

Improving healthcare access and availability with matching of care

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Catharina Wingner Leifland

Lecturer and Researcher, St. Tora Konsult, Sweden

Catharina Wingner Leifland has a background in accounting and teaching. She has been working in the Department of Service Management and in the Department of Business Administration at Lund University as a Lecturer and Researcher in Health Management. Teaching includes courses in Health Management, Financial Accounting as well as Strategy and Management Control. Her research focuses on availability of health care and matching of health-care services, specifically why and how availability differs among places and how it could be improved through matching. Research interest also includes availability of health care from the perspective of digital health solutions. Before joining academia, Catharina had extensive experience in both auditing/accounting/finance at accounting firms and as CFO in private companies. For many years, consultancy work has complemented her position as lecturer and researcher. Catharina earned her Master of Science in Business and Economics at Lund University, complemented by a bachelor's degree in Ethnology.

St. Tora Konsult AB, Björkvägen 1, 224 56 Lund, Sweden
Tel: +46 705 280690; E-mail: c.wingnerleifland@gmail.com



Lars Nordgren

Professor in Health Management, Halmstad University, Sweden

Lars Nordgren is Professor in Health Management at Halmstad University in Sweden. He holds a PhD in Business Administration and is Associate Professor in Service Studies at Lund University. Professor Nordgren has been active in several professional organisations and assumed leadership positions in different professional bodies. He has served as Hospital Director at different hospitals in the county councils of Kronoberg and Halland in Sweden and as the Director of Development in a county council of Halland. He has also headed the department of Organising and Development at Karolinska University Hospital in Stockholm. Currently, he is a member of the Regional Council for Halland County Council and of the Operating Committee for the Hospitals in Halland. Lars has done research concerning management and organising processes in healthcare and the dynamics of healthcare when it has been customer and market oriented. Other areas of research are value creation, service productivity and matching of patients. He has also studied merging processes of hospitals. Lars has published in several international journals on diverse aspects of the Swedish healthcare system, focusing on management and service in health-care delivery systems. His writing demonstrates the application of management and organisational behaviour theories to the study of specific issues relating to health. His work has a particular emphasis on policy initiatives that can improve the health status of Swedish citizens.

Halmstad University, Kristian 1V:s väg, 301 18 Halmstad, Sweden
Tel: +46 721 892080; E-mail: lars.nordgren@hh.se

Abstract The purpose of this study was to contribute to the development of a model including parameters for matching health-care services to patients. Inspired by 'engaged scholarship', the researchers practised continuous and close collaboration with practitioners at Region Skåne in Sweden. The agenda was based on questions and experiences that evolved from theory and experience gained during previous research, while the practitioners' agenda was based on problems and solutions arising within the organisation. As a result, mutual interpretations and concept creation were created and thus also the exchange of knowledge, information and competence between researchers and practitioners. The thoughts concerning the parameters included in a matching model emerged during meetings. The supportive data was conceptualised, converted and incorporated into an array of parameters illustrating coordination and matching in healthcare.

The healthcare matching concept, meaning a specified form of coordination, was applied as the main concept in the study. One contribution regarded how the coordination of health-care services occurs in Region Skane. An additional contribution was a discussion about which parameters are essential to include in the development of a matching model. Finally, there was a consideration concerning what kind of social values the matching model created. A fruitful way of implementing a matching model in healthcare is making use of a pilot project at a smaller organisation in a Swedish region.

KEYWORDS: coordination, healthcare, matching, parameters, Sweden, value-creating service

INTRODUCTION

Lack of adequate healthcare has been a problem in Sweden.¹ A review of the position in January–September 2017 shows that only 72–91 per cent of patients receive specialist care within the healthcare guarantee period. Given the way healthcare in Sweden is currently organised, with 21 autonomous regions, the country seems to lack the provision of health care of uniformly good accessibility.^{2,3} Although in an institutional sense there is a clear accountability for the local regions of a defined population, accessibility to specialist care is an ongoing problem for Swedish healthcare.⁴

The Swedish healthcare system is based on a societal model with relatively uniform conditions for all citizens with respect to access to health care.⁵ The Health and Medical Service Act regulates the responsibilities of regions and municipalities and gives local governments more freedom in this area. The role of the central government is to establish principles and guidelines and to set the political agenda for health and medical care. It does this through laws and ordinances or by reaching agreements with the Swedish Association of Local Authorities and Regions, which represents the 21 regions and municipalities. Responsibility for providing health care is devolved to the regions and municipal governments. Every region must provide all residents with good-quality health and

medical care and work towards promoting good health for the population. The regions finance almost all health care through tax revenues. Healthcare costs for amount to approximately 11 per cent of GDP.⁶ About 720,000 persons had additional private care insurance in 2021.

Sweden's population was 10.5m in 2022, a growing proportion of whom are elderly people. Life expectancy was 84.25 years for women and 80.78 years in 2019. Approximately 44,000 doctors (400 per 100,000 inhabitants) and 128,000 nurses (1.076 per 100,000 inhabitants) were employed in healthcare in 2020. There are 77 hospitals, seven of which are highly specialised university hospitals. In 2022 the volume of beds was 21.288 (the lowest volume of beds in Europe). Per thousand inhabitants the volume was 2.07. In 2021 the number of treatment occasions in hospitals amounted to 1,385,000. The majority of these were caused by diseases. During the 2000s, approximately 90,000 people died annually, and the number peaked at 98,000 in 2020 because of the pandemic. An ongoing trend has been to reduce full-scale emergency hospitals and to increase specialisation, while another trend is to progress from inpatient to outpatient care and from hospital to home care.

Concerning important service parameters, approximately 61 per cent of all patients got an acute assessment within one hour to an emergency department in November 2022.

