# Improving Inter-Organizational Care-Cure Designs:

# Specialization versus Integration

## Abstract

Purpose

This paper investigates inter-organizational designs for *care-cure* conditions in which low-risk patients are cared for in specialized care organizations and high-risk patients are cared for in specialized cure organizations. Performance impacts of increasing levels of integration between these organizations are analyzed.

Methodology

Mixed methods were used in Dutch perinatal care: analysis of archival data, clinical research and system dynamics simulation modeling.

Findings

Inter-organizational design has an effect on inter-organizational dynamics such as collaboration and trust, and also on the operational aspects such as patient flows through the system. Solutions are found in integrating care and cure organizations. However, not all levels of integrated designs perform better than a design based on organizational separation of care and cure.

Research and practical implications

A clear split between midwifery practices (care) and obstetric departments (cure) will not work since all pregnant women need both care and cure. Having midwifery practices only works well when there are high levels of collaboration and trust with obstetric departments in hospitals. Integrated care designs are likely to exhibit superior performance. However, these designs will have an adverse effect on organizations that are not part of this integration, since integrating only a subset of organizations will feed distrust, low collaboration and hence low performance.

Originality

The originality of this research is derived from its multi-method approach. Archival data and clinical research revealed the dynamic relations between organizations. The caveat of some integrated care models was found through simulation.

**Keywords:** Healthcare, Inter-Organizational Collaboration, Organization Design, System Dynamics

**Type:** Research paper

## Introduction

Healthcare has become a highly specialized service sector where different professionals with different backgrounds, working in different departments or even in different organizations have to collaborate to deliver high quality care (Mintzberg, 1997). This specialization is not always working well: it can result in fragmented, poorly coordinated care, and low service quality (Herzlinger, 1997; Kenagy *et al*., 1999). One root cause on which there appears to be a broad consensus is that the design of the services provided is in urgent need of improvement (Institute of Medicine, 2001; Herzlinger, 2004; Porter, 2010). This especially holds for patients who have a variety of needs, as is the case with chronic conditions such as cardiovascular risk, diabetes, chronic obstructive pulmonary disease (COPD), and congestive heart failure, but also with some psychological conditions and pregnancy. These conditions require general and preventive monitoring, education, psycho-social and basic medical support (which we will call a need for *care*) and in the case of an acute episode, patients need specialized, medical intervention (which we will call a need for *cure*). These *care* and *cure* needs can be met by the same professional, although, in the highly specialized practice of healthcare, they are mostly delivered by different professionals. In Europe, with its strong distinction between primary and secondary care, these professionals work in different organizations. Healthcare in the United States traditionally consists mostly of *cure* organizations, i.e. hospitals and specialist care (Wagner *et al*., 2001), but this is changing: these *cure* organizations have developed some *care* services, and primary/community organizations that focus on delivering *care* are being developed.

The current research focuses on the performance of an organizational design where low-risk patients are cared for in *care* organizations and where high-risk patients are cared for in *cure* organizations. From an operations management perspective, such a design is based on the principles of the focused factory concept (Skinner, 1974), in which an organizational split is made based on risk level (low-risk versus high-risk) and/or needs (*care* versus *cure* needs). The focused factory concept is based on the intuitive notion that a plant can achieve superior performance by organizing its resources to perform one task instead of trying to meet all sorts of demands from internal and external sources. However, it is also known that specialization in healthcare can result in problems of coordination and fragmentation (Herzlinger, 1997; Kenagy *et al*., 1999). So, even though an organizational design based on the focused factory concept may work well in theory, it can have its limitations in practice. Based on this notion, this research focuses on the following research questions (RQ):

RQ 1. What are the problems of the focused factory concept applied in healthcare systems with specialized organizations for care and cure?

RQ 2. Why are these problems encountered?

RQ 3. How can these problems be solved?

