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Abstract

This deliverable defines the monitoring framework for the uptake of digital health practices, called “European DigitalHealthUptake Radar”. The deliverable provides a comprehensive overview of the information that will be collected in the Radar Repository, the methodology for data collection, the strategy to gather external stakeholder input, as well as the approach to analysing the expected results and featuring successful practices.

Statement of originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both. Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of DG Connect, the European Commission. Neither the European Union nor the granting authority can be held responsible for them.

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EXECUTIVE SUMMARY

This report presents the DigitalHealthUptake (DHU) Radar Monitoring Framework and Approach. The so-called “European DigitalHealthUptake (DHU) Radar” has three functions, supported by three Radar components: 1) the Radar Repository, which will serve as a one-stop-shop catalogue of digital health practices in Europe, 2) the Radar Analytics, which will aim to analyse submitted practices and draw cross-practice insights from them in easy-to-understand summaries, and 3) Radar Spotlights, showcasing specific best practice examples identified during the analysis. It especially targets three broad stakeholder categories: the supply side of digital health innovations (e.g., large companies, SMEs, universities, SDOs), the demand side (e.g., patients, healthcare providers), and the demand enabler side (e.g., policymakers, payers, procurers).

The first section describes the framework for the continuous collection and analysis of digital health practices in Europe. The DHU Radar considers multiple types of digital health practices, including mainly but not exclusively policies and strategies, solutions and services, tools and methodologies. By encompassing a broad spectrum of digital health practices, the Radar aims to also obtain information about different aspects the practice is addressing, such as technological aspects (e.g., technology maturity, functionality), institutional aspects (e.g., scope of use of the practice, scale of uptake), and behavioural aspects (e.g., whether and how the practice contributes to patient empowerment and use adherence). To ensure a common understanding of the framework’s terminology, key terms of “digital health”, “digital health practice”, “uptake”, “adoption” and “scale-up” are defined. This common understanding is vital for all subsequent activities across the DHU project.

Furthermore, this report details the catalogue elements to be captured and carefully presented publicly in the DHU Radar Repository. These elements include the type of practice, information about the entity which develops / implements it, the practice’s level of maturity and scale of uptake, the available evidence of its impact, its geographical scope, countries and languages of current deployment, and whether the practice has been submitted to another database previously. Where applicable, additional information about the digital health practice can be provided in the Radar. These concern what aspects or application areas the practice relates to (grouped into aspects relating to clinicians/care practitioners or to patients/citizens), the target audience in terms of age groups, the prevention area addressed, the use case and care pathway positioning, as well as the degree of transferability and plans for cross-border implementation of the practice. Authors of the practices submitted to the Radar as well as other stakeholders registering to the Radar can further indicate their area(s) of expertise and need for expertise. This information will help to inform the identification of priority areas for the knowledge exchange facilitated by the DHU project.

The second section of this report defines the practices collection methodology. The collection of digital health practices will be done by the DHU consortium through two different channels: leveraging on synergy projects and existing repositories and incorporating external contributions from registered users via the DHU Portal. For this channel, a template was prepared for online and offline use and is annexed to this report. The template has been promoted and made available via the DHU Portal’s Radar Repository, allowing any external stakeholder to register and submit a practice online. A call for external contributions via the DHU project and partners’ channels has been organised to foster engagement. To guide the internal data collection and provide a basis for the quality and security check of external submissions, a set of inclusion criteria have been defined. Moreover, limitations of the data collection approach and risk mitigation procedures are discussed.

Lastly, in section 3, the report outlines the procedures set up to perform the analysis of the collected information, including the method and approach of analysis and describes the plan of the presentation and dissemination of results as well as the relevance of the results for further activities in the DHU project. Thematic analysis will synthesise the submitted information in digestible format. This will take the form of Radar spotlights, which can be good practice case studies or digital success stories and a visual presentation on the DHU Portal. Furthermore, the analysis aims to identify common and emerging

topics as well as success factors and challenges to the uptake of digital health practices in Europe in order to foster knowledge exchange for addressing these aspects.

1 DHU Radar Monitoring Framework

The European DigitalHealthUptake (DHU) Radar is a key pillar of the DHU project for continuously collecting, monitoring and analysing the uptake and use of digital health and care practices in European regions, Member States and associated countries. The Radar is aligned with key policy priorities for digital health uptake, most notably the third policy priority of the “Communication on enabling the digital transformation of health and care in the Digital Single Market; empowering citizens and building a healthier society”¹ which is encouraging the uptake of digital tools for citizen empowerment and for person-centred care. As a monitoring framework, the Radar provides the basis for facilitating and strengthening cooperation and knowledge exchange on priority topics, with a focus on the successes and challenges regarding the uptake of digital health practices in Europe. As such, the information collected by the Radar is vital for subsequent project activities.

This section describes the key characteristics of the DHU Radar Monitoring Framework for consolidating the landscape of digital health practices in Europe. These practices cover mainly but not exclusively policies and strategies, solutions and services, tools and methodologies. The approach to monitoring the uptake of digital health practices is depicted in Figure 1 below.

