TALLINN UNIVERSITY OF TECHNOLOGY

School of Information Technologies

Tairi Kollo 212077YVEM

GENERAL PHYSICIANS' AND CONSULTANTS' THOUGHTS ON THE E-CONSULTATION SYSTEM

Master's thesis

Supervisor: Katrin Gross-Paju
MD, PhD

Tallinn 2023

TALLINNA TEHNIKAÜLIKOOL

Infotehnoloogia Teaduskond

Tairi Kollo 212077YVEM

PERE-JA ERIARSTIDE ARVAMUSED E-KONSULTATSIOONI SÜSTEEMI KOHTA

Magistritöö

Juhendaja: Katrin Gross-Paju
MD, PhD

Tallinn 2023

Author’s declaration of originality

I hereby certify that I am the sole author of this thesis. All the used materials, references to the literature, and the work of others have been referred to. This thesis has not been presented for examination anywhere else.

Author: Tairi Kollo

11.05.2023

Abstract

Background: Although e-consultations are commonly utilized among clinicians, there has been limited research on the experiences of general physicians and consultants with this system. This is problematic because the satisfaction and utilization of the end-users are crucial for the success of the e-consultation system and gaps between different layers of the system can hinder its overall usability. Consequently, it is important to comprehend the experiences and perspectives of GPs and consultants with the system, as this can aid in identifying areas for enhancement and ensuring its ongoing success. **This thesis aimed** to gather personal thoughts on the use of the e-consultation system by GPs' and consultants from different specialties. **Methods:** Pragmatic, mixed-methods study using qualitative techniques (questionnaire, interviews). **Results:** In a total of 37 participants were included in the questionnaire, and 10 participants including seven general physicians and three consultants were included in the interviews. The use of e-consultation systems has been positively perceived by GPs and consultants in terms of improving communication and access to consultant care. However, concerns were raised regarding the quality of the information provided, workload, and the time-consuming nature of filling in the e-consultations. The content and structure of free text data fields also received mixed reviews from GPs. Improvements suggested by GPs included clearer options for e-consultation goals and responses, as well as reproducible forms of e-consultation attachments and active notifications about patient treatment journeys. GPs emphasized the need for a strict finishing to the process and response notifications accessible from GPs' desktops. **Conclusions:** E-consultation systems are effective in improving communication between doctors, faster access to consultant care, and reducing waiting times. Time constraints, lack of awareness, concerns about the quality of information, and the need for improvements are some of the barriers to the implementation. There is room for improvement in terms of the quality of the information provided in the system and the clarity of expectations between clinicians.

This thesis is written in English and is 82 pages long, including 6 chapters, 7 figures, and 5 tables.

Annotatsioon

Pere-ja eriarstide arvamused e-konsultatsiooni süsteemi kohta

Taust: Kuigi e-konsultatsioonid on arstide seas laialdaselt kasutusel, on pere-ja eriarstide kogemuste kohta e-konsultatsioonide kasutamisel tehtud vähe uuringuid. See on probleemne, sest lõppkasutajate rahulolu ja kasutamine on e-konsultatsiooni edu jaoks olulised ning erinevate süsteemi kihtide vahelised lüngad võivad takistada süsteemi üldist kasutatavust. On oluline mõista pere-ja eriarstide kogemusi ja vaatenurki, kuna see võib aidata tuvastada valdkondi täiustamiseks ja tagada süsteemi edu. **Selle lõputöö eesmärk** on koguda pere-ja eriarstide isiklikke hinnanguid e-konsultatsiooni süsteemi kasutamise kohta. **Metoodika:** Pragmaatiline, segameetodite uuring, kasutades kvalitatiivseid tehnikaid (küsimustik, intervjuud). **Tulemused**: Kokku osales küsimustikus 37 perearsti ja intervjuudes osales 10 arsti, sealhulgas seitse perearsti ja kolm eriarsti. E-konsultatsioon on avaldanud positiivset mõju pere-ja eriarstidele poolt suhtlemise hõlbustamise ja eriarsti vastuvõtule pääsemise paranemise tõttu. Siiski tõstatati mure teabe kvaliteedi, töökoormuse ja e-konsultatsiooni tegemise ja sellele vastamise aeganõudva iseloomu kohta seoses e-konsultatsioonide täitmise ja vabatekstiandmete väljade sisu ja struktuuriga. Perearstide poolt pakutud täiustused hõlmasid selgemaid valikuid e-konsultatsioonide eesmärkide ja vastuste ning taasesitatavate e-konsultatsiooni lisade vormide kohta ning aktiivseid teavitusi patsientide raviteekonnast. Perearstid rõhutasid vajadust lõpetada e-konsultatsiooni protsess konkreetselt ja saada patsiendi edasise käsitlemise kohta märguanne eriarstilt. **Järeldused:** E-konsultatsioon on tõhus arstidevahelise suhtlemise parandamisel, kiirema eriarsti vastuvõtu puhul ja ooteaegade vähendamisel. Küll aga esinevad süsteemi kasutamisel piirangud: ajaline piiratus, arstide vähene teadlikkus süsteemi mehhanismidest ja mure teabe kvaliteedi pärast.

Lõputöö on kirjutatud inglise keeles ning sisaldab teksti 82 leheküljel, 6 peatükki, 7 joonist, 5 tabelit.

List of abbreviations and terms

Consultant	A doctor who specializes in a specific profession, such as cardiology, endocrinology, hematology, etc. In the text is referred to as a consultant
E-consultation	A digital solution that's developed to provide the possibility to consult with specialists through the health information system to clarify the diagnosis of the patient and prescribe treatment
EHIF	Estonian Health Insurance Fund
EHR	Electronic health record
ESBL	An enzyme, produced by some bacteria, which makes them resistant to certain antibiotics
General physician (GP)	A doctor who treats all common medical conditions and is looking after the patients in his/her community. In the text referred to as GP
ICT	Information and communication technology
MRSA	Bacteria that are resistant to many commonly used antibiotics, including methicillin, which is a type of penicillin.
Multimorbid	More than two illnesses or diseases that are occurring in one person at the same time.
Riigi Teataja	The official publication of the Estonian state, published by the State Office
TM	Telemedicine
TTD	Therapeutic Target Database
TUQ	Telehealth usability questionnaire
WHO	World Health Organization

Table of contents

List of figures

List of tables

1 Introduction

„We cannot solve our problems with the same level of thinking we used when we created them“ - Einstein, 1946.

This quote intends to understand that to solve the problem, we need to change our perceptions and think differently from the time when the problem was created. 76 years later, this idea is also confirmed in the center of this thesis, which describes the communication between doctors using the example of the Estonian e-consultation system.

In the context of today's innovative e-service, Einstein's quote may seem unusual, as the quality and usability of the service are generally consistently tested and modified to make it more convenient for the user. Collected health data is processed, stored, and transmitted in an electronic environment. Such an environment is like an onion, which is built up layer by layer. Based on the expectations, experiences, and feedback of each layer, further development is planned for the next layer, which in turn serves the users of the system even better. Regardless of careful planning, gaps can emerge between these layers, which in turn affect the entire healthcare system and its ease of use, which needs regular assessments to be conducted to improve the system in use.

Satisfying physicians and patients is one of the crucial objectives of TM success [1], which can only be useful when people will begin to utilize it [2]. This is also true for the evaluation and re-evaluation of technology-based systems, including an e-consultation system that was implemented in 2013 [3]. Despite TMs acknowledged benefits, it will be a useful health service only when people will begin to utilize it [4]. Therefore, the general attitude of end-users towards acceptance of TM services will play a significant role [4].

The present research is based on a pragmatic philosophy, the idea of which lies in its observable practical consequences [5], [6]. This thesis analyzes the e-consultation system, which was created to improve communication between GPs' and consultants. In 2011, a pilot project was launched in Estonia, which enabled GPs' to consult with consultants regarding the future management of the patient. In 2013, Estonian Health Insurance Fund (EHIF) started financing the service. The first specialties of consultants involved were urology and endocrinology [35]. Gradually other specialties were added to the list, as the range of funded e-consultation specialties has expanded and additional consulting specialties are added every year [3].

The reasoning of this thesis begins with specific and limited observations and reaches generalized conclusions that are probable but not certain, given the evidence collected. The participants were 37 GPs who answered questionnaires and 10 doctors (both GPs and consultants), who participated in interviews the research is concluded. In addition to the semi-structured interviews, an expert opinion from EHIF is included to provide insight from a public organization on whose initiative and leadership the system has been implemented.

1.1 Aim and research questions

Problem: This thesis explores the experiences of GPs and consultants with the e-consultation system established by EHIF and defines recommendations for improvement. This is a problem because the success of the e-consultation system depends on the satisfaction and utilization by its end-users [4], and gaps between layers of the system can affect its overall usability. Therefore, understanding the experiences and perceptions of GPs and consultants with the system can help identify areas for improvement and ensure its continued success. The thesis analyses and compares the expectations and perceptions of GPs' and consultants. Therefore, the thesis aimed to evaluate the use of the e-consultation system and the attitudes and acceptance of the e-consultation system by GPs' and consultants from different specialties. The conclusions and recommendations will be drawn based on the results of the study for the future developments of e-consultations.

The research is based on 5 research questions (RQ), which pave the road for expanding the topic:

RQ 1. What factors influence the acceptance and adoption of the e-consultation system among general physicians?

RQ 2. How do consultant expectations of the e-consultation system compare to those of general physicians?

RQ 3. What design features of e-consultation systems are most important to general physicians and consultants, and how do these features impact their perceptions of the system?

RQ 4. To what extent does the use of e-consultations affect the productivity and job satisfaction of general physicians and consultants, and how do these effects vary by workload and other demographic factors?

RQ 5. What are the most critical areas for improvement in the e-consultation system as identified by general physicians and consultants, and how can these areas be addressed to enhance system effectiveness and usability?

The research is separated into seven chapters. The first chapter helps to introduce the topic of this research including the aims and research questions. The second chapter contains a literature review describing the development and requirements for e-consultations, the expectations of GPs and consultants, and the choice of methodology. The third chapter is a description of the methodology, specifying methods and participants, questionnaire and interview development, and the reliability of the study. The fourth chapter provides an overview of the results gathered from the qualitative and quantitative research and is further discussed in chapter five. Chapter five also includes limitations of the research, proposals from the participants, and suggestions for further research. In chapter six the topic will be summarized.

2 Literature overview

2.1 Development and requirements for the e-consultations

Before the e-consultations, clinicians approached patients and other clinicians the traditional way where the GP had to meet the patient in person, either in his/her office or during a house call [7]**.** In the early 2000s, the Estonian primary care system underwent reform, granting GPs greater independence and more responsibilities [8].

It was initially envisioned in the 1920s that technology could be a virtual alternative to the GP's house call. However, the technology needed to practically implement telemedicine (TM) was not developed until the mid-century, when NASA needed a way to provide medical care to astronauts in space [9].

In recent decades, there has been a great advancement in Information Technology (IT), TM, telehealth, and e-health in healthcare systems [10]. Advanced technologies with quality network services enable individuals to improve healthcare delivery and make it available to more people [11]. WHO defines telehealth as the "delivery of health care services, where patients and providers are separated by distance." [12]. Telehealth uses Information and Communication Technologies (ICT) for the exchange of information for the diagnosis and treatment of diseases [13]. The concomitant fusion of healthcare with information and communication technology (ICT) has enabled the development of various new services and networked medical devices [14].

TM has been around in some form for millennia [15]. The modern form of TM, however, appeared with the advent and maturation of the internet, [16]. Marika Žmenja states in her research that there is no generally accepted definition of TM. According to a statement by the European Commission, TM is defined as the use of ICT devices to provide healthcare services in situations where the healthcare professional and patient, or two healthcare professionals, are located in different physical locations [17]. The global implementation of TM services has proven to be successful in reducing both time and

geographical barriers associated with traditional methods of providing medical services [18]. Nowadays, TM refers to the remote evaluation and treatment of patients using telecommunications technology [9]. TM enables healthcare professionals to offer cost-efficient services, thereby minimizing patient access and workforce limitations [19].

TM has improved the capacity of healthcare providers to take care of many people without physically being present which can make it easier for people to get preventive treatment and help their long-term health [11]. It increases access to general and specialized healthcare services, delivers care to rural areas, offers providers greater flexibility in scheduling, and saves patients' time and money in seeking care [20]. Furthermore, now that it has proved TM worth, it will be around for a long time [11]. Satisfying physicians and patients is one of the crucial objectives of TM success [1]. Despite its acknowledged benefits, TM will be a useful health service only when people will begin to utilize it [4]. Therefore, the general attitude of end-users towards acceptance of TM services will play a significant role [4]. The topic of using TM to address world health issues warrants study, as does the identification of barriers to adoption and possible mechanisms to overcome those barriers [20].

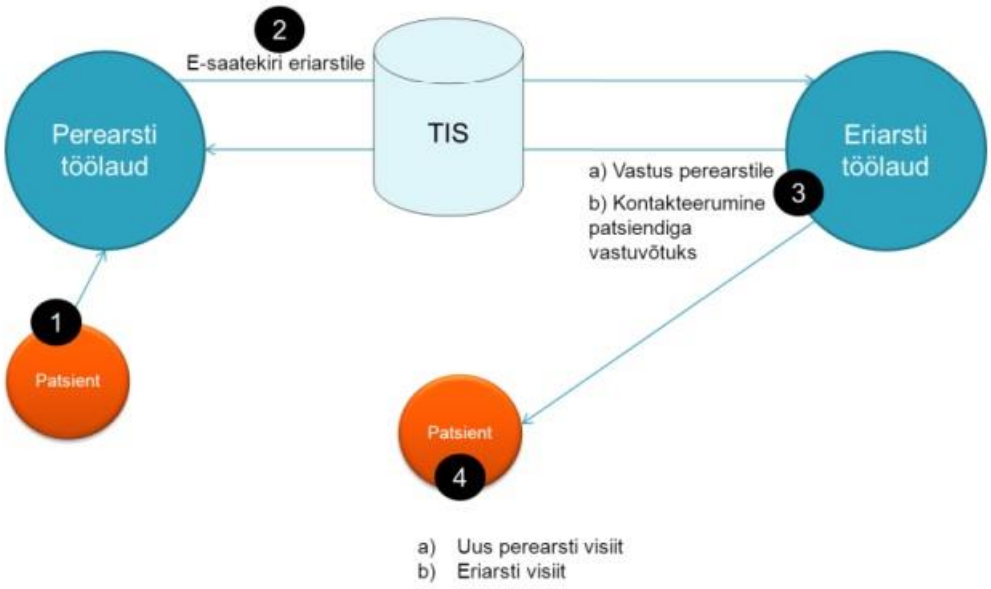
Due to improvements in the underlying enabling digital technology [15], an electronic medical record can hold more intimate details of an individual than any single document [21]. TM involves the widespread use of an electronic format for maintaining medical records and documenting diagnoses, prescriptions, and details of follow-up appointments [21]. One of the fastest-growing branches in TM is e-consultations [18].

