IMPROVE

Framework to IMPROVE the Integration of Patient Generated Health Data to Facilitate Value Based Healthcare

D3.8: Data Dashboard V2

Version 1.0

Authors:
Liss Hernández (UPM),
Manuel Ottaviano (UPM),
Diego Carvajal (UPM),
Giuseppe Fico (UPM)

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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This deliverable contains original unpublished work except where clearly indicated otherwise.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.

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Abbreviations and Acronyms

AI	Artificial Intelligence
CRS	Chronic rhinosinusitis
EHRs	Electronic Health Records
KPIs	Key Performance Indicators
LLMs	Large Language Models
MD	Macular Degeneration
MRI	Magnetic Resonance Imaging
MS	Multiple Sclerosis
PESTLE	Political, Economic, Social, Technological, Legal, and Environmental
PGHD	Patient-Generated Health Data
PPI	Patient Preference Information
PREMs	Patient-reported experience measures
PROMs	Patient-reported outcome measures
QoL	Quality of Life
SWOT	Strengths, weaknesses, opportunities and threats
UC	Use Case
UCD	User Centred Design
VBHC	Value-Based Healthcare

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Executive summary

This deliverable presents the second version of the IMPROVE dashboard design, expanding upon the initial work described in D3.5. It reflects the progress made through iterative, user-centred development and a collaborative co-creation process involving the project partners responsible for the Use Cases.

The dashboard is conceptualised as a modular, flexible tool designed to support multi-level assessment of digital health interventions in line with Value-Based Healthcare (VBHC) principles. It integrates functionalities for study characterization, data management, comparative analysis, and strategic decision support, enabling the structured use of Patient-Generated Health Data (PGHD) across retrospective and prospective studies.

This document introduces updated low-fidelity mockups, refined workflows, and a broader understanding of the dashboard's application to real-world clinical contexts. These developments are the result of dedicated workshops and bilateral meetings with Use Case partners, ensuring that both clinical and technical perspectives are captured.

The deliverable also provides an overview of the clinical studies involved, organised by disease area, and presents a mapping of stakeholder perspectives and assessment levels. A validation plan and development roadmap outline the next steps for transforming the prototype into a high-fidelity, fully functional tool that meets the needs of patients, clinicians, healthcare systems, and industry stakeholders.

Keywords: Dashboard, co-creation process, Use cases, low-fidelity mockups

1. Methodology for dashboard definition and design

1.1. Overview of the methodological approach

The definition and evolution of the IMPROVE dashboard have been firmly grounded in a User-Centred Design (UCD) methodology, in line with the foundations laid out in D3.5. This methodological framework ensures that end users remain at the core of all design and development activities, fostering the creation of a dashboard that is relevant, usable, and aligned with the practical realities of healthcare delivery.

This second phase of development has built upon the initial work by deepening user engagement, refining technical and clinical requirements, and initiating the validation of preliminary dashboard concepts. While D3.5 introduced the first iteration of the methodology with a strong emphasis on exploration and requirement gathering, the present phase—reported in this deliverable—focuses on consolidation, stakeholder feedback integration, and functional refinement.

The UCD methodology applied here combines iterative prototyping, collaborative co-design, and continuous validation loops. It aims to reduce the gap between technical development and clinical applicability by enabling users—notably, healthcare professionals and technical stakeholders involved in each Use Case (UC)—to shape and validate the dashboard as it evolves.

1.2. Iterative co-creation process

A critical milestone of this co-design process was the IMPROVE consortium workshop held in Madrid in November 2024, which brought together key clinical and technical partners responsible for the UCs. This session marked the beginning of an intensive co-creation phase focused on adapting the dashboard to the specificities of the studies planned in WP5.

During the workshop, UC partners were requested to provide structured information to support the design of tailored functionalities. The input template was structured around the following key elements:

- Rationale of the study and expected clinical and organizational impacts.
- Alignment with IMPROVE's project goals, in terms of evidence generation, patient engagement, and VBHC implementation.
- Definition of assessment level(s) (service, intervention, technology) and corresponding outcome measures.
- Data sources (e.g. clinical records, Patient-reported outcome measures (PROMs) / Patient-reported experience measures (PREMs), technology-generated data) and technological components involved.
- Analytical needs and data visualisation expectations: including desired indicators, comparison mechanisms, and insights to be extracted.
- Stakeholder mapping, distinguishing between those involved in the execution of the studies/pilots and those expected to benefit from the insights produced by the dashboard.

This participatory session served to consolidate a shared understanding of the dashboard's purpose and functionalities and laid the foundation for further work with individual UCs.

Following the workshop, dedicated bilateral meetings were held with each of the UC partners. These one-on-one sessions served to:

- Clarify and deepen the information provided during the workshop.
- Gather detailed clinical workflow descriptions, specific data dictionaries, and questionnaire structures.
- Understand the data collection processes, including distinctions between retrospective and prospective data availability.
- Present a preliminary dashboard architecture and workflow, and collect first validation feedback from the UC leaders regarding functionality, integration needs, and usability.

This close engagement made it possible to refine the design based on concrete needs, identify feasibility constraints early, and adapt expectations accordingly.

1.3. Stakeholder involvement and feedback loops

The co-creation process involved a broad range of stakeholders representing both clinical and technical domains across multiple institutions. Specifically, the following partners were engaged in the dedicated co-design and validation process (Table 1).

Table 1 Clinical and technical partners are involved in the Use Cases.

Disease area	Use Case	Clinical partners	Technical partners
Oncology	Cervix Cancer	NKI	PMS
	Prostate Cancer	NKI	PMS
	Head and Neck Squamous Cell Carcinoma	UDUS	Better
	Breast Cancer	AReSS	DEDA
Ophtalmology	Macular Degeneration	UKCL	IER-ROCHE-Better
Cardiovascular	Severe Aortic Stenosis	VHIR	MDT
	Heart Failure	GH CELJE	ROCHE-CERTH

Neurology	Multiple Sclerosis	FISM	DEDA
Chronic inflammation	Chronic Rhinosinusitis	UDUS	Better

Additionally, technical partners closely associated with data collection and system integration were involved to ensure alignment between clinical requirements and the capabilities of the underlying technological infrastructure.

This dual-level stakeholder engagement, clinical and technical, ensured that the dashboard development was both needs-driven and technically feasible, addressing data integration, interoperability, and implementation concerns from the outset.

To maintain a continuous feedback loop, several mechanisms were adopted:

- Collaborative online documentation repositories and templates for structured feedback.
- Regular follow-up meetings for clarification and refinement of requirements.
- Presentation of evolving design mock-ups and dashboard architecture for early validation.
- Integration of insights into the technical specification and dashboard roadmap.

This approach ensured that stakeholders not only contributed requirements but also actively shaped the product as it evolved, thus enhancing acceptability, usability, and relevance.

2. Conceptualization of the dashboard

This section provides an updated overview of the conceptual foundation of the IMPROVE dashboard, expanding on the vision established in the first version (D3.5) and incorporating key refinements that reflect the project's progress and evolving requirements.

The IMPROVE dashboard is designed to offer a multi-perspective analysis of clinical services, interventions, and health technologies, in alignment with the principles of VBHC. These principles, centred on measuring outcomes that matter to patients, optimizing resource allocation, promoting care integration, and ensuring transparency and equity, are reflected in the dashboard's core features. Specifically, the platform supports the systematic monitoring of patient-reported outcomes and experiences (PROMs and PREMs), the structured analysis of clinical and organisational performance, and the benchmarking of results across contexts and health systems. This aligns with the European approach to VBHC, which emphasizes a holistic view of value, including personal, societal, allocative, and technical dimensions[1], and positions the dashboard as a strategic decision-support tool to foster data-informed and value-oriented healthcare transformation.

Built as a modular and user-centred platform, the dashboard facilitates the definition, management, and assessment of both retrospective and prospective studies. Users are empowered to model their studies according to their own clinical context while relying on common data structures and predefined assessment levels to ensure consistency and comparability. Core functionalities include tools for data collection, semantic modelling, quality validation, and performance monitoring, all of which are essential for achieving reliable, value-oriented insights.

In addition to internal data modelling, the dashboard incorporates a comparative perspective, allowing users to position their study within the broader landscape of existing literature, similar initiatives, and related policy frameworks. This capability supports benchmarking and fosters collaborative learning across different domains and healthcare systems. The integration of large language models (LLMs) further enhances the platform by enabling the automated extraction of relevant insights from unstructured information, enriching the context and supporting deeper analysis.

At the conceptual level, the dashboard reinforces the role of PGHD as a high-value asset for innovation in healthcare. PGHD is not only clinically meaningful, but also easily integrable and comparable when appropriately structured. The IMPROVE approach demonstrates its applicability across a variety of digital services, care processes, and technologies, supporting evaluation efforts aligned with VBHC principles.

Finally, the dashboard has been designed with scalability and extensibility in mind, ensuring that it can be adapted to future UCs and clinical areas beyond the initial project scope. This forward-looking vision

[1] According to the Expert Panel on Effective Ways of Investing in Health (EXPH) of the European Commission, value in healthcare should be understood across four dimensions: personal value (appropriate care to achieve patients' goals), technical value (achieving best possible outcomes with available resources), allocative value (equitable distribution of resources), and societal value (contribution of healthcare to social participation and connectedness). See: European Commission Expert Panel on Effective Ways of Investing in Health (EXPH). *Defining value in "value-based healthcare"*. Brussels: European Commission, 2019. Available online

positions the IMPROVE dashboard as a practical, sustainable tool to support value-based decision-making across diverse healthcare contexts.

2.1. Dashboard stakeholders' perspective

This section presents the updated model for assessing digital health interventions through the IMPROVE dashboard, incorporating multiple layers of evaluation and capturing the perspectives of key stakeholders. The conceptual framework is designed to provide a comprehensive, structured, and multidimensional view of health interventions using PGHD, facilitating value-based decision-making across clinical, organizational, and societal contexts.

At the core of the model lies the integration of four levels of assessment: Technology, Intervention, Service, and Population Health. These levels represent different scopes of analysis and are used to guide the definition of outcome measures, data needs, and expected impact for each study or use case (Figure 1).

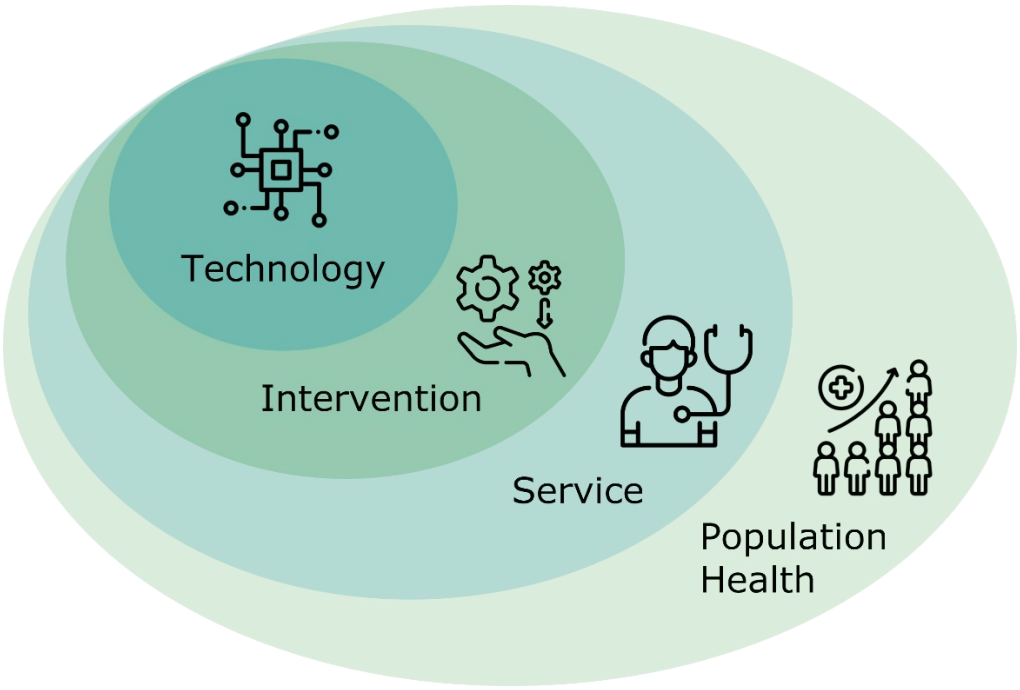

Figure 1 Four-level assessment model adopted in IMPROVE.