The median waiting time to diagnostics was 33 days in October 2022. Around 70 per cent of all patients had waited 90 days or less by November 2022 for the first visit to specialised care. Approximately 64 per cent of all patients had waited 90 days or less (90 days is the maximum length according to the care guarantee) by November 2022 for operation/procedure in specialised care. The average length of stay (excluding geriatrics and psychiatry) was 3.8 days per care occasion in 2020, which has been at approximately the same level in recent years. The average bed occupancy rate can be illustrated by the fact that the number of over-occupancies amounted to 7.8 per 100 beds in November 2022, presenting a problem.^{7,8}

Sweden ranks high in digital maturity, use of telemedicine and accessibility in healthcare according to international indexes and comparisons. The vision for e-health is to be the world's best in digitisation in healthcare by 2025.⁹

The foregoing data shows that inadequate availability of healthcare is still a problem in Sweden. There is a gap between the need for acute and specialised healthcare and accessible resources, which the system does not seem to fill. A model to improve healthcare access and availability by matching will thus be discussed.

According to Rothstein,¹⁰ the state is responsible for providing social welfare services, including health care, for all. The market is unable to play this role because of conditions that create market failure. Instead, citizens must trust that the healthcare system will deliver good health care in reasonable time. The Swedish healthcare system is universal (services should be made available to all persons), and care must be provided based on need.^{11–14} There is *a form of social contract between government and citizens that provides the foundations of the Scandinavian welfare state and orients public discourse towards the collective, rather than the individual good.*¹⁵

The problem of inadequate availability is an example of an insufficient level of service quality.^{16,17} Long waiting times for healthcare have long been the subject of criticism in various forums. The focus on waiting times must be understood against the backdrop of this being both risky and anxiety-creating for those on waiting lists, on the one hand, and of its being an indicator of inefficiency in the health service, on the other. The signs of inadequate availability are many, because of, among other things, improper coordination of existing resources and healthcare needs. Besides the frustration of facing long phone queues while waiting to make appointments, it can also be difficult to get a referral to a specialist. It can also be a question of patients having to see several different specialists before 'finding the right one'.

Other signs include patients remaining in hospital awaiting short-term accommodation or an old people's home owing to the shortage of such facilities.¹⁸ A further indication of inadequate availability in public healthcare is that numbers of private healthcare insurances have risen sharply.

Attempts have been made to redress the inadequate level of availability in Swedish healthcare. For instance, the care guarantee reform and 'the que billion', as it was known, which was abolished in its former state in 2014 and replaced by the 'the professional billion',¹⁹ in 2016, entailed a reduction in queuing times for, primarily, specialist care.^{20,21} An investigation into how patients perceive their possibilities of gaining access to healthcare, however, shows that the level of availability is poorer in Sweden than in its Nordic neighbours.²² The latter are better at separating out and prioritising urgent cases of illness in their own equivalents of the Swedish Care Guarantee.²³ Sweden had the lowest ranking in the Nordic area owing to the long *waiting times* in healthcare,²⁴ and even in 2018 'the notoriously poor Swedish accessibility situation seem[ed] very difficult to rectify'.²⁵

The effects of inadequate availability take the form of poor *coordination*, forcing patients to meet many different physicians, who, in some cases, lack a comprehensive picture of the patient and their case history. Under such circumstances, patients also experience insufficient *continuity* in their numerous encounters with physicians. Sometimes, this also means that there are encounters with doctors who lack specialist *competence*. This leads to unnecessary encounters and a protracted length of time before the right treatment is administered, presenting a healthcare security risk.²⁶ The availability of health care is about more than just having the opportunity to make an appointment with a doctor. The four preceding keywords in italics, namely waiting times, coordination, continuity, and competence, are all important components that allow healthcare to be perceived as available. It is a matter of being able, within a reasonable period, to establish contact with the right medical expert with the appropriate competence, and not having to repeat one's medical history to lots of different people. It is also important to eliminate unnecessary waiting times between the various parties involved, for example, between physicians, X-rays, lab tests and the patient. In this context, coordination becomes an important concept and tool for handling waiting times, continuity and competence, achieving, in turn, a higher level of access to health care. This also means that improved coordination will lead to greater service quality.

Coordination can be seen as a way of organising health service processes and represents the potential for improving accessibility through, for example, coordination of information and health records.²⁷ Matching is seen in this paper as a more specific form of coordination (see the section 'Conceptual Framework'). Historically, the evolution of Sweden's healthcare has not focused on coordination of the patient's care pathway.²⁸ Instead, it has primarily been about advances in medical

technology and competence development. Consequently, Sweden ranks high in medical competence but not in service.²⁹

In sum, Swedish healthcare shows shortcomings in availability of care. Moreover, there is a lack of smooth coordination in the provision of specialist care. As will be discussed in the section Conceptual Framework, there is also a lack of research on the matching of health care as a service.

CONCEPTUAL FRAMEWORK

The interaction concepts

Swedish healthcare is to some extent built up around care chains, as they are known.³⁰ These can be described as different pathways along which the concepts of collaboration, coordination and matching are used to describe the different stages of integration along these ways. The terms *coordination* and *matching* will form the basis for discussing parameters in a matching model.

