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Executive Summary

With the purpose of connecting the dots within digital health innovation ecosystems, the CONNECTINGHEALTH project has the overall objective of fostering interconnected and inclusive innovation ecosystems across Europe and maximizing the value of innovation in the digital health sector, with a long-term and sustainable vision.

The overall objective of CONNECTINGHEALTH is to foster interconnected and inclusive innovation ecosystems across Europe and maximise the value of innovation in the digital health sector, with a long-term and sustainable vision. The intended audience of CONNECTINGHEALTH is the public-at-large and all stakeholders that influence and interact with digital health. As such the methodology of conducting a series of interactive workshops on a variety of digital health topics was developed to yield results which can be applied to real-world scenarios.

Many meaningful findings were gathered regarding the barriers, enablers, and current landscapes of various digital health themes, however, the most innovative output of the findings was the development of four scenarios for digital health in 2030 which can act as guidelines for mitigating risk, purposeful cross-disciplinary, whole-of-society problem-solving.

The futures workshops completed in this project scope are reflected as being an effective tool in driving digital health innovation and exploring potential future scenarios while facilitating creative thinking around emerging technologies, trends, and user needs. Despite the success of the valuable insights and ideas generated by means of these workshops, the project team recommends additional research and multidisciplinary, cross-sectoral action to be taken to continue to address the gaps. Nonetheless, the upcoming project phase will work to develop a practical multi-year action plan which will aim to fill the gaps, and put forward potential implementation elements that will inform the European Commission, partners, businesses and other stakeholders about the next steps in developing digital health in Europe and globally.



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List of Abbreviations

Abbreviation	Full terminology
AI	Artificial Intelligence
ECHA	European Connected Health Alliance
EU	European Union



PN	Personalised Nutrition	
т	Task	
US	United States of America	
UK	United Kingdom	
WHO	World Health Organization	
WP	Work Package	



1.Project Information

1.1 CONNECTINGHEALTH Project Overview

The COVID-19 pandemic changed the world and healthcare, demonstrating the potential of new solutions (e.g., the use of digital technologies and data) and the ability of health and care systems to adopt them quickly. While the crisis increased the uptake of digital solutions, it also highlighted disparities and disconnects in the implementation and design of available technologies across Europe and the need to further develop supporting innovation ecosystems.

In addition, European countries (within the European Union (EU), United Kingdom (UK) and others) face stiff global competition to develop and adopt new healthcare technologies, developed mostly in the United States of America (US) and China to the detriment of the European market and citizens. Therefore, there is a need for collaboration, innovation and investment that capitalizes on the strengths of the European continent.

In the above context, the CONNECTINGHEALTH project has the overall objective of fostering interconnected and inclusive innovation ecosystems across Europe and maximizing the value of innovation in the digital health sector, with a long-term and sustainable vision.

CONNECTINGHEALTH is a two-year preparatory action funded by Horizon Europe that aims to foster interconnected inclusive innovation ecosystems across Europe and maximise the value of innovation in the sector of digital health.

The overall objective of CONNECTINGHEALTH is to foster interconnected and inclusive innovation ecosystems across Europe and maximise the value of innovation in the digital health sector, with a long-term and sustainable vision.

1.2 CONNECTINGHEALTH Objectives

The objectives of the CONNECTINGHEALTH project are as follows:

- **Objective 1:** To map the landscape of the digital health ecosystems in Europe and beyond including their stakeholders, resources, initiatives, projects and political frameworks.
- **Objective 2:** To explore the current and future opportunities for growth of the digital health sector, and its competitiveness.



- **Objective 3:** To engage a wide range of stakeholders from governments, industry, academia and society in the development of the multi-year action plan for the sustainable and thriving digital health sector in Europe.
- **Objective 4:** To connect and interconnect the existing regional and thematic digital health ecosystems for better cooperation, learning, exchange of best practices and wider impact.

1.3 CONNECTINGHEALTH WP2 Objectives

The Work Package (WP) 2 objectives can be summarised as follows:

- 1. To undertake a thorough mapping of the digital health ecosystems in Europe and beyond,
- 2. To conduct the strategic foresight exercise with a wide range of the stakeholders in order to identify the key uncertainties as well as possible, probable and preferable futures in the domain of digital health till 2030,
- 3. To identify the opportunities for action and mobilize the stakeholders.

1.4 CONNECTINGHEALTH Task 2.2 Scope

Task (T) 2.2 Scenario Planning - Digital health in 2020, led by ECHA, aimed at conducting scenario planning work on the future of the digital health sector in Europe and beyond through the planning and execution of a number of futures workshops with the key stakeholders engaged through the WP5. The work was carried out in five phases:

- 1. Preparatory phase (desk research) June 2022-September 2022
- 2. Nine thematic co-creation workshops with the diverse group of stakeholders to identify key assumptions and drivers for change (September 2022-February 2023)
- 3. Development of the initial mini-scenarios (February 2023)
- 4. Validation of the scenarios at the multi-stakeholder workshop (February 2023)
- 5. Collecting conclusions, report writing and dissemination of the results (February 2023 onwards).



2. Deliverable Introduction

2.1 Deliverable

This report aims to summarise the learnings and conclusions from the series of multi-stakeholder futures workshops that were conducted between 2022 and 2023 to explore the vision for digital health in 2030. The knowledge and conclusions of this deliverable are intended to be publicly disseminated through this report, articles, blog posts, podcasts and other channels to inform as wide an audience as possible with this unique piece of work.

Relation to other WPs and deliverables

Deliverable (D) 2.2: Scenarios for the digital health sector in 2030, led by European Connected Health Alliance (ECHA), involved the collaborative efforts of WP2 and other WPs, and will contribute directly to the final output of the project, D6.1 Comprehensive multi-year action plan. Additionally, the report is a complementary for the other deliverables in WP3 and WP4. The relation is presented below:

WP	Deliverable	Relationship
WP3	D3.1 Report on the three focus areas	Complementary
WP4	D4.1 The body of knowledge	Part of the analysis
WP6	D6.1 Multi-year action plan	Direct contribution

Content of the deliverable

This deliverable aims to provide an overview of futures planning, and more particularly in the context of digital health. Moreover, by providing an overview of the CONNECTINGHEALTH Futures Workshop series methodology and key findings, this deliverable positions itself to contribute to a meaningful discussion on the opportunities for the digital health industry, and the potential risks that the stakeholders. The deliverable does not present one but four different scenarios for the future. Each of them is probable and plausible but only one is preferred. Thus, it's important to engage the stakeholders in the discussion about the steps needed to be taken for the preferred future to unfold.

2.2 Objective and scope

The general objective of the Futures Workshops series was to generate a future vision for digital health towards 2030 taking into account current challenges and opportunities.



Specific objectives for this series are as follows:

- Establish collaborative dialogue spaces and networks among workshop participants
- Foster engagement from different stakeholders with CONNECTINGHEALTH
- Understand the challenges that digital health is facing in different contexts and think collectively about possible solutions



3. Futures Planning

3.1 What is Future Planning?

In order to better identify areas and activities of cooperation, to improve the efficiency and performance of Europe's innovation ecosystems and to explain the potential for growth and competitiveness foreseen in the sector of digital health, CONNECTINGHEALTH decided to perform the futures planning exercise. This exercise consisted of the mapping of the digital health ecosystems landscape (D2.1) and scenario planning (D2.2) that will be later complemented by the analysis of the focus areas in the WP3 - Evaluation of the opportunities in the selected focus areas, and within the SWOT analyses in the WP4 - Analysis of gaps and opportunities in the digital health sector.

Futures planning, associated with strategic foresight, is a structured and systematic way of using ideas about the future to anticipate and better prepare for change. Thanks to strategic foresight, it is possible to explore the different plausible futures that could arise, and the opportunities and challenges that could be present. Based on those ideas, it is possible to take better decisions and actions now.¹

Foresight can support planning and policy-making in the following main ways:

- Improved anticipation: to better anticipate changes that could emerge in the future
- Policy innovation: to reveal options for experimentation with innovative approaches
- Future-proofing: to stress-test existing or proposed strategies and policies.

The key element of strategic foresight is through the use of scenario planning to look into the plausible, probable and preferable futures by the development of multiple stories or imaginary pictures of what the future could look like in order to explore and learn from them. Scenario planning helps anticipate the impact of different scenarios and identify weaknesses. When these situations or future realities are anticipated years in advance, the subsequent weaknesses can be avoided, or impacts reduced more effectively than when similar real-life problems are considered under the duress of an emergency.

Scenarios can be used in a number of ways:

- 1. To visualise the alternatives of the futures and identify the opportunities they hold,
- 2. To define the preferred future that the actors should strive to achieve and the future that should be avoided,
- **3.** To gather the collective understanding of the preferred future and mobilise the stakeholders to the joint action.

¹ OECD, Strategic foresight, <u>oecd.org/strategic-foresight/</u> Retrieved 02.04.2023

In CONNECTINGHEALTH the scenarios have been developed in a co-creative manner during the futures workshops with the engaged ecosystems and stakeholders representing public and private actors, inclusive of academia, society-at-large, government and industry. These scenarios will be complemented by the analysis of the focus areas and the SWOT analysis in the next steps of the project.

3.2 Futures Planning in Practice

Over the years, numerous organisations have published reports that offer a vision of the future of digital health. The aims of those reports are often to help guide the stakeholder through the complex uncertainties and unknowns of the future, to create a positive ground for the upcoming changes, and to advocate for a certain vision of the future. The selected reports are presented and summarised below:

- 1. "The Future of Health Services Research" report by the National Academy of Medicine², which explores the potential of digital technologies to transform healthcare.
 - **Health equity is a critical priority**: Achieving health equity, which involves addressing the social determinants of health and ensuring that everyone has the opportunity to achieve optimal health, should be a top priority for healthcare delivery.
 - **Precision medicine has the potential to revolutionize healthcare:** Precision medicine, which involves tailoring healthcare to individuals based on their genetic, environmental, and lifestyle factors, has the potential to revolutionise healthcare by improving diagnosis and treatment.
 - **Digital health has the potential to improve healthcare delivery:** Digital health solutions, such as telehealth and remote monitoring, have the potential to improve healthcare delivery by increasing access to care, reducing costs, and improving patient outcomes.
 - **Healthcare delivery needs to become more patient-centered:** Healthcare delivery needs to become more patient-centered, with a focus on meeting individual needs and preferences, empowering patients to be partners in their care, and improving the patient experience.
 - Interdisciplinary collaboration and partnerships are key to success: Successful healthcare delivery requires interdisciplinary collaboration and partnerships across different stakeholders, including healthcare providers, patients, policymakers, and technology companies.