Technology level: This level focuses on the evaluation of the specific digital health tools deployed within the study, such as wearables, mobile apps, or remote monitoring devices. These technologies enable patients to report or capture health data in real time, outside clinical settings. Their assessment includes the accuracy, completeness, and timeliness of the collected data, as well as usability factors

like accessibility, feedback mechanisms, and ease of integration into clinical workflows, all of which influence patient engagement and adherence.

Intervention level: Here, the focus is on assessing how PGHD contributes to improving the effectiveness, safety, and efficiency of a particular clinical intervention. PGHD can enhance clinical decision-making by providing real-time, context-specific information about treatment response, symptoms, or quality of life. This is particularly relevant in chronic disease management and post-acute care, where continuous monitoring and early detection of changes in patient condition are critical.

Service level: The assessment of clinical services addresses how PGHD is used to optimize care delivery processes. This includes improving service accessibility, patient-provider communication, treatment adherence, and care coordination. PGHD supports remote care models, enables more responsive interventions, and enhances overall patient experience by capturing data on symptoms, behaviour, and satisfaction across the care continuum.

Population Health level: At the broadest level, PGHD is considered in terms of its contribution to improving outcomes across populations. This involves evaluating whether PGHD supports public health decision-making, informs targeted interventions, or contributes to reducing health inequalities. It also raises important questions regarding data privacy, digital inclusion, and the ethical use of personal health data at scale.

While Technology level is shown as the innermost layer in the visual model, this does not imply that it is limited to the Intervention level. On the contrary, technology is understood as a cross-cutting element that plays a critical role across all layers. Its representation as a distinct level enables a more granular evaluation of specific digital tools (e.g., wearables or mobile apps). However, such tools may support and interact with interventions, service delivery processes, or broader public health systems, depending on their scope and deployment context. This layered configuration reflects nested scopes of assessment, where technologies can be analysed as enablers of value at multiple levels.

In parallel with the four levels of assessment, the IMPROVE dashboard incorporates the perspectives of key stakeholders that influence, use, or are affected by digital health interventions. These include:

- Healthcare systems, which are concerned with resource allocation, performance, efficiency, and overall population health outcomes.
- Clinicians and care providers, whose focus lies in workflow integration, safety, clinical effectiveness, and care coordination.
- Patients, who bring essential insights about individual experience, preferences, health outcomes, and quality of life.
- Industry stakeholders, including technology developers and suppliers, who are interested in product usability, quality data, market needs, and opportunities for innovation.

These perspectives are mapped across the above-mentioned assessment levels to ensure that the dashboard captures relevant indicators, values, and insights for each stakeholder type and scope of evaluation (Figure 2).

IMPROVED medical practice

Perspective	Service level	Intervention level	Technology level
Healthcare system	Access volume, allocated resources, costs, patient wait time, accessibility, provider	Costs per patient, bed occupancy, length of stay, mortality rate	Costs
Clinical	Service experience, allocated resources, adherence	EHR, HIS data, effectiveness	Efficacy
Patients	PPI, PREM	PROM, PREM, PPI, QoL, RWD	User experience, acceptability, problems, side effects
Industrial	Process data	Quality data, trustworthiness	Quality data, costs

IMPROVED design of products and services

Figure 2 Stakeholder perspectives mapped across the assessment levels.

The mapping matrix (Figure 2) illustrates this integrated model. It aligns the main concerns and information needs of each stakeholder group across the levels of Technology, Intervention and Service. For example:

- From the patient perspective, the focus ranges from individual experience and acceptability (at the technology level) to broader measures such as PROMs, PREMs, Quality of Life (QoL), and societal impact.
- The clinical perspective considers how PGHD contributes to service delivery and clinical outcomes, including data from Electronic Health Records (EHRs) and hospital information systems.
- The healthcare system perspective emphasises performance indicators such as mortality, costs, access, and efficiency.
- The industrial perspective focuses on product quality, data trustworthiness, and market alignment.

Although the current mapping matrix (Figure 2) focuses on the Technology, Intervention, and Service levels, a fourth level, Population Health, was introduced later in the project following validation activities with selected stakeholders. This level addresses the broader systemic impact of digital health interventions and reflects their relevance for public health planning, equity, and long-term outcomes. While it is not yet integrated into the Use Case-specific matrices presented in next section, a preliminary set of reference indicators has been defined for each stakeholder perspective:

- From the healthcare system perspective: incidence, mortality, and overall healthcare costs.
- From the clinical perspective: identification of systemic bottlenecks and analysis of waiting lists.
- From the patient perspective: individual and societal impact, including broader measures of wellbeing.
- From the industrial perspective: market needs and innovation opportunities at the population level.

These indicators provide a foundation for incorporating the Population Health level in future dashboard evaluations and will be progressively integrated into the UC assessments.

Finally, this structured, multidimensional model is embedded in the dashboard's architecture to support tailored evaluation paths depending on the use case, level of analysis, and stakeholder priorities. It ensures that all relevant dimensions of value are considered, facilitating a holistic and stakeholder-aware approach to digital health assessment.

2.2. Dashboard workflow and interaction design

This section presents the workflow behind the IMPROVE dashboard, illustrating how users interact with the system to characterize studies, manage data, and extract meaningful insights. The workflow has been structured into three main, independent yet interconnected flows, reflecting the logical sequence of steps involved in evidence-based healthcare assessment.

This workflow is fully aligned with the conceptual architecture proposed in the original IMPROVE framework (see Figure 3), which articulates the dashboard's functionality through a modular Data and Living Lab. In particular, the dashboard operationalises several of the core building blocks described in the project proposal:

- It supports knowledge extraction through the Comparative Source module (literature, practices, policies);
- Facilitates real-world data (RWD) collection and management;
- Contributes to generating Federated Causal Evidence and synthesising internal/external sources for robust decision-making;
- Enables the exploration of engagement factors and value indicators via visual analytics;
- And supports the creation of implementation guidelines and educational material through its recommendation functionalities (IMPROVE Oracle).

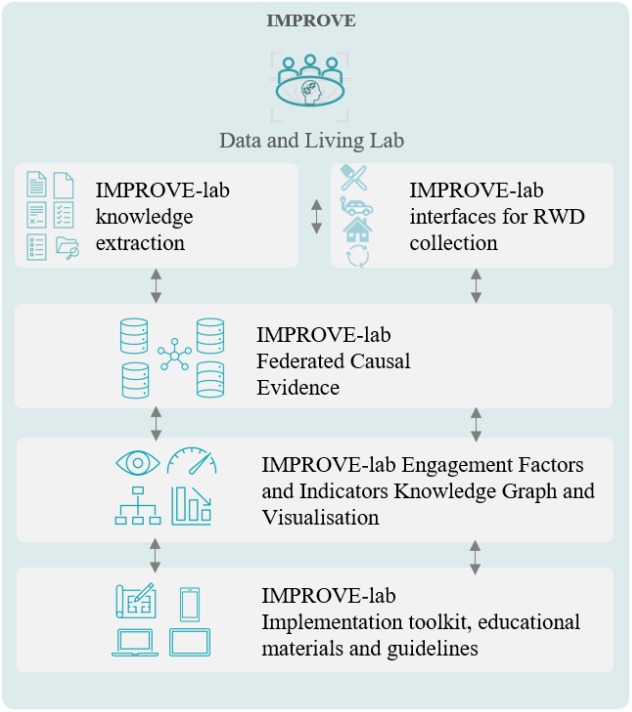

Figure 3 IMPROVE conceptual architecture.

By aligning these components, the dashboard ensures consistency with the overarching vision of IMPROVE: to deliver an integrated, scalable, and evidence-informed digital environment for value-based decision-making.

As shown in Figure 4, the dashboard workflow begins with ***Study Characterization***, followed by two parallel flows: ***Comparative Source*** and ***Data Management***, and finally concludes with the ***Decision Support System***.

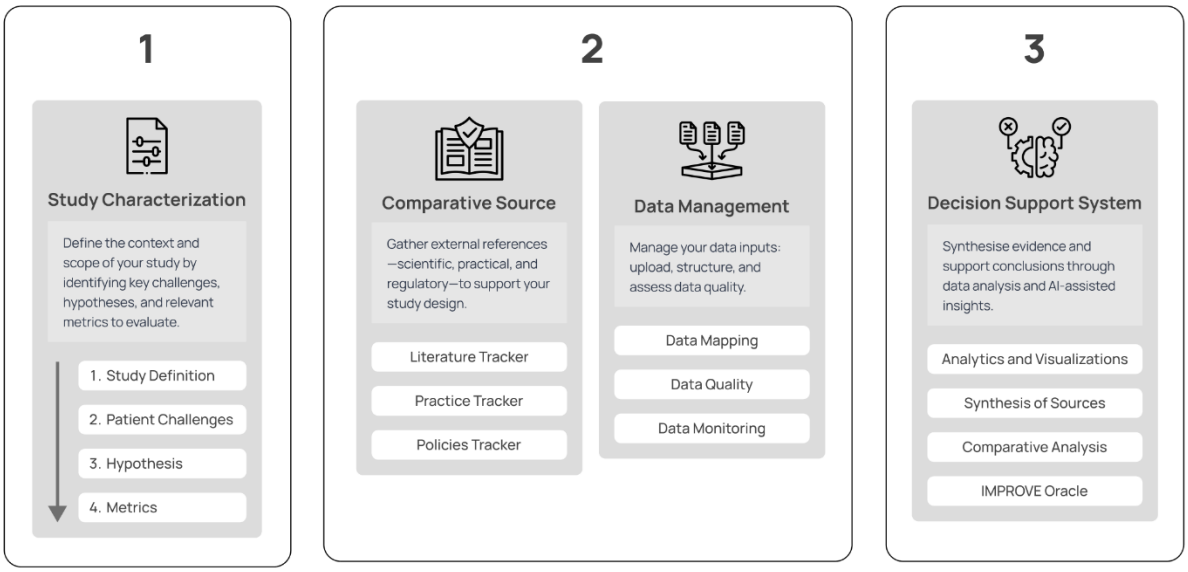

Figure 4 IMPROVE dashboard workflow.

The initial flow (**Study Characterization**) enables users to define the context and scope of their study. It guides them through identifying key challenges, formulating hypotheses, and selecting relevant metrics and outcomes to assess. The characterization is structured into four main steps:

- **Study Definition**: Including clinical background, scope, and classification.
- **Patient Challenges**: Understanding unmet needs and context-specific barriers.
- **Hypothesis**: Defining what is being evaluated or compared.
- **Metrics**: Selecting PROMs, PREMs, clinical Key Performance Indicators (KPIs), and other indicators to monitor.