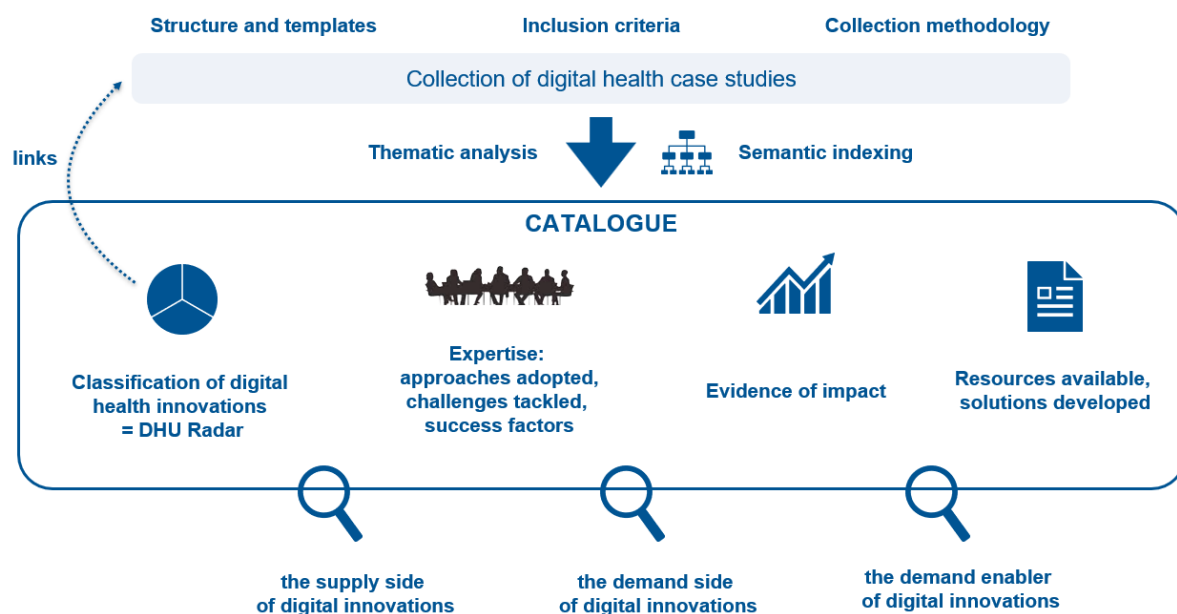


Figure 1. Approach to monitoring the uptake of digital health practices (DHU Radar)

The DHU Radar Monitoring Framework facilitates the collection of a large number of digital health practices as a one-stop-shop catalogue, also called Radar Repository. The main focus of the Radar Repository is digital health and care solutions. However, its ambition is to go beyond technological aspects by also analysing dimensions such as institutional (e.g., scope of use of the practice, scale of uptake) and behavioural (e.g., whether and how the practice contributes to patient empowerment and use adherence) aspects which influence the uptake of digital health practices. The Radar Repository also collects information on evidence of impact, opportunities, and investment gaps. The evolutive maintenance of the Radar throughout the course of the DHU project will be ensured thanks to the continuous collection and screening of new practices, developments, and emerging trends, as well as the update of existing information.

¹ COM(2018) 233 final. Communication on enabling the digital transformation of health and care in the Digital Single Market; empowering citizens and building a healthier society.

The Radar Repository will serve as an up-to-date resource library on digital health practices for three broad categories of stakeholders: the supply side of digital health innovations (e.g., large companies, SMEs, universities, SDOs), the demand side (e.g., patients, healthcare providers), and the demand enabler side (e.g., policymakers, payers, procurers). There is a need to deliver value to each of these stakeholder groups to ensure their engagement and receive their feedback during the development of the catalogue. Highlighting the added value of the Radar for these stakeholder groups is also vital for distinguishing the Radar Repository from other existing repositories of digital health solutions.

The different types of information collected in the Radar, the approach to data collection and analysis and the strategy for engaging external stakeholders are described in the following sections.

1.1 Key terms and concepts

A common understanding of key terms and concepts is the basis for the development and application of the DHU Radar Monitoring Framework, as well as any other activities across WPs in the DHU project's lifecycle. This is especially necessary given that the demand and supply side stakeholders may have a different understanding of some key concepts. The DHU consortium has created a dedicated glossary of terms and concepts that is planned to be implemented as an online, searchable database. Among the most relevant concepts related to the Radar are digital health and digital health practices, their uptake, scale-up and adoption, as well as their maturity and large-scale deployment in Europe. These and other terms can be found in the glossary, expected to be available on the DHU website in May 2023.

1.2 Elements in the DHU Radar

The DHU Radar has three different functions supported by three components, the **Radar Repository**, the **Radar Analytics** and the **Radar Spotlights**.

The Radar Repository categorises the submitted digital health practices according to a set of criteria. The type of practice, its level of uptake, maturity and deployment are mandatory fields which can be complemented by additional (optional) more detailed elements.

This section presents a detailed overview of the different sections of the practice collection template.

The Radar functions will be constantly monitored and updated over time if appropriate.