Collaboration and coordination

Collaboration and coordination are concepts involving some form of interaction and are common in the healthcare discourse. Linguistically, collaboration is synonymous with cooperation, while coordination involves arranging information systematically. Gulati³¹ describes collaboration as working together in the interests of the customer, and by coordination, he means focusing on the customer by means of organising information between organisational units. Gulati *et al.*³² establish that collaboration and coordination are unspecified terms that are dissimilar but also complementary facets of working together. Both words are common in the sense of acting together towards a defined goal. According to the foregoing reasoning, the terms *collaboration* and *working together* have a performative aspect of the significance of working together. Coordination has a more limited significance,

where focus is lying on arranging activities or work efforts in the best way, with the term coordination being more formal and instrumental.³³

Some researchers describe the different forms of collaboration, working together and coordination as a continuum, an unbroken sequence of increased integration. Integration can be used as an umbrella term in the sense of bringing together different actors and activities.^{34–37} Åhlgren and Axelsson³⁸ discuss a continuum containing five different stages of integration. The starting point is a zero-point called complete segregation. This point is followed by a stage called linking or interconnection, where working together occurs between existing organisational units that determine what is to be done, by whom and when. The third stage is called coordination in networks but still between existing units with the aim of sharing clinical information and coordinating various care services. The fourth stage is collaboration in the sense of including managers in networks to improve contact between those with responsibility. The last (highest) stage is called complete integration. During this stage, the assembled resources create new organisations that will improve services and meet patients' needs.³⁹ Nolte and McKee⁴⁰ discuss this in similar terms when explaining that the term *integration* means different methods that are intended to increase collaboration, coordination and networking between different parts of healthcare.

Matching

The concept of matching originates from economic theory where the discourse of matching markets takes place to match supply and demand. The design and application of the concept was developed by Alvin Roth.^{41,42} Roth developed applications to match students to public schools, residents to medical programmes and workers to employment in firms. In the medical field,

the matching concept has been used in kidney exchange programmes, matching donors to recipients and jobs to doctors.^{43–45} Based on Roth's research, Steiner⁴⁶ discusses matching of donors to recipients by means other than the price mechanism alone. Steiner⁴⁷ claims that 'markets match supply and demand not simply by the price mechanism alone, but thanks to other forms of commerce, such as personal relationship and a wide variety of market devices'. It is the matching itself that counts. According to Roth,⁴⁸ a market involves matching whenever price is not the only determinant of who gets what. Obviously, matching could be used in health care.

The term *health care matching* was developed as a value-creating service by Nordgren^{49,50} and was further developed by Nordgren *et al.*⁵¹ By health care matching Nordgren means a more specified form of coordination whereby resources and needs are taken into account in order to establish a state of equilibrium between these. The aim is to find the match between the patient and health care regarding, for example, time and competence, but also to avoid mismatches. One example of the latter is when appointments are sent out to patients who cannot attend at the appointed time and must then rebook.⁵² Only a few papers deal with the matching of health care as a service. One example concerns gynaecology clinics, which coordinate doctors who are specialists in certain medical problems and then match these doctors with the patients concerned. In this way, matching and increased specialisation represent two sides of the same coin: Patients are matched to specially trained doctors, and the latter become even more specialised by treating more patients who have a specific diagnosis.⁵³ A further example is the use of a digital appointments system that requires the day-to-day matching of health centre services with patients' appointment needs.⁵⁴ Duggal *et al.*⁵⁵ discuss the need for technical solutions

that will facilitate the matching of different medical records archived with different caregivers. This need exists for the correct patient information to be matched to those requiring the information, and it must be timely.

The matching of duties and staffing has been discussed as a tool for improving effectiveness, increasing the comfort and well-being of the staff, and optimising the care given to the patient.⁵⁶ An assessment has been made of whether Västerbotten County Council has a system that ensures or facilitates the correct dimensioning and matching of beds. The findings from this investigation showed that such a system was lacking.⁵⁷ Another example of matching is digital platforms that coordinate patients' encounters with doctors via computers, whereby asynchronous meetings occur and images can be transferred.^{58–60} The advice service *Health Helpline*, which provides medical advice over the phone, is also a form of matching.⁶¹

Social value

Social value partially overlaps public value, that is, it is something that should benefit the public good. Public value refers to how managers in public enterprises ensure that the organisation contributes to the public good in society. With public values, the focus is on the level of society and policy and refers to values where there is a normative consensus on '(a) the rights,

benefits and privileges to which citizens should (and should not) be entitled; (b) the obligations of citizens towards society, the state and each other; and (c) the principles on which governments and policies should be based'.⁶²

The Swedish care guarantee can be seen as an example of both a public value and an individual value. There is a form of social contract between the government and the patients based on trust,⁶³ that is, citizens anticipate getting health care in time. This will, in turn, create social value.

Arrangement of the paper

In sum, it can be said that we have, in the work that follows, defined collaboration as working together; the definition will then be that the term, just like the word matching, expresses an act involving two-way communication, for example, 'collaboration between units', matching between doctor and patient. Coordination expresses an act followed by a direct object, and the consequence here is that there is one-way communication, for example, 'coordinating a patient'. The terms *coordination* and *matching*, as discussed here, will form the basis when discussing parameters in a matching model.

The outline of the paper is illustrated in Table 1. The terms used will by degrees be raised and used in the text, and then given a significance. Aided by this table, the reader will have an overview of the paper.

Table 1: Arrangement (C. Wingner Leifland).

Discourse	Theory	Coordination	Matching
Keywords	Interaction concepts	Factors	Parameters
Accessibility	Collaboration	Waiting time	Co-morbidity
Waiting time	Coordination	Competence	Geographic availability
Continuity	Matching	Continuity	Premises/equipment
Competence	Social value	Referrals	Temporal availability
			Continuity
Society	Research	System	Individual

AIM AND RESEARCH QUESTIONS

As noted in the Introduction, the current organisation of healthcare in Sweden is unable to create health care of equally good accessibility throughout the country. Against this background, the aim is to contribute knowledge to the development of a model including parameters for matching health-care services. This model is intended to provide opportunities for increased availability and more effective utilisation of healthcare capacity. The following questions are brought to the fore:

- R1. How is the coordination regarding availability of health-care services being performed at Region Skane?⁶⁴
- R2. What parameters would be of value to include in a model that matches the capacities and needs regarding health-care services?
- R3. What kind of social value is constructed by matching?

