

# Digitalization of Health and Social Care Collaboration: Identification of Problems and Solutions

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## Abstract

Health- and social care are complex domains, requiring the collaboration of several professions and several care provider organizations within and between the domains. In this paper, we describe the collaboration between care providers in the Stockholm County and the municipality of Stockholm, highlighting how the information is exchanged, which IT system that supports the exchange, and legal prerequisites for the collaboration. We identify several problems in current practices, including the lack of system integration, and the underutilization of existing digital solutions. We also suggest several solutions aimed at improving the technical infrastructure for digital collaboration. These include the integration of IT systems, simplification of access to essential information, and the adoption of modern APIs to facilitate better communication among healthcare providers. We also present legal issues for the collaboration and how they can be addressed.

## Keywords

Healthcare, Integration, Collaboration

## 1. Introduction

Cooperation between care providers within and between Stockholm County and the municipality Stockholm is a major challenge for both health and social care. On one hand, healthcare, provided by hospitals and primary care, is the responsibility of Stockholm County. On the other hand, care in elderly (i.e. nursing) homes, and care carried out as part of home services are the responsibility of the Stockholm municipality. Thereby, it is paramount that the county and the municipality exchange information. Shortcomings in information transfer between the county and municipality can have consequences in the form of reduced efficiency but also lower quality in all forms of care. This applies especially to the elderly, who are often in need of different kind of care.

This paper describes the results of the project “Digitalization of healthcare” (the DISVO project) and the “Data-driven Solutions in Complex Care Processes” (the DISAL project). The projects are examining the cooperation between Stockholm County and the municipality of Stockholm, with a focus on legal prerequisites and IT systems that exist for cooperation in health and social care. While the DISVO project surveyed the current situation [1], DISAL examines solutions, including the use of AI for healthcare [2]. This paper is based on examining a scenario that describes the complexity of collaboration within and between the county and the municipality, the issues and possible solutions related to the IT systems used for collaboration, and legal hurdles and solutions.

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## 2. Cross-organizational collaboration in healthcare

The issue of supporting cross-organizational collaboration in health and social care can be viewed from several perspectives. Firstly, it may be seen as a general problem of the IT domain in the form of system integration. Secondly, it also includes regulation and processes that govern the use of integrated IT systems. While the issue of integration in health care are well known there are fewer studies on cross-organizational collaboration in health and social care [3].

As with many organizations, healthcare faces the silo issue [4] of isolated IT systems hindering collaboration. A practical example is that electronic health record (EHR) systems are typically not compatible [6], and thus cannot exchange information. On a general level, there exist solutions for integration issues when connecting IT systems. General products, such as message brokers, and implementation patterns are among these solutions. However, health and social care are complex, with specializations spread across organizations. Thus, there is a need not only for system integration but also for cross-organizational system integration [5]. Despite the need, the investment for creating technical integration may be seen as prohibitive [6].

Integration is also more than just technical integration. There are additional issues with laws, policies and processes. For example, to support successful collaboration, there is also a need for formalization of processes and routines [7]. This may also include sharing common principles, and even trust [8]. This need is acknowledged by the Refined eHealth European Interoperability Framework, which introduce the broader concept of interoperability that includes legal, policy and care processes as the three top levels in the interoperability stack, and information, application and IT infrastructure, as three the more technical levels [9].

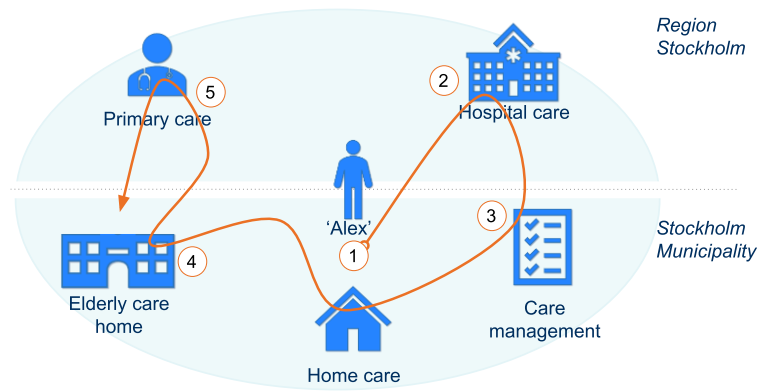
The above levels are needed to implement what is referred to as *integrated care*. In integrated care, the patient (and its relatives) sees health and social care as one service rather than a set of disparate services [10]. The lack of integrated care may not be an issue for all patients who can navigate the health and social care system. However, for some patients and areas, it is crucial. One such example is hospital discharge of elderly patients where the collaboration between the county and the municipality is paramount. This has been pointed out as a problem area [11][12], calling out for improved collaboration.