This phase is critical to ensure clarity and consistency in the data and evaluation strategy that follows.

Once the study is defined, users can proceed in parallel through two complementary paths: ***Comparative Source*** and ***Data Management***.

The **Comparative Source** module allows users to gather external references to support their study design and contextualization. It includes:

- **Literature Tracker**: To identify and extract evidence from scientific publications.
- **Practice Tracker**: To collect examples of real-world practices and implementations.
- **Policies Tracker**: To reference regulatory or institutional frameworks.

These resources help define relevant comparators and benchmarks for analysis.

In parallel, users manage the data related to their study through the **Data Management** flow which includes the following functionalities:

- **Data Mapping**: Structuring incoming data and aligning it with expected fields and formats.
- **Data Quality**: Assessing completeness, consistency, and reliability.
- **Data Monitoring**: Verifying that data collection and updates align with the study design.

This flow ensures that the study is underpinned by high-quality and well-structured data.

The final phase (**Decision Support System**) focuses on synthesizing evidence and supporting decision-making through advanced analysis and AI-assisted insights. This module provides:

- **Analytics and Visualizations**: Graphical displays of KPIs, outcomes, and trends.
- **Synthesis of Sources**: Integration of internal and external information.
- **Comparative Analysis**: Identification of performance gaps and best practices.
- **IMPROVE Oracle**: A recommendation system providing guidance and actionable suggestions aligned with VBHC principles.

Together, these components support the evaluation of services, interventions, and technologies, enabling data-driven conclusions and recommendations.

3. Use Cases implementation in the dashboard

This section presents a summary of the UCs implemented in the IMPROVE dashboard, grouped into broader disease-area case studies. The information has been collected through a co-creation process with the partners responsible for each UC, ensuring that the dashboard development is closely aligned with clinical realities and stakeholder needs. Each UC contributes to validating the dashboard's information model, particularly in terms of aligning assessment levels with stakeholder perspectives, while also demonstrating its functionalities while supporting value-based assessment in real-world healthcare scenarios.

3.1. Oncology case studies

3.1.1. Cervix cancer Use Case (PMS-NKI)

The Cervix cancer UC, coordinated by PMS and NKI partners, explores the use of quantitative Magnetic Resonance Imaging (MRI) to improve the prediction of patient outcomes following chemoradiotherapy for cervical cancer. This UC seeks to enhance the accuracy and reliability of imaging data while also placing a strong emphasis on the experience of volunteers and patients undergoing MRI procedures.

In addition to the technical advancement of MRI protocols, the study incorporates the patient perspective to inform the design and usability of MRI hardware and workflows. By capturing direct feedback from patients, the study contributes to more patient-friendly imaging solutions and better integration into clinical routines. This dual focus on innovation and experience exemplifies a VBHC approach.

The UC aligns with key IMPROVE project goals:

- Enhancing treatment selection by using quantitative imaging to personalise therapy and improve response prediction, ultimately guiding more effective and patient-centred treatment planning.
- Improving medical device design through the integration of patient feedback into MRI system development, helping ensure that future devices meet user expectations in terms of comfort, efficiency, and accessibility.

This UC sets the foundation for using PGHD, in this case, patient-reported experiences with imaging technologies, to both optimise clinical outcomes and inform innovation in medical technology design.

In relation to the dashboard, this UC is mapped across the Technology, Intervention, and Service levels of assessment. The stakeholder perspectives represented include Healthcare System, Clinical, Patient, and Industrial. The corresponding mapping table provides detailed insights on how each perspective aligns with the assessment levels for this specific study (Table 2).

Table 2 Cervix cancer UC: Stakeholder perspectives mapped across the assessment levels.

Perspective	Service level	Intervention level	Technology level
Health care system	Patient references	Patient references	Designed around patient
Clinical	Availability; accessibility	**HIS data**	Efficacy
Patients	Waiting times; preparation	**PREMs**	Number of rescans
Industrial	Preparation and scanning workflow	Comfort during scanning	Design for experience; **MRI hardware**

3.1.2. Prostate cancer Use Case (PMS-NKI)

The Prostate cancer UC, also led by PMS and NKI partners, aims to enhance the visualization of intra-prostatic tumors through multiparametric MRI (mpMRI) and to personalize radiotherapy treatment by implementing focal dose escalation strategies. The primary objectives include demonstrating that increasing the radiation dose specifically at the tumor site improves patient outcomes without increasing treatment-related toxicity. To this end, predictive models are being developed to estimate the feasible tumor dose achievable with given radiotherapy techniques, alongside outcome prediction models based on individual patient characteristics derived from clinical data and mpMRI. Furthermore, the study assesses physician treatment preferences and explores the potential application of alternative radiotherapy techniques by analyzing retrospective patient cohorts.

This UC contributes to the overarching IMPROVE project goal of optimizing treatment selection by integrating personalized clinical and imaging data with healthcare professional preferences, thereby supporting more tailored and effective prostate cancer management.

The mapping Table 3 illustrates the alignment between each stakeholder perspective and the respective assessment levels for this UC.

Table 3 Prostate cancer UC: Stakeholder perspectives mapped across the assessment levels.

Perspective	Service level	Intervention level	Technology level
Health care system	Allocated resources; patient wait time; accessibility	Cost per patient; **number of treatment fractions** (aggregated); number of invasive procedures	costs
Clinical	Service experience; accessibility; travel	**HIS data** (aggregated)	efficacy
Patients	PPI, PREM	**PROMS** (aggregated)	Comfort
Industrial		Positioning comfort	Dose quality assurance

3.1.3. HNSCC Use Case (UDUS-Better)

The Head and Neck Squamous Cell Carcinoma (HNSCC) UC, led by UDUS and Better partners, focuses on evaluating the QoL, disease-related distress, and care experience of patients affected by this condition. The study aims to assess how the integration of digital PROMs into clinical workflows can enhance decision-making, patient engagement, and overall care delivery.

Specifically, the study examines the added value of PROMs from both the patient's perspective, in terms of expressing preferences, identifying unmet needs, and improving communication, and the healthcare provider's perspective, where timely, structured feedback can support more informed and responsive interventions. By enabling a deeper understanding of patient experience, the study also has the potential to positively influence oncology service design and intervention strategies.

The UC further explores the comparison between traditional (paper-based) and digital methods of PROM collection, assessing not only data quality and actionability but also the usability and acceptance of digital formats. These comparisons will help identify more effective and scalable approaches to collecting patient-reported data in oncology care.

This initiative is closely aligned with several of the IMPROVE project's key goals:

- The integration of PROMs using digital tools that are smarter, more informative, and easier to operationalize in real time.
- The potential impact on clinical decision-making and patient experience in oncology services.
- The improvement of overall patient and clinician satisfaction through better communication and understanding of patient needs.

This UC is mapped with the assessment levels and the stakeholders' perspectives. The mapping table highlights how each perspective contributes to the evaluation at the selected levels (Table 4).

Table 4 HNSCC UC: Stakeholder perspectives mapped across the assessment levels.

Perspective	Service level	Intervention level	Technology level
Health care system	Access volume; allocate resources; costs; patient wait time; accessibility; provider	Cost per patient; bed occupancy; length of stay; mortality rate	Costs of deployment of Better platform
Clinical	Health professional perspective on digitalisation in clinical practice	HER; HIS data	Health professional user experience; barriers for implementations
Patients	Perceived quality of service	EQ-5D-3L, MARS-D, EORTC QLQ-C30	User experience; acceptability
Industrial			Patient preferences on PROM visualization; system logs

3.1.4. Breast cancer Use Case (DEDA-AReSS)

The Breast cancer UC, coordinated by DEDA and AReSS Puglia, is embedded within the Apulian Regional Cancer Network and focuses on the digitalisation of patient care pathways via the CoreHealth platform. Specifically, this UC targets the Breast Units and their functional integration with CorOs, the regional oncological coordination centres that serve as entry points to the cancer network.

The study aims to assess how PROMs and PREMs can be systematically integrated at various stages of the patient journey, from diagnosis to treatment and long-term follow-up, in order to improve quality of care, accessibility, and decision-making across the regional system. PROMs such as EQ-5D-5L, EORTC QLQ-C30, and the disease-specific BREAST-Q are used to measure health status and outcomes at multiple timepoints (T0 to T3), while PREMs are employed to evaluate the effectiveness and responsiveness of the care system.

The Use Case also investigates the G8 screening tool for patients over 65, as well as other value-based items such as social and psychological fragility, family history, and accessibility of the network, as captured through structured data within the platform.

This approach aligns strongly with the IMPROVE project goals of:

- Enhancing the evaluation of care pathways at the Service level through the integration of PROMs and assessing the use of patient-generated data and digital tools at the Technology level across the care continuum,
- Accelerating market entry for digital tools such as CoreHealth by validating their role in improving coordination, equity, and value in cancer care,
- Empowering patients through co-production and participation mechanisms (PPI), reinforced by collaboration with patient associations across the regional network.

This UC is mapped to the Service, Intervention, and Population Health levels of assessment and involves multiple stakeholder perspectives. The mapping presented in Table 5 illustrates how each stakeholder's perspective aligns with the different assessment levels.

Table 5 Breast cancer UC: Stakeholder perspectives mapped across the assessment levels.

Perspective	Service level	Intervention level	Technology level
Health care system	Access to Breast Units; waiting times; system responsiveness; network equity	Time to treatment; coordination; referral optimisation	Incidence trends; accessibility across regions
Clinical	Multidisciplinary team coordination; data collection workflow	Application of G8 screening; integration of PROMs into clinical routine	Evaluation of system performance via aggregated PROM/PREM data
Patients	PREMs at COrO entry point and during follow-up	PROMs: EQ-5D-5L, EORTC QLQ-C30, BREAST-Q	Patient needs, satisfaction, and co-production through associations
Industrial	Validation of CoreHealth platform implementation	Digital solution adoption in clinical settings	Impact of digital tools on care equity and population-level outcomes

3.2. Ophthalmology case study

3.2.1. Macular degeneration Use Case (IER-ROCHE-UKCL-Better)

The Macular Degeneration (MD) UC, implemented by the partners IER, ROCHE, UKCL and Better, applies PGHD in real-world care for patients with wet MD. The study aims to capture insights on patient motivation and experience about clinical and demographic factors, aligning with the goal of enhancing patient-centred care. This UC is currently under development, and more details regarding the dashboard integration will be included in future updates of this deliverable.

3.3. Cardiovascular case studies

3.3.1. Severe aortic stenosis Use Case (MDT-VHIR)

Led by MDT and VHIR partners, the Severe Aortic Stenosis UC focuses on implementing a digitally supported, patient-centred approach to improve the treatment pathway for patients with valvular heart disease. The study aims to drive a paradigm shift in the treatment of severe aortic stenosis by optimizing healthcare resource utilization and improving patient outcomes without increasing mortality or complications.

One of the primary goals is the digitization of the care process, including the integration of validated clinical protocols, educational materials, and structured questionnaires to continuously monitor patient symptoms and collect PGHD. This data plays a key role in enhancing the clinical decision-making process, particularly during the Heart Team discussions for treatment planning, and supports a more effective follow-up strategy to guide patient referrals and empower individuals in the self-management of their condition.

In parallel, the UC involves the validation of the Get Ready digital solution, which facilitates an agile and coordinated referral process. By eliminating unnecessary waiting times and improving communication among healthcare professionals, this solution supports faster access to care and promotes patient engagement, education, and satisfaction throughout the treatment journey.