METHOD AND DISPOSITION

To address processes of coordination and essential matching parameters, we used an overall action research approach. Action research works interactively in the sense that both practitioners and researchers contribute towards development and change by means of using their different competencies and experiences, and by applying these to the work of shaping, for instance, a working model.^{65–67}

Inspired by Van de Ven and Johnson⁶⁸ and Van de Ven,⁶⁹ the researchers practised continuous and close collaboration with practitioners at Region Skane. The Region of Skane is among the 21 regions, all of them functioning as separate organisational units, in the Swedish healthcare system. The researchers' agenda was based on questions and experiences that evolved from theory and gained experience during previous research, while the practitioners' agenda was based on problems arising

within the organisation. As a result, mutual interpretations and concept creation occurred during the research process and thus also the exchange of knowledge, information and competence between researchers and practitioners.⁷⁰

In accordance with this methodology, the thoughts concerning the parameters that can be included in a matching model, and that are accounted for in this paper, emerged during meetings with representatives of Region Skane. Finally, the supportive data was conceptualised, converted and incorporated into an array of parameters illustrating how coordination and matching are carried out.⁷¹

The analysis presented further on draws on five types of material: studies of policy documents, scientific papers, reports, meetings with administrative staff at Region Skane and coordination meeting with availability coordinators at Region Skane. As researchers, the authors of this paper have actively taken part in meetings, discussions, supplied knowledge, and created theoretical frames of preference around what has been discussed. One of the authors uses the knowledge he gained as a hospital director (manager) at different hospitals in Sweden between 1983 and 1999. During this period, he systematically made notes regarding events and important communications from the field.⁷²

Initially, studies of scientific papers and reports from National and European Health organisations were performed, searched with keywords such as accessibility, collaboration, coordination, matching and waiting time, all of them in the healthcare sector.

Furthermore, policy documents regarding coordination of patients at Region Skane, together with their annual and monthly reports, were studied. The reports included statistical data covering current waiting time/diagnosis and the number of patients waiting for care.

This was followed by one meeting, at the headquarters of Region Skane, with

seven female availability coordinators from various hospitals included at Region Skane. All the coordinators had a background from healthcare, mainly as former nurses.

Alongside the foregoing data gathering of empirics, seven meetings at the headquarters of Region Skane were conducted during 10th December, 2014 to 14th June, 2016. These meetings included a health strategist and an availability and coordination manager, both female, with a background as nurses. The authors of this paper were both present at the meetings, each lasting for about three hours.

All meetings were recorded, transcribed and systematised according to themes such as coordination, matching, availability, potential parameters and miscellaneous, in order to facilitate both future meetings and the writing of this paper. Quotes in the analysis are taken from the transcribed recordings. After each meeting a summary has also been written and analysed to provide a basis for discussion at the next meeting. The aforementioned themes crystallised and were selected as essential following the first meeting. In this way, material from a previous meeting has been able to be used in the next meeting to push both the discussion and the research forward.

In this paper, both the representatives of Region Skane will, henceforth, be anonymised by designating them as strategy and coordination managers or representatives of Region Skane as this will make things easier for the reader.

The paper is organised as follows. First, the conceptual framework is discussed. Then the methodology adopted is described. In the following section, a discussion, including analysis and result, is presented about the case study, showing how Region Skane is coordinating healthcare. The parameters that should be used in a model are included in this discussion. Resources and needs are made visible and related to each other in the model in a way that benefits availability. Based on the discussion, the parameters are

then included and further discussed in a tentative matching model. The conclusion summarises the discussion and proposals for new research.

RESULT AND ANALYSIS: INCREASED AVAILABILITY THROUGH MATCHING

The following is a description and a discussion, that is, an analysis of the results, where the researchers have used an action research approach developed in the section 'Method and disposition of the article', when gathering and analysing information in texts and statements. The intention was to get a description and an analysis of how Region Skane is coordinating the availability of health care and to discuss essential parameters that are of importance in a matching model. The intention was to create knowledge about the parameters that are intended to be useful in such a model. Each statement is followed by an analysis of how to interpret the statement using the concepts in the theoretical framework. The section shows how a Swedish region works with coordination of care administered to patients in order to meet the Swedish Care Guarantee.

Coordination in Region Skane

The Swedish Care Guarantee,⁷³ which is one of the most important checks and balances in care delivery, is instrumental in nature and involves straightforwardly measurable aspects of time and process quality in the form of how time objectives are being met. Against the backdrop of the Care Guarantee's nature, it has become clear that today there is a lack of infrastructure enabling the caregiver and caretaker to find each other in the best possible way. Comprehensively, this infrastructure must answer the who, the where, the when and the how of care. In many cases, the Care Guarantee does not comprise an entire chain of care and never comprises more complex quality aspects,

which also include, for example, parameters like patient journey times, continuity during care encounters, the right competence in the profession, relatives' involvement, time of day for receiving care, etc. The reading of the Care Guarantee calls to mind the rhetoric of political performatives, the promise being that the patient should feel certain of obtaining either treatment or a visit within a specific period.⁷⁴ If time targets are not met by hospital(s), the patient will be assisted in obtaining care from another caregiver, either inside or outside their county council within the guaranteed time. It has not been possible to make any legal or financial claims between the care provider and the patient based on the guarantee. Instead, this type of guarantee has been regulated via an agreement between the care provider, or its representatives, the Swedish Association of Local Authorities and Regions and the state.⁷⁵

In the rest of the paper, we designate the aforementioned parameters, which can be matched in a care matching model with the aim of improving the availability of care.