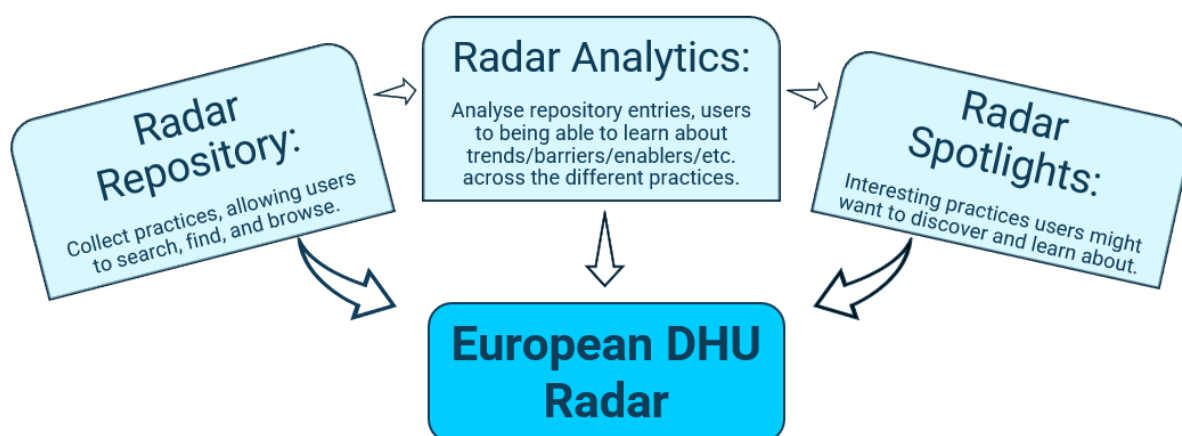


Figure 2. Overview of Radar components

1.2.1 Information on digital health practices

The type of information collected for a given practice has been discussed and agreed among the DHU consortium in several iterations. It was important to find a balance in the amount of information and time a stakeholder is willing to dedicate to the practice submission, and the necessary minimum level

of information that can be meaningfully analysed by DHU partners in order to derive insights that are of interest to the DHU community. Practices submitted to the Radar Repository are described via eleven main elements (questions) and seven additional elements.

Main elements

Firstly, the DHU Radar Monitoring Framework differentiates between four broad **types of digital health practice**:

- ▶ Policy and strategy in relation to digital health solutions or services
- ▶ Digital solution and service (e.g., application, digital health portal, platform, AI based system, etc.)
- ▶ Supporting tool and methodology for upscaling digital health solutions or services (e.g., management tool, impact assessment tool and methodology, ...)
- ▶ Other practices to be specified by the developer or implementer of the practice.

Secondly, a **short description** of the practice concerned will provide more information on its development, the target audience, functionality and intended use, as well as conditions for its use or application by third parties (e.g., licence agreement, etc.). Additionally, the developer and/or implementer of the practice will be clearly indicated, and identifiers or links to resources may be provided. Information about the developer/implementer (person, organisation) of the practice needs to be provided also.

Thirdly, information on the **maturity level** will be collected. This includes the classification of practices (applicable for digital solutions and services) in four maturity levels, if applicable: i) the practice/tool is “on the market” and integrated in routine use; ii) there is evidence for economic viability and/or benefits to the target group but further research/development is needed; iii) proof of concept is available and the solution works in a test environment; and iv) the idea has been formulated and/or research and experiments are underway to test a proof of concept. While the Radar Repository will publish practices of all maturity levels, only maturity level i) and ii) will be considered for the analysis.

Additionally, the practice’s **geographical scope** in terms of **countries** of current deployment and potential future deployment on a local, regional, national, or European level will be gathered. The **language(s) for which** the practice is currently available is also indicated.

One will also be asked to determine the **scale of uptake** (applicable for digital health solutions and services) quantified in terms of numbers of sites or end-users (i.e., patients, care providers) reached or planned to reach. If available, evidence on impact and economic value of the digital health solution and service will also be collected in terms of health outcomes, citizen empowerment, the economic value for both patients and health care, as well as its potential for increasing the capacity and resilience of the health system. This will also allow identifying cases where support in gathering this evidence could be provided.

Finally, one is also required to specify if the practice has previously been submitted to any other database or repository that is publicly available.

Additional elements

Additional information is especially relevant for practices that are sufficiently mature (level 3 or 4) and which will be further evaluated by the DHU project towards creating Radar Spotlights. This information can be provided through the practice submission as optional answers to some questions, but if left empty, the DHU team might contact the practice owner when performing the analysis.

As the Radar addresses a policy priority of person-centred digital health solutions, one of the optional questions aims to classify the practices according to their relation to key stakeholder end-users: i) clinicians / care practitioners; and ii) patients / citizens. For each group, we have listed the main solutions developed to date. They are listed in the table below:

Table 1. Classification of digital health solutions by primary target users

Related to clinicians / care practitioners	Clinician decision support
	Health data analytics (Artificial Intelligence, algorithm development and calibration, machine learning, risk stratification tools, etc.)
	Care pathway tracking and adherence
	Clinical team care planning and collaboration tools (e.g., digital shared care plan)
	Alerting systems for abnormal test results
	Escalation systems tracking home monitoring data streams
	Virtual reality surgery
	eLearning for workforce development
	ICT support for management of frailty, and/or falls prevention
	ePrescription solutions
	Regional and national Electronic Health Record systems
	Regional, national and local Integrated Care Record systems
Other	
Related to patients / citizens	Health data analytics (Artificial Intelligence, algorithm development and calibration, machine learning, risk stratification tools, etc.)
	Sensors, wearable devices
	Telehealth and telemedicine
	Remote monitoring apps, health outcomes tracking
	Personalised prevention apps
	Digital tools to support health education (health literacy) and digital health literacy
	Robotics (e.g., companion robots)
	Smart homes, independent living support, ambient assisted living technologies
	Health promotion, wellness apps and wearables, virtual coach
	Reminders, alerts
	Digital tools to support patient feedback and reporting of outcomes and experiences
	Self-management, ICT supporting adherence to medication and care plans
	Home care
	Smart workplaces
Other	

When appropriate, optional details on the target population and use case can additionally be presented.