² Whicher, D., Rosengren, K., Siddiqi, S., Simpson, L., editors. 2018. The Future of Health Services Research: Advancing Health Systems Research and Practice in the United States. Washington, DC: National Academy of Medicine.



The report highlights the need for transformative change in healthcare delivery to address the challenges and opportunities of the future. It emphasises the importance of health equity, precision medicine, digital health, patient-centered care, and collaboration and partnerships across stakeholders to achieve this change.

- 2. "The Future of Health" report by PwC3, which looks at the impact of digital technology on healthcare delivery, patient experience, and workforce transformation.
 - **Digital transformation is driving healthcare innovation:** Digital transformation is driving innovation in healthcare, enabling the development of new models of care, the integration of healthcare data, and the delivery of personalised medicine.
 - **The healthcare workforce is changing:** The healthcare workforce is evolving to meet the changing demands of healthcare delivery, with an increasing emphasis on interdisciplinary teams, new skills and competencies, and new models of care.
 - **Value-based care is gaining momentum:** Value-based care models, which focus on outcomes and quality of care rather than volume of services, are gaining momentum as a way to improve healthcare **delivery and reduce costs.**
 - **Patient-centered care is becoming the norm:** Patient-centered care, which places the patient at the center of healthcare delivery and focuses on meeting their individual needs and preferences, is becoming the norm in healthcare.
 - **Collaboration and partnerships are key to success:** Successful healthcare delivery requires collaboration and partnerships across different stakeholders, including healthcare providers, patients, policymakers, and technology companies.

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As PWC reports, based on the survey findings and the engagement with clients and partners, they expect the emergence of what is called the LIFEcare system, characterised by a convergence of wellcare and disease care systems. Overall, more than 75% of healthcare executives agreed that LIFEcare systems will be widespread by 2035, especially in cardiovascular and metabolic diseases, oncology and neurology.

³ Future of Health. How to transform BioPharma for the upcoming LIFEcare system, 2021, PwC, <u>strategyand.pwc.com/de/en/industries/health/future-of-health-2021.html</u> Retrieved 15.05.2023







- 3. "The Future of Digital Health" report by Boston Consulting Group, which was published in January 2023 provides the view on the future of digital health developments that takes into account the impact of the pandemic on the industry's development, as well as the economic instability and uncertainty that the EU and the world experience. The report provides the following insights into the future⁵:
 - Many trends in digital health that the pandemic inspired and spurred on continue to gain traction.
 - **Home-based health care will keep gaining momentum** after strong growth in 2022, due in part to the aging baby boomer population and to powerful technological advances—especially as the industry moves toward more "patient-led" delivery.
 - Alternative care models and new entrants in the healthcare space are expected to emerge while the grand retailers further develop their healthcare strategies.
 - The women's health arena will continue to attract attention, investment, and innovation. Femtech products and solutions will grow at a rapid pace, and femtech businesses will compete to develop hybrid, one-stop shops.
 - **Tech advances in general will unlock many new opportunities in digital health.** Virtual reality will offer new approaches for treating mental health conditions, and the healthcare industry will embrace more use cases for digital twins in clinical trials, hospital operations, and disease modeling.

⁴ <u>https://www.strategyand.pwc.com/de/en/industries/health/future-of-health-2021.html</u>

⁵ The Future of Digital Health, Boston Consulting Group, 2023,bcg.com/publications/2023/driving-the-future-ofdigital-health Retrieved 05.05.2023



 Digital tools will improve health equity over the coming years by helping to bridge care gaps, expand access, enable more personalised treatment, and eliminate geographic barriers. Mental health services, in particular, will benefit, with more options becoming available to those seeking care.

In general, despite the fact of the economic uncertainty, the report brings the exciting vision of the ongoing evolution of digital health. It brings the role of the grand retailers as well as the topic of women's health to the surface.

- 4. "Digital Health: A Framework for Healthcare Transformation" white paper by the HIMSS⁶, which proposes a framework for using digital technologies to improve healthcare delivery and outcomes.
 - Digital health can improve healthcare delivery and outcomes: Digital health has the potential to improve healthcare delivery and outcomes by increasing access to care, improving coordination between healthcare providers, and enhancing patient engagement and empowerment.
 - Interoperability and data analytics are critical for success: Interoperability and data analytics are essential for the success of digital health solutions, enabling the seamless sharing and analysis of healthcare data across different platforms and stakeholders.
 - Regulation and policy frameworks need to keep pace with technological advances: Regulatory and policy frameworks need to evolve to keep pace with the rapid advances in digital health, while also ensuring patient safety and privacy.
 - Digital health requires collaboration and partnerships across stakeholders: Successful digital health solutions require collaboration and partnerships across different stakeholders, including healthcare providers, patients, policymakers, and technology companies.
 - Digital health should be aligned with broader healthcare transformation efforts:
 Digital health solutions should be aligned with broader healthcare transformation efforts, such as value-based care models, to ensure that they contribute to the overall goals of improving healthcare delivery and outcomes.

Overall, the report emphasises the potential of digital health to transform healthcare delivery and improve patient outcomes, while also highlighting the need for careful planning, collaboration, and investment to realize these benefits.

⁶ Digital Health: A Framework for Healthcare Transformation, Snowdon A., HIMSS, 2020,



- **5.** "The Future of Healthcare: 2022 Hospital Vision Study" report by Zebra Technologies⁷, which looks at how digital technology can improve patient care and hospital operations.
 - **Hospital staff and patients expect greater use of technology:** Hospital staff and patients are increasingly expecting technology to be integrated into healthcare delivery, such as mobile devices, wearables, and telehealth solutions.
 - Improving patient safety and experience are top priorities: Hospitals are prioritising the use of technology to improve patient safety and experience, such as real-time location systems to track patients and equipment, and patient engagement tools.
 - Hospital leaders are investing in technology to improve efficiency and reduce costs: Hospital leaders are investing in technology to improve operational efficiency and reduce costs, such as electronic medical records, automated inventory management, and asset tracking solutions.
 - **Interoperability is a key challenge for hospitals:** The lack of interoperability between different technology solutions remains a significant challenge for hospitals, hindering their ability to deliver coordinated and comprehensive care.
 - Data analytics and AI are seen as critical for the future of healthcare: Hospital leaders believe that data analytics and AI will play an increasingly important role in improving healthcare delivery, such as by enabling predictive analytics and personalised medicine.

The report highlights the importance of technology in healthcare delivery, as well as the challenges that hospitals face in integrating and optimizing technology solutions. It emphasises the need for hospital leaders to carefully evaluate and invest in technology solutions that will improve patient outcomes, reduce costs, and enhance the overall quality of care.

6. Transforming healthcare with AI: The impact on the workforce and organisations, the joint report by McKinsey and the European Union's EIT Health⁸ explores how AI can support improvements in care outcomes, patient experience and access to healthcare services, specifically looking at how practitioners and organisations will be affected. It delivers the following conclusions:

⁷ The Future of Healthcare: 2022 Hospital Vision Study, 2022, Zebra Technologies, The Future of Healthcare: 2022 Hospital Vision Study, <u>zebra.com/content/dam/zebra_new_ia/en-us/solutions-verticals/vertical-</u> <u>solutions/healthcare/white-paper/2022-hospital-vision-study-en-global.pdf</u> Retrieved 08.05.2023

⁸ Transforming healthcare with AI: The impact on the workforce and organizations, McKinsey & EIT Health, 2020, <u>mckinsey.com/industries/healthcare/our-insights/transforming-healthcare-with-ai#/</u> Retrieved 15.04.2023



- **Building on automation,** Al has the potential to revolutionise healthcare and help address some of the challenges set out above
- **First**, solutions are likely to address the low-hanging fruit of routine, repetitive and largely administrative tasks, which absorb significant time of doctors and nurses, optimizing healthcare operations and increasing adoption.
- **In the second phase,** more AI solutions are expected to support the shift from hospital-based to home-based care, such as remote monitoring, AI-powered alerting systems, or virtual assistants, as patients take increasing ownership of their care.
- **In the third phase,** more AI solutions are expected to be seen in clinical practice based on evidence from clinical trials, with increasing focus on improved and scaled clinical decision-support tools.
- **Ultimately,** Al is expected to be an integral part of the healthcare value chain, from education and training to diagnosis and treatment, to general health delivery and health promotion.

The report provides guidance on what needs to happen in order to realise the vision. Those elements are: (1) Collaborative work, (2), Rethinking education and skills, (3) Strengthening data quality, governance, security and interoperability, (4) Managing change, (5) Investing in new talent and creating new roles, (6) Working at scale, and (7) Regulation, policymaking and liability, and managing risk, funding.

Overall, this report highlights the excitement of Europe-wide stakeholders, healthcare professionals, investors, and innovators about the impact of AI on European healthcare, and about the thoughtful approach taken across Europe to ensure this delivers ethical and trustworthy AI.

- **7.** Nordic Health 2030 Movement⁹ not a report itself but a movement focused on the Nordics and powered by the Copenhagen Institute of Futures Studies (CIFS), provides a vision of the future of 2030 with the following elements:
 - **The New Social Contract:** Everyone contributes; nobody is left behind. That is the balance of the responsibility that society should all bear together.
 - **The New Data Models:** All individuals and professionals are able to experience meaningful input and output of health-related data in real-time.
 - **The New Business Models:** All organisations providing health care are incentivised and rewarded for preventive efforts provided to individuals.

⁹ Nordic Health 2030 Movement nordichealth2030.org/philosophy/ Retrieved 03.05.2023



This vision was elaborated as a result of a series of workshops conducted in 2019 by the CIFS.

It's important to note that those reports predominantly focus on the positive vision of the future of digital health (eg. improving patient outcomes, improving safety, efficacy and efficiency, reducing costs, possibilities for business growth and development), neglecting threads, risks, obstacles and blockers, negative drivers and uncertainties. This is the gap that the CONNECTINGHEALTH workshops have aimed to fill, providing a more complete vision. By understanding the various scenarios, the stakeholders are not only able to understand that the preferred future is not granted and thus, requires commitment and effort, but also be prepared for adversities and surprising events.

3.3 Key megatrends and trends in digital health

The analysis of trends and megatrends plays a crucial role in futures planning. It involves examining and understanding patterns, shifts, and long-term forces that shape the future, enabling individuals and organisations to anticipate potential developments and make informed decisions. The analysis of trends and megatrends helps:

- Identify emerging opportunities and risks: Trends and megatrends analysis helps identify emerging opportunities that can be leveraged for growth and innovation. Additionally, it enables the identification of potential risks and challenges that may arise due to changing circumstances, allowing for proactive measures to mitigate negative impacts.
- Anticipate future needs and demands: Understanding trends and megatrends allows planners to anticipate future needs and demands. By tracking societal, economic, and technological shifts, they can predict changes in consumer preferences, industry dynamics, and market conditions.
- **Strategic decision-making:** Analysis of trends and megatrends provides a foundation for strategic decision-making. It helps organisations and individuals develop long-term visions and goals, guiding the formulation of strategies and policies that align with the anticipated future.
- Innovating and adapting: Trends and megatrends analysis encourages innovation and adaptation. By observing emerging patterns and disruptive forces, planners can identify opportunities for innovation, enabling them to create new products, services, or business models that cater to evolving needs. It also helps organisations adapt to new market realities, technology advancements, and societal shifts, ensuring relevance and competitiveness in a rapidly changing environment.



