

Exploring the design, planning and control mental health care services

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**EXPLORING THE DESIGN, PLANNING AND CONTROL OF
MENTAL HEALTH CARE SERVICES**

De studies in dit proefschrift zijn mogelijk gemaakt en mede gefinancierd door:
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**EXPLORING THE DESIGN, PLANNING AND CONTROL OF
MENTAL HEALTH CARE SERVICES**

Proefschrift

ter verkrijging van de graad van doctor
aan de Universiteit Maastricht,
op gezag van de Rector Magnificus, Prof. mr. G. P. M. F. Mols
volgens het besluit van het College van Decanen,
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'Insanity is doing the same thing over and over again and expecting different results.'

ALBERT EINSTEIN

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1 GENERAL INTRODUCTION

1.1 INTRODUCTION

This thesis focuses on the study of operations management (OM) in mental health care. Operations management concerns the design, the planning and control of processes that transfer inputs into products and services, that people use every day.¹

Mental health care should be demand-driven and organised effectively and transparently.² Nevertheless, the delivery processes in mental health care are often fragmented, not demand-driven; patients have to wait for care, continuity is not optimal, costs are rising, and transparency¹ is often lacking. Recently more attention has been paid to improving the delivery of care, as this is one of the most promising ways to improve efficiency and quality.³ Consequently, research on improving mental health care should address not only questions relating to drug treatments or psychological therapies, but also deal with searching out and defining the best methods of organising and delivering services.^{4, 5} Such research is the field of operations management. Accordingly, the question to be asked in operations management research is: how should the delivery of mental health care be organised in order to achieve higher quality and more efficiency?

Operations management in mental health care is defined as the analysis, design, planning, and control of all of the steps necessary for providing patient services.⁶ Operations management theory originates from research concerning manufacturing. In health care overall, research on operations management is gaining attention; however, in mental health care, research on operations management seems to be lagging behind.

The main purpose of this thesis is to assess how operations management is currently applied in the delivery of mental health care. In addition this thesis aims to provide knowledge on how improvements in operations management may contribute to increase efficiency and quality in mental health care. Furthermore, the methodology of assessing operations management in mental health care is subject of this thesis.

i: Patient and client are both terms used in literature. In this thesis the term patient is used because this term is most common in mental health care literature.

To better understand the field of study, first background information on mental health and mental health care in the Netherlands is given. Next, information on the delivery of mental health care is presented. Subsequently, operations management will be discussed in the context of mental health care. The chapter ends with the general aim, the research questions and the outline of the thesis.

1.2 MENTAL HEALTH CARE IN THE NETHERLANDS

Mental health is an integral part of the definition of health as defined in the WHO constitution: 'Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'.^{7, 8} The number of people using mental health care services is increasing in the Netherlands where one in six people are said to be mentally unhealthy.^{9, 10} In 2006, 772,000 patients were treated within the Dutch mental health care sector. In addition, the number of patients treated in specialised mental health care services in the Netherlands is growing (by 6% from 2004 to 2006).¹¹ Most adult patients have mood or anxiety disorders, while for the elderly, cognitive/organic disorders and mood disorders are most prevalent. The most prevalent disorders among the youth are developmental or behaviour disorders.¹¹ Optimally, all of these patients should be treated in the (mental) health care sector.

1.2.1 ORGANISATION AND FINANCING OF MENTAL HEALTH CARE

The mental health care sector consists of different layers of providers, each targeting different patient populations. The treatment of mental health disorders that can be treated in the short term and by general means is carried out by non-specialised extramural and curative care providers, especially general practitioners.

The general practitioner in the Netherlands has a central role and functions as the 'gatekeeper' to all other specialised care. Almost all Dutch citizens are registered with a general practitioner who deals with most of their medical problems.¹² Patients with a mental disorder that is beyond the capability of the general practitioner can be referred to other more specialised care providers. Specialised mental health care offers outpatient care, intramural care for patients who need to be hospitalised, and semi-mural care (a term often used for sheltered homes).¹³

In many European countries, including the Netherlands, there has been a trend away from an institutional model of care to outpatient and community care.¹⁴ The number of mental hospital beds has decreased in favour of community and outpatient services.¹⁵ Nowadays, most patients in specialised mental health care receive outpatient services.¹¹

One of the first efforts to move away from traditional inpatient care in the Netherlands was the creation of outpatient care institutes, the so-called RIAGG's, in the 1980s.¹⁵ The RIAGG's offer a broad spectrum of services, from curative psychotherapy to supportive community psychiatric care, for all age groups. In addition, they provide consultations to other professionals, organise a 24-hour, 7 days a week outreach crisis service, and provide information and education to populations at risk.⁹

In the second half of the 1990s many organisations such as the RIAGG's, mental hospitals and sheltered housing accommodations, merged into integrated regional mental health care organisations. Consequently, the boundaries between ambulant, semi-mural and intramural faded away.¹³ As a result the number of independent RIAGG's declined. In 2000, three-quarters of all mental hospitals were merged into new integrated mental health care services.⁹ In 2002 there were thirty integrated mental health care services; by 2006 there were forty-one integrated services.¹¹ The number of RIAGG's decreased from nineteen in 2000¹⁶ to seven in 2006.¹¹ Within the mental health care sector, care is mostly aimed at certain target groups, called circuits. These are: youth care, adult care, elderly care, sheltered home, care for substance abuse and forensic care.¹¹

Before 2008, mental health care was mainly paid for by the medical expenses act (AWBZ). In 2008, big parts of mental health care were transferred to another jurisdiction. Since then mental health care has been paid for by the medical expenses act, the insurance act, the law for social support (WMO) and by the Ministry of Justice. The main transfer that has taken place is the transfer of curative mental health care (shorter than one year) from the medical expenses act to the health insurance act (Zvw). With this transfer the medical expenses act regained its original aim, of providing insurance for long-term medical expenses. Furthermore, more cohesion within curative care and within the medical expenses act was achieved.¹⁷

Within the health insurance act a new financing system (Diagnosis Treatment Combination (DBC)) has been introduced (for the hospital sector in 2006, for the mental health care in 2008). The aim of the DBC system is to increase (regulated) market

competition, transparency of care and an increase of patient oriented processes. Within the DBC system, health insurers have to purchase curative mental health care and are thereby stimulated to negotiate regarding quality, volume and price.

Besides mergers, a new focus on community care and financial changes, there has been an increase in evidence-based and patient-oriented mental health care. On a national level, multi-disciplinary treatment guidelines are being developed to enhance using methods that are scientifically validated. Furthermore, non-specialised care provided by general practitioners is stimulated. In addition, care programmes are being developed and implemented. Care programmes, as used in mental health care services in the Netherlands, are instruments for improving quality of care.^{5, 9, 18} They define agreements on the type of care, the target population with a specific psychiatric diagnosis, demand for care, and the frequency and setting of care.^{9, 16, 18-20}

These developments all aim at better quality, continuity, demand-driven and efficient mental health care by changing the finance system and the treatment. In addition, the redesign of care delivery should be considered for optimising the efficiency and quality of mental health care, as will be detailed below.

1.3 MENTAL HEALTH CARE ORGANISATIONS AND CARE DELIVERY

According to Donabedian's model,²¹ the quality of care should be assessed by a combination of structure, process and outcome indicators. Consequently, to optimise the quality of the delivery of care, structure, process and outcome should all be considered. Structure refers to the setting in which providers deliver health care and concerns the characteristics of the health care system, such as the organisational structure and characteristics of both staff and the target population. Processes concern the activities that take place between practitioners and patients.²¹ They include all activities, from preventive services and treatment to aftercare, for individual patients as well as for a whole population.²² Outcomes are the end results of care and can be considered as the changes in a patient's or population's health status that can be attributed to antecedent health care, and reflect all aspects of the care delivery process.²¹

Mental health care delivery should be efficient and effective

in regard to quality requirements. Care processes and organisational structure should fit with each other to be efficient. Consequently, in case of an organisational redesign, both care processes and structure should be redesigned to obtain the positive effects of the redesign.²³ Quality and efficiency both depend on the system of a health care organization.²⁴ The design of care delivery, i.e. the structure and process, may facilitate or hamper efficiency and quality. For optimal delivery of care, the organisational structure and the care processes should be designed so that efficiency and quality are optimised. However, there are barriers to optimal care delivery²⁴⁻²⁹; these can be grouped into three categories²⁵:

1. the uncertainty of demand, supply and care
2. the complexity of coordination
3. the inflexibility of staff²⁴

These aspects of care delivery can cause discontinuity and variation in the care process that affect the efficiency and quality of mental health care.^{25, 26}

1.3.1 UNCERTAINTY, COMPLEXITY AND INFLEXIBILITY

The first category of factors is uncertainty. Uncertainty refers to unavailable or unused information on the processes of demand, supply or service. Accordingly, the processes of care delivery become unpredictable. Uncertainty is caused by variation in input, throughput or output, hampering efficiency and quality.²⁵⁻²⁹ For that reason variation should be managed and if possible reduced. However, variation is not always negative. Patients and services do differ in accordance with intrinsic inter-patient, inter-professional and inter-service differences. This kind of variation is inherent and common in mental health care.^{26, 27, 29} On the other hand, examples of unnecessary variation are the misinterpretation of data, unreliability in support systems and unnecessary habitual differences between professionals. Both types of variation, inherent and unnecessary variation, should be carefully studied in order to reveal opportunities for focused improvements. Standardisation of care processes is one way to reduce uncertainty and consequently a way to increase the predictability of care delivery. However, in complex systems, unpredictability is always present.³⁰

This brings us to the second category of factors: the complexity of coordination of care processes. Care processes can

be defined as the activities and relations that create outputs that are of value for the customer.^{4,31} The aim of care processes is to add value for a patient in an efficient way with guaranteed quality. Within mental health care, the main processes are the primary care processes in which the patient is most important and the product is the diagnosis and/or treatment.⁶ Optimally, patients should flow continuously through a care process without too many unneeded interruptions. Continuity of care, which is an uninterrupted and orderly movement of patients through the sequences of the service delivery system,³² has a positive influence on quality of life, functioning in the community and satisfaction with services. Consequently, improving continuity in, and between, mental health care services is worthwhile.³⁰ However, patients often do not flow continuously through the care process, and efficiency and quality are not guaranteed. The various activities of care processes are often not coordinated which implies that many transfer moments, transactions and non-value added activities.²⁵

Mental health care organisations often have a functional organisational structure, i.e. departments are organised around functions, disciplines or methods. As a result, different departments will strive to optimise their own functioning instead of the functioning of the whole patient flow.

Within a functional structure the cross-functional work flows and shared resources need to be coordinated.^{33 (p. 40)} However, the boundaries between the different departments and the environment are not fixed but unclear and shifting, which makes coordination complex.³⁰ Consequently, striving to optimise functionality can result in 'waste': i.e. activities that do not directly (from a medical/psychiatric point of view) add value to a patient.^{25, 34, 35} Accordingly the flow is unpredictable and the coordination of care processes is complex. In order to optimise continuity, the flow of patients as well as of information and resources should be designed and managed. Effective flow management is about getting the right patients to the right activities, at the right time, with the right professional and the right effort.^{36, 37}

The uncertainty of care processes and the complexity of coordination are intertwined. Uncertain care processes are unpredictable and make the system complex, consequently increasing the complexity of coordinating the system. In addition, flexibility is needed to react to uncertainty. By 'flexibility' we mean the adaptability of a system to cope with changing circumstances or instability caused by the environment.³⁸

Flexibility facilitates adaptation to internal and external changes. Some argue that there can be a trade-off between efficiency and flexibility.³⁹ Nevertheless, this trade-off may be shifted and flexibility can increase efficiency and quality.^{39, 40} Indeed, inflexibility may hamper efficiency and quality.²⁵ Therefore, inflexibility is the third category of factors that may hamper efficiency and quality.

Due to inflexible staff, materials and financial resources, adaptability in the care processes is restricted, which can have a negative influence on efficiency and quality.²⁵ Generally it is preferred that professionals have more than one capability so they can perform different types of activities.⁴¹ However, the necessity for such functionally flexible staff depends on the characteristics of a care process. Highly unpredictable care processes have a higher need for functionally flexible staff in comparison with standardised, predictable care processes. As the degree of staff specialisation also determines the quality of care, there can be a trade off between specialisation, process flexibility and quality.

In short, the structure and process of care delivery influence uncertainty, complexity and inflexibility, and consequently quality and efficiency. Uncertainty, complexity and inflexibility can be reduced by design, planning and control—this is the field of operations management that will be introduced below.

1.4 OPERATIONS MANAGEMENT AND THE DELIVERY OF MENTAL HEALTH CARE

As noted above, operations management is about transforming input into output to add value for a customer.¹ For health care, operations management can be defined as the analysis, design, planning, and control of all of the steps necessary to provide a service for a patient.⁶ One of the main aims of operations management is to limit variability and predict the flow of patients through design, planning and control, as discontinuity and variation in care can be problematic for efficiency and quality of care.^{25, 26, 42, 43} Planning is defined as the determination of what should be done and control as the process that assures that the planned results are obtained.⁴⁴

By integrating planning and control into the design of mental health care services the patient care process can be coordinated to a large extent.^{44, 45} Appropriate and effective design choices need to be made on different levels.⁴⁶ For example, at

the strategic level, strategic choices need to be made by management about what services are going to be offered. At the operational level, it's necessary to make decisions on patient planning and control.⁴⁶ Moreover, uncertainty and short-term planning need to be accounted for in health care.⁴⁴

According to Hofstede,⁴⁷ the way non-profit organisations such as mental health care services can be planned and controlled depends on the type of processes: i.e. whether output is measurable, if the activities are repeatable, if the objectives are unambiguous and if the effects of management interventions are known. Information technology, such as Enterprise Resource Planning (ERP) systems, may facilitate operations management. ERP systems are used in manufacturing and may be suitable for planning and control in mental health care.⁴⁴

1.4.1 OPERATIONS MANAGEMENT IN MENTAL HEALTH CARE

In manufacturing, goods are the main items flowing through the core process. In mental health care, patients instead of goods flow through the core process, which is the care process. Patients' characteristics will vary and, to a certain degree, influence the outcome of operations. Because health care services are provided for people rather than for property, mental health care service and patients are typically inseparable.⁴⁸ Therefore mental health care services should focus not only on the end services, but also on the process of delivering care. Furthermore, there is no perfect price-performance mechanism in health care. Services are intangible, i.e. specifications of product and delivery requirements are lacking. In addition, services are resource-oriented, and unused capacity is lost and cannot be stocked. In a service organisation such as mental health care, production is labour and skill is intensive, contributing to considerable variability in performance from one professional to another in service style, communication style and also in their technical skills.⁴⁸⁻⁵⁰ These characteristics of mental health care pose challenges in the application of operations management methods.⁴⁸⁻⁵⁰

Nevertheless, there are several operations management methods which can be applied to reduce variation, and to create a better patient flow. These methods strive for a reduction in uncertainty and complexity with as much flexibility as required by the design of the organisational structure and the care processes, and by its planning and control. This research investigated such methods in regard to mental health care.

1.4.2 GENERAL AIM AND RESEARCH QUESTIONS

In order to contribute to the field of knowledge on operations management in mental health care, and consequently to optimise quality and efficiency in mental health care services, the overall research question of this thesis is: 'How can advancements in operations management contribute to improving the efficiency and quality of mental health care services?' The general research question is divided into several sub-questions and is explored in several studies. The sub-questions are sometimes intertwined with each other and are therefore addressed in several chapters.

1. Which criteria should be used to describe and assess the delivery of mental health care services?
2. What are the structure, process and outcome characteristics of delivery of care for patients with depressive disorders within outpatient mental health care services?
3. Which planning and control models can be, and are, applied in mental health care services?
4. How is, and can, information technology be used for planning and control of care processes?
5. How can mental health care delivery be redesigned in order to optimise efficiency and quality?

1.5 BACKGROUND ON THE STUDIES AND METHODS APPLIED IN THIS RESEARCH

Various designs and methods are applied in different studies to answer the research questions. The designs and methods used in the different studies will be described in brief in this section. For further details on the methods the reader is referred to various chapters of this thesis.

In order to analyse the functioning of mental health care, one must first know what should be measured. Therefore a study of the literature of performance measurement, performance indicators, and their purposes as used in mental health care has been conducted.

Next, to gain a better understanding of the existing situation, a multiple-case study of outpatient mental health care services has been conducted. Case studies are considered worthwhile designs for exploring unknown situations,⁵¹ such as operations management in mental health care.^{52, 53} The

cases studied are four outpatient community mental health care services in the Netherlands. These services offer psychiatric care in different regions of the Netherlands. The focus of study was on characteristics of the structure and process organisation of care for adult patients (18 up to 64 years old) with a depressive disorder (DSM IV diagnostic criteria code: 296.2 x, 296.3 x, 300.4 and 311.00) who were in the system for less than two years. This group of patients was chosen because of the high occurrence of both categories of patients in the patient population of mental health care services.

At present there is little empirical evidence in mental health care on the effectiveness of care delivery structures.²³ The multiple-case study will provide more knowledge on the current functioning of outpatient mental health care services, and on possible improvements. However, the multiple-case study design cannot provide insights regarding the causal effects of changes in the delivery of care. One way to gather evidence on care delivery processes is through Operational Research methods (mathematical analytical approaches to investigate and improve the processes of care delivery). In general health care, mathematical models and simulation techniques are increasingly used to support decisions concerning such things as patient scheduling and admission policies.^{3, 54} In mental health care, however, simulation and mathematical models are applied less often. Therefore, this research attempts to expand evidence through Operational Research methods, i.e. simulation modelling, to investigate and improve the processes of care delivery. Within the simulation study, process variables that are assumed to influence efficiency and quality are systematically studied by means of experimenting.

In general, after understanding has been reached on how a desired situation should look, the appropriate improvements should be implemented. However, because implementation of improvements in the delivery of care can imply several changes in the structure and process of care and in the routines and rules of professionals, it is not straightforward,⁵⁵ and often fails.⁵⁶ At present, there is little empirical evidence in the field of mental health care on the effectiveness of care delivery structures, such as service lines and care programmes.²³ In addition, there have not been enough evaluations of health information systems performed and reported in literature.⁵⁷⁵⁸ In this thesis, a study will be presented that evaluates care programmes and information technology in a multi-disciplinary youth care centre, in order to contribute to the field of

knowledge on success and failure factors for delivering care and the use of information technology in mental health care.

1.6 OUTLINE OF THE THESIS

Chapter 2 presents a review of literature on performance measurement, its purposes and indicators, as well as a planning and control model based on performance measurement. **Chapter 3** describes a multiple-case study on operations management of mental health care, in particular the structure, process and outcomes of patients with a depressive disorder within outpatient mental health care services. **Chapter 4** presents a simulation study on the delivery of care and its effect on variation and discontinuity. An evaluation of care programmes and the implementation process of information technology is presented in **Chapter 5**. Finally, **Chapter 6** presents the main findings of this thesis and a discussion addressing some considerations and limitations of the research. In addition, several implications for mental health care services, and recommendations for further research are suggested. The thesis ends with some concluding remarks.

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2 PERFORMANCE MEASUREMENT IN MENTAL HEALTH CARE: PRESENT SITUATION AND FUTURE POSSIBILITIES

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ABSTRACT

OBJECTIVES

Objective This chapter describes performance measurement and its indicators for mental health care services. Performance measurement can serve several goals such as accountability, quality improvement and performance management. For all three purposes structure, process and outcome indicators should be measured.

METHODS

Literature was retrieved from Medline and PsychInfo in order to see which performance indicators were used for the three purposes of performance measurement in mental health care. The indicators were classified in structure, process and outcome indicators.

RESULTS

The results show no big differences in the indicators used among studies. Performance management is the performance measurement purpose most referred to, followed by accountability, and quality improvement. Outcome and process indicators are used most, structure indicators are in the minority. Several levels of measurement, i.e. national or service level, came forward in the literature review.

DISCUSSION

To overcome misinterpretation of data and to be able to improve quality and manage performances, performance indicator sets should refer to structure, process and outcome. Indicators should be chosen carefully with the aim of the measurement taken into mind. Based on this review, a conceptual framework is presented to support managers in their decisions about which indicators can best be used for performance measurement. Additionally a model that provides an understanding of the use of information gained by performance measurement is given.

2.1 INTRODUCTION

Mental health care services lag behind somatic health care in the development of measurement systems.¹ One of the reasons for this may be that mental health care services lack readily available objective outcome indicators, which are more available in somatic health care, such as in-hospital mortality or post-surgical complications.² Furthermore, mental health care services may be too focused upon collecting information that is imposed from insurers or government, which is often emphasising financial information (efficiency from a cost-containment perspective) and excluding other information detailing the way in which services can be provided.^{3, 4} Therefore, the improvement of mental health performance measurement is necessary, also due to several developments such as the force of market competition and the need for transparency in the care delivery process.

This chapter presents a review of literature to the use and purpose of performance indicators for performance measurement in mental health care services. Additionally, a framework to support mental health care services in the choice of performance indicators is presented. This framework, which is based on the literature review, can guide decision makers in the choice of performance indicators for mental health care services.

In mental health care, performances are measured for accountability, quality improvement, and to improve management on a continuous bases (performance management). Though performance measurement gains attention in mental health care, the use of data to drive improvement and management remains a challenge.⁵ Therefore, additional to the results of the review, a model that may facilitate managers in using information for management purposes, is presented.

This chapter is organised as follows: first a conceptual model used for the review is presented. Thereafter the review method is described and the results of the review are given. Next a conceptual framework that presents performance indicators is described. Finally, a model that may help managers in executing performance management is given. The chapter ends with a discussion about the use of indicators in light of the purposes of performance measurement.

2.1.1 REVIEW MODEL

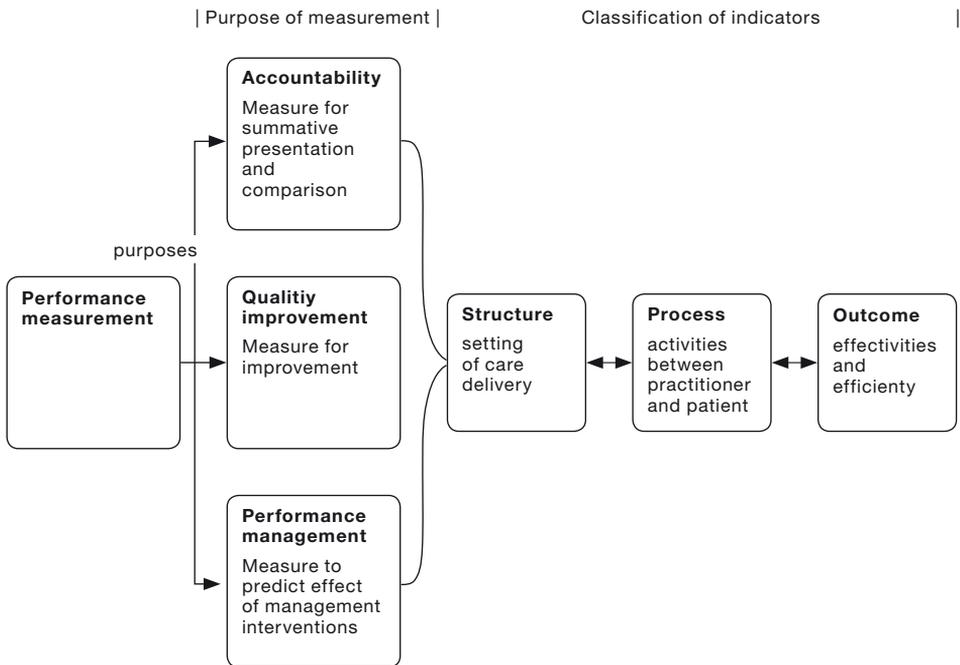
Figure 2.1 presents the conceptual model as used for the review. Because there is a lack of clarity and consistency in the use of terms in literature, the terms as used in this chapter first need to be defined.

Performance measurement is defined as the process that assesses the actual performance of an organisation.¹ Performances can be measured for several reasons. As figure 2.1 shows, the three common purposes of performance measurement being studied are:

1. Accountability
2. Quality improvement
3. Performance management

Using performance measurement for accountability implies that the performance information is compared with other services or standards. The information is used prescriptively and leads to summative judgments on the performance of care.⁶

Figure 2.1: Review model; Performance measurement, its purposes and indicators



These summative judgments can be seen as a strategy for empowering patients as customers to help them in choosing providers, to assess the care performance, to inform political debate and for external audits.⁶⁻¹⁰ An example of measurement for accountability is the league tables, which enables consumers comparing services. In the UK, National Health Services (NHS) league tables can be retrieved on internet.¹¹

For quality improvement, performances are measured in order to facilitate improvement activities (on e.g. national, service, or delivery level).¹² Seeing that, the main difference between performance measurement for accountability and for quality improvement is that the first is a summative representation of performances in order to compare performances, whereas the second is actually used for improvement of the quality.

