

# BARRIERS AND FACILITATORS FOR EHEALTH ADOPTION BY GENERAL PRACTITIONERS IN BELGIUM.

## ANALYSIS BASED ON THE INTEGRATED ALLOWANCE FOR GP PRACTICES



# BARRIERS AND FACILITATORS FOR EHEALTH ADOPTION BY GENERAL PRACTITIONERS IN BELGIUM. ANALYSIS BASED ON THE INTEGRATED ALLOWANCE FOR GP PRACTICES

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## LIST OF ABBREVIATIONS

<b>ABBREVIATION</b>	<b>DEFINITION</b>
BAPCOC	Belgian Antibiotic Policy Coordination Committee – Belgische commissie voor de coördinatie van het antibioticabeleid – Commission belge de coordination de la politique antibiotique
BE	Benefits evaluation
CHC	Community health centre
CoBRHA	Common Base Registry for HealthCare Actor
COZO	Collaboratief Zorgplatform
DPO	Data Protection Officer
EBP	Evidence-based practice
EHR	Electronic health record
EMR	Electronic medical record
EPD	Electronic patient dossier
ETEE	End-to-end encryption
FPS	Federal Public Service
GBA – APD	Belgian Data Protection Authority – Gegevensbeschermingsautoriteit – Autorité de protection des données
GMD	Global medical dossier
GMF	Global medical file
GP	General practitioner
HIS	Health Information Systems
ICT	Information and Communications Technology
IDP	Identity Provider Service
IMC VG – CIM SP	Interministerial Conference on Public Health – Interministeriële Conferentie Volksgezondheid – Conférence interministérielle Santé Publique



INSZ – NISS	Social security registration number – Identificatienummer van de sociale zekerheid – Numéro d'identification du Registre national
ISC	Information Security Committee
NHG	Dutch GP Society – Nederlands Huisartsen Genootschap
NIC – ICN	Nationaal Intermutualistisch College – Collège Intermutualiste National
PARIS	Prescription & Autorisation Requesting Information System
PDP	Policy Decision Point
RID	Recip-e identification number
RIZIV – INAMI	National Institute for Health and Disability Insurance – Rijksinstituut voor ziekte- en invaliditeitsverzekering – Institut national d'assurance maladie-invalidité
RSW	Réseau Santé Wallon
Sumehr	Summarised Electronic Health Record
TOTP	Time-based one-time password (TOTP)



## ■ SCIENTIFIC REPORT

### 1 BACKGROUND AND INTRODUCTION

#### 1.1 Defining eHealth and scope

eHealth is a broad term, referring to the application of information and communication technologies (ICT) across healthcare services. It has previously been defined in multiple ways. For example, the World Health Organization defines eHealth as “...the cost-effective and secure use of information and communication technologies in support of the health and health-related fields including healthcare, health surveillance and health education, knowledge and research”.<sup>1</sup>

In addition, the European Commission defines eHealth as “tools and services that use ICT to improve prevention, diagnosis, treatment, monitoring, and management of health and lifestyle”.<sup>2</sup> Depending on the definition used, eHealth encompasses a broad variety of digital health services, among which electronic patient dossiers (EPD), telehealth and – medicine, ICT systems for healthcare, virtual healthcare, mobile health (mHealth), etc. However, these domains are not always well defined and often overlap, which creates confusion.

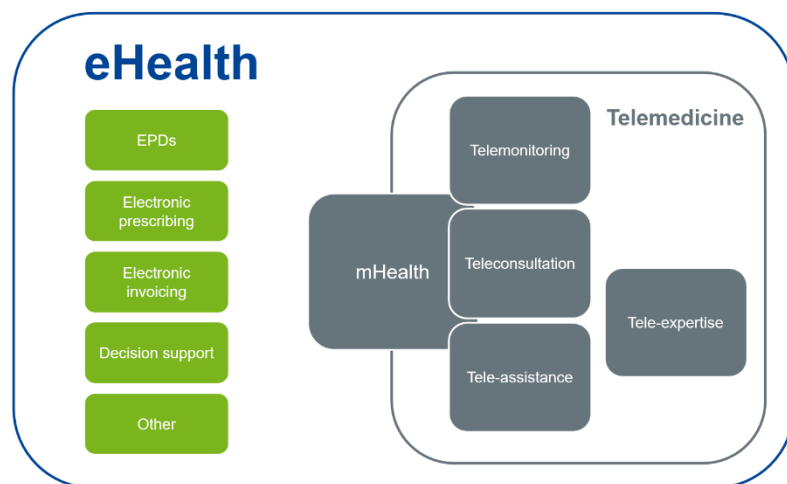
One possible distinction is between telemedicine, which is more directly related to diagnosis and treatment of patients, and eHealth solutions that are less directly related to diagnosis and treatment but aim to facilitate the day to day practice of healthcare. Telemedicine is commonly described as the provision of healthcare services, through the use of ICT, in situations where the healthcare professional and patient (or two healthcare professionals) are not in the same location.<sup>3</sup> It involves secure transmission of medical data and information, through text, sound, image, or other formats. Telemedicine can include a broad range of services: telemonitoring, teleconsultation, tele-assistance, and tele-expertise.<sup>4</sup> Telemonitoring is used to enable follow-up or integrated care. Healthcare professionals can remotely check and monitor data of a patient. Teleconsultation refers to a therapeutic or medical act carried out remotely, with or without the presence of another healthcare professional next to the patient. Tele-assistance is a practice occurring when a physician remotely guides (or performs) a medical act. mHealth is closely linked to telemedicine. According to the European





Commission, this term covers medical and public health practices supported by mobile devices (such as mobile phones or other wireless devices). It also includes applications such as lifestyle and wellbeing apps that may connect to medical devices or sensors (e.g. bracelets or watches), as well as personal guidance systems, health information and medication reminders provided by telemedicine wirelessly.<sup>5</sup>

**Figure 1 – Domains of eHealth and their interconnectivity**



**Source:** Adapted from Bensemmane & Baeten (2019)<sup>4</sup>

**Note:** Domains in grey are out-of-scope for this report.

eHealth services that are less directly related to diagnosis and treatment support the qualitative delivery of care, the securely sharing of healthcare information between healthcare providers, patient, health insurers and government agencies, and support the administrative side of practicing healthcare. They include electronic health records, electronic prescribing, electronic invoicing, decision support and securely exchanging health records between healthcare providers among others.

Potential benefits of the use of eHealth have been widely documented in the literature.<sup>6-10</sup> The use of eHealth services can improve practice organisation, assist GPs in decision-making, simplify prescriptions of medications and diagnostic procedures, provide alerts and reminders.<sup>11-17</sup> This potential benefits can lead to lower rates of errors and adverse drug events, higher productivity among GPs at lower costs.<sup>11, 16-18</sup> However, despite this widespread acknowledgement of the potential benefits of eHealth, the uptake has been slower than expected.<sup>19-22</sup> Research of the European Commission indicated that the uptake of eHealth in all European countries showed to be much more difficult and time-consuming than initially anticipated.<sup>23, 24</sup>

As well as in Europe, eHealth development and uptake in Belgium is an important priority of the Belgian federal and federated governments. This is, for example, reflected in the collaboration of the federal state, the Flemish region and community, the Walloon region, the Brussels region, the French community, the German community, and the different community commissions for Brussels in creating a first action plan in 2013 and adapted in 2015 to confront existing problems and stimulate eHealth services.<sup>25</sup> This first plan consisted of 20 action points aiming at a coordinated development of initiatives in the field of eHealth. In 2019, a follow-up eHealth action plan (2019 – 2021) was adopted by the Interministerial Conference on Public Health (IMC VG – CIM SP). By doing so, the IMC VG – CIM SP reinforces the commitment to further elaborate the digital transformation of Belgian healthcare.<sup>26</sup> The preparation of this new action plan was based on a number of principles:

- the continuation of inter-federal cooperation on the eHealth strategy and the pursuit of further optimisation of the cooperation model;
- the extension of ongoing projects to new target groups or other application areas;
- the continuation of ongoing projects with extra focus on use in practice;
- the development of a framework and management model for the use of existing systems that are built by the government and/or the private sector;



- strengthening the focus on “operational excellence” to continuously improve the availability and performance of the systems and tools used by patients and healthcare providers;
- connecting with European and international eHealth initiatives;
- revising of ongoing projects, finishing of projects that are no longer relevant, and start-up of new projects that can consolidate, harmonise and stabilise ongoing projects.

On the basis of these principles, seven clusters of 44 interconnected projects were identified, each with a clear ambition and objectives.<sup>26</sup> These seven clusters are:

1. **Foundations of the eHealth landscape:** this concerns e.g. the management and evolution of the principles and systems of computerised patient consent, the access matrix to eHealth services and information for healthcare providers, the management and use of basic services, the terminological and technical standards used, etc. This means that the same rules and agreements apply to both patients, healthcare providers and software suppliers.
2. **Transversal aspects of the eHealth plan:** e.g. providing appropriate communication, as well as ensuring proper management and follow-up of the projects by closely monitoring their coherence.
3. **Supporting the implementation:** e.g. the policy on incentives for the use of eHealth services by healthcare providers.
4. **Operational excellence:** this comprises concrete projects to ensure a smooth implementation of new tools and systems, both with a strong/reliable technical infrastructure, and with supporting and accompanying initiatives for all actors: citizens, providers, software suppliers, etc.
5. **Healthcare providers and healthcare institutions:** this cluster comprises a series of projects aiming to create value-added services for healthcare providers, such as tools for multidisciplinary and transmurial data exchange, the further development of the electronic prescription, the further development of the EPD in hospitals, the implementation of the BelRai instrument, etc. These are, to a large extent, projects that were already started in the eHealth action plan 2013-2018 and are now being further implemented and expanded.
6. **Patient as co-pilot:** this cluster includes the eHealth projects that address the patient directly. It concerns, for example, the further development of the Personal Health Viewer (Mijgezondheid.be – Masanté.be), with the ambition that citizens have access, via one portal, to all existing electronic information of their health record, independent of the “source”. Citizens will also be able to directly manage their declaration of organ donation.
7. **Health insurance funds:** a specific cluster of the eHealth plan is aiming at (public) health insurance funds that have a series of projects ongoing in the field of the digital transformation of administrative processes with healthcare providers, patients and the government, such as electronic invoicing and attestation, digitisation of agreements and consents such as for Chapter IV medicines, etc.

The Ministry of Social Affairs and Public Health noticed the low adoption rates for some eHealth services, and KCE asked to investigate possible factors contributing to or holding back the uptake of current available eHealth services for general practitioners (GPs) in Belgium. In parallel to the current study (which has a focus on the scientific literature and available administrative data for eHealth used by GPs), imec (Interuniversity Microelectronics Centre) conducted a survey to measure the uptake and attitude towards eHealth in a sample of healthcare providers, including GPs: the [eHealthMonitor](#). As part of the follow-up of this survey, several focus groups were conducted to further clarify facilitators and barriers for eHealth use. KCE conducted the focus groups for GPs and (part of) the findings are included in this report.



The scope of the current study, with regard to actual use of eHealth, is limited to the eHealth services that are less directly related to diagnosis and treatment, but aim to facilitate the day to day practice of GPs. More specifically, only the eHealth services taken into account in the criteria of the integrated allowance (“geïntegreerde praktijkpremie huisartsgeneeskunde – prime de pratique intégrée en médecine générale”) for GPs by RIZIV – INAMI are studied. This integrated allowance is linked to multiple parameters of use of eHealth services available to GPs. These parameters and their operationalisation in the integrated allowance are described more elaborately in Chapter 1 and Chapter 3.

## 1.2 Research questions

The goal of current report is to provide insight in the factors contributing to eHealth uptake among Belgian GPs. The results of this report should assist public authorities in setting priorities and making strategic decisions regarding the implementation of eHealth in primary care. The general aim covers the following research questions:

1. What are the current uptake rates of existing eHealth services by GPs in Belgium?
2. Are there differences in eHealth adoption between different groups of Belgian GPs?
3. What are the facilitators related to the use of existing eHealth services by (Belgian) GPs?
4. What barriers related to the use of existing eHealth services by (Belgian) GPs need to be overcome or addressed?

## 1.3 Methods

Different research methods were used during this project to answer the research questions. Main steps and research methods in general are summarised in Table 1. Each research method is described in detail in the respective chapter.

For research questions 1 and 2 we analysed administrative data on the different criteria for the integrated allowance for GPs by RIZIV – INAMI. Results of this analysis can be consulted in Chapter 3. The facilitating factors and barriers for the use of eHealth services by GPs (research questions 3 and 4) are addressed in three different chapters. First, the international literature was studied by means of a systematic literature review in Chapter 4. The results of this systematic review were complemented by a discourse analysis of the grey literature focused on the Belgian context (Chapter 5). Last, focus groups among GPs were conducted in which the factors and services contributing for eHealth uptake were identified. The findings of these focus groups are described in Chapter 6.

**Table 1 – Research questions and methods**

Research question	Method	Chapter
1. <b>What is the current uptake of existing eHealth services by GPs in Belgium?</b>	Analysis of administrative data provided by RIZIV – INAMI	Chapter 3
2. <b>Are there differences in eHealth adoption between different groups of Belgian GPs?</b>		
3. <b>What are the facilitators related to the use of existing eHealth services by (Belgian) GPs?</b>	Systematic review of the scientific literature	Chapter 4
4. <b>What barriers related to the use of existing eHealth services by (Belgian) GPs need to be overcome or addressed?</b>	Discourse analysis of the Belgian grey literature	Chapter 5
	Focus groups among Belgian GPs	Chapter 6



## 2 EHEALTH SERVICES IN THE RIZIV – INAMI INTEGRATED ALLOWANCE FOR GP PRACTICES

### 2.1 Scope

A patient visiting a GP in Belgium in 2020 participates in a web of eHealth services. In this chapter, we try to describe the existing eHealth services available to Belgian GPs at the time of writing. Many different partners, both private and governmental, interoperate to create an environment that partially automates and digitalises the workflow of the GP.

In this chapter, we will discuss the eHealth services that exist at the time of writing with a focus on services that are part of the assessment criteria for the RIZIV – INAMI integrated allowance for the GP practice, see section 3.2 for further details.<sup>27</sup> Purely commercial services are not discussed except to the extent they use or contribute to these services. We discuss both the building blocks as well as the end user services available to a GP. First, we describe an important service provider, the eHealth-platform. Second, we provide details on the different eHealth services available to GPs.

#### Disclaimer

All diagrams in this chapter depict principal flows of information between participating partners rather than exact technical exchanges. As the primary aim of this chapter is to introduce the concepts used in later chapters (rather than provide a comprehensive technical exposition), we chose this visualisation to keep the diagrams as reader-friendly as possible.

### 2.2 The eHealth-platform

#### 2.2.1 A public institution of social security

The eHealth-platform is the proverbial spider in the web. The eHealth-platform is a public institution of social security. Its purpose is to optimise the quality and continuity of healthcare provision and the safety of patients, to simplify administrative processes and to support health policy (art. 4 of the eHealth-platform law<sup>28</sup>).

The eHealth-platform has an extensive set of legal missions (article 5 of the eHealth-platform law, see Table 2).



**Table 2 – Legal missions of the eHealth-platform**

Mission	Description
<b>Develop a vision on and strategy for eHealth</b>	<ul style="list-style-type: none"> <li>• Effective, efficient and secure electronic service provision and information exchange in the healthcare sector.</li> <li>• Respecting the protection of privacy.</li> <li>• In close consultation with the various public and private actors in the healthcare sector.</li> </ul>
<b>Establish standards and a base architecture</b>	<ul style="list-style-type: none"> <li>• Establishing useful ICT-related functional and technical norms, standards, specifications.</li> <li>• Establishing basic architecture to support the vision and strategy.</li> </ul>
<b>Verify and register electronic records software packages</b>	<ul style="list-style-type: none"> <li>• Verifying the compliance of software packages for the management of electronic health records with established ICT-related functional and technical norms, standards and specifications</li> <li>• Registering these software packages.</li> </ul>
<b>Create and maintain basic electronic services</b>	<ul style="list-style-type: none"> <li>• The conception, management, development and provision in standard form, free of charge, to healthcare providers of basic electronic services which potentially support them, such as :               <ul style="list-style-type: none"> <li>○ a collaborative platform for the secure electronic exchange of data, including a system for the organisation and logging of the electronic data exchange, and a system for electronic access to the data;</li> <li>○ the basic services needed to support this electronic data exchange, such as:                   <ul style="list-style-type: none"> <li>▪ a system of encryption of data between sender and recipient;</li> <li>▪ a user and access management system;</li> <li>▪ a secure electronic mailbox for each healthcare actor;</li> <li>▪ an electronic dating system;</li> <li>▪ an encryption and anonymisation system for information;</li> <li>▪ a referral directory indicating, with the agreement of the patients concerned, which healthcare actors hold which types of data in relation to which patients.</li> </ul> </li> </ul> </li> </ul>
<b>Create and verify standards of quality</b>	<p>On the data exchanged on the collaboration platform:</p> <ul style="list-style-type: none"> <li>• Agreeing on a division of tasks concerning the collection, validation, storage and making available of the data.</li> <li>• Creating the quality standards with which such data must comply.</li> <li>• Verifying compliance with these quality standards.</li> </ul>
<b>Promote and coordinate programs and projects</b>	<p>Promoting and coordinating the realisation of programmes and projects that implement the vision and strategy, and that transcend (types of) actors in the healthcare sector.</p>
<b>Manage and coordinate ICT</b>	<p>Managing and coordinating the ICT-related, organisational, functional and technical aspects of data exchange.</p>



Mission	Description
<b>Act as a trusted third party</b>	<ul style="list-style-type: none"> <li>Act as an intermediary organisation for pseudonymising, collecting, merging, encoding or making available data useful for the knowledge, conception, management and delivery of healthcare.</li> <li>The eHealth platform itself may only keep the personal data processed in the context of this mission for as long as this is necessary for the purpose of encoding or making them anonymous. However, the eHealth platform may maintain the link between a data subject's real identification number and the coded identification number allocated to him/her if the recipient of the coded personal data so requests in a justified manner.</li> </ul>
<b>Promote and support the necessary changes in implementing the eHealth vision and strategy</b>	<ul style="list-style-type: none"> <li>Promoting compliance with the vision, strategy, functional and technical norms, standards and specifications, basic architecture.</li> <li>Promoting the use of the collaborative platform for secure electronic data exchange and basic services.</li> <li>Promoting and supporting the realisation of the programmes and projects by as many actors in the healthcare sector as possible.</li> </ul>
<b>Collaborate with other coordinating governmental institutions</b>	The organisation of cooperation with other public authorities, regardless of their level of government, charged with the coordination of electronic services.

To be able to perform its missions, the eHealth-platform can legally process the National Registry Number and has access to the National Registry. The eHealth-platform can process data related to health under the following conditions:

- The processing is authorised by the Information Security Committee (ISC) - Chamber Social Security and Health. The ISC is an independent governmental committee with the explicit mission to formulate good practices on the processing of personal data, to grant authorisations for the processing of social and health related personal data to the extent required by law and to support the function of Data Protection Officer (DPO). It has no supervisory power as this is the competence of the Belgian Data Protection Authority (GBA – APD).
- There is an exemption to the requirement of an authorisation by the ISC if the processing is laid down in legislation and requires the intervention of the eHealth-platform.

The eHealth-platform is the reference partner for healthcare actors when digitally exchanging personal data related to health (article 8/1 of the eHealth-platform law). Healthcare actors or the partners with which they exchange personal data are not required to use the services of the eHealth-platform for their applications. However, the ISC will need to establish equivalence of the services used to the services provided by the eHealth-platform in terms of information security.

The eHealth-platform has collaboration with healthcare actors and other governmental institutions written in its founding law. This is strongly reflected in the organisational structure of the eHealth-platform. A Management Committee with representatives of healthcare providers and other governmental institutions is tasked with approving the strategy and vision of the eHealth-platform, drawing up the draft budget and monitoring its implementation, and drawing up the financial statements of revenue and expenditure. Additionally, it is competent on personnel matters, and can propose new and changes to legislation to the competent Minister. Likewise,



it must be consulted on proposals of new legislation or of changes to existing legislation if it concerns the eHealth-platform.

A Concertation Committee with the users of the eHealth-platform helps the Management Committee with realising its tasks. The Concertation Committee has the following main tasks:

- Promote, in the interests of patients, the electronic exchange of data.
- Promote the exchange of secure data between healthcare actors.
- Increase the quality and continuity of healthcare by ensuring the continuous availability of health data relating to the patient.
- Optimise cooperation and communication between healthcare providers focused on improving patient follow-up.

The Concertation Committee can advise on:

- The organisation of future electronic data flows for the collection, processing and making available of clinical data and the organisation of the registers related to healthcare.
- The appointment of the intermediary body entrusted with the operational organisation of data flows and registries if the eHealth platform is unable to fulfil this mission.
- The definition of therapeutic relationships, the procedure relating to the informed consent of patients and the patients' right of access to the use of the data concerning them.
- In addition, the eHealth-platform offers a dashboard regarding the (planned) interventions and interruptions for several eHealth services, which can be consulted by GPs.

## 2.2.2 Basic electronic services

The eHealth-platform has developed several basic electronic services as building blocks for further applications. This section provides an overview of these services relevant to eHealth services for GPs, without going into too much technical detail.

### 2.2.2.1 eHealth certificate

The eHealth certificate is a digital document used to authenticate and authorise a system. The eHealth certificate allows a computer system to authenticate itself as a system used by a healthcare providers, or by a licensed organisation.<sup>29</sup> The eHealth certificate allows software programs like EPD software to connect to eHealth-platform services and obtain appropriate authorisation for the user. It is similar in nature to for example the eID<sup>a</sup> which can be used to authenticate a user rather than a system.

The eHealth certificate allows the eHealth-platform to assign different roles and levels of access to different types of users and organisational systems. Checks are performed during the issuing process and the certificate has a limited lifetime of three years. An individual healthcare professional needs to be registered in the authentic source of his professional category and needs to possess a strong personal authentication ID, namely the eID. For an organisation, similar requirements exist, e.g. for the representative of the organisation. On top of those, the organisation must respect certain norms of information security and guarantee that access to the systems is limited to authorised personnel only.<sup>30</sup>

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<sup>a</sup> eID is the electronic identity card issued to every Belgian citizen aged 12 or above.





### 2.2.2.2 Authentication and authorisation

An important service provided by the eHealth-platform is a trusted way to verify the identity of the partners in the information exchange (authentication) and to verify they have sufficient rights to use the requested service (authorisation). A prerequisite to this service is the existence of authentic sources. An authentic source holds the reference data in a certain domain and is governed by the organisation(s) responsible for that domain. In the case of healthcare actors and organisations, the “Common Base Registry for HealthCare Actor” (CoBRHA) is the authentic source.<sup>31</sup> It is the common database of the public institutions competent for the licensing of healthcare actors both individuals as well as organisations in Belgium. CoBHRA contains three types of information:

- Who is a healthcare actor in Belgium?
- What activities does the license cover? E.g. for individual healthcare actors, this concerns a licensed profession and additional specialisations. For organisations, this concerns licensed activities (e.g. general hospital, nursing home, intensive care, etc.).
- What are the responsibilities of the healthcare actor? For each healthcare actor, a profile is available. This profile contains, among others, the roles a healthcare actor can play.
- Currently, both federal as well as federated government organisations feed the database, depending on their competency with regard to healthcare.

The eHealth-platform distinguishes two user cases:

- Individuals present in the National Register with a social security registration number (INSZ – NISS).
- Systems that are part of an organisation that is registered in an authentic source (e.g. CoBHRA).
- The registration in the authentic sources above (National Register and CoBHRA) ensures that users have at least one type of digital key that allows them to identify themselves (e.g. eID or eHealth certificate). The eHealth-platform supports multiple key types, depending on the way of access (see also Figure 2):
- eID and the eHealth certificate for system-to-system access (e.g. EPD software to a an eHealth service<sup>b</sup>).
- eID, itsme®<sup>c</sup> and time-based one-time password (TOTP) for access to web portal services<sup>b</sup>.

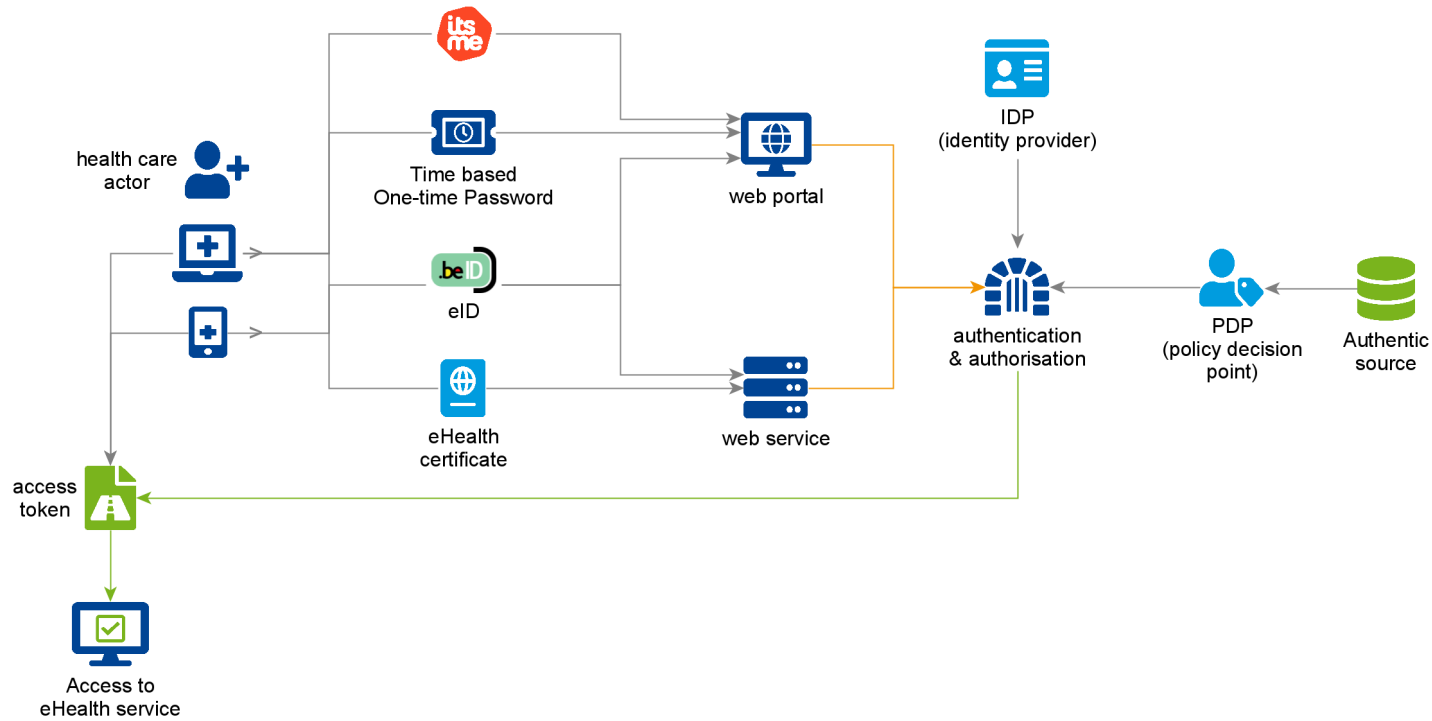
When trying to obtain access to an eHealth service, the identity of the healthcare actor is checked with an Identity Provider (IDP) service. Once verified (authenticated), the profile chosen by the healthcare actor is used to retrieve the rules by which access can be granted to the service through a Policy Decision Point (PDP). This last service uses authentic sources to retrieve the necessary information. If the rules grant the healthcare actor access (authorisation), an access token is made available allowing the use of the eHealth service.

<sup>b</sup> In this report, we use ‘web service’ to refer to an application or service that can be accessed over the web. If the corresponding application also provides a user interface in a browser, instead of or aside from system to system access, we use ‘web portal’ or ‘web portal service’.

<sup>c</sup> itsme® is an app on your smartphone that allows you to prove your identity and confirm transactions.



Figure 2 – Authentication and authorisation



**Note:** The figure depicts the logical flow of information and does not necessarily reflect the technical flow.



### 2.2.2.3 *End-to-end encryption service*

The end-to-end encryption (ETEE) service allows to encrypt messages for healthcare professionals or institutions. The service can be used for both a known or unknown recipient although different systems are used for each case. A message is used in this section in its broadest sense: a text message, a document, a sound recording, images, etc.

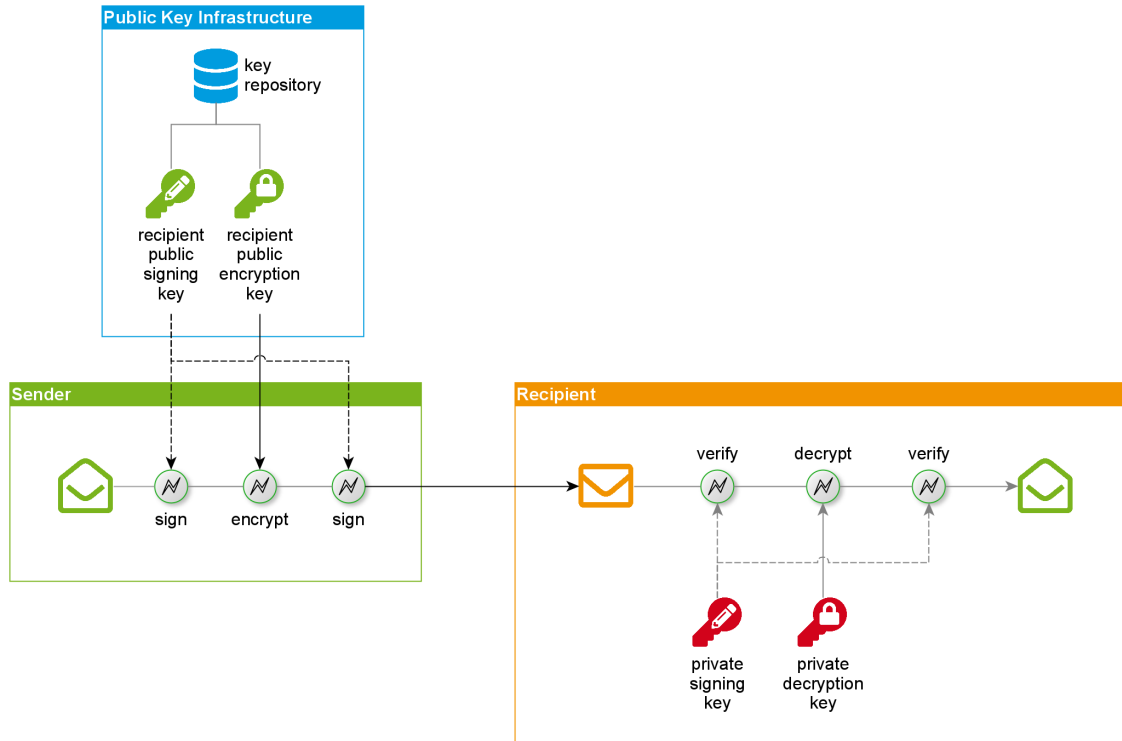
In case the recipient of the to-be-encrypted message is known, a public key (or asymmetric) cryptography solution is used.<sup>32</sup> To this end, when a healthcare professional or organisation is issued an eHealth certificate, two public-private key pairs are created as well, and the public keys are retained in a repository at the eHealth-platform. One key pair is used for signing, the other for encryption and both are linked to the eHealth certificate. An example exchange of messages with asymmetric cryptography is shown in Figure 3, using features of the eHealth-platform approach.

1. The sender uses the public signing key and the public encryption key of the recipient to sign and encrypt the message he or she wishes to send. These keys are retrieved in a trusted way from a repository in public key infrastructure. For the eHealth-platform, the eHealth-certificate and a dedicated repository at the eHealth-platform implement this.
2. The signed and encrypted message is then sent to the recipient, possibly over an insecure channel like the internet.
3. The recipient uses his private signing key and private decryption key to verify and decrypt the message.

A defining feature of asymmetric cryptography is that the public and private key are different although strongly related to each other, with the private key being able to decrypt messages encrypted with the public key. The algorithm chosen to create the public and private key makes it extremely difficult, and in practice unfeasible, to guess the private key from the public key, making it cryptographically very secure.



Figure 3 – Example schema of asymmetric cryptography



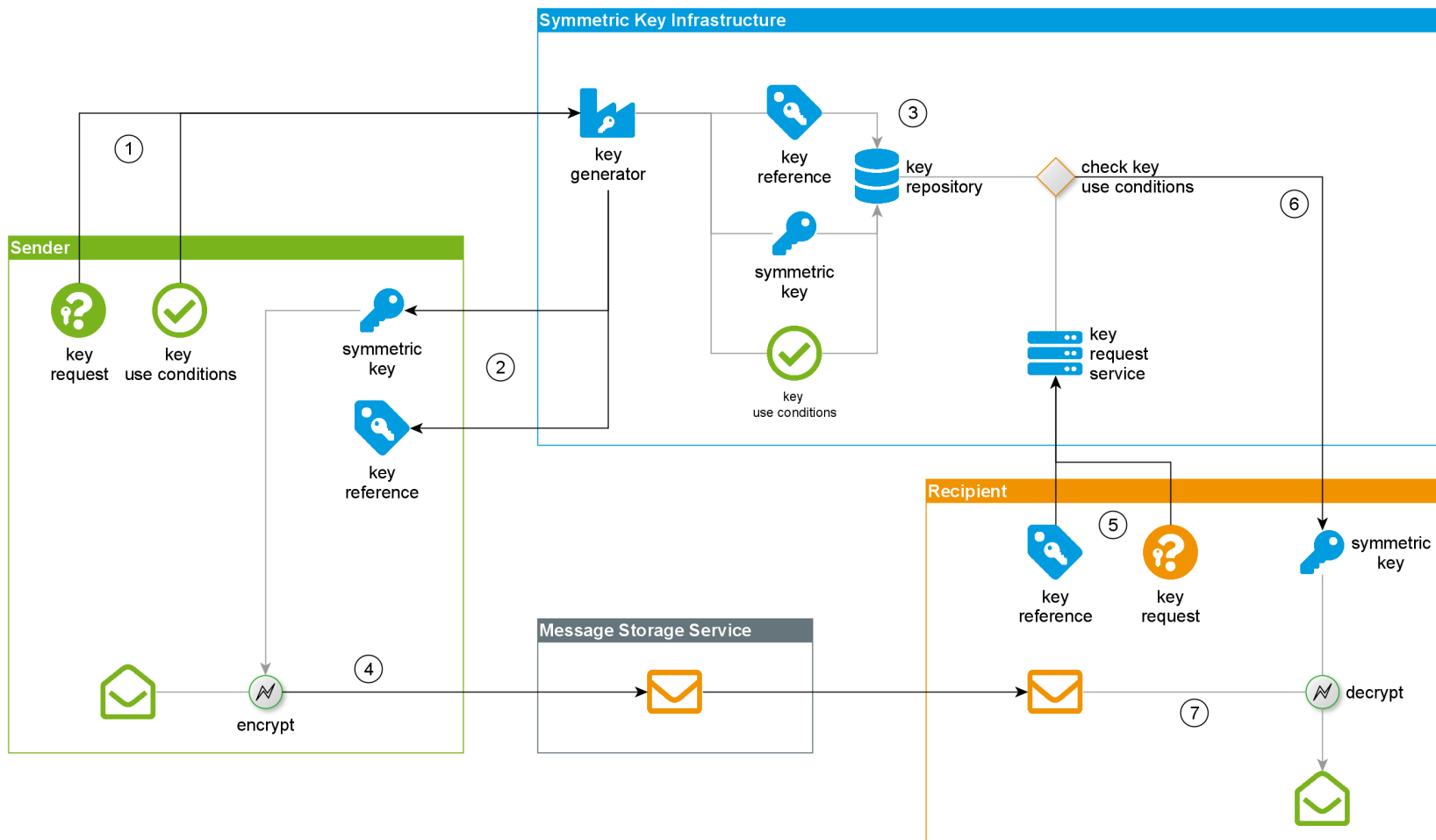


In case the recipient is not known in advance, a symmetric key cryptography solution is used.<sup>33</sup> This solution requires more involved steps than the asymmetric cryptography solution as the recipient is unknown in advance (the numbers in the description below refer to the numbers in Figure 4):

1. When a sender wants to make a message available to an unknown recipient, he or she requests a key to be used for encrypting the message, on the eHealth-platform end-to-end encryption web service. The request is accompanied by use conditions for the recipient. For example, if the message is an electronic prescription, the use condition is that the recipient must be a registered pharmacy with access to the eHealth-platform infrastructure. The request and reception of the key use the asymmetric cryptography solution described above in order to guarantee a safe exchange of the key.
2. The eHealth-platform end-to-end encryption web service creates a unique new key for each request. It also creates a key reference that can be used by the sender to give to a third party so the final recipient can fetch the key (see below).
3. The key, the key reference and the key use conditions are then stored at the eHealth-platform in a key repository.
4. The sender can then encrypt the message with the key. Often the encrypted message is then temporarily stored on a message storage service since the recipient is unknown at the time the message is sent. Since this depends on the application, this service is not a part of the symmetric key cryptography solution but is shown here illustratively.
5. The recipient can at a later time request the encryption key from the eHealth-platform end-to-end encryption web service. For that, he or she must possess the key reference. This usually involves a third party that received the key reference of the sender at the time the message was sent (e.g. a patient receiving an electronic prescription), and in turn gives the key reference to the recipient (e.g. a pharmacy).
6. Upon receiving the request for a key, the eHealth-platform end-to-end encryption web service checks the key reference and any key use conditions before retrieving the key from repository and sending it to the recipient. Again, this exchange uses the asymmetric cryptography solution described above in order to guarantee a safe exchange of the key.
7. After retrieving the message from the message storage service, the recipient can decrypt the message with the key.



Figure 4 – Information flow symmetric key solution



**Note:** The figure depicts the logical flow of information and does not necessarily reflect the technical flow.

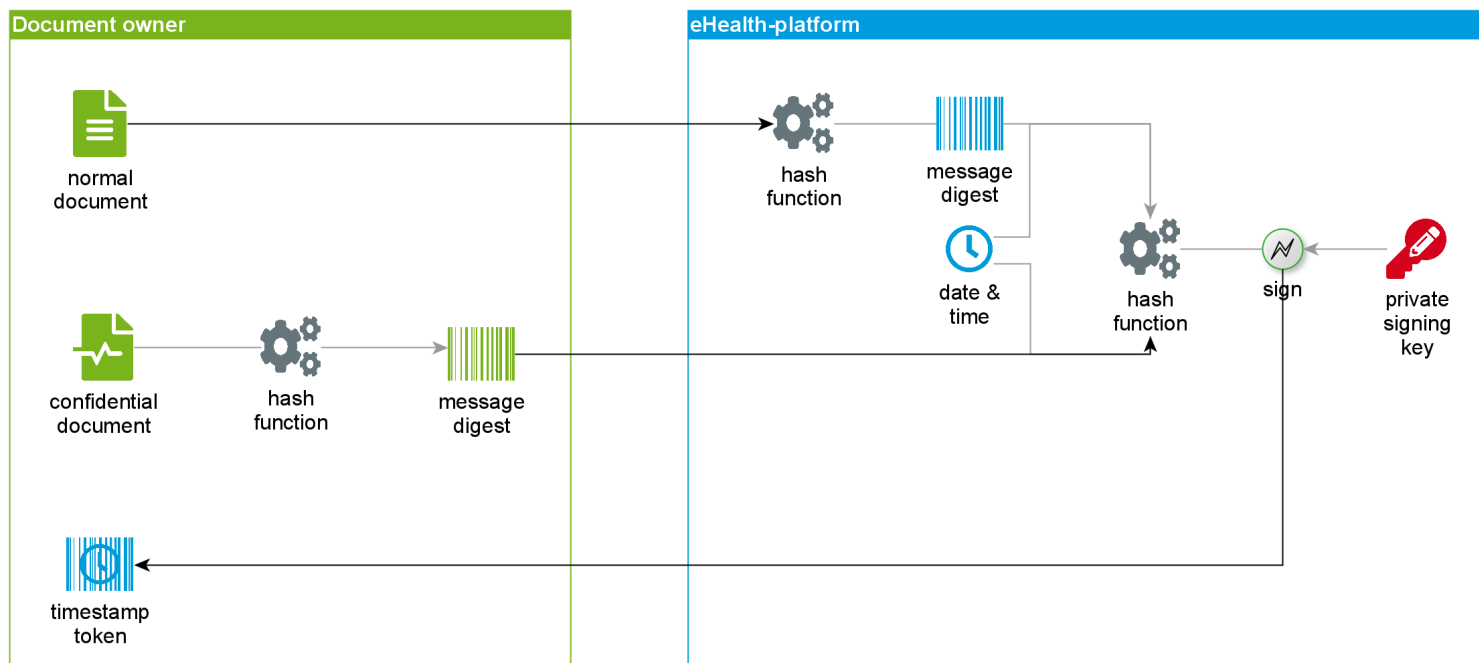


#### 2.2.2.4 *Timestamp service*

A trusted timestamp allows to prove a document existed with a certain content at a certain moment in time. The timestamp is tamper-proof. The eHealth-platform offers both the creation of timestamps as well as the consultation of a timestamp that is temporarily stored at the eHealth-platform.<sup>34</sup>

For the creation of trusted timestamps, the eHealth-platform both accepts documents, as well as message digests from e.g. confidential documents. A message digest is the resulting value from applying a cryptographic hash function to the document. This function creates a fixed size result (e.g. 64 characters). The function is one-way in the sense that the original document cannot be recovered from the message digest. The function is constructed in such a way that it is infeasible to find two different documents with the same message digest.

A document owner can request a trusted timestamp by either creating a message digest with one of the supported hash functions, or by sending the document itself, to the eHealth-platform timestamping service (see also Figure 5). In the latter case, the eHealth-platform creates a message digest. The message digest concatenated with a timestamp is then hashed again and signed by the eHealth-platform. The resulting timestamp token is returned to the document owner as a trusted timestamp. On request, the eHealth-platform can archive the timestamped document or message digest for later retrieval e.g. in a scenario of auditing.

**Figure 5 – Flow of information in timestamping service**

**Note:** The figure depicts the logical flow of information and does not necessarily reflect the technical flow.

## 2.3 eHealth services for GPs

In the following sections, eHealth services for GPs are discussed, often using a diagram to show the main information flow. To keep these diagrams legible, the basic electronic services provided by the eHealth-platform, and described in the previous section, are not shown in full detail, but are either represented simplified or mentioned in the accompanying text.

### 2.3.1 Recip-e – Electronic prescriptions

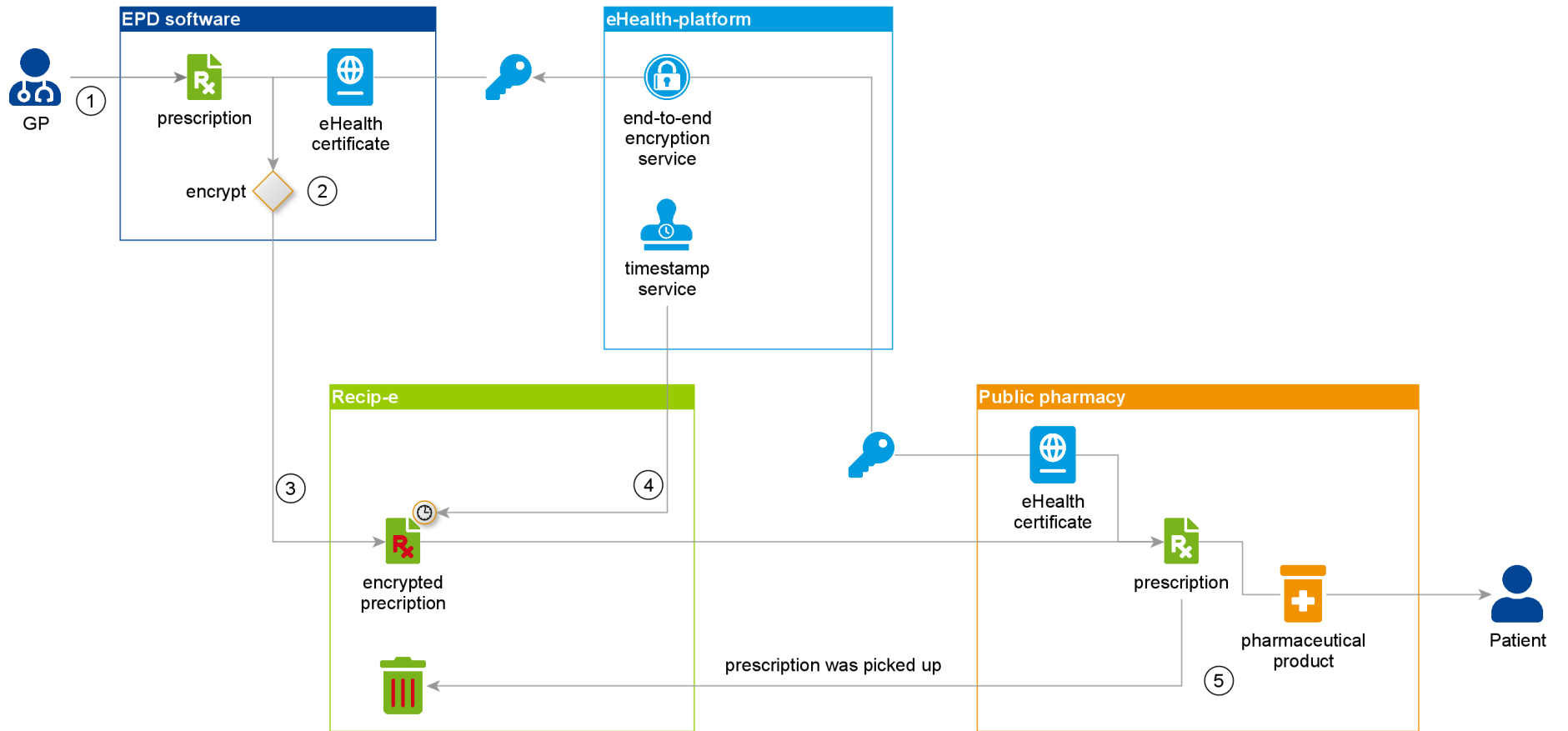
Recip-e is a system for physicians, dentists, and midwives that aims to replace paper prescriptions of pharmaceutical products, physiotherapy and nursing by electronic prescriptions.<sup>35</sup> Recip-e is compulsory for prescriptions of pharmaceutical products, except during visits and in emergencies. Prescriptions of physiotherapy and nursing are in test phase.

Figure 6 shows an overview of the Recip-e workflow. Table 3 details the steps involved with numbers corresponding to those in the figure.





Figure 6 – Principal flow of information in Recip-e



**Note:** The figure depicts the logical flow of information and does not necessarily reflect the technical flow.

**Table 3 – Flow of information in Recip-e (see Figure 6 for corresponding numbers)**

Figure N°	Description
1	The GP creates a new prescription for a pharmaceutical product in the EPD software. All licensed EPD software are obliged to support Recip-e.
2	The medical part of the electronic prescription is encrypted using the eHealth-platform end-to-end encryption web service (see section 2.2.2.2). This service provides a symmetric key for encrypting the prescription using the eHealth certificate to, among others, authenticate and authorise the GP. The encryption is done on the computer of the GP and the encryption key is stored at the eHealth-platform, including the conditions on which this key can be requested.
3	The electronic prescription with encrypted medical content is sent to and temporarily stored on the Recip-e server.
4	After verifying form and integrity of the prescription, Recip-e requests a trusted timestamp from the eHealth-platform timestamp service. The prescription gets a unique number (i.e. the Recip-e identification number [RID]) and the GP is notified of reception.
5	When a patient picks up the prescription, the pharmacy requests the prescription from the Recip-e server and based on its eHealth certificate, requests the key to decrypt the prescription from the eHealth-platform end-to-end encryption service. If the prescription is delivered, the Recip-e server is notified and the stored prescription is removed from the Recip-e server.

Recip-e offers a number of additional features on top of the principal workflow depicted in Figure 6. The patient can consult the prescription either in the [Mijngezondheid / Masanté](#) (an online health portal) or in the online portal of the commercial software deployed by the GP. The GP gets notified when the patient has collected the prescription and can check if the patient not (yet) collected the prescription within the valid time frame.

For GPs that do not yet use or not need an EPD software, or in cases where the GP must prescribe and has no access to his/her EPD software, RIZIV – INAMI provides a web portal, PARIS (Prescription & Autorisation Requesting Information System) that allows to prescribe electronically but without all the features and advantages of the EPD integrated Recip-e service.<sup>36</sup>

The Recip-e system is governed by a non-profit organisation (Recip-e VZW-ASBL) established in 2010.<sup>37</sup> Its members are healthcare organisations and associations representing healthcare professionals (see Table 4 for details).<sup>38</sup>


**Table 4 – Recip-e VZW-ASBL partner organisations**

Organisation	Description
<a href="#"><u>ABSYM – BVAS</u></a>	“Association Belge des Syndicats Médicaux – Belgische Vereniging van Artsensyndicaten”, an association representing physicians
<a href="#"><u>KARTEL</u></a>	Association of three organisations (ASGB, GBO, and MoDeS) representing physicians.
<a href="#"><u>AADM</u></a>	“Alliantie Artsenbelang – Alliance pour l’avenir des médecins”, an association representing physicians
<a href="#"><u>VVT</u></a>	“Verbond der Vlaamse Tandartsen”, an association representing dentists
<a href="#"><u>APB</u></a>	“Association Pharmaceutique Belge – Algemene Pharmaceutische Bond”, a national federation representing independent public pharmacies
<a href="#"><u>OPHACO</u></a>	“Office des Pharmacies Coopératives de Belgique – Vereniging der Coöperatieve Apotheken van België”, an association cooperative partnerships representing pharmacies
<a href="#"><u>AXXON</u></a>	An association representing physical therapists
<a href="#"><u>NVKVV</u></a>	An association representing nurses
<a href="#"><u>WitGeleKruis</u></a>	An organisation of home nursing and help at home.
<b>Home nursing associations</b>	Multiple other associations representing home nurses.

