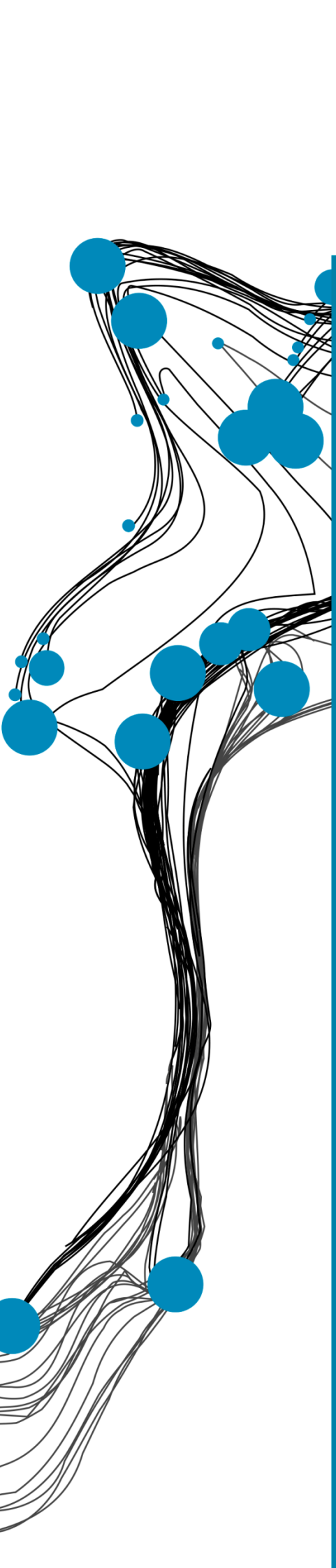

Assessing and Comparing the Quality of Wound Centres

MASTER THESIS

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Preface

This report is the result of the master thesis project of the master Health Sciences. The first chapter includes the article which is written in response to the research. The second chapter shows the results of the benchmark study, which was a part of the study. The third chapter represents an example of report that is distributed to the participants of the benchmark study. In the appendix an extended method is provided.

I would like to thank my supervisors Wim van Harten en Anke Wind for sharing their knowledge and experiences with me during the master thesis project. Their critical view and feedback were helpful to improve my research.

During the research, enthusiasm from the wound care field overwhelmed me. Wound nurses, specialists and managers were passionate about their job and for patients. This makes doing research in this field fascinating. I want to thank all participants who have taken time to support my research. A particular thanks to Inge Huigen, for her broad vision, her motivation and the valuable discussions.

Last, I want to thank my family, friends, and Bas for their support during studying the Master Health Sciences. I would like to thank my classmates, especially Marian, Jorieke, Max en Hany for their feedback and the nice time during the master Health Sciences.

Lotte Pruim

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1. Assessing and Comparing the Quality of Wound Centres

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Abstract

Multidisciplinary wound centres are currently facing an increase in both the incidence of wounds and the complexity of care. This has resulted in rising healthcare costs and an increase in ineffective treatments. Little evidence is available regarding optimal wound centre organization and effectiveness; thereby, measuring the quality of wound centres has become more important. This study aims to assess the evidence concerning quality by describing the state of the art of wound centres and organizational effectiveness, by developing indicators of quality and by assessing their suitability in a pilot study. A multi-method approach was used: the literature review performed resulted in the development of an indicator list subjected to expert review, and a benchmark study was completed comparing eight wound centres in the Netherlands. We provide a description of the relevant state-of-the-art aspects of wound centre organisation, which were multidisciplinary collaborations and standardization of the organization of care. Significant effectiveness was observed in improved healing rates and decreased costs. Forty-eight indicators were developed. The indicator list was tested by a benchmark study; however, outcome indicators were difficult to identify. Six indicators regarding structure, three regarding process, and five regarding outcome were identified, to measure and improve quality of wound centres.

Keywords
Benchmark, effectiveness, literature review, multidisciplinary, wound care

Key messages

- Organizing wound care through wound centres contributes to effectiveness; however, the quality of evidence supporting this is weak.
- We present a literature review describing the state of the art and effectiveness of wound centres.
- The state of the art of wound centres is characterized by multidisciplinary collaboration and standardization.
- The evidence of effectiveness, expressed by improved healing rates and lower costs, is limited.
- We developed 25 structure, 17 process and 6 outcome-related indicators.
- We performed a benchmark study in eight wound centres, where the indicators were tested. We identified little benefit from using the outcome indicators.
- After performing the pilot study testing all indicators, a final set of 14 indicators is recommended.

Introduction

The number of wound patients is increasing as a result of the ageing population and the increasing incidence of chronic conditions such as diabetes mellitus and cardiovascular disease (1,2). Currently, the prevalence of patients with complex wounds in developed countries is 2%, and is higher among the elderly (3,4). As a result, wound care-related costs involved are increasing. The overall costs of chronic wound care in the UK were estimated at US$3.0 billion per a year, and between US$6 billion and US$15 billion per year in the US (5,6). In Australia and Scandinavian countries, wound care costs form 2-4% of total healthcare expenses (7,8).

Additionally, the care provided for wound patients is complex. This is firstly due to the multiple aetiologies of wounds and to factors such as comorbidities, which influences the healing of wounds (9,10). Secondly, complexity increases due to treatment variation by the various integrated care relationships. In addition, patients require a personalized treatment strategy involving education and the provision of information (11–13). This complexity results in ineffective treatments, and patients experience chronic negative consequences such as pain, unpleasant odours and mobility problems that can negatively influence their social life (14).

Wound Expertise Centres are a current development that aims to deal with the increasing number of wound patients, the increasing costs, and the complexity of wound care. Wound Expertise Centres, also named specialized wound clinics, hospital-based wound centres, community-based wound clinics, or outpatient wound clinics (hereafter referred to as "wound centres"), are characterized by a multidisciplinary collaboration between providers involved in integrated wound care, such as medical and surgical specialities in clinical care, outpatient departments, home care providers, and General Practitioners (GPs) (15–23). Wound centres provide appropriate, evidence-based, comprehensive wound care pathways for all type of wounds, by concentrating care and expertise (16–20,22–24). During recent years, the number of wound centres has greatly increased, which has made it appear to be a successful measure (15,16,19,25).

However, evidence of this success is limited (26). In the literature, only one review from 2006 has reported on wound centres. However, proof of success such as high quality care is becoming increasingly important. Quality should be measured by transparency, responsibility and regulation, and show the level of quality provided, stimulate improvement and compare performance (27).

Through an up-to-date literature-based study, we aim to review the available evidence of the state of the art of wound centres. Furthermore, we aim to establish the effectiveness of wound centres by a review of the literature, to determine the added value of this type of service. Through this review, we aim to develop indicators to assess the quality and especially the effectiveness of wound centres in practice. We will then test these indicators in a pilot study, with the aim of assessing their suitability.

Overall, this study aims to add to the existing evidence regarding the organization of wound care by wound centres, in order to improve the quality of wound care.

Methods

Study design

In this study a mixed-method approach was used that included a literature review, the development of indicators, and a benchmark study. In order to accomplish this, we contacted eight wound centres located in large teaching and general hospitals in the Netherlands.

Literature review

Through a review of the literature, we aimed to gain an insight into the state of the art and effectiveness of wound centres, and retrieve indicators for quality. In the initial search of the literature, we applied search terms which covered a long period of time. We identified few empirical studies and a large number of evaluation studies, the majority of which were focussed on techniques and wound treatments. Consequently, we performed a search in which we excluded papers published prior to 2011. Since there is no officially-recognised nomenclature for this type of wound service, experts in the wound care field were asked to provide suggestions of relevant terms.

In order to avoid the accidental exclusion of any relevant studies, broad search terms were used. The search terms employed, which are adaptable to all databases, were: (wond OR wound OR ulcer OR diabetic) AND (centre OR center OR centrum OR clinic OR community OR service) AND (safety OR equit* OR effectiv* or efficien* OR timel* OR "patient centred*"). We included studies that reported empirical data only.

Data analyses were performed by the first researcher, who screened all studies on title and abstract. Studies that did not meet the inclusion criteria were excluded. The full text of the included studies was reviewed. Studies that focused on one type of wound or which did not report the structure, process or outcome of a wound centre were excluded. As few articles remained after full-text reading, we applied the snowballing technique. No time limitation was applied in order to identify value-added articles about organizing wound centres and quality. The remaining included studies were read by the first author, who highlighted important factors to describe the state of the art and effectiveness of wound centres. To ensure inter-rater reliability, the results were checked by the third author, who selected 90% of the same studies on title and abstract as the first author.

Indicator list and benchmark

We then retrieved indicators from the literature review, with the aim of assessing and comparing the quality of wound centres in practice. The indicators were subjected to an initial test involving benchmarking the indicators in a pilot setting. The first 11 steps of the 13 steps used for benchmarking, as developed by van Lent, were used (28). Table 1 shows the steps by van Lent and the application of these steps in this study. Step 12 and step 13 were not included due to the limited resources to execute the total process; however suggestions for improvement plan were given. Nine Dutch hospitals were invited to participate, of which eight agreed. For comparability, only large teaching and general hospitals were invited to participate. These hospitals were randomly selected. Three of the centres had existed for less than one year.

Nevertheless, these were included in order to reflect the reality of the current composition of wound centres. After defining the main characteristics, we identified the internal stakeholders; these were the medical specialties and staff involved in wound centres and the management of these centres.

Indicators

To structure the indicators (step 6 of benchmarking steps by van Lent), we selected the six domains of quality of the Institute of Medicine (29). Furthermore, indicators were divided into structure, process and outcome, and were then interrelated. For instance, a good

Table 1 - Benchmarking steps developed by van Lent (28)

13 steps by van Lent	**Application of the steps in this study**
1 Determine what to benchmark	Test indicators that measure the quality of wound centres
2 Form a benchmarking team	The authors of this article
3 Choose benchmarking partners	External partners participating: eight wound centres, called "wound expertise centres", located in large teaching and general hospitals located in the Netherlands
4 Define and verify the main characteristics of the partners	Wound centres are described by the characteristics of the hospital: the type of hospital, number of 1e outpatient visits, number of open DBCs, number of employees, total expenditure in Euros, and the medical discipline of the wound centre
5 Identify stakeholders	Involved medical specialties, such as vascular surgeons, dermatologists, plastic surgeons and nurse practitioners, wound nurses, managers of wound centres, other involved providers in the wound pathway, and the executive board of the hospital
6 Construct a framework to structure the indicators	The framework is based on the six domains of quality of the Institute of Medicine: safe, effective, efficient, timely, patient-centred and equitable, and Donabedian's structure, process and outcome indicators (29,30)
7 Develop relevant and comparable indicators	Indicators were retrieved from the literature review and the guidelines discussing wound care. Possible indicators were gathered by subject, compared for relevance, frequency of mention in the studies, specificity and measurability
8 Stakeholders select indicators	Indicators were presented to a dermatologist, managers of the wound centres, specialist nurses and indicator experts. After processing their feedback, the final set of indicators was established
9 Measure the set of performance indicators	During two months, wound centres were given the opportunity to report indicators. During this period, the first author visited the wound centres to answer questions and resolve difficulties with completing the indicators
10 Analyse performance indicators	The first reviewer compared the performance of wound centres and the indicators were analysed on suitability, relevance and usability.
11 Take action: results are presented in a report and recommendations are given	For each participating wound centre, a report was made containing the outcomes of the benchmark and recommendations for improving the wound centre
12 Develop relevant plans	Outside the scope of this study
13 Implement the improvement plans	Outside the scope of this study

structure, resulting in a good process, results in a good care outcome. The structure and process indicators assisted in clarifying the findings from the outcome indicators (30).

Indicators were developed using input from the literature and guidelines concerning wound care. The author used Google search engine to identify suitable guidelines provided that they entail information about more than one type of wound and be published in Western countries. Table 3 shows the characteristics of these guidelines. The remaining indicators were discussed with the stakeholders and indicator experts. The final set of indicators was then established. This set of performance indicators compares and assesses the quality of wound centres and also assesses the reliability and usability of the indicators.

Pilot study

During the benchmark study, the final set of indicators was sent to all wound centres. The first author visited the centres to resolve issues and gather additional data relevant to the analysis of the performance indicators. The data from the centres were validated by an additional check of the data submitted by the centres. After gathering data, indicators were analysed for suitability, relevance and usability. The performance of the centres was compared. This resulted in a final set of indicators and in the identification of eight documents reporting centre performance.

Results

A total of 7643 studies were identified using three different databases. Fourteen studies

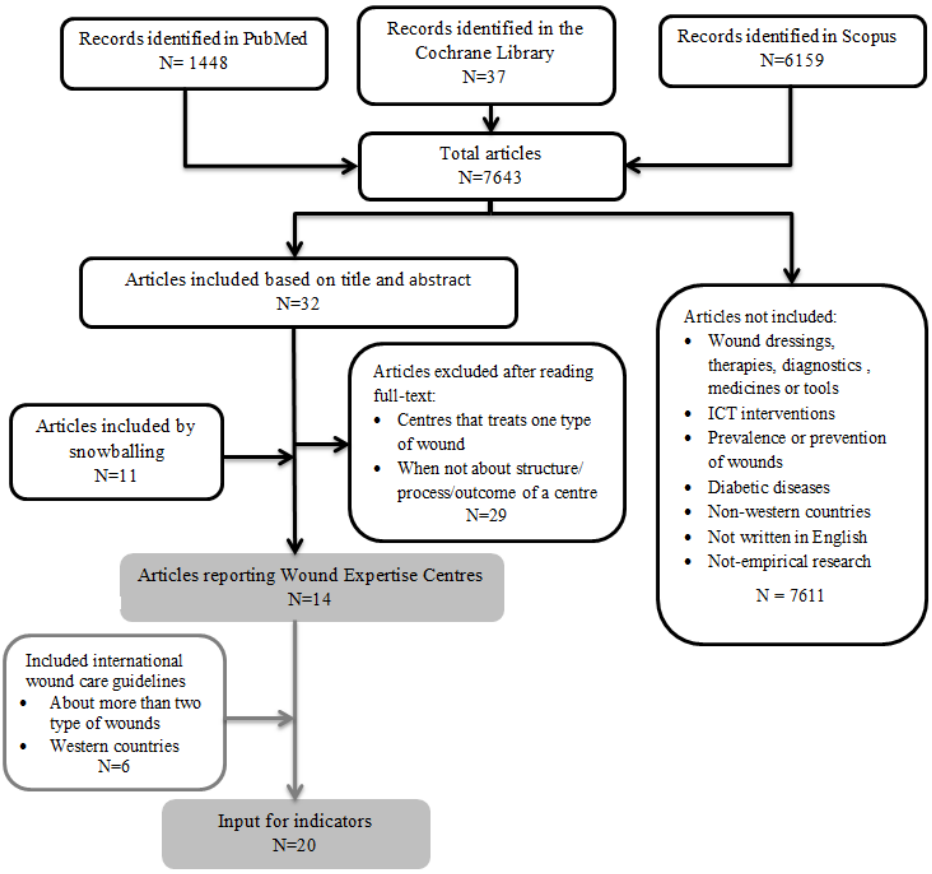

Figure 1 - Literature review

remained after review of title and abstract, full-text reading, and through the addition of 11 studies by implementation of the snowballing method (figure 1). The included studies varied in research design, including randomized controlled trials (N=2), cost-effectiveness studies (N=2), cross-sectional studies (N=1), a cohort study (N=1), a literature review (N=1) and case studies (N=7). No Dutch articles were found. Three studies reported no quantitative outcomes.

The main reported outcomes were the three-month healing rate and the decreased costs of care after admitting patients to wound centres. However, the three-month healing rate was reported using different endpoints, such that no comparison with the past or comparison with home care and care in the wound centres was included. Regarding the cost-effectiveness study published in 1993, only the percentages of this dated study were useful in the analysis. Nine studies reported or recommended a multidisciplinary approach. Four studies reported a multidisciplinary, collaborative approach with wound care providers from the wound care pathway. Table 2 presents the study characteristics of the included studies. This table is divided into Table 2A, which reports organization-directed studies, and Table 2B, which displays effectiveness studies.

State of the art of wound centres

As mentioned above, wound centres are facing an increasing incidence of wound patients, increased wound care costs and increased complexity of care. An explanation of how centres will deal with these issues, and improve the quality of the care they provide, will now be provided.

Multidisciplinary collaboration

Within wound centres, various medical specialties provide multidisciplinary collaboration. In the wound care pathway, wound centres collaborate with primary care organisations, such as home care organisations and home care nurses, GPs, podiatrists and physiotherapists (15–17,20,24). Wound centres collaborate with primary care providers by developing joint trust standards, guidelines and procedures, providing peer support, and conducting further research for support of and adoption by the providers involved in the wound care pathway (16,21). Additionally, agreements with primary care providers about standardized follow-up programs, guidelines and protocols improve quality (18,20,23,24). To structure these collaborations, daily and weekly multidisciplinary meetings occur including staff from the wound centre and providers of the wound care pathway (15,17,18,20).

These collaborations require a coordinator who takes responsibility for wound care. Overall, physicians are responsible for patients and influence medical management in wound centres (15,17,25). However, wound centres require a director with management skills and an awareness of evidence-based practice, with a sense of responsibility and of future perspectives (15,18–20,24,25,31). A director should be supported by a nurse practitioner who is also a case manager, and who coordinates clinical care by contacting related departments, advising home care nurses or organising care at patients'

homes, procuring wound care dressings, and handling staff education, research and innovation (18,23,25).

Standardization

Standardization is vital to wound care pathways, the treatment of wounds, staff education and staff policy. The wound care pathway has been standardised using guidelines, treatment algorithms and coordinated follow ups, which identically cover all workers (17,20,25). A practical example of standardization is that patients are all referred to one common place in the wound care pathway for wound assessment, after which they are referred to appropriate specialists for final diagnosis and treatment (15,20,21). Additionally, referral times should be standardized by making primary care providers aware of early referrals, which result in timely treatments (23). Timely treatments in turn positively influence costs, healing rates and healing times (15). However, in one particular study, the referral time is reported to be six months, which is three months higher than the time reported in guidelines (20). Another example of standardization is compliance with the treatment plan as described by the wound centre, home care nurse or home care organisation (24).

Treatments are standardized through evidence-based treatment plans, which contain important due dates and all the relevant information concerning treatment and the involved departments (15,18,20). The presence of full-time staff, compared to part-time staff, results in continuity of care. Additionally, each patient should have his/her own supervisor who is responsible for clinical care (15,17,20). Staff should be regularly monitored for competency and compliance to protocols by clinical leaders (18,20). The expertise of the staff increases through education in policies derived from standard national guidelines in all type of wounds (17–21,24,25,31–33). Both the education and training of primary care providers is important to improve quality (16,22). Furthermore, conducting further research into clinical pathways creates an environment of investigation and continuous learning (15–17,20,32). Two studies have, however, shown difficulties in achieving standardization, due to the number of involved departments, the variety of wound care products available and the different wound care pathways used for different wound types (17,25).

Documentation supports multidisciplinary collaboration and standardization. Wound centres document and monitor relevant data, after which protocols and healthcare pathways are evaluated to increase education and the improve the practice of audits (15,20,24,25). Documentation must be supported by the use of a convenient and accessible system, in which performance is clearly visible (15,16,18,20,24,25,32).

Effectiveness of organized wound care by wound centres

As noted in the Introduction, little evidence is available about the effectiveness of wound centres. This literature review aimed to identify the effectiveness of wound centres. Table 2B provides an overview of the reported healing

Table 2A – Study Characteristics of organization directed studies

Author, Publication year, Title, study design	Research design	Sample size	Type of wound centre	Healing rate	Outcomes
Kim et al. 2013 *Critical elements to building an effective wound care centre.* Single case study	Retrospective single case study reviews the critical elements for a successful multidisciplinary wound care centre.	NR	Tertiary care academic-based wound center in Washington, DC. USA. All kind of wounds are treated. The centre has a multidisciplinary approach.	NR	NR
Attinger et al. 2008 *How to make a hospital-based wound center financially viable: the Georgetown University Hospital model.* Single case study	Examination of the performance over six years of operation of the Georgetown University Hospital.	NR	Hospital-based wound center: The Georgetown University Hospital model in Washington, DC USA. All types of wounds are treated. The centre has a multidisciplinary approach.	NR	NR
Rayner 2006 *The role of nurse-led clinics in the management of chronic leg wounds.* Literature review	Considers the need for comprehensive assessment to determine management options, and discusses the contribution that community leg ulcer clinics can make.	NR	Community leg ulcer Nurse led clinics in Australia. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is recommended.	Overall improvement HR of 42-67% is reported by studies.	NR
Lorimer 2004 *Continuity through best practice: design and implementation of a nurse-led community leg-ulcer service.* Retrospective single case study	Analysing a nurse-led community leg-ulcer service.	NR	The Community Care Access Centre, a regional home-care authority in Ontario, Canada. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is recommended.	NR	NR

Table 2B – Study Characteristics of effectiveness studies

Author, Publication year, Title, study design	Research design	Sample size	Type of wound centre	Healing rate	Outcomes (costs, recurrence, duration, visits)
Rondas et al. 2015 *Cost analysis of one of the first outpatient wound clinics in the Netherlands* Cost-effectiveness study	Observational cohort study with a one-year pre-start and one-year post-start comparison of costs.	172 patients	Community-based outpatient wound care clinic in the Netherlands. All kind of wounds are treated. A multidisciplinary approach is not reported, but the relation between the clinic and specialist.	62% completely healed after one year introduction of the centre. HR prior to the introduction of the wound centre is not reported. Significance is not reported.	Cost decreased after introducing the outpatient wound clinic by 11.0% and hospital care by 34.7%.

