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Infrastructure or Knowledge?
Investment Priorities for Promoting the Adoption of Digital Health Tools*

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Abstract

As COVID-19 pandemic accelerated the digitalization of healthcare, prompting large public investments in the sector, it remains unclear whether the initial shock generated a stable adoption of digital health tools and the full exploitation of their functionalities. Using the case of the Electronic Health Records (EHR) in Italy, we show that a remarkable increase in its use in the aftermath of the pandemic is not necessarily associated to an equal understanding of its scope and functions by potential patients. Exploiting a 2020 reform and variation in pandemic exposure, we show that a one-standard-deviation increase in exposure increased EHR reported use by 39%, driven by records feeding and medical needs. We then leverage a December 2024 national media campaign on the EHR to conduct an original survey focused on its adoption. Among the main evidence is that the acknowledgment of the EHR existence does not translate into effective knowledge, access, or regular use. Engagement is more strongly associated with trust and digital attitudes than with most traditional socio-economic factors. Progress along the adoption chain depends on perceived needs, institutional confidence, and willingness to engage with digital tools. To provide an understanding of how to increase perceived benefits and willingness to engage with the EHR, we randomize information treatments based on the Technology Acceptance Model. Overall, our findings suggest that the effectiveness of large-scale digital health investments depends critically on citizens' awareness, trust, and engagement, and that more tailored information campaigns are needed to improve the general literacy of digital tools once they are introduced or potentiated.

JEL Classification: H51, H75, I12

Keywords: Electronic Health Records, Policy Knowledge, Digital Skills, Digital Health Skills

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1 Introduction

Digital healthcare aims at improving both the efficiency and the quality of care provision, yet its development and adoption pose persistent challenges (Fahy et al., 2021). On the supply side, the introduction of digital systems based on patients' medical records requires standardized digital formats (simple PDFs being often insufficient), an appropriate legal framework to guarantee privacy and data protection, training for healthcare personnel, and adjustments to clinical workflows. On the demand side, patients must be willing to adopt these tools, understand how to use them, and access them without compromising their health outcomes. [1] Trust plays a crucial role on both sides, while the effective use of digital health tools depends on citizens' digital skills and on their knowledge and awareness of the services available to them. Limited understanding of how these tools work or of the benefits they provide may reduce adoption and ultimately undermine the effectiveness of public investments in digital health.

The COVID-19 pandemic accelerated the adoption of digital health solutions in contexts often characterized by heterogeneous and fragmented supply, unclear legal frameworks, resistance to innovation, mistrust among users, and uneven infrastructure (Fahy et al., 2021). Governments responded with a wide range of measures, including increased investments and more supportive regulatory frameworks. Many of these interventions, however, were temporary, and it remains unclear whether the pandemic generated a stable and inclusive trajectory of digital transformation, which policy actions produced lasting effects, and whether the expansion of digital health tools has reduced or exacerbated inequalities in access to care.

This paper focuses on the drivers of patients' potential use of the Electronic Health Record (EHR), a widespread tool of digital health: a real-time, patient-centered digital record that allows authorized users to access and share comprehensive clinical information, including medical history, diagnoses, treatments, medications, laboratory results, and imaging data (WHO Global Observatory for eHealth, 2016). We use the Italian case study, since Italy was among the countries most severely affected by the COVID-19 pandemic, it had already introduced a national EHR system in 2012, and it invested an unprecedented amount of resources on it in the aftermath of the pandemic. Starting in 2021, it allocated more than €5 billion to its further development as part of its Recovery and Resilience Plan (RRP), a European public policy program, with specific resources devoted to improving interoperability, increasing the systematic feeding of clinical data, and expanding coverage so to support a new model of Telemedicine and territorial access to healthcare by summer 2026. Moreover, to improve common knowledge of the tool and citizens rights, the Italian government ran a

[1] For instance, concerns have been raised about the direct availability of sensitive information for patients with mental health conditions.

nationwide media campaign from spring to the end of 2024, promoting the safety of the EHR with respect to data storage.

We investigate the role of investments in strengthening the tool from the role of citizens' awareness, using different approaches and databases. We exploited a May 2020 regulation that mandated the automatic feeding of clinical information into the EHR (Section 2) to estimate how strengthening the infrastructure impacted on its use. Using data from the nationally representative Aspects of Daily Life (ADL) survey administered by the National Institute of Statistics (ISTAT) and a difference-in-differences strategy that leverages regional variation in pandemic intensity, we find that a one-standard-deviation higher exposure to the pandemic increased EHR use by 39% (Section 3). General digital skills did not improve significantly, while digital health skills increased by about 8%. The effects are mainly driven by individuals with more favorable socio-economic characteristics (e.g, higher education, employment), by those reporting higher levels of trust, and by those with more health needs. This may also be explained by the definition of EHR use adopted in the national survey, which identifies it as access to the EHR in the 90 days before the interview.

To overcome the lack of a clear understanding of the level of knowledge and use of EHR in the Italian population, we design an ad hoc survey in December 2024 on knowledge, use, and perceptions of the EHR (Section 4). The survey still collected a representative sample of the Italian population and was conducted during the second wave of the national media campaign and provides a unique snapshot of awareness and behavior at each stage of EHR adoption, from generic awareness to effective knowledge and actual use. We observe a substantial drop-off along the adoption chain: while 73% of respondents have heard of the EHR, only 68% of them have used it at least once, and just 63% have accessed it in the previous 90 days. Effective knowledge of how the system works is generally lower than expected also among users (see Section 4.1). Supply-side factors do not systematically predict citizens' knowledge and use: we show that the organization of the supply side in 2021 does not necessarily predict some of the characteristics of the same system in 2024, pointing to a substantial effort to level the field in terms of infrastructure. Instead, individual attitudes toward digital technologies and exposure to the national media campaign (although recalled by only 45% of the respondents) explain a larger share of the variation, and we find no clear geographical or socio-economic gradient.

Finally, we include an information experiment in our survey. Respondents were randomly assigned to one of two messages stressing the benefits of using the EHR: one centered on the individual perspective (the user can save time and money, for instance by avoiding unnecessary services), the other on a social perspective (time and money saved for the publicly funded NHS). After exposure, we measure respondents' willingness to use the EHR, to improve knowledge through dedicated services and a tutorial video, as well as their perceived benefits, risks and facilitating conditions. The individual-benefits framing is significantly more effective than the social-benefits framing at shifting both intended use and perceived usefulness, and its effect grows monotonically as the sample is restricted to respondents with weaker prior exposure to the system, reaching its maximum among those who had never heard of the EHR. As documented in Section 2.2, the government campaign predominantly adopted a relatively neutral framing stressing safety, continuity of care across regions, and quality of care without using a clear individual-versus-social benefits dichotomy. Hence, both our messages provide additional content to the official communication. The individual-benefits framing offers a more direct and personal focus on EHR benefits that the campaign only hints at, while the social-benefits framing centers around the social perspective that the campaign disregards. The differential effects we estimate can thus be interpreted as the relative persuasiveness of the two framings rather than as the marginal impact of novel information against an individual-benefits baseline. The absence of a no-information control group, however, implies that we cannot rank the absolute effect of either framing against a no-information scenario.

EHRs play a central role in the digital transformation of healthcare systems: they can improve continuity of care, support more accurate and timely diagnoses, reduce duplication of tests, and remove the need for patients to carry paper documentation. In many countries, however, EHR systems were formally introduced well before the pandemic, yet their effective implementation at the national level has often proved difficult despite substantial public investment. Our contribution both borrows and helps to explain evidence recollected by several countries.

International experience points to a recurring set of conditions that facilitate large-scale adoption, and most of them go beyond technological infrastructure. Trust is a central determinant of citizens' willingness to engage with the tool: clear communication on how data are managed, strong privacy safeguards, and credible oversight institutions are essential (Papadopoulos et al., 2024). Default enrollment through opt-out mechanisms appears significantly more effective than opt-in models. Germany's opt-in system, introduced in 2021, had been activated by only about 1% of eligible individuals by 2023 (Rau et al., 2024), whereas opt-out countries such as Denmark and Estonia have achieved near-universal coverage (Fagerlund et al., 2024). Technical performance alone is insufficient: the failed launch of the *Dossier Médical Partage* in 2004 with only 160,000 accounts opened by 2013 against a target of 5 million, illustrates how lengthy implementation processes, weak political support, and the absence of a critical mass of users can cripple uptake until communication and behavioral strategies are redesigned (Burnel, 2018; Sarwar et al., 2022). Finally, governance arrangements involve trade-offs: bottom-up approaches such as the U.S. one have favored rapid adoption but produced fragmented interoperability, while top-down strategies such as the UK's National Programme for IT have improved standardization at the cost of practitioner resistance (Wilson and Khansa, 2018). The common lesson is that successful EHR implementation requires not only infrastructure, but also institutional credibility, coherent governance, and policy designs capable of lowering behavioral barriers to participation. Yet, most of the existing evidence focuses on implementation within specific wards or facilities and on the reactions of healthcare professionals (Blumenthal and Tavenner, 2010; Khairat et al., 2020; Øvretveit et al., 2007; Vikkelsø, 2005). Comparatively little attention has been devoted to the perspective of patients and to the role of public awareness, trust, and acceptance, which we show to be crucial in the EHR development.

Our findings contribute to several strands of the literature. They add to the growing evidence on inequalities in digital health adoption by documenting gaps in awareness, effective knowledge, and digital health capabilities across population groups, and by showing that these gaps do not always coincide with traditional socio-economic divides. The paper also relates to the literature on policy take-up, which has highlighted the role of information frictions and behavioral factors but has paid limited attention to policy knowledge as a determinant of participation (Bhargava and Manoli, 2015; Finkelstein and Notowidigdo, 2019; Kleven and Kopczuk, 2011). In our setting, several RRP interventions aim to improve access to healthcare through digitalization, yet limited awareness of the EHR may hinder both take-up and policy effectiveness. In addition, the experimental results speak directly to the design of communication strategies in the digital health domain, suggesting that messages emphasizing concrete private returns are more effective than appeals to social wealth, especially among citizens who have not yet been reached through alternative information channels. More broadly, our analysis shows that the effectiveness of large-scale digital health investments depends not only on infrastructure and regulatory changes, but crucially on citizens' knowledge, trust, and engagement.

The remainder of the paper is organized as follows. Section 2 describes the Italian institutional context and the policy interventions that shaped the development of the EHR, including the 2021-2022 pilot projects and the 2024 media campaign. Section 3 presents the difference-in-differences analysis based on the ADL survey. Section 4 introduces the 2024 ad hoc survey, documents the patterns of awareness, knowledge, and use across the population, and presents the results of the information experiment. Section 5 concludes.

2 The Italian Case

Italy counts 19 regions and 2 autonomous provinces (the Autonomous Province of Trento and the Autonomous Province of Bolzano), which are responsible for providing healthcare services to their residents. While local governments must comply with national standards (Lisac et al., 2008), they retain substantial autonomy in organizing and regulating healthcare delivery within their jurisdictions. As a result, the country operates through 21 regional healthcare systems that rely on different combinations of local health authorities (LHAs), independent hospitals (IHs) (e.g., teaching hospitals), and private providers, which may or may not be accredited within the public system.

Residents are covered by health services provided by the LHA corresponding to their place of residence, although both intra- and interregional patient mobility occur. Each citizen is assigned, based on residency, to a general practitioner (GP), who is responsible for primary care and drug prescriptions. Within the public system, GPs act as gatekeepers for access to secondary care.

Within the NHS, the EHR (*Fascicolo Sanitario Elettronico*) was introduced in 2012 for both primary and secondary care (Legislative Decree No. 179). Although nationwide implementation was envisaged, the governance was delegated to regional governments, some of which had already experimented regional initiatives prior to 2012. All regions were expected to make the EHR available by the end of June 2015. However, this deadline was not met, as the legislation defining the mandatory and optional contents of the EHR was only adopted in September 2015. At that time, interoperability across regional systems was still lacking and was achieved only in 2018 through the establishment of a *National Infrastructure for Interoperability*.

On the eve of the COVID-19 pandemic, the content and functionality of the EHR remained highly heterogeneous across regions, and the system was scarcely used and poorly known among both patients and providers. Moreover, data upload required explicit patient consent, consistent with an opt-in feeding model. Following the outbreak of the pandemic and the need for remote access to medical information, it was established by law that, as of May 19, 2020, patient consent was no longer required for data upload (Law Decree 34/2020), and coverage was extended to services provided by private facilities. Patient consent, however, remained necessary for healthcare professionals to access individual records, so that an active role of the patients still characterizes the Italian system.

In 2021, Italy submitted its National Recovery and Resilience Plan (RRP) under the European Union's Recovery and Resilience Facility, a programme of more than €800 billion in loans and grants aimed at supporting Member States in addressing the economic and social consequences of the COVID-19 pandemic and strengthening resilience to future shocks. The plan finances reforms and investments to be implemented between 2021 and 2026. A specific investment of the RRP targets the upgrading of the EHR (the so-called EHR 2.0), with a budget exceeding €1.3 billion (Mission 6 – Component 2 – Investment 1.3 "Strengthening of the EHR"). The objective is to enhance the EHR technological infrastructure (as documented at the end of 2021 in Subsection 2.1) supporting healthcare delivery, health data analysis, and predictive capabilities within the Italian NHS. The policy objective is to transform the EHR into a fully digital environment that is interoperable, consistent, and accessible nationwide. Moreover, several other RRP investments to promote Telehealth and digitization of healthcare services rely on the effective functioning of the EHR system, for a total amount of about 5.5 billion.[2]

EHR 2.0 was formally introduced in July 2022 through the Ministerial Decree of May 20, 2022, which adopted the implementation guidelines for the period 2022–2026.[3] These guidelines identify two main operational targets for the development of EHR 2.0: *data feeding*, defined as the systematic and timely entry and updating of patients' clinical information, and *portability and interoperability*, namely the ability to exchange and use such information seamlessly across platforms and regions, across levels of care, and regardless of whether services are provided by public or private providers. These priorities were defined on the basis of a nationwide survey conducted among regions in 2021 to assess the level of EHR development and use.

Following the survey, the Department for Digital Transformation launched two pilot projects aimed at testing and promoting the adoption of the EHR. Three regions were selected for each initiative: a *feeding pilot project* (December 2021–October 2022) designed to improve data entry into the EHR, involving Basilicata (South), Campania (South), and Piemonte (North-West); and an *interregional portability project* (October 2021–June 2022) aimed at testing the exchange of EHR data across regions, involving Emilia-Romagna (North-East), Lombardy (North-West), and Puglia (South).

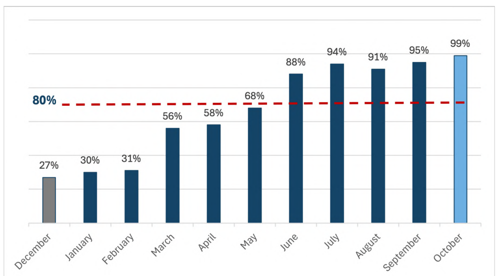
[2]For example, €1.5 billion is allocated to the development of telemedicine platforms and protocols; more than €2.8 billion is devoted to the digitalization of emergency departments in 280 public hospitals; approximately €900 million supports the migration to cloud infrastructures of electronic records managed by LHAs and IHs; and an additional €280 million finances the establishment of Territorial Operations Centres, which are intended to coordinate primary care and telemedicine services. An example of interaction between Telehealth and EHR is provided in Age.Na.S., Ministry of Health and Department of Digital Transformation. *Piattaforma di Telemedicina ed Ecosistema FSE. Punti di contatto e raccordo tra i due progetti* (2022), available at `https://www.agenas.gov.it/images/agenas/telemedicina/Telemedicina_e_FSE.pdf`.