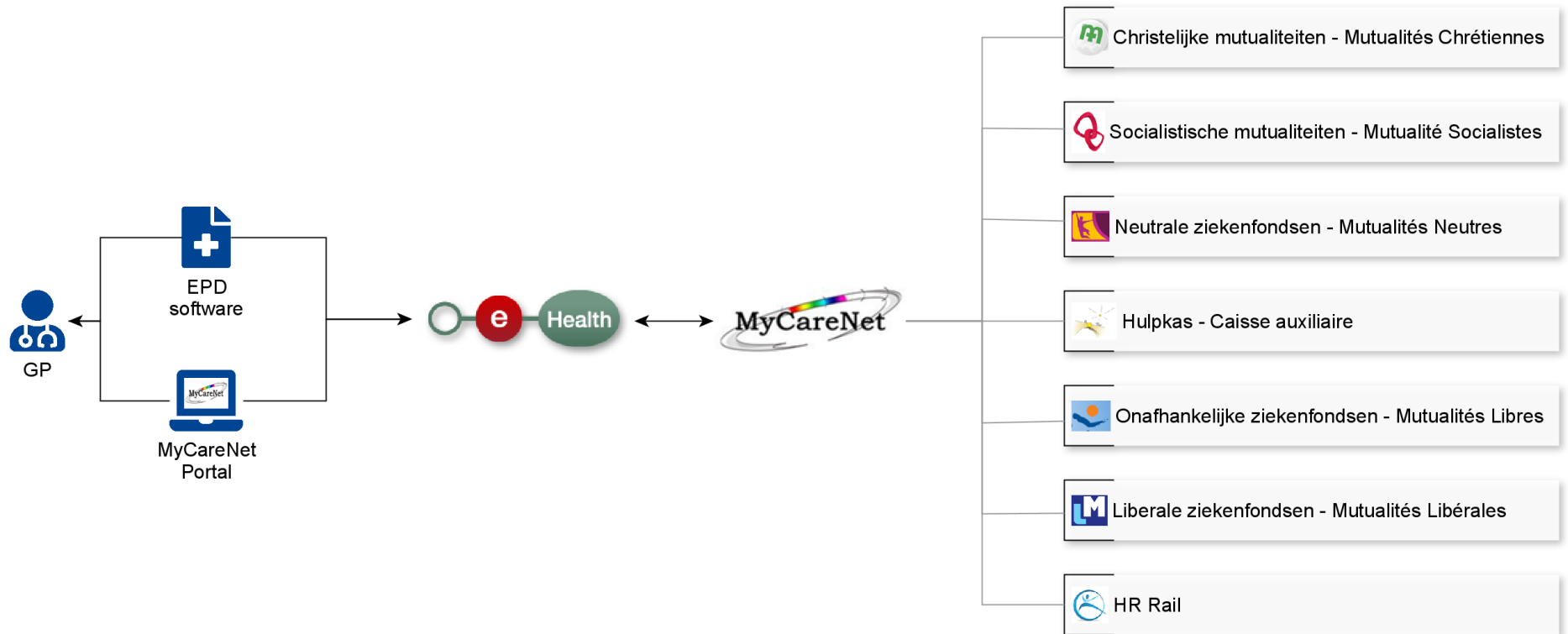
### 2.3.2 MyCareNet

MyCareNet is an electronic platform for information exchange between healthcare professionals and organisations, and the (public) health insurance funds. It is founded and managed by the association of the seven health insurance funds (NIC – ICN<sup>d</sup>). The platform aims to simplify administrative procedures, modernise the exchange of information between healthcare professionals and the health insurance funds, and create added value to all concerned.<sup>39</sup> A healthcare professional or organisation can connect to the MyCareNet platform either through their EPD software or through the MyCareNet Portal (Figure 7). Information can subsequently be exchanged with the infrastructure of one of the (public) health insurance fund. The eHealth-platform provides, among others, authentication services to verify that the healthcare professional or organisation is authorised to connect to the MyCareNet platform. The user management available through the eHealth-platform also allows healthcare organisations to manage access of authorised personnel.

<sup>d</sup> [Nationaal Intermutualistisch College - Collège Intermutualiste National.](#)



Figure 7 – MyCareNet infrastructure



MyCareNet provides several different services for physicians and other healthcare professionals. For physicians, the services shown in Table 5 are available at the time of writing. The last column of the table indicates if the use of the service is taken into account for the integrated allowance for the GP practice.


**Table 5 – MyCareNet services for physicians**

Service	Description	Parameter for the integrated allowance for the GP practice
<b>Insurability</b>	Retrieving information on assurance status and insurance rights of the (public) health insurance fund member.	No
<b>Information on the (public) health insurance fund member</b>	A service that extends the insurability service with other derived rights of the health insurance fund member like care path diabetes or renal insufficiency, chronic illness status and regular pharmacist.	No
<b>Chapter IV and VIII pharmaceuticals approval advising physician</b>	Reimbursement for certain pharmaceutical products requires an approval by the advising physician of the health insurance fund. This service allows to digitally manage the request for approval (see section 2.3.2.1 below for more details).	Yes
<b>eFact third payer electronic invoicing</b>	Retrieve the correct amount to charge the health insurance fund member and invoice the health insurance fund as third payer directly (see section 2.3.2.1 below for more details).	Yes
<b>eAttest third payer electronic invoicing</b>	Submit GP financial statements directly to the health insurance fund rather than on paper to the patient (see section 2.3.2.1 below for more details).	Yes
<b>Global Medical Dossier (GMD)</b>	Retrieve and manage the GMD status (see section 2.3.2.2 below for more details).	Yes

MyCareNet provides some of these services and others services for pharmacists, laboratories, community health centres (CHCs)<sup>e</sup>, nursing homes, dentists, tariff offices, nurses, hospitals and other healthcare professionals and organisations. In the next sections, we will focus on the MyCareNet services for GPs that are taken into account for the integrated allowance for the GP practice.

<sup>e</sup> Medical houses (maison médicale – wijkgezondheidscentra) are integrated healthcare practices with a multidisciplinary team, including (at least) several

GPs, administrative and reception staff, nurses, a physiotherapist and a psychotherapist.<sup>40</sup>



### 2.3.2.1 Chapter IV and VIII pharmaceuticals approval advising physician

The reimbursement of pharmaceutical products is subject to certain reimbursement conditions. RIZIV – INAMI groups the list of reimbursed pharmaceutical products in chapters according to the general reimbursement conditions (see Table 6).<sup>41</sup>

**Table 6 – General reimbursement conditions per chapter of pharmaceutical product list**

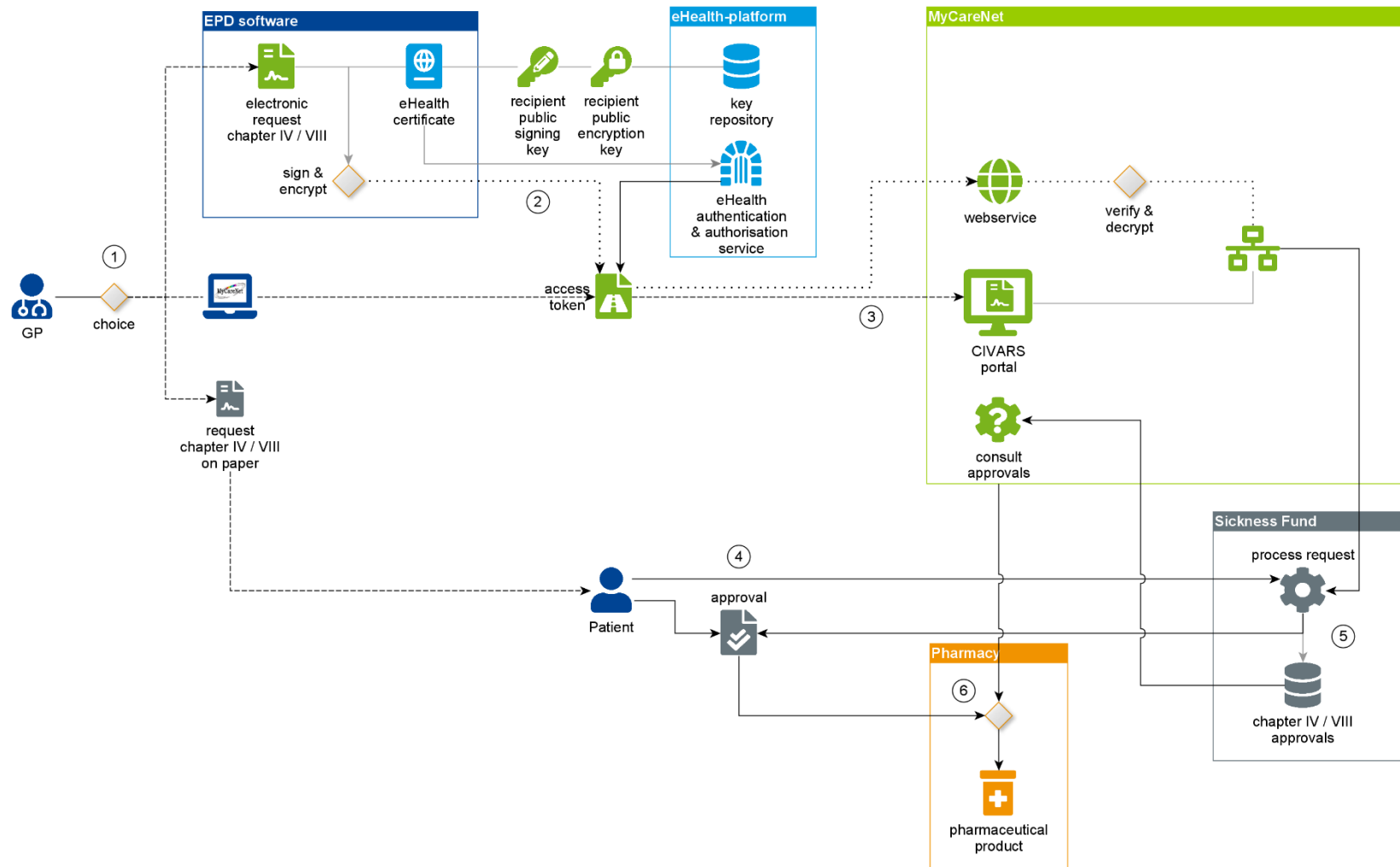
Chapter	General reimbursement conditions
I	Contains pharmaceutical products that are reimbursed without additional conditions.
II	Contains pharmaceutical products that are reimbursed for registered indications under certain conditions with a posteriori control by the advising physician of the health insurance fund.
III	Contains products for perfusion reimbursed for registered indications.
IV	Contains pharmaceutical products that are reimbursed under certain conditions determined by medical or budgetary reasons which limit indications, target groups, age groups, etc. <sup>42</sup> Additionally, reimbursement is conditional on a priori approval of the advising physician of the health insurance fund.

IV-bis	Contains pharmaceutical products not registered in Belgium or registered but not available in Belgium, and imported by the pharmacist. They are reimbursed under certain conditions, among which an authorisation by the health insurance fund to be requested by the patient.
V	Contains pharmaceutical products that are reimbursed after registration on the initiative of the Commission for the Reimbursement of Pharmaceutical Products at RIZIV–INAMI or the competent Minister, rather than following a request for reimbursement by a pharmaceutical company.
VIII	Contains ‘personalised’ pharmaceutical products for which reimbursement is conditional on the proven presence or absence of a molecular biomarker or companion diagnostics in the patient. Reimbursements are very similar to those in chapter IV and require a priori approval of the advising physician of the health insurance fund.

For pharmaceutical products in chapter IV and VIII, the prescriber needs to request reimbursement subject to an approval of the advising physician of the health insurance fund. For certain pharmaceutical products, an electronic request is compulsory, while for others both electronic and paper requests are valid (see Figure 8; numbers in the figure refer to the explanation in Table 7).



Figure 8 – Principal flow of information for chapter IV/VIII approval requests



*Note: The figure depicts the logical flow of information and does not necessarily reflect the technical flow.*

**Table 7 – Flow of information in chapter IV / VIII (see Figure 8 for corresponding numbers)**

Figure N°	Description
1	When prescribing a pharmaceutical product from chapter IV or VIII, the physician fills out the corresponding form to request approval of the advising physician of the health insurance fund. At the time of writing, he or she could choose to do this still on paper and provide it to the patient, for those products it is still allowed for. The form can also be filled out electronically, either in the EPD software of the GP or through an online web application (CIVARS).
2	In case the request form is filled out in the EPD software, the document is signed and encrypted with the public keys of MyCareNet, retrieved from the eHealth-platform key repository. After authentication and authorisation through the eHealth-platform, it is then sent to MyCareNet, where it is verified and decrypted.
3	In case the request form is entered directly in CIVARS, the eHealth-platform authentication service grants access to eligible healthcare professionals or organisations. The form is filled out in the MyCareNet application.
4	In case form is provided to the patient, the patient introduced the request directly to his health insurance fund.
5	The request is subsequently processed at the health insurance fund. For some pharmaceutical products, the process can, based on provided information in electronically provided forms, respond immediately with an approval or rejection. This decision is immediately sent to the healthcare professional (either in CIVARS or EPD software). In other cases, further processing by the advising physician is required. If an approval is granted, the approval with relevant information is stored in an approval repository. MyCareNet provides an interface for healthcare professionals and organisations to consult approvals for their patients. The patient receives the approval on paper as well.
6	With the approval, the patient can obtain the pharmaceutical product from the pharmacy. For a number of pharmaceutical products, the pharmacy can consult the approval repository through MyCareNet. For other pharmaceutical products, the proof of approval is still required on paper. This is destined to change in the future.





### 2.3.2.2 *Electronic financial statements and third payer electronic invoicing*

Before eAttest (electronic attestation/financial statement) and eFact (third payer electronic invoicing), patients (not entitled to the third-party payment scheme) consulting a GP paid the GP the amount due (co-payment plus reimbursed part, and supplement if applicable) and received an official financial statement on paper. Patients entitled to the third-party payment scheme only paid the co-payment and possible supplement to the GP while the health insurance fund covered the other part.

With eAttest and eFact, MyCareNet introduced two services that aim to simplify and digitalise (part) of this work flow. For patients entitled to the third-party payment scheme, the financial statement is sent directly to the health insurance fund through MyCareNet (eAttest) and the patient needs to pay only the co-payment and any supplement to the GP, which receives the reimbursable part directly from the health insurance fund (eFact).

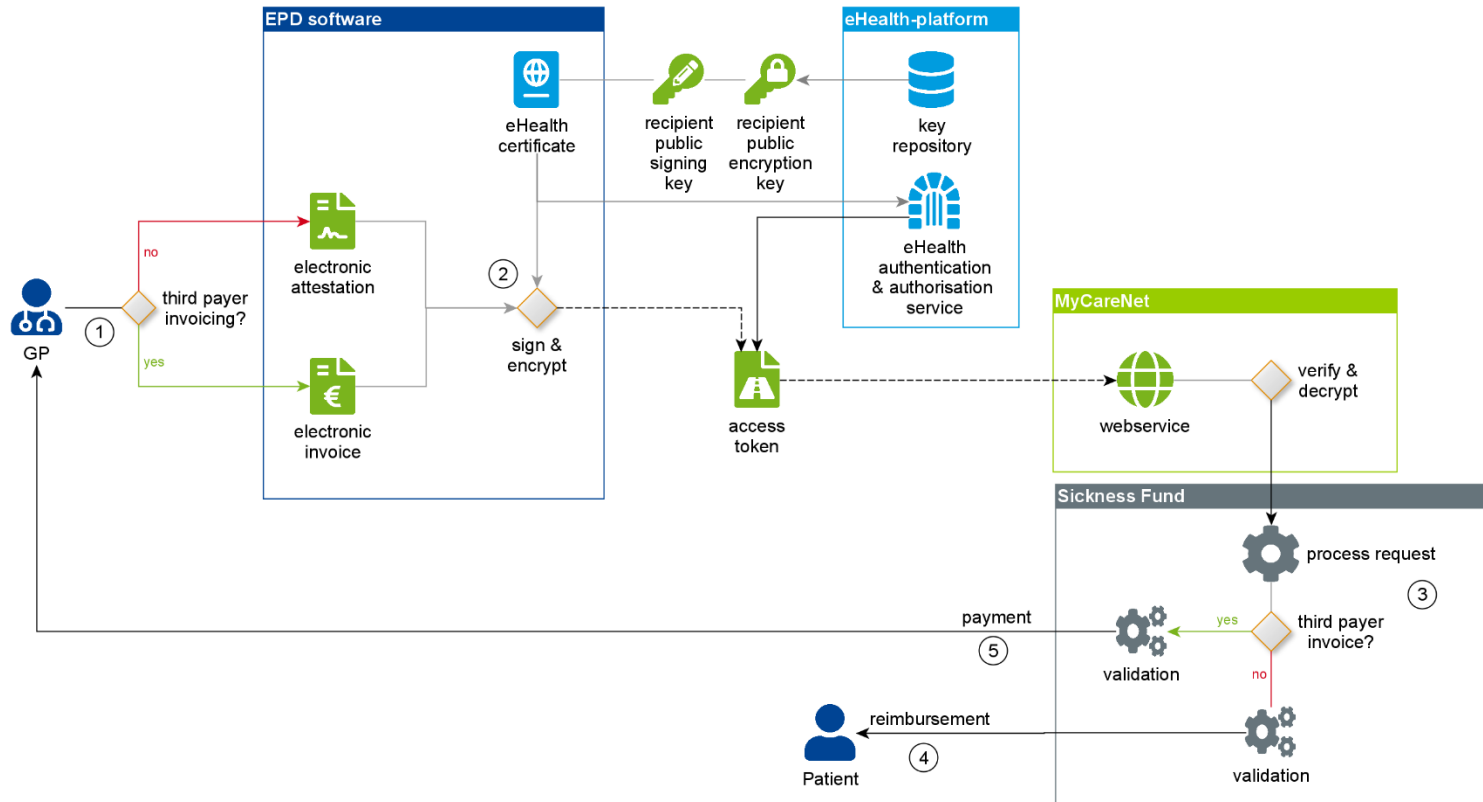
The eAttest service is also available for patients not entitled to the third-party payment scheme: they pay the GP for the consultation as before. After sending the financial statement electronically to the health insurance fund, a confirmation of receipt is sent to the GP's software. He or she can then print the receipt and hand it over to the patient. The receipt is just for follow-up by the patient, the health insurance fund automatically reimburses the part covered by the health insurance.

Third payer, possibly by eFact, is compulsory after verification of the insurability, for consultations with and technical procedures from a GP for patients with increased reimbursement status, as well as the technical procedures performed during a visit. Third payer is not compulsory for the visits by a GP.<sup>43</sup> For the following cases, third payer can be used as well:

- in a mental health center, family planning and sex education center or toxicomanic relief center;
- in an institution specialised in taking care of children, elderly or disabled people;
- to an entitled who dies or is in a comatose state during treatment;
- to an entitled who is in a temporary individual financial emergency situation;
- to an entitled who is exempt from personal contribution as an entitled resident within the framework of compulsory health insurance because his annual gross taxable family income is lower than the annual amount of the minimum living wage;
- to an entitled who is an unemployed person by application of the compulsory health insurance, who has been unemployed for at least six months in the capacity of a wholly unemployed person as referred to in the unemployment regulations and, within the meaning of the latter regulations, in the capacity of a member of the family or a single person, as well as his dependants;
- to an entitled who meets the medical-social conditions to be entitled to the increased child benefit;
- to a person entitled to the chronic disease statute;
- to a person entitled to the status of palliative patient at home;
- during an organised duty;
- during visits to patients admitted to a psychiatric hospital at the request of the psychiatrist of the hospital;
- at the request of the patient in case of GMD (see below), prevention module, or in the care model 'Follow-up of a patient with type 2 diabetes'.



Figure 9 – Principal flow of information for eAttest and eFact



**Note:** The figure depicts the logical flow of information and does not necessarily reflect the technical flow (consultation of the services 'insurability' and 'tariff' in step 1 are not shown).



**Table 8 – Flow of information in eAttest and eFact (see Figure 9 for corresponding numbers)**

Figure N°	Description
1	When a GP wants to electronically attest a healthcare act, he or she consults the insurability status of the patient through MyCareNet (not shown in Figure 9). The result determines if electronic third payer through eFact can or must be used or not; depending on the conditions previously described. If not, eAttest can be used to electronically submit the financial statement through MyCareNet to the health insurance fund. The GP requests through MyCareNet the correct tariff depending on the insurability status of the patient (e.g. increased reimbursement status, etc.; not shown in Figure 9).
2	The electronic financial statement or the electronic invoice is filled out in the EPD software and the document is signed and encrypted with the public keys of MyCareNet, retrieved from the eHealth-platform key repository. After authentication and authorisation through the eHealth-platform, it is then sent to MyCareNet, where it is verified and decrypted.
3	The request is subsequently processed at the health insurance fund. Both for electronic financial statements and the electronic invoices, a validation process is carried out.
4	In case of electronic financial statements, the patient is reimbursed the part covered by the health insurance.
5	In case of the electronic invoice, the health insurance fund pays the attested fee to the GP.

### 2.3.2.3 Global Medical Dossier (GMD)

The global medical dossier (GMD) is the medical file of a patient managed by his GP. The rules contained in article 2 of the RIZIV – INAMI nomenclature<sup>44</sup> determine the minimal elements comprising:

- social-administrative data;
- antecedents;
- problems;
- the reports of the other healthcare providers;
- chronic treatments;
- preventive measures undertaken, taking into account the patient's age and gender, and covering at least:
  - lifestyle (diet, exercise, tobacco and alcohol consumption);
  - cardiovascular diseases (anamnesis, clinical examination, acetylsalicylic acid for the groups at risk);
  - the detection of colorectal cancer, breast cancer and cervical cancer;
  - vaccination (diphtheria, tetanus, flu and pneumococcus);
  - biological measurements: lipids (patients over 50 years old), glycemia (patients over 65 years old), creatinine and proteinuria (for the groups at risk);
  - the detection of depression;
  - oral care;
- for a patient aged 45 to 74 with chronic disease status, various clinical and biological data useful for evaluating the patient's health state and for improving the quality of care.



A GP receives a fee for the management of the GMD, attestable once per year either for opening or continuation of a GMD. Continuation of the GMD can be done manually by the GP. The health insurance fund can extend the GMD administratively based on a GMD managed the previous year and at least one visit to the GP and no other GP attested the opening of the GMD.

Through MyCareNet the GP can manage the administrative aspects of the GMD:

- Consultation of which GP currently manages the GMD, if any. The service is available as part of the GP's EPD software or through an application on the MyCareNet web portal.
- Opening or taking over of a GMD. In case the patient had his or her GMD with another GP, the GMD is transferred to the new GP, notifying the former GP. Manual financial statements are no longer necessary: the GP will be paid in case no previous GMD financial statement was paid in the same year, and continuation will be effective the first time the patient has a contact with the GP in the following year. The service requires the GP to subscribe and no longer use GMD financial statements on paper. The service is available as part of the GP's EPD software.
- Retrieving a list of patients for which the GP holds the GMD. The service is available as part of the GP's EPD software.

### 2.3.3 First line digital vaults

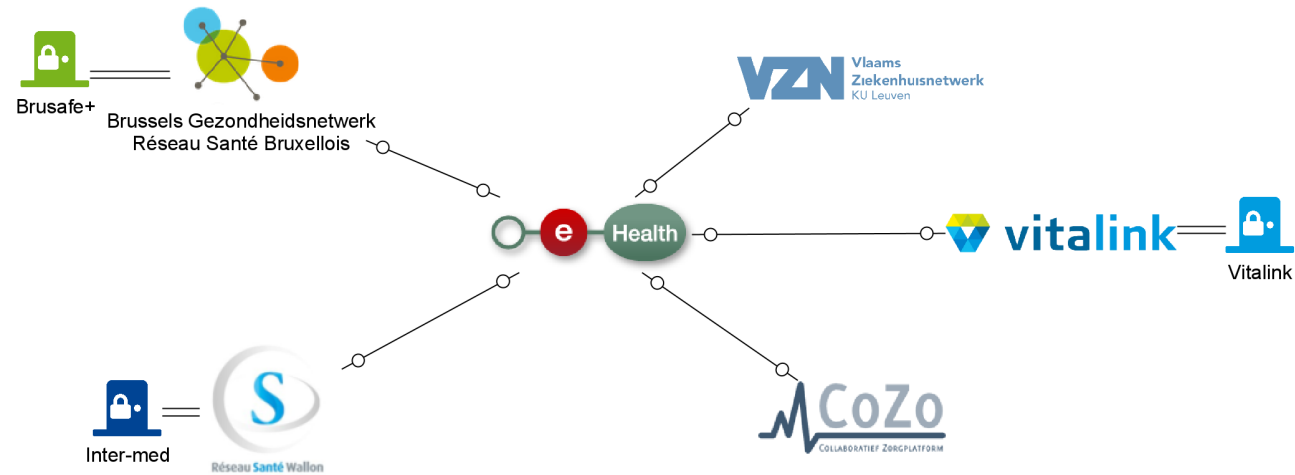
For first line healthcare actors, like GPs, certain information on the health of their patients can be made available for exchange between healthcare actors. This information is stored in a digital vault: the first line digital vaults. Each Belgian region has its own system: [Vitalink](#) in the Flanders region, [Brusafe+](#) in Brussels and [Inter-med](#) in the Walloon region.

These digital vaults are able to exchange information through the eHealth-platform in a system called hubs and metahub. The eHealth-platform is the metahub and maintains a referral repertory: an index on the availability of information on a patient either on a hub, or in a digital vault without specifying what information is available. The hubs are one of four regional networks for information exchange between hospitals and other healthcare actors: Collaboratief Zorgplatform (Cozo) and Vlaams Ziekenhuisnetwerk KULeuven in Flanders region, Brussels Gezondheidsnetwerk in Brussels (managed by the Abrumet non-profit organisation) and Réseau Santé Wallon (RSW) in the Walloon region. Each of these hubs maintains a referral repertory that contains an index on the availability of information on a patient with a specific healthcare actor (individual or organisation). The referral repertories do not contain health information but a reference to the location of health information. While the digital vault in Flanders is maintained by Vitalink separately from the hubs, the digital vaults of Brussels and the Walloon region are projects within the regional information exchange network (see also Figure 10).

An important prerequisite to the electronic sharing of health information by healthcare actors is the a priori informed consent of the patient.<sup>28</sup> The eHealth-platform maintains three registers related to this consent: registered consent, therapeutic relations with healthcare actors and exclusion of healthcare actors for sharing. Sharing of health information through the system of hubs, metahub and vaults is only possible on the condition the patient consented, between healthcare actors with a demonstrable therapeutic relation<sup>45</sup> and not excluded from sharing. An access matrix is maintained to define which type of healthcare actor can have access to what type of health information.<sup>46</sup> For example, while a GP with a therapeutic relation to the patient can access all parts of a summarised electronic health record (see below) of a patient, the patient's pharmacist can access only parts of it.



Figure 10 – Overview of vaults, hubs and metahub



The information that can be stored in these first line digital vaults as well as by which first line healthcare actors is still being further developed. In the section below, we discuss two types that are taken into account for the RIZIV – INAMI integrated allowance for the GP practice: summarised electronic health record and the medication plan.



### Summarised Electronic Health Record (Sumehr) and medication plan

The GP carefully maintains a securely stored patient record that contains all relevant information on the health status of the patient.<sup>47, 48</sup> In general, the following categories of information are to be included<sup>f</sup>:

- social-administrative data;
- a report of each consultation (date, reason, antecedents, anamnesis, clinical examination, diagnosis, examination/treatment);
- any documents containing the information and evaluations used for the care provided to the patient, concerning the patient's health and its evolution (examination results, protocols, reports, medical imaging, etc.).

The finality of keeping a patient health record is to assure the quality and continuity of care.<sup>48</sup> Aside from being an essential tool for the GP to ensure qualitative healthcare and as a legal element of proof, it is also a communication tool towards the patient and other healthcare providers. To facilitate this communication, the summarised electronic health record (Sumehr) was created. It is a snapshot from the patient health record and contains the information considered useful by the creator to ensure continuity of care for the patient.<sup>49</sup> As such, over time, multiple Sumehrs can be created, but only the chronologically last one is considered valid. A Sumehr can contain multiple items either under the heading of assessment (the items describing the current problems and treatments) or under the heading of history (the items describing the medical and therapeutic antecedents). For the available items, see Table 9.

Table 9 – Possible items in Sumehr<sup>49</sup>

Item	Description
<b>Adverse drug reaction</b>	Risks relative to adverse drug reactions, possible coded in a codification system like SNOMED CT, ICPC-2 or ICD-10.
<b>Allergy</b>	Risks relative to an allergy, including allergies to pharmaceutical products, possibly coded in a codification system like SNOMED CT, ICPC-2 or ICD-10.
<b>Social</b>	Social risk factors.
<b>Other</b>	Other risk factors.
<b>Contact person</b>	A person related to the patient for contact, possibly including the link to the patient.
<b>Healthcare contact</b>	Links to other healthcare providers including his or her role.
<b>GMD manager</b>	The healthcare provider managing the GMD if any.
<b>Patient will</b>	Registered therapeutic limitations for the patient.

<sup>f</sup> A [new law](#) that takes effect on the 1<sup>st</sup> of July 2021 provides a more detailed list of elements to be minimally included in the patient record (article 33).



Item	Description
	<p>For resuscitation one of</p> <ul style="list-style-type: none"><li>• No limit on treatment</li><li>• Do not attempt resuscitation</li><li>• Do not attempt resuscitation and do not extend treatment</li><li>• Do not attempt resuscitation and phase out treatment</li><li>• For hospitalisation one of</li><li>• No limitation on hospitalisation</li><li>• No hospitalisation</li><li>• Hospitalisation only in specific situations</li><li>• Other therapeutic limitations are e.g. blood transfusion refusal, clinical trial participation consent, etc. (see <a href="https://www.ehealth.fgov.be/standards/kmehr/en/tables/patients-will">https://www.ehealth.fgov.be/standards/kmehr/en/tables/patients-will</a> for other possibilities).</li></ul>
<b>Problem</b>	Presence or absence of a diagnosis, problem, complaint, symptom, etc. possibly coded in a codification system like SNOMED CT, ICPC-2 or ICD-10. Start and end dates are provided if available. An indication if the problem is still active or if it is a relevant past element.
<b>Treatment</b>	Presence or absence of treatment possibly coded in a codification system like SNOMED CT, ICPC-2 or ICD-10. Start and end dates are provided if available. An indication if the treatment is still active or if it is a relevant past element. It is possible to add that there are no known relevant therapeutic antecedents.
<b>Medication</b>	Current use of pharmaceutical products. It includes identification of the pharmaceutical product and corresponding ATC <sup>9</sup> . Start and end dates are provided if available. Additionally, elements like posology, frequency, temporality can be included (see <a href="https://www.ehealth.fgov.be/standards/kmehr/en/transactions/pharmaceutical-prescription">https://www.ehealth.fgov.be/standards/kmehr/en/transactions/pharmaceutical-prescription</a> for more details).
<b>Vaccine</b>	Administered vaccines and the corresponding indications and ATC. The date of administration is included.
<b>Comments</b>	For each of the previous items, an additional text comment can be added.

<sup>9</sup> The Anatomical Therapeutic Chemical (ATC) classification system provides a [WHO controlled classification](#) of pharmaceutical products up until the level of the molecule.

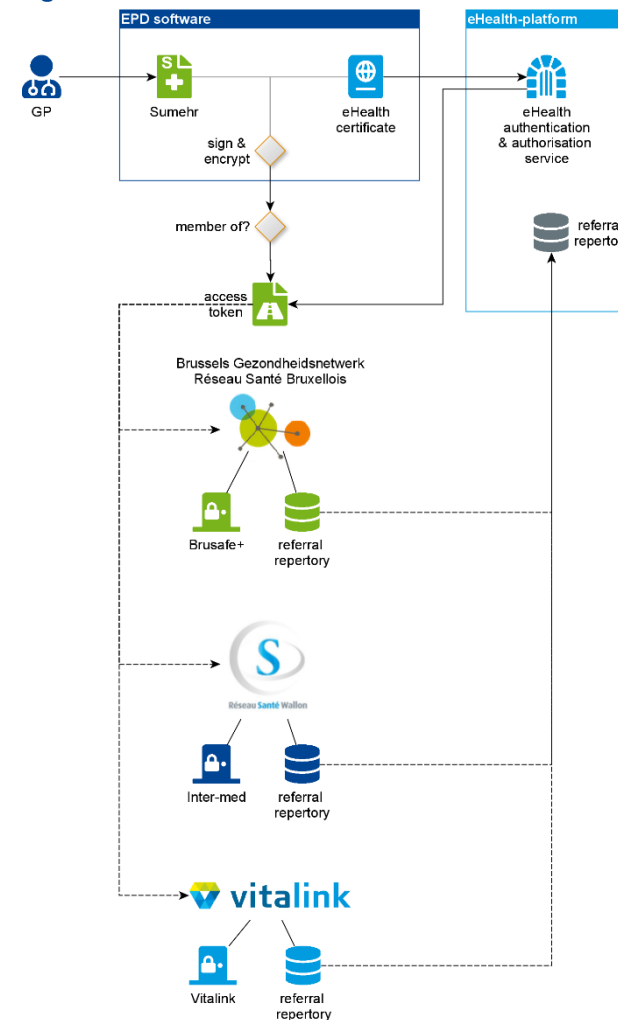


The medication plan is one of the possible items in the Sumehr but is considered as a separate parameter in the RIZIV – INAMI integrated allowance for the GP practice. For the digital vault of Vitalink, aside from the medication plan in Sumehr, a separate medication plan that can be enriched by other healthcare providers is available as well.<sup>50</sup>

An overview of the principal connection flow for Sumehr is shown in Figure 11. It is similar for the medication plan. All three digital vaults use a mix of eHealth-platform services and self-developed services and infrastructure to implement Sumehr and the medication plan, among other things. The details of each implementation are outside the scope of this report.

Through the personal health viewer in [Mijngezondheid - Masanté](#), patients can consult their Sumehr and medication plan if available, as well as managing the therapeutic relations and exclusions.

Figure 11 – Overview of Sumehr flow



**Note:** The figure depicts the logical flow of information and does not necessarily reflect the technical flow.





### 2.3.4 Cebam Evidence Linker

The Cebam Evidence Linker is integrated in GPs EPD software and presents relevant clinical guidelines based on coded diagnosis in ICPC-2 or ICD-10. [Cebam](#) is the Belgium Centre for Evidence Based Medicine that organises courses on evidence based medicine methodology, validates clinical guidelines, promotes systematic reviews, runs Cebam Digital Library for Health, and maintains the website 'Health and Science' that aims to be a reliable source of information on health.

The Cebam Evidence Linker presents clinical guidelines from the following sources:

- [EBPracticeNet](#), which provides guidelines validated by the evidence-based practice (EBP) program.
- [DynaMed Plus](#), which reviews and synthesises clinical guidelines, amongst other things.
- [NHG](#) (Dutch GP society), which develops standards, treatment guidelines, multidisciplinary guidelines, care modules, GPs brochures, collaboration guidelines, amongst other things.
- Belgian Antibiotic Policy Coordination Committee ([BAPCOC](#)), which publishes guidelines on responsible prescribing of antibiotics, amongst other things.
- The Cebam Evidence Linker uses the standard eHealth-platform authentication and authorisation service to determine who can access its services.

### 2.3.5 Medic-e – Disabled persons form

A disabled person can request an official recognition with the Federal Public Service Social Security to obtain certain benefits. In the process of recognition, the treating GP can be asked to provide information on the disabled person relevant for the recognition, such as relevant diagnoses, if it concerns a work related accident, etc. To facilitate this process, an electronic form has been integrated in the EPD software of GPs.<sup>51</sup> The form uses the standard eHealth-platform authentication and authorisation service and the end-to-end encryption to send the form to Federal Public Service Social Security.



### 3 INTEGRATED ALLOWANCE FOR GP PRACTICES AS AN INCENTIVE FOR EHEALTH UPTAKE

#### 3.1 Key points

- Each year, the integrated allowance for the GP practice is granted to GPs to stimulate their use of eHealth services. To receive the allowance, a certain number of criteria must be met. Each criterion consists of a minimal threshold of use of a digital service (Recip-e, the patient eHealth informed consent, Sumehr uploads, the uploading of medication schemes, the Cebam Evidence Linker and finally Chapter IV, eFact, eAttest and the digital GMF management which are all four available via MyCareNet).
- The most adopted criterion is the registration of the patient informed consent, more than 95% of the GPs meet the threshold of 25% of the patients with a Global Medical File for whom an informed consent was registered via eHealth. The second criterion is the use of Recip-e, of which more than 84% of GPs use this service for at least 25% of their drug prescriptions.
- Conversely, the least successful eHealth services are the Cebam Evidence Linker and eAttest available via MyCareNet with respectively only 37.5% of the GPs using the Cebam Evidence Linker more than 5 times a year and 45% introducing at least 5% of their consultations a year via eAttest.

- Adoption rates are higher in Flanders than in the two other regions.
- Adoption rates are lower in solo practices, where GPs are generally older compared to group practices or CHCs. Similarly, female GPs scored higher adoption rates than their male colleagues for every criterion, due to their younger age.
- Adoption rates increased for each criterion between 2017 and 2018, regardless of the region and the type of practice.

#### 3.2 The system of integrated allowance for the GP practice

In order to promote the use of eHealth services by GPs RIZIV – INAMI grants a yearly lump sum called “integrated allowance for the GP practice”. This financial bonus is granted to GPs who frequently use a certain number of digital services. This bonus is, however, not granted automatically, GPs need to apply for it yearly until the 31<sup>st</sup> of October of the following year. In 2020 the deadline for the allowance for year 2019 was postponed to the 31<sup>st</sup> of December due to the covid-19 crisis. A list of clearly defined criteria is used to define the level of use. The higher the number of criteria fulfilled, the higher the lump sum a GP receives.

##### Current system (for allowance year 2018)

Current system is regulated by the Royal Decree of 30 June 2017. This Royal degree stipulates the conditions and modalities to which RIZIV – INAMI can grant the financial bonus to GPs for the use of eHealth services.<sup>27</sup> The list of criteria is summarised in Table 10.



**Table 10 – Overview of RIZIV – INAMI criteria to apply for the integrated allowance for GPs**

Number	Criteria
<b>C1</b>	During the last 6 months of the allowance year, at least 25% of drug prescriptions were sent via <b>Recip-e</b> .
<b>C2</b>	During the last 6 months of the allowance year, at least 50% of Chapter IV drug reimbursement claims were introduced via the “ <b>Chapter IV</b> ” service of MyCareNet.
<b>C3</b>	During the last 6 months of the allowance year, at least 20% of the consultations with patients entitled to the preferential reimbursement were invoiced via the <b>eFact</b> service of MyCareNet.
<b>C4</b>	By 31 December of the allowance year, an <b>informed consent</b> was registered via the eHealth platform for at least 25% of the patients for whom Global Medical File (GMF) fees were granted during the allowance year. The informed consent can be registered by the patient, the GP or another provider (e.g. hospitals).
<b>C5</b>	The ratio between (a) the total number of patients for whom a <b>Sumehr</b> was uploaded via the digital platforms Vitalink, RSW or Abrumet by 31 December of the allowance year at the latest and (b) the number of patients for whom a Global Medical File (GMF) fees were received during the allowance year is at least 25%.
<b>C6</b>	<b>MyCareNet</b> was used during the allowance year to digitally manage the GMF fees.
<b>C7</b>	During the last 6 months of the allowance year, at least 5 <b>medication schemes</b> were created or adapted.
<b>C8</b>	During the last 6 months of the allowance year, the <b>Cebam Evidence Linker</b> was used at least 5 times (via log-in).
<b>C9</b>	During the last 6 months of the allowance year, at least 5% of the consultation certificates were introduced via the <b>eAttest</b> service of MyCareNet.
<b>C10</b>	During the allowance year, the electronic form “ <b>Evaluation of the disability – FPS Social Security</b> ” was used at least 3 times to send medical information to the FPS Social Security (DG Persons with Disabilities).

Each fulfilled criteria yields one point. The amount of the allowance depends on the number of points acquired. Criteria C3, C6 and C9 are not considered for the GPs working in a CHC. In 2018, C7 was automatically granted to all GPs due to technical problems that emerged during the medication schemes management.

Every GP may apply for the allowance for the year during which he/she is active. A GP is considered active in three situations:

1. Having a RIZIV – INAMI GP number since less than 5 years (competence code 003 or 004) on the 1<sup>st</sup> of January of the allowance year and being registered in an organised duty centre.
2. Having a RIZIV – INAMI GP number since at least 5 years (competence code 003 or 004), being registered in an organised duty service and having performed for up to 25 000€ health insurance fees (this condition of volume of activity is not required in CHCs).



3. Having a RIZIV – INAMI GP in training number (competence code 005 or 006) during the whole allowance year or having started a GP training during the allowance year.

A necessary condition for the GPs in training when applying for the allowance is the use of a **software package approved** by the National commission of representatives of medical doctors and health insurance funds, for the management of EPD. The list of approved software packages for the years 2019, 2020 and 2021 can be found in Appendix 1.1.

**Table 11 – Amount of the allowance for the years 2018, 2019 and 2020**

Situation allowance year	Allowance (€)
GP in training using an approved software package	800
Active GP	1 000
<ul style="list-style-type: none"> <li>not using an approved software package or</li> <li>working in a CHC and totalising less than 5/7 points or</li> <li>not working in a CHC and totalising less than 6/10 points.</li> </ul>	
Active GP using an approved software package and	3 500
<ul style="list-style-type: none"> <li>working in a CHC and totalising 5/7 points or</li> <li>not working in a CHC and totalising 6/10 points.</li> </ul>	
Active GP using an approved software package and	4 500
<ul style="list-style-type: none"> <li>working in a CHC and totalising 6/7 points or</li> <li>not working in a CHC and totalising 7/10 points.</li> </ul>	
Active GP using an approved software package and	6 000
<ul style="list-style-type: none"> <li>working in a CHC and totalising 7/7 points or</li> <li>not working in a CHC and totalising 8/10 points.</li> </ul>	

Source: RIZIV – INAMI

GPs working in a CHC or a group practice who do not reach the threshold for a particular criterion still receive the point if the CHC or group practice criterion average<sup>h</sup> lies above the threshold.

### Previous system (allowance year 2016 and 2017)

From 2016, a variable amount called "telematic allowance" was granted in function of the six first criteria (C1-C6: Recip-e, Chapter IV, eFact, informed consent, Sumehr uploads, digital GMF management), as well as a Sumehr allowance depending on the number of Sumehrs uploaded. The threshold for C5 (Sumehr-ratio) was set at 20% in 2016 and 2017 (versus 25% from 2018).

**Table 12 – Amount of the allowances for the years 2016 and 2017**

Situation integrated allowance year	Allowance (€)
GP in training using an approved software package	800
Active GP	1 500
<ul style="list-style-type: none"> <li>not using an approved software package or</li> <li>totalising less than 3 points (2016) – 4 points (2017)</li> </ul>	
Active GP using an approved software package and	3 400
<ul style="list-style-type: none"> <li>totalising 3 points (2016) – 4 points (2017)</li> </ul>	
Active GP using an approved software package and	4 550
<ul style="list-style-type: none"> <li>totalising 5 points (2016) – 6 points (2017)</li> </ul>	
<b>Additional Sumehr allowance</b>	
Sumehr uploaded for 200 patients (2016) - 400 patients (2017)	500

Source: RIZIV – INAMI

<sup>h</sup> For more details on the average calculation, see <https://www.inami.fgov.be/fr/professionnels/sante/medecins/aide/pratique->

<integree/Pages/default.aspx> or <https://www.inami.fgov.be/nl/professionals/individuele zorgverleners/artsen/hulp/geintegreerde-praktijk/Paginas/default.aspx>.



### 3.3 Measuring eHealth uptake by GPs using the integrated practice allowance criteria

#### 3.3.1 Data source

GPs characteristics and numbers on criteria fulfilment were extracted and delivered to KCE by RIZIV – INAMI for the years 2017 and 2018. Characteristics included region of practice, 5-year age categories, gender, volume of contacts (0, 1-1249,  $\geq 1250$ ), duty service registration (yes/no) and type of practice (CHC, group practice or solo practice). Each criterion was binary described (met or unmet). Distribution parameters of the intensity of use of criteria C1-C5 (2017 and 2018) and C9 (2018) were also delivered by region. Finally, aggregated tables were transmitted on the number of GPs working in group practices or in solo practices, who applied for the 2017 and 2018 allowance stratified by software package, region, volume of contacts, duty service registration and type of practice.

It is important to note that all data received concern graduated GPs. GPs in training were not in the selection.

#### 3.3.2 Methods

A minimal number of 1 250 contacts per year was chosen as a proxy to capture the 25 000€ amount of fees defining the active GPs in group and solo practices (25 000/ average fee of 20€ = 1 250 contacts).

Data transformation and descriptive analysis were performed using Excel 2013 and SAS software™ (SAS/BASE, SAS/STAT and SAS/GRAPH), version 9.4 M5 for Microsoft Windows.<sup>52</sup>

#### 3.3.3 Results

##### 3.3.3.1 Characteristics of GP population

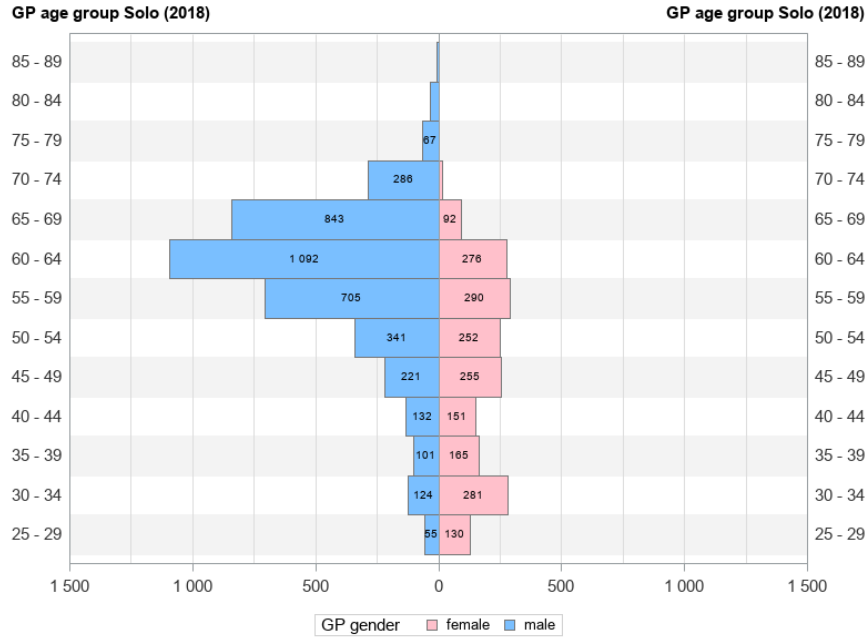
Solo practices are the most common type of practice in our database. In 2018, 15 670 GPs were working in a solo practice, of which 5 920 were defined as active. About half of them (50.4%) were registered in an organised duty centre and 39.5% had at least 1 250 yearly contacts. Out of the 3 918 GPs working in group practices in 2018, 97.6% were on duty and 93.1% had 1 250 yearly contacts or more, leading to 3 638 active GPs. The same year, 623 of the 638 GPs (97.8%) working in a CHC were on duty.

Figure 12, Figure 13 and Figure 14 show the 2018 age pyramids of the three subpopulations entitled for an integrated allowance application: active GPs for solo and group practices and GPs on duty for the CHCs. The 5-year median age class is 55-59 in solo practices, 45-49 in group practices and 40-49 in CHCs. The gender ratio is more balanced in group practices (54.4% females vs 32.3% in solo practices and 67.5% in CHCs). The majority of active GPs (57%) working in solo are male and older than 50 years. While CHCs show a symmetrical opposite pattern: more female GPs, younger than 50 (represent 55.1% of this, yet scarce, subpopulation).

The pattern differences are even more pronounced in 2017 (see Appendix 1.2).

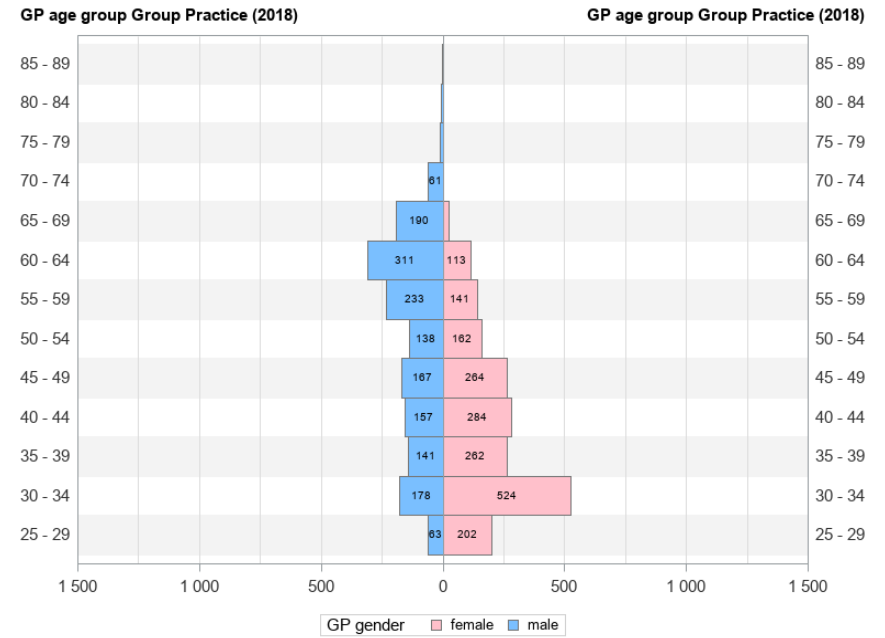


**Figure 12 – Age and gender distribution for GPs working in solo practices (2018)**



**Note:** Only active GPs included (1 250 or more patient contacts during the allowance year and on duty).

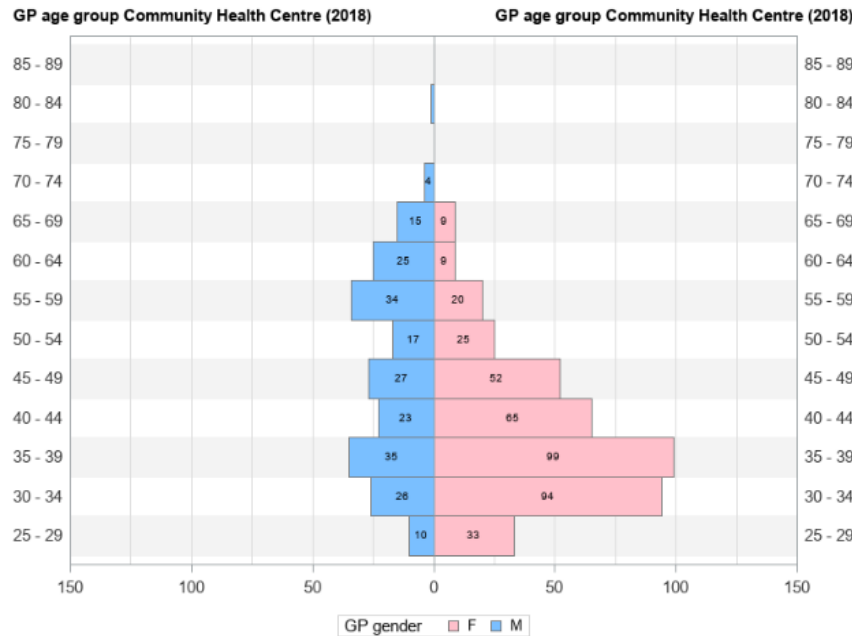
**Figure 13 – Age and gender distribution for GPs in group practices (2018)**



**Note:** Only active GPs included (1 250 or more patient contacts during the allowance year and on duty).



**Figure 14 – Age and gender distribution for GPs in CHCs (2018)**



**Note:** Only GPs on duty are included.

### 3.3.3.2 eHealth uptake by criterion

Table 13 presents the yearly coverage rate of each criterion in each type of practice. Criteria C8, C9 and C10 were established from 2018 on, while no information was available for C7 which had to be neutralised because of technical problems.