For the use case description, we want to be able to better filter prevention and care indications. The list of **areas of (primary) prevention** covered by practices will be constantly updated starting with as nutrition and diet, fitness and physical activity, education, screenings, mental health, environment. The same approach will be followed for the **care pathway positioning** of the practice, starting with treatment; disease monitoring, treatment compliance, self-management; early detection and diagnosis, precision diagnosis; prevention and wellness; rehabilitation; functional support and independent living;

patient or citizen communities, self-help and mentoring; public health surveillance and tracking; COVID-19 monitoring and care guidance; clinical trial data collection; reuse of data for research.

Lastly, additional information on the **connectivity** of a solution with regional and/or national services (e.g., whether the solution is a standalone app, or whether it requires data from other services and systems like and Electronic Health Record to function as intended), the degree of **transferability** (to other locations, regions or national scale in the same country), as well as potential **plans for cross-border implementation** can be added.

1.2.2 Continuous review of elements and Radar updates

The Radar elements will be reviewed periodically based on feedback received through the community of stakeholders that are using the Radar to submit their practices. In addition, the DHU consortium aims to continuously improve the experience of using the Radar and has already taken note of several possible improvements, including:

- the ability to enter keywords per practice, based on a predefined list of keywords
- showing pages of practices, i.e. showing only 10 pages at a time to avoid endless scrolling once more practices are added
- using a label to mark practices that are being added through collaboration with other repositories

1.2.3 Information on DHU Radar users

The DHU Radar Repository allows any stakeholder to register as a user via the DHU Portal. The functionality supporting the creation of a user profile has two aims:

- 1) Ensure direct ownership and provide a contact for the submitted practice, and allow a transfer of the ownership as well as later updating of the submitted information by the owner if needed.
- 2) Allow the user to Indicate his/her area of expertise and/or needs for expertise. The information will be used to facilitate the work of other DHU activities, such as identifying priority topics to be tackled by the DHU communities in work package 3, or proposing possible matchmakings and partnerships towards conducting twinning activities in work package 4.

The following fields are mandatory when registering via the DHU Portal: name, organisation, email. Optional fields include a link to a website, LinkedIn or Twitter, and expertise areas. The pre-listed areas of expertise considered cover key aspects of digital transformation and health data management as described in table 2. Users can propose additional expertise areas other than the pre-listed ones.

Table 2. DHU Radar user expertise areas

Digital transformation	Health data management
ICT product requirements specification and tendering	Interoperability standards, mappings
Innovative procurements	Data quality benchmarking
Financing models	FAIR data management
Product assessments, approvals, reimbursements	Decision support, AI
Legacy system migration	Consent management
Infrastructures	HCP registers, access controls
Cybersecurity	Data sharing and data access permissions
Care pathway transformation	Data protection policies and measures
Patient self-management and risk management	Governed information flows

Prevention and wellness tools and programmes	Digital health infrastructure
Digital and data education for citizens, patients, professionals, others	Health data spaces, data reuse

1.2.4 Guiding resources

Additional attention will be placed on identifying resources (e.g. published documents, reports, strategies, presentations, scientific papers) for i) contextualising the uptake of digital health solutions, and ii) documented guidance (e.g., blueprints) supporting digital health transformation through a combination of particular elements. These resources may be made available for sharing and reuse by other relevant stakeholders in the DHU communities where possible. While the focus will be on documents available in English, the project will aim to take into account also resources in national languages which can be translated automatically with an acceptable level of quality.

Stakeholders submitting such information to the DHU Radar Repository are asked to provide an object identifier, including Digital Object Identifier (DOI), International Standard Book Number (ISBN), and/or a URL to access the respective resource(s) online.

2 Collection methodology

The information on relevant digital health solutions and resources feeding into the DHU Radar Repository will be identified through desk research conducted by consortium members as well as through input from external stakeholders submitted via the collection template. The methodology applied for collecting information is outlined in the following sections.

2.1 Collection template

Based on the monitoring framework, a template was prepared to facilitate the collection of digital health practices and relevant additional information in offline and online formats. The collection template for digital health practices is presented in the Annex.

The collection template was developed by the work package 2 lead and refined based on feedback from DHU consortium partners. Before making the Radar public, the collection template was tested with consortium partners' established contacts from the demand and supply side as both can be owners or users of practices. The collection template for digital health practices is available on the DHU Portal (digitalhealthuptake.eu/radar/) and is now being promoted, allowing any external stakeholders to register as Radar users and submit content online.

2.2 Approach to the collection of digital health practices

Based on the template prepared, the data collection will be done both by the DHU consortium partners and by external stakeholders. The direct submission by external stakeholders is preferred because this process is more likely to convince the contributor to take ownership and provide updates about the digital health practice at later stages.

The collection will be possible via two channels – either via an offline (Word) form or via online submission on the DHU Portal. For the latter, the user will be able to register and fill in the online form. Users will be able to login, provide additional information in their profile, and add and maintain multiple digital health practices.