Edwards et al. 2013 *Health service pathways for patients with chronic leg ulcers: identifying effective pathways for facilitation of evidence based wound care.* Retrospective cross-sectional study and a prospective longitudinal observational study	Observational study and survey; 1. Retrospective study for the previous 12 months, by a survey and chart audit exploring existing health service pathways. 2. Prospective longitudinal observational study of participants for 24 weeks from admission.	70 patients	Specialized wound clinics: a community stand-alone specialist wound clinic within a university health clinics side and an outpatient specialist wound clinic within a large tertiary hospital in Queensland, Australia. Chronic leg ulcers; lower limb leg or foot ulcers are treated. Both clinics have a multidisciplinary approach.	3 month HR after the introduction of the wound centre: 59% (P<0.001) 6 month HR after the introduction of the wound centre: 81% (P<0.001) The HR prior to the introduction of the wound centres was not reported.	The average ulcer duration on admission was 22 weeks (range 2-728 weeks). 46% had a wound over six months before entering the centre, 17% had a wound over a year or longer before entering the centre. After the introduction of the wound centre, the median time to healing for the total sample was 12 weeks (95% CI 9.3–14.7). The SF-12 Physical Component improved after 24 weeks from 33.5 (SD=10.5) to 34.2(SD=11.4), p= 0.578. The SF-12 Mental Component improved after 24 weeks from 46.6 (SD=11.9) to 49.9 (SD=10.8), p=0.595. The pain score decreased from 50.0 (SD=26.4) to 34.0 (SD=23.3) (range: 0-100), p=0.017.
Harrison et al. 2008 *Nurse clinic versus home delivery of evidence-based community leg ulcer care: a randomized health service trial.* Randomized controlled trial	A prospective randomized control health services trial. Evaluation of home versus clinic care with equivalent care.	126 patients	Nurse clinic versus home delivery. Ontario, Canada. Venous leg ulcers and arterial leg ulcers are treated. Both nurse clinic and home delivery have a multidisciplinary approach.	3 month HR clinic 58.3% compared to home care at 56.7% (P=0.5).	Recurrence rates within one year were 24.6% in the clinic group compared to 21.5% in home care (p = 0.42) No differences were found in reduction in size, pain, health related quality of life, satisfaction with care, number of visits and costs. The SF-12 Physical Component was 35.5 (SD=10.3) for the home group compared to 34.7 (SD=9.7) in the clinic group, p=0.43. The SF-12 Mental Component was 50.9 (SD=10.8) in the home group compared to 48.4 (SD=11.2) in the clinic group, P=0.75.
Sholar et al. 2007 *The specialized wound care center: a 7-year experience at a tertiary care hospital.* Retrospective single case study	Providing baseline outcome measures, which serve as the basis for the comparison of treatment protocols and the development of prospective clinical trials.	2685 patients	A tertiary care hospital based wound center: The Erlanger Wound Care Center in Chattanooga, Tennesse, USA. All kind of wounds are treated. The centre has a multidisciplinary approach.	7 year HR after the introduction of the wound centre, varies by wound aetiology: Venous stasis ulcers: 58%, diabetic neuropathic ulcers: 37%, Post-surgical wounds: 34%, Arterial stasis ulcers: 33%, Pressure ulcers: 18%.	Visits: 70.0% of the patients were seen 10 times or less in the centre. 24.0% of the patients were seen between 11 and 29. 9% of the patients are seen 30 times or more.
Gottrup 2004 *A specialized wound-healing center concept: Importance of a multidisciplinary department structure and surgical treatment facilities in the treatment of chronic wounds.* Retrospective single case study	Analysing clinical multidisciplinary departments.	53 wounds	Clinical multidisciplinary departments: The Copenhagen Wound Healing Center (CWHC) and the University Center of Wound Healing (UCWH) in Copenhagen, Denmark. All types of wounds are treated. The centre has a multidisciplinary approach.	NR	39% recurrence rate after 1 year of surgery (P=NR).

Ghauri et al. 2000 *Influence of a specialized leg ulcer service on management and outcome.* Randomized controlled trial	Two-centre, countywide, randomized before and after study with a parallel control group. Compare the management and outcomes of community-based leg ulcer service.	200 patients	The community-based leg ulcer service compared with existing services in Gloucester, UK. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is not reported.	3 month HR prior to the introduction of the wound centre: 12% (P=NR) 3 month HR after the introduction of the wound centre: 48% (P=<0.001)	The 12-months recurrence rates decreased from 48% and 50% in the control centres to 17% (P<0.001) in the specialized clinics.
Stevens, Franks & Harrington 1997 *A community/hospital leg ulcer service.* Case study	A clinical audit outlines the multidisciplinary integrated community and hospital leg ulcer service and its effect on health outcomes and quality of life of patients, before and after implementation	259 patients	The Hounslow and Spelthorne Community and Mental Health Trust, UK. Venous leg ulcers and arterial leg ulcers are treated. The centre has a multidisciplinary approach.	3 month HR prior to the introduction of the wound centre: 21% (P=NR) 3 month HR after the introduction of the wound centre: 66% (P=NR) 6 month HR after the introduction of the wound centre: 79% (P=NR)	The number of visits reduced from 21.5 in the control audit to 14.7 in the clinical audit. People who experience no pain increased from 13% to 43%, p=0.002. The mobility score of the Nottingham health profile score (35) decreased from 43.9 to 31.7, p=0.003. Other Nottingham health profile scores – energy, emotion, sleep, social - are not significant reported after implement the service.
Simon et al. 1996 *Community leg ulcer clinics: a comparative study in two health authorities.* Retrospective cohort study	Prospectively cost and efficacy studies, before and one year after the introduction of five leg ulcer clinics in Stockport, compared to standard leg ulcer care.	+/- 200-250 ulcers	Community leg ulcer clinics, Stockport District Health Authority, UK. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is not reported, but the relation between home nurses to GPs.	3 month HR prior to the introduction of the wound centre: 26% (P=NR) 3 month HR after the introduction of the wound centre: 42% (P=<0.001)	The annual expenditure of leg ulcers clinics reduced 38.2% from £409 991 to £253 371. The cost of standard leg ulcer care increased from £556 039 to £673 318.
Bosanquet et al.1993 *Community leg ulcer clinics: cost effectiveness.* Cost-effectiveness study	Prospective and retrospective cost-effectiveness study of leg ulcer clinics compared to hospital-based venous ulcer care clinics.	+/- 500 patients	Riverside community leg ulcer clinics, UK. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is not reported, but the relation between home nurses and nurse specialists.	3 month HR prior to the introduction of the wound centre: 22% (P=NR) 3 month HR after the introduction of the wound centre: 80% (P=NR)	Costs were estimated to be £433 600 and £169 000 respectively, a decrease in costs of 61%.
Moffatt et al. 1992 *Community clinics for leg ulcers and impact on healing.* Multiple case study	Evaluation of effectiveness of community clinics for leg ulcers before and after set up a community clinic.	475 patients	Riverside District Health Authority, UK. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is not reported, but the relation between home nurses and nurse specialists.	3 month HR prior to the introduction of the wound centre: 22% (p=NR) 3 month HR after the introduction of the wound centre: 67% (P=NR) 6 month HR after the introduction of the wound centre: 81% (P=NR)	NR

rates and other effective outcomes of these studies. As previously mentioned, the evidence provided by these studies is weak, due to a lack of statistically significant outcomes.

The three-month healing rates after the introduction of the wound centre ranged from 42-67%, with a peak of 80% in one study from 1993. Only two studies reported significant ($p<0.001$) improvements in three-month healing rates, of 12% and 26% prior to the introduction of the wound centre, to 48% and 42% after the introduction of the wound centre, respectively. A further study reported a significant three-month healing rate of 59% ($p<0.001$) and a six-month healing rate of 81% ($p<0.001$), after introduction of the wound centre; however, without comparison to the rate prior to the introduction of the wound centre. The sample size (N=70-200) of studies reporting significant healing rates did not vary greatly. Nevertheless, the study designs and publication years did vary. Four studies reported healing rates before the introduction of the wound centre as ranging from 12-26%. No p-values were reported for these figures; however, these percentages are closer to each other.

Furthermore, one study reported recurrence rates of 48-50% prior to the introduction of the wound centres; this decreased to 17% after the wound centres opened ($p<0.001$) (23). Other studies reported no significant recurrence rates after the introduction of the centres, with rates ranging from 17-39% (16,17,22). The SF-12 score, which measures quality of life, was reported in two studies but without significant outcomes (34).

Cost-effectiveness studies have indicated that wound centres have fewer costs than the standard method used in wound treatment. Cost decreased after introducing (outpatient) wound centres, ranging from 11% (2015) to 61% (1993). Hospital costs decreased by 34.7% after an outpatient wound clinic was established (24).

Costs related to outpatient visits and primary care institutions decreased due to a reduction in the total number of visits. After admission to the centres, care was assessed once per week for a period of 12 weeks, instead of two to three times per week for a period of 17 weeks before admission to the centres. In the same study, visits in the wound care pathway, such as to GPs and inpatient hospital admissions, decreased from an average of 29.0 to 16.3 visits in 24 weeks. The number of visits to the wound centres increased from an average of 0.2 visits to 9.0 visits in 24 weeks (16). In conclusion, studies reported a positive effect between the care delivered by a wound centre and the cost savings achieved due to minimizing patient visits (15,19,33). The reduced used of this service enabled the treatment of an increased number of patients requiring care (16).

Indicators

Forty-eight indicators were developed from the literature review, six guidelines (Figure 1 and Table 3) and the benchmark steps developed by van Lent (28). The guidelines provided additional information about organizing wound centres. The aim of the indicators was to measure the quality and effectiveness of wound centres in practice.

Table 3: Guideline characteristics

Institution	Year	Country	Title	Document purpose	Type of wound
Australian Wound Management Association (AWMA)	2011	Australia & New Zealand	Standards for wound management	The standards are presented as a guide to clinicians, educators and researchers, health students and healthcare providers who desire to promote optimal outcomes in the care of individuals with wounds or those at risk of wounding.	All types of wounds
Health Service Executive (HSE)	2009	Ireland	National best practice and evidence based guidelines for wound management	To progress towards achieving the HSE's commitment to delivering better services for the individual through the provision of evidenced based practice (HSE 2007).	All types of wounds
Wounds UK	2013	United Kingdom	Optimising venous leg ulcer services in a changing NHS	To support best practice in VLU services to optimise service delivery, as this will ultimately improve patient care.	Leg venous ulcers
Nederlandse Vereniging voor Heelkunde (NVvH)	2013	Netherlands	Richtlijn Wondzorg	Evidence based guideline for the treatment of acute wounds in integrated care.	All types of wounds
Central West Community Care Access Centre (CCAC)	2009	Canada	Wound care guidelines	To implement best practices in wound care in the delivery of services to Central West CCAC clients.	All types of wounds
National Health Service (NHS), Worcestershire Health and Care Trust (WHCT)	2015	United Kingdom	Wound Assessment and Management Guideline	To ensure safe practice and maintain core standards of evidence based practice in wound management.	All types of wounds

Table 4 shows the final set of 48 indicators, distinguished as quantitative (N=25) and qualitative indicators (N=23) and furthermore categorised by structure (N=25), process (N=17) and outcome (N=6) indicators. For a clear layout, indicators were categorised under eight subheadings. Figures from 2015 were requested; however, three wound centres commenced in 2016, and therefore delivered the most recent figures. These wound centres were included because, as mentioned above, the included centres together reflect the reality of the diffuse presence of wound centres.

Wound centres fulfil the qualitative indicators well. These indicators lead to reflection of performance by those working at wound centres and create awareness. However, quantitative indicators are less likely to be applicable to wound centres. The indicators that are not applicable to the wound centres are the cost of providing wound care, the total costs of the wound centre, the three-month healing rate, the recurrence rate and patient quality of life. The centres do not have insight into the cost, or costs

Table 4: Indicators

No.	Indicator	Quantitative indicator	Structure(S)/ Process (P)/ Outcome(O)
Features of the Wound Centre			
1	Start date of the wound centre		S
2	Location of the wound centre		S
3	Level of care		S
Output			
4	Number of different wound types	Yes	P
5	Number of unique patients treated in the wound centre	Yes	P
6	Number of consultations provided in the wound centre	Yes	P
Staff			
7	Medical disciplines involved		S
8	Fulltime-equivalent staff attributed to the wound centre	Yes	S
9	Fulltime-equivalent supportive staff	Yes	S
10	Fulltime-equivalent coordinator	Yes	S
11	Fulltime-equivalent nurses with more than 5 year experience in treating wounds	Yes	S
12	Nursing hours from the wound centre	Yes	S
13	Absenteeism of staff	Yes	S
14	Staff satisfaction		S
The patient			
15	Patient participation in wound care		P
16	Informing patients		P
17	Self-management of patients		P
Wound care			
18	Person who initiate the treatment plan, which contains a planning		P
19	Waiting time in days for admission to the wound centre	Yes	P
20	Time of diagnosis		P
21	Treatment time in weeks in the wound centre	Yes	P
22	Average time in minutes of a consultation	Yes	P
23	Contact moments with the specialist		P
24	Number of home care consults provided by the wound centre	Yes	P
25	Accessibility of the wound centre by technologies		P
26	Assessment of a pain protocol		P
27	Wound care products – most used, number of suppliers, standardized list		S
Integrated care			
28	Collaboration in the wound care pathway		S
29	Coordination in the wound care pathway		S
30	Number of multidisciplinary meetings per month	Yes	S
31	Referral time in weeks to the wound centre	Yes	P
32	Standardized referral process of patients		P
33	Marketing of the wound centre by partners in the wound care pathway		S

Data management en process improvement			
34	Use of an Electronic Patient Record		S
35	Documentation of data		S
36	Number of evaluations of the organisation process	Yes	S
37	Number of internal audits	Yes	S
38	Research activities		S
39	Educate staff of the wound centre and providers in the wound care pathway		S
Costs			
40	Financing of care provided in the wound centre		S
41	Cost of providing wound care	Yes	S
42	Total costs of the wound centre	Yes	S
Outcomes			
43	Three-month healing rate	Yes	O
44	Average healing time in weeks	Yes	O
45	One year recurrence rate	Yes	O
46	Number of complications and the evaluation of complications	Yes	O
47	Patient satisfaction score	Yes	O
48	Patient quality of life score	Yes	O

and healing rates cannot be identified. One centre argued that the quality of life indicator is of doubtful benefit because of the differences between diagnosis and the initial patient circumstances. Indicators which were submitted by less than half of centres were the number of consultations, referral time to the wound centre, wound healing time, the number of complications and patient satisfaction. These figures were not measured by the wound centres or could not be identified. Ten indicators were not submitted or were poorly submitted. Six of these were outcome indicators.

Benchmark: Pilot indicators

Table 5 shows a selection of the benchmark outcomes. The outcomes are evaluated and presented in the table.

Various interpretations were received for multidisciplinary collaboration, as can be seen by the diversity of the involved medical disciplines. Seven centres collaborated with multiple medical disciplines and with primary care providers. The most-named co-operation partners in the wound care pathway were the GP, the orthopaedic cobbler, home care organizations, and the podiatrist. Only one centre had its own home care organization. Seven centres had collaborations with home care organizations involving education, sharing data, and home care organisations that treated patients from the wound centres. However, the meetings that structured these collaborations rarely occurred, as only half of the centres provided structural multidisciplinary meetings with medical specialities in the centres and providers of the wound care pathway.

Most wound centres educated staff from primary care institutions. One centre educated primary care providers more than once per month.

Table 5: A selection of the benchmark results. Columns A to H describe the participating wound centres that were established between 2007 and 2016 and which are located at the surgery or dermatology departments.

Indicators	**Centres**							
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Staff								
Involved medical disciplines	Dermatology	Vascular surgery	Vascular surgery, podiatrist, plastic surgery, revalidation department	Dermatology Phlebography, surgery, internal medicine	NR	Vascular -, trauma-, and plastic surgery, dermatology, orthopaedics revalidation department	Vascular surgery, dermatology	Vascular surgery, dermatology, plastic surgery
Wound care								
Treatment time in weeks	30	20	16	16	NR	36	NR	NR
Integrated care								
Number of multidisciplinary meetings intern per month	0	0	4	0	0	4	1	1
Number of multidisciplinary meetings in the whole wound pathway per month	2	0	1/3	0	0	1	0	0
Coordination on the wound pathway	Specialist	Specialist	WC and NP	GP	WC	Specialist	Specialist	NP and WC
Referral time in weeks	45	Unknown	1	Unknown	Unknown	30	20	Unknown
Data management en process improvement								
Number of yearly structured evaluations	1	0	NR	2	0	0	1	2
Number of internal audits a year	0	0	2	0	0	0	1	0
Frequency of education to primary HC providers	As desired by the HC providers	As desired by the HC providers	Less than one time a month	Weekly	0	Less than one time a month	As desired by the HC providers	As desired by the HC providers
Education policy	Theory and training on the job	No policy	Symposia, education like BLS education	Yearly education plans	Education plan	Personal development plan	E-learning, specific wound education	No policy

Costs								
Total costs	NR	Unknown	NR	Unknown	NR	NR	NR	Unknown
Outcomes								
Healing Rate	NR	NR	NR	NR	NR	NR	NR	NR
Mean time in weeks a wound healed								
● Leg ulcers	6.7	6.1	5.7	NR	NR	NR	NR	NR
● Diabetic foot ulcer	5.6	6.2	5.9	NR	NR	NR	NR	NR
● Decubitus	6.0	6.3	6.7	NR	NR	NR	NR	NR
Recurrence rate	NR	NR	NR	NR	NR	NR	NR	0
Complications	5.0	NR	NR	NR	NR	NR	NR	NR
Patient satisfaction	NR	NR	NR	59,33%	NR	NR	NR	NR
Quality of life	NR	NR	NR	NR	NR	NR	NR	NR

Four centres educated primary care providers only when it was desired by these providers. Staff members of the wound centre were educated in accordance with regulations and had the ability to improve their expertise by for instance visits to symposia.

Six of the eight centres performed evaluations or internal audits. During visits to the centres, it became clear that the relationship of the wound centres with different departments, without a central database, caused difficulties in performing evaluations. Furthermore, centres have various aims regarding the documentation of care, such as proven benefit, the submission of data for the inspectorate of healthcare, the analysis and evaluation of quality, gaining an insight into effectiveness, and one centre reported the aim of improving quality.

The self-management of patients was promoted at six centres. Two centres provided technological possibilities to provide care on demand, resulting in more accessible centres. Patients were informed of this during consults only.

To facilitate the referral process of patients from secondary to primary care, three centres used national guidelines. A further three centres did not use any guidelines.

The referral and treatment times also showed large differences between the centres. The discussions during the visits revealed that there was a correlation between referral, treatment and healing times. However, this was not confirmed by the benchmark results. One centre reported a one-week referral time, resulting in a 16-week treatment time. However, results from centres A and F were contradictory, as the referral and treatments times were 45 and 30 weeks, respectively, for centre A, and 30 and 36 weeks, respectively, for centre F.

The majority of the indicators reporting outcomes were missing. Three centres submitted healing times. However, these data were from an external wound organisation that gathered data from a proportion of the total number of patients treated at the wound centre. These outcomes had a small range from which to draw significant conclusions. One centre provided a patient

satisfaction survey and one centre reported the number of complications per year. As these outcomes were reported by one study, comparisons regarding effectiveness were not able to be made.

Discussion

To add to the existing evidence regarding the organization of wound centres, in order to improve the quality of this evidence, we aimed to review the evidence concerning the state of the art and effectiveness of wound centres. Additionally, we aimed to develop indicators to assess the quality and especially the effectiveness of wound centres in practice. These indicators were then tested in a pilot setting to assess their suitability.

State of the art of wound centres

In this study, 14 scientific articles were included, composed of three recent articles published since 2011 and 11 articles published over the period 1992-2011. Thus, a relative paucity of recent articles was found. The studies did not provide hard data about the organization of wound centres, such as the recommended number of staff members, multidisciplinary meetings, or a strong consensus regarding the type of guidelines that should be used. However, organizational features were addressed that help to organize wound centres.

Effectiveness of organized wound care by wound centres

The effectiveness of wound centres is indicated by, among others factors, healing rates, recurrence rates and costs. The results (N=2) showed limited significant improvements in healing. However, these healing rates corresponded to the insignificant healing rates reported in the other studies (N=8); therefore, we can conclude that wound centres improve healing rates.

There is as yet no solid evidence to further prove the effectiveness of wound centres. The figures obtained here were not comparable due to the small number of reported outcomes such as recurrence rates and health-related quality of life. However, these studies imply that the organisation of wound care by wound centres has added value by mainly improved healing rates and decreased costs. The outcome measurements made by these centres must increase in order to prove the effectiveness of wound centres. Indicators can facilitate these measurements.

Indicators

Forty-eight indicators were developed by an analysis of the literature and expert discussion. The effectiveness and quality of wound centres was assessed using these indicators. Ten indicators were reported to be deficient, of which six were outcome indicators. This indicates a gap between the ability of wound centres to submit data concerning these indicators and the careful developed indicator list.

First, we evaluated the ability of centres to submit data. Wound centres are distributed over different departments, without a shared database. This results in long-term and complicated data collection. By collecting data in for example a wound case, data are collected in a central

database. Furthermore, three centres had existed for less than one year, which made it difficult to submit data concerning, for example, one year recurrence rates. However, centres existing for longer than one year also had difficulties with submitting all data, especially those concerning outcome indicators. Additionally, centres are driven by individual goals to document care and are unaware of the necessity to electronically share medical documents. Only a few centres took action to document and analyse data.

The use of a database is of great importance in the improvement of quality, such as reducing healing times and costs (36). Centres must be aware of the need for an accessible and suitable database to demonstrate and improve their effectiveness in an environment where there is an increasing incidence of wounds, higher costs and complex wound care, resulting in more ineffective treatments.

Benchmark study: Pilot investigation of the indicators

Evaluation of the suitability of the indicators was examined by the benchmark study. Structure indicators were generally well-reported, with the exception of those regarding wound-centre costs. The literature also reported difficulties obtaining financial data, due to financial databases that do not have the function to deliver insight into specific information regarding centres or patients (15). Wound centres also indicated that relationships with multiple departments made cost calculations difficult.

The centres reported that the process indicators were clear. However, the quantitative process indicators were especially difficult to measure through integrated care. Financial partitions between the partners of the wound care pathway fail to improve this measure (33). Consequently, integrated care is difficult to accomplish, as is data collection from multiple wound care providers. Nevertheless, data from the entire wound care pathway are required to establish and improve the performance of the process, such as referral times. A transmural electronic health record database facilitates this process (37). Qualitative process indicators were well submitted by the wound centres.