Representatives of Region Skane say that since 2005, a system has been in place for coordinating care, patients, capacity and referrals to thus improve availability, reduce waiting times and use existing resources in the best possible way. If the unit receiving the referral issued by primary care lacks the capacity to take care of the patient within the Care Guarantee (see earlier), then the case will be reported for coordination within the 'capacity group', as it is known.

On attending a coordination meeting, the authors of this paper were able to see how coordination is prepared within a network of special availability coordinators from the various hospitals of Region Skane when they meet and review the status. They will then distribute the patients between the various healthcare providers based on where there is free capacity. At the meeting, the researchers observed how there was supportive data, partly in the form of a patient queue and partly in the form of an

Excel sheet showing the capacities of the various hospitals/clinics to receive patients queuing for various treatments. There was a dialogue between the various coordinators as regards how this distribution would be done. Allotments from the queuing list were done manually. Thus, in this way, these patients' individual wishes, if any, were not considered. The described way of coordinating by means of allocating patients to hospitals with free capacity has, as previously mentioned, with minor changes, been going on since 2005. There was, however, a different intention initially. One of the strategy and coordination managers comments: '[O]ur aim initially was, of course, to make ourselves obsolete, that things would be so good that you'd be taken care of within the timeframe of the Care Guarantee.'

Things did not turn out as in the preceding quote. Instead, the number of coordinations rose sharply during recent years owing to a poorer level of availability.⁷⁶ The consequence of this has been that many patients have been coordinated to other healthcare providers, for example, private healthcare providers both in the south and also other parts of Sweden.⁷⁷ Thus, extra visits are required. This fact becomes clearer when Region Skane's representative explains that if 'the patient has attended an appointment within the timeframe of the Care Guarantee, and been given a waiting time for an operation, and if he/she invokes the Care Guarantee, then he/she will, of course, attend another caregiver who will want to meet that patient one more time. And then, of course, there will be an unnecessary appointment'. As the quote indicates, this unnecessary appointment will be at the expense of an appointment becoming available for another patient. Additionally, it means that the lead times inside the chain of care will be unnecessarily long. Altogether, this will generate negative social value for the individual and for society.⁷⁸

The path to improved availability

The basis for achieving improved availability is to create an understanding of how need and capacity look like and which aspects (generating parameters) are of importance for matching care. One suggestion as regards sorting out the availability problems, according to a Swedish government report,⁷⁹ is the making of production and capacity plans. It is important in this context to create a clear picture of what is to be done, how it is to be done and by whom. The government report discusses important elements such as requirement analysis, where the services provided are charted to see which activities are being carried out and which patients are being treated, and resource analysis, which defines the professions, equipment and premises needed. This is in line with the model we discuss in the research question and the parameters that should be included in such a model.

A clear picture of what must be done begins with the referral and its management. Since the referral (whether it is a self-referral or written by a doctor) is regarded as a ticket into specialised care, this document must, according to strategy and coordination managers, include 'sufficient information to enable a proper assessment to be made'. Many referrals do not contain enough information to enable them to serve as the supportive data for an assessment; instead, they must be supplemented with further information. This leads to delays in referral management and patients contacting the health service to discuss the matter. This, however, is about not just the information in the document, but also the fact that there are too few referral assessors looking at the referrals. This is made clear when Region Skane's strategy and coordination managers say, '[W]e saw that it was very messy, depending on who was checking, because everyone had a different opinion. We had one or two who were the most experienced'.

In the specific situation referred to in the preceding quote, it transpired that the department of Region Skane decided to use two of the most experienced doctors to conduct the medical assessment. Strategy and coordination managers explain that referral management also takes a long time and often entails an anxious wait for the patient, although, as far back as 2005, it was decided that healthcare would nationally consider referral management to be a crucial factor of success in achieving good availability.

In regard to the range of health-care services, it is relatively simple to present the general range, for example, the fact that the basic range in urology is to be found at the surgical clinic in a specific city. According to Region Skane's representative, things become more complicated as regards, for instance, the range of varicose vein treatments that can be operated on using different methods, where these various methods are not carried out in the same place. In some cases, things become even more difficult, but this does not necessarily mean that this is a complicated procedure or that the patient's state of health is complicated. What is meant instead is situations where there is a combination of different health problems, known as *co-morbidity*, requiring more careful coordination as the treatment is not available in the general basic range. Strategy and coordination managers provide an example of this in the form of a visually impaired patient with a blood disease who needs a new hip. There is obviously a need for the improved coordination of patients with several different, perhaps also chronic, illnesses.⁸⁰ Here, matching is a step towards guiding patients in the direction of the right specialists within the healthcare system so that they gain access to good care.

Experience shows that *geographic location* is important and that it is deemed easier and more comfortable to undergo examinations and obtain treatment in the location where one resides. It is difficult

to get patients to take time off so they can travel longer distances to have an X-ray that takes ten minutes. One of the strategy and coordination managers, however, feels that if the degree of urgency felt by the patient is sufficiently high, then this will nevertheless tend to tip the balance and he or she will be willing to undertake a journey in order to make use of the particular health-care service. A further example mentioned is colonoscopy examinations of patients living at one place and getting care at another place, which was not working. These patients felt that the journey was too long, bearing in mind the preparations in the form of, for instance, not being able to eat and the requirement for purging prior to being examined. On the other hand, patients often thought that a shorter distance was acceptable. Thus, the importance emerges here of having the possibility of being matched in accordance with one's wishes regarding geographic location. This also creates increased social value for the patient.

Another important aspect is the *dispatching of appointment times*, which is done manually today by the health service. Representatives of Region Skane comment that many of these times must be rebooked when patients get in touch to say that they cannot attend at the appointed time. With direct matching to the patient's needs, this would largely be avoidable.