Healthcare is a complicated domain; it involves patients, patient flows, different professionals working in different organizations, and a variety of procedures and regulations. As such, this is best researched on different levels, and from a range of disciplines such as operations management, organizational science, and health policy (Creswell and Clark, 2007). Meanwhile, research and theory regarding inter-organizational designs in healthcare are at their early, formative stages, and the variables are still unknown. As such, we will need exploratory research with a mixed methods approach that combines elements of qualitative and quantitative research approaches (Creswell and Clark, 2007; Johnson *et al*., 2007). We conduct our research in a care system that has been organized according to the principles of the focused factory concept for decades: Dutch perinatal care. To answer our three research questions, we will perform three studies. First, we will use archival data analyses to gain insight in patient flows between an independent midwifery practice and an obstetric department in a hospital. In our second study, we will perform clinical research (Lewin, 1948; Schein, 1987) to gain a deeper understanding of why the Dutch perinatal system is not always operating according to its design. Thirdly, we will use simulation modeling (system dynamics) to investigate how Dutch perinatal care can be improved.

Overall, our mixed-method research in Dutch perinatal care teaches us that the inter-organizational design (i.e. a tiered system) has an effect on inter-organizational dynamics such as collaboration and trust, and on the operations such as patient flows through the system. Solutions are found in integrating *care* and *cure* organizations, however, not all levels of integrated care designs perform better than a design based on an organizational separation of *care* and *cure*.

## Literature review

Traditionally, healthcare has been delivered according to the “acute care” model (Wagner *et al*., 2001). It has been focused on *cure*, on medical intervention, delivered in hospitals, in secondary care. In the last decade awareness has increased of the value of *care*, of the psychological aspects and of the value of prevention in *care-cure* conditions (e.g. Rothman and Wagner, 2003). As a result of this shift*,* new designs for healthcare delivery have been developed. One notion from the OM literature that has exercised great appeal for the healthcare sector is the focused factory concept (Skinner, 1974). The concept is based on the intuitive notion that a plant can achieve superior performance by organizing its resources to perform one task instead of trying to meet all sorts of demands from internal and external sources. A focused factory with a narrow product mix for a particular market niche will outperform the conventional plant, which has a broader scope. This principle is also applied in healthcare (Cary and Mitchell, 2018; Herzlinger, 2004; Mclaughlin *et al*., 1995). For *care-cure* conditions, two main designs can be discerned: a design based on organizational *separation*, where *care* and *cure* are provided by different organizations, as is the case with primary and secondary care (e.g. Chin *et al*., 2000), and a design based on organizational *integration*, in which both *care* and *cure* are provided by the same organization, as is the case with specialty hospitals and service lines in general hospitals (e.g. McDermott *et al*., 2011).

Neither one of the above designs stands out as clearly the best: all come with problems. As such, in a recent study, the effects of focus on health care performance are reported to be moderate, mixed or missing (Bredenhoff et al., 2010; Peltokorpi et al., 2016). Focus exploits division of labor, specialization, standardization and knowledge creation (Ding, 2014; Douma and Schreuder, 2008). But, when *care* and *cure* are delivered by different organizations, care processes often become fragmented and problems of coordination arise regarding the patient’s condition (e.g. Edgren and Barnard, 2015; Preston *et al*., 1999). Each organization tends to focus on its own tasks and resources and not on the system as a whole, that is, the system actually experienced by patients: the customer journey (Wener and Woodgate, 2016; Zomerdijk and Voss, 2010). As a result, the task of improving the quality of interaction, cooperation and communication across the interfaces is not seen as any individual group’s particular responsibility (Kvamme *et al*., 2001). In addition, when professionals and organizations specialize in a particular condition, this can cause problems for co-morbidity patients (i.e. patients with more than one, often chronic, condition), and when professionals do not specialize in a particular condition, as is the case with practice nurses and general practitioners, knowledge of a particular condition is often lacking.