Additionally, the study aims to evaluate and improve clinical pathways, identifying opportunities for replication and adaptation in other clinical settings, ensuring broader applicability of the digital tools and practices developed.

This UC is fully aligned with the IMPROVE project goals of enhancing treatment selection, accelerating market access, and increasing the integration of PGHD into routine care to drive better outcomes and systemic efficiency.

This UC is mapped across the assessment levels and the stakeholder perspectives. Table 6 presents a comprehensive view of how each stakeholder is involved in evaluating outcomes and system-level improvements.

Table 6 Severe aortic stenosis UC: Stakeholder perspectives mapped across the assessment levels.

Perspective	Service level	Intervention level	Technology level
Health care system	**Access volume, allocated resources**, costs (estimation), patient wait time, **accessibility, provider, referral to treatment time, same day admission rate**	**length of stay, mortality rate**	Costs (estimation), acceptability
Clinical	Service experience, allocated resources	EHR, HIS data,	Efficacy
Patients	PREM, user satisfaction (NPS)	**PROM, PREM,**	**User experience, patient adherence,** problems, side effects,
Industrial	Process data	Quality data, trustworthiness	**Quality data**

3.3.2. Heart failure Use Case (ROCHE-CERTH)

The Heart Failure UC, involving the partners ROCHE and CERTH, is currently under definition. Further information and the dashboard integration approach will be incorporated in the following deliverables.

3.4. Neurology case study

3.4.1. Multiple sclerosis Use Case (FISM-DEDA)

The Multiple Sclerosis UC, led by FISM and DEDA partners, aims to develop and implement a VBHC framework tailored to the needs of people living with multiple sclerosis (MS). The study focuses on the evaluation of the MS Care Unit approach, and in particular of the multidisciplinary model for neurorehabilitation, by integrating patient-reported data into standard clinical assessments.

Through the systematic collection of PROMs, PREMs and PPI (Patient Preference Information) across national MS Care Units, the study investigates how incorporating the patient perspective can influence both clinical outcomes and healthcare costs. This includes assessing the impact on indirect and intangible costs, as well as determining the added value of patient-generated information in tailoring treatment and rehabilitation pathways.

This UC strongly aligns with the IMPROVE project objectives of:

- enhancing treatment selection by incorporating patient preferences and lived experiences into clinical decision-making, and
- accelerating market entry of integrated, patient-centric care models that offer scalable, cost-effective solutions for chronic neurological conditions.

Table 7 shows the corresponding mapping between the stakeholders' perspective and the assessment levels for this study.

Table 7 Multiple Sclerosis UC: Stakeholder perspectives mapped across the assessment levels.

Perspective	Service level	Intervention level	Technology level
Health care system	Access to MS Care Units, waiting times, system responsiveness, network equity	Time to treatment and rehabilitation, coordination, referral optimisation	Incidence trends, accessibility across regions
Clinical	Service experience, allocated resources, costs, adherence	Effectiveness (PROMS, other clinical data)	Efficacy, costs
Patients	Access to service, patient experience, QoL	PREM, PPI, personalization level, Anxiety and depression status , wearable data	User experience, acceptability, problems, side effects
Industrial	Process data	Quality data, trustworthiness	Quality data, costs

3.5. Chronic inflammation case study

3.5.1. Chronic rhinosinusitis Use Case (UDUS-Better)

The Chronic Rhinosinusitis (CRS) UC, coordinated by the partners UDUS and Better, aims to assess how the integration of digital PROMs can enhance clinical decision-making and treatment personalisation in patients with chronic inflammation. The study evaluates both general and disease-specific QoL and distress levels, with the goal of informing more tailored interventions that reflect patient preferences and needs.

The UC also investigates the perceived value of PROMs from two key perspectives: that of the patient, who benefits from more personalized and engaging care, and that of the healthcare provider, who gains access to more actionable and timely information to support diagnosis and treatment. A

particular focus is given to the use of SNOT-22, a validated symptom-based instrument for chronic rhinosinusitis, which is also used to guide decisions regarding biologic therapies.

This study aligns with the IMPROVE project goals of:

- Supporting the integration of PROMs into routine clinical workflows using digital technologies that enhance data usability, actionability, and real-time availability,
- Comparing digital and traditional PROM collection methods (e.g., paper-based vs. electronic, user-friendly vs. standard formats) to assess their impact on patient experience, engagement, and clinical efficiency.

Finally, Table 8 presents the alignment between each stakeholder perspective and the respective assessment levels.

Table 8 Chronic rhinosinusitis UC: Stakeholder perspectives mapped across the assessment levels.

Perspective	Service level	Intervention level	Technology level
Health care system	Access volume; allocate resources; costs; patient wait time; accessibility; provider	Cost per patient; bed occupancy; length of stay; mortality rate	Costs of deployment of BETTER platform
Clinical	Health professional perspective on digitalisation in clinical practice	HER; HIS data	Health professional user experience; barriers for implementations
Patients	Perceived quality of service	EQ-5D-3L, MARS-D, SNOT-22, VAS Score	User experience; acceptability
Industrial			Patient preferences on PROM visualization; system logs

4. Dashboard Prototyping and Design

To support the iterative and user-centred development of the IMPROVE dashboard, an early-stage prototyping process was implemented using low-fidelity mock-ups. This approach enabled the design team to translate conceptual ideas and functional requirements into visual representations, facilitating early feedback from stakeholders and end-users.

To ensure conceptual and functional coherence, the dashboard's features and the structure of information displayed in each screen have been designed in alignment with the information model derived from the analysis of the UCs. This includes not only the definition of relevant indicators across the four levels of assessment, but also the identification of data types, user interactions, and decision-support functionalities. The iterative co-creation process, conducted through multiple workshops and validation sessions with clinical, technical, and managerial stakeholders, ensured that the design choices respond to real-world needs, workflows, and priorities identified across the IMPROVE pilot settings.

In parallel, careful attention was paid to the differentiation of user types. Building on the stakeholder classification developed in D3.5, the dashboard defines three main categories of end users: (1) Health professionals and researchers, who require structured access to analyse clinical and technical data; (2) Industry and policy leaders, who seek broader implementation and system-level insights; and (3) the general public (patients and their informal caregivers), who engage with PGHD examples, community interaction, and non-restricted educational content.

The prototyping process was carried out using FIGMA[2], a cloud-based design and prototyping tool widely used for user interface development. FIGMA offers several key advantages for collaborative design:

- It allows multiple contributors to work simultaneously on the same interface, supporting real-time feedback and co-creation.
- It supports version control and iterative improvements without the need for extensive local installations or software dependencies.
- It provides an intuitive environment to create, organize, and test user flows, wireframes, and layout structures.

By using FIGMA, the team was able to efficiently design the dashboard's layout and functionality in close collaboration with clinical and technical stakeholders directly involved in the project's UCs, ensuring that the prototype reflected the specific needs, workflows, and constraints identified during the co-creation process.

[2] Figma. (2024). Figma: The collaborative interface design tool. https://www.figma.com

4.1. Low-Fidelity Mockups

This section presents the low-fidelity mock-ups created to illustrate the intended structure and workflow of the dashboard, as described in the previous Section 2.2. The workflow outlined below illustrates how professional users, primarily health professionals and researchers, interact with the platform to define studies, manage data, and generate insights. Each mock-up corresponds to a specific step in the user journey, showcasing key components, layout organization, and user interactions.

These mock-ups represent a first version of the dashboard interface, developed based on the conceptual workflow, functional requirements, informational model and input gathered during the co-creation activities with UC leaders. Their purpose is to serve as a visual and interactive basis for initial feedback.

The current mock-ups are expected to be updated and improved in future iterations, following a validation process that includes workshops with all project partners and one-to-one interviews with stakeholders. These activities will gather structured feedback regarding usability, layout, functionality, and alignment with the clinical and technical needs of the UCs.

In particular, the mock-ups also reflect the integration of data mapping and data quality functionalities, which are essential to ensure that the information collected through the dashboard is properly structured, complete, and reliable. These elements play a key role in maintaining consistency across studies and supporting trustworthy, value-based analyses.

Screenshots of the mock-ups are provided below, along with brief descriptions to explain their purpose, functionalities represented, and design rationale.

Figure 5 shows the login page of the dashboard. This interface provides a simple, secure, and accessible entry point for users. It includes basic authentication fields (username and password), with an option for password recovery. The design follows minimalist principles to reduce cognitive load and ensure a clean, focused user experience.

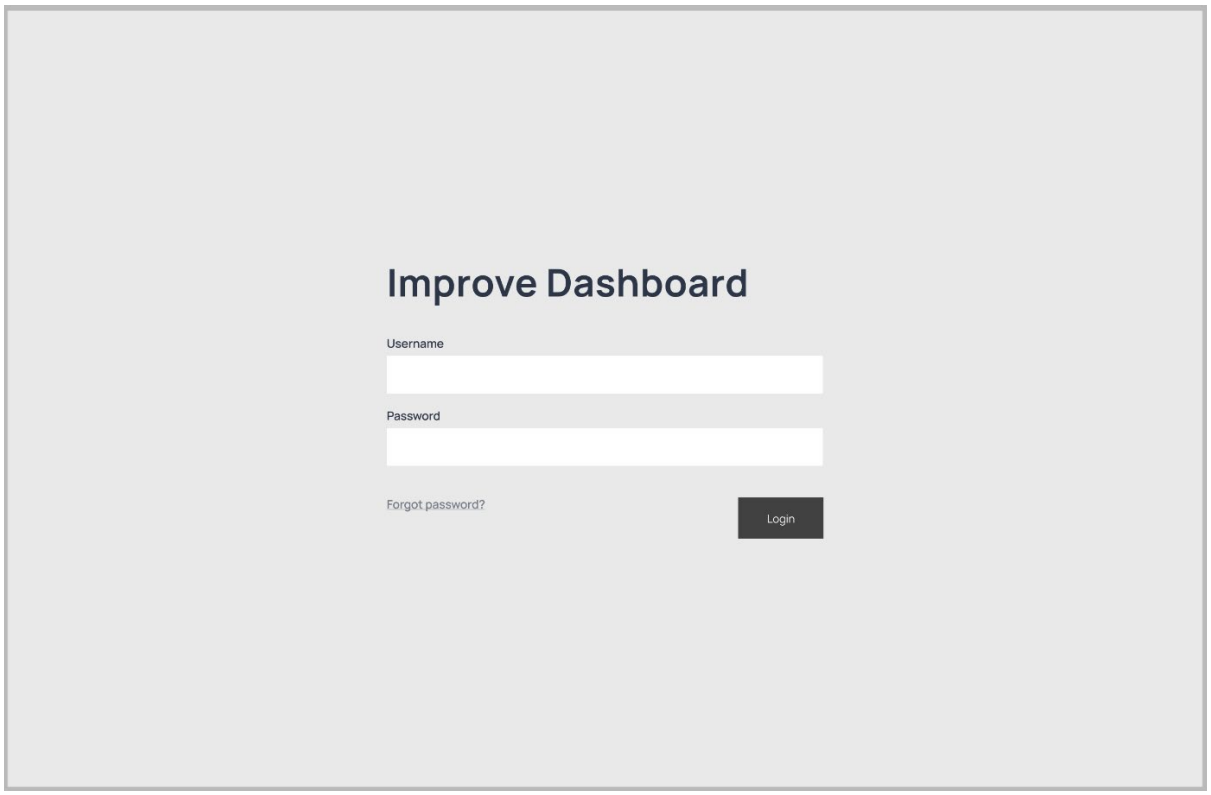

Figure 5 IMPROVE dashboard: Login page.