The general problem of information exchange found in the case study reported on in this paper are in line with what other projects report. However, the problems identified in this paper are more specific, and we also point out potential solutions in the form of changed system designs.

## 3. Project overview

Today, many different care providers are involved in care of the elderly. The different care providers may have different specialities, be public or private, and have counties or municipalities as principals. The background to the large number of actors involved around a person is a number of ongoing trends: an increasingly aging population where many of the elderly have multiple illnesses; a desire to provide close-to-patient care instead of costly hospital care; an increased involvement of patients and relatives in the care processes; as well as a model where a public actor decides and orders what care is to be produced, and where public and private actors compete to be suppliers of this care.

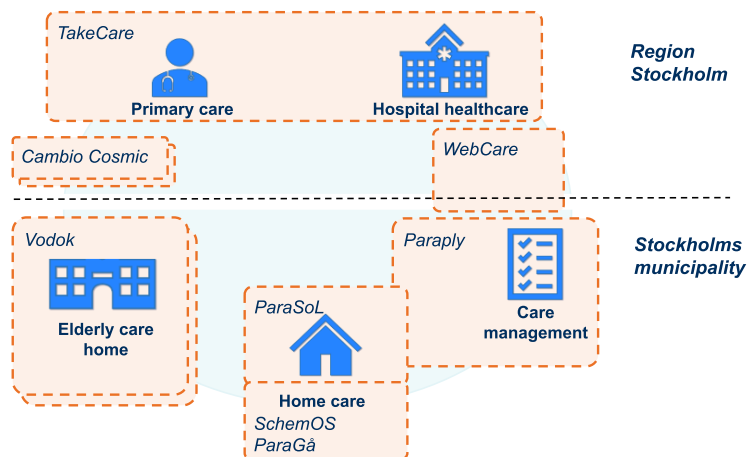
To illustrate how the actors get involved in the care of a patient, we created the archetypical case of an elderly patient, named 'Alex', (see figure 1) based on interviews with a number of care actors. The case starts with that Alex lives at home, with home care services a few times per week (1). When Alex falls and gets injured, Alex get transferred to a hospital and get investigated and treated (2). When recovering, a municipality social worker needs to get notified and create a new home care plan for Alex when returning home (3). However, as there are complications, Alex is transferred to a home for elderly care (4), and regularly needs to visit the primary care (5) for follow-ups.



**Figure 1:** Overview of the case, illustrating the type of care actors in Stockholm

To create the case example, and to identify problem areas, a total of 8 persons from the county and municipality, both care and administrative personnel, were interviewed, out of these, 3 were also involved in follow-up interviews to extend the data. Furthermore, 9 IT systems were examined. The interviews led to the identification of problem areas and also the documentation of the 'Alex' illustrative case scenario. Finally, applicable laws and regulations were analyzed.

As illustrated by the case, the involvement of many care providers requires collaboration between all actors involved, which in turn requires an effective exchange of information between them. A central problem in this context is that care providers involved do not get access to relevant and up-to-date information, especially when patients are shunted between care providers in the municipality and county. Reasons for this problem can be found in legal, organizational and technical barriers, but also in differences in culture, knowledge and working methods among care providers.