There have been numerous attempts to overcome these problems by focusing on integrating the delivery of *care* and *cure.* An integrated service focuses on improving outcomes for a target population (Ovretveit, 1998), by improving coordination, communication and collaboration between providers and/or professionals, and by integrating services. Many different definitions and concepts exist (Kodner and Spreeuwenberg, 2002; Memon and Kinder, 2016). They differ regarding the type of integration (functional, organizational, professional or clinical), the breadth of integration (horizontal or vertical), the degree of integration (linkage, coordination or integration), and the process of integration (Nolte and McKee, 2008). Integrated structures rarely integrate the actual delivery of *care* and *cure* at a *patient* level (Burns and Pauly, 2002): they focus more on administrative and *organizational* integration. If one is to achieve integrated care at the patient level, focus should be on the individual health professionals, on their collaboration, and on their behavior (Van Wijngaarden *et al*., 2006).

Collaboration between professionals and organizations is not only of importance to the healthcare sector, it is important in other sectors as well. Collaboration has been studied in various settings such as in buyer-supplier relations (e.g. Autry and Golicic, 2010) and in inter-organizational networks (e.g. Nooteboom, 2004). Inter-organizational relations are continually shaped and restructured by the organizations involved through a repetitive sequence of negotiation, commitment and execution (Ring and Van de Ven, 1994). In addition, relationship–performance spirals exist between collaborating organizations (Autry and Golicic, 2010) and there can be positive feedback loops between factors such as collaboration, travail (work/hardship), trust, information transparency and performance (Akkermans *et.al*., 2004). In settings in which multiple providers are engaged in carrying out highly interdependent tasks under conditions of uncertainty and time constraints, as is often the case in healthcare, shared knowledge, shared goals and mutual respect are important for achieving desired outcomes (Gittell and Douglass, 2012).

Thus different designs exist for *care-cure* conditions. However, each of these designs has its problems and it is not known yet what design might work best. In this research, we will study the different inter-organizational designs by focusing first on what the problem is with a design where *care* and *cure* are delivered by separate organizations and why it is a problem, before turning to solutions of integrated care.

### Research Setting

This research was conducted in the Dutch perinatal care system. This encompasses the care of pregnant women from the start of their pregnancy to giving birth. Different ideologies in perinatal care exist (e.g. Van Teijlingen, 2005), with the two extremes being the medical model (or illness-model) and the midwifery model (or wellness-model). In the former, pregnant women are primarily cared for by obstetricians within a medical, hospitalized setting, as is the case in the United States. In contrast, the midwifery model considers being pregnant and giving birth to be healthy and natural events, physiological processes involving no illness or disease, as is the case in the Netherlands. The current design of Dutch perinatal care is based on principles of the focused factory concept (Pieters et al., 2010;Van Stenus et al., 2017). In the Netherlands, all pregnant women are classified into two distinct groups: low-risk or high-risk. For these two sub-populations, two different services have been set up, staffed with different professionals (midwives and obstetricians) who have been educated and trained very differently, who belong to different professional communities and work in different organizations (independent midwifery practices and obstetric departments in hospitals). Moreover, policy development and financing structures are also different for midwives and obstetricians. The perinatal care system is organized in more or less the same way throughout the Netherlands.

In addition to the fact that Dutch perinatal care has been organized according to focused factory principles, it was chosen as the research setting for three further reasons. Firstly, Dutch perinatal care has been known for many years for its midwifery model of care, which has a strong focus on *care.* In contrast, for many other *care-cure* conditions it is only recently that healthcare providers have become aware of these *care* aspects, and many providers are still figuring out how to organize the delivery of care. Secondly, Dutch perinatal care is widely regarded as an example of good practice by other Western countries who would like to move towards a system with stronger midwife involvement for low-risk pregnancies (e.g. Wagner, 2006). Thirdly, the Netherlands has been investigating the effectiveness of its perinatal care system, since despite this international reputation it has problems regarding perinatal and maternal morbidity and mortality rates (EURO-PERISTAT, 2008), and the degree of user satisfaction with services expressed by pregnant women (Rijnders *et al*., 2008).

