014)</p> <p>Wells 2013 (Wells et al. 2013)</p> <p>Narrative review</p> <p>Aaronson 2014 (Aaronson et al. 2014)</p> <p>Amir 2009 (Amir and Brocky 2009)</p> <p>Duijts 2014 (Duijts et al. 2014b)</p> <p>Feuerstein 2010 (Feuerstein et al. 2010)</p> <p>Fitch 2014 (Fitch and Nicoll 2014)</p> <p>Horsboel 2012 (Horsboel et al. 2012)</p> <p>Islam 2014 (Islam et al. 2014)</p> <p>Mehnert 2011 (Mehnert 2011)</p> <p>Peteet 2000 (Peteet 2000)</p> <p>Richardson 2011 (Richardson et al. 2011)</p> <p>Silver 2013 (Silver et al. 2013)</p>	<p>Haematological malignancies</p>
<p>Work ability</p>	<p>Decreased work ability</p>	<p><u>General description in reviews:</u></p> <p>decreased work capacity (Feuerstein 2010)</p> <p>lower work productivity (Munir 2009)</p> <p>loss in worker productivity (Fitch 2014)</p> <p>'Physical and functional disabilities ... psychological</p>	<p>Narrative review:</p> <p>Feuerstein 2010 (Feuerstein et al. 2010)</p> <p>Fitch 2014 (Fitch and Nicoll 2014)</p> <p>Mehnert 2011 (Mehnert 2011)</p> <p>Molina 2013 (Molina and Feliu 2013)</p>	<p>Any</p>

Rehabilitation and return to work after cancer: a review of the literature

distress or mental disorders ... may adversely affect work ability.' (Mehnert 2011)

physical and psychological symptoms impacted on the patient's ability to return to work (Molina 2013)

cancer-related symptoms and impairments interfered with work performance, caused possible termination of employment or increase in amount of sick leave (Silver 2013)

Specific examples in reviews:

treatment interfered with cognitive and physical functioning at work (Feuerstein 2010)

decreased/impairments in physical and mental work ability (Feuerstein 2010, Munir 2009)

Munir 2009 (Munir et al. 2009)

Silver 2013 (Silver et al. 2013)

None of the reviews reported implications on safety issues at work due to cancer diagnose or treatment. It is however possible that, as with any other disease that causes similar symptoms, symptoms such as a lower level of energy, being tired or a diminished cognitive, physical or mental health status can affect the safety of workers and others due to an increased risk of accidents. This might be relevant for many occupations e.g. bus drivers, pilots, surgeons, or security guards.

4.1.2 Prognostic factors for return to work after cancer

This report identified and included relevant review articles that reported about prognostic factors for return to work after cancer. Some of the authors of those reviews used qualitative methods (e.g. meta-ethnography, grounded formal theory) to synthesise results from primary studies¹² and most of the identified reviews did not apply methods to synthesize single study results but presented a narrative of single studies and their results¹³. Reviews with a narrative approach describe single studies and their results but do not apply methods to synthesize the data. Reviews with a qualitative synthesis approach give an interpretative overview over the available data.

None of the two approaches provide a precise estimate of effects (e.g. which factors significantly or which factor most effectively promotes RTW). However both types of reviews provide an overview of factors that may possibly influence a successful RTW process after cancer.

The following five groups of factors were reported to influence the RTW process (Table 2):

- socio-demographic
- work-related
- disease-related
- treatment-related
- other.

Factors that the review authors considered as positively influencing RTW outcomes are marked with a plus sign (+), and factors considered barriers are marked with a minus sign (-). The review authors also listed some factors without specifying the direction of the influence, due to either missing or inconclusive evidence. These factors are marked with a question mark (?). The review authors also specified factors that were not significantly related to RTW. These are marked with a zero (0). When review authors came to different conclusions, e.g. one factor was considered a barrier in one review, and not significant in another, the factors are marked with more than one sign (e.g. (-/0)).

¹² (Banning 2011, Spelten et al. 2002, Stergiou-Kita et al. 2014, Tiedtke et al. 2010, Wells et al. 2013)

¹³ (Aaronson et al. 2014, Amir and Brocky 2009, Campbell et al. 2012, Cox et al. 2014, Feuerstein et al. 2010, Fitch and Nicoll 2014, Harji et al. 2015, Horsboel et al. 2012, Islam et al. 2014, Mehnert 2011, Molina and Feliu 2013, Munir et al. 2009, Richardson et al. 2011, Silver et al. 2013, Steiner et al. 2004, Steiner et al. 2010, Trivers et al. 2013, Ullrich et al. 2012, van Muijen et al. 2013)

Table 2: Overview of factors reported to influence return to work of cancer survivors

Category	Factors listed and described in the reviews ¹⁴	Evidence base
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¹⁴ Factors were considered by the review authors as barriers (-), facilitators (+), having no relevant association with RTW (0), or having an unspecified/inconclusive association with RTW (?).

Rehabilitation and return to work after cancer: a review of the literature

Socio-demographic factors

Age: younger (+) vs. older (-)

Gender: male (+/0/?) vs. female (-/0/?)

Educational level: higher (+/0) vs. lower (-/0)

Income: higher (+/0) vs. lower (-/0)

Occupational status: employed (+) vs. unemployed (-)

Marital status (?/0)

Race/ethnicity (?)

Qualitative synthesis:

Spelten 2002 (Spelten et al. 2002)

Narrative review:

Aaronson 2014 (Aaronson et al. 2014)

Amir 2009 (Amir and Brocky 2009)

Feuerstein 2010 (Feuerstein et al. 2010)

Fitch 2014 (Fitch and Nicoll 2014)

Horsboel 2012 (Horsboel et al. 2012)

Islam 2014 (Islam et al. 2014)

Mehnert 2011 (Mehnert 2011)

Molina 2013 (Molina and Feliu 2013)

Munir 2009 (Munir et al. 2009)

Richardson 2011 (Richardson et al. 2011)

Silver 2013 (Silver et al. 2013)

Steiner 2004 (Steiner et al. 2004)

Steiner 2010 (Steiner et al. 2010)

Ullrich 2012 (Ullrich et al. 2012)

Van Muijen 2013 (van Muijen et al. 2013)

Rehabilitation and return to work after cancer: a review of the literature

Work-related factors

Type of work:

physical and emotional demands: lower (+) vs higher (-) demands (e.g. desk vs. manual work, non-stressful vs. stressful)

Work setting:

workplace (?)

flexible working arrangements (+)

reduced working hours (+)

company employment (-)

health insurance coverage (-)

early or longer disability pension (-)

size of organisation (?)

job facility (?)

Social factors of work:

supportive work environment (+), positive attitudes of co-workers (+), supportive colleagues (+), perceived accommodating employer (e.g. RTW meeting, willingness to allow flexible working arrangements) (+)

disclosure of cancer to colleagues (+)

perceived discrimination at work (-/0)

non-supportive work environment (-)

Other work-related factors:

discretion over working hours/amount of work (+)

belonging to workers' union (+)

job replacement services (+)

job search assistance (+)

possible job loss (-)

Qualitative synthesis:

Wells 2013 (Wells et al. 2013)

Spelten 2002 (Spelten et al. 2002)

Stergiou-Kita 2014 (Stergiou-Kita et al. 2014)

Narrative reviews:

Aaronson 2014 (Aaronson et al. 2014)

Alfano 2009 (Alfano and Rowland 2009)

Amir 2009 (Amir and Brocky 2009)

Campbell 2012 (Campbell et al. 2012)

Feuerstein 2010 (Feuerstein et al. 2010)

Fitch 2014 (Fitch and Nicoll 2014)

Horsboel 2012 (Horsboel et al. 2012)

Islam 2014 (Islam et al. 2014)

Mehnert 2011 (Mehnert 2011)

Molina 2013 (Molina and Feliu 2013)

Richardson 2011 (Richardson et al. 2011)

Silver 2013 (Silver et al. 2013)

Steiner 2004 (Steiner et al. 2004)

Steiner 2010 (Steiner et al. 2010)

Van Muijen (van Muijen et al. 2013)

Rehabilitation and return to work after cancer: a review of the literature

Disease-related factors

Cancer site or type:

cancer site or type (?/0)

less aggressive cancer type (+)

breast (+) vs. colorectal cancer (-)

colorectal (+) vs. lung cancer (-)

specific types: colorectal, liver, lung cancer, advanced blood and lymph malignancies, brain and CNS cancer sites, gastrointestinal cancers, pancreatic cancer, head and neck cancers (-)

Cancer stage:

cancer stage (?)

less advanced, early cancer stage (+)

advanced tumour stage (-)

extensive disease (-)

Symptoms:

symptoms (?)

depression or fatigue (?/0/-)

less physical symptoms (+)

functional limitations (-)

nausea (0)

Other disease-related factors:

shorter length of sick-leave (+)

Qualitative synthesis

Spelten 2002 (Spelten et al. 2002)

Stergiou-Kita 2014 (Stergiou-Kita et al. 2014)

Narrative reviews:

Aaronson 2014 (Aaronson et al. 2014)

Amir 2009 (Amir and Brocky 2009)

Campbell 2012 (Campbell et al. 2012)

Feuerstein 2010 (Feuerstein et al. 2010)

Fitch 2014 (Fitch and Nicoll 2014)

Horsboel 2012 (Horsboel et al. 2012)

Islam 2014 (Islam et al. 2014)

Mehnert 2011 (Mehnert 2011)

Molina 2013 (Molina and Feliu 2013)

Munir 2009 (Munir et al. 2009)

Richardson 2011 (Richardson et al. 2011)

Silver 2013 (Silver et al. 2013)

Steiner 2004 (Steiner et al. 2004)

Steiner 2010 (Steiner et al. 2010)

Van Muijen (van Muijen et al. 2013)

Treatment-related factors

Type of treatment:
type of treatment (?), type of treatment as predictor at beginning of treatment (?)
less invasive/aggressive (+/?) vs invasive/aggressive (-/?)
absence of chemotherapy, radiation, or surgery (+)
surgery only (+)
extensive surgery (-)
chemotherapy (-)
endocrine therapy (-)
objective treatment response as predictor at end of treatment (?)
Other treatment-related factors:
treatment length (?)
side effects (?)
greater number of months since treatment (+)

Qualitative synthesis:

Banning 2011 (Banning 2011)
Spelten 2002 (Spelten et al. 2002)

Narrative reviews:

Aaronson 2014 (Aaronson et al. 2014)
Amir 2009 (Amir and Brocky 2009)
Feuerstein 2010 (Feuerstein et al. 2010)
Fitch 2014 (Fitch and Nicoll 2014)
Harji 2015 (Harji et al. 2015)
Horsboel 2012 (Horsboel et al. 2012)
Mehnert 2011 (Mehnert 2011)
Molina 2013 (Molina and Feliu 2013)
Munir 2009 (Munir et al. 2009)
Richardson 2011 (Richardson et al. 2011)
Silver 2013 (Silver et al. 2013)
Van Muijen 2013 (van Muijen et al. 2013)

Rehabilitation and return to work after cancer: a review of the literature

Other factors

advice from doctor regarding work (+)
changed attitudes to work such as reduced importance or decreased work aspiration (-)
fear of unemployment (-)
a change in the emotional states (depression, worry, frustration, fear of potential environmental hazards, and feelings of guilt) (-)
time (likelihood of returning to work over time) (?/+)
insurance concerns (?), private health insurance (+)
psychological factors: life satisfaction, willingness or self-motivation, normalcy and acceptance of maintaining a normal environment at work (+),
motivation (?), coping (?)
low quality of life scores (-)

Qualitative synthesis:

Banning 2011 (Banning 2011)
Stergiou-Kita 2014 (Stergiou-Kita et al. 2014)

Narrative reviews:

Cox 2014 (Cox et al. 2014)
Feuerstein 2010 (Feuerstein et al. 2010)
Fitch 2014 (Fitch and Nicoll 2014)
Islam 2014 (Islam et al. 2014)
Mehnert 2011 (Mehnert 2011)
Munir 2009 (Munir et al. 2009)
Richardson 2011 (Richardson et al. 2011)
Silver 2013 (Silver et al. 2013)
Spelten 2002 (Spelten et al. 2002)
Steiner 2010 (Steiner et al. 2010)
Trivers 2013 (Trivers et al. 2013)

Socio-demographic factors associated with RTW included age, gender, educational level, occupational status, marital status, and income. Individuals with a lower income, a lower level of education, of female gender, and older in age seemed less likely to return to work than males, younger adults and survivors with higher levels of education and income (Aaronson et al. 2014, Fitch and Nicoll 2014, Mehnert 2011, Molina and Feliu 2013, Steiner et al. 2004, Steiner et al. 2010, van Muijen et al. 2013). This evidence is not strong, however, and reviews provide conflicting results. Only age might be significantly associated with RTW (Horsboel et al. 2012, Spelten et al. 2002).

Examples of work-related factors were the type of work (physical and emotional job demands), the work setting (e.g. size of the organisation, working hours, health insurance and disability pension coverage), social factors at work (e.g. attitudes of colleagues), and other factors (e.g. possibility of job loss, union membership). In contrast, physically demanding jobs compared to less demanding jobs, were negatively associated with RTW (Aaronson et al. 2014, Amir and Brocky 2009, Spelten et al. 2002, Steiner et al. 2004, Steiner et al. 2010). Positive associated with return to work was a work setting with flexible working arrangements and reduced working hours. Negatively associated with RTW was a workplace with a health insurance coverage, as well as company employment and an early or longer disability pension. Other factors of the work setting, that were considered to be relevant factors to influence RTW decisions, were the workplace or the job facility in general and the size of the organisation. However, the effect on RTW was either not specified or the effect was considered unclear in the reviewed literature. Social factors of work that are considered to have a positive influence on RTW was a supportive work environment (including attitudes of colleagues and the perception of an accommodating employer and supportive colleagues). On the contrary, a non-supportive social work environment and perceived discrimination at work was considered a barrier, although discrimination at the workplace was not found to be significantly related to RTW (Spelten et al. 2002).