Until the e-consultation system was developed, historically patients had to wait in the live queue behind the door of the consultant hoping that they can see the consultant sometime during the appointment hours. Later, a system was developed where patients could register themselves for open appointment times [22]. GPs are held in high regard in society, and there is a strong national health policy focus on advancing primary care, which enjoys broad political consensus as a direction for health system development [8]. It was likely due to this emphasis on primary care that the notion of implementing e-consultation arose as part of a collaboration project between the Estonian Family Doctors' Society and the Estonian Hospitals Association [8]. Though initial discussions regarding a comprehensive e-consultation service took place in 2006 [8], tangible progress did not occur until 2011 when the Estonian Hospitals' association applied to include a new

healthcare service in the list of reimbursable health care services in Estonia [23], [24]. The purpose of e-consultation is to enhance access to medical diagnosis and treatment for those who are insured [24]. This solution enables family doctors to consult consultants in a more precise manner through the health information system, which aids in rapid diagnosis and treatment initiation [24].

A four-stage e-consultation process is illustrated in Figure 1 by Praxis which describes the journey of the patient data from start to finish. Firstly, the patient will provide the GP with the data who then makes a referral for an e-consultation. The data is then transferred through the health information system to the consultants' work desk. The consultant can have two options for the response. Firstly, they can send information about further treatment suggestions back to the GP or secondly, they will contact the patient themselves and agree on the in-person appointment.

Figure 1. Scheme of e-consultation operation by Praxis [24]



As a part of TM [24], e-consultations have become more relevant in the healthcare environment, but it is still little to be found specifically about clinician-to-clinician e-consultation systems in the literature. Lee and others describe e-consultations as a process improvement using health information technology to transform the traditional approach to specialty referrals [25]. Liddy and others, Vimalanada and others, and Rankine and others define e-consultations as an asynchronous communication between healthcare

providers that occurs within a shared electronic health record (EHR) or secure Web-based platform [26]–[28] which is also the definition that this thesis is staying with. Another description concludes it as clinician-to-clinician communications that may obviate face-to-face specialist visits [29]. Two systematic reviews from 2019 and 2020 describe e-consultations as technology-supported consultations which provide a more flexible, though different, style of the clinician-patient relationship [30], [31]. Lee and colleagues say that instead of submitting simple referral requests with little clinical information to specialty departments, GPs now submit clinical inquiries electronically to a specialist through an online portal, which opens a dialogue between the GP and the consultant about patient management [32].

Health policy and TM are heavily intertwined just as any innovation needs to be regulated for efficacy and safety, payment models need to be established and implemented, and privacy and security need to be maintained [33], [34]. In Estonia, GPs write an electronic referral letter which includes a set of data according to the pre-defined standard set by EHIF [35], [36]. Table 1 describes general information that must be on the referral letter including personal data such as date of birth, social security code, gender, and contact information, but also details of the person who made the referral and general data including that (unique code of the referral, the time of confirmation of the referral, the start and end date of the validity of the referral), data of the anamnesis and diagnosis, the name of the service that the patient is being sent to, and data of the healthcare service provider providing e-consultation [36]. According to the State Chancellery, additional information which is the data resulting from the specific nature of the service includes supportive information such as data of the healthcare provider to whom the patient is referred, objective findings of the patient, medical history (including previous appointments, and operations), allergies and medical regimen, details of the patient's contact person, known risk factors for the occurrence of infectious diseases and other data necessary for service provision must also be included [36].

Table 1. Information that must be included in electronically made referrals [36].

GENERAL INFORMATION	ADDITIONAL INFORMATION
General data of the patient, social security code, date of birth, gender, and contact information.	Data of the healthcare provider to whom the patient is referred to
Details of the person who made the referral (data of the institution and healthcare worker)	Objective findings of the patient
General data of the referral, including the unique code of the referral, the time of confirmation of the referral, the start and end date of the validity of the referral, considering the patient's state of health and the nature of the service	Patients' previous appointments, including previous surgeries
Patient history	Allergies and medication regimen of the patient
Patient diagnosis data	Details of the patient's contact person and/or representative (relation to the patient, first and last name, contact details)
The name of the service to which the person is sent, including the purpose and time criticality of the referring	Other data necessary for service provision
Data of the healthcare service provider providing e-consultation (institution data)	Known risk factors for the occurrence of infectious bacteria

In 2011, a pilot project was launched in Estonia which enabled GPs to use e-consultations for referral consultants. In 2013, EHIF started financing the service in two consultant specialties: urology and endocrinology. In April 2016, the social and market research company Saar Poll conducted a nationwide online survey to get an overview of the main barriers to using the e-consultation service among GPs, consultants, and hospital management. A study by Saar Poll stated that consultants, who respond to e-consultations relatively rarely need more time for a response than consultants who answer e-

consultations frequently. One of the findings from the Saar Poll study stated that 41% of the consultants who respond to e-consultations regularly, find that responding takes the same amount of time as a physical first appointment. 20% of the consultants said that responding to e-consultations should be done during paid working time. It also appears that only 15% of consultants who participated in the Saar Poll study had allocated separate time for responding to an e-consultation [37]. The majority of the consultants agreed or strongly agreed that the e-consultation process is simple and easy to use. A study from Saar Poll described e-consultation benefits by the consultants: "The referral is more informative, thorough, understandable and requires a correct form."[37] Almost all the participants that participated in the Saar Poll study highlighted their knowledge of response in case of a technical problem. 67% of the consultants would turn to a specialist within the treatment facility [37]. The barrier which was selected most frequently by consultants was inadequate information to complete the consult [37], [38]. Since the survey, there has been no study on e-consultation barriers between the GPs and consultants.

2.2 Expectations of GPs for the e-consultation system

The expectations of GPs and consultants for e-consultations dictate its high-quality, comprehensive, and immediate implementation by both parties [39]–[42]. Several concerns have been addressed in the context of e-consultations. Rankine and colleagues demonstrated that GPs are concerned about too many information fields and they might be interpreted as guidance to perform history or exam of several components that may be irrelevant [28]. Lee et al. study described the frustration of the GPs on the administrative burden of e-consultations, interface issues, and lack of integration between e-consultation and EHR [32]. Many participants described difficulty receiving notes after visits. Missing notes led to a gap of information as the GP had no information regarding patients´ future management [32]. The participants also highlighted increased administrative burden and restructuring specialty care, stating that they have to make more clicks to reach the same endpoint with using different systems [32].

Several negative aspects emerged from the Saar Poll study, such as different understandings of the concept of e-consultation, lack of suitable IT solutions, and, amongst others, lack of time and need, as GPs can quickly consult the necessary specialist on site. In addition to the aforementioned, the Saar Poll study also pointed out the lack of notifications of responses from the specialist, searching for answers, vague specialist response times, and ignorance of what happened to the patient after the e-consultation request was made (did the referral reach the specialist or if and when the patient went to the appointment) [37]. On the other hand, the study described that e-consultations have reduced the patient's waiting time for an appointment with a consultant as unnecessary patient referring has also decreased [25], [37]. This data is relatable to a study by Rankine et al. that demonstrated that e-consultation systems reduce travel burden [28].

Some of the participants from the primary care practitioners' perceptions of the electronic consult systems study describe the practice of exaggerating patients´ symptoms or relying on certain key phrases to get a consultant's appointment approved [25]. Additionally, the increase in the length of time to complete e-consultation compared to personal consultation has been brought up [32], [38]–[40].

The change in the workload of doctors, both increase [41] and also the decrease in the workload [25], [43] has been described. A study by Banks and colleagues in 2018 described the increase in the GP's workload using an e-consultation system in the West of England. A qualitative method was used for interviewing the GPs who were sampled by location and level of e-consultation use [41]. The results of that study described that most e-consultations resulted in a follow-up call by the GP with a telephone or face-to-face appointment because the e-consultation did not contain enough relevant information for further decision-making [41]. The results also stated that the technology used fell short of providing an effective platform for clinicians to consult with patients and did not justify the financial investment in the system [41].

A study by Rankine and colleagues in 2021 searched qualitatively analyzed user feedback during two phases of development, describing that even when e-consultations provide structure and documentation to activities that doctors already do, it still is a burden on their time and desired adequate reimbursement in a fee-for-service environment. They

also stated that e-consultations would make the referral process easier for consultants while the workload of GPs increased [28]. Concern was expressed by the GPs, where the comfort of carrying out the management plans and concerns about duplicating their work was focused on [28]. All the participants noted the complexity of anticipating the knowledge that the other doctor would need [28].

Lee et al. made a qualitative analysis to understand the GP perceptions of the results of e-consultation initiation on GP workflow, specialist access, and patient care. One of the results from the qualitative interviews made with 40 GPs in Los Angeles described that the previsit requirements requested by specialty reviewers were a burdensome shift of work to the GPs [44]. One of the participants of that study said that another issue is where the consultant seems to require a very long list of things that need to be done which makes the GP feel like a support staff when it’s wasting multiple primary care visits to accomplish that the consultant could do in one session [44]. Lee et al. also describe in their study a GPs viewpoint on consultants' expectations as having to put in all of the physical findings and exams. They said that experts frequently suggest that GPs should acquire diagnostic evaluations that are normally beyond their scope of responsibility for requesting or analyzing [44]. Occasionally, GPs were not authorized to request specialized examinations [44].

2.3 Expectations of consultants

Lee and colleagues describe a range of perspectives on how e-consultations have affected GPs’ relationships with specialists. Some participants from Lee's study clarify that communication is faster while others viewed interactions with consultants as more antagonistic, often describing the response of the consultants as insulting [25]. A study by Rankine and others discovered that consultants recommend using diagnosis-specific templates tailored to referral reasons, whereas concerns regarding GPs were somewhat opposing that, because these may increase the burden of the documentation process [28]. Rankine et al. also described concerns regarding incorporating e-consultations into the consultant's daily workflow and interoperability with other EHRs [28]. The quality of

workup data available in EHR leads to relying on someone else's visual assessment of the patient which could directly affect the outcome of the treatment plan and the quality of the consultation [37], [38], [44], [45].

A study made by Bhanot and others in 2021 described expectations such as shortening the workload of consultants and being able to consult more remotely which leads to fewer patients necessary for in-person evaluation and more thorough information from the e-consultation requesting side. Based on a study made by Azamar-Alonso and colleagues access to specialists depends on several factors, including a patient's clinical condition, a patient's age, the type and location of the referring clinic, a specialist's availability, as well as the level of communication and type of information shared between GPs and consultants in the referral process [43]. Bhanot and colleagues also mentioned expectations regarding reimbursement such as compensating for the amount of time spent completing some of the consults[38].

In conclusion, generally, the problems concerning GPs are related to their increased workload, describing the complexity of prerequisites, too many information fields, problems with integration between EHR and e-consultation system, and difficulties in receiving notes and notifications after the consultant appointment or e-consultation response. GPs feel they have to make too many clicks, to reach the same endpoints with different systems which is making the process more time-consuming. The positive aspects from the GPs' point of view are described as increased access to specialized healthcare services, delivering care to rural areas, and saving patients' time and money. Consultants' concern is related to incorporating e-consultations into the consultants' daily workflow and interoperability with other EHR-s. They also expressed concern regarding reimbursement such as compensating for the amount of time spent completing some of the consults. Consultants are satisfied that the communication between consultants and GPs is faster, the workload of consultants has shortened, they are being able to consult more remotely and the information gathered from the GP is more thorough and informative. In addition to acquiring information, it is crucial to draw conclusions from it and analyze it consistently. To repeatedly solve the problem that we have already faced before, repeated studies must be carried out to find out what the purpose of the proposed solution has been and whether it has fulfilled its purpose. A national online survey of

barriers to the implementation of e-consultation was conducted in 2016, after which it has not been re-examined whether and what barriers between family doctors and specialists have been resolved and what problems still need to be addressed. The study revealed several facts regarding the positive and negative aspects of e-consultations, which also provided the primary impetus for the present research.

3 Methodology

3.1 Choice of methodology

Feilzer states in her article on doing mixed methods research pragmatically, that pragmatic research does not expect to find unvarying causal links or truths but aims to interrogate a particular question, theory, or phenomenon with the most appropriate research method [46]. This research has focused on studying the issue of interest and value to observe how the use of e-consultation between physicians and GPs could lead to increased satisfaction between both sides. E-consultation system does not take inconsistencies between doctors into account and works logically, correcting the problem of communication honestly and transparently. E-consultations were created to solve a problem between people, however, the system itself is independent. As the topic requires a more in-depth understanding, a mixed-methods research method was chosen to carry out the study.

3.2 Methods and participants

The author of this thesis collects evidence to formulate the problem, looks for patterns in what the users of e-consultations say, and develops a theory to explain what has been collected. Inferences made using the inductive method are not logically necessary because there is no way to know that all possible evidence has been collected and that there is no additional evidence that has not been analyzed. The pragmatic approach in this study emphasizes utilizing both positivist and interpretivism philosophy as a continuum which

means that in this thesis, going into an argument on concepts of truth and reality is avoided. The mixed-method approach (questionnaire, interview, and questions to EHIF) used in this thesis is made using qualitative techniques.

The literature was searched from three different search engines. Appendix 2 will provide an overview of the literature search, including the key terminologies, combinations, and inclusion criteria. A total of 49 articles which include supportive literature, were used in this research. The literature review was done in PubMed, Google Scholar, and Mendeley considering key terminologies such *as telemedicine, telecommunications, remote consultation, general practice,* and *electronic consultations*. The terminology in PubMed and Google Scholar was conducted in MeSH with the combination of „OR", „AND" or „ * ". The author found 99 articles which were narrowed down to 9 fully suitable articles which were thoroughly read and assessed. Because of the low search results, an additional terminology was added to widen the search with *"covid",* which provided 373 additional articles from which to choose. The extraction was made based on the language (only Estonian and English were searched), free full text, years between 2015-2022, and the content regarding studies only about GP AND/OR consultant experience with e-consultation describing e-consultation as a separate service used for referring and asking advice between the doctors.

The inclusion criteria in Mendeley also contained compliance with the chosen terminology, free full text, language choice English and years between 2015-2022 which narrowed the search down to 176 results. After eliminating recurring articles, 49 articles were left to be read through. Most of the excluded content was related to e-consultation definition as communicating with patients through email, telephone call, or video call.

There are also seven additional pieces of literature providing supportive background information. An article from 2010 was used in this research to provide background for a pragmatic research method through the example of pragmatic research that used mixed methods and aims that pragmatism as a research paradigm supports the use of mixed-methods research [46]. Nationally established regulations for making a referral for e-consultation are described in Riigi Teataja [36].

During the literature search, terms and abbreviations were written down. In September 2022, the methodology was put in place, and it was clear, the topic needs to be addressed in a mixed-method approach. After gathering information from the initial literature

search, a questionnaire was conducted. A non-standardized questionnaire with open-ended questions was developed to gather a wider understanding of the main concern regarding the use of e-consultations from the GP's perspective. The questionnaire was printed and handed out at general practitioner conferences which took place on 01.10.21 in Paide, 23.10.21 in Tartu, and 12.11.21 in Tallinn. The overall response rate was 15 GPs out of 20 in Paide, 12 GPs out of 30 in Tartu, and 10 GPs out of 14 in Tallinn. This provided the necessary information on mapping the problematic area and provided insight into narrowing down the main subject of the problem.