The DHU Radar Repository will include practices of all maturity levels. However, only practices of the maturity levels 3) and 4) will be considered during the Radar Analytics. The level of maturity of a practice will be assessed as:

- 1) The idea has been formulated and/or research and experiments are underway to test a 'proof of concept';
- 2) Proof of concept is available: it works in a test setting and the potential end-users are positive about the concept;
- 3) There is evidence for economic viability and/or of benefits to the target group of the practice. Further research and development is needed for routine use;
- 4) The practice/case/tool is "on the market" and integrated in routine use. There is proven market impact, in terms of job creation, spin-off creation or other company growth.

Thus, solutions or services that are in the planning or early testing stages do qualify for inclusion in the Radar Repository but will not be analysed.

All gathered information will be collated in a Microsoft Excel spreadsheet accessible and editable by all consortium partners for further analysis.

The target number of screened and identified digital health practices was set at 3,000. DHU is aware that this is an ambitious target for a new initiative and relies on strong dissemination of the Radar through various European Commission channels, partners' networks, and synergies with other projects and initiatives. Promoting the Radar is a continuous activity in the project and will be reported in D5.3.

2.2.1 Screening

The consortium will conduct desk research for screening and collecting publicly available information on successfully implemented digital health practices using the collection template as a reference. The data collection will leverage the dissemination channels mentioned above in order to promote the Radar Repository to owners or potential users of practices.

Specifically, the study team will liaise with owners of established repositories and, where possible, directly with owners of successful digital health implementation cases. Through events planned in work package 3, DHU will aim to engage with these stakeholders at a deeper level in order to understand how the practices have become successful, what the owners require in order to scale them up or introduce them across borders, and other topics of relevance for uptake of digital health practices. This approach will allow the partners involved in the data collection to validate the quality of information, label it as “proven successes” and present the practices in a prioritised way to the demand side. Success cases that have been submitted by the DHU consortium partners from key sources can be later easily transferred directly to the owners of the practices (this requires that the owners register an account), allowing them to update the entered information if needed.

The initial collection of these successful practices by the DHU team will also be an incentive for external stakeholders to provide their individual contributions. The list below represents a first list of the key sources that will be consulted in the desk research:

- ▶ DigitalHealthEurope catalogue of mature digital health solutions and initiatives²
- ▶ EIP on AHA Repository of Innovative Practices³
- ▶ European mHealth Hub resources⁴
- ▶ EIT Health⁵
- ▶ CORDIS (H2020 and FP7 projects)⁶
- ▶ AAL projects⁷
- ▶ IMI projects⁸
- ▶ eHealth Network publications
- ▶ National-level and regional-level strategies and reports
- ▶ EU institutional reports (Communications, directives and regulations, reports)
- ▶ Journals (e.g., Medline, International Journal for Integrated Care)
- ▶ Other international resources (e.g., by WHO, ECDC)

2.2.2 External contributions

Once the Radar will have been populated with a number of successful cases collected during the screening phase, those initial examples will be highlighted when launching and promoting the call for external contributions as individual submissions to the Radar Repository. The call is co-led by demand (RSCN) and supply side (DIGITALEUROPE) partners to ensure sufficient and proportionate outreach in collaboration with work package 5: Communication, Dissemination, and Outreach. The call will allow for any owner, user or researcher of digital health and care practices to report on their activities by filling in the online form with pre-defined fields featured on the DHU Portal (see Annex).

Before any external information is made publicly available in the Radar Repository, the responsible consortium member validates the information for a quality and security check. The uploaded information from external contributions will be highlighted as submitted and owned by authors other

² <https://digitalhealtheuropa.eu/catalogue/>

³ <https://futurium.ec.europa.eu/en/active-and-healthy-living-digital-world/library/eip-aha-repository-innovative-practices>

⁴ <https://mhealth-hub.org/health-apps-repositories-in-europe>

⁵ <https://eithealth.eu/>

⁶ <https://cordis.europa.eu/projects/en>

⁷ <https://www.aal-europe.eu/projects-main/>

⁸ <https://www.imi.europa.eu/>

than the DHU consortium. All practices of high maturity will eventually will be assessed by the consortium (i.e., Radar Analytics) and may be selected and promoted as a success story or good practice case (e.g., by adding a tag) along with those identified during the screening phase (i.e., Radar Spotlights).

The WP2 and WP5 partners have jointly prepared a communication package for the call for external contributions. The package contains promotional material to be disseminated by all partners via their own channels and the DHU media channels (e.g., LinkedIn, Twitter, news item on the DHU Portal). DHU partners will contact various stakeholders such as European SMEs or start-ups working on new digital health solutions through the partners' networks. Examples include F6S's network of over 4 million SMEs, DIGITALEUROPE's eHealth Working Group, European procurers through the Procure4Health network, as well as policy makers, academic institutions, and other stakeholders.

To incentivise the engagement of stakeholders, the call for external contributions emphasises the benefits of sharing information for specific stakeholders from a marketing perspective (e.g., exchange between supply and demand sides, participation in webinars) and for the purpose of mutual learning (e.g., about success factors). Specifically, the DHU partners will consider showcasing selected entries in the Radar via social media channels on a monthly basis. Another incentive includes being informed about twinning/funding opportunities.

