Vision for eHealth 2025
Follow-up 2019

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Summary

The Government and the Swedish Association of Local Authorities and Regions (SALAR) have agreed on a common vision for eHealth, Vision for eHealth 2025. In January 2017, an action plan was presented for the vision work applicable to the period 2017–2019. The progress towards the vision shall be monitored through an annual follow-up. The objective is to stimulate a broad discussion on how the work with eHealth needs to be developed and prioritised to achieve the goals set out in the vision.

On behalf of the Preparatory Committee in the national governance and cooperation organisation, this report was prepared by a working group with representatives from the Swedish eHealth Agency, the National Board of Health and Welfare, SALAR, and Inera. The report is based on data from authorities and other national and international organisations. The working group selected the indicators identified in the follow-up model developed in 2018. Selected indicators form a picture of the development within eHealth in Sweden, but conclusions should not be drawn based on individual indicators.

For this year’s report, interviews were also conducted with individuals with leading positions in the Regions and groups of Regions that in 2019 completed their procurement of new healthcare information systems.

The report provides examples of existing support and e-services aimed at residents and employees in healthcare and social care, as well as examples of ongoing initiatives on a national level that create conditions for eHealth development.

By international comparison, Sweden is at the forefront within several areas. Examples highlighted in 2018 include the use of e-prescriptions, that residents can read sections of their medical records via the e-service Journalen, and that healthcare and social care personnel can access medical records via the National Patient Overview (NPO).

The main link between healthcare and the country’s residents in terms of digital healthcare services is the e-services provided by Healthcare Guide
1177, which in 2019 recorded 51 million log-ins - a clear increase since 2018. The use of NPO has also increased, albeit to a lesser extent. From a Nordic perspective, a 2019 comparison between the Nordic health portals shows that Sweden, with Healthcare Guide 1177, has the highest number of annual visits per capita, and shows a strong growth from 2013. Confidence in the Healthcare Guide 1177’s e-services has increased compared to the follow-up in 2018.

A survey conducted by the Swedish eHealth Agency in 2019 shows that a majority of respondents sought information on illness and treatment on the internet during the past 12 months, and a third have used some form of digital healthcare services. In another survey, the Swedish Internet Foundation found that five out of ten use digital services provided by healthcare providers while one out of ten specifically uses healthcare apps for doctor’s appointments.

Virtual doctor’s appointments have become increasingly widespread. Previously, mainly private healthcare providers, so-called online doctors, offered this service. Now, more and more public healthcare providers offer the same.

All Regions in the country aim to provide all residents from the age of 16 access to all their personal information documented by regionally funded healthcare and dental care providers by 2020 at the latest. Today, the Regions can display, on average, half the data volume technically possible to display.

Through a survey conducted in 2019, SALAR shows that the majority of employees in healthcare and social care have a positive view on increased digitalisation. When it comes to using digital technology to help with care, consultation, and treatment, two thirds are positive.

In 2019, the National Board of Health and Welfare reports that an increasing number of municipalities offer different types of welfare technology in special housing for the elderly and in assisted living facilities for persons with disabilities. Examples include night-time supervision with camera and care planning via video link in the accommodations.

Today, patients with chronic illnesses can have access to digital products and services for prescribed self-care and home monitoring, i.e. specialist care that patients can perform themselves. SALAR’s situation report in 2019 shows that all Regions describe this type of digital services in their
digitalisation strategies and that a third have adopted action plans for implementation. Pilot projects and tests are ongoing.

The National Board of Health and Welfare’s survey in 2019, of the extent and direction of the use of artificial intelligence (AI) in healthcare and social care, shows that AI is still at an early stage of development. There is a lot of ongoing research, but a limited number of applications are in regular operation.

At the national level, several government assignments are underway to create good conditions for eHealth development, mainly with respect to standardised conceptual use and information management. Agreements between the central government and SALAR shall also contribute to the development in Regions and municipalities. National efforts to strengthen knowledge management are an important channel for creating opportunities for eHealth development.

In 2019, several major procurements of health information systems were concluded, likely having a significant impact on Swedish eHealth for a long time to come. Therefore, as part of the basis for this follow-up of Vision for eHealth 2025, a number of interviews were conducted with people in leading positions in the Regions and groups of Regions that have now procured new healthcare information systems and with an existing customer group that did not go through a tendering procedure. In these interviews, several challenges with the implementation process were described. For a long time, there will be old and new systems in parallel and the Regions choose different strategies for migrating data from discontinued systems. Other challenges include employee training needs that need to be met in connection with using new systems, and that computer literacy is a limited resource.
1. Introduction

This report provides an overall picture of developments in the field eHealth in Sweden in 2019, based on a selection of indicators. The follow-up is being carried out for the third time since the Government and the Swedish Association of Local Authorities and Regions (SALAR) agreed on a common vision for eHealth development in 2016, Vision eHealth 2025.

The vision means that in 2025, Sweden will be the best in the world in using the possibilities of digitalisation and eHealth. The vision shall lead to increased welfare, good and equal health, and strengthen the individual's independence and participation in society.

The Preparatory Committee and the Steering Committee for the national governance and cooperation organisation for the vision have decided that the national eHealth development shall be monitored through annual follow-ups. The objective is to stimulate a broad discussion on how eHealth needs to be developed and prioritised to achieve the goals set out in the vision. Annually recurring data can form the basis of analysis of the development and the effects on the target groups as well as for targeted investments in eHealth on the part of the stakeholders.

The following people participated in the working group that compiled this report:

Annemieke Ålenius, Director, Swedish eHealth Agency (Chair)
Michel Silvestri, Head of Unit, Swedish eHealth Agency
Åke Nilsson, investigator, Swedish eHealth Agency
Charlotta Holm Sjögren, eHealth strategist, National Board of Health and Welfare
Maria Rude, investigator, National Board of Health and Welfare
Björn Hultgren, IT strategist, SALAR
Andreas Leifsson, Business Intelligence and Market Analyst, Inera
The report is based on the following description of eHealth: (1)

**eHealth**

Health is physical, mental, and social well-being. eHealth is the use of digital tools and the digital exchange of information to achieve and maintain health.

The term welfare technology, which is also used in the report, is a part of the area of eHealth and is defined as:  

**Welfare technology**

Digital technology aimed at maintaining or increasing safety, activity, participation or independence of a person who has or runs an increased risk of having a disability.

### 1.1 Background

In connection with the agreement on Vision for eHealth 2025, the parties presented an action plan for the work in the vision for the years 2017–2019, and a joint national governing and collaboration organisation. The objective of the organisation is to strengthen the collaboration work so that the stakeholders, jointly and individually, within their respective areas of responsibility and commitments, contribute to achieving the vision in the best possible way. The organisation is the common arena for governance, collaboration, coordination, and follow-up of the implementation of the action plan.

In order to measure and monitor the extent to which eHealth development is progressing towards the vision and to be able to decide on efforts to strengthen the development, a working group for follow-up was established,

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1 The National Board of Health and Welfare, the Swedish eHealth Agency, the Swedish Agency for Participation, the Swedish Association of Local Authorities and Regions, Famna, and the Association of Private Care Providers jointly prepared the description of the term eHealth in 2016. It is based on the WHO’s description of Health.

2 The definition is included in the National Board of Health and Welfare’s terminology database.
which works on behalf of the Preparatory Committee. In April 2018, the group presented a proposal for a follow-up model (1). In connection hereto, an initial test measurement was also presented based on indicators described in the model. The model should be seen as a framework for annual follow-ups.

1.2 Method

1.2.1 Indicators

Work on this year’s report has been based on the above-mentioned follow-up model and includes both indicators that were monitored in previous years and a number of new indicators. The indicators included in the report are found in three follow-up areas:

- **A: Need for and use of eHealth**
  - Functions, support, and services
    - The individual
    - The meeting
    - The employee

- **B: Structures that enable eHealth**
  - Development, administration and renewal
    - Regulatory framework
    - Technology and infrastructure
    - Standards and more uniform terminology use
    - Implementation and innovation capacity

- **C: Social conditions for eHealth**
  - E-demography
  - Health
  - Academia and research
  - Trade and industry

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3 The Preparatory Committee for Vision for eHealth 2025 includes government officials, SALAR, and the principals. The Preparatory Committee identifies needs and initiates analyses, preparatory work etc. The committee is also responsible for, inter alia, coordinating agreed efforts and activities.
1.2.2 Need for and use of eHealth

This follow-up area focuses on indicators that measure the need for and use of functions, decision support, and services, from three perspectives:

**The individual** - this includes, for example, self-service services, access to information, preventive and health-enhancing services, and strengthening social support structures as well as services that in various ways assist the individual in their contacts with healthcare and social care. Examples of these types of services include various forms of scheduling appointments, personal alarms, or blood sugar monitoring apps.

**The meeting** - this includes, for example, services that support the meeting between patients, users, close relatives, and employees in healthcare and social care. These are services that prepare the meeting, support the meeting itself or contribute to a follow-up dialogue. Examples of services in this case include virtual doctor's appointments, being able to make a health declaration online before the meeting or joint decision support such as home monitoring.

**The employee** - this includes services that support the employee's everyday life, such as services that automate and streamline work that is not directly patient or user-friendly, such as automatic transfer of data to quality records, e-referrals, structured documentation or consulting experts remotely.

1.2.3 Structures that enable eHealth

This follow-up area focuses on how the central government, Regions, municipalities, and other stakeholders work to create the conditions for individuals and employees to use eHealth in everyday life, i.e. structures that meet needs and stimulate use. Four perspectives are included:

**Regulatory framework** - interpretation, application, and adaptation of regulations to promote safe and effective use of information and data from an individual and organisational perspective.

**Technology and infrastructure** - the extent to which the principals satisfy the employees’ needs for technical equipment, appropriate information systems and training to use technology and digital support.

**Standards and uniform terminology** - the extent to which standards are applied to enable information transfer between stakeholders and the degree of connection to national platforms and to ensure that information can be transferred without loss of content and context.
**Implementation and innovation capacity** - the strategic, financial and operational conditions for principals and contractors to introduce eHealth solutions as well as the ability to develop the businesses to utilise eHealth solutions.

1.2.4 **Social conditions for eHealth**

This follow-up area includes background measures that are important to follow with respect to eHealth development. Four perspectives are included:

**E-demography** - Describes general social conditions for eHealth in terms of the population's access to internet, broadband, e-identification and more.

**Health** - highlights the general health development in terms of prevention and mortality linked to healthcare and social care.

**Trade and industry** - highlights how trade and industry contribute to accelerate eHealth development through research and innovation and the extent to which their competitiveness is strengthened by a good Swedish eHealth development.

**Academia and research** - highlights the research's contribution to accelerating eHealth development and the extent to which the competitive potential of research is strengthened by a strong Swedish eHealth development.

1.2.5 **Data collection**

The report has been prepared through data collection from relevant sources and reports produced in 2019, by, *inter alia*, the National Board of Health and Welfare, the Swedish eHealth Agency, the Swedish Agency for Health and Care Analysis, Inera, the Swedish Association of Local Authorities and Regions (SALAR), PWC Sweden, Statistics Sweden (SCB), the Swedish Internet Foundation, the Regional IT Directors’ Network (SLIT report), the Bertelsmann Foundation, and the Norwegian Directorate of eHealth (NDE).