After the methodology was set in place, the development of the interview questionnaires began and in October 2022 the first interview was conducted. For qualitative research, in-depth semi-structured interviews with three consultants and seven GPs were conducted in total. The participants were provided with a written consent form beforehand, which they had to sign directly or digitally and return to the interviewer. The interviews were recorded with an Apple tablet, which deposited the interviews in a private server until the data was analyzed. After the analysis, the data was deleted from the server. Interviews were carried out as phone call interviews, video call interviews, and face-to-face interviews. One interview lasted about 30 minutes in total and included 15 questions. All the interviews were completed by November 2022. In December 2022, Mari Kalbin, who is a chief specialist in the Department of Primary Services in EHIF was contacted via email to gather more in-depth information and a different viewpoint about the mechanisms of e-consultations through three open-ended, specific questions, which can be seen in Appendix 6.

3.3 Development of the questionnaire and interview

The questions for the questionnaire and the interviews were conducted taking TUQ (telehealth usability questionnaire) into account [47]. A scientifically proven questionnaire that focused on telehealth usability was looked for. From the most used questionnaire for evaluating telemedicine services article [48], the TUQ questionnaire,

which focused on the development of telehealth usability, was rated highest among questionnaires that were used for similar purposes.

3.3.1 Questionnaire questions

The questions were modified according to the needs of this thesis. There were nine open-ended questions in total, which were used to explore the topic in-depth, as they allow the participant to provide detailed responses and express their thoughts in their own words. The questionnaire questions are visible in Appendix 3.

The first three questions contained participants' subjective assessments on how the decision of making an e-consultation, is being made and how fast the response from the consultant is expected, to understand more about what type of patient benefits from the e-consultation the most. Further on, questions four and five elaborated on the information that's needed on the referral of e-consultation so that the response would be the most effective from the consultants' side. Question number six helped to describe the availability of the information, to make an e-consultation, so that the author of this thesis could have a clearer sight of how the information about the patient is being gathered into the referral of e-consultation and see if there are some aspects of barriers regarding it. Questions seven, eight, and nine were specifically about the e-consultation system in the means of its convenience, additional possibilities of use (meaning already existing shortcomings), and data content.

3.3.2 Interview questions

Interview questions were specified and modified based on the questionnaire results, to elaborate more about the issues stated in the responses of the quantitative questionnaires Interview questions can be seen in Appendix 4. After conducting questions, the interview plan was sent to an expert, to gather critical feedback about improving the questionnaire, after which it was used in interviewing GPs and consultants.

Before the interview, the interviewee received an informed consent form to inform them of the purpose and how the interview would be conducted. The consent form can be seen in Appendix 5. This information was also shared directly before the beginning of the interview.

The first four questions of the interview were developed to describe the background of the interviewee, including their working experience, specialty, the year of joining e-consultations, and the number of e-consultation referrals they make or reply to weekly. The next block of questions was focused on mapping out the current situation. Questions regarding the purpose of e-consultations in the past and the present gave insight into what sort of expectations can recur between having different goals in mind, which leads back to defining e-consultations. Describing the shortcomings of making an effective referral for e-consultations that benefits the GPs and the consultants were also included. To understand the information flow and the benefit of the e-consultation system better, the author of this thesis asked the interviewees about the information fields, regarding the data content, accessibility, and reliability. Additionally targeting the expectations of both the GP and the consultant regarding the further treatment of the patient and elaborates on the field of the workload of GPs and consultants.

3.4 Reliability of the study

3.4.1 Data analysis

In this mixed-methods thesis, the data was collected through questionnaires and interviews. Questionnaires provided a way to collect data from many participants quickly and efficiently. However, the reliability of the questionnaire depends on several factors, including the quality of the questions, the clarity of the instructions, and the representativeness of the sample. In this thesis, the questionnaire had 37 participants, which is a relatively small sample size. While the sample size is not necessarily indicative

of the reliability of the questionnaire, it does limit the generalizability of the findings. Questions of the questionnaire were open-ended, which does allow a more detailed response in the participants' own words but can also be challenging to analyze and may not yield consistent or easily comparable data. The questionnaire may not have been designed to capture all the aspects of e-consultations that are important to patients and healthcare providers. Additionally, the validity and reliability of the questionnaire were not explicitly discussed in the thesis, which can be a limitation.

Interviews, on the other hand, are a more in-depth method of data collection that allows for the exploration of complex issues. The small sample size of 10 participants in the interviews is a limitation, but the insights gained from these interviews provide valuable information about the experiences of healthcare providers with e-consultations. However, the reliability of the interviews is dependent on the skills of the interviewer, the quality of the questions, and the representativeness of the sample. Again, the thesis did not explicitly discuss the reliability and validity of the interviews.

Overall, the reliability of this mixed-methods study about e-consultations may be limited by the small sample size of both the questionnaire and the interviews. The study, however, provides valuable insights into the experiences of healthcare providers with e-consultations, and further research with larger sample sizes could help to improve the reliability of the findings.

3.4.2 Ethical considerations

When conducting research involving human subjects, ethical considerations are of utmost importance. In this study, ethical considerations were considered when interviewing GPs and consultants. Before conducting the interviews, the researchers obtained informed consent from the participants. The participants were provided with information about the study, its purpose, and their rights as participants. They were also informed that participation was voluntary and that they could withdraw from the study at any time.

Confidentiality was also maintained throughout the study. The participants were assured that their responses would be kept confidential and that their names and personal information would not be included in any reports or publications. The data collected from the participants were anonymized and stored securely to prevent any unauthorized access. The questions asked during the interviews were designed to be non-invasive and not to cause any discomfort to the participants.

Finally, the researchers were mindful of the power dynamics that exist between the researcher and the participants. The participants were respected as experts in their field, and their opinions and experiences were valued. The researchers ensured that the participants had ample opportunity to ask questions, provide feedback, and clarify any concerns they had about the study.

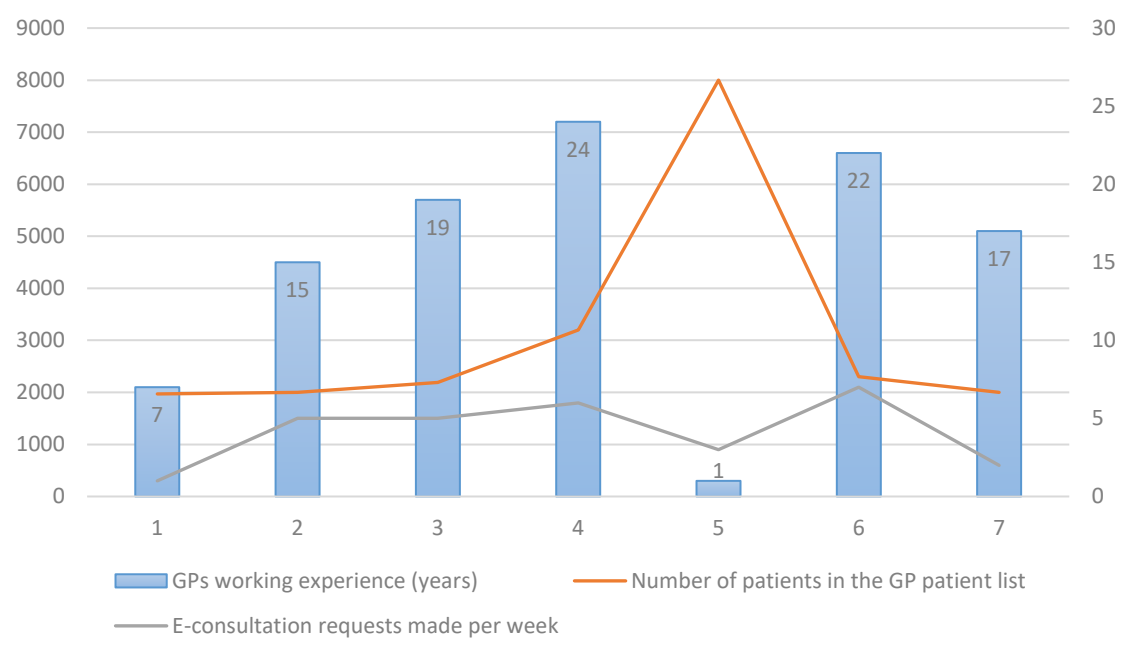
In conclusion, the ethical considerations were taken seriously in this study. The researchers obtained informed consent, maintained confidentiality, ensured the safety and well-being of the participants, and respected their expertise and opinions. These measures ensured that the study was conducted ethically and reliably and that the findings can be used to inform the implementation of e-consultations in healthcare settings.

4 Results

4.1 Participant data

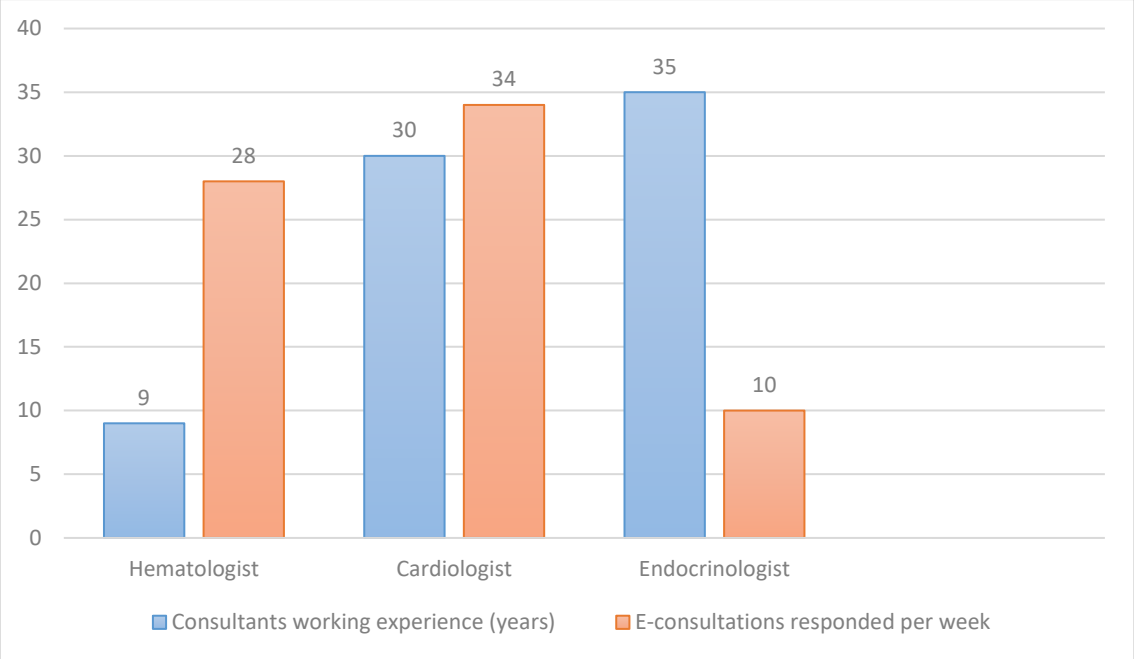
The **questionnaire** was answered by a total of 37 participants. All the participants were GPs. No demographic data were collected from this group. GP study sample characteristics for the **interviews** can be seen in Figure 2. Seven GPs were interviewed for this thesis. Their working experience ranges from one year to 24 years. The number of patients in the list of GP practices ranges from 1970 to 8000. On average, one GP makes four referrals per week which can be varied depending on their working week.

Figure 2. GP study sample characteristics for the interviews.



Three consultants from different specialties were interviewed: a hematologist, a cardiologist, and an endocrinologist. Their working experience ranges from nine years to 35 years. On average, one consultant responds to 24 e-consultations per week. Consultants' study sample characteristics for the interviews can be seen in Figure 3.

Figure 3. Consultants study sample characteristics for the interviews.



Additionally, EHIF representative, Mari Kalbin, was contacted through email. Questions asked from her can be seen in Appendix 6.

4.2 Evaluating clinicians' perceptions on e-consultations

4.2.1 Clinicians' views on the necessity of the e-consultations

According to the results of the **questionnaire**, all 37 respondents reported that generally patients are being referred to consultants through e-consultations. Among the questionnaire participants, 22 agreed that e-consultations are beneficial in their work, while 12 were unsure about the system's benefits and three other participants didn't know what to answer:

"I don't think a lot has changed (from starting to use the e-consultation system) from the GPs perspective."

During the **interviews**, all GPs emphasized the importance of e-consultations in their work. They noted that the system has significantly shortened access to consultant care, enabling faster communication between clinicians:

"Communication between the clinicians is faster. Access to consultant care has become more realistic as a result of the e-consultations."

One GP expressed reluctance toward using the e-consultation system:

"At the moment I feel like I'm forced to make it (e-consultation) when I don't have to do it and I could just calmly direct the patient to the waiting list."

All interviewed consultants agreed that the e-consultation system has improved communication between doctors, highlighting its positive impact on their work:

"Communication between doctors is faster and if necessary, I can refer the patient to another specialist myself."

4.2.2 Quality of e-consultations compared to traditional paper-based referrals

Questionnaires did not address the question of the quality of e-consultations.

During the **interviews**, some GPs discussed the quality of e-consultations compared to traditional paper-based referrals:

"E-consultations have higher content quality compared to paper-based referrals."

Similarly, one consultant underlined the improved quality of e-consultations in the interviews, noting that in the past, patients would arrive at the consultant's door with a referral letter that often lacked a proper explanation of the consultation. As the consultant stated:

"Earlier, the patient came to wait at the door of the consultant with a referral letter. Often there was no explanation for the consultation in the referral letter, it was good if the diagnosis was written."

4.2.3 Expectations of GPs towards consultants in the e-consultation process

All the GPs **interviews** described that the e-consultation process involves the GP initiating the e-consultation request, after which the consultant provides advice or requests the patient to come in for an appointment:

"The GP makes the e-consultation request and then the consultant will give advice or ask the patient to come to an appointment."

All the GPs said in their interviews that they would have mainly three major expectations of the consultants. Firstly, to get thorough and clear answers from the consultants to the questions that the GPs asked in the e-consultation referral:

"I want to get a specific answer from the consultant. Information about what kind of tests have to be done, what medication I have to prescribe, and how to monitor that treatment."

Secondly, all the GPs also said that if the patient requires further treatment, they would expect the consultant to take the patient over to themselves and continue as their attending physician. Additionally, one GP described an expectation regarding the feedback of taking over the patient:

"The consultant would reply to the e-consultation and if necessary, takes the patient to themselves (for further management). They will contact the patient to inform them about the arranged appointment time. It would be nice if they also inform the GP about the date and time of further treatment and tests, the consultant has sent the patient to."

In the interviews with the GPs and consultants, the e-consultation system was consistently described as a tool for obtaining clear and concrete advice from the consultants. One consultant emphasized that the system is particularly useful for less experienced GPs who require advice from a consultant.