Outcome indicators are difficult to provide, as most centres do not fulfil them. The indicators of healing rate and costs are frequently mentioned in the literature, and are relevant to measure the quality of wound centres (16,17,19,21–25,31–33). However, it seems to be difficult to report these rates. As mentioned above, reasons for this may be the diffuse presence of centres over multiple departments forming part of the wound care pathway. Furthermore, healing rates reveal the effectiveness of the entire pathway and are therefore attributable to all the included wound care providers of the pathway. To increase the submission of these indicators, wound centres should introduce, for instance, patient satisfaction surveys and methods to measure quality of life, such as the SF-36 survey (38). Five centres were advised to adjust their complication registry in order to actually register the number of complications. Finally, centres should report the healing time and recurrence rates for a convenient and accessible health record.

Benchmark study: Improve evidence to improve quality

The benchmark study provides us with insight into the current state of the quality of eight wound centres in the Netherlands. The indicators reveal well-organized centres, as can be seen from the multidisciplinary collaborations, the availability of standardized wound product lists, the performance of evaluations, and the instigation of policies to educate staff. Nevertheless, several quality aspects were not met by more than half of the centres.

First, multidisciplinary meetings rarely occur. Thus, although centres collaborate, the implementation of this collaboration can be improved by coordination of the wound care pathway. By becoming the coordinator of the entire wound care pathway, wound centres could take responsibility for the quality and effectiveness. For instance, improve the expertise of staff by standardized education of the involved healthcare providers and by collaboration with specialized home care organisations.

Second, evidence-based care initiated by the wound centres must be adopted by primary care institutions. In order to achieve this, wound centres in collaboration with the government should educate and fund primary care providers to facilitate the adoption of care (16). Patients can be treated at home due to the sufficient experience of all involved staff when such care is coordinated by the wound centre. This would lead to a lower number of occupied (outpatients) clinics, which had been marked as a problem during the centre visits (26). These factors, namely the collaboration and standardization of evidence-based care, benefits the continuity of care and timely treatment, as wounds heal faster and the time during which patients experience the negative effects of wounds decreases (17,20,21).

Third, indicators reporting patient centeredness show that centres can improve this measure of quality via increased patient participation and better accessibility of the centre through the use of technologies such as telemedicine (39).

Overall, wound centre C was the highest performing centre in the benchmark study due to the relatively highly-educated nurses, the average frequency of education of the primary care providers, the high number of multidisciplinary meetings, the varied composition of medical disciplines and the high number of internal audits. The treatment time at wound centre C, as well as the healing time, was the lowest in the benchmark study.

No conclusions could be drawn that a wound centre that is attached to a dermatology department performs better than for example a wound centre that is attached to a surgical department. The same applies to the composition of a multidisciplinary team.

Final indicators

The purpose of the indicators is to provide insight into the quality and effectiveness of the wound centres. As was to be expected, not all indicators proved suitable, relevant, or useful during the pilot study. For instance, the frequency of education was less important if the centre featured a standardized education policy by all providers from the wound care pathway.

Coordination of care is important; the specific coordinator of the care is less important. Furthermore, there were quite similar indicators, such as structured evaluations and audits. Both indicators, namely healing rate and healing time reported the healing outcomes within wound centres. The reliability of the recurrence rate is debatable, as dissatisfied patients may not have returned to the centres. Furthermore, the quality of life indicator was doubtful, as various diagnoses were provided on the basis of differing assumptions. The different time indicators, such as referral time, treatment time and healing time, are included as further research may show significant relationships between these indicators.

The total of 48 indicators that were developed by a review of the literature, expert discussion and investigation in a benchmark study resulted in 14 final indicators that were divided into structure (N=6), process (N=3) and outcome (N=5) indicators. Furthermore, a higher number of quantitative indicators (N=11) remained than qualitative indicators (N=3). Table 6 lists the final recommended indicators.

Limitations and further research

The first limitation of this study is that the indicators were provided by the managers of wound centres, nurse practitioners or specialists, while a proportion of the data concerned the integrated care process. This may have decreased the reliability of the provided indicators. Therefore, further research should be concerned with the providers involved in the entire wound care pathway and in gathering data from these providers, in order to provide insight into the quality of the entire wound care pathway.

The second limitation is that, due to fewer outcome indicators provided, correlations between the structure, process and outcome indicators could not be determined in this study, which was the originally intention of this distinction (30). Further research should be performed in a larger cohort, in which indicators for assessing the quality of wound centres are tested. Moreover, further investigation should emphasis significantly on the correlation between structure, process and outcome indicators.

Therefore, wound centres should consider how they can provide adequate data. In conclusion, the outcomes of this study provide a low amount of evidence, making further research necessary.

However, by assessing and comparing the quality of the wound centres in practice, the included centres became aware of their current state of quality, their structure, process and outcomes, and consequently opportunities for improvement. The benchmark study will be used as a baseline measurement for the three centres that commenced operation this year.

Conclusion

The literature review provides an insight into the quality and effectiveness of wound centres. This review was also used to develop a list of indicators in collaboration with experts. By performing a benchmark study, we were able to test these indicators. A lack of data limited the application of the results; however, the benchmark study provided an insight into the current quality of wound centres in practice as

Table 6: Final indicators

Indicator	Structure	Process	Outcome	Quantitative	Qualitative
Number of wounds treated *Total number of wounds treated in the wound centre*		•		•	
Medical disciplines involved *Medical disciplines which are involved in the wound care pathway*	•				•
Number of multidisciplinary meetings *Number of standardized multidisciplinary meetings per month, with all involved wound care providers*	•			•	
Use of structured protocols for referral processes	•				•
Number of structured evaluation *Number of standardized evaluations (for instance internal audits) performed per year*	•			•	
Education policy *Wound centre policy about standardized education of all providers in the wound care pathway*	•				•
Referral time *Average time in weeks between the first consultation at the primary care provider and the first consult in the wound centre*		•		•	
Treatment time *Average time in weeks between the first visit in the wound centre and the time of referral to primary care.*		•		•	
Healing time *Average time in weeks in which wounds are completely healed.*			•	•	
One year recurrence rate			•	•	
Number of complications			•	•	
Total costs of the wound centre	•			•	
Patient satisfaction *Score of the patient satisfaction survey*			•	•	
Patient quality of life *Score of the quality of life measurement*			•	•	

well as possible room for improvement. This benchmark study also created awareness among participants. The sector requires basic recommendations to improve care, which are here provided by the indicators. In conclusion, in order for wound centres to improve wound care,

indicators can be used to measure and improve the quality of care. Wound centres should strive to improve their measurements to both gain an insight into their current performance and to continuously prove their added value.

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2. Benchmark results

This chapter contains the benchmark results.

The first column shows the number of the indicator, a total of 48 indicators are reported.

The second column shows the title of the indicator.

The third column shows the definition or the subindicator.

De last columns with de letters A till H, display the eight wound centres that participate in the benchmark study.

Example:

Nr.	Indicator	Definitie/ Subindicator	A	B	C	D
5	Behandelde patiënten	Het aantal unieke patiënten dat is behandeld in het WEC.	136	557	1284	151

Abbreviations:

DBC = Diagnose-Behandel Combinatie

DOT = DBC op weg naar transparantie

DV = Diabetische Voet

EPD = Elektronisch Patiënten Dossier/ Electronic Health Record

MDO = MultiDisciplinair Overleg

MSVT zorg = Medisch Specialistische Verpleging in de Thuissituatie

PA = Physician Assistant

PDCA = Plan Do Check Act

VAS–score = Visuele Analoge Scale score

VVT = Verpleeg- en Verzorgingshuizen en Thuiszorg

WEC = Wond Expertise Centrum

Eigenschappen van het WEC

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
1	Startdatum		Datum waarop het WEC is gestart.	-	-	-	-
2	Locatie van het WEC	a.	De fysieke hoofdlocatie van het WEC.	Topklinisch ziekenhuis	Regionaal (algemeen) ziekenhuis	Topklinisch ziekenhuis	Topklinisch ziekenhuis
		b.	Het WEC is geïntegreerd in één polikliniek.	Ja	Ja	Ja	Nee
		c.	Indien 2b met ja beantwoord is, in welke polikliniek is het WEC geïntegreerd?	Dermatologie	Polikliniek chirurgie	Afdeling in het ziekenhuis	
		d.	Indien 2b met nee beantwoord is, welke plek heeft het WEC in de fysieke hoofdlocatie?		Er zijn pogingen om samen te werken met dermatologie, dat gaat deze maand beginnen.		Dermatologie en Chirurgie
3	Niveau van zorg		Het niveau waarop de zorg van het WEC wordt geboden.	Tweedelijns	Tweedelijns	Tweedelijns	Tweedelijns

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
1	Startdatum		Datum waarop het WEC is gestart.	-	-	-	-
2	Locatie van het WEC	a.	De fysieke hoofdlocatie van het WEC.	Topklinisch ziekenhuis	Topklinisch ziekenhuis	Topklinisch ziekenhuis	Regionaal (algemeen) ziekenhuis
		b.	Het WEC is geïntegreerd in één polikliniek.	Ja	Ja	Nee	Ja
		c.	Indien 2b met ja beantwoord is, in welke polikliniek is het WEC geïntegreerd?	Chirurgie	Chirurgie		Gipskamer
		d.	Indien 2b met nee beantwoord is, welke plek heeft het WEC in de fysieke hoofdlocatie?			Virtueel ingericht	
3	Niveau van zorg		Het niveau waarop de zorg van het WEC wordt geboden.	Tweedelijns	Tweedelijns	Tweedelijns	Tweedelijns

Output

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
4	Wonden	a.	Het aantal Ulcus Cruris Dermatologie (code 22)	156	252	202	126
		b.	Het aantal Ulcus Cruris Heelkunde (code 427)	n.v.t.	39	92	n.v.t.
		c.	Het aantal Diabetische voet Heelkunde (code 432)	n.v.t.	136	129	n.v.t.
		d.	Het aantal Decubitus wonden Heelkunde (code 150)	n.v.t.	23	53	n.v.t.
		e.	Het aantal overige wonden zoals een chirurgische wond, traumatische wond door dermatologie, Heelkunde of Plastische Chirurgie.		297	585	
5	Behandelde patiënten		Het aantal unieke patiënten dat is behandeld in het WEC.	136	557	1284	151
6	Consultaties		Het totaal aantal consultaties uitgevoerd in en door het WEC.	-	-	-	Declaratie op DOT's dus lastig te bepalen

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
4	Wonden	a.	Het aantal Ulcus Cruris Dermatologie (code 22)	-		Onbekend	16
		b.	Het aantal Ulcus Cruris Heelkunde (code 427)	-	292	Onbekend	0
		c.	Het aantal Diabetische voet Heelkunde (code 432)	-		Onbekend	0
		d.	Het aantal Decubitus wonden Heelkunde (code 150)	-	4	Onbekend	0
		e.	Het aantal overige wonden zoals een chirurgische wond, traumatische wond door dermatologie, Heelkunde of Plastische Chirurgie.	-		Onbekend	Moet nog opgestart worden (per 1 sept 2016)
5	Behandelde patiënten		Het aantal unieke patiënten dat is behandeld in het WEC.	-	176	Onbekend	16
6	Consultaties		Het totaal aantal consultaties uitgevoerd in en door het WEC.	-	310	Onbekend	264

Staf

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
7	Medische disciplines		De medische disciplines die betrokken zijn bij het WEC zoals een vaatchirurgie, dermatologie.	Dermatoloog, verpleegkundig specialist, doktersassistenten, wijkverpleegkundigen	Vaatchirurgie	Vaatchirurgie, podotherapie, plastisch chirurg, revalidatiearts.	Dermatologie, Flebologie, Chirurgie, Interne geneeskunde.
8	Fulltime-equivalent (fte)	a.	Fte Specialisten. (1fte=45 uur)	1	3	0,66fte	6 fte
		b.	Fte Arts assistenten. (1fte=36 uur)	0	0	0,22fte	1 fte gehele jaar
		c.	Fte verpleegkundig specialisten. (1fte=36 uur)	1	1	1 fte	0 (geen inzet in WEC)
		d.	Fte HBO verpleegkundigen. (1fte=36 uur)	0	0	Alle wondconsulenten zijn HBO geschoold	0 (geen inzet in WEC)
		e.	Fte MBO verpleegkundigen. (1fte=36 uur)	1	0	0,22	Geen, 23.80 fte doktersassistenten.
		f.	Fte verpleegkundigen met een master diploma in wondzorg/ wondconsulenten werkzaam in het WEC. (1fte=36 uur)	1	0	3,2fte	0
		g.	Fte overig zorg personeel, zoals een praktijkondersteuner. (1fte=36 uur)	3	0	1fte doktersassistentes	0

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
7	Medische disciplines		De medische disciplines die betrokken zijn bij het WEC zoals een vaatchirurgie, dermatologie.	Vaatchirurg, wondconsulent, wondverpleegkundige, revalidatiearts, gipsverbandmeester. Op consult dermatologie, plastische chirurgie	Vaatchirurgie, traumachirurgie, plastische chirurgie, dermatologie. NB dit zijn de kartrekkers. Daarnaast MDO met orthopedie en revalidatieartsen.	Vaatchirurgie/ dermatologie/ plastische chirurgie	
8	Fulltime-equivalent (fte)	a.	Fte Specialisten. (1fte=45 uur)	1	0,5	0	1
		b.	Fte Arts assistenten. (1fte=36 uur)	0	0,2	0	0
		c.	Fte verpleegkundig specialisten. (1fte=36 uur)	0	1	1	1 (streven)
		d.	Fte HBO verpleegkundigen. (1fte=36 uur)	0,8	0		
		e.	Fte MBO verpleegkundigen. (1fte=36 uur)	2,7	3	2,88	
		f.	Fte verpleegkundigen met een master diploma in wondzorg/ wondconsulenten werkzaam in het WEC. (1fte=36 uur)	2,3	0	0,67	0,89
		g.	Fte overig zorg personeel, zoals een praktijkondersteuner. (1fte=36 uur)	0	0	0	0,78

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
9	Ondersteunend personeel		Het aantal fte ondersteunend personeel naast zorgpersoneel. Bijvoorbeeld administratieve medewerkers of managers. (1fte=36 uur)	0	0	1fte (leidinggevende)	2
10	Regiehouder van het WEC		Het aantal fte regiehouder in het WEC (1fte=36 uur). De regiehouder is de persoon die eindverantwoordelijk is voor de patiënten in het WEC. Dit kan zowel een specialist zijn als een verpleegkundig specialist.	1	0	1fte (vaatchirurg)	zie 8a (specialisten)
11	Ervaren verpleegkundigen		Het aantal fte verpleegkundigen met meer dan 5 jaar ervaring in wondzorg. (1fte=36 uur)	1	1,4	Alle leden van het WEC	niet te monitoren (hele groep doktersassistenten wordt hierop ingezet)
12	Verpleegkundige uren		Het totale aantal verpleegkundige uren dat is ingezet in het WEC.	20 per week	81 per week	7144 per jaar	niet te monitoren
13	Ziekteverzuim		Het percentage ziekteverzuim onder medewerkers in het WEC.	5%	0	2,22%	jaarlijks < 2 %
14	Medewerkers-tevredenheid	a.	Een jaarlijks medewerkerstevredenheidsonderzoek in het WEC, waarvan de uitkomst wordt geëvalueerd met het personeel.	Nee	Nee	Nee	Nee
		b.	Indien 14a met ja is beantwoord, wat is de voornaamste uitkomst van het medewerkerstevredenheidsonderzoek?				Geen specifiek WEC onderzoek

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
9	Ondersteunend personeel		Het aantal fte ondersteunend personeel naast zorgpersoneel. Bijvoorbeeld administratieve medewerkers of managers. (1fte=36 uur)	1,2	1,5	0	0,22 fte (manager), 0,22 fte (secretariaat)
10	Regiehouder van het WEC		Het aantal fte regiehouder in het WEC (1fte=36 uur). De regiehouder is de persoon die eindverantwoordelijk is voor de patiënten in het WEC. Dit kan zowel een specialist zijn als een verpleegkundig specialist.	1	-	0	1 fte
11	Ervaren verpleegkundigen		Het aantal fte verpleegkundigen met meer dan 5 jaar ervaring in wondzorg. (1fte=36 uur)	5	3	2,88	1 fte
12	Verpleegkundige uren		Het totale aantal verpleegkundige uren dat is ingezet in het WEC.	40 per week	-	zie aantal FTE	16 uur / week
13	Ziekteverzuim		Het percentage ziekteverzuim onder medewerkers in het WEC.	7,60%	-		1,50%
14	Medewerkers-tevredenheid	a.	Een jaarlijks medewerkerstevredenheidsonderzoek in het WEC, waarvan de uitkomst wordt geëvalueerd met het personeel.	Nee	Nee	Nee	Ja
		b.	Indien 14a met ja is beantwoord, wat is de voornaamste uitkomst van het medewerkerstevredenheidsonderzoek?				Tevreden, leuk om op pad te gaan, patiënten erg tevreden met zorg, nieuwe dimensie aan eigen werkzaamheden.

De patient

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
15	Patiëntparticipatie in wondzorg		Op welke wijze wordt de patiënt betrokken bij de behandeling?	-	-	Patiënten worden geïnformeerd en geadviseerd en uiteindelijk bepaald de patiënt de behandeling door akkoord te geven.	Uitleg over de aandoening en wat de patiënt zelf kan bijdragen. Elk bezoek evaluatie. Met de patiënt een plan van aanpak opstellen.

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
15	Patiëntparticipatie in wondzorg		Op welke wijze wordt de patiënt betrokken bij de behandeling?	-	Shared decision	-	Patiënt wordt tijdens het eerste consult geïnformeerd over de (opties binnen de) behandeling.

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
16	Informeren van patiënten	a.	De wijze waarop patiënten worden geïnformeerd over de voortgang van de behandeling en uitkomsten. Bijvoorbeeld gedurende afspraken, door belafspraken, thuis inzicht in het Elektronische Patiënten Dossier (EPD).	Onder begeleiding toezicht in EPD	Tijdens consulten. Incidenteel via belafspraken of thuis omdat de thuiszorg er geen gedeeld EPD is met de thuiszorg.	Gedurende afspraken en belafspraken.	Mondeling tijdens polibezoek, patiënten boekje.
		b.	Patiënten hebben thuis toegang tot hun EPD.	Nee	Nee	Nee	Ja
		c.	Indien 16b met ja is beantwoord: Patiënten hebben door het EPD toegang tot real time resultaten van onderzoeken en behandelingen zonder vertraging tijdens de behandeling in het WEC.		Nee		Ja
		d.	Indien 16b met nee is beantwoord, waarom hebben patiënten thuis geen toegang tot hun EPD?	Zover is de techniek nog niet	Vanuit het ziekenhuis is nog geen inzage mogelijk in EPD.	Gaat via de behandelend arts	

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
16	Informeren van patiënten	a.	De wijze waarop patiënten worden geïnformeerd over de voortgang van de behandeling en uitkomsten. Bijvoorbeeld gedurende afspraken, door belafspraken, thuis inzicht in het Elektronische Patiënten Dossier (EPD).	EPIC sinds 1-4-2016 en toekomst keten EPD, wordt aan gewerkt.	Gedurende afspraken	Dit wordt gedaan via het patiënte portaal	EPD rapportage, bij een controle bezoek door specialist, verder tijdens de behandeling wordt de voortgang besproken.
		b.	Patiënten hebben thuis toegang tot hun EPD.	Ja	Nee	Nee	Ja
		c.	Indien 16b met ja is beantwoord: Patiënten hebben door het EPD toegang tot real time resultaten van onderzoeken en behandelingen zonder vertraging tijdens de behandeling in het WEC.	Nee			Nee
		d.	Indien 16b met nee is beantwoord, waarom hebben patiënten thuis geen toegang tot hun EPD?	EPIC werkt vertraagd. Toegang tot de gegevens is nog minimaal.	Moet nog EPD hiervoor gekozen worden eind 2016.	Werken in de organisatie met een patiënten portaal	Wel tot EPD, geen koppeling met het transmurale EPD.

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
17	Zelfmanagement	a.	Zelfmanagement door patiënten wordt gestimuleerd en gefaciliteerd door het aanbieden van informatie over zelfmanagement en wondzorg.	Ja	Nee	Ja	Ja
		b.	Indien 17a met ja beantwoord is, welke informatie wordt aangeboden?	Mondelinge toelichting en foldermateriaal		Folders en mondelinge voorlichting.	Wondzorg, zelfmanagement compressie, waar op te letten (hulp signalen)
		c.	Indien 17a met nee beantwoord is, waarom niet?		Er is onvoldoende formatie om dit degelijk op te pakken, incidenteel gebeurt het wel.		

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
17	Zelfmanagement	a.	Zelfmanagement door patiënten wordt gestimuleerd en gefaciliteerd door het aanbieden van informatie over zelfmanagement en wondzorg.	Nee	Ja	Ja	Ja
		b.	Indien 17a met ja beantwoord is, welke informatie wordt aangeboden?		Life style coaching	Informatie folders	Middels een folder
		c.	Indien 17a met nee beantwoord is, waarom niet?	Dit is nog niet uitgewerkt.			

De zorg

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
18	Behandelplan	a.	Wie initieert het behandelplan?	De verpleegkundig specialist	Overige	Overige	De specialist
			Indien 'overige', wie initieert het behandelplan?		Wat betreft medische ingrepen en medicatie, de specialist. De verpleegkundige (specialist) maakt een wondbehandelplan.	VS, Vaatchirurg en wondconsulent	
		b.	Elk behandelplan bevat een planning, met de verwachte genezingstendens en een datum voor ontslag uit het WEC.	Nee	Nee	Ja	Nee
19	Wachttijd voor het WEC	a.	De gemiddelde wachttijd in dagen voor het eerste consult.	7	4	5	7
		b.	Indien er gestreefd wordt naar een maximum wachttijd waarbinnen het eerste consult moet plaatsvinden in het WEC, wordt dit streven gehaald?	Ja	Ja	Ja	Ja
		c.	Indien 19b met nee beantwoord is, waarom wordt dit streven niet gehaald?				

