Considering the burden of cancer in the working age population, this thesis specifically addresses Cancer-Related Fatigue (CRF) and work ability in cancer survivors. Both topics are related to long-term sick leave and work participation in cancer survivors and need to be addressed in order to support them to find a way back to work (1-4). The following case illustrates the challenges a cancer survivor may face during a vocational rehabilitation trajectory, that eventually leads to a work disability assessment. Simultaneously, this case pictures the potential questions an insurance physician (IP) may need to answer, in assessing the work disability claim.

Mrs. F., a 39-year old divorced shop assistant working in a supermarket, is on sick leave since she was diagnosed with breast cancer almost two years ago. She had surgery and was treated with chemotherapy. She also used Herceptin and as a result suffered from left ventricular dysfunction, which improved afterwards. Previous medical history reports recurrent episodes of head-ache and an obsessive compulsive disorder treated adequately in the past. Although she recently visited her general practitioner (GP) asking for sleeping pills, the check-ups she had at the hospital were reassuring until now. She has applied for a disability benefit and visits the local office of the Social Security Agency (SSA). She tells the IP that over the last year, several times she tried to start working again. Initially, as she felt insecure about return to work (RTW), she asked her oncologist what to do. The oncologist reassured her, said that everything was fine so far, and that she should take her time and RTW when she felt ready for it. But then, it did not work out, even though at first her employer was very supportive in allowing her to retreat to the canteen of the supermarket if she felt the need to take a rest. She agreed to start with some cleaning work, assist in the supply chain just by checking stock and store for supplies, and took care of the coffee machine that customers may use freely. Even so, just after one hour of work, she would become increasingly tired. As RTW in the shop was no success, soon the Occupational Health Physician (OP) advised to switch to administrative tasks to which the employer agreed with some reluctance, as this meant shifting staff and tasks. Soon after she started in her new tasks, her co-worker, who was supposed to help her out in the office, went on maternity leave. As Mrs. F. was not trained to be an office worker, she felt that she was not up
to keeping the administration running smoothly. She also struggled with numbers and figures due to poor concentration. She once almost ordered the same products twice at the distribution center. This made her insecure and therefore she checked her work every now and then, as she was afraid to make mistakes that could be costly in the end. Now, she manages to work a few hours in the morning in administration, only to find herself lying on the couch at home in the afternoon. As a result, house-keeping and looking after her two children have become difficult. Moreover, her youngest son is not doing well at school now, about which she started to worry. She claims that she can only work a few hours per day at most and definitely not every day. That is, she has things to take care of at home as well and at the moment does not know how to cope and keep things organized.

FACTS AND FIGURES ON CANCER AND WORK

Over the last decades, the number of new cancer cases has grown worldwide (5). While in 2012 there were an estimated 14.1 million new cancer cases (6), by 2030, the global burden is expected to grow to 21.7 million new cases and 13 million cancer deaths per year (7). Nowadays, about 32.6 million people are globally living with cancer within 5 years of diagnosis, of whom 9.1 million in Europe (8). Specifically in the Netherlands, the incidence of cancer was 104,988 in 2015. This number will increase up to 123,000 in 2020, which for a part relates to the effect of an aging society (9). Currently, cancer is no longer equivalent to an incurable disease with fatal prognosis, because of advances made in cancer screening and treatment (10). As a result, cancer survival rates have improved markedly over the last decades in Western countries, e.g., 5-year survival rates in the Netherlands grew from 47% in 1993 to 62% in 2012 (11).

Not only the ageing society, but also the increased entry of women at the workplace and the introduction of a government policy that discourages early retirement, contributed to the growing percentage of workers aged 60 years or over in the Netherlands. That is, in 1996 only 16% of persons above 60 years had a job, while today more than 50% of this group is at work (12). Moreover, in the
Netherlands, as in other Western countries such as Denmark and Spain, changes regarding the retirement pension age are ongoing, in that this age has been raised from 65 to 67 years (13). While about 40% of those diagnosed with cancer in the Netherlands in 2014 was of working age, it is expected that these developments will also affect the number of cancer diagnoses in active workers.

