Summary
Healthcare workers are at risk for developing hand eczema as they are exposed to irritants during their work. Hand eczema is a problem for this particular group because it has a profound effect on their quality of life. Also, hand eczema is associated with high costs for society in terms of absenteeism, presenteeism, and medical costs. For healthcare workers, hand eczema also has consequences in the form of infection prevention within the hospitals they work. Healthcare workers with hand eczema have more bacteria on their hands and tend to disinfect their hands less often. Considering the aforementioned arguments, prevention of hand eczema among healthcare workers is needed. In the Netherlands, a guideline to prevent hand eczema was distributed among occupational physicians by the Netherlands Society of Occupational Medicine (NVAB). The recommendations from this guideline are as follows:

1. Use disinfectant instead of water and soap when the hands are not visibly dirty.
2. Avoid contact with water and soap by using gloves.
3. When wearing gloves longer than 10 minutes, wear cotton under gloves as well.
4. Use a moisturizer on a daily basis, at least 6 times a day.

Unfortunately, it is difficult for healthcare workers to comply with these recommendations. In addition, many new guidelines are not implemented into the daily practice of healthcare. Therefore, an implementation strategy is needed to encourage the use of these recommendations among healthcare workers in the Netherlands (chapter 1).

The objectives of this thesis were:

1. To develop a multifaceted implementation strategy to prevent hand eczema among healthcare workers in the Netherlands;
2. To investigate the prevalence of hand eczema among healthcare workers in the Netherlands, and the productivity losses associated with hand eczema;
3. To identify barriers and facilitators for the use of the multifaceted implementation strategy and the implementation of the NVAB guideline in a healthcare setting;
4. To evaluate the (cost) effectiveness of a multifaceted implementation strategy to prevent hand eczema among healthcare workers in the Netherlands

OBJECTIVE 1: DEVELOPMENT OF A MULTIFACETED IMPLEMENTATION STRATEGY

In chapter 2, the design of the Hands4U study was described. A multifaceted implementation strategy was developed based on the literature. This strategy consisted of: 1) education on (the prevention of) hand eczema 2) participatory working groups, 3) role models, 4) reminders (posters), and 5) a leaflet containing the recommendations for the prevention of hand eczema. The control group also received the aforementioned leaflet. The participatory working groups identified obstacles with the compliance to the recommendations for the prevention of hand eczema, found solutions for these barriers and
implemented the solutions within their department. The role models encouraged their colleagues to use the recommendations. The multifaceted implementation strategy was guided by a trained nurse.

The multifaceted implementation strategy was evaluated in a clustered randomized controlled trial. Randomization was performed at department-level. Departments where workers were exposed to irritants were invited to participate in the trial. The primary outcome measure was self-reported hand eczema. Secondary outcome measures were symptoms related to hand eczema, behaviour related to the prevention of hand eczema, knowledge of the prevention of hand eczema, awareness, and behavioural determinants. All outcome measures were assessed by means of a questionnaire, which was distributed at baseline, and after 3, 6, 9, and 12 months of follow-up.

OBJECTIVE 2: PREVALENCE OF HAND ECZEMA AND PRODUCTIVITY LOSSES RELATED TO HAND ECZEMA

In chapter 3, the prevalence of hand eczema, and related absenteeism and presenteeism (productivity losses at work), were assessed for healthcare professionals (healthcare workers with patient-related tasks). Of the 1232 healthcare professionals, 12% reported to have had hand eczema in the last year. In addition, 47% reported symptoms related to hand eczema in the last three months. Sick leave resulting from hand eczema was reported by 1.7% of the healthcare professionals with hand eczema. Of the healthcare professionals suffering from hand eczema, 22% went to work while having hand eczema, for more than 30 days in the last 3 months. These healthcare professionals reported only a minor influence on presenteeism.

Compared to other studies that were conducted among healthcare professionals, the prevalence of hand eczema and related absenteeism was low, but the prevalence of symptoms was high. This led to the conclusion that workers might not be aware of certain symptoms related to hand eczema, and therefore they do not report it. Further, hand eczema seems to have little impact on work in terms of presenteeism. However, healthcare professionals going to work while having hand eczema might pose a risk for infection within their department, as healthcare professionals with hand eczema tend to comply less with the rules for infection prevention, and they have more bacteria on their hands.

OBJECTIVE 3: BARRIERS AND FACILITATORS FOR THE MULTIFACETED IMPLEMENTATION STRATEGY AND THE NVAB GUIDELINE

The process evaluation of the multifaceted implementation strategy was presented in chapter 4. Of the 876 participants in the intervention group, 558 were invited to participate in the process evaluation. The model by Linnan and Steckler was used as a theoretical model. A trained nurse delivered almost all
the working group meetings and education sessions at the departments with a high fidelity to the intervention protocol. The working group members prioritized 104 solutions, of which 87 were implemented within the departments. Solutions regarding the use of a moisturizer were used by 91% of participants, while for the cotton under gloves solutions, only 31% used them. Of all participants, less than 40% actively engaged with the role models. 52% of participants went to the education session, and 78% had seen the reminders. In conclusion, the multifaceted implementation strategy seems a feasible strategy for a healthcare setting, as it was executed according to protocol, and most of the solutions were implemented well. The strategy could be improved by making the role models more influential, by enlarging the reach of the education sessions, and by finding other ways to implement wearing cotton under gloves.

Chapter 5 discussed barriers and facilitators for the implementation of the recommendations to prevent hand eczema. A qualitative study was performed in which 19 working group members were interviewed. Barriers and facilitators were derived from the interviews and were classified according to the recommendations for the prevention of hand eczema, or they were classified as referring to the guideline as a whole. For the separate recommendations, barriers and facilitators were mainly identified at the level of the innovation itself (e.g. the recommendations). These barriers and facilitators were mostly related to the concept of compatibility – the degree to which the recommendations are perceived as being consistent with the work healthcare workers have to perform. For the guideline as a whole, barriers and facilitators were also identified at levels other than innovation (socio-political (patients, rules/regulation), organization (department), user (healthcare worker), facilities (i.e. time, resources)).