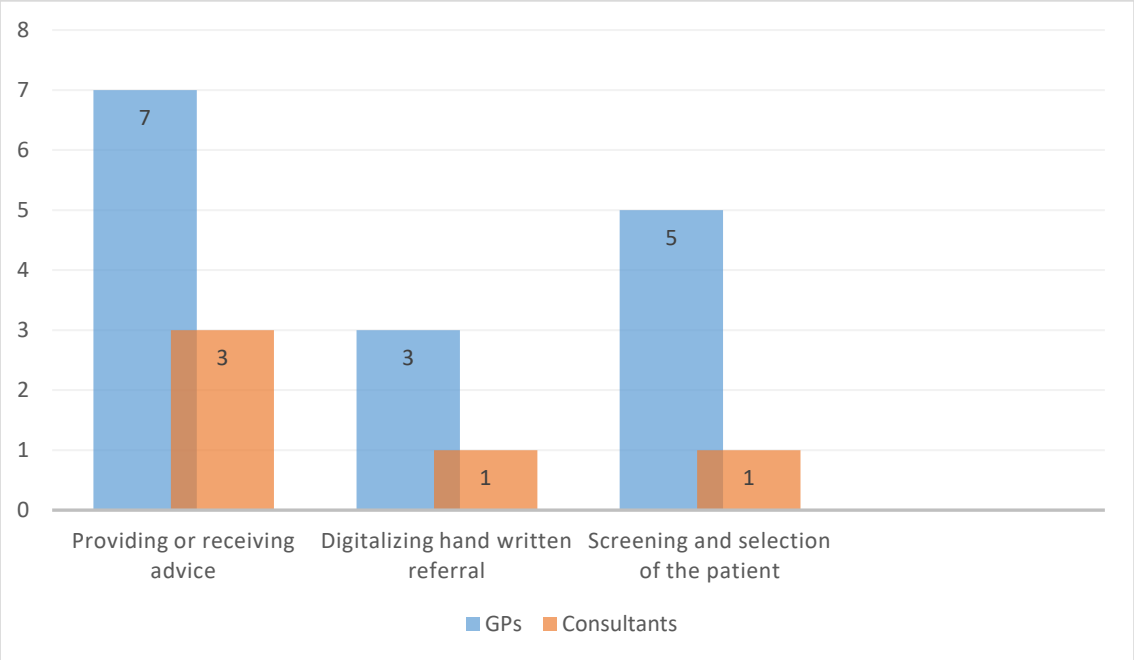
Another consultant highlighted the goal of the e-consultation system as a means for fast problem-solving and reducing unnecessary visits. The objective is to ensure that patients

who do come in for an appointment have specific specialty-related problems and require the attention of a consultant:

"E-consultation system was originally developed as an alternative to referring, as a digital shortcut. Today it is still used a lot, so the GP is not quite sure whether the patient should be referred or they should just ask advice about further treatment options."

Figure 4 helps to visualize the goal of e-consultations among GPs and consultants, describing three main subjects.

Figure 4. The goal of e-consultations among GPs and consultants.



4.2.4 Evaluation of the quality of the structure of e-consultations

Two GPs out of seven said in their **interviews** that they are satisfied with the content and structure of the free text data fields in the e-consultation system.

"I have to write the consultants' specialty, specific treatment facility, the purpose of the consultation, and content of the problem. I fill the data fields properly and there are no complaints at this point."

One GP said that there have been a few times when the consultant has sent the consultation back asking for additional information:

"There is a substantive deficit regarding the data fields, it remains unclear why the patient needs an e-consultation right at this moment and not any other time."

Another GP said that there could be two given options in the e-consultation system instead of a free data field about the purpose of the e-consultation:

"The purpose of the consultation could be an option, not a free text: advice from the consultant or taking the patient over from the GP. Currently, it can get very vague."

Two GPs expressed the desire for clearer information from the required specialty for their e-consultations in the interviews:

"It could be clearer to know which analyses must have been done beforehand."

Additionally, one GP described putting in a tick if the patient has ESBL (extended-spectrum beta-lactamase) or MRSA (methicillin-resistant staphylococcus):

"Every time I forget to note if it's ESBL or MRSA – you have to put the tick each time."

Consultants agree that data fields are overall clear and well structured, however, the content of the consultations is lacking quality. Consultants feel that a well-written and clear referral is a prerequisite for providing a thorough response to the GPs:

"GPs should specifically and briefly describe the background, and perform elementary analyses. It is very often the case that tests that I ask to be done, at the appointment I see that the GP still hasn't done these tests and I cannot start further analyses because I am doing basic testing."

4.2.5 Perceptions of the content and structure of the e-consultation system by GPs and consultants

Three participants from the **questionnaire** brought up that when the consultants have their vacation, the e-consultations remain unanswered. 18 other participants out of 37 said that the waiting times for an in-person appointment with the consultant are still long despite using the e-consultation system. Six participants out of 37 described that the patient will not get called to an appointment if the patient hasn't been examined beforehand:

"If the consultant doesn't understand the reason for referral, or if the consultant cannot find a disease corresponding to the specialty, then the patient won't be invited to the appointment".

Three participants out of 37 said in the questionnaire that sometimes the consultant forgets to read the recall on the referral or the patient has been directed to the wrong specialty. They also described unhelpful responses to e-consultations:

"Sometimes the consultants respond to the e-consultation very briefly or rudely, not giving further suggestions or taking actions to help to solve the problem. Sometimes they just reply with "Provide more information" and nothing more."

Nine other questionnaire participants said that they do not have relevant experience regarding making e-consultation requests.

In the **interviews**, the consultants highlight the importance of a clear problem statement that describes the actual problem the patient has at that exact moment:

"Often all other complaints are described in the e-consultation request which doesn't define the current problem at all."

Another consultant points out in the interviews that the treatment plan hasn't been described by the GP:

"The treatment plan of the patient that the GP sends to the consultant rarely corresponds to reality."

Table 2 describes the perceptions of the content and structure of the e-consultation system by GPs and consultants.

Table 2. Perceptions of the content and structure of the e-consultation system by GPs and consultants.

GENERAL PHYSICIAN	CONSULTANT
Clear responses to the e-consultation request by the consultants	Clear problem statement on the e-consultation request by the GP
Transferring the patient over to the consultant	A patient treatment plan that's relevant to the current situation
Feedback regarding the further treatment of the patient	

4.3 Challenges and feedback on the use of e-consultations by GPs and consultants

4.3.1 Evaluating the severity of the condition and intended purpose of e-consultations

During the **interviews**, all GPs emphasized that e-consultations are intended for patients with aggravated conditions who require more urgent intervention. According to five out of seven GPs, the primary objective is to screen patients who need immediate care from those who can wait for an appointment. As one GP put it:

"The right patient in the right place at the right time. The goal always was that the patient can get to the appointment faster and this goal is being fulfilled by the e-consultation system even now."

All GPs agreed that the decision to refer a patient depends on the patient's condition and that the GP must provide adequate and relevant information to the consultant for a proper evaluation:

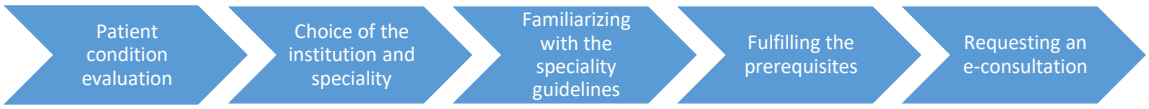
"To evaluate the condition of the patient, the GP has to fulfill the requirements asked by the consultant."

4.3.2 Choice of the institution and specialty (prerequisites and considerations for using e-consultations between GPs and consultants)

The use of e-consultations requires several prerequisites and considerations to ensure effective and efficient communication between GPs and consultants. Three of the 37 **questionnaire** participants identified that the prerequisites for using e-consultations by the GP are a working computer and fast internet. Additionally, all the participants from the questionnaire agreed that an easy-to-use search engine and quick access to data are essential for making e-consultation requests.

Figure 5 describes the stages for making an e-consultation.

Figure 5. Stages of making an e-consultation request by the GP.



Six of the 37 questionnaire participants mentioned the importance of integration of the e-consultation system with the GP computer system "Perearst" and emphasized the importance of geographical locations, appointment times, and specialization descriptions of the consultants:

"E -consultations should help to find a most suitable place and consultant for further treatment of the patient."

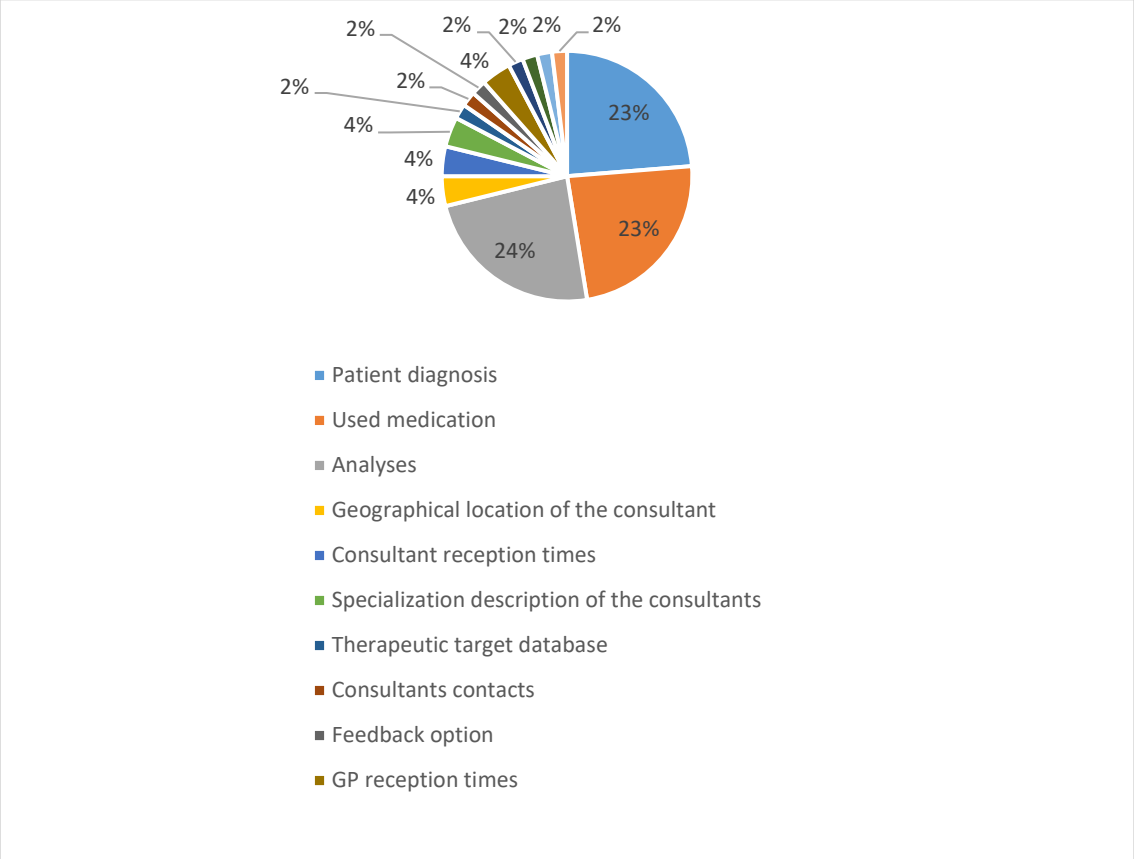
18 questionnaire participants out of 37 emphasized the importance of knowing the experience and sub-specialization of the consultants in different facilities:

"I would like to know the consultants' full name, the length of their working experience, and offered services and procedures by different institutions."

In addition, three respondents out of 37 participants in the questionnaire suggested that the e-consultation system should include a therapeutic target database (TTD) and consultant contacts.

Figure 6 illustrates the perceptions of what should be included in the e-consultation request from the questionnaire.

Figure 6. Perceptions of what should be included in the e-consultation request from the questionnaire.



Two GPs highlighted during the **interviews** that some specialties can only be consulted through the e-consultation system leaving no other options for communicating between the GP and these specialties. One GP expressed some reluctance towards the system, seeing it more as a formality than a necessity in certain cases:

"Some specialties cannot be consulted without an e-consultation which I also consider more as a formality than a necessity."

Furthermore, GPs expressed the importance of having a common consultation system across all hospitals to ensure patients have equal access to care:

"We should move forward in the direction that the majority of referrals to specialists are still e-consultations and that we do not have any hospitals that say they cannot do e-consultations".

All the GPs agreed in their interviews that their previous personal experience with the responded facility can impact their referral decisions. Certain aspects may affect the quality and availability of the service. Five GPs out of seven said that they refer the patient to an institution that the patient prefers:

"When the patient lives in another city, it is preferred to have a consultation with a consultant that works in that city. Patients' wishes will be taken into consideration to provide a more patient-centered service."

One GP mentioned the importance of understanding the prerequisites for specific specialties:

"I would like to know the prerequisites for the appointment with a sub-specialty, and if the referral should be done by a GP as an e-consultation or with a referral from another consultant."

Several aspects were discussed by the consultants in the interviews regarding the prerequisites and considerations for using the e-consultation system:

"We can see all the tests and examinations that have been done on the patient, but the problem is with extracting patient history…"

One consultant mentioned that guidelines for different specialties exist to assist GPs in describing a patient's condition to the consultant, but they are often overlooked or underutilized.

"There are guidelines for different specialties, which are available and accessible to all GPs. These guidelines are often overlooked or the GPs aren't just aware of that opportunity."

4.3.3 Feedback provided by the GPs and consultants on the e-consultation system

All the GPs from the **questionnaire** and **interviews** described a problem with receiving a notification of the response of the consultants. They agreed that the system should include response notifications that can be accessed from the GPs work desktop:

"There could be a reminder on the GPs work desk that the e-consultation has been answered."

Three questionnaire respondents out of 37 said that they would like to have the possibility to give feedback to the specific specialty or consultant:

"I want to give feedback to the exact consultant who responded to my e-consultation request."

During the **interviews**, one GP said that basic patient information could be in the e-consultation automatically, pulled from the system:

"Compilation is tedious. You must add analyses and patient history manually. You have to make a lot of clicks when a lot of this information could be pulled automatically."

Another GP said in the **interview** that it would be better to see the information regarding further decisions about the patient in the response to the consultation. That GP also highlighted the need for a further discussion with the same specialist, when making another referral, because the same specialist may no longer answer the next e-consultation:

"Sometimes there is a need for further discussion with the same specialist – but when making a referral again, the same specialist may no longer respond to e-consultations that day."

Having clearer options for the e-consultation goals and response is expected from the GPs to have a strict finishing to the process:

"As an answer, I would like to see where it is specifically stated that the patient has been taken over and there is a place and time when the patient must be somewhere. To leave a written trail as accurate as possible."

The consultants' feedback includes criticism about the results of e-consultation:

"Sometimes I don't understand why GPs send a patient to a consultant. I have made treatment recommendations, but things are still being done the old way by the GP so that these recommendations aren't considered."