The strategy and coordination manager at Region Skane comments: '[I]f I take an aorta patient, there'd be 5 doctors able to do that type of operation, but only one special doctor could manage this patient in particular. ... it's not just the operation itself, it's also the level of nursing competence, the IC unit, monitoring, and peripheral resources.' The quote indicates the importance and relevance of the *professional competence*.

This comment is about the fact that, from the point of view of healthcare, it is important to find the right level of

competence. This is also an important parameter for the patient, to feel a sense of security and trust. From the patient's perspective, however, information about the quality of the various treatment alternatives is difficult to access, and this makes it difficult for the care seeker to find the right level of competence.⁸¹

The government report⁸² concerning more effective resource utilisation in healthcare indicates the importance of the health service being organised from the patient's perspective, entailing, among other things, involvement and continuity. Moreover, it is also established that many patients claim to be dissatisfied with doctors for not having sufficient knowledge of their case histories. As a patient, obtaining *continuity* of care by meeting the same doctor for repeated consultations creates a sense of security and is, for many, an important aspect. One alternative is for the information to accompany the patient digitally and thus be accessible to the treating doctor.

The importance of continuity is as exemplified by a county council employee who relates his own experience as a patient of being forced to repeat his case history about ten times during health service encounters relating to the same bout of illness.⁸³ In the preceding Swedish government report, there is also some discussion, as previously mentioned, about *equipment* and *premises* as substantial parameters during the planning of capacity.⁸⁴ According to strategy and coordination managers at Region Skane, an important factor in patient choice concerns the consultation or treatment *time point*. Some patients may prefer not to use working time for medical appointments, preferring other times. This would also mean, then, that premises and equipment could be used more effectively.^{85,86} In healthcare, there are, for instance, costly MRI scanners that are only used for a limited number of hours every day but that could instead be used, both

from an economic perspective and from a patient-availability perspective, 24 hours a day.

In summary, we have identified and discussed parameters such as double appointments, geographical location, dispatching of appointment times, professional competence, continuity of doctors, insufficient information in referrals, co-morbidity, equipment and premises, time points consultations or treatment. These are all aspects that may generate negative social value when not taken care of properly, for individuals as well as society and health care in the context of, for example, lost income, sick leave costs and unnecessary lead times.⁸⁷

WORKS TOWARDS DESIGNING A TENTATIVE MATCHING MODEL

The development of a matching model can be illustrated by a continuum along which the terms become narrower and narrower, beginning with collaboration and working towards common goals. The next stage is the coordination of patients, which requires information about care capacities and needs. This coordination is done manually in Region Skane at the coordination meetings described earlier in the text. When discussing the terms included along a continuum (see previously) Region Skane's representatives

feel that 'collaboration is a form of working together which is required in order to be harmonized'. Additionally, you also have to 'in order to coordinate patients, which is a process, be harmonized and consequently also have collaborated and worked together'. Thus, the patient is not a participant in the process of coordination. Coordination can instead be regarded as a single-party process. The last stage, health-care matching, is a form of specified coordination whereby capacity and need are specified using parameters such as diagnosis, time, place, competence and co-morbidity. In contrast to coordination, matching is an action that involves dual-party communication, which emphasises the patient's participation.

A diagram of what an easy-to-follow matching model could look like is shown in Figure 1. This model is discussed by Nordgren *et al.*⁸⁸ and is further developed later.

The point of departure is matching the patient's healthcare needs with the care capacity of the health-care service. The referrer (the caregiver) classifies the patient's healthcare needs in the referral. This is done today by using specific care codes or by describing the health-care need in text.⁸⁹ A standardised description of care requirements can be classified using the code ICF (International Classification of

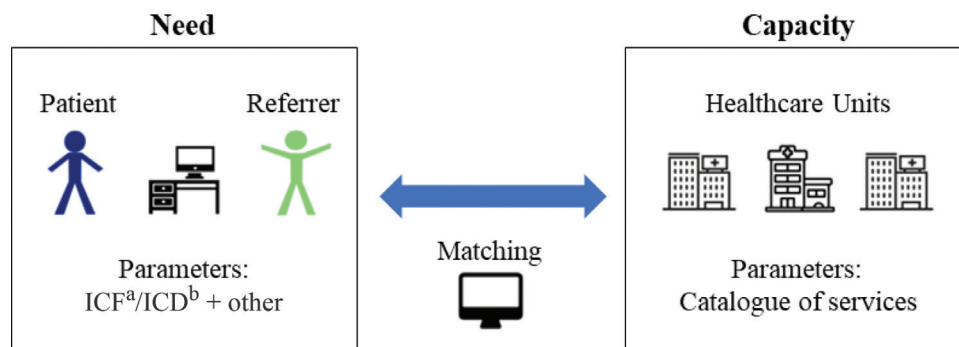


Figure 1 The matching process

^aInternational classification of functional status, disability and health (www.socialstyrelsen.se).

^bInternational statistical classification of illnesses and related health problems (www.socialstyrelsen.se).

Source: Freely adapted from Nordgren, L., Planander, A., Wingner Leifland, C., (2020), 'Value co-creation of healthcare services — developing a healthcare matching model', *International Journal of Business and Social Science*, Vol. 11, No. 8, pp. 35–46.

Functional, Disability and Health) and/or ICD (International Statistical Classification of Diseases and Related Health Problems), for example, impaired vision degree (xx) in left eye (ICF codable) due to cataracts (ICD codable). The healthcare need then constitutes parameters in and of itself. Over and above that, other parameters that can be of value to the patient need to be considered, for example, wishes regarding appointment times for treatment, travel routes and disabilities. These parameters are visible in the figure as 'other' and are elaborated on further on.