The third purpose of performance measurement is performance management. Not only does performance management involve the use of systematic methods for monitoring and managing an organisation's performance, it also involves the capability of an organisation, such as a mental health care service, to provide relevant information for decisions on future performances, and is therewith a part of management control process.¹³ An example of a well-known performance management model is the Balanced Score Card (BSC). The BSC can be used to connect strategic organisational aims with performance measurement and improvement issues.¹⁴ The BSC is designed for production, for-profit, companies where the financial perspective is dominant. The advantage of the BSC is that it balances performance indicators against each other in order to overcome a too heavy focus on one of the subjects, e.g. finance.¹⁵

Performance management and quality improvement are different in that performance management is proactive and concerns the capability to reach objectives in which data from the past are used for decision making,¹⁶ whereas quality improvement is reactive and focuses on deficiencies in quality and their improvement. Furthermore, quality improvement is mostly a one-time effort while performance management is an ongoing process.

The above has clarified what performance measurement is and why performances are measured. Now, following **figure 2.1**, performance indicators are introduced, as these need to be defined in order to measure performances. A performance indicator is a marker or sign of things one would like to measure.¹

Indicators can be grouped into various domains, which can be classified into structure, process and outcome. According to the paradigm of Donabedian,¹⁷ these three components assess quality of health care. We based our review on this classification because it is a well-known classification in health care.

Structure refers to the setting in which providers deliver health care and concerns the characteristics of the health-care system such as the organisational structure and the characteristics of staff. Structural characteristics influence the process of care so that the quality of care is either diminished or enhanced.¹⁷

The process concerns the activities that take place between practitioners and patients.¹⁷ It takes in all that is done to and for a population and an individual patient, from preventive services and treatment to aftercare.¹⁸ Process indicators are more sensitive than outcome measures to differences in performance of care and easier to interpret.¹⁹ Examples of process indicators are the use of evidence-based guidelines and the continuity of care. These two indicators directly influence the interaction between professional and patient.

The outcomes are the end results of care and can be considered as the changes in a patient's or population's health status that can be attributed to antecedent health care, and reflect all aspects of the process.^{17, 19} Examples of outcome indicators are health status and quality of life of patients reflecting the effectiveness of care. Also efficiency can be accounted for as an outcome.²⁰

2.2 METHOD OF LITERATURE REVIEW

In order to study the use of performance indicators in mental health care, we reviewed scientific literature. *PsychINFO* and *Medline* databases were searched for English scientific articles with the following keywords: 'Performance indicators', 'performance measurement' and 'performance management' in combination with 'mental health', and in combination with the Medical Subject Headings: 'Mental Health Services' and 'Mental-Health-Programs'. Through citation tracking additional articles were retrieved. The search included articles up to October 2007. Titles and abstracts were reviewed and when relevant, the full text was reviewed.

Our focus of the review was placed on understanding the purpose of performance measurement and the domains and indicators described. Consequently the inclusion criteria were that articles included should at least describe one of the three performance measurement purposes (accountability, quality improvement and performance management), together with performance indicators for mental health care. Articles that did not explicitly refer to indicators were excluded from the review. A second exclusion criterion was the presentation of just clinical outcome measures which were not used as a part of performance measurement.

For this review we classified all indicators used per retrieved article. Per article it is described whether indicators for structure, process or outcome were used. For additional information on the domains per article the first author can be contacted.

2.3 RESULTS OF LITERATURE REVIEW

We identified 23 articles. Multiple articles by the same author with the same topic are regarded as one and the reference of the first article is given. All references are given in **table 2.1** that shows the results of the literature review.

Seven articles described initiatives for accountability purposes on a (national) system level.²¹⁻²⁷ Six authors described performance measurement with quality improvement as main purpose.^{2, 3, 12, 28, 29, 32} Moreover, half of these six articles mentioned accountability as an additional purpose of performance measurement. Ten articles reported on performance management to base future decisions on.^{33, 35-37, 39, 40, 43, 44, 46} Of these ten articles three used the Balanced Score Card,^{40, 44, 46} which is a well-known framework used for performance management.¹⁴ Three articles described the use of a report card that provides managers and professionals with a summary of their overall contribution to service delivery.^{33, 34, 36, 39} A report card can present all the data measured per professional in a spreadsheet display.

Structure indicators were used in twelve articles. Process indicators were used in nineteen articles and outcome indicators in twenty articles (see **table 2.1**). The combination of structure, process and outcome was referred to in nine articles, and the combination of process and outcome indicators in eight articles.

Table 2.1: Classification of the articles included in the review

Articles included in review	Purpose of performance measurement	Classification of domains
Barrett, et al., 1992 ²¹	A	S, P, O
Chisholm, et al., 1997 ²²	A	P, O
Durbin, et al., 2003 ²³	A	O
Fonagy and Higgitt, 1989 ²⁴	A	S, P, O
Keppler-Seid, et al., 1980 ²⁵	A	P, O
McEwan and Goldner, 2002 ²⁶	A	S, P, O
Sorensen, et al., 1987 ²⁷	A	S, O
Blank, et al., 2004 ²⁸	Q, A ^b	P, O
Chinman, et al., 2002 ²⁹	Q	S
Clarkson and Challis, 2002 ³ ; Clarkson and Challis, 2002 ^{4, a}	Q, A ^b	S, P, O
Hermann, et al., 2000 ¹² ; Hermann, et al., 2004 ³⁰ ; Hermann, et al., 2006 ^{a, 31}	Q	P
Milne, et al., 1995 ³²	Q	O
Rosenheck and Cicchetti, 1998 ²	Q, A ^b	S, P, O
Baker, 1998 ³³ ; Baker, 1999 ^{34, a}	PM	P, O
Birleson, et al., 2001 ³⁵	PM	P, O
Carpinello, et al., 1998 ³⁶	PM	P, O
Kamis-Gould, 1987 ³⁷ ; Kamis-Gould and Waizer, 1992 ^{38, a}	PM	S, P, O
Mothersole, 2006 ³⁹	PM	P, O
Moullin, 2004 ⁴⁰ ; Moullin, 2004 ⁴¹ ; Moullin, et al., 2007 ⁴²	PM	P, O
Rosen, et al., 1989 ⁴³	PM	S, P
Santiago, 1999 ⁴⁴	PM	S, P, O
Tompkins and Perloff, 2004 ⁴⁵	PM	S, P, O
Wolfersteig and Dunham, 1998 ⁴⁶	PM	S, P, O

A: Accountability; Q: Quality improvement; PM: Performance management;

S: Structure; P: Process; O: Outcome

a: Multiple articles by the same author about the same topic are considered as one.

b: If an article describes both purposes with the same emphasise, both purposes are mentioned.

Furthermore, the combination of structure and process indicators was mentioned in one article, as was the combination of structure and outcome indicators. Two articles referred to just outcome indicators, one to just structure and one to just process indicators. The next section presents the combination of the purpose and type of indicators used.

2.3.1 PERFORMANCE INDICATORS USED FOR DIFFERENT PURPOSES

Here we present the patterns of indicators used for accountability, quality improvement and performance management according to the components structure, process and outcome. The description gives the reader some ideas of how the indicators are used in mental health care dependent on the purpose of performance measurement. Generally, accountability is more focused on outcome indicators, and quality improvement and performance management encompass indicators in a broader range.

ACCOUNTABILITY

As accountability measures performances mainly for the comparison of information on a national or regional level, it seems logical that all seven articles included outcome indicators, such as client/patient outcome, financial viability, frequency of negative response of therapy, productivity, satisfaction, social functioning, symptoms, or quality of life.²¹⁻²⁷ Five of the seven articles with the main focus on accountability referred to process indicators in which mostly accessibility and appropriateness were described. Other process indicators mentioned were: consumer/family participation, continuity, prevention, safety, and use of standards of care.

Structure indicators, such as characteristics of the population and of the staff, were included in four articles. Finally, three studies used structure, process and outcome indicators and had, therewith, clearly the broadest scope of measurement.^{21, 24, 26}

QUALITY IMPROVEMENT

As can be seen in **table 2.1**, three articles discussed performance measurement for reasons of both quality improvement and accountability.^{2, 3, 28} However, as already explained, quality improvement is not the same as accountability. The quality improvement efforts as described in the reviewed articles are described on a national/regional level,^{2, 28} on an organisational level^{3, 29, 32} or on both levels.¹²

With regard to the performance indicators, the articles that focused on both accountability and quality improvement encompass the broadest scope of domains. The other articles focused solely on structure, process or outcome.

Four out of six articles reflected outcome domains. To sum up, the indicators mentioned include: economic performance, health outcomes, length of stay, quality of life, satisfaction and symptoms.

Examples of process indicators that were presented are: accessibility, assessment, appropriateness, clarity of diagnoses, continuity, coordination, follow-up arrangements, intensity, prevention, safety, and timeliness.

Finally, structure indicators that have been pointed out, are needs and supply characteristics, and access/population coverage. One article described only structure indicators that relate to the population needs.²⁹

PERFORMANCE MANAGEMENT

Performance management uses information on performances for planning and control, and to predict future performances. Performance management was the focus of performance measurement in ten articles.^{33-37, 39, 40, 43-46} In four articles the performance management system as described in the article was performed by the state or national government.^{36, 37, 43, 45} As can be seen in **table 2.1**, outcome indicators were described in all articles except one.⁴³ Examples of indicators are clinical outcomes, health status, and number of consultations.

In short, process indicators, as brought up in all articles, are: access, appropriateness of service, coordinated care, safe and therapeutic environment, quality treatment services, and service utilisation.

Additionally, in five of the ten articles structure indicators were stated. These include indicators such as existence of programmes, innovation, job coverage, management and planning, the service structure, and staff competence.

2.3.2 SUGGESTION FOR A CONCEPTUAL FRAMEWORK FOR PERFORMANCE INDICATORS

We have discussed performance indicators as found in the literature. We will go one step further and classify these indicators in a conceptual framework to guide decision makers in their choice on performance indicators.

The conceptual framework (see **figure 2.2**) presents all the above mentioned aspects of performance measurement and aims to guide decision makers in the choice of indicators.

The aim of the performance measurement should be leading in the choice of indicators. The type of indicators a mental health care service or a local/national authority should use depends on the aims of the organisation as can be seen in the figure. Despite not being a complete listing of the domains and indicators possible, the framework does provide a representative spectrum of domains for performance measurement. The framework is not meant as normative or prescriptive but descriptive.

As can be seen in the figure; structure, process and outcome are linked with each other and several domains can be chosen for each of these components in order to measure performances. Decision makers should ideally use structure, process and outcome indicators based upon the aim of performance measurement. An example of the relation between outcome and the structure indicator 'population characteristics' is the following: rewarding good outcome without control for severity of problems, would reward to serve the patients with minor problems and favourable prognoses.²⁵ However, it is essential that the links between structure, process and outcomes are spelled out and tested.⁴³

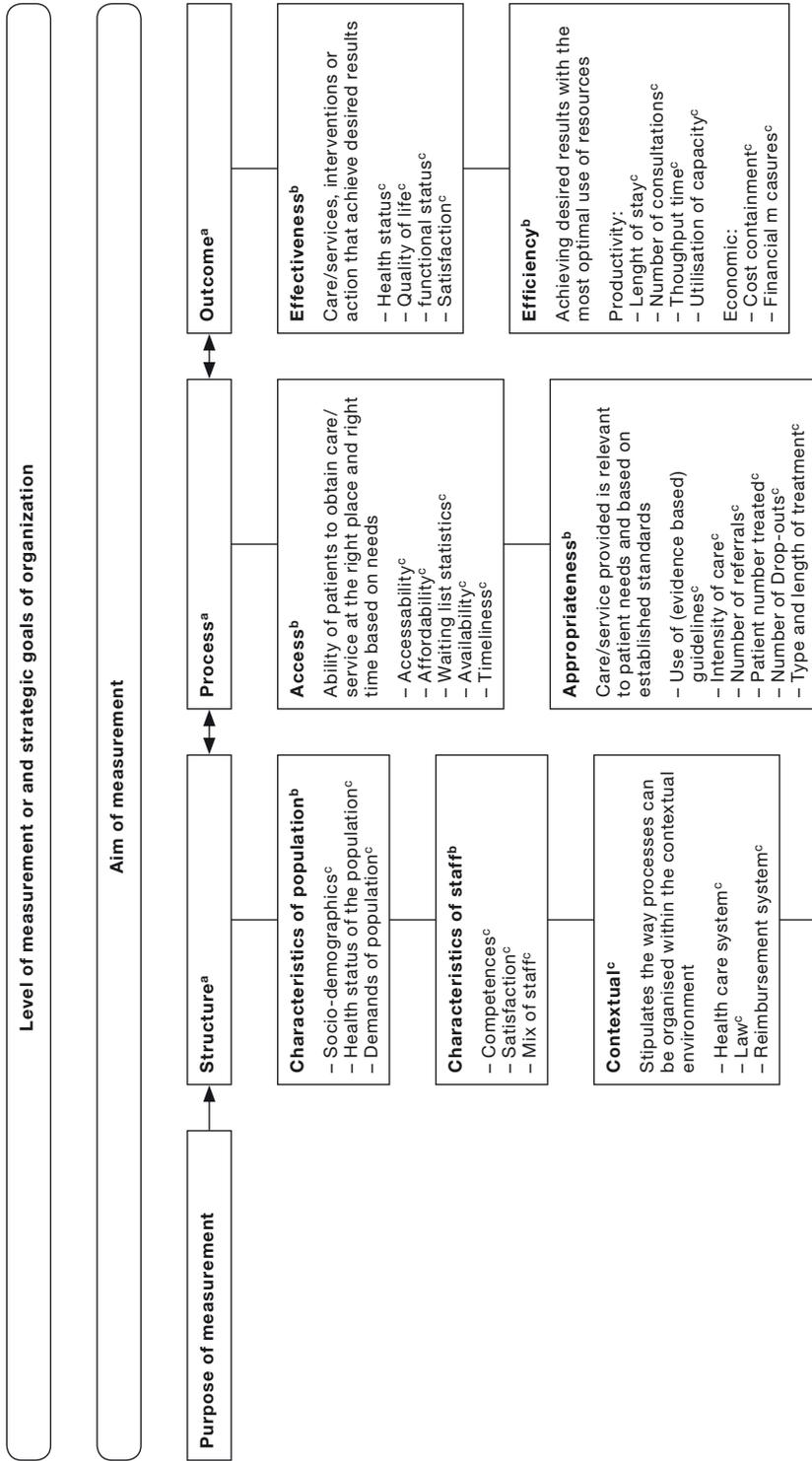
Which indicators should be used also depends on the level of measurement, e.g. the country/regional level, the local level or the patient level. A matrix in which the geographical dimension is included, clearly shows how the indicators can vary on different geographical levels.⁴⁸

2.3.3 THE USE OF INFORMATION

The actual use of information is just as important as the type of information that is gathered. In this section a model is presented that can guide decision makers, i.e. managers of mental health care services, in the use of information as gained by performance measurement.

Figure 2.3 shows what information needs to be collected and the possibilities to use the information. This figure is adapted from a model presenting necessary conditions for management control, as described by Otley and Berry.⁴⁹ This model is not intended to be normative or prescriptive, but rather to provide a descriptive model within features of performance management is presented.

Figure 2.2: Conceptual framework for the classification of performance indicators; domains and examples of indicators



Organisational structure^c

The set of arrangements by which the resources of an organisation, human and others, are connected through relationships⁴⁷

- Work design^c
- Size^c
- Authority^c
- Spezialisierung^c
- Use of information technology^c
- Flexibility^c

Continuity/coordination^b

Ability to provide uninterrupted, coordinated care/services across programs, practitioners, organisations and level of care/services over time

- Number of professionals/ organizations involved in the care^c
- Proportion of patients with follow-up visits^c
- Presence of case management^c
- Communication between providers^c
- Numbers of no-shows^c
- Use of monitoring systems^c

Prevention^b

Early intervention and prevention to avoid unnecessary reliance on services (Carpinello et al., 1998)³⁶

- Screening attempts^c
- Prevention methods which are used^c

Safety^b

Potential risk of the intervention or the environment

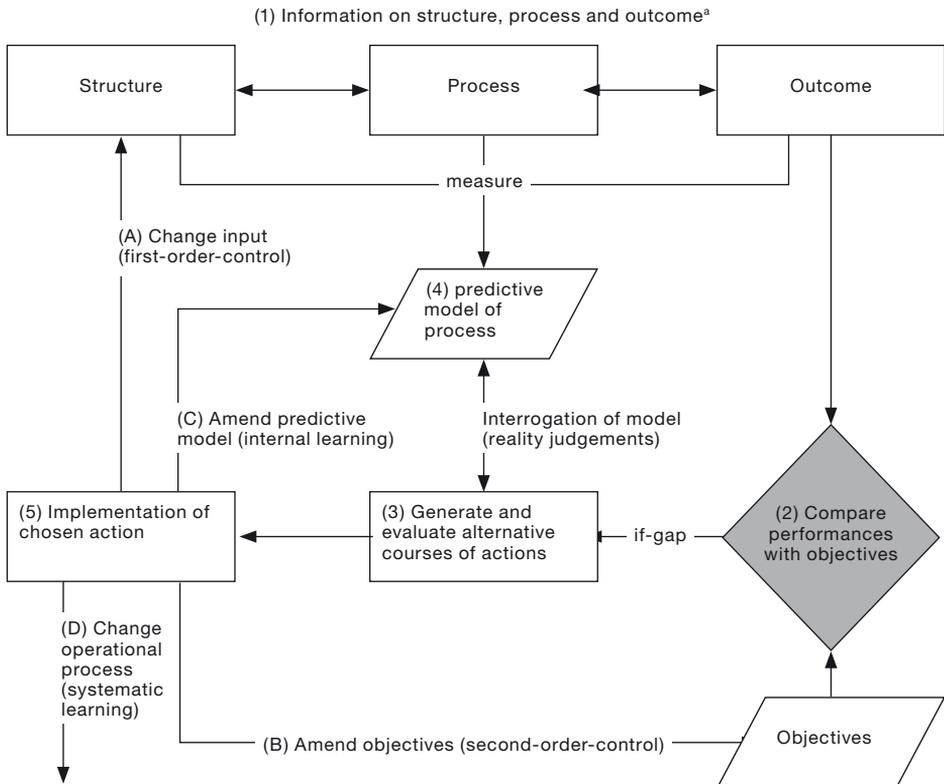
- Numbers of medication errors/ side effects^c
- Numbers on suicide^c

a: Classification of structure, process and outcome component in order to measure the overall performances of mental health care services

b: Domains used for grouping the indicators

c: Performance indicators

Figure 2.3: Model for the use of information gained from performance measurement. Adapted from Otley and Berry⁴⁹.



a: See figure 2.2 for performance indicators

For performance measurement indicators on structure, process and outcome need to be gathered (referred to with (1) in **figure 2.3**). These should be gathered routinely and be brought together. Next the performances that are measured need to be compared with objectives (referred to with (2) **figure 2.3**). Once the actual performances are compared with the desired performances, gaps should be identified, understood and explained (referred to with (3) in **figure 2.3**). In case of a gap, actions should be undertaken to close the gap. First, the causes of shortfalls between actual and desirable performances are to be known to understand what should be changed.⁵⁰ To get to know the causes, a predictive model should be established.

In a predictive model expectations and presuppositions about the structure, process and outcomes are made explicit. The major purpose of a predictive model is to enable answers to questions of the form: if a certain action is taken, then what consequences will follow? This helps managers in forecasting the likely outcomes of various alternative courses of actions, opposed to learning by 'trial and error'.⁴⁹ Based on intuition and experience managers often do what seems best. However, if they make their expectations and presuppositions explicit in a predictive model they can then forecast the likely outcomes of various alternative courses of actions. Consequently the effects of management interventions can be predicted. Thus, to predict the effect of an action a predictive model (referred to with (4) in **figure 2.3**) of the process being controlled is required.

Then an action to reduce the gap should be chosen and implemented (referred to with (5) in **figure 2.3**). Several ways may exist to reduce the gap and to maximise the achievement of the performances compared to the objectives (see **figure 2.3**).

One such a way is to change the system input to obtain the desired outcomes and is called 'first-order-control' (referred to with (A) in **figure 2.3**). As an example we take a guideline describing the mean number of consultations of patients with a depressive disorder to be fifteen. With first order control the fifteen consultations cannot be exceeded. It is clear that a hazard with first-order-control is that this option runs the risk that the aim becomes to keep the activity on the objective at any costs. This can be counterproductive and result in a situation where the attainment of objectives becomes more important than achieving progress and improvement in mental health care. With first-order-feedback-loops learning and improving does not occur. To ensure learning and improvement, a second-order-feedback loop is needed.

Second-order-control (referred to with (B) in **figure 2.3**) implies that the objectives are changed in the direction of the actual outcomes, making the objectives more realistic and attainable. With a second order feedback loop the target of a mean of fifteen consultations can be periodically adjusted to meet the real performances better. In essence, a second-order-feedback loop provides the flexibility necessary in mental health care services, as it is possible to overrule standards when the situation calls for this kind of action. Consequently, a second-order-feedback loop can cover more complex organisational situations.

Another possibility to cover a more complex situation is adapting the predictive model of expectations and presuppositions based on past experience, i.e. changing the expectations and presuppositions due to new insights. This is called internal learning (referred to with (C) in **figure 2.3**). For example, a structural exceeding of fifteen consultations by patients may be managed with an action as implementing a new protocol. A predictive model may predict the effects of a new protocol before it is implemented.

The fourth way is adapting the operational process itself (referred to with (D) in **figure 2.3**). The operational process can be fine-tuned or re-designed. This way of learning is called systematic learning.^{49, 51} Ultimately the overall aim of a mental health care service should be systematic learning; changing the care process in such a way that higher quality in a cost-effective way is gained. Taking the example of fifteen consultations again, a process re-design can imply that due to e.g. creating more continuity in care the mean of fifteen consultations is easier reached while maintaining quality. Yet again, the predictive model should be used to predict the consequences of a process re-design.

However, some conditions are needed for care processes to become manageable and to enable learning based on information: activities must be repeatable, objectives must be unambiguous, the effects of management interventions should be possible to predict in the predictive model, and outcomes must be measurable.⁵² Standardisation of the care delivery process provides the opportunity to describe objectives unambiguously. Furthermore, the organisational system should embed performance management to design, manage and improve the care. Care programmes offer possibilities to standardise care processes and to meet the need for flexibility of care processes and are therewith a system in which performance management can be integrated.⁵³

2.4 DISCUSSION

Although there are more articles that describe performance indicators for mental health care based on a literature review,^{1, 12} we believe this study is unique in itself. The combination of the literature review, a conceptual framework for performance indicators and a model that describes how to use information gained by measurement, is the added value of this chapter.

Performance measurement can serve several purposes for mental health care services. In this study three purposes are addressed: accountability, quality improvement and performance management. Overall most studies reviewed are focused at performance management (ten articles), followed by accountability (seven articles), and quality improvement (six articles) of which three studies explicitly described a combination of accountability and quality improvement as a purpose of performance measurement. Outcome indicators (twenty articles), and process (nineteen articles) indicators were mostly used, followed by structure (twelve articles).

Our study has some drawbacks. First of all, for the readability of this chapter we did not present all indicators per study. We did group, however, the indicators into domains and next classified them under the structure, process or outcome component. However, if a study mentioned just one outcome indicator besides several process indicators, this is equally weighed and the article is classified as having both process and outcome indicators.

Furthermore, our study focused on scientific articles. Therefore reports and grey literature are not included while these are common for accountability purposes (see 1).

Lastly, we based our review on the classification of Donabedian (1980)¹⁷ because it is a well-known classification in health care. However the structure, process and outcome framework of Donabedian is aimed to assess quality of health care. Nevertheless, quality can be seen as a component of performances along side indicators such as satisfaction and costs.^{1, 5, 16} Then quality is a component of performance to be assessed, just as costs, satisfaction, access and utilisation. Consequently performance is thus broader as quality. Therefore we interpreted the classification of structure, process and outcome broader and does our conceptual framework include outcomes such as effectiveness and efficiency that include economical and productivity indicators.

2.4.1 USE OF PERFORMANCE MEASUREMENT AND ITS INDICATORS

Although it has been argued that mostly outcome indicators are used for performance measurement,^{1, 5} we found almost equal numbers of articles with outcome and process indicators (twenty outcome and nineteen process). Structure indicators lagged behind with twelve articles. The difference in the prevalence of outcome indicators as found in our review

compared to the review of Adair et al.(2003)¹ may be explained by the fact that we did not include reports and grey literature in our review. Another explanation can be the exclusion of articles that only focused on clinical outcomes, which were not regarded as a part of performance measurement in our review. As accountability mainly focuses on comparison of outcomes for outsiders, it is logical that all seven articles with the focus on accountability, mentioned outcome indicators.