For this year’s follow-up, four group interviews were also conducted. The interviewees are persons in leading positions in the Regions and groups of Regions that concluded procurement of new health information systems in 2019 and an existing customer group that did not go through a tendering procedure. The groups interviewed represent Region Skåne, SUSSA4, Västra

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4 SUSSA is the Collaboration Group on Strategic Development of Healthcare-supporting Applications. The cooperating regions are: Västernorrland, Västerbotten, Blekinge, Örebro län, Sörmland, Halland, Norrbotten, Dalarna, and Gävleborg.
Götaland Region (VGR) and Customer Group COSMIC (KGC)\(^5\). The interviews were conducted between November 2019 and January 2020 by three participants in the follow-up group.

The interviews began with a brief description of the parts of the follow-up model and a number of themes that the interviews would focus on, for example, status of development/implementation, resource management, technology/infrastructure, computer science, compliance with standards and regulations, regional priorities, use of national services, education, and commercial realisation.

The interviewees were initially asked to speak freely for about 30 minutes about ongoing work. Then, the follow-up group participants asked supplementary questions based on the themes described above.

1.3 Delimitations

This year’s report mainly focuses on the follow-up areas Need for and use of eHealth as well as Structures that enable eHealth.

The report does not describe the function of the common governance and cooperation organisation or how the work in the various areas of operation and groups has been carried out. The report does not follow up on the effectiveness of the initiatives initiated in the 2019 coordination plan. However, there are a number of examples of ongoing work on a national level and efforts aimed at creating favourable conditions for eHealth trends.

The prerequisites for the report are that the work shall be based on existing data from authorities and other national or international organisations. It is important to note that conclusions should not be drawn based on individual indicators. The report shall be viewed based on the purpose of providing data for discussion, collaboration, and further development.

\(^5\) Customer group COSMIC (KGC): Regions Värmland, Kalmar, Uppsala, Kronoberg, Västmanland, Jönköping, Östergötland, and the private care provider Capio.
2. Successes and challenges

2.1 National successes

A strong contributing factor to successes in eHealth in Sweden is the creation and use of common solutions and components, which has resulted in extensive national exchange. Below are examples of areas where Sweden is at the forefront:

- More than 50 million logins on the national health portal Healthcare Guide 1177’s e-services (a 35% increase compared to 2018).
- 6.5 million residents had at some point logged in to their page on the Healthcare Guide 1177’s e-services by the end of the year.\(^6\)
- Doubling the use of Electronic Expert Support (EES) for pharmacists for the third year in a row.\(^7\)
- International leader in e-prescriptions (>99 percent of prescriptions are e-prescriptions).
- All residents can read sections of their medical records and see prescribed medication and test results via 1177.se.
- Healthcare personnel can access medical records across municipal and county council boundaries through a National Patient Overview (NPO).
- 95 percent of the municipalities are connected to NPO in order to be able to access other healthcare providers’ medical records. Compared to last year, the number of municipalities producing information for NPO has doubled from 13 to 26.
- In many municipalities, staff can now read and make notes online, for example when the home-help service visits care users in their homes. Furthermore, the staff in many municipalities have electronic planning tools.

Several of the aforementioned eHealth services use Inera’s service platform. Many initiatives and work take place on the regional level, and more and more also occur on the municipal level. There are several initiatives and innovations in different areas of expertise that are implemented by the trade and industry sector, often together with customers. The private sector is a positive force and examples where private stakeholders have led the way

\(^6\) Source: Inera
\(^7\) Source: Swedish eHealth Agency
include e-prescriptions, self-check-in terminals and virtual doctor’s appointments.

### 2.2 Challenges and development areas

Based on last year’s follow-up, a number of challenges and development areas can be included here. For example:

- **Standardisation of information content (semantic standards) and of information transfer (technical standards).**
- **Need for structured care data to develop the healthcare sector and promote research, which requires structured documentation.**
- **Access to national basic data (information on activities and organisation) as basic prerequisites for an efficient and stable exchange of information between healthcare providers.**
- **Uncertainty regarding legal conditions.**
- **Lack of competence in, for example, computer science and welfare technology.**
- **The need to establish mandatorship for the electronic certificates and to further develop and manage these.**
- **Mandatorship for, and further development and management of specifications jointly developed nationally.**
- **National coordination of efforts in eHealth development.**

All in all, it can be noted that the growth of national eHealth in Sweden is largely dependent on the speed of implementation on a regional (and also municipal) level. Last year’s report pointed to ongoing and imminent procurement of health information systems around the country, including the management of legacy systems with old data that need to be accessible. In this year’s report, these and other aspects are followed up by in-depth interviews with those responsible for the tendering procedures (see Section 4.3 Regional situation report).
3. Need for and use of eHealth

Vision eHealth is about using different types of digital support to utilise the user’s, client’s and patient’s own resources to achieve important values such as improved health and increased participation and self-determination. Access to information relating to one’s own person, individually adapted digital support, and flexible communication paths give people the opportunity to gain greater control over their health and life situation.

Through interviewing patients and healthcare professionals, the Swedish Agency for Health and Care Services Analysis (Vårdanalys) has investigated how to use digital technology in cancer care. In the report Gränslösa möjligheter, gränslösa utmaningar? (3), it is noted that respondents express the need for digital support that can be considered general, not specific to the diagnosis. These needs are primarily about basic support rather than artificial intelligence (AI), which is frequently discussed today. Both patients and healthcare professionals state that they need a coherent and accessible healthcare information environment with digital support that handles patient information, administrative information, decision support, counselling, and communication support in the care process. Patients express the need for digital technology that can contribute to both collecting and making such information available, and that the information is individualised, updated and quality assured. The patients interviewed express that they are lacking the opportunity to add notes or data sets themselves in 1177 Journalen in order to create a better overall picture of their state of health. The upcoming National Medication List (NLL) has been widely requested by patients. In this context, it is also clear that the patients interviewed consider the issue of privacy second to the quality of care.

According to the Vårdanalys report, healthcare personnel also express the need for digital support to be used to adapt the care to individual patients’ conditions and to be able to plan, monitor, and develop the care provided. Healthcare professionals agree on the difficulty of getting a good overview of the medical records today, regardless of which medical record system is used. The digital healthcare information environment does not meet the needs, according to the healthcare personnel, as long as the medical record systems do not have the right content, the right structure and include all the patient’s care providers.
3.1 The individual

This section describes the perspectives of residents, patients, and users on the use of digital services, access to information, contact routes to healthcare and social care, technology in the home, attitudes to e-services and apps, trust, and more.

3.1.1 An increasingly digital population

According to the OECD, Sweden is one of the world’s leading countries when it comes to digitalisation, with smaller gaps digitally than most countries. (4)

In their report Svenskarna och internet 2019 (5), the Swedish Internet Foundation describes how the use of the internet is expanding and that the population is becoming increasingly digital, while the group experiencing digital exclusion is declining. In its survey, the Swedish Internet Foundation asks about what types of digital services the residents have used. 58 percent of women and 48 percent of men have used digital services provided by healthcare providers.

In total, 98 percent of residents (12 years and older) state that they use the internet. The rate of increase is now very slow as the maximum value has almost been reached for the age groups up to 65 years.

It is therefore more interesting to see the development in the age groups from 66 years and older. In particular, we see a clear tendency for residents over the age of 76 whose internet use in 2019 increased faster than at any previous time of measurement (Diagram 1).

Diagram 1. Percentage of the population (66+ years) using the internet.
Source: Swedish Internet Foundation
Generally speaking, according to the Swedish Internet Foundation, the groups of older, low-skilled and low-income earners are taking advantage of digital opportunities to a lesser extent. This is also reflected in the use of the healthcare sector’s digital services. All in all, more people with higher education, higher household income and women between the age of 26 and 45, and urban residents, use the digital channels.

In the autumn of 2019, the Swedish eHealth Agency, with the help of Statistics Sweden (SCB), conducted a survey themed 'Join in developing digital healthcare services’ (6). In this survey, one in five respondents (20 percent) state that they have kept a digital health, exercise or diet diary (including when data has been uploaded from a smartphone, so-called fitness bracelet or smart watch) in the past 12 months. This applies to women more than men (23 percent compared to 18 percent) and younger individuals (about 30 percent 16-49 years) more than older.

3.1.2 Digital healthcare services

The results of the Swedish Internet Foundation’s survey Svenskarna och internet 2019 (5) show that five out of ten use the digital services of healthcare providers, which are mainly in the Healthcare Guide 1177, while one in ten use care apps for doctor’s appointments - women to a greater extent (13 percent) than men (9 percent). The use is mainly seen among residents aged up to 55 years (Diagram 2).

According to the Swedish Internet Foundation, 53 percent of the population over the age of 16 use the digital services provided by the healthcare system (scheduling appointments, referrals, test results, etc.) and it is somewhat more common in the city (56 percent) than in rural areas (47 percent).

![Diagram 2](image)

Diagram 2. Percentage of the population, broken down by different age categories, who use the digital services provided by the healthcare sector, and care apps for doctor’s appointments in 2019. Source: Swedish Internet Foundation
The Swedish eHealth Agency’s survey on digital healthcare services (6) was answered by 4,701 individuals (31.4 percent response rate) and showed that 6 out of 10 (61 percent) sought information on illness and treatment on the internet in the last 12 months. Of these, there were more women than men (69 percent compared to 54 percent), and significantly more younger individuals than older (76 percent of people aged 16-49 years compared to 19 percent of those over 75 years).

Over the past 12 months, 34 percent of respondents have used digital healthcare services. Of these, there were more women than men (39 percent compared to 28 percent) and significantly more younger individuals (40-49 percent of those aged 16-49) than older (24 percent of those aged 50-74 years, and 12 percent of those 75 years and above).

### 3.1.3 E-services in Healthcare Guide 1177

The main link between healthcare and the country's residents with respect to digital healthcare is the Healthcare Guide 1177’s e-services, which in 2019 recorded 51 million logins. Implementation and use of e-services for patients and residents have increased significantly over time.

In Healthcare Guide 1177, it is possible to track how different target groups choose to use the services and how the use has evolved since 2013, when they were introduced. E-services include a number of different functions that are made available to varying degrees in the different Regions. The resident can, for example, see notes in his medical records, renew prescriptions, schedule and reschedule appointments, and more.

Diagram 3 shows the average number of logins on Healthcare Guide 1177’s e-services per resident in 2019. Annual growth is 63 percent on average, which means that the average resident has increased their use eleven times since 2013, when the service was introduced.

Diagram 3 shows that women log in significantly more frequently up to late middle age and that men are more frequent users than women after retirement. On average, women under the age of 60 log in to the Healthcare Guide 1177’s e-services almost three times as often as men, while men over the age of 80 use the same service almost twice as often as women their age. This raises issues regarding care needs and healthcare consumption in general and digital healthcare consumption in particular. For children aged 0–13, parents log in on behalf of their children, and according to Diagram 3, this appears to be more for women than for men.

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6 The Swedish eHealth Agency asked about the last 12 months. The Swedish Internet Foundation did not set a time limit.
9 Source: Inera
Diagram 3. Average number of logins to Healthcare Guide 1177’s e-services per resident 2019, age range and gender. Note that the age category 10-19 years actually includes 16-19 years. Source: Inera

The statistics generally show that women are more frequent users of the Healthcare Guide 1177’s e-services (Diagram 4). In 2019, women’s use was twice as high as men’s, and the difference has increased for each individual year.

Diagram 4. Average number of logins to Healthcare Guide 1177 e-services per resident and year, in total and for each respective gender. Source: Inera
Online appointment book
Diagram 5 below shows how appointments scheduled via an online appointment book have developed in recent years, as a proportion of all visits to primary care.