Disease-related factors that were considered to influence RTW, were cancer type, site, stage, and symptoms, but an association with RTW was either unclear or considered irrelevant. However, literature authors that considered more specific characteristics, concluded that less aggressive cancer types are positively associated with RTW, as well as a less advanced, early cancer stage, less physical symptoms and a shorter length of sick-leave. An advanced tumour stage, an extensive disease, and functional limitations were considered barriers for RTW. Also some cancer types were considered to negatively influence RTW (colorectal, liver, lung cancer, advanced blood and lymph malignancies, brain and CNS cancer sites, gastrointestinal cancers, pancreatic cancer, head and neck cancers). In direct comparison, breast cancer patients were considered more likely to return to work than colorectal cancer patients and colorectal cancer patients more likely to RTW than lung cancer patients. The symptom nausea was considered a factor with no relevant relation to RTW.

Treatment-related factors considered in the scientific literature to influence RTW were the type of treatment (e.g. aggressive vs. less aggressive), the treatment length, and its side effects. RTW was negatively associated with intense and longer treatments (extensive surgery, chemotherapy, endocrine therapy) and positively associated with less invasive or aggressive treatment (absence of chemotherapy, radiation, surgery, or surgery only). One review conducted a meta-analysis of available intervention studies regarding the type of treatment. The analysis showed that aggressive and less aggressive treatment result in similar RTW rates for the same cancer type, although better quality studies are still needed to confirm this result (de Boer et al. 2015b). This could mean that, even though some review authors consider an effect of the type of treatment on RTW, the effect might not be significant. The treatment length and treatment side effects were considered factors that influence RTW, but the effect was considered unclear.

Other possible factors that the literature considered as hindering RTW were fear of unemployment, low quality of life scores; changed attitudes to work, such as reduced importance or decreased work aspiration; and changes in emotional states, such as depression, worry, frustration, fear, or guilt. Time is considered a facilitator of RTW, with the likelihood of RTW increasing over time (Steiner et al. 2010). Other factors that are considered facilitators are having private health insurance, receiving advice from one's doctor regarding work, and psychological factors (life satisfaction, willingness or self-motivation, normalcy and acceptance of maintaining a normal environment at work).

Another factor that is discussed in the literature to influence RTW is the personal perception of one's

illness, as it determines how someone manages and copes with his own disease (Hoving et al. 2010). However, the results are based on studies on somatic diseases, and to what extent the findings are relevant for cancer survivors remains unclear. For this reason it is not included in the table above.

4.1.3 Differences according to selected factors

Some research evidence suggests that differences in RTW outcomes are due to differences in occupations, occupational sectors, enterprise size, gender, age, and income.

It is, however, uncertain to what extent these factors influence RTW, and how they relate to other factors (such as treatment, diagnosis, psychological factors), because good quality evidence and multivariate analysis data are lacking.

The influence of the size of the enterprise is even less clear. Only one review identified size of organisation as an important factor, but it failed to provide reference to primary studies or specify the direction of the influence (Wells et al. 2013).

Thus, it is uncertain whether the following suggested relations are significant:

- Cancer survivors employed in manual labour might be less likely to return to work than survivors with less physically demanding jobs.
- The size of the organisation might be an important factor for RTW (direction unknown).
- Female cancer survivors might be less likely to return to work than male survivors.
- Older cancer survivors might be less likely to return to work than younger survivors.
- Cancer survivors with lower income might be less likely to return to work than survivors with a higher income.

It is difficult to draw strong conclusions about the influence of prognostic factors on RTW, because the evidence is mainly from studies using methods that cannot answer the question precisely (qualitative or cross-sectional studies). Even though these studies indicate what might be a valuable factor, to be more certain there is a need for longitudinal studies that indicate how strongly the factor is related to RTW.

Ideally, evidence regarding prognostic factors should be based on studies with a long follow-up (longitudinal design). This would strengthen the confidence in the results (minimise bias) and identify relevant factors that predict when a worker returns to work (prediction of work status over time). Furthermore, no reviews had numerically combined the results of prognostic factors in a meta-analysis. This means that the reviews could not draw convincing conclusions about the significance of the identified prognostic factors. For example, no information is available on how well factors predict RTW outcomes or how different factors are related. We cannot tell, for example, how much older versus younger age increases the risk of not returning to work.

4.2 Costs to employers, workers and society

The return to work of cancer survivors is economically important. Cancer survivors who do not return to work during or after treatment mean a financial loss for the worker, the employer, and society. Adapting the work environment may enable RTW. This may come with costs for the company and the worker, but in the end, these may be less than the costs of long-term sick leave.

Most of the scientific literature shows that individuals experience financial loss when they are not able to return to work after cancer. Most commonly, cancer changes the economic status of survivors and imposes economic difficulties on them and their family. Reviews reported economic loss for the individual due to reduced wages, related to, e.g. delayed RTW, exhaustion of paid sick leave, or unemployment. Furthermore, additional costs due to cancer and its treatment were also reported (Table 3).

The systematic reviews had no results regarding the economic impact on companies.

Only one review reported economic loss to society due to cancer-related loss of productivity and

working days. These costs for the European Union were estimated to be EUR 9.5 billion in 2009 (Aaronson et al. 2014). None of the reviews reported any additional costs to society, e.g. due to implementing RTW interventions for cancer survivors.

Table 3: Economic impact of cancer

Category	Sub-category	Descriptions in reviews	Evidence base
Individual level	General description of economic difficulties	<p>‘Financial difficulties’ (Harji 2015)</p> <p>‘A serious challenge to family budgets’, ‘financial burden’ (Wells 2013)</p> <p>‘contrary findings have been found related to earnings and wages in cancer patients (Mehnert 2011)</p>	<p>Qualitative synthesis:</p> <p>Wells 2013 (Wells et al. 2013)</p> <p>Harji 2015 (Harji et al. 2015)</p> <p>Narrative review</p> <p>Mehnert 2011 (Mehnert 2011)</p>
	No economic difference between cancer survivors and individuals without cancer	<p>‘one ... study assessed the economic consequences of the decision to return to work on the survivor and his or her family ... found that long-term survivors worked an average of >40 hours per week and had average wages similar to individuals without cancer’ (Steiner 2004)</p> <p>‘No differences in annual household income levels, in the number of paid hours per week, in working time each week (full-time, part-time) between cancer survivors and non-cancer control’ (Mehnert 2011)</p>	<p>Narrative review:</p> <p>Mehnert 2011</p> <p>Steiner 2004 (Steiner et al. 2004)</p>
	Higher income among cancer survivors	<p>‘significantly higher earnings in breast cancer survivors than among the non-cancer comparison group’ (Mehnert 2011)</p>	<p>Narrative review:</p> <p>Mehnert 2011</p>

	Economic loss	<p>Loss of income (including unemployment, reduced wages, delayed RTW) (Harji 2015, Ullrich 2012, Wells 2013)</p> <p>‘gradual exhaustion of sick pay’ (Wells 2013)</p> <p>‘cancer to be associated with a decline in overall earnings , decrease in wages’ (Mehnert 2011)</p> <p>‘43 % of ovarian cancer survivors reported working full-time post-diagnosis, compared to 67 % pre-diagnosis; however, this resulted in minimal impact on overall socioeconomic status’ (Trivers 2013)</p>	<p>Qualitative synthesis: Wells 2013 (Wells et al. 2013)</p> <p>Harji 2015 (Harji et al. 2015)</p> <p>Narrative review Trivers 2013 (Trivers et al. 2013)</p> <p>Ullrich 2012 (Ullrich et al. 2012)</p>
	Additional costs	<p>Financial burden due to cancer and treatment (including medical bills, higher heating costs, travel) (Ullrich 2012, Wells 2013)</p>	<p>Qualitative synthesis: Wells 2013 (Wells et al. 2013)</p> <p>Narrative review Ullrich 2012 (Ullrich et al. 2012)</p>
Company level	-	No descriptions in the reviews	-
Society level	Economic loss	<p>In 2009, lost working days due to cancer cost the European Union € 9.5 billion. (Aaronson 2014)</p> <p>‘mean total cost of illness/patient for pancreatic cancer in Germany was € 31 375 (cost years 2000-2003), where ... 10 % was contributed by indirect costs including loss of productivity due to days-off work. In 2009, the estimated cost/patient associated with loss of productivity due to absenteeism was € 6 077 in Sweden’, ‘a trend in increase of fiscal burden’, ‘major contributors ... were surgery, hospitalisations, chemotherapy, and loss of productivity’ (Kaushal 2012)</p>	<p>Narrative review Aaronson 2014 (Aaronson et al. 2014)</p> <p>Kaushal 2012 (Kaushal et al. 2012)</p>

4.2.1 Individual level

Systematic reviews identified that the financial impact on the cancer survivor is a combination of the additional costs of having cancer (e.g. travel and medical bills), gradual exhaustion of paid sick leave, and a change in occupational status (reduced wages, unemployment, or delayed RTW) (Harji et al. 2015, Ullrich et al. 2012, Wells et al. 2013).

Reviews did not use methods that can analyse the actual financial impact on cancer survivors numerically. Authors however argue that this can pose a serious challenge not only to the individual but also to a family's budget (Wells et al. 2013) and that it is unclear whether the financial status of cancer survivors is different to that of individuals without cancer (Mehnert 2011, Steiner et al. 2004).

4.2.2 Societal level

It has been argued that the economic consequences of cancer-related lost productivity are significant (Wells et al. 2014). The economic costs of cancer and RTW for the European Union in 2009 have been estimated to be billions (Aaronson et al. 2014).

4.3 Wider issues that may affect the worker

4.3.1 Meaning of work and motivation to work

The meaning of work and the motivation to work are factors that influence RTW decisions. From the scientific literature six factors were identified that are related to the motivation to work and either support or discourage RTW decisions (Table 4).

- **Enhancing factors**

An enhancing influence on RTW was reported when cancer survivors perceived work as 1) a marker of normality, 2) a marker of health, 3) important to one's identity, 4) socially important, 5) economically necessary or when cancer survivors perceived 6) pressure from the workplace to return to work.

Regaining normality and structure in everyday life was reported as both the motive to return to work and the meaning of work in itself. Cancer survivors valued the possibility to return to 'default' or perceived work as a distraction from cancer. Others understood work as a marker of well-being, and reported that working and being at work made them feel healthy. Work was also reported as being important to one's identity, and survivors returned to work to either regain a sense of their former self and identity or to adjust to bodily changes, or because work meant validation and achievement. Cancer survivors also valued relationships with co-workers and did not want to miss out on the social aspects of work. Those factors are all internally driven but other potentially enhancing factor for RTW were more externally driven. In these cases, survivors understood work as an economic necessity to protect lifestyle aspirations, to support the family, or they returned to work for insurance reasons. Some men in one review reported to feel pressure from the workplace to return to work (Handberg et al. 2014).

- **Hindering factors**

In contrast, some cancer survivors may choose not to return to work or to reduce working hours. Factors that hindered RTW were described when survivors reported a 1) change in the meaning and importance of work after their cancer diagnosis, 2) felt too ill to work, 3) perceived the workplace as discouraging, or simply preferred the 4) opportunity to take a break.

A change in the meaning and importance of work described to hinder RTW was when the value of work or "taste for work" decreased after having cancer. Also described were changed life perspectives and priorities that affect the meaning of work and alter work priorities. Some felt too fragile, ill, or confronted with health problems and health concerns that did not allow RTW. The characteristics that made the workplace a discouraging place and hindered RTW were not described in the included reviews.