• **Enabling future-proofing:** By analysing trends and megatrends, futures planning can help organisations future-proof their operations. By staying abreast of societal, environmental, and technological developments, planners can proactively identify potential disruptions or changes that may impact their industry.

Various reports have been published analysing the trends and megatrends in general, in relation to health, and digital health only. For example, the Roland Berger Trend Compedium 2050 covers six megatrends (Figure 2) that shape the future development of the world until 2050¹⁰. There, Health & Care are one of the megatrends and the long-term forces include: pandemics and other wildcards, diseases and treatment and caregiving. Additionally, the trend of increasingly age-related diseases such as dementia also point at a strong increase in the need for the cost intensive care.



Figure 2: Six megatrends shaping the future up to 2050 (Roland Berger)

Going deeper, the report by Health Care India, presents the key megatrends driving healthcare especially in the context of the digital transformation of the industry (Figure 3)¹¹. The key conclusion from this report was that the traditional healthcare model is over. Some healthcare organisations at the current crossroad will use data and digital technologies to serve patients in new, unique, and innovative ways, others will struggle with the change to see an inevitable decline. It's interesting to note that in the description of the above figure, the paper's authors unambiguously say: "The future of health is digital", which is very much in line with the preferred scenario of CONNECTINGHEALTH project (see Section 5).

¹⁰ Trend Compendium 2050: Megatrends shaping the coming decades, Krys Ch., Born D, 2020, The Roland Berger, rolandberger.com/en/Insights/Global-Topics/Trend-Compendium/ Retrieved 15.05.2023

¹¹ Digital Acceleration in Healthcare: 12 Mega-Trends Shaping its Transformation, <u>Venkateswaran</u> V., Yu H., Sanders J., Jakobs Ch., , 2021, HealthCare India, <u>healthcare-in-india.net/digital-health/digital-acceleration-in-healthcare-12-mega-trends-shaping-its-transformation/</u> Retrieved 05.05.2023





Figure 3: Key megatrends healthcare

After analysing the global and healthcare trends, it is possible to take a closer look at the trends in digital health specifically. The blog About Digital Health¹², which is one of the sources of thought leadership on digital health, has provided the overview of 14 longitudinal trends for 2023 which considers micro-disruptive technologies, incremental innovation, societal phenomena. Those trends include: (1) Telemedicine, (2) Health check-ups without doctors, (3) Lab at home, (4) New healthcare delivery models, (5) Health-related fake news, (6) Prescription ads, (7) Medical virtual reality, (8) New digital health mindset, (9) Patient-generated health data, (10) Big tech enters health, (11) Do-it-yourself health, (12) Remote health monitoring, (13) Clinical decision support system, and (14) Coaching and Al support.

The above mentioned trends and megatrends identified by the three presented reports are in line with the analyses of the reports presented in Section 3.2 that highlight the further rise of telemedicine, wearable technology, personalised medicine, AI and digital therapeutics. They also informed the leaders of workshops when deciding on the topics of the sessions and their scope (see Section 4).

¹² About Digital Health, Digital Health Trends 2023, <u>aboutdigitalhealth.com/2022/11/24/digital-health-trends-2023/</u> Retrieved 10.05.2023



4. Scenario Planning Workshops

4.1 Workshop Series Concept

In continuation of section 3.1 of this report, futures planning is a powerful tool which allows organisations and societies at large to prepare for potential future scenarios and make informed decisions which can help to shape the course of those futures while navigating uncertain and rapidly changing global dynamics. Although Futures planning may appear as novel to many, this concept has a robust pool of literature highlighting its significance and impact as a relevant methodology - ranging from academic studies, to professional reports and practice guides^{13 14 15} ¹⁶. Futures planning is a valuable methodology within the digital health domain as it aids in anticipating, preparing and shaping the future of healthcare delivery.¹⁷ Therefore, as a collective, the CONNECTINGHEALTH project team decided that the methodology was suitable for addressing the challenge at hand.

4.2 Methodology

The CONNECTINGHEALTH Futures Workshop series was conceptualised as contributing to the overall project goals by opening up dialogue with a wide range of stakeholders on the vision for the the development of the digital health sector in Europe (and considering Europe's role in boosting growth, competitiveness, and innovativeness of the digital health companies and organisations). The series was intended to host collaborative gatherings which engaged stakeholders from all relevant sectors to co-design the multi-year action plan deliverable within the project (D6.1).

The sessions were designed to be hosted as small-group sessions with no more than 15 participants for each session on a variety of topics. To decide on the chosen topics, the project team reviewed trends in digital health (in D2.1) alongside a new envisioned definition of digital health¹⁸ (which is further elaborated on in D2.1), conducted partner-wide discussions, and took into account their interests and level of expertise. The chosen topics were identified based on this

¹³ Future Workshops: The Unthinkable and How to Make It Happen, Troxer P., 2007,

academia.edu/43314073/Future_Workshops_The_Unthinkable_and_How_to_Make_It_Happen Retrieved 10.09.2022

¹⁴ The Future Workshop, <u>involve.org.uk/resources/methods/future-workshop</u> Retrieved 10.09.2022

¹⁵ Method: Future Workshop, <u>https://participedia.net/method/4796</u> Retrieved 10.09.2022

¹⁶ When the walls come tumbling down: the hospital of the future

pwc.com/us/en/industries/health-industries/library/healthcare-delivery.html

¹⁷ Prioritizing scenario planning in health care. How plans and providers can plan dynamically for the

future, deloitte.com/us/en/pages/life-sciences-and-health-care/articles/scenario-planning-amid-uncertainty.html

¹⁸ <u>https://www.himss.org/news/himss-defines-digital-health-global-healthcare-industry</u>



work completed. Once themes were selected, facilitators were decided upon based on an effort of balancing partner responsibility and available dates. The final themes decided upon were:

- Digital Therapeutics & Digital Pharma
- Telehealth & Remote Patient Monitoring
- Virtual Clinical Trials
- Digital Health Softwares & Platform Solutions
- Reimbursements & Financial Mechanisms
- Digital Health Governance and Regulation
- Digital Health Workforce
- Digital Health Data

The initial methodology for the thematic workshops are seen below, and further expanded on in section 4.5 below.

Workshop: hands-on phase

- 1. Ideation (50 minutes)
 - Analysis of critique phase (10 minutes)
 - Brainwriting (10 minutes)
 - Analysis and elaboration of the initial mini scenarios (30 minutes)
- 2. Break (10 minutes)
- **3.** Implementation (30 minutes)
 - Evaluate the registered mini scenarios
 - Formulate in concrete terms & choose the best mini scenarios (max. 2 per topic)

Participants of the workshops received questions to complete in an online questionnaire on GoogleForms connected with their session enrollment. Preparatory steps were taken to feed the critique phase of the workshops with the following guiding questions:

- 1. What are the barriers/enablers encountered by (selected digital health issue) today?
- 2. What are the uncertainties (facilitating or hindering) that may occur in the future?

Critical ideas previously collected were further expanded by the facilitators prior to the workshop and analysed and categorised. The objective of this phase was to establish a critical understanding of the different digital health topics and the challenges/enablers that each topic faces.

To begin the session, a general overview of the topic of focus of the workshop was provided. Next, participants received an overview of the points raised during the critique phase (which were



previously collected), and then, all participants were able to add their ideas, compare, contrast, and further elaborate.

Beyond this, the sessions were divided into two main hands-on sections: ideation and implementation. This was suggested initially as consisting of 50 minutes (which had some deviations based on trial and error, and ongoing feedback from project partners) First, for the ideation segment, the guiding question used was "what (digital health topic of focus of the workshop) could be like if there were no constraints, plenty of resources, and no restrictive laws?" In the first 10 minutes of this segment, participants acquired an overview of the points raised during the critique. Then, all participants received an overview of the points raised during the critique phase of the workshop. Following this, all participants received 10 minutes to draw an exaggerated picture of future possibilities using a brainwriting technique. The participants were then prompted to suggest solutions without reflecting about restrictions, traditions or other barriers – therefore, to search for unconventional solutions. Upon completing this, each of the breakout rooms would come back together to share their ideas.

After this, in the second step, the breakout sessions would re-commence, and participants had 30 minutes to transform the most promising ideas from the previous phase into two initial scenarios, which were required to be reduced to a possible and realisable core. One was to be a positive scenario in digital health for 2030 (if things went perfectly), and the other, a negative scenario (if things went wrong). Ideas were to be prioritised after a common analysis and evaluation.

4.3 Workshop Planning and Preparations

To begin, from an overall visual identity aspect, the workshop series slidedeck development was conducted by ECHA team members. Series promotional materials were also produced by ECHA partners and each workshop within the series had specific visual templates produced.

ECHA set up a GoogleForm to collect registration information of participants which would regularly be monitored for the sake of an ongoing invitation process over the course of the workshop series. One week prior to the workshop, Google Calendar invites were sent to participants registered as well as another reminder via email.

A preparatory guide for organisers and facilitators of the CONNECTINGHEALTH Futures Workshops was also produced and distributed accordingly (see annex 1). This guide was developed to support facilitators in better understanding the content of the session, ideal flow of the session, and the types of questions to ask in order to stimulate participant engagement.



Leading up to each workshop, ECHA team members would reach out to the given speaker(s) and ensure all appropriate preparations had been made, and presentation materials prepared. For most workshops, a pre-session call was organized to walk through the session, test tech, and ensure all project members on the call were well coordinated for the soon-to-be facilitation of the session. This was more often necessary for the virtual sessions planned as often times there were four (or more) project members supporting the session facilitation by dividing roles of the following tasks:

- Opening the call on the Zoom platform
- Recording the session
- Hosting the session
- Monitoring the waiting room for participants to accept into the call
- Monitoring the chat box for incoming queries or tech support needs
- Taking notes
- Creating breakout groups
- Leading breakout sessions

Moreover, in the days leading up to the session, ECHA team members would review the Google registration forms to collect and distribute the necessary responses from interactive questions to the workshop facilitators for them to incorporate into their slide decks for stimulating discussions. This was all completed simultaneously with ongoing workshop promotional efforts.