In 2018, 634,000 appointments were scheduled in an online appointment book. As 13.6 million visits were made to primary care during the same year, this means that barely 5 percent of these appointments were scheduled via the service. In 2019, the number of bookings has increased by 35 percent to 859,000, which corresponds to just over 6 percent of primary care visits in the same year. A clear increase, but starting from a low level.

Diagram 5. Number of visits to primary care and number of appointments scheduled via the online appointment book*. Source: Inera
*The number of visits to primary care is based on the 2018 value, adjusted for population change. The 2019 value was not available at the time of publication.

In 2018, the frequency of appointments scheduled via online appointment book, in relation to the number of visits to primary care, was the highest in Halland with 11.8 percent. In 2019, this proportion increased to about 20 percent in Halland, while six Regions are still below 3 percent on the same scale. In three Regions, the number of appointments made via an online appointment book decreased from 2018 to 2019.

1177 Journaled
By logging in to the service Journalen at 1177.se, patients from the age of 16 can access their own medical records. All Regions display some medical records, some more than others. No Region displays full medical records.

10 Source: Inera
11 Source: Inera
Table I. Data volumes in 1177 Journals available to the resident per Region (December 2019).*

Source: Inera

*Data is available when at least one medical record system in the Region presents it.
All Regions aim to provide all residents from the age of 16 access to all information about themselves documented in regionally funded healthcare and dental care, by 2020 at the latest. In terms of Sweden as a whole, 47 percent of the data volumes that are technically possible for all Regions to display are available. In order to achieve this objective, the Regions continue to adapt and connect their source systems to make it possible to display more information. In comparison with the 2018 follow-up, a total of ten out of 21 Regions have added data volumes. In all cases except one there is one additional volume. (Table I).

3.1.4 Regional e-services

More and more Regions offer digital services themselves or use digital elements in traditional care for purposes that each Region deem applicable. The digital services offered by the Regions are mainly available in primary care and may include counselling, recording medical history, referrals, and digital examination, according to the report *Digitala vårdtjänster och artificiell intelligens i hälso- och sjukvården. National Board of Health and Welfare* (7)

However, one conclusion to be drawn from the situation assessment in the project Ordered Introduction (8) is that while the supply of digital care services is increasing, there is a lack of clarity in how new solutions shall be integrated into publicly funded healthcare in a sustainable way. Thus far, private digital healthcare providers have been the driving force. Several pilot projects in the Regions show positive results, but representatives of the Regions point to several barriers to parallel introduction, such as compensation models, legal conditions, and organisational issues.

The introduction of self-service check-in services for arrival registration has been or is being implemented in all Regions and self-service for payment is being introduced in 13 Regions.

3.1.5 E-services and welfare technology in the municipalities

According to the National Board of Health and Welfare’s report *E-hälsa och välfärdssteknik i kommunerna 2019*, the development of e-services within social service is generally slow, which limits the individual’s ability to be in control of their contacts with social services. However, there is some development in specific areas and services. In the area of financial assistance, an increasing proportion of municipalities receive applications for assistance electronically. The proportion of municipalities here has increased from 8 percent in 2016 to 29 percent in 2019 (Table II). Other examples of e-services offered include the possibility of scheduling appointments with case managers, as well as chat forums.
Table II. Percentage of municipalities that participated in the National Board of Health and Welfare’s survey that stated they have at least one e-service for the application of different types of assistance or intervention (9)

<table>
<thead>
<tr>
<th>Field of activity</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children and youths</td>
<td>4%</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Financial assistance</td>
<td>8%</td>
<td>9%</td>
<td>16%</td>
<td>29%</td>
</tr>
<tr>
<td>Family Law</td>
<td>3%</td>
<td>0%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>Family counselling</td>
<td>2%</td>
<td>0%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>Adults with substance abuse problems</td>
<td>3%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>Individuals with impairments</td>
<td>11%</td>
<td>16%</td>
<td>18%</td>
<td>23%</td>
</tr>
<tr>
<td>Elderly care</td>
<td>16%</td>
<td>22%</td>
<td>23%</td>
<td>27%</td>
</tr>
</tbody>
</table>


To meet the growing demand for healthcare and social care, an increased implementation and use of digital technology is necessary. By offering digital technology in the home, resources can be freed up. The National Board of Health and Welfare annually reports on the development of eHealth and welfare technology in the municipalities. The results of the National Board of Health and Welfare’s report *E-hälsa och välfärdsteknik i kommunerna 2019* (9) show a continued increase and use in most of the areas of activity covered in the report. For example, 91 percent of personal alarms were digital in 2019.

The types of welfare technology described here aim to increase safety and independence for the individual user and support the staff and the caregiver. These are various types of welfare technology that may be interesting to monitor in situations where the individual lives in their own home (ordinary housing) with the support of home-help services and in special types of housing for the elderly and persons with disabilities.

Diagram 6 shows the increase in welfare technology in ordinary housing. For example, the percentage of municipalities with GPS alarms has increased from 26 percent in 2016 to 62 percent in 2019. However, the National Board of Health and Welfare finds that these are still mostly test and pilot operations and that there is not as clear an increase in the number of individual users using the technology. For example, there are three municipalities that together have more than half of the GPS alarms; others who have stated that they have GPS alarms have fewer than four alarms each. (9)
Diagram 7 and Diagram 8 show that more and more municipalities offer different types of welfare technology in special housing for the elderly and assisted living facilities for persons with disabilities. For example, the percentage of municipalities that offer night-time camera surveillance has increased from 6 percent in 2016 to 32 percent in 2019 in special housing for the elderly. A similar increase can be seen in housing for people with disabilities, from 5 percent in 2016 to 24 percent in 2019.

In 2019, most municipalities offer care planning via video in residences. In special housing for the elderly, the percentage has increased from 25 percent in 2016 to 71 percent in 2019.

Diagram 6. Percentage of municipalities that have various kinds of welfare technology for persons in ordinary housing. 12 Source: National Board of Health and Welfare

* The question was not asked before 2018
** The data on electronic locks for 2019 is an estimate based on interviews with suppliers and can therefore not be compared to 2018 as the data comes from the municipalities’ response to the survey.

12 Ordinary housing means that individuals live at home.
Diagram 7. Percentage of municipalities that have various kinds of welfare technology in special housing for the elderly. Source: The National Board of Health and Welfare

* The question was not asked in 2016
** The question was not asked in 2016 and 2017

In Sweden, special housing is the common term for several forms of housing adapted to, for example, older individuals in great need of care.
Diagram 8. Percentage of municipalities that have various kinds of welfare technology in housing for people with disabilities. Source: The National Board of Health and Welfare

* The question was not asked in 2016 and 2017
** The questions were first asked in the 2019 survey

The National Board of Health and Welfare’s report also highlights the possibility for the individual to connect to the internet in the municipality’s housing forms for the elderly and persons with impairments. An internet connection is not a welfare technology service per se but can enable communication and use of internet-based public services. In special housing for the elderly, the percentage of municipalities offering individuals to connect to the internet has increased from 42 percent in 2016 to 74 percent in 2019.

3.1.6 Attitudes to Healthcare Guide 1177’s digital healthcare services

By studying the residents’ attitudes to digital healthcare services, it is possible to form an idea of how the current situation is perceived and in which direction the development is heading.

The National Healthcare Barometer Survey (10) is conducted annually by SALAR, based on a resident survey. The questions asked present an overview of how Sweden’s residents view healthcare. The issues raise different perspectives that are difficult to compare among themselves, partly because they have different value bases. Therefore, it may be more valuable to study the trends.

With respect to trust in Healthcare Guide 1177 via the web, 66 percent of those who express an opinion sat they have a lot or quite a lot of trust. In 2016, this number was 61 percent. Those younger than 40 report the highest level of trust, which may be compared to Healthcare Guide 1177’s telephone service where those who are older than 70 years have the greatest trust.

The trust in Healthcare Guide 1177’s e-services has increased compared to 2018 and those who believe they are in good or very good health have a higher trust than people who consider themselves to be in worse health. (10) The group aged between 70 and 79 years has the highest level of trust, 68 percent, and the group aged between 40 and 49 has the lowest level of trust with 60 percent. Women (66 percent) have greater trust in Healthcare Guide 1177’s e-services than men (60 percent). One in four replied that they had no thoughts on this, a percentage that rises with an increase in age.

14 Housing for persons with impairments may be group homes and assisted-living apartments according to LSS or housing with special services according to the Social Services Act.
The National Healthcare Barometer Survey\textsuperscript{15} shows that the confidence in Healthcare Guide 1177’s e-services is on par with the trust in healthcare in general.

3.1.7 Digital exclusion

According to the Swedish Internet Foundation’s report *Svenskarna och internet 2019* (5), 95 percent of the Swedish population use the Internet and 98 percent have access to an internet connection. Approximately 1 million Swedes are non-users or infrequent internet users and are in so-called digital exclusion, approximately 100,000 fewer than in 2018. When asked whether they feel digitally included, 20 percent of the population responds ‘slightly digitally included’, and 9 percent answers ‘not at all digitally included’. It is mainly the elderly who experience the lowest digital inclusion.

It is also possible to illustrate what digital exclusion looks like by identifying the group that does not use the internet. Expressed here as the percentage who do not use the internet daily, which is just over 10 percent of the population over the age of 12. Approximately 70 percent of this group consists of residents over the age of 66 (Diagram 9).

Thus, digital exclusion is a challenge, not least because it almost exclusively covers the age groups with the largest care consumption. However, the trend is clear; the oldest age groups are catching up, while younger age groups have, in effect, reached their limit. In general, the weak users of digital options can be found in three groups: the elderly, the low-skilled, and the low-income earners. This is also reflected in the use of healthcare providers’ digital services.

\textsuperscript{15} The healthcare sector in numbers
It is worth noting that the main argument for not using the internet is not seeing the benefit. Half of the respondents in the Swedish Internet Foundation’s survey state that they do not see the usefulness or are simply not interested. As tablets, after all, have a strong position among residents over the age of 66, there is a potential for reduced digital exclusion if tablets can be loaned out to patients for domestic use.

Advanced age is by far the most prominent factor in digital exclusion. Out of the 1 million Swedes who are in digital exclusion, approximately 746,000 are over the age of 65. Lack of digital know-how, disinterest, and lack of motivation are the main reasons for non-use of the internet in Sweden and within the EU (5). Among the foreign-born, the percentage of people who never or rarely use the internet is slightly larger, and there is also a difference between urban and rural areas. Those who live in rural Sweden do not use the internet to the same extent as those who live in urban areas. Out of those who did not use the internet on a daily basis in 2019, 11 percent lived in rural areas and 7 percent lived in a city.

Socio-economic factors also have a certain effect on digital exclusion. Lower levels of education and lower income can be linked to less use of digital channels and services (11).
In addition to the elderly, the group of people with impairments also risk falling into digital exclusion. Among other things, impaired cognition can cause difficulties in using digital technology. While digital technology offers opportunities for people with impairments to become more involved in society, there is a risk that increased digitalisation will lead to an increased digital divide. If products and services are not designed based on different needs and conditions, large groups in society risk being excluded, which is why it is important to continue to focus on the issue of digital exclusion (12).

3.2 The employee
This section provides examples of services that support the employee’s everyday life, such as services that automate and streamline non-bedside work, such as automatic transfer of data to quality records, e-referral, and structured documentation.