CANCER-RELATED FATIGUE AND WORK ABILITY

The impact of cancer and its treatment, e.g., chemotherapy, may be a burden long after this treatment has been completed. That is, CRF, nausea, pain, physical limitations, cognitive limitations, sleep disorders and depression are frequently reported sequelae (14;15). Poor health can reduce work ability and act as a barrier towards work participation (16).

CRF, the most prevalent side-effect, is known for its prolonged course, and today around 10 million people suffer from CRF worldwide (15). It is defined as ‘significant fatigue, diminished energy, or increased need to rest, disproportionate to any recent change in activity level, to be present every day or nearly every day during the same 2-week period in the past month, as well as the presence of additional symptoms’ (17). It can be described as ‘a persistent, subjective sense of tiredness related to cancer and cancer treatment that interferes with usual functioning’ (1). The pathophysiology of CRF is poorly understood and aetiological factors seem to co-exist (18). That is, the most commonly identified causes include direct effects of cancer and tumor burden, treatment side effects, psychosocial factors, exacerbating comorbid symptoms and comorbid medical conditions (19). Being diagnosed with cancer and/or experiencing side-effects of treatment may limit the work ability of cancer survivors (20).

Work ability is defined as the overall fit of the worker with his/her job demands. It is a concept by which a worker judges his/her abilities to participate in work, which can be measured using the Work Ability Index (WAI) questionnaire (21). It can be used to assess health hazards at both the individual and group level by targeting factors related to both the worker and his/her working environment. Work
ability also concerns the interaction between these two against the background of the workers’ private/social network. Factors related to the worker, e.g., health, occupational competence, attitude and motivation, may interact with environmental factors such as job demands, the organization of the working community and its management. Ultimately, even society at large relates to the concept of work ability, e.g., by social security legislation regarding sickness benefits and work disability grants. Also, moral codes, e.g., how society and individuals value the meaning of work and work participation, are linked with work ability. Next to being a measure to monitor healthy workers in the workplace, work ability has also shown to be of value to assess the results of vocational rehabilitation among cancer survivors (20). This indicates the relevance of work ability in cancer survivors on long-term sick leave.

CANCER SURVIVORSHIP AND WORK PARTICIPATION

Workers with a chronic illness, among whom cancer survivors, view having work or being able to RTW as the third most important aspect that contributes to the quality of life, after the ability to go out, and to engage in social activities (22). Specifically in cancer survivors, work participation may act as a food-hold to regain control, lead the way back to former life and help to resume social contacts. It may help to improve self-confidence and overcome side-effects of the disease and treatment, and reduces potential financial loss associated with sick leave or work disability (23-27). Next to the cancer survivors’ benefits, work participation of cancer survivors is of interest to society at large in that it reduces loss of production and costs of sick leave compensation or work disability benefits.

For workers in general, work participation relates to keeping a balance between (personal) resources and job demands. Specifically in cancer survivors, adequate support by the partner/spouse, employer and coworkers, but also experiencing good health, having a high self-efficacy and being motivated, can help to meet job demands, such as high working hours and challenges related to physical, psychological, cognitive, social and/or emotional functioning at work (28).
Case: ‘She agreed to start with some cleaning work, but as RTW in the shop was no success she switched to administrative tasks. The employer agreed with some reluctance...’

Work participation of cancer survivors has been studied for over four decades now and its relevance is widely acknowledged (29-33). As the first papers on cancer survivorship and work participation appeared, the focus mainly was on work participation at short term, i.e., within a year of diagnosis, at which stage (active) treatment has usually ended. Later in time, the long-term effects of diagnosis and treatment on work participation gained attention as well. That is, it has been recognized that cancer survivors may face ongoing health problems long after successful completion of treatment (34-37). Therefore, nowadays more prospective studies, targeting at long-term effects of cancer and treatment, are conducted as cancer survivors may experience side-effects of treatment with a temporary or even permanent character (31). These may limit their functional abilities and, as a consequence, act as a barrier towards work participation (29;38;39). That is, previous studies have reported a poor outcome on work participation specifically in cancer survivors compared to healthy matched controls (40;41). It is assumed that this may reflect a form of discrimination of cancer survivors in the workplace and relates to the stigma of cancer within the occupational setting, the fear of recurrence, insecurity felt by stakeholders, such as the worker, employer, and physicians alike. Consequently, this may lead to irrational beliefs and attitudes that may interact and eventually obstruct work participation (42).