[3]These guidelines identify four main areas of action: (i) ensuring uniform digital health services for citizens, healthcare professionals, institutions, and research entities; (ii) standardizing content and coding, including demographic, administrative, and clinical data, imaging, structured clinical documents, and Patient-Generated Health Data; (iii) strengthening the technical architecture to improve interoperability across systems and regions; and (iv) enhancing governance and coordination mechanisms.

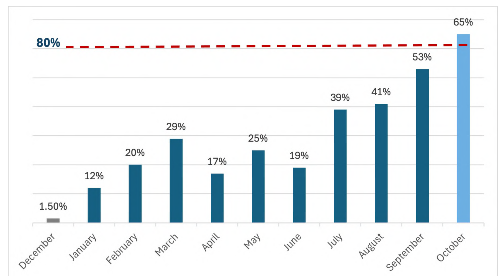
The feeding pilot was considered successful with Basilicata and Campania, which initially exhibited very low levels of data feeding (27% and 1.5%, respectively), recording the largest improvements (Figure 1). Similarly, the portability pilot led to an increase in the success rate of cross-regional data transfers from 14% to 93%, representing a significant step toward effective interoperability within the NHS (Figure 2).

Figure 1: **Feeding pilot**

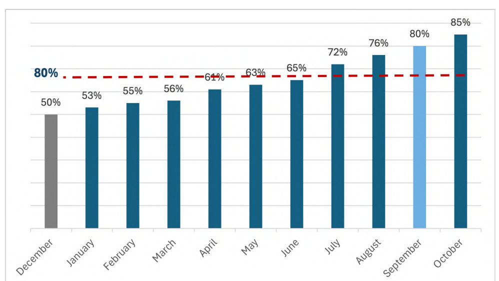
(a) Basilicata



(b) Campania



(c) Piemonte

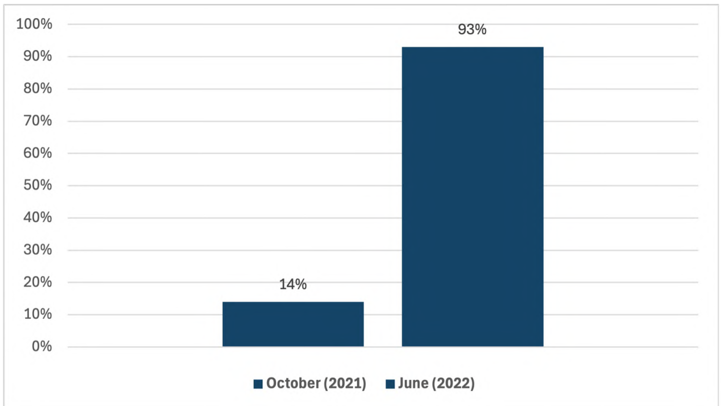


Notes: In gray is 2021 data. Dark blue = finalized, Light blue = scheduled. Source: State-Region Conference, Session of 12 October 2022, Topic "Information notice, according to Article 6, paragraph 1, of Legislative Decree No. 281 of 28 August 1997, by the Minister for Technological Innovation and Digital Transition on the progress of the Electronic Health Record project".

2.1 From the 2021 Survey to the 2024 Monitoring Dashboard Indexes

The 2021 *Survey on the State of Implementation of the Electronic Health Record*, was conducted by the Ministry of Health and the National Agency for Regional Health Services (named *AGENAS*). Its objective was to collect information on the main characteristics of each regional EHR system in order to provide an updated overview of the state of implementation and to support the design of the investments envisaged under the RRP. Information was collected for 10 key performance indicators (KPIs), listed in Table B.1. Figure B.1 plots the KPI values for the Italian regions revealing substantial regional variability in EHR adoption and data feeding which reflects differences in digital development and system in-

Figure 2: **Interregional portability project**



Notes: Source: State-Region Conference, Session of 12 October 2022, Topic "Information notice, according to Article 6, paragraph 1, of Legislative Decree No. 281 of 28 August 1997, by the Minister for Technological Innovation and Digital Transition on the progress of the Electronic Health Record project." The regions part of the pilot were Emilia Romagna, Lombardia, and Puglia.

tegration. However, no clear territorial gradient emerges (e.g., North-South gradient). No region recorded non-zero values for all KPIs, and some regions reported missing values for some KPIs.

The KPIs were harmonized under the EHR 2.0 Decree (Ministerial Decree of 7 September 2023), which defines the content of EHR 2.0 (covering services provided both within and outside the NHS), the roles and responsibilities of participating entities, the privacy and security requirements for the processing of personal data, and the official framework for national monitoring.[4] It was confirmed that patients must authorize healthcare professionals not directly generating the healthcare records uploaded on the EHR, operating within or outside the NHS, to access their EHR. At the same time, EHR data remain permanently accessible to patients and to the entities that generated them. Table B.2 reports the final list of documents expected to be included in the EHR and their correspondence with the 2021 KPIs.

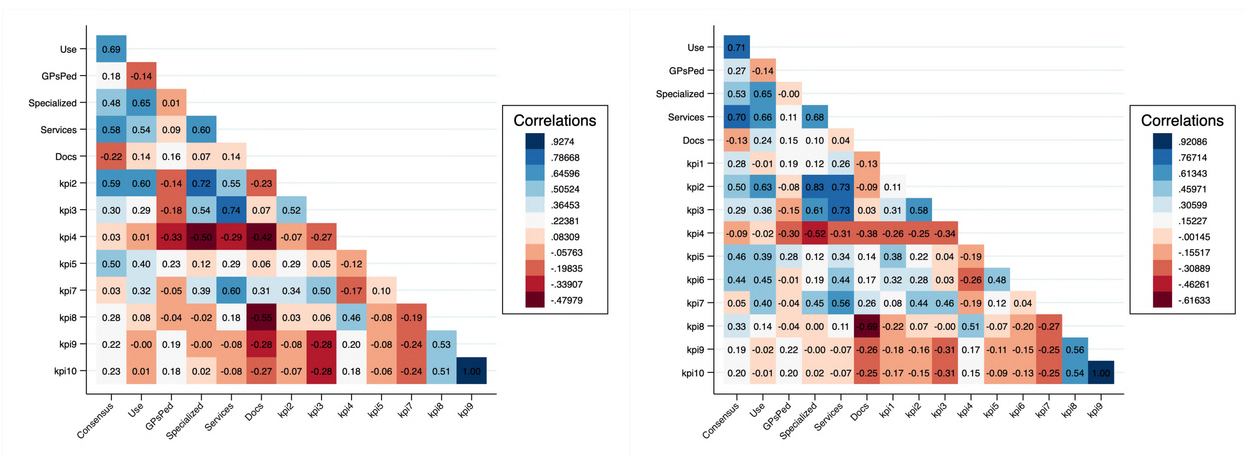
To support the implementation of the investment, the Ministry of Health and the Department for Digital Transformation developed an EHR Monitoring Dashboard, an IT platform that collects, analyzes, and visualizes data on the implementation, adoption, and use of the EHR across the country. The dashboard monitors both the availability of document types and services on regional EHR portals and the level of use by citizens and healthcare professionals. Table B.3 reports the main indicators published on the national EHR website,

[4]The decree implements Article 12(7) of Decree-Law No. 179 of 18 October 2012, converted into Law No. 221 of 17 December 2012, which originally introduced the EHR.

collected between September and November 2024 at the regional level.[5] Figure 3 shows the correlation coefficients at the regional level between the 2021 KPIs and the 2024 Monitoring Dashboard indicators. Figure 3.a includes all regions but for the two Autonomous Provinces, while Figure 3.b shows the values for those regions which do not have missing KPIs. In both cases, correlations coefficients are stable: higher level of consensus and use in 2024 are positively correlated KPIs related to emergency room reports (KPI2) and specialist outpatients reports (KPI5), while there are no strong nor positive correlations between the other 2021 KPI and the 2024 structure and impact. This is an important insight, given that the initial structure of the EHR system does not necessarily preclude a proper development in 2024. A first takeaway could be that the massive investment program due to the RRP was able to reduce some initial distances.

Figure 3: **Correlations between 2021 KPIs and 2024 Dashboard Indexes**

(a) All regions (b) All kpi



Notes: The explanation of each KPI is in Table B.1, while data from the monitoring dashboard refer to Table B.3. *All regions* means we are not including KPI1 and KPI6 since there are several regions with missing data for these kpi. *All kpi* stands for the group of regions with all kpi different from missing. In both scenario data for Trentino Alto Adige are not available.

[5]The website is `https://www.fascicolosanitario.gov.it`. The indicators provide updated information on the number of document types integrated into regional EHRs; the number of available online services; the number of citizens who accessed the EHR in the previous 90 days; the number of citizens who provided consent for document sharing; and the number of specialists and general practitioners actively using the system. As shown in Table B.4, the patient consent rate in 2024 is strongly positively correlated with EHR use, which in turn is highly correlated with the share of services (out of a potential set of 44) available through the EHR and with the proportion of healthcare professionals authorized to access the system. The share of available document types (out of a total of 16) is not positively correlated with consent rates, but it is positively associated with usage rates.

2.2 The 2024 media campaign

In 2024, the Ministry of Health, together with the Department for Digital Transformation (Presidency of the Council of Ministers) and the Ministry of Economy and Finance and in collaboration with the Regions and Autonomous Provinces, promoted a massive media campaign on the EHR. The campaign run twice in 2024 aiming at two targets: increase the knowledge of the EHR and allow citizens to opt out part of the documentations, exerting to so-called objection right to the uploading of pre-May 2020 records, for which there was no specific legislation.

The first round run in the spring 2024, with the indication of the time window for the objection right from Monday, 22 April until 30 June 2024 through the "EHR – Objection to pre-existing data" service available online within the Health Insurance Card System (*Sistema Tessera Sanitaria*). The second round run in the 2024 fall, with the possibility to exert the objection from Monday, 18 November until 17 December 2024.[6] During both campaigns, the same short presentation was made available through the main social platforms (Figure B.2). Its main message was that the EHR is a safe tool to store health information (with no specification to which data or information) and it could help healthcare providers to assist patients in an emergency situation. A 32-second video was available too, running both on social platforms and on TV, stressing the contents of the EHR (e.g., test results, prescriptions and reports) and that the goal of the EHR was to provide a more appropriate care even outside the region of residence, and to improve the quality of care. A reference to the security of the system was made and it was explained how to access to the EHR.[7]

[6] Figure A.3 plots the google trends on google research on the EHR, showing the two time intervals advertised by the media campaign. It appears that the spring campaign attracted more attention than the fall campaign.

[7] As at February 2026 the video is available at: `https://www.salute.gov.it/new/it/multimedia/fascicolo-sanitario-elettronico-sicuri-della-nostra-salute-riapertura-opposizione-al/`). The video states: *The Electronic Health Record collects your health data and medical documents securely, including test results, prescriptions, reports, and other information useful for your health. Thanks to the Electronic Health Record, healthcare professionals can access your medical history and provide more appropriate care, even if you are in a region different from the one where you live. The Electronic Health Record is an important tool to improve the quality and continuity of care, while ensuring the security and protection of personal data. From November 18 to December 17, 2024, it is possible to object to the inclusion in the Electronic Health Record of health data and documents related to services provided before May 19, 2020. The objection can be submitted online by accessing the service with SPID, Electronic Identity Card, or National Services Card. For more information, visit the Ministry of Health website or the Electronic Health Record portal. Electronic Health Record: confident about our health.* One should keep in mind that the adjective "sicuri" in Italian stands for both confident and safe.

3 The Boost to Digitization

The COVID-19 pandemic was a tremendous shock to digitization both on the side of the supply (e.g. more apps and services provided online) and use of digital tools on the side of the demand (e.g. from online gym classes through therapy sessions). Italy was particularly affected by the pandemic. From early March to mid-May, stringent nationwide restrictions on economic activities and individual mobility were implemented, including the closure of schools, retail businesses, and industrial plants, together with strict quarantine measures (Sebastiani et al., 2020). The national vaccination campaign began at the end of December 2020, and the majority of the population had been vaccinated by spring 2021.

To capture the geographic heterogeneity in the intensity of the COVID-19 outbreak, we use the percentage change in total deaths in 2020 (March-May) relative to the average, for the same months, over the years 2015–2019 as produced by ISTAT together with the High Institute of Health ((Istat and Iss, 2020); (Barili et al., 2024)). As shown in Figure A.2, mortality in January–February 2020 was lower than in previous years, whereas starting March 2020 excess mortality exceeded 100% relative to the 2015–2019 baseline. The impact of the pandemic varied substantially across regions.

To assess the impact of the pandemic on EHR use, we exploit a nationally representative cross-section survey conducted by ISTAT, the *Aspects of Daily Life* (*Aspetti di vita quotidiana*). It is an yearly survey generally administered around March. In addition to standard questions on respondents' socio-economic characteristics, it includes questions on specific habits and behaviors referring either to the previous 90 days or to the previous 12 months. A question on EHR use in the previous 90 days is available for the 2015, 2020, 2021, and 2022 waves. As discussed in Section 2, the EHR system was still under development in 2015, while in 2020 an important legislative intervention to support it was introduced in May. Since the 2020 wave is conducted in March and referred to the previous 3 months, both 2015 and 2020 can be considered pre-treatment years, whereas 2021 and 2022 represent the post-treatment period.

The May 2020 reform applied uniformly across regions. However, in regions more severely affected by the pandemic, a larger increase in EHR use may be expected. This effect could reflect both a stronger effort by regional authorities to promote EHR implementation in response to the pressure on their healthcare systems and a greater need for patients to rely on electronic records when in-person interactions with healthcare providers were limited. Although we cannot fully disentangle supply-side from demand-side mechanisms, we complement our analysis with two additional outcomes – digital health skills and general digital skills – to better interpret the implications of our findings on EHR use. The first index captures the use of digital health tools that are not necessarily provided through regional infrastructures (e.g., purchasing drugs online), while the second reflects broader digital competencies unrelated to healthcare or place of residence (e.g., online banking or buying and selling goods online).[8] Each index is constructed from multiple survey questions as described in Table 1, and normalized to range between 0 (no skills) and 1 (maximum proficiency across the relevant dimensions).

Table 1: **Definitions of the main outcomes- Aspects of daily life**

Variable	Definition	ADL Wave
EHR use		
EHR	dummy=1 if the respondent used her EHR in the last 90 days	2015, 2020, 2021, 2022
Digital Health Skills: variables included		
EHR other	dummy=1 if the respondent used online healthcare services (other than EHR) in the last 90 days	2015, 2020, 2021, 2022
App Health	dummy=1 if the respondent purchased or subscribed to an health app in the last 90 days	2020, 2021, 2022
Online booking	dummy=1 if the respondent booked a medical appointment online in the last 90 days	2015, 2020, 2021, 2022
Online drugs	dummy=1 if the respondent purchased drugs in the last 90 days	2015, 2020, 2021, 2022
Digital Skills: variables included		
Home banking	dummy =1 if the respondent used home banking services in the last 90 days	2015, 2020, 2021, 2022
Buy sell internet	dummy=1 if the respondent bought or sold anything on the web in the last 90 days	2015, 2020, 2021, 2022
Call videocall	dummy=1 if the respondent use cellphone and video-calls in the last 90 days	2015, 2020, 2021, 2022
Online fun	dummy=1 if the respondent used online free time activities (music, movie etc.) in the last 12 months	2015, 2020, 2021, 2022
Online reading	dummy=1 if the respondent used online reading services in the last 12 months	2015, 2020, 2021, 2022

Notes: Source: Aspect of Daily Life. The waves are defined on the basis of the availability of the question on the EHR use.