3.2.1 Inera's e-services
The use and implementation of Inera's e-services continues to vary greatly between different Regions, shown here primarily with respect to NPO, but also for a few other examples.

National Patient Overview (NPO)
Through the NPO service, healthcare personnel can access patients' medical records documented by other healthcare providers. The Regions can also integrate such information for viewing in the Region's own record system. All Regions display some records in NPO, some more than others (Table III). No Region displays all information. By the end of 2019, 53 percent of the data available was technically possible to display in NPO, compared to 51 percent in 2018.

The overall benefit of NPO becomes greater the more information is available. To display more information, the Regions need to continue to adapt and connect their source systems to NPO. The Regions also need to remove any filters they have chosen to apply to parts of the information displayed today. In addition, development work is continuing to make it technically possible to display more information from the Regions' record systems than is possible today.
Table III. Data volumes made available by the Regions in NPO 2019.

*Data is considered available when at least one medical record system in the Region display it. Source: Inera.*
Many municipalities and a small number of municipal private care providers are connected to NPO as consumers, but few are connected as producers. In August of 2019, 275 of the nation’s 290 municipalities had connected one or more of their care units as consumers in NPO (Table IV). This is an increase of approximately 100 percent from 2014. The use of NPO, measured as the number of searches in the system, has also increased significantly since 2014. However, few of the private providers of healthcare can consume information in NPO, around 18 percent. In addition, 36 private healthcare providers produce information for NPO.

In Sweden, around 20 percent of the municipalities have agreements with private providers for municipal healthcare (9). When it comes to producing information for NPO, 26 municipalities are connected as producers so that they can display parts of the information from their own records in NPO, double as many as by the end of 2018. In order for NPO to be of greater use to patients and to make care more efficient, municipalities as healthcare providers must connect all care units as both consumers and producers, grant access to the system to all authorised staff, and have procedures in place for use.
Table IV. Data volumes made available by municipalities in NPO 2019.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Available</th>
<th>Not Displayed</th>
<th>In Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eskilstuna kommun</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Finspångs kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Gislaveds kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Habo kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Happaranda kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Höörs kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Kalmar kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Karlskrona kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Kinda kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Leksands kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Malmö stad</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Motala kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Nyköpings kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Olofströms kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Ronneby kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Sölvesborgs kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Varberges kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Valdemarsvik kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Västerås kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Ydre kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Ätvidabergs kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Angelholm kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Ödeshög kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Önsköldsviks kommun</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

**Data volumes**

1. Diagnoses
2. Pharmaceuticals
3. X-ray referrals
4. Test results
5. Consulting Referrals
6. Attention Signals
7. Care Contacts
8. Notes
9. Vaccinations
10. Function status & ADL
11. Care Plan
12. Growth curves
13. Prenatal care
14. Referrals (flow)
15. Forms
16. Test results EKG
17. Test results – Microbiology
Electronic referral
Electronic referral across municipal and county council boundaries (Inera's solution) has been implemented in five Regions, another two have acquired the solution, and three have included it in their planning.

Electronic handling of ‘frikort’
Electronic handling of so-called ‘frikort’ (free passes) issued by private suppliers is now available in nine Regions and is being implemented in another two Regions. Exchange of information and collaboration with school healthcare exist in eight Regions, and discussions are ongoing in another seven Regions regarding implementing a solution. (13)

3.2.2 Electronic expert support
Electronic Expert Support (EES) is a decision support that helps the pharmacist identify any pharmaceutical-related problems, i.e. helps to check whether the customer’s different medications go together. For example, EES can discover medications that are unsuitable due to the patient’s age, dosage (especially for children and the elderly), multiple medications with the same effect and medications that conflict with each other. The purpose of EES is to improve pharmaceutical use and increase patient safety. EES is a complement to the pharmaceutical assessment and a way of ensuring the quality of filling prescriptions and making pharmaceutical treatment more equal. Medications that are used incorrectly can result in extensive costs to society and unnecessary suffering for the patient – worst case scenario, avoidable iatrogenic harm – and EES can contribute to better use of society's resources.

Diagram 10. Number of EES analyses per year. Source: Swedish eHealth Agency
In 2019, more than 9.8 million EES analyses were carried out, which is almost double the number in 2018, which in turn was a doubling from the year before (Diagram 10). It shall be considered that in 2019, more than 51 million e-prescriptions were saved to the national prescription register ‘Receptdepå human’ according to the Swedish eHealth Agency.

In order for the pharmacist at the pharmacy to be able to use EES when filling prescriptions, the customer/patient must give their consent. Consent only needs to be given once and is valid until further notice at all pharmacies, including e-pharmacies. The customer may withdraw their consent at any time. Table V shows that the number of consents has increased at a high rate in recent years.

Table V. Consents - number of customers who have given their consent to EES per year.

<table>
<thead>
<tr>
<th>Years</th>
<th>Number of consents</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>141,156</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>326,203</td>
<td>131%</td>
</tr>
<tr>
<td>2016</td>
<td>682,508</td>
<td>109%</td>
</tr>
<tr>
<td>2017</td>
<td>1,414,920</td>
<td>107%</td>
</tr>
<tr>
<td>2018</td>
<td>2,185,418</td>
<td>54%</td>
</tr>
<tr>
<td>2019</td>
<td>3,279,361</td>
<td>50%</td>
</tr>
</tbody>
</table>

Source: Swedish eHealth Agency.

3.2.3 Employee use of national services
One way of measuring how quickly employees change their work method is to measure the growth of some of the services provided. For example, the number of logins on Healthcare Guide 1177’s e-services, according to Inera, has increased by 205 percent since 2013. The number of NPO producer calls has increased by 100 percent since 2017 and the number of NPO users has increased by 350 percent since 2015.

3.2.4 Employees’ attitudes towards digitalisation
A survey by SALAR (14) shows that the majority of employees view increased digitalisation as positive. The group most positive towards increasing digitalisation are the doctors. Many nurses are also positive. When it comes to using digital technology\(^\text{16}\) to assist in care, consultations, and treatment, two thirds are positive, and nurses are the most positive. When it comes to care at home with the help of digital technology, half of the

\(^{16}\) Digital technology here refers to, for example, scheduling doctor’s appointments online, chats or video conferences with the patient.
employees are positive, and a quarter have a negative view. Doctors are the most positive group when it comes to digital technology for support and care in the home.

Only 16 percent of nursing students feel that their education prepares them for using digital tools in the workplace, and 68 percent of medical students say they are prepared to a very small or rather small extent.

3.2.5 Artificial Intelligence

In the report *Digitala vårdtjänster och artificiell intelligens i hälso- och sjukvården* (7), the National Board of Health and Welfare describes AI as 'the ability of a machine to emulate intelligent human behaviour, i.e. the ability of machines that enable them to function in meaningful ways in relation to the specific tasks and situations they are intended to carry out and act in'. The survey shows that AI in healthcare is still in its early stage of development. There are many ongoing research activities, but there is a limited number of applications in regular operation. Several observers believe that healthcare could be radically developed with the help of AI.

Currently, AI support is mainly used to record medical history, perform diagnostics, and in decision support. These include radiology (primarily mammography), cardiology, dermatology, digital pathology, ophthalmology, gastroenterology, and laboratory analysis. Other areas where AI is useful include monitoring and telemedicine, such as remote monitoring of patients with cardiac insufficiencies, digital home care and fall prevention with the help of sensors and pill boxes that remind the patient that it is time to take their medication and log the dispense.

The National Board of Health and Welfare’s review of applications and projects distinguishes between regulated systems and machine learning. With respect to regulated systems, caregivers have mainly introduced AI support in the areas of patient contact, monitoring and telemedicine. Table VI shows that it is mainly in the areas of recording medical history and patient contact that caregivers have introduced AI support in the form of machine learning systems. There are plans to introduce AI support in the near future, especially in recording medical history and triaging, and a great number of research projects are in progress.
Several of the AI grants active today, as well as the ongoing research projects, focus on improving efficiency in healthcare. However, machine learning requires copious amounts of data for development and major investments for there to be demonstrable financial gains. Likely, diagnostics and decision support will be streamlined, but the more decisive financial effects of AI will be a result of contemporaneous organisational changes.

The bibliographic review shows that AI usually performs its task more reliably than humans. Human performance is more variable depending on different circumstances, which can be both an advantage and a disadvantage. This suggests that the quality of care would benefit from utilising the cooperation between machines and humans to exploit their respective strengths, where humans see the whole picture and machines can perform more defined tasks. The public and private care providers interviewed believe that the quality of care is improved when assessments in diagnostic tools and decision support are based on copious amounts of data. Therefore, this leaves less room for subjectivity in the assessments.

Some researchers believe that the healthcare professions need to gain a greater understanding of how AI systems work. The use of AI in healthcare does not require less knowledge from healthcare professionals, but rather deeper and more comprehensive knowledge to be able to benefit from AI.

The report *Artificial Intelligence Market - Key Application Areas for Growth in Healthcare IT, Forecast to 2022*, examines the most important AI suppliers forecasting global healthcare revenue and use AI to increase product functionality (15). In total, this market is expected to grow to just over
USD 6 billion at a compound annual growth rate of just over 68 percent between 2018 and 2022 (16).

In addition to being used in clinical care, AI is believed to be useful in administrative tasks, as well. In an article in *Healthcare innovation* (17), researchers from the global healthcare industry describe that the most important initial areas of change will likely not be in direct clinical practice. The United States has already seen the benefits of automation for transferring routine tasks to machines. According to the article, non-routine data can be transferred to machines using AI. An estimate is that almost 30 percent of today's medical capacity can be transferred to patients (self-service) or to smart tools, or a combination of the two. This brings hope to be able to bridge the gap between the citizens'/patients' demand for care and the limited resources.

3.2.6 Read and take notes via mobile in Social Services

The National Board of Health and Welfare’s report *E-hälsa och välfärdsteknik i kommunerna 2019* (9) shows that in more and more municipalities, staff can read and take notes in the operational systems via mobile. One conceivable explanation may be the central government grant awarded to the municipalities, which has largely been used to procure mobile phones and tablets. Home-help services have seen the most development in this respect. In around half of the municipalities, all home-help service personnel can read and take notes on their mobile devices, for example in connection with a home visit.

Table VII. Percentage of municipalities where mobile Social Services staff can read from the operational system via mobile, 2019

<table>
<thead>
<tr>
<th>Field of activity</th>
<th>No one</th>
<th>Less than half</th>
<th>Approx. half</th>
<th>More than half</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children and youths</td>
<td>61%</td>
<td>12%</td>
<td>3%</td>
<td>5%</td>
<td>19%</td>
</tr>
<tr>
<td>Labour market initiatives</td>
<td>73%</td>
<td>11%</td>
<td>2%</td>
<td>4%</td>
<td>10%</td>
</tr>
<tr>
<td>Adults with substance abuse problems</td>
<td>63%</td>
<td>12%</td>
<td>2%</td>
<td>6%</td>
<td>17%</td>
</tr>
<tr>
<td>People with impairments</td>
<td>38%</td>
<td>28%</td>
<td>6%</td>
<td>8%</td>
<td>20%</td>
</tr>
<tr>
<td>Home-help service in ordinary housing</td>
<td>28%</td>
<td>15%</td>
<td>1%</td>
<td>6%</td>
<td>50%</td>
</tr>
</tbody>
</table>

In the same report, the National Board of Health and Welfare states that only a small percentage of municipalities have secured their various operational systems within Social Services, where personal data is processed. There has been no development of the percentage of municipalities that require secure role and identity-based authentication for access to systems.