Performance measurement for accountability, however, is often intended to inform programmes and systems. Nevertheless, clinical outcomes on patient level should also be included while these can inform future care provided to individual patients.⁵⁴ Nevertheless, because of the time and costs needed to establish a rich and clinically meaningful set of outcomes for all patients during their care, other clinical information than diagnostic codes, length of stay and details about interventions received during treatment are hardly measured in administrative databases.⁵⁵ Though, other clinical data, e.g. health status or symptoms, can drive improvements and management, and therefore measurement of those should be stimulated.

In the articles that focused on both quality and accountability, a broader spectrum of domains was accounted for compared to studies that focused on just quality improvement. Articles that focused on performance management were also likely to take into account a broader spectrum of indicators. Additionally, none of the articles that focused on performance management concentrated at a single domain. Besides, four out of ten articles focused on all three components: structure, process and outcome.

Structure domains were assessed in about half of the articles (twelve out of twenty-three). Structure factors influence the processes and, thereby, outcomes and should preferably be included in performance measurement. The structure domains that were included mostly referred to population characteristics, characteristics of staff and contextual aspects. Indicators of organisational structure aspects, such as the size and work design, were hardly encompassed. Nevertheless, these kinds of structure indicators give a thorough understanding of structure facilitates the interpretation of care processes and consequently the outcomes. This insight evidently helps professionals and/or managers to identify the actions necessary or most advantageous in a mental health care service.

In service organisations, such as mental health care, a higher emphasis is placed on external aspects of performance (i.e.

direct effects on customers such as delivery, customer service and quality), than on internal aspects of performance (i.e. efficiency, resource utilisation).⁵⁶

A performance management model, such as the BSC, can guide mental health care organisation towards a balanced set of indicators to consider both external and internal measures. Three of the reviewed articles referred to the Balanced Score Card.^{42, 44, 46} Two of these^{42, 44} adapted the original BSC to the context of public health and behavioural health care. All three articles presented indicators on each level of the BSC. These do reflect structure, process and outcome indicators.

Combining the BSC and the structure, process and outcome classification can see to covering the performances of the whole situation. The BSC prevents a too heavy focus on one area of performances, i.e. on financial perspectives. Consequently, a better understanding of the total performance of an organisation is obtained and can be managed.

Despite the conditions such as standardisation and measurability of outcomes that are needed for care processes to be managed by the model as presented in this chapter, we believe that in mental health care services many care processes can be managed using the information from the measurement. However, the use of performance measurement for management in mental health care services is severely underused despite its feasibility.³⁷ In mental health care performance measurement is seen as an expense, in contrast with business where it is seen as an investment.¹ Furthermore, in public sectors, such as mental health care, performance indicators are mostly used for external control, meaning that authority and control are exercised from outside of the organisation.⁷

To facilitate performance management for managers and professionals of mental health care services we presented a model on how to use information gained from performance measurement. This model is not normative or prescriptive, but can function as a guide to help decision makers in performance management activities.

However, not all managers and mental health care services have the possibility to develop their own performance management system. Many mental health providers are small organisations that do not have the resources to develop and implement performance measurement systems and the medical staff is typically unable to fully participate due to care delivery demands. On the other hand, regulations in mental health care urges for record keeping of performances which can be

one source of performance data.¹ Managers thus should ideally seek for opportunities to use at least the data that is already collected. Nevertheless, these data not always reflect all information needed and therefore should be completed with additional information.

Accountability towards several stakeholders is needed due to more articulate patients and more market competition. Therefore mental health care centres need to become more open and transparent. Additionally, performance measurement needs a culture within which the use of data is experienced as consonant with wider professional values and requires openness and reflection.³⁹ It is important that performance measurement is a system focused on improvement and is not a blame culture.⁴⁰ Consequently, mental health care needs to work on a culture of openness and curiosity.

2.5 CONCLUSIONS

Performance measurement in mental health care is used for accountability towards stakeholders, for quality improvement, and for performance management. There are no big differences in the use of indicators for these purposes. Outcome and process indicators are used most, and structure indicators are in the minority. To overcome misinterpretation of data and to be able to improve quality and manage performances, performance indicators sets should refer to structure, process and outcome. To overcome unintended effects, the selection, measurement and use of indicators must be done carefully and reflect the whole performances including quality, financial and productivity indicators.

A conceptual framework with several classifications of indicators for mental health care services is presented to facilitate the choice of indicators for performance measurement.

Furthermore, performance management implies that the planning and control is based on information in order to be proactive and learn. Measuring performances, comparing the performances with objectives, and taking appropriate actions to overcome shortfalls, are essential in performance management and explained, and illustrated in a model, in this chapter.

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3 UNDERSTANDING CARE DELIVERY PROCESSES IN MENTAL HEALTH CARE SERVICES: A MULTIPLE-CASE STUDY

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Submitted

ABSTRACT

OBJECTIVES

To demonstrate operations management for mental health care, by presenting findings on structure, process and outcomes of the care delivery for patients with a depressive disorder.

METHODS

A multiple-case study design in which a description of the care delivery process of four community mental health care services is made by means of observations, semi-structured interviews, document study, expert meetings and secondary data analysis. Performance indicators reflecting the structure, process and outcomes were assessed.

RESULTS

The mental health care services differed in the structure, process and outcome. The main differences involve the presence of objectives for their care process, the use of treatment protocols, use of information technology, attuning different activities of the care process, and homogeneity of the patient sub-population.

DISCUSSION

Mental health care services can improve care delivery with the design, planning and control of the care processes. Performances may be improved by grouping the patient population into more logistically homogeneous groups, the use of clear objectives for different care delivery processes, use of information technology, de-fragmenting care process, and functional flexible professionals.

3.1 INTRODUCTION

Recently, more attention has been paid to the organisation of care processes, as this influences both the efficiency and quality of care. The delivery of mental health care is often fragmented, not demand-driven and costs are rising. Consequently, optimal efficiency and quality is lacking. One of the most promising ways to improve efficiency and quality is improving the care delivery by operations management.¹ The analysis, design, planning and control of care delivery processes (all steps necessary to provide a service for a client) is the field of operations management.^{2 (p 3)}

Before innovations on care delivery processes can be implemented, possibilities for innovation of mental health care delivery first need to be better understood.³ The initial step is analysing and understanding the current situation. In mental health care, and health care in general, empirical findings on evidence of care delivery are scarce and pragmatically hard to obtain.^{4, 5} To gain more empirical findings, this chapter describes a multiple-case study to the operations management of care delivery in four outpatient community mental health care services (further referred to as MHS's) in the Netherlands. Care delivery is defined as the structure and care process that are needed to deliver care to patients. For optimal efficiency and quality the structure should be designed to fit care processes.^{4, 6, 7}

Structure and process factors can be barriers to optimal efficiency and quality. These barriers can be categorised into three groups:

1. uncertainty of care
2. complexity of care
3. inflexibility of care⁸

These three groups of structure and process factors can cause discontinuity of patient flow and variation in input, throughput and output. Variation and discontinuity are common in health care and the main factors hampering efficiency and quality of care.⁸ Therefore, structure and process factors that reflect uncertainty, complexity and inflexibility and may be associated with variation and discontinuity are explored in this multiple-case study. First, discontinuity and variation are explained.

Discontinuity of patient flow stands for a 'criss-cross' movement of patients from one activity to the next, which can involve several queues.⁸ Criss-cross flows mainly exist when process steps are interdependent and involve multiple contingencies and feedback loops.⁹ Consequently, patients may need to contact several different professionals and/or departments with many transfers, which make coordination complex and reduces or even destroys continuity of care.⁸⁻¹⁰

The second factor that may hamper efficiency and quality is variation. In health care a lot of variation in input, throughput and output is present, which can lower the quality of care, increase waiting lists and limit patient satisfaction.¹¹⁻¹³ However, variation does not always have negative implications. For example, patients differ, and professionals vary in level of expertise, affection and availability.¹² This kind of inherent variation should be managed rather than eliminated. Nevertheless, there can be unnecessary variation in the parameters of care processes, which causes can be identified and eliminated. Examples of unnecessary variation are the unneeded habitual differences between professionals, and professionals needing training.¹¹⁻¹⁴ (p 285)

The aim of this study is to demonstrate operation management for mental healthcare. The following research question is studied: what are structure, process and outcome characteristics of care delivery of patients with depressive disorders within four outpatient mental health care services, and how can this knowledge contribute to operations management in mental health care?

3.2 METHODS

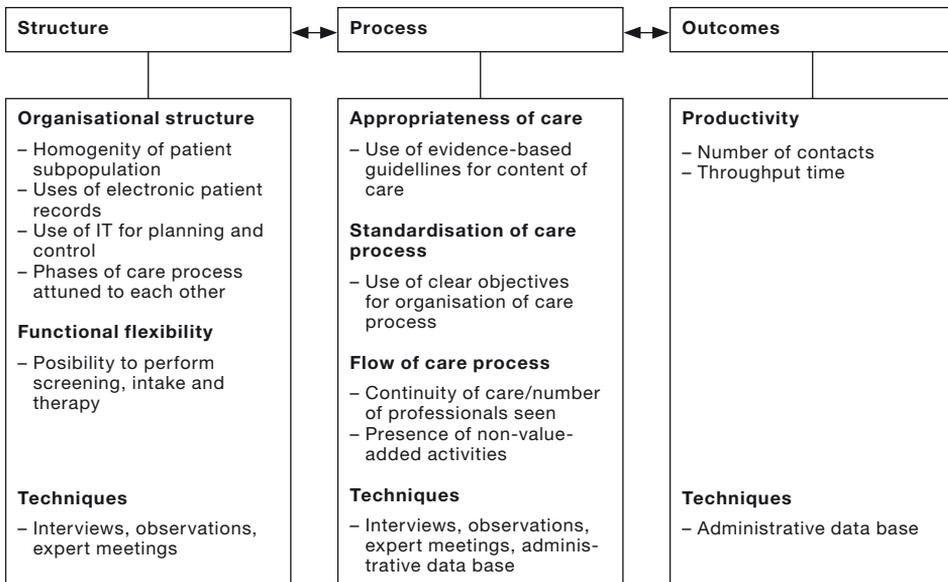
In order to demonstrate operations management for mental health care, we used a multiple-case study design. Such a design allows explorative research to create a better understanding of operations management and its relation to quality and efficiency of mental health care services.^{15, 16}

The cases studied were four outpatient community mental health care services in The Netherlands. These four services were selected because these are four of the few outpatient mental health care services in the Netherlands that are not merged into integrated regional mental health care organisations,^{17, 18} and therefore comparable in their organisational design. The

services offer psychiatric care in different regions of the Netherlands. The focus of study was upon characteristics of care delivery for adult patients (18 up to 64 years old) with a depressive disorder (DSM IV diagnostic criteria code: 296.2x, 296.3x, 300.4 and 311.00). This group of patients was chosen because of the high occurrence in the patient population of MHS's.

Performance indicators are used in order to structurally measure and compare operations management of the different cases. For the description of the current situation, we used patient-flow models supported with quantitative data. **Figure 3.1** shows the performance indicators and techniques as used in this study, which are elaborated on in the next section.

Figure 3.1: Performance indicators of this study and the techniques for information gathering



3.2.1 PERFORMANCE INDICATORS

To assure that a full spectrum of care delivery indicators was measured, we were guided by a framework based on Donabedian's^{19, 20} model (see **figure 3.1**). According to Donabedian's model,²⁰ quality of care should be assessed by a combination of structure, process and outcome indicators that reflect

the clinical quality. We interpret structure and process broader than defined by Donabedian (1980) to be able to measure other performances as well, besides clinical quality, for example productivity.^{6, 19} Although more indicators can be used to assess quality and efficiency, such as characteristics of a patient population, communication structures, safety, information flow and patient and employee satisfaction,⁶ the indicators used in this study were chosen from an operations management perspective to assess the care processes that produce value for the patients.^{8, 14} First, the structure indicators are presented, followed by process indicators and lastly outcome indicators are given.

STRUCTURE

Grouping patients into subpopulations with the same common characteristics such as diagnosis or expected throughput time, is assumed to increase homogeneity of the patient subpopulation and decrease variation and discontinuity.²¹ Therefore it is assessed whether patient subpopulations have been defined in the services.

Another characteristic assessed is the presence and use of information technology, which can reduce uncertainty and facilitates coordination.^{22, 23} In addition, it was studied if activities provided in different phases of care processes were attuned to each other. Attuning activities can influence the movement of a patient through the care delivery process and additionally the complexity of coordination.

Furthermore, flexibility is advocated to react to inherent variation and is needed for the adaptability of the system to changes in the chain of activities.^{24, 25} We studied functional flexibility of staff by assessing the possibility of staff to perform different activities, in this case screening, intake and therapy.

PROCESS

Process indicators relate to the activities that go on between provider and patient and thereby influence outcomes. We assessed the appropriateness of care by studying the use of evidence-based clinical protocols. Besides clinical protocols, we studied the use of clear, documented, objectives for the organisation of the care processes. Guidelines for care processes set objectives on what needs to take place, on how care should be delivered to a certain target population, by which profession, in which setting, through how many contacts and with what frequency. A distinction can be made between standard,

routine and non-routine processes depending on the level of repetition, amount of variation and uncertainty.²⁶ Standard processes are applicable in situations where activities are repeated in an identical fashion. Routines are associated with somewhat similar, but not totally identical activities, and non-routine processes emerge where events are dissimilar.²⁶

To examine (dis)continuity of flow of patients, the number of different professionals seen by patients was studied. In addition to discontinuity, criss-cross flows engender non-value-added activities such as waiting and unnecessary action in a medical/psychiatric way.^{8, 27} These activities (see **table 3.2** for an overview of non-value added activities) should be minimised or eliminated to create a continuous flow for patients, so that throughput time is shortened and quality maximised.^{27, 28}

OUTCOMES

According to Donabedian, outcomes refer to a change in the situation of a patient due to antecedent care.²⁰ However, outcome should not only reflect patients' outcomes but also employee and organisational outcomes⁶ and indicators relating to efficiency²⁹ and productivity¹⁹. We focused on productivity measures, such as the number of contacts and throughput time. We consider these to be a result of the process and part of efficiency. Throughput time is the time a patient pass through the entire care process including waiting time.

3.2.2 TECHNIQUES

The current situation of care delivery for the four cases studied was assessed during 2005. Firstly, the first author attended at least two staff meetings in each MHS (A,B,C, and D). Next, several professionals and managers per case were interviewed. The interview questionnaire was semi-structured, allowing interviewees to respond in their own words. Questions were asked about the flow of a patient through the process and the flow of information.

The interviewees were all involved in the care process for patients with a depressive disorder. The managers of the involved departments mentioned professionals to ask for participation. All contacted professionals were willing to participate. In MHS-A eleven persons (three care coordinators, three psychotherapists, three case managers, two nurses) were interviewed. In MHS-C six persons (two psychiatrist, (of which one

was the program leader), one psychotherapist, two nurses, one manager of the front entrance) were interviewed, and in MHS-D seven persons were interviewed (one clinical psychologist, one psycho-analyst, two psychiatrists, one nurse, one behavioural therapists and one secretary). All interviews were audio taped and from all interviews transcripts were made. These transcripts were coded by case according to sequence of the patient flow. Furthermore, documentation (where available) concerning the care process was analysed. The observations, semi-structured interviews and documentation, were analysed with pattern-matching and explanation building techniques as often used in case studies.³⁰ The analysis resulted in process descriptions and flow diagrams by case, which were validated by managers and professionals, individual and in presentations for departments.

Furthermore, on request an administrator of each MHS gathered data, about the number of contacts, throughput time and the number of professionals per patient, consulting administrative databases. Data concerned those patients who were deregistered in 2004 and registered after the first of January 2003. For the indicators of throughput time and number of contacts, the mean, standard deviation and the coefficient of variation (cv) were calculated. The cv is the standard deviation divided by the mean and is a relative measure of variation.³¹

After collecting data within each case, the different process descriptions from the cases were systematically compared with each other. Additionally, several expert meetings with staff from the different cases and the researchers were held. In these expert meetings, reflections on comparison of the four cases were given by all participants.

3.3 RESULTS

First, the results on structure are described, followed by the results on process and outcome. **tables 3.1 to 3.3** show the results.

3.3.1 STRUCTURE PERFORMANCES

In this paragraph the four outpatient mental health care services are compared on their structure indicators. **Table 3.1** presents a comparison of the four outpatient mental health care services on several structure indicators.

ORGANISATIONAL STRUCTURE

Homogeneity of patient population: The MHS's had a heterogeneous total patient population. All services had several departments that were focused on age categories. We studied care for adults (18 up to 64 years old). In general, the total group of adult patients was divided into two groups. The first group was a subpopulation of patients who were to be treated on a long-term base with more complex and chronic disorders. The second group were patients who were to be treated within two years by, among others, psychotherapy. MHS-C subdivided this latter group even further into groups targeted at patients with a certain diagnosis, e.g. mood, anxiety, or personality disorders. This division contributed to the management of inherent variation.

Use of electronic patient records: Only MHS-C used electronic patient records. The other MHSs had more process activities for the flow of information (e.g. copying of documents, transport of documents).

Use of information technology for planning and control: The software in MHS-C functioned as electronic organiser and could also provide management information on productivity per department or per professional, and financial information. However, the software was not used for planning and control of throughput time and number of contacts on a care process level. The MHS's without an electronic organiser had to note appointments on several paper documents.

Table 3.1: Results on structure indicators per MHS

Structure Indicators	MHS-A	MHS-B	MHS-C	MHS-D
Organisational structure				
Homogeneity of patient population	low	low	moderate	low
Use of electronic patient records	low	low	high	low
Use of information technology for planning and control	low	low	moderate	low
Phases of the care process attuned to each other (see also figure 3.2)	low	moderate	moderate	moderate
Functional flexibility				
Possibility to perform screening, intake and therapy	low	moderate	moderate	high

The researcher defined if the scores were low, moderate or high. The scoring is aimed for comparison but does not apply any weighing.

Phases of care process attuned: The MHS's differed in how different activities from a care process were attuned to each other, as can be seen in **figure 3.2**. MHS-A had a team of professionals for screening, another team for intake and yet another for therapy. Professionals could be part of more than one team. MHS-B integrated screening and intake in one team, which means that in principle the same professional performs the screening as well as the intake and these phases of the care process are integrated just as MHS-D integrated intake and treatment.

FUNCTIONAL FLEXIBILITY

Possibility to perform screening, intake and therapy: In MHS-B, MHS-C and MHS-D professionals performed basically standard two phases of the care process, i.e. screening and intake, or intake and treatment (see **figure 3.2**). As this was not the case in MHS-A, the functional flexibility of professionals in MHS-B, MHS-C and MHS-D was larger compared to MHS-A.

3.3.2 PROCESS PERFORMANCES

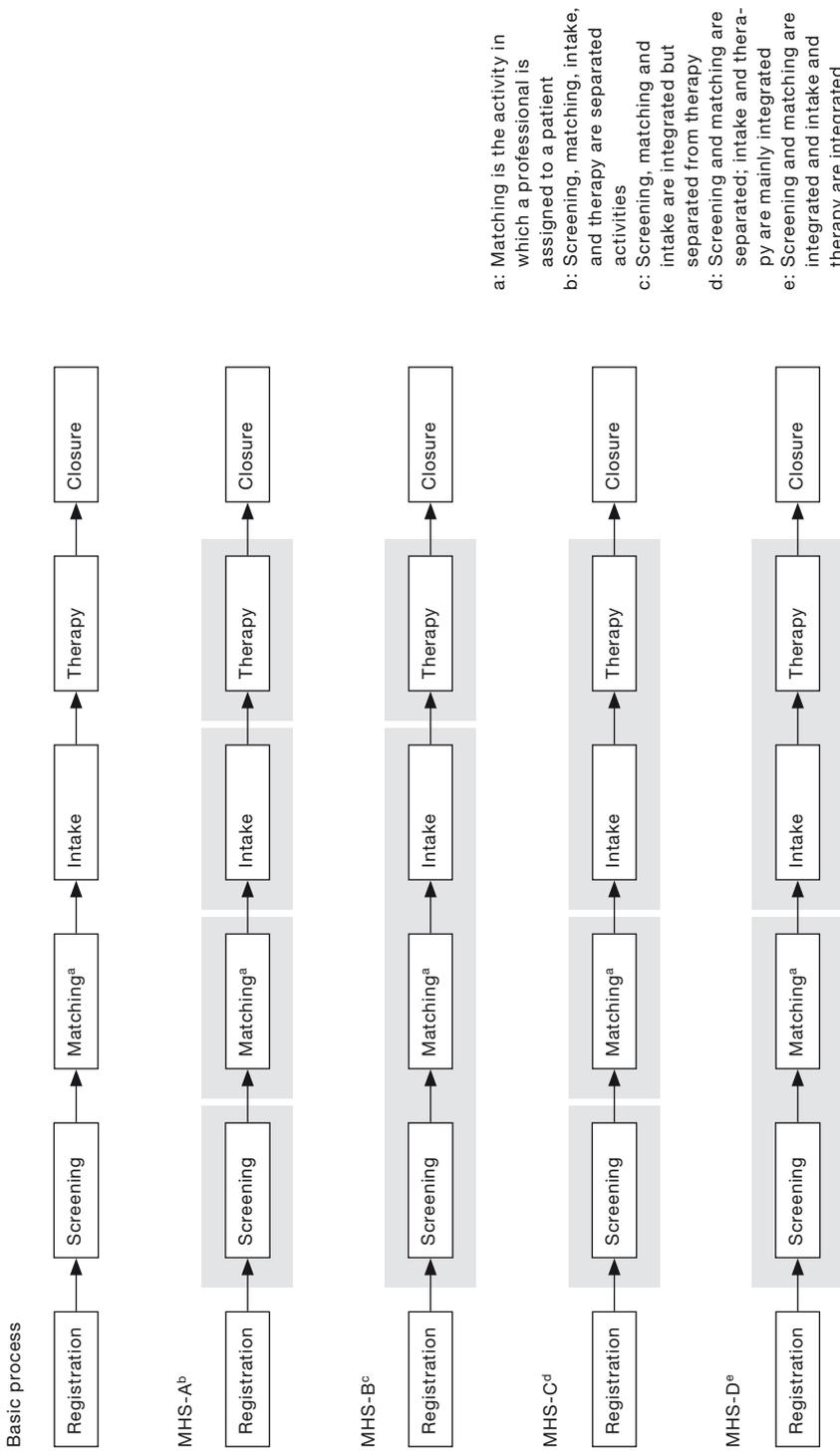
Several process indicators were measured. **Table 3.2** provides an overview with a rating per indicator for each MHS.

APPROPRIATENESS OF CARE

Use of evidence-based clinical protocols: Within MHS-A, B and D the use of evidence-based clinical protocols depended on the individual professional. In MHS-C the use of evidence-based treatment protocols was integrated in the policy of the department. Standardisation of care process.

Use of clear objectives for the organisation of care processes: MHS-C had objectives for the organisation of care processes documented in guidelines. These objectives included the mean number of contacts and the frequency of these contacts for different modules as e.g. cognitive behavioural therapy. Only deviations of the objectives needed to be reported in meetings. These objectives gave the professionals and managers tools to control the throughput time and number of contacts of the care process. MHS-D set and controlled objectives in multi-disciplinary staff meetings. However, in MHS-D all decisions regarding the number of contacts of an individual patient had to be made or confirmed in multidisciplinary meetings due to a lack of documentation of the objectives. In the other MHS's objectives for an individual treatment plan were mostly set by the responsible professional and discussed in a multidisciplinary team.

Figure 3.2: how different phases of the care process are attuned to each other per mental health care service



All MHS's did have criteria for the number of screening and number of intake contacts, however mostly not explicitly documented and therefore also not monitored. MHS-C on the other hand used a semi-structured interview for the intake.

FLOW OF THE CARE PROCESS

Continuity of care: In MHS-A patients saw the most different professionals, as can be seen in **table 3.2**.