To enhance the implementation of recommendations for the prevention of hand eczema in a healthcare setting, having knowledge about these recommendations seems to be an important first step. In addition, maintaining attention for the subject, testing the products beforehand, and a close collaboration with the infection control department, might enhance implementation. Further, it is important that the recommendations fit in with the work of the healthcare workers. When preparing the implementation of the recommendations, these points should be taken into account.

What role models perceived to be as their main tasks, and barriers and facilitators related to these tasks, were explored in chapter 6. By means of semi-structured interviews, 19 role models were interviewed. The role models considered the following as their main tasks: raising and maintaining awareness for the prevention of hand eczema, transferring information to their colleagues, interacting with colleagues, providing materials, and performing coordinating tasks. Barriers and facilitators that were mentioned in relation to the performing of their tasks as a role model were: whether the role suited the role model, (not) having affinity with the topic, support/resistance from colleagues, and risk perception within their department. Recommendations to improve the role model component in the multifaceted implementation strategy would be to select role models by taking into account previous coaching experience, and by adding training on how to deal with resistance from colleagues.
OBJECTIVE 4: (COST) EFFECTIVENESS OF THE MULTIFACETED IMPLEMENTATION STRATEGY

In chapter 7, the effects of the multifaceted strategy on behaviour and behavioural determinants after 6 months were presented, and in chapter 8 the effects on hand eczema and behaviour after 12 months were described. The NOSQ-2002 was used to assess hand eczema prevalence and behaviour related to hand eczema prevention in the past 3 months. A symptom-based questionnaire was used to assess symptoms related to hand eczema. Behavioural determinants were measured by means of the ASE model (attitude, social influence, self-efficacy, and intention). In addition, knowledge on the prevention of hand eczema, and awareness for hand eczema, were assessed. Questionnaires were filled out at baseline, and at 3, 6, 9, and 12 months follow-up. In total, 1649 participants were included in the Hands4U study: 773 in the control group and 876 in the intervention group. After six months, the response rate was 65%, and after 12 months the response rate was 66%. No statistically significant effects were found for the behavioural determinants at the 6 month follow-up. The intervention group scored 0.74 points higher than the control group on knowledge after 6 months (95% CI 0.54; 0.95) and showed an effect on awareness (OR 6.3; 95% CI 3.4; 11.6). After 12 months, the intervention group reported a lower frequency of hand washing (B: -0.38; 95% CI -0.48; -0.27), more frequent use of a moisturizer (B: 0.30; 95% CI 0.22; 0.39), and the intervention group was 6.3 times more likely (95% CI 3.2; 12.4) to report wearing cotton under gloves compared to the control group. No statically significant effects were found – both after 6 months and 12 months – for other types of behaviour (use of disinfectant, performing wet work, wearing gloves, use of body lotion, wearing jewellery). The intervention group was significantly more likely to report hand eczema (OR: 1.45; 95% CI 1.03; 2.04) and hand eczema symptoms (OR: 1.31; 95% CI 1.06; 1.61) 12 months after baseline compared to the control group. In chapter 7, we discussed the finding that no effect was found on the behavioural determinants, but that we did find an effect on preventive behaviour. The behavioural determinants, attitude, social influence, and self-efficacy, influence the intention to perform the desired behaviour, in this case preventive behaviour in relation to hand eczema. The intention to perform the behaviour is the strongest predictor for actually performing the behaviour. Therefore, an explanation for this finding could be that the intention to perform the behaviour was already high at baseline. As a result, the multifaceted implementation strategy might have reduced barriers that stood between the intention to perform the behaviour and the behaviour itself. In chapter 8, we formulated a hypothesis for the negative effect on hand eczema (symptoms) following the multifaceted implementation strategy. This might be explained by an increased awareness for hand eczema (symptoms) in the intervention group in combination with self-reported outcome measures following the education session. More research is needed to investigate these unexpected effects on hand eczema. At the end of both chapters, we recommended employing the multifaceted implementation strategy in practice, as it was effective in implementing the recommendations for the prevention of hand eczema.

The cost-effectiveness and financial return on investments of the multifaceted implementation strategy were discussed in chapter 9 from both a societal and the employer’s perspective. Data on hand eczema and costs were collected at baseline, and after 3, 6, 9, and 12 months of follow-up. Data on compliance
with the NVAB guideline were collected at baseline, and after 6 and 12 months of follow-up. Costs data consisted of costs for medical consumption, absenteeism, presenteeism, and intervention costs. For hand eczema, the multifaceted implementation strategy appeared not to be cost-effective. Using the employer’s perspective and/or the compliance measure instead of hand eczema showed more or less the same results. Further, cost benefit analyses showed that the investments for the employer were larger than the benefits. As a result, the further implementation of the multifaceted implementation strategy and its use in relation to the prevention of hand eczema cannot be recommended.

In chapter 10, the results of this thesis are summarized, discussed, and recommendations are given for research and practice. The overall conclusion of this thesis is that the multifaceted implementation strategy is a feasible strategy to use in a healthcare setting and is effective in implementing the NVAB guideline for the prevention of hand eczema. However, following the unexpected results on hand eczema and the strategy not being cost-effective, further implementation of the multifaceted implementation strategy cannot be recommended. Future research should focus on developing new implementation strategies for the prevention of hand eczema, the use of self-reported outcome measures, and investigating whether self-reported health complaints – like hand eczema – are influenced by an increased awareness for these complaints following an intervention.