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
18	Behandelplan	a.	Wie initieert het behandelplan?	Overige	De verpleegkundig specialist	De specialist	De specialist
			Indien 'overige', wie initieert het behandelplan?	WEC arts en wondconsulent			
		b.	Elk behandelplan bevat een planning, met de verwachte genezingstendens en een datum voor ontslag uit het WEC.	Nee	Nee	Ja	Nee
19	Wachttijd voor het WEC	a.	De gemiddelde wachttijd in dagen voor het eerste consult.	1	7	-	3
		b.	Indien er gestreefd wordt naar een maximum wachttijd waarbinnen het eerste consult moet plaatsvinden in het WEC, wordt dit streven gehaald?	Nee	Ja	Ja	Ja
		c.	Indien 19b met nee beantwoord is, waarom wordt dit streven niet gehaald?	Wordt nog niet gemeten			

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
20	Tijd tot het stellen van een diagnose	a.	Op welk moment wordt de definitieve diagnose gesteld? (bijvoorbeeld direct tijdens het eerst consult, of het aantal dagen na het eerste consult).	Waarschijnlijkheid diagnose meteen bij het eerste consult. Zekere diagnose soms na onderzoek op het spatader-centrum ongeveer na 2 of 3 weken.	10 dagen na het eerste consult	Tijdens eerste consult direct een dd, definitieve diagnose na uitslagen aanvullend onderzoek.	Meestal bij het eerste consult, indien verder onderzoek nodig is later.
		b.	Het gemiddeld aantal wonden waarvan de diagnose wordt bijgesteld in het WEC omdat de waarschijnlijkheidsdiagnose niet klopte.	3	Gebeurt wel in een aantal gevallen maar het is niet te doen om dit in een aantal vast te stellen.	Geen idee	-
		c.	Wie stelt de diagnose?	De verpleegkundig specialist	De specialist	Overige	De specialist
			Indien 'overige', wie stelt de diagnose?			VS en Specialis	
21	Behandeltijd		De gemiddelde tijd in weken tussen het eerste consult in het WEC en de terugverwijzing van de patiënt naar de eerstelijnszorg.	30	20	16	16

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
20	Tijd tot het stellen van een diagnose	a.	Op welk moment wordt de definitieve diagnose gesteld? (bijvoorbeeld direct tijdens het eerst consult, of het aantal dagen na het eerste consult).	Binnen 48 uur, maar afhankelijk van problematiek en hoeveel onderzoeken nodig en hoe snel kunnen die uitgevoerd worden.	Tijdens eerste consult	Dit is moeilijk in te schatten	Tijdens eerste consult
		b.	Het gemiddeld aantal wonden waarvan de diagnose wordt bijgesteld in het WEC omdat de waarschijnlijkheidsdiagnose niet klopte.	-	10%	Onbekend	0
		c.	Wie stelt de diagnose?	De specialist	De specialist	De specialist	De specialist
			Indien 'overige', wie stelt de diagnose?				
21	Behandeltijd		De gemiddelde tijd in weken tussen het eerste consult in het WEC en de terugverwijzing van de patiënt naar de eerstelijnszorg.	-	36	Onbekend	-

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
22	Spreekuren	a.	De gemiddelde tijd in minuten voor een behandeling die een patiënt krijgt in het WEC. Dus de gemiddelde tijd dat een patiënt in de behandelkamer van het WEC zit per consult.	15	30	Controle patiënt: 20 minuten, nieuwe patiënten: 45 minuten.	20 minuten per aangedaan been
		b.	Het WEC heeft inloopspreekuren op vaste momenten in de week, waar patiënten zonder afspraak terecht kunnen.	Nee	Nee	Nee	Nee
23	Contact met specialist		De momenten waarop de patiënt tijdens de behandeling in het WEC de specialist/ regieverpleegkundige ziet.	Bij elk bezoek		Tijdens het behandeltraject minimaal 1x face to face contact met specialist, overige afspraken altijd met VS of wondconsulent.	1 x per 3 a 4 weken, indien nodig eerder

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
22	Spreekuren	a.	De gemiddelde tijd in minuten voor een behandeling die een patiënt krijgt in het WEC. Dus de gemiddelde tijd dat een patiënt in de behandelkamer van het WEC zit per consult.	Nieuwe patiënten 45 minuten vervolg consulten 30 minuten	20	Onbekend	20
		b.	Het WEC heeft inloopspreekuren op vaste momenten in de week, waar patiënten zonder afspraak terecht kunnen.	Nee	Nee	Nee	Nee
23	Contact met specialist		De momenten waarop de patiënt tijdens de behandeling in het WEC de specialist/ regieverpleegkundige ziet.	Indien nodig	Intake en nadien op indicatie en afhankelijk van pathologie.	Bij 1e consult	Specialist één keer in de 4 tot 6 weken

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
24	Zorg aan huis	a.	Medewerkers van het WEC bieden zorg aan huis of op andere locaties, dan op de locatie van het WEC zelf.	Nee	Nee	Ja	Nee
		b.	Indien vraag 24a met ja is beantwoord, wat is het aantal behandelconsulten aan huis?			-	
			Indien vraag 24a met ja is beantwoord, wat is het aantal (éénmalige) diagnostische consulten aan huis?			-	
		c.	Indien vraag 24a met nee is beantwoord, op welke wijze voorziet het WEC in de zorg voor patiënten die moeilijk of niet naar het WEC kunnen komen?	Een in wondzorg gespecialiseerde thuiszorgorganisatie.	Daarin voorziet het WEC niet		Samenwerking met alle zorginstellingen in de regio die met de behandeling van ulcus cruris te maken hebben.
25	Toegankelijkheid	a.	Het WEC biedt technologische mogelijkheden voor het leveren van zorg op afstand aan patiënten. Denk aan: Skype, Facetime, telemedicine.	Nee	Nee	Ja	Nee
		b.	Zijn er afgelopen jaar patiënten geweigerd in het WEC op basis van hun contract met de verzekeraar.	Nee	Nee	Nee	Nee

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
24	Zorg aan huis	a.	Medewerkers van het WEC bieden zorg aan huis of op andere locaties, dan op de locatie van het WEC zelf.	Nee	Nee	Nee	Ja
		b.	Indien vraag 24a met ja is beantwoord, wat is het aantal behandelconsulten aan huis?				2 per week per patiënt.
			Indien vraag 24a met ja is beantwoord, wat is het aantal (éénmalige) diagnostische consulten aan huis?				0
		c.	Indien vraag 24a met nee is beantwoord, op welke wijze voorziet het WEC in de zorg voor patiënten die moeilijk of niet naar het WEC kunnen komen?	Nog niet wel in regionale verzorgings-tehuizen. En via thuiszorg met foto's en telefonisch overleg	Start thuisconsulten eind 2016. voorheen gecontracteerde thuiszorg via MSVT contracten.		
25	Toegankelijkheid	a.	Het WEC biedt technologische mogelijkheden voor het leveren van zorg op afstand aan patiënten. Denk aan: Skype, Facetime, telemedicine.	Nee	Ja	Nee	Nee
		b.	Zijn er afgelopen jaar patiënten geweigerd in het WEC op basis van hun contract met de verzekeraar.	Nee	Nee	Nee	Nee

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
26	Pijn assessment		Is er een protocol voor het ondernemen van actie wanneer blijkt dat patiënten een bepaalde pijnscore (zoals de VAS score) hebben tijdens een spreekuur.	Ja	Nee	Ja	Ja
27	Wondzorg producten	a.	In het WEC wordt gewerkt met een vastgestelde lijst wondverbandmiddelen voor alle wonden.	Ja	Ja	Ja	Ja
		b.	De top 3 van de meest gebruikte wondverbandmiddelen voor de ulcus cruris (zowel voor behandeling bij dermatologie als voor heelkunde).	Mepilex, Aquacel, zilversulfadiazine		Kerlixgaas, Kendal foam, schuimverband	Schuimverband, wondgel, alginaat
		c.	Het aantal leveranciers van wondverbandmiddelen aan het WEC.	1	1	5	1
		d.	Het WEC levert eigen wondverbandmaterialen zonder tussenkomst van een apotheek.	Ja	Ja	Ja	Ja

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
26	Pijn assessment		Is er een protocol voor het ondernemen van actie wanneer blijkt dat patiënten een bepaalde pijnscore (zoals de VAS score) hebben tijdens een spreekuur.	Nee	Ja	Ja	Nee
27	Wondzorg producten	a.	In het WEC wordt gewerkt met een vastgestelde lijst wondverbandmiddelen voor alle wonden.	Ja	Ja	Ja	Ja
		b.	De top 3 van de meest gebruikte wondverbandmiddelen voor de ulcus cruris (zowel voor behandeling bij dermatologie als voor heelkunde).	Schuimverbanden, alginaat, PG zwachtels	Flaminal, kerlix, BJ gazen	Onbekend	-
		c.	Het aantal leveranciers van wondverbandmiddelen aan het WEC.	veel meer dan 5	-	6	1
		d.	Het WEC levert eigen wondverbandmaterialen zonder tussenkomst van een apotheek.	Nee	Ja	Nee	Nee

Ketenzorg

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
28	Samenwerking in de keten	a.	De zorgverleners die behoren tot de ketenzorg van het WEC; bijvoorbeeld een huisarts, orthopedisch schoenmaker, fysiotherapeut et cetera.	Geen		Orthopedisch schoenmaker, huisarts.	Huisarts, verzorgings/ verpleeghuisarts, revalidatiearts.
		b.	Op welke wijze is er samenwerking met VVT instellingen? Bijvoorbeeld: scholing aan personeel van VVT instellingen, wondconsulenten behandelen cliënten van VVT instellingen.	Scholing	Incidenteel wordt scholing gegeven. Er is informatie uitwisseling m.b.t. de patiëntenzorg. Er worden geen patiënten behandeld.	Ja, aan hogescholen, verpleeg- en verzorgingshuizen	Scholing. Indien nodig telefonisch overleg.
		c.	Op welke wijze is er samenwerking met reguliere thuiszorgorganisaties?	Indien een patiënt al thuiszorg heeft wordt deze wanneer nodig ingeschakeld voor wondzorg.	Informatie delen m.b.t. patiëntenzorg	We hebben een eigen thuiszorgorganisatie	Idem
		d.	Andere samenwerkingspartners dan zorgverleners; zoals een zorgverzekeraar waar speciale afspraken mee zijn of een taxibedrijf voor vervoer.	Geen	Geen andere afspraken	Huidtherapeuten, medisch speciaalzaak	Geen

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
28	Samenwerking in de keten	a.	De zorgverleners die behoren tot de ketenzorg van het WEC; bijvoorbeeld een huisarts, orthopedisch schoenmaker, fysiotherapeut et cetera.	Orthopedisch schoenmaker	Podotherapeut, huisarts, huidtherapeut, orthopedisch schoenmaker, revalidatiecentrum.	Orthopedisch schoenmaker, podotherapeut, thuiszorg	Geen samenwerking (wel in gesprek over anderhalvelijns samenwerking)
		b.	Op welke wijze is er samenwerking met VVT instellingen? Bijvoorbeeld: scholing aan personeel van VVT instellingen, wondconsulenten behandelen cliënten van VVT instellingen.	Beperkte scholing aan medewerkers in revalidatiecentra en aan thuiszorgorganisaties	Scholing	Op aanvraag van de VVT instellingen	Ja, scholing vanuit poliklinieken.
		c.	Op welke wijze is er samenwerking met reguliere thuiszorgorganisaties?	Met sommige korte lijnen en mail en foto contact.	Gecontracteerd via MSVT contracten. En nascholing.	Op aanvraag van de thuiszorgorganisatie	Geen gecontracteerde thuiszorgorganisatie.
		d.	Andere samenwerkingspartners dan zorgverleners; zoals een zorgverzekeraar waar speciale afspraken mee zijn of een taxibedrijf voor vervoer.	Geen	Geen	Intentie met een in wondzorg gespecialiseerde thuiszorgorganisatie	Nee, geen vaste afspraken

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
29	Regie in de keten		Welke zorgverlener heeft tijdens de behandeling van patiënten in het WEC de regie over patiënten?	De specialist van het WEC	De specialist van het WEC	Anders	De huisarts
			Indien ‘anders’, welke zorgverlener heeft de regie tijdens behandeling in het WEC?			Wondconsulenten en VS	
30	Multidisciplinair overleg	a.	Het standaard aantal multidisciplinair overleggen per maand met alle betrokken specialisten en regiehouders van het WEC.	0	0	1x per week	0
		b.	Het standaard aantal multidisciplinair overleggen per maand met alle betrokken specialisten en zorgverleners in de hele keten. Dus inclusief zorgverleners uit de eerstelijnszorg.	2	0	4x per jaar	0
		c.	Op welke momenten, anders dan het hiervoor genoemde MDO, is er contact tussen zorgverleners in de keten. Dus wanneer hebben de eerstelijns, anderhalvelijns en/of tweedelijns zorgverleners contact behalve tijdens het MDO.	Indien nodig	Voor en/of na polibezoeken	Gemiddeld 2 x per jaar (transfer verpleegkundige/ verpleeghuis/ thuiszorg)	2 x per jaar via de Adviesraad van het WEC

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
29	Regie in de keten		Welke zorgverlener heeft tijdens de behandeling van patiënten in het WEC de regie over patiënten?	Anders	De specialist van het WEC	Anders	De specialist van het WEC
			Indien ‘anders’, welke zorgverlener heeft de regie tijdens behandeling in het WEC?	Wondconsultent en toekomst ook Wondverpleegkundige		Diabetische voet verpleegkundig specialist en ulcus cruris specialistisch verpleegkundige	Wondconsulent. Streven is om straks een PA chirurgie op te leiden die de regie gaat voeren.
30	Multidisciplinair overleg	a.	Het standaard aantal multidisciplinair overleggen per maand met alle betrokken specialisten en regiehouders van het WEC.	0 intern wel 1x per week DV MDO	4	Voetenspreekuur	1
		b.	Het standaard aantal multidisciplinair overleggen per maand met alle betrokken specialisten en zorgverleners in de hele keten. Dus inclusief zorgverleners uit de eerstelijnszorg.	0	1	0	0
		c.	Op welke momenten, anders dan het hiervoor genoemde MDO, is er contact tussen zorgverleners in de keten. Dus wanneer hebben de eerstelijns, anderhalvelijns en/of tweedelijns zorgverleners contact behalve tijdens het MDO.	Papieren overdracht. Bij problemen wordt gebeld	Jaarlijkse nascholingen; 2-3 per jaar	Nog niet georganiseerd	Via teleconsult, wekelijks afstemming en incidenteel afhankelijk van de patiënt.

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
31	Verwijzingen	a.	Binnen hoeveel weken gemiddeld wordt een patiënt gezien in het WEC. Anders gezegd: hoeveel weken gemiddeld is de patiënt onder behandeling van de huisarts, voordat de patiënt het eerste consult krijg in het WEC.	45	Onbekend	1	Onbekend
		b.	Zelf verwijzing: het aantal patiënten dat zichzelf verwijst naar het WEC, zonder tussenkomst van andere zorgverleners.	5	Onbekend, dit wordt niet aangemoedigd	0	0
32	Overdracht van patiënten	a.	Volgens welke protocollen en/of richtlijnen vindt de overdracht van patiënten plaats vanuit het WEC naar de eerstelijnszorg.	Geen richtlijnen of protocollen worden gebruikt tijdens de overdracht	Geen richtlijnen of protocollen worden gebruikt tijdens de overdracht	Door het WEC zelf ontworpen richtlijnen of protocollen	Door het WEC zelf ontworpen richtlijnen of protocollen
		b.	Patiëntkarakteristieken, wond karakteristieken, diagnose, datum van opvolging, behandelplan en namen van verantwoordelijke zorgverleners zijn opgenomen in de overdracht.	Ja	Ja	Ja	Ja
		c.	Er is een gestandaardiseerd follow-up proces voor wanneer de patiënt het WEC verlaat om verder behandeld te worden in de eerstelijn.	Ja	Nee	Ja	Ja
		d.	Welke andere maatregelen dan een protocol neemt het WEC om de overdracht van patiënten effectief te laten verlopen?	Geen	Geen	Gezamenlijk EPD	Schriftelijke en/of mondelinge overdracht

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
31	Verwijzingen	a.	Binnen hoeveel weken gemiddeld wordt een patiënt gezien in het WEC. Anders gezegd: hoeveel weken gemiddeld is de patiënt onder behandeling van de huisarts, voordat de patiënt het eerste consult krijg in het WEC.	Onbekend. Onderzoek toont aan meer dan 30 weken	30	Onbekend	20
		b.	Zelf verwijzing: het aantal patiënten dat zichzelf verwijst naar het WEC, zonder tussenkomst van andere zorgverleners.	0	Onbekend	0	0
32	Overdracht van patiënten	a.	Volgens welke protocollen en/of richtlijnen vindt de overdracht van patiënten plaats vanuit het WEC naar de eerstelijnszorg.	Landelijke richtlijnen of protocollen	Landelijke richtlijnen of protocollen	Geen richtlijnen of protocollen worden gebruikt tijdens de overdracht	Landelijke richtlijnen of protocollen
		b.	Patiëntkarakteristieken, wond karakteristieken, diagnose, datum van opvolging, behandelplan en namen van verantwoordelijke zorgverleners zijn opgenomen in de overdracht.	Ja	Ja	Ja	Ja
		c.	Er is een gestandaardiseerd follow-up proces voor wanneer de patiënt het WEC verlaat om verder behandeld te worden in de eerstelijn.	Nee	Nee	Nee	Ja
		d.	Welke andere maatregelen dan een protocol neemt het WEC om de overdracht van patiënten effectief te laten verlopen?	Geen	Foto's	Telefonisch contact	Soms komt de mantelzorger of thuiszorg nog een keer kijken, of gaat de medewerker langs bij vervolginstelling.

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
33	Marketing		Het WEC promoot haar zorgproducten en zorgdiensten in de keten.	Ja	Ja	Ja	

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
33	Marketing		Het WEC promoot haar zorgproducten en zorgdiensten in de keten.	Nee	Nee	Ja	Nee

Dataverzameling en procesverbetering

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
34	Elektronisch Patiënten Dossier	a.	Intramuraal of transmuraal Elektronisch Patiënten Dossier	Intramuraal EPD	Intramuraal EPD	Intramuraal EPD	Intramuraal EPD
		b.	Alle betrokken zorgverleners in de hele keten hebben direct toegang tot het EPD van de patiënt wanneer dat nodig is.	Nee	Nee	Nee	Nee
		c.	Indien 34b met nee beantwoord is, waarom niet?	Zo ver is de techniek nog niet	Het EPD is niet vanuit het WEC inzichtelijk	Extramuraal hebben wij een apart EPD.	Niet iedereen is op het EPD aangesloten
		d.	Wonden worden gefotografeerd en de digitale foto's worden opgenomen in het EPD van de patiënt.	Ja	Ja	Ja	Ja
		e.	Op welke wijze krijgt de zorgverlener inzicht in het genezingsproces van patiënten?	Via foto's en overdracht	Via foto's metingen en rapportages	Via inzage in EPD en Wondbespreking.	mondeling of schriftelijk
35	Documentatie	a.	Welke data wordt verzameld in het WEC? Zoals patiëntgegevens, wondkenmerken.	Wondkenmerken, behandelperiode	Patiëntengegevens en oorzaak van de wond	Via EPD, eigen Excel registratie document, via apart EPD (met thuiszorg).	
		b.	Wat is het doel van dataverzameling?	Voordeel WEC aantonen	Verzamelen van IGZ indicator	Registratie en analyse	

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
34	Elektronisch Patiënten Dossier	a.	Intramuraal of transmuraal Elektronisch Patiënten Dossier	Intramuraal EPD	Intramuraal EPD	Intramuraal EPD	Transmuraal EPD
		b.	Alle betrokken zorgverleners in de hele keten hebben direct toegang tot het EPD van de patiënt wanneer dat nodig is.	Nee	Nee	Ja	Ja
		c.	Indien 34b met nee beantwoord is, waarom niet?	Nog niet gereed.	I.v.m. privacy		
		d.	Wonden worden gefotografeerd en de digitale foto's worden opgenomen in het EPD van de patiënt.	Ja	Ja	Ja	Ja
		e.	Op welke wijze krijgt de zorgverlener inzicht in het genezingsproces van patiënten?	Via EPIC is er een wonddossier aangemaakt en via notities.	Foto's, MDO, polibezoeken	Verslaglegging in het medisch dossier	Wordt besproken tijdens de behandeling
35	Documentatie	a.	Welke data wordt verzameld in het WEC? Zoals patiëntgegevens, wondkenmerken.	Nog niet geregeld in EPIC, pas gestart 1-4-2016 dit moet nog verder gebouwd en aangepast worden.	Volledige registratie is digitaal met data verzameling aan gekoppeld.	Vanuit het EPD kan informatie worden gegenereerd	Alle data wordt verzameld in een EPD die voor elk betrokken zorgverlener toegankelijk is.
		b.	Wat is het doel van dataverzameling?	Registratie en kwaliteit, toetsen van het beleid en leren van de resultaten.	Uitkomsten van zorg	Verbeteren van de wondzorg in kwaliteit	Inzicht krijgen in genezingstendens, duur van behandeling.