Table 3.2 process indicators per MHS

Process Indicators	MHS-A	MHS-B	MHS-C	MHS-D
Appropriateness				
Use of evidence-based guidelines	moderate	moderate	high	low
Standardisation of care process				
Use of clear objectives for care process	low	x	high	moderate
Flow of care process				
<i>Continuity of care</i>				
Number of different professionals per patient (mean ±sd)	3.2 ±2.2	2.8 ±1.5	2.8 ±1	1 ±0.1 ^a
<i>Presence of non-value-added activities</i>				
Chance for double information asking	very high	high	high	high
Need to take all decisions regarding throughput time in staff meetings	high	high	high	high
Transport of patient files	very high	high	low	high
Movement of professionals to obtain patient files	high	high	low	high
Waiting before screening	high	high	high	high
Waiting before intake	high	high	high	low
Waiting before treatment	very high	low	moderate	high
Processing; need to note appointments several times in paper agendas'	high	x	low	very high
Defects; Wrong matching of patients with professionals/departments	very high	x	moderate	x

Note that with 'appropriateness of care' and 'standardisation' a 'very high' is the best score while a 'very low' is the lowest score. In 'flow of care' a 'high' has negative denotation scores while a 'low' has a positive denotation. The researcher defined if the scores were low, moderate or high. The scoring is aimed for comparison but does not apply any weighing.

x: no insight gained due to a lack of administrative data or not clear through interviews/observations

a: In this MHS only numbers about the key responsible professional were collected

Presence of non-value-added activities: The amount and type of non-value added activities differed between the MHS's (**table 3.2**). Waiting moments for a patient before screening, before intake and, as in MHS-A, also before the start of a treatment were observed. In MHS-A 'defects' were present as many patients were referred to a 'wrong' department; 42% of the patients with a depressive disorder who were in the system under two years, were treated at the department which was in principal aimed at more complex patients who needed long-term treatment. Furthermore, information and documents flew crisscross through MHS-A, which made the flow discontinuous and coordination complex.

3.3.3 OUTCOME PERFORMANCES

As shown in **table 3.3**, the total caseload of patients with a depressive disorder in the registration period varied between the four MHS's. MHS-C had the highest caseload when looking at the number of patients and number of contacts, and MHS-D had the lowest. Furthermore, **table 3.3** shows the number of contacts and throughput time.

Table 3.3: Results on outcome (number of contacts and throughput time) per MHS

Outcome indicators	MHS-A	MHS-B	MHS-C	MHS-D
Case-load^a				
Number of patients	165 (103) ^b	97	287	88
Number of contacts	1432 (1255) ^b	1176	4107	1066
Variation in productivity^c				
Number of contacts (Mean ±sd)	8.7 ±8.8 (12.2 ±9.5) ^b	12.1 ±12.9	14.3 ±10	12.1 ±8.5
Coefficient of variation	0.99	1.07	0.69	0.70
Throughput time in days (Mean ±sd)	144 ±148 (208 ±150) ^b	177 ±172	221 ±124	214 ±131
Coefficient of variation	1.03 (0.72) ^b	0.98	0.57	0.62

a: Case load concerns those patients with a depressive disorder between who were deregistered in 2004 and registered after the first of January 2003

b: Without patients who have received only intake, only crisis or only intake and crisis contact

c: Numbers are the mean for patients of all patients included in the case-load

3.4 DISCUSSION

The aim of this study is to demonstrate operation management for mental healthcare. The research question for this study is: what are structure, process and outcome characteristics of care delivery of patients with depressive disorders within four outpatient mental health care services, and how can this knowledge contribute to operations management in mental health care? Care processes within four community mental health care services were studied from an operations management perspective. The focus of the study was upon the care delivery process towards patients with a depressive disorder.

The basic tendency reviewed is that the MHS with the lowest CV (MHS-C) has different structure and process characteristics compared to the other services (also see **table 3.2**). In spite of the lower variation in MHS-C, the mean number of contacts and throughput time is relatively high. An explanation for this higher mean may be that this service used a structured intake instrument for which more contacts may be needed. Another explanation may be that this service was the only one in which evidence-based treatment protocols were used for the main treatments. The question whether the apparent larger number of contacts associated with this was justified cannot be answered, as the data on clinical effects and relapse were unavailable. Thus, standardising the care process might have positive consequences of reducing the CV, but a may increase the number of contacts per patient. Obviously a balance should be found between effectiveness, the mean number of contacts and the necessary variation. This is a process of trial and error in each MHS.

The fewer number of contacts in MHS-A may be influenced by the fact that a larger part of patients (38%) who only had an intake or crisis contact and no subsequent therapy. Leaving these patients out of the sample, the mean number of contacts rises to the level of the other services (12.2 ± 9.5).

The comparison of the four outpatient mental health care services on several structure, process and outcome indicators lead to the understanding that operations management might be associated with the variation and discontinuity as found in this study. The operations management characteristics that are used in this study and basically cover the indicators as shown in **figure 3.1**, are discussed below.

ORGANISATIONAL STRUCTURE

In all the services, departments were based on age categories. Adult care departments were defined based on the complexity of the diagnosis and the expected duration of care. However, this distinction was sometimes blurred. In addition, it was not always easy to assign patients to one of the departments because of the lack of clear assignment criteria. In MHS-A, different activities within phases of care (e.g. screening, intake, therapy) were not geared to each other and therewith the care process was fragmented and the burden of coordination was high. In this case the organisational structure did not facilitate the flow of care processes, which lead to fragmentation of activities of a care delivery process. This seems to be connected with variation and discontinuity.

The organisational structure should support processes that are more routine as well as processes that are non-routine. In the mental health care services both routine and non-routine processes are present; in addition to the patient subpopulation that was subject of the multiple-case study (i.e. patients with a mild and moderate depressive disorder) other patient groups such as patients with a schizophrenic disorder were treated. The different subpopulations of patients can vary in their level of uncertainty and complexity. Optimally, the patient subpopulations that differ in the level of uncertainty and complexity are separated in the organisational structure to increase predictability and planning and control of care processes of the subpopulations.^{7,9, 32} To do so, a possibility applicable for outpatient community mental health care services is the so called 'hybrid organisation'.⁷ In a hybrid organisation one part of the organisation is of a mechanistic nature suited for more routine processes and the other part is more organic and suited for the non-routine tasks. The different parts can be focused at a target population for which the structure and process fit. In this way an organisational structure is created in which the services are organised around a targeted (multi-disciplinary) patient population, offering specialised care in well-described care processes. This can decrease the coordination burden and makes a flow of a patient predictable.^{8, 10}

HOMOGENEITY OF PATIENT POPULATION

In this study the flow for patients with a mild and moderate depressive disorder was studied. We assumed that this patient group had common characteristics in their care delivery process. However, in this group of patients inter-patient

variation on throughput-time and number of consultations was still present. Nevertheless, care process for patient groups based on a diagnosis, such as depressive disorders in MHS-C probably have less inter-patient variation compared to a patient group with more different diagnosis, and may have contributed to a smaller variation in outcomes in MHS-C compared to the other MHS's. In addition, the focus on a diagnosis offers, besides management of inherent variation, a possibility to integrate (evidence-based) treatment protocols in the design of the care process to increase adherence.

OBJECTIVES, PLANNING AND CONTROL

As seen in MHS-C and MHS-D, comparing the actual performances with objectives can reduce unnecessary variation. Furthermore, as is done in MHS-C, just reporting the deviations of objectives instead of all decisions taken, decreases the time spent on (multidisciplinary) meetings and non-value added activities are diminished. Well-established objectives on the care process enable professionals and managers to plan and control a care process for patients by feedback;¹⁹ i.e. comparing performances with objectives and in case of deviation taking appropriate action. Nevertheless, the level of permanence and flexibility of handling the objectives differs between standard, routine and non-routine processes. For routine and non-routine processes as most processes in mental health care, flexibility in handling the objectives is required.

FLEXIBILITY FOR ADAPTABILITY

Even though demands of patients within a homogeneous patient population have similarities, patients do differ. Variation cannot be reduced completely and will always be present. This inherent variation should be managed by process design.¹² To do so, flexibility in standards is needed and should be accounted for. For routine processes objectives can be set in standards, but flexibility to cope with these standards is necessary. For non-routine processes, the flexibility requirement is even higher to be able to react to the high level of uncertainty and complexity.²⁶ As seen in this study and in previous studies, for mental health care, care programmes are possible.^{9, 22, 33} Care programmes describe and standardise phases of an individual treatment (i.e. modules). Through this, standardisation and customisation of care and flexibility in the care process is possible.

Another factor that may be needed to react to inherent variation and to reduce discontinuity is the presence of functional

flexible professionals. The tasks screening, intake and therapy can be integrated more and professionals who can perform all of these tasks are preferred. However, an appropriate balance between functional flexibility and specialisation is necessary. A certain degree of specialisation can be desirable for the quality of professionals' performances.

INFORMATION TECHNOLOGY

In the cases studied, information technology was present and mostly used to handle the information flow, i.e. for registration purposes, for electronic patient files, and to build and share documents in the service. The use of information technology for these purposes facilitated the coordination of care and the continuity of care. Non-value added activities and unnecessary variation can be reduced by the use of information technology.

Although IT can contribute to the quality and efficiency of care^{34, 35} it of course depends on the quality of the software if it is actually better than without IT. Nevertheless, to support planning and control, and to provide management information, software can have planning (determining what should be done) and control (control if the care process is executed according to plan) functionalities. An example of such functionality is an alert to the user in the case of a deviation. Subsequently, insights in deviations are gained to control the process.²² Due to uncertainty and complexity of most care processes in mental healthcare, information technology used for planning and control should support short term and reactive decision-making.⁷

3.4.1 LIMITATIONS AND RECOMMENDATIONS FOR FURTHER STUDY

The indicators were selected from an operations management perspective that focuses on care processes. Consequently other, also important, indicators such as employee satisfaction and contextual factors were not selected and measured; but note that the main objective was to demonstrate operations management for mental health care. Although it can be discussed if indicators on productivity should be classified as outcome or process, we choose to classify these as a productivity outcome of the system.¹⁹

Although the routinely measurement of clinical outcomes may be expensive and time consuming,³⁶ to optimise quality of care delivery as well as of clinical outcomes these should at

least be measured. However, these were not available as the MHS's did not consistently measure this. Consequently, a relation between structure, process, and patient outcomes of care cannot be given and a further investigation, preferably in a longitudinal study, of this relation is needed. In addition, because we did not weigh the several indicators the interpretation of the grading of the MHS's should be done with caution.

The reliability of the data differed between the services. First of all the method of registration and the definitions used in the services differed. Second, it took a lot of effort for the MHS's to collect data, and the delivered files needed much correction. The administrative databases did not hold all data needed for a complete picture. Furthermore, multiple databases and administrators were often needed to gather the data. These imperfections made data gathering difficult in the MHS's and therefore the reliability of the quantitative data is not guaranteed. It is possible that the differences in numbers of the caseload between the MHS's influence the differences in the cv. For further studies it may be better to be independent of secondary databases and to collect data in a longitudinal study.

This multiple-case study explored the care delivery in four outpatient mental health care services to demonstrate operations management in mental health care. We do believe that the multiple-case study method used provided insight in operations management of mental health care. A point of attention is that the data-triangulation, as is done in this study, is needed to strengthen validity and reliability.

3.5 CONCLUSION

Challenges in mental health care for optimising operations management, seem to lie within different factors. Grouping the population in more homogeneous groups, use of clear objectives, information technology, attuning activities, and flexible professionals, may support the reduction and management of variation and discontinuity and therewith may contribute to more efficiency and quality of care.

Overall, operations management was not optimally. We recommend mental health care services to integrate operations management in their policy because operations management offers opportunities for mental health care services to improve the care delivering resulting in more quality and efficiency.

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4 REDESIGNING THE DELIVERY OF OUTPATIENT MENTAL HEALTH CARE: AN OPERATIONAL RESEARCH APPROACH

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Submitted

ABSTRACT

OBJECTIVES

To gain a better understanding of the relationship between care delivery processes of patients with a depressive disorder within outpatient mental health care services, process variation (efficiency), and discontinuity (quality).

METHODS

A simulation model is used to study how characteristics of care delivery of patients with a depressive disorder influence variation and discontinuity. The independent variables that were experimented with are: the (non)use of guidelines, the accuracy of diagnosis and treatment plan, the moment a care process is evaluated and the functional flexibility of professionals. The output dependent variables measured were 'number of patient transfers' and 'number of consultations'. ANOVA was used for statistical testing of the results.

RESULTS

The use of guidelines decreases the mean number of, and variation within, consultations. Accurate diagnosis and treatment plan significantly decreases the number of consultations. The timing of evaluation influence the number of consultations. In the case of an inaccurate diagnosis and treatment plan an early evaluation contributes to fewer unnecessary consultations. The number of transfers decreases significantly with an accurate diagnosis and treatment plan. Functionally flexible professionals contribute to fewer patient transfers. also combined with an accurate diagnosis and treatment plan. The moment the care process is evaluated influences the number of transfers.

DISCUSSION

The operational research approach provided insight in different scenarios of care delivery on variation and discontinuity of patient flow. Care delivery variables interrelate with each other. All should be carefully (re)considered when optimising mental health care services. Some suggestions for optimising the delivery of care are provided in this study, like using guidelines. an accurate care assignment, functional flexible professionals and an explicit evaluation moment.

4.1 INTRODUCTION

The delivery of mental health care is often fragmented, not demand-driven, and costs are rising. Moreover, variation in the care process and discontinuities in the flow of patients are common, hampering the efficiency and quality of care delivery.¹ Both aspects have a negative impact on quality of life and service satisfaction, and improvement would be beneficial.¹⁻³ Improving the delivery of care is one of the most promising ways to improve efficiency and quality.⁴ Consequently, studies on optimising the methods for organising and delivering care should be conducted, alongside exploring questions relating to the best drug treatment or psychological therapies.⁵ There is currently little empirical evidence on the effectiveness of care delivery structures, such as service lines and care programmes,⁶ in mental health care.

In operations research, modelling is important as a decision support tool in examining the design of mental health care processes, and expanding evidence on efficiency improvement. Modelling is used as a research method for overcoming difficulties in using randomised controlled trials, like the possibility to implement experimental design in the care delivery practice. In addition to practical advantages, modelling has clear advantages concerning content, such as the possibility of comparing all relevant options, and transferability to other settings. Furthermore, modelling can include a longer time horizon, and inform the design of future trials.^{7,8}

The aim of this chapter is to gain insight into the relationships between the organisation of delivering outpatient mental health care to patients with a depressive disorder, particularly concerning the variation and discontinuity in the care process. The relationships between the processes variables and the variation and discontinuity in these processes are investigated and discussed by means of a simulation model. Accordingly, the best methods for organising outpatient mental health care services are explored. The organisation variables explored are the use of guidelines for care processes, misdiagnosis and the effects of accuracy of treatment plan, the effect of functionally flexible professionals and the moment care is evaluated.

This chapter is organised as follows. First, some theoretical background is provided on the organisation of mental health care, describing the process and variables of delivery of care. In the following 'method' section, the simulation model is presented, the variables as used in a simulation model are

discussed and presented schematically. Next, the simulation results are presented. Finally, we discuss how the results help to understand mental health care services, especially the variation and discontinuity in patients' treatments, and how to improve its organisation.

4.2 PROCESS AND VARIABLES OF DELIVERY OF MENTAL HEALTH CARE

Mental health care services often face uncertainty in the process of care delivery.⁹ Uncertainty makes care unpredictable and difficult to coordinate, and can lead to lower quality of care, an increase in waiting lists, an increase in processing time and limit patient satisfaction.² This uncertainty is caused by variation in input (e.g. arrival patterns and demand of patients), throughput (e.g. type, duration and frequency of care) and output (e.g. health status and processing time). Variation can be reduced with information on demand, supply and the care process. This information standardises processes and can be described in guidelines to inform decisions about how care should be delivered, to which target population, by which professional, in which setting and with what frequency.¹⁰ In order to support process standardisation, it is necessary that patients who differ in predictability are treated in different care processes. That is, patients with an unpredictable disorder (e.g. schizophrenia) should be separated from patients whose care process can be predicted (e.g. depressive disorders).¹¹

Once care processes are separated, it is important that a patient is diagnosed as accurate as possible and placed in the correct process. A mismatch of patient diagnosis and care process can result in a loss of efficiency and quality.¹¹ In addition, the diagnosis is needed to plan treatment accurately.¹² The initial treatment plan based on the diagnostic evaluation is, however, not always consistent with the care actually delivered. A change in treatment plan during therapy is assumed to influence (variation in) the number of consultations because other consultations than predicted are needed. Furthermore, a change in therapy can imply a change of professionals if the initially assigned professional cannot provide the other type of therapy. Accordingly, patients may be transferred between different professionals and continuity is not optimal. There is growing evidence on the benefits of (semi-)structured interviews to set a diagnosis.^{12–15} Several studies show that with

a (semi)structured interview the percentages of misdiagnosis and missed diagnoses are reduced.^{12–15} In order to keep continuity of care at an optimal level, the functional flexibility of professionals should be stimulated. Functional flexibility enhances quality of care by reducing the number of professionals a patient needs to have contact with.¹⁶ Generally, it is preferred that professionals have more than one capability so they can perform different types of activities. With functionally flexible professionals the number of transfers and thus discontinuity of care may be decreased. However, the necessity for functionally flexible professionals depends on the characteristics of a care process and the costs involved. It is assumed that a standardised care process in which all process variables are predictable and the need for adaptability is low, does not necessarily need functionally flexible professionals.¹⁶

Care processes need to be planned, preferably by using guidelines. In addition, the planned processes need to be controlled. Feedback on the progress of care is needed for effectiveness and for efficiency purposes.¹⁷ Feedback can be obtained at evaluation moments to monitor if the patients' needs are being met or if care needs to be adjusted to achieve the objectives. The feedback can result in an adaptation of the objectives and this accordingly influences the output. It is assumed that the optimal evaluation moment in which feedback is gained, depends on the predictability of the care process; if care is predictable the moment of evaluation is less influential than for unpredictable care. Furthermore, the moment of evaluation determines the moment it is noticed whether a patient needs another type, or more or less, therapy. Thus the moment of evaluation may influence the number of patient transfers and consequently the discontinuity.

The level of process variation and the level of flow discontinuity are influenced by the design of care delivery processes. Care delivery variables that influence variation and discontinuity do not stand alone but are interrelated.

4.3 METHOD: MODELLING PROCESS MENTAL HEALTH CARE

A simulation model is used to study how care delivery characteristics influence the uncertainty of the output (expressed in number of consultations) and discontinuity of care process (expressed in number of patient transfers).

More specifically, the model is used to:

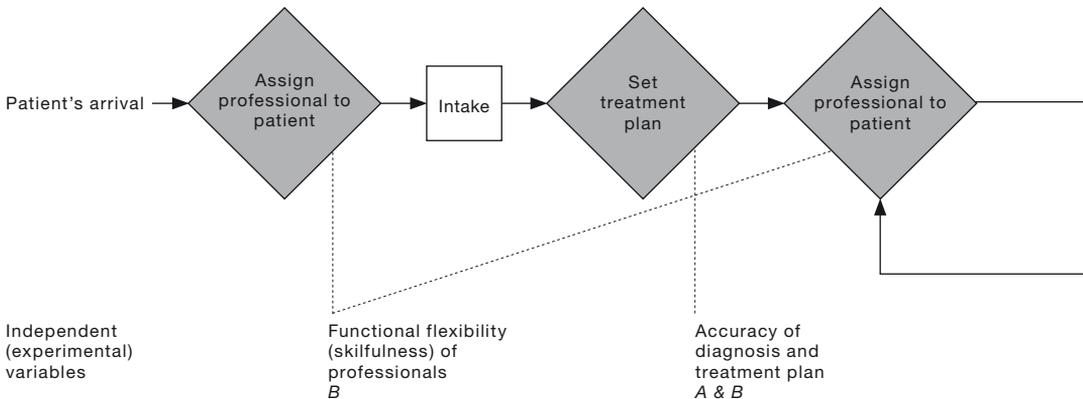
1. explore the effect of guidelines on reducing variation
2. study the effect of diagnostic accuracy on the variation and discontinuity of patient flow
3. explore the effect of functionally flexible professionals on the discontinuity of the patient flow
4. to test the effect of the moment of evaluation on the variation and the discontinuity of the patient flow

A more detailed description of the conceptual model (i.e. a non-software specific model that includes the independent and dependent variables¹⁸), the model implementation, input and validation, and analysis are provided below.

4.3.2 PATIENT FLOW

Figure 4.1 depicts the flow of patients with a mild or moderate depressive disorder. Patients enter the care process and participate in an intake in which the diagnosis is set. The patients then flow to the therapy that has been decided on at intake.

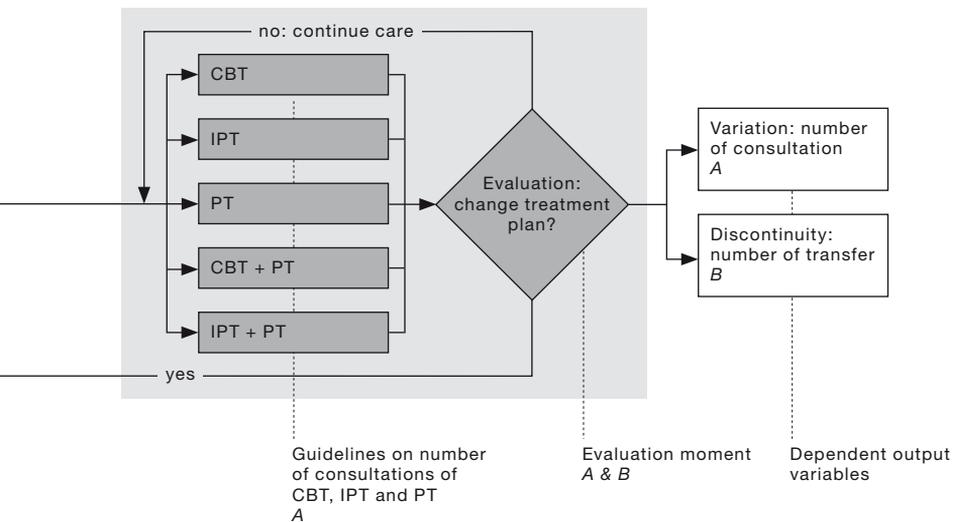
Figure 4.1: Independent and dependent variables for the process flow of patients with a depressive disorder



During therapy, it is possible to change the therapy if it does not work out as expected. It is assumed that this will be decided at the moment of evaluation. In the flow diagram, it is assumed that all patients finish the care process with a certain number of consultations and number of transfers between different professionals. Accordingly, the horizon used is not depicted in a time statement but involves the time needed to have all consultations until the patients are assumed to be recovered. The dependent output variables and independent experimental variables of the care process are also presented in the diagram and detailed below.

4.3.3 DEPENDENT OUTPUT VARIABLES

The dependent (output) variables we are interested in are variation and discontinuity of the patient flow. In our model variation is operationalised as the output variable 'number of consultations'. The discontinuity is operationalised by reviewing the 'number of transfers'. **Figure 4.1** shows the dependent output variables and their relation to the independent variables.



The independent experimental variables with an 'A' are assumed to influence variation reflected in number of consultations. The independent experimental variables with a 'B' are assumed to influence the discontinuity reflected in number of transfers.

4.3.4 INDEPENDENT INPUT VARIABLES

Table 4.1 displays the model input and data sources for each independent variable of which some are fixed, others are experimented with. These are described below.

Table 4.1: Values of independent variables as input of the simulation model

Independent Variables	Values in simulation model	Data source
Fixed variables		
Number of patients	2000	Data registration ^a Experts' opinions
Number of professionals	14	Data registration ^a Experts' opinions
Intake	Weibull (3,4)	Multiple-case study
Type of treatment	Intake & CBT:22% Intake & IPT: 21% Intake & PT:10% Intake & CBT & PT: 30% Intake & IPT & PT: 17%	Data registration ^a
Experimental variables		
Use of guidelines on number of consultations	Level 1 (most uncertainty): – IPT & CBT: Minimum number consultations: 7; Weibull (1,11) – PT: Minimum number consultations: 1; Weibull (1,3) Level 2 (middle level of uncertainty): – IPT & CBT: Minimum number consultations:7; Weibull (3,11) – PT: Minimum number consultations: 1; Weibull (3,3) Level 3 (least uncertainty): – IPT & CBT: Minimum number consultations:7; Weibull (5,11) – PT: Minimum number consultations: 1; Weibull (5,3)	Data from multiple-case study Experts' opinions Evidence-based guidelines ^{19, 20}
Accuracy of diagnosis and treatment plan (Chance for difference between initial treatment plan and actually given care)	Level 1 – 7% of patients do not have depressive disorder – 15% of patients have a difference between the initial treatment plan and actually care Level 2 – 25% of patients do not have depressive disorder – 50% of patients have a difference between the initial treatment plan and actually care Level 3 – 50% of patients do not have depressive disorder – 70% of patients have a difference between the initial treatment plan and actually care	Data registration ^a Experts' opinions Literature ¹⁵

Functional flexibility of professionals	<p>Level 1 (mono-skilled)</p> <ul style="list-style-type: none"> - 45% of staff have CBT skills - 45% of staff have IPT skills - 10% of staff have PT skills - 50% of staff have intake skills <p>Level 2 (multi-skilled. without intake)</p> <ul style="list-style-type: none"> - 30% of staff have CBT and IPT skills - 30% of staff have CBT and PT skills - 30% of staff have IPT and IPT skills - 10% of staff have CBT, IPT and PT skills - 50% of staff have intake skills <p>Level 3 (multi-skilled with intake)</p> <ul style="list-style-type: none"> - 30% of staff have CBT and IPT skills - 30% of staff have CBT and PT skills - 30% of staff have IPT and IPT skills - 10% of staff have CBT, IPT and PT skills - 100% of staff have intake skills 	Data registration ^a Experts' opinions
Evaluation moment	<p>Level 1: 50% of consultations</p> <p>Level 2: after 75% of consultations</p> <p>Level 3: at random but after at least 2 consultations</p>	Experts' opinions

a: Data registration from one outpatient community mental health care service

NUMBER OF PATIENTS AND PROFESSIONALS

The relationship between the number of professionals (14) and that of patients (2000) is based on data of the community mental health care service (see **table 4.1**).