Table 3 describes feedback from the GPs and the consultants about the e-consultation system.

Table 3. Feedback was provided by the GPs and consultants on the e-consultation system.

GENERAL PHYSICIAN	CONSULTANT
A lower number of clicks in the e-consultation system	A more thorough description of the background of the patient by the GP
Visually seen specialty requirements	GPs performed elementary analyses before requesting an e-consultation
2 options for the e-consultation purpose	
Further information from the consultants about the next steps after the appointment	
Further discussion with the same consultant	

4.3.4 E-consultation effect on the GPs and consultant workload

While the **questionnaire** and **interviews** highlighted the positive impact of e-consultations on the healthcare sector, some participants expressed concerns about the time-consuming nature of filling in e-consultations. Three out of 37 respondents reported not having enough time for this task:

"*I don't have time for making an e-consultation."*

In the **interviews** with the GPs, all emphasize the increase in their workload. Three GPs described making e-consultation requests outside of working hours.

"I can't make it during working hours, I do it additionally, outside of working hours from my own time. E-consultation requires more information than simply making a conventional referral, as it also takes more time".

Four GPs out of seven said in the interviews that something must change with the workload:

"If I had to choose whether to create a gap or a break in the doctor's working hours or to make the e-consultation system nice and good, I would choose the second option. Making the system better, would be a more sustainable solution than starting to change the work organization."

All the consultants brought up the increase in their workload in their interviews. They said that when the consultant works in an out-patient clinic or has a day job, it's easier to organize e-consultation responses in the daily work. Usually, the doctor, who is on call is also responsible for responding to the e-consultations. Broadly speaking, the workload depends on how the consultants' work is organized.

"There are more patients in the outpatient clinic, so there's a higher need for appointments and additional appointments, as well. These appointments include blood tests and analyses and there are also patients with chronic diseases who visit the doctor regularly. In these terms, some additional patients need extra time as separate patients."

One consultant said that in their specialty, every year a couple of hundred e-consultations are added to the previous year, which means that the rise in responding to e-consultations is remarkable. Currently, the average time spent on e-consultations is approximately 133 hours per year:

"We had 1300 e-consultations in the year 2021. In 2020 there were 1100 and before that, in 2019 there were 800 e-consultations."

Another consultant also underlines the workload increase, comparing a physical appointment with the e-consultation since it needs the same amount of concentration and often there's a need to find additional information about the patient:

"The workload is higher. It is as if it is an additional patient, for whom it is necessary to take extra time to do these consultations. If there are emergencies during the day in addition to scheduled patients, e-consultations will be held outside of working hours".

Table 4 shows the change in GPs and consultants' workloads. It describes the increase in workload for both clinicians and GPs.

Table 4. Change in workload amongst GPs and consultants.

GENERAL PRACTITIONERS	CONSULTANTS
Increase in workload	Increase in workload
Takes the same or more amount of concentration as a physical appointment	Takes the same or more amount of concentration as a physical appointment
Need to operate in complex digital baggage to find relevant information	Need to find additional information to the requested e-consultation
Is comparable to an additional patient	Is comparable to an additional patient

4.4 Advancements and future developments in the e-consultation system for clinicians

4.4.1 Further digitalization of the process

When talking about patient data and its gathering for the e-consultation, a few aspects regarding that appeared in the **interviews** with the GPs. All the GPs from the interviews said that there can be a lot of patient data to copy and paste:

"It would be better to have some of the data that remains basic, be pulled from the system automatically, such as family history, but also information about previous surgeries and other information that remains unchanged."

All the GPs agree to the complex and difficult handling of digital baggage, as it can be incomprehensible in a limited period or a more intensive work environment setting:

"Sometimes the analyses of some patients' 10 years of visits to specialists have to be processed one by one, copied and pasted if it's relevant in the context of this specific disease".

In addition to the digital baggage, the knowledge of response to the referral also remains an issue for the GPs:

"We wait for another institution to send an invoice for the patient to indicate when he has visited the consultant – the medical records are open, the bills are open, everything is on hold."

All the GPs describe processing patient data, to see if the answer to the e-consultation has come. GPs must figure out their strategy for keeping themselves updated with patient information:

"Since there is a lot of work, it is difficult to remember all the things, and we would need automatic notifications about the received tests, case reports, and answered e-consultations."

The GPs are mostly well-satisfied with the technical part of e-consultations. However, two GPs brought up an incident where the consultations have been lost due to them being erased or lost in the system. One GP brought forward the complexity of specialty choice as there are different names and occupations from the same specialty:

"I understand that they want to bring the specialties together as much as possible to harmonize the list, but this makes it even more complex. Another specialty where you just have to orient yourself, if you want a vascular surgeon, you have to choose a cardiovascular surgeon at East-Tallinn Central Hospital but a vascular surgeon at North-Estonia Regional Hospital, i.e., completely different specialties, however, the surgeons solve the same problem."

Another GP described a technically improbable situation where the consultation has been answered and the attachment that was in the referral, wasn't in a reproducible form. Six GPs said during the interviews that the e-consultation system is trustworthy:

"All the information is there and doesn't get lost."

One GP elaborates that technical issues are mostly related to the GP system "Perearst" not to the e-consultation system. This can be looked at as a problem in implementation leading to the loss of efficiency and productivity of the e-consultation system.

One consultant said in the interview that the e-consultation system is technically working without problems:

"It's easy to understand and is well structured. No technical issues have occurred."

Some incidents are brought up by two consultants in the interviews, where referrals arrived late, even up to several business days later:

"There have been double referrals which lead to an increased workload of the consultants since the other referral cannot be deleted and if not answered, it will remain in the system as unanswered."

Another consultant states that a few times there has been an error in entering text as the system freezes but all these times the technical support has called themselves and solved the problem quickly. One consultant brings out that sometimes the consultant itself forgets to add information, which cannot be blamed on the system. GPs describe more problems with the content while consultants describe more problems with technical readings, as is well visualized in Table 5.

Table 5. Further digitalization of the process.

GENERAL PHYSICIAN	CONSULTANT
Difficulty with the choice of specialty	Double referrals
E-consultation and/or GP system freezing	E-consultation system freezing

Enormous digital baggage of the patient	Enormous digital baggage of the patient
Insufficient information fields	Insufficient information fields
Referral getting lost or erased	

4.4.2 Official Source of Information by a representative of the Estonian Health Insurance Fund

Mari Kalbin from EHIF said that patients' access to the right consultant has improved and that the solution to the patient's problem arrives faster:

"The organization of the patient's treatment has also improved. From the point of view of consultants, the patient's access to the right consultant has improved, and patients can get a solution to their health problem and, if necessary, treatment promptly. The prerequisite for this is, of course, an e-consultation referral prepared by a GP and prepared with exhaustive information."

Preparing referrals and reading or interpreting referral responses or case reports to change, continue or start the patient's treatment is a daily part of a family doctor's work:

"In the case of e-consultation, digital information moves instead of the patient (the GP asks and the consultant answers), so it is not additional work, which could require separate payment, but by doing normal work differently. Initially, there were some problems in organizing the work in a new way, but after getting used to it, both patients and GPs have found such a solution necessary."

The financing of e-consultations today is such that the institution or doctor who requested the e-consultation can submit an invoice to EHIF:

"The inquiring and the corresponding institution or doctor settles the accounts themselves, EHIF does not interfere there. In other words, the GP does not directly receive any additional payment for conducting e-consultations and requesting answers."

Since e-consultation services have developed since the moment when they were created, EHIF is also planning to review the billing part at some point, to see if they can somehow make it more convenient for the institutions.

Mari Kalbin also stated that a consultant can order tests before going to the patient's reception via e-consultation:

"In this way, the patient arrives at the specialist's appointment already with the necessary test results, which facilitates the specialist to provide faster and more precisely targeted treatment or procedures for the patient's health condition. The so-called first meeting has already taken place via electronic information."

4.5 Additional

In the **interview**, one GP brought up the aspect of finance as a reason to make the e-consultation. The amount of finance is limited for the GPs' use of tests and analyses, clarifying that the lack of finance and the rising need for healthcare services has led to a situation where supportive systems are being used to gain financial profits:

"Since there is a determined amount of finance provided to the GP from which all the tests are done, it may not always be enough to give the patients all the testing that they need, so when making an e-consultation the burden of finance will be transferred to the consultant, who can do the testing from their funds."

Additionally, a consultant highlighted in their interview that currently e-consultation is compared with the initial visit to a doctor, and the physical appointment that follows the e-consultation will be listed as a second visit:

"When a consultant who responds to the e-consultation meets a patient during the appointment for the first time, there must be a difference in billing between an e-consultation and an in-person appointment."

4.6 Proposals from participants on e-consultations

5 GPs described the idea of having two options in the data fields of the e-consultation system that would help to narrow down the purpose of a consultation:

"One of the options should be for asking advice from the consultant and the other option should include taking the patient over from the GP to the consultant."

Another suggestion was made by two GPs to have reproducible forms of the e-consultation attachments since currently, these are not approachable after closing the e-consultation. Currently, the response cannot be seen as a notification either from the GPs' viewpoint. It was brought up by all the GPs to make an active notification about an arrived response to e-consultation which also includes mandatory information about what happens to the patient next:

"Has the patient been taken over (for further management) by the consultant and when and where does the patient need to go."

This would leave a written trail providing GPs with much-needed information on an ongoing process and helps to keep track of the patient's treatment journey. Six GPs highlighted the need for further discussion with the same consultant:

"Currently, different consultants answer the referrals, and it is not possible to keep an ongoing conversation with the same specialist through the e-consultation system. The consultant can send the referral back to the GP and that ends the active communication between them."

As it has been stated above, a clearer visual sight of specialty requirements on the e-consultation window was brought up by five GPs:

"It would help to narrow down the time cost of searching what needs to be addressed and instead, offers a straight-up visual for the chosen specialty."

Attention has been paid to the number of clicks a GP has to make for a thorough e-consultation:

"Having multiple windows open at the work desk not only makes it more difficult to find the information but it's also an extremely ineffective usage of the system overall."

Multiple participants spoke about digital baggage and the necessity to make it more comprehensible:

"A lot of information that already has been gathered will be regularly updated and accessing the information must become more organized."

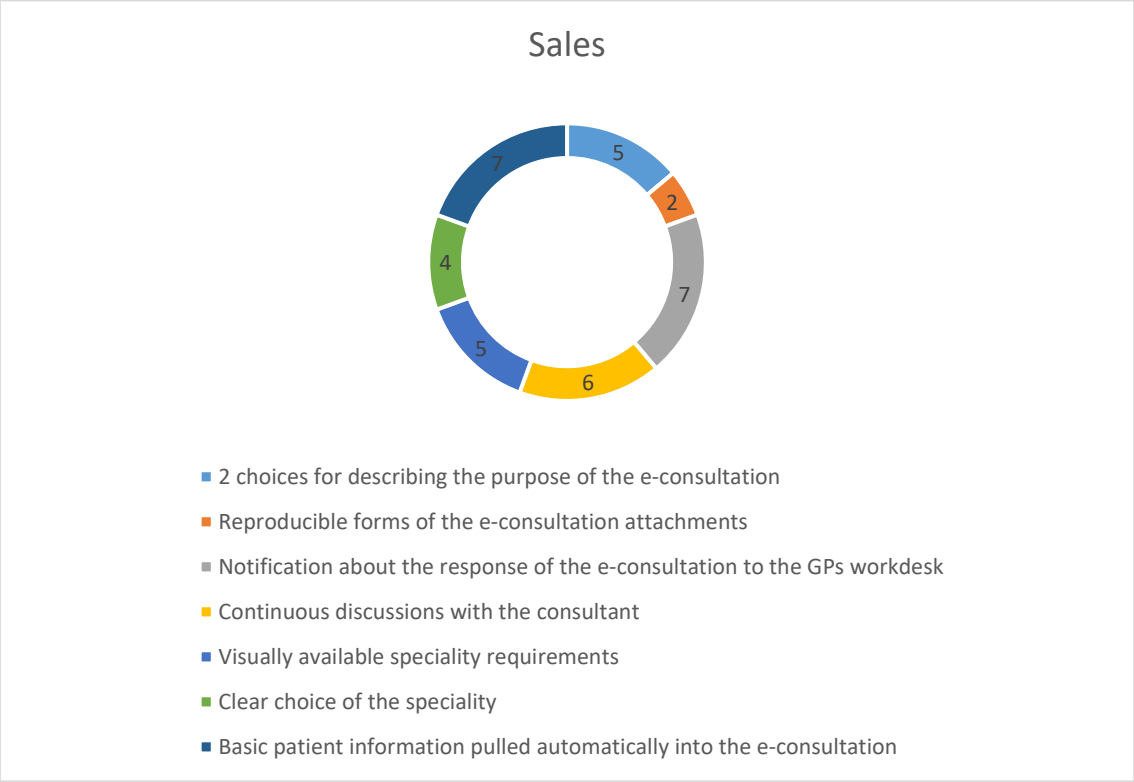
All the GPs from the interviews proposed having patient basic information, such as family history and operations (information that doesn't change), pulled automatically into the e-consultation so there won't be a need to go and look for it repeatedly.

When discussing the technical parts, and choosing the specialty came up with four GPs:

"Currently there can be a mix-up between the specialties while having the same profession with the same problem-solving but named differently. There is no database containing Estonian doctors' professional competencies which means that there is no actual overview of the professions and their locations nationwide."

Figure 7 provides an overview of the proposals by the interview participants to improve the current e-consultation system.

Figure 7. Proposals by the interview participants.



5 Discussion

Technology as a virtual alternative to the GPs' house call was envisioned in the 1920s but developed in the mid-century when NASA needed a way to provide medical care to astronauts in space [9]. Since then, TM has been defined from various viewpoints having remote evaluation and treatment of patients using telecommunications technology in common. A study by Kissi and others stated that TM success can be measured by GPs' and patients' satisfaction [1]. A study investigating acceptance of telemedicine services by Kamal and others describes that TM will be a useful health service only when people will begin to utilize it and therefore, the general attitude of end-users towards acceptance of TM services will play a significant role [4]. Another description concludes e-consultations as clinician-to-clinician communications that may obviate face-to-face specialist visits [29] and which is the main focus of this thesis as well. Therefore, the thesis aimed to evaluate the use of the e-consultation system and the attitudes and acceptance of the e-consultation system by GPs' and consultants from different specialties. Importantly, comments of EHIF as the implementer of the system were included in the study.

5.1 Participants

Input from the GPs', consultants and EHIF representatives provided valuable insights into the use of the e-consultation system and its effectiveness in the healthcare setting. Lee and colleagues say that instead of submitting simple referral requests with little clinical information to specialty departments, GPs' now submit clinical inquiries electronically to a specialist through an online portal, which opens a dialogue between the GP and the consultant about patient management [32]. The results suggest that e-consultations are generally perceived as beneficial by the GPs' and consultants, with improved communication between doctors and faster access to consultant care being highlighted as

positive impacts of the system. Lee and others also describe that the cooperation and communication between GPs and consultants have increased [32]. Although no demographic data was collected from the questionnaire group, the characteristics of the interviewees were presented, which showed that GPs' had varying levels of working experience and patient lists.