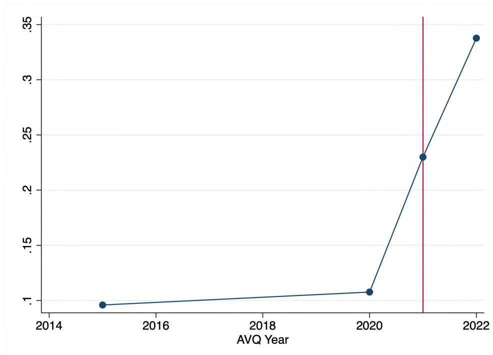
Figure 4 reports trends in EHR use and in the additional outcomes for the survey waves in which the question on EHR use is available. Consistent with the gradual development of the EHR in Italy, the increase in EHR use is modest between 2015 and 2020, while it sharply

[8] The activity "looking for health information online" is not included in the digital health skills index because it does not necessarily reflect the ability to use a specific online health service.

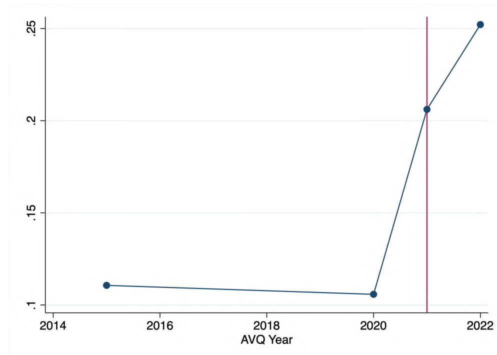
accelerates in 2021 and 2022, when part of the RRP-related investments, including the pilot projects, kicked off. Digital health skills also increased over the period, although to a lesser extent, whereas general digital skills were already on an upward trend by 2020.

Figure 4: **Trends in the main outcomes**

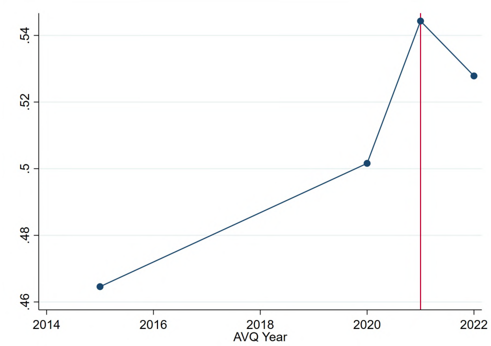
(a) EHR use



(b) Digital health skills



(c) Digital skills



Notes: The red line marks year 2021: since the survey is run every year in March for the period we are considering, and refer to habits and behaviors in the previous 90 days or 12 months, the 2020 data could not be completely representative of the COVID-19 pandemic.

As a further internal validity check, Table 2 reports the correlations among the three outcomes in the pre-treatment period. EHR use is strongly correlated with digital health skills, while its correlation with general digital skills is weaker, although in the expected direction.

To account for heterogeneity in EHR use, we include four groups of observable characteristics, listed in Table A.1: a set of socio-economic variables (*SES*); a set of controls capturing individual health status and drug consumption (*Health*); a set of variables measuring the level of trust in other people and in the main institutions responsible for the healthcare system (*Trust*); and a dummy (*Associations*) capturing respondents' exposure to information channels and their degree of civic engagement, such as participation in associations (ranging from trade unions to religious organizations).

Table 2: **Internal validation (2015-2020)**

	EHR	Digital health skills	Digital skills
EHR	1.000		
Digital health skills	0.596	1.000	
Digital skills	0.161	0.313	1.000

Notes: Aspect of Daily Life survey (wave 2015 and 2020). For a description of the indexes see Table 1.

Figure A.1 reports descriptive statistics for the main outcomes in 2020. Overall, higher educational attainment (at least a high school degree) and employment are associated with greater EHR use and higher levels of both general digital skills and digital health skills. Health-related characteristics, however, show a different pattern across outcomes. Older individuals, women, and those reporting chronic conditions or poorer level of self-assessed health record higher use of the EHR and of digital health tools, likely reflecting a greater perceived need for healthcare services, while displaying lower levels of general digital skills, not necessarily related to their health status.

3.1 The Econometric Analysis

We assess the effect of the boost due to the pandemic using the rate of extra death during the first wave as a proxy for the intensity of being expose to COVID-19. This variable (DR) is the sum of the mortality rates in March 2020, April 2020 and May 2020, normalized on the mortality of the same period in the years 2015-2019. On average there was an increase by 27% in mortality rates, while regions in the upper 90% percentile recorded an increase of more than 50%. We estimate the following model:

$$EHR_{irt} = \omega(DR_r) * Post + SES_i^{'}\beta + Health_i^{'}\sigma + Trust_i^{'}\pi + Associations_i^{'}\alpha + \rho_r + \gamma_t + \epsilon_r \tag{1}$$

so that for each individual i, residing in region r, and in the wave at time t, we assess the impact of her region exposure to the COVID-19 pandemic (ω) on her own use of the EHR. The full list of socio economic characteristics $SES_i^{'}$, the detailed information on the perceived health status $Health_i^{'}$, as well as what is included in the vector $Trust_i^{'}$, are listed in Table A.1. ρ_r are regional fixed effects to control for the characteristics of the healthcare system. Through the regional fixed effects we take care also of the heterogeneous level of development of the regional EHR as well as the cultural approach to digital tools when dealing with the healthcare system. γ_t controls for the year fixed effects. The same model is tested also for the outcomes digital health skills and digital skills.

Table 3 shows the baseline results. Overall a more intensive exposure to the pandemic, is associated to an increase in the EHR use and to an improvement of digital health skills, with no effects on digital skills. An increase by a standard deviation in our proxy for exposure (0.32) is associated to an increase by 39.7% at the mean of EHR use ((0.134*0.32)/0.108) and by 8% at the mean of digital health skills ((0.024*0.32)/0.095).[9] The larger magnitude of the impact on EHR can be in part related to the 2020 legislation and to the structural effort to reinforce the EHR infrastructure in a more systematic way, as the demand for more digital tools obviously increase as a consequence of the constraints imposed by the pandemic.

Table 3: **Results Exposure to COVID19**

	(1)	(2)	(3)
Panel A: EHR			
Treatment	0.134***	0.133***	0.134***
	(0.031)	(0.031)	(0.031)
Mean	0.108	0.108	0.108
Obs	83,030	83,030	83,030
Panel B: Digital Health Skills			
Treatment	0.024**	0.023**	0.024**
	(0.010)	(0.010)	(0.010)
Mean	0.095	0.095	0.095
Obs	83,048	83,048	83,048
Panel C: Digital Skills			
Treatment	0.005	0.005	0.005
	(0.005)	(0.004)	(0.004)
Mean	0.512	0.512	0.512
Obs	83,048	83,048	83,048
SES	Yes	Yes	Yes
Health	Yes	Yes	Yes
Trust	No	Yes	Yes
Associations	No	No	Yes
Year FE	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes

Notes: The dependent variable is EHR (dummy), Digital health skills (continuous between 0 and 1), Digital skills (continuous between 0 and 1). *** p<0.01, ** p<0.05, * p<0.1. For a detailed explanation of the controls see Table A.1.

To provide a better understanding of the potential dynamics behind of main results, we

[9]Table A.2 shows the results of the event study run with the four years of the survey: there are not anticipatory effects in 2020 (reference year being 2015), and we can detect a strong effect for EHR use in 2021 and 2022.

add to our baseline model an interaction term to check for differential effects along those observable characteristics listed in FigureA.1 among the main drivers of higher values of the EHR use. Table 4 shows the results of these new estimates. The main socio-economic characteristics associated to higher income availability (being married, having at least a high school degree and being employed) are associated to a stronger increase in EHR use as it is being a female. On the side of the health conditions, respondents with chronic conditions do not drive the results, but consuming drugs and not being satisfied of her own health conditions do. Trust is a driver only when it refers to people and not necessarily institutions. When we test for any differential effect due to have been residing in one of the regions participating to the pilot experiments (which was still not completed at the time of the 2022 wave), has a positive effect.

The dynamic of the drivers are not exactly the same when it comes to explain the average effect on the digital health skills. As shown in Table A.3, the main effects are explained by the main socio-economic drivers and being a female, as well as suffering from a chronic conditions and consuming drugs. Trust in people still increases the level of digital health skills, while all the regions involved in a pilot experiments saw an increase in digital health skills.

Table 4: **Drivers of the effects on EHR use**

	SES				**Health**		
	Female	**Married**	**Employed**	**High School**	**Chronic**	**Drugs**	**Satisfied**
Treatment	0.117***	0.129***	0.096***	0.088***	0.132***	0.118***	0.146***
	(0.032)	(0.031)	(0.028)	(0.029)	(0.030)	(0.030)	(0.031)
Interaction	0.034***	0.010***	0.052***	0.069***	0.006	0.032***	-0.014*
	(0.007)	(0.003)	(0.004)	(0.007)	(0.004)	(0.006)	(0.008)
Mean	0.108	0.108	0.108	0.108	0.108	0.108	0.108
Obs	83,030	83,030	83,030	83,030	83,030	83,030	83,030

	Trust			**Supply Factors**
	People	**Region**	**Parliament**	**Pilot**
Treatment	0.125***	0.135***	0.136***	0.109***
	(0.030)	(0.029)	(0.031)	(0.022)
Interaction	0.027***	-0.003	-0.005	0.089**
	(0.003)	(0.010)	(0.003)	(0.032)
Mean	0.108	0.108	0.108	0.108
Obs	83,030	83,030	83,030	83,030

Notes: The dependent variable is EHR (dummy). For each column we show the result with the full list of controls and regional and year fixed effects. For the drivers on the supply side we also add the dummy pilot which identify. *** p<0.01, ** p<0.05, * p<0.1.

4 The 2024 Survey

The ADL survey has the great benefit that, although cross-sectional, it is repeated yearly and is representative of the Italian population. Yet, as far as the EHR is concerned, relying on the ADL questions means we can only discriminate between those who reported having used the EHR in the previous 90 days and those who did not. The non-users might be people who never heard about the existence of the EHR, who do not know how it works and how it might affect their health, or they might have made a first access to their EHR and yet not have used it in the last 90 days. Moreover, this focus does not allow us to investigate heterogeneous levels of effective knowledge of the EHR also among those who have used the tool.

To provide a better understanding of the actual knowledge of this tool on which an enormous amount of public funding has been invested, we designed an ad hoc survey. Our 52-question survey collected a representative sample by gender, age (younger than 35, 35-55, 55-65, older than 65) and region of residence and had two targets: obtain a comprehensive assessment of the perception, use, and effective knowledge of the EHR in the population and test different informative messages to increase the use of the EHR. The survey was run between the end of November (pilot) and the first weeks of December 2024. This timeframe is of particular interest since it coincides with an advanced state of the implementation of the RRP investments and overlaps with the second media campaign on the EHR.

The survey was conducted online (CAWI interviews) and administered by a commercial company. The final sample includes 2,779 observations, after excluding those who did not pass the inclusion criteria.[10] Table A.4 shows that, compared to the ADL sample, our respondents are positively selected on several dimensions, consistent with the fact that this is an online survey. Our respondents are more educated (89.7% have at least a high school degree, against 55% in the ADL) and more often employed (61.6% vs. 45%), mainly in the private sector (70%). Our respondents also report higher levels of trust both in other people and institutions and they have even more trust in the NHS.[11] Half of our respondents reside in one of the regions in the portability pilot or in the feeding pilot and they report, on average, relatively high digital skills (0.828) and high digital health skills (0.700) compared to the average values in the population represented in the ADL survey.

[10]We dropped respondents who completed the survey in less than 4 minutes or more than 45 minutes (3 observations; average completion time being 12 minutes), those who failed the attention test (19 observations), those younger than 33 with adult kids (2 observations), and those declaring that they do not use internet even though they participate to an online survey (2 observations).

[11]56% of our respondents trust other people against 23% in the ADL. The gap is confirmed, but smaller, when regional governments (55% vs. 39%) and parliament (51% vs. 37%) are at stake.

4.1 EHR Outcomes: perceptions, behaviors, and knowledge

The survey allows us to distinguish different stages in citizens' relationship with the EHR. We start measuring the awareness of the tool by asking respondents whether they have ever heard of the EHR, and whether they recall having seen an EHR information campaign. Then, we measure the effective knowledge of the tool. Following standard approaches to knowledge assessment, respondents were asked general questions on who can access the EHR, who can upload documents into it, how to access it, and which services are available through it. Finally, we observe a set of actual behaviors toward it: whether respondents have used it at least once (i.e, first access), whether they have accessed their health records online in the last 90 days (a question that closely mirrors the one available in the ADL survey), whether they made their first access before or after the start of the COVID-19 pandemic, and how frequently they have being using the EHR since their first access. All these outcomes are summarized in Table 5.

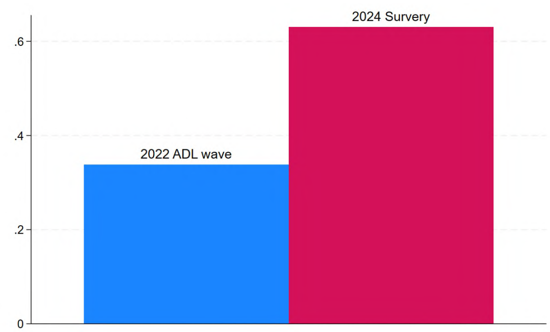
Table 5: **EHR outcomes**

	Definition	Mean	Std. Dev.	Obs.
Awareness				
Aware	Dummy equal to 1 if the respondent declared to be aware of the EHR	0.728	0.445	2,779
Campaign	Dummy equal to 1 if the respondent declared to have seen a EHR campaign	0.449	0.497	2,779
Knowledge				
Knowledge	Mean score of 12 binary indicators measuring knowledge of EHR functioning (conditional on being aware of the EHR)	0.654	0.128	2,024
Behaviors				
First access	Dummy equal to 1 if the respondent has made a first access to her EHR account (conditional on being aware of the EHR)	0.682	0.466	2,024
Access 90d	Dummy equal to 1 if the respondent declared to have accessed her health record online in the previous 90 days (conditional on being aware of the EHR)	0.630	0.483	2,024
Early first access	Dummy equal to 1 if the respondent made the first access to her EHR before Covid-19 pandemic (conditional on having accessed it at least once)	0.293	0.456	1,380
Late first access	Dummy equal to 1 if the respondent made the first access to her EHR less than 2 years prior the survey (conditional on having accessed it at least once)	0.453	0.498	1,380
Frequent use	Dummy equal to 1 if the respondent declared to have been using the EHR from quite to very often since her first access (conditional on having accessed it at least once)	0.464	0.499	1,380

Notes: *Early activation* and *Late activation* refers to the distribution of the time of activation of the EHR at the date of the interview according to the distribution shown in Panel (a) of Figure A.5.