TYPE OF TREATMENT

Three main types of therapy are distinguished. These are Cognitive Behavioural Therapy (CBT), Interpersonal Psychotherapy (IPT) and Pharmacotherapy (PT). The ratio of patients with a certain type of therapy is based on data of the community mental health care service, and confirmed by expert opinions (see **table 4.1**). It is assumed that all patients participate in an intake.

NUMBER OF CONSULTATIONS

For the intake and different types of therapy, the minimum and mean number of consultations of patients are defined (**table 4.1**). The number of consultations is based on data from the community mental health care service, expert opinions and clinical guidelines.^{19, 20} The analysis of the data on the three different modules has been validated by experts.

ACCURACY OF DIAGNOSIS AND TREATMENT PLAN

All patients who enter care processes need to be diagnosed in order to plan treatment and to assign the right care. All patients simulated are assumed to have a depressive disorder.

However, sometimes the diagnosis can be wrong or missed. The percentage of patients with a misdiagnosis used in the simulation model is based on literature about (semi)structured diagnostic interviews¹⁵ and expert opinions (see **table 4.1**).

Even with a correct diagnosis, it is possible that the treatment provided does not meet a patient's needs. Accordingly another therapy can be initiated, e.g. PT can be provided instead of CBT. Another possibility is adding a therapy or, in the case of combination therapy, stopping a therapy. The chance that the provided therapy as described in the treatment plan needs to be changed is based on expert opinions about the data of the community mental health care service (see **table 4.1**).

FUNCTIONAL FLEXIBILITY OF PROFESSIONALS

The functional flexibility of professionals is determined by the number of different skills a professional has. The professionals involved in the care process for patients with a depressive disorder have different skills, e.g. psychiatrists have different skills than psychotherapists. The skills in this simulation study are defined as the capability to perform an intake, IPT, CBT or PT (**table 4.1**). The percentage of professionals with a particular capability was an estimate based on the number of full time equivalents of the community mental health care service, for both psychotherapy and psychiatric care.

EVALUATION MOMENT

Evaluation of the progress of care can be done implicitly during therapy, or explicitly at a predefined moment of the care process. The moments of evaluation as simulated in this model are based on expert opinions (**table 4.1**).

4.3.5 MODEL IMPLEMENTATION, INPUT AND VALIDATION

On the basis of the conceptual model the model was implemented in Mathematica® (www.wolfram.com). The processes under study were simulated with the help of symbolic (mathematical) tools. To account for the unpredictability and uncertainty of mental health care, we used several distribution and decision trees for the flow of patients in the model.

Table 4.1 displays the model input and data sources per independent variable of which some are fixed, others are experimented with. The data used in this simulation study were a combination of data from registration databases gathered in a case study of an outpatient mental health care service in the

Netherlands, which included data from 2003 till 2004. Where empirical data were missing, expert opinions were used (including three professionals from the outpatient mental health care service and a Dutch university affiliate [see acknowledgements and fourth author]) for estimating and validating values of variables. In addition, Dutch multidisciplinary (evidence-based) guidelines on depressive disorders^{19, 20} were used. Once the data collection was completed, the data were analysed and accumulated to be used in the simulation. All data gathered refer to patients with mild or moderate depressive disorders.

All components of the simulation model were checked for accuracy and logic by the modellers several times during the computation process. The different inputs for the scenarios were checked for logic with the output, i.e. if the output changed as expected, to evaluate the sensitivity of the model.

The purpose of the model simulations is illustrative rather than normative. Accordingly, the concern of the model is 'closeness to reality'.²¹ The closeness to reality was regarded with the content validity (does the model make sense to a group of experts?) and construct validity (is the model measuring the underlying characteristics) of the conceptual model through expert opinions, data analysis and literature.

4.3.6 SIMULATION AND SCENARIO ANALYSIS

In order to investigate the effect of the four independent variables on the number of consultation and/or number of patient transfers, we used two experimental study designs in the simulation model.

In the first design, twenty-seven experiments were conducted within a full factorial experimental design to study how the dependent output variable 'number of consultations' was influenced by the independent variables 'use of guidelines', 'accuracy of diagnosis and treatment plan' and 'moment of evaluation'. These independent experimental variables and dependent output are shown with an 'A' in **figure 4.1**.

In the second design, twenty-seven experiments were conducted within a full factorial experimental design to test the effect of the independent variables 'accuracy of the diagnosis and consequent treatment plan', 'functional flexibility of professionals', and 'evaluation moment', on the number of transfers. These independent experimental variables and dependent output are shown with a 'B' in **figure 4.1**.

Table 4.1 presents all independent experimental variables and the different levels of each scenario. The parameterisation of the four independent experimental variables and the alternative scenarios per experimental variable are described below.

USE OF GUIDELINES ON NUMBER OF CONSULTATIONS

To study the effect of guidelines on the number of consultations for CBT, IPT and PT, the uncertainty level around the mean number of consultations was subjected to experimentation, using a Weibull distribution. A Weibull distribution has two parameters, α (shape) and β (scale). Parameter α determines the uncertainty level around the mean. If α equals 1, the Weibull resembles the exponential distribution, which is often used in simulations of delivery of services (2). By experimenting with the value for α , we can simulate that no guidelines are used and the professional has all clinical freedom ($\alpha = 1$; level 1), or that guidelines are used which describe the preferred number of consultations and there is very little uncertainty ($\alpha = 5$; level 3). In between these levels, level 2 simulated a process in which guidelines are used to a certain extent and there is some uncertainty ($\alpha = 3$).

ACCURACY OF DIAGNOSIS AND TREATMENT PLAN

In this simulation study, three scenarios on the effects of misdiagnosis and a change in the initial treatment plan were evaluated. At three levels the number of patients who had a misdiagnosis and who had a change in the initial treatment plan was simulated (**table 4.1**). There were three options for a change in the initial treatment plan. First, another type of therapy could be added to the treatment plan. Second, it was possible to stop a certain therapy and remove it from the treatment plan. Third, a therapy could be stopped and another therapy initiated (e.g. a module CBT could be changed into a module PT).

FUNCTIONAL FLEXIBILITY OF PROFESSIONALS

The functional flexibility of professionals was manipulated at three levels. At the first level all professionals were mono-skilled, meaning that they could perform only one type of therapy. Furthermore, at this level 50% of the professionals could perform an intake. At the second level, all professionals could provide two types of therapy and 50% of these professionals carried out intake consultations. At the third level, all of the professionals could provide two types of therapy, and all could perform intake consultations.

EVALUATION MOMENT

Three possible moments at which care could be evaluated were simulated. At the first level, the evaluation moment occurred after 50 % of the consultations. At the second level, the evaluation moment was set after 75 % of the consultations. At the third level, the professionals could decide on the moment of evaluation themselves (in the simulation model this is set on an at random evaluation moment).

4.3.7 STATISTICAL ANALYSIS

The results of the experiments were compared via ANOVA analysis, subdividing the total variation into useful and meaningful components of variation (i.e. main effects, interaction effects and error). The main and interaction effects of the independent variables on the dependent measures 'number of consultations' and 'number of transfers' were determined accordingly. Bonferroni post-tests ($\alpha = 0.01$) were conducted to study which levels contribute significantly to changes in the output.

4.4 RESULTS

4.4.1 NUMBER OF CONSULTATIONS

Table 4.2 presents the mean, standard deviation and coefficient of variation (the standard deviation divided by the mean as a relative measure of variation) of the experiments focusing on the dependent variable 'number of consultations' are presented in **table 4.2**, complemented with the outcome of the ANOVA in **table 4.3**.

As can be seen in **table 4.2**, when professionals do not use guidelines the level of uncertainty is high, and consequently the mean number of consultations is highest. The Bonferroni post-tests show that the level with the most uncertainty (no guidelines) differs significantly from both other levels. As the results further show, the accuracy of a treatment plan based on the diagnosis influences the number of consultations. The higher the chance for a change in treatment plan due to an inaccurate diagnosis, the higher the mean number of consultations (**table 4.2**).

Table 4.2: Results of simulation: the effect of the independent experimental variables on number of consultations

Levels of independent experimental Variables			Output: number of consultations ^a		
Use of guidelines on number of consultations	Accuracy of diagnosis and treatment plan	Evaluation moment	MEAN ^b	SD ^b	CV ^c
Least	15 %	50 %	13.8	9.9	0.7
Least	15 %	70 %	13.8	10.0	0.7
Least	15 %	Random	13.9	10.4	0.7
Middle	15 %	50 %	10.9	4.1	0.4
Middle	15 %	70 %	10.9	4.1	0.4
Middle	15 %	Random	11.2	4.1	0.4
Most	15 %	50 %	10.9	3.6	0.3
Most	15 %	70 %	11.0	3.6	0.3
Most	15 %	Random	10.8	3.7	0.3
Least	50 %	50 %	14.2	10.3	0.7
Least	50 %	70 %	14.8	10.2	0.7
Least	50 %	Random	13.9	9.5	0.7
Middle	50 %	50 %	11.3	4.0	0.4
Middle	50 %	70 %	11.7	3.7	0.3
Middle	50 %	Random	11.4	4.1	0.4
Most	50 %	50 %	11.3	3.3	0.3
Most	50 %	70 %	11.7	3.0	0.3
Most	50 %	Random	11.4	3.5	0.3
Least	70 %	50 %	14.4	9.7	0.7
Least	70 %	70 %	15.0	9.6	0.6
Least	70 %	Random	14.5	10.1	0.7
Middle	70 %	50 %	11.5	3.8	0.3
Middle	70 %	70 %	11.8	3.5	0.3
Middle	70 %	Random	11.6	4.1	0.4
Most	70 %	50 %	11.3	3.3	0.3
Most	70 %	70 %	11.9	2.8	0.2
Most	70 %	Random	11.5	3.4	0.3

a: Excluding intake consultations

b: SD: Standard Deviation; CV: Coefficient of Variation (standard deviation divided by mean, a relative measure of variation)

Table 4.3: ANOVA table for number of consultations

	DF	Sum of squares	Mean Square	F-ratio	P value
Guidelines	2	103205	51602.6	1223.25	0.00 ^a
Accuracy of diagnosis and treatment plan	2	4640.16	2320.08	54.9981	0 ^a
Evaluation moment	2	1028.25	514.127	12.1875	0.00 ^a
Accuracy of treatment plan * guidelines	4	134.618	33.6546	0.79779	0.53
Accuracy of treatment plan * evaluation moment	4	726.495	181.624	4.30543	0.00 ^a
Guidelines * evaluation moment	4	227.425	56.8562	1.34779	0.25
Accuracy of treatment plan * guidelines * evaluation moment	8	240.189	30.0236	0.711717	0.68
Error	53973	2.27684x10 ⁶			
Total	53999	2.38704x10 ⁶			

a: Variable is significant with significance level of 0.01

The ANOVA analysis proved that the use (or non-use) of guidelines significantly accounts for most of the differences in the mean number of consultations (**table 4.3**). Next, the correctness of diagnosis and the accuracy of the treatment plan have a significant effect on the mean number of consultations. The moment the care process is evaluated also has a significant effect on the number of consultations; however, the effect is less in comparison with the other two variables. The significant interaction effect measured was the interaction variable treatment plan * evaluation moment (**table 4.3**). This indicated that these two variables interrelate, which will be further explained in the discussion.

Moreover, an increase in the chance for a misdiagnosis has an effect on the total number of consultations given to patients with another disorder than the one studied in this model, i.e. patients with a minor or moderate depressive disorder. With more accurate diagnosis based on (semi)structured interviews, the time professionals used in treating these patients could have been saved for patients with the actual minor or moderate depressive disorder.

4.4.2 NUMBER OF TRANSFERS

Table 4.4 presents the mean, standard deviation and coefficient of variation (the standard deviation divided by the mean as a relative measure of variation) of the experiments focusing on the dependent variable 'number of transfers', and the corresponding ANOVA results are presented in **table 4.5**.

As can be observed from the simulation results on the number of transfers (**table 4.4**), within the experiments where professionals were multi-skilled and thus functionally flexible, patients had significantly fewer transfers than in the experiment where professionals were not functionally flexible. The results for the levels of functional flexibility significantly differ from each other, according to the Bonferroni post-tests. In addition, the higher the chances for a change in treatment plan due to an inaccurate diagnosis, the higher the mean number of transfers. The Bonferroni post-tests showed all three levels differed significantly from each other.

The ANOVA analysis showed that the functional flexibility of professionals is the most significant factor explaining the differences in the number of transfers (**table 4.5**). The next most significant factor is the accuracy of the treatment plan. The interaction variable 'accuracy of treatment plan * functional flexibility' influences the number of transfers more than the evaluation moment (**table 4.5**). In the discussion this interaction effect will be discussed in more detail.

Table 4.4: Results of simulation; effect of the independent experimental variables on number of transfers

Levels of independent experimental Variables			Output: number of transfers		
Accuracy of diagnosis and treatment plan	Functional flexibility ^a	Evaluation moment	MEAN ^b	SD ^b	CV ^b
15 %	Mono	50 %	2.2	0.7	0.3
15 %	Mono	70 %	2.2	0.7	0.3
15 %	Mono	Random	2.2	0.7	0.3
15 %	Multi	50 %	1.6	0.6	0.4
15 %	Multi	70 %	1.7	0.6	0.3
15 %	Multi	Random	1.7	0.6	0.4
15 %	Multi & intake	50 %	1.5	0.6	0.4
15 %	Multi & intake	70 %	1.5	0.6	0.4
15 %	Multi & intake	Random	1.6	0.6	0.4
50 %	Mono	50 %	2.3	0.6	0.3
50 %	Mono	70 %	2.4	0.6	0.3
50 %	Mono	Random	2.3	0.7	0.3
50 %	Multi	50 %	1.8	0.6	0.3
50 %	Multi	70 %	1.8	0.6	0.3
50 %	Multi	Random	1.8	0.6	0.3
50 %	Multi & intake	50 %	1.6	0.7	0.4
50 %	Multi & intake	70 %	1.6	0.7	0.4
50 %	Multi & intake	Random	1.6	0.7	0.4
70 %	Mono	50 %	2.5	0.6	0.2
70 %	Mono	70 %	2.5	0.5	0.2
70 %	Mono	Random	2.5	0.6	0.2
70 %	Multi	50 %	1.9	0.6	0.3
70 %	Multi	70 %	1.9	0.6	0.3
70 %	Multi	Random	1.9	0.6	0.3
70 %	Multi & intake	50 %	1.7	0.7	0.4
70 %	Multi & intake	70 %	1.7	0.7	0.4
70 %	Multi & intake	Random	1.7	0.7	0.4

a: Mono skilled, Multi skilled, or Multi skilled and intake excluding intake consultations

SD: Standard Deviation

CV: Coefficient of Variation (standard deviation divided by mean, a relative measure of variation)

Table 4.5: ANOVA table for number of transfers

	DF	Sum of squares	Mean Square	F-ratio	P value
Accuracy of diagnosis and treatment plan	2	502.64	251.32	647.74	0 ^a
Functional flexibility	2	5209.36	2604.68	6713.22	0.00 ^a
Evaluation moment	2	8.24	4.12	10.62	0.00 ^a
Accuracy of treatment plan* evaluation moment	4	1.42	0.36	0.92	0.45
Accuracy of treatment plan* functional flexibility	4	55.25	13.81	35.60	0 ^a
Evaluation moment* functional flexibility	4	3.23	0.81	2.08	0.08
Accuracy of treatment plan* evaluation moment* functional flexibility	8	3.12	0.39	1.00	0.43
Error	53973	20947.1	0.39		
Total	53999	26724.4			

a: Variable is significant with significance level of 0.01

4.5 DISCUSSION

This simulation study strengthens the idea that processes in the delivery of outpatient mental health care influence variation (i.e. number of consultations) and discontinuity (i.e. number of transfers). The use of guidelines appears to have a positive effect on the mean number of consultations. In addition, as expected, a high chance for misdiagnosis increases the number of consultations and the number of patient transfers. Also, the moment professionals evaluate the progress of care combined with the uncertainty of a care process have an effect on the number of consultations. Furthermore, the results of this study show that functionally flexible staff contributes significantly to continuity of care.

If a professional is multi-skilled and can perform different phases and therapies of a care process (i.e. intake and CBT, or CBT and IPT), patient waiting time between different phases of treatment can be reduced. The different effects and the optimisation possibilities of the delivery of mental health care are discussed in more detail below.

4.5.1 GUIDELINES

Using guidelines together with decision criteria decreases variation and, as could be seen in this simulation study, can also decrease the mean number of consultations. In the simulation study the mean number of consultations is modelled to be the same in each scenario, but the uncertainty around the mean varied. The variation thus led to a different total number of consultations. Standardising care processes is thus a way to increase efficiency by reducing unnecessary variation. Besides reducing variation, standardisation reduces the interdependency of activities. Although interdependent activities are not necessarily a problem, in the presence of variation such processes become difficult to manage.² Moreover, although standardisation can have efficiency and quality advantages, customisation of care remains important.¹¹ Not all patients follow exactly the same care path and patients differ in their need for therapy.

One recommended way to overcome too much standardisation and to customise care is by implementing (evidence-based) guidelines per phase of care processes (i.e. a module 'intake', 'CBT', 'IPT' and 'PT') as was simulated in this study. Though standardisation seems efficient and effective, certain conditions have to be fulfilled for such process based services to succeed. These conditions are described below.

4.5.2 ORGANISATIONAL STRUCTURE

In order to standardise care processes, subpopulations should be distinguished based on common (logistical) characteristics to increase homogeneity and consequently the predictability of future care and treatment activities. Accordingly, psychiatrically complex patients with an uncertain care path, such as patients with a schizophrenic disorder, should be separated from less complex and more predictable patients. In this simulation study it was assumed that the care process only contained patients with a depressive disorder. Such a separation of care processes implies a change from discipline-based organisation (departments which have been divided among several professional disciplines, each headed by a chief) to an organisation that is organised around integrated services or patient care functions such as care programmes or service lines.^{10, 22} Nevertheless, the evidence on the effectiveness of these organisational structures is scarce and not always completely

positive.⁶ Although these structures seem efficient and effective, certain conditions have to be fulfilled for such process-based services to succeed.

4.5.3 ACCURACY OF DIAGNOSIS AND TREATMENT PLAN

A first condition of process-based mental health care and evidence-based guidelines is the need for a method that characterises patients' problems before or early in the care process.^{11, 15} This is needed in order to predict in which care process a new individual patient belongs. As seen in this study, false positive patients (i.e. patients who are given the diagnosis of the focused care process, in this study depression, but who have been misdiagnosed and are actually in the wrong care process) have a significant negative effect on the efficiency of care processes. Therefore, a thorough care assignment to minimise false positive patients is required. A structured interview such as the SCID¹³ can be administered efficiently as a standard part of a more extensive intake assessment.¹² Although a structured interview might take more time than a traditional clinical diagnostic evaluation, this can be compensated for by reducing the total mean number of consultations, as seen in this simulation study. Moreover, an accurate treatment plan significantly decreases the number of unnecessary transfers and thus facilitates coordination of care. Thus, optimally mental health care services should implement a thorough care assignment method to minimise false positive patients and to maximise continuity.

4.5.4 FUNCTIONAL FLEXIBILITY OF PROFESSIONALS

Another factor that should be considered is the skills needed by professionals. A standardised care process in which all process variables are predictable and the need for adaptability is low does not necessarily need functionally flexible professionals.¹⁶ However, care must be taken in regard to job inflexibility and a consequent decrease in job quality and work satisfaction. Functional flexibility can prevent job inflexibility. Besides, as the results show, the functional flexibility of professionals results in fewer patient transfers between professionals, and thus contributes to better continuity. The interaction between functional flexibility and the accuracy of a treatment plan, as seen in the analysis, emphasises the need to be functionally flexible when there is a higher chance for a

change in therapy, in order to react to this change. The organisational structure, e.g. a care programme, thus influences the need for functional flexibility and consequent patient transfers.²² This implies for mental health care services that professionals should be stimulated to be functional flexible accounting for the needed specialisation.²³

An example of increasing the functional flexibility of professionals in mental health care is enabling psychotherapists to prescribe antidepressants, in addition to their original tasks.²⁴ However, some degree of specialisation might enhance quality, and a good trade-off should be found between specialisation and functional flexibility. To find this balance, professionals could be assigned to different care processes, with a very clear distinction of capacity between those processes, in order to keep coordination from becoming too complex.

4.5.5 EVALUATION MOMENT

As seen in the analysis, the timing of evaluation, in combination with the use of guidelines, affects the number of consultations. This pleads for different moments of evaluation for care processes that differ in uncertainty and predictability. For care processes that are more uncertain, such as care for patients with a schizophrenic disorder, it is advisable to evaluate early in the process, so that possible misdiagnosis or the need to change care are detected in time. Such an evaluation moment can be used to reduce uncertainty for the following part of the process and should be placed at points in the flow where a change in uncertainty occurs, e.g. after the intake.²⁵ For very uncertain processes it is advisable to evaluate more often to see if a change in uncertainty occurs and the flow of patients needs to be changed. However, extensive evaluation moments can cost time and thus money. Nevertheless, an evaluation moment to control for the objective on a mean number of consultations can prevent too many 'wasted' consultations and can thus increase efficiency and quality. Therefore it is recommended to define evaluation moments and to use the results as feedback for further progress of care. While implementation of standardised care processes is a process of trial and error, evaluation is needed to analyse the progress of the implementation and where adjustments may be needed.

4.5.6 LIMITATIONS

The study has potential weaknesses. First of all, the data used in the simulation model was based partly on expert opinion. The use of expert opinion, however, did enable us to show the effects of different scenarios. In addition, just a few care delivery variables have been selected. In future studies more and/or other variables should be included in simulation studies. Furthermore, our model did not account for a time horizon, which can be regarded as a drawback of the model. Nevertheless, the aim of the model was not to show results on waiting times or capacity optimisation, in which the use of a time frame and arrival patterns would be required. For future research, such models may provide evidence for reducing waiting times in delivering mental health care services.

4.6 CONCLUSIONS

This simulation study showed that different care delivery activities affect discontinuity and variation and should be managed. Also, these care delivery variables are often interrelated with each other, as the analysis showed when interaction variables turned out to significantly affect system performance. Consequently, the perspective for optimising mental health care services should carefully be (re)considered from a more integrated viewpoint, to include not only drug treatments and psychological therapies, but also including insights from operations management focused on standardisation of care, and improving staff flexibility, care assignment and evaluation. As stated before, empirical evidence on the delivery of care is scarce⁶ and, pragmatically, hard to obtain.⁷ Although modelling is per definition a simplification of reality, it provides a helpful tool for testing how care can best be delivered.

In conclusion, optimisation of mental health care delivery for depression is not a simply matter of implementing treatment guidelines. The results indicate that semi-structured clinical interviews should be used to increase diagnostic accuracy, that treatment effects should be assessed regularly, and that staff flexibility (and therefore a high degree of professionalism) should be encouraged, so that changes in treatment can be made when necessary.

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5 A PLANNING TOOL FOR MULTIDISCIPLINARY YOUTH CARE EVALUATED: A CASE STUDY

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ABSTRACT

OBJECTIVES

This study aims to gain more insight in whether care programming in health care can be supported by IT and what is needed for successful implementation. We evaluated a case where an organisation structured its care processes into care programmes and used a planning tool for planning and control of the care programmes. The results of this evaluation contribute to existing knowledge about the relation between care processes and IT as well as IT implementation.

METHODS

We used multiple data sources to support and complete the results. The evaluation of the case took place by means of face-to-face-interviews, a document study and analyses of e-mails.

RESULTS

The care programmes and the planning tool were not compatible and did not achieve the intended goals. The professionals failed to appreciate flexibility of the care programmes.

DISCUSSION

The implementation of the planning tool failed because of too little user involvement in the implementation. Moreover, care programmes were in general not accepted by the professionals. All this resulted in a non-fit between the care programmes and the planning tool. We advise for routine processes as care programmes to develop a balance between flexibility and standardisation. This is a process of trial and error and requires adaptive information technology and user involvement in development and implementation.