The GPs' reported making an average of four e-consultations per week, which suggests that e-consultations could potentially further reduce the number of paper-based referrals and improve the efficiency of the healthcare system. However, the number of referrals varied depending on the GP's workload, which suggests that the implementation of e-consultations should be tailored to the individual needs and circumstances of each healthcare provider. The consultants reported responding to an average of 24 consultations per week, which suggests that e-consultations can improve the timeliness of specialist advice and reduce the need for face-to-face consultations. This finding is also supported by Saar Poll's study, where it was found that consultants, who respond to e-consultations relatively rarely need more time for a response than consultants who answer e-consultations more frequently [37].

The expectations of GPs' towards consultants in the e-consultation process were also discussed. A study by Lee and others described difficulty receiving notes after consultants' visits, leading to a gap in information from the GP side, regarding patients' future management [25]. It appeared from the interviews that GPs expected to receive thorough and clear answers to their questions from the consultants, and if the patient required further treatment, they expected the consultant to take over the patient and continue as their attending physician. One GP also expressed the desire for consultants to provide feedback on the date and time of further treatment and tests arranged for the patient.

Overall, the findings suggest that e-consultations have a positive impact on healthcare, but there is room for improvement in terms of the quality of the information provided in the system and the clarity of expectations between GPs and consultants. These insights may be valuable for healthcare providers looking to improve their use of e-consultations and ensure the system is working optimally for all parties involved.

5.2 Clinicians' Perceptions on e-consultations

The questionnaire results show that many participants believe e-consultations are beneficial in healthcare settings, but some were unsure due to time constraints or lack of awareness. These findings suggest that there may be barriers to the implementation of e-consultations that need to be addressed. Nonetheless, existing literature supports the idea that e-consultations can improve access to healthcare services, reduce wait times, and increase patient satisfaction. This finding is supported by Saar Poll's study, which described that e-consultations have reduced the patients' waiting time for an appointment with a consultant [37]. Rankine and others add that the e-consultation system reduces travel burden [28] which can improve access to healthcare services and makes them more transparent.

Some GPs expressed concerns about the quality of the information provided in the free text data fields of the e-consultation system and suggested that there could be improvements made to make it clearer which analyses must be done beforehand. Lee and others describe GP practices as exaggerating patients' symptoms or relying on certain key phrases to get a consultant's appointment [25]. It also appeared that it's expected the GPs to acquire diagnostic evaluations that are normally beyond their scope of responsibility for requesting or analyzing [25] which leads to the quality aspect of the e-consultation.

Comments from GPs and consultants in interviews highlight potential benefits of e-consultations, such as improved content quality and more detailed information. Due to improvements in the underlying enabling digital technology [15], an electronic medical record can hold more intimate details of an individual than any single document [21]. This was confirmed in the current thesis, where some GPs and consultants noted that e-consultations have higher content quality compared to traditional paper-based referrals, which can lead to clearer and more thorough advice from consultants. The content and structure of the free text data fields in the e-consultation system were critical issues for both GPs and consultants. While some GPs were satisfied, others expressed concerns about the content and structure of the data fields. Further refinement of the e-consultation system is necessary, particularly regarding the content and structure of the data fields.

GPs may benefit from more specific options for the consultation, while consultants require clear and detailed referrals to provide adequate responses.

E-consultation system was described as useful for obtaining clear and concrete advice, particularly for less experienced GPs, during the interviews. Consultants emphasized the need for well-written and clear referrals, including proper background information and elementary analyses. The GPs, however, emphasized the importance of clear and specific answers from consultants and receiving feedback regarding further treatment and tests. Lee and others support this finding stating that some participants viewed interactions with consultants as more antagonistic, often describing the response of the consultants as insulting [32]. The lack of face-to-face interaction could lead to miscommunication or incomplete information, potentially impacting consultation quality. It can be said that delays in response times, long waiting times for in-person appointments, and issues with the quality and clarity of e-consultation referrals are among the challenges faced in using the system effectively both in literature as well in the results of this thesis.

It's important to note that e-consultations may not be suitable for all patients or medical conditions and that the quality of care provided through e-consultations may vary. While the questionnaire may not have addressed the quality of e-consultations, comments from the GPs and consultants suggest that e-consultations may have benefits over traditional paper-based referrals in terms of content quality and detailed information. Ongoing training and support for both GPs and consultants in using the e-consultation system effectively is necessary. The issues raised in the questionnaire and interviews highlight the need for ongoing evaluation and improvement of e-consultation systems to realize their full potential in improving access to specialist care and reducing unnecessary appointments.

5.3 Challenges and feedback on the use of e-consultations by GPs and consultants

The questionnaire responses and interview discussions shed light on the prerequisites and considerations for the effective use of e-consultations between GPs and consultants, as well as the benefits and challenges associated with this approach to healthcare delivery. Regarding the prerequisites, the availability of a working computer, fast internet, easy-to-use search engines, quick access to data, and integration with the GP computer system are critical factors that need to be in place to ensure effective and efficient communication. Lee and others described the frustration of the GPs on the interface issues and lack of integration between e-consultation and EHR [32], however, the results from the current thesis were the opposite. It was found that even when integration between e-consultation and EHR was mandatory, a bigger problem was integrating the e-consultation system with the GP system. Additionally, knowledge of the experience and sub-specialization of consultants and the offered services and procedures by different institutions were described as essential to refer patients to the appropriate consultant for their specific needs.

On the other hand, the interviews revealed that there are several challenges and issues associated with e-consultations. One of the significant concerns highlighted by GPs is the limited options for communication with some specialties. Lee and others made a qualitative analysis to understand the GP perceptions of the results of e-consultation initiation on GP workflow, specialist access, and patient care and found out that the previsit requirements requested by specialty reviewers were a burdensome shift of work to the GPs [44], which means that to maintain further communication, there has to be made a choice of using the resources and weighing the time-burden of these processes. Another challenge discussed is the need for a common consultation system across all hospitals to ensure equal access to care. Additionally, the personal experiences of GPs with the responded facility can affect referral decisions, and patient preferences should be taken into consideration.

Regarding the feedback system, both GPs and consultants agree on the need for response notifications that can be accessed from the GPs' work desktops. This finding is supported

by Lee and others mentioning difficulty receiving notes after visits [25]. There is also a need for the possibility to give feedback to the specific specialty or consultant. GPs suggest the automatic inclusion of basic patient information in the e-consultation and clearer options for the e-consultation goals and response to ensure a strict finishing to the process. Furthermore, the consultants emphasized the importance of understanding the reasons for the referral and following the treatment recommendations provided by the consultant. Guidelines for different specialties exist to assist GPs in describing a patient's condition to the consultant, but they are often overlooked or underutilized.

The concerns expressed by both GPs and consultants about the time-consuming nature of e-consultations are also important to consider. While e-consultations offer many benefits, such as convenience for patients and reduced healthcare costs, they must also be feasible and manageable for healthcare providers. This finding is supported by Bhanot and others regarding reimbursement such as compensating for the amount of time spent completing some of the consults [38].

In summary, the results highlight the need for a comprehensive and integrated e-consultation system that addresses the challenges and prerequisites to ensure effective communication and improve patient care. A successful e-consultation system requires a combination of user-friendly technology, accessible information, and relevant resources to ensure that patients are referred to the appropriate consultant and receive timely and effective care.

5.4 Advancements and future developments in the e-consultation system for clinicians

The interviews with GPs and consultants highlight several challenges related to gathering patient data for e-consultations. One of the major concerns is the amount of patient data that needs to be copied and pasted, which can be time-consuming and tedious for healthcare providers. GPs suggest that some basic patient data such as family history, previous surgeries, and other unchanged information should be pulled automatically from

the system to save time and effort. The complexity of handling digital baggage is another challenge, and it can be overwhelming in a limited period or a more intensive work environment. Processing patient data and keeping up with patient information is also a challenge, and GPs suggest the need for automatic notifications about received tests, case reports, and answered e-consultations. Technical issues such as lost consultations and erased data are also highlighted, but the GPs and consultants generally agree that the e-consultation system is trustworthy.

There are also concerns about the accuracy and consistency of specialty names and occupations from the same specialty, which can be confusing for healthcare providers. Additionally, there have been incidents of referrals arriving late, which can increase the workload of consultants. Bhanot and others described in 2021 expectations of shortening the workload of consultants and being able to consult more remotely [49]. Saar Poll study allocated separate time for responding to an e-consultation by only 15% of the participated consultants, which also came up from the responses of the current thesis. Clinicians say, however, that it would be easier to make the e-consultation system better than re-organize the work of the clinicians.

Overall, the e-consultation system is deemed technically working without significant problems. The challenges identified in the interviews suggest that the implementation of the e-consultation system needs improvement to enhance its efficiency and productivity. Healthcare providers need to be provided with adequate technical support and training to use the system effectively. Additionally, the system needs to be designed to simplify the process of gathering patient data and ensure the accuracy and consistency of specialty names and occupations. A study by Rankine and others discovered that consultants recommend using diagnosis-specific templates tailored to referral reasons, whereas concerns regarding GPs were somewhat opposing that, because these may increase the burden of the documentation process [28]. The implementation of these improvements can lead to a more efficient and effective e-consultation system that benefits both healthcare providers and patients.

Mari Kalbin from EHIF highlights the positive impact of e-consultations on patient access to the right consultant and faster solutions to their health problems. The improved organization of patient treatment is attributed to the e-consultation referral system, which

provides exhaustive information to consultants. The e-consultation referral system also allows for the digital exchange of information between GPs and consultants, reducing the need for patients to physically visit consultants.

Kalbin notes that preparing referrals and interpreting referral responses or case reports is a daily part of a family doctor's work, and e-consultations are not additional work that requires a separate payment. Instead, e-consultations are a normal way of conducting consultations. However, the financing of e-consultations is such that the institutions or doctors who requested the e-consultation can submit an invoice to EHIF. The family doctor does not receive any additional payment for conducting e-consultations and requesting answers.

While it is true that the limited amount of finance provided to GPs can lead to a situation where supportive systems are being used to gain financial profits, it is essential to prioritize the quality of care provided to patients. EHIF is planning to review the billing part of e-consultations at some point to make it more convenient for institutions. Kalbin also notes that consultants can order tests before the patient's reception via e-consultation, allowing patients to arrive at specialist appointments with necessary test results, and facilitating faster and more targeted treatment or procedures. Overall, Kalbin's comments suggest that e-consultations have improved the organization of patient treatment and reduced the need for physical visits to consultants, leading to faster and more targeted treatment.

Regarding the billing of e-consultations, it is essential to have a clear and fair system that accurately reflects the services provided. It is reasonable to expect that an e-consultation followed by a physical appointment would be billed differently than a physical appointment alone. Still, the details of this system should be carefully considered to ensure that it does not discourage the use of e-consultations and provides fair compensation for the services provided. While finance and billing are important considerations in healthcare, they should not be the primary drivers of decisions regarding the use of e-consultations. The focus should always be on providing the best possible care for patients, and any billing system should be carefully designed to reflect the services provided and encourage the use of e-consultations where appropriate.

5.5 Proposals from participants in e-consultations

The feedback and suggestions from GPs have highlighted several important areas for improvement in the e-consultation system. One practical solution that has been suggested is to provide two options for the consultation, one for asking for advice and the other for transferring the patient. This would help narrow down the purpose of the consultation and make it more straightforward for GPs. To provide GPs with a clear trail of patient treatment and keep track of ongoing processes, it is essential to have reproducible forms of e-consultation attachments and an active notification system for when a response arrives. Additionally, ongoing conversations with the same consultant are important to ensure a smooth patient journey and effective treatment. It is also crucial to have a clearer visual display of special requirements and reduce the number of clicks required for a thorough e-consultation. Lee and others support this finding stating that clinicians have to make more clicks to reach the same endpoint with using different systems [32]. This would help reduce the time and effort required by GPs to find the necessary information and improve the overall efficiency of the system.

Furthermore, making digital baggage more comprehensible and automatically pulling patient basic information into the e-consultation are necessary improvements to the system. To ensure the accurate and efficient allocation of patients to the appropriate consultant, there is a need to address the lack of a database containing Estonian doctors' professional competencies. Overall, the feedback and suggestions from GPs underscore the need for ongoing improvements and developments in the e-consultation system to enhance the quality of patient care and provide a more efficient and effective healthcare system.

5.6 Limitations and correlations

It is essential to acknowledge the limitations of the study and the correlations between different parts of the thesis. Limitations refer to the aspects that could have affected the validity and reliability of the study. It is crucial to identify and address these limitations in the thesis to ensure a clear understanding of the scope and extent to which the results can be generalized:

1. **Limited sample size:** the thesis included only a small number of GPs and consultants, which may limit the generalizability of the findings to other healthcare providers.
2. **The characteristics of the participants:** It is unclear whether participant characteristics data is a representative sample of the population of GPs and consultants in the healthcare setting.
3. **Data collection:** No demographic data were collected from the questionnaire group, making it difficult to determine whether the results are representative of a specific population
4. **Bias:** The thesis may have had selection bias, as only those who agreed to participate were included. This may have resulted in a biased sample that does not represent the entire population of GPs and consultants who use e-consultations.
5. **Self-reporting:** The thesis relied on self-reported data, which may not accurately reflect the actual behaviors or experiences of the participants. The responses may be influenced by social desirability bias, where participants provide answers that they believe are more socially acceptable.
6. **Lack of external validation:** The thesis did not include external validation of the findings, which may limit the reliability and validity of the results.
7. **Timeframe:** The study is based on the knowledge available up to 2022, and as such, may not reflect the current state of e-consultations in healthcare.

5.7 Suggestions for further research

Based on the findings of this thesis, several areas for further research could build on this research and deepen the understanding of e-consultations in healthcare:

1. **Larger sample size:** While this study interviewed 7 GPs and 3 consultants, a larger sample size could provide a more comprehensive understanding of the experiences of healthcare providers with e-consultations.
2. **Quality of e-consultations:** Further research could focus on the quality of e-consultations and how they compare to in-person consultations. This could include evaluating patient satisfaction with e-consultations and exploring whether e-consultations can lead to improved health outcomes.
3. **Optimizing e-consultations:** Additional research could focus on how e-consultations can be optimized to improve patient outcomes. This could include exploring how healthcare providers can better use e-consultations to diagnose and treat patients, as well as how to overcome any barriers that may prevent patients from using e-consultations.
4. **Content and structure of data fields:** As noted in this study, the content and structure of the data fields in the e-consultation system can impact the efficiency and effectiveness of these consultations. Further research could explore how to improve the design of these data fields to ensure that they are user-friendly and meet the needs of healthcare providers and patients.

Overall, there is significant potential for further research in this area, and continued exploration of e-consultations in healthcare can help to optimize the use of these tools and improve patient outcomes.