4.4 Workshop Promotional Efforts

The CONNECTINGHEALTH workshops were promoted under the leadership of ECHA, however, with continuous partnership and active engagement from all project partners over the duration of the workshop series.

Firstly, ECHA hosted a CONNECTINGHEALTH specific landing page on their own organisational website¹⁹, outlining the project in depth, but also showcasing specific information regarding the workshop series and how to register²⁰. Additionally, all project partners would advertise upcoming workshops on their own organisation social media platforms (primarily through the use of Twitter and LinkedIn platforms), and individual project participants would too share information to their own multidisciplinary and global networks through word-of-mouth and through the use of social media.

¹⁹ <u>https://echalliance.com/connectinghealth/</u>

²⁰ <u>https://echalliance.com/wp-content/uploads/2022/12/workshops-connectinghealth-202212.pdf</u>

Another means of promotional efforts were made by ECHA with a focus towards the ECHA ecosystems. These actions included: promotion of the project workshops in the meetings with the Ecosystem coordinators, targeted emails with the workshop agenda and promoting the link between the ECHAlliance members and the project and its results. ECHA also posted on social media twice a week during all project with the promotion of the events and everything related to CONNECTINGHEALTH as well as the progress of the project partners.

Communication has been at the core of this project, with ECHA and Ecosystems members joining forces to try to make the project, its workshops and results reach as many target audiences as possible. All efforts have been dedicated to digital marketing by all possible means (specific emails, infographics, social media posts) and also to the promotion of these events when they have been physical.

With all those who registered for the events, ECHA gradually built up a database of interested parties who have been present at more than one workshop, to whom emails were sent about future events.

CONNECTINGHEALTH futures	workshops	5	
Digital Therapeutics & Digital Pharma	11th Oct 2022	SZOMBATHELY, HUNGARY	
Telehealth & Remote Patient Monitoring	11th Oct 2022	SZOMBATHELY, HUNGARY	
Digital Health Softwares & Platform Solutions	26th Oct 2022	GALICIA, SPAIN	
Reimbursements & Financial Mechanisms	30th Nov 2022	VIRTUAL	
Digital Health Skills & Workforce	14th Dec 2022	ATHENS, GREECE	
Digital Health Skills & Workforce	13th Jan 2023	VIRTUAL	**
/irtual Clinical Trials	18th Jan 2023	VIRTUAL	ÉCHAlliance
Digital Health Data	19th Jan 2023	VIRTUAL	PBN
The future of Digital Health	March 2023	BARCELONA, SPAIN	
The future of Digital Health	March 2023	VIRTUAL	SEINÄJOEN AMMATTIKORKEAKOULU SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES
			Scottish Enterprise

Figure 4: CONNECTINGHEALTH futures workshops schedule





Pannon Business Network and 9 others

Figure 5: Final CONNECTINGHEALTH future workshop promo on social media



CONNECTINGHEALTH @cnnectinghealth · Jan 26 ···· We're in Brussels today presenting #CONNECTINGHEALTH to the European Commissioner @GabrielMariya, as part of a workshop targeting the New European Innovation Agenda @EU_EISMEA

Exciting to connect with so many other #EUprojects 2 100



Figure 6: Social media post showcasing CONNECTINGHEALTH presentation to the European January 2023





Figure 7: Social media post showcasing the first CONNECTINGHEALTH partner meeting of 2023

Finally, at the end of each workshop, and in the session follow-up emails to all participants, project members would highlight the upcoming sessions to encourage participants to register for more upcoming workshops, and to also share amongst their personal and professional networks for greater reach.

4.5 Workshop Execution

The workshop schedule which was executed is seen below.



Торіс	Date	Details
Digital Therapeutics & Digital Pharma	11th Oct 2022	In-person - Szombathely - Hungary <u>Szombathely2030 Conference</u>
Telehealth & Remote Patient Monitoring	11th Oct 2022	In-person - Szombathely - Hungary Szombathely2030 Conference
Digital Health Softwares & Platform Solutions	26th Oct 2022	In-person - Galicia - Spain <u>RIES forum</u>
Reimbursements & Financial Mechanisms	30th Nov 2022	Virtual
Digital Health Skills & Workforce	14th Dec 2022	In-person - Athens
Digital Health Skills & Workforce	13th Jan 2023	<u>Virtual</u>
Virtual Clinical Trials	18th Jan 2023	<u>Virtual</u>
Digital Health Data	19th Jan 2023	Virtual
Personalised Nutrition	9th Feb 2023	Virtual
The future of Digital Health	March 2023	In-person - Barcelona - Spain DHWS 2023

Figure 8: CONNECTINGHEALTH Futures Workshop Schedule

Prior to the workshops, it was key to establish a critical understanding of the different digital health topics and the challenges/enablers that each topic faces. As such, the workshops ran according to the methodology outlined in section 4.2.

4.6 Summary of Workshops

The workshops were well received amongst the involved participants and turnout numbers ranged from 4 through 174 – averaging in the 20s. The participants and organisations represented within the workshops included a variety of sectors such as:

- Health and social care providers or professionals
- Digital health companies
- Policy makers
- Payors digital health (investors, health insurances, and others)
- Third sector (digital health associations, organisations and charities)



In conducting an overview of the participant representations from a variety of sectors, it was found that the third-sector (digital health associations, organisations, and non-for-profit), education and research groups were most greatly represented, and the policy-makers group and payors digital health groups (including investors, health insurances, etc.) were the least represented.

4.7 Workshop Reporting

After each workshop, workshop facilitators were asked to complete a specific workshop reporting tool, which was developed collaboratively amongst all project partners under the lead of ECHA (see annex 2). This report was shared amongst all project partners and stored in the project Drive for future review and reporting needs.

The following short-form information was collected within this reporting tool:

- Date
- Type *(face-to-face or virtual)*
- Organizer
- Number of participants
- Special guests
- Participant analysis (outlining different sectors and domains)

In addition to the demographic information collected during the registration process, more indepth questions were directed to the registrants to reflect on the chosen digital health topic of the session in hopes to collect useful data which could be implemented into the presentation slides and promote a more robust discussion amongst the group. This information included:

- Preparation Phase results (outlining the barriers and enablers encountered by the given digital health theme, as well as, the uncertainties facilitating or hindering the future implementation and success of the given digital health theme)
- Critique Phase analysis (outlining which things must be avoided, definitely be avoided, or unable to be avoided in order for x theme to thrive in a futures context)

During the workshop exercises, additional feedback is received by the participants for the previous points and would be recorded and implemented into the final report to provide the most holistic vision of data collected.

During the workshops, a large portion of time was dedicated to an Ideation Phase which aimed to answer the question "What could digital health look like (in relation to the digital health theme addressed in the session) if there were no constraints, plenty of resources, and no restrictive



laws?". Through conducting break out sessions, meaningful dialogue would emerge to answer this overarching question, and again, the results would be transposed into the overall reporting tool following the session.

In addition to the session conclusions, recommendations and final comments, the most impactful component of the sessions from both a reporting standpoint and real-world application were the "ideal scenarios." The ideal scenarios emerged in hopes of transforming the most promising ideas for the future from the session into real world, applicable examples, which can be found in the next section of this report.

As leads of the CONNECTINGHEALTH preparatory action, the project partners aimed to explore the question "A future vision for digital health: What will the future vision for digital health look like in 2030?" over the course of six months across ten thematic, interactive, multidisciplinary workshops. By sharing multi-stakeholder perspectives to brainstorm about the enablers, barriers, and uncertainties surrounding the topic overall and different themes, the project focused towards generating creative solutions to the potential challenges.

With this in mind, the European Union is on the path to the "digital decade"²¹ – a guided course with various concrete targets and objectives for 2030, which is working towards Europe's overall digital transformation. For this purpose, the solutions that are being put forward must consider people at the forefront, freedom of choice, safety and security, solidarity and inclusion, participation, and sustainability. Coinciding, that also the Regional Digital Health Action Plan for the World Health Organization (WHO)- Europe 2023-2030²² was launched with the intent to support countries in "leveraging and scaling up digital transformation for better health and in aligning digital technology investment decisions with their health systems needs, while fully respecting the values of equity, solidarity and human rights" – further emphasising that the time is now for futures discussions on this matter.

By highlighting a plethora of different topics within the CONNECTINGHEALTH workshops such as digital health skills, personalised nutrition, reimbursements and financial mechanisms, virtual clinical trials, and more, project partners were able to gather key insight into the matter to not only acknowledge the considerations of the EU and WHO frameworks previously mentioned, but

²¹ Europe's Digital Decade: digital targets for 2030, European Commission, <u>commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en</u> Retrieved 10.05.2023

²² Regional digital health action plan for the WHO European Region 2023–2030, WHO-EURO, <u>apps.who.int/iris/bitstream/handle/10665/360950/72wd05e-DigitalHealth-220529.pdf?sequence=2&isAllowed=y</u> Retrieved 10.05.2023



to also prompt effective next steps for what needs to be done to manifest the desired future scenario

Throughout the duration of the futures workshop series, the project team collected meaningful data through the pre-workshop questionnaires and also during the productive group discussions. The cumulation of the findings can be seen below in the tables highlighting the identified barriers, enablers, uncertainties of each of the selected digital health topics focused on in the sessions, in addition to showcasing elements of both positive and negative scenarios, as perceived by the registrants and participants. This feedback directly fed into the final scenarios for digital health and will be the guiding force for further implementation and planning in the next steps of the CONNECTINGHEALTH project.



Table 1: Workshop 1 Key Findings

	Digital Therapeutics & Digital Pharma Workshop
Barriers	 How to connect healthcare and patient monitoring with the help of AI? Chronically ill patients will need 0-24 assistance in the future, but the professional staff in the health sector is decreasing How to receive information faster in the health system? To speed up the flow of information in life-threatening situations to provide more efficient and targeted treatment Faster and better recognition of chronic illnesses Prevention and patient monitoring with digital solutions
Enablers	 Digital Health System available in Hungary (patient's information is stored there (blood tests, COVID tests etc.) National and international projects for fundings, trainings Private medical hospitals are more popular Start-ups, Universities, companies, and investors are already collaborating and searching opportunities together Top healthcare universities and laboratories in Hungary Health care robots for social care homes (mostly privately funded) Sponsors GDPR dedicated offices in hospitals Anti-bullying and mental health coaches (for request they visit schools; they are also available online)
Uncertainties	 GDPR Issues Where to keep all the private date safe? How to avoid issues about hacking? Rural areas are less developed (must have internet access!) To make opportunity to senior generation to learn how to use this tool Trust issues (Only the health staff see the private details? AI can also make mistakes; senior generation can have trust issues that they can "only see" the health staff) Trust issues from the doctors: How to make sure their clients follow e.g. the diet or they give real data?
Elements of positive scenario (considering a combination of both workshop 1 & 2 - as facilitated by project partners PBN=	Ideal scenario in 10 or 15 years would be if people would all have access to the internet and smart equipments. As mentioned above these are must-have accessories to have fluent digital pharma, digital therapeutics and for telehealth and patient monitoring. Other very important issues to be solved are the GDPR and access to private and secure information, which could be solved by having the same GDPR rules in the EU. Even though with certain chronic illness there will be need for face-to-face visits for the doctors, but with other illnesses e.g. mental health issues or diabetics monitoring it could be a solution to have an APP or a webpage, where therapeutics are available, our health could be monitored and these could be securely available anywhere (e.g. when we travel abroad and we need medication the doctor can log in to see our medications and health-issues to give us proper help). EU and national fundings are crucial parts of the digitalization and for the improvements of this important sector such as health.