**Figure 2:** The main IT systems

As a part of the project several IT systems that were used were identified (figure 2). In Stockholm County, there are for example at least two EHR systems in use: TakeCare, and Cambio Cosmic. Stockholm municipality uses several systems, including EHR systems (such as Vodok), and systems for social care service management such as SchemOS, and Paraply. Moreover, a special system was employed for supporting direct communication between the county and the municipality (called WebCare).

#### 4. Identified problems

Five problem areas affecting the IT systems were identified during the interviews and work on the case scenario. Most problems stem from the adaptation of the systems to the care

organizations in which they are used, rather than pure technical limitations in the form of performance or reliability, for example. In this section the problems are described, and in the next section suggestions for solutions are given.

#### 4.1 No integration between the system

**The problem:** The systems involved are not integrated, so information is transferred via paper, fax and telephone.

**Consequences:** Lack of integration means that information needs to be entered in several places, for example both in the EHR systems Vodok and Cosmic . The lack of integration also leads to the use of faxes and extra phone calls. In addition to duplication of work, there is also a risk that the information in the different systems does not match.

**Example:** In the scenario, Alex's private physician in primary care can use a EHR system, for example Cosmic, while the municipality nurses at the elderly home utilize the Vodok system. Essential information needs to be entered into both systems. Similar lack of integration exists between TakeCare and Vodok, and between Vodok and ParaSoL.

#### 4.2 Mismatch between synchronous and asynchronous communication

**The problem:** It is difficult for two people to communicate in real time using an administrative system. In some cases, synchronous communication between two actors is required, that is, one actor listens and immediately gives answers to questions. This typically applies to so-called knowledge-intensive processes [13], where the work is dependent on several experts working together. Asynchronous communication, via e-mail for example, has a disadvantage here in that it can take a long time between a question and an answer. Administrative systems are often structured to support asynchronous communication, rather than direct synchronous communication.

**Consequences:** Due to the lack of support for real-time communication, telephone, e-mail, video conference or the chat function in, for example, Teams, must be used instead. This means that phone numbers or corresponding contact information need to be available, and this information may be in another system, such as the EHR system. This makes it difficult to communicate between care providers. Furthermore, contact by telephone can mean that staff need to spend time looking for the right person, and finally the communication may not be documented as it takes place outside the usual systems.

**Example:** When Alex is discharged from the regional hospital, it's necessary to inform the municipality's social worker and home care services. It is crucial for the home care services to be ready to receive Alex when he gets home. The hospital staff, therefore, need immediate confirmation from the home care services, requiring synchronous communication at the time of discharge. Perhaps the home care services need to ask questions and receive answers directly when Alex is on the way. Currently, telephone is used for this contact.

#### 4.3 Lack of information and information abundance

**The problem:** The system may lack some information but has an abundance of information that is not useful. An abundance of information can, for example, mean that a person in a certain role gets to see more information than is needed for the work task. This can be about different types of information, but also historical information that is not always relevant to the work task.

**Consequences:** Lack of information can lead to wrong decisions, or to duplication of work. An abundance of information can lead to not finding the right information.

**Example:** For the municipality's social workers, an Activities of Daily Living (ADL) assessment is crucial for evaluating Alex's need for assistance at home. Therefore, when Alex is discharged

from the hospital, it's important that the ADL status is updated. However, today, the ADL status is often missing in the WebCare system, while there may be an abundance of other information that the social worker doesn't need.

#### 4.4 Denied access

**The problem:** Care workers, patients and relatives may not access information in certain systems as the systems cannot grant access (authorization) to a subset of information in the system for a specific group.

**Consequences:** Lack of access to the systems leads to the same effects as a lack of information, i.e. incorrect decisions and/or duplication of effort in entering and receiving information into systems.

**Example:** Caregivers who are not nurses in elderly care homes are unable to access necessary information about Alex from the EHR system (Vodok), such as care instructions given by the physician, as there are no provisions for granting specific authorization to caregivers in the EHR system.

#### 4.5 Complex system

**The problem:** Using a IT system can be complex as it can require extensive handling or be difficult to learn. This problem can manifest itself in the fact that it can take time to document (reported as "many clicks" required to use the system) and get information out of certain systems, as well as particularly difficult to get statistics when needed.