6 Conclusion

RQ 1: Factors that influence the acceptance and adoption of the e-consultation system among GPs are that the Estonian e-consultation system fulfills its purpose of improved communication between doctors, faster access to consultant care, and reduced waiting times for appointments with the consultants. Despite that, some barriers to the implementation of e-consultations include time constraints, lack of awareness, concerns about the quality of the information provided, and the need for improvements to make it clearer which analyses must be done beforehand.

To overcome these barriers, the implementation of e-consultations should be tailored to the individual needs and circumstances of each healthcare provider. This will require collaboration and communication between all stakeholders, including healthcare providers, IT specialists, patients, and policymakers. By working together, they can develop and implement effective e-consultation systems that meet the needs of all stakeholders while improving the overall quality and efficiency of healthcare delivery.

RQ 2: Based on the information provided, both GPs and consultants agree on the need for a comprehensive and integrated e-consultation system that addresses the challenges and prerequisites to ensure effective communication and improve patient care. Guidelines for different specialties exist to assist GPs in describing a patient's condition to the consultant, but they are often overlooked or underutilized. Consultants indicate the need for a comprehensive and integrated e-consultation system that addresses the challenges and prerequisites to ensure effective communication and improve patient care.

RQ 3: According to the questionnaire responses and interview discussions, the most important design features of e-consultation systems for GPs and consultants are user-friendly technology, integration with the GP computer system, easily accessible information from medical information programs (earlier history, investigations, some analysis),

GPs lack direct access to some consultants with sub-specialization. Also, clear communication options for follow-up consultations with the same consultant. GPs noted that feedback notifications (notification that the answer of the consultant after e-consultation is ready) and the possibility of giving feedback to the specific specialty or consultant are also important for GPs. GPs also noted the lack of a general e-consultation system across all hospitals. Consultants agreed that information from EHR should be better accessed, but overall, they were satisfied with the design features of the e-consultation.

Personal experiences of GPs affecting referral decisions, time-consuming nature of e-consultations, accuracy, and consistency of specialty names and occupations, and gathering patient data. The implementation of the e-consultation system needs improvement to enhance its efficiency and productivity. Healthcare providers need to be provided with adequate technical support and training to use the system effectively. The e-consultation system needs to be designed to simplify the process of gathering patient data and ensure the accuracy and consistency of specialty names and occupations.

RQ 4: The use of e-consultations affects the productivity and job satisfaction of GPs and consultants. The effects vary based on their workload. GPs and consultants both indicated the time-consuming nature of e-consultations. Consultants brought up the increase in their workload in their interviews, and they mentioned that when the consultant works in an outpatient clinic or has a day job, it's easier to organize e-consultation responses in the daily work.

The workload increase has been attributed to the fact that e-consultations require more information than conventional referrals and often there's a need to find additional information about the patient. One consultant also underlines that the workload increase is comparable to seeing an additional patient, as e-consultations need the same amount of concentration as physical appointments. The workload has increased for both GPs and consultants due to the introduction of e-consultations, and the time-consuming nature of filling in e-consultations is a major concern for some participants. The workload depends on how the consultants' work is organized, and the increase in workload is due to the need to gather more information about the patient.

RQ 5: The study suggests there is room for improvement in terms of the quality of the information provided in the system and the clarity of expectations between GPs and consultants. The most critical areas for improvement identified by GPs and consultants include:

1. **Providing adequate technical support and training to healthcare providers:** Some participants were unsure about the benefits of e-consultations due to time constraints that may be related to the lack of awareness. This suggests that information and training to improve the use of e-consultation systems is necessary for some GPs. Also, improvements in usability and ease of use could increase adoption of the system.
1. **Quality of information provided:** GPs and consultants expressed concerns about the quality of the information provided in the free text data fields of the e-consultation system, namely missing clear questions addressing the aim of the e-consultation was felt to decrease the quality of the service and using diagnosis-specific templates tailored to referral reasons.
2. **Thorough and clear answers to questions:** GPs expected to receive thorough and clear answers to their questions from the consultants. Also, f the patient required further specialist management they expected the consultant to take over the patient and continue as the patient´s attending physician. Some GPs also expressed the desire for consultants to provide feedback on the date and time of further treatment and tests arranged for the patient.
3. **Clarity of expectations between GPs and consultants:** It was found that there was a gap in information from the GP side regarding patients' future management. GPs expected consultants to provide thorough and clear answers to their questions, but the consultants' visits did not always provide notes. This highlighted the need for clarity of expectations between GPs and consultants.
4. **Providing a common consultation system across all hospitals in Estonia:** It is expected to have a nationwide system in place, to provide equivalent service to all people in Estonia
5. **Automation of patient data:** Gathering patient data for e-consultations automatically from the system and simplifying the process of gathering patient data was brought up by both the GPs and consultants.

6. **Further contact:** Accuracy and consistency of specialty names and occupations and allowing feedback to the specific specialty or consultant.

To enhance system effectiveness and usability, the following strategies can be implemented:

1. **Develop guidelines for information quality:** Guidelines can be developed to ensure that the information provided in the e-consultation system meets a minimum standard. This could include providing clear instructions on what analyses must be done before submitting a request.
2. **Ensure clear communication:** There needs to be clear communication between GPs and consultants to ensure that expectations are met. This could involve providing feedback on the date and time of further treatment and tests arranged for the patient but also providing response notifications that can be accessed from the GPs' work desktop.
2. **Increase awareness and training:** To increase the adoption of the system, there needs to be more awareness and training provided to GPs and consultants. This could include providing training on how to use the system and its benefits.
3. **Streamline the system:** The system could be streamlined to make it more user-friendly and easier to use. This could involve reducing the number of steps required to complete an e-consultation and providing more guidance on the process.

7 Summary

The use of e-consultation systems has become an integral part of the healthcare system, and it is generally perceived positively by GPs and consultants in terms of its ability to improve communication and shorten access to consultant care. All GPs interviewed highlighted the importance of e-consultations in their work, but there were some concerns regarding the quality of information provided through the system. GPs expect clear and specific advice from consultants and prefer the consultant to take over the patient if further treatment is required. E-consultation systems were seen as particularly useful for less experienced GPs who require advice from consultants. The content and structure of the free text data fields in the e-consultation system received mixed reviews from GPs, with some suggesting improvements such as providing options instead of free text fields. Overall, the study suggests that e-consultation systems have a positive impact on healthcare communication, but there is room for improvement in terms of data fields and clarity of information.

E-consultations have the potential to improve access to care and streamline the referral process in the healthcare sector. However, there are concerns raised by the GPs and consultants regarding the workload and time-consuming nature of filling in e-consultations. The GPs highlighted the importance of having a common consultation system across all hospitals to ensure patients have equal access to care. They also emphasized the impact of their previous personal experience with the institution in making referral decisions. The consultants expressed the need for clearer options for e-consultation goals and responses to have a strict finishing to the process. Moreover, there is a need for response notifications that can be accessed from the GPs work desktop. Finally, some consultants criticized the results of e-consultations and the lack of adherence to treatment recommendations. Overall, addressing these concerns and improving the e-consultation system could lead to more efficient and patient-centered healthcare services.

E-consultations have become a vital part of healthcare services, especially in light of the COVID-19 pandemic. However, there are still areas that need improvement, such as the

billing process and the need for clearer visual aids on the e-consultation window. The GPs' suggestions regarding the need for reproducible forms of e-consultation attachments and active notifications about patient treatment journeys are also critical areas that require attention. Moreover, the issue of digital baggage and the need for more organized access to patient information also requires addressing. Finally, the lack of a database containing doctors' professional competencies makes it difficult to choose the right specialty for the e-consultation. The EHIF's plan to review the billing part is a positive step toward addressing some of these issues.

References

[1] J. Kissi, B. Dai, C. S. K. Dogbe, J. Banahene, and O. Ernest, "Predictive factors of physicians' satisfaction with telemedicine services acceptance," *Health Informatics J*, vol. 26, no. 3, pp. 1866–1880, Sep. 2020, doi: 10.1177/1460458219892162.

[2] S. A. Kamal, M. Shafiq, and P. Kakria, "Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM)," *Technol Soc*, vol. 60, Feb. 2020, doi: 10.1016/j.techsoc.2019.101212.

[3] Tervisekassa, "E-konsultatsioon." https://www.tervisekassa.ee/partnerile/raviasutusele/perearstile/e-konsultatsioon (accessed Apr. 10, 2023).

[4] S. A. Kamal, M. Shafiq, and P. Kakria, "Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM)," *Technol Soc*, vol. 60, Feb. 2020, doi: 10.1016/j.techsoc.2019.101212.

[5] K. Klockner, P. Shields, M. Pillay, and K. Ames, "Pragmatism as a teaching philosophy in the safety sciences: A higher education pedagogy perspective," *Saf Sci*, vol. 138, 2021, doi: 10.1016/j.ssci.2020.105095.

[6] V. Kaushik and C. A. Walsh, "Pragmatism as a research paradigm and its implications for Social Work research," *Soc Sci*, vol. 8, no. 9, 2019, doi: 10.3390/socsci8090255.

[7] E. Keely, C. Liddy, and A. Afkham, "Utilization, benefits, and impact of an e-consultation service across diverse specialties and primary care providers," *Telemedicine and e-Health*, vol. 19, no. 10, 2013, doi: 10.1089/tmj.2013.0007.

[8] P. ; A. A. ; R. P. ; C. G. ; E. R. ; P.-A. G. Kruus, "E-consultation service supporting Moldovan family doctors," 2015.

[9] S. S. Bajowala, J. Milosch, and C. Bansal, "Telemedicine Pays: Billing and Coding Update," *Current Allergy and Asthma Reports*, vol. 20, no. 10. Springer, Oct. 01, 2020. doi: 10.1007/s11882-020-00956-y.

[10] A. I. Albarrak *et al.*, "Assessment of physician's knowledge, perception and willingness of telemedicine in Riyadh region, Saudi Arabia," *J Infect Public Health*, vol. 14, no. 1, pp. 97–102, Jan. 2021, doi: 10.1016/j.jiph.2019.04.006.

[11] A. Haleem, M. Javaid, R. P. Singh, and R. Suman, "Telemedicine for healthcare: Capabilities, features, barriers, and applications," *Sensors International*, vol. 2. KeAi Communications Co., Jan. 01, 2021. doi: 10.1016/j.sintl.2021.100117.

[12] World Health Organization and International Telecommunication Union, "WHO-ITU global standard for accessibility of telehealth services," Jan. 2022.

[13] WHO, *Global Diffusion of eHealth: Making Universal Health Coverage Achievable. Report of the Third Global Survey on eHealth*. 2016.

[14] D. W. Kim, J. Y. Choi, and K. H. Han, "Risk management-based security evaluation model for telemedicine systems," *BMC Med Inform Decis Mak*, vol. 20, no. 1, Jun. 2020, doi: 10.1186/s12911-020-01145-7.

[15] M. Waller and C. Stotler, “Telemedicine: a Primer,” *Current Allergy and Asthma Reports*, vol. 18, no. 10. Current Medicine Group LLC 1, Oct. 01, 2018. doi: 10.1007/s11882-018-0808-4.
[16] A. Waqas, S. H. Teoh, L. V. Lapão, L. A. Messina, and J. C. Correia, “Harnessing telemedicine for the provision of health care: Bibliometric and scientometric analysis,” *J Med Internet Res*, vol. 22, no. 10, Oct. 2020, doi: 10.2196/18835.
[17] M. Žmenja, “Provision of Health-care Service over the Internet – the Legality of E-consultations in Estonia,” *Juridica International*, vol. 26, 2017, doi: 10.12697/ji.2017.26.05.
[18] K. Furlepa, A. Tenderenda, R. Kozłowski, M. Marczak, W. Wierzba, and A. Śliwczyński, “Recommendations for the Development of Telemedicine in Poland Based on the Analysis of Barriers and Selected Telemedicine Solutions,” *Int J Environ Res Public Health*, vol. 19, no. 3, Feb. 2022, doi: 10.3390/ijerph19031221.
[19] R. W. Ahmad, K. Salah, R. Jayaraman, I. Yaqoob, S. Ellahham, and M. Omar, “The role of blockchain technology in telehealth and telemedicine,” *International Journal of Medical Informatics*, vol. 148. Elsevier Ireland Ltd, Apr. 01, 2021. doi: 10.1016/j.ijmedinf.2021.104399.
[20] C. Scott Kruse, P. Karem, K. Shifflett, L. Vegi, K. Ravi, and M. Brooks, “Evaluating barriers to adopting telemedicine worldwide: A systematic review,” *Journal of Telemedicine and Telecare*, vol. 24, no. 1. SAGE Publications Ltd, pp. 4–12, Jan. 01, 2018. doi: 10.1177/1357633X16674087.
[21] G. Nittari *et al.*, “Telemedicine Practice: Review of the Current Ethical and Legal Challenges,” *Telemedicine and e-Health*, vol. 26, no. 12. Mary Ann Liebert Inc., pp. 1427–1437, Dec. 01, 2020. doi: 10.1089/tmj.2019.0158.
[22] Tehik, “Üleriigiline digiregistratuur.”
[23] Tervisekassa, “E-konsultatsioon.” https://www.tervisekassa.ee/partnerile/raviasutusele/perearstile/e-konsultatsioon (accessed Apr. 10, 2023).
[24] P. R. P. H. R. E. R. A. A. Kruus, “Telemeditsiini laialdasem rakendamine Eestis,” 2014.
[25] M. S. Lee, K. N. Ray, A. Mehrotra, P. Giboney, H. F. Yee, and M. L. Barnett, “Primary care practitioners’ perceptions of electronic consult systems: A qualitative analysis,” in *JAMA Internal Medicine*, 2018. doi: 10.1001/jamainternmed.2018.0738.
[26] V. G. Vimalananda *et al.*, “Electronic consultations (e-consults) to improve access to specialty care: A systematic review and narrative synthesis,” *J Telemed Telecare*, vol. 21, no. 6, 2015, doi: 10.1177/1357633X15582108.
[27] C. Liddy, I. Moroz, A. Mihan, N. Nawar, and E. Keely, “A Systematic Review of Asynchronous, Provider-to-Provider, Electronic Consultation Services to Improve Access to Specialty Care Available Worldwide,” *Telemedicine and e-Health*, vol. 25, no. 3, 2019, doi: 10.1089/tmj.2018.0005.
[28] J. Rankine, D. Yeramosu, L. Matheo, G. M. Sequeira, E. Miller, and K. N. Ray, “Optimizing e-consultations to adolescent medicine specialists: Qualitative synthesis of feedback from user-centered design,” *JMIR Human Factors*, vol. 8, no. 3. 2021. doi: 10.2196/25568.
[29] V. G. Vimalananda *et al.*, “Electronic consultations (E-consults) and their outcomes: A systematic review,” *Journal of the American Medical Informatics Association*, vol. 27, no. 3. 2020. doi: 10.1093/jamia/ocz185.