Elements of negative scenario	N/A - this information was not collected by the session facilitators.
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Table 2: Workshop 2 Key Findings

	Telehealth & Remote Patient Monitoring Workshop
Barriers	 Chronically ill patients will need 0-24 assistance in the future, but the professional staff in the health sector is decreasing How to connect healthcare and patient monitoring with the help of Al? Chronically ill patients will need 0-24 assistance in the future, but the professional staff in the health sector is decreasing Prevention and patient monitoring with digital solutions limitations with performing comprehensive physical examination Possibility for technical issues security breaches, GDPR issues worry that telehealth affects continuity of care online interactions are impersonal People should familiarize themselves with potential telehealth legal risks
Enablers	 Digital Health System available in Hungary (patient's information is stored there (blood tests, COVID tests etc.) Smart devices are getting more popular Trainings specialized for health care workers, social care workers and for elderly generations National and international projects for fundings, trainings Start-ups, Universities, companies, and investors are already collaborating and searching opportunities together Top healthcare universities and laboratories in Hungary Health care robots for social care homes (mostly privately funded) Sponsors GDPR dedicated offices in hospitals Mental-health hotline (with psychologists and volunteers) Anti-bullying and mental health coaches (for request they visit schools; they are also available online)
Uncertainties	 GDPR Issues Where to keep all the private date safe? How to avoid issues about hacking? Rural areas are less developed (must have internet access!) To make opportunity to senior generation to learn how to use this tool Trust issues (Only the health staff see the private details? Al can also make mistakes; senior generation can have trust issues that they can "only see" the health staff) Trust issues from the doctors: How to make sure their clients follow e.g. the diet or they give real data?



Elements of positive scenario (considering a combination of both workshop 1 & 2 - as facilitated by project partners PBN=	Ideal scenario in 10 or 15 years would be if people would all have access to internet and smart equipments. As mentioned above these are must-have accessories to have fluent digital pharma, digital therapeutics and for telehealth and patient monitoring. Other very important issues to be solved are the GDPR and access to private and secure information, which could be solved with having the same GDPR rules in the EU. Even though with certain chronical illness there will be need for face-to-face visits for the doctors, but with other illnesses e.g. mental health issues or diabetics monitoring it could be a solution to have an APP or a webpage, where therapeutics are available, our health could be monitored and these could be securely available anywhere (e.g. when we travel abroad and we need medication the doctor can log in to see our medications and health-issues to give us proper help). EU and national fundings are crucial part of the digitalization and for the improvements of this important sector such as health.
Elements of negative scenario	N/A - this information was not collected by the session facilitators.

Table 3: Workshop 3 Key Findings

	Digital Health Softwares & Platform Solutions Workshop
Barriers	 Too much regulation of softwares Lacking time and the resources to use software solutions Challenges in integration of softwares & platforms Challenges in purchasing procedures Lack of links between health services and the private sector and software Unequal access to softwares
Enablers	 Technology training Good user experience of softwares Users demanding more digital services Physicians with positive attitudes toward software solutions Governments motivated to digitalize services
Uncertainties	 The use of Artificial Intelligence Populations aging Safety and reliability of solutions: usefulness to the health personnel Medical Device Regulations Lack of cooperation between different administrations Attitudes against digital health softwares and platforms
Elements of positive	Positive scenario 01.



scenario	In 2030 emphasis of health promotion shifted from a disease centered approach towards a more preventive approach throughout EU with the assistance of high-end digital health softwares. In addition, a more holistic view of health is endorsed in digital health care and health promotion, better considering all aspects of health and wellness, leading to populations being healthier than ever. With new superior digital health softwares and platform solutions, self-care of diseases and disorders took great steps forward and patients are now better able to promote their health effectively without assistance of health personnel. As a result of these customized, self-care oriented softwares, traditional health care services are less needed and the cost of healthcare systems in EU is significantly lower.
	Positive scenario 02. Digital health softwares and platforms continued their great development from 2022 to the year 2030 but as a significant change of approach, quality replaced quantity. As a result, the digital health software market in 2030 is no longer oversupplied with similar competing solutions and The users are very satisfied. Interoperability of digital health softwares and platform solutions improved to the point that every EU citizen now has access to digital health softwares that works perfectly between countries, regions, and sectors of health care. Health care personnel and patients are now able to access health data seamlessly without any unnecessary boundaries. Trust in digital health softwares and in their safety is at a great level.
Elements of negative scenario	<u>Negative scenario 01.</u> In 2030 sizes of elderly populations in the EU have grown significantly and countries have not been able to adapt, resulting in insufficient quality of elderly care. In addition, urbanization has advantaged to the point that inequality between rural and urban regions has created significant gaps in the wellbeing of populations. Also, health literacy disparities are growing at an alarming rate.
	Digital health softwares and platform solutions have failed to adapt to the situation and have not been able to provide the needed solutions to the new problems. This is due to poor interoperability of the solutions and the failure to meet the requirements and needs of the populations. Resources to digital health software research and development are also greatly lacking. Risk of discrimination regarding health data is growing and trust in software solutions is worse than ever.
	Negative scenario 02. Despite clear indications, social- and health care sectors remain segregated throughout the EU in 2030, leading to poor quality of services. The poor interoperability of digital health softwares and platform solutions between countries, regions and health care sectors has further worsened the situation. Global conflicts, poor politics and new pandemics have led to a great international health crisis, and health care systems are at the brink of collapse. At the same time, digital health softwares and other technologies have led to huge breakthroughs in health promotion, but these solutions have only been available for the wealthiest populations, which has led to extreme health inequalities. The extremely wealthy people who are financially able to purchase these solutions, are healthier than ever and live significantly longer than those who can't, which is creating large socio economic, ethical and political conflicts.

Table 4: Workshop 4 Key Findings

Reimbursements & Financial Mechanisms Workshop



Barriers	 Lack of transparency Fragmentation of frameworks Unclear reimbursement system for the innovation treatments or digital health therapies Lack of value-based reimbursement Bureaucracy Governance and policy Reimbursement model Lack of database information on the patient needs GDPR compliance is too complicated and overestimated Lack of investors overall Lack of funding for early stage startups Limited resources Different European states all have different systems, and within the same country, there could be different frameworks* Aging population, higher chronic conditions and subsequent costs for the needed care (social lens)* Current models are not adequate to address the social lens*
Enablers	 IT systems and clinical oriented development Policies German example of reimbursing digital health solutions* Some new apps to control transparency and automation (in Germany)* More smart technologies with monitoring and with contact of relevant actors in healthcare - making it easier for patients to get to know their situations* More examples on social impact investing as a financing model for going towards more preventative actions* New scientific findings regarding preventing or delaying brain health related diseases with lifestyle actions - and building up a more result based model which could contribute (?)* Impact Investing*
Uncertainties	 The processes and silos and egos will only get worse Lack of public fundings, new pandemics or wars, recession, lack of European coalition Budget not aligned with preventing Competition for human resources within the workforce between countries related to clinical professions and specialized professionals (i.e. no one to replace retired populations and aspect of brain drain with professionals moving to work in different countries for better conditions or wages)* How politicians will use health systems to leverage their political will and popularity* Expectations on return of financing - will it be constant or not in the future? (Tied to the unknowns re: the future business models- do we need new business models to reflect the evolutions of the digital world)* Lack of digital skills amongst new and existing employees in the healthcare system, nor on the topic of cyber security, and they do not have the past nor present opportunities for sufficient training (from admin to doctors)* If you want people to embrace new systems, they need the training (an preferably before they even get to the job) - without, it could hinder innovation and implementation/usage of technology* Lack of coordination and collaboration between EU countries* EHDS



	 Reimbursement framework Financing of the health systems in the EU: national, regional?
Elements of positive scenario	N/A - The project facilitators did not collect this information in this particular session.
Elements of negative scenario	N/A- The project facilitators did not collect this information in this particular session.

Table 5: Workshop 5 & 6 Key Findings

	Digital Health Skills & Workforce Workshops
Barriers	 Approx. 1/5 of adult Europeans struggle with basic reading and writing, calculation, and using digital tools in everyday life Low levels of qualification can put people at higher risk of unemployment, poverty and social exclusion Skills gaps in the health workforce Digital skills not included in medical and health professional curriculum There is an expectation that everyone is digital, but the expectations do not reflect the reality as they are higher than the skills available An existing generation gap (some of the older generations prefer "older" ways of engagement as opposed to younger generations that can be perceived as being more open to changes) Systemic issues which may be regarding how work is organized and outside of the control of the individual Making the time for learning new technologies and adapting as needed Before there is a return on investment it will take time for larger funding bodies and governments to invest in it Universities may face a challenge in expecting their educators to have digital health skills on top of everything else that is required for their day-to-day work portfolio A clash between the new digital age workforce and pre-existing workforce Cyber-attacks in hospitals/data security breaches Approx. 1/5 of adult Europeans struggle with basic reading and writing, calculation, and using digital tools in everyday life Outdated professional regulations & outdated curricula and teaching methods Many people may not be aware of the potential benefits of digital health or may not understand how it can be used effectively in healthcare settings. Gaps between DH strategies and delivery Low levels of qualification can put people at higher risk of unemployment, poverty and social exclusion Skill gaps in health workforce Resistance to learn new technology IT professionals may not always be capable of working wit