Table 4: Work motivation/meaning of work for cancer survivors and its influence on return to work

Category	Sub-category	Motivation to work and meaning of work, as listed in reviews	Evidence base
Enhancing influence on RTW	Regaining normality and structure	normality (Wells 2013, Handberg 2014, Banning 2011, Peteet 2000) structure, 'default' (Wells 2013) work generates and structures everyday life (Silver 2013) therapeutic value: distraction from cancer (Wells 2013)	Qualitative synthesis: Banning 2011 (Banning 2011) Handberg 2014 (Handberg et al. 2014) Wells 2013 (Wells et al. 2013) Narrative review: Peteet 2000 Silver 2013 (Silver et al. 2013)
	Marker of health	feeling healthy (Banning 2011) marker of health/well-being (Wells 2013) return to work perceived as an important phase in the recovery process, a measure of control over illness, positive step towards future (Duijts 2014a)	Qualitative synthesis: Banning 2011 (Banning 2011) Wells 2013 (Wells et al. 2013) Narrative review: Duijts 2014a (Duijts et al. 2014a)
	Important for identity	Sense of identity (Banning 2011), identity as a worker (Wells 2013), concept of identity (Peteet 2000) achievement, validation, a goal to return (Wells 2013) working as a way of confronting and re-adjusting to altered bodies, re-establishing a sense of former selves (Wells 2013)	Qualitative synthesis: Banning 2011 (Banning 2011) Wells 2013 (Wells et al. 2013) Narrative review: Peteet 2000

Rehabilitation and return to work after cancer: a review of the literature

<p>Socially important</p>	<p>social interaction: support, belonging (Wells 2013) social interaction: alleviation of boredom/ isolation (Wells 2013) close relationship to colleagues: strong desire to get back to work quickly, not missing out on the social aspect of the workplace (Handberg 2014) work and colleagues seen as rehabilitation (Handberg 2014(Handberg et al. 2014))</p>	<p>Qualitative synthesis: Handberg 2014 (Handberg et al. 2014) Wells 2013 (Wells et al. 2013)</p>
<p>Economically necessary</p>	<p>Economic necessity or protection of current/future lifestyle aspirations (Wells 2013) pressure due to finances and insurance (Banning 2011) burden of being economically responsible for the family (Handberg 2014) fear of job loss (Alfano 2009)</p>	<p>Qualitative synthesis: Banning 2011 (Banning 2011) Handberg 2014 (Handberg et al. 2014) Wells 2013 (Wells et al. 2013) Narrative review: Alfano 2009 (Alfano and Rowland 2009)</p>
<p>Pressure from workplace to return to work</p>	<p>feeling of pressure from the workplace for men to come back to work as soon as possible (Handberg 2014) anxiety about being fired (Handberg 2014) fear of sick leave (Banning 2011)</p>	<p>Qualitative synthesis: Banning 2011 (Banning 2011) Handberg 2014 (Handberg et al. 2014)</p>

Rehabilitation and return to work after cancer: a review of the literature

Hindering influence on RTW	Work is less important (meaning and importance of work changed after cancer diagnosis)	<p>value of work decreased after having cancer (Feuerstein 2010)</p> <p>lost the taste for work (Silver 2013),</p> <p>changed life perspectives might affect the meaning of work to some degree (Handberg 2014)</p> <p>altered work priorities (Banning 2011)</p> <p>re-evaluation of work/life balance (job/career change or retirement, reducing hours etc.) (Wells 2013)</p> <p>finding new activities/ meaning in life when RTW is not possible (Wells 2013)</p> <p>Voluntarily stop working, reduce work hour, or change job content as a result of a re-evaluation of life priorities (Duijts 2014a)</p> <p>diminished taste for work, increased time required for health maintenance (Alfano 2009)</p>	<p>Qualitative synthesis:</p> <p>Handberg 2014 (Handberg et al. 2014)</p> <p>Banning 2011 (Banning 2011)</p> <p>Wells 2013 (Wells et al. 2013)</p> <p>Narrative review:</p> <p>Alfano 2009 (Alfano and Rowland 2009)</p> <p>Duijts 2014a (Duijts et al. 2014a)</p> <p>Feuerstein 2010 (Feuerstein et al. 2010)</p> <p>Silver 2013 (Silver et al. 2013)</p>
	Feeling too ill to work	<p>feeling too fragile to return to work (Silver 2013)</p> <p>required to stop working, reduce work hour, or change job content because of physical or cognitive problems or psychological concerns arising from diagnosis or treatment (Duijts 2014a)</p>	<p>Narrative review:</p> <p>Duijts 2014a (Duijts et al. 2014a)</p> <p>Silver 2013 (Silver et al. 2013)</p>
	Perceiving the workplace as discouraging	<p>workplace is a discouraging place (Silver 2013)</p>	<p>Narrative review:</p> <p>Silver 2013 (Silver et al. 2013)</p>
	Opportunity to take a break	<p>taking opportunity to pause (Silver 2013)</p>	<p>Narrative review:</p> <p>Silver 2013 (Silver et al. 2013)</p>

4.3.2 Attitudes and behaviour of colleagues

The behaviour and attitudes of others can either support or discourage cancer survivors' RTW decisions and influence organisational structures and interpersonal relationships. The scientific literature mainly describes the attitudes and behaviours of others from the perspective of the cancer survivor. These findings describe cancer survivors' positive and negative experiences of workplace accommodations, support from health care professionals, and support from their colleagues and employers (table 5).

Negative experiences were reported in reviews as receiving unwanted workplace accommodations; a lack of support from health professionals, employers and colleagues; or facing discrimination and misconceptions regarding the impact of cancer. In contrast, positive experiences were related to receiving appropriate workplace accommodations and adjustments; organisational communication between health care professionals and employers; legal protection; and support from health care professionals, colleagues and employers.

Neither communication between health care professionals and employers, nor the type and content of support from professionals, colleagues and employers were very well elaborated in the scientific literature. However, lack of support was described as not receiving work-related guidance from professionals, or receiving insincere or only short-lived support from colleagues and employers. Examples of support that resulted in positive experiences were receiving advice from medical practitioners regarding RTW (Amir and Brocky 2009), and consistent personal and emotional support from colleagues and employers (e.g. empathy, dignity, contact during and after treatment, help to manage symptoms, help to generate a greater understanding of the illness in the workplace) (Wells et al. 2013).

Cancer survivors experienced discrimination due to forced changes; refusal of modifications; unfair dismissal; employment discrimination; or insensitive, stigmatising behaviour. Survivors also reported that employers did not always realise how long side-effects can last.

The type of workplace accommodations and whether they were perceived as wanted or unwanted were not described in detail. Examples of accommodations that were received positively were adaptations to counteract reduced work ability, such as reduced demands or shorter working hours.

Table 5: Attitudes and behaviours of others towards cancer and return to work

Category	Sub-category	Description in reviews	Evidence base
Positive experiences of cancer survivors	Workplace accommodations	<p>organisational support: workplace accommodations, modifications provided (in accordance with legislation), ‘employers’ willingness and ability to make adjustments to the workplace and job role (e.g. flexible working hours and shared workloads)’, ‘modifications to the workplace, working hours, duties, accommodation of hospital appointments, load alleviation, provision of assistance and changes in personnel’ (Wells 2013)</p> <p>‘most [workers with cancer] were given work adjustments in terms of flexibility, reduced demands and shorter working hours’ (Munir 2009)</p> <p>‘Most [workers with cancer] asked for adaptations to account for poor work ability (or changed employment) or made self-adaptations’ (Munir 2009)</p>	<p>Qualitative synthesis: Wells 2013 (Wells et al. 2013)</p> <p>Narrative review: Munir 2009 (Munir et al. 2009)</p>
	Communication between health care professionals and employers/ management	<p>Communication about the organisation of work between health care professionals and employers/ management (Wells 2013)</p>	<p>Qualitative synthesis: Wells 2013 (Wells et al. 2013)</p>
	Support from health professionals	<p>advice from medical practitioners (Amir 2009)</p> <p>support from occupational physician (Islam 2014)</p> <p>support related to work issues provided by health care professionals, social workers and occupational health services/professionals (Wells 2013)</p>	<p>Qualitative synthesis: Wells 2013 (Wells et al. 2013)</p> <p>Narrative review: Amir 2009 (Amir and Brocky 2009) Islam 2014 (Islam et al. 2014)</p>

Rehabilitation and return to work after cancer: a review of the literature

Negative experiences of cancer	Legal protection	<p>legal protection of cancer survivors at work (Amir 2009)</p> <p>workplace modifications provided in accordance with legislation (Wells 2013)</p>	<p>Qualitative synthesis: Wells 2013 (Wells et al. 2013)</p> <p>Narrative review: Amir 2009 (Amir and Brocky 2009)</p>
	Personal and emotional support from colleagues and employers (including misguided support)	<p>interpersonal support: (Consistent) personal and emotional support of employers and colleagues during sick leave and on return to work (including well-meaning but misguided support), '(e.g. empathy, dignity), along with the actions and attitudes of co-workers', 'Contact with co-workers during and after treatment', 'helping the newly returned survivor manage their symptoms and in generating a greater understanding of the illness in the workplace' (Wells 2013)</p> <p>support from colleagues and employers (Islam 2014)</p>	<p>Qualitative synthesis: Wells 2013 (Wells et al. 2013)</p> <p>Narrative review: Islam 2014 (Islam et al. 2014)</p>
	Unwanted workplace accommodations	<p>'others received adaptations they did not want e.g. demotions, task changes' (Munir 2009)</p>	<p>Narrative review: Munir 2009 (Munir et al. 2009)</p>

Rehabilitation and return to work after cancer: a review of the literature

survivors

Lack of support from health professionals	<p>lack of work-related guidance and support from health care professionals, social workers and occupational health services/professionals (Wells 2013):</p> <p>lack of ‘information and guidance of their health care team for making decisions about returning to work’ (Wells 2013)</p> <p>feeling of ‘bothering’ their doctor with questions about work, or simply not knowing what to ask’ (Wells 2013)</p> <p>‘inflexibility of healthcare appointment systems, negative attitudes towards return to work and refusal to issue sick certificates’ (Wells 2013)</p> <p>fear that the ‘physician might disclose medical information that could threaten their job’ (Wells 2013)</p>	Qualitative synthesis: Wells 2013 (Wells et al. 2013)
Discrimination	<p>discrimination (Peteet 2000)</p> <p>experiencing discrimination/disadvantage: forced changes, refused modifications, unfair dismissal (Wells 2013)</p> <p>employment discrimination (Amir 2009)</p> <p>insensitive, stigmatising support/ communication: ‘feeling stigmatized at work ranged from experiencing ‘awkward silences’ or inappropriate gossip, to more specific instances of sexual stigmatization (gynaecologic cancers)’ (Wells 2013)</p>	Qualitative synthesis: Wells 2013 (Wells et al. 2013) Narrative review: Amir 2009 (Amir and Brocky 2009) Peteet 2000
Lack of support from employers/colleagues	lack of support/communication, insincere or short-lived support from employers/colleagues (Wells 2013)	Qualitative synthesis: Wells 2013 (Wells et al. 2013)
Employers’ misconceptions	‘Employers do not realize how long side-effects can last’ (Munir 2009)	Narrative review: Munir 2009 (Munir et al. 2009)

4.3.3 Difficulties in balancing demands of work and treatment

Cancer survivors face difficulties in balancing the conflicting demands of work and treatment, such as the need for sick leave during treatment and the obligation to be at work (Wells et al. 2013). Scientific literature that describes these difficulties in more detail is lacking.

4.4 Work-related and occupational cancer

The development of cancer may be caused by work and its environment. Occupational cancer can be defined as cancer that is mainly caused by exposure at work, whereas work-related cancer is considered multifactorial and work exposure plays a smaller role among other factors. Both occupational and work-related cancers can be prevented by reducing or eliminating exposures at work (e.g. asbestos, UV-light). It has been estimated that in Britain stricter interventions including better compliance to lower exposure limits at work would prevent more than 8,200 cancers (Hutchings et al. 2012).

Regarding RTW after cancer, there is a lack of systematic reviews and primary studies on work-related or occupational cancer. It is unclear whether the findings regarding non-occupational or non-work-related cancers are applicable when the cancer is due to workplace exposure.

It is likely that the RTW process and the content of RTW interventions are different to those when the cancers are not work-related. Occupational cancer types might affect survivors' work motivation more drastically and probably call for more radical workplace changes (e.g. complete change of profession). When there is a clear diagnosis of an occupational disease, return to an unchanged workplace might not be an option. Whether a worker diagnosed with occupational cancer can return to his or her work, depends on the circumstances and the profession. Because of latency, the cancer may be related to an exposure a long time ago. For instance, prominent occupational cancers such as mesothelioma due to asbestos exposure, have a very long latency time and a very short survival time after diagnosis. In these cases RTW is usually not an option.

For other cancer diagnoses which might be work-related, such as breast cancer after exposure to night work or skin cancer after working in the construction industry, the additional diagnosis of an occupational origin for the disease is rather infrequent. The reason for this is that many other factors in addition to occupational exposure might be implicated which are person-related or took place outside the work place. In these cases, proper guidance by an occupational health expert on the risks involved with continuing the same work would be helpful.

4.5 Aspects relevant to small and medium-sized enterprises

The size of the company seems to have an impact on cancer survivors' possibilities to return to work (Wells et al. 2013). In companies with less than 250 workers (SMEs) information and resources for RTW strategies or programmes are lacking, and support and education are needed (Wells et al. 2014, Williams and Westmorland 2002, Wilson et al. 2012). The problems seem to relate especially to small enterprises with fewer than 50 workers, and to micro enterprises with fewer than 10 workers (EU-OSHA 2016).

In general, scientific literature on SMEs, cancer and RTW is lacking. Researchers already stated some time ago that studies on this 'neglected area' are needed (Wells et al. 2014). Primary studies on the following issues are still needed:

- the needs, views and experiences of the self-employed persons or managers working in SMEs;
- the economic impact of employing a worker diagnosed with cancer;
- the conditions that hinder or promote RTW interventions for cancer survivors in SMEs.

We identified three relevant primary studies. One study measured the effect on firms' survival of cancer diagnoses among the self-employed and small business owners (Ha-Vinh et al. 2015). There was no significant influence on enterprise survival rates five years after diagnosis, but a significantly

higher hazard ratio for closing down during the first five years than among those firms without a diagnose of cancer. The authors conclude that support for the first five years, including insurance coverage and aid from the social protection system, should be available to owners and the self-employed, to prevent the disease affecting the survival of their small businesses.

Two other studies identified the challenges of smaller businesses in managing workers affected by cancer.

One study conducted in-depth interviews with 35 selected employers from the UK who had some experience of managing workers with cancer, and 14 professionals working closely with small businesses (Wilson et al. 2012). The study authors interpreted the results in terms of advantages and disadvantages of SMEs (compared to, e.g. bigger companies) in managing the absences of workers with cancer. Advantages were seen in the small size of the enterprise that provides a more family like atmosphere. This may create a more supportive environment for workers with cancer in the RTW process. Further, communication between worker and employer about cancer and work related issues might be easier. Disadvantages were reported to be: lack of experience in the management of absence and health issues at the workplace, limited access to occupational health services (the smaller the company the less likely occupational health services are provided by the workplace), the lack of (experienced) human resource departments in small companies. Those drawbacks can make it difficult for the employer to balance the responsibilities to run the company and to manage issues related to health and absence. The study authors concluded, that appropriate support especially tailored for SMEs is needed. Some employers reported to prefer telephone support, while others preferred internet-based or paper-based information materials.