[30] F. Mold, J. Hendy, Y. L. Lai, and S. de Lusignan, “Electronic consultation in primary care between providers and patients: Systematic review,” *JMIR Medical Informatics*, vol. 7, no. 4. 2019. doi: 10.2196/13042.
[31] H. K. Y. Almathami, K. Than Win, and E. Vlahu-Gjorgievska, “Barriers and facilitators that influence telemedicine-based, real-time, online consultation at patients’ homes: Systematic literature review,” *Journal of Medical Internet Research*, vol. 22, no. 2. 2020. doi: 10.2196/16407.
[32] M. S. Lee, K. N. Ray, A. Mehrotra, P. Giboney, H. F. Yee, and M. L. Barnett, “Primary care practitioners’ perceptions of electronic consult systems: A qualitative analysis,” in *JAMA Internal Medicine*, 2018. doi: 10.1001/jamainternmed.2018.0738.
[33] D. Kotz, S. E. Lord, A. J. O’Malley, L. Stark, and L. A. Marsch, “Workshop on emerging technology and data analytics for behavioral health,” *JMIR Res Protoc*, vol. 20, no. 6, 2018, doi: 10.2196/resprot.9589.
[34] C. S. Kruse, K. Williams, J. Bohls, and W. Shamsi, “Telemedicine and health policy: A systematic review,” *Health Policy and Technology*, vol. 10, no. 1. Elsevier B.V., pp. 209–229, Mar. 01, 2021. doi: 10.1016/j.hlpt.2020.10.006.
[35] Riigikantselei and Justiitsministeerium, “Eesti Haigekassa tervishoiuteenuste loetelu,” Jun. 2021.
[36] Riigikantselei and Justiitsministeerium, “Tervishoiuteenuse osutamise dokumenteerimise tingimused ja kord-Riigi Teataja,” Sep. 2008.
[37] “E-KONSULTATSIOONI RAKENDUMISE BARJÄÄRIANALÜÜSI LÄBIVIIMINE Tellija: Eesti Haigekassa TALLINN,” 2016. [Online]. Available: www.saarpoll.ee
[38] N. Bhanot, G. Dimitriou, L. McAninch, C. Rossi, D. Thompson, and S. Manzi, “Perspectives of Health Care Providers in an Integrated Health Care Delivery Network on Inpatient Electronic Consultation (e-Consult) Use During the COVID-19 Pandemic,” *J Patient Exp*, vol. 8, 2021, doi: 10.1177/23743735211007696.
[39] V. G. Vimalananda *et al.*, “Electronic consultations (e-consults) to improve access to specialty care: A systematic review and narrative synthesis,” *J Telemed Telecare*, vol. 21, no. 6, 2015, doi: 10.1177/1357633X15582108.
[40] M. Lee *et al.*, “Perspectives of VA Primary Care Clinicians Toward Electronic Consultation-Related Workload Burden: A Qualitative Analysis,” *JAMA Netw Open*, vol. 3, no. 10, 2020, doi: 10.1001/jamanetworkopen.2020.18104.
[41] J. Banks *et al.*, “Use of an electronic consultation system in primary care: A qualitative interview study,” *British Journal of General Practice*, vol. 68, no. 666, 2018, doi: 10.3399/bjgp17X693509.
[42] K. Tzartzas, P. N. Oberhauser, R. Marion-Veyron, C. Bourquin, N. Senn, and F. Stiefel, “General practitioners referring patients to specialists in tertiary healthcare: A qualitative study,” *BMC Fam Pract*, vol. 20, no. 1, 2019, doi: 10.1186/s12875-019-1053-1.
[43] A. Azamar-Alonso, A. P. Costa, L. A. Huebner, and J. E. Tarride, “Electronic referral systems in health care: A scoping review,” *ClinicoEconomics and Outcomes Research*, vol. 11, 2019, doi: 10.2147/CEOR.S195597.
[44] M. Lee *et al.*, “Perspectives of VA Primary Care Clinicians Toward Electronic Consultation-Related Workload Burden: A Qualitative Analysis,” *JAMA Netw Open*, vol. 3, no. 10, 2020, doi: 10.1001/jamanetworkopen.2020.18104.

[45] J. Strymish *et al.*, “Electronic consultations (E-consults): Advancing infectious disease care in a large veterans affairs healthcare system,” *Clinical Infectious Diseases*, vol. 64, no. 8, pp. 1123–1125, Apr. 2017, doi: 10.1093/cid/cix058.
[46] M. Y. Feilzer, “Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm,” *J Mix Methods Res*, vol. 4, no. 1, 2010, doi: 10.1177/1558689809349691.
[47] B. Parmanto, A. N. Lewis, Jr., K. M. Graham, and M. H. Bertolet, “Development of the Telehealth Usability Questionnaire (TUQ),” *Int J Telerehabil*, vol. 8, no. 1, pp. 3–10, Jul. 2016, doi: 10.5195/ijt.2016.6196.
[48] S. Hajesmaeel-Gohari and K. Bahaadinbeigy, “The most used questionnaires for evaluating telemedicine services,” *BMC Med Inform Decis Mak*, vol. 21, no. 1, 2021, doi: 10.1186/s12911-021-01407-y.
[49] N. Bhanot, G. Dimitriou, L. McAninch, C. Rossi, D. Thompson, and S. Manzi, “Perspectives of Health Care Providers in an Integrated Health Care Delivery Network on Inpatient Electronic Consultation (e-Consult) Use During the COVID-19 Pandemic,” *J Patient Exp*, vol. 8, 2021, doi: 10.1177/23743735211007696.

Appendix 1 – Non-exclusive licence for reproduction and publication of a graduation thesis

I, Tairi Kollo

1. Grant Tallinn University of Technology free licence (non-exclusive licence) for my thesis "General physicians' and consultants' thoughts on the e-consultation system" , supervised by Katrin Gross-Paju

    1.1. to be reproduced for the purposes of preservation and electronic publication of the graduation thesis, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright;

    1.2. to be published via the web of Tallinn University of Technology, incl. to be entered in the digital collection of the library of Tallinn University of Technology until expiry of the term of copyright.

2. I am aware that the author also retains the rights specified in clause 1 of the non-exclusive licence.

3. I confirm that granting the non-exclusive licence does not infringe other persons' intellectual property rights, the rights arising from the Personal Data Protection Act or rights arising from other legislation.

11.05.2023

Appendix 2 – Literature review

Data collection method

Search engines	**Key terminology**	**Combinations**	**Inclusion criteria**
PubMed MeSH	*telemedicine*	"OR"	Estonian
Google Scholar MeSH	*telecommunications*	"AND"	English
Mendeley	*remote consultation*	" * "	Free full text
	general practice		2015-2022
	electronic consultations		
Total:	PubMed + Google Scholar: **99 articles**	**+** *covid* terminology **= 373**	**Total: 472 articles** **Total used: 54**

Appendix 3 – Questionnaire for the GPs

The purpose of this survey is to gather information about the e-consultation system used by GPs. It takes about 10 minutes to respond. When answering questions, please be open and honest. Survey participants remain anonymous. The collected data will be processed and used in writing the master's thesis of TalTech E-Health student Tairi Kollo. Please return the completed questionnaire to the graduate student.
If you have any questions, contact through the email: takoll@ttu.com
Thank you very much for answering the questionnaire!

Q1. How to decide to whom and where to send a patient through e-consultation?

Q2. How is the need for appointment speed determined?

Q3. How fast should patient consultation be responded through e-consultation?

Q4. How to communicate this in the cover letter?

Q5. What kind of information must be included in the e-consultation referral letter so that the necessary information reaches the consultant?

Q6. How is information currently available about the patient's prior preparation for referral to a consultant?

Q7. How would making e-consultation requests be the most handy and convenient for you?

Q8. What other features should e-consultation have in addition to referring patients to consultants?

Q9. What kind of data should the e-consultation contain?

Appendix 4 – Interview questions in Estonian

INTERVJUU KAVA

1. **Tutvustus**

   Tere, olen Tallinna Tehnikaülikooli E-Tervise õppekava üliõpilane Tairi Kollo ning enda lõputöö raames soovin viia läbi intervjuu, mille eesmärk on kaardistada e-konsultatsioonide kasutajakogemust perearstide ning eriarstide seas. Ühele intervjuule on planeeritud 30 minutit. Kogutavaid andmeid kasutatakse intervjuud läbi viiva üliõpilase lõputöö koostamiseks, mille eesmärk on hinnata arstidevahelist suhtlust Eesti e-konsultatsiooni näitel.

   Intervjuu viiakse läbi struktueeritult ning seda salvestatakse diktofoniga. Kogutud andmetele on ligipääs vaid intervjuu läbiviijal, kes andmeid isiklikult kogub ja analüüsib. Tegemist ei ole isikupõhise andmekorjega, ekspertide vastused küsimustele säilitatakse intervjueerija poolt tagatud turvalises serveris andmete analüüsimiseni, mille järgselt lindistused kustutatakse ja paberkandjal olevad märkmed hävitatakse. Uuringus osalemine on vabatahtlik ning Teil on õigus loobuda osalemast ükskõik millisel intervjuu hetkel.

2. **Nõusoleku lehe täitmine INFORMEERITUD NÕUSOLEKULEHT** (allkirjastatud või digiallkirjastatud)

Eesmärk	**INTERVJUU KÜSIMUSED**
3. **Taustauuring**	**PEREARSTID**
	3.1. Kui kaua olete töötanud perearstina?
	3.2. Kui suur on Teie patsiendibaas?
	3.3. Mis aastal liitusite e-konsultatsioonide kasutamisega?
	3.4. Kui palju teete e-konsultatsioone nädalas?
	ERIARSTID

	3.5. Kui kaua olete töötanud eriarstina?
	3.6. Mis erialale olete spetsialiseerunud?
	3.7. Mis aastal liitusite e-konsultatsioonide kasutamisega?
	3.8 Kui palju teete e-konsultatsioone nädalas?
4. Hetkeolukorra kaardistamine	4.1. Mis on e-konsultatsioonide peamine eesmärk?
	4.2. Kuidas toimus patsiendi seisundist lähtuv konsulteerimine arstide vahel enne e-konsultatsioonide teket?
	4.3. Missuguse terviseseisundiga patsiendile sobib e-konsultatsioon?
	4.4. Mis põhjustel võib jääda patsient tervishoiutöötaja poolt e-konsultatsioonile suunamata? Mis põhjustel võib jääda patsient patsiendipoolse probleemi korral e-konsultatsioonile suunamata?
	4.5. **PEREARSTILE**: Mis on Teie ootused e-konsultatsioonile vastavale eriarstile patsiendi edaspidise käsitlemise suhtes? **ERIARSTILE:** Mis on Teie ootused e-konsultatsiooni päringut tegevale arstile patsiendi terviseseisundi kirjeldamise suhtes?
	4.6. Missugused informatsiooni väljad tuleb täita e-konsultatsiooni päringut tegeval arstil? Kas vajalikud väljad täidetakse alati? **PEREARSTILE:** Missugused puudujäägid kerkivad informatsioonivälju täites esile? **ERIARSTILE:** Missugused informatsiooni puudujäägid kerkivad päringutes täidetud informatsiooniväljades esile?
	4.7. **ERIARSTILE**: Mis informatsioon tuleb esitada e-konsultatsiooni vastusel?
	4.8. Mida muudaksite e-konsultatsioonide informatsiooni väljadel?
	4.9. Mis nädalapäevadel vastatakse e-konsultatsiooni päringule?
	4.12. Mis saab patsiendist edasi peale e-konsultatsiooni vastuse saabumist? Kui suur hulk patsiente vajab edasist visiiti või konsultatsiooni enda terviseprobleemi lahendamiseks?
	4.13. Missuguseid muutuseid on arstide vahelises suhtluses e-konsultatsioonide kasutuselevõtt praeguseks esile kutsunud?

	4.14. Kuidas on lahendatud e-konsultatsioonidega seonduvate tehniliste probleemide teke? Kuidas saab e-konsultatsiooni tegev või sellele vastav arst ise probleemi lahendada?
	4.15. Missugune on olnud Teie kogemus kasutamise lihtsusega e-konsultatsioonide osas? Missugune on olnud Teie kogemus e-konsultatsiooni süsteemi usaldusväärsuse osas? Missugune on olnud Teie kogemus e-konsultatsiooni süsteemis patsiendiandmetele ligipääsu osas?
	4.16. Kuidas hindate enda töökoormuse muutusi seoses e-konsultatsioonide tekkega?
	4.17. Missuguseid kitsaskohti on Teie arvates veel vaja lahendada seonduvalt e-konsultatsiooniteenusega?
	4.18. Mis on Teie ootused (pere)arstile / (eri)arstile e-konsultatsioonide tegemisel?
5. Intervjuu lõpetamine	6.1. Siin on võimalus avaldada oma mõtteid/ettepanekuid lisaks küsitud küsimustele
	Aitäh, et osalesite intervjuus!

Appendix 5 – Consent form for the interviewees in Estonian

INFORMEERITUD NÕUSOLEKU LEHT

Mind, ……., on informeeritud intervjuu eesmärgist, milleks on kaardistada e-konsultatsioonide kasutajakogemust perearstide ning eriarstide seas. Kogutavaid andmeid kasutatakse Tallinna Tehnikaülikooli E-Tervise õppekava üliõpilase Tairi Kollo lõputöö kirjutamise jaoks.

Mind on teavitatud, et intervjuu viiakse läbi näost-näkku või video teel ning seda lindistatakse.

Mind on teavitatud, et kogutud andmetele on ligipääs vaid intervjuu läbiviijal, kes andmeid isiklikult kogub ja analüüsib. Mind on teavitatud, et andmeid säilitatakse läbiviija poolt turvalises serveris andmete lõpliku analüüsimiseni, mille järgselt lindistused kustutatakse ja paberkandjal olevad märkmed hävitatakse. Mind on teavitatud, et minu konfidentsiaalsus tagatakse. Tean, et mul on õigus ükskõik millisel hetkel loobuda uuringus osalemast. Tean, et mul on võimalus tutvuda analüüsi tulemustega, mis saadetakse mulle soovi korral emailile.

Kinnitan, et olen kursis intervjuu eesmärgiga, olen saanud võimaluse esitada küsimusi ja saanud oma küsimustele rahuldavad vastused. Osalen uuringus vabatahtlikult ja tean, et mul on õigus igal ajal uuringus osalemisest loobuda ilma põhjendusi andmata. Kinnitan seda oma allkirjaga.

Osaleja nimi	Kuupäev	Allkiri
Vastutava isiku/Intervjueerija nimi	Kuupäev	Allkiri

Appendix 6 – Questions asked from Estonian Health Insurance Fund in Estonian

1) Kas perearstid peavad oma eelarvest tasuma kulud e-konsultatsioonidele või saavad nad rahalist kompensatsiooni päringute tegemise eest? Kas algselt oli planeeritud lisatasu perearstidele/eriarstidele?

2) Kuidas haigekassa vaates mõjutab e-konsultatsioonide tegemine arstide töökoormust?

3) Kas pärast e-konsultatsiooni võib eriarst tellida ja ära teha uuringud, enne esmast patsiendikonsultatsiooni?