Case: ‘The oncologist said that she should take her time and RTW when she felt ready for it...’

However, positive changes have occurred since the first studies were published that addressed work participation of cancer survivors. Nowadays, an average of 89% of cancer survivors is able to return to work within two years post diagnosis (31).
DEFINING WORK PARTICIPATION OUTCOMES

Next to differences in the definition of both short-term and long-term periods of sick leave, studies vary in the way work participation outcomes are described. In the literature, several outcome measures are used, e.g., (time to) RTW, days of sick leave, sickness benefit, employment status, time to job loss, annual wage loss, disability pension, and work disability (31). For a part, the outcome measures used are likely to be linked with the social security legislation that applies to the population studied, which, as we know, differs between countries. This can make the results of studies between countries difficult to compare. In this respect, the concept of work ability may serve as an alternative that allows a worker to estimate his/her abilities to participate in work, irrespective of actual working status or sick leave.

WORK DISABILITY ASSESSMENT IN THE NETHERLANDS

While measuring work ability using the WAI seems straightforward, assessing work disability claims, as performed by the Dutch SSA, is more complex.

Case: ‘She manages to work a few hours in the morning in administration, only to find herself lying on the couch in the afternoon...’

In the Netherlands, workers may apply for a work disability benefit after sick leave lasting 24 months. During this initial 24-month sick leave period, the sick-listed worker and the employer are obliged to participate in a RTW trajectory in which both parties carry responsibility. This is described in the Dutch Gatekeeper Act, a law designed to reduce the inflow towards work disability compensation schemes. Usually during the 24-month sick leave, a sick-listed worker with an employment contract sees an OP on a regular basis; the OP is contracted by the employer and gives advice on the steps to be taken in the RTW trajectory. In case of unemployment, sick-listed workers are advised by the SSA.

In case a worker needs to apply for a work disability benefit, an IP working for the SSA, assesses the worker’s functional abilities. The process of assessment of
functional abilities is complex and depends on a variety of medical and non-medical factors. That is, the concept of work disability relates to medical, organizational, jurisdictional and social factors that each can play a role and/or may interact. The IP may use several sources of information in assessing functional abilities, but the interview with the sick-listed worker usually acts as the most important one in this process. Next to this, the IP may use guidelines and/or information provided by third parties, e.g., a GP, the OP or a clinician, as to decide on functional abilities. Although the information, as gathered by the IP, predominantly targets at cancer survivors, we must realize that in the decision making process that underlies an assessment, also characteristics of the IP play a role, such as IP's experiences related to assessing CRF and cancer survivors' functional abilities, and/or IP's adherence to guidelines.

Finally, as a result of the assessment, the IP gives a description of functional abilities using the Functional Abilities List (FAL), which has 106 items covering six domains, i.e., personal functioning, social functioning, adjustment to physical environmental demands, dynamic movements, static postures, and working hours. In the assessment, an IP should consider that legislation requires that work disability, which is defined by wage loss, may only be assumed if claimed functional limitations and disease can be linked in a causal relationship.

Case: ‘She has things to take care of at home as well and at the moment does not know how to cope…’

Nonetheless, it must be noted that, according to Dutch law, work disability can be assumed even in absence of a clear diagnosis. That is, as long as the IP reports consistency between impairments, functional limitations and handicaps, work disability compensation can be granted (43).

Next, if applicable and based on the FAL, a labour expert assesses the loss of former wages earned, which can be either (1) less than 35%, (2) in between 35 to 80%, or (3) over 80% of former wages earned. Workers are granted a work disability benefit if loss of income exceeds 35% of former wages. If a worker has no labour capacities, the IP has to evaluate the sustainability of this disability. That is, the evaluation of the prognosis of abilities has consequences as to what benefit act the claimant is entitled (WGA: Benefit Act for the non-durable fully disabled
and for those with functional abilities having a wage loss of more than 35%; IVA: Benefit Act for the fully and durable disabled). The assessment of the prognosis of abilities, by the IP, therefore has more implications than it used to have in the former Disability Insurance Act (WAO). However, it relates to the expected prognosis of functional abilities only and not to the course and prognosis of the underlying disease.

