

Disclaimer: We kindly ask to acknowledge that due to the diverse and heterogeneous nature of the questions and the dynamic pandemic situation some of the information might be incomplete or only correct for the time being. Thus, please consider the date with the below information. All available information was provided by a country representative from the PHIRI network during or in connection to the respective meeting.

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Table 1: Country responses: Analysis of telemedicine and/or artificial intelligence

Country	<p>Topic: Analysis of telemedicine and/or artificial intelligence</p> <ul style="list-style-type: none"> • Is there an analysis of the use of telemedicine and/or artificial intelligence in your countries' inpatient sector (published or ongoing)?? • If yes, <ul style="list-style-type: none"> - Who has carried out/is carrying out this analysis? Which authority (or other partner) is or has been commissioned to carry out such an analysis? - What conceptual framework do you use for the definition of telemedicine and/or artificial intelligence (e.g. functions like storage and forwarding/monitoring/interaction for telemedicine; prediction/diagnosis/treatment for AI) - What were the methods used (literature search, web search, expert interviews, etc.)? • If no, are there plans to carry out such a study? • Has there been an increase in the use or implementation of telemedicine and/or artificial intelligence since the beginning of the pandemic? If yes, please give examples.
Austria	<ul style="list-style-type: none"> • Yes, carried out in 2022, published (in German, for the time being) in 2023. • It was carried out by Gesundheit Österreich GmbH on behalf of MoH. It was differentiated by maturity of the application: telemedicine/AI in regular care, pilots and other (studies, research projects etc); and we distinguish by functions <ul style="list-style-type: none"> - for telemedicine: remote monitoring/telemonitoring, interactive services, store and forward - for AI: risk prediction, diagnostics, therapy improvement <p>The methods used were systematic web search and expert interviews.</p>
Belgium	Will reply in written.
Bulgaria	<ul style="list-style-type: none"> • No, there are only some media articles. • As far as is known there are no plans to carry out such a study. • Yes, according to the media publication there was an increase: The Bulgarian context (https://www.investor.bg/a/262-analizi/247645-telemeditsinata-v-balgariya-misiyata-nevazmozhna) <p>The fund for start-up companies LaunchHub has invested in six companies in the field of healthcare so far, but the market of telemedicine offers in our country is still small and the accelerator claims that they do not yet have expertise in this field, one of the partners commented to Investor.bg at LaunchHub Rumen Iliev.</p> <p>Although the startup scene in our country has not yet recognized telemedicine as a particularly attractive field, we still have successful examples in this field. Sirma Medical Systems has already developed its own application called Diabetes: M, which offers an integrated platform for monitoring key parameters of diabetic patients.</p> <p>ScaleFocus is also working on projects in this area. "Since the beginning of the year, our team has been working on its own innovative platform on a project in this area. We are soon launching two larger projects that have telemedicine functionality. Medicine is a priority direction for the company's business," the company commented, without specifying the direction of the projects in question. "Following the examples of investments in telemedicine worldwide, the company seeks to show that there is potential for such development in our country as well."</p>