The most successful criterion is C4 (i.e. informed consent for at least 25% for patients with a GMF), with more than 90% of GPs reaching this threshold in 2018. It is noteworthy that the registration of the informed consent can be made by the GP but also by another healthcare professional or the patient. Every other criterion depends on the GP only. The least popular criterion is C5 (i.e. Sumehr). Nevertheless, in line with the trend for every other criterion between 2017 and 2018, its percentage increased between 2017 and 2018 despite the raise of the threshold from 20% to 25%. C2 (i.e. Chapter IV) also knows a notable amelioration between 2017 and 2018. Thresholds seemed easier to attain in group practices (in the lead for C1-C6 and C9) followed by CHCs (in the lead for C8 and C10) compared to solo practices. The result for the consultation of the Cebam Evidence Linker (i.e. C8) is particularly low in solo practices, as less than a quarter of them used this service at least 5 times in 2018. Similarly, the use of the digital Disability evaluation form (i.e. C10) scores low among solo practices, as only 42% of them used it at least 3 times for their evaluation in 2018, compared to more than 80% of GPs in the other practices.


**Table 13 – Percentage of GPs reaching the threshold per criterion (2017-2018)**

Criterion / year, type of practice	2017				2018			
	Solo N=6 100	Group N=3 383	CHC N=573	ALL N=10 056	Solo N=5 920	Group N=3 638	CHC N=623	ALL N=10 181
C1 Recip-e (25%)	63.7%	93.8%	85.9%	<b>75.1%</b>	74.8%	97.5%	96.1%	<b>84.2%</b>
C2 MyCareNet Chapter IV (50%)	48.6%	78.4%	46.1%	<b>58.5%</b>	63.1%	89.8%	71.3%	<b>73.1%</b>
C3 MyCareNet eFact (20%)	54.7%	86.3%		<b>62.2%</b>	66.6%	93.2%		<b>72.0%</b>
C4 GMF informed consent (25%)	90.0%	98.5%	78.7%	<b>92.3%</b>	96.1%	99.8%	92.9%	<b>97.2%</b>
C5 Sumehr (20/25% in 2017/18)	36.4%	72.0%	50.8%	<b>49.2%</b>	41.5%	74.8%	52.2%	<b>54.0%</b>
C6 MyCareNet digital GMF management	55.6%	79.6%		<b>60.5%</b>	66.6%	89.1%		<b>70.5%</b>
C8 Cebam Evidence linker (5 times)					22.5%	57.6%	60.0%	<b>37.4%</b>
C9 MyCareNet eAttest (5%)					36.2%	67.0%		<b>45.0%</b>
C10 Disability evaluation form (3 times)					41.6%	81.7%	85.9%	<b>58.6%</b>

Results are presented by region instead of type of practice in Table 14. Flanders shows better adoption rates than the two other regions. By comparison, Wallonia scores particularly low on C8 (Cebam Evidence linker) and Brussels on C3 (MyCareNet eFact) and C9 (MyCareNet eAttest). Brussels' result is not very high for the C8 (Cebam Evidence linker) neither. Both these regions also obtain low adoption rates on C5 (Sumehr). These results can partially be explained by the regional differences in type of practice: only about 50% of the GPs (active and on duty) in Flanders work in solo practices versus respectively 66% and 75% in Brussels and Wallonia. The remaining percentages of GPs working respectively in group practices and CHCs are 47% and 4% in Flanders, 14% and 19% in Brussels and 18% and 7% in Wallonia.

<sup>i</sup> The threshold of 1 250 contacts does not apply to CHCs.




**Table 14 – Percentage of GPs reaching the threshold per criterion and region (2017-2018)**

Criterion / year, region	2017				2018				
	Type of practice	Flanders N=5 928	Wallonia N=3 273	Brussels N=854	Belgium N=10 056	Flanders N=6 059	Wallonia N=3 263	Brussels N=859	Belgium N=10 181
C1 Recip-e (25%)		84.2%	61.2%	65.5%	<b>75.1%</b>	90.4%	74.4%	77.9%	<b>84.2%</b>
C2 MyCareNet Chapter IV (50%)		68.9%	43.8%	42.2%	<b>58.5%</b>	80.3%	63.3%	60.1%	<b>73.1%</b>
C3 MyCareNet eFact (20%) (*)		72.6%	48.6%	42.4%	<b>62.2%</b>	79.9%	62.9%	50.5%	<b>72.0%</b>
C4 GMF informed consent (25%)		97.7%	84.6%	84.3%	<b>92.3%</b>	99.1%	94.6%	94.2%	<b>97.2%</b>
C5 Sumehr (20/25% in 2017/18)		59.9%	32.5%	39.2%	<b>49.2%</b>	64.5%	38.2%	40.0%	<b>54.0%</b>
C6 MyCareNet digital GMF management (*)		66.8%	52.7%	46.7%	<b>60.5%</b>	75.9%	65.2%	52.6%	<b>70.5%</b>
C8 Cebam Evidence linker (5 times)						49.4%	18.4%	24.8%	<b>37.4%</b>
C9 MyCareNet eAttest (5%) (*)						52.1%	36.8%	25.8%	<b>45.0%</b>
C10 Disability evaluation form (3 times)						67.5%	46.2%	43.2%	<b>58.6%</b>

(\*) Criterion applying to solo and group practices, not CHCs.

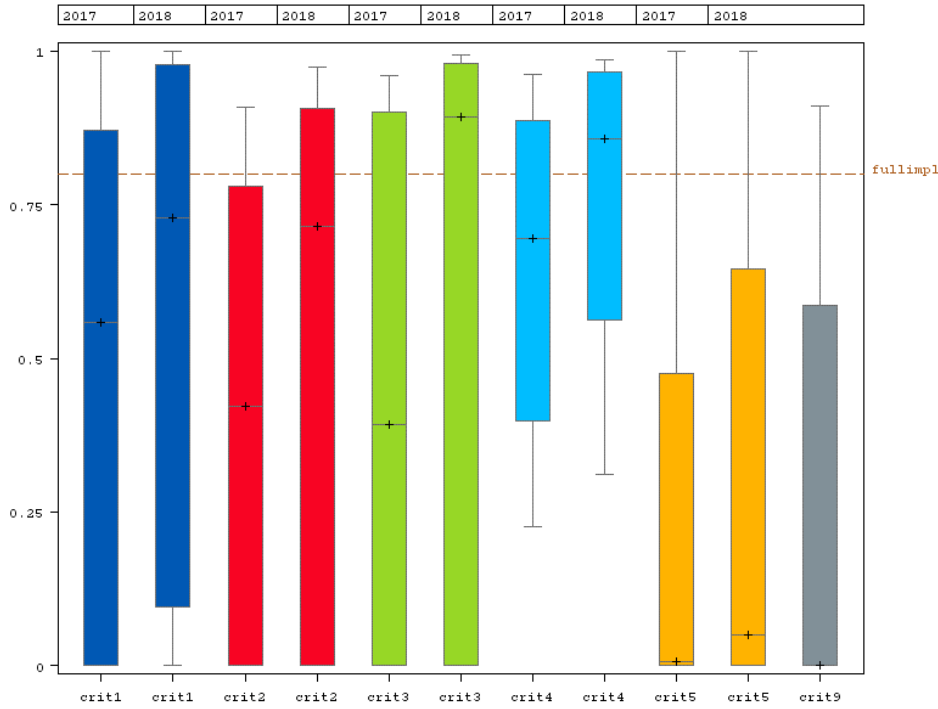
### 3.3.3.3 Intensity of use by criterion (C1-C5, C9)

For some criteria, a continuous measure was not available. For example, C6 is binary measured for each GP (Yes/No). The frequency of use of the Cebam Evidence Linker (C8) and the digital Disability evaluation form (C10) was not available either. For all other criteria, it was possible to design boxplots visualising to what extent the criterion was met (see Figure 15). The boxplots below are based on the population of GPs working in solo or group practices, not in those working in CHCs. GPs working CHCs were excluded from these boxplots because of the high adoption rates mentioned in Table 13. As a matter of comparison, we conventionally settled a dashed line at 80% on the figures, considering that this level indicated a high adoption rate (close to full implementation). These high adoption rates may be explained by the advanced administrative support in these centres.

As seen before, the adoption of the criteria increased between 2017 and 2018, as the medians rise. Although for some criteria the variability of use remains large and there are still GPs not using Chapter IV via MyCareNet (i.e. C2) and eFact functionality (i.e. C3) at all in 2018.



Figure 15 – Belgian evolution eHealth uptake criteria (C1-C5, C9)

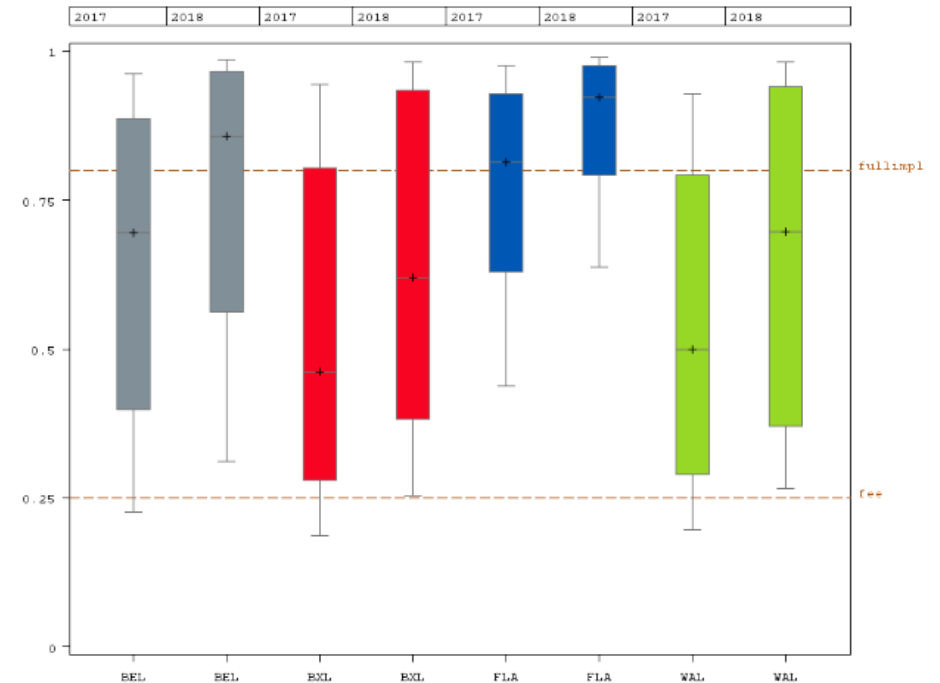


**Note:** Boxplots with box defined by  $P_{25}$ ,  $P_{50}$  and  $P_{75}$ , endlines defined by  $P_{10}$  and  $P_{90}$ . These limits are calculated on active GPs in solo or group practices, CHCs excluded. Reference line at 80% use. Crit 1: Recip-e; Crit 2: MyCareNet Chapter IV; Crit 3: MyCareNet eFact; Crit 4: GMF Informed Consent; Crit 5: Sumehr; Crit 9: MyCareNet eAttest (only available for 2018).

Regional differences are illustrated in Figure 16, Figure 17 and Figure 18 for criteria C4, C5 and C9. The other criteria boxplots stratified by region, which show the same trends as these three figures, can be found in Appendix 1.3. As seen above, Flanders generally has higher adoption rates compared to the other regions. Furthermore, adoption rates in Flanders exhibit a slightly

lower variability in its results (except for C5) as its other boxplots are shorter than those of the two other regions. As seen above, the uptake of C5 (Sumehr) increases between 2017 and 2018 in every region (despite the higher threshold in 2018). However, only median adoption rates in Flanders are above the 2018 threshold. C9 (i.e. eAttest) uptake is particularly low in Brussels (2018).

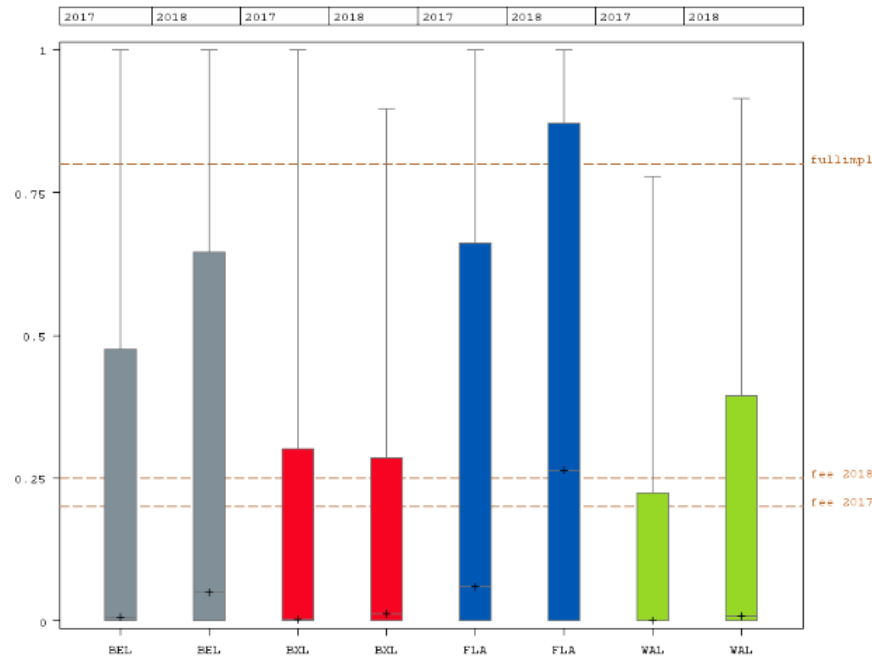
Figure 16 – Evolution eHealth uptake C4 GMF informed consent



**Note:** Boxplots with box defined by  $P_{25}$ ,  $P_{50}$  and  $P_{75}$ , endlines defined by  $P_{10}$  and  $P_{90}$ , calculated on active GPs in solo or group practices. Reference line at 80% use. Minimal threshold at 25%.

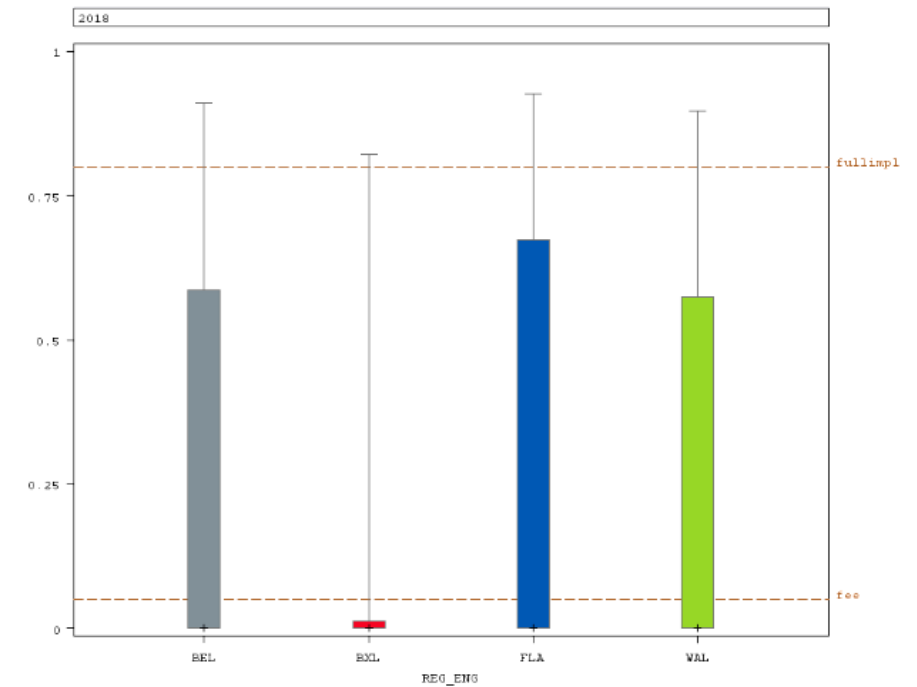


Figure 17 – Evolution eHealth uptake C5 Sumehr



**Note:** Boxplots with box defined by  $P_{25}$ ,  $P_{50}$  and  $P_{75}$ , endlines defined by  $P_{10}$  and  $P_{90}$ , calculated on active GPs in solo or group practices. Reference line at 80% use. Minimal threshold at 20% (2017) and 25% (2018).

Figure 18 – Evolution eHealth uptake C9 MyCareNet eAttest (2018)



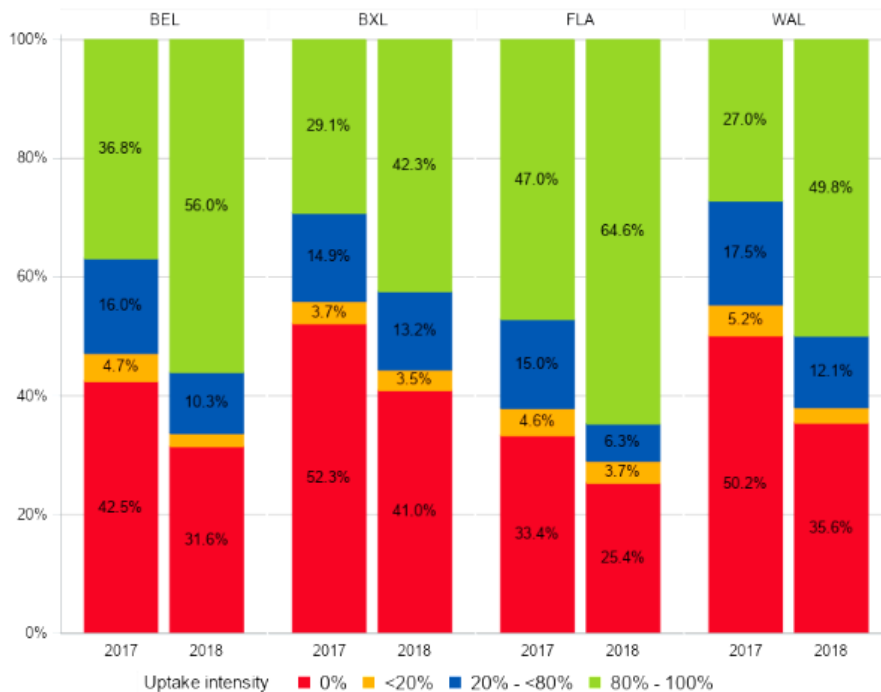
**Note:** Boxplots with box defined by  $P_{25}$ ,  $P_{50}$  and  $P_{75}$ , endlines defined by  $P_{10}$  and  $P_{90}$ , calculated on active GPs in solo or group practices. Reference line at 80% use. Minimal threshold at 5%.

Stacked bars represent another way to visualise adoption rates of eHealth services providing additional information next to the one reported in the boxplots. For example, Figure 19 illustrates the contrast between two groups: the intensive users, which adopt eFact via MyCareNet for more than 80% of their consultations (in green), and those who never used this service (in red). Only a few GPs are situated in between. For the use of C9 eAttest in Brussels, the moderate and intensive users (in green and blue) are more numerous than the light users (in orange) in Figure 20. In Brussels, there is



thus a minority of GPs (23.6%) reaching the 5% threshold of use in of eAttest but they use it for the vast majority of their certificates. Stacked diagrams for other criteria can be consulted in Appendix 1.4.

**Figure 19 – Evolution of intensity of use classes C3 MyCareNet eFact**



**Note:** Active GPs in solo or group practices.

**Figure 20 – Evolution of intensity of use classes C9 MyCareNet eAttest (2018)**



**Note:** Active GPs in solo or group practices.



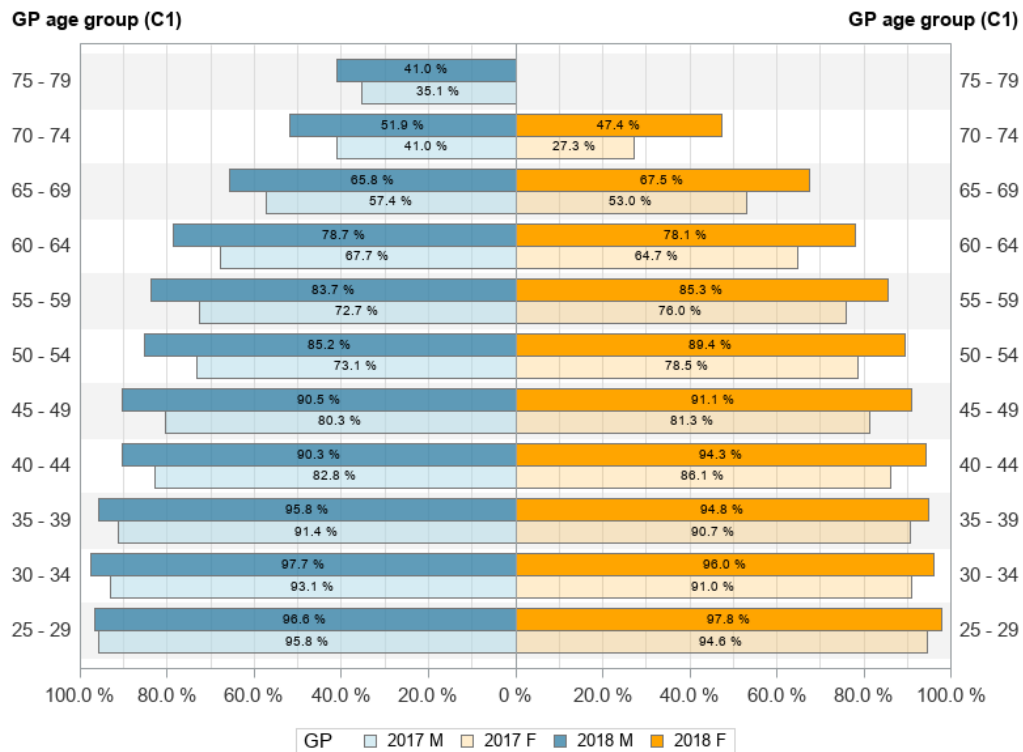
#### 3.3.3.4 *Uptake evolution by GP age group and gender*

The positive evolution of all criteria between 2017 and 2018 can be observed in every category of age and gender. Figure 21 presents the uptake on C1 (i.e. Recip-e) for all active GPs working in group or solo practices, the figures of other criteria can be found in Appendix 1.5. CHCs were not included, and age was limited to 79 years in order to avoid subgroups with very few GPs.

For some criteria (C1 Recip-e, C2 Chapter IV, C3 eFact and C6 digital GMF management) the gain between 2017 and 2018 is larger in age brackets above 60 years (note that the number of GPs in brackets above 70 years may be low). This can be attributed to an actual amelioration of the adoption rate and also to the dynamic of aging; GPs pass from one age bracket presenting a good score in 2017 to the next one showing a less good score in 2017, therefore raising it in 2018.



Figure 21 – Uptake evolution C1 Recip-e among active GPs (2017 to 2018)



Note: Active GPs in solo or group practices aged up to 79 years.


**Table 15 – Percentage of GPs reaching the threshold per criterion and gender (2017-2018)**

Criterion / year, gender						
Gender	Males N=6 006	Females N=4 049	ALL N=10 056(**)	Males N=5 883	Females N=4 298	ALL N=10 181
C1 Recip-e (25%)	70.1%	82.5%	<b>75.1%</b>	79.4%	90.9%	<b>84.2%</b>
C2 MyCareNet Chapter IV (50%)	54.2%	64.8%	<b>58.5%</b>	68.4%	79.6%	<b>73.1%</b>
C3 MyCareNet eFact (20%) (*)	58.5%	67.7%	<b>62.2%</b>	68.4%	76.9%	<b>72.0%</b>
C4 GMF informed consent (25%)	92.9%	91.3%	<b>92.3%</b>	97.4%	97.1%	<b>97.2%</b>
C5 Sumehr (20/25% in 2017/18)	46.1%	53.9%	<b>49.2%</b>	50.9%	58.4%	<b>54.0%</b>
C6 MyCareNet digital GMF management (*)	57.1%	65.6%	<b>60.5%</b>	67.0%	75.3%	<b>70.5%</b>
C8 Cebam Evidence linker (5 times)	.	.	.	33.5%	42.7%	<b>37.4%</b>
C9 MyCareNet eAttest (5%) (*)	.	.	.	40.4%	51.3%	<b>45.0%</b>
C10 Disability evaluation form (3 times)	.	.	.	54.0%	65.0%	<b>58.6%</b>

(\*) Criterion applying to solo and group practices, not CHCs. (\*\*) Gender was missing for one GP.

Except for C4 (informed consent), Table 15 shows that female GPs scored higher adoption rates than their male colleagues in every criterion, due to their younger age (i.e. age is negatively associated with uptake, the younger the age, the higher the uptake). Indeed, in each logistic regression using each criterion as dependent variable and year and gender as explanatory variable, gender was always statistically significant in favour of women (except for C4). As soon as age was introduced, the gender effect always lost its statistical significance, meaning that the gender effect can be explained by age. In other words, female GPs are younger which make them more prone to adopt eHealth services.

### 3.3.3.5 Uptake by GP age group, gender and type of practice

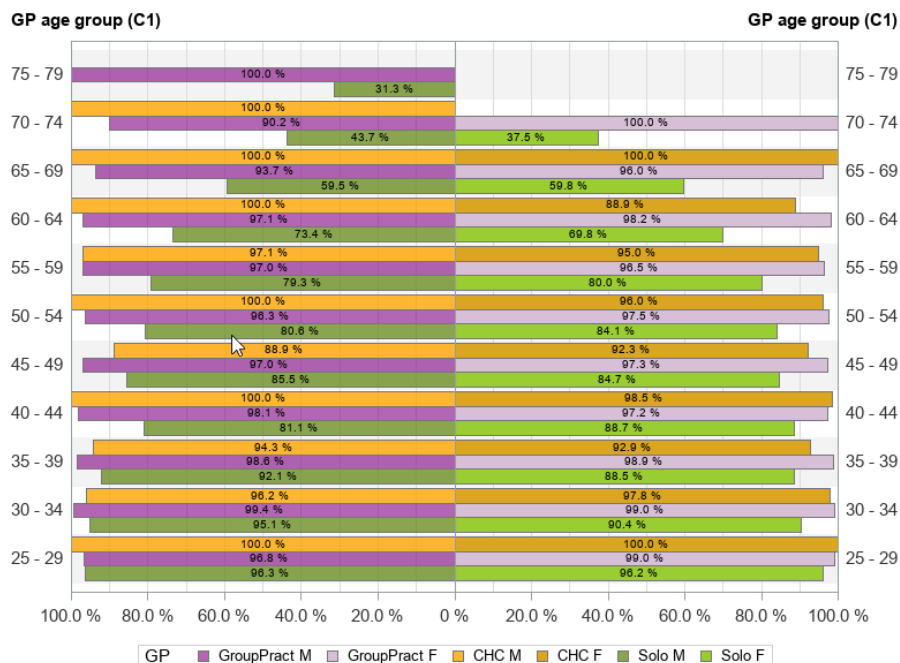
When adding the type of practice as a supplementary level of analysis, one should bear in mind that some subgroups include very few GPs and that interpretation should be done with caution. For example, the 100% of 70-74 year-old female GPs working in group practices using Recip-e for their drug prescriptions was calculated on 3 GPs (Figure 22).

As stated before, the uptake on eHealth criteria is lower in solo practices than in group practices and CHCs. This statement remains true in the majority of age and gender subgroups. There are a few exceptions: for example, the percentages of female GPs using MyCareNet in most of their Chapter IV reimbursement requests are more or less similar in solo and group practices throughout age brackets (Figure 23). The effect of age is less pronounced in group practices and CHCs in C8 (i.e. Cebam Evidence Linker) and C10 (i.e. digital Disability evaluation form), especially in women



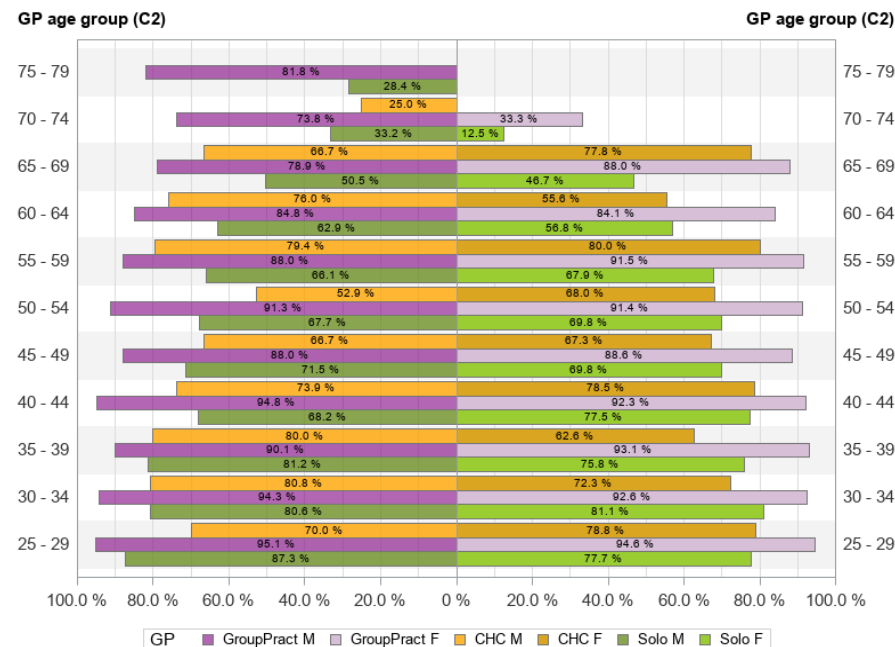
for C8 where older female GPs score more or less as good as younger colleagues (see other Figures in Appendix 1.6). Unfortunately, we do not have information of the yearly number of times the Cebam Evidence Linker is used per age bracket, only that the 5 times threshold is attained or not.

**Figure 22 – Uptake C1 Recip-e by GP type of practice (2018)**



**Note:** Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.

**Figure 23 – Uptake C2 MyCareNet Chapter IV by GP type of practice (2018)**



**Note:** Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.

**3.3.3.6 Uptake by GP age group, gender and region**

Examples of figures by age group, gender and region are given for C5 and C8. We refer the reader to Appendix 1.7 for other figures.

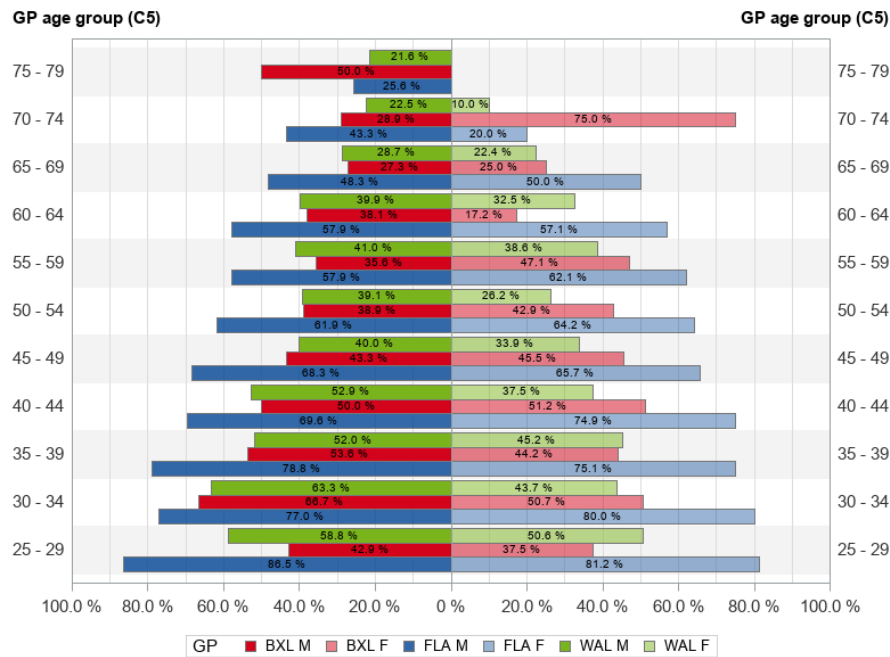
One must proceed with the same caution in interpretation of these figures (as explained above) due to small numbers in some subgroups. Nevertheless, it seems that younger GPs in Wallonia need to be encouraged to use more services like the Chapter IV service of MycareNet (i.e. C2), the Cebam Evidence Linker (i.e. C8) and the eAttest service of MyCareNet (i.e.





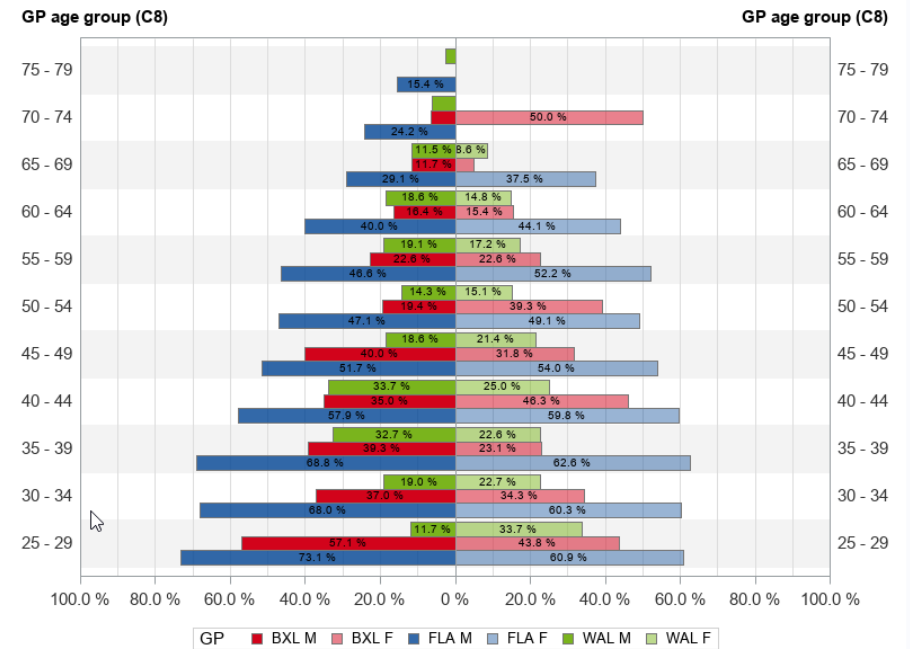
C9), as the basis of the pyramids is more narrow compared to its middle part (especially in male GPs). The same is true for young GPs in Brussels for the upload of Sumehr (i.e. C5) and the Disability digital evaluation form (especially in female GPs).

**Figure 24 – Uptake C5 Sumehr by region (2018)**



**Note:** Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.

**Figure 25 – Uptake C8 Cebam Evidence Linker by region (2018)**



**Note:** Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.



### 3.3.3.7 Association between criteria C1 and C2, C4 and C5

It seemed reasonable to hypothesize a correlation between C1 and C2 or C4 and C5. One could assume that a high user of the Recip-e service is also more likely to use MyCareNet for claiming reimbursement of Chapter IV drugs, or GPs with higher rates of informed consents among their patients have also higher Sumehr uploads.

Indeed, a Chi-square test confirmed that C1 Recip-e and C2 chapter IV were positively associated in all three GP-populations: the CHCs, group and solo practices. In other words, GPs sending at least 25% of their prescriptions via Recip-e are likely to introduce more than half their Chapter IV reimbursement claims via MyCareNet. The same observation applies for the association between C4 Informed Consent and C5 Sumehr.

### 3.3.3.8 Software packages used in 2017 and 2018

GPs in training are obliged to use a **software package approved** by the National commission of representatives of medical doctors and health insurance funds. Graduated GPs are not obliged to use a recognised software package, but if they do, the integrated allowance increases (see Table 11).

Information on used software packages was available for GPs applying for the allowance (who represent 83.5% and 82.6% of the active GPs in solo and group practices in 2017 and 2018). The three most used software packages by active GPs in solo or group practices, and who applied for the allowance, are CareConnect, HealthOne and Windoc. These software packages are the most popular both in 2017 and 2018, consolidating their market share from 77.9% till 81.3% (see Appendix 1.8). The popularity of software packages varies between regions. In 2018, CareConnect is widely used in Flanders (55%) followed by Windoc (19.1%) and HealthOne (15.8%). CareConnect is also the market leader in Wallonia (41.4%), followed by EpicureSoft (24%) and HealthOne (21.7%). HealthOne is the most common used in Brussels (43.3%), followed by EpicureSoft (22.6%) and CareConnect (22.4%).

## 4 FACTORS INFLUENCING EHEALTH ADOPTION: AN UMBRELLA REVIEW

### 4.1 Key points

- We included 20 reviews, of which 16 were traditional systematic literature reviews, three were umbrella reviews and one a scoping review. The majority of the included publications described the adoption of EPDs. Most of the reviews were focusing on physicians. Three publications mentioned “healthcare professionals”, without further specification, three referred to primary care professionals (also not further specified) and three publications did not mention the targeted healthcare professionals.
- The methodological quality of the majority of the included publications was assessed “critically low” and “low”. However, important to note is that the used quality assessment instrument may not be suitable for the design of the selected publications.
- The included publications mention a wide range of factors contributing to the adoption of eHealth.
- Major domains of relevance are quality of the eHealth technology; use and user satisfaction; net benefits; individual-, organisational-, and implementation characteristics; and country-specific factors (such as governance, standards, funding, or trends).
- Fundamental factors for eHealth adoption were identified by counting the number of publications in which it was addressed. These fundamental factors entail interoperability, security, and ease of use of the new eHealth system; effect on the patient-provider relationship; net costs; the use of “champions”; computer literacy and attitude towards innovation/technology of the healthcare professionals; practice characteristics; availability of training and involvement of end-users during the

**implementation; and the existence of incentive programs for taking up eHealth technology.**

## 4.2 Aim

In order to inform policy makers on methods to enhance the uptake of eHealth services in Belgium, the current systematic literature review aims to synthesise and summarise the factors influencing eHealth adoption.

## 4.3 Methods

Previous published systematic literature reviews were identified through a search strategy in three bibliographic databases (i.e. Ovid Medline®, Embase®, and Cochrane Library). These databases were searched on 31 July 2019 with the following restrictions: language (English, French, and Dutch) and date limits (from January 2009 – August 2019). We provide the reader with a more detailed overview of our inclusion- and exclusion criteria, following the PICOT model in Table 16.

Initially, the search strategy was developed in collaboration with a KCE information specialist to search Medline through the Ovid interface. This search strategy was subsequently translated to Embase and the Cochrane Library. The detailed search terms and number of hits for each search strategy are provided in Appendix 2.1.

**Table 16 – Inclusion and exclusion criteria**

	INCLUSION	EXCLUSION
<b>P</b>	Healthcare professionals (all healthcare settings were considered)	Factors identified by patients or other population groups
<b>I</b>	Systematic literature review on the evidence of barriers and facilitators to adopt eHealth technology	Primary studies identifying barriers and facilitators to adopt eHealth technology
<b>C</b>	This review was not limited to comparator studies	
<b>O</b>	Factors to adopt eHealth technology	
<b>T</b>	Systematic reviews Narrative reviews Qualitative meta-syntheses or meta-ethnographies Scoping reviews	Primary publications Secondary analyses Summaries of the literature for the purpose of information or commentary Discussions of literature included in contributions to theory building or critique Editorial discussions Publications in which the abstract states it is a review, but no support evidence in the main paper (such as details of databases, search strategies, etc.) Protocols of systematic literature reviews (however, in case of relevance, main paper was searched for)

Bibliographic results were exported and deduplicated to the Rayyan QRCI tool<sup>53</sup> for screening. Titles and abstracts of potentially relevant references were screened by one reviewer (JD), who also reviewed full-texts of eligible papers. Afterwards, the reference list of each selected publication was screened for additional eligible publications (i.e. backward citation). Uncertainty was resolved by discussion with the other members of the research team. A structured form guided data extraction of study



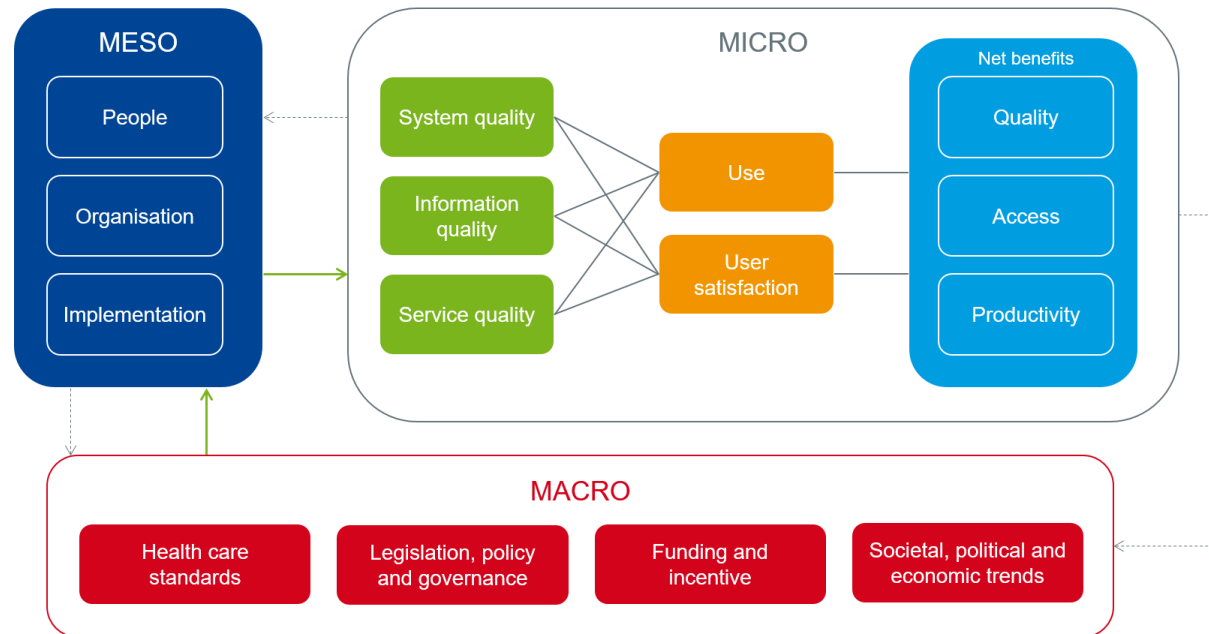
characteristics, including review design, focus of the systematic literature review, time frame, and number of included publications. In the following stage, all mentioned factors for eHealth adoption were extracted from the included publications. Factors with close relevance were combined and subsequently mapped using the clinical adoption framework (Box 1). References to the factors in the selected publications were counted. When a factor was mentioned in half or more of the included publications (i.e.  $\geq 10$  publications) it was considered a fundamental factor for adopting eHealth.

### Box 1 – Clinical adoption framework

The clinical adoption framework is a conceptual framework to map factors influencing health information system (HIS) success (Figure 26). It is an extended version of the Infoway Benefits Evaluation (BE) framework, published in 2006.<sup>54</sup> The BE framework has been well received in the healthcare community because it “made sense” as a scheme when interpreting eHealth adoption and evaluation. Nevertheless, the BE framework did not take into account the organisational and social contexts. These contexts are added in the extended clinical adoption framework, which is described here. The clinical adoption framework merges theories and models from disciplines of information systems, organisation sciences, and health informatics. These theories and models include: the Information Technology Interaction Model, Unified Theory of Acceptance and Use

of Technology Model, implementation research, task-technology fit, managing changes and risks, and people and socio-organisational aspects of eHealth.<sup>55</sup>

The framework groups evaluation categories into dimensions on three levels (i.e. micro, meso, and macro level). The *micro level* comprises three dimensions: (i) HIS quality, (ii) usage quality, and (iii) net benefits. The HIS quality-dimension includes information, system, and service quality. Usage quality is measured by use and user satisfaction. The net benefits dimension consists of care quality, productivity, and access. The *meso level* comprises the dimensions (i) people, (ii) organisation, and (iii) implementation process. People refers to all types of individuals or groups implied in eHealth, personal characteristics and expectations, as well as roles and responsibilities. The organisation dimension measures the extent to which eHealth fits the organisation’s strategy, culture, structure and processes, information infrastructure, and return on value. The *macro level* consists of four dimensions: (i) HIS standards, (ii) governance, (iii) funding, and (iv) trends. HIS standards are the types of eHealth, organisational performance and professional practice standards in place. Governance refers to the influence of governing bodies, legislative acts, and regulations or policies. Funding implies the payment, remuneration, and incentive programs in place. Last, trends refer to public expectations, as well as socio-political and economic cultures toward technology and eHealth.<sup>55</sup> We refer the reader to Lau and Price<sup>55</sup> for more detailed information on the clinical adoption framework.

**Figure 26 – Clinical adoption framework**

Source: Adapted from Lau and Price <sup>55</sup>



### 4.3.1 Quality assessment

The included systematic literature reviews were methodologically evaluated by one reviewer (JD), using the AMSTAR 2 instrument<sup>56</sup> (which is also conform the KCE process notes<sup>57</sup>). We listed the evaluation items of the AMSTAR 2 instrument below in Box 2.

#### Box 2 – AMSTAR 2 instrument to assess methodological quality of systematic literature reviews

<b>Item 1</b>	Did the research question and inclusion criteria for the review include the components of PICO?
<b>Item 2</b>	Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?
<b>Item 3</b>	Did the review authors explain their selection of the study design for inclusion in the review?
<b>Item 4</b>	Did the review authors use a comprehensive literature search strategy?
<b>Item 5</b>	Did the review authors perform study selection in duplicate?
<b>Item 6</b>	Did the review authors perform data extraction in duplicate?
<b>Item 7</b>	Did the review authors provide a list of excluded studies and justify the exclusion?
<b>Item 8</b>	Did the review authors describe the included studies in adequate detail?
<b>Item 9</b>	Did the review authors use a satisfactory technique for assessing the risk of bias in individual studies that were included in the review?
<b>Item 10</b>	Did the review authors report on the source of funding for the studies included in the review?

<b>Item 11</b>	If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?
<b>Item 12</b>	If meta-analysis was performed, did the review authors assess the potential impact of risk of bias in individual studies on the results of the meta-analysis or other evidence synthesis?
<b>Item 13</b>	Did the review authors account for risk of bias in individual studies when interpreting/discussing the results of the review?
<b>Item 14</b>	Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?
<b>Item 15</b>	If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?
<b>Item 16</b>	Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?

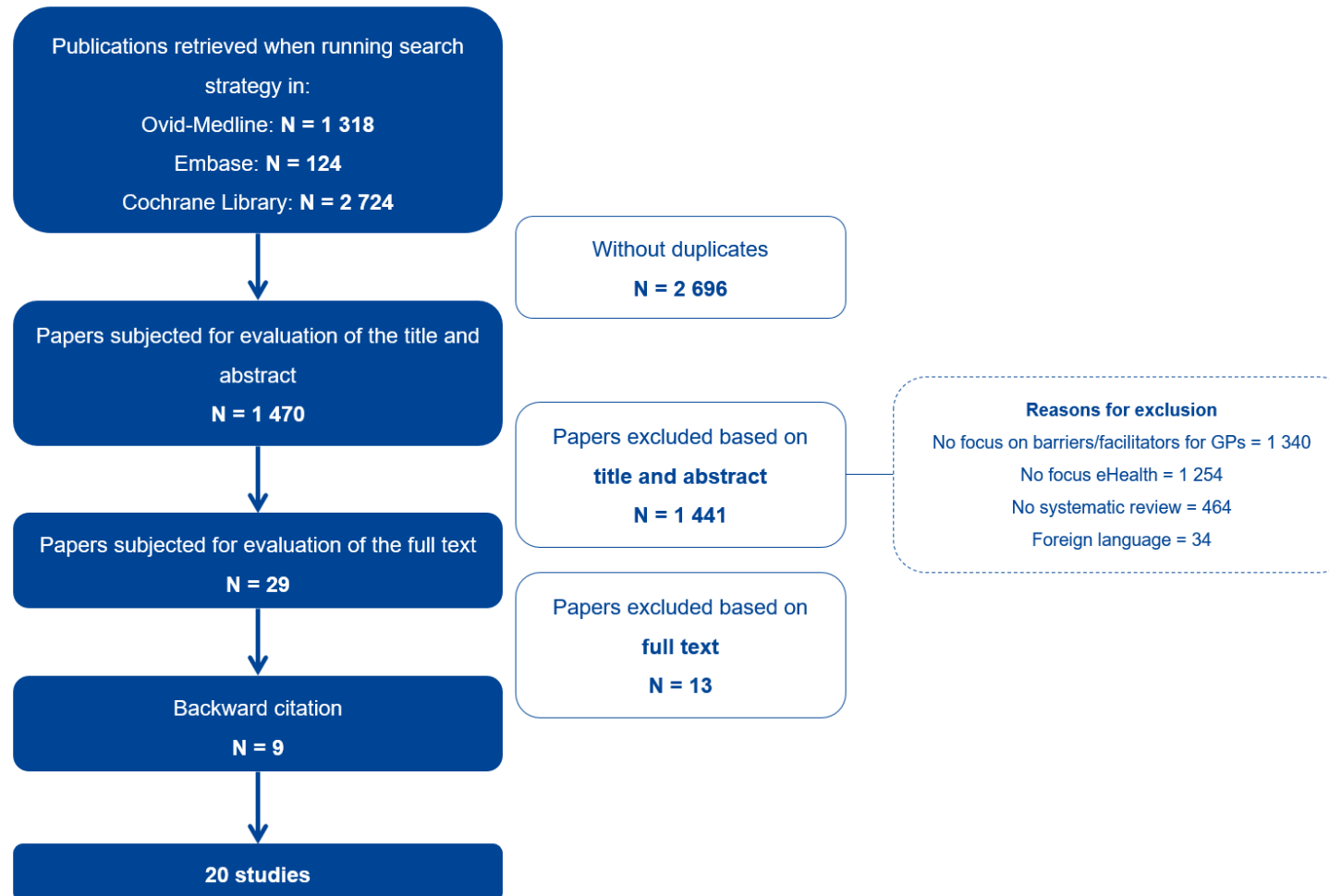
Source: Shea, Reeves<sup>56</sup>

## 4.4 Results

The identified publications (N = 4 166) from the search in the three databases were merged and duplicates were removed. Titles and abstracts of the remaining 1 470 publications were screened for eligibility (of which 1 441 were excluded). In the second screening round, the full text of the 29 remaining publications was assessed, resulting in the exclusion of 13 publications. The screening of the reference lists of the selected publications identified 9 additional publications. This resulted in 20 studies fulfilling the inclusion criteria. The screening process is summarised in the flow chart presented in Figure 27.