### Research Design and Methods

This research applies a mixed method approach, consisting of three parts, each with its own research question, its own method and each with a focus on a certain part of Dutch perinatal care. A mixed methods approach is often used in management studies in general (Creswell and Clark, 2007), and in particular in studies that focus on the inter-organizational level such as supply chains (Singhal and Singhal, 2012). The first part focuses on the first research question and is addressed by archival data analyses of the flow of patients between one hospital and one midwifery practice. The second part focuses on the second research question and uses a variety of clinical research approaches applied to a region in the Netherlands. The third part focuses on the third research question, and is answered with system dynamics modeling. Simulation is especially useful for theory development when the focal phenomena involve multiple and interacting processes, time delays, or other nonlinear effects such as feedback loops and thresholds, when the theoretical focus is longitudinal, nonlinear, or processual, or when empirical data are challenging to obtain (Davis *et al*., 2007).

#### Archival Data Analysis for Insight into Patient Flows

The first phase focuses on the problems of the application of the focused factory concept in Dutch perinatal care, through an examination of operational performance. Performance is determined by internal and external fit (Pieters et al., 2010; Venkatraman and Camillus 1984). The internal environment is composed of the business strategy, manufacturing/operations strategy, and organizational design. The external environment consists of all those significant elements outside the organization, such as the industry, clients, competitors, governmental entities and professional groups.

Regarding the internal fit, since Dutch perinatal care is designed in line with focused factory principles, one would expect midwifery practices to focus on low-risk pregnant women only, obstetric departments in hospitals to focus on high-risk pregnant women only, and that there should not be too many transfers between the two organizations. Regarding the external fit, one would expect internal processes to be aligned with the characteristics of the medical condition, i.e. pregnancy. The internal and external fit was investigated by archival data analysis of the flows of pregnant women between a midwifery practice and a hospital in Tilburg. Data from 737 pregnant women in one particular year (2007) were collected regarding the medical condition at the start of the pregnancy, the consultations during the pregnancy, the delivery, and referrals between the midwifery practice and the hospital. The findings were discussed with representatives from both organizations.

#### Clinical Research for Insight into Inter-Organizational Dynamics

In a system based on the focused factory concept and in which patients should be referred between organizations only when necessary, collaboration between the organizations becomes important. To try to understand why the focused factory concept does not work well in Dutch perinatal care, clinical research (Schein, 1987) was initiated, at the request of the system stakeholders – the 16 obstetricians of the obstetric departments of two hospitals and the 45 midwives of twelve midwifery practices – in an effort to improve system performance by increasing joint understanding of the underlying dynamics of their faltering collaboration.

Four activities (see also Akkermans, 2001) were undertaken. Firstly, 13 obstetricians and 22 midwives (35 in total) completed a questionnaire, which was based on previous questionnaires that studied inter-firm relationships (Humpreys *et al*., 2003; Johnston *et al*., 2004). Secondly, semi-structured interviews were held with seven obstetricians in the hospitals and 19 midwifes working in the six midwifery practices. The following questions were used as a guideline for the interviews: What contributes to good collaboration? What contributes to bad collaboration? How do you notice the performance of the collaboration? Thirdly, group model building sessions (Vennix, 1996) focused on one or two aspects of the collaboration. Causal loop diagrams (Sterman, 2000) were used to disentangle the problems. This resulted in ten different causal loop diagrams revealing the root causes of these problems. Fourthly, in a plenary session the findings were presented to all participants. This approach allowed us to initially investigate a large number of variables and their relationships, find out which of these were the most significant, and gain insight into people’s mental models. This is of importance since at the start of the project it was not even known what all the relevant variables were, let alone their precise inter-relationships.