	<p>Telemedicine in Bulgaria is already a fact (https://bntnews.bg/news/telemedicinata-v-balgariya-veche-e-fakt-1223479news.html) Telemedicine is already a fact in our country. On a pilot basis, two high-tech stations were put into operation in Burgas, with the help of which doctors examine elderly people from a distance without the patients having to go to the hospital.</p>
Croatia	<p>Croatia does not have a public health authority that is required to make a telemedicine and AI in health analysis. Croatian Institute of Public Health plans to make such an in-depth analysis. Currently we are at the beginning of such an action by reviewing existing analyses and developing a research plan. WHO's publication „Monitoring and evaluating digital health interventions – a practical guide to conducting research and assessment“ will be the main guideline in such an attempt. Croatia has a strong and growing AI scene led by the CroAI network. They have published an AI landscape which is not limited on the health sector but it also includes it. It is available at: https://www.croai.org/landscape Regarding the increase of telemedicine and AI practices during COVID, we can state the following:</p> <ul style="list-style-type: none"> - There is a rise of patients communicating with their doctors over phonecalls and they have been, for example, heading out ePrescriptions for their medications - During the pandemic a personal assistant based on AI was published to answer questions about COVID-19. It was implemented by the Ministry of Health and available on: https://www.koronavirus.hr/andrija-prvi-digitalni-asistent-u-borbi-protiv-koronavirusa-u-hrvatskoj-zivi-na-whatsappu/460 (no longer available due to low demand as the pandemic is fading) - A private hospital „Sv. Magdalena“ has launched a personal assistant called Megi for their patients with cardiovascular diseases. More info available at: https://www.total-croatia-news.com/made-in-croatia/48850-megi-ai-healthcare - Since the 1st of December Doct is operating in Croatia. It is a private-sector run application which allows prepaid users to call a general practitioner around the clock with a video-call. More info available at: https://doct.online/
Germany	<ul style="list-style-type: none"> • Reitzle, L.; Schmidt, C.; Färber, F.; Huebl, L.; Wieler, L.H.; Ziese, T.; Heidemann, C. Perceived Access to Health Care Services and Relevance of Telemedicine during the COVID-19 Pandemic in Germany. Int. J. Environ. Res. Public Health 2021, 18, 7661. https://doi.org/10.3390/ijerph18147661 Heidemann, C.; Reitzle, L.; Schmidt, C.; Fuchs, J.; Prütz, F.; Scheidt-Nave, C. Non-utilisation of health care services during the COVID-19 pandemic: Results of the CoMoLo study. Journal of Health Monitoring · 2022 7(S1) Robert Koch Institute, Berlin DOI 10.25646/9564
Italy	<ul style="list-style-type: none"> • In recent years, the Observatory for Digital Innovation in Health (https://www.osservatori.net/en/research/active-observatories/sanita-digitale) has monitored the state of diffusion of Telemedicine in Italy, noting an ever-very modest use of these solutions up to 2019. The emergency in this sense was a Copernican revolution: having been Telemedicine often the only possible way of delivering health services, many health actors have had the opportunity to understand the benefits. According to the latest Observatory report, during 2020, 47% of specialist doctors and 39% of family doctors resorted to Tele-consultation with specialist doctors. The adoption of Tele-visits is on the increase: it was used during the emergency by 39% of specialist doctors and GPs, while the pre-emergency use rates were around 10%. • There are not authorities or other partners which have been specifically commissioned to carry out such analysis. The Observatory for Digital Innovation in Health has published some information on the use of Telemedicine in Italy (in Italian language: https://www.osservatori.net/it/ricerche/comunicati-stampa/sanita-connessa-dopo-emergenza); The Ministry of Health has provided the National Guidelines on the Telemedicine (in Italian language: https://www.salute.gov.it/imgs/C_17_pubblicazioni_2129_allegato.pdf); in addition, the Ministry of Health has allocated specific budget (1 billion of Euros) for the Creation of a National Platform for Telemedicine services in the Italian National Recovery and Resilience Plan-PNRR (in Italian language: https://www.pnrr.salute.gov.it/portale/pnrrsalute/dettaglioContenutiPNRRSalute.jsp?lingua=italiano&id=5876&area=PNRR-Salute&menu=investimenti). The Presidency of the Council of Ministers has settled up the Agency for Digital Italy-AGID (https://www.agid.gov.it/en/piattaforme/digital-healthcare-system), which offers services for, among all, Telemedicine and Digital Healthcare System; The methods used for collect information on the use of the Telemedicine were basically literature search and web search. • Among the Telemedicine experiences that have stood out in the last period, there are some such as:



	<ul style="list-style-type: none"> - the one carried out by the ASST Grande Ospedale Metropolitano Niguarda, which has launched a Tele-visit project, aimed in particular at bedridden or too weak patients to move, in follow-up or who need to make a remote visit by exchanging clinical documentation; - another interesting experience is that of the Autonomous Province of Trento, which in the "TreC Pediatrics" platform has integrated, in addition to a communication system between the family and the pediatrician, a Tele-visit service; - among the projects aimed at chronic patients, the one started by Aress Puglia stands out: the Talisman project allows remote monitoring and the possibility of carrying out medical video consultations and tele-visits, based on a pre-established treatment plan.).
Latvia	<p>There is no specific analysis about telemedicine by sectors (in-patient or out-patient). There was a survey about telemedicine "Evaluation of remote healthcare services and their influencing factors" 2021 (in Latvian) https://lzp.gov.lv/wp-content/uploads/2021/04/ARTSS-WP5-SR1-Telemedicina_publicesanai.pdf</p> <p>Of course, the use of telemedicine services increased, although there are no such statistical data, but especially during COVID and also afterwards, several medical institutions, specialists, adapting to the new situation, provided visits online.</p> <p>Agreeing on a new approach in the digitalization of the health sector: The Ministry of Health, the National Health Service, professional organizations of the healthcare industry, leading organizations of medical institutions and patients, as well as organizations in the IT field agreed on a new approach to the digitization of the healthcare industry with a modern solution helping to make treatment and health care more accessible to patients, while making the work of medical personnel and health sector workers easier - MEMORANDUM OF COOPERATION "About digital transformation, the Digital Health Ecosystem, and promoting innovation in the health sector" (in Latvian) https://www.vm.gov.lv/lv/media/10241/download</p> <p>As the number of telemedicine cases in health care is increasing, especially within GPs provided services, we are planning to add this position in the annual official statistical reports. At this moment it is impossible to separate telemedicine cases from the total number of visits.</p>
Malta	<p>Basically, such analyses have not been carried out in Malta. But it is well known that telemedicine is being used more. Most physicians have discovered that they can achieve more through telemedicine. In terms of AI, there are some experiments in the public systems, for example within the pharmaceutical dispensing network. But in terms of analysis, there is nothing to report.</p>
Poland	<ul style="list-style-type: none"> • The Ministry of Health is working towards the digital transformation of the healthcare in Poland, including within the inpatient sector, with the use of i.a. telemedicine and AI solutions. We are continuously analyzing the context of increasing the resilience of the health sector with the technology enabled provision of remote health care. • In 2021 the Ministry of Health has setup the Innovation Board that monitors, gathers information, conducts analyses and recommends innovative solutions for implementation into the Polish healthcare system. The Ministry of Health is collecting information on innovative medical solutions in a dedicated registry. The definition of telemedicine which we follow is based on medical procedures delivered remotely to the patient's environment, including enabling relevant patient - doctor and doctor-doctor communication. Regarding the adopted definition of AI, we understand it as the use of AI tools to process large datasets for the purpose of improving diagnosis, treatment and to make informed predictions towards the individual patient. The methods used include literature search, web search, expert search- we use a combination of these methods. • The Covid pandemic has changed the healthcare system in many areas, contributed to the development and implementation of new tools, based on already existing infrastructure, and provided some innovative solutions. We have noted significant development of remote visits within primary care. There has been a rapid increase in the number of users of digital services, particularly as regards the Patient's Internet Account (IKP - a tool that facilitates access to digital services and individual health data) and e-prescriptions. The expansion of IKP with new functionalities and the provision of mobile version of IKP (mojeIKP application), makes IKP the centre of health information management for patients. Currently, there are over 16,8 million active patient's internet accounts. The system-wide deployment of the e-prescription (in January 2020) has been a great success and has allowed for the continuity of health services during COVID-19 pandemic. Within 6 months from the introduction of mandatory e-prescription, the level of e-prescriptions issued exceeded 90%. The number of e-prescriptions issued has been steadily increasing -for example, in June 2020 the share of e-prescriptions rose to 95.7%, while in February 2020, just before the pandemic it was 88.2%. E-prescription proved to be an efficient and useful tool during COVID-19 pandemic, benefiting both medical personnel and patients (who did not need to visit medical facilities to continue their treatment). In 2022 Poland has joined the countries that have launched cross-border e-prescription. Foreign patients can fill e-prescriptions at a Polish pharmacy, and Polish patients can fill e-prescriptions abroad. Cross-border e-prescription exchange is now possible with Croatia, Spain, Estonia, Portugal, and Finland. The Covid pandemic