Figure 27 – Flow chart of the study selection process





#### 4.4.1 Characteristics of the included publications

Full study details are presented in Table 17. The majority of the included publications were traditional systematic literature reviews (n=16). Three of the publications reported the results of an umbrella review and one of a scoping review. EPDs were the most studied eHealth services in the selection of publications (n=12). Most of the reviews were focusing on physicians (n=9). Three publications mentioned “healthcare professionals”, without further specification, three referred to primary care professionals (also not further specified) and three publications did not mention the targeted healthcare professionals. Search strategies in the selected publications ranged from inception up to 2017.

Overall, when judged against the items of the AMSTAR 2 instrument, many of the included systematic literature reviews were methodologically poor. The design of 13 included publications was considered “critically low” and three “low”. The methodology of only four included publications was rated “moderate”. Following the critical items of the AMSTAR instrument, there was little transparency in the methodology of the selected publications. The details of the quality assessment of all publications can be consulted in Appendix 2.2.

**Table 17 – Study characteristics of the included publications**

	Study design	Focus review		Time frame	Number of included publications	Quality assessment
		eHealth services	Healthcare professionals			
<b>Bassi et al. (2012)<sup>58</sup></b>	Systematic literature review	EMR	Physicians	2000 – May 2012	19 publications	Critically low
<b>Boonstra et al. (2010)<sup>59</sup></b>	Systematic literature review	EMR	Physicians	January 1998 – May 2009	22 publications	Critically low
<b>Castillo et al. (2010)<sup>60</sup></b>	Systematic literature review	EHR	Physicians	January 1985 – December 2009	68 publications	Critically low
<b>Chang et al. (2015)<sup>61</sup></b>	Systematic literature review	EMR	Not specified	N/A	10 publications	Low
<b>Cresswell et al. (2013)<sup>62</sup></b>	Umbrella review	eHealth*	Not specified	1997 – 2010	121 publications	Moderate
<b>de Grood et al. (2016)<sup>63</sup></b>	Scoping review	EMR or EHR Telemedicine e-Prescribing General eHealth/HIT	Physicians	Inception – 24 July 2015	74 publications	Critically low





		Health knowledge management CPOE mHealth Other				
<b>Fontaine et al. (2010)<sup>64</sup></b>	Systematic literature review	Health information exchange systems EMR	Primary care (not further specified)	January 1990 – September 2008	64 publications	Critically low
<b>Gagnon et al. (2012)<sup>65</sup></b>	Systematic literature review	e-Prescribing	Primary care (not further specified)	January 2002 – December 2012	34 publications	Low
<b>Gagnon et al. (2014)<sup>66</sup></b>	Systematic literature review	Information and communication technologies	Healthcare professionals (not further specified)	January 1990 – October 2007	106 publications	Critically low
<b>Lau et al. (2012)<sup>67</sup></b>	Systematic literature review	EMR	Physicians	Inception – July 2009	43 publications	Critically low
<b>Li et al. (2013)<sup>68</sup></b>	Systematic literature review	eHealth EMR EHR	Healthcare professionals (not further specified)	Inception – November 2011	93 publications	Critically low
<b>Ludwick et al. (2009)<sup>69</sup></b>	Systematic literature review	CPOE EMR EHR Clinical decision support systems Picture archiving and communication systems Nursing information systems Personal health records	Primary care (not further specified)	2000 – 2007	86 publications	Critically low
<b>Mair et al. (2012)<sup>70</sup></b>	Umbrella review	eHealth**	Not specified	1990 – 2009	37 publications	Moderate
<b>McGinn et al. (2011)<sup>71</sup></b>	Systematic literature review	EHR	Healthcare professionals (including physicians,	1999 – 2009	60 publications	Low



			nurses, administrative staff, pharmacists, midwives, and social workers)			
<b>Moxey et al. (2010)<sup>72</sup></b>	Systematic literature review	Computerised clinical decision support for prescribing	Physicians	1990 – November 2007	59 publications	Critically low
<b>O'Donnell et al. (2018)<sup>73</sup></b>	Systematic literature review	EMR	Primary care physicians	1 January 1996 – 1 August 2017	33 publications	Moderate
<b>Police et al. (2011)<sup>74</sup></b>	Systematic literature review	HIT (not further specified)	Physicians	12 January 2004 – 12 January 2009	119 publications	Critically low
<b>Ross et al. (2016)<sup>75</sup></b>	Umbrella review	eHealth <sup>***</sup>	Healthcare professionals (not further specified)	1 August 2009 – 1 January 2014	44 publications	Moderate
<b>Taylor et al. (2016)<sup>76</sup></b>	Systematic literature review	EHR	Chiropractors	November 2005 – February 2015	45 publications	Critically low
<b>Ye et al. (2010)<sup>77</sup></b>	Systematic literature review	E-mail communication	Physicians	2000 – 2008	4 publications	Critically low

EMR: electronic medical record; EHR: electronic health record; HIT: health information technology; CPOE: computerised physician order entry

\* eHealth includes computerised decision support, e-prescribing, and EHRs

\*\* Thesaurus terms referring to eHealth were: medical-information-applications, management-information systems, decision-making-computer-assisted, diagnosis-computer-assisted, therapy-computer-assisted, medical-records-systems-computerised, medical-order-entry-systems, electronic-mail, videoconferencing, telemedicine, computer-communication-networks, and internet.

\*\*\* eHealth technologies include management systems (such as EHRs that allow the acquisition, transmission, and storage of patient data), computerised decision support systems (including diagnostic support, alerts and reminder systems), communication systems (such as telecommunication that act as an intermediary between users), and information resources (such as the internet).



#### 4.4.2 Factors influencing eHealth adoption: mapping in the clinical adoption framework

All factors mentioned in the included publications were listed. After merging those that were similar and thematic clustering, we ended up with 81 distinct factors. These factors were mapped to the categories of the clinical adoption framework: 36 of them could be mapped in the micro level, 31 in the meso level, and 14 in the macro level (see Table 18). The factors are elaborated in more detail below.

##### 4.4.2.1 Fundamental factors

When a factor was addressed in half or more of the included publications (i.e.  $\geq 10$  publications), it was considered to be fundamental for the adoption of eHealth. The number of references for each factor can be consulted in the Metrics-column in Table 18. Factors highlighted in blue in the table (and in bold throughout the text) reached the metrics cut-off of 10 and were, therefore, considered fundamental.

At the micro level, these fundamental factors are “interoperability”, “security”, “ease of use”, “patient-provider relationship”, and “net costs”. The factors “champions or superusers”, “computer literacy”, “attitude towards innovation and technology”, “practice characteristics”, “training”, and “involvement of end-users” can be considered fundamental at the meso level. And last, at the macro level, the implementation of “incentive programs” encourages the uptake of eHealth.

**Table 18 – Mapping of the factors for eHealth adoption in the clinical adoption framework**

Level	Dimension	Category	Factors	Publications	Metrics
MICRO	HIS quality	<i>Information quality</i>	Pre-analysis	63	1
			Content	58, 65-67	4
			Alerts	58, 66	2
	<i>System quality</i>		Design	58, 65-69, 73, 75	8
			Template	67, 73	2
			Interoperability	58-66, 68, 70-73, 75, 76	16
			Adaptability	59, 62, 66, 75	4
			System response time	62, 67, 73, 75	4
			Reliability	58, 59, 65-67	5
			Technical limitations	58, 59, 65, 66, 71, 72	6
			Security	58, 59, 63-66, 68-72, 74, 75, 77	14
			<i>Service quality</i>		Support
	Downtime	58, 67, 71, 73, 75			5



Level	Dimension	Category	Factors	Publications	Metrics
MESO	Use		Intention	67	1
			Strategies	67	1
			Patterns	67	1
	User satisfaction		Perceived usefulness	58, 62, 65, 66, 68, 70, 73, 75	8
			Ease of use	58, 59, 62, 63, 65-68, 70, 71, 75	11
			Previous experience	58, 69	2
			Self-efficacy	58, 66	2
			Overall satisfaction	58, 65, 66	3
	Net benefits	Care quality	Safety	58, 67, 69, 72	4
			Quality improvement	58, 67, 69	3
			Effectiveness	58, 67	2
			Appropriateness	58	1
			Health outcomes	58, 65, 66	3
			Observability	65, 66	2
			Guidelines compliance	67	1
			Patient-provider relationship	58, 59, 63, 65, 66, 68, 69, 71-73, 75	11
		Productivity	Lower productivity during transition	58, 59, 63, 64, 74	5
			Efficiency	58, 66, 67, 69, 71, 73, 77	7
			Coordination	58, 60, 62, 67	4
			Net costs	58, 62, 63, 65-69, 71, 74-76	12
			Start-up costs	58, 59, 64, 69, 73, 75	6
			Maintenance costs	58, 59, 64, 67, 73, 75	6
			Training costs	69, 73	2
			Time saving	66	1
Access	Real-time access	58, 72-75	5		
People	Individual and groups	Peers	58, 59, 65, 66, 68	5	
		Patients	65, 66	2	
		Management	66, 68, 75	3	



Level	Dimension	Category	Factors	Publications	Metrics
Organisation	<i>Personal characteristics</i>		Champions	58-62, 65, 67, 69, 70, 72, 73, 75	12
			Sociodemographic characteristics	58, 63, 66-68, 73, 74	7
			Computer literacy	58, 59, 61, 62, 65, 67-69, 71, 73, 75	11
	<i>Personal expectations</i>		Perceived voluntariness	66, 68	2
			Attitude towards innovation and technology	58, 59, 61, 62, 65, 68, 71, 74-76	10
			Quality improvement	70	1
	<i>Roles and responsibilities</i>		Comparison paper versus electronic systems	58	1
			Task shift	62, 63, 66-68, 71, 75	7
			Fear	71, 75	2
		<i>Strategy</i>			0
	<i>Culture</i>		Positive culture	59, 62, 65, 68, 73, 75	6
			Resistance to change	58, 66, 69, 71, 74, 75	6
	<i>Structure and processes</i>		Practice characteristics	58, 59, 63, 65-69, 73, 74, 76	11
			Leadership	59, 61, 62, 65	4
<i>Info and infrastructure</i>		Availability	59, 65, 68, 75	5	
		Quality	68, 75	2	
<i>Return on value</i>		Benefits	58, 62-64, 66, 68, 74, 75	8	
		Uncertainty	58, 59, 64-66	5	
Implementation	<i>Stage</i>				0
	<i>Project</i>		Strategic plan	62, 64, 66, 67, 73, 75	6
			Pilot	62, 65	2
			Incremental implementation	59, 64, 69, 75	4
			Sufficient time	58, 59, 63, 65, 67, 69, 71, 75, 77	9
			Training	58, 59, 63, 65, 67, 69, 70, 72-76	11
			Support	59, 60, 63, 65, 69, 70, 72	7
			Adequate financial resources	70	1
			Evaluation	58, 70, 75	3
	<i>HIS-practice fit</i>		Practice compatibility	58, 60, 65, 67-69, 72, 73, 75	9



Level	Dimension	Category	Factors	Publications	Metrics	
MACRO			Business alignment	58, 62, 68, 75	4	
			Need	58, 65, 71, 73, 74	5	
			Involvement of end-users	59, 62, 65-71, 73-76	13	
	<b>Governance</b>	<i>Legislative acts</i>		Support	65, 66	2
				<i>Regulations and policies</i>	Data security guidelines	58, 68, 73
				Liability	58, 63, 64, 69, 72, 75	6
				Support	70, 75	2
				Obligation of reporting information	58	1
				<i>Governance bodies</i>	Trust	64
	<b>Standards</b>	<i>HIS standards</i>		Vendor certification and accreditation	58, 59, 65, 66, 68, 69, 76	7
				HIS standards	58, 64, 67, 70, 74, 75	6
				Guidelines	58, 67, 75	3
				<i>Performance standards</i>		0
				<i>Practice standards</i>		0
	<b>Funding</b>	<i>Remuneration</i>		Reimbursement	58, 68, 77	3
				Pay for performance	58, 67, 71, 74, 75	5
		<i>Incentive programs</i>		Incentive programs	58, 59, 64-69, 73, 75, 76	11
				Subsidy to buy system	67, 75	2
		<i>Added value</i>				0
	<b>Trends</b>	<i>Societal trends</i>		Competition	58, 64, 66, 68	4
				Public opinion towards innovation and technology	58	2
		<i>Political trends</i>				0
				<i>Economic trends</i>		0

Factors highlighted in blue in the table reached the metrics cut-off of 10 and were, therefore, considered fundamental.



#### 4.4.2.2 Micro level

##### HIS quality

###### Information quality

- The completeness, accuracy, relevance and comprehension of the content in the eHealth system influences its uptake.<sup>58, 65-67</sup> Additionally, de Groot et al.<sup>63</sup> emphasises that physicians prefer to see an analysis of the data rather than raw data to get an overview of their patients and clinical work. Two publications emphasise that the ability of the eHealth technology to provide the healthcare professional with drug-related interaction alerts will increase its uptake.<sup>58, 66</sup> However, these publications also report that an excess of these alerts can lead to annoyance, and by doing so, decrease the tendency to adopt eHealth.

###### System quality

- The design of the eHealth technology was identified to influence its adoption in eight selected publications.<sup>58, 65-69, 73, 75</sup> This design should be intuitive and contain an user-friendly interface. The availability of templates as a structured mean to enter data is also perceived to be beneficial by healthcare professionals.<sup>67, 73</sup> A key factor for the uptake of eHealth is the **interoperability with other systems**.<sup>58-66, 68, 70-73, 75, 76</sup> Healthcare professionals are less likely to use an eHealth technology when it is not compatible or does not connect with other electronic systems. Furthermore, eHealth systems which can easily be adapted, have a high speed, are reliable, and have few technical limitations show higher uptake rates.<sup>58, 59, 62, 65-67, 72, 73, 75</sup> Last, and also identified as a key factor, new technology taking into account the **privacy and security of the patient data** will also be beneficial for its adoption.<sup>58, 59, 63-66, 68-72, 74, 75, 77</sup>

###### Service quality

- Service quality can be summarised as the degree to which a healthcare professional believes eHealth is important, can improve job performance, and the availability of infrastructures supporting its adoption.<sup>55</sup> Two main themes emerged from the included publications in the current literature review: (i) support and (ii) downtime. The availability and access to ongoing technical support can improve the uptake of eHealth technology.<sup>58, 59, 61, 67, 68, 73, 75</sup> Furthermore, disruptions to office operations and patient care due to unplanned downtime may hinder this uptake.<sup>58, 67, 71, 73, 75</sup>

##### Use

Use refers to eHealth system usage intention or patterns.<sup>55</sup> Our systematic literature review identified only one publication referring to factors in this category. Lau et al.<sup>67</sup> mentioned that intent (e.g. quality improvement versus record keeping), actual strategies to optimise appropriate use and routinely using HIS encourages the uptake of eHealth.

##### User satisfaction

User satisfaction refers to the usefulness, ease-of-use, and competency of working with eHealth services.<sup>55</sup> These services need to be perceived as useful<sup>58, 62, 65, 68, 70, 73, 75</sup> and **user-friendly**<sup>58, 59, 62, 63, 65-68, 70, 71, 75</sup> as these are quite essential prerequisites for effective use. Furthermore, previous experience, self-efficacy, and overall satisfaction of working with eHealth systems will likely encourage eHealth adoption.<sup>58, 66, 69</sup>

##### Net benefits

###### Care quality

- If eHealth interventions are perceived to enhance patient safety, improve quality of care and its effectiveness and appropriateness, enhances patient health outcomes, and increases guidelines compliance, healthcare professionals are more inclined to use eHealth technology.<sup>58, 65-67, 69, 72</sup> Moreover, one of the most cited factors of eHealth adoption was the **impact of eHealth on the patient-provider**



**relationship.** Some healthcare professionals worried that using the computer during a consultation would have a negative influence on the patient-provider relationship.<sup>58, 59, 63, 65, 66, 68, 69, 71-73, 75</sup> For example, some healthcare professionals think that the loss of eye-contact will result in dissatisfaction of the patient and loss of context. According to Li et al.<sup>68</sup>, users who prefer a more distant relationship between provider and patient were found to have higher eHealth usage rates.

#### *Productivity*

- The indirect costs related to reduced productivity during the transition period or early implementation stages has been shown to decrease eHealth uptake.<sup>58, 59, 63, 64, 71, 74</sup> The expectation that this transition will also lead to a higher workload and lower efficiency is perceived as a barrier.<sup>58, 66, 67, 69, 73, 77</sup> The benefits also have to be observable.<sup>65, 66</sup> However, when a new eHealth technology supports interprofessional roles/collaboration and increases communication between other healthcare professionals its uptake will increase.<sup>58, 60, 62, 67</sup> A system which is not cost-effective and has **high net costs** (in comparison to benefits) will be more likely to have lower uptake rates.<sup>58, 62, 63, 65-69, 71, 74-76</sup> This accounts also for eHealth systems with high start-up costs, maintenance costs, and training costs.<sup>58, 59, 64, 67, 69, 73, 75</sup> And last, the new eHealth technology should save time compared to the previous approach.<sup>66</sup>

#### *Access*

- The ability to provide easy access to the eHealth technology has been mentioned by several selected publications as driver for the adoption of eHealth, connectivity issues and the inability to provide real-time access to eHealth systems entail loss of time and potential loss of revenue.<sup>58, 72-75</sup>

#### *4.4.2.3 Meso level*

##### **People**

##### *Individual and groups*

- Type of individuals or groups (such as patients, other healthcare professionals, policy makers, or stakeholder groups) can influence the adoption of eHealth.<sup>55</sup> For example, the attitude or recommendations of peers can influence the eHealth-perception of a healthcare professional.<sup>58, 59, 65, 66, 68</sup> The experience and opinion of the patient on the newly implemented eHealth technology can also influence the uptake rates.<sup>65, 66</sup> For example, if patients do not see the benefit of e-prescriptions, physicians could be less inclined to adopt them.<sup>66</sup> In addition, commitment of the management and their support to change may positively influence healthcare professionals to adopt eHealth.<sup>66, 68, 75</sup> One of the key factors in eHealth adoption in our systematic literature review is the presence of **clinical “superusers” or “champions”**.<sup>58-62, 65, 67, 69, 70, 72, 73, 75</sup> These champions are usually healthcare peers raising awareness of new HIS, introducing their colleagues to it and teaching them how to use it, supporting them in adopting it, and by doing so increasing their colleagues’ knowledge and understanding of eHealth and its potential benefits.<sup>75</sup> However, the presence of champions can also act as a barrier for eHealth adoption. Champions with a negative attitude towards eHealth may jeopardize the commitment of their colleagues and thus block implementation.<sup>70</sup>

##### *Provider characteristics*

- Certain sociodemographic characteristics are reported to influence whether healthcare professionals choose to use eHealth technologies.<sup>58, 63, 66-68, 74</sup> Younger, male, or native healthcare professionals show to be more likely to adopt eHealth systems.<sup>58, 68, 73</sup> Additionally, teaching or hospital affiliation may affect healthcare professionals’ drive to adopt eHealth. Those affiliated with a college/university or hospital show higher rates of eHealth uptake.<sup>68, 74</sup> Although only reported by one included publication, the following factors influence also adoption of eHealth adoption: income, speciality, isolation





from colleagues, years in practice, and ownership of a practice.<sup>58, 63, 68</sup> Moreover, nine included publications suggest “**computer literacy**” is a key factor for healthcare professionals to use eHealth technology.<sup>58, 59, 61, 62, 65-69, 71, 73, 75</sup> Those professionals who are not familiar to work with computers are less likely to use eHealth.

#### *Personal expectations*

- Personal expectations of the healthcare professionals can influence the uptake of eHealth. According to Lau and Price<sup>55</sup> personal expectations can be defined as the degree to which an individual healthcare professional believes HIS is important, can improve job performance and infrastructure exists to support its adoption. In the selected publications, four main themes emerged which could be classified in this category: (i) perceived voluntariness, (ii) attitude towards innovation and technology, (iii) quality improvement, and (iv) comparison paper versus electronic systems.
- Perceived voluntariness can be defined as the degree to which use of the eHealth technology is perceived as being voluntary or of free will.<sup>66, 68</sup> According to Li et al.<sup>68</sup> perceived voluntariness has a positive influence on behavioural intention to use eHealth. Furthermore, the **attitude** of the healthcare professional **towards innovation and technology** has been shown to be a key factor in the uptake of eHealth.<sup>58, 59, 61, 62, 65, 68, 71, 74-76</sup> If healthcare professionals believe that innovation and technology is positive and that the benefits outweigh the disadvantages, adoption can be increased. Quality improvement is also one of the main themes in the category of personal expectations. When healthcare professionals see in eHealth technologies a way to reduce errors, they will have higher uptake rates.<sup>70</sup> And last, when users perceive electronic registration as more beneficial compared to registration on paper, it can encourage uptake.<sup>58</sup>

#### *Roles and responsibilities*

- The position, function, or obligation of an individual or group towards eHealth adoption can be categorised in the category “roles and responsibilities”.<sup>55</sup> Concerns of the healthcare professionals in the shifting of their tasks (such as concerns that implementation will take time away from clinical tasks, dissatisfaction or uncertainty with new roles and responsibilities, etc.) could impede the uptake of eHealth.<sup>62, 63, 66-68, 71, 75</sup> However, the included publications also refer to fear in terms of loss in personal or professional privacy, threatened clinical autonomy, or new responsibilities as barriers.<sup>71, 75</sup>

#### **Organisation**

##### *Strategy*

- This category includes a set of coordinated activities, especially designed to reach an overall mandate and objectives of the organisation including eHealth adoption.<sup>55</sup> There were no factors mentioned in the selected publications which could be mapped in this category.

##### *Culture*

- “Culture” refers to values and beliefs shared by members of an organisation over time.<sup>55</sup> A positive organisational culture can influence a professional’s perception, and thus, adoption of eHealth.<sup>59, 62, 65, 68, 73, 75</sup> Additionally, those healthcare professionals whose organisational culture is reluctant to change may negatively influence the uptake of new eHealth technologies.<sup>58, 69, 71, 74, 75</sup>

##### *Structure and processes*

- A wide variety of practice characteristics has been shown to influence eHealth adoption in the existing body of knowledge. The following practice characteristics can all influence the uptake of eHealth: location of the practice, patient population and its age range, level of the practice (i.e. primary, secondary, or tertiary), single or multi-specialty practices, remuneration patterns, ownership of the practice, structures and processes in place, and affiliation with an integrated delivery network or quality improvement programme.<sup>58, 59, 63, 65, 66, 68, 74</sup> However, the most



cited practice characteristic affecting eHealth adoption is **practice size**. Literature shows that eHealth adoption is lower among smaller practices.<sup>58, 67-69, 73, 74, 76</sup> This may be due to a range of reasons, such as the lower buying power of software packages for these smaller practices.<sup>69</sup> Additionally, the practice's leadership can affect eHealth adoption. Senior leadership and flexible regional leadership can increase the adoption rates.<sup>59, 61, 62, 65</sup>

#### *Info and infrastructure*

- The selected publications report that the required ICT infrastructure (for example good internet connection or band width) should be available in the practice and should be of high quality for higher eHealth adoption rates.<sup>59, 65, 66, 68, 75</sup>

#### *Return on value*

- This category refers to the economic returns on HIS investment in terms of benefit, effectiveness, and utility.<sup>55</sup> If healthcare professionals are convinced of the benefits of a new eHealth technology, they can have a positive influence on the uptake of these technologies.<sup>58, 62-64, 66, 68, 74, 75</sup> Benefits could include offering a relative advantage over existing practices, proof of utility, delivering early benefits, etc. Also, personal investment in exchange for the benefits expected from the eHealth systems influences the uptake.<sup>67</sup> Uncertainty regarding return on value or benefits, however, can negatively influence eHealth adoption.<sup>58, 59, 64-66</sup> Ross et al.<sup>75</sup> emphasises that educating healthcare professionals on early benefits and when they could be expected could increase uptake rates.

## **Implementation**

### *Stage*

- The “stage” category entails all eHealth adoption stages from initiation, build/buy, and introduction to adaptation.<sup>55</sup> However, there were no factors mentioned in the selected publications which could be mapped in this category.

### *Project*

- This category can be defined as the planning, activities, and resources for eHealth adoption.<sup>55</sup> The current systematic literature review identified eight factors contributing to the success of eHealth uptake: (i) strategic plan, (ii) pilot, (iii) incremental implementation, (iv) time sufficiency, (v) training, (vi) support, (vii) adequate financial resources, and (viii) evaluation. When the implementation of a new eHealth technology is well planned and carried out using a strategic plan, eHealth uptake rates will be higher.<sup>62, 64, 66, 67, 73, 75</sup> This will also be the case, if the implementation has been piloted, is incremental (instead of a “big bang” implementation) and the users have sufficient time to acquire and learn how to use the new system.<sup>58, 59, 62-65, 67, 69, 71, 75, 77</sup> The availability of appropriate, high-quality, and well-funded **training** has been shown to be a key factor to increase eHealth adoption.<sup>58, 59, 63, 65, 67, 69, 70, 72-76</sup> Additionally, and closely related to training, the availability of technical and administrative support during the implementation is a factor influencing the uptake.<sup>59, 60, 63, 65, 66, 69, 70, 72</sup> Adequate financial resources has been mentioned by one selected publication.<sup>70</sup> Lastly, the existence of an evaluation process during implementation can lead to changes to improve quality of the eHealth technology and increase its adoption among users.<sup>58, 70, 75</sup>



### *HIS-practice fit*

- This category refers to the degree of fit between the eHealth system and organisational work practices including the required changes for adoption.<sup>55</sup> The compatibility between this eHealth system and current practice/workflow and decision making processes is described to be a factor for eHealth adoption in several publications.<sup>58, 60, 65-69, 72, 73, 75</sup> Furthermore, the eHealth technology should be compatible with the business processes in place, and meeting the needs of the users.<sup>58, 62, 65, 68, 71, 73-75</sup> Last, strategies **to involve end-users** in all steps of the adoption process (including selection, implementation, and evaluation) has been shown as one of the key factors to increase eHealth uptake by healthcare professionals.<sup>59, 62, 65-68, 70, 71, 73-76</sup>

#### 4.4.2.4 Macro level

### **Governance**

#### *Legislative acts*

- This category entails all types of HIS related legislative acts (such as health information and privacy laws) governing eHealth adoption.<sup>55</sup> If there exist healthcare policies supporting the implementation of eHealth technology, the uptake rates among healthcare professionals could be higher compared to those where no such policies exist.<sup>65, 66</sup>

#### *Regulations and policies*

- Regulations and policies are defined by the types of HIS related regulations and policies, such as data access and security or privacy guidelines.<sup>55</sup> The absence or inadequacy of legislation and the way policy supports eHealth can impact its adoption.<sup>70, 75</sup> Moreover, the selected publications in this literature review emphasise also (i) the need for government regulation requiring mandatory reporting of patient information and (ii) the availability of data security guidelines as factors for the uptake of eHealth.<sup>58, 68, 73</sup> Concerns and lack of clarity on the liability can also discourage healthcare professionals from using eHealth technology.<sup>58, 63, 64, 69, 72, 75</sup>

### *Governance bodies*

- Types of accountability and decision making structures in place regarding eHealth adoption are included in this category.<sup>55</sup> Current systematic literature review reveals that trust in governance and policies on eHealth can play a role in the uptake of eHealth.<sup>64</sup> Furthermore, several included publications highlight the importance of vendor certification and accreditation.<sup>58, 59, 65, 66, 68, 69, 76</sup> For example, Bassi et al.<sup>58</sup> and Li et al.<sup>68</sup> report that the transience in IT vendors (or the uncertainty around them) and lack of certification is a barrier for healthcare professionals to adopt eHealth sufficiently.

### **Standards**

#### *HIS standards*

- This category refers to the types of data, messaging, terminology and technology standards that influence healthcare with respect to eHealth adoption.<sup>55</sup> Several selected publications mention that the lack of recognised standards and guidelines on content, terminology, data management, coding, and representation will act as a barrier for the uptake of eHealth.<sup>58, 64, 67, 70, 74, 75</sup>

#### *Performance standards*

- Performance standards contain all types of organisational standards available, such as accreditation of healthcare facilities or performance targets.<sup>55</sup> The current systematic literature review did not identify factors in this category.

#### *Practice standards*

- Practice standards refer to the desired level of professional competency, knowledge, skills and performance in the workplace, including eHealth adoption.<sup>55</sup> No factors contributing to eHealth adoption have been identified in this category.



## Funding

### *Remuneration*

- Types of compensation available (such as alternative payment systems) to encourage change at the individual, practice and organisational levels can be classified in this category.<sup>55</sup> Reported factors in the category “remunerations” can be classified in two main topics: (i) reimbursement and (ii) pay for performance initiatives. According to three publications, a reimbursement system for healthcare professionals encourages the uptake of a HIS.<sup>58, 68, 77</sup> Furthermore, pay for performance initiatives can help accelerate eHealth adoption.<sup>58, 67, 71, 74, 75</sup> For example one of the included studies in the systematic literature review of Police et al.<sup>74</sup> demonstrated that the uptake of HIS systems was significantly higher in physician practice groups evaluated by an pay for performance system.

### *Incentive programs*

- All available types of reward programs encouraging eHealth adoption on the individual, practice, and organisational levels can be classified in the category “incentive programs”.<sup>55</sup> **Financial incentive programs** (or the lack/misalignment of them) is a frequently cited factor that brings healthcare professionals in adopting eHealth.<sup>58, 59, 64-66, 68, 69, 73, 75, 76</sup> In addition, two publications mention that the government or insurers should provide subsidies to support healthcare professionals to buy the required software packages.<sup>67, 75</sup>

### *Added value*

- Added value entails general expectations on the return-on-value from the uptake of eHealth such as improved patient safety and access to care.<sup>55</sup> There were no factors mentioned in the selected publications which could be mapped in this category.

## Trends

### *Societal trends*

- Societal trends encompasses the general expectations of the public towards healthcare and eHealth.<sup>55</sup> Competition and public opinion towards innovation and technology are the two factors reported to affect eHealth adoption on the societal level.<sup>58, 64, 66, 68</sup> According to Bassi et al.<sup>58</sup> competitive peer pressure in terms of more practices becoming computerised may have a positive influence on the uptake of eHealth. However, competition may also create conflicts and misalignment between healthcare professionals, leading to a barrier in health information exchange.<sup>64</sup> Furthermore, the public opinion towards innovation and technology in terms of distrust in eHealth systems can lead to less uptake of eHealth.<sup>58</sup> In this respect, Nictiz has focused on changing the societal trend among GPs in the Netherlands by hyping eHealth through the organisation of a mediatised Mobile Healthcare Congress, during which the results of their yearly eHealth-Monitor are presented.

### *Political trends*

- This category can be summarised as the general political climate towards healthcare and eHealth.<sup>55</sup> Current systematic literature review did not identify factors which would be mapped in this category.

### *Economic trends*

- General economic investment climate towards healthcare and eHealth can be classified in the category “economic trends”.<sup>55</sup> There were no factors mentioned in the selected publications which could be mapped in this category.



## 4.5 Conclusion

Findings of current systematic literature review highlight that there is a wide range of factors contributing to the uptake of eHealth technology by healthcare professionals. These factors range from quality of the eHealth technology, use and user satisfaction, net benefits, individual-, organisational-, and implementation characteristics, to country-specific factors (such as governance, standards, funding, or trends).

In addition, this review identified fundamental factors for eHealth adoption and these should, therefore, be considered in future implementations and evaluations. These fundamental factors are: interoperability; security and ease of use of the new eHealth system; effect on the patient-provider relationship; net costs; the presence of “champions”; computer literacy and attitude towards innovation/technology of the healthcare professionals; practice characteristics; availability of training and involvement of end-users during the implementation; and the existence of incentive programs for taking up eHealth technology.

This review identified factors as fundamental if they were cited in half or more of the included sample (i.e.  $\geq 10$  publications). This operationalisation was applied to bring some depth in the long list of factors contributing to the adoption of eHealth. However, it brings also a limitation to the review. Some of the mentioned factors were not marked as fundamental, although they were cited in many publications. Overall, the majority of the included literature reviews were assessed methodologically poor. Following the critical items of the AMSTAR instrument, there was little transparency in the methodology of the selected publications. However, we noticed a large overlap of the results of the current systematic literature review and those of recent reviews of, for example, the European Commission.<sup>78</sup>

## 5 BARRIERS AND FACILITATORS OF EHEALTH UPTAKE IN BELGIUM: LESSONS LEARNED FROM THE GREY LITERATURE

### 5.1 Key points

- **Barriers mentioned in Belgian grey literature refer to an imbalance between costs and benefits of eHealth use, lack of ergonomics and interoperability, structural problems related to the architecture of the eHealth system, crashes of the system, information overload and difficulties implementing EBP. In addition, problems and inconveniences cause time loss or time investment not outweighed by the potential benefits of eHealth.**
- **Although the grey literature mostly describes the problems GPs encounter while using eHealth services, cited potential facilitators entail the availability of high-quality support services and training and a financial bonus system (e.i. the integrated allowance for GPs).**

### 5.2 Methods

Grey literature was gathered through general internet search engines and snowballing of authors' names, searching on the websites of organisations contributing to eHealth and general practice, such as professional organisations. Used terms are the Dutch and French equivalents for eHealth uptake, eHealth use, Belgium, GPs, healthcare professionals, and barriers.

Only documents addressing problems hampering eHealth adoption in Belgium were retained. The search resulted in 17 documents: two documents were outdated (2015 and 2016), five did not address the problems regarding eHealth adoption of GPs, and two were descriptive reporting only on the use of eHealth services. We refer the reader to Table 19 for an overview of the grey literature screened and the decision taken.



The nine remaining documents have been analysed using Nvivo© software.<sup>79-87</sup>

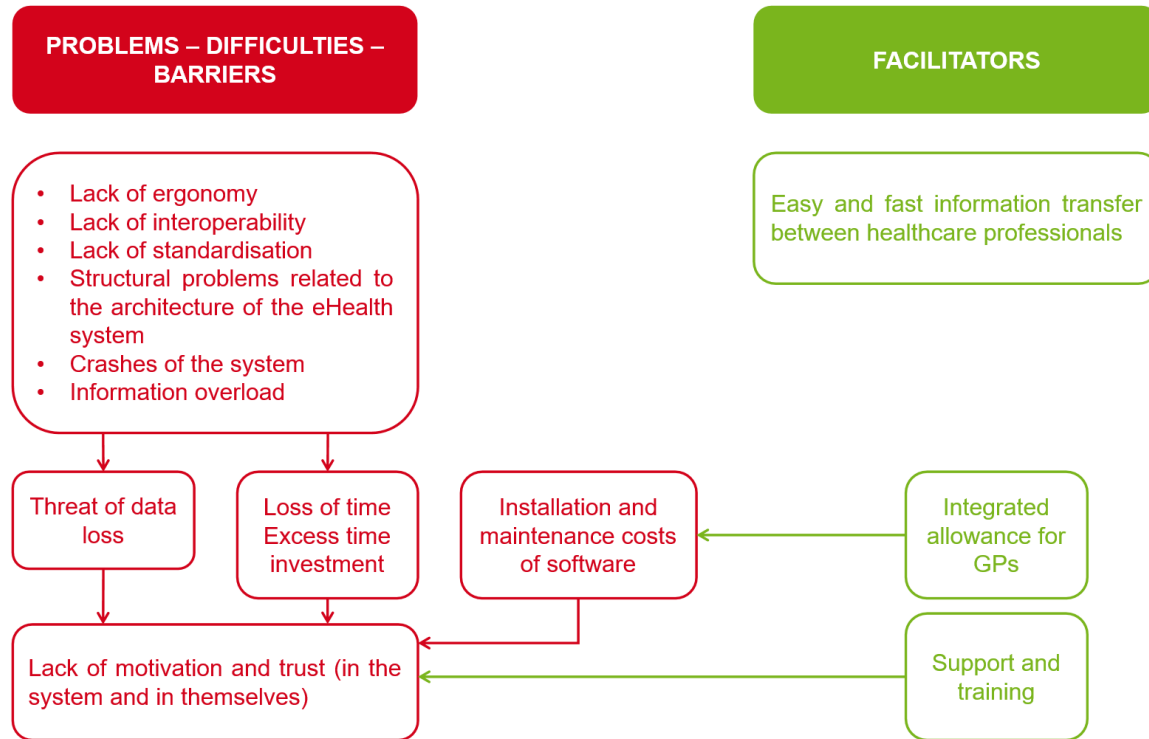
Each text has been read and coded in Nvivo. This means relevant text fragments received a code summarising the content of the text fragment. Next, codes were clustered. Clusters are presented in Figure 28 below.

**Table 19 – References grey literature and decision to in- or exclude**

Reference	Decision
Moerenhout T. Treating the real or the digital patient? Impact of e-health applications on patient autonomy and the patient-doctor relationship. An ethical assessment: Ghent University; 2019.	Included
Jacobs F. eHealth panne in België. SMarthealth.nl 2018.	Included
Société scientifique de médecine générale. Des problèmes avec les outils de l'e-santé? La SSMG ouvre un point de signalement. 2018.	Included
Parmentier PV, Orban T. Informatique médicale. La SSMG se lance dans une veille continue, avec (bientôt) un eCrash-bis. 2018.	Included
Braga D, Parmentier PV, Stroetmann KA. Analyse des problèmes rapportés par les médecins généralistes et recommandation. SSMG, cellule e-santé; 2018.	Included
Kuiper J, de Wolf P, van Gucht K, Jacobs A. eHealth toepassingen in de Vlaamse huisartsenpraktijk. eHealth Monitor huisartsen 2017. 2017.	Included
Colson W. Waar wringt het ICT-schoentje. Artsenkrant 2017.	Included
Van Giel R. Geduld van huisartsen op na zoveelste crash van eHealth. Huisarts Nu. 2020;nr. 2616.	Included
Zanella L. Pannes eHealth: Le ras-le-bol des médecins. Le journal du médecin. 2020;nr. 2616.	Included
Protocolakkoord. Actieplan e-Gezondheid 2019-2021, M. De Block, J. Vandeuren, A. Greoli, R. Demotte, D. Gosuin, G. Vanhengel, C. Jodogne, A. Antoniadis	Out of scope
Dujardin D, Vanootehem L. Analyse van eHealth toepassingen in België, Faculteit Economie en Bedrijfskunde, Universiteit Gent. Masterproef, Academiejaar 2015-2016.	Outdated: 2016
Callens M. eHealth in België. CM Informatie 2014	Outdated: 2016
Safuta A. La santé numérique a-t-elle un genre? Les nouvelles technologies au service de la santé. 2017. Les femmes prévoyantes socialistes	Out of scope
Country profile Belgium. 2016. Observatory for eHealth. World Health Organisation.	Outdated: 2016
Huisartsenvereniging Gent. Resultaten enquête eGezondheidsopleiding op uw maat. 2017.	Out of scope
Defloor S, Heijlen R. Juridische en praktische vragen over e-toegang tot het patiëntendossier door de patiënt: reflecties door patiënten. 2016. Vlaams patiëntenplatform vzw.	Out of scope
Schriftelijke vraag nr. 197 van F. Saeys aan J. Vandeuren. 31 januari 2019. Zorgverstrekkers in de eerstelijns - ICT gebruik.	Out of scope



Figure 28 – Problems hampering eHealth adoption in Belgium







### 5.3 What is troubling the eHealth adoption in Belgium?

Based on a discourse analysis of the grey literature, Belgian GPs experience an imbalance between the costs and benefits of eHealth use. The potential of easy and fast information transfer between healthcare professionals is threatened by a lack of ergonomics (e.g. error messages, unreadable documents, non-functioning links, high number of clicks) and interoperability (e.g. no integration in GP's software package), structural problems related to the architecture of the eHealth system, crashes of the system, information overload and difficulties implementing EBP (e.g. decision aids, alerts).

These problems and inconveniences involve loss of time or a time investment not outweighed by potential benefits of eHealth. Time lost by a malfunctioning of the eHealth system is time that cannot be spent on patient care. This means income loss for the GPs and less quality of care of patients. In addition GPs fear data loss caused by failures of the eHealth system. Finally, costs of software installation and maintenance add up to the list of disadvantages or problems. These direct financial costs are compensated by a bonus paid by RIZIV – INAMI, the so-called integrated allowance for GP practices.

Time loss, the perceived threat of data loss and installation costs bring about a lot of frustration and undermine GPs' motivation and trust in the eHealth system, as well as trust in their own capabilities to handle eHealth and the troubleshooting that comes with it.

Support (e.g. helpdesk, hotline) and training were identified in the grey literature as potential facilitators of eHealth uptake mitigating the lack of motivation and trust. Conversely, a lack of support was not reported as a barrier in the retrieved documents. Belgian organisations that currently provide support are, amongst others, éénlijn.be<sup>j</sup> in Flanders, e-santewallonie in Wallonie, and the e-Health Academy in Brussels.

Finally, we also noted that patients are not familiar with the eHealth services such as the personal health viewer, which means GPs need to spend time to explain it to their patients.

Solutions to the problems described above were sometimes identified as well. Interoperability between systems was mentioned, as well as the need on information to be complete and coded in a standardised way, available in a multidisciplinary electronic health record. The proliferation of international open standards for healthcare information (like HL7, FHIR and SNOMED CT) should be encouraged and governed by a central organisation or structure. Incorporation of decision aids that support evidence based practice was seen as a needed future feature of current EPD software packages.

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<sup>j</sup> Éénlijn.be was taken over by VIVEL in 2020.





## 6 GPS' PERSPECTIVE ON THE USE OF EHEALTH SERVICES: A QUALITATIVE STUDY

### 6.1 Key points

- **GPs experience difficulties in the communication with IT services, public or private, they identify a gap between application development and practical implementation, and they are concerned about information overload and data quality.**
- **Barriers to the use of eHealth services cluster around user comfort, the investment of time, energy and budget, fear of being dependent on the technology and the IT services and concerns about data security.**
- **eHealth services are more easily adopted if the added value in day to day practice is clear and surpasses the costs and inconveniences, if peer support is available and if there is a financial incentive.**
- **GPs ask a stepwise implementation and a well-developed and extensive implementation plan. There is a need for prioritisation and agenda setting. GPs recommend to invest in the quality of existing services, rather than in developing new ones. They would like to be more involved in prioritisation, as well development and implementation of services. To promote the use of eHealth services, GPs insisted on the role of trainings, continuous support and an accessible point of contact for trouble shooting.**
- **The COVID-19 crisis had a large (positive) impact on the use of eHealth services such as eFact and Recip-e.**

### 6.2 Introduction

In order to collect data on the perspective of GPs, we organised three online focus groups, one in Flanders (Dutch speaking), one in Brussels (French speaking) and one in Wallonia (French speaking). For the recruitment of GPs we collaborated with the researchers of imec. At the time of the KCE research project, imec was carrying out a survey on the use of and attitudes towards eHealth in Belgian primary care, i.e. the first edition of the [eHealthMonitor](#). This eHealthMonitor combines both a recurring survey and focus groups on the use of eHealth services among various healthcare professionals in Belgium.

### 6.3 Methods

#### 6.3.1 Recruitment and sample

In contrast to this KCE project, the eHealthMonitor targeted several types of healthcare professionals (e.g. nurses, GPs, pharmacists etc.). The survey was held from October until December 2019 and reached more than 9 000 respondents. At the end of the survey respondents were asked whether they would accept to participate in a focus group interview. This resulted in a list of professionals who could be contacted for a focus group interview. In August 2020, imec invited the GPs who accepted, to participate in a focus group in September, conducted by KCE. Finally, four Flemish, two Brussels and four Walloon GPs participated in the respective online focus groups. The sample consisted of a heterogeneous group regarding age, type of practice (solo versus group practice) and familiarity with eHealth. With 2 out of 10, female GPs were underrepresented. Table 20 provides an overview of the main characteristics of the GP participants.

**Table 20 – Characteristics of the GP participants**

	Flanders	Brussels	Wallonia
<b>AGE</b>			
< 40 years	1	0	0
41 – 60 years	1	1	1
> 60 years	2	1	3
<b>GENDER</b>			
Female	1	0	1
Male	3	2	3
<b>TYPE OF PRACTICE</b>			
Solo practice	2	1	1
Group practice	2	1	3

### 6.3.2 Interview guide

The interview guide was developed in close collaboration with the imec researchers. In addition to questions on online communication and teleconsultation, it covered questions on the barriers and facilitators associated with eHealth uptake, more specifically regarding the eHealth services that are part of the RIZIV – INAMI integrated allowance for the GP practice, as this was the focus of this study. The interview guide can be found in Appendix 3.

### 6.3.3 Online focus group interviews

Focus groups are group semi-structured interviews used for the purpose of information gathering focused on a specific subject<sup>88</sup>, in this case eHealth uptake. In the study the aim is to get an in-depth understanding of eHealth use as it is experienced by GPs in their daily practice. The focus groups were moderated by two KCE researchers: the Dutch group by a native Dutch speaker, the French groups by a native French speaker. In addition a second researcher participated as observer and notulist. Focus groups allow interaction between participants, which means a large amount of data can

be generated in a short time. From the group dynamic topics can emerge that otherwise might be unobservable. As focus groups allow interaction among participants, the group dynamics (e.g. the confrontation of experiences of experienced eHealth users with less experienced GPs) can bring about insights in ways individual interviews may not be able to do. The interaction between participants may result in more in-depth information and elicit a broader range of perspectives related to the carefully designed questions. Since we aim to identify barriers and facilitators in eHealth uptake, we wanted to maximize the variation in participants accounts by doing focus groups instead of individual interviews.

Because of the COVID-19 pandemic the focus group interviews took place by means of the online video conferencing tool Zoom. GPs received a Zoom-link by e-mail the day before the focus group interview took place. The focus groups lasted between 98 to 142 minutes.

All focus group interviews have been transcribed verbatim.

### 6.3.4 Analysis

Transcripts have been coded in Nvivo© by two KCE researchers (WC and LK), the Dutch focus group interview by the same native Dutch researcher, the French focus group interview by the same native French researcher. In a first step an inductive thematic analysis has been performed. The Dutch focus group transcript has been coded first. Nodes have been clustered together in five themes: problems with eHealth, barriers and facilitators to the use of eHealth, potential services and the impact of COVID-19 on eHealth use. This way of working comes down to an inductive thematic analysis, in a second step the resulting node tree has been used as a framework to code the French transcripts. However, during the coding, new nodes have been added to the node tree.

We added quotes (in the mother-tongue of the participant) in the text to illustrate our findings.



## 6.4 Findings

The findings are structured and described following five themes: problems with eHealth services, barriers and facilitators to the use of eHealth services, ideas for improvement, and the impact of COVID-19 on eHealth use.

### 6.4.1 Problems with eHealth use

During the focus groups GPs highlighted a number of problems associated with eHealth use. GPs encountered communication problems with IT services, especially in response to crashes of eHealth services. They also said that the development of services is not in tune with practical implementation, and that eHealth services generate large amounts of data, making it no longer workable. Finally a lack of data quality was discussed as well as the loss of therapeutic expertise and workforce due to GPs quitting their practice by fear of computerisation.

#### 6.4.1.1 Difficult communication between GP and IT services in general

GPs find the IT lexicon difficult to understand. For example, error messages on screen are incomprehensible. They do not provide the user with any information regarding the cause of the problem or how to solve it. Being unable to identify the source of the problem is an important source of frustration. Moreover, GPs report that the IT jargon makes it difficult to understand an explanation.

*“En dat is voor mij wel het grote probleem bij IT, is dat die een eigen lexicon hebben wat je niet kan doorbreken en zeggen van, leg het nog een keer uit aan een leek zodanig dat we het kunnen begrijpen. Dan gaan we misschien drie keer minder moeten bellen omdat we het zelf kunnen oplossen.”*

GPs want to learn how to solve problems themselves in case they would re-occur, hence be less dependent on external IT services. However, external IT services mostly take control over the screen and solve a problem in a few clicks, but the GP cannot reproduce the action when the problem re-occurs.

*“En een van mijn frustraties daarin is dat er heel vaak gezegd wordt van we gaan uw scherm overpakken, we gaan eens kijken en we gaan het oplossen. Ja, dat werkt dus niet hè? Ik wil zeggen, daar leer je als gebruiker niets van, je hebt het niet zelf gedaan. Het is klik-klik-klik en voordat je geweten hebt waar dat er iets gebeurd is en het werkt weer, dat is voor mij enorm frustrerend.”*

Apart from the lost learning opportunity, GPs expressed their suspicion regarding the remote control, since they hand over their computer to an unknown.

*“Je moet de computer in handen geven van anderen. Je kent die vaak ook niet in het begin. Ja, die doen allerlei gedragingen op uw computer, en dan werkt dat weer. Allee, als je een beetje argwanend bent (...) dan werkt dat niet hè? (...) Als je weet wat dat er gebeurt dan is dat geen probleem hè?”*

Also, there is no uniformity in the user interfaces between software packages, which also slows down learning.