### 3.3 The meeting

This section describes services that support the meeting between patients, users, close relatives, and employees in healthcare and social care. These can be services for preparing the meeting, supporting the meeting itself or contributing to a follow-up dialogue. Examples of services include virtual doctor’s appointments, being able to make a health declaration online before the meeting or so-called home monitoring.

#### 3.3.1 Virtual doctor’s appointments

Virtual doctor’s appointments are described as healthcare provided via digital remote contact, i.e. through some form of digital communication where a patient and the healthcare personnel are spatially separated.

Virtual doctor’s appointments have become increasingly widespread. Previously, it was primarily private healthcare providers, so-called online doctors, who offered the service. Now, an increasing number of public healthcare providers are offering this service.

According to the *National Healthcare Barometer Survey 2019* (10), residents still have a low confidence in virtual doctor’s appointments and half of residents have no opinion on the matter.

The resident survey conducted by the Swedish eHealth Agency and Statistics Sweden in 2019 shows that 8 percent of the respondents had a video conference with healthcare workers instead of a physical visit. When asked ‘What factor(s) made you choose a virtual doctor’s appointment?’, those who reported this type of visit responded that it was mainly time-saving (74 percent), for convenience (66 percent) and accessibility (66 percent).

In 2019, the Jönköping Academy for Improvement of Health and Welfare conducted a register-based research study based on 17,300 digital visits that residents of the Region Jönköping County have had with Min Doktor, KRY, and Bra Liv nära. Also, 26 individual in-depth interviews (18) were also conducted. This survey shows that it is mainly people up to the age of 30 who use this type of service (70 percent) and women more so than men. This is in line with the survey conducted by the National Board of Health and

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17 Source: Swedish eHealth Agency
Welfare in 2018 (*Digitala vårdtjänster riktade till patienter - kartläggning och uppföljning*), which also concluded that it is predominantly women who have used the digital healthcare services to date, and people under 50 (90 percent). The most common diagnoses in the research study were acute upper respiratory tract infection, skin rash, and cough, which also corresponds to the National Board of Health and Welfare’s survey. In total, there were approximately 1,400 different diagnoses in the study, of which the ten most common accounted for approximately 20 percent of the digital contacts. In 90 percent of care contacts, each individual only has one contact.

Another example of the ever-increasing use of virtual doctor’s appointments is Region Stockholm’s healthcare app ‘Always open’. The Region has seen a significant increase in downloads of the app and by May 2019, 8,000 video meetings had taken place (19). Other examples are ‘Bra Liv’ in Region Jönköping County, ‘Närhälsan Online’ in Region Västra Götaland, ‘Digital Vårdcentral’ in Region Östergötland, and ‘My Care’ in Region Dalarna.

Currently, there are five major private stakeholders offering virtual doctor’s appointments on the Swedish market: Min Doktor, KRY, Doktor.se, Capio Go, and Doktor24. There are also several smaller stakeholders. Within psychiatry, there are also a number of private stakeholders offering this type of service, such as Mendly and Pratamera. Public psychiatry now also offers services on the CBT platform developed within SALAR.

According to Grant Thornton’s report (20), 604,000 online doctor visits were made in 2018, which corresponds to 4.6 percent of all visits to primary care. The figures include the companies Kry, Doktor.se, Min Doktor, Doktor 24, and Capio Go. This was an increase of 172 percent from 2017. According to data from Region Sörmland and Region Jönköping County, the Swedish medical journal *Läkartidningen* has estimated a continued increase to a total of 1.1 million visits from those outside the county to private digital healthcare providers in 2019.

In the inquiry *Digifysiskt vårdval – tillgänglig primärvård baserad på behov och kontinuitet* SOU 2019: 42 (21), it is argued that the digital care offered by online doctors today should be integrated into the overall proposal for reformed care choice. Primary care should not be split between digital and physical care, according to the inquiry, as it is only a choice of work methods. Integration should occur through procurement. This would mean that today’s online doctor companies would need to apply for establishment in all Regions, and that the companies also need to be able to provide physical care, either themselves or through an agreement with a subcontractor. The conclusions of the inquiry are that private digital healthcare providers also need to create physical doctor’s offices, either
operated by them or through collaboration with other parties. The result of this is that private players in 2019 opened offices in collaboration with, for example, ICA Maxi (22) and Apoteket AB (23), in order to be able to offer physical doctor’s offices.

3.3.2 Prescribed self-care and home monitoring

SALAR's report from the project Ordered Introduction (24) includes a current situation report and an analysis of a number of available care offers with digital services (25). The focus is on home monitoring and prescribed self-care for people with chronic illnesses. Digital products and services for prescribed self-care and home monitoring include healthcare measures that healthcare professionals have assessed that the patient can do outside of a healthcare facility, either by themselves or with the help of, for example, a close relative or personal assistant. When it comes to patients with chronic illnesses, this is often parts of specialist care that can be performed by the patient themselves outside the hospital, so-called specialised self-care.

Examples of digital services for prescribed self-care may include:

- scale with connected software that helps heart failure patients administer the correct dosage of medication
- digital service for asthma patients to measure lung function with the aim of improving asthma control, lung function and medication, or
- digital glucose meter that helps diabetic patients administer the correct medication.

All Regions have some form of digitalisation strategy that describes digitalisation in healthcare in general, which includes digital services and products for patients with chronic diseases. Around one-third of the Regions have adopted action plans that include the introduction of digital products and services to patients with chronic diseases, but without specifying which services.

Several Regions are planning for or have ongoing pilot projects to test digital products or services for patients with chronic diseases, such as chronic obstructive pulmonary disease (COPD) and heart failure. This type of service has also been implemented to a limited extent, in some Regions.

The Swedish eHealth Agency’s resident survey in 2019 shows that the type of digital healthcare services that send test data (for example blood pressure, blood sugar level) to a health centre or hospital are only used to a
small extent. Among the respondents, it was consistently only a minor percentage regardless of Region, but with some positive exceptions.\textsuperscript{18}

The challenges of embarking on a parallel introduction often include legal, financial, organisational, and technical aspects. The interviewees in the Regions highlight the need for support from the national stakeholders to create the conditions for the Regions to introduce digital products and services.

In the report on Ordered Introduction, the Regions indicate needs that they feel should be addressed on a national level:

- Recommendations on compensation models that facilitate the use of digital services for prescribed self-care and home monitoring.
- Clarification of legal conditions and legal interpretation, including with regard to information security.
- National infrastructure and technical conditions for data exchange between providers’ core systems and digital services for prescribed self-care and home monitoring.
- Procurement of certain functions nationally that can be used regionally for increased cost-effectiveness and benefit to the Regions.
- Common checklists for the introduction of digital services to achieve coherence within the Regions and for better use of resources.
- Clarification of the roles and responsibilities of the national stakeholders (e.g. authorities) and how they should cooperate with one another.

The report also provides several examples of digital services in different parts of the country, such as services for home monitoring, services for patients with chronic illnesses and services for healthcare meetings:

- IBD Home, a service offered to patients with inflammatory bowel disease. According to Telia, which is a supplier, IBD Home pilots are being implemented in five Regions.
- Optilog, offered to heart failure patients. According to the supplier CareLigo, pilot projects are being carried out or have been carried out in ten Regions.
- The COPD centre at Sahlgrenska University Hospital in Gothenburg offers some patients home monitoring of their general state with digital tools linked to instruments that measure, \textit{inter alia}, the

\textsuperscript{18} Source: Swedish eHealth Agency
patient's blood pressure, blood oxygen saturation, and physical activity.

- VälTel, a project in Region Jämtland Härjedalen, offers digital support to patients with chronic illnesses, such as hypertension.
4. Structures that enable eHealth

The work on eHealth is ongoing on both national and regional and local levels. The vision's implementation plan for 2017–2019 has included three main intervention areas for the work on a national level: regulations, technical standards, and a more uniform terminology use. Efforts in these areas will create the conditions for eHealth development in the country.

The principals also create conditions for development, both through joint and local initiatives. In the report of the Swedish Agency for Health and Care Analysis (Vårdanalys) 2019 (3), a number of conclusions have been compiled, linked to the ongoing work on the national level, within the scope of the vision. An overall conclusion is that e-health development should move from collaboration to coordinating governance. Vårdanalys also finds that legislation, guidelines, and national standards that create the conditions for coordinated development and at the same time safeguard the patient's privacy and safety are needed.

Furthermore, Vårdanalys says that the central government needs to clarify which fundamental prerequisites need to be met in the care information environment in order for the patient to receive good care. This may, for example, be about continuing to develop common standards and regulatory framework for information transfer between different Regions and municipalities.

According to Vårdanalys, efforts to coordinate the digitalisation work of the Regions and municipalities have not been sufficient. They are calling for more powerful initiatives from the central government to achieve a nationally coherent care information environment to support patients and healthcare personnel.

Furthermore, Vårdanalys suggests that the Government reviews the distribution of roles and responsibilities among the state stakeholders working with digitalisation in healthcare. Although there are structures for collaboration within the field of eHealth, many state initiatives run parallel and without sufficient coordination.

The study on welfare technology in elder care (SOU 2020:14) proposes measures that may promote the introduction of welfare technology. The purpose is to improve the conditions for the activities and personnel in elder care to make better use of the potential of welfare technology. The proposals cover adequate support, knowledge, and improved conditions for staff,
improved legal conditions for the use of welfare technology, and improved collaboration and national support.

4.1 National efforts

This section describes a number of initiatives on a national level, both government mandates for authorities and agreements between the Government and SALAR. Several national stakeholders cooperate in these national initiatives.

4.1.1 Structured documentation tools

The National Board of Health and Welfare manages national semantic standards in the form of tools to structure and encode information on patients and users. The tools are National Information (NI), the structured clinical vocabulary Snomed CT, health-related classifications, and the National Board of Health and Welfare's terminology database (26).

Using the tools as a reference and starting point, the authority also develops descriptions of area-specific information, so-called specifications. These describe how different types of information should be structured and coded in medical records and personal files as well as in national e-services that process the information. One example is the specification for attention information, so-called critical information, which is crucial for the individual's safety (27).

There are several examples of specifications that describe information processed in various national e-services, for example in insurance medicine decision support (28). This decision support contains both general principles for sick listing and recommendations for assessing working capacity for various diagnoses. Through Inera's Webcert service, healthcare professionals can create digital certificates for, inter alia, sickness benefits. All Regions have set up an integration with Webcert in order to be able to issue the Swedish Social Insurance Agency's new certificates.

Another specification is the national code system with reason for treatment (29), developed and administrated by the National Board of Health and Welfare and distributed by the Swedish eHealth Agency. The code system (called the national source for reasons for prescription and treatment) contains approximately 1,600 different reasons for treatment with related descriptions of the purpose with the treatment, reasons for changes, and links to all pharmaceuticals available on the Swedish market. The code system is live and can be implemented into healthcare information systems.

19 Insurance medicine decision support (FMB): decision support to be integrated into the healthcare sector's electronic record system and system for issuing certificates.
Reason for treatment will be included as one of the information elements in the Swedish National Medication List. In 2019, work began on an addendum, including reasons for treatment beyond approved indication, meaning other medical conditions than those for which the medication is actually approved. The addendum should cover common prescriptions based on evidence or best practices. The National Board of Health and Welfare updates the content of the code system weekly.