	proved that the development of e-health solutions is the right direction towards enhancing resilience of healthcare sector and providing quality services for patients.
Portugal	Portugal has had experience with telemedicine for more than 20 years, especially in hospitals in areas such as cardiology or dermatology. Due to Covid-19, the link between primary care and home care has become widespread. There are several platforms to support nurses and doctors who connect with patients at home. In terms of AI, Portugal is also starting to look at it and we are starting to understand that it needs a lot of interoperability and it depends on data quality and data availability. So, it is not easy to establish it in healthcare, although there are several projects. In Portugal, there was an organisation set up to regulate AI and telemedicine.
Romania	<ul style="list-style-type: none"> • There is no study of the use of telemedicine and/or artificial intelligence • There are no plans to carry out such a study • There was no increase in the use or implementation of telemedicine and/or AI since the beginning of the pandemic
Serbia	<p>In 2020, The Republic Fund of Health Insurance introduced telemedicine service among services for primary healthcare and specialist in the primary healthcare units. From 2022, the similar service exists on the secondary level of healthcare. Evaluation studies are scarce. I found some of them, mostly regarding pharmacists.</p> <p>Knowledge and attitude towards digital pharmacy of pharmacists in Serbia Implementation of Telepharmacy Services in Community Pharmacy – Pharmacists’ Perspective in Republic of Serbia NORMALIZATION OF HEALTH RECORDS IN THE SERBIAN LANGUAGE WITH THE AIM OF SMART HEALTH SERVICES REALIZATION PATIENT SATISFACTION WITH THE USE OF TELEMEDICINE DURING COVID-19 PANDEMIC</p> <p>In 2022, the government of the Republic of Serbia announced that several pilot projects have been launched within the Serbian healthcare system, the aim of which has been to test the potential of certain forms of telemedicine in practice (primarily, electronic and telephone consultations between citizens, selected doctors and specialist doctors) to improve the treatment of patients. More information on the link.</p>
Spain	<ul style="list-style-type: none"> • Some articles have been published for this topic, mainly focused on specific services and diseases: Vidal-Alaball J, Acosta-Roja R, Pastor Hernández N, Sanchez Luque U, Morrison D, Narejos Pérez S, Perez-Llano J, Salvador Vèrges A, López Seguí F. Telemedicine in the face of the COVID-19 pandemic. Aten Primaria. 2020 Jun-Jul;52(6):418-422. doi: 10.1016/j.aprim.2020.04.003. Epub 2020 Apr 17. PMID: 32402477; PMCID: PMC7164871. https://pubmed.ncbi.nlm.nih.gov/32402477/ Cordoba R, Lopez-Garcia A, Morillo D, Perez-Saenz MA, Askari E, Prieto RE, Castillo Bazan E, Llamas Sillero P, Herrero Gonzalez A, Short Apellaniz J, Del Olmo M, Arcos J. Feasibility of telemedicine in the management strategy of patients with lymphoma amid the COVID-19 pandemic in Spain, a prospective study. JMIR Form Res. 2023 Jan 3. doi: 10.2196/34128. Epub ahead of print. PMID: 36645838. https://pubmed.ncbi.nlm.nih.gov/36645838/ Del Hoyo J, Millán M, Garrido-Marín A, Nos P, Barreiro-de Acosta M, Bujanda L, de la Portilla F, Aguas M; AEG, AECP, GETECCU. Changes in the management of IBD patients since the onset of COVID-19 pandemic. A path toward the implementation of telemedicine in Spain? Gastroenterol Hepatol. 2022 Nov;45(9):697-705. doi: 10.1016/j.gastrohep.2021.08.006. Epub 2021 Sep 8. PMID: 34508808; PMCID: PMC8425749. https://pubmed.ncbi.nlm.nih.gov/34508808/ Marti-Bonmati L, Cerdá-Alberich L, Pérez-Girbés A, Díaz Beveridge R, Montalvá Orón E, Pérez Rojas J, Alberich-Bayarri A. Pancreatic cancer, radiomics and artificial intelligence. Br J Radiol. 2022 Sep 1;95(1137):20220072. doi: 10.1259/bjr.20220072. Epub 2022 Jun 28. PMID: 35687700. https://pubmed.ncbi.nlm.nih.gov/35687700/ • With the aim of helping to know the real state of the implementation of ICT in the Spanish public health sector, the Spanish Society of Health Informatics (SEIS) and the ICT managers of the Health Services of the Spanish regions, in collaboration with the Ministry of Health, Social Services and Equality (current Ministry of Health) and the public business entity Red.es, addressed in 2012, the preparation of a report, called INDEX SEIS, to record a set of significant indicators that would allow assessing and quantifying the implementation of ICT in the Spanish public health, including Telemedicine (https://seis.es/indice-seis/). The 2022 INDEX SEIS report is in its final stages of preparation and will be published shortly. The data is aggregated for reasons of data protection. <p>The Science and Technology Office of Congress of Deputies (Office C) published on November 2022 the report “Artificial Intelligence and Health” To produce this report the C Office referenced 270 documents and consulted 30 experts in the subject. Of this multidisciplinary group, 50% belong to the field of life sciences (medicine, bioinformatics, biomedical engineering, health regulation and evaluation, and ecology), 26% come from physics and</p>