Figure 6 displays the list of available studies, representing the central landing page for logged-in users. This screen presents a searchable and sortable table with key metadata for each UC (study name, type of study, disease area, status, and last updated date). Users can perform actions such as updating, viewing, or editing study data. Additionally, a "Create New" button allows users to initiate the process of registering a new study in the dashboard.

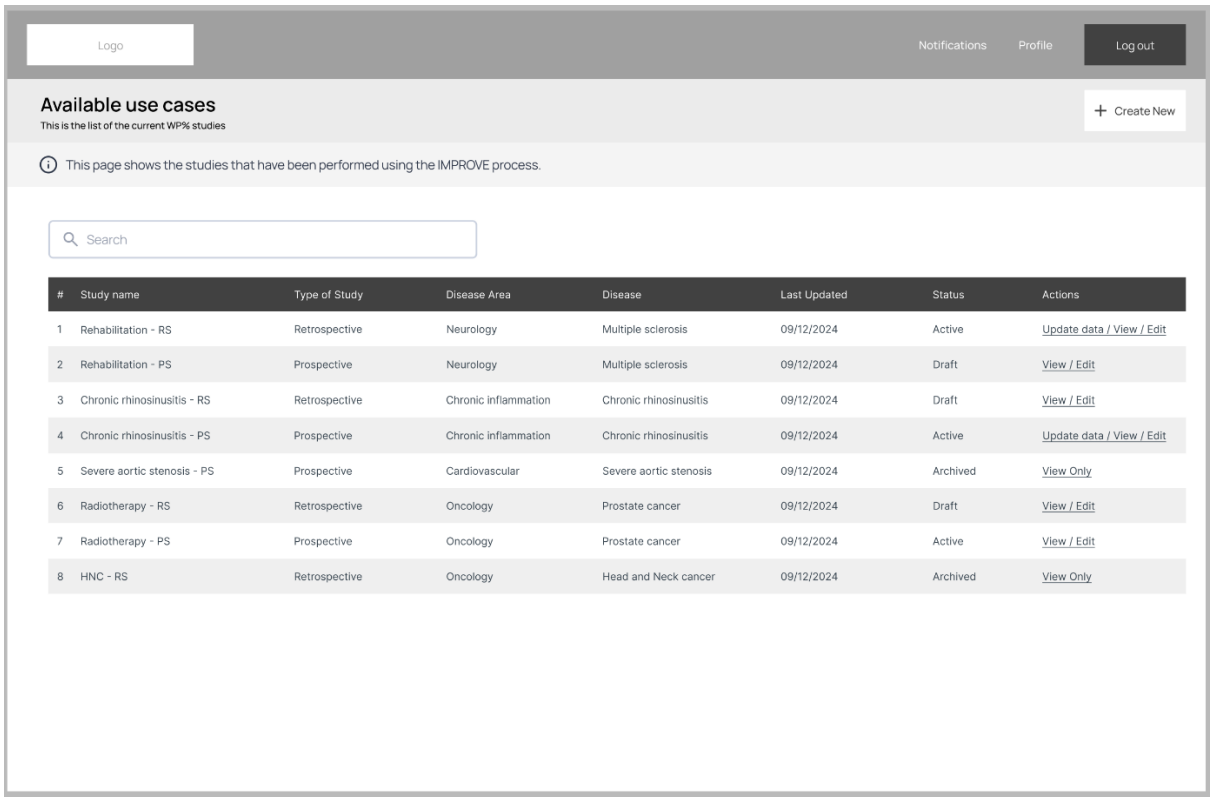

Figure 6 IMPROVE dashboard: Study list.

The process of creating a new study begins with a guided, step-by-step workflow. The first step is illustrated in Figure 7 and is focused on defining the context and scope of the study. Users are asked to provide essential information such as the disease area, patient characteristics, type of study, and the level of assessment being targeted (e.g., technology, intervention, clinical service, or population level). This step ensures that all subsequent dashboard functionalities are tailored to the specific needs and objectives of the study, allowing for a more relevant and structured analysis.

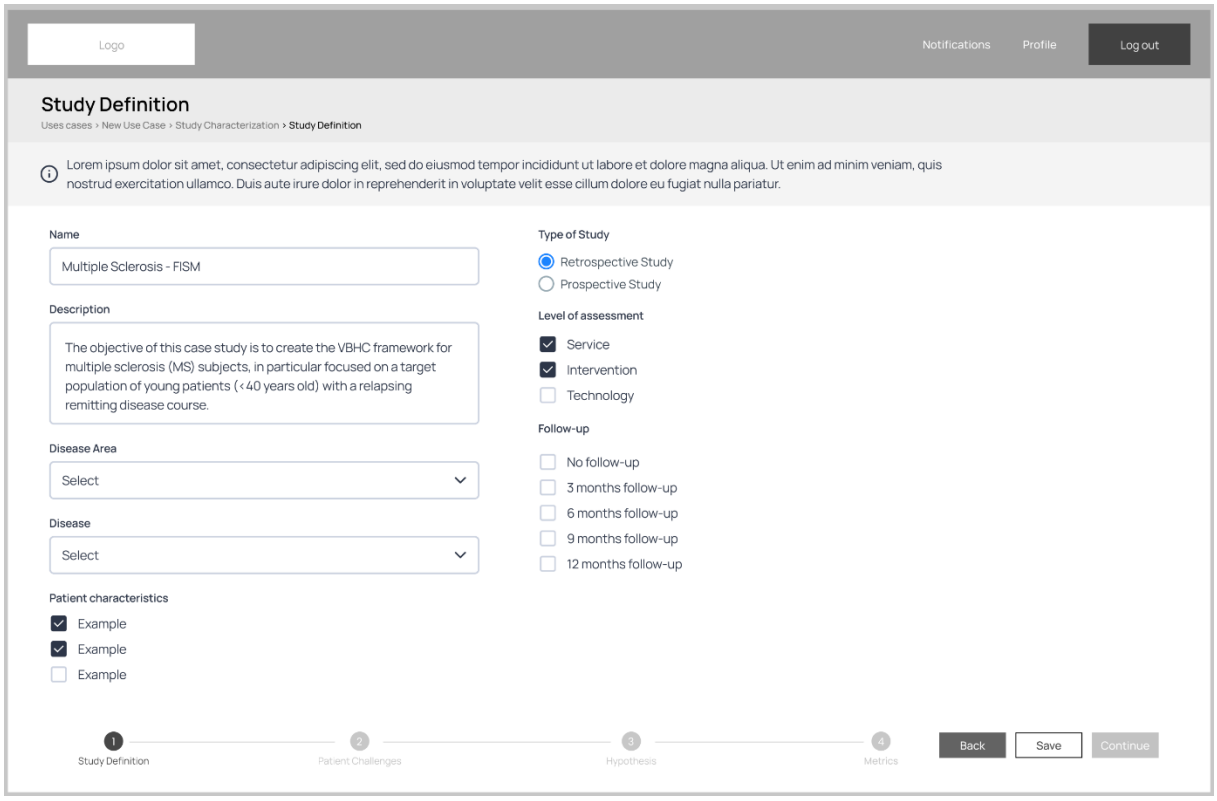

Figure 7 IMPROVE dashboard: Study definition.

Based on the previously defined study, the system will suggest relevant challenges that patients may face, such as treatment adherence, acceptance of diagnosis and therapy, or financial burden (Figure 8). Additionally, users can define new specific challenges to better tailor the assessment (Figure 9). This helps to identify barriers and improve engagement strategies.

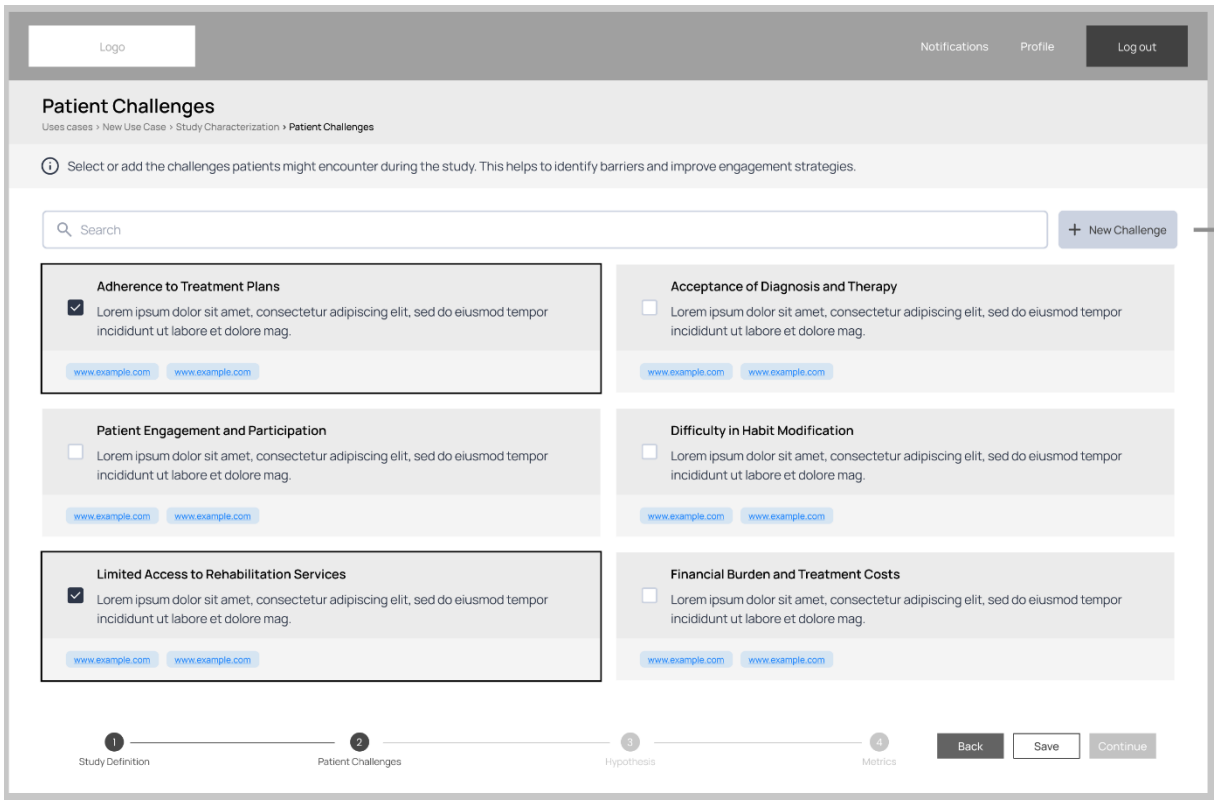

Figure 8 IMPROVE dashboard: Patient challenges.

