Chapter 9

General discussion
This thesis concerns work functioning of patients with rheumatoid arthritis (RA) and it closes with a general discussion of research findings. First, I will present the main findings related to the objectives of this thesis. I will then reflect on these findings. Finally implications and recommendations for research and practice will be described.

Objectives of this thesis were:
1. To review the literature concerning the effectiveness of workplace interventions to prevent work disability;
2. To investigate factors associated with at-work productivity loss, and the association between at-work productivity loss and quality of life for workers with RA;
3. To develop and evaluate an intervention at the workplace with the aim to improve and maintain work productivity for workers with RA;

Main findings and reflection

Objective 1:
In chapter 2, we reviewed the literature. We searched for studies that evaluated a workplace intervention (workplace adaptations, and active involvement of at least the supervisor) for workers who were on sick leave. We found that for workers with musculoskeletal disorders, workplace interventions were more effective than usual care in returning these workers back to work. Workers with musculoskeletal disorders receiving a workplace intervention also had reduced pain levels and improved functional status. The effectiveness of workplace interventions for workers who were on sick leave due to mental health problems or other health conditions could not be established.

Systematic reviews are often considered as studies leading to the highest quality of evidence. With the systematic approach- research question following the PICO system, search strategy, strict inclusion criteria, risk of bias assessment of the individual studies, meta-analysis, GRADE levels of evidence- it is unlikely that relevant studies will be missed. Furthermore, results are presented considering both the quality of the individual studies as well as the quality of the overall evidence. In our systematic review, we found that the effectiveness of workplace interventions on sickness absence differs among workers with specific causes of work disability. The effectiveness was demonstrated for workers with musculoskeletal disorders but not for workers with mental health problems or other health conditions if the goal was to return workers back to work. In other words, a workplace intervention is effective in such a way that a sick-listed worker with musculoskeletal disorders can return to work earlier. This raises the question if a workplace intervention can be effective to improve work functioning as well if the worker is not sick-listed but functioning is hampered by limitations at the workplace, which was the aim of the Care for Work project.
In our review, we found that workplace interventions are effective for workers with musculoskeletal disorders. However, there are many different health conditions classified as musculoskeletal disorders, and we did not analyze differences between these different health conditions. We therefore cannot be certain that workplace interventions will be effective for all musculoskeletal disorders. The needs of a group of workers with a specific musculoskeletal disorder should be addressed when implementing a workplace intervention, even though we showed the effectiveness of workplace interventions for workers with musculoskeletal disorders in general.

Objective 2:
In chapter 3, we concluded that at-work productivity loss was associated with workers who had poorer mental health, more physical role limitations, who were ever treated with a biological therapeutic, who were not satisfied with their work, and had more work instability. We furthermore found that at-work productivity loss was negatively associated with health-related quality of life, especially in the dimensions of mental health, physical role limitations and pain.

As described in chapter 3, there are several methodological limitations concerning this study. The results are based on cross sectional data, and the cross validation indicates that study results should be interpreted with caution. However, not much is known yet regarding predictors of at-work productivity loss in general; whether these are predictors for at-work productivity loss for workers with RA or also for workers with other health conditions (1;2). Our study therefore at least gives direction on this subject. We showed that at-work productivity loss is associated with personal, disease-related, and work-related factors, which is in line with the International Classification of Functioning, Disability and Health (ICF model) of the World Health Organization (3). The ICF model points out that a restriction in participation is the result of factors related to the health condition, personal, and environmental factors. This implies that interventions with the aim to enhance work participation should not focus on only one factor out of these three fields; a broader scope is needed.

We also showed that at-work productivity loss is associated with a poorer quality of life. It is already known that permanent work disability is related to poorer quality of life (4-6). In our study, we found that quality of life is related to limitations in work functioning. This implies that work has an important meaning for personal wellbeing, but also that reducing limitations at work could contribute to improved quality of life. However this should be established in an intervention study.

Objective 3:
Chapter 4 described the development of the intervention program and the development of the evaluation strategy. The intervention developed consisted of integrated care and a
participatory workplace intervention. With integrated care, we aimed to integrate curative and occupational health care, facilitate communication between caregivers involved, and hence come to improved work functioning as the treatment goal towards the patient. The participatory workplace intervention is based on participatory ergonomics (7;8) and aims to achieve consensus between patient and supervisor regarding feasible solutions for obstacles for functioning at work. The primary outcome was at-work productivity loss. We furthermore evaluated the process of implementation of the intervention, and its cost effectiveness.