Another study was conducted in Singapore, on the perceived barriers and facilitators for employers in hiring or retraining cancer survivors (Leong et al. 2011). The study authors enrolled 500 SMEs in an online survey and carried out 10 in-depth interviews with SME employers. The top three concerns were survivors' current health state, insurance costs and the ability to meet job demands, whereas the facilitators were the perceived moral obligation, and existing government initiatives to promote the RTW of cancer survivors. Considering the economic, societal and cultural differences between Singapore and Europe, it is difficult to determine whether these results apply to the European context.

4.6 Interventions and resources

For this overview of the literature the term 'intervention and resources' is understood in a broad way, including both very active approaches of support, such as training, but also less active approaches, such as providing information by phone, online or paper-based.

The overview shows that only a few scientific studies describe available interventions and resources relevant for cancer and RTW and that only few scientific reviews report about their effectiveness on RTW. Most information on available interventions was found in the grey literature. The problem is that an evaluation of their effectiveness in promoting RTW is completely missing from this type of literature. This shows the existing gap between practice and research on this important subject.

The tables under display an overview of the available interventions and resources that have been located. Interventions were included if they specifically focused on the issue of the RTW of cancer survivors and if they were described in either the scientific or grey literature.

Most interventions have been developed for cancer survivors. Some interventions are especially for employers, human resource professionals, line managers, or health care professionals. Only a few interventions are available for SMEs and the self-employed affected by cancer.

The interventions described in the scientific literature focus on rehabilitation, guidelines, and workplace accommodations. Rehabilitation services for cancer survivors, with an aim to improve their work ability, may include vocational, medical, physical, psycho-educational, and multidisciplinary interventions. A positive influence on RTW could only be shown for multidisciplinary interventions (de Boer et al. 2015b, de Boer et al. 2015a). The effect of the other interventions is uncertain.

Results from the grey literature show that many additional interventions are available that provide information, training and assistance related to employment after cancer diagnosis and treatment.

However, none of these have been evaluated, and the effect on RTW is unknown. Most services are provided by NGOs and focus mainly on providing information and consultancy regarding cancer and RTW. The interventions available are in the form of webinars, seminars, lectures, online material, videos, printed material (posters, brochures), telephone and email support, or personal consultancy meetings. Other interventions enable the exchange of experiences, ideas, and communication between those affected by cancer or working with cancer survivors via membership in networks and support groups.

4.6.1 For cancer survivors

Depending on the country, cancer survivors have access to different rehabilitation services and information sources from the social and health care sector. They may include vocational, medical, physical, psycho-educational, and multidisciplinary interventions.

Survivors can find further support from non-governmental organisations (NGOs). These services are mostly informative (resources) and do not include rehabilitation. The aim of these interventions is to enable cancer survivors to adapt to their new situations and make informed decisions regarding their RTW. The information is disseminated in printed form (e.g. brochures), personally (e.g. in-house counselling, telephone), or on the internet (e.g. online articles, videos, and webinars).

Some cancer survivors receive support from their employers in the RTW process when, for example, the company has RTW programs and policies in place that can assist cancer survivors with workplace concerns (Black and Frost 2011, Short and Vargo 2006). Descriptions in the scientific literature are almost entirely missing that describe those programs and policies in more detail. Entirely missing are evaluations of the effectiveness of those interventions. The scientific literature described that workplace adjustments and accommodations are concerning the flexibility on how long, where, when and at what times employees work. This included the adjustment to working hours (e.g. gradual RTW, flexible working hours, zero-hour contracts), adjustments at the workplace (e.g. own office space instead of open-plan office, remote work), paid leave for health care appointments, and adjustments to the workload (e.g. job-sharing, reduced demands, provision of assistance) (see table 6). The grey literature provides resources (e.g. booklets) that give information about possible accommodations and programs but it is unclear if those are actually implemented (interventions). One of the grey literature resources listed in the table below is the webpage of the Job Accommodation Network. This webpage provides a list of the following possible workplace accommodations:

1) to accommodate for fatigue and weakness:

- Reduce or eliminate physical exertion and workplace stress
- Schedule periodic rest breaks away from the workstation
- Allow a flexible work schedule and flexible use of leave time
- Allow work from home
- Implement ergonomic workstation design
- Provide a scooter or other mobility aid if walking cannot be reduced
- Provide parking close to the work-site
- Install automatic door openers
- Make sure materials and equipment are within reach range
- Move workstation close to other work areas, office equipment, and break rooms
- Reduce noise with sound absorbent baffles/partitions, environmental sound machines, and headsets
- Provide alternate work space to reduce visual and auditory distractions

, 2) to accommodate for medical treatment

- Provide flexible schedules and leave time
- Allow a self-paced workload with flexible hours
- Allow employee to work from home
- Provide part-time work schedules

, 3) to accommodate for respiratory difficulties:

- Provide adjustable ventilation
- Keep work environment free from dust, smoke, odour, and fumes
- Implement a "fragrance-free" workplace policy and a "smoke free" building policy
- Avoid temperature extremes
- Use fan/air-conditioner or heater at the workstation
- Redirect air conditioning and heating vents

, 4) to accommodate for skin irritations:

- Avoid infectious agents and chemicals
- Avoid invasive procedures (activities that could exacerbate a person's skin condition)
- Provide alternate and protective clothing

, 5) accommodate stress:

- Develop strategies to deal with work problems before they arise
- Provide sensitivity training to co-workers
- Allow telephone calls during work hours to doctors and others for support
- Provide information on counselling and worker assistance programs
- Allow flexible work environment:
 - Flexible scheduling
 - Modified break schedule
 - Leave for counselling
 - Work from home/Flexi-place

And to 6) accommodate for temperature sensitivity:

- Modify work-site temperature
- Modify dress code
- Use fan/air-conditioner or heater at the workstation
- Allow flexible scheduling and flexible use of leave time
- Allow work from home during extremely hot or cold weather
- Maintain the ventilation system
- Redirect air conditioning and heating vents
- Provide an office with separate temperature control

Even though differences exist between countries, governments provide legal protection for cancer survivors at work or returning to work against, e.g. employment discrimination. In some countries, employers are bound by law to make reasonable adjustments for people with disabilities. Examples of these are reducing working days, altering working hours, or altering the work environment.

Table 6: Overview and examples of interventions and resources for cancer survivors

Name as stated by authors ¹⁵	Topics and content	Provider and Sources	Evaluation of the effect on RTW ¹⁶
Examples from scientific literature:			
Guideline	10-step plan on how to return to work for cancer survivors and occupational health professionals	(Amir and Brocky 2009, de Boer and Frings-Dresen 2009, Egan et al. 2013, Nieuwenhuijsen et al. 2006)	No effect on return to work ((Amir and Brocky 2009) on basis of one study)
Psycho-educational intervention	Self-care behaviours to reduce cancer-related fatigue (including lectures, handbook, goal setting, progress diary), or patient education on physical side effects, stress and coping (including group discussions and lectures)	(de Boer et al. 2015b)	Low-quality evidence of no considerable difference in the effect of psycho-educational interventions compared to care as usual on RTW (de Boer et al. 2015b)
Workplace adjustments or accommodations	Flexibility on how long, where, when and at what times employees work, including: adjustments to working hours: gradual RTW, compressed hours (arrangement to work a traditional hour workweek in less than the traditional number of workdays), annual hours, shorter working hours, part-time work, flexible working hours, term-time (arrangement to work a particular number of weeks per	(Munir et al. 2009, Rick et al. 2012, Sinclair 2015, Stergiou-Kita et al. 2014, Wells et al. 2013)	Not performed

¹⁵ If the authors provided no name, the intervention is indicated as Website.

¹⁶ The results from the best available evidence identified in this review are presented. An empty cell indicates that evidence on the effectiveness is missing.

Rehabilitation and return to work after cancer: a review of the literature

	<p>year), career breaks, zero-hour contracts;</p> <p>adjustments at workplace: own office space (instead of open-plan office), remote work (working from home, mobile working/teleworking);</p> <p>paid leave: paid leave for health care appointments;</p> <p>adjustments to workload: job-sharing (shared workloads), modifications to duties, load alleviation, reduced demands, provision of assistance and changes in personnel, commissioned outcomes.</p>		
Person-directed vocational intervention	<p>Person-directed vocational intervention: including advanced vocational training, retraining, workplace accommodations, work trials, assistance with job placement, therapy to restore an individual's work-related functions; covered by (depending on country): statutory pension insurance scheme, employment agency, injury insurance, employers' liability insurance association; provided by: (occupational) health professionals</p>	<p>(Parkinson et al. 2010, Rick et al. 2012, Short and Vargo 2006, Silver et al. 2013)</p>	<p>Not performed</p>
Medical intervention	<p>Medical intervention including less radical or function-conserving treatment</p>	<p>(de Boer et al. 2015b)</p>	<p>Low-quality evidence that function-conserving approaches yield similar RTW rates to those of more radical treatments (de Boer et al. 2015b)</p>
Physical intervention	<p>Physical intervention including physical activity, behavior change intervention, walking and supervised exercise</p>	<p>(de Boer and Frings-Dresen 2009, de Boer et al. 2015b, Hoving et al. 2009, Short and Vargo 2006, Silver et al. 2013)</p>	<p>Low-quality evidence that physical training is not more effective than care as usual for RTW (systematic review (de Boer et al. 2015b, de Boer et al. 2015a))</p>
Multidisciplinary	<p>Multidisciplinary intervention including physiotherapy,</p>	<p>(de Boer and Frings-Dresen</p>	<p>Moderate-quality evidence that</p>

Rehabilitation and return to work after cancer: a review of the literature

intervention	occupational therapy, speech therapy, vocational rehabilitation, psychology in relation to RTW (delivering e.g. education, counselling, training)	2009, de Boer et al. 2015b, Hoving et al. 2009, Short and Vargo 2006, Silver et al. 2013)	multidisciplinary interventions that combine vocational counselling with patient education, patient counselling, and biofeedback assisted behavioral training or physical exercises produce a higher RTW rate than that of care as usual (based on one systematic review with a meta-analysis combining five RCTs (de Boer et al. 2015b, de Boer et al. 2015a))
Examples from grey literature and online questionnaire:			
Advice by telephone	Legislation, experiences of cancer and work of cancer survivors, work adaptations, advice on RTW	Kom op tegen kanker (B)	Not performed
Advice by telephone	Information on RTW, legislation; communication with employer, general practitioner and medical specialist; work adaptations; collaboration with occupational health organisations, hospitals and employer organisations	LIKAS (B)	Not performed
Advice by telephone and online, referral to occupational health professional	referrals can be made by the general practitioner or employer after four weeks of absence with the consent of the worker, occupational health professional identifies obstacles preventing the worker from returning to work, produces a RTW plan tailored to the worker's needs (the program is designed to work alongside, not to replace, existing occupational health services)	Fit for work (UK)	Not performed
Article	Employment options, steps to take to continue working, legal rights, resolving employment problems	Livestrong.org (USA)	Not performed

Rehabilitation and return to work after cancer: a review of the literature

Booklet	Rehabilitation including vocational rehabilitation, gradual RTW ('Hamburger Model'), financial help, unemployment, legal rights regarding termination of work contract	Roche Pharma AG (DE)	Not performed
Booklet	employment law, disability status, financial issues, self-employment, unemployment, rehabilitation, gradual RTW, contact addresses for consultancy, answers to 100 most popular questions regarding cancer and work	Österreichische Krebshilfe and Krebshilfe Wien (AT)	Not performed
Booklet	Talking to employer and colleagues, legal rights, disability status, vocational rehabilitation, workplace accommodations, financial support	Krebs und Beruf (DE)	Not performed
Consultation	Developing occupational goals, RTW motivation and job application training	Krebs und Beruf (DE)	Not performed
Consultation: telephone and email	Any topic regarding cancer, including RTW	Deutsche Krebshilfe (DE)	Not performed
Consultation, help and information: written and audio material	Face-to-face consultation: at 'Krebsberatungsstellen' about anything (including cancer and RTW) Written material: vocational rehabilitation, goal setting, first weeks at work, communicating at the workplace Audio material: expert interview about cancer and RTW	German cancer society (DE)	Not performed
Consultation: individual or group coaching	Learning how to cope with long-term side effects of cancer diagnosis and treatment, education for worker on legislation, RTW plan, involvement of employer and colleagues	Rentree (B)	Not performed

Rehabilitation and return to work after cancer: a review of the literature

Consultation, website, individual coaching	Guidance is most often tailor-made after first consultation e.g. recovery, empowerment, fitness plan, learning how to cope with long-term side effects of cancer diagnosis and treatment, education for worker and employer, improving communication, expert view of occupational physician, RTW support, other duties/employer	Re-turn (www.re-turn.nl)	Not performed
Counselling	Requesting reasonable accommodations, finding a job after cancer	Patient information website (1st , 2nd link) of the American Society of Clinical Oncology (ASCO) (USA)	Not performed
Fact sheet	Legal protection	Cancer care (USA)	Not performed
Individual coaching	Individual support for one year to help cancer survivors with no job to find gainful employment.	www.opuce.nl	Not performed
Information	Collection of links to information about gradual rehabilitation, legal rights, pensions, rehabilitation	INKA (DE)	Not performed
Information	Talking to employers, colleagues and HR, financial impact, gradual RTW, managing tiredness at work, resources, help and support	Bupa (UK)	Not performed
Information	Key questions, reasons to work, what to consider when making a decision regarding RTW, flexible work arrangements, access to leave entitlements, managing and controlling side effects, making work adjustments, changing jobs, working carers	Cancer council NSW (AU)	Not performed
Information and consultation	Vocational and medical rehabilitation, gradual RTW, implications of cancer for work ability	NCT Heidelberg (DE)	Not performed