*“Omdat dat gaat over het moeten uitvinken van een kruisje of het moeten bevestigen met een ‘yes’ of een ‘no’ bij manier van spreken. Allee, dat kruipt daarin. Ik vind dat ongelofelijk frustrerend dat men niet in staat is om één taal te gebruiken. Je ziet gewoon vanuit welke ontwikkelaar dat zo’n ding gekomen is. Men is gewoon van altijd een pop-up venstertje op die manier te laten komen en dat je het op die manier moet weg doen. En een ander doet het op een andere manier. En dat lijkt voor jonge mensen, ja, je staat daar niet altijd bij stil. Maar voor ouderen, en voor een leercurve te kunnen krijgen is dat waanzinnig slecht hè? Als je de ene keer op een kruisje mag duwen en op een ander moment nooit op een kruisje in de rechter bovenhoek mag duwen omdat dan het probleem is dat het weg is.”*

When an eHealth service crashes, the cause of the crash remains a mystery to the GP. Nevertheless, knowing the cause is essential in finding a solution themselves, in deciding who to contact or in estimating how much time it will take before the problem is solved. In case of a local problem, GPs can take steps to get their system up and running. In case of a problem somewhere in the system, they depend on others to solve it. In any case it means a loss



of time and a lot of frustration, but when out of control, GPs grind the most. Early warning groups, i.e. groups of users and IT'ers communicating about software problems, do useful work in this regard. In addition, GPs would like to know whether the dysfunction is caused by their own doing and how to prevent it in the future. Error messages seem not to be very illuminating or helpful in this regard, as they are completely incomprehensible.

*“Voor mij geeft dat wel wat gerustheid dat ze daar aan werken en dat je heel snel weet waar dat het zit. Want het blijft toch een heel moeilijk gegeven. Is het uw eigen netwerk dat problemen geeft? Is het de provider die een probleem geeft? Is het de dienstverlening die een probleem heeft? Is het de provider van de dienstverlening die een probleem heeft? Zijn het de verschillende entiteiten hè, binnen die dienstverlening?”*

*“Waar dat ik mij dan bijzonder aan erger is dat ik het gevoel heb dat er foutmeldingen zijn, ik kan die dan wel doorsturen, de fout verdwijnt maar je weet nooit hoe de fout gekomen is. Of je weet gewoon, ik heb niet het gevoel dat als ik iets verkeerd doe, dat ik het kan vermijden om diezelfde fout de volgende keer te maken.”*

#### **6.4.1.2 Developers of services insufficiently take into account implications at user level**

GPs reported that too little attention is being paid to the practical implementation during the development and launching of new eHealth services. Initiators of new eHealth services seem not to be aware of the implications eHealth services have at user level. Often eHealth services demand a reorganisation of GPs' work flow. Consequences can be far-reaching. Therefore, users should be involved in the development process, extensive user information and training programs should accompany the introduction of new eHealth services and an adaptation period is needed.

*“En dat is wat dat ik bedoel, en dat is wat ik regelmatig tegenkom, dat men wel het lumineuze idee heeft om een aantal zaken te doen, maar de praktische implementatie en wat dat voor gevolgen heeft daar stoten wij dan iedere keer op hè?”*

*« C'est vrai que ça fait un peu rouleau compresseur et que parfois on a l'impression d'être pris comme ça à froid. Mais quand l'INAMI a testé l'histoire des ordonnances, c'était il y a quand même 4,5 ans si mes souvenirs sont bons. Et donc il a recruté une centaine de médecins en Belgique et on a testé pendant 2 ans. Donc pour lui, il y a eu un test, il y a eu une série d'interactions avec la médecine de terrain jusqu'à ce que le produit soit suffisamment mûr, qu'il pouvait être appliqué. Et c'est vrai que il y a des collègues qui m'ont fait "mais comment ça ? Pourquoi ? Ça vient comme ça tout de suite pour le terrain ?" Je dis "bah non, ça fait 4 ans", ils tombaient des nues. Oui, c'est normal, ils n'ont pas été consultés. C'est parfois simplement une lettre qui dit "est-ce que vous êtes intéressé, pas intéressé", celui qui est intéressé il va faire tout son cheminement, l'autre il a juste la lettre et puis paf, l'application. Ça, il y a souvent ça. (...) Je pense que l'information c'est une bonne chose, mais que de le faire au rouleau compresseur comme ça a été fait pour Recip-e et cetera, je crois qu'on aurait dû avoir une période en fait d'adaptation. »*

#### **6.4.1.3 Information overload**

eHealth services generate a big flow of data or make data available. The GPs are expected to use and interpret the available data flow. This takes time, especially because data accumulates rapidly to large amounts, making it no longer workable. For example, the hub allows the GP to look for information related to a patient, available at other healthcare providers. The hub is basically a large index that shows per patient what documents are available e.g. at the hospital he visited or with the medical specialist he consulted. These long lists of documents hide the one specific document the GP needs. Time gains are thus nullified.

*“En ja, ik heb daar wel wat als huisarts, als enige huisarts bijna, binnen een zorgcontext niet, maar wel ontwikkeling heel vaak de bemerking dat er van alle kanten dingen ontwikkeld worden maar dat men nooit nadenkt van wat er met die data moet gebeuren en wie dat die data zal interpreteren dergelijke meer.”*

*“Wat ik wel vaststel als ik een hub open en zelf zoek naar patiëntengegevens dat dat dus een allegaartje van irrelevante*



*documenten en zelfs aanvragen voor een radiologie zitten daar soms in, waardoor je door de bomen het bos niet meer ziet hè? Dus een Sumehr is een relevant gegeven. En een goede specialistenbrief dat is relevant. Maar al die tussenliggende dingen die daar allemaal in staan, en bij patiënten met een geschiedenis van hier tot ginder, dat zijn honderden documenten die je dan allemaal moet aanklikken en openen voordat je ze kunt zien om dan vast te stellen dat ze niet relevant zijn. En ik weet niet of dat bij de patiënten ook zo is. Maar als dat zo zou zijn dan zal dat in de toekomst onbruikbaar worden omwille van de hoeveelheid informatie.”*

#### 6.4.1.4 Data quality

- Apart from the quantity of the available data, also the quality can be problematic. GPs mentioned the Summarized Electronic Health Record (Sumehr) by means of example. GPs get a financial incentive once they reach a certain threshold of Sumehrs, but there is no quality control. Building a high quality Sumehr, which means, one that is usable and informative for other physicians, takes time. A ‘quick and dirty’ Sumehr takes less time, is sufficient to get a financial incentive, but is useless.

*“Zelfs de mensen die de drempel van 500 Sumehrs van de praktijk halen, niemand zegt dat dat Sumehrs zijn waar iemand anders iets mee is hè? De kwaliteit van die Sumehrs dat wordt niet gecontroleerd, en je krijgt een punt voor elke Sumehr ja, ongeacht de kwaliteit ervan hè?”*

*« Voilà, l'informatique c'est pas simplement avoir des données qu'on ne sait pas exploiter, c'est des données qu'on sait exploiter sinon ça ne sert à rien. »*

#### 6.4.1.5 Loss of workforce in general practice

In the focus groups it has been reported that some older GPs have discontinued their practice because they were reluctant to take the step to computerisation.

*« Moi j'ai vu des confrères un peu plus âgés que moi et cetera qui étaient vraiment, qui heureusement ont été rassurés en apprenant qu'ils n'étaient pas obligés par la loi d'utiliser Recip-e, qu'ils pouvaient encore faire des ordonnances papier, parce que sinon ils étaient prêts à déguerpir. Et attention, il y en a plusieurs qui l'ont fait. Et donc ça, ça pose un énorme problème parce que c'était par ailleurs d'excellents médecins avec une très grosse patientèle, avec une grosse expérience. Il y a une perte, il y a une vraie perte de capital thérapeutique qui a été faite. »*

#### 6.4.2 Barriers to the use of eHealth application

In what follows we distinguish between (i) general barriers to the use of eHealth services and (ii) barriers related to specific services.

##### 6.4.2.1 General barriers to the use of eHealth services

Barriers to the use of eHealth services cluster around user comfort, the investment of time, energy and budget, fear of being dependent and concerns about data security.

##### User comfort: incompatibility issues and usability

GPs report incompatibilities between different software packages for general practice. This complicates the exchange of information between GP practices. Also, regional differences induce technical problems due to a lack of compatibility. A Flemish patient consulting a GP in Brussels brings problems regarding prevention issues, e.g. vaccination and screening programs, because this depends on two different regions, hence two different information systems.





« Je pense que tous les programmes sont pas compatibles, entre un problème de compatibilité entre différents programmes, entre par exemple moi j'emploie CareConnect mais bon j'ai un confrère qui est au Réseau Santé wallon qui lui emploie HealthOne et là on va quand même, on échange ce qui se fait et on voit qui a modifié un traitement, des choses comme ça. Donc si moi je publie, lui il revoit le patient un moment après, il refait un changement de traitement, tout ça se remet à jour chez moi. Ça, ça commence à marcher, mais en dehors de ça au niveau des cliniques, c'est nul et c'est les deux seuls logiciels qui réellement savent faire ça. »

« Et donc et moi j'ai quand même le sentiment qu'il y a une concurrence entre les projets informatiques, parfois on organise plus la concurrence que la collaboration entre Wallonie et Flandre et Bruxelles qu'autre chose quoi, et donc ça, ça nuit un peu à l'avancement des projets. Ici, quand on travaille à Bruxelles et que j'ai un patient néerlandophone qui habite à Zaventem et qui vient me consulter à Schaerbeek, et que j'ai pas, et que le schéma de vaccination et tout ce qui concerne la prévention, c'est-à-dire le dépistage du cancer colorectal et le mammothest, c'est un autre système et que c'est un autre système informatique et ça facilite pas les choses. Enfin voilà, c'est la Belgique quoi. »

Usability is the key. Every application changes GPs work flow, hence demands an adaptation. GPs need time to adapt their way of working and routines.

« Il faut savoir que chaque service informatique qui change en fait modifie un peu les pratiques et souvent quand un service informatique est mis en place, il repasse une partie de la charge de travail sur les utilisateurs. »

### **Digitalisation demands a serious investment of time, energy and budget**

The switch to a fully computerised practice is expensive and demands a serious investment, not only in hardware, but even more so in software licenses and maintenance contracts. In addition, connectivity becomes

increasingly important, since more and more eHealth transactions depend on communication with the Cloud.

« (...) l'informatique ça coûte un pont, surtout au début, c'était vraiment très cher. (...) j'ai beaucoup investi dans la sécurité informatique. Eh bien il est un fait certain, c'est que c'est le prix d'une très belle Mercedes maintenant. Mais donc il est un fait certain, c'est que tout ça coûte très cher. (...) Et donc ça, je pense qu'il y a un problème aussi d'argent. Maintenant ce qui coûte, ce n'est plus tellement le matos, c'est plutôt les licences, les mises à jour des programmes. Et puis quand il y a des bugs, on trouve très difficilement des gens qui sont vraiment compétents. »

“Het zal zo worden, je kunt het misschien nog hebben als back-up maar je zult toch gedwongen worden stilletjes aan om richting Cloud te gaan. Wat op zich ook veel voordelen heeft hè, ik ben er absoluut voorstander van maar allee. Je moet niet meer in hardware investeren maar je moet dan wel in connectiviteit investeren en daarin zijn de providers helemaal niet scheutig om deftige uitleg te geven hè?”

GPs can use the RIZIV – INAMI integrated allowance for the GP practice to invest in soft- and hardware. Physicians who are not entitled to this budget are disadvantaged, and perhaps less motivated or able to make the necessary investments.

« C'est encore un problème, enfin en tout cas au niveau des médecins généralistes, je m'avancerais pas trop pour les autres professions. Je sais que par exemple dans les plannings familiaux, dans les centres de santé mentale, c'est toujours un problème parce que c'est les médecins qui n'ont pas accès à la prime informatique, et il faut pas se leurrer, cette prime informatique, elle sert aussi à payer du hardware et de l'équipement des médecins, même si c'est des choses qui sont déductibles des impôts et tout ça. »



However some GPs perceive the RIZIV – INAMI integrated allowance for the GP practice as a kind of gift, a bonus, a reward, instead of a compensation for the costs.

*« Je pense que dans l'esprit des médecins, la prime ne devait pas servir à payer tout ça, c'était la prime, c'était un cadeau qu'on leur faisait et que par ailleurs ça devait être gratuit. Donc il y avait de la part de pas mal de médecins un raisonnement qui était complètement pervers. Et je sais pas moi, quand j'ai rencontré ces médecins qui arrêtaient la profession, ils me disaient "oui mais j'ai pas envie d'investir là-dedans, ça va me coûter des sous. (...) Les médecins ne consentent pas les efforts d'investissement qu'il convient pour être à la hauteur de la situation. »*

Finally, hardware, software and internet connections need regular maintenance, renewal and updates to stay performant. This is challenging for GPs as IT is only a working tool, not their core business, nor main concern, nor always a domain of personal interest. By consequence outdated hard- and software is a problem.

*« Il y a un problème dans le hardware, il y a un problème dans le matériel. Maintenant, ce qui est vrai, et ça, d'autres pour faire comme moi l'ont déjà dit, a contrario certains confrères ont un matériel qui n'est pas toujours très suffisant et suffisamment professionnel, parfois qui n'est pas suffisamment mis à jour. Moi je suis parfois effrayé quand je vais chez des amis confrères qui me disent "tiens tu t'y connais bien, regarde un peu". Et puis je vois, ils sont dans des versions antédiluviennes, je dis "mais tu n'as jamais fait de mises à jour ?" "oh qu'est-ce que c'est ? Montre-moi un peu". Enfin c'est inadmissible, et ça c'est bien l'ignorance informatique, c'est ça le drame (...), l'informatique ce n'est qu'un outil, parce que ce qu'on fait c'est d'abord de la médecine. Et donc un peu comme l'ingénieur qui ne sait pas faire, qui ne saurait plus travailler sans l'informatique parce qu'il en a besoin, c'est vrai que maintenant en médecine, ça devient nécessaire aussi. Mais ça suppose que tout, et les softwares et les hardwares et les communications et les lignes Internet et cetera soient performantes. Et là il y a un grave problème. »*

### **GPs do not like being dependent on technology**

GPs do not like being dependent on IT services, on connectivity, or even the provision of electricity. In order to keep functioning, some GPs set up backup systems (e.g. their own server) in case the connection with the Cloud is down.

*“- Hoe belangrijk dat je netwerk gaat worden als alles helemaal in de Cloud gaat draaien. Hoe afhankelijk we zijn van een correct werkende verbinding. Ja? Mijn grote schrik is als we gaan overschakelen naar de Cloud, het mag dan allemaal intern goed draaien maar als de communicatie door de provider op nul gezet wordt dan kunnen wij niets meer doen hè? Ik bedoel, dat is waanzinnig.*

*- Dat is bij ons de reden geweest om nog een server in onze kelder te zetten hè? Omdat we het niet vertrouwen als het in de Cloud zit.”*

*« Moi je suis parfois un petit peu mal à l'aise de la dépendance qu'on en fait derrière avoir par rapport en fait à ce système. Voilà, je sais pas, mais on a une panne de courant pendant 48 heures, comment on fait ? Moi je pense que je fais encore la chance de faire partie je dirais des médecins qui ont connu la pratique je dirais avec peu d'informatique, je crois que je m'en sortirais encore mais les plus jeunes qui sont très dépendants de l'informatique, je me pose des questions. »*

GPs feel trapped in the IT business model in which attractive and useful services are offered and subsequently changed or charged more. This is especially frustrating when GPs got used to the application and organised their work flow around it. The investment in one application makes them reluctant to switch to another application.

*“En dat we afhankelijk worden van een tool ja? Want dat is het heikele punt, want als de ontwikkelaar daarvan iets doet dan zit je in de val want dan kun je niet meer verder en dan heb je het vaak al geïmplementeerd en ben je er al aan gewoon hè? En ja, dat is natuurlijk het business model van die IT firma's. Je moet het mij niet zeggen, ja? We geven het u als teaser en dan gebruik je het, en*



*nadien ja, het werkt niet meer, we moeten dat toch iets anders doen want we vinden dat het te veel waarde heeft. En ik heb daar toch wel wat schrik voor binnen het betalingssysteem zoals dat het nu zit.”*

### **GPs worry about data security**

The reluctance towards being dependent on external factors such as IT services for the well-functioning of their general practice, is also related to data security concerns. Some GPs are not convinced about the security measures taken to protect sensitive data and take additional measures themselves.

*« C'est évident que dans la eHealthbox, il y a énormément de données qui sont transférées. Alors c'est vrai que au niveau des cadres informatiques et des cadres médicaux, on nous jure sur les saintes icones que bien sûr tout ça est bien protégé et cetera mais je suis loin d'en être convaincu. Je suis parfois effrayé, effrayé de la transmission de données sur des simples boîtes mails et cetera. »*

*« Il y a des informations un peu touchy et donc c'est vrai que c'est une de mes préoccupations, c'est d'ailleurs pour ça que personnellement moi j'évite de soigneusement d'utiliser le Cloud. Donc j'ai un serveur, un vrai serveur en bas dans la cave et mes données sont là-dedans. »*

*« Moi je pense qu'il faut une gouvernance des données de santé qui soit plus, qui donne confiance aux professionnels et aux citoyens. Et donc il faut insister fort là-dessus parce qu'il y a, voilà, pour stocker des choses, quels sont les garde-fous et cetera, ça c'est quand même important. »*

### **6.4.2.2 Barriers relative to specific eHealth services**

#### **Digital medication schedule**

Clearly there is a general dissatisfaction among GPs about the digital medication schedule. Some GPs even agreed among colleagues in the same region to stop using it and even software support services advice not to use it.

*“Het medicatieschema is in mijn ervaring de toepassing waar ik het minst van hou op dit ogenblik. En velen met mij, want we hebben hier in onze regio zelfs afgesproken van de mensen een papieren medicatieschema mee te geven.”*

*“Ik heb zelfs naar aanleiding van de praktijkpremie nog gebeld met mijn software firma, hoe het zat met dat medicatieschema, of ik dat toch wel goed doe. En ze zeggen, zet dat vlug op om die vijf keer te halen en zet het dan alstublieft vlug af.”*

It seems that there are incompatibilities between software for general practice and for pharmacists, which makes it impossible to exchange information on the medication schedule of patients.

*« Il y a le schéma de médication aussi qui est, au niveau partage en est nulle part non plus puisqu'on publie peut-être, mais il n'y a pas de retour puisque peu de logiciels cliniques ne savent envoyer des schémas de médication. »*

*« Vraiment ce qui bloque, c'est vraiment la différence de logiciels et l'incompatibilité apparemment des écritures informatiques entre ce qui est pharmacien et qui est médecin. »*

In addition the exchange of information only goes in one direction, i.e. from GP to pharmacist, but not the other way around. Also there is no feedback from hospitals after discharge.

*« C'est un peu dommage que l'échange, il ne fonctionne que dans un sens, nous on n'a pas le retour effectivement s'il y a des modifications de l'hôpital ou que le pharmacien puisse nous dire "eh attention vous prescrivez, votre patient il fait de la fibrillation, on va*





*lui prescrire un anticoagulant mais le gars il prend en fait plein d'ibuprofène sur le côté", donc voilà. »*

### Cebam Evidence linker

The evidence linker has been characterised by GPs as not essential for general practice. In other words, GPs estimate they can perfectly function without the evidence linker.

*« Ça a changé récemment mais jusqu'à y a longtemps, juste encore au début de cette année, on devait faire un double login, on devait se loguer dans le logiciel et se reloguer après quand on était sur internet avec notre carte d'identité plutôt que d'utiliser le premier login. Et ça, c'est pour ça que c'est pas utilisé. Et si c'est pas très connu non plus, c'est parce que c'est vraiment pas un outil qui sert directement pour la pratique mais c'est vraiment un outil qui sert pour la documentation scientifique et aller chercher des recommandations de bonne pratique ou bien les informations sur les médicaments. Et ça, c'est pas très, on va dire que c'est moins populaire au niveau médical dans une pratique pas vraiment quotidienne quoi. »*

In addition, GPs say it is not mature, nor well known among GPs. Also it is not easily accessible. Until recently, a double login was necessary. It seems not to function in combination with certain software packages for general practice. Finally, unjustified or useless alerts irritate GPs.

*« Le chemin de médication Evidence linker, manifestement on les a mis dans la prime Informatique avant qu'ils soient tout à fait au point, avant qu'ils soient tout à fait débogués, avant qu'on en ait fait la promotion et la formation. »*

*« Non, c'est par rapport aux remarques, parfois qui sont faites "tiens attention il y a, attention le taux de glucose est beaucoup trop haut, allez voir s'il y a pas du diabète". Alors qu'on va regarder, c'est un taux qui a été fait manifestement à jeun et que voilà, donc il y a parfois des petites remarques qui nous entraînent vers une littérature*

*qui est bien faite, mais le fait d'attirer notre attention n'est pas toujours tout à fait justifié. »*

### E-Vax/vaccinet

This application seems to be available and well-functioning in Flanders but not so much in Wallonia. It covers a clinical necessity and is valued as an important tool for general practice, however GPs indicate it is not user friendly and complicated in use.

The application is also of interest for paediatricians, K&G/ONE<sup>k</sup>, and school medicine, but is not accessible for those services. GPs do not see the use of using an application which is not used by other physicians (such as paediatricians) playing an important role in preventive medicine.

GPs say they know in advance that they will not find the information they are looking for, hence they are discouraged to use the application.

*« - Ils ne sont pas disponibles, la vaccination, ça concerne les médecins généralistes, les pédiatres principalement et l'ONE encore plus et dans plein d'ONE.*

*- Le secteur scolaire aussi.*

*- Le secteur, oui, les PSE et l'ONE, et il y a pas, donc il faut développer des applications dans ces quatre ou cinq services-là et ça n'a pas été fait. Il y en a que un ou deux pour lequel il y a, l'application fonctionne vraiment. Du coup, si tout est pas fait en même temps, les médecins généralistes ils ne voient pas l'intérêt d'utiliser une application qui n'est pas remplie par d'autres médecins, ils savent très bien à l'avance qu'ils ne vont pas trouver d'informations et du coup ils l'utilisent pas, ils sont découragés d'avance. »*

<sup>k</sup> Kind en Gezin/Office de la naissance et de l'enfance.



Finally, there is no direct linkage between e-Vax/vaccinet and the software package of GPs. If one encodes a vaccine, it is not directly added in e-vax/vaccinet. They have to encode a vaccine in their own system and e-vax/vaccinet separately, creating double work

*« Mais ce que je regrette, c'est que ce ne soit pas intégré directement dans le logiciel donc ce qui serait quand même plus facile. Je ne sais pas si c'est propre à HealthOne ou si c'est propre à l'ensemble des logiciels. Donc il faut se connecter avec sa carte d'identité, enfin et cetera, ça prend parfois du temps en consultation. »*

### Sumehr

Sumehrs are characterised as very useful, if well made. GPs emphasised that it takes time to build a Sumehr and keep it up to date. GPs regret that there is no quality control.

*“Dus ook mijn ervaring met Sumehr opladen en onderhouden is geen sinecure hè? Dat vertraagt een stukje uw flow, als je iedere wijziging terug moet synchroniseren. Een mooie Sumehr maken is ook niet zo simpel, dus daar steek je wat tijd in, zeker de eerste keer. En het hangt voor een stuk natuurlijk samen met hoe gestructureerd dat je al registreert, en daar moet je eerlijk in zijn. En ik denk dat ik daar inderdaad ook een heleboel modale huisartsen kan in volgen, dat dat niet bij iedereen zo gestructureerd is vanaf het begin, of dat je een heel ding moet inhalen van vroeger.”*

*“Zelfs de mensen die de drempel van 500 Sumehrs van de praktijk halen, niemand zegt dat dat Sumehrs zijn waar iemand anders iets mee is hè? De kwaliteit van die Sumehrs dat wordt niet gecontroleerd, en je krijgt een punt voor elke Sumehr ja, ongeacht de kwaliteit ervan hè?”*

*« Après, il faut reconnaître que le manque de qualité des Sumehr, il est aussi lié à la convivialité du logiciel ou parfois même la structure des logiciels. »*

### eFact and eAttest

Both eFact and eAttest enable GPs to work more efficiently. They are evaluated as very useful services, especially since teleconsultations became more frequent due to the COVID-19 crisis. eFact seems to be more time consuming, because someone needs to check whether the payments have been made, but there are divergent opinions on how much time this takes.

A reason not to use eAttest is that, although eAttest is meant to decrease the administrative work for patients, some patients like to get a paper receipt.

About eAttest GPs seemed to have questions, such as what to do in case something went wrong, or what are tax implications.

*“Omdat eFact veel complexer is. Veel meer nawerk vraagt van eAttest. eAttest is op een knop duwen en het is in orde, terwijl eFact, je moet toch kijken of uw betalingen kloppen en zo. Ja, aan de andere kant vind ik eFact bij wijze van spreken belangrijker, want daar krijg je uw centen. Maar eFact is veel nuttiger, ook nu in Corona tijden. Als je bepaalde prestaties levert en ja, je kunt vrij gemakkelijk zeggen, je kunt een rekening doorsturen via eFact als de patiënt geen wisselgeld mee had of als je hem inderdaad niet gezien hebt. Ja, nu wordt het de tele-raadpleging, dat is uitsluitend eFact.”*

*“Je zou het ook omgekeerd kunnen kijken. Bij eAttest heb je uw geld in handen, bij eFact is het afwachten of je het geld krijgt. Of erop vertrouwen dat je het geld krijgt. Dus ik zou denken dat de drempel voor een aantal mensen dan misschien toch. En ik vind ook dat eFact, ja, het is een heel nuttig ding, het werkt heel goed, maar het controlewerk? We hebben een secretaresse die daar halftijds mee bezig is bijna.”*

*“Ja, de weigeringen zijn heel minimaal, dat klopt. En administratief moet je het wel wat opvolgen maar toch niet zo, allee, zeker niet halftijds. Ik volg het zelf op en ik steek daar niet zo heel veel tijd in. Ik denk dat dat geen 20 minuten per maand is dat ik dat doe.”*



*“Voor eAttest denk ik ook dat de mensen zich afvragen, hoe werkt dat dan fiscaal. Dat dat ook zou moeten uitgelegd worden van wat betekent dat precies? Hoe breng je dat fiscaal in? Waar moet je op letten? Wat doe je als je fouten hebt met eFact? Wat doe je met die fouten? Dus niet alleen de allereerste stap maar echt een begeleiding bij de eerste keren dat je die dingen gebruikt. En iemand op wie, al is het de collega om de hoek op wie dat je kunt terugvallen van, dat gaat hier zo raar, wat moet ik nu doen?”*

*« En fait j'utilise eFact beaucoup mais eAttest personnellement pas (...) pour des raisons un peu pratiques et je dirais même un peu aussi culturelles. Les gens aiment bien la plupart du temps avoir les attestations, enfin ça dépend très fort un peu du type de patientèle que l'on a. »*

### 6.4.3 Facilitators of eHealth use

From the focus groups it seems that the use of eHealth services is a matter of rational balancing costs against benefits. Facilitators are grouped around three clusters, which are described below.

In short, eHealth services are more easily adopted if:

- The perceived added value surpasses the perceived costs (time, energy, budget)
- Peer support is available
- There is a financial incentive.

#### 6.4.3.1 A clear added value outweighing the inconveniences

The participants asserted that the general principle behind the uptake of eHealth services is the balancing of advantages and disadvantages, or in other words costs and benefits. The added value must be big enough in order to tolerate inconveniences, such as software failures.

*« Il y a un taux de pénétration qui est relativement important qui est probablement dû à la carotte que ça représente par rapport à la*

*facilité administrative et aussi au retour financier que ça représente. »*

The precondition for using a service is that it works. Inconveniences such as software failures are time and energy consuming. In addition, usability and user comfort are very much appreciated.

*“Het systeem moet werken. Met zo weinig mogelijk fouten.”*

In addition, the added value of a service must be known by experience or by other means such as recommendation by peers, and clear top down information campaigns demonstrating the advantages of a new tool.

*« Essayer de bien de montrer aux gens, enfin en tout cas aux médecins, les avantages qu'ils peuvent en fait en tirer point de vue gain de temps, parfois gain d'espace, je dirais en fait aussi. Ça c'est peut-être quelque chose qu'on ne promet pas en fait assez, c'est dire "voilà, gérer vos patients e-DMG, c'est un clic, vous gagnez en fait plein de temps, vous devez pas passer par un office de tarification". Voilà, je crois qu'on ne montre pas suffisamment assez les aspects positifs. »*

*“En het pakket van hoe moet ik dat doen, en leren hoe dat dat een meerwaarde kan zijn over een aantal zaken. Allee. Wij waren een van de eersten van eAttest omdat ik vooral zag dat ik dan geen boekjes meer hoefde te laten uitrekenen en ze niet meer moest sorteren en gelijk wat hè.”*

Once the added value is clear and GPs are convinced about the use of the application, they are prepared to cope with some degree of inconvenience.

*“Als het heel nuttig is dan neem je er af en toe een foutje bij. De voordelen moeten evident veel groter zijn dan de miserie die je hebt omdat het niet werkt.”*



Services linked to payment, by extension, services that make GPs' life easier, are more readily adopted.

*« Les médecins sont des grands prescripteurs, ils utilisent bien la prescription électronique et puis ils s'attendent à gagner leur vie, donc ils facturent bien via MyCareNet parce que ça c'est indispensable pour la pratique en fait tous les jours. »*

#### 6.4.3.2 Working in a group practice facilitates eHealth use

Chapter 3 showed that group practices are overrepresented in the group of eHealth users. The focus groups helped to disentangle the underlying mechanisms:

- Group practices set common goals. Every member tries to contribute to the accomplishment of a goal and feels supported by peers when things get difficult.

*“Wij zijn nu een samengestelde praktijk van drie praktijken waarvan twee solisten, en een duo. En zeker de solisten die zeggen, sinds dat we hier zitten zijn we veel rapper mee met een aantal dingen omdat je elkaar wel wat opjut of meetrekt hè? Dat je zegt van we willen dat samen bereiken en dan doe je dat.”*

- In a group practice GPs need mutual agreements and a kind of common work flow, because they back-up for each other. Patients not necessarily consult one and the same GP, but often the GP who is first available. Continuity of care requires a common way of working (e.g. registering the reason of the consultation, diagnosis, treatment, etc.)

*“Ja, het is ook belangrijker naar de continuïteit van zorg dikwijls hè? Als patiënten wisselen moet je toch een aantal basisafspraken maken van wat je noteert, op welke manier je noteert, als je uw eigen consultatie op een vlotte manier wilt laten verlopen hè? Als het leidt naar dat je in de geschreven dossiers moet gaan kijken van je collega die niet leesbaar zijn ja, dan heb je niet veel winst om dat elektronisch te gaan doen hè?”*

*« L'autre élément, c'est que quand on travaille en groupe, fatalement on voit parfois des patients des autres ou on est*

*plusieurs médecins sur le même patient et donc il faut communiquer. Et donc rien que le fait de demander une communication oblige les autres ou en tout cas oblige à travailler ensemble et donc oblige de remplir beaucoup mieux nos dossiers médicaux. »*

- GPs in a group practice rely on each other for the solution of problems and to learn how new services function. The presence of peers functions as a help desk.

*“Dat is inderdaad een soort gebruikersgroep waar je de eerste stappen leert doen om zo'n dingen te doen en dan heb je iemand naast u nodig. Ik weet niet, dat is al waarschijnlijk overal zo, maar bij ons in de praktijk word ik daar meestal eerst op aangesproken als daar iemand zit met een probleem dat niet werkt. En dat gebeurt toch regelmatig. Dus mensen die niemand hebben waar ze zo gemakkelijk kunnen vragen van hoe zit dat hier, ik denk dat dat veel mensen zou hebben als ze zo iemand bij de hand hadden.”*

- In a group practice GPs are more stimulated to adapt their behaviour in function of the group. Solo GPs who are involved in a solid network of peers can also benefit from the group's dynamics. Without a reference group, solo GPs lack a comparator, a frame of reference.

*« Pour toutes les compétences médicales quasiment à ma connaissance, dans toutes les études quand on pratique en groupe, on est plus stimulé à changer de comportement, à changer d'attitude, on discute plus avec ses collègues et on a une évolution de sa pratique qui est en moyenne plus rapide que quand on travaille tout seul. Sauf si, voilà, sauf si on travaille tout seul mais qu'on a un réseau très très dense et moi c'est mon impression, que ça. »*

*« Oui, ça fonctionne dans l'autre sens aussi, des médecins qui travaillent seuls ont tendance à être beaucoup plus individualiste et donc à être centrés sur leur pratique et à ne pas beaucoup s'informer sur ce qu'il se passe par ailleurs. »*



- Group practices often have the administrative support of a secretary.

*« La deuxième chose que je vois, c'est que dans les pratiques de groupe, alors organisées avec secrétariat et cetera, le secrétariat prend en charge une grosse grosse partie de l'administration. Et dans ces éléments-là, il y a pas mal d'éléments administratifs, même de gestion administrative des données médicales, je veux dire, donc je pense que tout ce travail est fait en partie par le secrétariat aussi, voilà. »*

#### 6.4.3.3 The RIZIV – INAMI integrated allowance is an important incentive

The RIZIV – INAMI integrated allowance for the GP practice is an important financial incentive to use eHealth services.

*“Dus degenen die niet over zijn zullen het voelen in hun portemonnee. En dat werkt nog altijd. En dat betekent dat geld dus een belangrijke stimulator is. Dat is ook wel zo hè? Die 10 criteria, je probeert die wel te halen hè?”*

*« Je pense que la stratégie qui a été suivie d'incitation et pas de pénalisation est certainement la bonne stratégie. »*

#### 6.4.4 Ideas to improve the use of eHealth services

##### 6.4.4.1 Present a comprehensive and extensive roadmap eHealth for a stepwise implementation

Some GPs seem to feel overwhelmed by the number of eHealth services and tools. There is a need for prioritisation and agenda setting. GPs ask a stepwise implementation and a well-developed and extensive implementation plan, including training initiatives and information campaigns.

*« (...) faciliter l'utilisation par les médecins et puis avoir des objectifs de santé publique avec un agenda clair aussi, peut-être pas courir autant de services à la fois mais autant de fonctionnalités à la fois mais avoir un agenda plus cohérent vis-à-*

*vis du public et des médecins et des objectifs que ça recouvre pour le système de santé. Et en disant "voilà, l'année untel va être, l'objectif, on va essayer d'amener tel service à son maximum d'utilisation, faire la promotion qui est en cours et voilà, oui. »*

*« Il y a perpétuellement des nouveaux outils qui sont mis en place, mais le projet, on va dire informatique, ou la roadmap e-santé comme on l'appelle au niveau fédéral, pour moi elle n'est pas assez globale quoi, elle devrait comprendre des actions de formation, de sensibilisation et d'autres actions d'éducation en général. Et aussi vis-à-vis du secteur de la santé et des médecins en particulier, pour ce qui concerne ma profession, parce que la fracture numérique elle est là aussi, les gens comprennent pas, les professionnels comprennent pas pourquoi ils doivent utiliser tel ou tel outil, comment il faut l'utiliser, et à quoi ça sert. Et alors ça amène à un rejet de l'outil et aussi, finalement ça amène aussi à une dévalorisation de l'outil, à l'utiliser aussi que pour des raisons administratives alors que ça peut apporter si c'est bien intégré dans la pratique. »*

##### 6.4.4.2 Investing in the quality of services rather than in the number

GPs recommend in addition, not to launch an application prematurely, but only if it is really ready and well tested. GPs ask to invest in the quality of existing services, rather than in developing new ones.

*« Donc je pense que il peut y avoir, on peut pousser à la qualité des écrans et à la qualité des services encore très très fort pour que ce soit plus en plus facile. On est sur une bonne progression, je pense maintenant, et il faudrait peut-être pas augmenter trop le nombre de services parce que ça c'est risqué comme stratégie, surtout en informatique, mais essayer d'améliorer la qualité de ceux qui sont déjà existants. »*





#### 6.4.4.3 User involvement in priority setting and application development

GPs prefer to be more involved in priority setting and development of eHealth services.

Priority setting means that the eHealth agenda should be needs-driven. In other words, GPs would like to be consulted to determine what kind of services are needed or would be a real added value in general practice. From the GPs accounts it seems that this kind of bottom-up approach is currently lacking.

*“Vroeger hadden wij met de dokters een gebruikersgroep die geconsulteerd werd door de ontwikkelaars. En dat was een technisch overleg en daar werden prioriteiten bepaald van wat moet er in zitten. En dat kwam vanuit het terrein, wat nu met de meeste systemen veel te weinig gebeurt. [...] Plus dat er een hele andere drive gekomen is, dat vanuit eHealth een aantal andere instanties beslissen wat prioriteit krijgt hè? Het verhaal van onze praktijkpremie is daarvan een schoon voorbeeld. Als wij niet anders kunnen dan de vorige criteria gebruiken voor het volgende jaar is dat gewoon omdat er geen tijd is voor nieuwe ontwikkelingen van de dingen die wij interessant vinden hè?”*

GPs also claimed that they can have a useful input in the development of services. They suggest a co-creation process between GPs and software developers enabling the combination of their practical knowledge on how to run a general practice and IT development competences of software developers. GPs also invite software developers to observe a number of consultations to gain insight in the daily practice of a GPs' work.

*“Dat de systemen intelligenter worden, dan moet je inderdaad denk ik gebruikers meepakken hè. Dan moet je mensen hebben die weten hoe ons werk is, dus dan moet je de artsen daarin mee hebben. Ik weet niet hoe ik iets moet ontwikkelen maar ik weet wel hoe ik werk en wat dat ik nodig heb.”*

*“Ik zeg vaak van, je mag van mij gerust een paar consultaties komen volgen. Er zijn er een aantal die dat effectief ook al gedaan hebben*

*bij enkele mensen. (...) Omdat dat een eye opener is van oh, jullie zijn toch met veel andere dingen bezig dan ik dacht.”*

GPs would like to see eHealth services as more embedded in the general practice software package.

*“Het is dan wel simpeler hè? Want vroeger moest je nog altijd inloggen en nu kun je direct verbinding maken vanuit uw medisch dossier. Dat zou ook bijvoorbeeld nog kunnen met beeldvorming en beeldvorming aanvraag en zo, moet je nog altijd naar andere links. Dat zou beter geïntegreerd kunnen worden. Ook de koppeling met vaccinet zou nog beter kunnen vind ik. Duidelijker gestructureerd.”*

#### 6.4.4.4 Develop and accredit trainings and continuous support for GPs.

GPs insist on the role of training to promote eHealth services use. Although the basics should be included in the curriculum of medical training, also other formats are needed to enable continuous learning. This way each GP can choose the most suited formula, depending on his/her needs and available time. Formats mentioned are individual and group information sessions and short webinars. Accreditation of trainings might convince GPs to participate.

*« Les petits webinaires genre 40, 60 minutes comme moi j'ai eu hier, je trouve que c'est vraiment, je dirais, parfait. On cible deux trucs, configuration du Sumher et utilisation, je dirais, du système de prescription, trucs et astuces. Voilà, on a pris 40 minutes pour l'un et 15 minutes pour l'autre et c'était vraiment super bien fait, sans bouger en fait de chez soi. »*

*« Et alors peut-être aussi que tous ceux qui font les formations dans la télématique médicale, que ce soit peut-être reconnu aussi comme formation parce qu'on nous demande de faire de la formation dans d'autres domaines, d'avoir un certain nombre de formations continues par an et pourquoi pas tous ces éléments ne pourraient pas être retenus au même titre que les autres ? »*



A guided introduction to new software or a new application is important, but even so continuous support. GPs need an accessible point of contact for hands-on support in case of problems. This can be provided by an IT professional, but also a colleague GP.

*“Dus niet alleen de allereerste stap maar echt een begeleiding bij de eerste keren dat je die dingen gebruikt. En iemand op wie, al is het de collega om de hoek op wie dat je kunt terugvallen van, dat gaat hier zo raar, wat moet ik nu doen?”*

*“Enfin, wij hebben in de kring gebruiksgroepen opgezet voor verschillende dossiersystemen maar we zien toch dat dat niet zo frequent gebruikt wordt. Vroeger werkte ik met Medidoc en daar hebben we wel een Vlaamse gebruiksgroep en daar kwamen toch wel veel nuttige tips uit. Dus ja, misschien een grotere gebruiksgroep dan de eHealth diensten waar dat iemand zit die snel reageert of kan reageren, zou misschien wel een hulpmiddel kunnen zijn. En die de technische uitleg ook kan illustreren. Dat je inderdaad weet wat er misloopt en dat je het zelf in de toekomst kunt oplossen.”*

*« Moi-même, je ne suis pas vraiment un utilisateur le plus pointu mais quand j'ai besoin d'une aide, je la trouve notamment chez le fournisseur de dossiers, enfin fournisseur de logiciel. J'ai aussi un service de soutien informatique qui m'a installé tout mon truc machin et là aussi je trouve l'aide qui convient, ça me coûte un petit sou mais ce sont des frais professionnels et ça me permet un confort d'utilisation. Quand j'ai vraiment un problème, quasi dans l'heure je suis dépanné. »*

Direct communication with IT services facilitates quick resolution. Direct communication however goes in two directions: from GPs to IT services, but also the other way round. There is a strong need for such a feedback loop that keeps GPs informed about problems. Problem alerts allow GPs to anticipate and adapt their use of eHealth services.

*“Het zou veel frustratie wegnemen moest dit rapper gecommuniceerd worden naar de gebruikers hè? Want dat geeft aanleiding tot veel frustratie. Nu de laatste maanden is de uitval niet meer zo frequent, maar het heeft een periode geweest dat het*

*frequent was en dikwijls ook op maandag. (...) Dus er zou een soort van feedback loop moeten komen waardoor dat de gebruikers beter geïnformeerd zijn.”*

#### 6.4.5 Impact of COVID-19 on the use of eHealth services in general practice

The COVID-19 crisis had a large impact on the use of eHealth services (such as eFact and Recip-e). eFact allows the invoicing of teleconsultations, and Recip-e provides electronic prescriptions. GPs note that demands for a prescription by e-mail are not self-evident, because the mails are in addition to the in-office consultation work.

GPs registered less GMDs, because of the decrease in ordinary infections, no children on consultation and teleconsultations not being counted for the GMD fee. The amount of information that arrives by means of eHealth, decreased because specialists' activity was reduced.

*« Donc je pense qu'effectivement ça a boosté, je dirais, certains médecins, et ça a forcé les logiciels à être réactifs oui, en tout cas certains logiciels. »*

*« Je pense qu'il y a une augmentation dans les prescriptions électroniques, ça oui puisque beaucoup de patients ne se déplacent plus pour les renouvellements. Donc c'est une voie que j'ai utilisée beaucoup plus vis-à-vis des pharmaciens. Maintenant, parallèlement, tous les rapports des spécialistes, il y en avait quasi plus parce qu'ils ne travaillaient plus. Le travail eHealth, ou en tout cas la somme d'informations que j'ai eu par eHealth, ça a nettement diminué. »*

*« On a eu la chance d'avoir un logiciel effectivement extrêmement réactif avec notamment des arbres décisionnels : est-ce qu'il faut en fait envoyer en fait le patient se faire tester je dirais ou pas ? Est-ce qu'il faut l'hospitaliser ? Avec effectivement toute une série de e-forms en fait qui sont en fait arrivées en fait je dirais très vite et avec un helpdesk qui restait malgré ça quand même relativement accessible. »*



*« Sur l'informatique justement, on l'a vu en général que ça augmentait l'utilisation de l'informatique et des outils à distance, la crise COVID. »*

*“En dan de tweede zaak inderdaad van voorschriften en vragen via mail, dat vinden we toch wel belastend en dat komt bovenop het gewone consultatiewerk. En patiënten verlangen dikwijls heel snel een antwoord terwijl je met andere zaken bezig bent. En zolang dat nog niet gehonoreerd is, is dat toch wel moeilijk vind ik.”*

## 7 DISCUSSION

Potential benefits of the use of eHealth have been widely documented in the literature.<sup>6-10</sup> However, despite this widespread acknowledgement of the potential benefits of eHealth, the uptake has been slower than expected.<sup>19-22</sup> Research of the European Commission indicated that the uptake of eHealth in all European countries showed to be much more difficult and time-consuming than initially anticipated.<sup>23, 24</sup> The current report aims to provide a cross-sectional overview of the uptake rates of eHealth services by Belgian GPs and map the factors contributing to its uptake.

### 7.1 Uptake rates

RIZIV – INAMI data (from 2017 and 2018) revealed the uptake rates of several eHealth services that are part of the integrated allowance for GPs. The integrated allowance is granted to GPs to stimulate their use of eHealth services. To receive this allowance, a certain number of criteria must be met. Each criterion consists of a minimal threshold of use of a digital eHealth service (Recip-e, the patient informed consent, Sumehr uploads, the uploading of medication schemes, the Cebam Evidence Linker and finally Chapter IV, eFact, eAttest and the digital GMF management which are all four available via MyCareNet). The data-analysis showed an increase for each criterion between 2017 and 2018. The registration of the patient informed consent and the use of Recip-e had the highest uptake rates. The high uptake rate for the registration of the informed consent is, however, not exclusively the responsibility of the GP. Although it is counted for the integrated allowance for the GP, other healthcare professionals or facilities as well as patients themselves can also register this informed consent. Nevertheless, all the other criteria of the integrated allowance are only GP-dependent. Lowest uptake rates were observed for the Cebam Evidence Linker and the eAttest available via MyCareNet. In addition, uptake rates were highest in Flanders, for younger GPs and in group practices and CHCs.





## 7.2 Factors contributing to eHealth adoption

The mapping of factors contributing to eHealth uptake was studied in three different chapters: (i) a systematic review of the international literature (Chapter 4), (ii) a review of the grey literature focusing on Belgium (Chapter 5), and (iii) during focus groups with GPs (Chapter 6).

Figure 29 shows an comprehensive and detailed overview of all determinants of eHealth uptake we came across through (international) literature search and focus group interviews with Belgian GPs.<sup>1</sup> Dark blue dots represent the core variables “eHealth uptake” and “motivations for eHealth uptake”. They are connected with a number of clusters. Clusters are partly blue, green and orange. Green dots show the overlap between the international literature and the focus group data, while blue ones were only encountered in the literature review and orange ones only in the focus groups. As green is the most important color in the figure, this means that

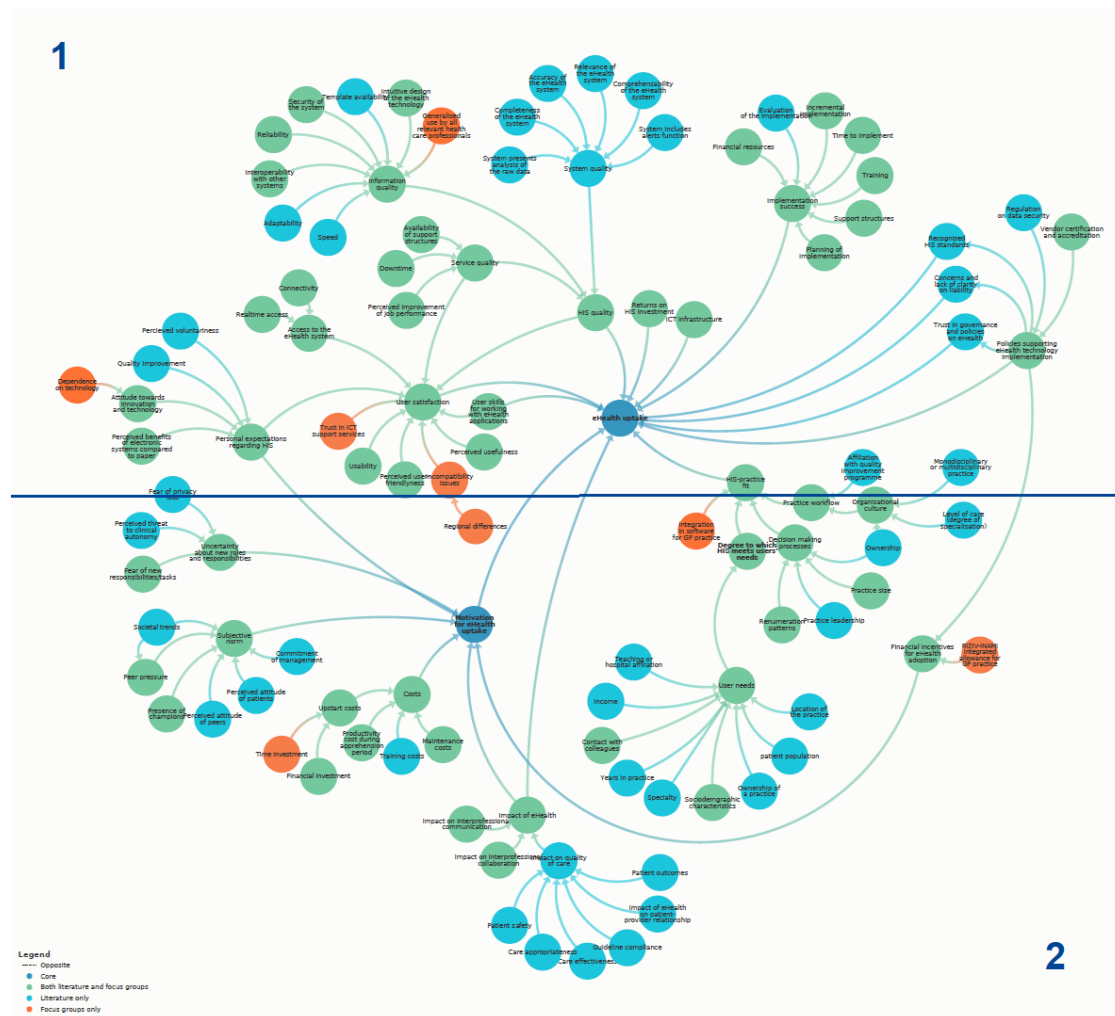
the international literature and the focus group data converge to a large extent. Orange dots represent elements that are uniquely mentioned in the focus group data, hence are characterising the particularity of the Belgian situation. These particularities are scattered over the figure, not over-representing one cluster over another. Mainly green and orange clusters are about “user satisfaction”, “implementation success”, “HIS-practice fit”, “service quality” and “costs”. Blue dots were not addressed during the focus groups with GPs, which does not necessarily mean that they do not apply for Belgium. Mainly blue clusters are about “system quality” and “impact on quality of care”. “System quality” might be too macroscopic to be in the scope of individual GPs. In addition, “system quality” is addressed indirectly in the clusters “service quality” and “information quality”. However the absence of “impact on quality of care” in the discourse of Belgian GPs is remarkable. It seems that this element is neither a barrier nor a facilitator for GPs to use eHealth services.