In chapter 5, we found that the participatory workplace intervention was implemented quite well, but integrated care was not. In chapter 6, the effectiveness of the intervention was evaluated after 6 months of follow-up. The intervention showed that the intervention group experienced slightly more supervisor support than the usual care group. After 12 months of follow-up (chapter 7), we did not find intervention effects on any outcome; at-work productivity loss, work instability, pain, fatigue, and quality of life. Finally, chapter 8 describes the cost-effectiveness of our intervention. In total, average costs after 12 months of follow-up were highest in the intervention group compared to the control group. The main cost effectiveness and cost utility analyses show that the intervention was more expensive and less effective than usual care.

Design
We chose to evaluate our intervention with an RCT design. RCTs are generally perceived as the golden standard for evaluating interventions. A great advantage of the RCT design is that known and unknown prognostic factors are expected to be balanced over the intervention and control group. As described by Schelvis et al, conducting an RCT on a multi-component intervention in an occupational health setting is not always the most feasible option (9), especially when the intervention is evaluated within an organization (amongst others issues with randomization and context (10)). We feel however that an RCT design was feasible in our study. We included patients working in any employment or in self-employment, therefore, participants were working at many different employers and locations and hence, locations are not interdependent. Therefore, we avoided the risk of contamination between the intervention and control group among workers for the same employer, and for example a financial reduction of an employer is not likely to have affected our trial.

Randomization
A specific method for randomization is minimization. Minimization is based on weighed randomization to ensure treatment arms are balanced with respect to prognostic factors as well as for the number of patients in each group. Minimization has certain advantages over randomization. Minimization allows pre-stratification by multiple prognostic factors, even in small samples (11;12). This means that even in our small study sample (n=150), it is possible to stratify patients by multiple prognostic factors. This is an important advantage, since
small samples are prone to an imbalance between groups. One might argue though that minimization might not have been the best option to allocate patients to the intervention or control group. As described in chapter 3, not much is known up until now about prognostic factors for at-work productivity loss for patients with RA. Therefore, we chose to pre-stratify patients according to prognostic factors for work disability (i.e. gender, physically or mentally demanding work, and number of working hours). It is possible that these factors are no prognostic factors for at-work productivity loss, and with the knowledge we have now (chapter 3), it is likely that these factors were not the best prognostic factors for work functioning. As we showed, factors from the personal, external, and disease-related dimensions are related to at-work productivity loss, and we have not pre-stratified patients according to disease-related factors. By applying minimization, it is possible that we weighed the allocation on prognostic factors only minimally relevant, which might have caused other important unknown factors to be unbalanced between groups. In our baseline tables, we found relevant baseline differences on the outcomes at-work productivity loss, work instability and mental health. Although we corrected our effect analyses for baseline differences, it might have influenced our results. By minimising our participants, we might have created an imbalance between groups. Overall, we advise to apply minimization only when it is more evident which prognostic factors are important.

Participants
We chose to include a population which reflects the working RA population, and we only restricted inclusion based on limitations in work functioning. Although it has been pointed out in previous research that patients recently diagnosed are the most vulnerable for continuing work (13;14), a longer disease duration does not necessarily imply that patients do not experience difficulties in work functioning anymore. When patients manage to continue working after the first few years after disease onset, it is likely they were in a supportive environment in which they could adapt their work to their needs, to be able to continue working. This is likely to be related to the type of work. Heavy manual work is more difficult to adapt, and previous research has shown that manual work is a predictor for work disability (15;16). Also, worse scores on the Health Assessment Questionnaire (measuring functional limitations) predict permanent work disability as well as absenteeism (17-20). Therefore, we hypothesize that patients who are still working despite a longer disease duration are likely to have better HAQ scores, and typically mentally demanding work instead of physically demanding work. This is also called the ‘healthy worker effect’, which suggests that workers have a better health status than the general population because workers with a worse health are excluded from the workforce (21;22). In our sample, participants had relatively mild functional disability (HAQ score at baseline 0.79 (SD: 0.55)), and 66.7% had a mentally demanding job. This might have led to a ceiling effect on our primary outcome at-work productivity loss (23). To be able to show relevant improvements, it is needed to include
participants with poor work functioning, and this might be the case for patients recently after disease onset. The disease is not yet under control at that stage, and patients might not have adapted their workplace yet. Patients at an early disease stage might have more to gain from a workplace-related intervention. Although we feel patients with a long disease duration can still experience difficulties at work (as all participants indicated at baseline), it is more difficult to measure improvements in work functioning due the ceiling effect on the primary outcome. Participants might also have already adapted their work to their needs.