In 2019, the National Board of Health and Welfare began work on developing national data volumes, NIMs, i.e. detailed specifications of data volumes that need to be available in multiple contexts and clinical processes (30). NIMs, for example, can describe how information on test data should be documented with a uniform structure and with a selection of codes. One example of a NIM is a specification of how the patient’s measured body temperature shall be documented. The work is based on the reference models in NI and the samples are produced in Snomed CT or, if necessary, from a classification. A specification can contain several NIMs and one NIM can be part of several different specifications.

The development of NIMs takes place within the framework of several different government mandates and has a clear link to SALAR's work on developing person-centred and coherent care processes (see Section 4.1.6 below). This work identifies information that appears in multiple care processes and that should be structured and coded uniformly.

4.1.2 National common specifications

In March 2019, the Swedish eHealth Agency was commissioned to compile and make available common national specifications (S2019/01521/FS) (31). These are agreements on how standards should be applied in different situations to facilitate information exchange (semantic and technical interoperability) within and between healthcare and social services. The assignment includes setting up a function for managing such specifications and conducting an in-depth analysis on the existing assignment of responsibilities for issues related to standardisation and common specifications in healthcare and social services. An important and crucial part in the result of this assignment is to collaborate with the relevant authorities, principals, and organisations within standardisation and, where appropriate, consider the work being done within the scope of Vision for eHealth 2025.

The programme has conducted a needs and insight analysis during the latter part of 2019. The analysis has contributed to insight into governance and responsibility as well as collaboration between parties, stakeholders' needs regarding platform, availability, functions, services, and support. Inventory
and compilation of specifications is performed continuously throughout the mandate period. A definition of what a common national specification is shall be adopted no later than in June of 2020.

An initial interim report was submitted to the Government on 28 November 2019, where the Swedish eHealth Agency presented a structure for the work on the assignment. In connection with the interim report on 31 August 2020, an in-depth analysis of responsibilities and cost estimates for the administration of the function over a one-year term and long-term shall be submitted to the Government. The assignment goes into administration on 30 September 2021.

4.1.3 National Medication List

Work is underway to develop the National Medication List (NLL) to be implemented in the Regions during 2020. The primary purpose of NLL is to improve patient safety by meeting the patient’s and healthcare personnel’s need for comprehensive information on a patient’s medication.

The Swedish eHealth Agency has the main mandate to produce the NLL (32), which will replace two of the registers that the authority manages today: the prescription register and the medication list. During 2018 and 2019, the National Board of Health and Welfare was tasked with investigating how terminology related to prescription of treatment and medication can be handled and similarly interpreted regardless of the stakeholder or system. The work has been conducted on the basis of the National Board of Health and Welfare’s requirements on how a prescription shall be documented (HSLF-FS 2017:37) (33) and with NI and Snomed CT as references, and taking into account the needs that exist in connection with the implementation of the NLL. The code of system for reasons for treatment will also form part of the NLL.

4.1.4 Knowledge management systems

Sweden’s Regions, with the support of SALAR, have established a common knowledge management system for a more knowledge-based, equal, and resource-efficient high-quality care. The Regions’ knowledge management system is about developing, disseminating, and using the best possible knowledge in healthcare. The goal is for the best knowledge to be available and used in every patient meeting.

The three parts of knowledge management are knowledge support, follow-up and analysis, and support for business development and leadership. Knowledge support shall be developed in relevant areas and designed to be easy to use. The system shall make it easier to coordinate the knowledge support used in healthcare.
There are 26 national programme areas. They direct knowledge management in their respective fields and consist of experts with broad expertise in the field. In addition, there are eight national collaborative groups (NSGs) with representation from all healthcare Regions. SALAR also participates in NSG with an expert member.

When it comes to national knowledge management within Social Services, 96 percent of the municipalities have adopted SALAR’s recommendation on joint financing of Social Services’ knowledge management. SALAR works with the municipalities in accordance with the recommendation. This means that the municipalities that adopt the recommendation during 2020 - 2023 contribute to the joint funding of:

- quality register used by the municipalities
- a selection of user surveys and the development of systematic follow-up
- national dialogue and coordination.

Kunskapsguiden (34) also contributes to knowledge management, providing information on both eHealth and welfare technology, as well as Partnerskapet, a model for long-term knowledge development, which supports knowledge management in.

SALAR operates a network of purchasers to support municipalities in their efforts to modernise and digitise their operational systems (35). Increased digitalisation within Social Services could lead to more efficient work processes, a better work environment, greater knowledge of the operations, and more time for the users. Many municipalities are requesting more national support in their procurement of new operational systems and in the dialogue with suppliers of existing systems. To support the municipalities, SALAR leads a network of purchasers for Social Services’ entire operational system (including IFO, the elderly, LSS, social psychiatry, and municipal healthcare). The work is ongoing during 2019-2022 and will be co-funded by Vinnova.

4.1.5 National collaboration group - structured care information
NSG was formed to lead and coordinate the Regions’ national, joint work within different areas based on existing national joint structures and work.

In 2019, an NSG was established for structured care information. The cooperation group’s mission is to coordinate the Regions’ work towards a more uniform information structure within and across system and care provider boundaries by:
- Identifying areas and issues that, based on ongoing work with the implementation of new healthcare information environments, require common positions across Regions.
- Establishing a process to quickly and continuously make jointly agreed decisions on applications, selection, etc.
- Initiating and directing work within the working groups established with links to the collaborative group.
- Cooperating with other collaborative groups in knowledge management systems with special emphasis on the collaboration groups Methods for Knowledge Support, Follow-up and Analysis and Quality Register.
- Supporting the national programme areas from the perspective of structured care information.
- Cooperating with authorities and other interested parties.
- Monitoring ongoing work within the area - international, national, regional, and local.
- Spreading knowledge in the field of health informatics.
- Identifying, developing, and disseminating common methods and working methods.
- Increasing the level of competence in the field of health informatics.
- Using resources and expertise effectively.

4.1.6 Person-centred and coherent care processes

The central government and SALAR have signed an agreement with the aim of developing care processes for new disease areas. These care processes are now referred to as person-centred and coherent care processes. The care processes are based on reliable and up-to-date knowledge support and thus based on the best available knowledge on care and treatment.

Work on developing person-centred and coherent care processes in the following ten disease areas began in 2019: rheumatoid arthritis, first-time onset of schizophrenia, stroke and TIA, heart failure, acute limb ischemia, hip osteoarthritis, COPD, osteoporosis, sepsis, and investigation of cognitive failure and dementia. Based on four of these care processes, a special pilot project was launched in 2019, focusing on informatics. The pilots aim to improve conditions for uniform care documentation in some areas, and to develop a general methodology that can be widely used within the National system for knowledge management. The work is carried out in close cooperation with the relevant authorities.
4.2 Situational picture in the municipalities

4.2.1 Operational systems for Social Services

The digital support available to the operations is central to the development of eHealth. Here, the development differs slightly between healthcare and social services. A feasibility study on networks for purchasers of Social Services’ operational system (36), conducted by SALAR in 2019 (35), shows that the municipalities experience deficiencies in basic functions of the operational systems as well as deficiencies in efficiency, user-friendliness and the ability to analyse and retrieve the data stored in the systems. The municipalities need several new functions in order to be able to communicate digitally with users, residents and with other stakeholders as well as to be able to automate, analyse data and use AI.

In an evaluation of the four major suppliers that exist today, it is described that suppliers have different conditions for working with content-based innovation, such as automation, robotisation, and enabling better integrations with other stakeholders, and this is related to how far they have come in the technical development of the systems. The development of systems for Social Services is generally slow, and the innovations mentioned in the suppliers’ five-year plans do not represent major steps forward (37).

In 2016, the City of Stockholm conducted a survey (38) of the operational needs and then made the assessment that none of the standard systems on the market were as changeable as the business development requires. The steering committee decided to replace the city’s social system with a combination of tools (and standard systems in cases where necessary due to complex industry-specific needs). The IT support that will form the basis for a large part of the improvements is a so-called process management or case management tool. With this type of tool, the city gets a technical platform that serves as the basis for more continuous and business-related changes, where the business changes usually do not require coding of an IT provider but can be done in a user-friendly interface.

In a research study from Lund University on the digitalisation of social work (39), it is described that digitisation options need to be better integrated into the work process within Social Services. For example, record keeping is still often both digital and analogue. The study establishes a number of recommendations to promote continued development, inter alia, to have a clear strategy, to inventory access to both technology and expertise, and that important systems need to be able to communicate with each other.

In SALAR’s feasibility study (35), 47 percent of respondents say that the agreements for the current operational system expire within one to two
years. This means that almost half of the country’s municipalities are facing or are in a procurement process. This also means that these municipalities will enter into agreements that will run for a number of years to come. Contract periods vary, but municipalities like to have long contract periods because the work on changing operational systems is so extensive, takes a long time, and affects all activities. This work is preferably avoided for as long as possible. However, long contract periods have a lock-in effect on the existing solutions and, as mentioned, existing operational systems today are not adapted to the requirements of the activities nor designed in a way that they can easily be adapted to changes or innovation in the activities.

Most municipalities that participated in SALAR’s survey also state that they allocate less than SEK 1 million annually to the development and management of the operational systems. 47 percent say they set aside less than SEK 1 million and 10 percent set aside less than SEK 100,000 in their budget for this work. Only the biggest municipalities have the opportunity, competence, and means to procure more innovative solutions of the kind the City of Stockholm procured.

In the Swedish eHealth Agency’s assignment Nationellt stöd till kommunerna vid införande av digital teknik (e-hälsa) (40), the municipalities request better support in the form of national requirements but also support with supplier contacts. This is desirable in order to be able to work in a more standardised and equal way across the country.

4.2.2 Structured documentation in Social Services

Children’s Needs in Focus (BBIC) and the Individual’s Needs in Focus (IBIC) are examples of standardised working methods within Social Services that support the development of structured documentation. BBIC, which is licensed, is used in all municipalities in the country except one. The use of IBIC is not as widespread but is increasing, as the National Board of Health and Welfare’s open comparisons demonstrate (41). For example, 39 percent of municipalities state that they have used IBIC in all surveys for persons in ordinary housing within elder care in 2019. The year before, it was 22 percent.

As an integral part of IBIC and BBIC, the National Board of Health and Welfare has developed information specifications that describe how relevant information linked to the user can be documented in a structured and uniform manner. The information specifications support the municipalities in developing documentation and ordering IT development and procuring operational systems. One important part is the support provided to re-use documented information for systematic follow-up, which in turn provides the basis for the local knowledge development.
4.2.3 Challenges with the implementation of welfare technology

The inquiry on welfare technology in elder care (SOU 2020:14) shows that the municipalities are at different levels with respect to digitalisation in elder care. It is reported that there are still few elderly people who have access to services designed with welfare technology, despite the various advantages of welfare technology. There are several successful projects on the municipal level, but it has proven difficult for municipalities to move from projects to parallel introduction. The inquiry has investigated what would promote a broader implementation and initially presents six main obstacles:

1. Uncertainty about the legal conditions for providing welfare technology to those with reduced decision-making ability.
2. Lack of digital infrastructure, both in terms of technical infrastructure and in terms of digital information exchange.
3. Lack of expertise in digitisation and welfare technology in all occupational groups in elder care.
4. Lack of cooperation and coordination between principals but also between the central government, Regions, and municipalities.
5. Lack of national governance - the tasks of government agencies overlap, and governance is sometimes perceived as contradictory.
6. Fragmented knowledge generation in elder care.