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<sup>1</sup> Figure 29 is available in table-format in Appendix 4.



Figure 29 – Mapping of the factors contributing to eHealth adoption



Note: This figure was divided in two parts to increase readability (see Figure 30 and Figure 31)



Figure 30 – Mapping of the factors contributing to eHealth adoption (part 1)

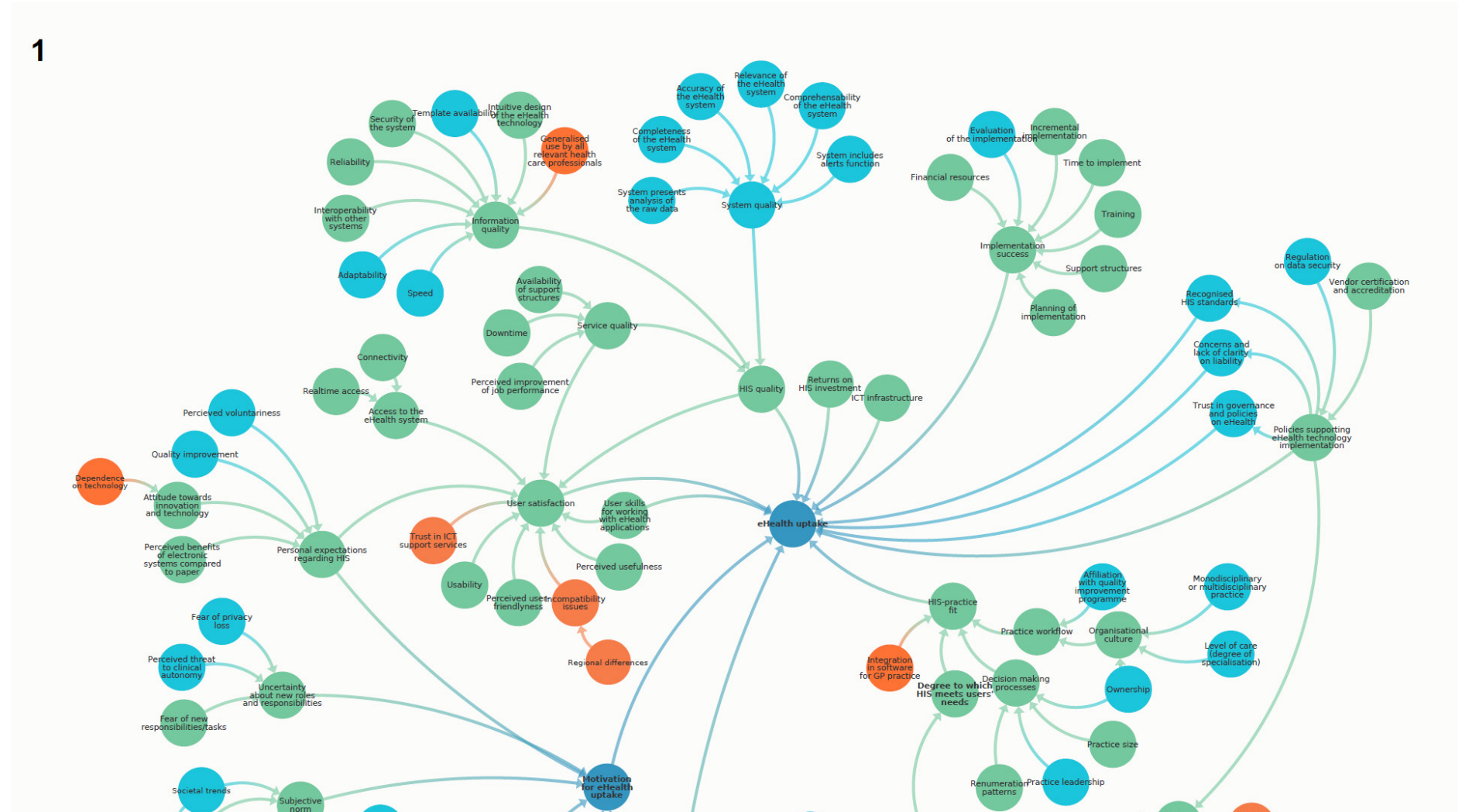




Figure 31 – Mapping of the factors contributing to eHealth adoption (part 2)

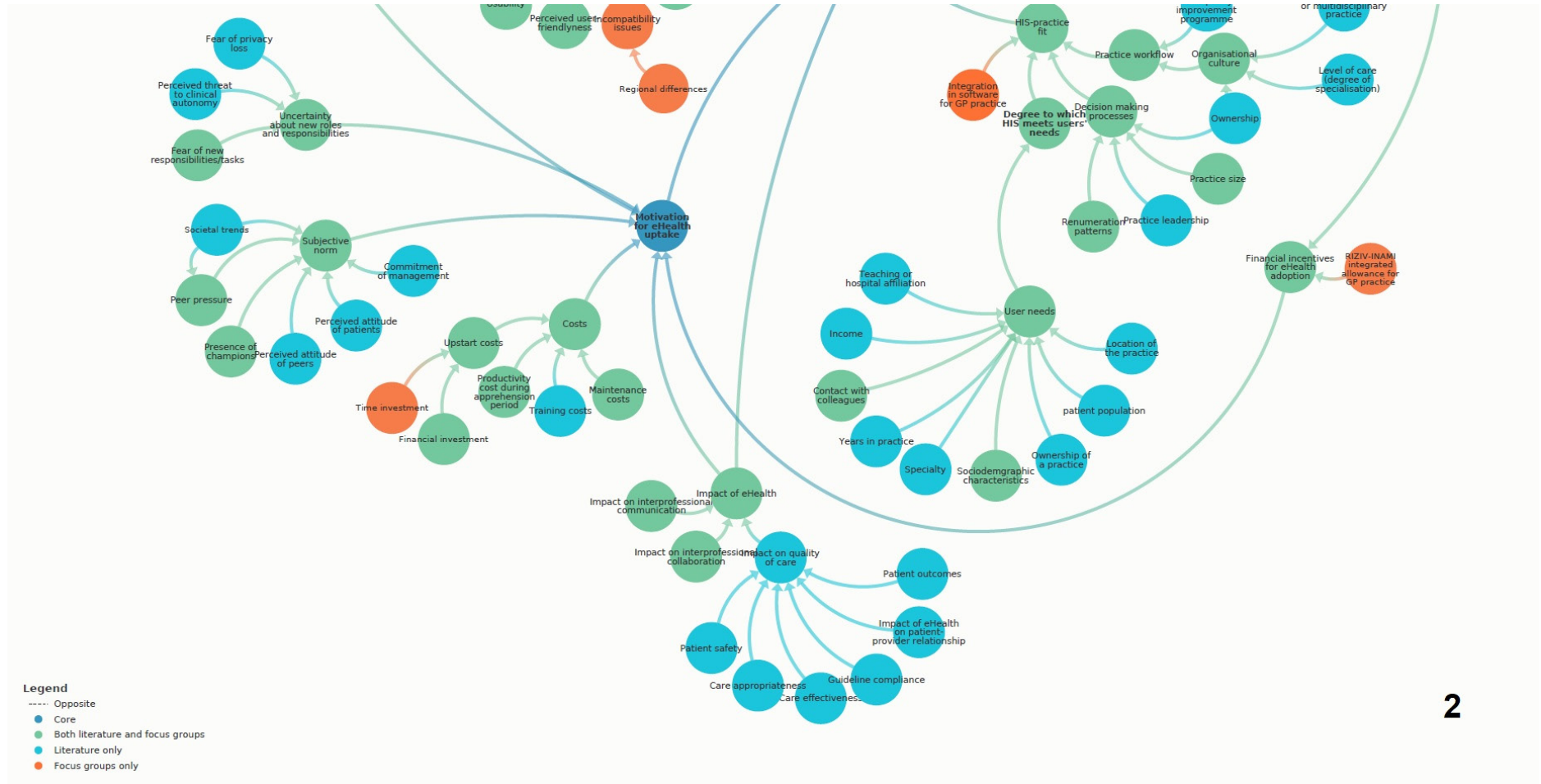




Table 21 provides a summary of the main identified facilitators and barriers influencing eHealth adoption, based on the key points of each chapter.

### 7.2.1 Facilitators

**Interoperability** between eHealth services has been found as a major determining facilitator for eHealth adoption. GPs are less likely to use an eHealth service when it is not compatible or does not connect with other electronic systems. In addition, GP-participants pointed out during the focus groups that the problem in interoperability is also present between regions as they each use their own system, complicating the exchange of information.

Closely related to interoperability is the facilitator “**ease of use**”. GPs prefer eHealth services that are user-friendly and partly “do the work for them/make their professional life easier”. For example, it should be possible to import test results easily into different eHealth services to avoid adding them manually. GPs perceive the absence of such feature as a loss of time.

Furthermore, **incentive programs** were perceived as essential by GPs to encourage them to adopt eHealth. They are more likely to use eHealth services if the (financial) **benefits outweigh the inconveniences**.

**Training and support** was also a recurring facilitators contributing to eHealth uptake, however, it can take many forms. GPs in the focus groups mentioned that **peer support** (of which they report it is higher in group practices) is an important facilitator. Also the presence of “**champions**” or “superusers” was found to be imperative for adoption. These champions are usually healthcare peers raising awareness of new eHealth services, introducing their colleagues to it and teaching them how to use it, supporting them in adopting it, and by doing so increasing their colleagues’ knowledge and understanding of eHealth and its potential benefits. Both peer support and “champions” could be part of the explanation why the usage numbers found in the data are generally higher in group practices and CHCs.

**Involvement of end-users** in the development- and implementation phase seemed to be critical to enhance uptake rates. By involving GPs new eHealth services can be really tailored to their needs, and, for example, remedied structural problems in the architecture of interfaces.

Moreover, a **positive attitude towards technology and innovation** and some **practice characteristics** (such as group practices, practice size) have been shown to be a facilitator for eHealth adoption. Although only mentioned in one of the chapters, GPs use eHealth services more when the **data is of high quality** (for example Sumehrs), when there is a **comprehensive roadmap**, and when GPs are more **literate concerning technology**.

### 7.2.2 Barriers

A barrier is when GPs feel that eHealth is a **loss of time** and when it requires a substantial investment of time to make a eHealth service their own. The reluctance towards **being dependent on external factors** such as ICT services for the well-functioning of their general practice, is also related to worries about **data security** concerns. Some GPs were not convinced about the security measures taken to protect sensitive data, and the focus groups pointed out they often take additional measures. It remained unclear what causes this sentiment towards currently implemented security measures, which are based on industry standard practices to the extent it concerns the eHealth services for GPs discussed in this report. Privacy and security of the patient data was also one of the fundamental factors for uptake coming from the literature review.

Too much pop-ups and **information overload** has also been mentioned by GPs as a barrier.



**Lack of standardisation** of user interface, functionality and software access (API<sup>m</sup>) between eHealth services has shown to be a barrier of eHealth uptake. Policy makers are conscious about this, as can be seen in the eHealth action plan where cluster 3 on operational excellence explicitly aspires to further develop existing interoperable architectures with preferably an integrated access to eHealth services.<sup>26</sup> E.g. the standardisation of privacy aspects and access security for future authentic sources or digital vaults is a priority.

Furthermore, although only mentioned in one of the three chapters, GPs perceive structural problems related to the **architecture and crashes of an eHealth service** as barrier. Last, **communication** has also been mentioned. Currently GPs perceive problems with communicating with IT services in case of problems.

**Table 21 – Facilitators and barriers identified to influence eHealth adoption by GPs in Belgium**

Factor	Systematic literature review <sup>n</sup> Chapter 4	Review of grey literature Chapter 5	Focus groups Chapter 6
<b>FACILITATORS<sup>o</sup></b>			
Interoperability with other systems	x	x	x
Ease of use	x	x	x
Availability of incentive programs	x	x	x
Training and support	x	x	x
Involvement of end-users	x		x

<sup>m</sup> Application Programming Interface: a published software interface which defines how computer systems can interact: what kind of calls and requests can be made and how, what data format should be used, etc.

Added value outweigh inconveniences	x		x
Positive attitude towards innovation and technology	x	x	
Practice characteristics such as group practices, practice size, etc.	x		x
Data quality			x
Comprehensive and extensive eHealth roadmap			x
Computer literacy	x		
Investment in quality of services rather than quantity			x
<b>BARRIERS</b>			
Loss of time and excess time investment	x	x	x
Lack of or concerns about data security	x	x	x
Information overload		x	x
Lack of standardisation		x	
Structural problems related to the architecture of the eHealth system		x	
Crashes of the system		x	
Difficult communication between GP and IT services			x

<sup>n</sup> Only factors identified as “fundamental” by the systematic literature review are listed in this column.

<sup>o</sup> The interpretation of the factors identifies them as facilitators or barriers. If a facilitator is interpreted negatively, it becomes a barrier and vice versa.






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Being dependent of technology	x
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**Limitations**

The results of this scientific report should be interpreted taking into account some limitations.

eHealth is a domain that is evolving incredibly fast, constantly changing and subjected to external factors. For the data-analysis in Chapter 3, we used data for the years 2017 and 2018. These were the most recent data available, however, these older data may be an underestimation of the current eHealth adoption rates by GPs. Moreover, RIZIV – INAMI was not able to give us detailed information on how the data we received were biased by flaws existing in the data such as outdated GPs characteristics or misclassification bias (GPs switching between type of practice or having multiple practice). In addition, this project was partly conducted during the current COVID-19 pandemic. During this pandemic, GPs were “obliged” to shift to more innovative care delivery methods (e.g. telemonitoring or teleconsultations).<sup>89</sup> GPs, participating in the focus groups, mentioned that the uptake of several eHealth services also increased substantially due to the pandemic (i.e. the use of Recip-e and eFact). Most of the data available on the use of eHealth is either aggregated and linked to operational follow-up (e.g. number of Sumehrs uploaded) or on the assessment of the criteria for the RIZIV – INAMI integrated allowance for the GP practice. We used the latter as it was possible to link these to characteristics of the GPs.<sup>p</sup> Data on other eHealth services is not centrally available or not linkable to other characteristics.

Furthermore, we labelled factors as “fundamental” in the systematic literature review if they were cited in half or more of the included sample (i.e. ≥ 10 publications). This operationalisation was applied to bring some depth

in the long list of factors contributing to the adoption of eHealth. However, it brings also a limitation to the review. Some of the mentioned factors were not marked as fundamental, although they were cited in many publications.

Ten Belgian GPs shared their experiences with eHealth use during online focus groups. This is a small number, even in qualitative research methods, which might be partly explained by the COVID-19 crisis demanding a lot of time and energy of GPs. Initially, the focus groups also would have taken place face-to-face, however, due to the COVID-19 crisis, online focus groups were conducted. In line with the literature on online focus groups, this decreased the maximum number of participants to 6 per focus group to ensure all participants the opportunity to contribute and reduce strain on the moderator. Qualitative research methods do not aim at representativeness in a statistical sense, but at representativeness of perspectives, meanings, opinions and ideas of different stakeholders in relation to the problem researched. Ideally there should be a mixture of different “population characteristics” to ensure that the arguments and ideas of the participants represent the opinions and attitudes of the relevant population (of GPs in this study). Our sample of 10 GPs represented the three regions (Flanders, Brussels and Wallonia) and was heterogeneous in terms of age, ICT skills and expert knowledge about eHealth services. However, most participants had a group practice and were male. The low number of female participants may have introduced a bias in the data, especially because we know that the eHealth uptake is high among female GPs. If women experience different barriers and facilitators in eHealth use than men, we were unable to cover them in our data. However, the convergence with the international literature, illustrated by the spread of the green and orange elements over Figure 29 gives us a reason to believe that the focus group data is a rather good representation of the most important perspectives of Belgian GPs.

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<sup>p</sup> As described in Chapter 1 we received aggregated data from RIZIV – INAMI.



## ■ APPENDICES

### APPENDIX 1. APPENDIX TO CHAPTER 3

#### Appendix 1.1. Approved software packages

Table 22 – Overview of approved software packages per allowance year

	Until 2019	2020	From 2021 onwards
CareConnect (HealthConnect)	x	x	x
Epicure (MedicalSoft)	x	x	
HealthOne (HDMP)	x	x	x
Le Généraliste (PC Sol)	x	x	
Medidoc (Corilus)	x	x	
Medigest (Corilus)	x	x	
Medinote (The Virtual Circle)	x	x	
Pricare (Figac)	x	x	
Accrimed (Corilus)	x	x	
Daktari (Barista Software)	x	x	x
iCure (TakTik SA)	x	x	
Medinect (OFFIMED)	x	x	x
Omnipro (MIMS)	x	x	x (Xperthis)
Windoc (CompuGroup Medical Belgium bvba)	x	x	
Prodoc (CEGEKA)	x	x	x
Topaz (Topaz Care SRL)		x	x
Medispring (Medispring SCRL)		x	x





Appendix 1.2. Descriptive statistics of GP population

Figure 32 – Age and gender distribution for GPs in solo and group practices (2018)

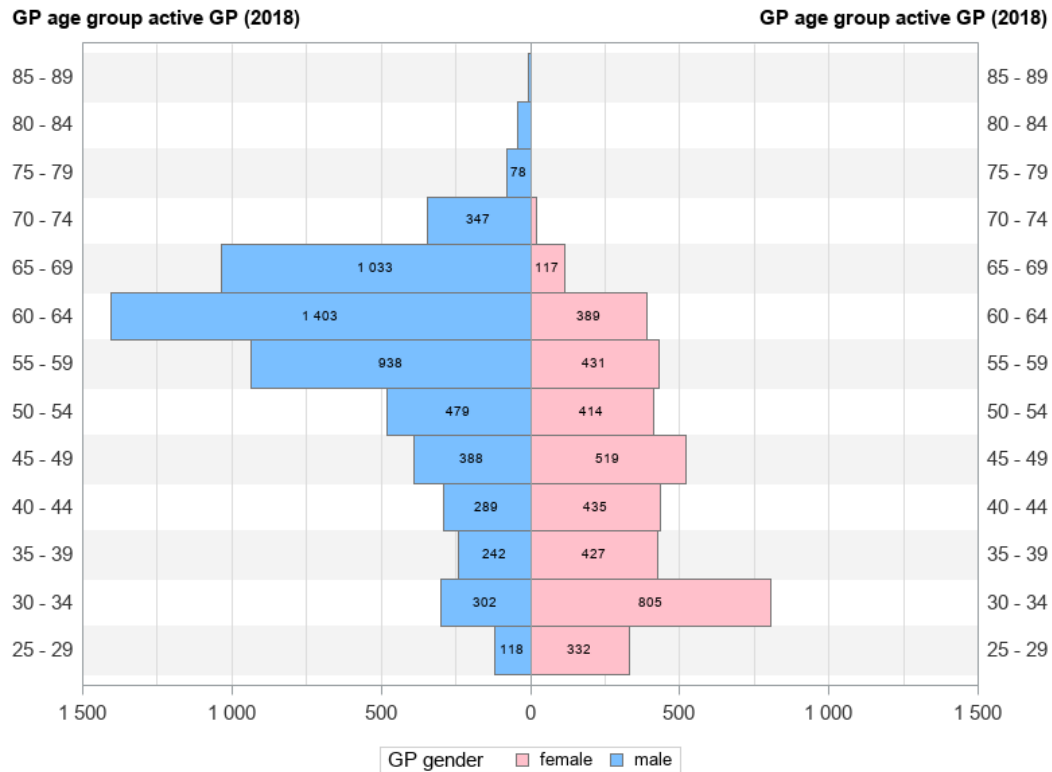




Figure 33 – Age and gender distribution for GPs in solo practices (2017)

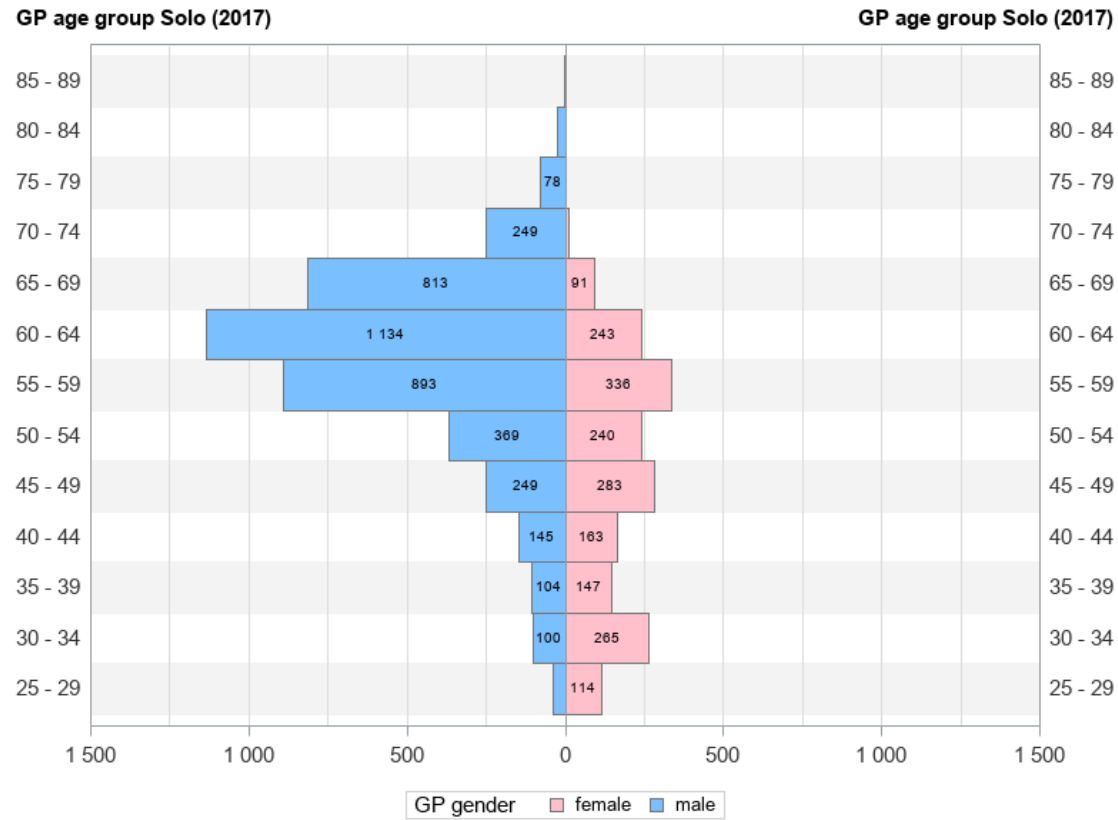




Figure 34 – Age and gender distribution for GPs in group practices (2017)

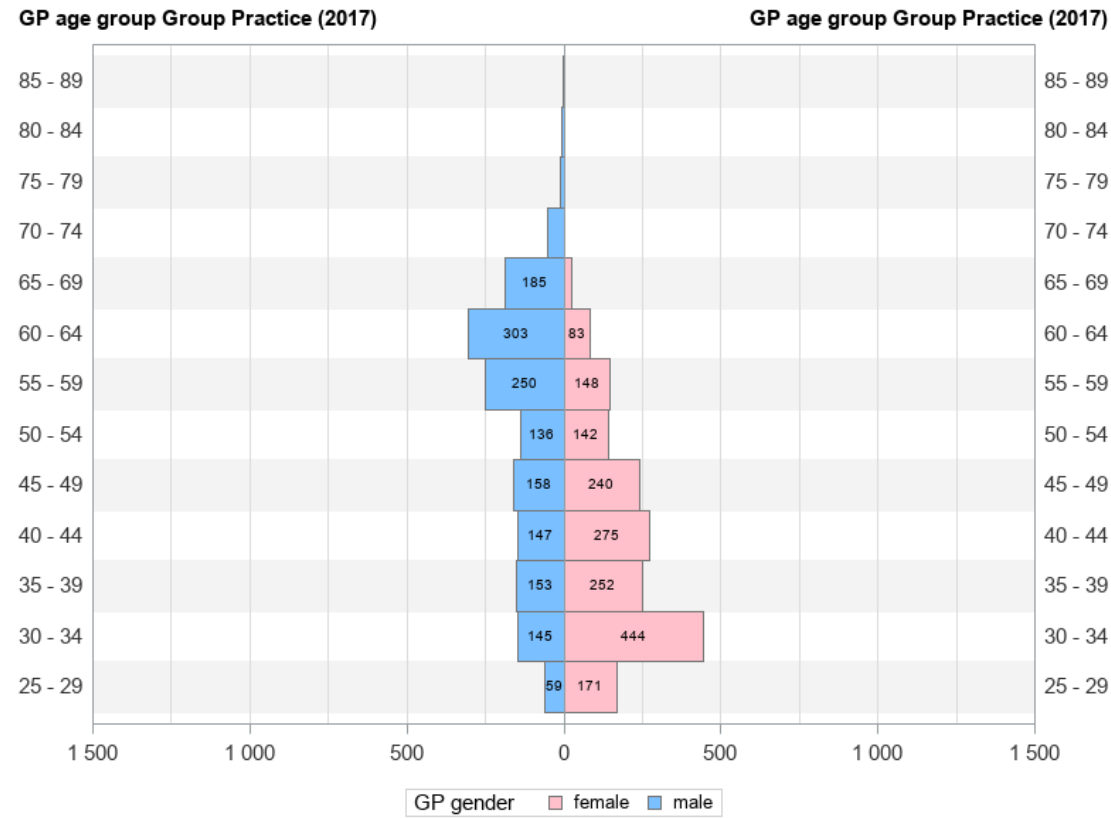
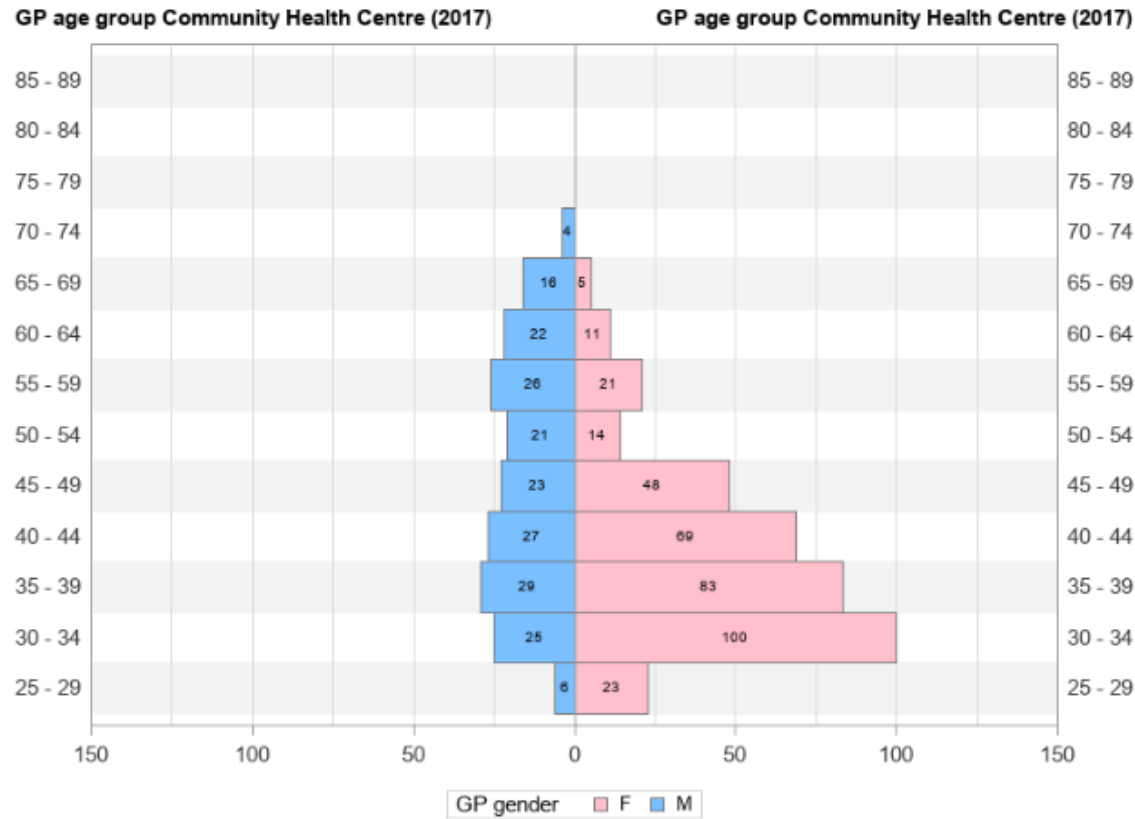




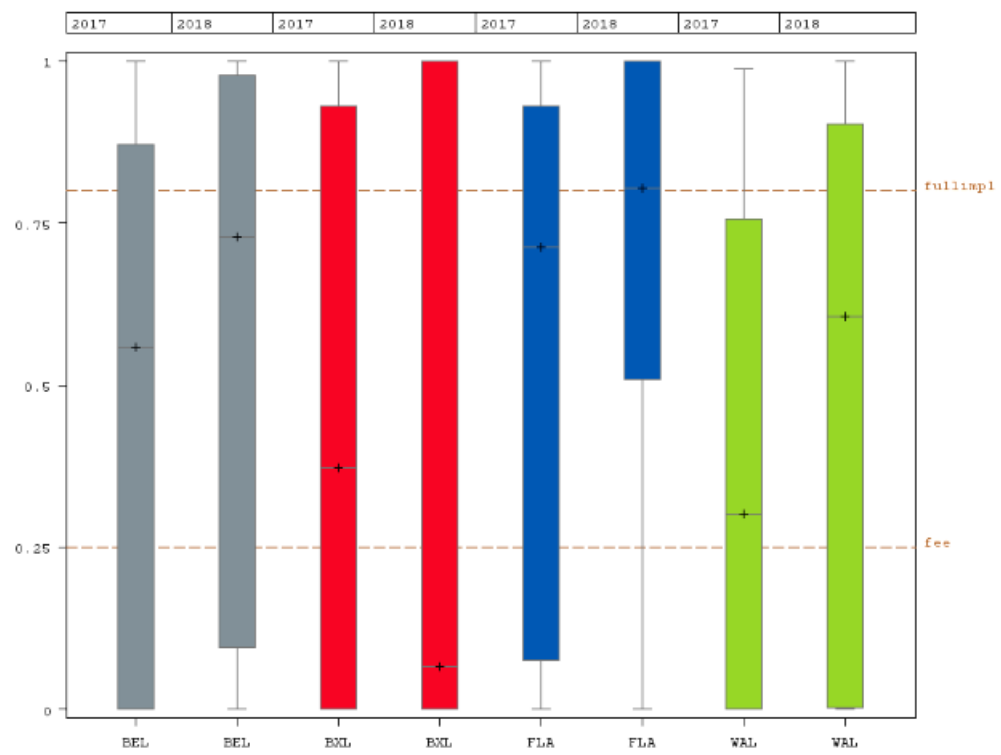
Figure 35 – Age and gender distribution for GPs in CHCs (2017)





### Appendix 1.3. Uptake by criterion (C1-C5, C9)

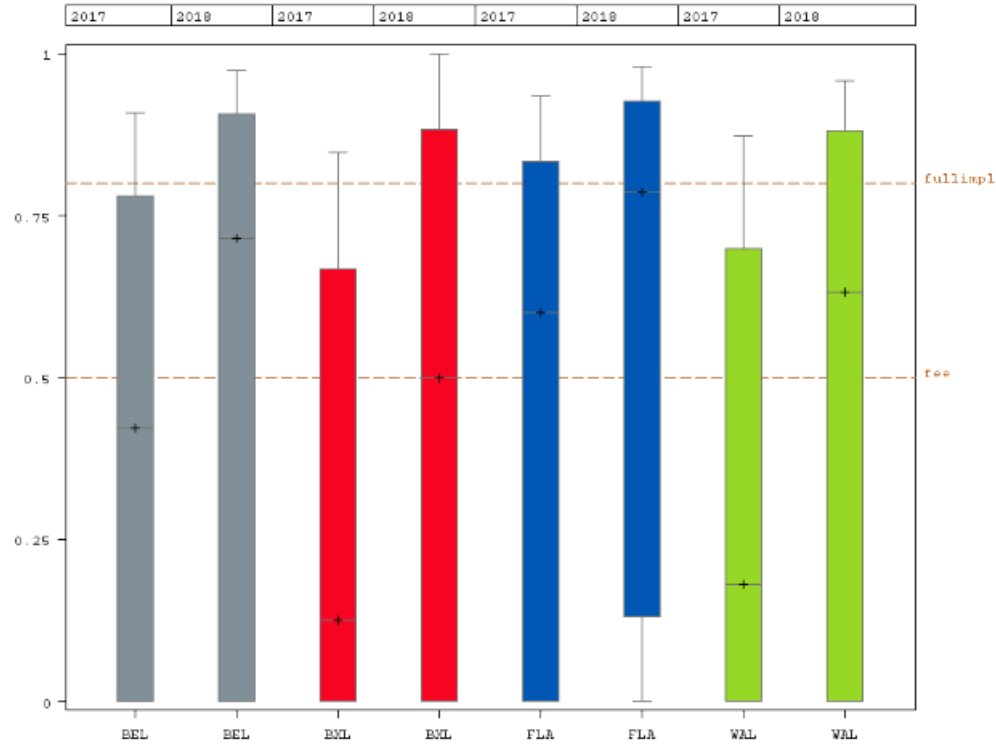
Figure 36 – Evolution eHealth uptake C1 Recip-e



**Note:** Boxplots with box defined by  $P_{25}$ ,  $P_{50}$  and  $P_{75}$ , endlines defined by  $P_{10}$  and  $P_{90}$ . Reference line at 80% use. Minimal Threshold at 25%.



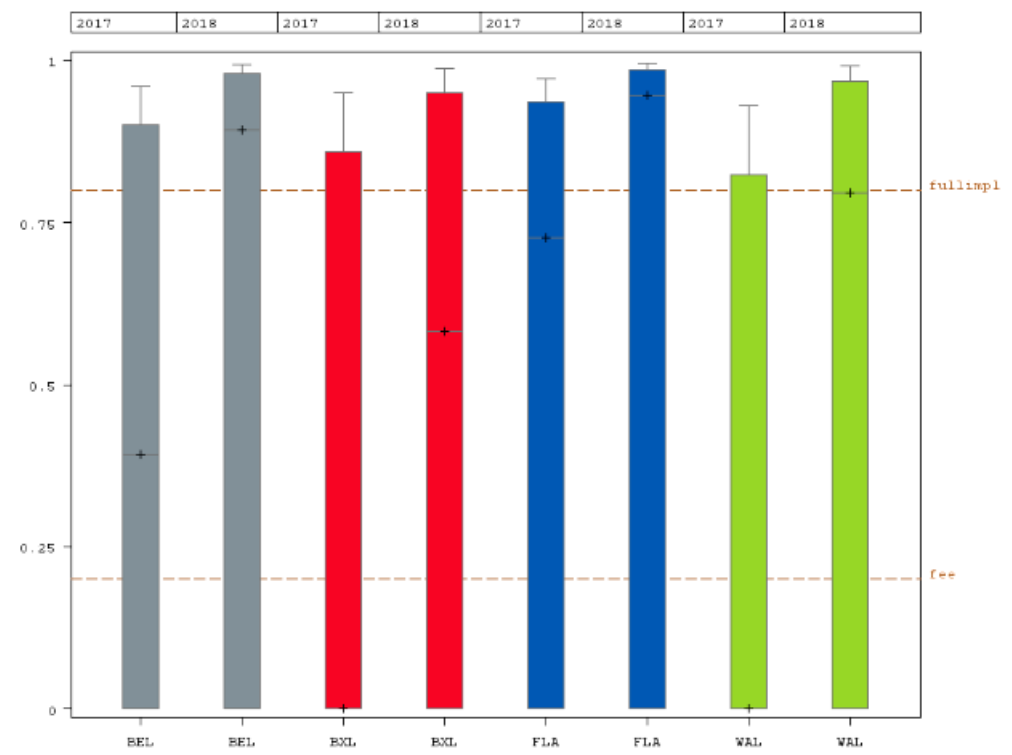
Figure 37 – Evolution eHealth uptake C2 MyCareNet Chapter IV



**Note:** Boxplots with box defined by  $P_{25}$ ,  $P_{50}$  and  $P_{75}$ , endlines defined by  $P_{10}$  and  $P_{90}$ . Reference line at 80% use. Minimal Threshold at 50%.



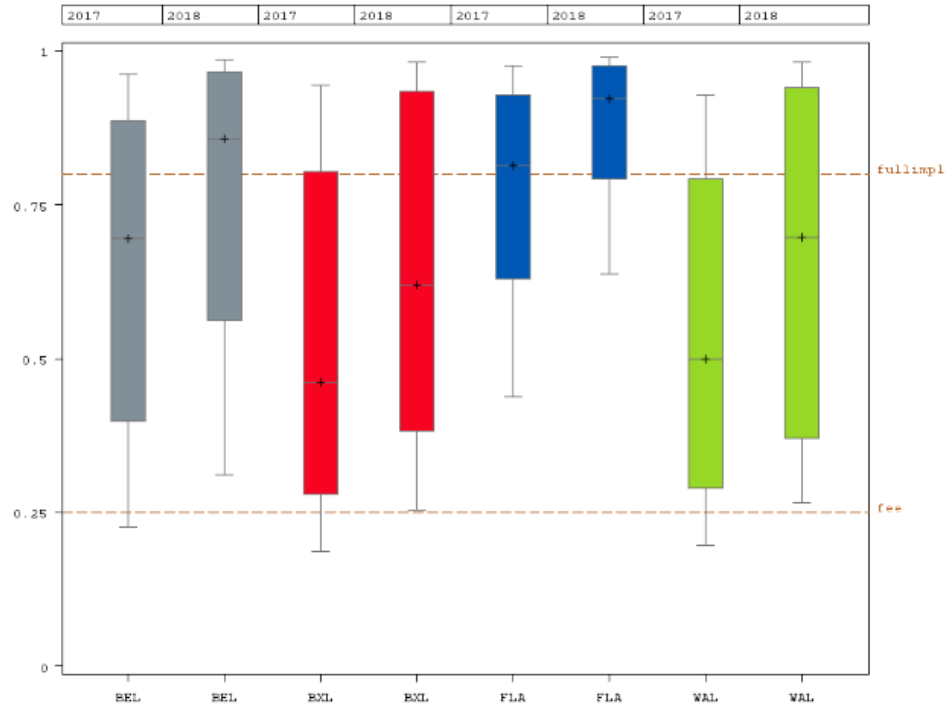
Figure 38 – Evolution eHealth uptake C3 MyCareNet eFact



Note: Boxplots with box defined by P<sub>25</sub>, P<sub>50</sub> and P<sub>75</sub>, endlines defined by P<sub>10</sub> and P<sub>90</sub>. Reference line at 80% use. Minimal Threshold at 20%.



Figure 39 – Evolution eHealth uptake C4 informed consent



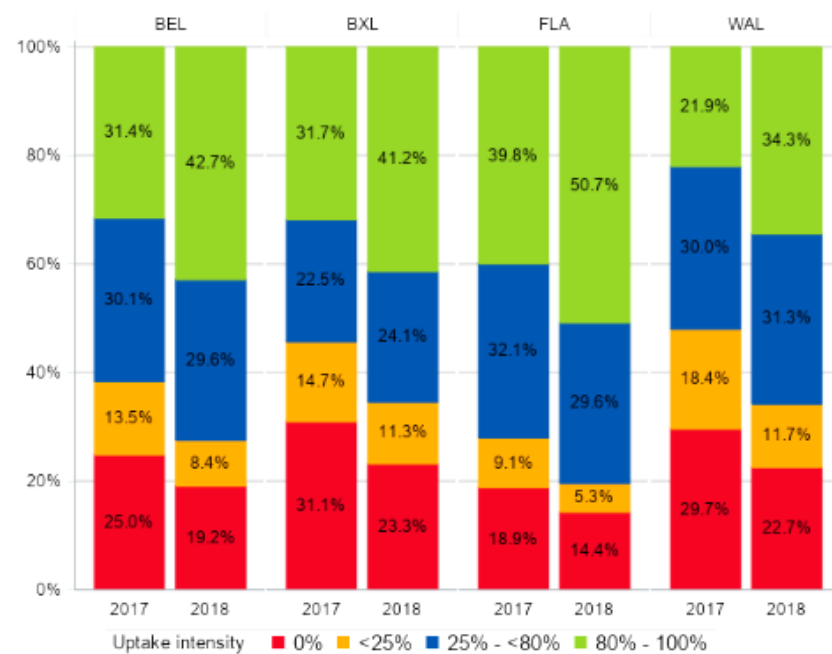
**Note:** Boxplots with box defined by P<sub>25</sub>, P<sub>50</sub> and P<sub>75</sub>, endlines defined by P<sub>10</sub> and P<sub>90</sub>. Reference line at 80% use. Minimal Threshold at 25%.





## Appendix 1.4. Intensity of use by criterion (C1-C5, C9)

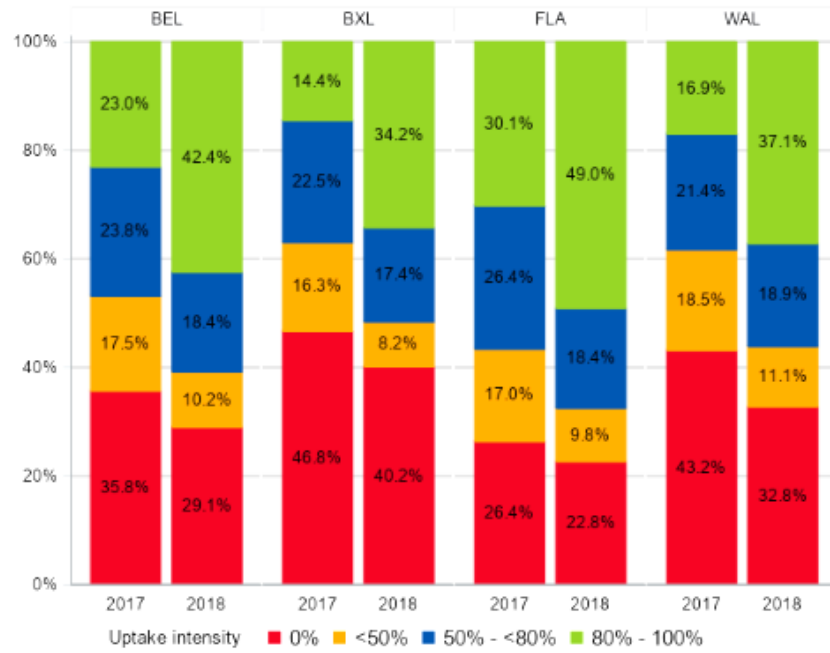
Figure 40 – Evolution of intensity of use classes C1 Recip-e



**Note:** Active GPs in solo or group practices.



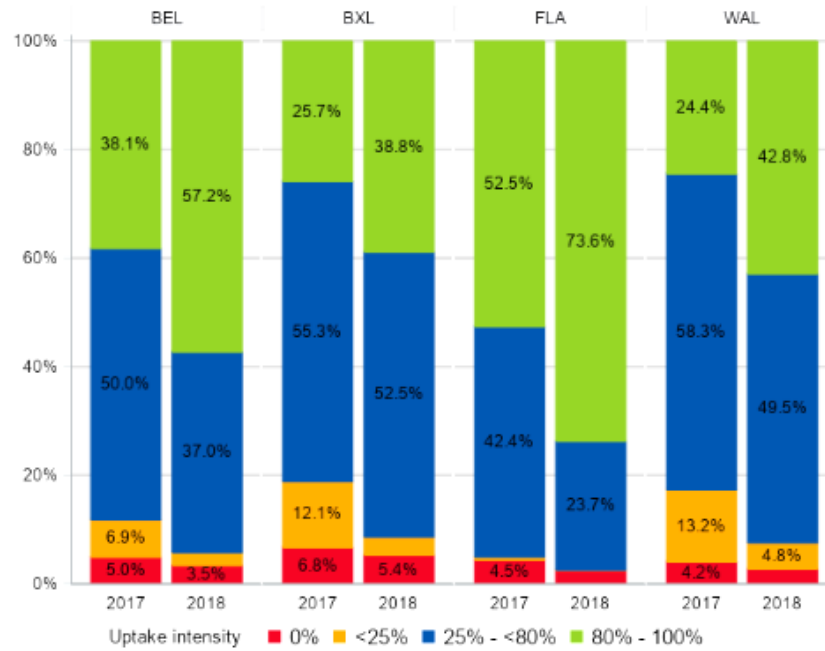
Figure 41 – Evolution of intensity of use classes C2 MyCareNet Chapter IV



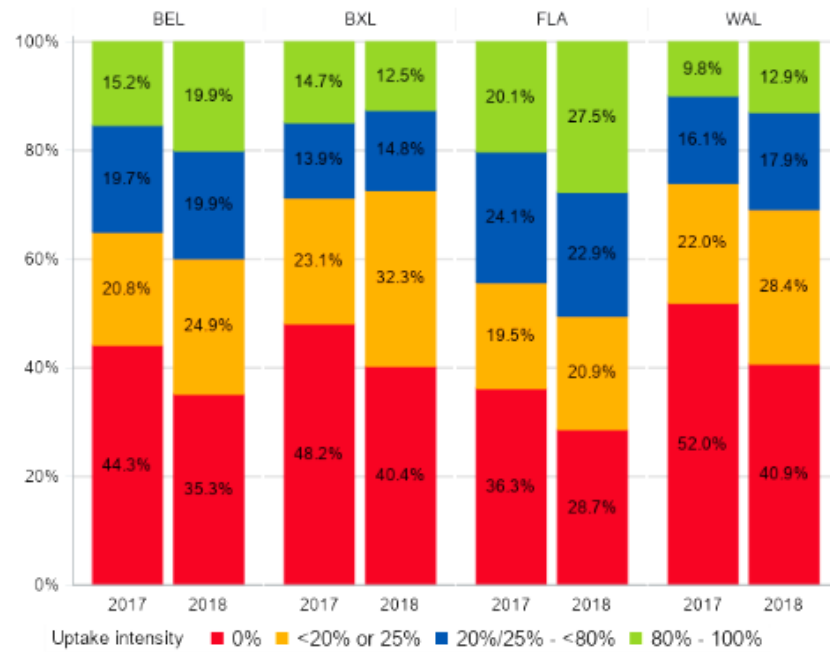
Note: Active GPs in solo or group practices.



**Figure 42 – Evolution of intensity of use classes C4 informed consent**



**Note:** Active GPs in solo or group practices.

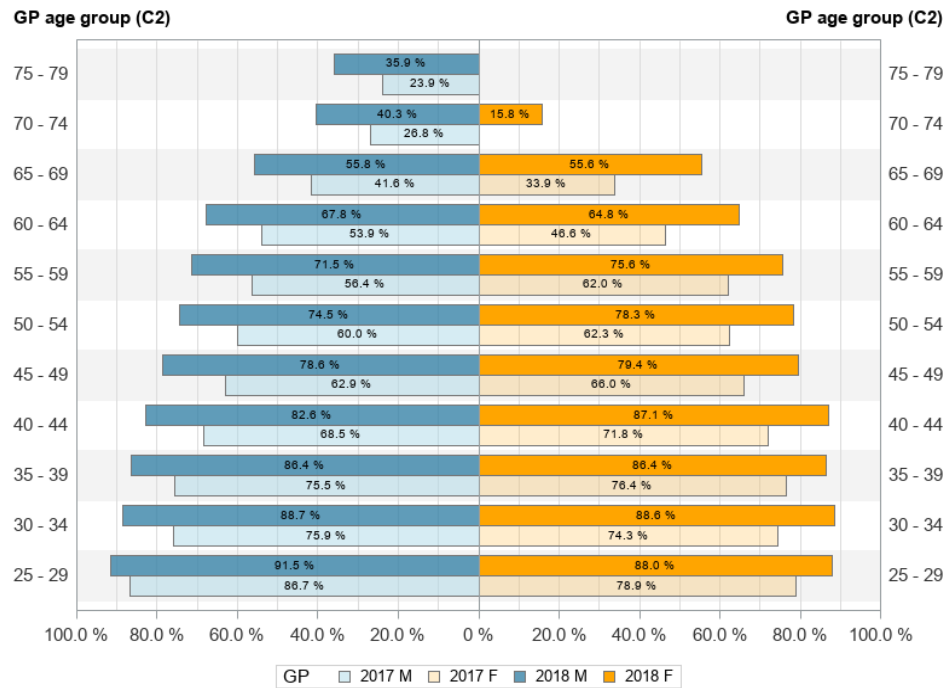
**Figure 43 – Evolution of intensity of use classes C5 Sumehr**

**Note:** Active GPs in solo or group practices.



Appendix 1.5. Evolution uptake by GP age group and gender

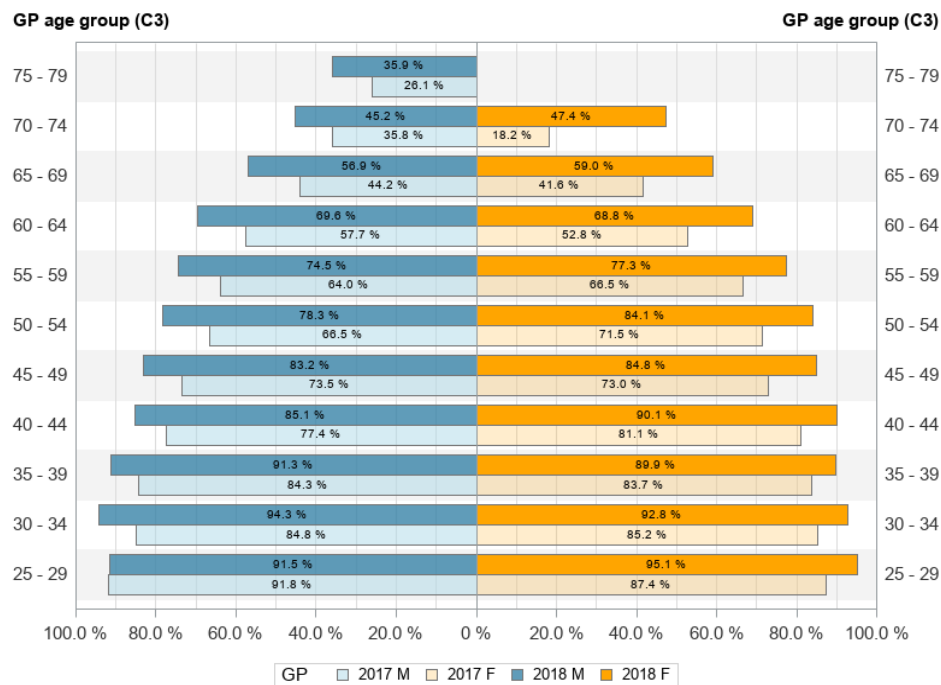
Figure 44 – Uptake evolution C2 MyCareNet Chapter IV among active GPs (2017 to 2018)



**Note:** Active GPs in solo or group practices aged up to 79 years.



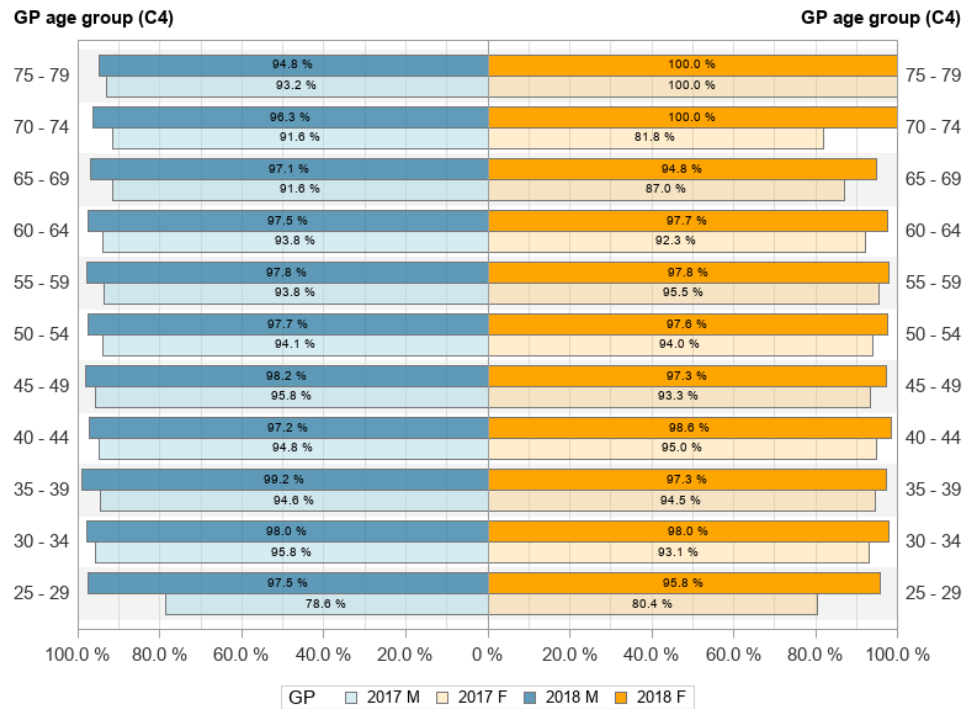
Figure 45 – Uptake evolution C3 MyCareNet eFact among active GPs (2017 to 2018)



Note: Active GPs in solo or group practices aged up to 79 years.