The descriptive evidence points to a substantial drop-off along the adoption process. Even if GPs are obliged to feed their patients' EHR and, therefore, to use it in managing the relationship with their patients, only 72.8% of respondents report having heard of the EHR. Among them, 68% have accessed their account at least once (i.e, first access) and 63% accessed their health records online in the previous 90 days. Among those who have accessed it at least once, only 46.4% have used the system frequently since their first access. First access is also relatively recent for many respondents: 45.3% of users, who have accessed their account at least once, report having used the EHR for the first time less than two years before the interview, whereas only 29.3% did so before the pandemic.[12] This pattern is consistent with a process of gradual diffusion that accelerated in the post-pandemic period and possibly during the period of intensified public communication.

Figure 5: **Average access to health online records in the last 90 days**



Notes: The figure shows the average access to online health records in the previous 90 days reported by respondents to our 2024 survey and by respondents to the 2022 ADL wave (the last containing a specific question on the EHR use).

Figure 5 compares the share of respondents reporting access to their online health records in the previous 90 days in our 2024 survey and that in the 2022 ADL wave. Such a share is markedly higher in our sample (around 63%) than in the ADL sample (around 34%). Yet, the increase may not only be due to the spread of the EHR use. Our sample is itself positively selected on digital exposure, given the online (CAWI) administration of our survey, as already reflected in the higher mean values of digital and digital-health skills. Moreover, the supply side further improved thanks to additional RRP-related investments and a nationwide communication campaign was made, plausibly contributing to genuine growth in EHR uptake.

Effective knowledge appears considerably more limited than generic awareness or first access: respondents who accessed the EHR at least once correctly identify, on average, only 65% of its basic functions. This suggests that even among citizens who are not completely unfamiliar with the tool, many lack a full understanding of how it actually works. In other words, occasional use does not necessarily imply informed use. The same conclusion emerges when we look at recall of the government campaign. Despite the scale of the communication effort and the fact that our survey overlaps with the second 2024 campaign, only 44.9% of respondents report having seen information on the EHR. Thus, even at an advanced stage of RRP implementation and during a national communication campaign, awareness of the

[12]See Figure A.5.a for the distribution of the ”first access” periods.

public messaging itself remains far from satisfactory.

Table 6: **Internal validity exercise - 2024 Survey**

All respondents (2,779 respondents)

	Campaign	Aware	Digital health skills	Digital skills	
Campaign	1.000				
Aware	0.449	1.000			
Digital health skills	0.208	0.133	1.000		
Digital skills	0.107	0.138	0.107	0.343	1.000

Conditional on being aware of EHR (2,024 respondents)

	Campaign	First access	Knowledge	Digital health skills	Digital skills	
Campaign	1.000					
First access	0.129	1.000				
Knowledge	-0.106	0.387	-0.205	1.000		
Digital health skills	0.193	0.159	0.078	-0.072	1.000	
Digital skills	0.122	0.076	-0.044	0.068	0.337	1.000

Conditional on having accessed the EHR at least once (1,380 respondents)

	Campaign	Knowledge	Early first access	Late first access	Frequent use	Access 90d	Digital health skills	Digital skills
Campaign	1.000							
Knowledge	-0.130	1.000						
Early first access	-0.138	0.154	1.000					
Late first access	0.109	-0.063	-0.586	1.000				
Frequent use	0.093	-0.027	0.182	-0.243	1.000			
Access 90d	0.121	0.032	0.102	-0.077	0.342	1.000		
Digital health skills	0.187	-0.062	-0.025	0.032	0.188	0.301	1.000	
Digital skills	0.076	0.095	-0.020	0.016	0.116	0.194	0.340	1.000

Notes: The table reports correlations coefficients.

Table 6 presents an internal validity exercise where we computed the correlation coefficients among the main outcomes across three sets of respondents: all respondents (2,779), those aware of the EHR existence (2,024), and those who have made a first access to their EHR account (1,380). We observe three main patterns. First, in the full sample *Campaign* correlates more strongly with digital health skills (0.208) than with general digital skills (0.107), consistent with the ADL evidence that exposure to digital health tools, rather than generic digital ability, drives campaign recall; the correlation between the two skill indices is stable across the three samples (around 0.340), mitigating concerns of compositional changes. Second, conditional on awareness, effective knowledge correlates positively with having done the first access (0.387), but negatively, even if weakly, with *Campaign* (-0.106): the campaign does not appear to reach those who already hold correct priors. Third, conditional on having done the first access, frequency of use is essentially uncorrelated with effective *Knowledge* (-0.027) and digital health skills (-0.062) but strongly correlated with having accessed the EHR in the previous 90 days (0.342) and early first access (0.182). It appears that first access, regular use and effective knowledge therefore respond to different elements, strengthening the case for communication strategies targeted not only at non-users but also at users with inaccurate priors.

4.2 Correlates of awareness, activation, and uses

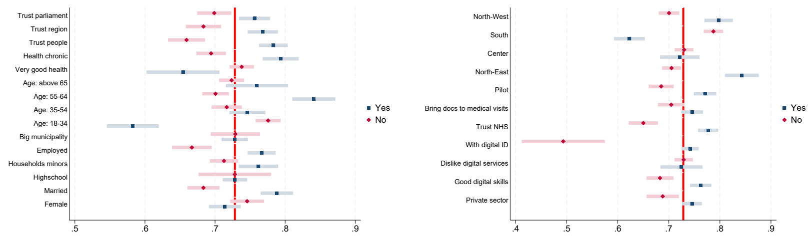
Building on the groups of observables defined in the ADL section (Section 3) and on additional variables collected through our survey, Figures 6a and 6b describe how the main outcomes of the EHR vary across the different subgroups of respondents. For each outcome and each binary observable, we plot the within-group sample mean and its 95% confidence interval. The figures should be read as a set of conditional means: each row reports the average outcome for the two subgroups defined by a given characteristic, with no further controls. Each plot also displays the average value of the outcome to provide a sense of where each group stands relative to the overall mean. This provides a first description of the heterogeneity in EHR engagement, which we exploit later in the experimental analysis (Section 4.3).

Taken together, the figures show that the adoption process is shaped less by a clear socio-economic factor than by a combination of trust, digital attitudes, and prior exposure to information, with some systematic demographic and territorial patterns that nonetheless emerge.

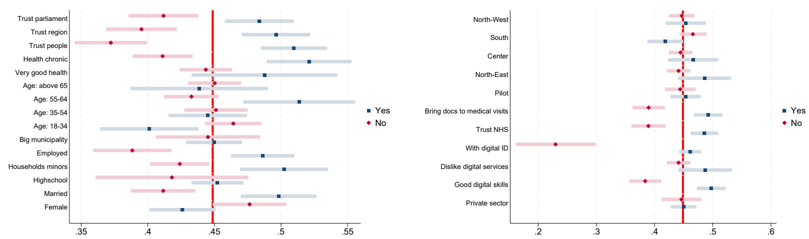
In both figures, respondents with higher trust, especially trust in the NHS and in other people, display higher EHR awareness, greater recall of the campaign, a higher probability of having done the first access and an access during the previous 90 days, and a more frequent use. This pattern is consistent with the idea that engaging with a digital health infrastructure requires not only technical access but also confidence in the institutions that manage data and organize care. Moreover, it is still reconcilable with the ADL evidence. Even if trust in regional and national institutions is now positively associated with most EHR outcomes, it appears most relevant for the upstream ones such as awareness and campaign recall, while its association with access in the previous 90 days, that is, the dimensions closer to the ADL outcome, is clearly weaker. Respondents reporting good digital skills or a positive attitude toward digital services are more likely to be aware of the EHR, to know how it works, to have done the first access to their account and an access in the previous 90 days, and to use it more frequently. The opposite pattern emerges for respondents who declare that they dislike digital services. This is particularly visible for first access and frequent use, suggesting that digital predisposition matters less for mere awareness than for moving from awareness to actual use. These patterns complement the results from the ADL analysis: generic digital skills alone are not the main driver of EHR take-up, but attitudes toward digital interaction and confidence in using such tools appear closely linked to actual engagement.

Figure 6a: **Different intensity of the awareness and knowledge**

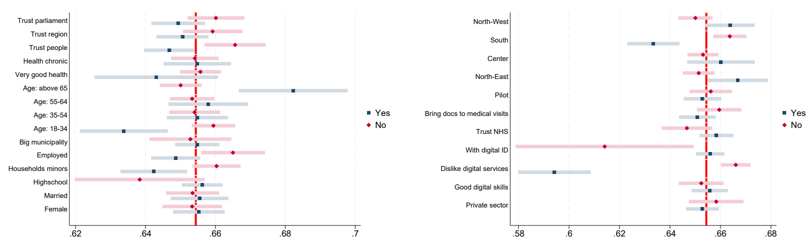
(a) Aware (Obs. 2,779)



(b) Campaign (Obs. 2,779)



(c) Knowledge (Obs. 2,024)

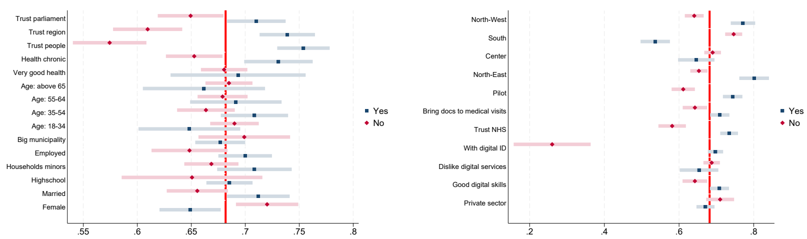


Notes: The figure plots the within-group sample mean and its 95% confidence interval, separately for respondents with the characteristic equal to one (in navy) and equal to zero (in cranberry). Then, each row reports the average outcome for the two subgroups defined by each given characteristic, with no further controls. The red vertical line represents the average value of the outcome in the related sample.

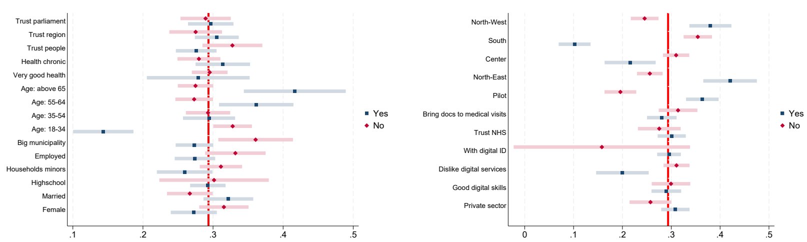
The figures also point to a gender difference. Women are, on average, less likely to report awareness, campaign recall, and first access, but among those who made the first access they are more likely to have accessed it in the previous 90 days and to use it frequently. This suggests that women may face a weaker entry into the system but, once engaged, use it more intensively, likely reflecting their greater involvement in the management of the household health. Regarding socio-economic characteristics, marital status and employment status are positively associated with most indicators of awareness and use, whereas education displays a less uniform pattern. In particular, having at least a high school degree is not systematically associated with higher awareness or first access, although it tends to correlate positively with some dimensions of knowledge and use. This helps reconcile the 2024 descriptive evidence with the ADL results: in the ADL population data, socio-economic advantage was clearly

Figure 6b: **Different intensity of use**

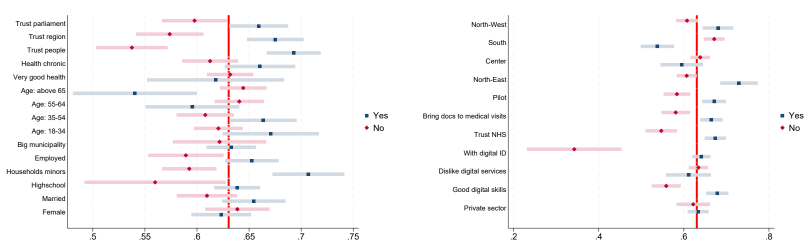
(a) First access (Obs. 2,024)



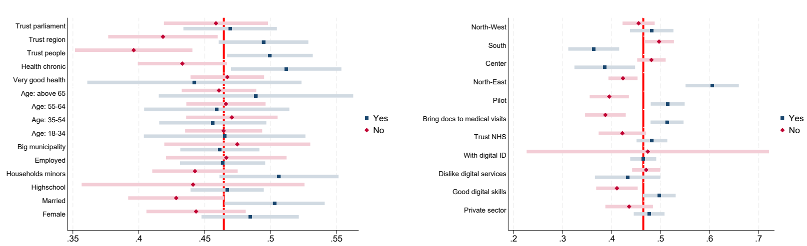
(b) Early vs. late first access (Obs.1,380)



(c) Access 90d (Obs. 2,024)



(d) Frequent use (Obs. 1,380)



Notes: The figure plots the within-group sample mean and its 95% confidence interval, separately for respondents with the characteristic equal to one (in navy) and equal to zero (in cranberry). Then, each row reports the average outcome for the two subgroups defined by each given characteristic, with no further controls. The red vertical line represents the average value of the outcome in the related sample.

associated with greater EHR use; in our online sample, where respondents are already positively selected in terms of education and digital access, those gradients become less sharp and are partly replaced by variation in trust and digital attitudes.

Age gradients are recorded but not always monotonic. Younger respondents are generally more likely to recall the campaign and more digitally oriented, while middle-aged groups appear more likely to have activated the EHR and to have accessed it in the previous 90 days. Older respondents do not perform systematically worse across all outcomes, suggesting that healthcare needs may partly offset digital disadvantages. Consistently, respondents with chronic conditions are often more aware of the EHR and more likely to use it, indicating that demand for care remains an important driver of engagement. Their effective knowledge of the tool, however, is not higher than that of respondents without chronic conditions. This is a relevant finding as it challenges the common expectation that a more intensive use implies a better understanding among those with greater health needs.

Figures 6a and 6b also show some territorial heterogeneity, though not always in the same direction across outcomes. A broad North-South gradient emerges for awareness, first access, access in the previous 90 days, and frequent use, with respondents in Southern regions generally displaying lower engagement. The gap is, however, less evident for effective knowledge, and it is not present for the recollection of the EHR campaign. This is consistent with the broader evidence in the paper: territorial differences matter, but they do not map neatly into a simple North-South divide in EHR infrastructure alone. Finally, the role of pilots is mixed. Residing in a pilot region is often associated with higher awareness or use, but not with higher knowledge.

Overall, Figures 6a and 6b offer some relevant takeaways. Awareness of the EHR is far from equivalent to effective knowledge, access in the previous 90 days, or regular use. Trust and digital attitudes are more systematically associated with engagement than most traditional socio-economic variables within this online sample. Finally, movement along the adoption chain, from awareness to first access, from first access to access in the previous 90 days, and from access in the previous 90 days to regular use, appears to depend on a combination of perceived needs, institutional confidence, and willingness to interact with digital tools.

4.3 The information treatment

Participants were randomly assigned to one of two informational treatments concerning the EHR. Both treatments were designed to stress the advantages of the system, but they differed in the perspective emphasized. The first treatment focused on the individual benefits of using the EHR, stressing that it can save time and money, for instance by reducing unnecessary tests or services (i.e, individual narrative). The second treatment focused on the social benefits, stressing potential savings in time and resources for the NHS (i.e, social narrative).

The experimental design does not include a no-information control group. This choice is motivated by the fact that our survey was conducted during an active government media campaign on the EHR. In this context, a truly untreated group (i.e, not exposed to information) would have been difficult to define, since even respondents assigned to a nominal control condition could have been exposed to the official campaign through television, social media, or regional portals. Such contamination would have made the interpretation of a treated-versus-untreated comparison more challenging. Comparing two alternative framings of EHR benefits, by contrast, allows us to hold constant the provision of factual information while identifying the marginal effect of how those benefits are communicated, prioritizing internal validity in a context where external information flows cannot be controlled.