#### Simulation Modeling for Insights into Inter-Organizational Designs

The third phase focused on evaluating inter-organizational designs, taken into account the inter-organizational dynamics as studied in the second phase, and demonstrating why these inter-organizational designs might or might not work. This was achieved through the use of system dynamics (SD) modeling. SD focuses on how causal relationships among system elements can influence the behavior of a system (Forrester, 1961; Sterman, 2000). It intensifies the perception of feedback, accumulation, and delays (Größler *et al*., 2008). A further strength of SD is that models can be based on different sources of data (Forrester, 1980). In our case, mental, written and numerical data on patient flows and inter-organizational dynamics were elicited through archival data analysis, questionnaires, interviews and group model building sessions. Additional data were derived from the literature on the Dutch perinatal care system and collaboration.

## RESULTS

### Insight into Patient Flows through Archival Data Analysis

The first phase focused on the problems of the application of the focused factory concept in Dutch perinatal care, investigating internal and external fit by analyzing patient flows. Our archival data analysis showed that there is not a good fit between the design of the system and the way it actually operates. Figure 1 represents four states and the inflows and outflows between states in Dutch perinatal care for pregnant women. In the diagramming notation, states, represented by rectangles, denote a level of a variable (in our case the number of pregnant women), flow variables fill or drain the state and are depicted as pipes with valves (Sterman, 2000). Here, the state in which a woman resides depends on her risk level (low-risk or high-risk) and on the organization that takes care of her (midwifery practice or obstetric department in a hospital). Note that, for reasons of readability, Figure 1 does not present the inflow and the outflow of pregnant women in each state by becoming pregnant and delivering. The other variables in this figure will be explained later.

Regarding the internal fit, according to focused factory principles one would expect only a small number of transfers between the two organizations. Instead, in our analyses, we found that there is a significant transfer of pregnant women between the organizations: 77% of the pregnant women who start in the midwifery practice also receive hospital care at some point. Moreover, a significant number of low-risk pregnant women are cared for in the hospital: 50% of the pregnant women in the hospital were categorized as low-risk at the start of their pregnancy, but were not referred to the midwifery practice. Interestingly, the women who receive care from both the midwifery practice and the hospital have on average 17.5 consultations, and they see on average ten different healthcare professionals (midwives, obstetricians, residents).

*<Insert Figure 1 about here>*

Regarding the external fit, one would expect internal processes to be aligned with the characteristics of the medical condition, i.e. pregnancy. However, we found that it is hard to predict the risk level of pregnant women at the start of their pregnancy. In a focused factory system, one would want to decide at the start of the pregnancy which type of “factory” will take care of the pregnant women. Our archival data analysis showed that 77% of the women that were labeled as being low-risk at the start of their pregnancy in the midwifery practice still had to see an obstetrician along the way. In addition, pregnant women do need both *care* and *cure* along the way. High-risk pregnant women also need psycho-social support, and low-risk pregnant women often do need some medical expertise, since the predictability of the risk level is low.

Summarizing, our first research question was aimed at finding out the problems of the focused factory concept applied in health care systems with specialized organizations for care and cure. Our analysis reveals that although the organizations may be specialized, the patients are not: the majority of patients need to move between care and cure organizations. The main reasons for this is the low predictability of the risk level at the start of the pregnancy and the need for both *care* and *cure* of most patients.

### Insights into Inter-Organizational Dynamics through Qualitative Research

In a system that is based on the focused factory concept and in which patients should be referred between organizations when necessary, collaboration between organizations is likely to be important. Our interviews, questionnaires, group model-building and other clinical research revealed two key findings. Firstly, midwives and obstetricians all believe there is value in collaborating together (exchanging information, streamlining care processes, knowing each other better), and that better collaboration will have a positive effect on performance (increased service to patients, increased quality of care, decreased costs, higher patient satisfaction, higher professional satisfaction). However, even though both professional groups expect the relationship to last a long time, the relationship is by no means symmetric: midwives trust obstetricians more than vice-versa, midwives provide the obstetricians with more information, and midwives feel they depend more on the obstetricians than vice-versa.