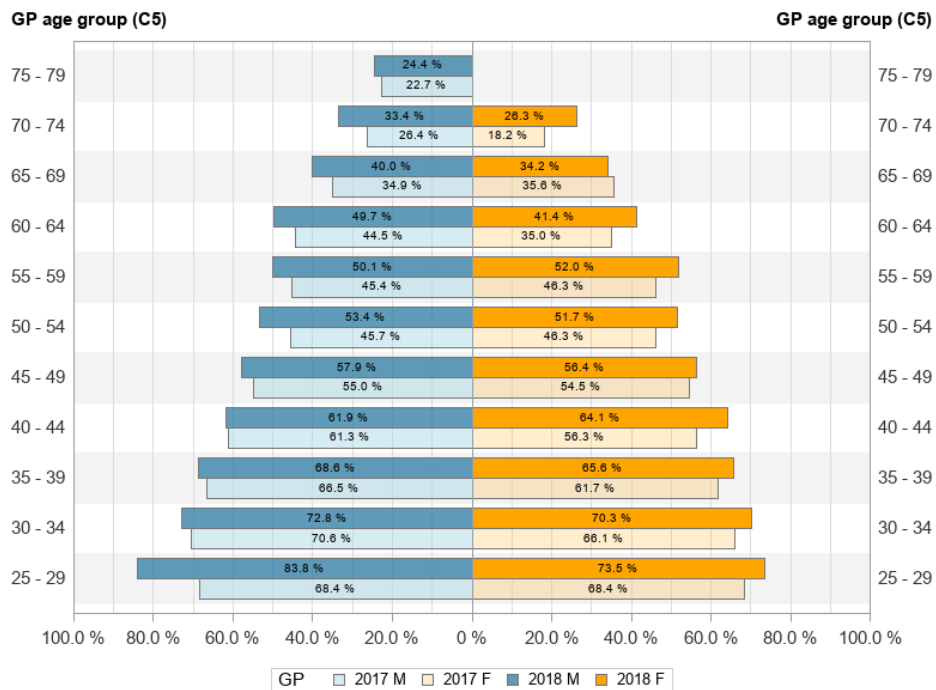
Figure 46 – Uptake evolution C4 GMF informed consent among active GPs (2017 to 2018)



Note: Active GPs in solo or group practices aged up to 79 years.



Figure 47 – Uptake evolution C5 Sumehr among active GPs (2017 to 2018)

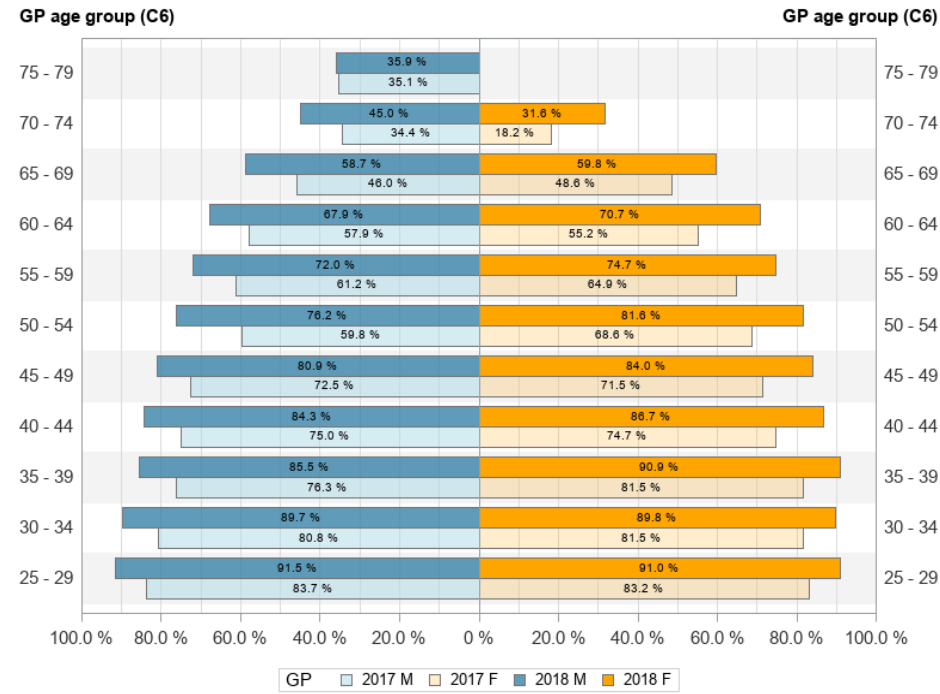


Note: Active GPs in solo or group practices aged up to 79 years. Threshold was 20% in 2017 and 25% in 2018.





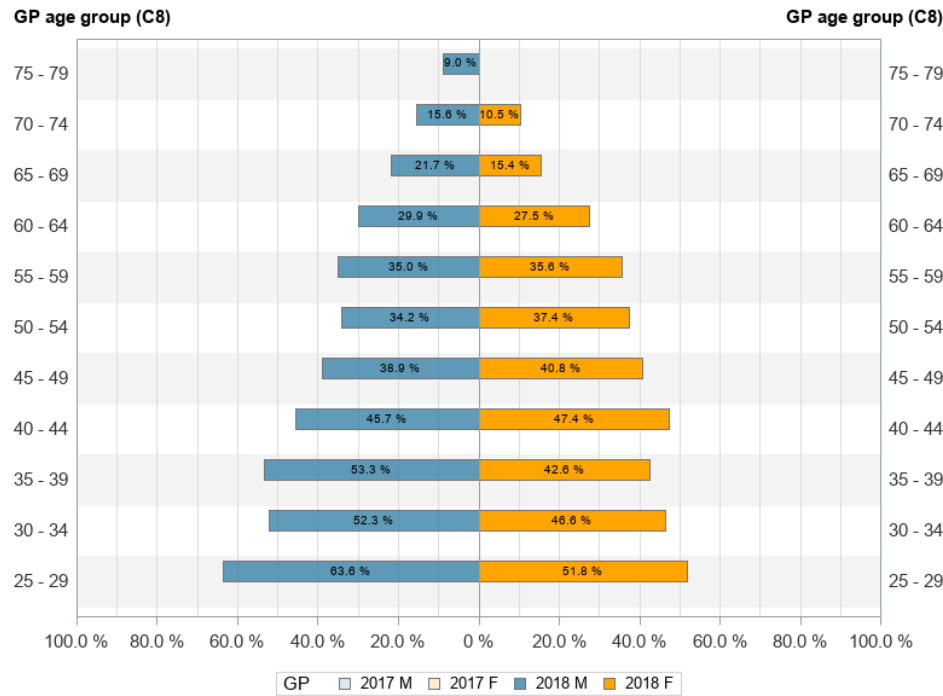
Figure 48 – Uptake evolution C6 digital GMF management among active GPs (2017 to 2018)



**Note:** Active GPs in solo or group practices aged up to 79 years.



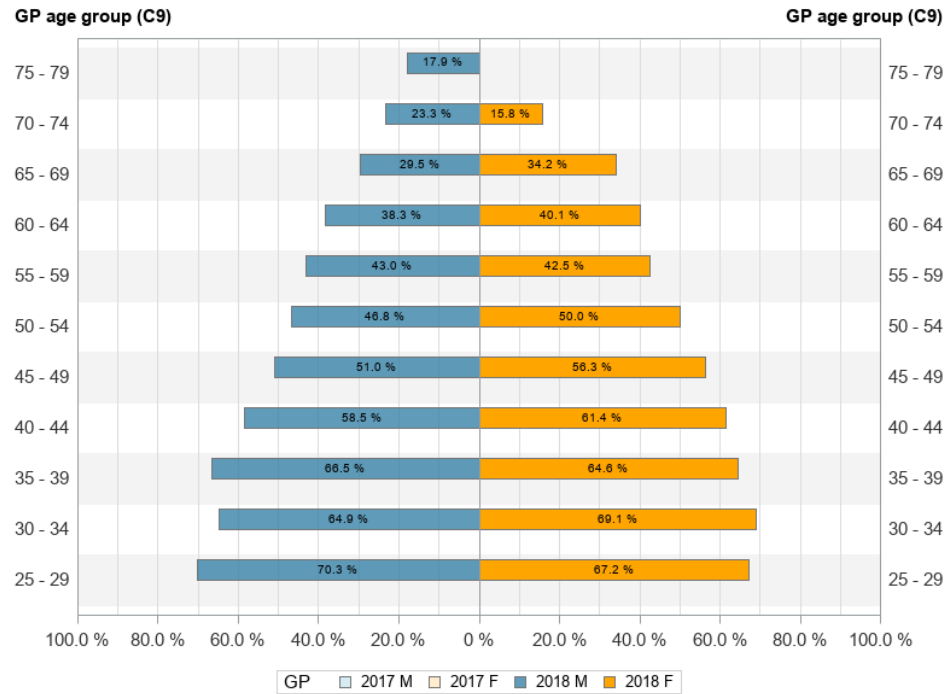
Figure 49 – Uptake evolution C8 Cebam Evidence Linker among active GPs (2017 to 2018)



Note: Active GPs in solo or group practices aged up to 79 years (implemented from 2018).



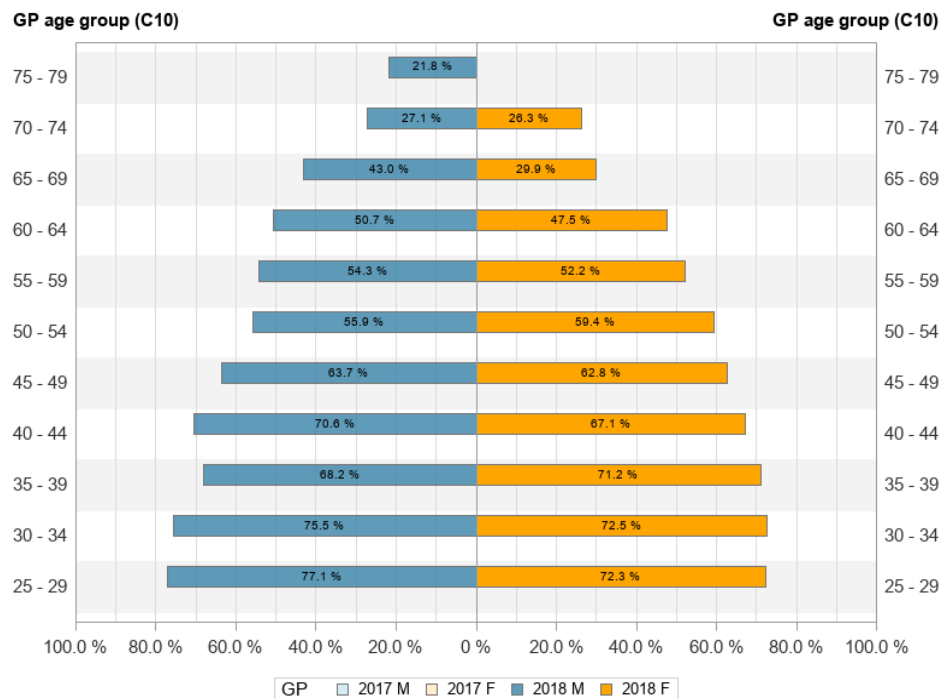
**Figure 50 – Uptake status C9 MyCareNet eAttest among active GPs (2018)**



**Note:** Active GPs in solo or group practices aged up to 79 years (implemented from 2018).



Figure 51 – Uptake status for C10 Handicap among active GPs (2018)

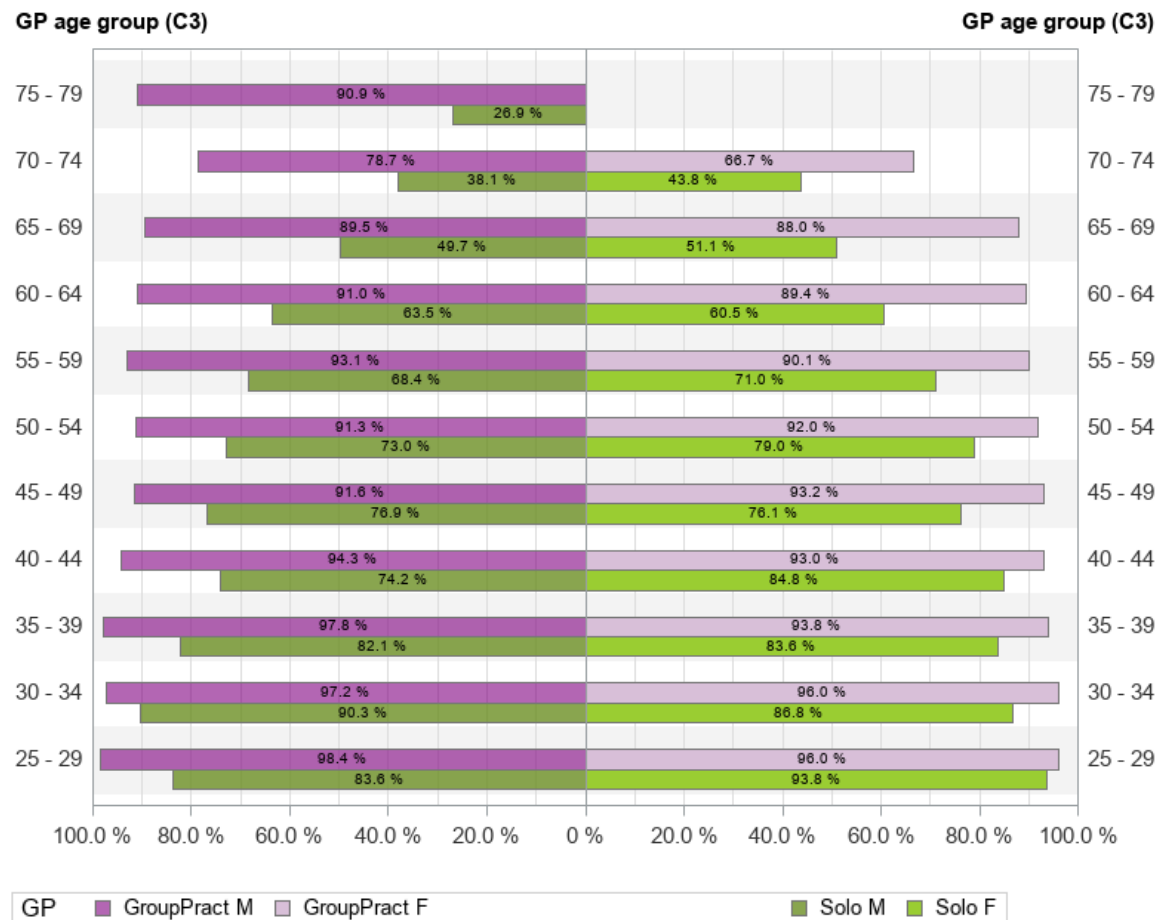


**Note:** Active GPs in solo or group practices aged up to 79 years (implemented from 2018).



Appendix 1.6. Uptake by GP age group, gender and type of practice

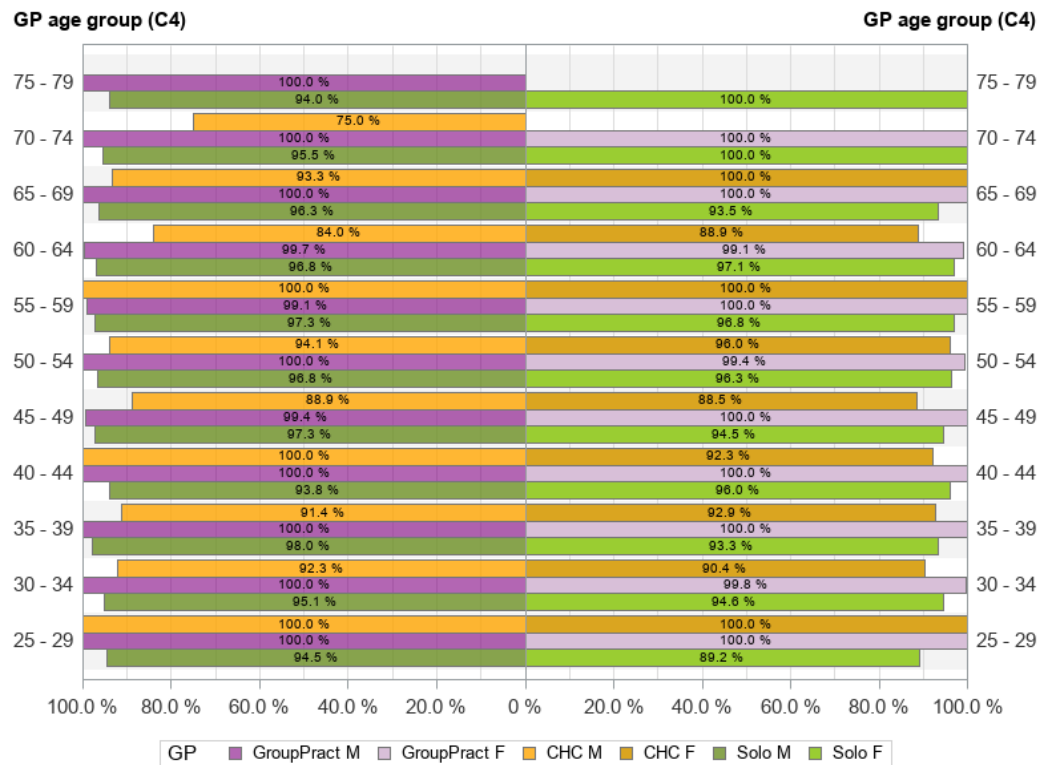
Figure 52 – Uptake C3 MyCareNet eFact by GP type of practice (2018)



Note: Active GPs in solo or group practices, aged up to 79 years (not in application in CHCs).



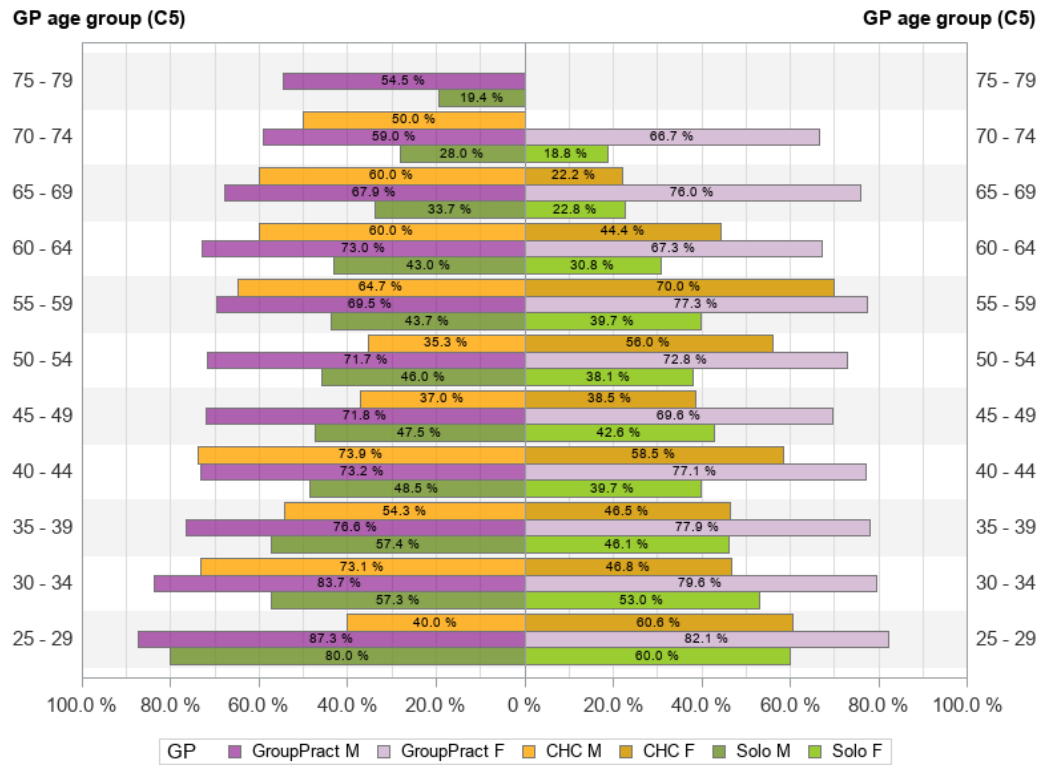
Figure 53 – Uptake C4 GMF informed consent by GP type of practice (2018)



Note: Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.



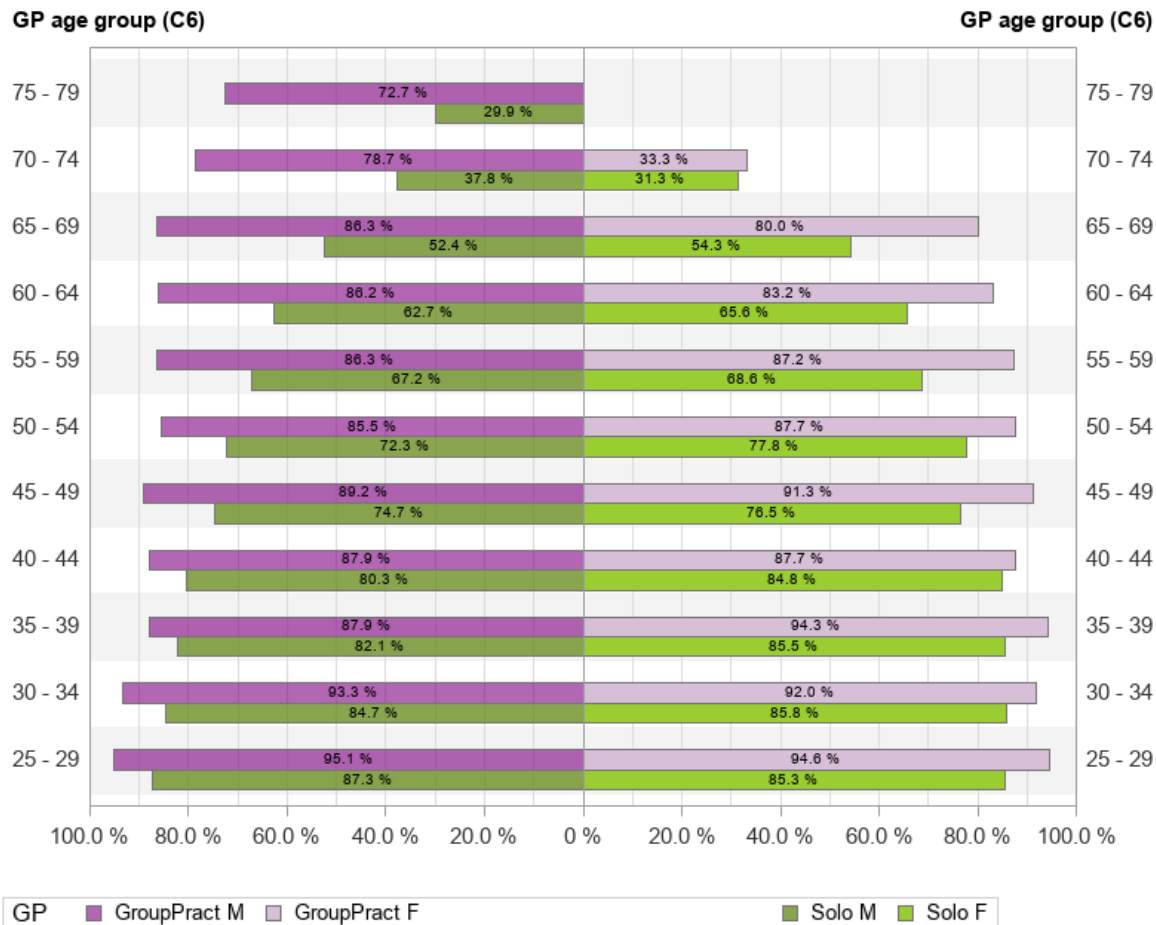
Figure 54 – Uptake C5 Sumehr by GP type of practice (2018)



Note: Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.



Figure 55 – Uptake C6 digital GMF management by GP type of practice (2018)

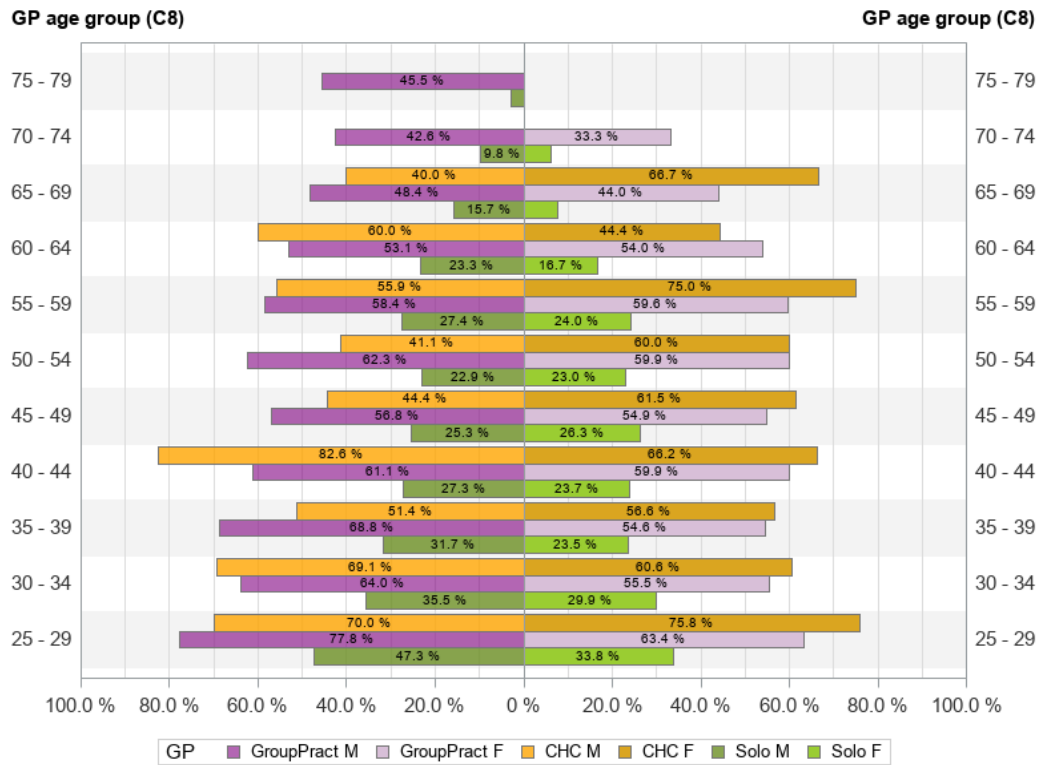


Note: Active GPs in solo or group practices, aged up to 79 years (not in application in CHCs).





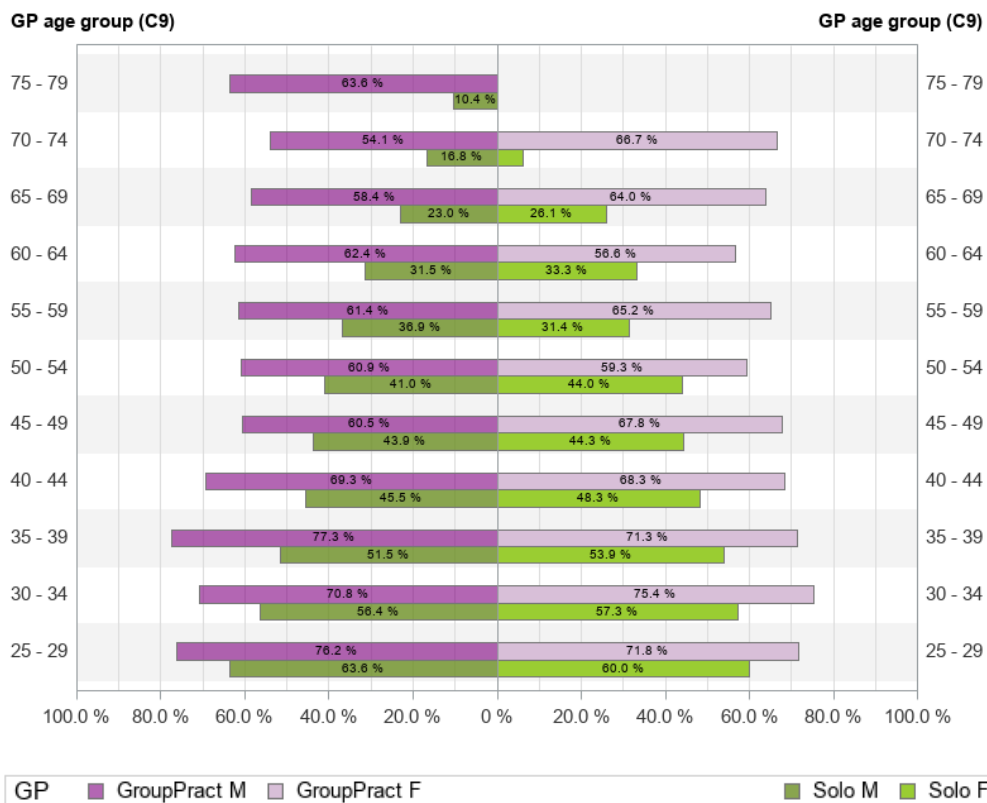
Figure 56 – Uptake C8 Cebam Evidence Linker by GP type of practice (2018)



Note: Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.



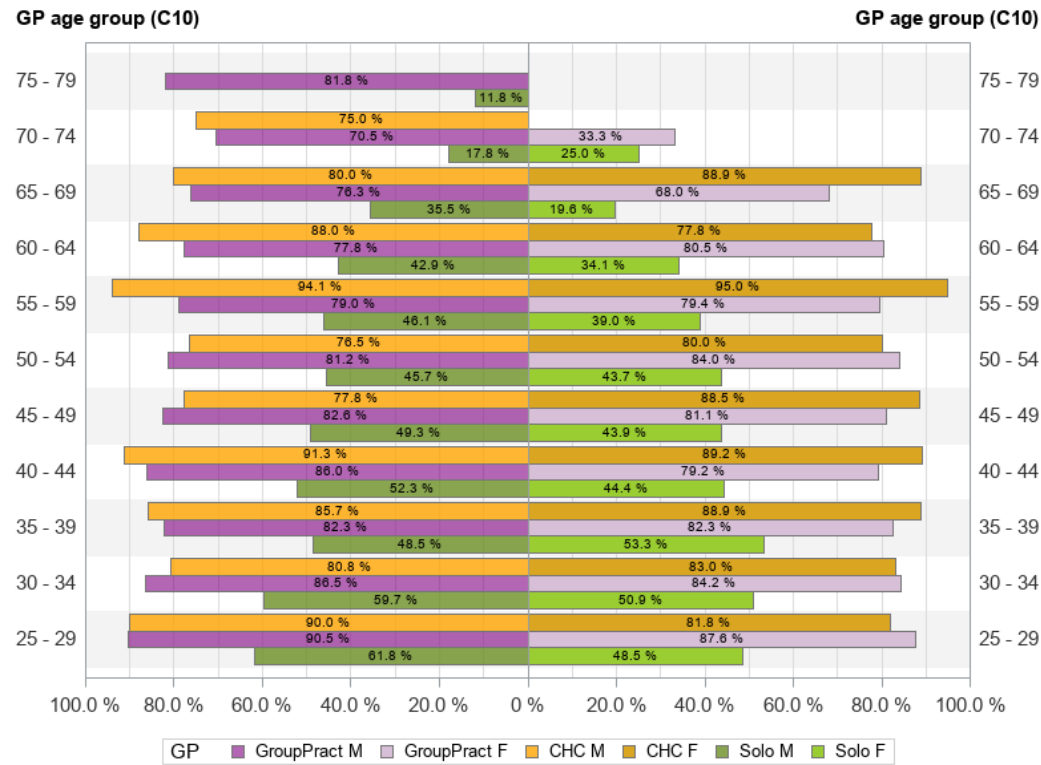
Figure 57 – Uptake C9 MyCareNet eAttest by GP type of practice (2018)



Note: Active GPs in solo or group practices, aged up to 79 years (not in application in CHCs).



Figure 58 – Uptake C10 Handicap by GP type of practice (2018)

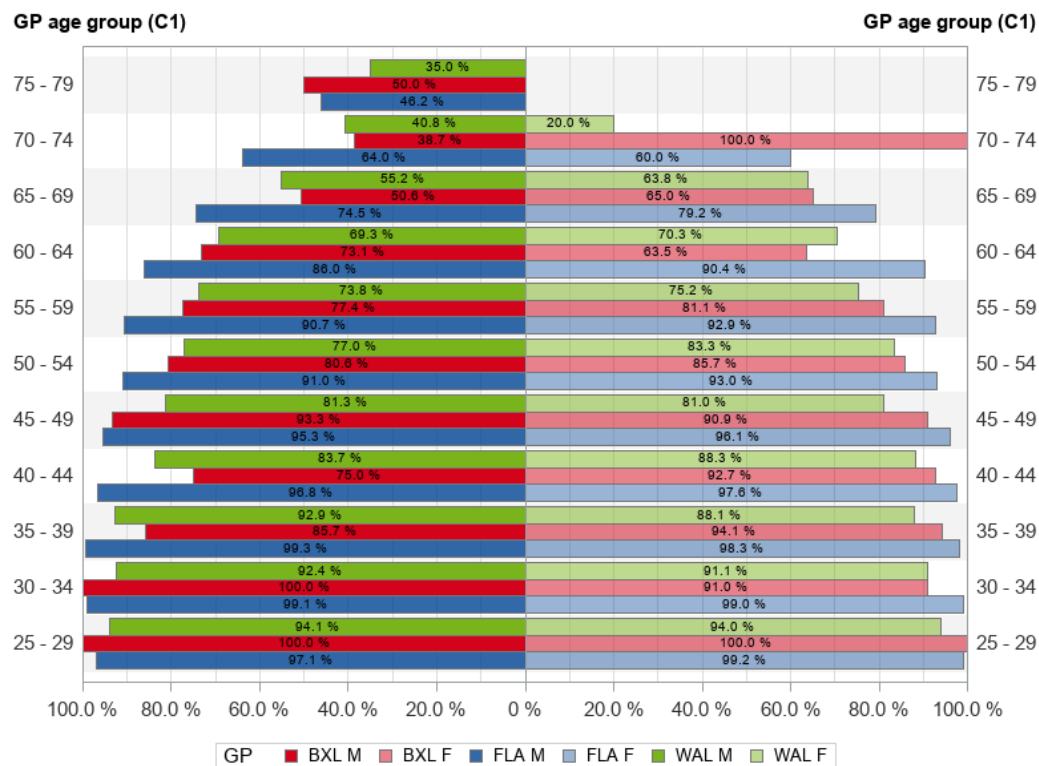


Note: Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.



Appendix 1.7. Uptake by age group, gender and region

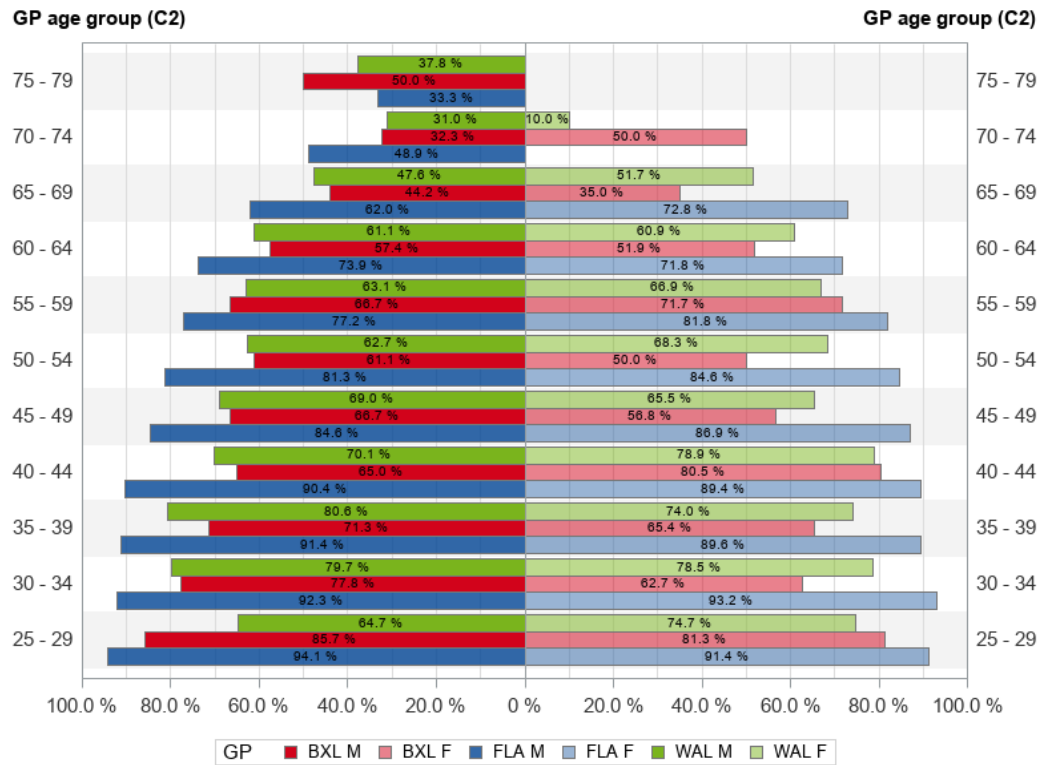
Figure 59 – Uptake C1 Recip-e by Region (2018)



Note: Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.



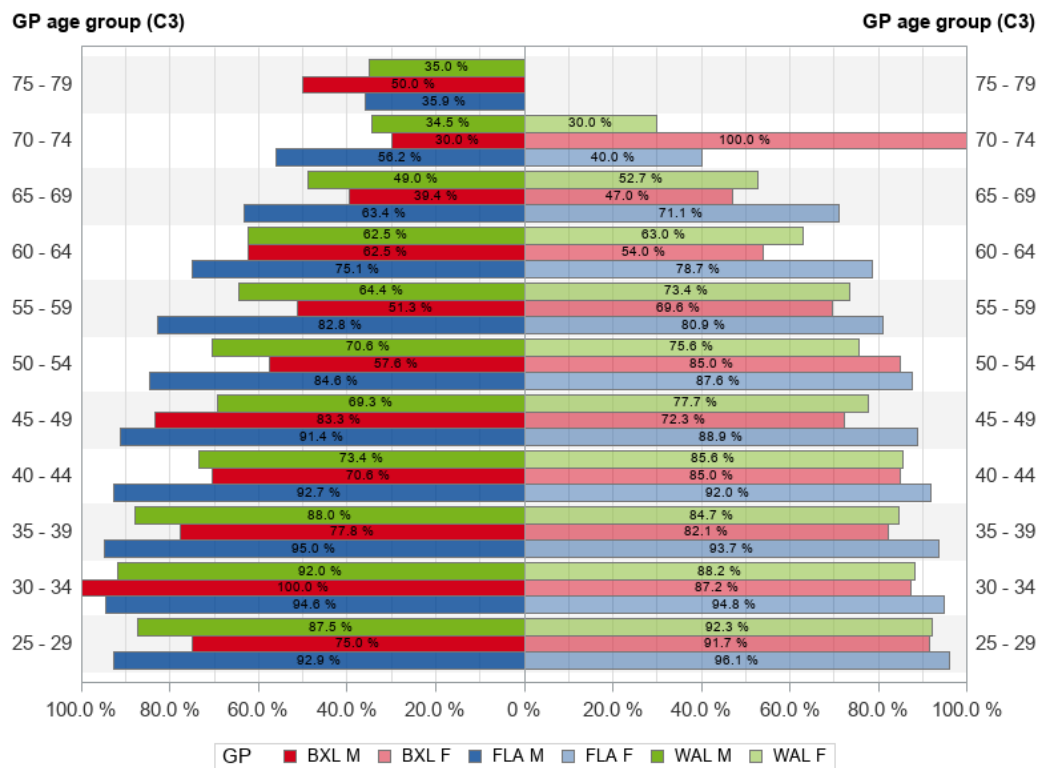
Figure 60 – Uptake C2 MyCareNet Chapter IV by region (2018)



Note: Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.



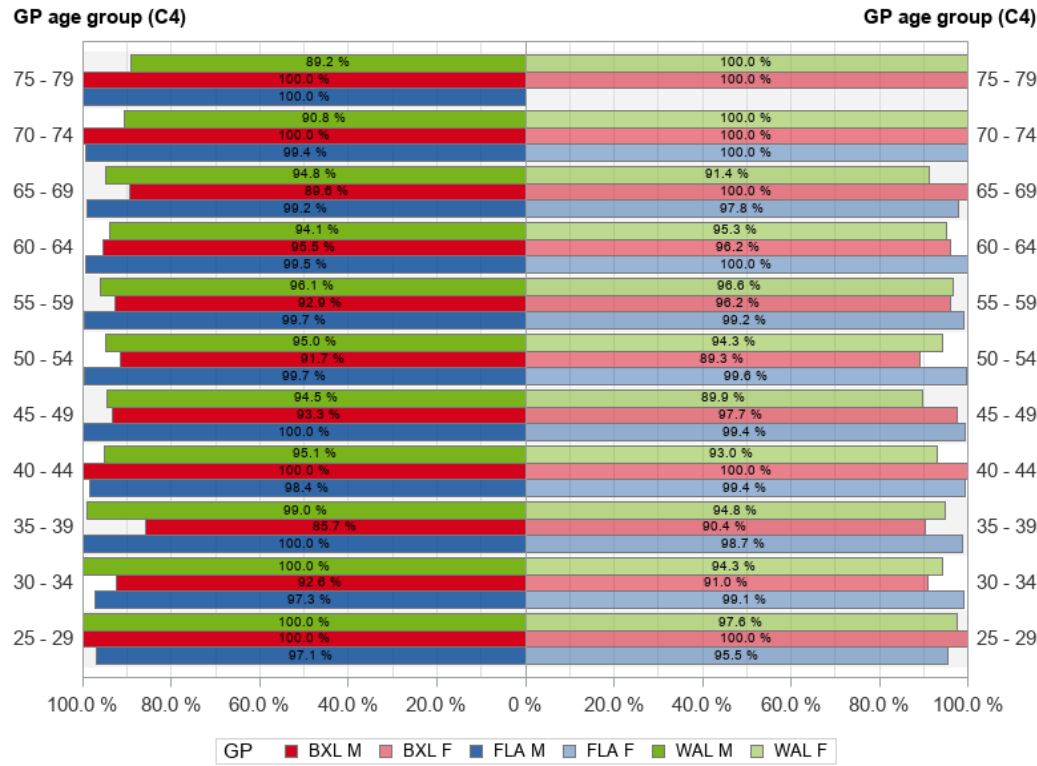
Figure 61 – Uptake C3 MyCareNet eFact by region (2018)



Note: Active GPs in solo or group practices, aged up to 79 years (not in application in CHCs).



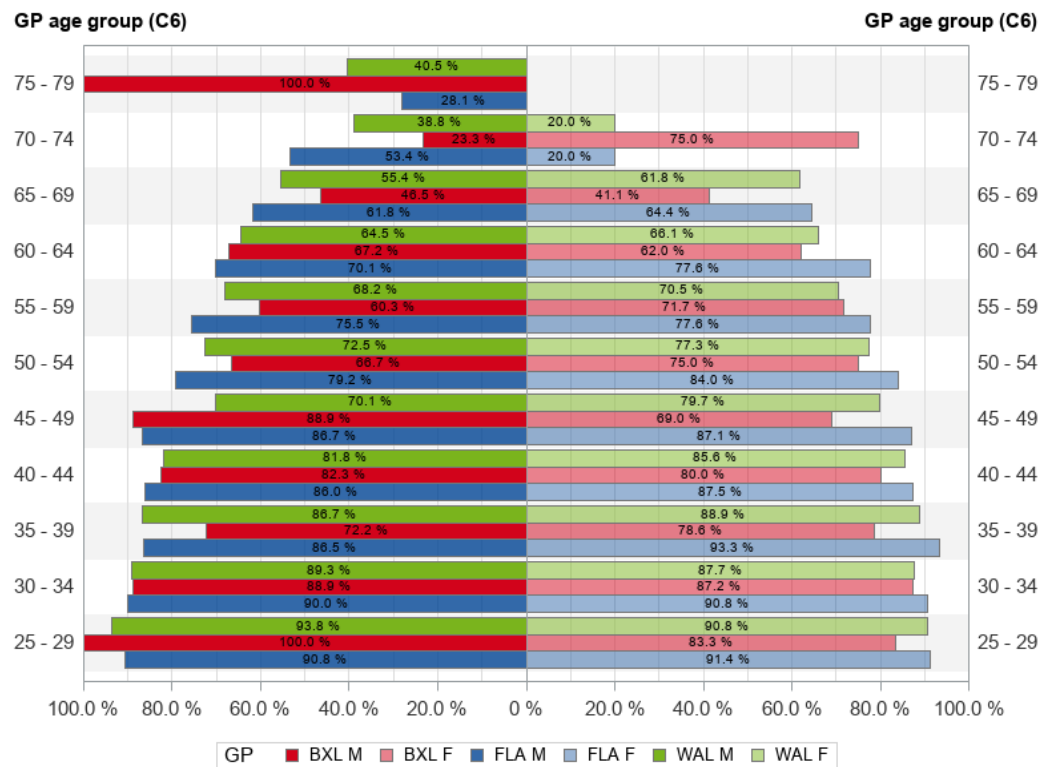
Figure 62 – Uptake C4 GMF informed consent by region (2018)



**Note:** Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.



Figure 63 – Uptake C6 digital GMD management by region (2018)

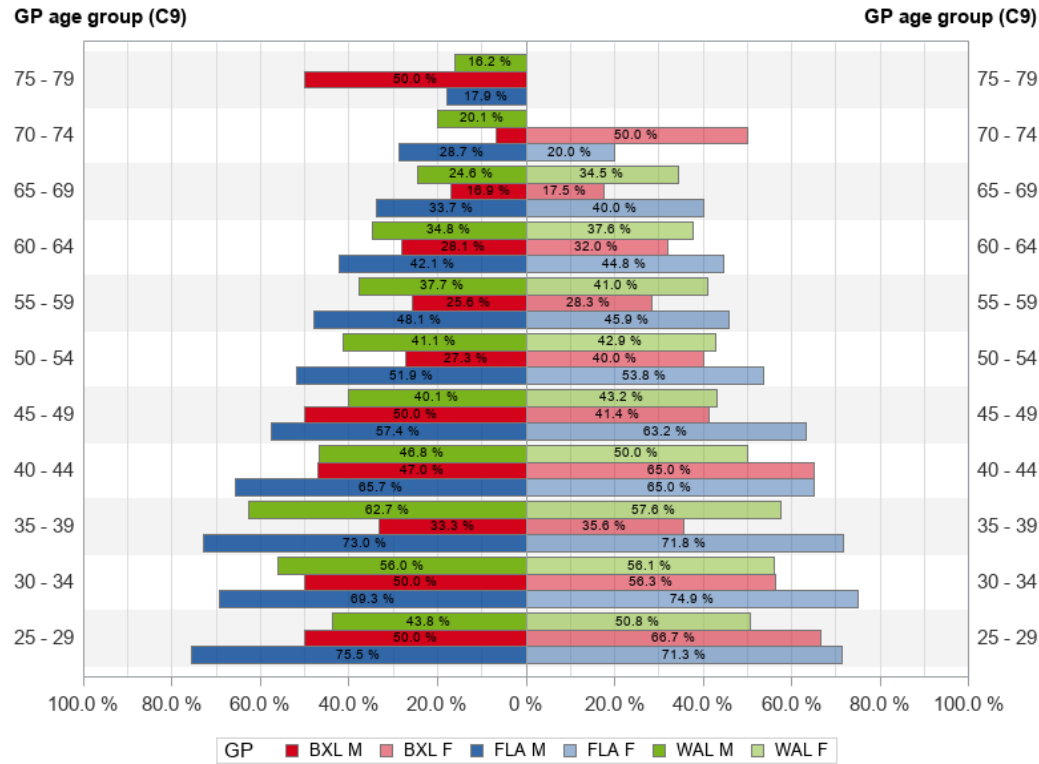


Note: Active GPs in solo or group practices, aged up to 79 years (not in application in CHCs).