5.1 INTRODUCTION

Several social changes and trends in health care, e.g. case-mix reimbursement systems, increasing demands and rising expectations, are forcing health care organisations to change their organisational structure. Health care organisations are required to be transparent in the care they offer as well as more patient-oriented.¹

A Dutch multidisciplinary centre for youth care also experienced these requirements. To better attune their care to their patients and to increase the efficiency and effectiveness of the resource used, they introduced so-called care programmes to standardise their processes. Standardisation of processes can increase the efficiency and enable quality control.² The choice for care programming implies a certain way of planning and control of the care processes. Planning is defined as the decision process that determines what should be done. And control is defined as the process that assures that the planned results are obtained.¹ An organisation that wants to manage processes as much as possible by care programmes needs information technology for automated support for planning and control. The use of information technology offers opportunities to support health care professionals, to increase efficiency of care and to improve the quality.³ Such automated support could come in the form of an Enterprise Resource Planning (ERP) system.

ERP systems suit stable circumstances, but for dynamic circumstances they are often not appropriate. For dynamic circumstances more reactive and short-term planning is needed.^{1, 4} Van Merode et al.¹ studied the potential of ERP for health care. They stated that health care can utilise ERP for deterministic processes. Nevertheless, in health care processes variability and stochasticity exist. Consequently, it is not possible to apply ERP to all health care processes. Most health care processes, and therefore the information technology, should be adaptive to variability and stochasticity of situations; much more than ERP systems normally are.¹ For most processes in health care, Advanced Resource Planning Systems are required for the short term planning and optimisation.^{1, 4} To find a balance between standardisation and variability and stochasticity, a second order feedback loop in the planning and control is needed. A second order feedback loop provides the needed flexibility, promotes learning and creates opportunities for improvement.⁵

Whether the use of IT is successful depends not only on the quality of the technological artefacts but also on the actors, i.e. the people working with IT and the organisational environment in which they are employed.⁶ Evaluations of health information systems are not sufficiently performed and reported in literature.^{6,7}

To contribute to existing knowledge, we report the results of an evaluation of a pilot in which IT is introduced to support care programmes in planning and control. The aim of this study was to gain more insight into whether care programming can be supported by IT and which success factors are needed to succeed in the support of IT. The results of this evaluation study may contribute to the improvement of IT and its implementation in supporting the planning and control of care processes. The case of the evaluation is the centre for multidisciplinary youth care mentioned above.

For the automated support of the care programmes in the centre, a software application with ERP and Advanced Resource Planning Systems features was developed.ⁱ The software application is a planning tool, which was intended to support working with care programmes. From now on we will refer to this software application as the planning tool.

The planning tool was tested in a pilot, in two care programmes. These two care programmes comprised a part of the services offered by the centre. Because it was a pilot, the planning tool as tried out in the pilot could be adapted to the organisation. The planning tool interacted with the work processes of the professionals and required interaction of the professionals and other employees like the system manager and application manager. Therefore, we focused on the experiences of these professionals and employees (i.e. treatment supervisor, application manager and system manager) and their use of the planning tool. With the evaluation study, we answer the following questions:

1. What are the experiences with the care programmes?
2. What are the experiences with the new information technology?
3. Does the information system work as intended?

i: Developed by Mateum BV Maastricht, The Netherlands

4. Is the information technology suitable for the care programmes?
5. What are suggestions for improving the information technology in relation to the care programmes?

After a description of the case, the care programmes and the planning tool as used in the case study are described. Then the methods as used for the evaluation of the pilot and the results are presented. Finally, the results are discussed.

5.2 CASE DESCRIPTION

The setting of the case study was a Dutch multidisciplinary centre for youth care which provides ambulant and semi-ambulant care. The multidisciplinary centre for youth care is a part of a larger centre. This organisation offers, besides the multidisciplinary youth care, also mental health care for children and youth, special education, and a crisis centre for women and their children. The care of this larger organisation can be ambulant, part-time or fulltime.

The multidisciplinary youth care centre provides mental health care, social services, speech therapy, physiotherapy and medical care. In 2003, the centre had 174 places for children and employed 153 persons (professionals, staff and other employees). The centre had a catchments area that covers about 3.15 % of the Dutch population. In the centre care programmes were introduced. The aim of the care programmes was to plan processes more efficient, and effective, and also to improve the patient-oriented way of working.

5.2.1 CARE PROGRAMMING

Care programming does not only answers the question what needs to take place, but, more importantly, it provides an indication about how care should be delivered to a certain target group, by which professional, in which setting and with what frequency.

For the planning and control of care programming, management must plan and control different stages. Various organisational roles have to be designed for these stages. In the centre, a distinction in responsibilities was made at four stages. **Figure 5.1** offers an outline of the different planning stages and

aspects of these stages as used in the centre. The time period of the stages were estimated and had to be tried out in the pilot. The first stage refers to determining the content of the care programs by the board. The second stage concerns determining the supply and capacity necessary for the next year. At the third stage the individual patient routings are planned by the treatment supervisor. The fourth stage concerns the scheduling of actual treatment. The professionals should follow this schedule. The planning tool aimed to support the planning and control at the various stages. The planning tool was used at a daily basis only at the third and fourth stage. In general, a care process consists of several stages, from diagnosis to the end of the treatment. The stages in a care process are milestones of patient care or episodes of resource utilisation throughout the care process.⁸ In the care programmes these different stages are reflected by modules needing different resources. The amount, frequency and type of activities offered in a module are standardised by protocols. To plan modules of an individual care process, it is important that all resources including professionals, space and time, are known for each module. These different modules are described in a Bill Of Resources (BOR). A BOR is derived from a Bill Of Materials, as used in industry, and is a description of resources required at each stage of a care process.^{1, 8} To plan the activities of a module, each module of a care programme contained a BOR for a specified patient group. The BOR defined the location, activity, type of professional as a resource for a specific stage of care. For example, the protocol of the module physical therapy required the following resources:

- Activities: individual therapy
- Location: physical therapist room
- Frequency: 1 – 2 times per week
- Duration of activity: 30 minutes
- Duration: three to nine months. After 15 sessions an evaluation is required
- Discipline: physical therapist

CHANGES IN STRUCTURE

As a result of the introduction of care programmes, the original functional organisation structure (i.e. when the organisation is structured around disciplines) no longer suited the content of care. Therefore, the centre transformed its functional structure into new clusters; each was responsible for a set of

care programmes and headed by a cluster manager. The clusters were multidisciplinary, meaning that various types of professionals worked together in one cluster.

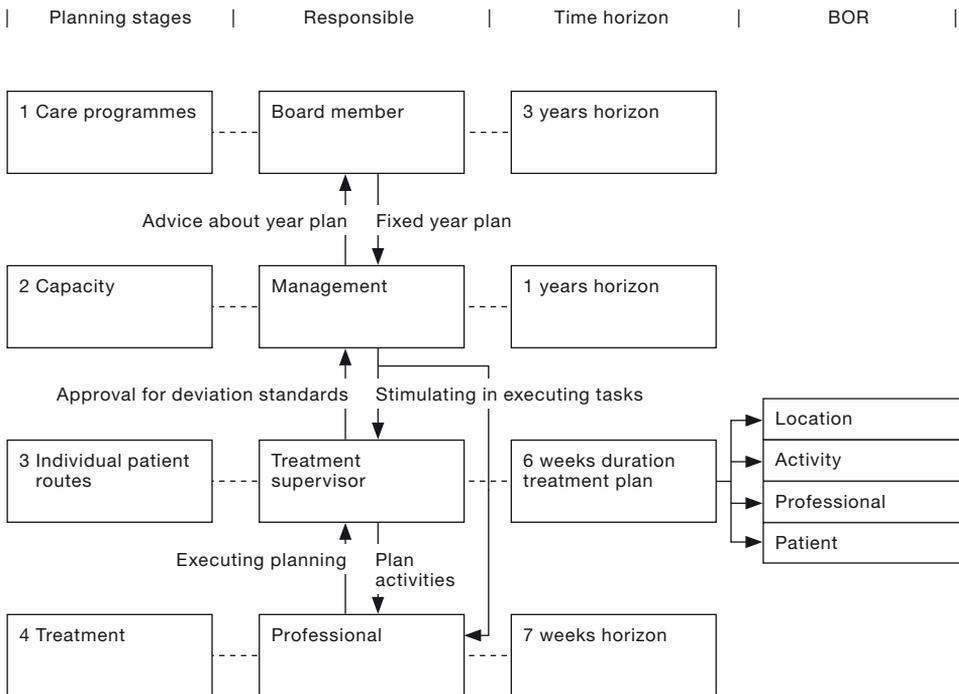
NEED FOR AUTOMATED SUPPORT

Two years after the introduction of the care programmes the managers of the centre felt that a more automated support for planning and control was needed to successfully complete the change in the organisation. The coordination of the care programmes was complex and automated support might reduce this complexity. This automated support was the planning tool. The managers felt that two care programmes were sufficiently embedded into daily practice to be used in a pilot testing the planning tool.

TASKS AND RESPONSIBILITIES

The care programmes and the planning tool lead to some significant changes in tasks and responsibilities. The treatment supervisor and application manager were newly developed

Figure 5.1 Schema planning stages, responsibilities and BOR



positions. The treatment supervisor (who was a behavioural scientist) was responsible for the planning, execution and evaluation of individual patient care plans. The patient's first contact was with the treatment supervisor. Together they decided which modules, corresponding to the patient's individual needs, the patient should receive. These modules formed the individual care plan. The starting date of each module was determined and communicated to the patient at this first contact. Because of this new way of working, the professionals of the centre lost some autonomy and flexibility in planning their activities. The application manager's function was to support the professionals in working with the planning tool. A system manager was present for the maintenance of the software.

During the pilot, the operational use of the planning tool shifted from the treatment supervisor to the application manager. This role change took place because the planning proved to be too much of an administrative burden for the treatment supervisor. Because of this change in roles, the treatment supervisor now e-mailed the name of the modules and starting dates of a new individual care plan to the application manager. Next, the application manager planned the activities of the modules with the planning tool.

All professionals and employees had access to the tool but had different authorisations. In the planning tool the activities of a module were defined as meetings attended by patients and/or professionals. When planning these activities, the planning tool had to account for the availability of the resources, locations, professionals and the patient.

The professionals could find the activities that had to be executed in the electronic organiser of the planning tool. The professionals could ask the application manager questions about the planning as well as difficulties or errors in the system by e-mail. In addition, the professionals were required to contact the application manager when they rescheduled activities. The professionals had to contact the application manager for rescheduling activities, because the application manager had the responsibility of planning all the activities with the planning tool. As a result, the application manager functioned as a helpdesk by e-mail.

5.2.2 FUNCTIONALITIES OF PLANNING TOOL

The features of care programmes such as the involvement of several disciplines, professionals and departments, and the

standardisation of modules, require certain functionalities of the planning tool. The planning tool contained the following functionalities:

BOR

To plan the activities, the system used a BOR consisting of locations, activities, professionals and patient as described in protocols.

EVENT HANDLERS

An event handler was available in the planning tool to be able to handle ad hoc changes by revising timetables and re-arranging activities. The treatment supervisor, who was able to deviate from the standard modules in case the module did not fit to an individual patient's situation, could use this functionality. The modifications that could be made related to the planning of the duration of the module, the frequency of sessions and the time per session.

ORGANISER

Since the centre used the planning tool to plan activities, the tool was able to provide an overview of the activities for a professional and functioned as an electronic organiser for each professional.

CONTROL FUNCTION

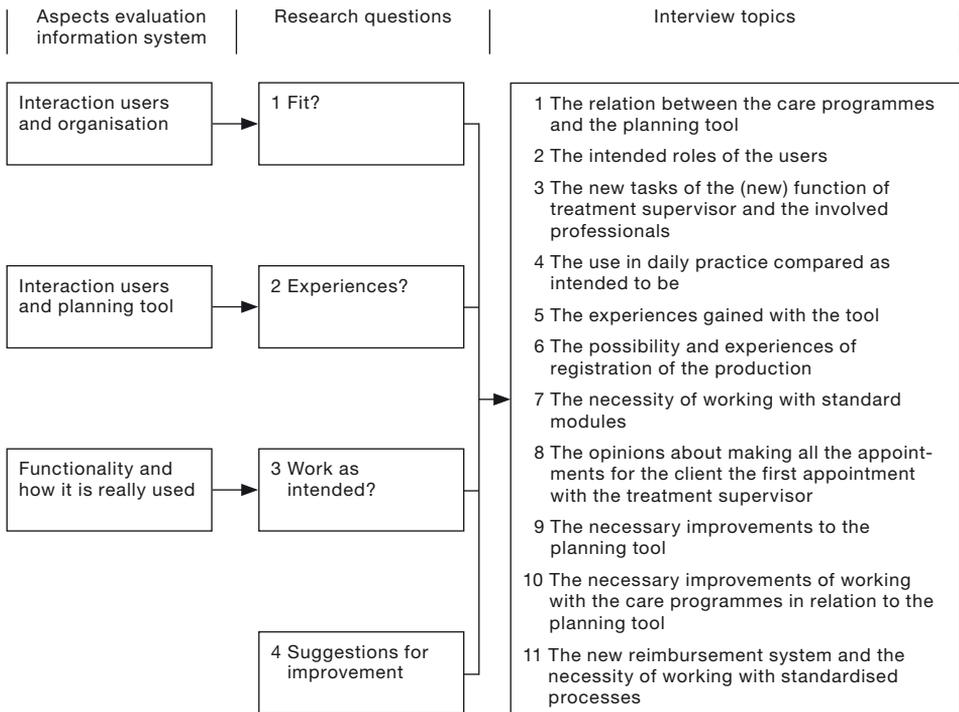
For process control reasons, several norms to control the processes were defined. An example of such a norm is the amount of time between the referral date and the first activity of the treatment supervisor with a patient. This could not exceed a period of three weeks. The planning tool had several monitor functions, e.g. time registrations of activities by the professionals, i.e. the professionals needed to register if activities had taken place or not. Other monitor functions were the generation of progress reports of activities and a report with a description of reasons for deviations in planning. Any deviations from the standard modules needed to be registered. To deviate from the standard modules, permission of the treatment supervisor was needed. The treatment supervisor had to register all the deviations made. This allowed the managers to analyze each deviation between the standard, the planned care, and the actual delivered care for each patient. As a result of the analysis the reasons behind the deviations could be detected and maybe solved by changing processes or norms. The results of

a deviation analysis had to be used as information for a second order feedback loop on the planning stages 1 and 2 (figure 5.1). A second order feedback loop may lead to changes in protocols, modules and the composition of care programmes.

5.3 METHOD

When evaluating new IT, the focus is very often on the technical bugs, human computer interfaces friendliness and daily usage of the information system. But also the interaction between the users and the tool is important.^{9, 10} Because technology interacts with the human it is more a situation or process that is evaluated than a single product. The functionality and the way it is really used are important to consider in the evaluation.⁶ To evaluate the planning tool in relation to the care programmes, we established a topic list for the data collection, as shown in figure 5.2.

Figure 5.2 Evaluation topics



In evaluations of information systems data from different sources can complement each other to provide a more complete picture.^{7, 11} Therefore we used several sources of data and various methods to answer our research questions. A document study was performed to analyze reports of meetings, the description of the care programmes, the protocols and the functionalities of the tool. With a document study, themes can be identified that emerged during meetings.¹² The main data source was semi-structured face-to-face interviews with all the professionals and employees involved in the pilot. The semi-structured questionnaire is shown in **table 5.1**.

This evaluation consisted of twenty-one semi-structured face-to-face interviews with professionals and employees to explore and describe motivations, hopes and fears and to document stories about what worked or not and why.¹² The following professionals were interviewed: two paediatricians, two speech therapists, two physical therapists, three group leaders (in one interview we interviewed two group leaders together), one unit leader, three social workers, one psychotherapist, three nurses (in one interview we interviewed two nurses together) and one home trainer. Additionally, the following employees were interviewed: two application managers, one system manager, and two treatment supervisors. All interviews were audio taped and transcribed for analysis. Furthermore, we conducted an analysis of the e-mails to and from the help-desk in the period of the pilot.

Table 5.1 Questionnaire used in evaluation study

Topics and questions

- 1 The relation between the care programmes and the planning tool
 - What do you think about the relation between working with the care programmes and the planning of care? (think about the objectives of the care programmes and the planning tool)

- 2 The intended roles of the users

Who has which intended role at:

 - Determining which, how many and within what term certain modules are necessary
 - Making the planning/appointments in the planning tool
 - Executing the results of the planning
 - Controlling the execution of the planning / product registration
 - Taking care of the conditions needed for the planning and the execution

- 3 The new tasks of the (new) function of treatment supervisor and the involved professionals
 - What is new at the intended role of the treatment supervisor and those involved now they have to work according to the protocol for the care programmes?

4 The use in daily practice compared as intended to be.

- Is the practice as intended to be?
 - Has the intended method of working worn off in practice? Concerning the relation between working with care programmes and planning of care
 - The different roles in:
 - Determining which, how many and within what term certain modules are necessary
 - Making the planning / appointments in the planning tool
 - Executing the results of the planning
 - Controlling the execution of the planning / product registration
 - Taking care of the conditions needed for the planning and the execution
-

5 The experiences gained with the tool

- Did you make use of the planning tool?
 - If yes:
 - What are your experiences?
 - Does it support you in the planning? How?
 - What are the positive and negative aspects?
-

6 The possibility and experience of registration of the production

- Did you use the possibility to register your production?
 - If yes: What did you think about it?
 - If no: Why not?
-

7 The necessity of working with standard modules

- In every module a standard was made about the number of sessions and the duration of the sessions. Do you think that planning with standards is a condition to plan well?
-

8 The opinions about making all the appointments for the patient at the first appointment with the treatment supervisor

- How do you feel about making all the appointments right at the start of the treatment for the whole treatment period?
 - What are the positive and negative aspects?
-

9 The necessary improvements to the planning tool system.

- What do you think is necessary to improve the planning tool system?
-

10 The necessary improvements of working with the care programmes in relation to the planning tool

- What do you think is necessary to improve the working with care programmes in relation to the planning tool?
-

11 The new reimbursement system and the necessity of working with standardised processes.

- Do you think it is necessary to standardise the modules concerning costs and avails?
- Do you think it is necessary to plan months ahead?

5.4 RESULTS

For the presentation of the results, we grouped some interview topics which are illustrated in **figure 5.2** and **table 5.1**. **Table 5.2** and **table 5.3** summarise the main results of the interviews with the professionals and employees and the e-mail analyses.

Table 5.2 Results of the semi-structured interviews

Question number	Yes/ used	No/ not used	used, but in other way as intended ^a	No answer	Total respond- ents ^b
1 Relation between the care programmes and the planning tool is clear	21	—	—	—	21 (P+E)
2 Is there knowledge of the intended roles	21	—	—	—	21 (P+E)
4 The Intended method worn off in practice for:					
a determining modules by the treatment supervisor	21	—	—	—	21 (P+E)
b planning with tool by the professionals	5	4	5	2	16 (P)
c executing planning by the professionals	3	5	5	3	16 (P)
d product registration by the professionals	1	11	3	1	16 (P)
e conditions of the information system	5	2	-	9	16 (P)
5 Did respondents make use of the planning tool?	1 4	4 —	8 —	3 1	16 (P) 5 (E)
6 Registration of production	—	9	5	2	16 (P)
7 Are standard modules necessary for planning?	13	6	—	2	21 (P+E)
8 Is it positive that appointments with patients are made in first contact?	17	—	—	4	21 (P+E)
11 Need of standardised processes for reimbursement system?	16	—	—	5	21 (P+E)

Question 3, 9, and 10 are open-end questions and therefore not mentioned in this table.

a : The category 'Used in other way as intended' means that the functionality has been tried out, but not used as intended, e.g. professionals who used the planning tool to schedule already made appointments

b: A distinction is made between professionals (P) and employees (E) because they had different roles in respect to the planning tool

Table 5.3 Results of the e-mail analyses of the helpdesk

Characteristics	Results
Period of functioning of the helpdesk	January–June 2004
Total e-mails (including questions, replies, reports of errors)	406
New patients in care programmes started in January–June 2004	27
E-mails about planning (without replies)	81
E-mail from treatment supervisor to plan individual patient route, new patients planned	14
E-mails about extending modules	3
E-mail from any professional about planning ^a an appointment	14
E-mail from any professional about registering ^b already made appointment	50
E-mails about problems with registration of production	32

a: The application manager uses the tool to plan an appointment

b: The appointments have been planned already by the professionals themselves or took place before forwarding the date to the application manager

5.4.1 KNOWLEDGE ABOUT RELATIONS AND TASKS OF CARE PROGRAMMES AND THE PLANNING TOOL

The professionals and employees know that a (central) planning system is essential in areas involving various care programmes.

Citation: ‘if all care programmes have to be tuned to each other a logistic problem will occur. In that case, the planning tool will be convenient.’

However, the overall aim of the planning tool is not always clear.

Citation: ‘that you do not have to plan your own appointments, that they are planned for you. I have no idea what the meaning of that is. I only know that it is meant to create an overview of who has to perform what tasks at what moment and at what place. I do not see any advantages in it for me.’

The interviewees knew the different roles and tasks involved in working with the care programmes and the care planner, but they also noticed that the two care programmes and tool functions were not used as intended. Additionally, above citation shows that this professional did not see an advantage for himself/herself.

5.4.2 THE USE AND EXPERIENCES WITH THE CARE PROGRAMMES AND THE PLANNING TOOL

The new task of the treatment supervisor to prescribe the individual patient routes for new patients was used as intended. The professionals did not experience differences in their work content, but noticed significant differences in the structure of the new clusters, which now were multidisciplinary structured instead of functional. Furthermore, they experienced differences in the way they had to assemble reports.

Regarding planning, four professionals did not use the planning tool at all. Five professionals used the planning scheme as intended throughout the entire pilot project. Other professionals tried it in the beginning but stopped. Some professionals never opened the planning tool and scheduled the activities themselves. After they scheduled the activities they forwarded the dates to the application manager either before or after the activity took place (**table 5.2**). Data retrieved from the helpdesk also show this. As shown in **table 5.3**, the treatment supervisors did e-mail the names of the needed modules that required planning in more than 50 percent of all the new patients. From the 81 e-mails about planning, fourteen e-mails concerned the actual planning of standard modules for an individual patient route. In addition, another fourteen of these 81 e-mails concerned a question of a professional for the application manager to plan an activity without using the standard modules. Furthermore, 50 e-mails concerned the registrations of activities after the activities were scheduled by the professionals themselves. This also shows that professionals planned their own activities instead of the application managers who could use the planning tool. Five employees noticed that not all professionals used the tool as was intended. Besides that, the application manager would sometimes e-mail or call the professional about the planning of a new patient. This implies that the professionals did not depend on the planning tool to view the planning. Everybody found it problematic to maintain three separate organisers (the planning tool, the former technical environment, and a paper organiser).

Everyone was familiar with the possibility to register realised activities within the planning tool. Nevertheless, the experiences with registration of the performed activities were minimal because this function was frequently out of order. As shown in **table 5.3**, the e-mail analysis also shows this.

The conditions for planning and execution were not always good. Many thought that the tool was not user friendly and others felt that the implementation of the planning tool was poor. Five professionals responded positively about conditions as availability of resources and space.

5.4.3 STANDARDISATION OF MODULES

All professionals who thought that standard modules were necessary for planning (**table 5.2**), indicated that a standard cannot be rigid and must therefore be a flexible guideline that allows for deviation. Three out of the thirteen respondents felt that for some tasks, i.e. assessment or medical research, standards are possible, but for others i.e. ad hoc tasks, standards are not suitable.

Citation: 'A standard is a nice guideline, but it remains work of humans'

'It seems to me that there are situations a computer cannot plan. I do it myself. I take 1.5 hour for an anamnesis, which is also a mean.'

5.4.4 PLANNING ACTIVITIES AT THE START OF A TREATMENT

Almost all of the interviewees agreed that providing patients with an overview of all first activities of the different modules during their first contact with the treatment supervisor is a positive development (**table 5.2**). But, they also stated that deviations from the standard modules must be possible.

5.4.5 SUGGESTIONS FOR IMPROVEMENTS OF THE INFORMATION SYSTEM

The interviewees suggested improvements on several aspects. One aspect refers to the planning tool itself. The user friendliness of the system such as the visualisation and the ease of operation should be improved (three interviewees).

According to the interviewees, another improvement regarding the organisation of the planning tool would be that one person, a central planner, is responsible for the planning. This person must be permanently available during office hours and familiar with daily practice. In the beginning of the pilot the treatment supervisor was appointed to plan the activities. Nevertheless, the interviewees were critical of the intended role of the treatment supervisor to plan the activities. In their

opinion, a treatment supervisor is a professional who should not be spending his/her time on administrative tasks.