Healthcare capacity consists of a description of the healthcare institutions and the services they can offer. This could be done in a catalogue of services containing classifications of healthcare measures, written in the form of the National Board of Health and Welfare's codes for classifying healthcare measures, for example, cataract operation, code ZZ. Exactly which services are to be provided by the respective healthcare unit must be online so that there is certainty regarding which range is available. It would be appropriate to attach to the catalogue an open appointment book for doctors to enable booking suitable times.⁹⁰ Additionally, the catalogue contains other parameters of interest in regard to making care available, for example, premises, waiting times and opening hours. The catalogue of services is digital and is updated in real time to safeguard the available capacity.

The actors in the model include the care seeker, the referrer, various care institutions and an independent matching unit in the form of a digital platform.⁹¹ Matching between health-care needs and capacities will thus take place on the parameter level, which is of significance for continuity, competence and reduced waiting times.

The discussion earlier on, which focused on co-morbidity, geographic and temporal availability, competence, continuity, equipment and premises, are all examples of parameters that should be included in a model. When aiming to outline a matching

model, which could uniformly describe the capacity of the health-care services and the need for these, it is essential to determine the parameters that will be used to coordinate and match patients as well as possible. Each of the parameters can be divided into three main categories, for the capacity of services and the need for services. For the capacity of services, these categories are resources (R), availability (A) and state of health (SH). For the needs, the categories are social data (SD), availability (A) and state of health (SH). When it comes to which services are being offered by healthcare in the catalogue of services, the term *resources* means the premises and equipment available, for example, operating theatres, beds, X-ray and radiation equipment. These categories express both health and social values.

Resources also include the various specialties (orthopaedics, gynaecology, etc) and also the competence and specialisations of the doctors. Examples of these can include specialists in infectious diseases with tropical diseases as a specialisation or skin specialists with children's allergies as a specialisation. Availability means the waiting time and opening hours status of the health service and the physical and geographical availability.

Finally, a parameter is needed for SH whereby healthcare shows what is on offer in the form of competence regarding patients with co-morbidity, that is, two or more simultaneous diagnoses. In regard to what needs the patient has, social parameters in the form of data about age, gender, weight, special language and speech needs and disabilities are important to coordinate. Parameters concerning SH are, of course, essential. Besides the primary reason for the appointment, these can also be information about ongoing treatment, repeat appointments or initial appointments, co-morbidity and information about combined lists of medicines. Further parameters concern temporal availability: when the patient is available for, and wants to have, the appointment.

During the study, a set of essential parameters to be used in a healthcare matching model crystallised. The following are two tables containing these parameters. Examples of essential parameters in each main category are as follows (Figure 2):

The matching model, with its parameters, creates the possibility of increasing accessibility to care and providing patients with care within a reasonable time and with the right level of competence. In order to link back to the discussion earlier on in this paper concerning different terms of interaction, it is thus important to call attention to the fact that all of these terms are of significance to, and work together within, a healthcare matching model that contains the preceding parameters. The fact that this is important is also noted by one of

the strategy and coordination managers at Region Skane:

‘[I]t’s rather obvious that if you get a patient in, then you know what has to be done with that patient[.] It’s part of this planning function and matching is really about ... that you look at an operation, that a referral arrives, and that you read what it says, and you can then gather what needs to be done with the patient and that you’re planning it then right from the start.’

The preceding quote illustrates the importance and need for adequate planning, that is, using matching as a developed planning tool with standard parameters. This will create value based on the patients’ need.⁹²