The content of the government media campaign (Figure B.2) is largely neutral with respect to the framing dimension we manipulate. It stresses that the EHR safely stores health information, that it allows healthcare professionals to provide more appropriate care also outside the region of residence, and that it improves the quality and continuity of care, without emphasizing a clear individual-versus-social benefits dichotomy. As a result, neither of our two information messages fully overlaps with the campaign messaging. Respondents in the individual-benefits group are exposed to a direct and personal framing of benefits that the campaign only hints at, while respondents in the social-benefits group are exposed to a totally different framing from the one of the campaign. Both messages therefore add new content relative to the official messaging, and the differential effect we estimate can be interpreted as the relative persuasiveness of the two framings. Nonetheless, the absence of a no-information control group implies that we cannot estimate the absolute effect of providing information relative to providing none, nor can we determine whether either treatment improves outcomes relative to the status quo created by the concurrent campaign. Our estimates capture only the relative effectiveness of the individual-benefits framing compared with the social-benefits framing. Still, this comparison is relevant from a policy perspective. The practical question for policymakers is often not whether information matters in the abstract, but which type of communication is more effective in shifting beliefs and intended behavior.

After exposure to one of the two messages, respondents answered a set of follow-up questions aimed at measuring their beliefs and intentions regarding the EHR. The design of these questions follows the theoretical framework of the Technology Acceptance Model (TAM), one of the most widely used models to explain the adoption of new technologies. In its original formulation, the TAM identifies two key determinants of adoption: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which individuals believe that using a technology improves outcomes or performance, while perceived ease of use captures the degree to which they expect the technology to require limited effort (Kamal et al., 2020). These perceptions shape attitudes toward the technology and, ultimately, behavioral intention to use it.

Our post-treatment questions map closely into these TAM dimensions. Using five-point Likert scales, we elicit respondents' willingness to continue or start using the EHR, to use it when in need of care, and to recommend it to relatives and friends. These items capture usage intention. We measure perceived usefulness through questions referring to the quality of care, the management of health information, and the ability to better understand one's own health status. Perceived ease of use is captured through statements on the ease of using the EHR and the clarity of its interface. We also consider other dimensions often related to technology adoption, including facilitating conditions, social influence, and perceived risk. Table 7 summarizes the mapping between the survey items and the TAM constructs. To synthesize the information contained in respondents' answers, we construct the main outcomes using principal component analysis (PCA) on the set of items corresponding to each construct.[13]

According to the TAM framework, information should affect adoption by shifting respondents' beliefs about usefulness and, to some extent, ease of use. In our setting, both treatments may reduce information frictions by clarifying what the EHR is and what it can do. However, the framing of benefits is also likely to matter. When the gains are presented as accruing directly to the individual, they become more concrete, immediate, and personally relevant. When the same gains are presented as accruing to the healthcare system, they are more diffuse and less directly internalized by respondents.

There are therefore solid theoretical reasons to expect the individual-benefits framing to be more effective than the social-benefits framing. Messages emphasizing private returns make the consequences of adoption more salient and reduce psychological distance. By contrast, messages centered on social gains typically refer to benefits that are more abstract, less directly appropriable by the individual, and potentially subject to free-riding. This distinction is particularly relevant when adoption requires attention, cognitive effort, or a change in habitual behavior. In such contexts, self-interested appeals are often found to be more effective than pro-social ones, especially when private benefits are concrete and easily understood (Asensio and Delmas, 2016; Chapman et al., 2010; Jordan et al., 2021; Milkman et al., 2011). More broadly, this prediction is consistent with theories of salience, prospect-based evaluation, and present-biased responses to incentives, according to which individuals

[13] We test the robustness of our results to alternative definition of our outcomes of interest. Results are reported in Table A.7.

Table 7: **TAM constructs & Survey questions**

Construct	Survey items
Perceived Usefulness (PU)	The EHR can ensure a better quality of care EHR use reduces the complexity of my healthcare The EHR increases my knowledge about my health status
Perceived ease of use (PEOU)	Using the EHR is easy for me The organization and navigation of the EHR is clear and understandable
Usage Intention (UI)	I intend to continue/start using the EHR in the future Whenever I need medical care, I would gladly use the EHR I intend to inform my relatives and friends about the EHR
Facilitating conditions (FC)	I can/could get help from others when I have difficulty using the EHR I have/would have the knowledge needed to use the EHR I have/would have the resources needed to use the EHR
Perceived Risk (PR)	I would not want the EHR to interfere with or change the way I interact with doctors Using the EHR is/would be a waste of time I think the EHR has adequate privacy protection measures that guarantee the security of the information contained therein I think the EHR only collect personal data of users that are necessary for their activity I think the EHR will not provide my personal information to other companies without my consent
Social Influence (SI)	My GP thinks I should use the EHR People whose opinions matter to me prefer that I use the EHR

Notes: The table reports the TAM constructs and the corresponding survey items.

place greater weight on benefits that are immediate and personally experienced than on those that are social or temporally distant (Kahneman and Tversky, 1979; Loewenstein et al., 2007; Thaler and Sunstein, 2008). In the context of the EHR, a message stressing that this tool can save the user time, reduce duplication of tests, and improve the continuity of her own care is therefore more likely to increase perceived usefulness and intended use than a message emphasizing efficiency gains for the NHS.

We estimate the effect of being exposed to the individual-benefits framing rather than to the social-benefits framing using the following model:

$$\begin{aligned} Outcome_{irm} =& \delta Treatment_i + SES_i'\beta + Health_i'\sigma + Trust_i'\pi + Skills_i\lambda \\ &+ \mu MarloweCrowne_i + \alpha_r + \epsilon_m \end{aligned} \tag{2}$$

where $Outcome_{irm}$ denotes the post-treatment outcome of individual i living in region r and macro-area m. The vectors SES_i, $Health_i$, and $Trust_i$ include the same broad groups of controls used in the previous analysis and described in Table A.4. $Skills_i$ includes self-assessed digital skills, digital health skills, general digital skills, possession of a digital identity needed to access the EHR, and attitudes toward digital tools. The health controls also include whether the respondent usually brings medical documentation to visits. This variable proxies for a revealed propensity to actively manage one's own clinical information, that is, a behavior that the EHR essentially digitizes. It is therefore likely to be correlated both with baseline beliefs about the usefulness of the system and with the way respondents process the informational message.[14]

The model includes regional fixed effects (α_r) to absorb time-invariant regional heterogeneity in the institutional and technological environment to which respondents are exposed. This is particularly relevant in the Italian context, where EHR has been developed within regionally organized healthcare systems that may differ in how far implementation has progressed, as documented in Section 2. Even though treatment is randomly assigned at the individual level, such differences may shape baseline beliefs and the way respondents interpret the informational messages. Regional fixed effects therefore ensure that the treatment effect is identified from within-region variation. Standard errors are computed using a bootstrap procedure clustered at the macro-area level, so as to allow for residual correlation within broad territorial areas sharing similar media environments and institutional conditions. Given the small number of macro-areas, this correction should be interpreted cautiously; nevertheless, it is intended as a more conservative inference procedure than relying exclusively on individual-level heteroskedasticity-robust standard errors.

Finally, given the nature of the questionnaire, there is a possibility that respondents may have tried to provide answers they believed would satisfy the researchers. This concern is mitigated by the design of our experiment as both our messages provide the same positive information on the EHR benefits but with a different framing. As a consequence, any tendency to align responses with what the researchers are perceived to favor should affect respondents in both groups similarly. Still, once could be concerned that one framing may be perceived as more socially approved than the other. This would be the case, for instance, if social benefits are associated to a more pro-social responses. To address this residual issue, and following Dhar et al. (2018)), we include a Marlowe-Crowne social desirability index based on the validated 13-item scale developed by (Reynolds, 1982). This index captures respondents' tendency to seek social approval.

The effectiveness of the treatment is likely to depend on respondents' prior engagement with the EHR. Individuals who already use it regularly may have well-formed beliefs and therefore limited scope for updating. By contrast, those who have never accessed it, or have never heard of it, are more likely to face binding information frictions. To capture this heterogeneity, Table 8 reports estimates for four progressively more restrictive samples.

[14] Moreover, even if random assignment ensures balance in expectation, controlling for this dimension absorbs residual heterogeneity in prior engagement with health-related information and improves the precision of the estimated treatment effect.

Column (1) uses the full sample. Column (2) excludes frequent users. Column (3) excludes respondents who accessed it at least once. Column (4) focuses only on respondents who had never heard of the EHR.[15] This progressive restriction allows us to test whether the effect of information is strongest where prior engagement is weakest.

Table 8: **Experiment results**

	Usage Intention				**Perceived Usefulness**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	0.053**	0.075***	0.157***	0.265***	0.061	0.088	0.133***	0.155**
	(0.021)	(0.023)	(0.034)	(0.060)	(0.062)	(0.069)	(0.042)	(0.064)
Mean	0.000	-0.137	-0.397	-0.415	0.000	-0.040	-0.103	-0.103
Obs	2,779	2,138	1,399	755	2,779	2,138	1,399	755

Notes: Estimates in column (1) are obtained running model the estimation model in Eq. 2 on the whole sample. Differently, estimates in column (2) refer to the sample excluding EHR frequent users, while those in column (3) to the sample discarding respondents who accessed their EHR at least once. Finally, estimates in column (4) refers only to those respondents who claimed to not know the EHR. All specifications include regional fixed effects and control for the Marlower Crowne index and the following vectors: *SES*, *Health*, *Trust*, *Skills*. Bootstrapped standard error at the macro-area level in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

The results support this interpretation. The individual-benefits framing produces larger increases in both usage intention and perceived usefulness than the social-benefits framing, and the magnitude of the effect increases monotonically as we move to samples characterized by lower prior exposure to the EHR. In the full sample, the individual framing increases usage intention by 0.053 standard deviations relative to the social framing. The effect rises to 0.157 standard deviations when respondents, who accessed it at least once, are excluded and reaches 0.265 standard deviations among those who had never heard of the EHR. This pattern strongly suggests that the treatment operates by relaxing information frictions: the less familiar respondents are with the system, the larger the effect of receiving a message centered on direct private gains. The results for perceived usefulness are qualitatively similar, although less precisely estimated in the full sample. The coefficient is positive but not statistically different from zero in column (5), while it becomes significant both economically and statistically among non-users and previously unaware respondents. This divergence between usage intention and perceived usefulness in the full sample may reflect the fact that some respondents, especially regular users, already recognize the practical value of the EHR. For them, additional information may shift intended behavior more than it changes underlying assessments of usefulness.

To better understand the mechanisms behind these average effects, we then examine whether the relative effectiveness of the individual-benefits framing varies along three sets

[15] In Tables 5a and 5b, we show the balance test for the whole sample and the used sub-groups. Results reassuringly show that control and treated groups are mostly balanced along all observable characteristics.

of dimensions, that is, socio-economic characteristics, prior engagement with the EHR, and supply-side factors.

On the socio-economic side, we consider gender, marital status, employment, and education. Section 4.2 shows that women face a weaker entry into the system but, conditional on first access, use it more; we therefore expect the individual-benefits framing, which stresses time and money savings in the management of healthcare, to influence more women, who are typically more involved in managing household health. Household structure and education affect both access to alternative information channels and the ability to process and critically evaluate messages. Section 4.2 shows that married and employed respondents tend to display higher baseline engagement, while education has a weaker and less uniform association with EHR outcomes; we therefore expect smaller effects among married respondents and a less clear-cut pattern by education.

According to the TAM, information should be more effective the more uncertain individuals are about the technology's usefulness or functioning, while the literature on information provision suggests that messages are more effective when they offer new content and when they are perceived as personally relevant. Then, on the side of engagement with the EHR, we consider prior awareness, access in the previous 90 days, recall of the government campaign, and effective knowledge of the tool. Section 4.2 shows these dimensions are highly heterogeneous across respondents and not necessarily correlated with each other. We therefore expect stronger responses among those previously unaware of the EHR, those who have not accessed it in the previous 90 days, and those who do not recall the media campaign. Effective knowledge is more ambiguous a priori as respondents with higher prior knowledge may have less scope for updating, but they may also be better placed to translate the message into a clear belief update because they already understand the EHR functioning.

On the supply side, territorial context may shape the credibility and visibility of the message. Section 4.2 shows lower baseline engagement in the South and a positive but uneven role of the pilot regions, leading us to expect larger effects of new information where baseline engagement and supply-side maturity are weaker. We also proxy supply-side maturity also looking at the EHR Monitoring Dashboard (i.e, *Dashboard*) which captures the quality of the regional EHR environment at the time of our survey. Specifically, we construct a dummy equal to one for respondents residing in a region whose value on the PCA of the dashboard indicators described in Section 2.1 lies above the median of the distribution. Also, in this case, we expect smaller treatment effects in regions with a better EHR environment that would make the additional value of our informational message smaller. As a further alternative measure, we also construct the dummy *Reg FE* equal to one if the respondent resides in a region whose estimated regional fixed effect is above the median value of the corresponding distribution, where the regional fixed effects are those obtained from estimating Equation 2 with EHR awareness as the dependent variable. Hence, *Reg FE* identifies regions characterized by systematically higher residual baseline awareness of the EHR, after controlling for individual composition, and can be interpreted as measuring the unobserved component of the regional implementation and communication environment that makes citizens, on average, more familiar with this tool. Lastly, we look at the share of people in each region who gave their consent to grant access to their EHR also to healthcare professionals other than those who fed it. *Consent* is therefore a dummy equal to one if such share is above the median of the distribution in our sample. Since consent is a prerequisite for healthcare professionals to access individual records, regions with higher consent rates are those where the EHR is more deeply embedded in patient-provider relationship and where we therefore expect smaller treatment effects.

Table 9: **Heterogeneity analysis - Usage intention**

	SES				**Engagement with the EHR**			
	Female	**Married**	**Employed**	**High School**	**Awarness**	**Access 90d**	**Campaign**	**Knowledge**
Treatment	0.054	0.135***	0.105*	-0.002	0.263***	-0.043**	0.167***	-0.071***
	(0.051)	(0.045)	(0.057)	(0.185)	(0.061)	(0.018)	(0.030)	(0.022)
Interaction	-0.002	-0.191**	-0.084	0.062	-0.285***	-0.068**	-0.246***	0.138***
	(0.097)	(0.076)	(0.064)	(0.191)	(0.068)	(0.030)	(0.057)	(0.041)
Obs	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779

	Supply Factors				
	South	**Reg FE**	**Pilot**	**Dash-board**	**Consent**
Treatment	0.025	0.050	0.085	0.085	0.035
	(0.016)	(0.049)	(0.061)	(0.061)	(0.058)
Interaction	0.079***	0.006	-0.061	0.053	0.034
	(0.018)	(0.062)	(0.116)	(0.031)	(0.055)
Obs	2,779	2,779	2,779	2,779	2,779

Notes: Estimates are obtained by model in Equation 2 including an interaction between the treatment indicator and a dummy for the relevant dimension of heterogeneity. Bootstrapped standard error at the macro-area level in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

To implement this heterogeneity analysis, we augment Equation 2 with an interaction between the treatment indicator and a dummy for the relevant dimension of heterogeneity. These estimates are reported only for the full sample, since further sample restrictions would substantially reduce precision and make subgroup comparisons less informative. The full sample also provides the broadest picture of how treatment effects vary across the population.