engineering sciences (informatics engineering, natural language processing, electronic engineering and robotics engineering) and 19% from social sciences and humanities (behavioural sciences, ethics, philosophy and law); 87% work in Spanish institutions or centres, whereas 13 % have affiliations abroad. Further information here (English version): https://www.oficinac.es/sites/default/files/informes/20221114_Report%20C%20IA.pdf
 At the national level, the Digital Spain 2026 strategy, Digital Health Strategy, the Artificial Intelligence National Strategy (ENIA) and the Spanish R&D&I Strategy in Artificial Intelligence cover different aspects of the development of artificial intelligence in the field of health, among other subjects. Some strategies are mentioned below:

- The Ministry of Economics and Digital Transformation published in November 2020 the document: The National Strategy for artificial intelligence (English version). This Strategy establishes seven strategic objectives or results to achieve with its application: scientific excellence and innovation in Artificial Intelligence, the projection of the Spanish language, the creation of qualified employment, the transformation of the productive fabric, the creation of confidence in the use of AI, the incorporation of values humanists to AI and the development of an inclusive and sustainable AI. <https://portal.mineco.gob.es/RecursosArticulo/mineco/ministerio/ficheros/National-Strategy-on-AI.pdf>
- The Ministry of Health published in December 2021 the document The Digital Health Strategy of the National Health System. This strategy aspires to contribute to the maintenance of a good level of health in the Spanish population and to strengthen the public health system through the transformative capacity of digital technologies aimed at people, health professionals, provider organizations health services and other related agents. https://www.sanidad.gob.es/ciudadanos/pdf/Estrategia_de_Salud_Digital_del_SNS.pdf
- Digital Spain 2026. The Spanish Government launched in July 2020 the agenda Digital Spain, conceived as the roadmap for promote the process of digital transformation of the country. This agenda was also conceived as a pillar strategy for recovery from the crisis generated by the pandemic, and as a vector of modernization and prosperity in the medium term, acting in the triple dimension of infrastructures and technology (data economy and AI); economy and people. https://espanadigital.gob.es/sites/espanadigital/files/202207/Espa%C3%B1aDigital_2026.pdf
- Last data of the Spanish Society of Health Informatics published in 2021 (<https://seis.es/indice-2021/>) showed the 3 telemedicine specialties most frequently used in Spanish regions: Teledermatology (16), Teleictus (14) and Teleoftalmology (12). Two new indicators were included in the report of 2020 to know the amount of teleconsultations in Primary and Specialised Health Care

Number of patients attending teleconsultations	2020		2021	
	Number of respondents (spanish regions)	Number of patients	Number of respondents (spanish regions)	Number of patients
Primary Health Care	8	265395	12	31216989
Specialised Health Care	7	75925	13	4882772

The Netherlands

- Yes, the E-healthmonitor analyses the use of e-health/telemedicine in the Netherlands. Reports are published here: <https://www.rivm.nl/e-health/publicaties>
- The E-healthmonitor is carried out by RIVM, Nivel and the National E-health Living Lab (as part of LUMC) in the Netherlands, commissioned by the ministry of Health, Welfare and Sport
- The E-health monitor studies the use of digital health care, or e-health, defined as 'the use of digital information and communication in order to support and/or improve health and health care'.
- Panel research - using questionnaires and quantitative analyses - among health care professionals and health care consumers + Qualitative research, such as interviews and focus groups to interpret the findings from the panel research and to focus on drivers, barriers and good practices of digital health care.



	<ul style="list-style-type: none">• There has been done a separate study on the (change in) use of digital health care during the pandemic. This is described here: https://www.rivm.nl/bibliotheek/rapporten/2021-0237.pdf
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