Rehabilitation and return to work after cancer: a review of the literature

Information and slideshow	General information about cancer, unemployment, communication at the workplace, disability status, gradual RTW	Integrationsämter BIH (DE)	Not performed
Information and support via phone or email	Confidential service: individual can speak or email a specialist health professional about anything to do with cancer	Cancer Council NSW (AU)	Not performed
Information Centres	Information on cancer and a range of support services available within hospitals and treatment centres around NSW for cancer patients, cancer carer, their friends and family	Cancer Council NSW (AU)	Not performed
Information on website, On-line video, DVD, E-learning course, Guide and Toolkit (written information package), Advice by telephone	Coping with side effects, treatment decisions, rights at work, working during treatment, talking to employers, resources	MacMillan (UK)	Not performed
Recorded "Work & cancer webinars"	Recorded to enable viewing after live event (including link to webinar recording, copy of the power point and list of resources for future reference): bowel cancer and RTW, work/life balance, financial issues and work, legal issues, how RTW can affect cancer survivor	Cancer council NSW (AU)	Not performed
Seminars, consultation (for groups or single person)	Self-help potential, integration rather than isolation, tips for professional communication skills and job coaching, stress management and mobilising personal resources, legal issues, adverse reactions to therapies,	Sachsen-Anhaltische Krebsgesellschaft e.V. (DE)	Not performed

Rehabilitation and return to work after cancer: a review of the literature

	fatigue, benefits		
Support group	Talking to other people who have been affected by cancer	MacMillan (UK), Breastcancer.org (USA)	Not performed
Support group	Barriers and facilitators to RTW, work environment, flexibility for employer, workplace adaptations, relationship with colleagues (communication), perceived discrimination, bullying, dealing with limitations and deficits, developing solutions and strategies to stay at work	Sachsen-Anhaltische Krebsgesellschaft e.V. (DE)	Not performed
Technical assistance	Providing a list of possible accommodations in the workplace)	Job Accommodation Network (USA)	Not performed
Toolkit or guide	Communication, RTW options, work/life balance	Maggie's centre and Unum (UK)	Not performed
Training and workshops	Life after cancer, including transition back to work	Maggie's (UK)	Not performed
Website	Information on RTW; legislation; communication with employer, general practitioner and medical specialist; work adaptations; collaboration with occupational health organisations, hospitals and employer organisations	LIKAS (B)	Not performed
Website	Legislation, experiences of cancer and work of cancer survivors, work adaptations, advice on RTW	Kom op tegen kanker (B)	Not performed
Website	Vocational rehabilitation, gradual RTW, working part	Novartis Pharma GmbH: 'Leben mit Brustkrebs' .de	Not performed

Rehabilitation and return to work after cancer: a review of the literature

	time, disability status, unemployment benefits, pension	(DE)	
Website	Setting professional boundaries, recasting yourself, the “new normal”, effects of cancer on work, legal protection, relieving stress, travelling with cancer, mindset	cancer+careers (USA)	Not performed
Website	Employment rights	Cancer advocacy (USA)	Not performed
Website	Telling co-workers, reasonable workplace accommodations, discrimination, legal protection, resources	American cancer society (USA)	Not performed
Website	Telling employers and co-workers, Working during treatment, Taking time off work for treatment, Looking for a new job, Recognizing and responding to discrimination, Balancing your job and treatment	Breastcancer.org (USA)	Not performed
Website	Talking and relating to others, handling problems and legal rights at work	National cancer institute (USA)	Not performed
Website	Gradual reintegration, workplace adaptations, rehabilitation, unemployment benefits	Betanet.de by beta pharm (DE)	Not performed
Workshop	Developing occupational goals, compatibility of job and cancer care, job application, communication at the workplace	Kobra-Berlin (DE), Leben nach Krebs (DE)	Not performed

4.6.2 For employers, line managers and human resource professionals

Support for employers focuses on managing sick workers and how to support their RTW (e.g. appropriate workplace accommodation). The interventions available for employers are mainly informative, and may include counselling or in-house training courses. Scientific evaluation reports on the effectiveness of available interventions are lacking.

Interventions and resources are currently available for employers, line managers, and human resource professionals in the form of personal consultations, videos, newsletters, webinars, posters, booklets, workshops, and e-learning courses.

Topics include general information about cancer, legislation and finances, roles, and the support needs of staff and cancer carers. Information is available about how cancer and its treatment affects people and how this may affect a person’s work. Employers can learn about common myths and facts, and about death and bereavement. Further information is available on the legal background to work and cancer, the financial support available to workers, the role of the employer and occupational health, and the support needs of staff and working carers.

Other topics are communication with survivors and their colleagues or how to practically support cancer survivors’ RTW and staying at work. The employer can learn about confidentiality issues, managing absences, workplace policies, creating a RTW plan¹⁷, and possible changes to work arrangements (workplace accommodation/adjustments). Possible workplace accommodations are, for example: paid working time for medical appointments, reduced working hours, and RTW meetings¹⁸.

Table 7: Overview and examples of available interventions for employers, line managers and human resources

Name as stated by authors	Topics and content	Provider and Sources	Evaluation of the effect on RTW ¹⁹
Examples from grey literature and online questionnaire:			
Consultation, individual coaching	Guidance is most often tailored after first consultation, e.g. Creating a RTW plan, employer’s role, how to support the worker when back at work	Re-turn (www.re-turn.nl)	Not performed

¹⁷ A RTW plan is a written document about the agreed RTW process between a worker and his superiors and maybe health professionals. The plan may include exact dates, needed adjustments, and agreed priorities.

¹⁸ A RTW meeting is an informal conversation between a worker returning to work and his superior with the purpose to ensure a successful RTW. Regular meetings may include a discussion about problems that may cause further absence and possible adjustments to the workplace/hours/duties.

¹⁹ Presented are the results from the best available evidence identified in this review. An empty cell indicates that evidence on the effectiveness is missing.

<p>Information on website, On-line video, Cancer policy templates, DVD, E-learning course, Advice by telephone</p>	<p>Legislation regarding work and cancer, how cancer affects people, possible changes to work arrangements, supporting carers, workplace policies, financial support for workers, managing absence, self-employment and cancer, communicating about work with your worker, setting up a cancer policy for your company, courses for employers, managers, HR and unions reps</p>	<p><u>MacMillan</u> (UK)</p>	<p>Not performed</p>
<p>Open Workshops, In-company workshops, Face-to-face consultancy, E-newsletter, Toolkit (written information package)</p>	<p>Interactive workshops (cancer treatment, its side effects and the impact on a person's work; legislation; talking about cancer; making workplace adjustments)</p> <p>Consultation about best practice provision (e.g. reviewing long-term sickness, bereavement and carers' policies, advising on the support needs of staff)</p>	<p><u>MacMillan</u> (UK)</p>	<p>Not performed</p>
<p>Technical assistance, fact sheets, consultancy</p>	<p>Accommodation ideas for cancer survivors</p>	<p><u>Job Accommodation Network</u> (USA)</p>	<p>Not performed</p>
<p>Tool kit or employer's guide</p>	<p>Creating a graduated RTW plan, employer's role, how to support the worker when back at work, how to plan RTW</p>	<p><u>Maggie's Centres and Unum</u> (UK)</p>	<p>Not performed</p>
<p>Workplace fact sheets, workplace posters</p>	<p>How to provide a supportive, fair work environment: overview, myths and facts, talking to your worker (the first conversation), managing treatment effects, creating cancer-friendly workplaces, supporting a colleague with cancer, supporting working carers, death and bereavement</p>	<p><u>Cancer council NSW</u> (AU)</p>	<p>Not performed</p>

4.6.3 For health care professionals

Health care professionals can support cancer survivors' RTW. Interventions to improve health care professional's skills and expertise may include information advising on how to communicate about employment issues with people affected by cancer, how to develop and deliver care and services, and information on their roles and responsibilities.

Guidelines are available that provide advice on, for example, workplace accommodations, or communication between health care professionals or with cancer survivors. One example is an intervention that took place in a hospital in the Netherlands. Participants were given support in how to communicate about the cancer diagnosis, the treatment plan and its outcome. Cancer survivors and physicians received an additional leaflet that described a detailed 10-step plan for returning to work, which included an activity plan and goals.

Rehabilitation and return to work after cancer: a review of the literature

Further, professional networks exist that enable members to share expertise and knowledge.

Table 8: Overview and examples of available interventions and resources for health care professionals

Name as stated by authors	Topics and content	Source	Evaluation of the effect on RTW ²⁰
Examples from scientific evidence			
Guideline	Communication between attending and occupational physicians and a 10-step plan on how to return to work for cancer survivors and occupational health professionals	(Amir and Brocky 2009, de Boer and Frings-Dresen 2009, Egan et al. 2013, Nieuwenhuijsen et al. 2006)	No effect on RTW (result from systematic reviews (Amir and Brocky 2009, de Boer and Frings-Dresen 2009) based on one primary study)
Examples from grey literature			
Information on website, Online video, E-learning course, Guide (written information package)	Talking about employment issues with people affected by cancer, delivering care, role and responsibilities, other resources	<u>MacMillan</u> (UK)	Not performed
Consultation (Advice by telephone)	Help regarding: giving advice on work-related issues, learning about effects of cancer treatment on work, or promoting their services regarding advice on work-related issues	<u>MacMillan</u> (UK)	Not performed
Professional networks	Sharing expertise and knowledge	<u>MacMillan</u> (UK)	Not performed

4.6.4 For the self-employed and owners of small and medium-sized enterprises

Interventions that specifically focus on the self-employed and small and medium-sized enterprise owners are the least described in the literature, and are thus likely to be less frequently available. This is despite the fact that SMEs are by far the biggest proportion of enterprises in Europe. Interventions that are currently available are via telephone, video, or in written form.

²⁰ Presented are the results from the best available evidence identified in this review. An empty cell indicates that evidence on the effectiveness is missing.

Interventions that are especially for the self-employed cover topics about treatment decisions and about founding, running, and closing down a business. This includes information about working during treatment, giving up work, managing workload, making decisions about working, financial issues and support, and communication with clients.

Owners of small and medium-sized enterprises have access to relevant information that includes legal responsibilities, communication, examples of support for carers and survivors, and the impact of cancer on their business (e.g. via MacMillan (UK)).

Table 9: Overview and examples of interventions and resources for the self-employed and small and medium-sized enterprises

Name as stated by authors ²¹	Topics and content	Provider and Sources	Evaluation of the effect on RTW ²²
Examples from grey literature for SME owners:			
Information on website, On-line video, DVD, Advice by telephone	Communication, resources, legal responsibilities, bereavement, examples of support for carers and survivors, impact of cancer cases on business	<u>MacMillan (UK)</u>	Not performed
Examples from grey literature for the self-employed:			
Information on website, Advice by telephone, On-line community	Financial and emotional support, working during treatment, giving up work, communication, treatment decisions, managing workload	<u>MacMillan (UK)</u>	Not performed
E-Learning	E-Learning for cancer survivors when they want to start up their own company	<u>Dutch patient organisation 'leven met kanker'</u> (NL)	Not performed
Consultation	Only for self-employed who are insured against work disability, guidance is most often tailored after the first consultation e.g. recovery, empowerment, fitness plan, learning how to cope with long-term side effects of cancer diagnosis and treatment	Re-turn (<u>www.re-turn.nl</u>) (NL)	Not performed

²¹ If the authors provided no name, the intervention is indicated as Website.

²² Presented are the results from the best available evidence identified in this review. An empty cell indicates that evidence on the effectiveness is missing.

Information	Making a decision about working, managing your business, telling clients about the cancer, financial issues	Cancer Council NSW (AU)
Website	How to keep your business running during treatment	Breastcancer.org (USA)
Workshop	Career plan, work accommodations, work ability, working conditions, communication of limited capacities, job applications	Kobra-Berlin (DE)

4.7 Synergies and roles of policy areas and (enterprise) actors

The scientific literature about cancer and RTW does not study the different roles and synergies between policy areas and (enterprise) actors in awareness-raising, information provision and support for cancer survivors in their RTW. Evidence that systematically analyses the interactions and roles of the relevant stakeholders is missing.

The actors that are frequently mentioned in the literature as influencing RTW decisions, in addition to the cancer survivors themselves, are health care professionals; employers, including workers in human resource departments; colleagues; and trade unions. The grey literature also mentions other actors as providing support to employers and workers: employment and social services, professionals in the area of legal protection, and NGOs.

Although communication among health care professionals, employers and workers is not very well elaborated in the literature, communication between the actors can be an important factor for a successful RTW process (see paragraph 4.3.2).

Support for the employer or cancer survivor may be direct, for example, in the form of providing information, training courses, consultation or legal representation. An example of more indirect support is national awareness raising campaigns.

Actors in this process vary. Even though the type of actors across countries may be similar, the responsibilities, the ability to influence, and the way in which the actors communicate differ significantly. These differences, as well as the similarities, are not well documented in either the grey or the scientific literature. However, they may be crucial when developing and implementing interventions to promote RTW among cancer survivors.

5 Discussion

5.1 Strengths and weaknesses of the report

Because the search for the scientific literature has been done systematically in multiple databases, it can be said with confidence that all relevant studies have been located. Also the screening process has been done in duplicate, so it is unlikely that any relevant literature has been missed. The lack of reviews on small and medium-sized enterprises and occupational/work-related cancer was anticipated and results were supplemented by individual study data, which strengthened the usefulness of this literature overview.

The results of this report are mostly based on systematic review results and have been summarised using a systematic qualitative approach. Although more meaningful results could be achieved if results from primary studies were combined numerically in a meta-analysis, the studies at hand and the time available for this review did not permit such an approach. The strength of the qualitative approach is that it provides a broad overview of the available knowledge on the various implications that cancer has on RTW. It further shows if and where evidence that could provide more meaningful results is missing. This has not been done before, and informs further steps in research.