Several patterns stand out in Tables 9 and 10. On the socio-economic side, married respondents react less to the individual-benefits framing than unmarried respondents. One

Table 10: **Heterogeneity analysis - Perceived usefulness**

	SES				Engagement with the EHR			
	Female	**Married**	**Employed**	**High School**	**Awarness**	**Access 90d**	**Campaign**	**Knowledge**
Treatment	0.050	0.173***	0.109***	0.270**	0.172**	0.060	0.148***	0.005
	(0.093)	(0.050)	(0.027)	(0.120)	(0.068)	(0.106)	(0.056)	(0.047)
Interaction	0.020	-0.261***	-0.077	-0.233*	-0.152*	-0.068	-0.189***	0.108**
	(0.104)	(0.073)	(0.054)	(0.100)	(0.080)	(0.104)	(0.058)	(0.052)
Obs	2,779	2,779	2,779	2,779	2,779	2,779	2,779	2,779

	Supply Factors				
	South	**Reg FE**	**Pilot**	**Dash-board**	**Consent**
Treatment	0.079	0.024	0.123	0.061	0.042
	(0.106)	(0.073)	(0.087)	(0.070)	(0.102)
Interaction	-0.049	0.087	-0.122	-0.001	0.038
	(0.111)	(0.066)	(0.104)	(0.034)	(0.088)
Obs	2,779	2,779	2,779	2,779	2,779

Notes: Estimates are obtained by model in Equation 2 including an interaction between the treatment indicator and a dummy for the relevant dimension of heterogeneity. Bootstrapped standard error at the macro-area level in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

possible interpretation is that individuals embedded in household networks have alternative channels through which they acquire information or discuss health-related tools, making the experimental message less pivotal. The heterogeneity by education is more nuanced. Respondents without a high school degree appear particularly responsive in terms of perceived usefulness, suggesting that less educated respondents face larger informational barriers regarding the concrete private benefits of the EHR, so that a message emphasizing time savings and reduced duplication of tests is especially informative for them. Differently, we do not observed a differential effect by gender nor by employment status.

Turning to engagement with the EHR, respondents who were already aware of the EHR display significantly smaller treatment effects on both usage intention and perceived usefulness. This supports the view that the experiment mainly reduces information frictions rather than changing deep preferences. Similarly, respondents who recall the government campaign exhibit substantially smaller responses, suggesting that the additional value of an additional message is lower. This result is policy-relevant: once a segment of the population has already been exposed to an information campaign, further information may have limited impact. Access to the EHR in the previous 90 days is also associated with smaller effects, especially for usage intention. Respondents who logged in during the previous 90 days are already informed by direct experience, leaving limited room for additional updating through a brief message. An apparently counter-intuitive result concerns prior effective knowledge of the EHR, which is associated with larger treatment effects rather than smaller ones. A plausible interpretation is that prior knowledge and new information are complements rather than substitutes: respondents who already understand how the tool works may be better placed to appreciate the practical relevance of the benefits stressed in the treatment, whereas respondents with very low prior knowledge may lack the cognitive scaffolding necessary to translate the message into a clear belief update.

Finally, the supply-side dimensions provide a quite consistent picture. Residence in the South is associated with larger effects on usage intention, consistent with the lower baseline engagement documented in Section 4.2 and with the interpretation that the marginal value of new information is higher where the system is less embedded in everyday practice. Differently, the interactions with *Reg FE*, *Pilot*, *Dashboard*, and *Consent* are small and statistically indistinguishable from zero. Even where regional environments differ in terms of implementation and depth of integration into the patient-provider relationship as proxied by our variables, they do not impact the relative effectiveness of the individual-benefits framing once personal information frictions are properly accounted for.[16]

Taken together, these experimental results provide some policy-relevant takeaways. First, framing matters: emphasizing private and concrete benefits is more effective than stressing social gains. Second, information is especially effective among individuals with low prior exposure to the EHR, confirming that individual-level information gaps. rather than differences in the supply-side, remain a major barrier to adoption. This implies that successful digital health policies require not only infrastructure and regulation, but also targeted and credible communication strategies capable of reaching citizens who remain poorly informed or only weakly engaged.

5 Conclusions

This paper examines the drivers of patients' EHR use in Italy, distinguishing the role of supply-side investments from that of citizens' awareness, knowledge, and attitudes the EHR. By combining a difference-in-differences analysis on a nationally representative survey with an ad hoc survey conducted at the end of 2024, we provide novel evidence on how a major

[16]Several specifications display negative coefficients on the Treatment dummy. These coefficients should not be read as evidence that the individual-benefits framing is harmful. They capture the effect of the treatment for the baseline group only (i.e, respondents with the interacted variable equals zero) and reflect simultaneous forces. In some of these subgroups the individual-benefits framing may be perceived as less credible or less informative when respondents have no concrete experience that allows them to evaluate the claim of personal time and money savings, generating a small negative differential relative to the social framing. Moreover, several of these baseline coefficients are small in magnitude and only marginally significant; their economic content lies primarily in the interaction terms.

shock to digitization, an unprecedented public investment programme, and a nationwide media campaign jointly shape the diffusion of digital health tools.

If the COVID-19 pandemic acted as an important catalyst for EHR use, its effects turn out to be concentrated among individuals with more favourable socio-economic conditions, those reporting higher trust, and those with greater health needs, indicating that demand for care, alongside institutional confidence, remains a key driver of digital take-up. Interestingly, our 2024 survey shows a substantial drop-off along the adoption chain, from generic awareness to effective knowledge and regular use, and reveals that the structure of regional EHR systems in 2021 does not systematically predict their characteristics in 2024. This suggests that the RRP investments contributed to levelling the supply side, while individual attitudes and exposure to information remain the strongest correlates of awareness and use, with no clear socio-economic or geographical gradient. In addition, the information experiment embedded in our survey shows that framing matters. A message centred on individual benefits is significantly more effective than one centred on social benefits in shifting intended use and perceived usefulness, and its effect grows monotonically as the sample is restricted to respondents with weaker prior exposure to the system.

The challenges associated with digital health tools, including EHRs, are multidimensional and concern not only their adoption, but also their effective use and their impact on providers' workflows, patients' outcomes, and the overall efficiency of healthcare systems. A substantial share of the literature on EHR adoption focuses on organizational effects within healthcare facilities (e.g., hospitals and clinics), particularly with respect to providers' workflow and productivity (e.g., (Khairat et al., 2020)). However, patients' choices and engagement are equally relevant for the diffusion and effective use of these systems, especially in opt-in systems where the level of information and understanding among patients is a key determinant of adoption (Rau et al., 2024). Limited knowledge or mistrust may therefore reduce take-up and generate inequalities in access to the benefits of digital health.

Our findings provide several important policy implications. Large-scale investments in digital health infrastructure appear necessary but not sufficient to ensure widespread and equitable adoption. Closing the gap between availability and effective use requires additional interventions targeting citizens' knowledge and engagement. In this perspective, communication strategies should not be understood as a generic awareness exercise, as the framing of the message affects its effectiveness, with concrete and personally appropriable benefits more persuasive than benefits for the society. Moreover, the residual heterogeneity observed in awareness, knowledge, and use does not mirrors traditional socio-economic or territorial divides, so that targeting strategies based solely on standard indicators of vulnerability may prove insufficient.

Still, our survey is positively selected on digital exposure, and the experimental design compares two alternative framings rather than informed and uninformed respondents, since a credibly untreated group could not be defined during an active national campaign. Future research conducted outside the window of active government campaigns, or employing designs that can credibly isolate respondents from external information flows, would be valuable for establishing absolute treatment effects and benchmarking the magnitude of gains achievable through targeted communication strategies.

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Appendix A: Additional Tables and Figures

Table A.1: **Definitions of Controls in Aspects of Daily Life**

Variable	**Definition**	**Mean**
Socio-Economic Status		
Female	dummy=1 if the respondent is a female	0.518
Married	dummy=1 if the respondent is married or cohabitating	0.503
High school	dummy=1 if the respondent has at least a high school diploma or more	0.552
Households minors	dummy=1 if there are younger than 18 in the household besides the respondent	0.273
Employed	dummy=1 if the respondent has s stable occupation	0.450
Big municipality	dummy=1 if the respondent resides in a municipality with more than 10,000 inhabitants	0.430
Age: Younger than 34	dummy=1 if the respondent is 18-34 years old	0.210
Age: 35-54	dummy=1 if the respondent is 35-54 years old	0.349
Age: 55-64	dummy=1 if the respondent is 55-64 years old	0.168
Age: above 65	dummy=1 if the respondent is older than 65 years old	0.274
Health Status		
Very good health	dummy =1 if the respondent self assessed health status is very good or excellent	0.654
Satisfied health	dummy=1 if the respondent declares satisfied or very satisfied of her health status overall	0.801
Drugs	dummy=1 if the respondent declares to have used some drug in last two days	0.481
Health chronic	dummy=1 if the respondent declares to suffer from a health chronic condition	0.356
Trust		
People	dummy =1 if the respondent stated that most people deserved to be trusted	0.234
Regional government	dummy=1 if the respondent stated that she trusts the regional government	0.392
Italian parliament	dummy=1 if the respondent stated that she trusts the Italian Parliament	0.369
Information		
Associations	dummy=1 if the respondent attended any activity/meeting of an association (e.g., cultural, union, political) in the last 12 months	0.199

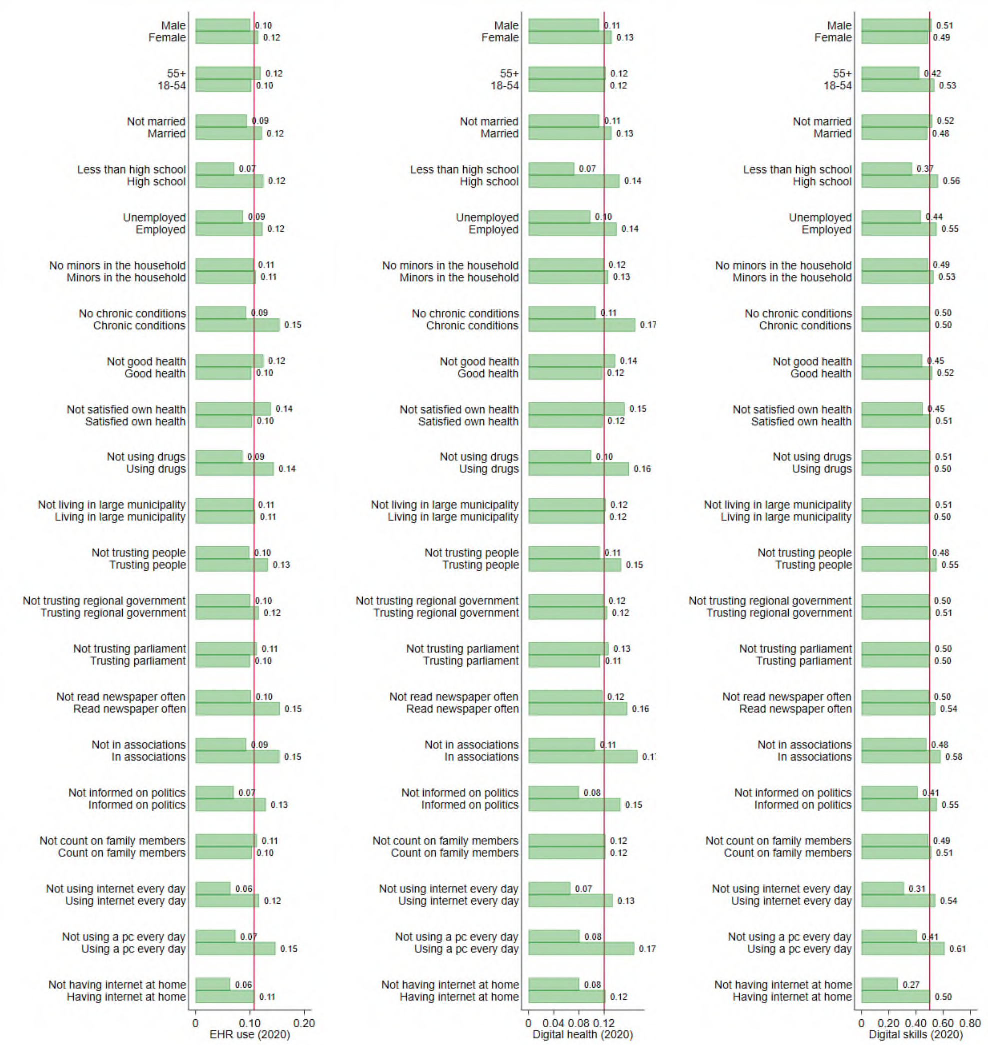
Notes: Definitions and descriptive statistics of the controls included in the estimation of Equation 1.

Table A.2: **Event Study**

	EHR use			**Digital health skills**			**Digital skills**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Year_{-1}$	-0.021	-0.019	-0.021	-0.015	-0.014	-0.015	0.003	0.005	0.003
	(0.022)	(0.021)	(0.022)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
$Year_0$	0.094***	0.096***	0.095***	0.009	0.010	0.009	0.009	0.011	0.010
	(0.030)	(0.030)	(0.031)	(0.007)	(0.007)	(0.007)	(0.010)	(0.010)	(0.010)
$Year_{+1}$	0.141**	0.141**	0.142**	0.016	0.016	0.016	0.005	0.006	0.006
	(0.053)	(0.053)	(0.053)	(0.012)	(0.012)	(0.012)	(0.008)	(0.008)	(0.008)
Mean	0.108	0.108	0.108	0.095	0.095	0.095	0.512	0.512	0.512
Obs	83,030	83,030	83,030	83,048	83,048	83,048	83,048	83,048	83,048
SES	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Health	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Trust	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Associations	No	No	Yes	No	No	Yes	No	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

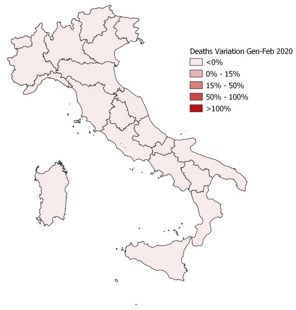
Notes: The dependent variable is EHR (dummy), Digital health skills (continuous between 0 and 1), Digital skills (continuous between 0 and 1). *** p<0.01, ** p<0.05, * p<0.1.

Figure A.1: **Drivers for the main outcomes: descriptives statistics**

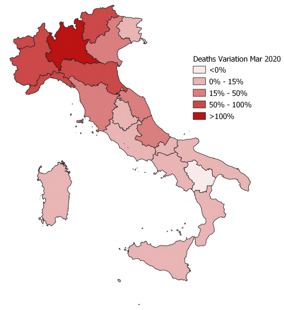


Notes: The three panels report the main descriptive statistics for the three outcomes of interest at 2020. The red line indicates the average value of the outcome in that year.