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
36	Evaluatie van het organisatieproces van het WEC	a.	Het aantal keer per jaar dat het organisatieproces van het WEC wordt geëvalueerd door een gestandaardiseerde methode zoals PDCA.	1	0	Geen gestandaardiseerde methode. Via eigen overlegmomenten van het WEC.	Dit wordt geëvalueerd in het overleg, gemiddeld 2 x per jaar.
		b.	Het aantal keer per jaar dat het WEC focusgroepen met patiënten organiseert om de zorg in het WEC te evalueren.	0	0	1x per jaar een symposium	0
		c.	Wat zijn vervolgstappen na het evalueren van het organisatieproces van het WEC?		Nee	Plannen van de verbeterpunten en dan opnieuw evalueren.	Gericht op scholing, verbeteren processen en innovatie
37	Interne audits		Het aantal interne audits in het WEC per jaar, door bijvoorbeeld de tracermethodiek.	0	0	2x per jaar	0

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
36	Evaluatie van het organisatieproces van het WEC	a.	Het aantal keer per jaar dat het organisatieproces van het WEC wordt geëvalueerd door een gestandaardiseerde methode zoals PDCA.	0	0	2 keer per jaar	1
		b.	Het aantal keer per jaar dat het WEC focusgroepen met patiënten organiseert om de zorg in het WEC te evalueren.	0	4	0	1
		c.	Wat zijn vervolgstappen na het evalueren van het organisatieproces van het WEC?	n.v.t.	Bespreken binnen WEC commissie. Momenteel overleg regionaal project (eerste tweede lijn evaluatie).	Verbeterproces uitvoeren	WEC is net opgestart, hopelijk per jan ook de anderhalve lijn, met pilot DFZ dan ook monitoring en verbetering
37	Interne audits		Het aantal interne audits in het WEC per jaar, door bijvoorbeeld de tracermethodiek.	0	0	0	1

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
38	Onderzoek	a.	Het WEC voert wetenschappelijk onderzoek uit.	Nee	Nee	Ja	Nee
		b.	Indien vraag 38a met ja is beantwoord, op welke wijze is wetenschappelijk onderzoek in het WEC vormgegeven?			Meewerken aan wetenschappelijk onderzoek, literatuurstudies voor protocollering.	
		c.	Het aantal unieke publicaties van wetenschappelijk onderzoek door/in samenwerking met het WEC.		0	1 en een 2e is momenteel bezig.	
		d.	Het WEC participeert in onderzoek naar nieuwe medicijnen/verbandmiddelen en devices/technieken.		Nee	Ja met medicijnen/ verbandmiddelen en devices/technieken	Ja met medicijnen/ verbandmiddelen

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
38	Onderzoek	a.	Het WEC voert wetenschappelijk onderzoek uit.	Nee	Ja	Ja	Nee
		b.	Indien vraag 38a met ja is beantwoord, op welke wijze is wetenschappelijk onderzoek in het WEC vormgegeven?		Participatie onderzoek vanuit UT Twente, RCT vaatchirurgie landelijk, cohort studies, etc.	Vanuit zorgpad ontwikkeling	
		c.	Het aantal unieke publicaties van wetenschappelijk onderzoek door/in samenwerking met het WEC.	0	5 PubMed.		
		d.	Het WEC participeert in onderzoek naar nieuwe medicijnen/verbandmiddelen en devices/technieken.	Ja met medicijnen/ verbandmiddelen en devices/technieken	Ja met medicijnen/ verbandmiddelen en devices/technieken	Ja met medicijnen/ verbandmiddelen en devices/technieken	Nee

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
39	Onderwijs	a.	Wat is het beleid van het WEC omtrent scholing van staf?	Theorie en training on the job	Geen beleid	Bezoeken van symposia en congressen en verplichte scholingen als BLS en Brandpreventie en rampoefening.	Ieder jaar wordt een opleidingsplan gemaakt
		b.	Op welke wijze wordt door scholing en training het expertiseniveau van staf van het WEC hoog gehouden naast officiële activiteiten voor de BIG registratie? Bijvoorbeeld verplicht aantal scholingsdagen, budgeten voor scholing.	Budget voor scholing en training on the job	Geen beleid	Minimaal 1 tot 2 congressen per jaar. Hier is een vast budget voor.	Staat in opleidingsplan, interne en externe scholing.
		c.	Het WEC biedt trainingen en onderwijs aan eerstelijns zorgverleners (zoals huisartsen, thuiszorgmedewerkers).	Ja	Ja	Ja	Ja
		d.	Indien 39c met ja beantwoord, wat is de frequentie van trainingen?	Naar wens van de eerstlijnszorgverleners	Naar wens van de eerstlijnszorgverleners	Minder dan 1x per maand	Wekelijks
		e.	Indien 39c met nee beantwoord is, op welke wijze draagt het WEC anders bij aan kennisverspreiding in de keten?				
		f.	De gegeven educatie is geaccrediteerd.	Nee	Ja	Ja	Ja

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
39	Onderwijs	a.	Wat is het beleid van het WEC omtrent scholing van staf?	Scholingsplan in de maak	Via een persoonlijk ontwikkelplan	Nee	E-learning, specifieke wondcursus, kwaliteitskaders voor zwachtelen
		b.	Op welke wijze wordt door scholing en training het expertiseniveau van staf van het WEC hoog gehouden naast officiële activiteiten voor de BIG registratie? Bijvoorbeeld verplicht aantal scholingsdagen, budgeten voor scholing.	In de maak, wel bedsite teaching, casusanalyse en klinisch redeneren, wens intern opleiden van personeel	Zie bovenstaande en aanbieden congressen betaald vanuit wetenschapspot.	Nee	1 scholingsdag per jaar, kleine vergoeding per poli voor symposia
		c.	Het WEC biedt trainingen en onderwijs aan eerstelijns zorgverleners (zoals huisartsen, thuiszorgmedewerkers).	Nee	Ja	Ja	Ja
		d.	Indien 39c met ja beantwoord, wat is de frequentie van trainingen?		Minder dan 1x per maand	Naar wens van de eerstlijnszorgverleners	Naar wens van de eerstlijnszorgverleners
		e.	Indien 39c met nee beantwoord is, op welke wijze draagt het WEC anders bij aan kennisverspreiding in de keten?	Dit moet nog georganiseerd worden			
		f.	De gegeven educatie is geaccrediteerd.		Ja	Ja	Nee

Kosten

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
40	Financiering	a.	De wijze waarop de behandelingen van het WEC worden gedeclareerd.		Per patiënt	Per patiënt	Anders
			Indien 'anders', hoe worden behandelingen gedeclareerd?				DBC
		b.	Welke financieringsstromen kent het WEC?		DOT	DOT	DBC
		c.	Wie is financieel risicodrager in de keten wanneer patiënten worden behandeld in het WEC?		Het ziekenhuis (het WEC)	Het ziekenhuis (het WEC)	Het ziekenhuis (het WEC)
			Indien 'anders', wie is financieel risicodrager?			Supervisor (Vaatchirurg)	
		d.	Het WEC is eigen budgethouder met een eigen verantwoordelijkheid voor betreffende inkomsten en uitgaven.		Nee	Nee	Nee
41	Kosten van zorg	a.	De totale kosten van wondverbandmiddelen en devices per type wond in euro's.	-	-	-	Niet inzichtelijk
		b.	De totale kosten van medische zorg per type wond in euro's (uitgezonderd wondverbandmiddelen en devices).	-	-	-	Niet inzichtelijk
42	Totale kosten van het WEC		De totale kosten van het WEC inclusief: materialen, devices, medische zorg, vervoer etc.	-	-	-	Niet inzichtelijk

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
40	Financiering	a.	De wijze waarop de behandelingen van het WEC worden gedeclareerd.	Anders	Per patiënt	Per verrichting	Per patiënt
			Indien 'anders', hoe worden behandelingen gedeclareerd?	DOT			
		b.	Welke financieringsstromen kent het WEC?	DOT, poliklinische apotheek, thuiszorg	Tweedelijns en studies. MSVT volgt 2016		MSVT
		c.	Wie is financieel risicodrager in de keten wanneer patiënten worden behandeld in het WEC?	Het ziekenhuis (het WEC)	Het ziekenhuis (het WEC)	Het ziekenhuis (het WEC)	Anders
			Indien 'anders', wie is financieel risicodrager?				Expertise organisatie voor gespecialiseerde wondzorg.
		d.	Het WEC is eigen budgethouder met een eigen verantwoordelijkheid voor betreffende inkomsten en uitgaven.	Nee	Nee	Nee	Nee
41	Kosten van zorg	a.	De totale kosten van wondverbandmiddelen en devices per type wond in euro's.	-	-	Gegevens zijn niet te achterhalen	-
		b.	De totale kosten van medische zorg per type wond in euro's (uitgezonderd wondverbandmiddelen en devices).	-	-	Lastig te achterhalen	-
42	Totale kosten van het WEC		De totale kosten van het WEC inclusief: materialen, devices, medische zorg, vervoer etc.	-	-	Lastig te achterhalen	-

Uitkomsten

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
43	Healing rate	a.	Het percentage genezen Ulcus Cruris wonden binnen 3 maanden na het eerste consult.	-	-	-	-
		b.	Het percentage genezen diabetische voeten binnen 3 maanden na het eerste consult.	-	-	-	-
		c.	Het percentage genezen decubitus wonden binnen 3 maanden na het eerste consult.	-	-	-	n.v.t.
44	Healing time	a.	De gemiddelde tijd in weken dat de Ulcus Cruris wonden volledig genezen zijn.	6,7	6,1	5,7	-
		b.	De gemiddelde tijd in weken dat diabetische voeten volledig genezen zijn.	5,6	6,2	5,9	n.v.t.
		c.	De gemiddelde tijd in weken dat decubitus wonden volledig genezen zijn.	6	6,3	6,7	n.v.t.
45	Recidieven		Het aantal wonden met een recidief binnen een jaar na het ontslag uit het WEC.				-

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
43	Healing rate	a.	Het percentage genezen Ulcus Cruris wonden binnen 3 maanden na het eerste consult.	-	-	-	50%
		b.	Het percentage genezen diabetische voeten binnen 3 maanden na het eerste consult.	-	-	-	-
		c.	Het percentage genezen decubitus wonden binnen 3 maanden na het eerste consult.	-	-	-	-
44	Healing time	a.	De gemiddelde tijd in weken dat de Ulcus Cruris wonden volledig genezen zijn.	-	-	-	-
		b.	De gemiddelde tijd in weken dat diabetische voeten volledig genezen zijn.	-	-	-	-
		c.	De gemiddelde tijd in weken dat decubitus wonden volledig genezen zijn.	-	-	-	-
45	Recidieven		Het aantal wonden met een recidief binnen een jaar na het ontslag uit het WEC.	-	-	0	-

Nr.	Indicator		Definitie/ Subindicator	A	B	C	D
46	Complicaties	a.	Hoe worden complicaties geregistreerd?	Geen vaste database. Wordt besproken met betrokkenen.	Geen registratie	Niet	via EPD
		b.	Worden complicaties door de staf van het WEC geëvalueerd?	Ja	Nee	Nee	Ja
		c.	Het aantal complicaties tijdens de behandeling in het WEC.	5	Onbekend	-	Niet geregistreerd voor WEC specifiek
47	Patiënttevredenheid		Uitkomst en of score van het patiënttevredenheidsonderzoek.	-	Geen patiënten-tevredenheidsonder-zoek	Geen	Zeer tevreden patiënten = 59,33%, NPS = 64,72%
48	Kwaliteit van leven	a.	Welke methode wordt gebruikt om de kwaliteit van leven te meten? Bijvoorbeeld de SF-36 score gemeten bij binnenkomst en drie maanden na behandeling in het WEC.	Geen	Geen	Geen	Geen
		b.	Wat is de uitkomst van de meting naar de kwaliteit van leven van patiënten van het WEC.	-	-	-	-
		c.	Is deze methode geschikt voor het meten van de kwaliteit van leven van patiënten van het WEC? Waarom wel of niet?	-	-	-	-

Nr.	Indicator		Definitie/ Subindicator	E	F	G	H
46	Complicaties	a.	Hoe worden complicaties geregistreerd?	Complicatie registratie in EPIC	DSV registratie systeem (intern EPD)	Complicatie registratie	In transmuraal en intramuraal EPD
		b.	Worden complicaties door de staf van het WEC geëvalueerd?	Nee	Ja	Ja	Ja
		c.	Het aantal complicaties tijdens de behandeling in het WEC.	-	20%	Onbekend	-
47	Patiënttevredenheid		Uitkomst en of score van het patiënttevredenheidsonderzoek.	-	Geen	Geen onderzoek gericht op het WEC	Nog niet afgenomen
48	Kwaliteit van leven	a.	Welke methode wordt gebruikt om de kwaliteit van leven te meten? Bijvoorbeeld de SF-36 score gemeten bij binnenkomst en drie maanden na behandeling in het WEC.	Nog niet, komt wel in EPIC zou mooi zijn dat het ook in een transmuraal EPD zit.	Geen	Geen WEC gerelateerde meting voor de kwaliteit van leven	-
		b.	Wat is de uitkomst van de meting naar de kwaliteit van leven van patiënten van het WEC.	-	Geen	Geen WEC gerelateerde meting voor de kwaliteit van leven	-
		c.	Is deze methode geschikt voor het meten van de kwaliteit van leven van patiënten van het WEC? Waarom wel of niet?	Weten we niet, zou mooi zijn als daar onderzoek naar gedaan gaat worden.	Twijfelachtig. Kwaliteit van leven analysen zijn sterk afhankelijk van uitgangspositie en dit verschilt sterk per diagnose.	Geen WEC gerelateerde meting voor de kwaliteit van leven	-

3. Representation of a benchmark report

In this chapter, an example of a report including the evaluation and comparison of the benchmark results for wound centres is included. Furthermore, recommendations were given to improve care of these centres by examples of other participating wound centres.

Rapportage naar aanleiding van de benchmark Wond Expertise Centra 2016

Wond Expertise Centrum XX

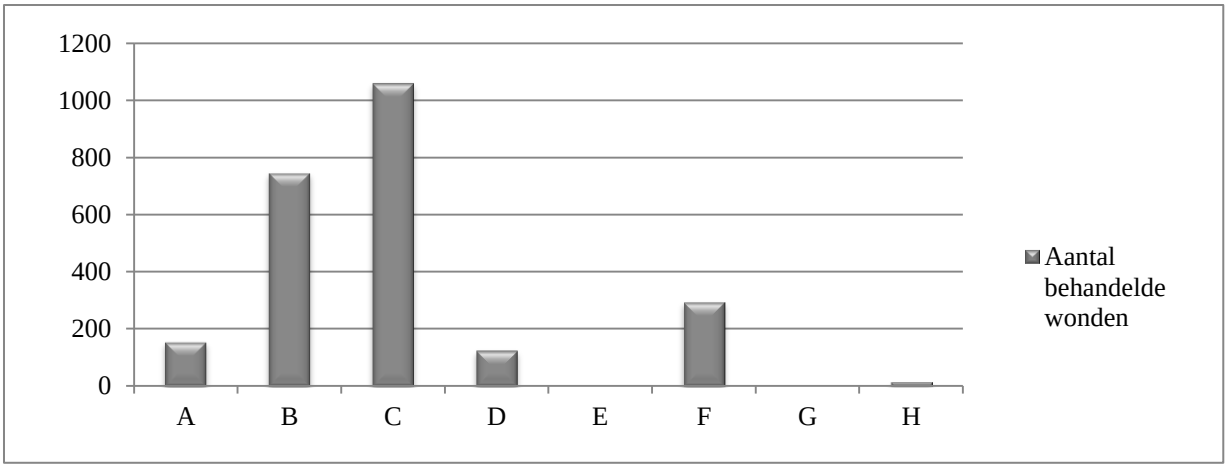
Ter attentie van XX

Het WEC XX is weergegeven als wondcentrum ‘B’.

In het Excel bestand vindt u een uitgebreid overzicht van de benchmark uitkomsten.

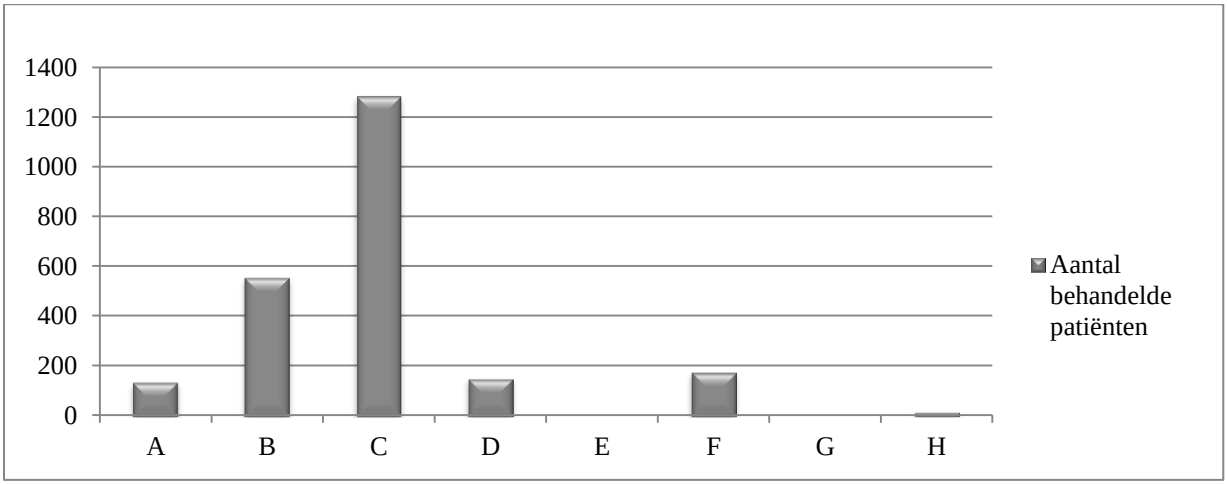
Output

Het WEC behandelt verschillende wonden, voornamelijk dermatologische wonden. Figuur 1 geeft het totaal aantal behandelde wonden van de deelnemende centra weer. Centrum B heeft op één centrum na de meest wonden behandeld in het WEC.



Figuur 1 - Totaal aantal behandelde wonden

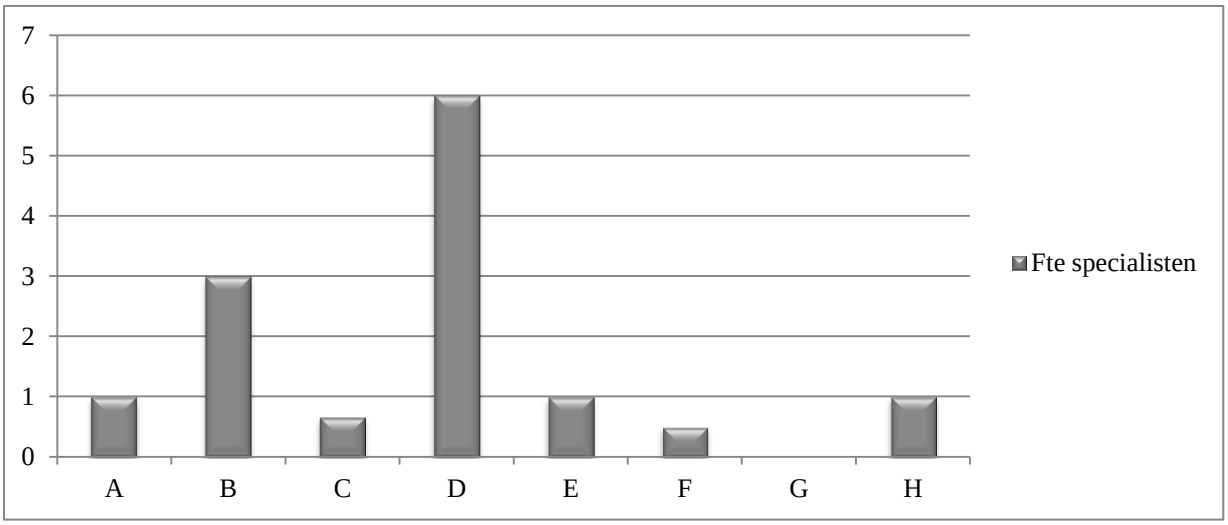
Figuur 2, het totaal aantal behandelde patiënten, is vergelijkbaar met figuur 1. Ook hier is centrum B het centrum dat de op één na de meeste patiënten behandeld heeft.



Figuur 2 - Totaal aantal behandelde patiënten

Staf

Het WEC werkt binnen de medische discipline chirurgie en is gestart met het opzetten van een samenwerking met de afdeling dermatologie. Dit is aanbevolen omdat een multidisciplinair wond centrum bijdraagt aan effectieve zorg. Het aantal fte medisch specialisten, zoals te zien in figuur 3, is aan de hoge kant. Verpleegkundig specialisten of arts assistenten zouden medisch specialisten kunnen ontlasten door taken over te nemen. Het aantal wondverpleegkundigen met meer dan 5 jaar ervaring is gemiddeld in wondcentrum B.



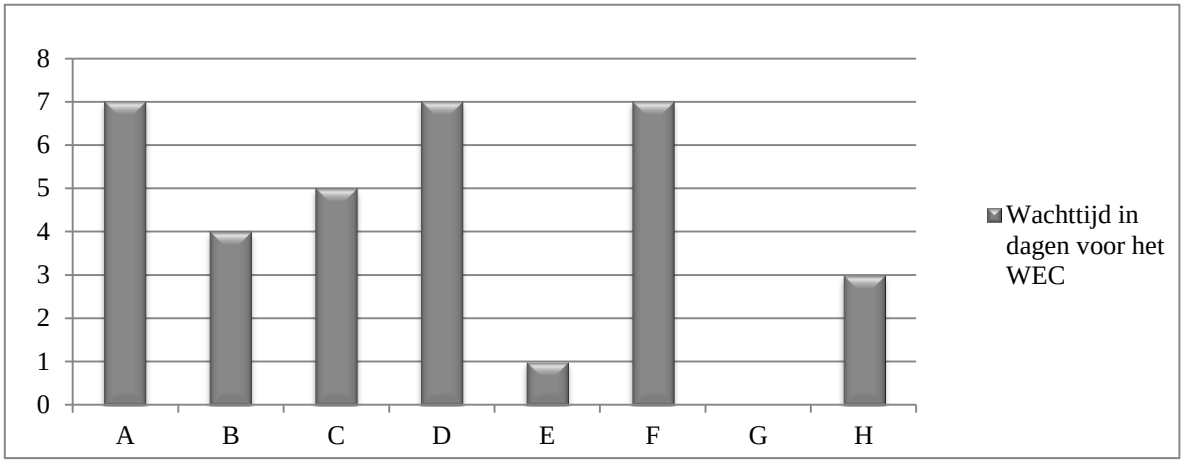
Figuur 3 - Fte specialisten betrokken bij het WEC

De patiënt

Het WEC kan verbeteren op het gebied van patiëntgerichtheid. Er zijn nog weinig faciliteiten ingericht om dit onderwerp te verbeteren. Door educatie, het gezamenlijk opstellen van een behandelplan en deze vervolgens te laten goedkeuren door de patiënt wordt de patiëntgerichtheid verhoogd. Wondcentrum B kan hier leren van andere centra. Patiëntgerichtheid verbetert compliance, wat bijdraagt aan een effectieve en efficiënte wondgenezing (Rayner, 2006).