Prior to the call for external contributions, the WP2 lead prepared some Radar Repository entries in collaboration with partners focusing on a few successful practices by (re-)connecting with solution owners (e.g., F6S COVID-X, EIP on AHA repository, DHE catalogue), thereby providing external stakeholders interested in the Radar with good practice examples.

The Radar promotional campaign was launched in the beginning of April 2023. The timeframe of the activities from the first draft collection template and technical implementation of the Radar via the DHU Portal to the call for external contributions is detailed below.

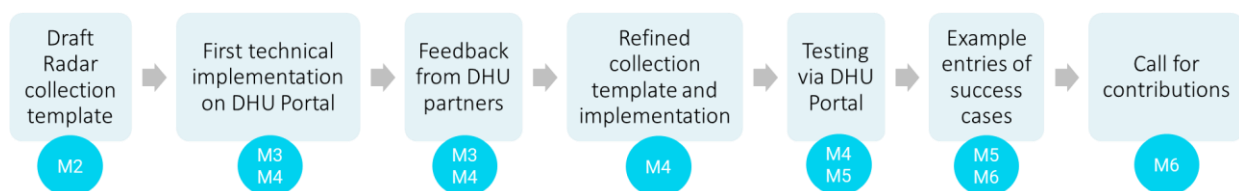


Figure 3. Steps to DHU Radar implementation

2.3 Limitations and risk mitigation

During the data collection stage, the partners involved will be in close contact to discuss progress and specific cases, as well as react to any challenges (technical, conceptual) stakeholders might experience when submitting practices to the Radar Repository.

Should a low number of responses be received from external stakeholders during the data collection for the DHU Radar, consortium partners will put more efforts into a comprehensive and targeted promotion of the call for data collection. Additionally, synergies with other European initiatives and projects, such as the new Partnership on Transforming Health and Care, as well as other multipliers in the consortium's network, will be utilised.

Stakeholders responding to the survey, especially innovators, may be reluctant to provide specific information. In case of gaps or outdated publicly available information collected during the screening phase, or in content received from external contributions, there will be efforts to close these gaps and update the information where possible. Those efforts will consist in direct interactions with practice owners, asking them to update and correct given information (this will be the case for example for all pre-filled information collected by the consortium partners). The owners who make their solutions and practices available on the DHU Portal will be encouraged to update the information regularly, making

the Radar an interactive tool to monitor the progress of development of uptake of those solutions. Further, users will be encouraged to participate in WP3 to address any existing gaps and plan activities that can help to fill these (e.g., carrying out a cost-effectiveness assessment to measure the impact).

A limitation is that much of the information underlying the assessment of maturity may in many cases be self-reported by individuals directly involved in the development, implementation or maintenance of the practice in question. Thus, the data collection does not rely on independent assessments, which may ultimately affect the results drawn from the analysis, for instance in terms of intervention areas that could be prioritised.

3 Analysis

The results of the external contributions will be analysed by the consortium together with the results of the consortium partners' screening of digital health practices in the second Radar component: Radar Analytics. The aim of the data analysis is to:

- 1) Consolidate existing knowledge and synthesise it into easy-to-understand, accessible information;
- 2) Promote solutions and good practices via the DHU portal;
- 3) Foster further knowledge exchange among practice owners, leading to new partnerships and collaboration;
- 4) Address new or emerging topics which require further discussion with key stakeholders.

The collected information will be analysed, consolidated, and presented according to different focus areas. Between 5-10 focus areas shall be addressed in the monitoring and analysis of the uptake and integration of digital health practices. The analysis may include dimensions such as:

- ▶ An overview of digital health practices in regions, Member States and associated countries;
- ▶ The economic value and impact of the solutions to both patients and health and care systems;
- ▶ A presentation of barriers and success factors for uptake, including examples of good practice;
- ▶ An overview of available indicator tools and toolkits, such as tools to measure the solutions' uptake, assess their impact, maturity, degree of policy integration, health information reliability, required skills and literacy to ensure end-users (e.g., patients, health professionals, informal caregivers, etc.) are empowered, etc.;
- ▶ An analysis of investment gaps, opportunities, and good examples of cost-effective implementation, financing and reimbursement models.

Thematic analysis and semantic indexing will be applied to analyse the explicit content of the collected information. A compilation of keywords or terms most frequently represented can provide an indication on the specific contents covered by the digital health practices. In addition to the search function of the DHU Radar Repository via the DHU Portal, four general filters can be applied in the Radar Repository: type of practice, maturity level, country, and geographical scope.

The results of the Radar analysis will be made publicly available and promoted via the DHU Portal as Radar Spotlights, packaged into sharable and easily digestible items and visual presentation. These may take the form of a collection of "good practice" tags and case studies as well as a showcase of tools and links to further support materials. Depending on the collected information, the visual presentation may consider the development of an interactive map of practices deployed in the Member States and associated countries, as well as a visual representation of frequencies (e.g., of the types of digital health practices submitted, the use cases of solutions and services, etc.). The visual presentation of the results in the form of Spotlights will help to add more value to the Radar and distinguish it from other existing repositories.