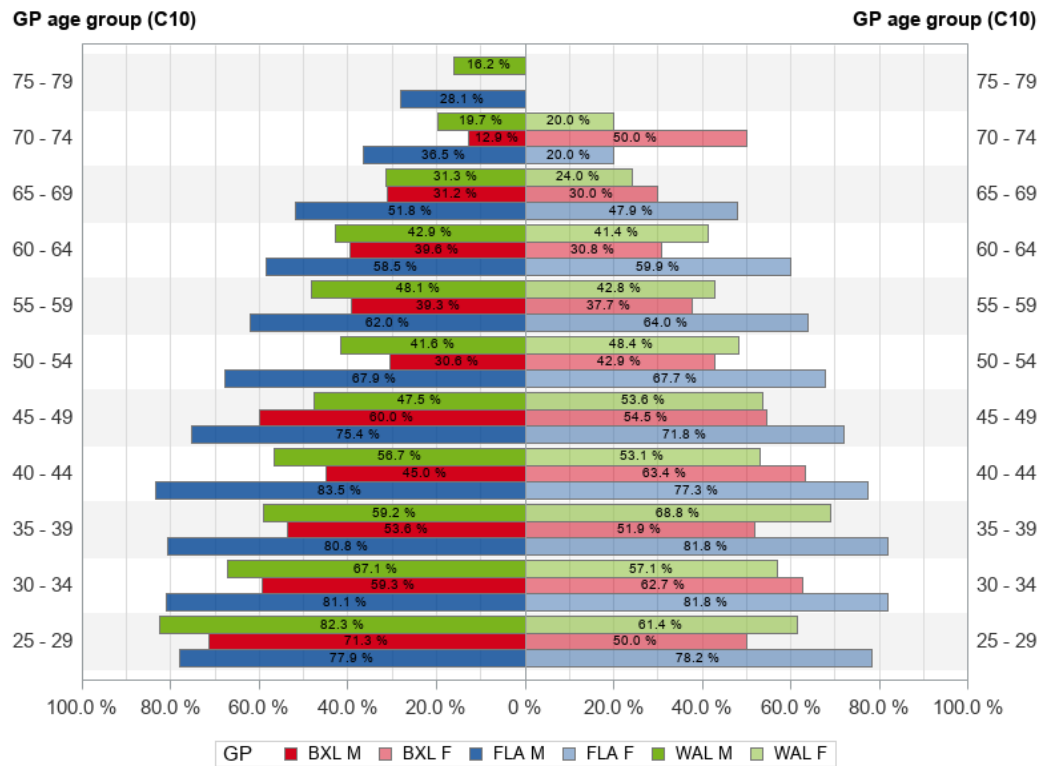
Figure 64 – Uptake C9 MyCareNet eAttest by region (2018)



Note: Active GPs in solo or group practices, aged up to 79 years (not in application in CHCs).



Figure 65 – Uptake C10 Handicap form by region (2018)



Note: Active GPs in solo or group practices and GPs on duty in CHCs, aged up to 79 years.



## Appendix 1.8. Software packages used in 2017 and 2018

Table 23 – Software packages used by active GPs applying for the integrated allowance, sorted on 2018

Software	2017		2018	
	N	%	N	%
CareConnect	3 057	38.6	3 862	48.9
HealthOne	1 614	20.4	1 521	19.3
Windoc	1 504	19	1 038	13.1
EpicureSoft	890	11.2	686	8.7
Daktari	167	2.1	319	4
Medinect	77	1	114	1.4
Pro_Doc	92	1.2	102	1.3
Medidoc	186	2.4	71	0.9
OmniPro	76	1	49	0.6
iCure	46	0.6	48	0.6
Accrimed	37	0.5	46	0.6
Le Généraliste	151	1.9	24	0.3
Medigest	18	0.2	13	0.2
Pricare	8	0.1	5	0.1
<b>TOTAL</b>	<b>7923</b>	<b>100</b>	<b>7 898</b>	<b>100</b>

*Note: Active GPs in solo or group practices who applied for the allowance.*



## APPENDIX 2. APPENDIX TO CHAPTER 4

### Appendix 2.1. Search strategies

Table 24 – Search strategy primary studies in Ovid Medline®

Nr	Search term(s)	Hits	Nr	Search term(s)	Hits
1	exp General Practitioners/	7 036	33	e-mail*.ab,ti,kf,jw.	7 825
2	exp Primary Health Care/	148 340	34	e-learning.ab,ti,kf,jw.	2 409
3	exp Physicians, Family/	16 064	35	e-education.ab,ti,kf,jw.	32
4	exp Physicians, Primary Care/	3 023	36	e-consult*.ab,ti,kf,jw.	136
5	Ambulatory Care/	41 644	37	e-refer*.ab,ti,kf,jw.	116
6	1 or 2 or 3 or 4 or 5	207 623	38	decision support system?.ab,ti,kf,jw.	5 477
7	general practi*.ab,ti,kf,jw.	88 941	39	bioinformatics.ab,ti,kf,jw.	65 094
8	primary care.ab,ti,kf,jw.	116 025	40	artificial intelligence.ab,ti,kf,jw.	6 385
9	primary health*.ab,ti,kf,jw.	36 088	41	big data.ab,ti,kf,jw.	5 692
10	family practice.ab,ti,kf,jw.	24 217	42	deep learning.ab,ti,kf,jw.	5 025
11	family physician*.ab,ti,kf,jw.	45 487	43	online.ab,ti,kf,jw.	140 220
12	ambulatory.ab,ti,kf,jw.	77 773	44	mobile health.ab,ti,kf,jw.	3 439
13	out?patient?.ab,ti,kf,jw.	158 506	45	19 or 20 or 21 or 22 or 23 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43	806 052
14	7 or 8 or 9 or 10 or 11 or 12 or 13	480 278	46	18 or 45	3 387 868
15	6 or 14	582 946	47	15 and 46	95 595
16	exp **"information sciences (non mesh)"	2 927 760	48	barriers.ab,ti,kf.	121 608
17	**"Electronic Health Records"	16 849	49	facilitators.ab,ti,kf.	13 037
18	16 or 17	2 933 472	50	burden?.ab,ti,kf,jw.	188 768
19	telemedicine.ab,ti,kf,jw.	14 359	51	implement*.ab,ti,kf,jw.	445 172
20	e?health*.ab,ti,kf,jw.	3 108	52	adopt*.ab,ti,kf,jw.	228 026



21	e?medicine.ab,ti,kf,jw.	26	53	attitude.ab,ti,kf,jw.	49 840
22	telehealth*.ab,ti,kf,jw.	4 210	54	attitude?.ab,ti,kf,jw.	142 032
23	information technolog*.ab,ti,kf,jw.	13 851	55	48 or 49 or 50 or 51 or 52 or 53 or 54	1 038 291
24	computer*.ab,ti,kf.	291 640	56	exp Attitude/	545 174
25	computer*.ab,ti,kf,jw.	329 949	57	exp "Attitude of Health Personnel"/	151 855
26	internet.ab,ti,kf,jw.	50 902	58	exp Attitude to Computers/	4 582
27	information system?.ab,ti,kf,jw.	30 257	59	56 or 57 or 58	574 996
28	web.ab,ti,kf,jw.	100 192	60	55 or 59	1 476 014
29	search engine?.ab,ti,kf,jw.	5 959	61	47 and 60	34 986
30	digital.ab,ti,kf,jw.	117 310	62	('systematic review'.ti. or 'meta-analysis'.pt. or 'meta-analysis'.ti. or 'systematic literature review'.ti. or 'this systematic review'.tw. or 'pooling project'.tw. or ('systematic review'.ab,ti. and review.pt.) or 'meta synthesis'.ti. or 'meta synthesis'.ti. or 'integrative review'.tw. or 'integrative research review'.tw. or 'rapid review'.tw. or 'consensus development conference'.pt. or 'practice guideline'.pt. or 'drug class reviews'.ti. or 'cochrane database syst rev'.ja. or 'acp journal club'.ja. or 'health technol assess'.ja. or 'evid rep technol assess summ'.ja. or 'jbi database system rev implement rep'.ja. or ('clinical guideline' and management).tw. or (('evidence based'.ti. or evidence-based medicine/ or 'best practice'.ti. or 'best practices'.ti. or 'evidence synthesis'.ab,ti.) and (((review.pt. or diseases category/ or behavior.mp.) and behavior mechanisms/) or therapeutics/ or 'evaluation studies'.pt. or 'validation studies'.pt. or guideline.pt. or pmcbook.mp.)) or ((systematic or systematically or critical or 'study selection' or ((predetermined or inclusion) and criteri*) or 'exclusion criteri*' or 'main outcome measures' or 'standard of care' or 'standards of care').tw. and ((survey or surveys or overview* or review or reviews or search* or handsearch).tw. or analysis.ti. or critique.ab,ti. or appraisal.tw. or (reduction.tw. and (risk/ or risk.tw.) and (death or recurrence).mp.)) and ((literature or articles or publications or publication or bibliography or bibliographies or published or pooled data or unpublished or citation or citations or database or internet or textbooks or references or scales or papers or datasets or	360 758



				trials or meta-analy* or (clinical and studies)).tw. or treatment outcome/ or 'treatment outcome'.tw. or pmcbook.mp.)) not (letter or 'newspaper article').pt. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	
31	numeric.ab,ti,kf,jw.	9 936	63	61 and 64	1 709
32	e-alert?.ab,ti,kf,jw.	22	64	limit 63 to yr="2009-2019"	1 318

Database: Ovid MEDLINE (R) and Epub ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R)

**Table 25 – Search strategy primary studies in Embase®**

Nr	Search term(s)	Hits	Nr	Search term(s)	Hits
1	'general practitioner'/de	93 845	33	'e refer*':ab,ti,kw	336
2	'primary health care'/exp	158 994	34	"decision support system\$":ab,ti,kw	7 171
3	'ambulatory care'/exp	48 737	35	bioinformatics:ab,ti,kw	54 149
4	1 or 2 or 3	2 799 598	36	'artificial intelligence':ab,ti,kw	6 845
5	'general practi*':ab,ti,kw	103 751	37	'big data':ab,ti,kw	6 808
6	'primary care':ab,ti,kw	146 508	38	'deep learning':ab,ti,kw	6 636
7	'primary health*':ab,ti,kw	37 274	39	online:ab,ti,kw	144 080
8	'family practice':ab,ti,kw	9 553	40	'mobile health':ab,ti,kw	3 438
9	'family physician*':ab,ti,kw	17 985	41	'information processing'/exp	1 611 746
10	ambulatory:ab,ti,kw	109 621	42	17 or 41	1 653 523
11	'out\$patient\$':ab,ti,kw	254 647	43	18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40	924 618
12	5 or 6 or 7 or 8 or 9 or 10 or 11	605 643	44	42 or 43	2 179 921
13	4 or 12	698 071	45	13 and 44	84 463
14	'information science'/exp	89 428	46	barriers:ab,ti,kw	151 122



15	'electronic health record'/exp	13 339	47	facilitators:ab,ti,kw	16 831
16	'telehealth'/exp	3 998	48	burden\$:ab,ti,kw	290 533
17	14 or 15 or 16	139 955	49	implement*:ab,ti,kw	581 767
18	telemedicine:ab,ti,kw	15 127	50	adopt*:ab,ti,kw	285 836
19	e\$health*:ab,ti,kw	3 299	51	attitude:ab,ti,kw	64 652
20	e\$medicine:ab,ti,kw	48	52	attitude\$:ab,ti,kw	179 992
21	telehealth*:ab,ti,kw	5 170	53	46 or 47 or 48 or 49 or 50 or 51 or 52	1 369 668
22	'information technolog*':ab,ti,kw	15 379	54	'attitude'/exp	735 464
23	computer*:ab,ti,kw	367 773	55	'barriers'/exp	26
24	internet:ab,ti,kw	65 987	56	'facilitator'/exp	11
25	"information system\$":ab,ti,kw	40 923	57	54 or 55 or 56	735 481
26	web:ab,ti,kw	125 220	58	53 or 57	1 940 384
27	"search engine\$":ab,ti,kw	7 737	59	45 and 58	29 970
28	digital:ab,ti,kw	148 007	60	'meta-analysis'/exp OR 'meta-analysis' OR 'systematic review'/exp OR 'systematic review'	406 987
29	numeric:ab,ti,kw	14 709	61	59 and 60	1 120
30	'e mail*':ab,ti,kw	12 805	62	61 and [2009-2019]/py	999
31	'e learning':ab,ti,kw	4 258	63	62 not [medline]/lim	382
32	'e consult*':ab,ti,kw	339	64	63 not ('conference abstract'/it OR 'conference paper'/it OR 'conference review'/it)	124



Table 26 – Search strategy in Cochrane Library

Nr	Search term(s)	Hits	Nr	Search term(s)	Hits
1	[mh "General Practitioners"]	240	31	e-alert?:ab,ti	0
2	[mh "Primary Health Care"]	6 659	32	e-mail*:ab,ti	3 656
3	[mh "Physicians, Family"]	444	33	e-learning:ab,ti	562
4	[mh "Physicians, Primary Care"]	144	34	e-education:ab,ti	30
5	[mh ^"Ambulatory Care"]	3 199	35	e-consult*:ab,ti	30
6	1 or 2 or 3 or 4 or 5	10 135	36	e-refer*:ab,ti	11
7	(general NEXT practi*):ab,ti	9 364	37	("decision support" NEXT system?):ab,ti	527
8	"primary care":ab,ti	16 090	38	bioinformatics:ab,ti	212
9	(primary NEXT health*):ab,ti	2 398	39	"artificial intelligence":ab,ti	143
10	family practice:ab,ti	5 048	40	"big data":ab,ti	99
11	(family NEXT physician*):ab,ti	985	41	"deep learning":ab,ti	105
12	ambulatory:ab,ti	13 253	42	online:ab,ti	11 304
13	out?patient?:ab,ti	24 767	43	"mobile health":ab,ti	677
14	7 or 8 or 9 or 10 or 11 or 12 or 13	62 740	44	19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43	39 525
15	6 or 14	66 298	45	18 or 44	77 200
16	[mh "information sciences"]	43 580	46	15 and 45	8 600
17	[mh "Electronic Health Records"]	313	47	barriers:ab,ti	8 517
18	16 or 17	43 694	48	facilitators:ab,ti	1 659
19	telemedicine:ab,ti	1 264	49	burden?:ab,ti	17 389
20	e?health*:ab,ti	699	50	implement*:ab,ti	33 393
21	e?medicine:ab,ti	1	51	adopt*:ab,ti	11 224
22	telehealth*:ab,ti	790	52	attitude?:ab,ti	10 779
23	(information NEXT technolog*):ab,ti	528	53	47 or 48 or 49 or 50 or 51 or 52	55 680
24	computer*:ab,ti	27 203	54	[mh "Attitude"]	36 024





25	internet:ab,ti	7 184	55	[mh "Attitude of Health Personnel"]	2 159
26	(information NEXT system?):ab,ti	904	56	[mh "Attitude to Computers"]	156
27	web:ab,ti	9 852	57	54 or 55 or 56	36 204
28	(search NEXT engine?):ab,ti	113	58	53 or 57	87 974
29	digital:ab,ti	8 844	59	46 and 58	3 524
30	numeric:ab,ti	4 523	60	46 and 58 with Cochrane Library publication date Between Jan 2009 and Dec 2019	2 724

Appendix 2.2. Quality assessment of the included publications

Table 27 – Evaluation of selected systematic literature reviews according to the AMSTAR 2 instrument<sup>56</sup>

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Overall rating
<b>Bassi et al. (2012)<sup>58</sup></b>	-	-	+	-	+	-	-	+	+	-	-	-	+	+	-	+	Critically low
<b>Boonstra et al. (2010)<sup>59</sup></b>	+	-	+	±	-	-	-	+	-	-	NA	NA	-	+	NA	+	Critically low
<b>Castillo et al. (2010)<sup>60</sup></b>	+	-	-	±	+	+	-	-	-	-	NA	NA	-	+	NA	+	Critically low
<b>Chang et al. (2015)<sup>61</sup></b>	-	-	-	±	-	-	-	-	-	-	NA	NA	-	+	NA	+	Low
<b>Cresswell et al. (2013)<sup>62</sup></b>	+	+	+	+	+	+	-	-	+	-	NA	NA	+	+	NA	+	Moderate
<b>de Grood et al. (2016)<sup>63</sup></b>	-	-	+	±	+	+	-	-	-	-	NA	NA	-	+	NA	+	Critically low
<b>Fontaine et al. (2010)<sup>64</sup></b>	-	-	+	±	+	+	-	-	-	-	NA	NA	-	+	NA	+	Critically low
<b>Gagnon et al. (2012)<sup>65</sup></b>	+	+	+	±	+	+	-	+	+	-	NA	NA	-	+	NA	-	Low
<b>Gagnon et al. (2014)<sup>66</sup></b>	+	-	+	-	+	+	-	-	+	-	NA	NA	-	+	NA	+	Critically low
<b>Lau et al. (2012)<sup>67</sup></b>	-	-	-	±	+	+	-	-	-	-	NA	NA	-	+	NA	+	Critically low
<b>Li et al. (2013)<sup>68</sup></b>	-	-	-	±	-	-	-	-	-	-	NA	NA	-	+	NA	+	Critically low
<b>Ludwick et al. (2009)<sup>69</sup></b>	-	-	-	-	-	-	-	-	-	-	NA	NA	-	+	NA	+	Critically low
<b>Mair et al. (2012)<sup>70</sup></b>	-	-	+	±	+	+	-	-	+	-	NA	NA	+	+	NA	+	Moderate
<b>McGinn et al. (2011)<sup>71</sup></b>	-	-	+	±	+	+	-	±	+	-	NA	NA	-	+	NA	+	Low



<b>Moxey et al. (2010)<sup>72</sup></b>	+	-	+	±	+	+	-	-	-	-	NA	NA	-	+	NA	+	Critically low
<b>O'Donnell et al. (2018)<sup>73</sup></b>	+	-	-	±	+	+	-	-	+	-	NA	NA	+	+	NA	+	Moderate
<b>Police et al. (2011)<sup>74</sup></b>	+	-	+	±	-	-	-	-	-	-	NA	NA	-	+	NA	+	Critically low
<b>Ross et al. (2016)<sup>75</sup></b>	+	+	+	±	+	+	-	-	+	-	NA	NA	+	+	NA	+	Moderate
<b>Taylor et al. (2016)<sup>76</sup></b>	+	-	+	±	-	-	-	-	-	-	NA	NA	-	+	NA	+	Critically low
<b>Ye et al. (2010)<sup>77</sup></b>	-	-	-	-	-	-	-	-	-	-	NA	NA	-	-	NA	-	Critically low

Item 1: inclusion of PICO components; item 2: a priori design; item 3: explanation of study selection; item 4: comprehensive search strategy; item 5: study selection in duplicate; item 6: data extraction in duplicate; item 7: list of excluded studies with reasons; item 8: describe studies in adequate detail; item 9: risk of bias (RoB) assessment; item 10: report of individual study funding sources; item 11: appropriate methods for statistical combination if appropriate; item 12: assess impact of RoB on synthesis; item 13: account for RoB in interpretation of review; item 14: explanation of heterogeneity in results; item 15: likelihood of publication bias; item 16: any potential sources of conflict

Rows highlighted in blue are considered critical domains.



## APPENDIX 3. APPENDIX TO CHAPTER 6

### Appendix 3.1. Interview guide

Table 28 – Interview guide used during the focus groups

Time	Questions in Dutch	Questions in French	Results eHealthMonitor 2019 - remarks
<b>25 min</b>	<b>Introduction</b>		
5 min	<p>Verwelkoming van de participanten en introductie onderzoekers:</p> <ul style="list-style-type: none"> <li>• Naam, functie, rol tijdens de focusgroep (moderator/notulist)</li> </ul> <p>Uitleg doel onderzoek:</p> <ul style="list-style-type: none"> <li>• Met de eHealthMonitor 2019 proberen we inzicht te krijgen in het gebruik van digitale toepassingen en diensten in de Belgische gezondheidszorg van verschillende zorgverleners (huisartsen, arts-specialisten, verpleeg-en zorgkundigen) en burgers. Op die manier kunnen we de doelstellingen rond digitalisering in het gezondheidsbeleid toetsen en inspiratie aanleveren voor de opmaak van toekomstige beleidsplannen.</li> <li>• We hebben de vragenlijsten, die pre-COVID-19 afgenomen zijn, geanalyseerd en willen met dit groepsgesprek dieper in gesprek gaan met u omtrent uw persoonlijke ervaringen met eHealth. <ul style="list-style-type: none"> <li>○ Door de huidige omstandigheden zijn we geïnteresseerd in uw ervaringen pre en post de COVID-19 sanitaire crisis.</li> </ul> </li> </ul> <p>Uitleg verwachtingen naar participanten toe:</p> <ul style="list-style-type: none"> <li>• Het doel van dit groepsgesprek is om een open discussie te voeren: <ul style="list-style-type: none"> <li>○ Er zijn geen goede of foute antwoorden</li> <li>○ Verschillende antwoorden/standpunten zijn mogelijk (en wenselijk)</li> </ul> </li> </ul>	<p>Accueil des participants et présentation des chercheurs :</p> <ul style="list-style-type: none"> <li>• Nom, fonction, rôle pendant le groupe de discussion (modérateur/notuliste)</li> </ul> <p>Expliquer le but de la recherche :</p> <ul style="list-style-type: none"> <li>• Les deux projets essaient de mieux comprendre l'utilisation des applications et services numériques dans le domaine des soins de santé, par différents prestataires de soins (médecins généralistes, pharmaciens, médecins-spécialistes, infirmiers et aides-soignantes) et par les citoyens. De cette manière nous pourrions tester les objectifs de la politique de santé en matière de numérisation. Les résultats pourront aussi servir de guide lors de l'élaboration des futurs plans politiques.</li> <li>• Dans le cadre du eHealthMonitor 2019, nous avons diffusé et analysé des questionnaires, avant la crise sanitaire (COVID-19). Nous voulons, avec ce groupe de discussion, engager un discussion plus en profondeur de votre expérience personnelle avec l'e-santé. <ul style="list-style-type: none"> <li>○ Dû à la situation actuelle, nous sommes intéressés par vos expériences avant et après la crise sanitaire (COVID-19).</li> <li>○ Expliquez les attentes à l'égard des participants :</li> </ul> </li> <li>• L'objectif de ce groupe de discussion est de mener une discussion ouverte:</li> </ul>	



Time	Questions in Dutch	Questions in French	Results eHealthMonitor 2019 - remarks
	<ul style="list-style-type: none"><li>○ Respect voor elkaar: elkaar laten uitspreken, niet veroordelen, beleefd, ...</li><li>• Het gesprek wordt opgenomen en er worden tijdens het gesprek nota's genomen door (naam notulist)</li><li>○ <i>Zo is het mogelijk om het nadien opnieuw te beluisteren, vermijden we om belangrijke info te missen.</i></li><li>• Alle data zal anoniem weergegeven worden in het uiteindelijke rapport</li><li>• Het eindrapport zal in het najaar van 2020 verschijnen</li></ul>	<ul style="list-style-type: none"><li>○ Il n'y a pas de bonnes ou de mauvaises réponses</li><li>○ Différentes réponses/différents points de vues sont possibles (et souhaitables!)</li><li>○ Respectez l'autre: n'interrompez pas, ne jugez pas, soyez polis,...</li><li>• La discussion sera enregistrée et (nom modérateur) prendra des notes pendant cette discussion</li><li>○ Ainsi nous pourrons la réécouter par après et nous éviterons de manquer des informations importantes</li><li>• Toutes les données collectées seront utilisées de façon anonyme dans le rapport final.</li><li>• Le rapport final du eHealthMonitor 2019 sera publié en automne 2020 et le rapport final du projet KCE sera publié en Janvier 2021 sur le site web du KCE.</li></ul>	
10 min	<p>Allereerst willen we u graag vragen om u kort voor te stellen:</p> <ul style="list-style-type: none"><li>• Naam</li><li>• Leeftijd</li><li>• Functie</li><li>• Werkervaring (aantal jaar ervaring als...)</li><li>• Plaats van tewerkstelling</li></ul>	<p>Premièrement nous voulons vous demander de vous présenter brièvement :</p> <ul style="list-style-type: none"><li>• Nom</li><li>• Age</li><li>• Fonction</li><li>• Années d'ancienneté</li><li>• Lieu de travail</li></ul>	
10 min	<p>Wat is het eerste dat in u opkomt wanneer u denkt aan eHealth?</p> <p><i>Subvraag: Kort doorvragen of dit hetzelfde was pre/post COVID-19. Waarom wel (niet)?</i></p>	<p>Quelle est la première chose qui vous vient à l'esprit quand vous pensez à e-santé ?</p> <p><i>Sous-question : Est-ce que votre image de l'e-santé a changé à cause de la crise sanitaire (COVID-19) ? Pourquoi (pas) ?</i></p>	
<b>20 min</b>	<b>Use of eHealth services</b>		
	<p>In de eerste plaats willen wij het graag met u hebben over het gebruik van, en uw ervaring met, de verschillende e-gezondheidsdiensten die voor uw</p>	<p>Premièrement, nous allons aborder l'utilisation et votre expérience des différents services e-santé qui sont mis à disposition de votre profession. Ces</p>	<p>Most eHealth services are embedded in the software packages (Electronic Medical Records) that are used by GPs. However, for GPs who do not use a software</p>



Time	Questions in Dutch	Questions in French	Results eHealthMonitor 2019 - remarks
	<p>beroep ter beschikking staan. Deze e-zondheidsdiensten kunnen ingebed zitten in het softwarepakket, ook wel Elektronisch Medisch Dossier (EMD) genoemd, dat u gebruikt, maar u kan deze ook apart raadplegen via het eHealth portaal van de overheid.</p>	<p>services e-santé peuvent être intégrés dans votre logiciel, également appelé Dossier Médical Informatisé (DMI), mais vous pouvez aussi les consulter par le portail e-santé du gouvernement.</p>	<p>package, the government made it possible to access these services through the eHealth portal website.</p>
10 min	<p><b>SHOW GRAPH:</b> use of different services (only region of participants)</p> <p>In de volgende grafiek ziet u resultaten van eHealth gebruik voor de COVID-19 crisis.</p> <ul style="list-style-type: none"> <li>• Wat komt er in u op wanneer u naar deze resultaten kijkt?</li> </ul> <p><i>Subvragen:</i></p> <ul style="list-style-type: none"> <li>• <i>Verschildt dit of vind u zichzelf nog steeds terug in deze resultaten na de sanitaire crisis?</i> <ul style="list-style-type: none"> <li>○ <i>Welke verschillen zijn er?</i></li> <li>○ <i>Wat zou er kunnen helpen om het gebruik van eHealth te bevorderen? [barrières?]</i></li> <li>○ <i>Schat u in dat de nieuwe post- COVID-19 trend zich zal doorzetten?</i></li> <li>○ <i>Waarom springt de jongste leeftijdsgroep (eerste helft van de dertig) er uit in gebruik? Opleiding? Waarom springen groepspraktijken er uit?</i></li> <li>○ <i>Waarom meer in Vlaanderen dan in Wallonië of Brussel?</i></li> <li>○ <i>Sumehr scoort een stuk lager in gebruik dan de andere diensten. Waarom?</i></li> <li>○ <i>Recip-e is gedaald in gebruik in Brussel tussen 2017 en 2018, terwijl het in Vlaanderen en Wallonië gestegen is. Waarom?</i></li> </ul> </li> </ul>	<p><b>SHOW GRAPH:</b> use of different services (only region of participants)</p> <p>Sur le graphique suivant vous pouvez voir les résultats de l'utilisation des différents services e-santé avant la crise sanitaire (COVID-19).</p> <ul style="list-style-type: none"> <li>• <i>Que pensez-vous lorsque vous voyez ces résultats ?</i></li> </ul> <p><i>Sous-questions :</i></p> <ul style="list-style-type: none"> <li>• <i>Pouvez-vous vous retrouver dans ces résultats après la crise sanitaire ?</i> <ul style="list-style-type: none"> <li>○ <i>Quelles sont les différences ?</i></li> <li>○ <i>Qu'est-ce qu'il pourrait aider à promouvoir l'utilisation des services e-sante? [obstacles?]</i></li> <li>○ <i>Pensez-vous que la nouvelle tendance post-COVID-19 va se poursuivre ?</i></li> <li>○ <i>Pourquoi la tranche d'âge la plus jeune (première moitié de 30 ans) se distingue-t-elle dans l'utilisation ? Une formation ? Pourquoi les pratiques de groupe se distinguent-elles ?</i></li> <li>○ <i>Pourquoi plus en Flandre qu'en Wallonie ou à Bruxelles ?</i></li> <li>○ <i>Sumehr obtient un score d'utilisation beaucoup plus faible que les autres services. Pourquoi en est-il ainsi ?</i></li> <li>○ <i>L'utilisation de Recip-e a diminué à Bruxelles entre 2017 et 2018, alors qu'elle</i></li> </ul> </li> </ul>	<p>98,8% of respondents use a software package and eHealth services are relatively well known and used. Except for UPPAD, all eHealth services were used by more than half of the respondents and most were even used by more than 70% of respondents.</p> <p>Five most used eHealth services are Recip-e (96.1%), MyCareNet (92.3%), Sumehr (85.7%), eFact (78.6%) and eVax/Vaccinet (74.1%).</p> <p>We were not able to get information on why certain services are not used from the survey. Therefore it would be interesting to further elaborate on this topic.</p>



Time	Questions in Dutch	Questions in French	Results eHealthMonitor 2019 - remarks
		<i>a augmenté en Flandre et en Wallonie. Pourquoi ?</i>	
10 min	<p>Meer dan 40% van de huisartsen gaf aan nood te hebben aan extra ondersteuning rond e-gezondheidsdiensten.</p> <ul style="list-style-type: none"> <li>Welke concrete informatie, ondersteuningsmaterialen, maatregelen zijn nodig?</li> </ul> <p><i>Subvragen:</i></p> <ul style="list-style-type: none"> <li><i>Waar zitten de gaten/onzekerheden in de informatie die nu reeds beschikbaar is omtrent e-gezondheidsdiensten?</i> <ul style="list-style-type: none"> <li><i>Op welke manier kunnen deze gaten/onzekerheden aangepakt worden?</i></li> </ul> </li> <li><i>Wiens taak is het om extra opleiding/materiaal te voorzien?</i> <ul style="list-style-type: none"> <li><i>Waarom?</i></li> </ul> </li> </ul>	<p>Plus de 40% des médecins généralistes indiquent qu'ils souhaitent plus de soutien dans l'utilisation des services e-santé.</p> <ul style="list-style-type: none"> <li>Quelles informations concrètes, matériels de support, mesures de soutien sont nécessaires selon vous ?</li> </ul> <p><i>Sous-questions :</i></p> <ul style="list-style-type: none"> <li><i>Où sont les lacunes/ambiguïtés dans les informations déjà disponibles concernant les services e-santé ?</i> <ul style="list-style-type: none"> <li><i>De quelle façon pourrait on combler ces lacunes/ambiguïtés ?</i></li> </ul> </li> <li><i>À qui revient la responsabilité de fournir une formation / du matériel supplémentaire ?</i> <ul style="list-style-type: none"> <li><i>Pourquoi ?</i></li> </ul> </li> </ul>	<p>Over 40% of respondents would like:</p> <ul style="list-style-type: none"> <li>Additional supporting materials to better inform patients about eHealth services</li> <li>Additional training for the use of eHealth services</li> <li>Supporting materials about the use of eHealth services in their daily job</li> </ul> <p>The literature revealed that champions play an important role in eHealth adoption. Is this also the case in Belgium?</p> <p>Financial incentives?</p>
<b>15 min</b>	<b>Online communication with patients</b>		
	Er bestaan mogelijkheden tot online communicatie tussen patiënten en uzelf of uw praktijk/zorginstelling (bijv. online afspraken maken, online een herhaalvoorschrift aanvragen of online vragen stellen).	La communication entre les patients et vous-même ou votre cabinet/institution de soins peut se dérouler en ligne (p.ex. les rendez-vous en ligne, des demandes de nouvelles prescriptions en ligne ou des questions posées en ligne).	
15 min	<p>Hoe staat u zelf ten opzicht van online communicatie met patiënten?</p> <p><i>Subvragen :</i></p> <ul style="list-style-type: none"> <li><i>Waarom positief/negatief?</i> <ul style="list-style-type: none"> <li><i>Wat zijn de voordelen/ uw bezorgdheden m.b.t. online communicatie met patiënten?</i></li> <li><i>Wat zijn uw bezorgdheden m.b.t. online communicatie met patiënten?</i></li> <li><i>Wat is uw persoonlijke ervaring met online communicatie met patiënten?</i></li> </ul> </li> </ul>	<p>Quelle est votre opinion concernant la communication en ligne avec les patients?</p> <p><i>Sous-questions :</i></p> <ul style="list-style-type: none"> <li><i>Pourquoi positif/négatif ?</i> <ul style="list-style-type: none"> <li><i>Quels sont, selon vous, les avantages de la communication en ligne avec les patients ?</i></li> <li><i>Qu'est-ce qui vous inquiète concernant la communication en ligne avec les patients ?</i></li> </ul> </li> </ul>	<p>The general perspective towards online communication with patients is somewhat negative. Main concerns are:</p> <ul style="list-style-type: none"> <li>More than three out of four respondents believe that medical accountability with online communication is unclear</li> <li>The majority of respondents (69.4%) think that online communication is going to result in unwanted communication</li> </ul>



Time	Questions in Dutch	Questions in French	Results eHealthMonitor 2019 - remarks
	<ul style="list-style-type: none"> <li>• <i>Is uw houding veranderd door de COVID-19 crisis?</i> <ul style="list-style-type: none"> <li>○ <i>Waarom wel/niet?</i></li> </ul> </li> <li>• <i>Is uw gebruik veranderd door de COVID-19 crisis?</i> <ul style="list-style-type: none"> <li>○ <i>Gaat u gemaakte veranderingen blijven behouden?</i></li> <li>○ <i>Waarom wel/niet?</i></li> <li>○ <i>Wat zijn mogelijke barrières om deze veranderingen blijvend te behouden?</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ <i>Quelle est votre expérience personnelle avec la communication en ligne avec les patients ?</i></li> <li>• <i>Est-ce que la crise sanitaire (COVID-19) a changé votre attitude ?</i> <ul style="list-style-type: none"> <li>○ <i>Pourquoi (pas) ?</i></li> </ul> </li> <li>• <i>Est-ce que votre utilisation de la communication en ligne avec les patients a changé à cause de la crise sanitaire (COVID-19) ?</i> <ul style="list-style-type: none"> <li>○ <i>Allez-vous conserver les changements effectués ?</i></li> <li>○ <i>Pourquoi (pas) ?</i></li> <li>○ <i>Quels sont les obstacles possibles au maintien de ces changements ?</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Over one in three respondents (37.3%) do not think that online communication with patients is safe.</li> <li>• Over 60% of GPs in Wallonia and Brussels and 40% of GPs in Flanders do not believe that online communication suits their patients.</li> <li>• 40% of GPs do not trust online communication with patients</li> </ul>
<b>20 min</b>	<b>Online consultation of the GMD record</b>		
10 min	<p>Patiënten kunnen hun gezondheidsgegevens enkel online inkijken indien zij hun toestemming hebben gegeven voor het digitaal uitwisselen van gezondheidsgegevens.</p> <ul style="list-style-type: none"> <li>• Hoe ervaart u het digitaal delen van gezondheidsgegevens met patiënten in de praktijk?</li> </ul> <p><i>Subvragen:</i></p> <ul style="list-style-type: none"> <li>• <i>Hoe heeft u dit in uw dagelijks werk als huisarts ervaren pre/tijdens/post COVID-19 crisis?</i> <ul style="list-style-type: none"> <li>○ <i>[Voordelen, barrières, moeilijkheden]</i></li> </ul> </li> </ul>	<p>Les patients peuvent consulter leurs données de santé en ligne uniquement s'ils ont donné leurs consentement au partage numérique des données de santé.</p> <ul style="list-style-type: none"> <li>• En tant que médecin généraliste, comment vivez-vous le partage de données numérique de santé avec vos patients ?</li> </ul> <p><i>Sous-questions :</i></p> <ul style="list-style-type: none"> <li>• <i>Comment avez-vous vécu le partage numérique avant/durant/après la crise sanitaire COVID-19?</i> <ul style="list-style-type: none"> <li>○ <i>[Avantages, obstacles, difficultés]</i></li> </ul> </li> </ul>	<p>According to the current regulations, patients need to provide informed consent to share their digital health data amongst healthcare providers.</p> <p>Preliminary results of our citizen survey indicate that just under half of the respondents gave explicit consent for the digital exchange of their health data. The primary goal of this question is to explore whether GP's are aware of the current regulations regarding informed consent. However, it would be too sensitive to ask this directly as this might feel as if we are questioning their knowledge of and adherence to the current regulations. Therefore if they bring up the topic of informed consent themselves, this is certainly an area of interest, but please remain careful when exploring this topic.</p>
10 min	<p>De meerderheid van de burgers gaf aan dat zij automatisch online toegang wensen tot al hun gezondheidsgegevens, zonder preselectie door een zorgverlener.</p> <ul style="list-style-type: none"> <li>• Wat denkt u hiervan?</li> </ul>	<p>La majorité des citoyens indiquent qu'ils souhaiteraient avoir automatiquement la possibilité de consulter en ligne toutes leurs données de santé, sans présélection de leur dispensateur de soins.</p> <ul style="list-style-type: none"> <li>• Quelle est votre opinion à ce sujet ?</li> </ul>	<p>65.6% of citizens would like to automatically get access to all their online personal health data without any preselection by a healthcare worker. Within the sample, there are regional differences:</p>



Time	Questions in Dutch	Questions in French	Results eHealthMonitor 2019 - remarks
	<p><i>Subvragen:</i></p> <ul style="list-style-type: none"> <li>Onder welke omstandigheden is online inzage door patiënten wel/niet gewenst?</li> <li>Welke moeilijkheden, barrières ervaart u m.b.t. online inzage door patiënten?</li> <li>Waar bent u bezorgd over m.b.t. online inzage door patiënten?</li> </ul>	<p><i>Sous-questions :</i></p> <ul style="list-style-type: none"> <li>Dans quelles circonstances la consultation en ligne est-elle souhaitable/non souhaitable ?</li> <li>Quelles difficultés/obstacles rencontrez-vous avec la consultation en ligne de données de santé par vos patients ?</li> <li>Qu'est-ce qui vous inquiète concernant la consultation en ligne de données de santé par vos patients ?</li> </ul>	<ul style="list-style-type: none"> <li>Flanders (N=2499): 72.3% want access to all their health data automatically</li> <li>Brussels (N=456): 49.1% want access to all their health data automatically</li> <li>Wallonia (N=814): 54.4% want access to all their health data automatically</li> </ul>
<b>25 min</b>	<b>Self-management and online treatment</b>		
	<p>In de zorgverlening aan patiënten kan gebruik gemaakt worden van digitale toepassingen. Met digitale toepassingen bedoelen we het totale aanbod van apps, programma's of digitale apparatuur die gebruikt kunnen worden voor een zorgvraag. In dit deel zullen we specifiek ingaan op het inzetten van digitale toepassingen voor de zorgverlening en/of begeleiding op afstand (bij de patiënt thuis of in een zorginstelling), namelijk teleconsult en telemonitoring.</p>	<p>Des outils numériques peuvent être utilisés pour les soins aux patients. Des outils numériques sont des applications, programmes ou appareils numériques qui peuvent être utilisés pour une demande de soins. Dans cette partie nous abordons spécifiquement l'utilisation des outils numériques pour les soins et l'accompagnement à distance (chez le patient à domicile ou dans une institution de soins), notamment la téléconsultation et le télémonitoring.</p>	
	<p>Een teleconsult betekent dat patiënten, via een website of e-mail, een medische vraag kunnen stellen aan een zorgverlener (bijv. de huisarts). Telemonitoring is het op afstand monitoren van een patiënt, waarbij deze in de thuissituatie de eigen gezondheidswaarden meet. De patiënt kan deze vervolgens digitaal opslaan en eventueel met u delen. Daarnaast kunnen hierbij soms aanvullende vragen aan de patiënt worden gesteld.</p>	<p>Une téléconsultation signifie que le patient peut poser une question médicale via un site web ou par email à un dispensateur de soins (p.ex. le médecin généraliste). Le télémonitoring est le suivi à distance d'un patient au cours duquel celui-ci mesure ses propres paramètres de santé à domicile. Le patient peut stocker ces données de santé en ligne et peut éventuellement vous les transmettre. En outre, des questions complémentaires peuvent parfois être posées de manière numérique au patient.</p>	
25 min	<p><b>SHOW GRAPH:</b> teleconsult/telemonitoring results Uit onze resultaten bleek dat bijna de helft van de respondenten (49.9%) het gebruik van telemonitoring in de toekomst gewenst vindt. Het</p>	<p><b>SHOW GRAPH:</b> teleconsult/telemonitoring results Nos résultats montrent que presque la moitié (49.9%) des personnes interrogées trouvent l'utilisation du télémonitoring souhaitable à l'avenir.</p>	<p>48.3% of respondents indicate that they do not want to use teleconsults in the future. Just over one in five (21.6%) respondents would like to use teleconsults.</p>





Time	Questions in Dutch	Questions in French	Results eHealthMonitor 2019 - remarks
	<p>gebruik van teleconsult lijkt echter minder gewenst: 21.6% van de respondenten vindt het gebruik van teleconsult in de toekomst gewenst en bijna de helft van de respondenten (48.3%) vindt dit niet gewenst.</p> <ul style="list-style-type: none"> <li>• Wat waren volgens u de belangrijkste redenen die kunnen verklaren waarom huisartsen een verschillende houding hadden m.b.t. het gebruik van teleconsult en telemonitoring?</li> </ul> <p><i>Subvragen:</i>  <i>Wat is uw persoonlijke ervaring met teleconsultaties en/of telemonitoring?</i>  <i>Met de sanitaire crisis (COVID-19) zijn teleconsultaties versneld doorgevoerd.</i></p> <ul style="list-style-type: none"> <li>• <i>Hoe heeft u dit ervaren?</i> <ul style="list-style-type: none"> <li>○ <i>Wat liep goed? Wat liep minder goed?</i></li> </ul> </li> <li>• <i>Is uw mening (in positieve of negatieve zin) veranderd door de veranderingen die hebben plaatsgevonden tijdens de sanitaire crisis (COVID-19)?</i></li> <li>• <i>Zijn teleconsultaties een service die u wenst te behouden in uw dagelijkse praktijk?</i> <ul style="list-style-type: none"> <li>○ <i>Waarom wel/niet?</i></li> </ul> </li> </ul>	<p>Toutefois, l'utilisation de la téléconsultation paraît moins souhaitable, 21.6% trouve l'utilisation de la téléconsultation souhaitable à l'avenir et presque la moitié (48.3%) trouvent l'utilisation de la téléconsultation non-souhaitable.</p> <ul style="list-style-type: none"> <li>• A votre avis, quelles sont les raisons principales qui peuvent expliquer la différence d'attitude chez les médecins généralistes concernant l'utilisation du télémonitoring et de la téléconsultation ?</li> </ul> <p><i>Sous-questions :</i>  <i>Quel est votre expérience avec la téléconsultation et/ou le télémonitoring ?</i>  <i>Dû à la crise sanitaire (COVID-19) l'introduction des téléconsultations a été accélérée.</i></p> <ul style="list-style-type: none"> <li>• <i>Comment avez-vous vécu cela ?</i> <ul style="list-style-type: none"> <li>○ <i>Qu'est-ce qu'il s'est bien passé/pas bien passé ?</i></li> </ul> </li> <li>• <i>A votre avis concernant la téléconsultation changé à cause de la crise sanitaire (COVID-19)?</i></li> <li>• <i>Est-ce que les téléconsultations sont un service que vous voulez maintenir dans votre pratique quotidienne ?</i> <ul style="list-style-type: none"> <li>○ <i>Pourquoi (pas) ?</i></li> </ul> </li> </ul>	<p>49.9% of respondents are in favour of using telemonitoring. Only 17.2% of respondents do not want to use telemonitoring.</p> <p>Of particular interest would be to explore why respondents are favourable towards the use of telemonitoring, but not towards the use of teleconsults.</p>
<b>15 min</b>	<b>Conclusion</b>		
10 min	Welke zijn, volgens u, de drie belangrijkste factoren die bijdragen tot het gebruik van eHealth?	Quels sont, selon vous, les trois facteurs principaux contribuant à l'utilisation de l'e-santé ?	
5 min	Zijn er zaken die nog niet aan bod gekomen zijn maar waarvan u vindt dat ze toch belangrijk zijn voor het onderzoek?	Y a-t-il autre chose qui n'a pas encore été discuté et que vous trouvez important dans le cadre de notre étude ?	
	Bedankt voor uw deelname aan dit groepsgebesprek.	Merci de votre participation à ce groupe de discussion.	



## APPENDIX 4. APPENDIX TO CHAPTER 7

### Appendix 4.1. Mapping of the factors contributing to eHealth adoption

Table 29 – Factors of eHealth adoption by GPs in Belgium

Cluster names	Elements within clusters	
Core	eHealth uptake	Both literature and focus groups
Core	Motivation for eHealth uptake	Both literature and focus groups
Costs	Maintenance costs	Both literature and focus groups
	Productivity cost during apprehension period	Both literature and focus groups
	Upstart costs	Both literature and focus groups
	Training costs	Literature only
	Financial investment	Both literature and focus groups
	Time investment	Focus groups only
Directly linked to core	Policies supporting eHealth technology implementation	Both literature and focus groups
	Recognised HIS standards	Literature only
	ICT infrastructure	Both literature and focus groups
	Returns on HIS investment	Both literature and focus groups
	Concerns and lack of clarity on liability	Literature only
	Trust in governance and policies on eHealth	Literature only
Financial incentives for eHealth adoption	RIZIV – INAMI integrated allowance for GP practice	Both literature and focus groups
HIS quality	Availability of support structures	Both literature and focus groups
	Downtime	Both literature and focus groups
	Service quality	Both literature and focus groups
	System quality	Both literature and focus groups



	Accuracy of the eHealth system	Literature only
	Adaptability	Literature only
	Completeness of the eHealth system	Literature only
	Comprehensability of the eHealth system	Literature only
	Relevance of the eHealth system	Literature only
	Security of the system	Literature only
	Speed	Literature only
	System includes alerts function	Literature only
	System presents analysis of the raw data	Literature only
	Template availability	Literature only
	Perceived improvement of job performance	Both literature and focus groups
	Generalised use by all relevant health care professionals	Focus groups only
HIS-practice fit	Degree to which HIS meets users' needs	Both literature and focus groups
	Decision making processes	Both literature and focus groups
	Organisational culture	Both literature and focus groups
	Practice size	Both literature and focus groups
	Practice workflow	Both literature and focus groups
	Remuneration patterns	Both literature and focus groups
	Affiliation with quality improvement programme	Literature only
	Level of care (degree of specialisation)	Literature only



	Monodisciplinary or multidisciplinary practice	Literature only
	Ownership	Literature only
	Practice leadership	Literature only
	Integration in software for GP practice	Focus groups only
Impact of eHealth	Care appropriateness	Literature only
	Care effectiveness	Literature only
	Impact of eHealth on patient-provider relationship	Literature only
	Impact on quality of care	Literature only
	Patient outcomes	Literature only
	Patient safety	Literature only
	Guideline compliance	Literature only
	Impact on interprofessional collaboration	Both literature and focus groups
	Impact on interprofessional communication	Both literature and focus groups
Implementation success	Incremental implementation	Both literature and focus groups
	Planning of implementation	Both literature and focus groups
	Support structures	Both literature and focus groups
	Time to implement	Both literature and focus groups
	Training	Both literature and focus groups
	Evaluation of the implementation	Literature only
	Financial resources	Both literature and focus groups
Information quality	Interoperability with other systems	Both literature and focus groups
	Intuitive design of the eHealth technology	Both literature and focus groups
	Reliability	Both literature and focus groups
Personal expectations regarding HIS	Attitude towards innovation and technology	Both literature and focus groups



	Perceived benefits of electronic systems compared to paper	Both literature and focus groups
	Quality improvement	Literature only
	Dependence on technology	Focus groups only
Policies supporting eHealth technology implementation	Regulation on data security	Literature only
	Vendor certification and accreditation	Literature only
Subjective norm	Peer pressure	Both literature and focus groups
	Presence of champions	Both literature and focus groups
	Commitment of management	Literature only
	Perceived attitude of patients	Literature only
	Perceived attitude of peers	Literature only
	Societal trends	Literature only
Uncertainty about new roles and responsibilities	Fear of new responsibilities/tasks	Both literature and focus groups
	Fear of privacy loss	Literature only
	Perceived threat to clinical autonomy	Literature only
User needs	Location of the practice	Literature only
	Patient population	Literature only
	Contact with colleagues	Both literature and focus groups
	Sociodemographic characteristics	Both literature and focus groups
	Income	Literature only
	Ownership of a practice	Literature only
	Specialty	Literature only



	Teaching or hospital affiliation	Literature only
	Years in practice	Literature only
User satisfaction	Connectivity	Both literature and focus groups
	Realtime access	Both literature and focus groups
	Perceived usefulness	Both literature and focus groups
	Perceived user-friendliness	Both literature and focus groups
	User skills for working with eHealth applications	Both literature and focus groups
	Usability	Both literature and focus groups
	Incompatibility issues	Focus groups only
	Trust in ICT support services	Focus groups only
	Regional differences	Focus groups only



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