**Consequences:** Complex systems make working with the systems inefficient.

**Example:** The Vodok system, used by nurses at the elderly home facility, features numerous screens, making it complex. For instance, different sections are used for clinical documentation and medication management. Consequently, it is challenging to retrieve all information related to a particular event since data for an event is spread across various screens. Another example is the lack of aggregated information in the ParaSoL system. This could make it difficult to access information on the number of eligible individuals for a specific intervention within a given timeframe.

### 5. Suggested solutions to identified problems

In this section, a number of proposals for solutions to the identified problems are given. Each solution proposal is general, that is, the solution proposal should be seen as a guideline for how the problem can be solved rather than a detailed solution that can be directly implemented. Table 1 shows an overview of the proposed solutions and how they relate to the identified problems.

**Table 1.**  
Solution and problems

<b>Solution</b>	<b>Problem</b>
<i>Take advantage of existing platforms</i>	Information shortage and information abundance
<i>Make the use of APIs the norm</i>	Non-integrated systems
<i>Redesign information exchange systems</i>	Mismatch between synchronous and asynchronous communication
<i>Grant access to systems</i>	Denied access
<i>Simplify systems</i>	Complex systems

## 5.1 Take advantage of existing platforms

Today, there are several ready-made platforms that could be used to solve the problem of lack of information. These platforms are developed in parallel with the development of systems in the county and the municipality. A possible solution is therefore to primarily benefit from the platforms that exist, rather than developing new separate functions in existing systems. While current platforms are rigid, there are opportunities to create more flexible ecosystems in the health and social care domains [15].

**Example:** The analysis of the scenario revealed that having access to the patient's activity daily living (ADL) status is important for the municipality. ADL status could be available in the national health care platform (NPÖ), but the municipality does not currently use this information. Another example is that there was a demand for a patient's medication list. A system for a national medication list has been developed and implemented by the e-Health Authority in 2021. Here too, the possibility of using this already existing system should be explored.

## 5.2 Enable the use of APIs standard

Modern systems often have some form of API (Application Programming Interface) prepared, which makes them easier to integrate with other systems. To facilitate future integration, it is therefore important to promote systems that have APIs, and to develop and use APIs in existing systems. A proposed solution is to work long-term to use APIs. This can be achieved, for example, by requiring that certain API standards should be followed when procuring systems, or by requiring that information about services to be performed can be provided via an API when procuring services. A possible part of using APIs is also to strive to use international standards for the exchange of information in healthcare. An example is the use of the FHIR standard [14]. It can be noted here that the national healthcare platform, NPÖ, currently does not use FHIR.

**Example:** A lack of standardized APIs is evident in the different EHR systems being used. For example, when the patient changes doctors, information might need to be manually copied between different systems such as Cosmic and TakeCare. The exchange of information would be significantly facilitated if these systems utilized an API, for example following the information standard HL7 FHIR.

## 5.3 Review access to system

A central point for the use of information in IT systems is that the right roles can access information. Creating a design that allows several people to access the information is not complex in itself, the complex part of the solution is that certain roles should be able to have the right to see only a subset of the information that exists. A solution must enable a section of information to be displayed to different actors. This can be solution used for relatives, but also for analysts and researchers who want to process de-identified information.

**Example:** An example where access needs to be granted is the Vodok system. Currently, nursing assistants do not have access to this EHR system because it does not have the capability to limit the information they can see.

## 5.4 Simplify systems

Several of the systems used in the scenario are complex, i.e. they contain a large amount of information types and relationships between them. For certain tasks and infrequent users, there may therefore be a need to provide templates, or functions for special tasks.

**Example:** One example of a possible simplification is the extraction of information related to a specific event in the Vodok system. Currently, this requires using a number of screens. A possible solution is to provide a ready-made system function that offers all the information about an event.