**PITFALLS IN DISABILITY ASSESSMENT**

There are several potential problems the IP may encounter in assessing cancer survivors’ functional abilities. As cancer survivors approach the end of the 24-month sick leave period, the long-term side-effects of the disease and treatment experienced may be difficult to assess. Especially in case subjective feelings, such as distress, depressive symptoms or CRF, prevail. Next, a prognosis towards the course of functional abilities may seem unclear. However, the outcome of the assessment regarding the sustainability of functional abilities is very relevant to both the cancer survivor and society. It relates to timely identifying cancer survivors being either able or unable to RTW, and the need to provide support, either financially by provision of a work disability grant, or by initiating a vocational rehabilitation program.

*The introductory case of Mrs. F. illustrates the complexity of work disability assessments in cancer survivors. That is, it demonstrates that in assessing a work disability claim, during the interview, a cancer survivor may give a vast amount of information that an IP needs to address and explicate. In this respect, we may question which elements, as presented in the cancer survivors’ history, an IP sees as important and relevant.*
RESEARCH QUESTIONS

In the case presented, the information given can be arranged into a number of topics that seem related to health status, personal circumstances, work demands, job support and accommodation, legislation and client’s perception. An IP usually sorts and weighs this information and eventually a decision making process evolves leading to a FAL describing both cancer survivors’ functional abilities and their durability. Regarding the assessment of work disability at 24-month sick leave of cancer survivors, the following questions may arise:

Question 1: Which factors are known to predict RTW in cancer survivors on long-term sick leave?

Question 2: Which factors are associated with work disability in cancer survivors at 24-month sick leave?

Question 3: Which factors predict CRF and work ability in cancer survivors at long-term follow-up, after the assessment of work disability?

Question 4: Which factors do IPs consider in assessing CRF and abilities in cancer survivors at 24-month sick leave?

Finding the answers to these questions may be to the benefit of cancer survivors who are on long-term sick leave, and at risk for work disability. Also, it may support IPs in assessing work disability claims of cancer survivors.

MAIN OBJECTIVE AND OUTLINE OF THESIS

Considering the expected increase of cancer survivors at working age and the positive effect of work participation in cancer survivors in general, the main objective of this thesis is to identify predictive factors for CRF and work ability in cancer survivors on long-term sick leave.

– In Chapter 2, a systematic review is described on predictors of RTW and employment in cancer survivors. The objective of this study was to provide an overview of the prognostic factors for RTW and employment of cancer survivors.
Chapter 1

- In Chapter 3, a longitudinal study on prognostic factors of work disability in employed cancer survivors is presented. The purpose of this study was to identify prognostic factors of work disability at 24-month sick leave in sick-listed employed cancer survivors at short-term, i.e., 10-month sick leave.
- The results of a cross-sectional study on factors associated with work disability in employed cancer survivors at 24-month sick leave are presented in Chapter 4. The objective of this study was to disclose factors associated with work disability in cancer survivors at 24-month sick leave.
- The main study of this thesis is described in Chapter 5, in which the results of a prospective cohort study on predictive factors for both CRF and work ability in cancer survivors beyond 24-month sick leave are presented. The aim of this study was to identify prognostic factors related to both CRF and work ability in cancer survivors on long-term sick leave.
- In Chapter 6, a cross-sectional study on coping and health complaints, functional limitations, work ability and work status of long-term sick-listed cancer survivors is described. The purpose was to investigate the possible mediating role of active and passive coping between health complaints and functional limitations, work ability and work status, in cancer survivors on long-term sick leave.
- The results of a qualitative focus group study that describes IPs’ perspectives related to the work disability assessment of cancer survivors are presented in Chapter 7. In this study, aspects IPs consider in assessing work disability of cancer survivors, their experiences related to the assessment of CRF, the use of cancer specific guidelines and needs related to the use of a prediction rule that targets to support work disability assessments, are described.

In the final Chapter 8, the main findings of the separate studies listed above are discussed, interpreted and connected into a framework leading to recommendations for future research.
REFERENCES