Secondly, the root causes of why things go wrong include a lack of trust, feelings of competition, a sub-optimal exchange of information, sub-optimal communication between midwifery practices and obstetric departments in hospitals, and not knowing each other. Although trust consists of several aspects (Nooteboom, 2004), our research shows that the trust midwifery practices have in hospitals seems to be determined by financial incentives, by fear of hospitals “stealing” their clients. On the other hand, the trust hospitals have in midwifery practices seems to be determined by the obstetricians’ perceptions of the competences of midwives in recognizing high-risk pregnancies. Trust and referral behavior are tied together in a self-reinforcing feedback loop (R1), the trust-loop (see Figure 1).

The more low-risk pregnant women are cared for in hospitals, the less trust midwifery practices have in hospitals, so midwifery practices refer fewer high-risk pregnant women to hospitals, and there are more high-risk pregnant women in midwifery practices, reducing the trust hospitals have in midwifery practices. As a result, hospitals refer fewer low-risk pregnant women to midwifery practices, which results in more low-risk pregnant women in hospitals, and so on.

Summarizing, in our first study we found that most patients need both care and cure which causes a need for specialized organizations for care and cure to refer patients from one organization to the other. Our second study was aimed at understanding why this referral may be a problem (our second research question). Our findings reveal that when the specialized organizations in a focused factory concept do not trust each other, this results in fewer/slower referrals of patients between the two types of organizations, leading to more patients cared for in the “wrong” organization, which will further feed distrust in both types of organizations. In addition, the benefits of being a focused factory will be reduced.

### Insights into Inter-Organizational Designs through Simulation Modeling

In the third phase of this research a SD model of Dutch perinatal care was developed. A high level overview is presented in Figure 1. Whether or not pregnant women are referred between the organizations depends on the level of trust (as described above) and on the level of collaboration. Collaboration in the model is characterized by contractual obligations, rules and procedures; it is the level of formal collaboration (Smith *et al*., 1995; Wren, 1961). Within an organization, pregnant women “flow” from one state to another by developing and recovering from a high-risk pregnancy, which is affected by the quality of care the organization is delivering. The quality of care is determined by the competences of the professionals involved, the work pressure (Oliva and Sterman, 2001), and the collaboration. Broadly speaking, midwives lack *cure* competences (Amelink-Verburg and Buitendijk, 2010; Reuwer et al., 2009) and obstetricians lack care competences (Franx, 2011; NVOG-HOOG, 2005). Note that in reality, there is inevitably an element of “care” in the hospital sector and an element of “cure” in the midwifery sector. However, these concepts are essentially archetypes, intended for gaining insights into the behaviour of human actors in the maternity care system, rather than a rigid demarcation of clinical practice. Work pressure is determined by the number of consultations pregnant women require. Work pressure and quality of care are tied together in a self-reinforcing feedback loop: the higher the work pressure, the lower the quality of care, the greater the number of high-risk pregnant women, the more consultations and the higher the work pressure (in Figure 1: R2 for midwifery practices and R3 for hospitals).

One apparent solution to the problems with the current design is to make major steps towards a more integrated system. Besides the current focused factory based design of Dutch perinatal care, the SD model evaluates three inter-organizational models that all focus on integrating care, although in different ways:

* *Collaborative model.*  Formal collaboration between all midwifery practices and hospitals is structurally improved by an inter-organizational improvement project.
* *Improved hospital model*. Hospitals employ midwives too. As a result hospitals are able to meet the *care* needs of pregnant women. There are no specific efforts to improve collaboration between hospitals and midwifery practices.
* *Partial merged care model.* A percentage (in this case 20%) of the midwifery practices and the hospitals merge into one integrated care unit which is able to meet both the *care* and the *cure* needs of pregnant women. The remaining midwifery practices stay independent from the hospitals. There are no specific efforts to improve collaboration between hospitals and the remaining independent midwifery practices.