4.3 Regional situational picture

This section describes the situation in the Regions in terms of implementation of new information systems and further development of existing systems. The texts are based on interviews conducted with representatives from Region Skåne, Region Västra Götaland (VGR), SUSSA and Customer Group COSMIC (KGC). Region Stockholm has not yet completed a procurement process or decided on information systems and has therefore not been interviewed in this context. The interviews were conducted between November 2019 and January 2020.

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20 SUSSA is the Collaboration Group on Strategic Development of Healthcare-supporting Applications. The cooperating regions are: Västernorrland, Västerbotten, Blekinge, Örebro län, Sörmland, Halland, Norrbotten, Dalarna, and Gävleborg.
22 Source: interviews carried out by the follow-up group, Vision for eHealth 2025.
4.3.1 Procurement in 2019

Currently, four suppliers cover 93 percent of the Swedish healthcare documentation market. The new procurements mean further consolidation. Today, there are shortcomings in interoperability between the systems. This is mainly due to a lack of standardisation of both informatics and technology and how the systems have been implemented.

The 18 Regions that responded to the SLIT survey (13), either require (14 Regions) or offer (4 Regions) private healthcare providers included in the care choice (LOV) to use the same medical record system as the Region. The requirement to use the same system has increased over the years.

The 2018 follow-up report on Vision for eHealth described that eHealth development in Sweden is dependent on the regional implementation speed. On disincentive was that many of Sweden’s Regions completed extensive procurement processes for new healthcare information systems. Expectations were that the completed procurements would increase the willingness to invest in new functionalities rather than make adjustments to the legacy systems that will be replaced.

Systems and suppliers are linked to customer groups, Millenium/Cerner to Region Skåne and Region Västra Götaland (VGR), and COSMIC/Cambio to SUSSA and KGC.

All in all, two main tracks are identified with respect to operating the systems that are now being implemented and developed further:

1. Region Skåne and SUSSA have procured services with their respective supplier’s operational responsibility.

2. VGR and KGC have procured, and will continue to have, in-house systems.

There are also differences between purchasing systems/services from a Swedish supplier and an American supplier (Cerner) who have not previously delivered systems to Sweden, especially with respect to the legal requirements applicable to Swedish healthcare.

KGC and SUSSA now have the same system vendor but currently cooperate to varying degrees within each group. The Regions in SUSSA work together on informatics and configuration of the system, while the Regions in the existing KGC do this individually. The Regions in the existing KGC have their own installations but cooperate with respect to orders and tests of COSMIC functions as services.
According to the interviewees, the implementation of the new systems will impact healthcare over the coming years. Several of the interviewees believe that major operational changes will be required, which in turn is likely to contribute to a decline in healthcare production for some time.

4.3.2 Informatics and interoperability

In the SLIT report (13), only nine Regions say they have sufficient computer skills and ten Regions have designated individuals responsible for informatics.

The implementation project in Region Skåne, SDV (Skåne’s Digital Care System), will standardise the input of information, which must be possible to encode. Examples of code systems and classifications include Snomed CT, ICD-10\textsuperscript{23} and ICNP\textsuperscript{24}. The Region wants to use international standards, not regional\textsuperscript{25}.

Region Skåne states that the requirements built into National Information (NI) are read and used in tendering processes, for example. The structured clinical vocabulary Snomed CT shall be used where possible and appropriate and is built into new templates linked to terms in the system. However, the system cannot hold the code, so only the terminology in Snomed CT is used. One challenge in the terminology work is to gain approval from the organisation to use new terms, and to convey the benefits of standardising and coding. Another challenge is lengthy Snomed CT terminology, i.e. which cannot meet the system’s character limits.

Within SUSSA, there has long been a common documentation policy that will now be developed further, which is expected to be of great help in future work. SUSSA plans to use Snomed CT when implementing the new healthcare information system. However, they see some challenges related to Snomed CT, just like other Regions, for example with pre- and post-coordination (how concepts are used alone or combined). SUSSA also uses the process and terminology models in NI as references when working with a glossary.

The interviews revealed that the work with the Regions’ national systems for knowledge management provides a positive climate for change, and that there is a clear connection between knowledge management and work related to informatics. These works shall interact with each other. One

\textsuperscript{23}ICD-10: A statistical classification to make general statistical compilations and analyses. The Swedish version is called ICD-10-SE.

\textsuperscript{24}ICNP: Classification for patient data and clinical activities in the domain of nursing, available in Swedish translation.

\textsuperscript{25}Source: Interviews
Region points out that Informatics is not the same as setting up templates in a system. Informatics ensure that know-how in the business/profession is able to generate structured information in a uniform way. Then, informatics can be implemented in the system.

In 2015, the Healthcare Board of VGR decided to use Snomed CT as a structured clinical vocabulary for medical terminology. A new strategy document is being prepared.

The informatics work in VGR's project Health Information Environment of the Future (FVM) is domain-wide. This means that it includes links between healthcare, social care, the economy and even, for example, public transport within the county (Västtrafik) when it comes to healthcare journeys.

The Regions in the current Customer Group Cosmic (KGC) work on informatics matters separately, and each has its own configuration of their respective systems. However, there is cooperation on requirements for the supplier and when ordering new development, as well as in acceptance tests of new functions. The customer group has agreed to prioritise the pharmaceutical part of the system, a solution for process orientation and improved support for structured documentation using Snomed CT. With Snomed CT, you see a major gain from the connection to the quality registers, but a variable consolidation is required on the common register level and a uniform connection to the care information systems.

4.3.3 Migration of record history

When it comes to migrating data from decommissioned to new systems, the Regions take different approaches. 26

VGR's migration project has a basic policy of ‘as little as possible’, and preferably only forward-looking data. If there are fewer than 5,000 entries, this is done by manual registration. Data that is not to be migrated will likely be stored in intermediate storage in R7e-archives. SUSSA also intends to store all data from discontinued systems in the R7e-archive's intermediate archive.

26 Source: Interviews

27 R7e-archive is an e-archive that enables filing and storing electronic information. R7e-archives receive electronic information in accepted formats that enable searchability in the material today and in the future. The R7e-archive solution was created through a unique cooperation between the ten county councils included in R7e-archive. The concept means that several county councils and other future stakeholders may share a common e-archive with common operation and administration. Access to received information is subject to authorisation control. http://www.r7earkiv.se/
Region Skåne will migrate selected information from last year’s data to Millenium. One challenge with the migration is that there are many systems that must be ‘switched off’ and replaced by the common new system. For Region Skåne, this applies to approximately 50 systems and for VGR approximately 40 systems. Add to this a number of integrations that are no longer needed.

Some old systems will stay in a read-only mode, VGR describes, with an expected lifespan. This is due in part to the fact that there is a built-in organisational structure in data from discontinued systems that will be difficult to manage outside the old systems. Without the previous system, it will be impossible to understand the origin of this data.

4.3.4 Collaboration between customer groups

VGR and Region Skåne cooperate based on having the same system vendor, while cooperation with SUSSA and KGC is limited thus far. The main focus of SUSSA, who are switching to a new system, will initially be to reach a ‘baseline’, i.e. the current level. Step one for the SUSSA Region is to introduce COSMIC in its basic form. Today, there is no cooperation with KGC on requirements for further development of the system, but there is great potential for collaboration between the two groups in the future.

Region Halland, which is part of SUSSA but partly shares healthcare areas with both Region Skåne and VGR, will face an extra challenge in the future. Here, there will probably be a need for increased collaboration in informatics work, considering that patient streams are shared with both Region Skåne and VGR.

4.3.5 Regional challenges

**Patient Data Act**

The Patient Data Act requires adjustments to the care system, mainly concerning coherent record keeping with locks, consent management and log review.

In the May 2019 SLIT report (13), 4 Regions stated that they had completed their adjustments, and 14 said they were partially completed. Meanwhile, 8 out of 17 Regions indicated that the necessary adjustments would be ready during 2019 (Diagram 11).
Diagram 11. Point in time when the Patient Data Act is expected to be fully implemented and applied in the healthcare sector, number of Regions, accumulated values. Source: SLIT report.

In the interviews, SUSSA and VGR state that they have decided to read migrated data in R7e-archives, which will require adapting R7e-archives to comply with the Patient Data Act. In Region Skåne and VGR, the Patient Data Act has led to Cerner having to undertake further development, which in turn has caused delays in the implementation for both Region Skåne and VGR.

**CLOUD Act**
Region Skåne and VGR will need to manage cloud services and the Clarifying Lawful Overseas Use of Data Act (CLOUD Act)\(^{28}\), mainly with respect to sharing data with patients via a patient portal, but also when using decision support and home monitoring of the patient. At the time of writing this report, both Regions are using the City of Gothenburg’s procedure for cloud use in MS-Office365 (42)(43).

Analyses are also ongoing on the European level. The European Data Protection Board (EDPB)\(^{29}\) and European Data Protection Supervisor

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\(^{28}\) The Clarifying Lawful Overseas Use of Data Act (CLOUD Act) is a federal law adopted in the United States in 2018. The CLOUD Act aims to enable federal legislation to compel tech companies based in the United States to provide requested data stored on servers in the United States or in any other country.

\(^{29}\) The European Data Protection Board is an independent European body contributing to a uniform application of data protection rules throughout the European Union and promotes cooperation between the European Union’s data protection authorities.
EDPS has investigated what possibilities a data controller has to comply with a request for disclosure of personal data under the US CLOUD Act. (44)

The General Data Protection Regulation (GDPR) poses special requirements for adequate protection when transferring data to third countries. Privacy Shield, a self-certification mechanism, is a common safeguard used when transferring data to the United States. This means that companies in the United States can register with the US Department of Commerce and announce that they meet the requirements of the Privacy Shield. According to a European Commission decision, data controllers in the EU are allowed to transfer personal data to recipients who have joined Privacy Shield.

However, only companies can join Privacy Shield. In addition, as Privacy Shield only covers the private sector and the CLOUD Act is a unilaterally established national law in the United States, the EDPB sees very limited opportunities for a data controller in the EU to comply with a direct request from a US authority.

As for Swedish authorities, eSam, a member-driven programme for collaboration between 27 authorities and SALAR, has made a legal assessment. Based on this, it is recommended that anyone planning to store information in a cloud service carefully analyse the type of information in question and on this basis make the necessary risk and impact assessments.

eSam’s legal expert group finds that it is not possible to rule out that a provider of a cloud service subject to foreign legislation can contribute to the disclosure of confidential information. Furthermore, eSam argues that in the legal sense it must be seen as a disclosure if a cloud service is used to process confidential data if the cloud service is owned by a foreign company where this country’s legal system requires the company to provide certain information to that country’s authorities under certain circumstances (45).

Informatics
The Regions mention that informatics resources are scarce, especially when good knowledge of healthcare is also required. VGR has hired twelve newly graduated information scientists via a consulting firm. The interviewees feel that these individuals view the Region and the public sector as an attractive place to work because it is important to feel that one’s work is meaningful and that you make a difference.

EDPS, the European Data Protection Supervisor, is an independent supervisory authority within the European Union tasked with monitoring and ensuring compliance with the Union’s regulations on personal data processing.