In order to obtain a complete overview of the interventions, this review applied a broad search, for more than scientific literature. The results are based on a systematic search in electronic databases for relevant systematic reviews, primary studies, and grey literature. Furthermore, experts in the field were contacted, and an additional search in Google has been performed, to supplement the results from the traditional literature search of databases. Especially the broad Google-based approach reveals what is available in practice and what has not been described in the scientific literature.

Although this report used an English search strategy in electronic databases, the results of the scientific literature are not biased by language. Publications are identified by an English search strategy, irrespective of the language of the article, because the keywords and titles related to these articles are indexed in English. Moreover, none of the identified studies have been excluded on the basis of the publication language. The additional Google search was carried out in English and German because the results are sensitive to the language of keywords. As most of the results of the interventions overview are based on the Google search results, the list is not exhaustive. However, the results of the Google search provide an interesting variety of interventions. It is likely that, even though interventions from other countries could not be identified using English and German keywords to search in Google, the identified types of interventions available (e.g. leaflet, consultation) are very similar.

This report used a very broad assessment of the quality of the evidence. In comparison, reviews and randomised controlled trials are rated as having the highest quality; individual studies are considered to be of lower quality and grey literature and expert opinions are considered the lowest quality evidence. This is a very crude estimate of the quality of the evidence, and is based on the assumption that this really represents the grading of the confidence in the results (from high to low). A better understanding of the applicability of the evidence could be achieved using a better approach (e.g. GRADE), but the method used makes a reasonable judgement of the quality of evidence.

5.2 Authors' conclusions

5.2.1 Implications for practice

Surviving cancer can limit ones' work ability for various reasons. The implications of cancer and its treatment can affect all aspects of human health and well-being, and include physical, mental, and cognitive symptoms. These implications can be either long or short term. Having cancer may also lead to a reassessment of one's life and the meaning of work. Survivors may be highly motivated to return to work in order to regain normality and control of their lives, or they may decide not to return to work

at all. When returning to work, survivors may face difficulties in balancing work and treatment demands, including negative attitudes or behaviour among their colleagues and employers. All of this may lead to a reassessment of work and life goals, and thus hinder RTW.

There is a gap between the descriptions and evaluations of interventions that aim to enhance RTW in the scientific literature and that which is available in practice. In other words, only little can be found in the scientific literature about the existing RTW interventions and resources. Most information displayed in this overview comes from grey literature. Available interventions and resources are, for example, information and training on cancer and RTW issues, rehabilitation services, guidelines, and workplace accommodations. Most interventions and resources have been developed primarily for cancer survivors, followed by interventions for employers and health care professionals. Very few interventions and resources are available that are specifically for the self-employed or small and medium-sized enterprises.

With the rising number of cancer survivors, effective interventions are needed to enable RTW and to reduce the costs to individuals and society at large. But to date, little is known about the effectiveness of these interventions, making it difficult to recommend 'best practices'. Only for multidisciplinary interventions there is evidence that RTW has been improved when compared to care as usual. These interventions include physiotherapy, occupational therapy, speech therapy, vocational rehabilitation, and psychology in relation to RTW (delivery of e.g. education, counselling, training) (de Boer et al. 2015a).

As well as the cancer type, treatment and side effects, the literature considers a broad spectrum of prognostic factors, including socio-demographic and workplace-related factors. But it is unclear which factors are the most important and to what degree they influence RTW. Once the most important factors are identified, RTW interventions should be tailored to match them; for example, interventions to reduce physical workload or interventions especially designed for older workers.

As it is unclear which factors are relevant, cancer survivors, employers and health care professionals could consider monitoring and reducing physical and emotional job demands, working hours, and unsupportive attitudes of colleagues to prevent discrimination at the workplace and to possibly increase RTW. It might also be helpful to ensure access to health insurance and disability pension coverage. If cancer survivors and health care professionals consider the possible impact on RTW of all treatment decisions, the likelihood of RTW may improve.

Some other possible prognostic factors for RTW are not amenable to change (such as age, gender, disease). However it might be helpful to consider that older workers, women, and survivors of more serious cancer types may need different or increased support in order to return to work. Psychological factors such as willingness or self-motivation, and changes in emotional states such as depression, worry, frustration, or fear might also lower the chances of returning to work, and might need to be considered when offering support to survivors or when planning RTW.

Developing and implementing efficient and effective interventions to promote RTW may require close collaboration between government, stakeholders, and practitioners. This at least has been argued to be "critical in developing an evidence-based occupational rehabilitation system for cancer survivors" (Mak 2011). In order to build this relationship, a comprehensive overview of relevant stakeholders and their roles is still needed. The key actors who need to communicate in order to develop and implement interventions are the cancer survivors themselves, health care professionals, employers and workers in human resource departments, colleagues, professionals in legal rights, employment and social services, trade unions, NGOs, and the government.

It is uncertain whether there are differences between the RTW implications and interventions for occupational/work-related cancers and those for cancers that are not associated with exposure at work. It is however likely that given the possible different implications for survivors' psychological health and the risk of recurrence, the RTW process, and RTW interventions are or should be different. Occupational or work-related cancer might call for other psychological interventions and more drastic vocational rehabilitation services (such as enabling re-entry into a new job market).

It is also unknown whether cancer has a different impact on large companies and on SMEs and the self-employed. However, it has been argued that SMEs and the self-employed are less likely to be able to provide workplace accommodations that enable a worker with cancer to return to work.

Furthermore, it has been shown that the self-employed are at a higher risk of having to close down their business during the first five years after cancer diagnosis. The bigger a company is, the more likely it is that they have the resources supporting and keeping an worker with reduced work ability at work or on a long sick leave. On the other hand, SME workers might have a closer relationship with their employers, and keeping in contact during treatment may be easier, which might in turn facilitate RTW. The motivation to return to work might also be higher among the self-employed and for workers of small compared to large companies.

Interventions that are tailored for small business owners are lacking. For example, it might be useful to provide access to financial aid during the first five years after diagnosis in order to prevent the risk of these businesses closing down. Further support might be needed in drawing up policies that regulate and assist in the management of issues such as time off and bereavement.

5.2.2 Implications for research

Most of the existing knowledge is about the implication of a cancer diagnosis on workers. Comparably little is known about the employer's side, including the self-employed and owners of SMEs.

There is a need for studies on employers' needs, experiences, motivations, and perceptions of cancer; and the barriers to and facilitators of returning to work in Europe. Moreover, the economic aspects of the work-related problems of cancer, such as absence from work, decreased work productivity, and early retirement have been almost neglected in the scientific review literature. Further reviews are needed on the economic impact of employing a worker diagnosed with cancer and the conditions that hinder or promote RTW interventions for cancer survivors in SMEs. Studies should highlight the differences in the impact of cancer on big companies, SMEs, and the self-employed.

There is also a need for evidence regarding the economic difference between cancer survivors and people without cancer. Studies should account for country-specific differences, e.g. access to financial support for cancer survivors.

Studies on the implementation and effectiveness of RTW interventions are also lacking. The evidence available from primary studies is of moderate or poor quality (de Boer et al. 2015b). The impact an intervention has on actual RTW outcomes, such as number of working days, amount of sick leave, or unemployment rate, should be measured. Improvements in, for example, the adherence to rehabilitation recommendations; satisfaction with the processes; communication among patients, occupational physicians, colleagues, and employers; or in the number of people drawing up RTW plans are only proxy measures, and do not measure the actual effect on RTW.

In order to develop effective and efficient RTW interventions, there is a need for better quality studies on prognostic factors and the impact of work-related or occupational cancer on RTW. Evidence regarding prognostic factors should be based on long-term studies, and reviews should use methods to numerically combine study results.

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Appendix

Methods - Scientific literature

Criteria for considering literature

To be included in this report, studies and reviews had to focus on adult cancer survivors and report on the following outcomes, RTW interventions and/or synergies and roles:

1. Health and safety implications for workers returning to work during or after cancer treatment (e.g. health symptoms, prognostic factors)
2. Economic impact of cancer on the cancer survivor and employer (e.g. days lost, adaption of equipment, compensation payments)
3. Wider issues that may affect the worker, such as the compatibility of treatment and work and employment (e.g. meaning of work, employer discrimination).
4. Interventions or policies aiming to promote the RTW of cancer survivors (e.g. population, setting)
5. Synergies and roles of policy areas and (enterprise) actors (e.g. communication, shared responsibilities).

This means that reviews or studies that did not report relevant outcomes were excluded from this report, as were reviews and studies that focused on childhood cancer survivors and first-time employment.

Furthermore, to ensure the relevance of the included reviews, we applied two minimum quality requirements. First, only reviews with a systematic literature search were included. We excluded reviews that only used selected primary studies without performing a systematic search, in order to ensure that review results were less biased and based on all the available evidence. Second, only reviews published after or in the year 2000 were included. We excluded older reviews to ensure that the review results were based on sufficiently recent, relevant studies.

The title and keywords of the scientific literature are always, and the abstracts often, published in English in the electronic databases used for this report. This means that relevant reviews and primary studies can be identified by an English search strategy even if the publication is in a language other than English. This report included all search results in the screening and data extraction process, irrespective of the language of publication or publication status.

Search methods – scientific literature

The systematic literature search was run in four electronic databases (Medline through PubMed, Embase through Scopus, Psycinfo, and OSH-Update) for the systematic literature search. The search strategy consisted of concepts for cancer, RTW outcomes, and RTW programmes and practices. For reviews, a search filter was added, which was developed by the Centre for Reviews and Dissemination from the University of York. For primary studies, search words were added for occupational cancer and SMEs. The full search strategy for all databases is described below p.72).

All findings of the search were imported into the reference management programme Endnote and duplicates were deleted. All irrelevant findings were excluded from this reference database, first on the basis of title and abstract, and second on the basis of full text.

Selection of studies

Two researchers independently screened the review literature for eligibility via title and abstract. Any conflicts were resolved via a telephone conference. The second screening and data extraction was carried out in full text and duplicate, until similar results were reached (which was after six reviews).

Screening and data extraction were performed by one researcher per reference.

The search results of primary studies were screened by one researcher. The same researcher extracted the data from the included primary studies.

Data extraction and management

The following data were extracted from the results section, the conclusion and discussion part of all included reviews and primary studies, using a pre-constructed data extraction form:

1. General information about the article (e.g. authors, year, objectives, and population characteristics)
2. Relevant outcomes:
 - a. Health and safety implications for workers returning to work during or after cancer treatment (e.g. health symptoms, prognostic factors),
 - b. Economic impact of cancer on the cancer survivor and employer (e.g. days lost, adaption of equipment, compensation payments)
 - c. Wider issues that may affect the worker, such as the compatibility of treatment and work and employment (e.g. meaning of work, employer discrimination)
 - d. Differences in employment sector, occupation, size of enterprise, social gradient, or gender in outcomes a., b. and c.
3. Interventions or policies aiming to promote the RTW of cancer survivors (e.g. population, setting)
4. Synergies and roles of policy areas and (enterprise) actors (e.g. communication, shared responsibilities).

The form was designed to highlight data that focus on occupational or work-related cancer (e.g. differences in motivation to return to work) and/or reports on aspects specifically relevant to SMEs (e.g. specific conditions that may hinder or promote action in SMEs).

Data synthesis

Microsoft Office's Excel and Word were used to synthesise the extracted data, and qualitative research methods were applied to analyse and synthesise the data of all included systematic reviews and primary studies. This included up to three levels of analysis:

1. identifying similar findings (using Pivot tables in Microsoft Excel);
2. synthesizing similar findings to first-order interpretations (using Microsoft Word);
3. if appropriate, synthesising first-order to second-order interpretations (using Microsoft Word).

The results of this synthesis are presented in tables for each level of analysis (see under heading 4 Results). To improve the readability of the report, the different levels of analysis are reported in tables as 'description in reviews'/'listed in reviews', 'sub-category', and/or 'category'.

Methods - Grey literature

Grey literature is literature that has not been published in a scientific peer-reviewed journal and includes policy papers, dissertations and government documents. Thus the grey literature would not have been found using the systematic search for scientific literature described above.

Criteria for considering literature

The aim of including grey literature was to fill the expected lack of scientific evidence reporting interventions, programs, or policies that focused on cancer survivors and RTW. Grey literature that only reported other outcomes, such as prognostic factors, was excluded from this report.

Search methods for identifying grey literature

For searching relevant grey literature the following databases and sources were used:

- OpenGrey,
- Google.com
- Specific websites of governments and OSH organisations, social partners and NGOs, including:
 - OECD,
 - Eurostat,
 - EU-OSHA,
 - IARC,
 - French Agence Nationale de Sécurité Sanitaire de l'Alimentation, de l'Environnement et du Travail (ANSES),
 - Finnish Institute of Occupational Health (FIOH),
 - Occupational Medicine / University of Southampton,
 - KU Leuven,
 - The Health Council of the Netherlands.

Selection of studies

One researcher screened the literature for eligibility; first by title and abstract, and second by full text. The data of each reference were extracted by one researcher.

Data extraction and management

Data were collected from the included articles using the same pre-constructed data extraction form as that used for the reviews and primary studies. This included general information about the publication (e.g. authors, year and objectives) and data on any relevant RTW intervention, programme, or policy (e.g. country, name, effectiveness, additional sources for further information).

Interventions were relevant for this report when their aim was to promote the RTW of cancer survivors and they concerned more than the rehabilitation of cancer survivors' work ability (such as hormone therapy, psychotherapy, physiotherapy, less invasive surgery). Relevant interventions were, for example, workplace policies, guidelines, workplace adaptations, national strategies, or awareness raising campaigns.