The main goal in a healthcare system is to improve the health of a population (Horvath, 1975), and thus it is not the performance of individual organizations that counts, but the performance of the system as a whole. Patients should be cared for in the right organization: high-risk pregnant women in hospitals (*cure* organizations), low-risk pregnant women in midwifery practices (*care* organizations). Having high-risk patients cared for in midwifery practices can lead to negative effects on their medical outcomes (Van Dillen *et al*., 2010), while low-risk pregnant women cared for in the hospital often results in unnecessary, dangerous, invasive obstetric interventions (Wagner, 2001).

The four models were run for ten simulated years (the model is available from the authors upon request). Table 1 presents the end values of the proportion of high-risk pregnant women in hospitals, including the improvement percentage compared to the current situation (base case).

*<Insert Table 1 about here>*

There are several implications for Dutch perinatal care. Firstly, for Dutch perinatal care the best thing to do is to implement the collaborative model, i.e. to improve collaboration between all independent midwifery practices and obstetric departments in hospitals, because of the virtuous cycles of trust and transparency that are nurtured in this setting. Secondly, the improved hospital model performs the worst. If hospitals opt for this model, they might be able to deliver a higher quality of care and increase their own performance, but the proportion of high-risk pregnant women cared for by the “wrong” organization (in the midwifery practices) will increase, and overall performance of the system will decrease. A third finding is that when a few midwifery practices decide to merge with the hospitals, while most practices remain independent and outside of the collaboration, overall system performance will get worse, due to vicious cycles of eroding trust between hospitals and independent midwifery practices, performance for the *whole* patient population will decrease.

Summarizing, our third research question was aimed and finding out how the problem of low trust between organizations involved in a focused factory design in healthcare can be solved. Our simulation results reveal that trust can be enhanced by improving collaboration between *all* organizations in a specific healthcare region. This will result in improved performance for the whole population of patients, since collaboration results in patients being referred between organizations when needed, which increases trust in the system and more clinically appropriate referrals between organizations. When only a subset of the organizations in a specific healthcare region is merged into an integrated care unit that focuses on both *care* and *cure* and on both low-risk and high-risk, the performance of this integrated care unit’s own patient population will increase. However, the performance for the whole population of patients will decrease, since the remaining independent organizations distrust the integrated care unit and are less likely to refer patients to it.

## Implications and Conclusions

This research has focused on the organizational design for *care-cure* conditions. Many different organizational designs exist, ranging from a complete separation of *care* and *cure* to the integration of *care* and *cure* in one organization. This research has investigated three research questions: (1) What are problems of applying the focused factory concept in healthcare systems with specialized organizations for care and cure? (2) Why are these problems encountered? (3) How can these problems be solved? This research has applied a mixed method approach to investigate organizational design for *care-cure* conditions. The Dutch perinatal care system, traditionally based on the “focused factory” concept, was used as our research setting.

### Implications for Practice

Based on our research, we conclude that the current organizational design for Dutch perinatal care, which is based on organizational separation of low-risk and high-risk and of *care* and *cure,* is not optimal. Improved performance can be achieved through integrating care. However, there is a caveat: partially integrated designs actually result in worse overall system performance than the current segmented model. This is the case for the improved hospital model and the partially merged model that meets both *care* and *cure* needs and can serve both low-risk and high-risk pregnant women, respectively by employing midwives or merging with some (but not all) midwifery practices. In these models, feelings of competition will dominate, the independent midwifery practices will distrust the improved hospital or the merged integrated care unit, and as a result they are less likely to refer high-risk pregnant women in a timely fashion, causing pregnant women to receive sub-optimal care. For Dutch perinatal care, the best thing to do is to implement the collaborative model, i.e. to improve collaboration between *all* independent midwifery practices and obstetric departments in hospitals in a specific region.