A suggested improvement regarding the implementation of the tool is to appoint someone who is designated to support the implementation.

Citation: 'in any case, someone should be free to really do this. If it comes on top of someone's other tasks, I do not think it will get off the ground.'

With regard to the experienced inflexibility of standards and the planning tool, seven of the sixteen professionals explicitly mentioned this and suggest improving the flexibility. Interviewees claim that it must be possible to deviate from a standard.

Furthermore, a suggestion for improvement concerns describing the care programmes and the planning tool in one document in relation to each other. During the pilot these were described in two separate documents.

5.5 DISCUSSION AND CONCLUSION

We used several data sources revealing issues that supported and complement each other. The results show that, with regard to research questions 1 and 2, the professionals experienced the standard modules of the care programmes as too rigid to react to ad hoc changes. In addition, the users of the planning tool experienced the planning tool as not user friendly.

The planning tool did not work as was intended (research question 3). The main functionality of the planning tool, to plan and control activities, was hardly used. The non-use supports the reported experiences that the planning tool and the care programmes standard modules were too rigid. Also, the option within the planning tool to deviate from the standard modules was seldom used. There seem to be two main reasons for this non-use of the deviation option. The first reason is that there was a noticeable lack of knowledge among the users of the planning tool about the overall aim and the options offered by the planning tool. Additionally, the professionals did not see a direct advantage for themselves. As a result the motivation to use the system of the planning tool was not high. The second reason is that for deviation from the modules, permission of the treatment supervisor was needed and that this deviation was monitored. From a socio-political perspective,^{13(p 88)} we can expect that the professionals were afraid for a different

power balance due to the planning tool and care programmes. They were afraid for individual performance control, as a manager pointed out after the results of the evaluation were presented. This implies that professionals did not appreciate the aim of the deviation registration, i.e. that the results of the analysis could work as information for a second order feedback loop. The aim of the planning tool on the planning stage of the individual patient routes (stage 4) (**figure 5.1**), to plan activities was known. However, it was not known what the overall function of the control function was.

The implementation of the planning tool in the pilot failed, mainly for two reasons: the bad implementation process and the misfit with the care programmes in daily practice.

5.5.1 FIT BETWEEN CARE PROGRAMMES AND PLANNING TOOL

From a socio-structural perspective, the planning tool requires a certain structure of the care processes. According to Hofstede,⁵ planning and control by care programmes fits with processes with characteristics as repeatability of activities, measurability of outcomes, knowledge about the effect of management interventions and unambiguous objectives. The care programmes had objectives as stated in the protocols of the standard modules. The activities were highly repeatable and outcomes regarding the set of objectives could be measured. The effects of management interventions on the process could be measured (by means of deviation analyses), and therefore be known. Basically, the characteristics of the care programmes complied with the requirements of the planning and control model as implemented in the planning tool (fourth research question). The planning tool did contain all the needed functions to plan and control the care programmes according to the standard modules. And the planning tool also had an event handler to react to ad hoc changes and to deviate from the standard modules.

With the care programmes, the professionals did experience differences in the structure of work, but not in the content of it. In daily practice, the professionals did not work according to the standard modules of the care programmes. Since the planning tool had some ERP functionalities as the BOR, which was based on the standard modules, it could not work if the standard modules were not used. Probably the planning tool revealed a resistance to a way of working that was introduced long before

the implementation of the planning tool, namely the care programmes. The new way of working was not accepted by the professionals and they still used their old routines. From a socio-cultural perspective,^{13(p 88)} the professionals did not comply with the standard modules because they feared inflexibility in providing care and a loss of autonomy. This evaluation study supports the claim that, to be able to react to variability and stochasticity, some planning freedom for professionals is needed.¹ Consequently, for care programmes a balance between flexibility and standardisation of processes needs to be found.

The success of certain organisational methods as the care programmes can sometimes only be determined after implementation of IT, in this case the planning tool, since IT is a prerequisite to work as intended. Therefore, IT has to be adaptive to the process organisation. But also the processes must be modified if needed. To create a fit between care processes and IT, first processes have to be carefully considered before software is developed and implemented. This latter is a process of trial and error, and requires adaptive information technology. Because it is a process of trial and error the moment of implementation is difficult to define. The elements of the social-technical system constantly change with the implementation, which makes sequential implementation of IT and new process organisation difficult. It was the conviction of the management of the organisation that to successfully achieve organisational change towards working with care programmes, increased automated support would be necessary. The implementation of the planning tool was thought to promote working with care programmes. The implementation of the planning tool showed that the professionals did not accept the standard modules of the care programmes because of fear for inflexibility of the care programmes, and with that not being able to react to ad hoc changes and individual patient demands. Yet, more research is needed to how the compliance of professionals with standards can be evaluated. What are the reasons of professionals to comply or not to comply with standards?

5.5.2 IMPLEMENTATION PROCESS

In the youth centre the planning tool could be adapted to the processes. The processes were redesigned into care programmes before the development and implementation of the planning tool as is desirable for the implementation of IT. The adaptability of the software in relation with a process driven

approach, in which the planning tool could be adapted to fit the processes, should make the implementation less complex, less time consuming as the implementation of traditional ERP software.¹⁴ Even though the planning tool was adaptive and elements of a technology-driven organisational change initiative were used, the implementation in the pilot failed. A technology-driven organisational change initiative understands the implementation as an evolutionary change process affecting organisational life, and should respond to changing objectives, conditions and unfolding circumstances.¹⁵ To implement adaptive information technology, a traditional IT project that focuses on technology and is linear, phase-oriented, planned beforehand through rational analysis and strictly controlled against time schedules and budgets, is not suitable.¹⁵ The importance of the involvement of the key users in the specification and selection process and also training and effective communication about the new system to the users is reported often in literature.¹⁵⁻¹⁸ In the centre the user-involvement in the development of the software, and as driving force for the implementation, was not enough to realise an organisational change.

To improve the planning tool in relation to the care programmes (as stated in research question 5), the main improvement is the implementation in which users have to be involved to create a fit between standardisation and the needed flexibility. To succeed in organisational change, users have to be informed about the overall aim of the new processes and the IT to improve the acceptance of both.

A limitation of this case study was that there were no evaluations of the care programmes prior to the introduction of the planning tool. Ideally, separate evaluations are needed to determine the effects of different projects. If the care programmes had been evaluated before the introduction of the planning tool, the planning tool might have had a bigger chance for success. It is therefore unclear if the level of acceptance had been different, would the implementation have been more successful.

Overall, this study emphasises the need for user involvement and a process driven approach for a successful development and implementation of adaptive information technology for automated support of the planning and control for the non-deterministic health care processes.

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6 GENERAL DISCUSSION

6.1 INTRODUCTION

The overall aim of this thesis is to explore how advancements in operations management can contribute to improving the efficiency and quality of mental health care services.

For optimal care delivery, the organisational structure and the care processes should be designed in such a way that efficiency and quality are optimised. Barriers to optimal care delivery can be categorised into three groups: i. e.

1. uncertainty of care
2. complexity of care
3. inflexibility of care

It was assumed that these three groups of barriers should be studied in order to understand how operations management is associated with the efficiency of mental health care services and their quality. In this study, the following research questions were investigated:

1. Which criteria should be used to describe and assess care delivery in mental health care services?
2. What are the structure, process and outcome characteristics of delivery of care for patients with depressive disorders within various outpatient mental health care services?
3. Which planning and control models can be, and are, applied to mental health care services?
4. How can information technology be used for planning and control of care processes and how is this being realised?
5. How can mental health care delivery be redesigned in order to optimise efficiency and quality?

This chapter first summarises the main findings. Thereafter considerations and limitations are presented. Subsequently, implications for mental health care services and recommendations for further research are provided. This discussion chapter ends with concluding remarks.

6.2 MAIN FINDINGS

To describe and analyse mental health care services, it was first necessary to identify the indicators that should be measured for accountability, quality improvement and performance management (**Chapter 2**). Therefore a review of the literature on performance measurement and performance indicators was conducted. The results of the review showed that outcome and process indicators were primarily referred to in mental health care literature. Structure indicators were in the minority. The structure indicators that were reported in the literature reflected characteristics of the patient population, characteristics of staff, contextual indicators, and organisational structure. The process indicators that were reported concerned access, appropriateness, continuity/coordination, prevention and safety. The outcome indicators reflected effectiveness and efficiency. These indicators are represented in a framework given in **Chapter 2**.

The framework presented in **Chapter 2** was used to guide the assessment of the structure, processes and outcomes in outpatient community mental health care services (**Chapter 3**). The assessment showed that structure, process and outcome of care delivery differed between the four services. In general, the designs of the mental health care services were not optimal for facilitating focused care in order to cope with inherent variation. A number of structure and process characteristics seemed to increase uncertainty, complexity and inflexibility. These were the heterogeneity of the patient population, the lack of clear objectives, the under use of clinical treatment protocols, insufficient functional flexibility of professionals, under use of information technology and the fragmentation of activities. The multiple-case study showed further that unsatisfactory planning and control of performances led to much unnecessary variation in delivery of care. Information technology was mostly used to handle the information flow and sometimes for electronic patient files. However, information technology was scarcely used to support planning and control. As a result the mental health care providers were not able to direct performances toward a specific target.

The simulation study (**Chapter 4**) showed that the use of clear objectives on the number of consultations significantly decreased the mean and variation of the number of consultations. Furthermore, a more accurate treatment plan based on a reliable diagnostic assessment by e.g. the use of a (semi)

structured interview such as the SCID, decreased the number of consultations. In addition, the evaluation moment, and the relation between the treatment plan and the evaluation moment had a significant effect on the number of consultations. The number of patient transfers was above all significantly influenced by the functional flexibility of professionals; the more functional flexibility the fewer transfers. Furthermore, the higher the chance for a change in treatment plan, the higher the mean number of patient transfers. In addition, the interaction between the variability of treatment plan and functional flexibility influences the number of transfers significantly, more than does the evaluation moment. Consequently, the optimisation of mental health care delivery is not a simply matter of implementing clinical treatment guidelines, but requires a change in the structure and process of care, such as can be done with care programmes presented in **Chapter 5**.

The case study presented in **Chapter 5** shows the results of an evaluation of a care programme approach supported by information technology in a multidisciplinary youth care centre. Information technology should be used in managing care programmes. Accordingly, the structure and care processes of the programmes must fit with the appropriate information technology for an optimal result. To realise such a fit, care processes need to be routine and information systems need to be adaptable and support short term planning. In theory this was the situation in the multidisciplinary youth centre. However, the evaluation showed that neither the functionalities of the care programmes nor the functionalities of the information technology (the planning tool) worked as intended. The planning tool revealed that the care programmes, which were implemented two years before the planning tool, did not function optimally. Ultimately, the implementation failed. Professionals did not comply with standard modules and used their old routines. The failure to implement the care programmes as well as the failure to use the planning tool may be explained by a lack of knowledge on the part of the users regarding the aim of care programmes and of the planning tool, a fear of inflexibility in planning, and non-optimal practical conditions.

6.3 CONSIDERATIONS AND LIMITATIONS

In order to explore operations management in mental health care, several methodological designs were used to answer the overall research question. These included a review of the literature, a multiple-case study, a simulation study and an evaluation study. The combination of the different studies strengthens the validity of the research by using both qualitative and quantitative analysis. All studies can be characterised as explanatory. No definitive causal relationships can be made, but note that this was not the purpose of the studies. The overall face validity of these studies was secured by the involvement of staff and professionals of the various services. Although all designs were carefully chosen and conducted, several methodological and theoretical considerations should be taken into account. These considerations are discussed per study below.

6.3.1 REVIEW OF LITERATURE ON MEASURING PERFORMANCE

The literature review identified relevant studies regarding performance measurement. However, within a literature review it is impossible to detect all available relevant studies due to publication bias (not all relevant studies are published or publication may be delayed).¹ It is possible that not all mental health care services who measured their performances published the results in scientific journals, or indeed published at all.² Furthermore, only English-language publications were reviewed, implying that publications in journals or in reports in another language are lacking.¹

The literature review was led by the classification of indicators into structure, process and outcome as defined in Donabedian's model.³ This model explicitly links structure to the process of care, and the process of care to subsequent patient outcomes. This classification excludes performances other than structure, process and outcome on a clinical level. However, structure and process also influence employee and organisational outcomes.^{4, 5} In this thesis structure, process and outcome are interpreted broadly, to include effectiveness and efficiency, with economic and productivity indicators. This broader interpretation is recommended for the application of operations management to mental health care. The framework given in **Chapter 2** was used to guide the assessment of care delivery systems in outpatient mental health care services.

A performance management model is presented in **Chapter 2**. This model applies to a design with unambiguous objectives, measurable output, known effects of management interventions and repetitive activities.⁶ However, these requirements were not met in the multiple-case study.

6.3.2 MULTIPLE-CASE STUDY OF OUTPATIENT MENTAL HEALTH CARE SERVICES

The multiple-case study design made it possible to compare the structure and process characteristics of four outpatient mental health care services. The comparisons revealed several weaknesses and strengths. It can be argued that the multiple-case study design and broad approach prevented causal relations and deeper insights into the causalities and improvement possibilities from coming to light. However, finding causal and statistical relationships was not the aim of the multiple-case study; rather, the aim was merely to explore and refine understanding of the organisational structure and general process characteristics.⁷⁻⁹ Therefore the multiple-case study design was considered to be the most appropriate method for better understanding the current situation and revealing patient-flows and bottlenecks.

Within the design of the study it was sometimes difficult to obtain data from the outpatient mental health care services; it was an effort for the services to collect data, and the files delivered needed considerable correction. As a result the reliability of the data could sometimes be questioned. In addition, data about effectiveness was lacking at the time of the study, as the mental health care services did not consistently measure effectiveness. Consequently, a relation between the design of care delivery and the effectiveness of care cannot be given and a further investigation, preferably by means of a longitudinal study, of this relation is desirable.

To improve validity, data triangulation (one method and multiple data sources, e.g. interviews with different key informants) and method triangulation (different methods, e.g. interviews, observations, records, expert meetings) were used and regarded as very important.⁹⁻¹²

Although this research shows that care programmes which focus on homogeneous patient subpopulations to increase efficiency and quality are not yet common, there is a trend towards such care programmes in the Netherlands.¹³⁻¹⁸ However, these care programmes often describe the content and process of care,

but are not designed into the organisational structure and care processes. Moreover, in general there is no planning and control model integrated into the design. In fact, outcomes regarding effectiveness and efficiency were not measured in most services, and consequently were not available to the relevant professionals or to managers.

Based on this research, one can agree with van Roth and van Dierdonck¹⁹ that there is a need to integrate planning and control into the design of mental health care services, taking feedback loops into account, so that the patient care process can be coordinated to a large extent. This will very likely reduce variation and discontinuity. Nevertheless, short term planning needs to be integrated at operational level to allow for ad hoc decisions and uncertainty. Accordingly, second order feedback loops are required so that it's possible to deviate from objectives.

6.3.3 SIMULATION MODEL STUDY

This study showed that modelling is an important tool for examining designs of health care processes, and that it has clear advantages concerning content, such as the ability to test several scenarios.^{20, 21} Modelling is by definition a simplification of reality, and simulation models are not often used to study operation management in mental health care.²² In this research the simulation model proved to be a helpful tool in testing several scenarios on how care can best be delivered. A limitation of the simulation study was that the data used in the simulation model was based partly on estimates. The use of estimates did enable us to show the effects of different scenarios.

The results of the model study provide further insights into the effect of process characteristics on variation and discontinuity. This study clearly shows that clinical guidelines on diagnosis and treatment alone are not sufficient for improving the delivery of care; this is in agreement with what has been reported in the literature.^{23, 24} Just a few variables for the delivery of care were selected, and the choice of variables may have affected the results. In future simulation studies more and/or other variables should be included.

The insights provided by the simulation study regarding delivery of care and the influence on variation and discontinuity (**Chapter 4**) can support managers in making decisions about appropriate system design for their mental health care service,²⁵ and as input for Randomised Controlled Trials of delivery of care.²¹

6.3.4 EVALUATION STUDY OF CARE PROGRAMMES AND INFORMATION TECHNOLOGY

A case study design was used to evaluate the functioning of care programmes and information technology (in this study the planning tool) in a multidisciplinary youth care centre. The evaluation revealed the failure of both the implementation of the care programmes and of the planning tool. One reason may be that professionals were not sufficiently involved to realise an organisational change in the structure of the care programme.²⁶ A second possible factor in the failure of the sequential implementation of care programmes and the planning tool, could be that process improvement is much more likely to be achieved if the information technology application development is incorporated into the process for managing change,²⁷ which was not the situation in the multidisciplinary youth care centre. In order to be incorporated into various situations the software needs to be adaptable. In addition, professional staff and administrators need to be aware of the various possibilities of the software and how to employ it to get the most out of it.

Because the care programmes and the planning tool were implemented sequentially, ideally separate evaluations should have been conducted in order to determine the effects of the different projects, but this wasn't possible within the parameters of this research. To secure validity of the results, data triangulation and method triangulation were employed.⁹⁻¹²

6.3.5 GENERALISABILITY OF RESULTS

The results from the multiple-case study may be time and content specific. However, the results can be used to guide redesign of care delivery in mental health care services. Although the cases studied were independent outpatient community mental health care services in the Netherlands, the characteristics are believed to bear similarities with other outpatient as well as with inpatient mental health care that in general is provided in integrated services. The results from the simulation study systematically explored features observed in the multiple-case study, and can be used to inform decision makers about possible effects of redesigning mental health care processes.

Most of this thesis focused on services treating patients with depressive disorders. Nevertheless, the problems that were observed are expected to be the same for services treating

other disorders. Accordingly, the implications of this research also apply to other disorders and related care processes.

The care programme approach recommended for outpatient mental health care in this thesis, was tested in a multidisciplinary youth care centre (see **Chapter 5**). Although the multidisciplinary youth care centre and outpatient community mental health care services are not similar situations, these services do have certain resemblances. In the multidisciplinary youth care centre, the same type of treatments were given as in the outpatient community mental health care services: i.e. treatments with professional staff as the main resources, and care that is delivered mainly through interactions between patient and professional. Therefore the functionalities of the care programmes and the planning tool, and the results of the evaluation, should be applicable to (outpatient) mental health care services.

As was found in much of the international literature reviewed in this thesis, other countries have the same difficulties concerning rising costs, discontinuity, practice variation and de-fragmentation. Therefore, the implications that will be described in Section 6.4, very likely also apply to mental health care services in countries other than the Netherlands.

6.4 IMPLICATIONS FOR MENTAL HEALTH CARE SERVICES

Implications for optimising the delivery of care in mental health care services are detailed below. These implications follow directly from the results of this research and are, where possible, substantiated with references to other studies. The variation and number of possible patient transfers in the care process should be reduced as much as possible by design, planning and control.

The results of this research show that the design, planning and control of outpatient community mental health care services were not optimal. Planning and control should be integrated into the design to better attune care to individual patients and to increase efficiency and quality. Mental health care services can achieve this by implementing care programmes (see **Chapter 5**). In the Netherlands, care programmes are mainly used as an instrument to improve quality of care without directly altering the care processes.^{15, 16, 28} In this thesis the term care programmes is used for an overall approach to improving the care processes, as well as improving the quality of care. In health care literature, several terms

can be found for this broader approach, such as integrated care pathways²⁸ and service lines.²⁹

Care programmes are not implemented overnight and do not automatically lead to better results.²⁹ Several decisions on different levels have to be implemented for a programme to be successful.³⁰ These decisions may require several changes regarding:

1. the organisational structure
2. the grouping of patients for focused care
3. resource allocation, tasks and responsibilities
4. standardisation of care processes
5. (functional) flexibility of professionals
6. methods for assigning patients to care programmes
7. integrated planning and control by using indicators
8. the use of information technology.

Moreover, these changes can only function through the standardisation of care programmes. The main implications of these changes are described below.

ORGANISATIONAL STRUCTURE

Based on the overall aim and strategy of a service, the organisational structure should be defined. The outpatient community mental health care services offer a broad spectrum of care to a heterogeneous population.¹⁵ Accordingly, the organisational structure should support processes that are routine, as well as processes that are non-routine.

A care programme requires simultaneous changes in the structure and care processes.³¹ Ideally, when a mental health care service implements several care programmes, they work within a hybrid organisational structure in which different subpopulations of patients can be served with the specialised care focused on their particular needs.³²⁻³⁴ In such a hybrid organisation one part of the organisation is organised for more routine processes, and the other part is organised for non-routine tasks. This means that focused care can be provided for different patient populations.

The next step is to compose (or modify) the process. First, the care processes need to be defined, in order to offer focused care that is aimed at patients' particular needs.³⁵ Accordingly, a target population must be chosen.

TOWARDS FOCUSED CARE: TARGET POPULATION

In order to distinguish between different target populations, homogeneous patient groups with a high enough volume to allow allocation of resources to each patient subpopulation should be defined.³² According to Măruşter et al. (2007), the separation of subpopulations to create target populations should be based on the predictability of care and the consequent underlying logistics of the care processes.³⁶ Target populations which are chosen with the focus on diagnosis offer, besides increasing predictability of care, the possibility for integrating (evidence-based) clinical treatment guidelines in the design of the care process. However, diagnosis does not necessarily imply commonalities in the logistics of the care process. Mental health care is generally more person centred; i.e. a diagnosis does not necessarily lead to a single, definitive sequence of events.²⁸ Other commonalities should be found to increase predictability. More study is needed on the commonalities of patient populations to define the underlying logistics of the care process.

RESOURCES, TASKS AND RESPONSIBILITIES PER CARE PROGRAMME

Within a hybrid organisation, professionals are no longer clustered based on their disciplines; rather they are clustered based on the patients' needs as defined in the care programme. Professionals and managers should have a clear description of tasks and responsibilities, and should be assigned to a care programme accordingly. To prevent too narrow a focus and a consequent decrease in work satisfaction, professionals can be assigned to different care programmes, with clear capacity to overcome too much interference and disturbance and hence a more complex coordination.³⁷ Job enrichment or job switching can also be considered for preventing a decrease in work satisfaction.^{38, 39} In addition, in order to maintain a high level of knowledge, knowledge sharing between colleagues within the same discipline and from other disciplines within the care programme should be encouraged. Furthermore, process ownership is needed in order to establish managerial accountability.^{40, 41} Of course, the different process owners should cooperate.⁴² Care programmes, after all, are not islands unto themselves, but can overlap, and professionals can be involved in several care programmes.

TOWARDS ROUTINE CARE PROCESSES

Both the multiple-case study and the simulation study showed that using routine care processes decreased unnecessary variation. A care process consists of several stages, from diagnosis to the end of the treatment. The stages in a care process are milestones in a patients' care or episodes of resource utilisation throughout the process.¹⁹ In care programmes, modules utilising different resources reflect these different stages.

The modules describe different interventions such as intake, cognitive behavioural therapy or pharmacotherapy. Accordingly, the type of activities, amount of activities, frequency of activities, and resources needed in a module should be defined in guidelines for a process to become more routine. This approach does account for personalized care. Patients can get personalized care if the modules that an individual patient needs are provided. The guidelines for the modules make process improvement possible. Preferably, the guidelines should be derived from evidence-based clinical guidelines. In this way the adherence to evidence-based clinical guidelines, which is not self evident,⁴³ can be improved by process design.

TOWARDS FLEXIBILITY

Usually a patient flows through several phases of a process and consequently needs more than one module. A different professional can provide each module, resulting in patient transfers. One way to decrease the number of unnecessary patient transfers, is to promote the functional flexibility of professionals. In addition to better continuity, functional flexibility can also increase the capability to deal with changes in treatments when necessary. Although generally it is preferable that professionals have more capabilities and are functionally flexible,^{44, 45} some degree of specialisation can enhance the quality of care.⁴⁶ Moreover, functional flexibility may cause responsibility to become clouded or ambiguous, and qualitative intensification of work can be perceived as extra workload and a possible lack of ownership of tasks may occur.⁴⁵ Thus, functional flexibility can increase continuity of care, yet the breadth of flexibility that is appropriate and desirable needs to be balanced with specialisation and standardisation of care.

Mental health care cannot be completely defined and ordered. A balance needs to be found between providing employees with procedures to follow, clinical freedom and their professional autonomy. This can be accomplished by providing the (clinical) freedom to innovate, to deviate from the targets,

to react to stochasticity and variability, and to be creative.^{17,34,47,48} Determining the balance between flexibility, standardisation and specialisation of professionals is a process of trial and error and requires learning and experimentation at the local level.⁴⁹

TOWARDS A METHOD FOR CLASSIFYING PATIENTS

Another important requirement of a hybrid structure for which care programmes are used is an adequate selection criteria to characterise patients' problems before, or early in the process. Such a method is required to place a new patient in the appropriate care programme, and to determine which modules fit the needs of the patient.