Methods - Online questionnaire

Criteria for considering participants for online questionnaire

Participants were contacted who were likely to be able to provide us with information regarding existing RTW interventions for cancer survivors. Relevant participants worked in the field of occupational health and safety, RTW interventions, or cancer rehabilitation.

Identification of participants

First professional networks that were active in the relevant fields were identified. The questionnaire was then disseminated via email, either by the research team using the mailing list, or via contact persons in networks of which the authors of this report were not members.

Table 10: List of relevant networks

Name	Description	Via
COST CANWON	COST Cancer and Work network: European cooperation in science and technology, 23 participating European countries, development and evaluation of new programmes for the rehabilitation and RTW after cancer. Members include IARC and members from around 10 countries (e.g. Sweden, Germany, Finland, The Netherlands, UK, Slovenia, Spain, Slovakia, France, Denmark) where action has been taken in this specific area at an institutional level	Mailing list direct to members
CANCON	Cancer control: EU joint Action on Cancer Control which aims to contribute in different ways to reducing the cancer burden in the EU, including reintegration of cancer patients	Mailing list direct to members
EPR	European Platform for Rehabilitation: network of leading European providers of rehabilitation services for people with disabilities and other disadvantaged groups. EPR's member organisations are influential in their countries and stand for high quality service delivery in the fields of vocational training, reintegration, and social care	Mailing list to EPR coordinators
PEROSH	Network comprising 12 Occupational Safety and Health (OSH) institutes across the European Union, all playing key roles in their national affiliations to governments/authorities and health and accident insurance systems	Contact person
EU-OSHA	European Agency for Safety and Health at Work: tripartite organisation of the European Union with the task of collecting, analysing and disseminating relevant information that can serve the needs of people involved in safety and health at work. Its website contains various publications in the field of occupational safety and health	Contact person
EASME	Executive Agency for Small and Medium-sized Enterprises	Contact person
ENWHP	European Network For Workplace Health Promotion	Contact person

Development of questionnaire

The aim of the questionnaire was to collect additional material from experts in the field, i.e. material that was not covered by the scientific and grey literature search. The questionnaire was disseminated via email. This allowed the participants to directly answer the contact person and attach any additional documents.

The introduction included a brief description of the aim of the project, the organisation, and the authors involved in the report. Participants were asked to provide the following information:

- name of the intervention, practice or policy;
- possible link to (information on) intervention, practice or policy, if available;
- possible contact details for people involved, if available;
- any additional information (pdf, file, anything), if available.

Data collection and information analysis

Data were retrieved via email. The material was screened and the data extracted following the same criteria and steps as those for grey literature.

Search strategies

Table 11 provides a general overview of the performed searches.

The searches for systematic reviews and primary studies were performed in January and March 2016, in four different search engines.

Grey literature was searched for in March, April, and May in one electronic database, selected websites, and one internet search engine (Google).

All searches included keywords for cancer and RTW, and additional keywords were added where needed (e.g. for SMEs).

Table 11: Summary of search for literature

Database/Source	Latest search	Search terms for
Systematic reviews		
Medline through PubMed	28 January 2016	Cancer Return-to-work, work adaptations, work outcomes (including costs such as days lost) Programmes and initiatives
OSH update	03 March 2016	
PsychInfo	28 January 2016	
Embase	27 January 2016	
Primary studies		
Medline through PubMed	28 March 2016	1. search: Occupational cancer, return to work 2. search: SMEs, cancer (return to work)
OSH update	03 March 2016	
PsychInfo	25 March 2016	
Embase	28 March 2016	
Grey literature		
Opengrey	17 May 2016	Cancer Work (return to work)
Google (English)	April 2016	
Google (German, Dutch, French)	May 2016	
Online questionnaire	March/April 2016	

Below is the documentation of the exact search strategies and the number of items found by all search engines for:

- systematic reviews;
- occupational or work-related cancer;

- primary studies on SMEs;
- grey literature.

Search strategy for systematic reviews

Table 12: Search strategy for systematic reviews

Database: PubMed (28.01.16)		
Search	Query	Items found
#1: Search words for cancer and work-related cancer	neoplasms [MeSH Terms] or cancer* [Text Word] or neoplasm* [Text Word] or carcinoma* [Text Word] or oncolog* [Text Word] or malignan* [Text Word] or tumor [Text Word] or tumour [Text Word] or tumors [Text Word] or tumours [Text Word] or leukemia* [Text Word] or sarcoma* [Text Word] or lymphoma* [Text Word] or melanoma* [Text Word] or blastoma* [Text Word] or radiotherapy [Text Word] or chemotherapy [Text Word] or occupational cancer [Text Word]	82714
#2: Search words for return-to-work, work outcomes and work adaptations (including costs such as days lost)	“return to work” [Text word] or employment [MeSH Terms] or employment [Text Word] or unemployment [MeSH Terms] or unemployment [Text Word] or unemployed [Text Word] or retirement [Text Word] or “sick leave” [MeSH Terms] or “sick leave” [Text Word] or “Sickness absence” [Text Word] or absenteeism [MeSH Terms] or absenteeism [Text word] or “work” [MeSH Terms] or company [Text Word] or work adaptation* [Text word]	184369
#3: Search words for programmes and initiatives	“rehabilitation, vocational” [MeSH Terms] or rehabilitation [MeSH Terms:NoExp] or “neoplasms/rehabilitation” [MeSH Terms] or vocational* [Text Word] or “work rehabilitation” [Text Word] or program* [Text Word] or intervention [Text Word]	801089
#4: All	#1 AND #2 AND #3	772
#5: Review filter (developed by CRD York)	"meta-analysis as topic"[MeSH Terms] OR meta-analysis[pt] OR meta-analysis[tiab] OR review[pt] OR review[tiab] NOT (letter[pt] OR editorial[pt] OR comment[pt]) NOT ("animals"[MeSH Terms:noexp] NOT "humans"[MeSH Terms])	523590
#6: Reviews only	#4 AND #5	124
Published after 1999	Using Endnote	104
Removal of duplicates	Using Endnote	84
Database: OSH update (03.03.2016)		

Rehabilitation and return to work after cancer: a review of the literature

Search	Query	Items found
#1	"return to work" OR rehabilitation OR "sick leave" OR absence [Title]	
#2	cancer OR neoplasm OR mesothelioma OR lymphoma OR leukemia [All fields]	
#3	" OUCCOHS" / " OUCISD" / " OUEUAG" / " OUHSEL" / " OUBIB" / " OUIINF" / " OUIRFT" / " OUIRLG" / " OUISST" / " OUNIOC" / " OUNIOS" / " OURILO" [Databases]	
#4	#1 AND #2 AND #3	59
Database: PsychInfo (28.01.16)		
Search	Query	Items found
#1: Cancer and work-related cancer	neoplasm* OR cancer* OR carcinoma* OR oncolog* OR tumour OR tumor OR leukemia* OR sarcoma* OR lymphoma* OR melanoma* OR blastoma* OR radiotherapy OR chemotherapy OR "occupational cancer"	82 714
#2: Return-to-work, work outcomes and work adaptations (including costs such as days lost)	"return to work" OR subject("Reemployment ") OR employment OR unemployment OR unemployed OR "sick leave" OR "sickness absence" OR "absenteeism" OR mjsub(work) OR subject("Occupational Adjustment") OR (work AND adaption) OR SU.exact("OCCUPATIONAL HEALTH") OR company	184369
#3: Programmes and initiatives	subject("Vocational Rehabilitation") OR SU.exact("REHABILITATION") OR (neoplasms AND SU.exact("REHABILITATION")) OR vocational OR "work rehabilitation" OR program* OR intervention*	801089
#4: All	#1 AND #2 AND #3	772
#5: review filter	"Meta Analysis" OR review	523590
#6: Reviews only	#4 AND #5	124
#7: Published after 1999	#6 AND YR(2000-2017)	104
Removal of duplicates	Endnote	84
Database: Embase (27.01.2016)		
Search	Query	Items found

#1: Cancer	'cancer'/exp OR 'cancer' OR 'neoplasm'/de OR 'neoplasm' OR carcinoma* OR oncolog* OR malignan* OR tumor OR tumour OR tumors OR tumours OR leukemia* OR sarcoma* OR lymphoma* OR melanoma* OR blastoma* OR radiotherapy OR chemotherapy OR 'occupational cancer'	516589 8
#2: Return to work	'return to work' OR employment OR 'employment'/de OR 'unemployment'/de OR unemployment OR unemployed OR retirement OR 'sick leave'/de OR 'sick leave' OR 'sickness absence' OR 'absenteeism'/de OR absenteeism OR 'work'/de OR company OR 'work' NEXT/1 adaption*	319090
#3: Rehabilitation program	'rehabilitation, vocational'/de OR 'rehabilitation'/de OR 'neoplasms/rehabilitation' OR vocational* OR 'work rehabilitation' OR program* OR intervention	200291 8
#4: Review filter published after 1999	'meta analysis (topic)'/de OR 'meta analysis':it OR review:it OR review:ab,ti NOT (letter:it OR editorial:it OR comment:it) AND [2000-2016]/py	194115 4
#6: Reviews only	#1 AND #2 AND #3 AND #4	716
Removal of duplicates	Endnote	645

Search strategy for primary studies on occupational and work-related cancer

Table 13: Search strategy for primary studies - occupational and work-related cancer

Database: Pubmed (28.03.2016)		
Search	Query	Items found
#1	("Ionizing radiation"[title/abstract]) AND ("bone cancer" [Title/Abstract] OR "bone neoplasm*" [Title/Abstract] OR "bone neoplasms"[MeSH Terms] OR "leukaemia"[Title/Abstract] OR "leukemia"[MeSH Terms] OR "leukemia"[Title/Abstract] OR "lung neoplasms"[MeSH Terms] OR "lung neoplasm*" [Title/Abstract] OR "lung cancer"[Title/Abstract] OR "liver neoplasms"[MeSH Terms] OR "liver neoplasm*" [Title/Abstract] OR "liver cancer"[Title/Abstract] OR "thyroid neoplasms"[MeSH Terms] OR "thyroid neoplasm*" [Title/Abstract] OR "thyroid cancer"[Title/Abstract])	1835
#2	(Sun[Title/Abstract] OR solar radiation[Title/Abstract] OR UV[Title/Abstract]) AND ("skin neoplasms"[MeSH Terms] OR "skin neoplasm*" [title/abstract] OR "skin cancer"[title/abstract])	6823
#3	(PAH[Title/Abstract] OR benzoapyrene[Title/Abstract] OR benzopyrene[Title/Abstract]) AND ("lung neoplasms"[MeSH Terms] OR "lung neoplasm*" [Title/Abstract] OR "lung cancer"[Title/Abstract] OR "urinary bladder neoplasms"[MeSH Terms] OR "urinary bladder neoplasm*" [Title/Abstract] OR "bladder cancer"[Title/Abstract] OR "skin neoplasms"[MeSH Terms] OR "skin neoplasm*" [Title/Abstract] OR "skin cancer"[Title/Abstract])	493

#4	(asbestos[Title/Abstract] AND (Mesothelioma[Title/Abstract] OR "lung neoplasms"[MeSH Terms] OR "lung neoplasm*[Title/Abstract] OR "lung cancer"[Title/Abstract])	4977
#5	(Silica[Title/Abstract] OR quartz[Title/Abstract]) AND ("lung neoplasms"[MeSH Terms] OR "lung neoplasm*[Title/Abstract] OR "lung cancer"[Title/Abstract])	694
#6	("wood dust" [Title/Abstract]) AND ("nose neoplasms"[MeSH Terms] OR "nose neoplasm*[Title/Abstract] OR "nasal cancer"[Title/Abstract])	164
#7	(Arsenic[Title/Abstract] OR Beryllium[Title/Abstract] OR Cadmium[Title/Abstract] OR Chromium[Title/Abstract] OR Nickel[Title/Abstract]) AND ("lung neoplasms"[MeSH Terms] OR "lung neoplasm*[Title/Abstract] OR "lung cancer"[Title/Abstract])	1257
#8	(Benzene[Title/Abstract] AND ("leukaemia"[Title/Abstract] OR "leukemia"[MeSH Terms] OR "leukemia"[Title/Abstract] OR "lymphoma"[MeSH Terms] OR "lymphoma"[Title/Abstract])	1050
#9	("Coal tar" [Title/Abstract] OR "mineral oil" [Title/Abstract] OR soot[Title/Abstract]) AND ("skin neoplasms"[MeSH Terms] OR "skin neoplasm*[Title/Abstract] OR "skin cancer"[Title/Abstract])	107
#10	(Plastic[Title/Abstract] OR rubber[Title/Abstract] OR dye[Title/Abstract]) AND ("urinary bladder neoplasms"[MeSH Terms] OR "urinary bladder neoplasm*[Title/Abstract] OR "bladder cancer"[Title/Abstract])	485
#11	(Pesticides[Title/Abstract] AND ("lymphoma"[MeSH Terms] OR "lymphoma"[Title/Abstract] OR lymphoid[Title/Abstract])	240
#12	("shift work" [Title/Abstract]) AND ("breast neoplasms"[MeSH Terms] OR "breast neoplasm*[Title/Abstract] OR "breast cancer"[Title/Abstract])	132
#13	(#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12)	17842
#14	"occupational cancer"[title/abstract] OR (("work related"[title/abstract] OR "occupational exposure"[title/abstract] OR "work exposure" [title/abstract]) AND cancer[title/abstract])	3185
#15	#13 OR #14	20274
#16	("return-to-work"[Title/abstract] OR re-employment[Title/abstract] OR "rehabilitation, vocational" [MeSH Terms] OR vocational*[Text Word] OR "work ability"[Text Word] OR "work capacity"[Text Word] OR "work activity"[Text Word] OR "work disability"[Text Word] OR "work rehabilitation"[Text Word] OR "work status"[Text Word] OR "work retention"[Text Word] OR workability[Text Word] OR employability[Text Word] OR employable[Text Word])	35975
#17	#15 AND #16	81