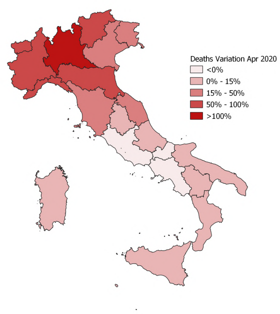
Figure A.2: **Variations in Death Rates by period-region (2020)**



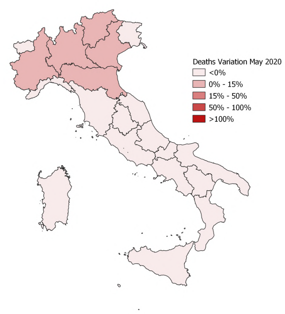
(a) January-February



(b) March



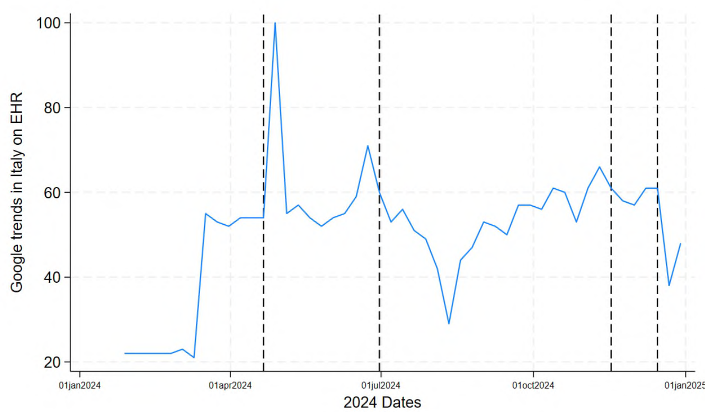
(c) April



(d) May

Notes: Variations in *death rates* are measures computed by the National Institute of Statistics (ISTAT) together with the Istituto Superiore di Sanità (ISS) on administrative data (Istat and Iss, 2020). They describe the percentage variation in death rates observed in the relevant month in 2020 in comparison with the corresponding average rate reported in the period 2015-2019.

Figure A.3: **Google trends on EHR**



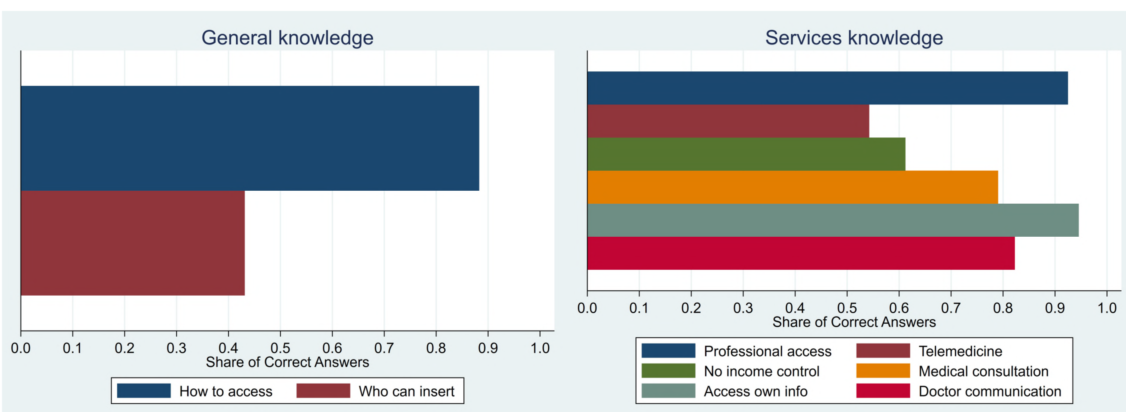
Notes: Google trends for the statement "Electronic Health Records" in Italy. The vertical lines identify the periods in which citizens could extert their objection right to the uploading of the records dated before May 2020.

Table A.3: **Drivers of the effects on Digital Health Skills**

	SES				Health		
	Female	**Married**	**Employed**	**High School**	**Chronic**	**Drugs**	**Satisfied**
Treatment	0.015	0.019*	0.012	0.007	0.022**	0.014	0.028**
	(0.010)	(0.010)	(0.009)	(0.010)	(0.009)	(0.009)	(0.011)
Interaction	0.018***	0.010***	0.016***	0.026***	0.004*	0.019***	-0.006**
	(0.001)	(0.002)	(0.005)	(0.006)	(0.002)	(0.002)	(0.002)
Mean	0.095	0.095	0.095	0.095	0.095	0.095	0.095
Obs	83,048	83,048	83,048	83,048	83,048	83,048	83,048
	Trust				Supply Factors		
	People	**Region**	**Parliament**		**Pilot**		
Treatment	0.022**	0.024**	0.025**		0.022**		
	(0.009)	(0.009)	(0.009)		(0.010)		
Interaction	0.005*	-0.000	-0.002		0.017*		
	(0.002)	(0.003)	(0.004)		(0.008)		
Mean	0.095	0.095	0.095		0.095		
Obs	83,048	83,048	83,048		83,048		

Notes: The dependent variable is Digital health skills (continuous between 0 and 1). For each column we show the result with the full list of controls and regional and year fixed effects. *** p<0.01, ** p<0.05, * p<0.1.

Figure A.4: **EHR knowledge**



(a) Key features (b) Services

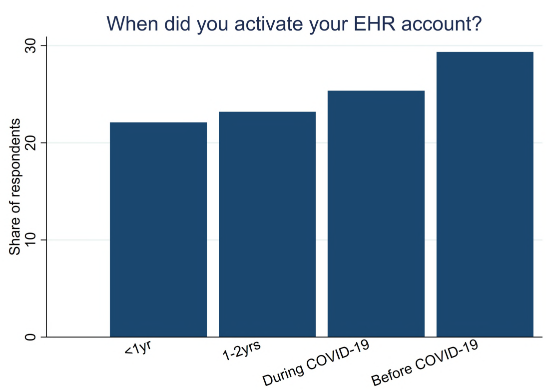
Notes: The figure (a) is based on the answers to the following questions: (i) who can enter data into the EHR?, (ii) After activating the EHR, how do you access it?. Figures (b) looks at the answers to the question "What is/are, in your opinion, the function/s of the EHR?". For each question, repondents were presented with a set of option to which they had to reply "Yes/No".

Table A.4: **Descriptive Statistics**

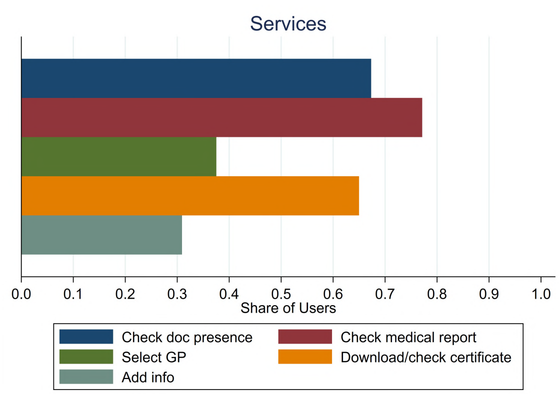
	Description	Mean	Std. Dev.	Obs.
Socio-economic characteristics				
Female	see Table A.1	0.550	0.498	2,779
Age: 18-34	see Table A.1	0.246	0.431	2,779
Age: 35-54	see Table A.1	0.395	0.489	2,779
Age: 55-64	see Table A.1	0.197	0.398	2,779
Age: above 65	see Table A.1	0.129	0.335	2,779
Married	see Table A.1	0.428	0.495	2,779
High school	see Table A.1	0.897	0.304	2,779
Households minors	see Table A.1	0.316	0.465	2,779
Employed	see Table A.1	0.616	0.486	2,779
Private	dummy=1 if the respondent is employed in the private sector	0.702	0.457	2,779
Big municipality	see Table A.1	0.777	0.173	2,779
MarloweCrowne	Social desirability index varying between 0 and 13	8.206	2.702	2,779
Health				
Very good health	see Table A.1	0.117	0.321	2,779
Health chronic	see Table A.1	0.342	0.474	2,779
Always bring docs to medical visits	dummy=1 if the respondent declared that she brings her medical records/documents to medical visits	0.577	0.494	2,779
Supply-side factors				
Pilot	dummy=1 if the respondent resides in a region involved in a pilot	0.504	0.500	2,779
Trust				
People	see Table A.1	0.556	0.497	2,779
Region	see Table A.1	0.529	0.499	2,779
Parliament	see Table A.1	0.512	0.500	2,779
NHS	dummy=1 if the respondent stated that she trusts the Italian NHS	0.616	0.486	2,779
Digital attitudes and behaviors				
Self-assessed good digital skills	dummy=1 if the respondent self-assessed digital skills are good or very good	0.573	0.494	2,779
Dislike digital services	dummy=1 if the respondent declared to dislike digital services	0.163	0.370	2,779
Digital Identity	dummy=1 if the respondent stated that she has SPID and/or CIE	0.947	0.050	2,631
Digital skills				
Digital skills	Average of 5 dummies indicating whether the respondent performs selected online activities (home banking, buying/selling, video calls, reading content, and entertainment)	0.828	0.207	2,779
Digital health skills	Average of 4 dummies indicating whether the respondent uses digital tools for health-related activities (booking of visits/exams, health apps, communication with the GP, and with specialists)	0.700	0.318	2,779

Notes: Definitions and descriptives statistics of the controls included in the estimation of Equation 2.

Figure A.5: **Use patterns**



(a) Activation timing



(b) Last used services

Notes: The figure (a) is based on the answers to the question "How long ago did you activate the EHR?", while Figures (b) looks at the answers to the question "Think about the last time you accessed the EHR, did you perform one of the following actions?". For each option, repondents were had to reply "Yes/No".

Table 5a: **Balance tests**

	All			No regular EHR users		
	Social framing	**Individual framing**	**Diff.**	**Social framing**	**Individual framing**	**Diff.**
Female	0.551	0.548	0.003	0.553	0.556	-0.003
	(0.498)	(0.498)		(0.497)	(0.497)	
Age 18-34	0.225	0.266	-0.041*	0.239	0.288	-0.049 **
	(0.418)	(0.442)		(0.427)	(0.453)	
Age: 35-54	0.418	0.373	0.044*	0.411	0.369	0.042*
	(0.493)	(0.484)		(0.492)	(0.483)	
Age: 55-64	0.188	0.206	-0.018	0.179	0.196	-0.017
	(0.391)	(0.404)		(0.384)	(0.397)	
Age: 65+	0.135	0.123	0.012	0.136	0.117	0.019
	(0.341)	(0.329)		(0.343)	(0.321)	
Married	0.428	0.428	0.000	0.398	0.401	-0.003
	(0.495)	(0.495)		(0.490)	(0.490)	
Highschool	0.900	0.894	0.006	0.901	0.887	0.015
	(0.300)	(0.309)		(0.298)	(0.317)	
Households minors	0.326	0.306	0.020	0.302	0.295	0.007
	(0.469)	(0.461)		(0.459)	(0.456)	
Employed	0.614	0.619	0.803	-0.005	0.600	0.004
	(0.487)	(0.486)		(0.489)	(0.490)	
Private sector	0.701	0.704	-0.002	0.698	0.693	0.005
	(0.458)	(0.457)		(0.459)	(0.461)	
Big municipality	0.778	0.776	0.002	0.774	0.786	-0.012
	(0.416)	(0.417)		(0.418)	(0.410)	
Marlowe crowne	8.166	8.245	-0.079	8.138	8.197	-0.059
	(2.755)	(2.648)		(2.627)	(2.615)	
Very good health	0.112	0.121	-0.009	0.117	0.125	-0.008
	(0.316)	(0.326)		(0.322)	(0.331)	
Chronic health	0.350	0.334	0.016	0.327	0.298	0.030
	(0.477)	(0.472)		(0.469)	(0.457)	
Always bring docs to medical visits	0.582	0.009	0.629	0.559	0.534	0.026
	(0.493)	(0.495)		(0.497)	(0.499)	
Trust people	0.556	0.557	-0.001	0.520	0.499	0.021
	(0.497)	(0.497)		(0.500)	(0.500)	
Trust region	0.523	0.536	-0.013	0.482	0.508	-0.025
	(0.500)	(0.499)		(0.500)	(0.500)	
Trust parliament	0.518	0.507	0.010	0.503	0.493	0.009
	(0.500)	(0.500)		(0.500)	(0.500)	
Trust SSN	0.618	0.615	0.003	0.580	0.582	-0.002
	(0.486)	(0.487)		(0.494)	(0.493)	
Good digital skills	0.551	0.594	-0.044*	0.527	0.562	-0.035
	(0.498)	(0.491)		(0.500)	(0.496)	
Dislike digital services	0.156	0.171	0-.014	0.158	0.180	-0.022
	(0.363)	(0.376)		(0.365)	(0.384)	
With digital ID	0.940	0.954	-0.014	0.927	0.944	-0.017
	(0.238)	(0.210)		(0.261)	(0.231)	
Digital skills	0.829	0.828	0.000	0.814	0.814	0.001
	(0.210)	(0.204)		(0.216)	(0.210)	
Digital health skills	0.700	0.699	0.001	0.666	0.663	0.003
	(0.319)	(0.317)		(0.328)	(0.326)	
Obs	1,389	1,390		1,072	1,062	

Notes: The table reports the balance tests for the control variables included in the regression analysis. The test performed is a t-test assuming unequal variance between groups.

Table 5b: **Balance tests**

	Never done EHR use			**Never heard of the EHR**		
	Social framing	**Individual framing**	**Diff.**	**Social framing**	**Individual framing**	**Diff.**
Female	0.588	0.585	0.003	0.568	0.589	-0.021
	(0.493)	(0.493)		(0.496)	(0.493)	
Age 18-34	0.278	0.328	-0.049	0.357	0.398	-0.041
	(0.449)	(0.470)		(0.480)	(0.490)	
Age: 35-54	0.381	0.360	0.022	0.386	0.353	0.033
	(0.486))	(0.480)		(0.487)	(0.479)	
Age: 55-64	0.161	0.167	-0.006	0.105	0.126	-0.021
	(0.367)	(0.373)		(0.306)	(0.332)	
Age: 65+	0.140	0.115	0.025	0.118	0.110	0.008
	(0.347)	(0.320)		(0.323)	(0.313)	
Married	0.370	0376	-0.007	0.332	0.335	-0.003
	(0.483)	(0.485)		(0.472)	(0.473)	
Highschool	0.903	0.882	0.021	0.893	0.901	-0.008
	(0.296)	(0.323)		(0.310)	(0.300)	
Households minors	0.297	0.281	0.017	0.292	0.262	0.030
	(0.457)	(0.450)		(0.455)	(0.440)	
Employed	0.566	0.569	-0.004	0.531	0.529	0.002
	(0.496)	(0.495)		(0.500)	(0.500)	
Private sector	0.700	0.696	0.004	0.684	0.634	0.050
	(0.459)	(0.460)		(0.466)	(0.482)	
Big municipality	0.772	0.793	-0.021	0.794	0.762	0.032
	(0.420)	(0.405)		(0.405)	(0.427)	
Marlowe crowne	8.105	8.219	-0.115	7.928	7.974	-0.046
	(2.693)	(2.617)		(2.791)	(2.551)	
Very good health	0.128	0.125	0.003	0.150	0.147	0.004
	(0.334)	(0.331)		(0.358)	(0.354)	
Chronic health	0.314	0.258	0.055*	0.290	0.230	0.059
	(0.464)	(0.438)		(0.454)	(0.422)	
Always bring docs to medical visits	0.564	0.518	0.046	0.576	0.505	0.071*
	(0.496)	(0.500)		(0.495)	(0.501)	
Trust people	0.467	0.439	0.028	0.456	0.432	0.024
	(0.499)	(0.497)		(0.499)	(0.496)	
Trust region	0.439	0.469	-0.031	0.445	0.458	-0.013
	(0.497)	(0.499)		(0.498)	(0.499)	
Trust parliament	0.482	0.461	0.021	0.475	0.445	0.030
	(0.500)	(0.498)		(0.498)	(0.499)	
Trust SSN	0.521	0.531	-0.009	0.504	0.508	-0.004
	(0.500)	(0.499)		(0.501)	(0.501)	
Good digital skills	0.490	0.554	-0.064*	0.461	0.539	-0.078
	(0.500)	(0.497)		(0.499)	(0.499)	
Dislike digital services	0.172	0.169	0.003	0.177	0.154	0.023
	(0.378)	(0.375)		(0.382)	(0.362)	
With digital ID	0.892	0.992	-0.030	0.882	0.919	-0.037
	(0.310)	(0.268)		(0.323)	(0.273)	
Digital skills	0.809	0.801	0.009	0.795	0.789	0.006
	(0.223)	(0.215)		(0.229)	(0.211)	
Digital health skills	0.643	0.640	0.003	0.631	0.630	0.000
	(0.338)	(0.338)		(0.339)	(0.339)	
Obs	679	720		373	382	

Notes: The table reports the balance tests for the control variables included in the regression analysis. The test performed is a t-test assuming unequal variance between groups.

