ENGLISH SUMMARY

The current economic climate and the restricted healthcare budgets necessitate brief hospitalization as a method of minimizing direct healthcare costs. However, indirect costs associated with productivity loss following surgery may contribute to total societal costs associated with surgical care even more. In addition, despite all revolutionary progress in surgical care in the last decades, length of recovery after surgery has not declined accordingly.

This thesis describes the different aspects of an internet-based perioperative care programme aimed at improving perioperative care following gynaecological surgery, in order to prevent unnecessary delayed postoperative recovery and minimize societal costs associated with prolonged sick leave and increased health care utilization after surgery. The aim of this thesis was to contribute to the development of a sound evidence base on post-operative recovery following gynaecological surgery and interventions facilitating the return to pre-operative levels of activity and participation.

Chapter 1 provides a general introduction and describes the outline of the thesis. First, we illustrated that the two most important underlying factors that contribute to current unnecessary prolonged convalescence include the transition of care from the hospital towards the home environment, leaving much of the recovery phase to occur outside the monitored hospital, as well as the lack of standardized perioperative education, leaving the patient unprepared for their own recovery trajectory. Second, we explained that preventing unnecessary prolonged postoperative recovery is not only beneficial to the individual patient, but has also great implications for society as a whole. At last, we described the work of our research group on which the current thesis was build. Previously, a multidisciplinary care programme was developed, consisting of an eHealth intervention and, for those patients at risk of prolonged sick leave, an occupational intervention. The conceptual framework for this care programme includes the hypothesis that unnecessary delayed postoperative recovery can be prevented through the mechanisms of:

1. providing personalised guidance throughout the entire surgical pathway from the early preoperative phase, starting from the moment the indication for surgery is set, until the late postoperative phase, ending with full recovery and resumption of all daily activities, including work;
2. promoting appropriate recovery expectations by providing tailored convalescence advice;
3. facilitating self-management.
Proof of concept of this previously developed Internet-based care programme was demonstrated in an efficacy randomized controlled trial (RCT). Exposure to the care programme led to improved return to work rates in the intervention group compared with the control group. Chapter 2 presents the results of a process evaluation which was conducted alongside that RCT. Compliance, perceived effectiveness and satisfaction were high among patients. In addition, other stakeholders such as gynaecologists and employers assessed the intervention as potentially very useful. Notwithstanding, external validity was low due to strict guidance of patients and professionals by the research team in order to avoid protocol deviations. The results of this process evaluation were used in order to make several improvements to the care programme to facilitate implementation in real practice.

Chapter 3 presents the protocol that was designed to evaluate both the effectiveness and cost-effectiveness of the adapted perioperative care programme. A stepped stepped-wedge cluster-randomized controlled trial was employed, which involved a sequential rollout of the intervention in the participating clusters over several time periods, until all clusters received the intervention eventually. This design was advantageous as it was not obligatory for the participating hospitals to withdraw the intervention at the end of the trial. In addition, it enabled us to study the implementation process itself.

Eligible for this study were employed women, 18-65 years of age, who were scheduled for hysterectomy and/or laparoscopic adnexal surgery. The power calculation demonstrated that at least 454 participants had to be included. Depending on the implementation phase of their hospital, patients were allocated to usual care or the Internet-based care programme. The primary outcome was the duration until full sustainable return to work. The secondary outcomes included general recovery, recovery-specific quality of life, self-efficacy, coping, and pain. The data were collected by means of self-reported electronic questionnaires before surgery and at 2, 6, 12, 26, and 52 weeks after surgery. Sick leave and cost data were measured by monthly sick leave calendars, and cost diaries during the 12-month follow-up period. The economic evaluation was performed from the societal perspective.

The results of the stepped stepped-wedge cluster-randomized controlled trial are revealed in Chapter 4. In total, 433 women were included of which 206 women received usual care and 227 women were exposed to the Internet-based care programme. Median time until RTW was 49 days (interquartile range (IQR) 27–76) in the intervention group and 62 days (IQR 42–85) in the control group. The proportional hazard hypothesis was tested and rejected as the time-dependent covariate for group was highly significant (P=0.001). Therefore, a piecewise Cox model was fitted taking into account the non-proportionality of hazards by creating two different time intervals. In the first 85 days after surgery, patients receiving the
intervention returned to work faster than patients in the control group (hazard ratio (HR) 2.66, 95% confidence interval (CI) 1.88 to 3.77), but this effect was reversed in the small group of patients that did not reach RTW within this period (0.28, 0.17 to 0.46).

Patients in the intervention group scored slightly better on the secondary outcomes recovery-specific quality of life and pain at two weeks following surgery. The differences disappeared with longer follow-up and are probably not of any clinical relevance. Indicators showed that the implementation of the care programme was most successful at the level of the patient (82.8%) and the professional (81.7%).

Based on the results presented in this chapter we concluded that the implementation of an Internet-based care programme has a large potential to lead to accelerated recovery and improved RTW rates following different types of gynaecological surgery.