	 Digital skills not included in medical and health professional curriculum Lack of understanding of career options in digital HC, etc. Lack of resources (money, staff, time) Gender, race, age bias - gaps in training Not enough time to get to know different tools Poor digital literacy of patients Recognition of digital skills by leaders The risk of excluding a group fully (i.e. migrants) Not reaching the people we need to speak to (not enough focus on marginalized groups) in order to better think about how we consider the development of digitalization
Enablers	 Global transition in economy and society Greater industry awareness According to the European Skills Panorama1, analysing digital data and using digital tools for collaboration were respectively the second and third most requested skills in the health and social care sector in 2020. EU initiatives, programs and platforms such as Europass, Digital Skills and Job Coalition, and Upskilling pathways which aim to help adults acquire necessary skills European countries have increasingly been recognising the importance of adopting green and digital New policies such as the EU Digital Targets for 2030 The results of the pandemic (some of which are positive and enlightened individuals and societies on the power of technology for good) We have a generation of the digital natives that are about to enter the workforce More needs-driven research on policy impacts More partnerships with private and governmental entities – harmonized system of patient data will provide new data points for the R&D - helping to get the right medicine at the right time Almost everyone owns a smartphone, and technology is becoming more widespread and affordable Making internet connections more equitable amongst remote locations Global transition in economy and society EU initiatives, programs and platforms such as Europass, Digital Skills and Job Coalition, and Upskilling pathways which aim to help adults acquire necessary skills Whole systems approaches Improvement in general literacy Upskilling in minority groups (considering race, gender, etc.) Greater industry awareness Providing education and training can help healthcare professionals understand the benefits and potential of digital health and how to use it effectively in their practice. Continuous professional development Mos of the Medical Devices are now app based and Software as Medic



	 According to the European Skills Panorama1, analysing digital data and using digital tools for collaboration were respectively the second and third most requested skills in the health and social care sector in 2020. New policies such as the EU Digital Targets for 2030 European countries have increasingly been recognising the importance of adopting green and digital solutions. Progressive strategies and enlightened leadership Digital literacy training and policy Trust – how do we create trust in these systems and new ways of doing work Working on curriculum to not only include digital skills but perhaps more on people skills (if the development of digital skills means more time for interaction)
Uncertainties	 Brain drain - certain EU Member States educating and upskilling workforce which then may leave to other countries for better opportunities (hindering) How rural and urban communities will facilitate necessary changes in health and social care in equitable ways (could be hindering or facilitating) Building resilience during future pandemics which can directly impact the workforce (facilitating) Building necessary persona profiles – keeping an eye on personas and how they evolve to better understand how the tools can provide a meaningful capability to know who's on both sides of the tools Ability of policy makers and decision markers to deliver expectations - their initiatives and commitments to making change (including the "how" they will make change) need to be better communicated so that they can be endorsed and accepted Priorities may change as the world evolves, future pandemics, etc. etc
Elements of positive scenario	In 2030, digital health training has been integrated into the education system. As a result, the new health professionals are already skilled when they enter the workforce, and the infrastructure is in place to accommodate this. Digitalization has progressed to the point where people are not talking about digital health skills anymore - just health skills - since digital aspects have already been built in and integrated to health promotion and care throughout. This has been allowed by countries in the EU being more coherent and harmonized in digital skills, data, and canceling of restrictive legislation. Supporting this movement, the health markets have adapted and designed their solutions well to reflect the needs of the patients and workers. They also integrate smoothly into the systems and workflows, so that the digital health solutions don't require extensive training. In addition, sufficient and consistent health literacy levels have been achieved by populations and the efficacy of the implemented technologies has been proven. In 2030, patients are equipped with sufficient skills to promote their health and prevent disease using digital platforms. This is due to increasing digital skills transferable i.e., from other non-health-related digital platforms (such as social media) as well as using simple, common and interoperable, technologies developed in close co-operation with developers, health professionals and patients. Notably, even the aging populations have emerged as keen audiences for digital health solutions. Despite this great progress, digital solutions are still not forced upon individuals. People can still choose if they wish to conduct their matters face-to-face or online. The digital health skills of the workforce are insured by adequate funding for upskilling the workers across all sectors. General awareness of the opportunities and potential new career paths are clear, which has attracted new talents to the field. To ensure continuity, the EU has imposed standards for digital health skills o



Elements of negative scenario	In 2030, the silos in and outside health care are increasing, which worsens the exclusion of certain groups and ultimately impacts overall health of populations. For the health professionals, certain roles have become less attractive due to poor technological tools and processes and insufficient education on technologies have led to misdiagnoses of the patients.
	Digital health is replaced by a new different buzzword, which reallocates the focus to the irrelevant things from the important health promotion matters. Leadership, understanding and funding for promoting digital health skills is greatly lacking. Data is getting backlogged and expiring unsupported softwares are causing longevity and continuation issues, to which organizations and workforces are incapable to react. Poor health literacy of the populations has led to individuals self-diagnosing themselves poorly via the internet and not consulting health professionals when needed. In 2030, people are not skilled enough and therefore don't use digital health solutions, but rather only conduct their matters the "traditional way". Patients and professionals, who are not skilled to use the digital tools in health care, feel overwhelmed with seemingly unnecessary and untrustworthy tech gadgets and systems that neither make health care jobs easier nor contribute positively to the care of patients. Skill gaps and inequality between the digitally disadvantaged and the tech savvy are growing.
	What worsens the situation is that the potential workers with good skills are attracted to different sectors instead of health care and policy makers fail to acknowledge gender gaps in digital health skills or act on them.

Table 6: Workshop 7 Key Findings

	Virtual Clinical Trials Workshop
Barriers	 Ignorance Technological transparency How to ensure compliance to all trial parameters Knowledge and Education The need to define rigorous methods Cultural Barriers Creating Synthetic Data Lack of regulatory framework Tradition Insufficient understanding of & subscription into the process by key participants There are lots of technological barriers but many staff management issues are potentially more problematics GDPR Accuracy / efficacy Skills gaps (inc. in trial staff) Data Security Coded data Academic Empires



Enablers	 Promise of equitable digital access / literacy Rigorously defined methods that act as a barrier today will become enablers when addressed Increased use of personal health monitoring products by patients/citizens Opportunity for more meaningful patient involvement at all stages Better for disabled participants Improving technology Opportunity for larger sample sizes Data silos General push to digital health & care delivery New standards such as FIRE and OpenEHR Existing trial methods can be used Promise of potential cost reductions
Uncertainties	 Success @ engaging disadvantaged populations Communications Barrier Al advancements Demonstrating utility and contribution to develop evidence Acceptance Data protection regulation Success or failure of finding a way to maintain the "human touch" Technology Statistical biases are challenging to identify and address Our ability to translate old/existing methods to virtual clinical trials Adoption by pharma industry Evaluation
Elements of positive scenario	 Less invasive approaches as a fantastic opportunity (better data, more easily adopted by a broader group) Greater trust and transparency (directly related to trust for government and governance) so that we can accept data collection and monitoring Responsible use of data and more cybersecurity (thinking of who should have access, how can they use it, and who has the power and for what cause) Surveillance in a public health definition as a norm for the greater good More utilization of the public health/community health sector to create buy-in, awareness, etc. Linking citizen generated data with health care data Supporting population based studies



	Novel trial design adaptive / platform studies
	Improve time from discovery to implementation
	Broaden access to trials / novel drugs
	• Increased patient training (which non-invasiveness helps address) OR less complicated strategies which don't require as much patient training because they are more intuitive
	Idea that contributions are being used for a positive collective
	• Opt Out rather than Opt In systems
	• The virtual trials become mainstream - they are not seen as being completely different from the normal trials, they just use different techniques:
	 accepted way for everyone (patients, staff, researchers, ethics committee, regulators)
	O progress / developments in the area of IoMT devices - motivation, economic support, "Will definitely be available by 2030"
	 AI / ML help to handle different participant languages and support participation and collaboration
	 Development of data support services: more research, time and effort
	• The process of VCT & systems are user-friendly and so well developed that everyone will be able to participate:
	 Including demographic groups to develop the systems
	 More resources are allocated
	• OpenEHR/FHIR adopted more widely
	• Access to innovation treatment faster than before
Elements of negative scenario	• Same or worsened trust in governments and governance which keeps thing from improving
	People have an increased feeling that they are being tracked for negative purposes
	 Not realizing the promise of certain technologies - which decreases likelihood of uptake
	• Not something bad happening but a lost opportunity of something good that should have happened
	 Lack of framework on what type of trials and data are most suitable for what



Weak empowerment
Lack of best practices
• Regulatory minefield that deters the researchers from using the opportunity \rightarrow it becomes more expensive
• Lack of participant trust because of lack of education, knowledge, failure to build the trust before now and then,
Participants feel pushed and not engaged limited communication and support available
• Perceived quality of the results of VCT is lower - potential scandal that can cause a public outrage ("it only takes one"), investigators blamed for conducting VCT "if something goes wrong"
• Virtual clinical trials are primarily used because they are "easier" - at the cost of the value and reliability of the data
Data breaches: security and privacy issues
• There will have been a reasonable high profile incident of fraud, clinical malpractice, or a data protection breach that is attributed to the trial being conducted virtually
• Widespread mistrust about data security and some of the technical providers (e.g. "so now Google have my medical data??")
• Becomes seen by patients as being a worse service (as some telemedicine is today - e.g. "I just want to see the doctor, not have a phone call")

Table 7: Workshop 8 Key Findings

	Digital Health Data Workshop
Barriers	 Lack of skill sets for health informatics Lack of data standardization Poor quality of data Poor business model Lack of robust data Management system Lack of modern digital infrastructure Data Controllers tend to be risk averse. Confusion around what is allowed Lack of clean data



	 Cybersecurity Fear of data being shared Lack of appropriate user training opportunities Important to recognise that the barriers for using data for patient care are different from those of using barriers for system improvement Lack of permission to share & use data Increased costs Governance and policy Limited resources -manual tasks & paper trails Data silos Lack of Trust Issues with data interpretation & translation Data quality & collection in primary vs secondary care Lack of consistency of data within the system
Enablers	 Entry of big tech firms into the market Streamlining NHS processes Robust business model Digital health policies Huge potential to speed up research and market new products Electronic patient records Increasing digital literacy in the population IoT is a potential enabler A large number of people can now see the "promise" of digital health and what gathering more data can enable Sensor technologies (e.g. electrochemical sensors) are improving and becoming cheaper.
Uncertainties	 Disease classification under systems like Snowmed Shortage of skilled workforce Issues with the lack of access to health data for patients & families Lack of privacy and data security Difficulties integrating health data from different sources-making it difficult to analyse data Difficulty in developing standards for collection, storage & use of health data Data accuracy Whether an opt-in or opt-out model prevails & what this means for trust DH & data can improve the quality of healthcare. Improve effectiveness of treatments by providing clinicians with access to information Help reduce healthcare costs by eliminating duplication & errors Personalised medicine Public attitudes Funding



	 Confidentiality vs utility Perception vs reality on data usage Will legal changes keep pace with digital Will different perspectives come together on data sharing
Elements of positive scenario	 Use of data to build clear process models to be used to optimize hospital care and/or patient journey in different care contexts Integrated health systems and information sharing Accurate data to ensure patients get proper service when they need it When there is a health problem, utilization of at-home monitoring Advanced precision medicine treatments Legal framework and ethical questions addressed and answered Using data to help individuals adhere to treatment (i.e. with the use of apps) Optimal process of co-creation of data usage between different stakeholders and diff. Contexts (i.e. patient groups, clinicians, and start-ups) Patients own their own health data - improved cyber security Less prescription errors Systems that enable more independent living with an aging population and take off pressure from the public health system. Medical data of patients should be accessible for patients through digital tools, such as digital health passports or digital signatures Consent-based system with a balance between monitoring of data and people's access to data The default behaviour should be that my data is shared to a care delivery network for the purpose of providing care to citizens Digital health care should be a standard for everyone, an essential right to everybody (considering disparities between rich and poor).
Elements of negative scenario	 Worsened inequalities in service care within our borders due to stagnant interoperability and data sharing within health systems Inequalities due to socioeconomics - geographical barriers, lack of monetary support for buying into these technologies, data structure limits High chance of discrimination due to genetic data breach (i.e. certain gender, racial, etc. groups being more present in certain data, studies, etc.)