The results are also taken up further to derive priority intervention areas that have a high potential to accelerate implementation, deployment and scaling up of digital health practices. The identification of common topics to work on as well as common barriers and challenges that need to be overcome, e.g., through a structured exchange of good practices and agreement on common approaches in WP3, is a major output of the analysis. The presentation of digital success stories will also be leveraged on in WP3. The organisations and consortia which have submitted the digital health practices are also potential candidates for the tailored support services designed under task 4.3, and the twinnings (task 4.2) aiming at knowledge exchange to improve the transferability and market access of digital health practices which contribute to large-scale deployment.

The figure below serves as a summary of the processes behind the DHU Radar.



Figure 4. DHU Radar: Collection, analysis, and continuous monitoring

ANNEX: DHU Radar collection template for online and offline use

As implemented at the launch of the Radar in April 2023.

European Digital Health Uptake (DHU) Radar

The European DHU Radar collects digital health resources, henceforth called practices, with a particular focus on digital health solutions. The Radar serves as a one-stop-shop catalogue of digital health solutions and services, but also strategies and policies, supporting tools, methodologies, and other types of resources on the uptake of digital health practices in Europe.

User Registration

You need to create a user account to submit and make your digital health practice publicly available to the DHU community in the Radar.

As a user, you will take ownership of your submitted content and can provide updates at later stages. Your contribution will be verified before publication.

- ▶ Email*
- ▶ First Name*
- ▶ Last Name*
- ▶ Organisation*
- ▶ Password*
- ▶ Confirm Password*

* Mandatory field

Additional Information:

- ▶ Website
- ▶ LinkedIn
- ▶ Twitter

Please indicate your area(s) of expertise and/or interest to learn.

Area(s) of expertise:	Need for expertise:	
<input type="checkbox"/>	<input type="checkbox"/>	ICT product requirements specification and tendering
<input type="checkbox"/>	<input type="checkbox"/>	Innovative procurements
<input type="checkbox"/>	<input type="checkbox"/>	Financing models
<input type="checkbox"/>	<input type="checkbox"/>	Product assessments, approvals, reimbursements
<input type="checkbox"/>	<input type="checkbox"/>	Legacy system migration
<input type="checkbox"/>	<input type="checkbox"/>	Infrastructures
<input type="checkbox"/>	<input type="checkbox"/>	Cybersecurity
<input type="checkbox"/>	<input type="checkbox"/>	Care pathway transformation
<input type="checkbox"/>	<input type="checkbox"/>	Patient self-management and risk management
<input type="checkbox"/>	<input type="checkbox"/>	Prevention and wellness tools and programmes

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Digital and data education for citizens, patients, professionals, others |
| <input type="checkbox"/> | <input type="checkbox"/> | Interoperability standards, mappings |
| <input type="checkbox"/> | <input type="checkbox"/> | Data quality benchmarking |
| <input type="checkbox"/> | <input type="checkbox"/> | FAIR data management |
| <input type="checkbox"/> | <input type="checkbox"/> | Decision support, AI |
| <input type="checkbox"/> | <input type="checkbox"/> | Consent management |
| <input type="checkbox"/> | <input type="checkbox"/> | HCP registers, access controls |
| <input type="checkbox"/> | <input type="checkbox"/> | Data sharing and data access permissions |
| <input type="checkbox"/> | <input type="checkbox"/> | Data protection policies and measures |
| <input type="checkbox"/> | <input type="checkbox"/> | Governed information flows |
| <input type="checkbox"/> | <input type="checkbox"/> | Digital health infrastructure |
| <input type="checkbox"/> | <input type="checkbox"/> | Health data spaces, data reuse |
| <input type="checkbox"/> | <input type="checkbox"/> | Other (please specify) |

Add your digital health practice/solution

Please provide a short title for the practice: *

What is the type of practice you are submitting? * [Single choice]

- Policy and strategy
- Digital solution and service (e.g., application, digital health portal, ...)
- Supporting tool and methodology (e.g., monitoring tool, impact assessment tool and methodology, ...)
- Other (please specify, e.g., guidance for change management, care pathway redesign, business alignment, interoperability framework etc.)

Please specify other type of practice below.

Please describe the practice (max. 500 words). Consider the following information: *

- What is the practice about?
- When was it developed and by whom?
- What is the intended audience?
- How the practice be used / how does it function?
- Who might be interested in learning about or wish to use / apply it?
- What are the conditions for using / applying it (e.g., free, license agreement, etc.)?
- If applicable, please provide an identifier (e.g., ISBN, DOI, URL).

Who is the developer/implementer of the practice (name of person, organisation, and/or URL)? *

What is the maturity of the practice?* [Single choice]

- The idea has been formulated and/or research and experiments are underway to test a “proof of concept”
- Proof of concept is available: it works in a test setting and the potential end-users are positive about the concept
- There is evidence for economic viability and /or of benefits to the target group of the practice. Further research/development is needed for routine use.
- The practice/case/tool is “on the market” and integrated in routine use. There is proven market impact, in terms of job creation, spin-off creation or other company growth.
- Not applicable

Please use free text to elaborate on the maturity of the practice.