Chapter 5 describes the results of the cost-effectiveness study that was performed alongside the stepped-wedge cluster-randomized controlled trial. At 12 months, there were no statistically significant differences in total societal costs (€−647; 95% CI €−2116 to €753). However, the incremental cost-effectiveness ratio (ICER) for RTW was 56, indicating that each day earlier RTW in the intervention group was associated with cost savings of €56 compared with usual care. The probability of the intervention being cost-effective was 0.79 at a willingness-to-pay (WTP) of €0 per day earlier RTW, which increased to 0.97 at a WTP of €76 per day earlier RTW.

Taking into account that on average the costs of a day of sickness absence are €230, we considered the care programme to be cost-effective in comparison with usual care for duration until sustainable RTW after gynaecological surgery for benign disease. A latent barrier to future acceptance and implementation of the care programme lies in the fact that the costs and benefits of the care programme are separated between different types of stakeholders.

In chapter 6 we investigated if the prospective recovery data collected in the two previous trials could be used to verify the adequacy of an earlier developed expert-based guideline on convalescence recommendations. In order to do so, we calculated median recovery times for ten daily activities (sitting, standing, walking, climbing stairs, bending, lifting, driving, cycling, household chores, sport activities and RTW) and compared these to the recovery times recommended by an expert panel. Convalescence recommendations were considered correct when at least 25% and less than 50% of the women were able to resume an activity before or at the recommended recovery time.
Recovery data were available of 304 patients with a median length of follow-up was 12 weeks (IQR: 6–12 weeks). There was a wide variation in the duration until the resumption of daily activities within and between groups of patients undergoing different types of surgery. For the majority of activities actual recovery times exceeded the recovery time recommended by the expert panel. Yet, recovery times lengthened with increasing levels of physical burden of the daily activities as well as with increasing levels of invasiveness of the procedures, conform the algorithm of the expert-based convalescence guideline. The convalescence guideline seemed more accurate for patients undergoing more complex surgery than patients undergoing minimal invasive surgeries, as the recommendations in the latter group were often too strenuous.

With the data from this study we were then able to optimize the developed expert-based guideline on convalescence recommendations. Ultimately, the collection of detailed recovery data leads to advanced tailored convalescence advice, also taking into account individual patient characteristics such as age and the presence of any co-morbidity, as well as environmental factors such as specific job demands.

Chapter 7 describes the results from a survey study which was conducted in preparation of adapting the eHealth intervention to a different patient population undergoing other types of surgery. The objective of the study was to evaluate patients’ opinions, needs and preferences regarding the information and guidance provided to them during the perioperative period and to investigate whether eHealth may be of assistance in this.

Patients who underwent various forms of abdominal surgery in a one-year period were invited to complete a questionnaire about this topic. In total 207 participants completed the questionnaire. Although most participants reported that they had received some basic information about the surgical procedure and the recovery process, more than half of the participants searched the Internet for additional information. Most reported shortcomings included the absence of detailed information about the resumption of (work) activities as well as the inconsistency between advice received by different healthcare professionals involved in the recovery process. A majority (78%) of the participants expected an e-health program to be helpful during the recovery process. A website was assessed as most useful, followed by a mobile phone application. In particular practical functions focusing on the preparation for surgery and monitoring after surgery were expected to be valuable. The majority of patients opposed the option to replace the standard postoperative consult by an eConsult, since they preferred a personal contact with their surgeon.

Chapter 8 presents a systematic review that was conducted to summarize and critically appraise the current evidence on the effectiveness of perioperative strategies that facilitate
the return to preoperative levels of activity and participation. A total of 41 unique studies were included. Most studies were performed in the field of cardiology (n=11), orthopaedics (n=10) and gynaecology (n=9). To assess the content of the included interventions four different domains were identified which could be targeted: knowledge increase, behaviour modification, psychosocial guidance and organization optimization. The majority of interventions targeted more than one domain.

Outcomes included outcome measures assessing the return to preoperative levels of activity and participation. Twenty-four studies (58.5%) reported at least a positive effect of the intervention compared to usual care. Due to the substantial heterogeneity in perioperative interventions there was insufficient data to identify an optimum programme. Notwithstanding, a multimodal approach is likely to have better impact on functional outcomes compared to single modality.

In chapter 9 the main findings of this thesis are presented, methodological considerations of the studies are discussed and the results of this thesis are put in broader perspective in the context of the available literature. Finally, a number of key features at the level of the patient, the health professional as well as the organisation of healthcare are listed that are associated with the future implementation of our intervention and determine the degree of success of implementation.

In conclusion, the present thesis demonstrated that postoperative recovery in gynaecological patients can be enhanced by improving recovery expectations and facilitating self-management through an internet-based perioperative care programme. This care programme is an example of an initiative leading to value-based healthcare: by optimizing perioperative care, patients can benefit from innovative minimal invasive surgical approaches and society as a whole can benefit through reduced healthcare utilization and minimal productivity-loss costs.