#18	(“randomized-controlled-trial”[Publication Type] OR “controlled clinical trial”[Publication Type] OR “Randomized Controlled Trials as Topic”[Majr] OR “random allocation” [MeSH Terms] OR “double blind method” [MeSH Terms] OR single blind method[MeSH Terms] OR “clinical trial”[Publication Type] OR “Clinical Trials as Topic”[Mesh:NoExp] OR (clin* n25 trial*[Title/Abstract]) OR ((singl* [Text Word] OR doubl* [Text Word] OR trebl* [Text Word] OR tripl* [Text Word]) AND (mask* [Text Word] OR blind* [Text Word])) OR placebos[MeSH Terms] OR placebo* [Text Word] OR random* [Text Word] OR “research design”[Mesh:NoExp] OR “comparative study”[Publication Type] OR “evaluation studies”[Publication Type] OR “follow-up studies” [MeSH Terms] OR “prospective studies” [MeSH Terms] OR “cross-over studies” [MeSH Terms] OR control* [Text Word] OR prospectiv* [Text Word] OR volunteer*[Text Word] OR Evaluate* [Text Word] OR Compare* [Text Word] OR Program* [Text Word])	9020520
#19	#17 AND #18	49
Database: Embase (via Ovid, 25.03.2016)		
Search	Query	Items found
#1 occ cancer	('work-related cancer' or 'occupational cancer').mp.	3120
#2 RTW	('return to work' or employment or vocational).mp. or 'work'/de	122325
#3 occ cancer and RTW	(1 and 2)	332
#4 occ cancer and RTW not risk or prevention	(1 and 2) not (risk or epidemiological or prevention).mp.	70
Database: PsychInfo (via Ovid, 28.03.2016)		
Search	Query	Items found
#1 occ cancer	('work-related cancer' or 'occupational cancer').mp.	6
#2 RTW	('return to work' or employment or vocational).mp. or 'work'/de	78600
#3 occ cancer and RTW	(1 and 2)	1
Database: OSH update		
Search	Query	Items found

#1	"return to work" OR rehabilitation OR "sick leave" OR absence [Title]	
#2	cancer OR neoplasm OR mesothelioma OR lymphoma OR leukemia [All fields]	
#3	" OUCCOHS" / " OUCISD" / " OUEUAG" / " OUHSEL" / " OUBIB" / " OUIINFT" / " OUIRFT" / " OUIRLG" / " OUISST" / " OUNIOC" / " OUNIOS" / " OURILO" [Databases]	
#4	#1 AND #2 AND #3	59

Search strategy for primary studies focusing on small and medium-sized enterprises

Table 14: Search strategy for primary studies – small and medium-sized enterprises

Database: Pubmed		
Search	Query	Items found
#1 Cancer	(neoplasms[MeSH Terms] OR cancer*[Text Word] OR neoplasm*[Text Word] OR carcinoma*[Text Word] OR oncolog*[Text Word] OR malignan*[Text Word] OR tumor[Text Word] OR tumour[Text Word] OR tumors[Text Word] OR tumours[Text Word] OR leukemia*[Text Word] OR sarcoma*[Text Word] OR lymphoma*[Text Word] OR melanoma*[Text Word] OR blastoma*[Text Word] OR radiotherapy[Text Word] OR chemotherapy[Text Word])	3685488
#2 RTW	"return-to-work"[Text Word] OR employment[MeSH Terms] OR employment[Text Word] OR unemployment[MeSH Terms] OR unemployment[Text Word] OR unemployed[Text Word] OR retirement[Text Word] OR "sick leave" [MeSH Terms] OR sick leave[Text Word] OR Sickness absence[Text Word] OR absenteeism[MeSH Terms] OR absenteeism[Text Word] OR "work" [MeSH Terms] OR occupations[MeSH Terms] OR "occupational medicine" [MeSH Terms] OR "occupational health" [MeSH Terms] OR "occupational health services" [MeSH Terms] OR "disability management"[Text Word] OR "rehabilitation, vocational" [MeSH Terms] OR occupation*[Text Word] OR "Rehabilitation"[Mesh:NoExp] OR "neoplasms/rehabilitation" [MeSH Terms] OR vocational*[Text Word] OR "work ability"[Text Word] OR "work capacity"[Text Word] OR "work activity"[Text Word] OR "work disability"[Text Word] OR "work rehabilitation"[Text Word] OR "work status"[Text Word] OR "work retention"[Text Word] OR workability[Text Word] OR employability[Text Word] OR employable[Text Word] OR employee*[Text Word]	469312
#3 SMEs	((((Micro OR small OR medium OR micro-size* OR small-size* OR medium-size* OR micro-scale* OR small-scale* OR medium-scale* OR SME OR MSE) AND (enterprise* OR business*)) OR "enterprise size" OR "enterprise scale")	5336
#4	#1 AND #2 AND #3	41
Database: Embase via Ovid (25.03.2016)		
Search	Query	Items found

#1 Cancer	'cancer'/exp or 'cancer'.mp. or 'neoplasm'/de or 'neoplasm'.mp. or carcinoma*.mp. or oncolog*.mp. or malignan*.mp. or tumor.mp. or tumour.mp. or tumors.mp. or tumours.mp. or leukemia*.mp. or sarcoma*.mp. or lymphoma*.mp. or melanoma*.mp. or blastoma*.mp. or radiotherapy.mp. or chemotherapy.mp. or 'occupational cancer'.mp. [mp=title, abstract, heading word, drug tradename, original title, device manufacturer, drug manufacturer, device trade name, keyword]	4759118
#2 SMEs	('small enterprise*' or 'medium enterprise*' or 'micro business' or (('medium scale' or 'small scale' or 'small size' or 'medium size') and (business or enterprise*))).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device tradename, keyword]	1087
#3	#1 AND #2	67
Database: PsychInfo via Ovid 25.03.2016		
Search	Query	Items found
#1 Cancer	(neoplasm* or cancer* or carcinoma* or oncolog* or tumour or tumor or leukemia* or sarcoma* or lymphoma* or melanoma* or blastoma* or radiotherapy or chemotherapy or 'occupational cancer').mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]	64193
#2 SMEs	('small enterprise*' or 'medium enterprise*' or 'micro business' or (('medium scale' or 'small scale' or 'small size' or 'medium size') and (business or enterprise*))).mp. [mp=title, abstract, heading word, drug tradename, original title, device manufacturer, drug manufacturer, device tradename, keyword]	724
#3	#1 AND #2	3

Search strategy for grey literature

Table 15: Search strategy for grey literature

Database: OpenGrey (17.05.2016)		
Search	Query	Items found
#1	Cancer AND return AND work	5
Database: Google.com (17.05.2016)		
Search	Query	Items included in screening
#1	Cancer work	the first 20

#2	Cancer occupation	as above
#3	Cancer employment	as above
Search	Query	Items found
#1	Krebs Arbeit	the first 20
#2	Krebs Wiedereinstieg	as above
#3	Krebs Wiedereingliederung	
#4	Krebs Beruf	as above

Results of search and screening process

The section above contains a detailed description of the search engines used and the key words applied. Below are the results of the searches and screening process.

Scientific review

The search for systematic reviews located 989 articles. Consequently, 72 duplicates were excluded and 917 articles screened via title and abstract. Most articles (837 articles) did not fulfil the inclusion criteria and were excluded. A total of 80 articles were then screened in full text to check eligibility: of these 40 did not fulfil the criteria and were excluded, leaving 40 articles.

In the next step, the search for original studies was conducted and 242 articles were found. During title and abstract screening, 202 articles were identified as not fulfilling the inclusion criteria and were excluded. Forty articles were screened in full text, two of which fulfilled the inclusion criteria.

Grey literature

As the first step, the database OpenGrey was searched and five articles were located. However, none of these articles fulfilled the inclusion criteria.

The search engine Google.com was used to locate further publications. The first 20 hits were screened for each combination of keywords.

The specific internet pages were screened and three articles were located. One of those was already identified and included with the systematic search for scientific literature (de Boer et al. 2015a), one was a description of an ongoing research study for which no results are yet available (Desiron et al. 2016), and another one did not fulfil the inclusion criteria.

Results from the online questionnaire provided no additional literature that fulfilled the inclusion criteria.

Description of included scientific literature

This report included 36 systematic reviews and three primary studies. Most reviews did not use methods for synthesising the results of primary studies (narrative reviews) and included studies on any type of cancer. Publications were in either German, English or French (Table 16).

Table 16: Overview of the included scientific literature

Number of publications	Study ID	Methods	Date of publication	Type of cancer (as stated by author)	Language of publication
Primary studies					
1.	Ha-Vinh 2015	Population-based longitudinal study	2015	Any	French
2.	Leong 2011	Survey, interview study	2011	Any	English
3.	Tamminga 2013	Randomised controlled trial	2013	Any	English
Reviews					
1.	Aaronson 2014	Narrative (quantitative and qualitative studies)	2014	Any	English
2.	Alfano 2009	Narrative	2009	Any	English
3.	Amir 2009	Narrative	2009	Any	English
4.	Banning 2011	Qualitative: meta-ethnographic	2011	Breast cancer	English
5.	Campbell 2012	Narrative	2012	Breast cancer	English
6.	Cox 2014	Narrative	2014	Any	English

Rehabilitation and return to work after cancer: a review of the literature

7.	de Boer 2015b	Quantitative: meta-analysis	2015	Any	English
8.	Duijts 2014a	Narrative	2014	Any	English
9.	Duijts 2014b	Narrative (quantitative and qualitative studies)	2014	Any	English
10.	Egan 2013	Narrative (review of reviews and RCTs)	2013	Any	English
11.	Feuerstein 2010	Narrative	2010	Any	English
12. 13.	Fitch 2013 and Fitch 2014	Narrative	2013 and 2014 (two publications of the same study)	Any	English
14.	Handberg 2014	Qualitative: Interpretive Description analysis	2014	Any but men only	English
15.	Harji 2015	Qualitative: content analysis	2015	Locally recurrent rectal cancer	English
16.	Horsboel 2012	Narrative	2012	Haematological malignancies	English
17.	Hoving 2009	Narrative	2009	Breast cancer	English
18.	Hoving 2010	Narrative	2010	Somatic diseases and symptoms	English

Rehabilitation and return to work after cancer: a review of the literature

19.	Islam 2014	Narrative	2014	Breast cancer	English
20.	Kaushal 2012	Narrative	2012	Pancreatic cancer	English
21.	Mehnert 2011	Narrative	2011	Any	English
22.	Molina 2013	Narrative (qualitative)	2013	Any	English
23.	Munir 2009	Narrative	2009	Any	English
24.	Parkinson 2010	Narrative	2010	Any	English
25.	Peteet 2000	Narrative	2000	Not reported	English
26.	Richardson 2011	Narrative	2011	Any	English
27.	Silver 2013	Narrative	2013	Any	English
28.	Spelten 2002	Qualitative synthesis (quantitative studies)	2002	Any	English
29.	Steiner 2004	Narrative (quantitative)	2004	Any	English
30.	Steiner 2010	Narrative (quantitative studies)	2010 (update of Steiner 2004)	Any	English

Rehabilitation and return to work after cancer: a review of the literature

31.	Stergiou-Kita 2014	Qualitative: meta-ethnography (qualitative studies)	2014	Any	English
32.	Tiedtke 2010	Qualitative: method not defined (using abstraction and synthesis) (qualitative studies)	2010	Breast	English
33.	Trivers 2013	Narrative (quantitative studies)	2013	Ovarian	English
34.	Ullrich 2012	Narrative (quantitative studies)	2012	Any	German
35.	van Muijen 2013	Narrative (quantitative studies)	2013	Any	English
36.	Wells 2013	Qualitative: meta-synthesis	2013	Any	English

Description of online questionnaire participants

Networks and institutes active in the field of cancer and return to work were contacted in order to reach study participants. After the first round of emails, five participants from two different networks (CANWON and EPR) replied. Even after a reminder was sent out, only one further reply was received.

Assessment of quality of included studies

The quality appraisal of the included literature was based on a crude assessment of the risk of bias of the applied study methods, rather than weighing qualitative against quantitative approaches. The studies with the lowest risk of bias are at the top level.

The quality of the studies is categorised into five levels:

1. Systematic reviews including a meta-analysis (e.g. meta-regression),
2. Systematic reviews without a meta-analysis and randomised controlled studies,
3. Controlled and/or long-term studies (e.g. cohort studies, case-control studies),
4. Uncontrolled and short-term studies (e.g. surveys, case series, case reports), and
5. Reports without a valid study population (e.g. expert opinions).

Systematic reviews are on the top two levels, as they include evidence from multiple studies, thus drawing conclusions on the basis of a higher number of study participants. Results from a single randomised controlled trial are at a low risk of bias, and for this reason are grouped on the same level as systematic reviews without a meta-analysis.

On the highest level are systematic reviews that numerically combined study results. These reviews provide a more precise estimate of effects than reviews that report a narrative of single study results or use a qualitative approach to combine study results (e.g. meta-ethnography, grounded formal theory).

Reviews with a qualitative synthesis approach give an important interpretative overview over the available data, but cannot give an effect estimate (e.g. which work motivation most effectively promotes RTW).

Single studies are on level three and four.

Better quality studies are those that are either long-term (with a long follow-up) or that included a control group. Both study designs were considered to lower the risk of bias compared to single studies with a short follow-up or without a control group.

On the lowest quality level of evidence are publications that lack data on a valid study population. These reports may be based on experiences with the related subject (e.g. expert opinion papers), but are at a higher risk of bias than the research methods described above.