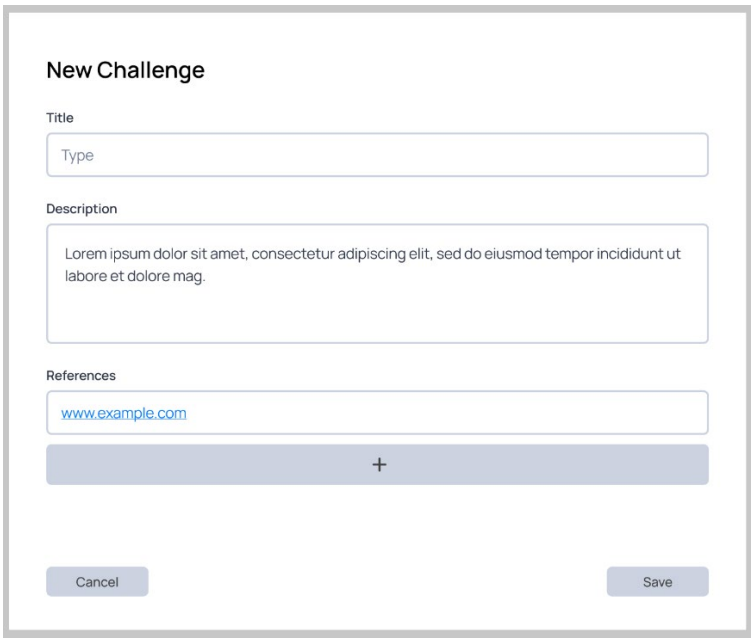

Figure 9 IMPROVE dashboard: New challenge creation.

Figure 10 shows the screen to define the hypotheses. The hypotheses relate to the analysis of why the previous challenges might occur. Here, the user should identify or add potential causes that could explain the patient challenges. This step helps design better interventions.

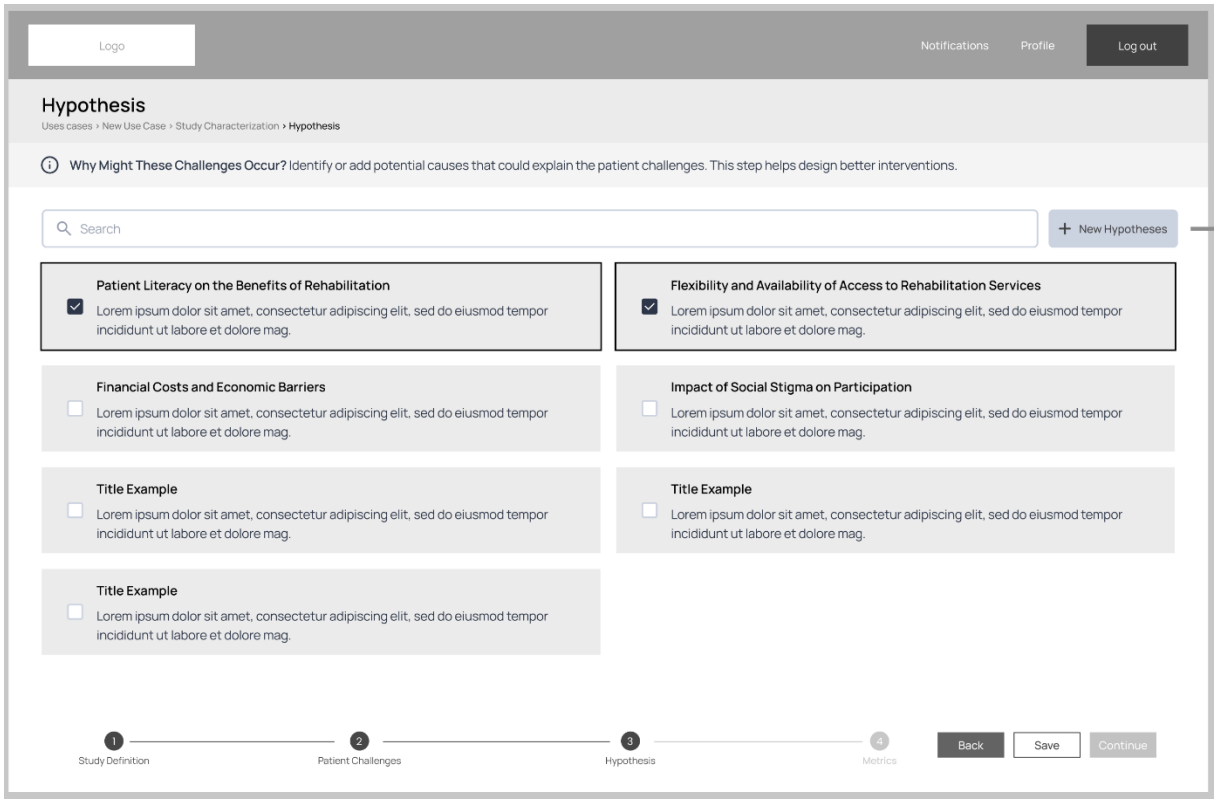

Figure 10 IMPROVE dashboard: Hypotheses List.

Same as previous functionality, users can define new hypotheses to guide the analysis and ensure that the assessment is aligned with the study's specific research questions and objectives (Figure 11).

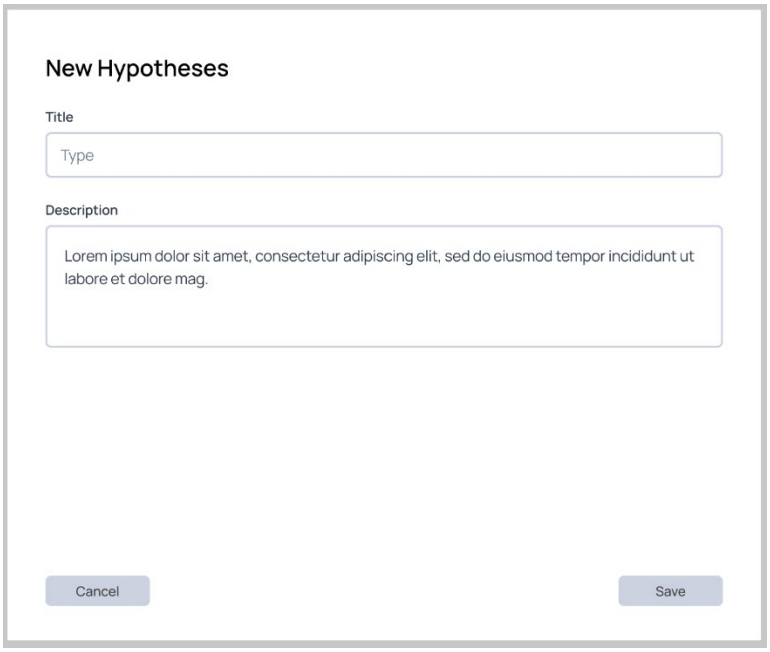

Figure 11 IMPROVE dashboard: New hypothesis creation.

Finally, based on the previously defined information, mainly the study goals and identified patient challenges, the dashboard will recommend a set of relevant metrics (KPIs) to ensure a comprehensive evaluation of outcomes (Figure 12). These may include clinical outcomes, patient QoL, and healthcare system impact, among others. Additionally, users will have the option to define and add new custom metrics to better align the assessment with their specific study needs (Figure 13).

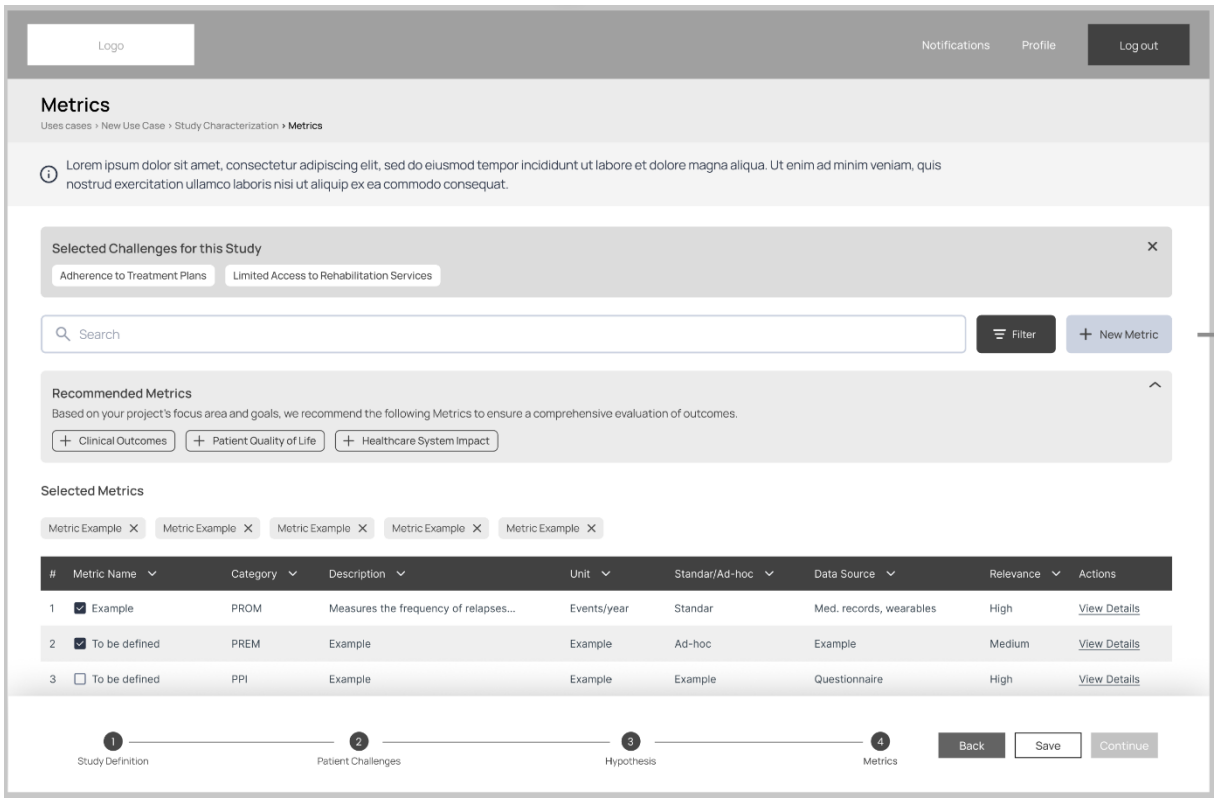

Figure 12 IMPROVE dashboard: Metrics List.

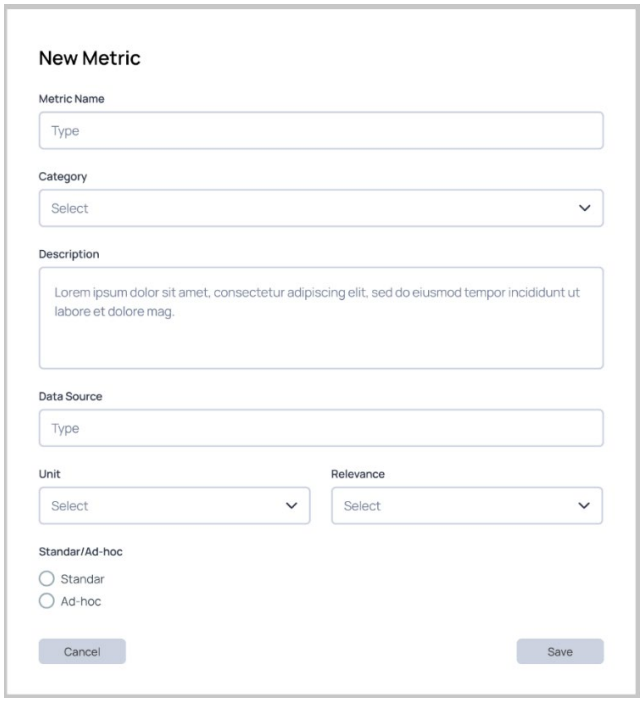

Figure 13 IMPROVE dashboard: New metric creation.

Once the study characterization is completed, the user is presented with two possible paths to further enrich the study definition: the Comparative Sources workflow and the Data Management workflow. These two streams are designed to complement each other by providing both contextual and data-driven insights.