Table A.6: **Additional Results**

	Perceived ease of use				**Facilitating conditions**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	-0.009	-0.011	0.068*	0.000	-0.022	-0.022	-0.009	-0.051
	(0.014)	(0.030)	(0.035)	(0.000)	(0.051)	(0.062)	(0.080)	(0.072)
Mean	0.000	-0.206	-0.551	-1.058	0.000	-0.085	-0.193	-0.211
	Perceived risk				**Social influence**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	0.012	0.018	0.044*	0.012	0.013	0.008	0.070**	0.072
	(0.025)	(0.048)	(0.025)	(0.049)	(0.036)	(0.041)	(0.040)	(0.061)
Mean	0.000	-0.008	0.007	0.004	0.000	-0.105	-0.192	-0.242
	More information				**Tutorial**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	0.024	0.020	0.086	0.197*	-0.046	-0.082***	0.055	0.045
	(0.059)	(0.076)	(0.111)	(0.104)	(0.049)	(0.019)	(0.080)	(0.094)
Mean	4.341	4.252	4.124	4.093	3.726	3.744	3.710	3.623
Obs	2,779	2,138	1,399	755	2,779	2,138	1,399	755

Notes: Estimates in column (1) are obtained running model the estimation model in Eq. eq:eqn3 on the whole sample. Differently, estimates in column (2) refer to the sample excluding EHR frequent users, while those in column (3) to the sample discarding respondents who accessed their EHR at least once. Finally, estimates in column (4) refers only to those respondents who claimed to not know the EHR. Bootstrapped standard error at the macro-area level in parenthesis. All specifications include regional fixed effects and control for the Marlower Crowne index and the following vectors: SES, $Health$, $Trust$, $Skills$. Bootstrapped standard error at the macro-area level in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table A.7: **Alternative outcomes definitions**

	Usage Intention				**Perceived Usefulness**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PANEL A: Sum								
Treatment	0.041	0.012*	0.017**	0.030***	0.068	0.092	0.126**	0.168**
	(0.021)	(0.023)	(0.034)	(0.060)	(0.048)	(0.070)	(0.055)	(0.067)
Mean	2.330	2.224	2.077	2.077	2.314	2.248	2.174	2.196
PANEL B: Average								
Treatment	0.035**	0.051**	0.089***	0.123**	0.056	0.023	0.031	0.042**
	(0.018)	(0.023)	(0.021)	(0.062)	(0.024)	(0.017)	(0.025)	(0.017)
Mean	0.777	0.741	0.692	0.692	0.771	0.749	0.725	0.732
Obs	2,779	2,138	1,399	755	2,779	2,138	1,399	755

Notes: Panel A reports the results when the outcome is constructed as the sum of the corresponding survey items for each TAM construct, while Panel B reports the results when the outcome is constructing as the average of such survey items. To know the items for each TAM constructs see Table 7. Estimates in column (1) are obtained running model the estimation model in Eq. eq:eqn3 on the whole sample. Differently, estimates in column (2) refer to the sample excluding EHR frequent users, while those in column (3) to the sample discarding respondents who accessed their EHR at least once. Finally, estimates in column (4) refers only to those respondents who claimed to not know the EHR. Bootstrapped standard error at the macro-area level in parenthesis. All specifications include regional fixed effects and control for the Marlower Crowne index and the following vectors: *SES*, *Health*, *Trust*, *Skills*. Bootstrapped standard error at the macro-area level in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Appendix B: Additional Tables and Figures on the implementation of the EHR in Italy

Table B.1: **2021 Survey: key performance indicators (KPI)**

KPI 1→ Indexed discharge letters / hospital admissions
KPI 2 → Indexed emergency room reports / total ER visits
KPI 3 → Indexed lab reports / total lab tests performed
KPI 4 → Indexed radiology reports / total radiology exams
KPI 5 → Indexed specialist outpatient reports / total outpatient services
KPI 6 →Indexed pathology reports / total pathology tests
KPI 7 → Citizens with indexed vaccination certificates / total residents
KPI 8 → Total indexed documents / total assisted individuals
KPI 9 → Assisted individuals with indexed Summary Health Profile (PSS) / total assisted individuals
KPI 10 → Number of indexed PSS / number of general practitioners

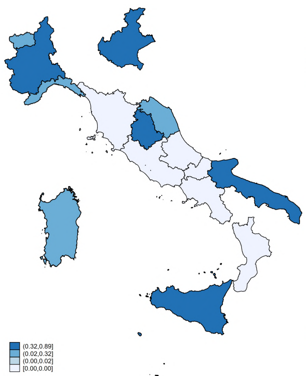
Notes: Source: the 2021 *Survey on the State of Implementation of the Electronic Health Record* described in Section2.1

Table B.2: **Match between survey 21 key performance indicators with the document required based on the 2023 Ministerial Decree**

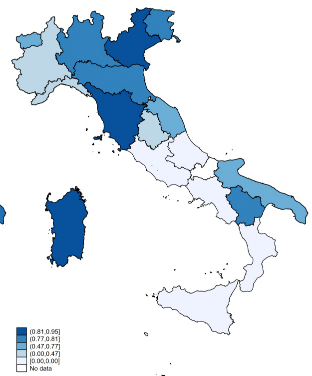
KPI 2021 Survey	**Records required by the 2023 Decree**
KPI 1→ Indexed discharge letters / hospital admissions	Discharge letters
KPI 2 → Indexed emergency room reports / total ER visits	Emergency room reports
KPI 3 → Indexed lab reports / total lab tests performed	Lab reports
KPI 4 → Indexed radiology reports / total radiology exams	Radiology reports
KPI 5 → Indexed specialist outpatient reports / total outpatient services	Specialist outpatient reports Specialist prescriptions
KPI 6 →Indexed pathology reports / total pathology tests	Pathology reports
KPI 7 → Citizens with indexed vaccination certificates / total residents	Vaccination certificates
KPI 8 → Total indexed documents / total assisted individuals	Drug Prescription Drug dispensing document Document for the provision of specialist assistance services Patient's personal notebook Individual vaccination record Invitation letter for screenings, vaccinations or other prevention initiatives Medical record
KPI 9 → Assisted individuals with indexed Summary Health Profile/ total assisted individuals	Summary Health Profile
KPI 10 → Number of indexed Summary Health Profiles / number of general practitioners	

Notes: Entities contributing to EHR 2.0 data feeding include: 1) Local health authorities and public healthcare providers under the national health system; 2) Accredited private healthcare facilities; 3) Licensed healthcare professionals, including those operating out of the public system.

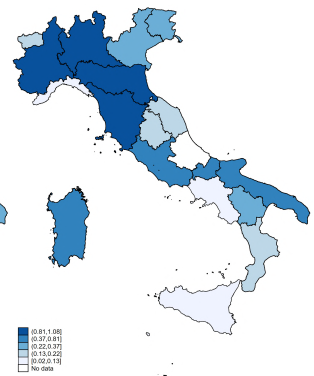
Figure B.1: **KPI Distribution**



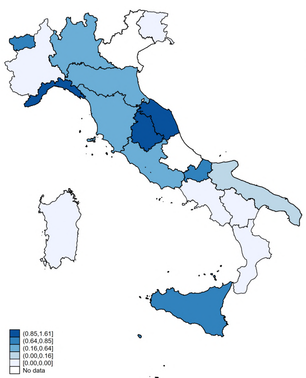
(a) Kpi 1



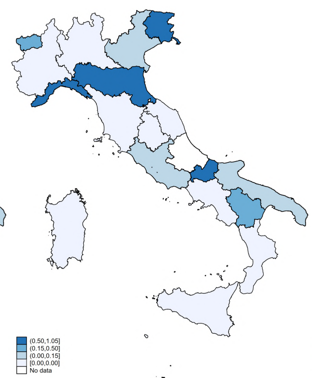
(b) Kpi 2



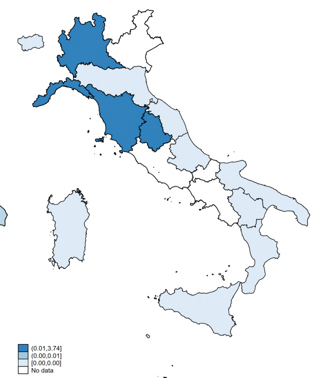
(c) Kpi 3



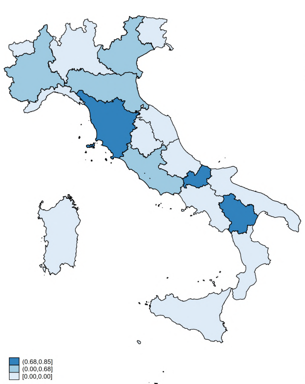
(d) Kpi 4



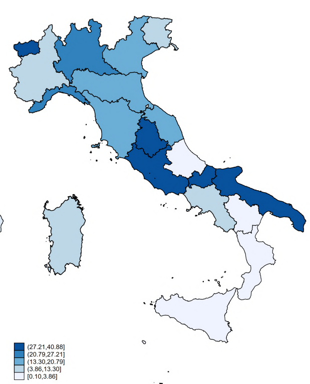
(e) Kpi 5



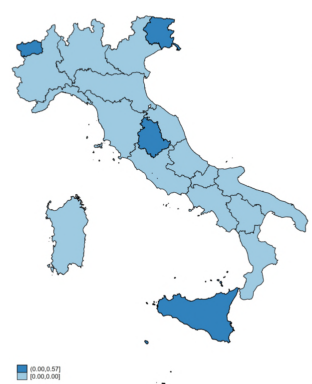
(f) Kpi 6



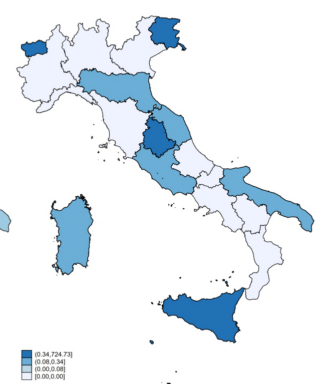
(g) Kpi 7



(h) Kpi 8



(i) Kpi 9



(j) Kpi 10

Notes: The figure shows the 2021 values at the regional level of the 10 KPI, as described in Table B.1. When a region does not appear it means that the value for that region is missing.

Figure B.2: **Media campaign**

(a) Electronic health record. Protecting our health with confidence. From 18/11/24 to 17/12/24 it is once again possible to object to the inclusion of documents dated before 19/05/20

(b) Protecting our health with confidence

(c) The Electronic Health Record securely stores health data and medical records

(d) It allows healthcare professionals to consult them in order to treat patients anywhere, even in emergency situations

Notes: In Italian, confidence and safety is expressed by the same word (sicurezza). The slides were made available on Facebook, Twitter, YouTube, Linkedin, and Instagram. A video was also circulating on the social platforms and on the webpage of the ministry of health (see at https://www.salute.gov.it/new/it/multimedia/fascicolo-sanitario-elettronico-sicuri-della-nostra-salute-riapertura-opposizione-al/). The video states: The Electronic Health Record collects your health data and medical documents securely, including test results, prescriptions, reports, and other information useful for your health. Thanks to the Electronic Health Record, healthcare professionals can access your medical history and provide more appropriate care, even if you are in a region different from the one where you live. The Electronic Health Record is an important tool to improve the quality and continuity of care, while ensuring the security and protection of personal data. From November 18 to December 17, 2024, it is possible to object to the inclusion in the Electronic Health Record of health data and documents related to services provided before May 19, 2020. The objection can be submitted online by accessing the service with SPID, Electronic Identity Card, or National Services Card. For more information, visit the Ministry of Health website or the Electronic Health Record portal. Electronic Health Record: confident about our health.

Table B.3: **Monitoring Dashboard Data 2024**

Region	Integrated docs	Services available	Citizens used EHR (90 days)	Citizens consensus	Specialized physicians	GPs and Pediatricians
	(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**
Abruzzo	0.88	0.29	0.02	0.01	0.29	0.88
Basilicata	0.75	0.27	0.05	0.04	0.93	100
Calabria	0.88	0.10	0.02	0.01	0.25	0.95
Campania	0.81	0.22	0.20	0.01	0.85	100
Emilia-Romagna	0.81	0.54	0.39	0.89	0.96	100
Friuli Venezia Giulia	0.81	0.46	0.35	0.83	0.80	0.97
Lazio	0.94	0.51	0.04	0.8	0.59	0.97
Liguria	0.81	0.17	0.02	0.11	0.2	0.99
Lombardia	0.69	0.41	0.26	0.66	100	0.93
Marche	0.63	0.12	0.01	0.09	0.02	0.92
Molise	0.88	0.29	0.02	0.01	100	100
P.A. Bolzano	0.75	0.12	0.34	0.29	100	0.86
P.A. Trento	0.88	0.46	0.51	0.87	100	100
Piemonte	0.88	0.41	0.17	0.26	100	100
Puglia	0.56	0.41	0.04	0.71	100	100
Sardegna	0.94	0.32	0.13	0.23	100	100
Sicilia	0.81	0.12	0.01	0.25	0.34	0.91
Toscana	0.75	0.56	0.32	0.27	100	0.81
Umbria	0.69	0.24	0.04	0.29	0.01	100
Valle d'Aosta	0.69	0.32	0.24	0.69	100	100
Veneto	0.94	0.32	0.23	0.87	100	100

Notes: These data had been published on the Italian website of the EHR, based on data from the monitoring dashboard. Columns (a)-(b)-(d)-(e) are data on November 30, 2024 (for Marche columns (d) and (e) are data on October 11, 2024). Columns (c)-(e)-(f) are data from the period September-November 2024 (but for Marche for which column (f) is based on data September-October, 2024). Services (44) included in the regional EHR. Docs (16) included in the regional EHR

Table B.4: **Correlation -Monitoring Dashboard Data 2024**

	Citizens consensus	Citizens used EHR (90 days)	GPs and Pediatricians	Specialized physicians	Services available	Integrated docs
Citizens consensus	1.0000					
Citizens used EHR (90days)	0.7037	1.0000				
GPs and Pediatricians	0.2427	-0.0702	1.0000			
Specialized physicians	0.4741	0.6127	0.1381	1.0000		
Services available	0.5321	0.5327	0.0865	0.5646	1.0000	
Integrated docs	-0.1575	0.0679	0.1522	0.0974	0.1100	1.0000

Notes: Potential Services (44) included in the regional EHR. Potential Docs (16) included in the regional EHR.