The implications of these findings for perinatal care systems in other countries depend on the existing system that is in place. For systems built on the medical model (e.g. the United States), where healthcare providers are thinking about moving towards a more midwifery-based model, this research advises caution. Choosing an inter-organizational design in which there is a clear split between midwifery practices focusing on low-risk pregnant women and obstetric departments in hospitals focusing on high-risk pregnant women will not work, since it is not known in advance whether a pregnancy will turn out to be a low- or a high-risk one, and since all pregnant women need both *care* and *cure*. Having independent midwifery practices only works well when there are high levels of collaboration and trust with *cure* providers (obstetric departments in hospitals).

### Implications for Theory, Limitations and Suggestions for Further Research

In general, for *care-cure* conditions, organizational designs that seek to integrate *care* and *cure* activities are likely to exhibit superior performance over designs that focus on specialization. One important caveat is that such integrated care designs will have an adverse effect on the overall population if they remain limited to only a subset of the overall population, since such an integrated subset will feed distrust, low collaboration and low performance from the rest of the healthcare system. This contribution to theory is inductively derived from our archival data analysis, clinical research and simulation. The dynamic relations between the organizations could not have been found with archival data analysis only: we needed clinical research in order to discover them. In addition, the insights we found regarding the caveat of some integrated care models could not have been found without simulation.

Although pregnancy is a *care-cure* condition, it differs from other *care-cure* conditions. Firstly, it is time-limited (i.e. nine months), whereas most other *care-cure* conditions are chronic, life-long conditions. Referral behavior might be different for chronic diseases. Secondly, most pregnant women do not have co-morbidities, whereas they are common in other *care-cure* conditions. Co-morbidities are likely to result in a more complicated care process, with more professionals and more organizations involved. Thirdly, Dutch *cure* organizations are able to take care of low-risk pregnant women, which results in competition between *care* and *cure* providers. For other conditions, it might not be possible for the *cure* providers to also take care of the patients who only need *care*.

Despite the differences between pregnancy and other *care-cure* conditions, Dutch perinatal care is still an appropriate setting to study inter-organizational designs. Whereas healthcare providers have only relatively recently become aware of the psycho-social aspects of many *care-cure* conditions, Dutch perinatal care is widely known for its focus on *care*, since it has been operating according to the midwifery model for decades. Furthermore, regardless of the problems mentioned in this paper, the perinatal morbidity rate in The Netherlands is one of the lowest in Europe (Eurostat, 2015), pregnant women have high trust in the quality of care, and there is no increased risk of adverse perinatal outcomes for planned home births among low-risk women (De Jonge, et al. 2014). In addition, Dutch perinatal care is a clearly defined system: only two types of organizations are involved, and it is set up the same throughout the whole country. The GP only plays a minor role in this system, since only 5% are involved in perinatal care (De Verloskundige, 2018). It seems to make sense to first understand the dynamics in a “simple” healthcare network (two types of providers) designed for a condition with hardly any co-morbidities (pregnancy). A suggestion for further research would be to conduct a similar study for a *care-cure* condition that involves chronic patients with a high risk of co-morbidities. *Care-cure* conditions such as diabetes, COPD, and heart failure are commonly associated with co-morbidities and hence a larger number of different specialist professionals are involved, over a much longer time period.

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*Figure 1. High level diagram of Dutch perinatal care*

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*Table 1. Results of the scenarios*

|  |  |
| --- | --- |
|  | **High-risk in hospital** |
| % HR in H | Normalized value | Improvement % |
| Base case | 68% | 100.0 |  |
| Collaborative model | 79% | 116.2 | 16.2 |
| Improved hospital model | 62% | 91.2 | -8.8 |
| Partial merged care model | 64% | 94.1 | -5.9 |