The Comparative Sources workflow enhances the study from a state-of-the-art perspective, allowing users to explore and integrate relevant scientific literature, similar initiatives, and related policy frameworks connected to the same topic or clinical area. This helps to situate the study within a broader research and policy landscape, offering valuable external references and comparators.

In parallel, the Data Management workflow focuses on the internal aspects of the study, guiding users through the detailed definition of the associated data. This includes specifying the structure, source, and content of the datasets, as well as any relevant variables to be monitored. This information is critical for enabling the dashboard's visualization and tracking features, ensuring that the study's analytical potential is fully supported.

Together, these workflows ensure a comprehensive and multidimensional understanding of the study, combining external evidence with internal data readiness to support meaningful assessment and decision-making within the IMPROVE framework.

Figure 14 shows the first screen of the Comparative sources module which is devoted for the Literature tracker. In this screen, the system will recommend literature and scientific papers relevant to the study, supporting the assessment and integration of patient-generated health data (PGHD).

At this stage, further discussion is required to define additional functionalities aligned with WP2 data screening and extraction processes.

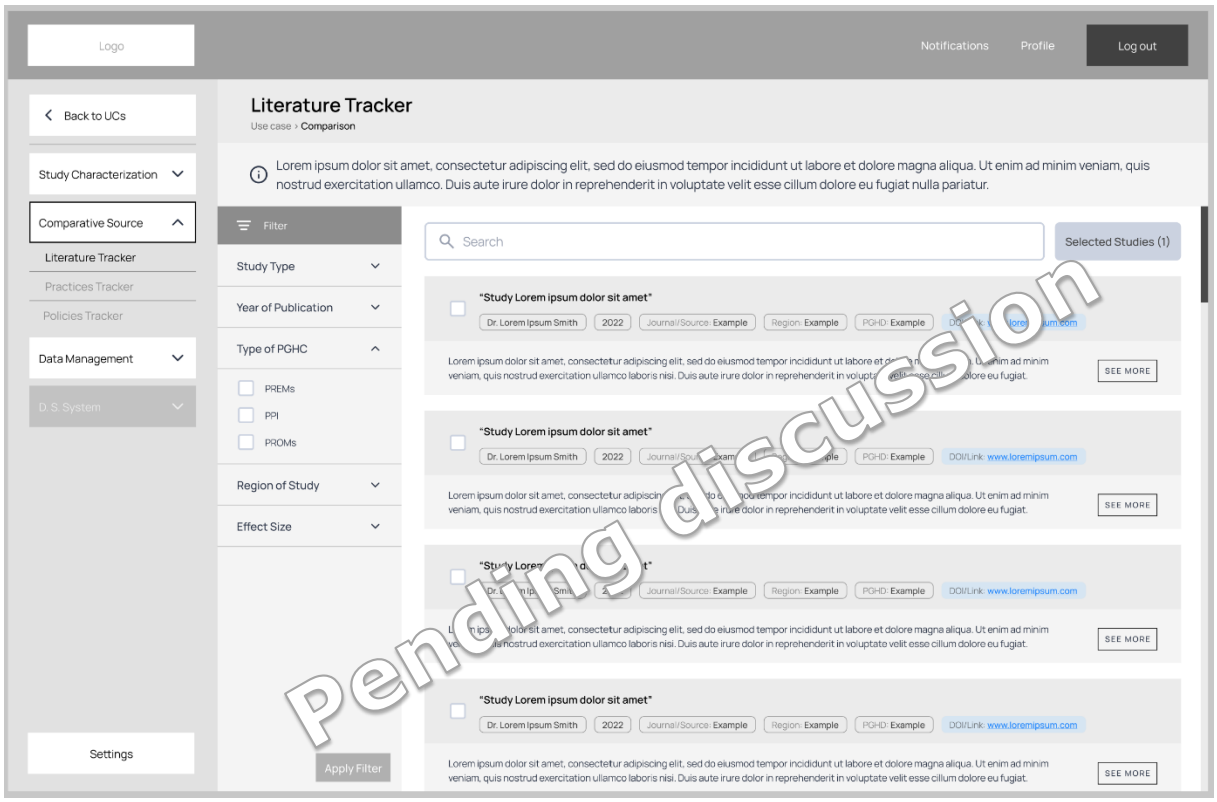

Figure 14 IMPROVE dashboard: Literature tracker.

Figure 15 presents a set of recommended practices tailored to the specific characteristics of the study. These practices are generated using information extracted from the data and knowledge warehouse, ensuring evidence-based relevance. Users can refine the recommendations using filter options to customize the output based on specific parameters.

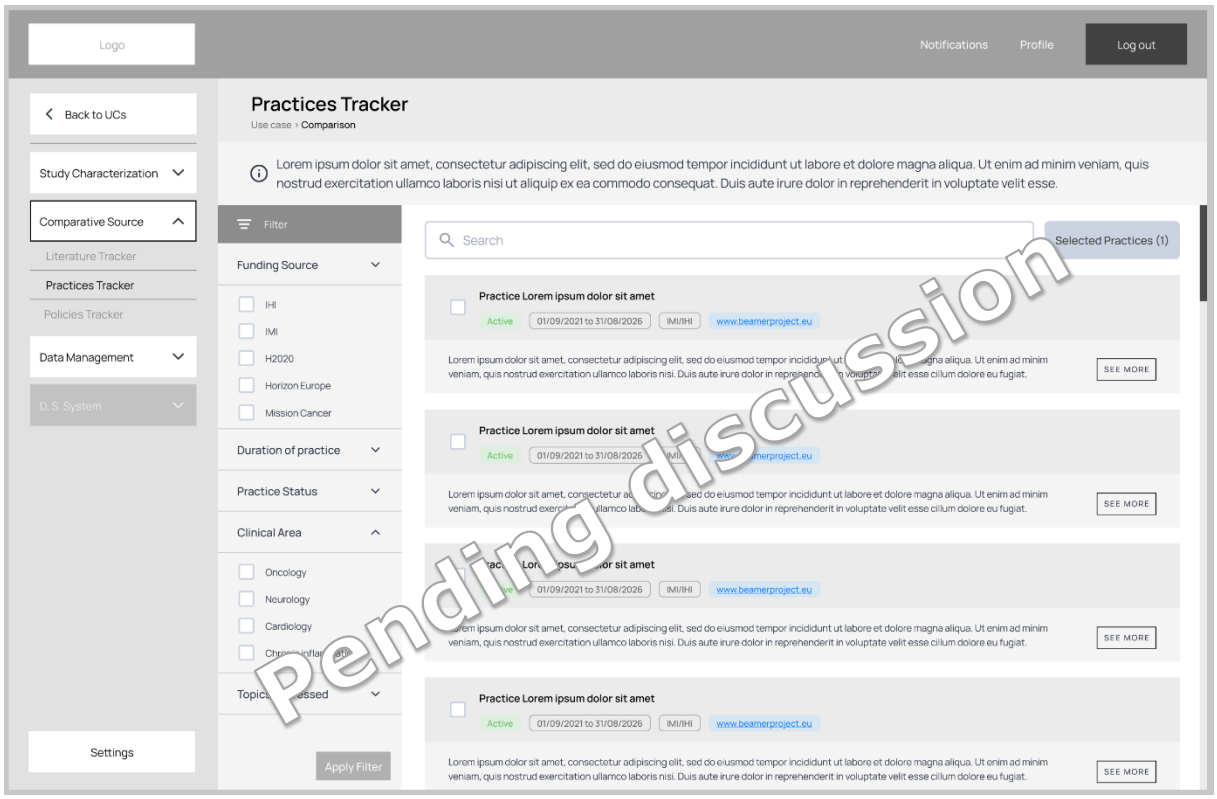

Figure 15 IMPROVE dashboard: Practices tracker.

The policies tracker screen (Figure 16) provides policies tailored to the specific study. These proposals are based on data and the information retrieved from the knowledge warehouse, ensuring relevance and alignment with existing evidence. Users can apply filter options to refine the results based on specific policy domains, populations, or study parameters.

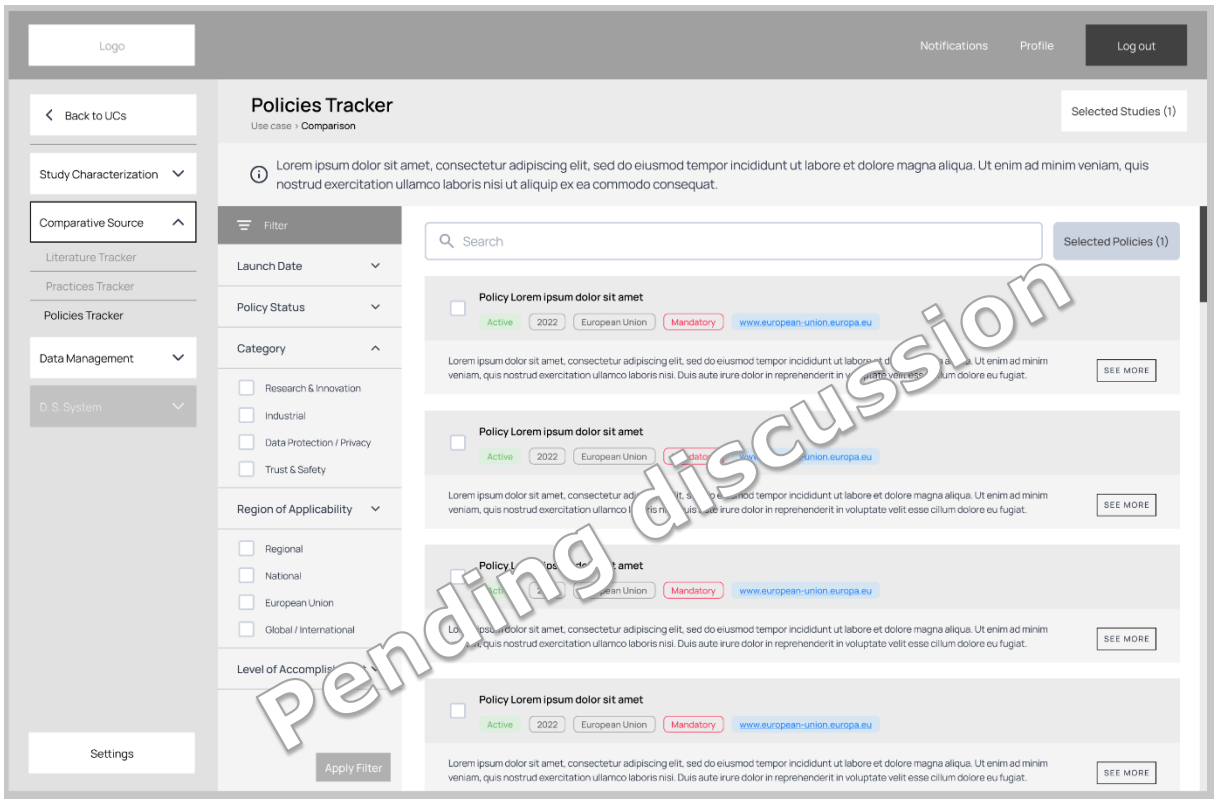

Figure 16 IMPROVE dashboard: Policies tracker.

After completing the study characterization and optionally exploring comparative sources, users can proceed with the Data Management workflow. This stream focuses on defining and organizing the study's data structure, ensuring that the information is ready for analysis and visualization within the dashboard. It enables alignment with the IMPROVE data standards while allowing for customization to meet the specific requirements of each study.