Private companies having access to personal data (i.e. insurance)
Issues with data storage - where is everyone's data when something goes wrong?
 More cyber attacks on hospitals – tons of data unveiled (and going to insurance and banking companies)
Not reaching enough maturity in the use of data for training models, AI, machine learning algorithms – this will not enable the use of technologies that may benefit from available health data (such as medical imaging).
Digital health data standards would still not be guaranteed in a fragmented and unequal world
Innovators would still find it hard to reach markets. Companies would still find it difficult to access data and collaborate with health systems and clinicians due to a range of barriers including a lack of interoperable data, high costs and regulation.
• Surveilled without our consent and black-box AI makes use of this in ways that are commercially driven and not in our best interests
• Al would still be emerging and we could think that Al is "the truth"
Bias in data from AI hasn't been solved and is leading to negative outcomes for people or groups.

Table 8: Workshop 9 Key Findings

	Personalised Nutrition (PN) Workshop
Barriers	 The lack of any international policy and industrial strategy for Longevity, like the UK's recognition of "aging in society" as an industrial challenge Digital literacy The heterogeneity of health data infrastructures has slowed the development of a nationwide personalized health ecosystem Mass production is cheaper & current food system is based on this Digital solutions can rely heavily on unreliable user input High cost / luxury good Healthcare budgets are constrained The lack of a specific Longevity business community Lack of patient access to nutritionists PN Advisors need to be trustworthy Willingness to share data by the patients/consumers Data safety



	 In Hungary-monitoring of patients with a health condition who need PN is hard for the doctors. Current industry configuration.
Enablers	 Improving technology Importance of "wellness" to consumers Increased public health interest in regulating / recommending diet Increased number of people with complex dietary needs (i.e. allergies) Potential for insurance models If there is a valid methodology for patient treatment Nutritional knowledge by stakeholders EU funding schemes to enable collaborative working of consortia and academicians Media passionate about PN (traditional & social media) Academicians working collaboratively with medical consultants towards precision nutrition Tax benefits.
Uncertainties	 Implementation of science to the actual apps Various interpretation of PN (less of supplements and more of nutritional science preventing/controlling health conditions) Attitudes & tension with ethical consumption & "natural ingredients" Food & diet trends & attitudes Application of blockchain technology to ingredient supply chains Regulation & GM Legislation.
Elements of positive scenario	 "Healthy" is attractive paradigm shift and consumers are encouraged to see personal nutrition as part of their quality of life Higher awareness of nutritional information and their impact on health to enable patients' self-assessment Improved nutritional education and awareness so there is more societal demand for a change More investment in the area of personalised nutrition, both from the government but also from the retail sector or major producers. More investments (and tax relief) encourage greater investment in establishing an enhanced retail face supplying improved and personalised food experiences that appeal to healthier lifestyles Better monitoring: Gathering more nutritional data and patients' information through algorhythm → Right data and the way we use this healthcare data for personalised nutrition Need to see a "fashionable" following to be able to engage more people, e.g. celebrity endorsement etc in accessible solutions to encourage the masses to see the benefits Consumer and HCP need to fully understand and endorse the personalised nutrition as a part of their clinical pathway: facilitating policies and



	leadership \rightarrow endorsed on the highest possible level
	 Mainstream the "medical side" of personalised nutrition
	 "Opting out" from a personalised nutrition scheme.
Elements of negative scenario	• No consensus on what's "healthy nutrition" is - different trends drive the nutrition, not health
	 Too many players leading to a misuse of the algorithm for personalised nutrition solutions
	Efficiency issues, marketing misleading claims
	• A "PN is elite" outcome where the wealthy get more options and the lower economic demographics continue to struggle to understand and/or get access to solutions
	• Could still face access issues due to digital literacy inequalities and digital literacy issues within the medical profession itself (e.g. GPs needing upskilling to provide understanding to patients about their data)
	Patient-generated data not accessible from GPs
	• Patients unhappy to share their lifestyle data or share inaccurate data
	• People would only react and take action to adopt personalised nutrition solutions when they get clinical symptoms and not in a preventive way
	 Status quo - difficult to change the eating behaviours, slow change
	Challenge in engaging food manufacturers
	• Lack of belief of the policy makers that their work changes anything



When bringing together the results of the completed workshops, barriers towards a pro digitalhealth future included:

- Low digital literacy
- Lack of trust
- Concerns about data safety
- Poor data quality
- Conservative mindsets
- Lack of standards
- Limited resources
- Fragmented policy and implementation frameworks
- Lack of collaboration

On the contrary, the enablers of a future reality which successfully implements and integrates digital health that were most regularly identified included:

- Electronic health records
- Cost reductions
- Promise of health equity
- New insurance models
- Improving technology
- Increased public interest
- Increased use of digital health solutions
- Opportunity for engagement of the various demographics
- Digital health policies

These enablers and barriers are very much inline with the literature, and continue to showcase the importance of co-creation in health services. The future of digital health requires collaboration amongst all elements of the healthcare ecosystem²³, including: healthcare professionals, health systems, the patient, the insurers, the regulators, the payers, and the pharma industry.

Bringing these together, under the leadership of ECHA, the development of four scenarios for digital health in 2030 was completed. Task leads plotted around the two critical uncertainties:

²³ <u>https://www.jabil.com/blog/digital-health-infographic.html</u>



development of digital health policies (low-high) and people's empowerment (low-high), as seen on the image below:



Figure 9: CONNECTINGHEALTH four scenarios for digital health in 2030

Each of the scenario can be described shortly as follows:

- Digital health is health Empowered and informed healthcare professionals, supporting staff and citizens who embrace new systems which address reimbursement and financial mechanisms. They also have adequate training to implement efficiently and effectively the digital solutions based on data and AI in their daily practice. Digital health helps cut the costs of healthcare and direct the limited resources in the most optimal way. The access to healthcare services has raised thanks to the availability of telehealth in remote areas, interpretation services and other solutions that help eg. visually impaired people to access health information and instructions. Digital health is not threatened as something special, but one of the ways to deliver health services.
- It's a limbo There are shared standards, some good practices and advanced investments in digital health (technologies, training, implementation) but the update remains low due to the skepticism and lack of understanding of the added value of digital among people, who still prefer a face-to-face interaction with the healthcare professionals. This is mainly



due to the insufficient training, education and information - people remain untrustful towards the technology and alienated from the innovations.

- The black hole Technology giants have a much bigger control on the health sector compared to the current state, having an effect also on the financial mechanisms. People use digital services like applications but with a little understanding of how they influence their health and what happens with their data. The policies that were supposed to create a better environment for digital health and health data exchange failed on the European level, and the national governments don't have power, resources and competences to implement them on their own. The gap is filled in by the private sector that "americanise" the healthcare sector even further.
- The status quo? People love digital solutions for health and wellbeing and for how efficient and effective they can be. However, due to the limited regional and national uptake, the use remains fragmented and on a case-by-case basis. Despite best efforts, The policies that were supposed to create a better environment for digital health and health data exchange failed on the European level and the fragmentation continues.



5. Next Steps

5.1 Future Scenarios Dissemination

Project partners have begun brainstorming efforts to determine what the vision is for the dissemination of the future scenarios findings. Select excerpts and key takeaway messages will be transformed into digestible social media content which will be shared on the CONNECTINGHEALTH and affiliated-partners' social media platforms with the goal to build awareness and recognition on the strategic relevance of the topic in the field of digital health. Additionally, by sharing this content, it will continue to help establish CONNECTINGHEALTH and its involved stakeholders as a key "thought leader" in the discipline of digital health, and more specifically, futures planning. One example of how this was put into action was a blog written by ECHA project members titled "A future vision for digital health: what will 2030 look like?" ²⁴ This blog was highlighted on the CONNECTINGHEALTH website and social media channels and reshared amongst all project partners.

Besides social media outreach, the CONNECTINGHEALTH partner team has a roster of international events in which they will be highlighting the project and it's main findings in multidisciplinary, and multistakeholder environments such as Digital Health Society Summit (November 2023) or Digital Health & Wellness Summit (February 2024).

Finally, within the ECHA-specific network, the following actions are intended to be made in order to continue expanding the reach for project dissemination and main findings:

- Publication of blog posts and stories in the newsletter,
- Presentation of the results in the ECHAlliance podcast,
- Presentation during the all ecosystems coordinators calls and Thematic Innovation Ecosystems.

5.2 Putting the Findings Into Practice

In defining strategies and actions regarding the implementation of futures planning in the context of digital health, a handful of considerations should be taken into account. Some clear steps to put the findings of futures planning of this CONNECTINGHEALTH activity into practice within the realm of digital health can be seen below:

²⁴ <u>https://www.linkedin.com/pulse/future-vision-digital-health-what-2030-look-</u>

like%3FtrackingId=AG0XiyJ3gAL1EnzuNcb79A%253D%253D/?trackingId=AG0XiyJ3gAL1EnzuNcb79A%3D %3D



- Stay aware and updated on industry trends within digital health which includes new technologies, regulations, consumer demands in different geographical contexts, in order to seek industry gaps, opportunities, challenges, etc.
- Continue to identify emerging technologies with potential impact and application within the digital health domain – such as AI, machine learning, virtual realty (VR), etc., in order to better understand how they may assist or enhance achieving specific digital health solutions.
- 3. Conduct additional market research with the findings of the workshop series as the crux of the discussion to further understand specific market segments and associated needs, and to continue to identify and define gaps, barriers and opportunities for innovation in digital health. This is especially important from a multisectorial, multi stakeholder approach for gathering the most holistic and relevant information to apply.
- 4. As a project, aim to define strategic objectives in the next phase of work based on the key insights achieved by the futures planning workshops which focus on a specific digital health initiative that addresses current and future trends, anticipated needs, etc.
- 5. Create a roadmap action plan for approaching the above strategic objectives paired with relevant activities and realistic timelines (considering SMART goals²⁵ throughout).