Please indicate the countries where the practice is currently deployed: * [Multiple choice]

- | | | | |
|-----------------------------------|--|--------------------------------------|--|
| <input type="checkbox"/> Austria | <input type="checkbox"/> France | <input type="checkbox"/> Lithuania | <input type="checkbox"/> Slovenia |
| <input type="checkbox"/> Belgium | <input type="checkbox"/> Germany | <input type="checkbox"/> Luxembourg | <input type="checkbox"/> Spain |
| <input type="checkbox"/> Bulgaria | <input type="checkbox"/> Greece | <input type="checkbox"/> Malta | <input type="checkbox"/> Sweden |
| <input type="checkbox"/> Croatia | <input type="checkbox"/> Hungary | <input type="checkbox"/> Netherlands | <input type="checkbox"/> Switzerland |
| <input type="checkbox"/> Cyprus | <input type="checkbox"/> Iceland | <input type="checkbox"/> Norway | <input type="checkbox"/> Türkiye |
| <input type="checkbox"/> Czechia | <input type="checkbox"/> Ireland | <input type="checkbox"/> Poland | <input type="checkbox"/> United Kingdom (please specify) |
| <input type="checkbox"/> Denmark | <input type="checkbox"/> Italy | <input type="checkbox"/> Portugal | <input type="checkbox"/> Other (please specify) |
| <input type="checkbox"/> Estonia | <input type="checkbox"/> Latvia | <input type="checkbox"/> Romania | |
| <input type="checkbox"/> Finland | <input type="checkbox"/> Liechtenstein | <input type="checkbox"/> Slovakia | |

Please use free text to provide details about the selected options (e.g., specify what countries in the UK) or add further countries.

Please indicate the geographical scope of the practice in terms of current deployment:* [Single choice]

- Local
- Regional
- National
- European

International

Please use free text to provide details about the selected option. Also consider whether the practice could theoretically be used in any other European country.

Please indicate the language(s) the practice is available in.*

If applicable, please comment on the scale of uptake of your practice (e.g., number of sites, users reached/planned to reach). *

If applicable, for which of the following aspects is evidence available in support of the practice?
[Multiple choice]

- Impact on health outcomes
- Economic value to health and care systems
- Economic value to patients
- Impact on the health system's capacity and resilience (e.g., health and care efficiency, continuity of care)
- Contribution to citizen empowerment
- No impact-related evidence is currently available

Please use free text to provide details about the selected options or add further aspects.

* mandatory field

Have you submitted this practice in any other database or repository of digital health resources that is publicly available (apart from your organisation's own website/portal)? If yes, please provide a reference to the database (e.g., URL, name) *

Additional form fields

If applicable, please indicate which of the following aspects the practice relates to. [Multiple choice]

Related to clinicians / care practitioners:

- Clinical decision support
- Health data analytics (Artificial Intelligence, algorithm development and calibration, machine learning, risk stratification tools, etc.)
- Care pathway tracking and adherence

- Clinical team care planning and collaboration tools (e.g., digital shared care plan)
- Alerting systems for abnormal test results
- Escalation systems tracking home monitoring data streams
- Virtual reality surgery
- eLearning for workforce development
- ICT support for management of frailty, and/or falls prevention
- ePrescription solutions
- Regional and national Electronic Health Record systems
- Regional, national and local Integrated Care Record systems
- Other (please specify)

Please use free text to provide details about the selected options or add further aspects.

Related to patients / citizens:

- Remote monitoring apps, health outcomes tracking
- Sensors, wearable devices
- Telehealth and telemedicine
- Health outcomes tracking
- Personalised prevention apps
- Health promotion and wellness apps and wearables, virtual coaches
- Health data analytics (Artificial Intelligence, algorithm development and calibration, machine learning, risk stratification tools, etc.)
- Robotics (e.g., companion robots)
- Smart homes, independent living support, ambient assisted living technologies
- Smart workplaces
- Digital tools to support health education (health literacy), digital health literacy
- Reminders, Alerts
- Digital tools to support patient feedback and reporting of outcomes and experiences
- Self-management, ICT supporting adherence to medication and care-plans
- Home care
- Other (please specify)

Please use free text to provide details about the selected options or add further aspects.

If applicable, please indicate the practice's primary target patient group (age). [Multiple choice]

- Young children (0-4)
- Children (5-14)
- Youth and young adults (15-24)
- Adults (25-64)

- Older adults (65+)
- May be used across all patient ages

If applicable, please indicate the prevention area(s) addressed. [Multiple choice]

- Not applicable
- Nutrition and diet
- Fitness and physical activity
- Education
- Health screenings
- Vaccination and immunisation
- Mental health
- Environment (e.g., housing, workplace)
- Other (please specify)

Please use free text to provide details about the selected options or add further aspects.

If applicable, please indicate the use case / care pathway positioning of the practice. [Multiple choice]

- Treatment
- Disease monitoring, treatment compliance, self-management
- Early detection and early diagnosis, precision diagnosis
- Prevention and wellness
- Integrated care pathways
- Functional support and independent living (e.g., for frailty)
- Patient or citizen communities, self-help and mentoring
- Rehabilitation
- Public health surveillance, tracking
- COVID-19 monitoring and care guidance
- Clinical trial data collection
- Reuse of data for research

If applicable, to what extent is the practice ready to be transferred? [Single choice]

- Transferability has not been considered in a systematic way.
- Ready for transfer, but the practice has not been transferred yet.
- The practice has been transferred in other locations, regions or national scale in the same country.

Do you have plans for cross-border implementation? [Single choice]

- Implemented and deployed cross-border

- Have been developed but not implemented
- Are considered and will be developed in the near future
- Have not been considered and will not be developed in the near future

If applicable, please comment on the connectivity of the practice with regional and/or national services.