De zorg

De gemiddelde wachttijd in dagen voor het eerste consult is relatief laag, zoals gepresenteerd in figuur 4. In het gesprek van 9 september 2016 kwam naar voren dat de poliklinieken vaak vol zitten. Hierdoor kan de wachttijd verder oplopen. Een oplossing voor minder volle poliklinieken is het thuis behandelen van patiënten. Hierbij is het nodig dat de expertise in de hele wondzorgketen hoog is. Het WEC kan hierin de regie nemen door expertise te verhogen met behulp van standaard scholing van eerstelijnszorgverleners. Ook kunnen er afspraken worden gemaakt met patiënten om enkel wondverpleegkundigen de wond te laten behandelen.



Figuur 4 - Wachttijd in dagen voor het WEC

Patiënten zijn gemiddeld 20 weken onder behandeling in uw WEC. Dit is relatief laag. Verder is het een compliment waard dat dit cijfer inzichtelijk is.
Het WEC biedt geen technologische mogelijkheden voor het leveren van zorg op afstand. Deze faciliteiten zullen de toegankelijkheid verbeteren.

Ketenzorg

Er zijn geen ketenpartners van het WEC opgegeven. Er is wel samenwerking met VVT-instellingen en thuiszorgorganisaties door scholing en informatie uitwisseling.
Ondanks dat het WEC aangeeft samenwerking met dermatologie op te starten is er nog geen standaard multidisciplinair overleg ingeregeld. Wel is er, voor- en na polibezoeken, contact tussen zorgverleners uit de keten. Door standaard multidisciplinaire overleggen, tussen bijvoorbeeld de huisarts, wondverpleegkundige en vaatchirurg, ontstaat er afstemming in de keten en krijgen patiënten tijdiger de juiste behandeling.
Het aantal weken voordat een patiënt wordt doorverwezen naar het WEC is niet opgegeven. Het is aannemelijk dat dit niet zichtbaar is door de ontbrekende samenwerking met eerstelijns zorgverleners, zoals de huisarts. Door deze gegevens inzichtelijk te maken, aan de hand van een transmuraal EPD, kunnen verbetermaatregelen genomen worden. Uit gesprekken met de verschillende centra bleek dat de verwijzingstijd meer dan 30 weken bedraagt. Het is niet met resultaten onderbouwd, maar de verwachting is wanneer deze verwijzingstijd wordt terug gedrongen, de behandeltijd en genezingsduur ook korter zal zijn. Dit zal de algemene kwaliteit van het WEC verbeteren, wat betreft effectiviteit, efficiëntie, tijdige behandeling en patiëntgerichtheid.
Er worden geen richtlijnen en protocollen door het WEC gebruikt. Studies die zijn geïncludeerd in het onderzoek tonen aan dat het gebruik van richtlijnen en protocollen de zorg verbetert, ten opzichte van geen gebruik van richtlijnen en protocollen.
Daarnaast werd tijdens het gesprek duidelijk dat er verschil is in de samenwerking tussen het WEC en de thuiszorgorganisaties. De relatie met de thuiszorgorganisaties kan worden verbeterd door

bijvoorbeeld het organiseren van symposia. Het gebruik van protocollen en richtlijnen voor meer gestandaardiseerde zorg, geven thuiszorgorganisaties ondersteuning tijdens het verlenen van zorg.

Dataverzameling en procesverbetering

Dataverzameling in het WEC heeft als hoofddoel gegevens aanleveren voor de Inspectie voor de Gezondheidszorg. Het WEC zou data ook kunnen gebruiken om de kwaliteit van het WEC inzichtelijk te maken, te evalueren en te verbeteren. Door interne audits uit te voeren aan de hand van de tracermethodiek waarbij het zorgpad van de patiënt wordt afgelopen, worden verbeterpunten zichtbaar. Een beleid voor scholing van personeel zoals andere centra, geeft handvaten aan personeel om zichzelf te kunnen blijven ontwikkelen.
Het WEC biedt educatie aan eerstelijnszorg verleners. De frequentie van de trainingen hangt af van de vraag door eerstelijnszorgverleners. Het WEC kan de expertise in de keten verhogen door actiever en eerstelijnszorgverleners te scholen.

Kosten

U hebt geen kosten opgegeven.
Wij realiseren ons dat enkele genoemde maatregelen om de kwaliteit te verhogen kosten met zich mee brengen. In de literatuur wordt vermeld: “WEC can be seen as an investment with a high return in patient benefit” (Bosanquet, 1993). Door minder consultaties op de fysieke locatie van het WEC en door kortere behandeltijden als gevolg van een effectievere organisatie, kunnen kosten dalen.

Uitkomsten

XX heeft cijfers aangeleverd wat betreft de healing time. Dit is gemiddeld zes weken, gelijk aan de andere twee centra die deze cijfers kunnen aanleveren. Echter zijn dit alleen de cijfers van XX, en valt er geen conclusie te trekken over alle patiënten die door het WEC worden behandeld. Verdere uitkomst indicatoren zijn niet inzichtelijk.
Er wordt geadviseerd om data te verzamelen in een systeem, wat gaat over alle patiënten van het WEC om kwaliteit inzichtelijk te maken, te evalueren en te verbeteren.

Conclusie

Het WEC kent toegewijde wondverpleegkundigen die zich inzetten om de wondzorg effectief te organiseren, in het ziekenhuis, maar ook in de keten. Het WEC bestaat redelijk lang, maar heeft moeite om echt van de grond te komen. Door een intensievere samenwerking tussen medische disciplines en binnen de keten, kan het WEC meer gaan betekenen. De effectiviteit zal ook richting het bestuur moeten worden aangetoond, om de meerwaarde te bewijzen. Tijdens het gesprek met XX werd duidelijk dat tijd voor de organisatie van zorg schaars is.
Het advies is om de organisatie van de structuur en processen te verbeteren zoals hierboven aangegeven, dit zal leiden tot betere uitkomsten van zorg.

Appendix

Concept Master Thesis

Master Thesis

Health Sciences

Assessing and comparing the quality of wound centres

Lotte Pruim

Version 3.0

UNIVERSITY OF TWENTE.

Master Thesis

Assessing and comparing the quality of wound centres

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Defintions

English	Dutch	Meaning
Integrated care	Anderhalvelijnszorg	Care provided between primary care and secondary care. The aim of this care is to lower costs of care while providing the same qualitative care level as secondary care.
Quality of a WEC	Kwaliteit van een WEC	The six aims for improvement from IOM (Safe, effective, patient centred, timely, efficient, and equitable) cover the term quality in this study.
State of the art	Het nieuwste van het nieuwste	Highest level of the most recent stage of a technique or science, and therefor considered the best.
Suitable indicators	Geschikte indicatoren	Indicators are: acceptable, discriminating, realizable, reliable, changeable, validity.

1. Introduction

The introduction starts with different trends in the current health care landscape related to the subject. Then it describes the current state of wound care which results in the subject; wound expertise centres. Subsequent, the research question appears.

1.1 Current situation in the Dutch healthcare landscape

Rising healthcare costs have forced the government to take measures in order to keep healthcare affordable[1]. Hence, a decentralization policy is implemented that causes a shift from hospital care to primary care which results in new trends such as integrated care[2]. In addition, patients will have more control due to self-management and shared decision making[3]. This combined with more access to information focussing on performance and quality of health care providers, results in a stronger position of patients. At the same time health insurers can use their control function to keep care affordable[4].

Integrated care connects primary care and secondary care. There is a distinction between general and specialized integrated care. General integrated care is the transfer from the hospital to the General Practitioner (GP) in order to deliver care to the patients, such as minor surgeries. Specialized integrated care is single specialized care that can be planned, and where specific knowledge and experience is available to avoid a transfer to secondary care. When the diagnosis is made in this type of care, the patients returns to primary care[5]. Integrated care can be called substitution. An additional purpose is to lower the costs of treating patients in primary care, which is less costly than secondary care, but have care qualitatively equal with secondary care level. In that case it will partly solve the problem of rising healthcare spending which is caused by for example ageing population and more use of costly new technologies and medication.

The increasing control of patients in regard to the delivery of care makes their choices more important. Patients base their choice for a specific care provider mostly on insights of other people and organizations that measure performance and quality, such as accreditation bodies[6]. This transformation to more dominant roles of patients can be called a 'friendly takeover'. Hospitals will have to respond to this by accepting it and using patient's preferences in organizing care[7]. On the other hand, health insurers try to become more dominant. Simultaneously the application of Value-Based Purchasing (VBP) is increasing, which is *the organized attempts by purchasers to ensure and improve the quality of health programs when negotiating costs with providers and insurers*. This transformation is called 'intentional macro system transformation'[8]. The hospital has to deal with this change and must try to minimize the negative effects for the organization[7].

Continuous Quality Improvement (CQI) is increasingly important partly due to dominant roles of patients and insurers. As is stated by Al-Assaf (2008) *improvement is a process, and a process is continuous. Monitoring should continue, and improvements should be initiated every time they are needed*. Measuring quality must be done for several reasons which are shown in box 1[10].

Box 1 - why measuring quality?[9]

- Transparency
- Responsibility
- Regulation
- Accreditation
- Stimulate quality improvement
- Show the state of quality
- Compare performance
- Information for decision making for patients and health insurers

Quality is defined by Institute of Medicine (IOM) (1990) as: *the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge*[11].

In the report 'Crossing the Quality Chasm' (2001) the IOM offers a framework to improve healthcare by six aims for improvement, which are also dimensions of quality[11]:

Safe	Care should be as safe for patients in healthcare facilities as in their homes.
Effective	The science and evidence behind healthcare should be applied and serve as the standard in the delivery of care.
Patient centred	The system of care should revolve around the patient, respect patient preferences, and put the patient in control.
Timely	Patients should experience no waits or delays in receiving care and service.
Efficient	Care and service should be cost effective, and waste should be removed from the system.
Equitable	Unequal treatment should be a fact of the past; disparities in care should be eradicated.

Donabedian (1980) indicates different indicators that can be used to measure and to continuously improve quality: 'Structure', 'Process', and 'Outcome'[6,12,13]. 'Structure' addresses the organization of care such as human resources, equipment, and organizational structures. 'Process' focuses on the medical practice of an organization, so all activities that are performed from arrival to discharge of patients. 'Outcome' represents the consequences of care[6].
Indicators are based on: evidence from scientific research, guideline recommendations, systematic combination of existing evidence with expert's opinions, and tools such as the AIRE instrument[9]. Developing indicators can by five steps shown in box 2.

Box 2 – Develop indicators
(Braspenning, et al. 2013)
1. Define the goal of the measurement.
2. Select or develop a preliminary set of indicators.
3. Find consensus among target users.
4. Test the indicators empirically.
5. Create a feedback report.

Indicators highly depend on patient group characteristics and healthcare settings. The case mix of hospitals and variation complicate the comparison indicators across organizations [14]. Moreover, *organizations have often difficulty determining which clinical indicators are truly important and represent the process of care provided*[15].

1.2 Current state of wound care

Through developments in the healthcare landscape, such as ageing population and more chronic diseases as diabetics and cardiovascular diseases, the number of wound patients will increase [3,16]. Currently the prevalence of patients with complex wounds is 2% in developed countries[17]; converted to the Netherlands this means 320.000 patients a year. The prevalence is higher amongst elderly people[18]. According to a United Kingdom (UK) study, most frequent wounds are pressure ulcers and leg ulcers. Moreover one in five people had a type of complex wound which has a low prevalence. Therefore, wound care must be approached as a whole rather than as an independent wound type[18].

Complex wounds are defined by Hall et al.(2014) as *superficial-, partial-, or full-thickness skin loss wounds healing by secondary intention*[18]. Complex wounds have a disrupted healing trend caused by pathophysiological disruptions, additionally psychosocial disturbances, lack of knowledge, and insufficient embedding of adequate wound care in healthcare institutions[19].

The costs of wound care increases as a result of the rising prevalence of patients with complex wounds. It is calculated by the National Health Service in the UK that the costs of wound care are €38-59 per inhabitant yearly[17]. The overall costs of chronic wound care in the UK were estimated at 2.3-3 billion pounds a year[20]. In the US, the total costs of chronic wounds are estimated at 25 billion dollar a year[21]. In Australia the costs of wound care are 2.85 billion dollars a year, which is about 2% of the national healthcare budget[22]. In Scandinavian countries the costs are 2% to 4% of the total healthcare expenses[23].

Wound care is a complex service, related to the differences in wounds and differences in healing processes through different treatments[24], the involvment of several therapists such as GPs, medical specialists, elderly care speciaslist, physician assistants, poidatrists, and various locations where wound care is performed such as hospitals, outpatient clinics, nursing homes, and home care. Rondas et al. (2015) suggest that "*the wound care landscape in the Netherland is fragmented, ineffective and done with inadequate professional standardisation",*

alluding to the different health care providers involved in wound care and the different financing of this kind of care[25].

The Dutch professional association for nurses in wound care (V&VN Wound consultants) and the Wound Care Consultant Society (WCS) (2012) suggest that when different therapies are prescribed, an ineffective treatment will result[26]. The recovery time is also longer and patients experience longer unnecessary negative effects such as pain, unpleasant odours, and mobility problems having an influence on the social life of patients[27]. A current development which addresses the problems is Wound Expertise Centres.

1.3 Wound Expertise Centre

A Wound Expertise Centre (WEC) treats patients with complex wounds through a multidisciplinary collaboration between health care providers such as specialists, physicians, GPs, wound nurses, nurse practitioners, home care organizations, and other wound specialists[28]. A WEC provides the following services: keep control over patients with complex wounds, guide, advice, and treat patients for one or more complex wounds. The NZa claims that this type of services generates *on average a more rapid healing of complex wounds with respect to regular treatment methods, resulting in a shorter treatment time and fewer consultations*[30].

Currently, there are more than twenty WECs in the Netherlands[24], a number that is growing due to early mentioned changes in the prevalence of wounds and the government policy.

In 2012, the V&VN wound consultants proposed requirements for the structure of WECs, which were adopted by the Health Care Inspectorate (IGZ).

There is no consensus on the exact location of the WEC in the wound care pathway, nor on the physical side, such as within hospitals as outpatient departments or outside the hospital as a free-standing clinic[28]. Hence, it can be assumed that this probably results in very different types of WECs.

It is proposed that costs can be reduced when the GP is in control of the WEC. So, the WEC is both a care technical innovation and a financial innovation[28].

Considering the trends and changes in healthcare and the specific wound care combined with the increasing importance of quality determines the relevance for the study.

2. The research problem

The different types of providing wound care, different guidelines, indicators for general wound care, and a few indicators for setting up a WEC have been documented in literature. Little attention has been given to the different types of WECs, organization of WECs, and their performance. Moreover, little is known about indicators that can be used to measure, monitor, and continuously improve wound care in a WEC. WECs can be defined more specifically after studying the literature regarding the state of the art of WECs and the added value of this type of services. When the knowledge is acquired, existing WECs will be compared within the Netherlands. This benchmark will be made in order to gain insight in the performance of organizing a WEC and the progress that has to be made. Ultimately, indicators for measuring and improving wound care in WECs are created, based on the scientific literature review, benchmarking, and additional experts' opinions.

Objective of the study

The aim of this study is to assess the quality of a WEC by establish indicators that may help providers of a WEC to assure, control, and improve quality.

Main research question

The main research question of this study is:

> *Does organizing wound care through WECs result in better qualitative outcomes and with which indicators can this relation be established?*

Research questions

1. What is the state of the art of WECs?
    - 2.1 What is the state of the art of WECs?
    - 2.2 What is the added value of this type of services?
2. What is the best practice in WECs?
3. What are suitable performance indicators in order to continuously improve the quality of WECs?
    - 3.1 What are suitable structure indicators?
    - 3.2 What are suitable process indicators?
    - 3.3 What are suitable outcome indicators?

3. Methodology

The study consists of a mixed method approach with a scientific literature review that focuses on wound centres and a benchmarking study is done. The literature review results in preliminary indicators, which were tested by a benchmark of wound centres on their quality performance. The outcomes are the final indicators. In the remaining of this chapter the methods are explained in further detail.

3.1 Scientific literature review

The aim of the scientific literature review is to answer the first research question:

What is the state of the art of Wound Expertise Centres?

The review focuses especially on the Netherlands and international, in order to identify the added value of a WEC.

Databases which are used to find relevant articles are: PubMed, Scopus and the Cochrane library. Besides, Google is used to find relevant guidelines to get input for indicators. Because the term 'WEC; is not officially confirmed, search is done through the use of wide search terms to not exclude any article beforehand. Included are studies containing the next words: 'wond, wound, ulcer, or diabetic' and 'centre, center, centrum, clinic, community, or service'. Furthermore, the words of the definition of quality of IOM (2001) are added: 'safety, equity, effective, efficient, timely, or patient centred'. Due to this wide search, the results are limited to the last five years, and the languages English and Dutch. Dutch words are used for searching Dutch advice reports or institutes such as the IGZ. Medical Subject Headings (MeSH) terms are used to find the most relevant articles. Besides MeSH terms, synonyms, the sequence of words, and the jargon are taken into account.

On the 23th of June, 7647 results were identified. Title and abstract are read, but articles which met the not-inclusion-criteria, as provided in figure 1, were not included in the review. The remaining articles (32) were full-text reviewed and results in an addition of 11 articles by snowballing. 29 articles are excluded after reading the full text by the criteria that are provided in figure 1. 14 articles are left. The characteristics and main outcomes of these articles are provided in chapter 4.

National and international guidelines were used to get input for indicators. Criteria for guidelines are provided in figure 1. A lot of guidelines were not included from well-known organizations, such as the Agency for Healthcare Research and Quality (AHRQ), the Scottish Intercollegiate Guidelines Network (*SIGN*), the Association for the Advancement of Wound Care (AAWC) and the Wound Healing Society (WHS). The reason to exclude these guidelines is because of the major focus on providing clinical care and not on how to organize wound care centres. Furthermore, literature sources used to write the guidelines are already included in the scientific literature review.

For reliability of the scientific literature review, a check of the results is done by a second researcher.
An overview for the literature study is given in figure 1.

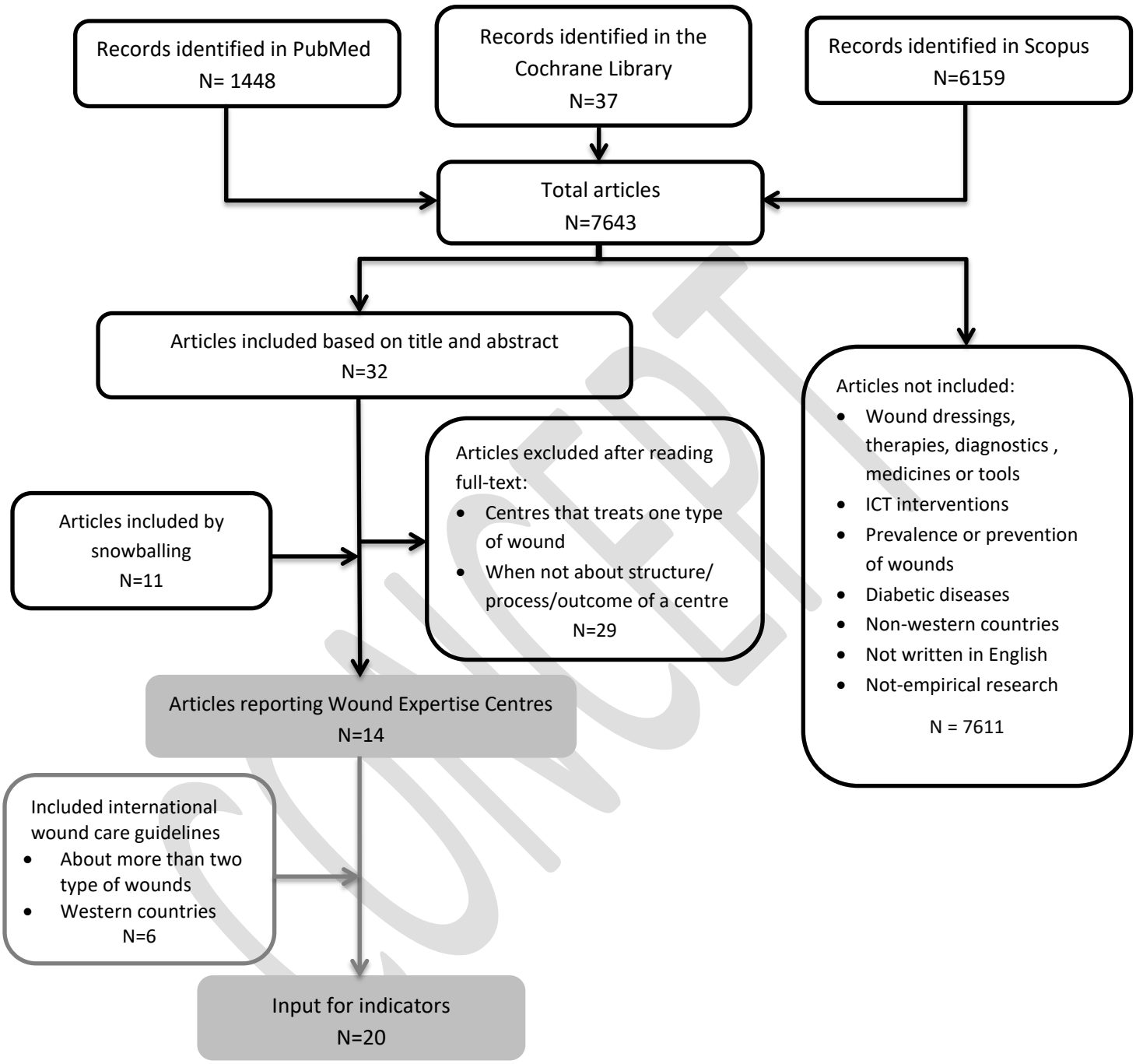

Figure 1 – overview of the scientific literature review

3.2 Benchmarking

Benchmarking is "comparing the processes and successes of your competitors or of similar top-performing organizations to your current processes to define, through gap analysis, process variation and organizational opportunities for improvement. Benchmarking is not just about organizations which performs better, but also how they perform better"[31].