Additionally, these findings could help with forecasting future health or digital health trends, and assist with overall risk mitigation and adaptability. Beyond these steps for moving towards implementation, it is important for the project to act as a "thought leader" in continuing to spread the message of collaboration amongst its diverse, multidisciplinary followership. By continuing to lead a dialogue about the importance of cross-sectoral collaboration in digital health amongst a variety of stakeholders (i.e., healthcare providers, technology vendors, regulatory videos, patient advocacy groups, etc.), CONNECTINGHEALTH can strive to accelerate progression at a systemic level which will further aid in leveraging implementation efforts effectively.

²⁵ How to write smart goals, <u>atlassian.com/blog/productivity/how-to-write-smart-</u> <u>goals#:~:text=What%20are%20SMART%20goals%3F,within%20a%20certain%20time%20frame</u> Retrieved 01.09.2022



Moreover, to accommodate all-of-society digital health transformations, flexible infrastructures must be built.²⁶ Because digital health is evolving so rapidly, flexible and scalable infrastructures must be considered in order to address the needs of emphasising interoperability, data standards, and ensuring compatibility and compliance with emerging technologies, systems (and needs).^{27 28}

²⁶ Global Strategy on Digital Health 2020-2025, WHO, who.int/docs/default-

source/documents/gs4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf Retrieved 05.05.2023

²⁷ Why ageing physical healthcare infrastructure needs an uplift for the digital age, World Economic Forum, <u>weforum.org/agenda/2023/01/healthcare-digital-transformation-infrastructure-davos23/</u> Retrieved 01.03.2023

²⁸ The Role of Digital Infrastructure in Reshaping Health Innovation, <u>blog.equinix.com/blog/2021/02/28/the-role-of-digital-infrastructure-in-reshaping-health-innovation/</u> Retrieved 01.03.2023



6. Conclusion

Reiterating the overarching objectives of CONNECTINGHEALTH, it is evident that the actions taken in the futures scenarios workshops have been targeted, meaningful and effective.

Futures workshops have been recognised as being an effective tool in driving digital health innovation, and workshops such as these within the CONNECTINGHEALTH programming are designed to explore potential future scenarios and facilitate creative thinking around emerging technologies, trends, and user needs. By bringing together a diverse group of stakeholders, such as healthcare professionals, researchers, technologists, and patients, futures workshops can foster collaboration and generate valuable insights and ideas in order to pre-emptively plan, pivot quicker, and ultimately improve outcomes.

Although insightful, the work conducted and the results found in this aspect of the CONNECTINGHEALTH project are only just a starting point, and more research and multidisciplinary, cross-sectoral action must be taken. As such, collectively, the CONNECTINGHEALTH partners hope to continue addressing the gaps and taking actionable steps forward in the upcoming phase of the project to develop the meaningful multi-year action plan that will inform the European Commission, partners, businesses and other stakeholders about the next steps in developing the digital health in Europe and beyond.



Appendix

Annex 1

Guide for the organisers and facilitators of the CONNECTINGHEALTH futures workshops

Futures workshops CONNECTINGHEALTH

- This is a guide for the facilitators of the futures workshops.
- Please prepare the presentation for the workshops using the <u>template</u>.
- To watch the preparatory workshop, click here.
- Keep in mind the information needed for the reporting tool.

Before the workshop

Note that participants need to register before the workshop and answer three questions:

- 1. What are the barriers encountered by digital health today?
- 2. What are the enablers encountered by digital health today?
- 3. What are the uncertainties (facilitating or hindering) that may occur in the future?

Those questions will help you shape the first part of the workshop - Critique phase analysis. Also, we want to register in which sector the participants work. This information is part of the reporting tool.

For virtual workshops: questions are part of the registration process.

For F2F events: each organizer will decide the best way to pose the questions to the participants in advance. Some options are to send the participants an email a few days before the workshop or to print the questions and distribute them. In any case, the facilitator should receive the answers before the workshop, with some time to prepare and add the answers to the template. Also, add to the registration a multiple choice question about the participants' type of organization, including the following types:

- 1. Education and research
- 2. Health and social care providers or professionals
- 3. Digital health companies
- 4. Policymakers
- 5. Payors digital health (investors, health insurances & others)
- 6. Third sector (digital health associations, organizations, and charities)

Once you receive the answers, analyse them, cluster whenever possible and complete slides 6, 7, and 8 of the <u>template</u>. Use one text box for each answer, as shown below. If needed,



complete the slides with internal ideas. For barriers, always present the ideas as "lack of", "gaps in" or negative adjectives/nouns (constraints, overlap, etc).



During the workshop

General recommendations

- Keep the whole workshop topic within the assigned theme, even if the questions or comments from participants are more general.
- Focus on the future, don't dwell in the past or present. We know what the problems are.
- Avoid being overoptimistic about the future. We are looking for different scenarios, also the grim ones, even if we hope for better times.
- 1. Start by explaining why are the workshops called "futures workshops" (5 min)

Because the main goal is to envision different possible futures in relation to digital health; not only one possibility but many that can happen depending on the conditions that are being imagined. The main idea is to discuss different scenarios that can happen. Our timeframe is 2030.

2. Mention that the workshop is part of a series of workshops, with different themes, plus two final workshops where a general analysis of the future of Digital Health will be made, taking into account the conclusions of the previous workshops.

Indicate also how the participants can register for the virtual workshops. Here is the link.

3. Present the agenda of the day and the objectives of the workshop using slides 3 & 4. (5 min)



Emphasize the idea that the outcomes of the workshops will contribute to the EU 2030 Agenda, and furthermore the workshop should serve as a space for dialogue between stakeholders that can be extended beyond the scope & duration of the workshop.

4. Critique phase: Reflect on the ideas presented on slides 6-8 (10 min)

If needed, ask participants to further explain some of the ideas described if needed. Note that the first two questions are asking about the PRESENT while the last question is asking about the FUTURE.

If necessary and possible, group the answers into categories to make it easier to go through them.

In slide 6, ask participants their opinion about which barrier needs to be avoided, cannot be avoided, or needs definitely to be avoided. Color the idea boxes according to the different answers.

By the end of this point, about <u>20 minutes of the workshop</u> should have passed. In case there are many ideas and participants still want to comment, the facilitator can indicate that future facilitators or barriers will be discussed in the rest of the workshop and move on.

5. Group brainstorming: Divide the participants into two groups to discuss "What digital health could look like in 2030 if there were no constraints, plenty of resources, and no restrictive laws...?"

Participants will have 15 min to draw an exaggerated picture of future possibilities using a brainwriting technique. Generally known solutions should be avoided and non-verbalized and intuitive knowledge should be enhanced. The participants should suggest solutions without reflecting on restrictions, traditions, or other barriers, that is search for unconventional solutions. At this point we are only talking about the FUTURE and what it could look like, so encourage participants to think beyond the present constraints and imagine other scenarios.

Instruct participants to choose a spokesperson from each group who will present the ideas to the rest.

After 15 min of discussion, ask participants to come back to the general group and present their ideas (5 min each group). Use the template slides 11 & 12 to take notes or ask participants to do it directly.

After the critique phase, 50 min should have passed.

6. Break: While participants take a 10 min break, the facilitator can reflect on and organize the ideas presented by the groups.

Ideally, the ideas will be separated into different categories according to what they refer to. For example: society & social determinants, technology & internet access, financial & economy, collaboration, engagement, law & regulations.

Once the ideas are categorized, the facilitator will prepare two initial scenarios (one more optimistic and the other less), consisting on 4 to 5 items that could summarise the future ideas in achievable aspects, following the concept: "Transforming the most promising ideas into scenarios, that is, they must be reduced to a possible and feasible core. Considering: increased



population coverage, improved living conditions, improved social determinants of health, etc." The idea is to come up with two possible scenarios, which may involve also some uncertainties like pandemics and wars, but include possible alternatives.

7. Scenarios: Present the two initial scenarios (or basic ideas for scenarios) and ask participants to provide ideas on what needs to happen in the near future in order to reach each of the scenarios proposed.

This exercise should take about 20 minutes.

For example, if one of the ideas for improving digital health in 2030 is that everyone in Europe should have the internet, then the scenario proposed by the facilitator could be that in 2030 internet coverage is 100% everywhere in the EU. The participants can propose for example that the provision of WiFi is a state responsibility that reaches all citizens.

At this point, we are not talking about the present or the current situation or challenges. We are only focusing on the future and what needs to be done from now on to reach this proposed future.

Ideally, the facilitator will propose one optimistic and one pessimistic scenario. Let's remember that the future will most likely be a mix of those scenarios and that the future is not always very bright - we need to be prepared for different scenarios.

In the preparatory workshop, this was done individually, but for larger groups won't be possible, so a more collaborative approach should be used.

- 8. Keep 10 minutes to draw conclusions or final comments from the participants.
- At the end, remember to encourage participants to follow CONNECTINGHEALTH's social media accounts to stay tuned about the project. They can follow us <u>on</u> <u>Linkedin</u> and <u>on Twitter</u>.



Annex 2



Project number: 101070756
Project name: CONNECTing the dots withIN diGItal HEALTH Innovation Ecosystems
Project acronym: CONNECTINGHEALTH
Call: HORIZON-EIE-2021-CONNECT-01
Type of action: HORIZON Coordination and Support Actions

Workshop Reporting Tool

Date of the workshop	DD/MM/YYYY
Type (F2F, Virtual)	
If F2F, add the details to the event	
including the link	
Organizer	
Number of participants	
Special guests (only for virtual	
events)	

Participants Analysis

Type of Organization	# participants	% participants/total
Education and research		
Health and social care providers or		
professionals		
Digital health companies		
Policy makers		
Payors digital health (investors, health		
insurances & others)		
Third sector (digital health associations,		
organizations and charities)		

Preparation Phase Results

What are the barriers encountered by (selected digital health issue) today?

Text text

What are the enablers encountered by (selected digital health issue) today?

• Text text

What are the uncertainties (facilitating or hindering) that may occur in the future?

• Text text

Critique Phase Analysis

To be avoided	To be definitely avoided	Cannot be avoided
Text text		



Ideation Phase Results

What digital health could look like if there were no constraints, plenty of

resources, and no restrictive laws...?

Group 1	Group 2

Ideal Scenarios Results

Transforming the most promising ideas into scenarios, that is, they must be reduced to a possible and realizable core.

Considering: increased population coverage, improved living conditions, improved social determinants of health, etc.

Description here

Conclusions

Add conclusions here

Recommendations and final comments

Add recommendations and final comments here

Pictures

Add at least 1 picture with the participants and 1 with the group presentations.