**Intervention**

The intervention we evaluated has been evaluated before in different populations with different outcome measures. In the study of Lambeek, it was shown that patients with low back pain receiving the intervention returned to work faster and more often than patients with low back pain receiving usual care (24;25). The intervention was also evaluated for patients sick listed due to distress. Overall, the intervention was not effective on return to work in this group. However, the workplace intervention significantly reduced time until return to work for patients who indicated at baseline that they intended to return to work despite symptoms (26;27). These previous evaluations concerned workers on sick leave. We evaluated the intervention for patients still working. This is an important difference in the purpose of the intervention. We might conclude here that we failed to show the effectiveness of the intervention to improve work productivity and prevent sick leave, and hence, the intervention might be less suitable for this prevention purpose. If we critically look at our intervention, this might be caused by the content of the participatory workplace intervention. The first step during the workplace visit of the occupational therapist, is to discuss barriers of the patient for work functioning. These barriers then form the starting point in formulating workplace adaptations. If a patient only has minor barriers for work functioning, this will then not lead to high-impact workplace adaptations. One might argue that the workplace intervention we evaluated is more suitable for workers with more severe barriers at the workplace. Only then, workplace adaptations can be implemented that thoroughly improve a work situation. If the current study population and the current purpose (improve at-work productivity) is maintained, an intervention with a different perspective is needed. First of all, it is questionable whether workers with only minor limitations in functioning are in need of such an intensive intervention. Furthermore, when there are hardly any limitations, these limitations should not be the starting point of the intervention.

Integrated care was a component of our intervention besides the participatory workplace intervention. Integrated care aims to improve communication between caregivers involved, and hence, come towards one treatment goal instead of giving conflicting advices to the patient (28). As shown in our process evaluation, integrated care was not implemented very well. There was not much communication between the caregivers involved. Communication efforts were not executed as prescribed by the intervention protocol. This leaves us with the question
regarding why our protocol was not executed as prescribed. One major barrier seems to be related to time. Busy schedules of medical specialists and paramedics make it difficult to plan moments for consultations, even by phone. We advise here to create standard time points in the schedules of the caregivers involved, to facilitate communication between the care givers.

Population in the usual care group
We compared our intervention to usual care, as provided in the participating treatment centers. Our treatment centers (Reade, department of rheumatology of the VU University medical Center, and the outpost of Reade) are specialized centers in the Netherlands. This might have implications for the patient population of these centers. First of all, the usual care as provided in these centers is likely to be academic or top clinical care when compared to regional treatment centers. Also, with the attention for work-related problems increasing, rheumatologists might include the topic ‘work’ in their consultations with a patient. There were also efforts to include this topic in consultations, such as Target@Work, an effort to implement a guideline concerning RA and work participation (29). Another implication of the participating treatment centers is that it is likely that our study population has a higher than average disease severity, which can be noticed by the large percentage of patients in our sample being treated with biological therapeutics (30).

Outcome
The primary outcome of our study was at-work productivity loss, which is also called presen­teeism. Presenteeism receives a lot of attention nowadays. The prevention of presenteeism is important considering sustainable employability (31). With the current developments in the labor market – an ageing population and hence older working population, an increasing retirement age, and with the age of workers increasing, also an increase in workers with health problems and chronic health conditions – it is vital to keep employees available for the labor market and to prevent presenteeism as much as possible (32;33).
Concerning RA, the large impact of presenteeism on total indirect costs has been emphasized (34;35). This leaves us with the question of how to measure presenteeism. In our study, we chose to use the Work Limitations Questionnaire (WLQ) (36), although many instruments are available. In a review on measurement properties of self-reported instruments to measure at-work productivity, studies on 15 different instruments were identified (37). Of these 15, the WLQ is the instrument which is most frequently evaluated according to this review. Evidence synthesis showed that the WLQ has good measurement properties, but responsiveness, which is very important in a trial, does not show good evidence. Responsiveness refers to the ability of an instrument to detect change over time in the construct to be measured (38). Two studies analyzed the responsiveness of the WLQ, and they found only moderate responsiveness (low correlation between change scores). The review authors cautiously recommend to use the WLQ for use in occupational health practice. We also chose to use
the WLQ to measure the primary outcome of our study. Up until now, the WLQ is the best measurement instrument to measure presenteeism, and furthermore, the WLQ has been validated among populations with arthritis (39;40). Although the WLQ is up until now the best available instrument to measure presenteeism, we should remain critical concerning how to measure presenteeism (41). Furthermore, it is important that researchers continue with validation studies of these measurement instruments in order to get a more complete view on their measurement properties.

Summary of main points
There are several indicators for why our intervention was not found to be effective. First of all, our process evaluation showed that the implementation of the intervention, especially integrated care, was not implemented as intended. Furthermore, the inclusion criteria for patients in the RCT and the purpose of the intervention might not fully match. If the aim is to support workers with only minor barriers at the workplace, a workplace intervention which intends to reduce these barriers might not be the best option. On the other hand, if the current intervention is maintained, a study population with more severe barriers at the workplace might be more relevant.