"The performance improvement reached by benchmarking will be promoted by[32]:

- providing an environment amenable to organizational change through continuous improvement and striving to match industry-leading practices and results;
- creating objective measures of performance that are driven by industry leading targets instead of by past performance;
- providing a customer/external focus;
- substantiating the need for improvement; and
- establishing data-driven decision-making processes"

The benchmark technique will be applied to compare eight state of the art examples elsewhere in the Netherlands. For this benchmark the 13 steps for benchmarking from van Lent are used[33]:

Step 1. Determine what to benchmark.

The performance of different WECs will be compared.

Step 2. Form a benchmarking team.

Step 3. Choose benmarking partners: XX.

Partners should be positively convinced to participate in the research, such as the learning effect of the benchmark, for both best practices and underperforming organizations

Step 4. Define and verify the main characteristics of the partners.

1. XX
    a. Contact person: XX (manager)
    b. Type of institution: General hospital
    c. Medical discipline of the WEC: dermatology, surgery
    d. Number of 1e outpatient visits: XX
    e. Number of open DBC's: XX
    f. Number of employees: XX
    g. Total expenditure: XX
2. XX
    a. Contact person: XX (vascular surgeon).
    b. Type of institution: Top clinical hospital
    c. Medical discipline of the WEC: Surgery
    d. Number of 1e outpatient visits: XX
    e. Number of open DBC's: XX
    f. Number of employees: XX
    g. Total expenditure: XX
3. XX
    a. XX (wound consultant)
    b. Type of institution: Ltd.
    c. Medical discipline of the WEC: Dermatology
    d. Number of 1e outpatient visits: XX
    e. Number of open DBC's: XX
    f. Number of employees: XX
    g. Total expenditure: XX
4. *XX*
    a. Contact person: XX (dermatologist).

b. Type of institution: Top clinical hospital
c. Medical discipline of the WEC: dermatology, surgery, and plastic surgery
d. Number of 1e outpatient visits: XX
e. Number of open DBC's: XX
f. Number of employees: XX
g. Total expenditure: XX

5. XX
   a. Contact person: XX (vascular surgeon)
   b. Type of institution: Top clinical hospital
   c. Medical discipline of the WEC: surgery
   d. Number of 1e outpatient visits: XX
   e. Number of open DBC's: XX
   f. Number of employees: XX
   g. Total expenditure: XX
6. XX
   a. Contact person: XX (wound consultant)
   b. Type of institution: General hospital
   c. Medical discipline of the WEC: surgery
   d. Number of 1e outpatient visits: XX
   e. Number of open DBC's: XX
   f. Number of employees: XX
   g. Total expenditure: XX
7. XX
   a. Contact person: XX (wound consultant)
   b. Type of institution: Top clinical hospital
   c. Medical discipline of the WEC: dermatology
   d. Number of 1e outpatient visits: XX
   e. Number of open DBC's: XX
   f. Number of employees: XX
   g. Total expenditure: XX
8. XX
   a. Contact person: XX (vascular surgeon)
   b. Type of institution: Top clinical hospital
   c. Medical discipline of the WEC: surgery
   d. Number of 1e outpatient visits: XX
   e. Number of open DBC's: XX
   f. Number of employees: XX
   g. Total expenditure: XX

Step 5. Identify stakeholders

Stakeholders are: hospitals, the health insurers, GPs, patients. During this benchmark only hospitals are a stakeholder. "Involve stakeholders to obtain consensus about the indicators, to provide information on data availability and reliability, and to assist in data collection"[33].

Step 6. Construct a framework to structure the indicators

The framework is based on Donabedian's structure, process and outcome indicators, and with the six aims of improvement of the IOM. These are: Safe, Effective, Efficient, Timely, Patient centred and Equitable.

Step 7. Develop relevant and comparable indicators

Based on the framework a literature study is conducted with the aim to receive input for indicators (chapter 4). The final selected articles are completely read and possible input for indicators to measure

the quality of WECs is marked. This is also done for relevant guidelines of wound care. All outcomes from this part of the investigation is gathered and compared on relevance, frequency of mentioning, specificity, and measurability. Then indicators for benchmarking are developed and are submitted to stakeholders.

Step 8. Stakeholder select indicators.

The first developed indicators are presented to a dermatologist, managers of the WECs, specialist nurses, and indicator experts. Their feedback is subsequently processed, so that ultimately the final set of indicator could establish.

Step 9. Measure the set of performance indicators.

"Quantitative data were retrieved from annual reports and requested from the administrative departments, whereas qualitative data were mainly collected by conducting semi-structured interviews during the site visits"[33].

Step 10. Analyse the performance differences.

This step determine the best practice, or better said 'good practice' because it is not up to the researcher to determine what is best unless it is noted in literature. The outcome of this step is performed in chapter 6.

Step 11. Take action: results were presented in a report and recommendations were given.

The results of the benchmark will be used to advice organisations in qualitative manner and to develop a set of performance indicators for continuous improvement of the quality of a WEC. This is provided in chapter 7, develop final indicators.

Step 12. Develop improvement plans

Step 13. Implement the improvement plans

The study provides step 1 to 11 because it is up to the centres themselves to improve the processes and organisation of the WECs. The results of the benchmark will be combined with the scientific literature review and both will create a set of indicators that measure the success of WECs.

3.3 Baseline measurement

A baseline measurement is done for the region XX with the aim to check to the appropriateness of the developed indicators. The baseline measurement is done with the indicators derived from the literature review and the benchmark. The benchmark also contains a part of the baseline measurement when some indicators already have been measured by the benchmark. The amount of time or the number of patients which is used for the measurement depends on the characteristics of the indicators. After the baseline measurement, targets were set to improve care and the indicators. It will be parallel with step 4 of the indicator development, shown in box 2 of chapter 1: test the indicators empirically.

Further steps in the study:

Data analysis

At the end of each study phase, data is analysed and short concluded. After all phases, these analyses are combined.

Develop final indicators

Then the final indicators are developed and determined, following a format for indicators. Stakeholders such as insurers, the medical disciplines of a WEC, GPs, and nurses were asked about suitable indicators and their opinions about WECs, which is used as background information.

Advice

The final advice is the indicators for measuring quality in order to determine the quality of a WEC. It is an independent advice for all WECs in the Netherlands.

Final report

The last phase of the study was to report all findings, write the discussion and conclusion, summarize the report, and checking all parts on inside and outside performance.

Research question	Method	Chapter
1. State of the art of WECs	Scientific literature review	4,5
2. The best practice in WECs	Benchmark, Baseline measurement	6
3. Suitable indicators in order to continuous improve quality of WECs	Scientific literature review, Benchmark, Baseline measurement	7

4. Results: scientific literature review

This chapter describes the results of the scientific literature review, which are subsequently used to describe the state-of-the-art of organizing a WEC and to develop indicators for the benchmark.

Table 1 shows information about the final articles in regard to the study design, sample size, type of wound care centre, type of wounds treated, and outcomes. However, the loss of follow-up as well as the timeline of the follow-up was not included because nearly half of the articles describe these criteria. Table 2 shows the characteristics of the followed guidelines.

In this study, the author found only fourteen articles that address Wound Expertise Centre (WEC) out of a very extensive review of more than 7000 search results. Out of those fourteen publications, only one study was carried out in the Netherlands. Thus, it can be obviously concluded that, no much research work focusing on Dutch wound care centres. Moreover, three out of fourteen articles were published over the last five years.

The main core of the reviewed articles was concerned about the case study design. Nevertheless, most of the articles described the wound care centres from organizational view and what medical service such care centres provide. Furthermore, the sample sizes broadly vary between the studies, from slightly more than fifty wounds treated to more than 2600 patients included in the sample size. Additionally, wound care centres have been named very different as community clinics, leg ulcer clinics, hospitals-based wound centres, and wound healing centres.

To summarize, the literature review turned out that there is no significant number of recent studies focusing on WECs practices. Nonetheless, the articles found help to understand the state-of-the-art of WECs.

Table 1A – Study Characteristics of organization directed studies

Author, Publication year, Title, study design	Research design	Sample size	Type of wound centre	Healing rate	Outcomes
Kim et al. 2013 *Critical elements to building an effective wound care centre.* Single case study	Retrospective single case study reviews the critical elements for a successful multidisciplinary wound care centre.	NR	Tertiary care academic-based wound center in Washington, DC. USA. All kind of wounds are treated. The centre has a multidisciplinary approach.	NR	NR
Attinger et al. 2008 *How to make a hospital-based wound center financially viable: the Georgetown University Hospital model.* Single case study	Examination of the performance over six years of operation of the Georgetown University Hospital.	NR	Hospital-based wound center: The Georgetown University Hospital model in Washington, DC USA. All types of wounds are treated. The centre has a multidisciplinary approach.	NR	NR
Rayner 2006 *The role of nurse-led clinics in the management of chronic leg wounds.* Literature review	Considers the need for comprehensive assessment to determine management options, and discusses the contribution that community leg ulcer clinics can make.	NR	Community leg ulcer Nurse led clinics in Australia. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is recommended.	Overall improvement HR of 42-67% is reported by studies.	NR
Lorimer 2004 *Continuity through best practice: design and implementation of a nurse-led community leg-ulcer service*. Retrospective single case study	Analysing a nurse-led community leg-ulcer service.	NR	The Community Care Access Centre, a regional home-care authority in Ontario, Canada. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is recommended.	NR	NR

Table 1B – Study Characteristics of effectiveness studies

Author, Publication year, Title, study design	Research design	Sample size	Type of wound centre	Healing rate	Outcomes (costs, recurrence, duration, visits)
Rondas et al. 2015 *Cost analysis of one of the first outpatient wound clinics in the Netherlands* Cost-effectiveness study	Observational cohort study with a one-year pre-start and one-year post-start comparison of costs.	172 patients	Community-based outpatient wound care clinic in the Netherlands. All kind of wounds are treated A multidisciplinary approach is not reported, but the relation between the clinic and specialist.	62% completely healed after one year introduction of the centre. HR prior to the introduction of the wound centre is not reported. Significance is not reported.	Cost decreased after introducing the outpatient wound clinic by 11.0% and hospital care by 34.7%.
Edwards et al. 2013 *Health service pathways for patients with chronic leg ulcers:*	Observational study and survey; 1. Retrospective study for	70 patients	Specialized wound clinics: a community stand-alone specialist wound clinic within a university health	3 month HR after the introduction of the wound centre: 59% (P<0.001)	The average ulcer duration on admission was 22 weeks (range 2-728 weeks). 46% had a wound over six months before

identifying effective pathways for facilitation of evidence based wound care. Retrospective cross-sectional study and a prospective longitudinal observational study.	the previous 12 months, by a survey and chart audit exploring existing health service pathways. 2. Prospective longitudinal observational study of participants for 24 weeks from admission.		clinics side and an outpatient specialist wound clinic within a large tertiary hospital in Queensland, Australia. Chronic leg ulcers; lower limb leg or foot ulcers are treated. Both clinics have a multidisciplinary approach.	6 month HR after the introduction of the wound centre: 81% (P<0.001) The HR prior to the introduction of the wound centres was not reported.	entering the centre, 17% had a wound over a year or longer before entering the centre. After the introduction of the wound centre, the median time to healing for the total sample was 12 weeks (95% CI 9.3–14.7). The SF-12 Physical Component improved after 24 weeks from 33.5 (SD=10.5) to 34.2(SD=11.4), p= 0.578. The SF-12 Mental Component improved after 24 weeks from 46.6 (SD=11.9) to 49.9 (SD=10.8), p=0.595. The pain score decreased from 50.0 (SD=26.4) to 34.0 (SD=23.3) (range: 0-100), p=0.017.
Harrison et al. 2008 *Nurse clinic versus home delivery of evidence-based community leg ulcer care: a randomized health service trial.* Randomized controlled trial	A prospective randomized control health services trial. Evaluation of home versus clinic care with equivalent care.	126 patients	Nurse clinic versus home delivery. Ontario, Canada. Venous leg ulcers and arterial leg ulcers are treated. Both nurse clinic and home delivery have a multidisciplinary approach.	3 month HR clinic 58.3% compared to home care at 56.7% (P=0.5).	Recurrence rates within one year were 24.6% in the clinic group compared to 21.5% in home care (p = 0.42) No differences were found in reduction in size, pain, health related quality of life, satisfaction with care, number of visits and costs. The SF-12 Physical Component was 35.5 (SD=10.3) for the home group compared to 34.7 (SD=9.7) in the clinic group, p=0.43. The SF-12 Mental Component was 50.9 (SD=10.8) in the home group compared to 48.4 (SD=11.2) in the clinic group, P=0.75.
Sholar et al. 2007 *The specialized wound care center: a 7-year experience at a tertiary care hospital.* Retrospective single case study	Providing baseline outcome measures, which serve as the basis for the comparison of treatment protocols and the development of prospective clinical trials.	2685 patients	A tertiary care hospital based wound center: The Erlanger Wound Care Center in Chattanooga, Tennesse, USA. All kind of wounds are treated. The centre has a multidisciplinary approach.	7 year HR after the introduction of the wound centre, varies by wound aetiology: Venous stasis ulcers: 58%, diabetic neuropathic ulcers: 37%, Post-surgical wounds: 34%, Arterial stasis ulcers: 33%, Pressure ulcers: 18%.	Visits: 70.0% of the patients were seen 10 times or less in the centre. 24.0% of the patients were seen between 11 and 29. 9% of the patients are seen 30 times or more.
Gottrup 2004 A specialized wound-healing center *concept: Importance of* a *multidisciplinary department structure and surgical treatment facilities in the treatment of chronic* wounds. Retrospective single case study	Analysing clinical multidisciplinary departments.	53 wounds	Clinical multidisciplinary departments: The Copenhagen Wound Healing Center (CWHC) and the University Center of Wound Healing (UCWH) in Copenhagen, Denmark. All types of wounds are treated. The centre has a multidisciplinary approach.	NR	39.0% recurrence rate after 1 year of surgery (P=NR).

Ghauri et al. 2000 *Influence of a specialized leg ulcer service on management and outcome.* Randomized controlled trial	Two-centre, countywide, randomized before and after study with a parallel control group. Compare the management and outcomes of community-based leg ulcer service.	200 patients	The community-based leg ulcer service compared with existing services in Gloucester, UK. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is not reported.	3 month HR prior to the introduction of the wound centre: 12% (P=NR) 3 month HR after the introduction of the wound centre: 48% (P=<0.001)	The 12-months recurrence rates decreased from 48% and 50% in the control centres to 17% (P<0.001) in the specialized clinics.
Stevens, Franks & Harrington 1997 *A community/hospital leg ulcer service*. Case study	A clinical audit outlines the multidisciplinary integrated community and hospital leg ulcer service and its effect on health outcomes and quality of life of patients, before and after implementation	259 patients	The Hounslow and Spelthorne Community and Mental Health Trust, UK, Venous leg ulcers and arterial leg ulcers are treated. The centre has a multidisciplinary approach.	3 month HR prior to the introduction of the wound centre: 21% (P=NR) 3 month HR after the introduction of the wound centre: 66% (P=NR) 6 month HR after the introduction of the wound centre: 79% (P=NR)	The number of visits reduced from 21.5 in the control audit to 14.7 in the clinical audit. People who experience no pain increased from 13% to 43%, p=0.002. The mobility score of the Nottingham health profile score (35) decreased from 43.9 to 31.7, p=0.003. Other Nottingham health profile scores – energy, emotion, sleep, social - are not significant reported after implement the service.
Simon et al. 1996 *Community leg ulcer clinics: a comparative study in two health authorities.* Retrospective cohort study	Prospectively cost and efficacy studies, before and one year after the introduction of five leg ulcer clinics in Stockport, compared to standard leg ulcer care.	+/- 200-250 ulcers	Community leg ulcer clinics, Stockport District Health Authority, UK. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is not reported, but the relation between home nurses to GPs.	3 month HR prior to the introduction of the wound centre: 26% (P=NR) 3 month HR after the introduction of the wound centre: 42% (P=<0.001)	The annual expenditure of leg ulcers clinics reduced 38.2% from £409 991 to £253 371. The cost of standard leg ulcer care increased from £556 039 to £673 318.
Bosanquet et al.1993 *Community leg ulcer clinics: cost effectiveness.* Cost-effectiveness study	Prospective and retrospective cost-effectiveness study of leg ulcer clinics compared to hospital-based venous ulcer care clinics.	+/- 500 patients	Riverside community leg ulcer clinics, UK. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is not reported, but the relation between home nurses and nurse specialists.	3 month HR prior to the introduction of the wound centre: 22% (P=NR) 3 month HR after the introduction of the wound centre: 80% (P=NR)	Costs were estimated to be £433 600 and £169 000 respectively, a decrease in costs of 61%.
Moffatt et al. 1992 *Community clinics for leg ulcers and impact on healing.* Multiple case study	Evaluation of effectiveness of community clinics for leg ulcers before and after set up a community clinic.	475 patients	Riverside District Health Authority, UK. Venous leg ulcers and arterial leg ulcers are treated. A multidisciplinary approach is not reported, but the relation between home nurses and nurse specialists.	3 month HR prior to the introduction of the wound centre: 22% (p=NR) 3 month HR after the introduction of the wound centre: 67% (P=NR) 6 month HR after the introduction of the wound centre: 81% (P=NR)	NR

Table 2: Guideline characteristics					
Institution	**Year**	**Country**	**Title**	**Document purpose**	**Kind of wound**
Australian wound management association (AWMA)	2011	Australia & New Zealand	Standards for wound management	The standards are presented as a guide to clinicians, educators and researchers, health students and health care providers who desire to promote optimal outcomes in the care of individuals with wounds or those at risk of wounding.	All types of wounds
Health Service Executive (HSE)	2009	Ireland	National best practice and evidence based guidelines for wound management	To progress towards achieving the HSE's commitment to delivering better services for the individual through the provision of evidenced based practice (HSE 2007).	All types of wounds
Wounds UK	2013	UK	Optimising venous leg ulcer services in a changing NHS.	To support best practice in VLU services to optimise service delivery, this will ultimately improve patient care.	Leg ulcers
Nederlandse vereniging voor Heelkunde (NVvH)	2013	Netherlands	Richtlijn Wondzorg	Evidence based guideline for the treatment of acute wounds in integrated care.	All types of wounds
Central West Community Care Access Centre (CCAC)	2009	Canada	Wound care guidelines	To implement best practices in wound care in the delivery of services to Central West CCAC clients	All types of wounds
NHS, Worcestershire Health and Care Trust (WHCT)	2015	United kingdom	Wound Assessment and Management Guideline	To ensure safe practice and maintain core standards of evidence based practice in Wound management	All types of wounds

5. State-of-the-Art of Wound Expertise Centres

Based on the articles showed in chapter 4, the state-of-the-art of WECs is described. The purpose of this chapter is to understand the structure, process (described in chapter 5.1) and outcome (described in chapter 5.2) of this type of services.
The most named features in chapter 5.1 are: multidisciplinary collaboration, staff and their features, tasks and expertise, and documentation and research. The process is characterized by evidence-based care, with standardization if possible, and a timely and an effective treatment.
The most named outcomes in chapter 5.2 are about healing, recurrence, quality of life and costs.

While studying the state-of-the-art of WECs, remember that there are some general on-going changes in the wound care field. The number of wound care centres has risen dramatically because of several influences, namely: limited resources, the trend to switch from secondary care to primary care, and lastly moving towards more specialized and centralized care approach[34–37].

5.1 What is the state-of-the-art in the organization of WECs?

In chapter 4, the author has pointed out that WECs around the world have different features and so is organization of wound care centres. For instance, the authors of the included studies dissent about features such as location and team composition.

The structure of a WEC

Kim et al. (2013) have identified three types of centres: “free standing clinics”, “community hospitals”, and “academic hospital services”. The author found that each of them has advantages and disadvantages. For instance, in free standing clinics, patients can have easy access to care services. In contrast academic hospitals as well as community hospitals provide patients with better facilities to get treated in a hospital settings characterized by centralized and comprehensive approach. To conclude, the study advocates a wound care centre outlined within the hospital care setting because of easy access to healthcare services, which is quite limited in other medical practices outside the hospital[35].
On the other side, another recent research advocate a WEC outside the hospital anticipate as more cost-effective than a WEC located within a hospital and is less intimidating service than hospital-based services[25].
Gottrup (2004) argues that a wound care centre should has an outpatient clinic as well as an inpatient ward, in order to provide surgical treatments which calls for an inpatients ward with the intention to treat all kind of wounds.
Whilst, Harrison et al. (2008) claim that the location of care is not of great importance. The organization of care, by evidence-based care, well-educated staff and dedicated staff is more important than the setting where care is delivered, when comparing nurse clinic with readily available supplies and home care delivery which have more delay in providing care by the treatment plan[38].

The physical location of the wound care centre must be an easy accessible building, provided wide hallways and elevators, especially for elderly and disabled patients[37,39]. The building should have enough treatment rooms to reflect the number of patients to treat, about six examinations rooms when treating about 40 patients a day[35,39,40]. In the rooms, facilities for assessments and treatment must be available, and so enough storage space for all amenities in order to facilitate clinical care[35,39].

Multidisciplinary collaboration

As aforementioned in the introduction WECs are characterized by a **multidisciplinary collaboration**. Kim et al. (2013) state that multidisciplinary collaboration is the most crucial success factor to establish wound care centre, because “no single health care provider is adequately equipped with the knowledge, skill, and experience to provide comprehensive care for complex wounds”. It also avoids the ‘potential silo effect’ by continuously contact between team members[35,40].

Members of a multidisciplinary team are from inside and outside the hospital, with everyone having their own input in the team[34,35,37,39,40].

Staff

Staff members work in a multidisciplinary team with surgical and medical specialities, nurse support, and also with administrative and technical support. Several studies identified a list of professionals and occupations that can team up to work a collaborative and multidisciplinary manner (see box 3).

Physicians are overall responsible for patients and should register patients for financing care, on their first visit. Care is more efficient when physicians are available on demand rather than on a scheduled base[36,40]. The influence of physicians improve medical management in WECs[35].