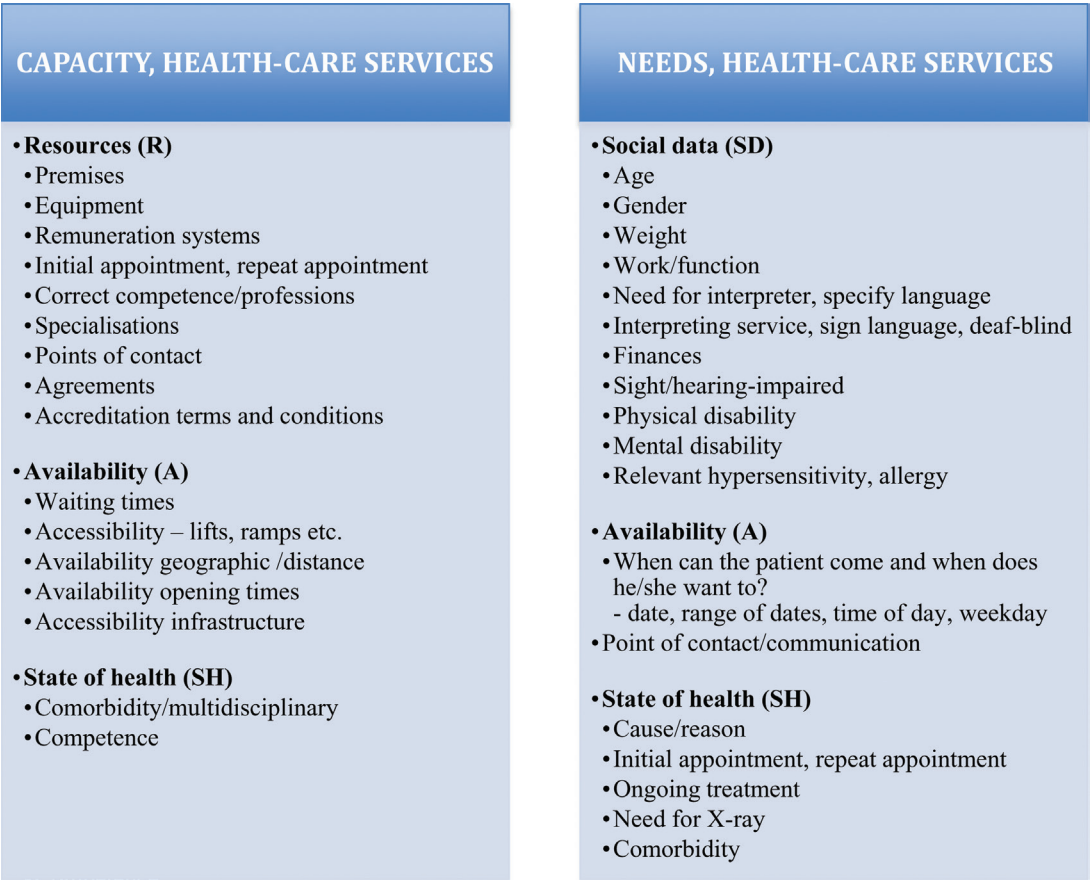


Figure 2 Parameters used in matching model

In the Introduction there is some discussion about improved coordination in healthcare also entailing an increased level of service quality. Factors such as competencies, times and information are important to coordinate. In summary, this section has discussed, based on the factors identified, several parameters that are to be included in a matching model. These parameters also express social values for the patient and for society. (See the last paragraph in the section *'The path to improved availability'*.)

CONCLUSION

Contribution

A variety of research has been done regarding coordination of healthcare. This paper has gone a step further by applying the matching concept for healthcare and discussing parameters in a matching model. Moreover, collaboration and coordination are used as concepts involving some form of interaction and are common in the healthcare discourse. As shown in 'Conceptual framework' only a few papers have dealt with the matching of healthcare as a service, creating social value to providers and patients in healthcare.

First (R.1), the paper provides a contribution regarding how the coordination of health-care services occurs at Region Skane. Coordination in healthcare can be studied based on various points of departure. An example of this is that the objective of coordination could be the patient receiving better care from a medical perspective, healthcare being the same for everyone, or the patient feeling satisfied with the care on offer.⁹³ In this paper, we have focused on coordination for achieving availability and shorter waiting times in health care. Here, it is important to begin with the patient's needs and the abilities of the healthcare organisation. One challenge lies in having joint systems that enable the sharing of information gathered from various actors. Another challenge is patient

information. One prerequisite of joint systems, however, is the fact that healthcare must have the possibility to receive and handle all the patient information such as preferred geographical location, co-morbidity and preferred time points that, in practice, is already available and could thus also be organised in a health-care matching model.

A further (R.2) contribution made is a discussion about which parameters are essential to include in the development of a matching model where the individual's need for health care is matched with the capacity existing in the same. In contrast to coordination of healthcare, which is about one-way action in giving care, matching accentuates the interaction, that is, co-creation, between patients, referrers and providers.⁹⁴ The paper shows the importance of evaluating a matching model that includes the discussed parameters. By using such a matching model in healthcare, it would be easier to achieve the accessibility goals stated in the Swedish Health and Medical Service Act for guaranteeing care. By taking the parameters into consideration, the caregiver and the caretaker are enabled to find each other in the best possible way, and then the process of matching care to the patient could be done more precisely. An example of how matching can be used in practice concerns the cancellation and rebooking of appointments. A patient who is unable to attend an appointment may wish to postpone the visit by a week, while another patient with a later appointment would really like an earlier one. Switching these two patients' times is currently impossible as the staff dealing with appointments lack the resources to find someone who wants to switch. Instead, appointments are managed mainly by sending them out by post, times that often enough must be changed manually later via phone calls and waiting in long phone queues. Matching avoids this unnecessary administration, and social value for patients could be created.

The paper shows the need for a structured catalogue of care services and needs that will serve as the supportive data for a matching model. The parameters in the tentative model can be divided into three main categories each, for the capacity of services and the need for services. For the capacity of services, these categories are resources (R), availability (A) and state of health (SH). For the needs, the categories are social data (SD), availability (A) and state of health (SH). When it comes to which services are being offered by healthcare in the catalogue of services, the term *resources* means the premises and equipment available, for example, operating theatres, beds, X-ray and radiation equipment. These categories express both health values and social values.

Thirdly (R3), the potential values of using the discussed parameters in a matching model can entail shorter waiting times for patients for appointments and treatments, shorter lead times within the chain of care, shorter periods on sick leave, increased collaboration and more effective use of cancellation times. Moreover, improved referral management could be done. All these contribute to improve social value for the patients as individuals and for the healthcare system as well as for the whole society.

As described in the Introduction, seen from a societal perspective, the citizens of Sweden must trust that the healthcare system will give them good healthcare in reasonable time. The market is unable to play this role because of conditions that create market failure. Instead, the Swedish healthcare system is based on a societal model with relatively uniform conditions for all citizens in regard to access to social services as health care. Responsibility for providing health care is devolved to the county councils and, in some cases, municipal governments. Every county council must provide residents with good-quality health and medical care and work to promote good health for the entire population.⁹⁵ In light of this responsibility the researchers argue that it seems reasonable

that a matching model contributes to improving social value to the citizens.

Implications for future research

A fruitful way of implementing a new model in healthcare, which should be of relevance to the matching model, is making use of a pilot project, or simulation, at a smaller organisation in a Swedish region. With the aim of testing the parameters of the matching model, it would be of interest to conduct a research study in one or two clinics, selected based on showing good results in the form of short waiting times. At these clinics, studies would be conducted concerning how coordination and matching are organised and implemented. During such a study, the matching model can be compared parameter by parameter with the measures that the clinic has taken so as to be able to validate the significance of the model.

Limitations

The result of this study comes from research within one regional setting. The result might still be applicable in other regions since the organisation of Swedish healthcare does not differ between regions in a way that will impede the operation of a matching model.

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