The Swedish Data Protection Authority participates in EDPB and EDPS.
VGR points out that there is no national decision on the use of Snomed CT, which leads to some regional doubt and that individual stakeholders therefore must take on a major part of the development work and potential risks. One challenge is that there is too little knowledge about Snomed CT regionally. Another challenge is that there are no tools and guidelines for mapping between Snomed CT and the health-related classifications. At the same time, different record keepers have different requirements when it comes to which code systems to use. In several cases, Snomed CT could be used where there are other requirements today, for example in the Swedish Medical Birth Registry.

4.3.6 Collaboration with the municipalities
When it comes to collaboration with the municipalities, the Regions differ. In Region Skåne, the municipalities have an option for the procurement. In SUSSA, no municipality has an option. SUSSA holds that it was not possible to include the municipalities in the procurement because it would then be too difficult to complete. VGR has included its own 49 municipalities in its procurement of future healthcare information systems. KGC cooperates with the municipalities in the use of COSMIC.

4.3.7 The implementation phase
A major challenge in the implementation phase, mentioned by both Region Skåne and VGR, will be the step-by-step roll-out of the systems. Over the course of a year, the old and new systems will need to exist and operate in parallel. Region Skåne will have a locked version of its system throughout the roll-out phase. The Region benefits from past experiences of implementing systems in primary care. In addition, they have access to the Copenhagen Region’s lessons learned from their system change.

SUSSA believes that changing systems will be a major challenge. A great deal of work will go into learning to use the new system. Healthcare production is expected to decrease for some time.

4.3.8 The Regions and the national initiatives and services
Most of the interviewees have the same views on Inera’s work, both in terms of deliveries and quality, as well as their implementation capacity.

Furthermore, the interviewees feel that relevant authorities need to mobilise within their respective areas to a greater extent. The issue of a terminology server was brought up as an example. Those involved, i.e. Inera, the National Board of Health and Welfare, and the Swedish eHealth Agency, all had the requirements, but were not considered to be in sync in a joint effort.
Interviewees felt there is suboptimisation in the national assignments, both with Inera and the authorities. This creates confusion in the Regions, which do not know how to relate to the national work. The result may be that no-one does anything.

Regarding population services, the Regions believe that as much as possible should be routed through 1177, such as the support and treatment platform Stöd och behandling (SoB), the form service Formulärtjänsten, Journalen, and the online appointment book. If 1177’s rate of development is too low, regional services will instead be developed and used. It is also likely that platforms for virtual doctor’s appointments will be procured by the Regions themselves as they wait for a national initiative. The Regions will also borrow from each other, i.e. one Region may develop methods and content in services that other Regions will be able to use for a fee, but a Region is responsible for content and quality.

One situation that will need to be addressed is that patients increasingly buy their own equipment, such as ECG equipment. At present, healthcare cannot utilise the values created by this equipment and do not know how to process this data. The Regions may be surprised by how quickly things develop and how quickly new technology will be adapted to society by individuals.

In the interviews, there were also comments on the National Medication List, inter alia that the legislative text is surprisingly detailed, for example regarding locks, but also that it is worrying that the solution is without requisition pharmaceuticals.

Several of the interviewees mentioned that the work on the Regions’ national knowledge management systems provides a positive climate for change, but that the work of the Regions and customer groups in the national collaboration groups (NSG), including that for structured care information, needs to be strengthened. The interviewees emphasise that the threat to this is partly the issue of resources, but also that there is an uneven distribution in the mandate of the participants in the groups.

4.3.9 Commercial realisations when procuring new systems

Commercial realisation is generally difficult to measure as the object of care is flexible and external factors change conditions over time. Influenza epidemics, organisational changes, staff reductions, savings, closures of clinics, etc. may occur during an evaluation period.

On the issue of commercial realisation, one Region says that one way of measuring this is to try to translate the endpoints into measurable benefits
and to measure before and after procurement and implementation of a new system.

As an example, VGR has not done a ‘business case’, as it is difficult to put a number on everything. As it has already been decided to invest in a new system, they choose to examine the softer values. You could look at the endpoints from different perspective, you may see secondary or tertiary effects or effects on another administrative budget.

Care production loss is also currently difficult to predict during the implementation phase, there are no good studies to collect data from for such a measurement.

On the issue of estimated commercial realisations, it is mentioned that this will be possible in several different areas. In Region Skåne, for example, 18 million referrals are currently processed in paper form, which will be digitised. Commercial realisation also comes by enabling automatic collection of vital parameters and constant access to real-time data. This will have major effects and reduce the cost per patient. Copious amounts of structured and encoded data will provide favourable conditions for efficient data exchange, for example to quality registers and future AI solutions. Being able to measure quality in aggregated structured and encoded data in real time will also generate effects.

4.3.10 IT costs and budget
The Regions’ IT managers and IT strategists annually compile a report on eHealth and IT in the Regions, the so-called SLIT report. This report has been compiled since 2003. The report published in 2019, reports results based on responses from 18 out of 21 Regions.

IT costs as a proportion of total assets has remained at almost the same level ever since the measurements began in 2003. In 2004, IT costs were 2.82 percent. In 2018, IT costs make up 2.95 percent of total assets, compared to 2.88 percent for 2017. However, there are significant differences between the IT costs of individual Regions.

In 2018, the total annual IT cost for the Regions (including their own personnel) amounted to approximately SEK 11.5 billion - an increase of approximately SEK 0.9 billion from the previous year. Services, products, costs, and total assets

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32 Total assets, or balance sheet total as it is also called, is the sum total of all liabilities or assets in the balance sheet. Total assets is the sum total of a company’s resources and the result of liabilities and equity according to the company’s balance sheet. Total assets show a company’s financial situation at a specific point in time.
software and more are being procured on the market for approximately SEK 8.4 billion.

According to the SLIT report, 13 Regions are forecasting an increase in the IT budget for 2019, while five Regions indicate that it will remain unchanged or be reduced.
5. International outlook

The goal of Vision 2025 states that Sweden shall be the best in the world in using the possibilities of digitalisation and eHealth. This goal can only be followed up by comparing how other countries are developing in the eHealth area. There are a number of ways of measuring and comparing the developments in eHealth in different countries, where some are more comparable than others. No two countries are alike, which means that the conditions that form the basis for achieving the indicators differ.

5.1 1177 compared to other portals in the Nordic countries

A study of national health portals in Norway, Sweden, Denmark, and Finland, conducted by the Norwegian Directorate of eHealth in 2019 (46), shows that the average number of visits per capita grows as services expand and new services are launched.

All the Nordic portals show strong growth in visits. The portals also continuously increase the number of services offered and communicate the services to the public. Sweden has the highest number of annual visits per capita, and strong growth from 2013. The increase in visits to the Swedish open website 1177 may be due to several factors:

- The vast amount of available information on symptoms, diseases, and treatments as well as a complete directory of all healthcare providers in the country.
- When a resident searches the internet for symptoms, illness, treatment, or healthcare providers, 1177 is almost always among the top search results.
- Most Regions refer their patients to 1177 for care-related information rather than referring to information on their own regional websites.
- Healthcare professionals often refer to 1177 and suggest that patients read more on the website. Information on the website is often used by the media and referred to in articles on health conditions.

In 2019, the Norwegian Directorate of eHealth compiled a comparison between health portals in the Nordic countries showing the individuals’ use...
of these health portals. The use of health portals to access and search for health information may give an indication of the residents’ digitalisation and eHealth maturity.

Diagram 12 shows the number of visits per resident and year to the national health portals in each country. The features of each portal differ slightly.\footnote{Methods of counting visits and logins vary between countries, but the numbers provide an indication of use. Finland lacks statistics to separate visits from logins: Kanta.fi primarily offers services requiring login to certificates and does not offer open information like the other portals.}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{diagram12.png}
\caption{Visits to national health portals per capita, April 2019. Source: Norwegian Directorate of eHealth}
\end{figure}

\section{5.2 Digital health index for international comparison}

The study \cite{SmartHealthSystems}, conducted in 2019 on behalf of the German Bertelsmann Stiftung, reports on a Digital health index consisting of three components:

- **Policy actions**: Political and strategic processes (legal frameworks, governance, institutions).

- **Digital health preparedness**: Technical implementation and semantic maturity.
• **Actual use** of data in healthcare and social care.

Data was collected from 14 countries in Europe as well as Canada, Israel, and Australia. All in all, Sweden ranks seventh in this fairly comprehensive comparison among these countries (Diagram 13).

Diagram 13. Digital health index for Sweden, compared to a selection of other countries.

Source: Bertelsmann Foundation

### 5.3 Digital Economy and Society Index (DESI)

DESI is a composite index that summarises relevant indicators of the EU’s digital performance and maps the development of Member States’ digital competitiveness. In this comparison, Sweden fares fairly well and Sweden’s ranking with respect to eHealth is better than for other digital public services (Diagram 14). Compared to the very best countries, Sweden is slightly behind in the use of eHealth services and electronic exchange of medical data. However, all of Sweden's measured values with respect to eHealth are well above the EU average. Sweden also receives the highest possible measured value for the use of electronic prescriptions (48).
Diagram 14. Scores in DESI 2019 for the areas of eGovernment and eHealth, for a selection of countries.

Comment: The table shows the scores in DESI for the subcategories e-Government and e-Health, which combined make up the main area Digital public services.
6. Reports to the Swedish Data Protection Authority

In May 2018, via the European General Data Protection Regulation (GDPR), an obligation for private and public entities that process personal data to report certain personal data breaches to the Swedish Data Protection Authority was introduced. In August 2018, the Criminal Data Act introduced a corresponding reporting requirement for law enforcement authorities.

As the reporting obligation was introduced on 25 May 2018, there are no comparable full-year figures on the number of reported breaches between 2018 and 2019. Instead, we can compare the number of reported breaches per month. According to the Swedish Data Protection Authority's reports (49)(50), the number of reported personal data breaches per month increased in 2019. During 2019, the Swedish Data Protection Authority received a total of just under 4,800 notifications of personal data breaches, from all sectors. This corresponds to approximately 400 reported breaches per month, compared to 2018 when approximately 320 breaches were reported per month. The increase per month corresponds to 23 percent between years. The public sector accounts for the largest increase in reported breaches, especially government agencies and the healthcare sector. In 2019, both of these sectors reported twice as many breaches on average per month compared to 2018. The healthcare sector saw an increase from 26 to 55 per month (+111 percent).

The most common cause of reported breaches remains the human factor, which is said to have caused half of the reported incidents in 2019. In businesses where personal data is primarily handled in internal IT systems or systems that citizens log into, the most common incident is unauthorised access.

Sectors where incorrect mailings are the most common type of breach include Social Services and the healthcare sector (Diagram 15).

Out of all notifications, from all sectors, the percentage of notifications concerning healthcare was 14 percent in 2019, compared to 8 percent in 2018. The percentage of notifications regarding Social Services was 9 percent in 2019, compared to 7 percent in 2018.
Most reported breaches in the healthcare sector are caused by human error, seven out of ten reported breaches have listed this as cause (Diagram 16).

For breaches considered particularly serious, the Swedish Data Protection Authority makes an in-depth assessment. Ongoing supervisory matters regarding personal data breaches in the healthcare sector are:

- Healthcare Guide 1177. The Swedish Data Protection Authority is reviewing the breach related to Healthcare Guide 1177 and inspections began in March and June of 2019. The review covers six supervisory matters and concerns, *inter alia*, the Regions’ processing of personal data relating to health advisory services, the connection between the Regions and health advisory services via Healthcare Guide 1177, and the distribution of responsibilities between the various stakeholders.

- Region Uppsala. Inspections began in September 2019 and investigates the reasons why the Region sent patient data without encryption.
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