Nurse practitioners can execute delegated tasks by physicians to run the clinic independently. Tasks such as the assessment of wounds, writing of orders, initiate and write treatment plans.

Furthermore, they coordinate care by contacting related departments, advice community nurses when necessary, and improve care by taking care of staff education, research and innovation[39,41].

Wound nurses (or wound consultants) are specialized in wound care and are clinical team members who help physicians and nurse practitioners with providing care through the assessment of wounds, change dressings, and the education of patients[39]. Nurses who have the authority to make decisions and are responsible for implementing wound care protocols, have to be educated to lower the risks associated with decision making by nurses[42].

Community nurses assist patients at home with treatment and therapy. This is necessary to prevent recurrence. These patients experience the treatment and therapy as a difficult thing[43].

A **(clinical) director** is critical for a durable and financial viable wound care centre[35]. A director can be physicians or nurse practitioners specialized in wound care with management skills[25,36,37,42,44]. The director must coordinate care, have sufficient knowledge and expertise in wound care, have the ability to apply management skills both inside and outside the WEC, and awareness of current evidence-based practice, added with knowledge of the referral process[37,39,42,44]. Furthermore, the director must have a sense of responsibility and a vision for the future[35].

A director can be supported by a **nurse manager**. The nurse manager is responsible for the matters of supported staff and is able to overseeing daily operations, including staff and resource allocation, with focus on quality of care[35,36]. Furthermore, **case managers** can support directors by coordinate clinical care such as organizing care at patients' home and the procurement of wound dressings[36].

At least two staff members should coordinate care in the WEC to ensure an effective process and continuity of management[42].

At last, several studies report different types of **supported staff** members such as (clinical) administrators who cover the business aspects of a WEC by financial issues (budgeting, billing, purchasing) and daily operations as

Box 3 - Members of a multidisciplinary team[34,35,39,40]:

Surgical specialties
- Vascular surgeon
- Plastic surgeon
- Dermatologist
- Orthopaedic surgeon
- General surgeon

Medical specialties
- Podiatrist
- Rheumatologist
- Haematologist
- Endocrinologist
- Hyperbaric specialist
- Emergency room physician
- Infection disease specialist
- Elderly-care physician
- Psychiatrist
- Nutritionist
- Physiotherapists
- Prosthetics specialist
- Occupational therapists
- General practitioner
- Pharmacist

Nurse support
- Nurse practitioners
- Physician assistant
- Wound nurses
- Community nurses
- Medical assistant
- Social worker/ family carer

Administrative support
- Director
- Nurse manager
- Case manager
- (Clinical) administrators
- Receptionists
- Administrative assistants
- Photographer

Technical support
- Data entry technician

regulatory compliance[35]. Additionally, administrative assistants, receptionists, photographers, and data entry technicians are all critical for an efficient WEC[36,39].

Features and expertise of staff

The fourteen studies found in chapter 4 indicate different staff combinations of previous named staff members with all team compositions having both positive and negative influences on the quality of a WEC. Therefore, teams from a WEC can also be described on **staffs' features and expertise**, without focussing on the staff members separately.

First of all, all involved staff members should have interest in wound care, which result in a **motivated and dedicated** (nurse) team[35,40,42].

Secondly, staff members must be well-educated, have sufficient experience, and be able to care for patients with all type of wounds[35,39,40]. Trough having well-educated staff, the specialist can focus solely on clinical care and can be sure of effective and adequate wound care[35].

When staff exclusively performs wound care, **experiences** in this type of care increases, treatment continuity become higher, and staff can continuously improve themselves by developing their skills. Hench, hiring full time staff is recommended to ensure competency, continuity, and expertise[35,40,42]. However, staff should be continuously educated and regularly monitored for competency[39].

Several studies report accredited staff **education**, in all type of wounds, as an important factor for the success of a wound care centre[39,40,42–46]. Education based on education plans, can be derived from standard national guidelines[40]. Especially nurses with a lot of responsibilities have to follow training and education before they can be deployed in a wound care centre[42,43].

As mentioned in the introduction, more patients will be treated in primary care instead of secondary care, whereby the WEC should be aware of a lower level of experience and education of staff on wound care in primary care. This can result in poorer care and healthcare outcomes; accordingly, the WEC can take responsibility to educate primary care providers[38].

Additionally, there have to be enough physicians in relation to nurses and patients in order to provide timely, effective and efficient care[39,42].

Finally, staff members have to **collaborate** in a team and deliver care as a team, which is "the best interest of the patient" claimed by Gottrup (2004)[40,43]. Moreover, staff must accepting each other within the team and they have to want to collaborate[35,39].

Collaboration between staff from the WEC and staff and providers outside the wound care centre (such as GPs and community nurses) accomplish a successful, efficient and financial viable wound care centre[39]. Additionally, regularly meeting of staff ensure patient-centred care, keep everyone involved in the treatment, and involved in the treatment developments of wound care. Problems with patients should be evaluated daily, with all involved medical specialities, by for example multidisciplinary grand rounds[40]. Wound healing meetings with involved departments and staff must take place weekly, and can have different forms such as a complications conference, a problem case conference, a multidisciplinary conference, a teaching conference or grand rounds. During this weekly wound healing meetings, specialists (such as a microbiologist) can join the meeting to bring his expertise and discuss the wounds[39,40,42].

Furthermore, collaboration with providers outside the WEC can be successful when evidence-based care, assessments and treatment initiated by the wound care centre is adopted by this primary care institutions. In order to achieve this, primary care providers should be educated and funded to facilitate the adoption of care[34]. The health care providers should also collaborate in developing joint trust standards, guidelines and procedures for wound care and providing peer support[43]. This is an important step towards achieving a widespread adoption of wound care pathways[34].

Other participants in wound care are purchasers, who measure health care outcomes in order to budgeting wound care. This type of wound requires a different way of financing due to faded boundaries between primary care and secondary care[46.] Collaboration with wound care providers, purchasers can contribute to improve wound care.

Documentation and research

Besides purchasers who want information attained by **documentation**, such as patient characteristics, wound characteristics, and treatment outcomes, documentation is also desirable for health care providers themselves. This data can be gathered by asking patients, verifying information by GP's medical records and the correspondence between the GP and the physicianss[25]. However, financial data is not always attainable due to financial databases of hospitals whom do not have the ability to provide insight into specific data of patients to evaluate care[35].

Documentation is used to detect the underlying cause of the wound, evaluate healing rates as well the effectiveness of providing care through benchmarking. With evaluation of protocols and health care pathways, care can be continuously improved, resulting in improvement measures for education and practice audit.[25,35,36,42]

Gathering data requires an infrastructure for documenting such as an Electronic Health Record (EHR)[39]. An EHR should include wound treatment algorithms, wound tracings, digital photographs, and data about the healing progress, referrals, patients history, and medical data such as lab results[34,35,39]. Documentation in an EHR ensure continuous and effective communication between health care providers as well as quickly assessable patients' data[35,36].

The last factor describing the state-of-the-art of the structure of WECs is **research**, which "fosters a culture of investigation, encourages an environment of perpetual learning, and stimulates discussion among the wound care team and enables the exploration of new drugs, devices or techniques"[35]. Research in innovative centres results in improved healing rates and further development of the services[34,35,42,45]. The organizational infrastructure should support research, which is more likely in academic institutions[35]. One study advocates an academic relationship and structure for further organization development. In designing an academic structure, academic education and professorship must be integrated in the WEC[40].

The processes of a WEC

Evidence-based care

A frequently mentioned feature of the state-of-the-art of a WEC is the application of **evidence-based care**, to ensure the best available care and facilitate the clinical operation[34,38,39,42]. Providing evidence-based care by a protocol take care of every health care provider "work from the same script"[42]. Furthermore, evidence-based care increase healing rates, decrease healing time, and reduce costs. Besides, continuity and standardization are enhanced, quality of communication improve, and staff obtain up-to-date treatment information[34,38,40,42].

Despites these advantages, Edwards et al. (2013) found a number of studies that reported a "poor implementation" of evidence-based care. The implementation of evidence-based care can be supported by aforementioned factors such as continuously education, experienced and dedicated of staff, support from a clinical director, specialists in wound care, and home care providers[34,42]. The compliance of the evidence-based care protocols can be monitored by clinical leaders[42].

Standardization

A standardized guideline and a standardized pathway contributes to a timely diagnose as well as a timely treatment[35,43]. **Standardization** of care improve continuity of management in order to that patients are referred to one common place in the wound care pathway where wounds can be assessed and then can referred to the appropriate specialist for a final diagnose and treatment plan[42,43]. Furthermore, standardization makes it easier to analyse wounds accurately, control wound care costs, and contributes to information continuity in order to improve communication between health care providers[36,40,42]. Later on in the wound care

process, standardized follow-up programme or guideline is important for patients who are referred back to primary care or are discharged from the wound care centre. Two studies suggest having difficulties to achieve standardization due to the number of involved departments and the variety in wound care products as well as different wound care pathways for different wound types[36,40].

The treatment

The wound care process for patients starts at the **access** to the wound care centre. Gottrup (2004) states that all types of wounds should be accepted by the wound care centre "in order to function optimally". A recent study identified the number of days the wound exists on admission to the wound care centres, varying per wound type: 101 days of existence for venous ulcers, 92 days for arterial ulcers, 52 days for mixed ulcers, and 50 days for diabetic ulcers. The median ulcer duration on admission was 157 days (22 weeks) compared to a median duration of three months founded by a dated study[25,44]. Another study found that 46% of the patients had a wound duration of over six months before entering the centre and 17% had a wound duration of a year or longer[34]. Lorimer (2004) indicates the recommended referral time by guidelines, which is three months.
To return to the subject, patients have access to wound care centres by referral of health care providers, such as GPs or specialists, or by themselves[25,34,36,43,45].

In case of referrals, the mean time in which patients are **referred** to a WEC is 22 weeks[34]. Patients benefit from an early as well as correct diagnosis, in order to treatment starts earlier and wounds are healed faster[25,35]. Appendix 1, referrals and care pathways are given.

After admitting patients to the WEC, assessment takes place. Without focussing on all assessment methods, is it remarkable that a lot of articles mentioned the ankle brachial pressure index (ABPI)[25,34,36,41,45] and the duplex ultrasonography[34,36,41]. It is important that the assessment method is structured, performed by the right staff members, and evidence-based[25,43,45]. A comprehensive appropriate assessment is very important to find the underlying problem of wounds, a safe treatment, and the healing of wounds[34,37,42].
During the assessment, relevant patient- and wound information is gathered to complete the treatment plan[40].

Furthermore, the **treatment plan** with an appropriate intervention is being developed[35,37]. The treatment plan is based on current medical problems, historical data, patient information, and physical examination[36]. A standard treatment algorithm per wound type is recommended, for all types of wounds[36,40]. The treatment plan should include a planning as well, to include times for discharge and reassessment. To succeed the planning, important due dates and all possible relevant information, such as a surgery, and referrals to other departments such as an outpatient setting have to be included. The planning has financially impact when it is complied.[35,39,42]
Patients who are treated in their homes by staff of the wound care centre or by an external home care organisation, have to perform the treatment plan as described by the wound care centre[25].

Eventually, specialized wound care and expertise is provided[37]. For enhanced continuity and an effective **treatment**, it is recommended to making one staff member responsible for a patient[40,42]. When patients enter the treatment room, the nurse practitioner or specialist view and evaluate the size of the wound, the wound (bed) characteristics and the wound location. The outcome of this evaluation must be reported in the Electronic Health Record (EHR), including a photograph of the wound in order to evaluate the healing process. Based on the findings, the provider decides to continue the treatment or update the treatment. The nurse cleans the wound, if necessary, by debridement, treat the wound with mediation and redress the wound. A common named treatment method is compression therapy[45]. During the visit, the nurses and specialists are a source of information for patients, and patients can be educated in wound care. The time in which a routine visits must be carried out have a range in literature between thirty to sixty minutes, from which ten to fifteen minutes in availability of the specialist.[35,39,40]

All data gathered during the visit, concerning patients' well-being, should be reported in a documentation system[35,36,39,45]. When the patient has leaved after a visit, nurses can provide administrative tasks such as plan discharges, communicate with home care organisations and coordinate referrals[35].
Other involved health care providers of the patients are informed when the treatment plan is made and when treatments ended by a healed wound[45].

Finally, the process of a WEC has to be coordinated by a dedicated person with sense of responsibility[35,43].

Conclusion 5.1 – Many ways to organize a Wound Expertise Centre

WECs are organized in very different ways, directed by different staff members, located in a hospital or outside a hospital, and providing care as a primary or secondary care institution. Overall, the main points for an effective WEC are: a multidisciplinary team and approach[34–36,39,40], an appropriate, comprehensive and standardized assessment and treatment, with an appropriate treatment plan[25,36–38,40,41,45], based on evidence-based care[34,38–40,42], with educated and experienced staff, required by consistent education and training[25,38,40–42,44], and accessibility of equipment for assessment and treatment[25,38,40,44]. Further, care should be documented, by the use of an EHR, to measure outcomes and evaluate care, in order to improve care continiously[25,34–36,39,42]. At last, basic and clinical research is mentioned as an important feature for WECs[40]. These features help to improve care by an easier access and referral to wound care centres, a faster diagnosis and treatment which results in the added value of wound care centres[35,40].

5.2 What is the added value of this type of services?

Most reported outcomes in the studies about Wound Expertise Centres (WEC) are about healing, recurrence, quality of life and cost. This paragraph shows possible positive results of organizing wound care by this type of services.

The outcome of a WEC

Healing rates and healing time

First, the most important effects are the improved **healing rates** as well as improved **healing time**. 42% to 80% (65% on average) of the wounds healed after three months (see table 2). Before the introduction of the clinic about 25% of wounds are healed within three months. However, the rate 'completely healed after one year' is only reported in the study of Rondas et al. (2015) and has a rate of 62%. The literature study by Rayner (2006) report an improvement in healing of 42-67%.

Table 1 - Average healing rates after introduction of a WEC

Study	3 months healing rate before introduction of wound clinic	3 months healing rate after introduction of wound clinic	6 months healing rate after introduction of wound clinic
Edwards		59% (P<0.001)	81% (P<0.001)
Harrison		57/58% (p=0.5)	
Ghauri		51% (P<0.001)	
Stevens		66% (p=NR)	79% (p=NR)
Simon	26%	42% (P<0.001)	
Bosanquet	22%	80% (p=NR)	
Moffatt		67% (p=NR)	81% (p=NR)

Sholar et al. (2007) found different healing rates per wound type over a period of seven years: 58% of the venous stasis ulcers are healed and 18% of the pressure ulcers are healed. On average 38% of the wound patients are healed and 9% of wounds are improved. Remarkable is the relative high rate (45%) of patients who not complete treatment[36]. Another study identified a rate of 7,3% of patients who failed to heal[44]. Either way, studies report a significant link between compliance and the success of the treatment. For example, the recurrence risk increase when patients are not compliant[37].
Overall, care delivered by an expertise centre can improve **compliance** when patients participate in their treatment, through a collaborative approach and utilization of health promotion activities as well as

enthusiasm and motivated patients, with increased knowledge gained by patient education, the extent in which patients own the problem and the number of visits to the wound care centre [35,37,46]. So, if a lot of patients do not complete treatment by non-compliancy, wound care centres should focuses on previous mentioned influences.
Besides, etiology, the size of the ulcer at admission and home care have influence on wound healing[44]. However, one study have found that place of care not have influence on the healing rate[38].

Recurrence rates

Secondly, the one year **recurrence rate** decreases by treating wounds in an expertise centre. Several studies report recurrence rates about 50% to 70% before introducing a WEC[34,39,41]. After introducing the expertise service, recurrence rates decreases to 17% to 39%[34,37,38,40,41].

Regarding to **complication rates** in wound care, the included articles give not much attention to this rate. It is only mentioned that by the right way of organizing wound care, such as by medical management and a multidisciplinary approach, complications decrease[35].

Quality of life

Furthermore, outcomes related to patient-centred care show also improvements, such as the **Health Related Quality of Life** (HRQoL). After introducing the wound care centre concept, SF-12 scores have a non-significant increase, pain scores decreases, and the number of patients with risk of depression decreases (see table 3). Harrison et al. (2008) found for the SF-12 Physical Component Summery a score of 35.1 and for the SF-12 Mental Component Summery a score of 49.7, which is comparable to the outcomes of the study by Edwards et al. (2013). Remarkable is that both studies report lower scores of the SF-12 Physical component and the SF-12 Mental component than national averages[34,38].

Moreover, the number of patients experience **pain** decreased also in the study of Stevens et al. (1997) from 87% to 57%.

Table 2 - Quality of life, pain, depression and functional ability measures [34]

Test	Mean (SD) at baseline	Mean (SD) at 24 weeks
SF-12 Physical Component Summery *Range 0-100, where 50 = population mean and lower scores indicate poorer HRQoL*	33.5 (10.5)	34.2 (11.4)
SF-12 Mental Component Summery *Range 0-100, where 50 = population mean and lower scores indicate poorer HRQoL*	46.6 (11.9)	49.9 (10.8)
Pain Severity *Range 0-100, higher scores = higher level of pain.*	50.0 (26.4)	34.0 (23.3)
Instrumental Activities of Daily Living Scale *Range 0-7, higher scores= increased independence on assistance*	2.50 (1.98)	2.09 (2.02)
Geriatric Depression Scale *Range 0-15, scores > 4 = mild risk, > 10 = high risk*	41.8%	28.9%

One study identified **patient satisfaction**, in which 95% of the patients were “very satisfied with care received in the past 12 months”. 93% of the patients would recommend care to others, 96-98% of the patients were satisfied with the received information about care, and 80-98% were satisfied about waiting times[38].
The added value of satisfied patients and patients’ positive recommendations is a successful and recommended wound care centre which act as a “resource for the whole community”[39].

Costs

Costs are incurred by the use of hospital recourses, consults for physician services, hospital or health care system support (such as referrals), inpatient costs, wound materials costs, space, supplies/ equipment, other staff costs, other overhead costs, and indirect costs as security, cleaning[35,39,45].

Wound care essentially affects financial and human resources, such as personnel, supplies and space, which have the highest cost. In another study, the community nurse visits are most costly, compared to inpatient days costs, GP consultations and bandages[37,39,46].
When wound care is provided in academic institutions or large hospitals, much overhead costs are a disadvantage[35].

Additionally, the **number of visits** decreases after introducing the WEC, which can result in lower costs[36,43]. The number of visits identified in the studies varied from one visit every ten days[46], to once a week[25,41,43], to two to three times a week[34,38]. The time of total treatment varies from 12 to 18 weeks[34,38,43].
After introducing a wound care centre the number of visits to the GP, Community nurse, and Medical specialist decreases; with the strongest declining in visits of the GP from on average 17 visits to one visit in 24 weeks. However, the number of visits to the Specialist Wound Clinic, such as a medical practitioner and nurse or Nurse Practitioner increases from on average 0.2 visits to nine visits in 24 weeks. Two studies remark a growing number of outpatient visits[35,39]. The total visits on average decreased from 29 to 16.3 visits in 24 weeks[34]. A significantly decrease in visits result in lower costs.

Lastly, several **cost-effectiveness** studies conclude that wound care centres have fewer costs than the regular way of treating wounds (see table 4). The recent cost-effectiveness study found reduced reimbursement costs per patient with an average amount of £1873 (€2621)[25]. The most cost savings of care are on materials and direct staff due to "progressively healing of wounds"[45].

Table 3 – percentage decrease in total costs of a WEC

Study	**Percentage decrease in costs**
Rondas (primary care WEC and hospital care respectively)	11%; 34,7%
Simon (community clinic)	38,2%
Bosanquet (Community leg ulcer clinic)	61%

However, wound care provided by WECs causes' downstream revenue. Therefore, lower costs can balance this downstream, by an optimally use of resources and reducing waste[35,40].
In fact, the financial goal for a WEC is to be budget neutral[35]. Though, a wound care centre is probably not break even by high labour costs and little generated revenue so that indirect cost are difficult to cover[39].
Overall, a WEC can be seen as "an investment with a high return in patient benefit as well as with a possible reduction in costs on the long term"[46]. Through a team approach, positive outcomes, satisfied patients who recommended the WEC, it "becomes a financially viable proposition for the institution"[39].

Conclusion 5.2 – the added value of Wound Expertise Centres

Most of the included articles report improved health outcomes and costs. The main added value is the improved healing rate and healing time, in other words more effective care.[25,34,35,37,39–42,44–46]. Further, reducing costs and create an efficient centre is a main outcome of a WEC[25,34,37,39,40,42,45]. This is a result of a reduction in the use of health services and of treatment episodes per patient[34,42].
Other added values are reduced recurrence rates[37,41], improved quality of life[34,37], reduced pain[34], easier access to the service by earlier referrals[34,35,46], improved diagnosis[41], and improved continuity[42].

Conclusion chapter 5

The state-of-the-art of WECs is characterized by a very different organization of wound care, but with common success factors. Particularly, a multidisciplinary approach, evidence-based care, with educated, experienced, and moreover motivated staff which results in a faster diagnosis and treatment, and whereby wound care can continuously improve by documentation and evaluation of care. Given these success factors from literature healing rates improve and healing times decrease, the well-being of patients enhance, and cost reduce.

Admittedly, it must be noticed that the included studies have different ways of organizing a WEC. For instance the staff involved in the wound care centres, the availability of a specialist physician, and the location where care is provided. Besides, the publication dates of the studies are very different, with the most up-to-date study of Rondas et al. (2015).

In conclusion, care is safe by experienced and educated staff as well as by the use of guidelines, in order care is also effective added by evidence-based care and improved healing rates. Care is patient-centred by improved patients' well-being, care is timely by a faster diagnosis, treatment, and healing, care is efficient by lower costs, and finally care is equitable by treating all type of wounds.

6 Benchmark: the best practice in Wound Expertise Centres

Research question: What is the best practice in WECs?

7 Indicators

Research question: What are suitable performance indicators in order to continuously improve the quality of WECs?

- What are suitable structure indicators?
- What are suitable process indicators?
- What are suitable outcome indicators?

8 Discussion

9 Limitations

10 Conclusion

11 Bibliography

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