Implications
Although our study showed that the workplace integrated care intervention was not effective on decreasing at-work productivity loss, it provides several implications for future research, as well as implications for practice. Both will be described below.

Implications for research
There is up until now no consensus concerning how to measure presenteeism. It is important that researchers pursue on validation studies of measurement instruments in order to get a more complete overview of measurement properties of these instruments, and hence be able to make an informed decision about which measurement instrument to use. We recommend to adapt the intervention to the needs of the patient. We suggest to conduct a qualitative study before implementing an intervention to investigate the needs of patients, and also to investigate which patients are in need of a workplace intervention. For example, when the study population is only limited in work functioning, patients could be asked if they are really in need of workplace adaptations. They might have more to gain from for example education about how to communicate about their disease with their supervisor and coworkers, or training in how to maintain a healthy balance between work and private life. If such a qualitative study is to be conducted, it might also be helpful to involve the supervisor and caregiver, in order to get a complete overview of the needs to maintain work productivity, and to adapt an intervention to this specific purpose.
When performing a process evaluation, we suggest to add qualitative data to the evaluation. Qualitative data can profoundly add relevant information, especially concerning reasons why certain intervention aspects did not work out that well. We furthermore suggest to link outcomes of a process evaluation to outcomes of a study, in other words, are implementation flaws related to the outcomes? We suggest to proceed on research to determine predictors for at-work productivity loss by making use of longitudinal data, in order to proceed on the knowledge regarding this topic.

**Implications for practice**

As shown in our review, workplace interventions are effective for workers on sick-leave due to musculoskeletal disorders. We therefore suggest to apply workplace interventions for workers with musculoskeletal disorders if the goal is to return them back to work. We found that at-work productivity loss is associated with reduced quality of life. Previous research has furthermore shown the association between work disability and reduced quality of life. Therefore, for physicians, it is important to acknowledge the importance of work for his/ her patients. We suggest to incorporate the topic ‘work’ in consultations with the patient.

We showed that at-work productivity loss is associated with disease-related factors, personal factors, and environmental factors. When a patient with RA experiences difficulties in functioning at work, it is important physicians look at other factors in addition to disease-related factors. An improvement in disease-related factors alone might not be enough to improve the work functioning of a patient.

In our process evaluation, we found that the implementation of integrated care was not very successful. Communication between medical specialists and paramedics was not achieved as intended. We suggest to include time points for communication with other caregivers in the day-to-day schedules of physicians. This will likely facilitate actual communication about treatment goals between the different care givers involved; which has the potential to improve care.

We also found in our process evaluation that the intervention was not delivered to the extent we aimed for. Especially for integrated care, a large number of patients did not receive the evaluation meetings. Furthermore, only 81.3% of the participants received the intake of the intervention. Any reason for the fact that the intervention was delivered too few should be addressed, whether this was due to for example administrative issues, or omissions in the study protocol.
Participants in the intervention indicated that they were satisfied with the intervention, despite the fact that its effectiveness could not be established. This suggests a gap in usual care concerning the involvement of the topic work. Even when an RA patient is still working, there can be obstacles at work, and these need to be addressed. For a patient, it would be helpful if caregivers could assist to dissolve these obstacles.

Conclusion
This thesis showed that a workplace intervention is effective to return workers with musculoskeletal disorders back to work. We furthermore showed that an intervention, consisting of integrated care and a participatory workplace intervention, was not an effective intervention to improve at-work productivity loss in a group of patients with rheumatoid arthritis. The intervention did not improve quality of life, pain, fatigue, and work instability, although the intervention was effective to improve supervisor support after 6 months of follow-up. The intervention was not implemented as planned. These findings make clear that it is not recommended to implement the intervention in its current form for this target group of working RA patients with relatively mild work limitations. We do however emphasize that at-work productivity loss is a very important aspect during the work life of patients with RA, and although not easily observable (while absenteeism shows up in registries of the company and coworkers see you are not at the workplace, this is not the case in the occurrence of presenteeism), most patients experience at-work productivity loss. We therefore urge researchers to proceed on studies to support workers with RA to maintain their work functioning.
Reference List


Chapter 9


(28) Anema JR, Van Der Giezen AM. [Little communication between company doctors and private physicians with respect to hindrances to return to work after prolonged absence from work because of low back pain]. Ned Tijdschr Geneeskd 1999; 143(11):572-5.

(29) Target@Work: Praktijktest implementatie richtlijn reumatoide artritis en participatie in arbeid. 2014. Amersfoort, Centrum Werk Gezondheid.