A good classification method can minimise false positive patients in a care programme.^{33,36} The use of (semi) structured intakes such as the SCID might accomplish this.⁵⁰ In addition, with a structured intake method the sequence and flow of (clinical) activities can be planned at the beginning of the treatment, facilitating coordination and effectiveness.^{50,51} Continuity can be improved in this way, and both efficiency and quality improved.

TOWARDS AN INTEGRATED PLANNING AND CONTROL SYSTEM

The growing attention on measuring performance for accountability in mental health care^{2,52} should be used to create a mindset with managers and professionals in which it is normal to plan activities, to measure performance and to incorporate this in daily management activities.

Process definitions provide excellent input for planning patient care. The planning of activities occurs at several levels with another time horizon (see **Chapter 5**). On an operational level the single patient path needs to be planned with a short time horizon. Professionals can plan an individual patient path based on the defined modules of a care programme.

Next, the planned process should be controlled, optimally by feedback loops. To optimise the quality of care and reduce practice variation, (clinical) performances should be measured and used for continuous quality improvement and performance management.⁵³ Performance measurement is believed to be a necessity for a modern process-oriented mental health care service,⁵⁴ even though it may be expensive, time consuming and possibly even regarded as threatening by professionals.^{46,55} Nevertheless, it is an important factor in the improvement, planning, and control of care delivery. Moreover, performance

management is complementary to evidence-based practice. If performances are unsatisfactory, the introduction or enhancement of practices can produce necessary improvements.⁵⁶ As such, care programmes support evidence-based mental health care and protocol information can be used for planning and control purposes.

It is thus recommended to systematically measure performances and to provide feedback on these performances on all decision levels, i.e. from the strategic to the operational level. When there is a gap between performance and objectives the shortfalls can be seen and analysed to understand which action(s) should be undertaken to close the gap. The performances can then be incrementally improved by deviation analyses and learning cycles. **Chapter 2** discusses several options for performance management by feedback. If care programmes differ in the level of routines, the degree of detail, the level of flexibility and permanence of handling the objectives and deviations can vary.^{33, 57, 58}

The different modules of the various care programmes can be described in terms of a Bill of Resources (BOR). A BOR describes the resources required at each stage of a care programme (described in modules) and facilitates resource planning.^{19, 34} Chapter 5 describes the use of a BOR in detail. A BOR facilitates automatic support for the planning and control of care programmes by the application of information technology.

TOWARDS THE USE OF INFORMATION TECHNOLOGY

Information technology can increase compliance with care programmes; one could say it is essential for the realisation of care programmes.^{27, 31, 58, 59} Information technology can reduce non-value added activities and facilitate coordination; if used correctly; it makes it possible to follow a patient throughout the care process and to generate surveys of the patient's progress and the efforts of professionals. In addition, information technology can support planning and control of mental health care services. Information technology can facilitate centralised planning; it is indispensable for data management and for data gathering as well as for comparing performance with target values and with historical values, and for disseminating the results.⁵⁴

To facilitate planning and control, software needs to allow ad hoc changes and to be able to provide for short-term planning.³¹ In addition, information systems have to be aligned with

the structure and processes of care, which need to be considered and modified if necessary.³⁷ Therefore, information technology needs to support the stochasticity, variability and heterogeneity present in mental health care. Consequently information technology should be adaptable and support short term planning.

REDESIGN

There are different concepts for improving quality in mental health care, such as total quality management (TQM) and continuous quality improvement (CQI) that provide useful models.⁶⁰ For improving patient processes, a business process redesign (BPR) focus seems more appropriate. A BPR focuses on analysing and streamlining process flows.^{61(p 11)} In order to implement care programmes as described above, structure and processes can be redesigned. Process redesign is not done overnight and success depends on many factors.^{62, 63} Several rules and routines that have come into being historically may no longer be optimum and need to be changed.⁶⁴ Furthermore, redesign represents a challenge to mental health care providers to reconsider their whole approach to improving the quality of services.²⁶ Before a redesign is executed, computer simulation can be useful in guiding decisions on redesign and for opening discussion on aligning the interests of different stakeholders.

6.5 RECOMMENDATIONS FOR FURTHER RESEARCH

Several recommendations for further research arise from this thesis. Overall, more study is needed on evidence-based mental health care services, i.e. on the efficiency and (cost) effectiveness of services.

In the multiple-case study, causalities between structure, process and outcomes were not studied. However, the results of this study can be used to set up a longitudinal study into the causal relationships between the structure, process and (clinical) outcomes of care. Another suggestion is a before and after design in which the delivery of care is redesigned and the effects are investigated. Also, area comparative studies may be appropriate, if contextual conditions are comparable. More study is needed on the commonalities of different subpopulations in mental health care in order to better understand how homogeneous patient subpopulations can be formed.

The use of operational research methods should be increased to obtain evidence on the effectiveness and efficiency of mental health care services. Simulation studies can facilitate decisions on the optimal delivery of mental health care and can contribute to the dissemination of knowledge on the effects of redesigns. These models should reflect the complexity, uncertainty, variability and limited resources of mental health care services.⁶⁵

Cost-effectiveness studies can provide more insight into costs and effectiveness from redesigns and should be conducted more often to realise evidence-based mental health care. In addition, (cost) effectiveness studies of clinical guidelines and on the implementation of these guidelines are needed, together with patient outcome measurements.

A last recommendation for further research concerns the use of information technology. Information technology is underused in mental health care, and more research is needed on the type of software and the implementation processes needed.

Policy should support care programmes within services, but also support cooperation between different services. An example is the integration of prevention, primary care and specialised care in disease management programmes. Therefore the present Dutch reimbursement system (DBC-system) should focus not only on diagnosis-treatment combinations within one service, but also across services.

6.6 CONCLUDING REMARKS

In this thesis the overall question studied is how improvements in operations management can increase efficiency and quality in mental health care services. Improving the operations management of mental health care delivery is not a simple matter of implementing (clinical) guidelines; many design, planning and control issues should be reconsidered.

Mental health care services can increase their efficiency and quality by using operations management that should be integrated into policy. This thesis aims to give a better understanding of the current situation of operations management in mental health care. It provides proposals on improving mental health care services and aims to increase the use of operations management approaches in mental health care services.

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7 SUMMARY

Summary

In the Netherlands there are an increasing number of people using mental health care services. However, the quality and efficiency of mental health care is often not optimal. Consequently, research to improve mental health care should, next to the (cost-)effectiveness of separate interventions, deal with questions relating to the best methods of design, planning and control of mental health care services. This is the field of operations management research of mental health care.

The main purpose of this thesis is to explore how advancements in operations management can contribute to improving the efficiency and quality of mental health care services. This thesis describes the current state of operations management in mental health care services and provides suggestions for changing its use so that the efficiency and quality of mental health care improves. **Chapter 1** describes the background of the thesis and lists the main research aims.

To assess the current situation and international use of operations management within mental health care, we first performed a systematic review of relevant literature; this is presented in **Chapter 2**. The review focused on the question: are the performances of mental health care organisations measured, and for what purpose? The review was also performed in order to identify the criteria that are relevant when measuring the efficiency and quality of care delivery in mental health care.

The review shows that performance measurement mainly serves three goals:

1. performance management (i. e. to provide information for decisions on future performances)
2. accountability
3. quality improvement.

In addition, the review shows that indicators should optimally reflect the structure, process and outcome of mental health care services. Based on this review, a conceptual framework is presented to support managers in their decisions about which indicators are best used for performance measurement.

Besides deciding on the right indicators for performance measurement, it is just as important to use the gathered information. Therefore a model is provided to guide decision makers in the use of the information. The essence of the model is that performances should be measured, and should be

compared with objectives; if these deviate, actions should be taken to close the gap between objectives and performances.

After the performance indicators were identified in the literature, we were interested in the current situation of outpatient mental health care services on a national level in the Netherlands. To demonstrate the current situation we performed a multiple-case study, which is presented in **Chapter 3**. Within this multiple-case study, the care delivery of four outpatient mental health care services was assessed. The main focus was on structure (characteristics of the organisation) and process indicators (activities between professional and patient). Structure and process factors can be barriers to optimal efficiency and quality. The barriers can be categorised into uncertainty of care, complexity of care and inflexibility of care. These three groups of structure and process factors can cause discontinuity of the patient flow and variation within input, throughput and output of care processes. Discontinuity and variation are the main factors that may hamper efficiency and quality. The current situation of the four services was assessed by means of observations, semi-structured interviews, document study, expert meetings and secondary data analysis.

The study showed that the structure, process and outcome of care delivery differed between the four services. In general the design, planning and control were not optimal. Suggestions for improving the operations management are given, which include: group patients into more homogeneous groups, define objectives to make care processes more routine, remain flexible, and increase the use of information technology.

One of the main difficulties in operations management research is that there are limited possibilities for testing hypotheses in an experimental situation. As a result, there is little empirical evidence in the field of mental health care on the effectiveness of alternative care delivery structures. Therefore we explored in a simulation study, described in **Chapter 4**, how alternative forms of delivery of care would affect important characteristics of that care such as the number of consultations (process variation) and the number of patient transfers (discontinuity). The starting point of the simulation study was the empirical findings on the current functioning of outpatient mental health care services, as found in the multiple-case study.

Several independent variables were defined and manipulated to study the relation between these and the number of consultations and the number of patient transfers. The independent variables were: the use of guidelines in the care process, the accuracy of the diagnosis and treatment plan by the (non) use of a semi-structured interview for the intake, the point at which the progress of the care is evaluated, and the functional flexibility of professionals (i. e. the number of skills professionals have).

The results of the simulations show that the use of guidelines decreases the mean number of, and variation within, consultations. In addition, an accurate diagnosis and treatment plan significantly decreases the number of consultations and the number of patient transfers. The accuracy of the diagnosis and treatment plan, in combination with the functional flexibility of professionals, affects the number of transfers. The timing of the evaluation of the care process influences the number of consultations as well as the number of patient transfers. Furthermore, the timing of the evaluation, in combination with the accuracy of the diagnosis and treatment plan, influences the number of consultations. In addition, functionally flexible professionals contribute to fewer patient transfers.

It can be concluded that care delivery variables interrelate with each other. Consequently, the optimisation of mental health care is not just a matter of implementing one aspect, but requires a total change in structure and in the care process. This can be accomplished with well-designed and implemented care programmes facilitated with information technology; care programmes and information technology are further explored in **Chapter 5**.

As we described in **Chapter 3** and **Chapter 4**, information technology can aid in managing care programmes. **Chapter 5** presents a case study of a multidisciplinary youth care centre in which the requisite functionalities of care programmes and information technology are evaluated. The aim was to gain more insight into care programming and to see whether information technology can play a supporting role.

The results of the evaluation show that the care programmes and the planning tool were not compatible and did not achieve the intended goals. The professionals failed to appreciate the flexibility of care programmes and not all functionalities of the planning tool were known or used. All this resulted in a non-fit between the care programmes and the planning tool.

Information technology should play as large a role as possible in managing care programmes. However, to facilitate the planning and control of care programmes, information technology needs to be able to support ad hoc changes and to provide for short term planning. It can be concluded that a balance between flexibility and standardisation should be developed for care programmes. This is a process of trial and error and requires adaptable information technology and user involvement in development and implementation.

Chapter 6 summarises the main findings of the studies presented in the thesis. Some considerations and limitations of the studies are provided. Implications for mental health care services are also presented.

Within this thesis we suggest mental health care services to design their organisation in an efficient way by care programmes. This means that the organisational structure should facilitate various processes for targeted subpopulations such as depressive disorders, anxiety disorders and schizophrenic disorders. Therefore homogeneous patient subpopulations need to be defined. To support such a process based organisational structure, tasks and responsibilities need to be clearly defined for each care programme. A fourth recommendation is to define the care programmes with clear objectives for the different phases of the care process, which should be used for planning the care processes, as well as for controlling the performances of the processes. It is suggested that the flexibility of professionals to react to inherent inter-patient variation and ad hoc changes needs to be taken into account. Besides, in order to assign individual patients to subpopulations, a reliable method for classifying patients should be developed; preferably based on semi-structured interviews such as the Structured Clinical Interview for DSM Disorders (SCID). Another recommendation is that both managers and professional staff of mental health care services should measure performances on structure, process and outcomes and react to any shortfalls in the performances. In that way performances can be improved and managed. Finally, information technology should be used to support care programmes and the planning and control of these programmes.

By utilising these operations management methods, mental health care services can implement care programmes in which planning and control are integrated into the design of the care processes. In this way care can be better attuned to

patient needs, and efficiency and quality increased. Nevertheless, more (experimental and operational) research is needed to define the relationship between the structure, process and outcome of mental health care services, and consequent (cost) effectiveness.

8 SAMENVATTING

Het aantal mensen dat gebruik maakt van Geestelijke Gezondheidszorg (GGZ) in Nederland groeit. Naast een groei in omvang van de GGZ, worden in toenemende mate ook vragen gesteld bij de kwaliteit en efficiëntie van de zorg. Daarom is onderzoek naar de (kosten) effectiviteit van interventies, zoals diagnostiek en behandeling belangrijk. Maar, naast onderzoek naar interventies, moet ook onderzoek worden gedaan naar de organisatie, planning en beheersing van de GGZ. Dit is het onderzoeksgebied van operations management.

In dit proefschrift worden studies naar de organisatie, planning en beheersing van GGZ instellingen beschreven. Naast een beschrijving van de huidige stand van zaken, worden voorstellen gedaan om met behulp van operations management de kwaliteit en efficiëntie van GGZ instellingen te verbeteren. **Hoofdstuk 1** beschrijft de achtergrond van het proefschrift en geeft de onderzoeksdoelen weer.

Om inzicht te krijgen in het huidige nationale en internationale gebruik van operations management in de GGZ is een systematische literatuurstudie uitgevoerd. In deze literatuurstudie (**hoofdstuk 2**) is onderzocht met welk doel prestaties van GGZ instellingen worden gemeten en met welke criteria bij deze meting rekening wordt gehouden.

Prestaties worden gemeten voor hoofdzakelijk drie doelen:

1. het managen van prestaties (informatie om beslissingen over toekomstige prestaties op te baseren)
2. ter verantwoording
3. voor kwaliteitsverbetering

Het is van belang dat de prestatie-indicatoren zowel aspecten van de structuur, van de processen en van de uitkomsten van GGZ instellingen weergeven. Op basis van de literatuurstudie is een schema ontworpen dat verschillende prestatie-indicatoren weergeeft. Dit schema kan managers ondersteunen bij het maken van beslissingen over de te gebruiken indicatoren. Het meten van de juiste indicatoren alleen is niet voldoende. De informatie die uit de meting naar voren komt, moet ook worden gebruikt voor planning- en beheersingsdoeleinden. Na het meten van de prestaties dient daarom de verkregen informatie te worden vergeleken met de vooraf gestelde doelen. Als de prestaties en de doelen van elkaar afwijken, is het van belang actie te ondernemen om deze afwijking te verminderen.

Nadat de prestatie-indicatoren in de literatuurstudie waren gedefinieerd, hebben we de huidige stand van zaken met betrekking tot de organisatie, de planning en de beheersing in de ambulante GGZ instellingen in Nederland onderzocht. Daartoe is een casestudie uitgevoerd waarbij vier verschillende ambulante GGZ instellingen (RIAGG) zijn bestudeerd (**hoofdstuk 3**). In deze studie zijn vooral de structuur- (karakteristieken van de GGZ instelling) en procesfactoren (activiteiten tussen hulpverleners en patiënten) onderzocht. De wijze waarop de structuur en het proces zijn georganiseerd, kunnen de efficiëntie en kwaliteit van zorg bevorderen maar ook belemmeren. In deze studie hebben we ons gericht op de belemmeringen. De belemmeringen hebben we gegroepeerd in drie categorieën. Deze zijn de onzekerheid van zorg, de complexiteit van zorg en de inflexibiliteit van zorg. Deze drie categorieën beïnvloeden de (dis)continuïteit van de patiëntenstroom. Daarnaast beïnvloeden deze groepen de aanwezige variatie in de input, doorstroom en in de uitkomsten van de zorgprocessen. Discontinuïteit en variatie zijn de voornaamste factoren die efficiëntie en kwaliteit belemmeren. De huidige situatie van de vier bestudeerde instellingen is vastgesteld doormiddel van observaties, semi-gestructureerde interviews, expert bijeenkomsten en een data-analyse.

De structuur, het proces en de uitkomsten van de vier instellingen verschillen. Over het algemeen zijn de organisatie, de planning en beheersing van de zorgverleningprocessen niet optimaal. In dit hoofdstuk worden voorstellen gedaan deze te verbeteren. Een van de voorstellen is om de patiënten te groeperen zodat meer homogene patiëntengroepen ontstaan. Een ander voorstel is om doelen duidelijker te definiëren zodat een proces routinematiger wordt. Het is wel van belang dat de benodigde flexibiliteit gewaarborgd wordt. Ook wordt een voorstel gedaan om meer gebruik te maken van informatietechnologie.

In onderzoek naar organisaties is het moeilijk om hypothesen te testen in een experimentele situatie. Dit verklaart waarom er weinig empirisch onderzoek is gedaan naar de effectiviteit van verschillende zorgverleningprocessen in de GGZ. Een alternatieve manier om inzicht te krijgen in de gevolgen van organisatieveranderingen op de uitkomsten van de zorg is door middel van simulatiestudies. We hebben een simulatiestudie uitgevoerd waarin het effect van verschillende zorgverleningprocessen op belangrijke karakteristieken van zorg, zoals het aantal consulten (procesvariatie) en het aantal

patiëntverplaatsingen (discontinuïteit), is onderzocht (**hoofdstuk 4**). Het uitgangspunt waren empirische gegevens van ambulante GGZ instellingen. Verschillende onafhankelijke variabelen zijn gedefinieerd en gevarieerd om zo de invloed van deze onafhankelijke variabelen op het aantal consulten en het aantal verplaatsingen van patiënten te onderzoeken. De onafhankelijke variabelen waren: richtlijnen met betrekking tot het zorgproces, de accuraatheid van de diagnose en het behandelplan die gesteld worden in de intake al dan niet met behulp van semi-gestructureerde interviews, het moment waarop de zorg wordt geëvalueerd, en de functionele flexibiliteit van de zorgverleners (het aantal vaardigheden dat een zorgverlener heeft).

De resultaten van de simulaties tonen aan dat door gebruik te maken van richtlijnen het gemiddelde aantal consulten en de variatie in het aantal consulten afneemt. Een accurate diagnose en behandelplan zorgen voor een significante daling in het aantal consulten en het aantal patiëntverplaatsingen. De accuraatheid van de diagnose en behandelplan in combinatie met de functionele flexibiliteit van zorgverleners heeft invloed op het aantal patiëntverplaatsingen. Het moment waarop een proces wordt geëvalueerd heeft invloed op het aantal consulten en het aantal patiëntverplaatsingen. Het moment van evaluatie gecombineerd met de accuraatheid van de diagnose en behandelplan heeft invloed op het aantal consulten. Bovendien zorgen functioneel flexibele zorgverleners voor minder patiëntverplaatsingen.

Geconcludeerd kan worden dat verschillende procesvariabelen met elkaar in verband staan. Daardoor is het implementeren van één variabele niet voldoende om de efficiëntie en kwaliteit van GGZ instellingen te verbeteren, maar is een totale verandering van structuur en proces nodig. Dit kan worden bereikt door goed ontworpen en goed geïmplementeerde zorgprogramma's die worden ondersteund door informatietechnologie. Zorgprogramma's en informatietechnologie worden in **hoofdstuk 5** verder beschreven.

Zoals in **hoofdstuk 3** en **hoofdstuk 4** is beschreven, kan informatietechnologie het management van zorgprogramma's ondersteunen. **hoofdstuk 5** beschrijft een casestudie van een multidisciplinaire jeugdgezondheidszorg instelling waarin zorgprogramma's en informatietechnologie zijn geëvalueerd. Het doel van deze studie was om meer inzicht te krijgen in zorgprogramma's en de ondersteunende rol van informatietechnologie.

De zorgprogramma's en de informatietechnologie voldeden niet aan de vooraf gestelde verwachtingen. De zorgverleners waren vaak niet op de hoogte van de flexibiliteit van de zorgprogramma's. Bovendien waren niet alle mogelijkheden van de informatietechnologie bekend of werden niet gebruikt. Het gevolg hiervan was dat de zorgprogramma's en de informatietechnologie niet goed werkten. Informatietechnologie is nodig voor het goed kunnen managen van zorgprogramma's. Echter, om planning en beheersing van zorgprogramma's te ondersteunen moet informatietechnologie ook de aanwezige ad hoc veranderingen en korte termijn planning ondersteunen. Een balans tussen flexibiliteit en standaardisatie is dus noodzakelijk om te werken met zorgprogramma's. Dit is een proces van uitproberen en vraagt om informatietechnologie met een zeker aanpassingsvermogen. Bij de implementatie van zorgprogramma's en van informatietechnologie is het van belang dat de uiteindelijke gebruikers bij de ontwikkeling en implementatie van zorgprogramma's en van informatietechnologie worden betrokken.

In **hoofdstuk 6** zijn de voornaamste bevindingen van de verschillende studies beschreven. De resultaten van de diverse studies worden beschouwd en beperkingen van de verschillende studies zijn weergegeven. Daarnaast zijn implicaties van de studies voor GGZ instellingen gepresenteerd.

In dit proefschrift raden we GGZ instellingen aan om de organisatie in zorgprogramma's te structureren. Dit betekent dat de organisatiestructuur de verschillende processen voor verschillende doelgroepen, zoals depressieve stoornissen, angststoornissen en schizofrenie, moet ondersteunen. Daarmee is de tweede aanbeveling om homogene patiëntengroepen te definiëren voor de verschillende zorgprogramma's. Vervolgens, om een op zorgprogramma's gebaseerde organisatiestructuur mogelijk te maken, is het belangrijk om de taken en verantwoordelijkheden voor elk zorgprogramma te bepalen en te beschrijven. Als vierde bevelen we aan om de zorgprogramma's in duidelijke richtlijnen met duidelijke doelen voor de verschillende fases van een zorgproces te omschrijven. Deze doelen worden gebruikt voor het plannen en voor het beheersen van de prestaties van het zorgproces. Hierbij wordt aanbevolen om de zorgverleners een bepaalde mate van flexibiliteit te laten behouden om te kunnen reageren op aanwezige variatie tussen patiënten. Bovendien is het van belang om bij het toewijzen van de individuele patiënten aan verschillende subpopulaties van de zorgprogramma's gebruik te maken van een

betrouwbare methode om diagnoses te stellen, idealiter gebaseerd op semi-gestructureerde interviews zoals bijvoorbeeld het Structured Clinical Interview for DSM Disorders (SCID). Een andere punt van aandacht is het belang van het continue meten van prestaties betreffende de structuur, het proces en de uitkomsten, door zowel managers als zorgverleners van GGZ instellingen. Daarbij dienen ze te reageren op eventuele tekortkomingen in de prestaties. Op deze manier kunnen prestaties worden verbeterd en gemanaged. De laatste aanbeveling die wordt gedaan is om informatietechnologie te gebruiken dat de zorgprogramma's en de planning en beheersing van deze programma's kan ondersteunen.

Wanneer GGZ instellingen meer gebruik maken van operations management methoden kunnen ze planning en beheersing integreren in het ontwerp van de organisatie gebaseerd op zorgprogramma's. Op deze manier is de zorg beter afgestemd op de behoeften van de patiënt, en kan efficiëntie en kwaliteit worden verbeterd.

Het onderzoek van dit proefschrift geeft aanleiding tot meer (experimenteel en operationeel) onderzoek naar de relatie tussen structuur, proces en uitkomst van GGZ instellingen en de bijbehorende (kosten) effectiviteit.

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Irma Baars

10 CURRICULUM VITAE

Irma Baars was born in Wehl, the Netherlands, on May 31, 1980. After finishing secondary school (vwo) in 1998, she started her study in Health Sciences at Maastricht University, the Netherlands. In January 2003 she graduated with a specialisation in Health Care studies (MSc).

She started working at the Department of Health, Organisation, Policy and Economics at the Faculty of Health, Medicine and Life Sciences at Maastricht University in 2003. She worked on a research project on operations management, focusing on the system requirements for part-time working doctors. In 2004 she started her PhD research in the same department, within the School for Public Health and Primary Care (CAPHRI). Her PhD research concentrated on operations management in mental health care services, with the aim of improving quality in mental health care services. Furthermore, she taught within the programmes for Master of Health, Policy, Economics and Management and Master of Health Service Innovation. She also supervised students with their thesis projects.

From November 2008 until March 2009 she worked at the advanced teacher academy (Instituut Opleiding Leraren) in Paramaribo, Surinam. She developed and taught a module about quality in health care and a module about international health care.

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