## 5.5 Design for communication

Cooperation between municipality and county sometimes requires quick decisions and direct communication between those who know about a case and the resources that are available. Today, some communication still takes place via fax and telephone. One suggestion is to create systems that support direct communication. An example of such direct communication is the chat function found in the WebCare system. For future further development, other possibilities should also be considered, such as integrated direct communication. Additional possibilities are to review the work steps that today require direct communication, as one possibility could be to completely automate these work steps with IT systems.

**Example:** When Alex is discharged from the hospital, the hospital coordinator can currently use the WebCare system to chat with the municipality's case workers. However, sometimes the telephone is used anyways for certain types of communication that require an immediate response. Similarly, there may be a need to contact the home care service provider to ensure they are prepared to receive Alex upon arrival. One possibility here is to explore whether this communication can be automated so that home care service provider is automatically scheduled at the appropriate time. However, this requires that the systems have access to information such as the home care service's schedule.

## 6. Applicable laws

Some of the cross-organizational collaboration in health and social care is related to legal issues, which is discussed in this section. Possible solutions to address these issues are also presented.

### 6.1 Laws and legal hurdles

The General Data Protection Regulation (GDPR) is intended to protect patients' personal health data and has, as a union law, precedence over national Swedish legislation. Both the county and a municipality generally have the right to process the health data of patients according to the GDPR. The GDPR, however, does not include any special provisions regarding the exchange of information between different public actors related to health and social care, which is not surprising, since it is up to the member states to organize their health and social care systems.

According to Swedish law, different actors, such as the county and the municipality are as a rule not allowed to share information due to provisions in the Public Access to Information and Secrecy Act (in Swedish: Offentlighets- och Sekretesslagen, 2009:400), which applies to public actors. Nevertheless, there are grounds for breaking the secrecy in cases of hospital discharge if the law on cooperation regarding hospital discharge (in Swedish: Lag (2017:612) om samverkan vid utskrivning från sluten hälso- och sjukvård) applies. From this we can conclude that there is legal support for an exchange of information between the county and the municipalities regarding hospital discharges, albeit within narrow margins. Nevertheless, the main barrier in this regard is related to weaknesses in the IT-system used to secure this information exchange. Due to patient security concerns, health care personnel, continue to communicate via fax and phone.

After the DISVO project was finalized, a new law has come into force, regulating a voluntary system with shared electronic health and care records system, which makes it possible for healthcare providers of the county and of the municipality to directly access the records regarding elderly and disabled persons (in Swedish: Lagen (2022:913) om sammanhållen vård- och omsorgsdokumentation). What impact the new legislation has had concerning the exchange

of information between county and municipalities specifically in regard to the discharge process is therefore not known, especially since it is voluntary. The problems identified in the DISVO-project however, seem to persist.

## 6.2 Addressing the legal hurdles and law by design.

Finding sustainable legal solutions to address the legal hurdles when it comes to an exchange of information between care providers in Sweden is a challenging endeavor. There have been numerous government investigations on the topic throughout the years. The need for digitalization of the healthcare system and to secure a safe exchange of the information between care providers is crucial to saving lives. Nevertheless, organizational structures and legal hurdles, continue to plague the hospital discharge process. Organizational changes, creating a more unified structure, is one option, but this could give rise to constitutional issues and local self-government. Another option is to create more open rules regarding the breaking of secrecy to allow for a less limited exchange of information based on patient security assessments, and instead focus on regulating the level of security and oversight of the development and deployment of IT-systems used by the health care providers.

## Conclusion

The DISVO project identified a number of problems related to IT system use in the health and social care domains in Stockholm. It can be noted that several of the identified problems in digital collaboration between healthcare providers in Stockholm are not primarily due to the number of IT systems but rather due to their design. Among the five key issues identified, three—integration complexity, access limitations, and communication barriers—are directly tied to system design. This is in contrast with a study performed on the issues with using IT system for communication in health [16] where three out of four problems reported on were related to management and coordination, rather than IT design issues.

While there exists a degree of system integration today, we underscore the need for further development. The county and municipality have already taken steps to improve the situation, such as the replacement of the WebCare system with a new system with additional functionalities.

## Acknowledgements

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