Figure 17 shows the initial interface of this workflow: the Data mapping screen. Here, users can configure the data structure of their study by selecting relevant variables from the IMPROVE reference data model. This model has been collaborative defined to ensure semantic consistency and comparability across UCs. Rather than defining a new data model from scratch, users are guided to select and map only those variables that apply to their study context.

Variable descriptions, types, and predefined value ranges are available to ensure consistency and interoperability. When needed, users may extend or annotate the structure, but always within the framework of the IMPROVE reference model.

Additionally, the platform allows users to upload their own data files, which are then automatically mapped to the selected structure. This ensures that imported data remains compatible with the platform's analytical and visualization tools, enabling robust and comparable evaluations across studies.

This approach ensures that all study-specific configurations are aligned with a harmonized data model, enabling consistent comparisons and aggregation of results across different studies.

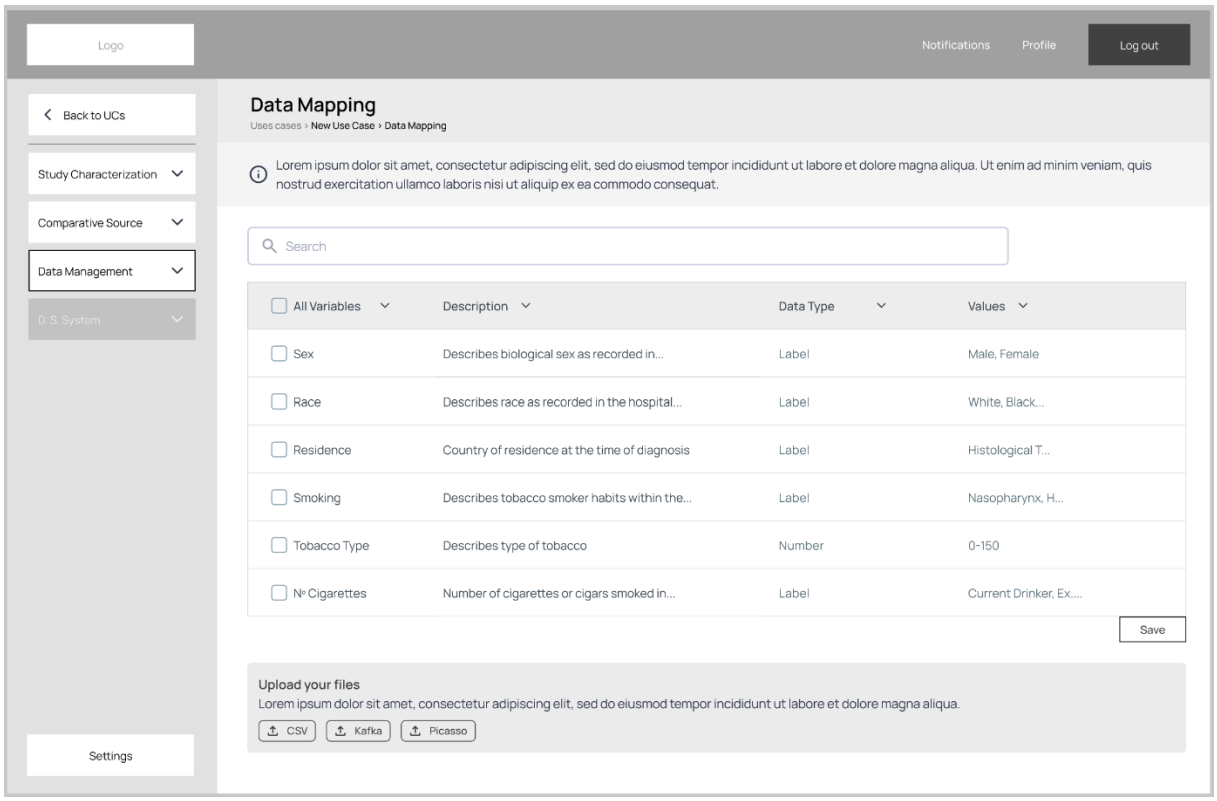

Figure 17 IMPROVE dashboard: Study data mapping.

The Data Quality screen (Figure 18) is currently under development. The proposed functionality will enable the dashboard to perform automated checks and quality analysis on the uploaded data, evaluating key aspects such as completeness, consistency, and accuracy. The results of this assessment will be displayed in a clear and user-friendly format, allowing users to quickly identify potential issues and take corrective actions. This step is essential to ensure the reliability and integrity of the data before proceeding with further analysis and visualization within the platform.

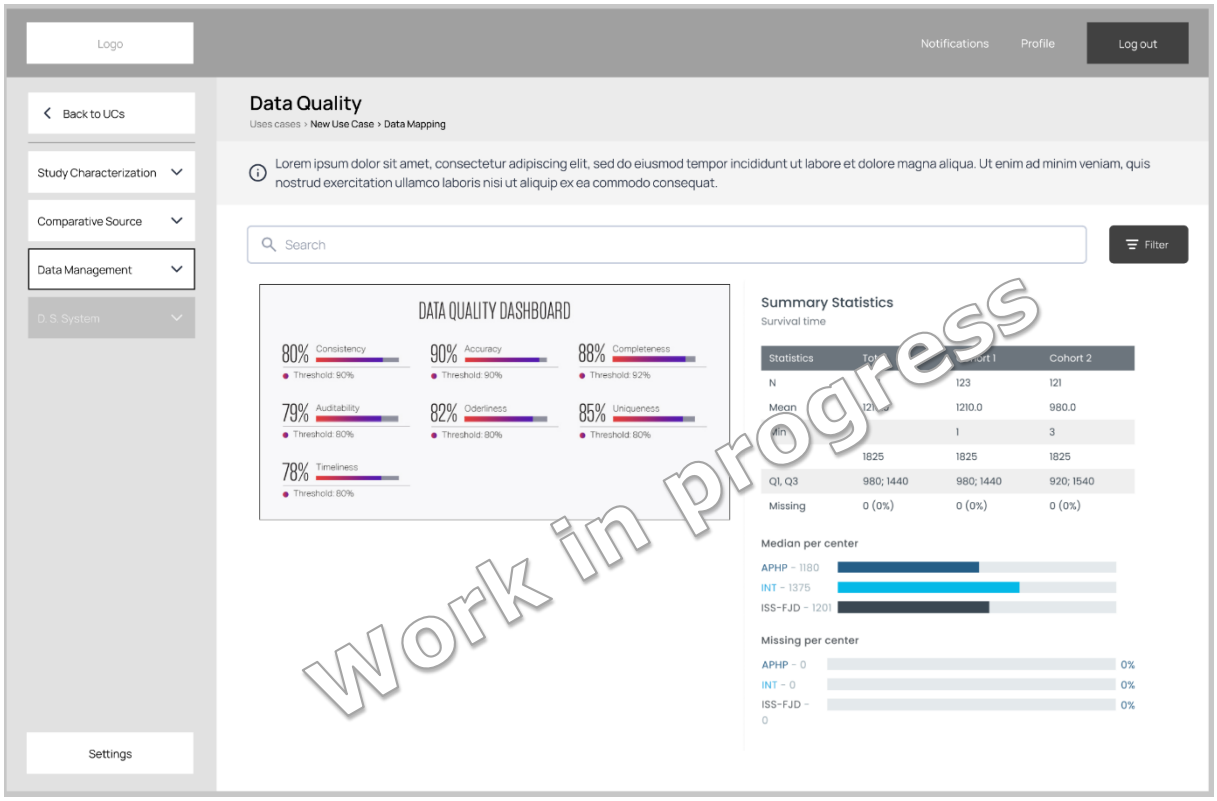

Figure 18 IMPROVE dashboard: Study data quality.

Figure 19 shows the Data monitoring screen, which provides a clear and straightforward view of the uploaded study data. The purpose of this interface is to allow users to explore the raw data exactly as it was submitted, without any transformation, aggregation, or analysis applied. This initial visualization helps users verify the structure and content of their dataset, confirm successful upload, and identify any immediate discrepancies or missing elements before proceeding to more advanced steps such as data quality assessment or performance evaluation.

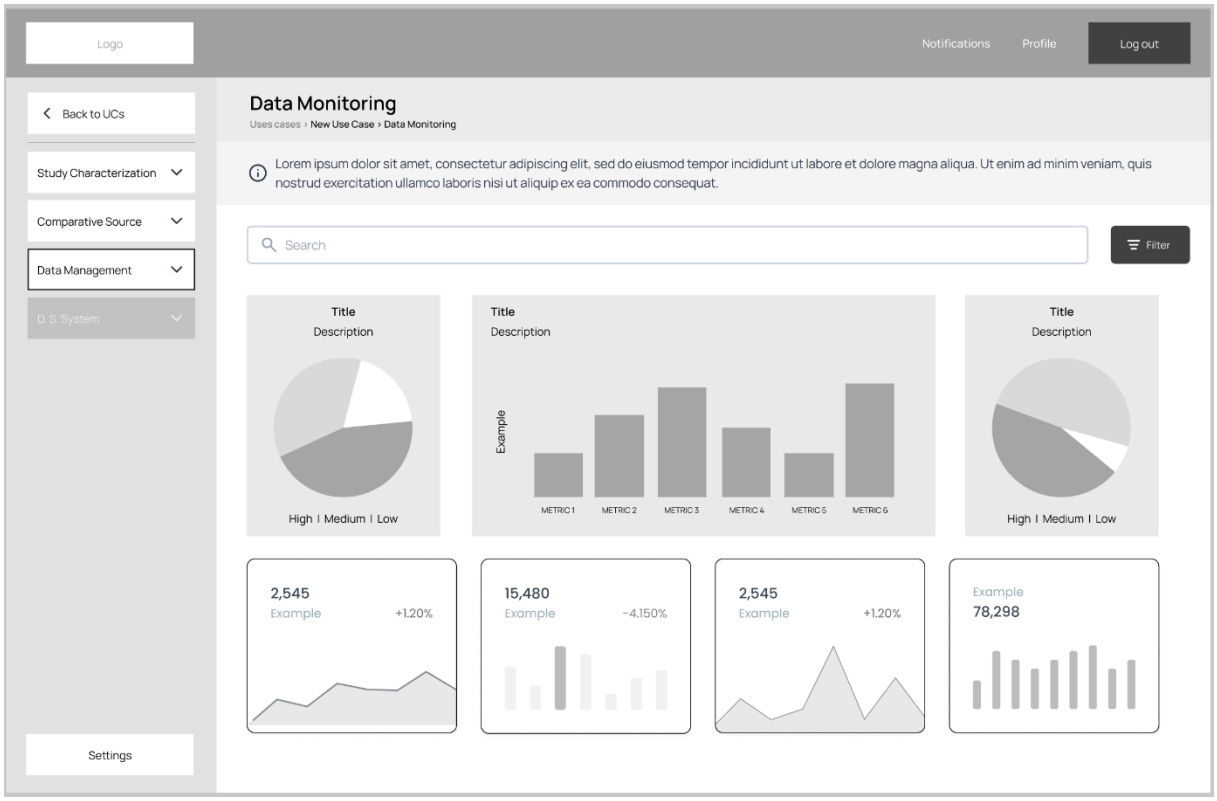

Figure 19 IMPROVE dashboard: Study data monitoring.

The screen shown in Figure 20 is the first interface of the final workflow: the Decision Support System. This section of the dashboard provides advanced analytics and data visualizations designed to extract deeper insights from the study data. It incorporates techniques such as clustering, correlation analysis, and other statistical methods to uncover hidden patterns and relationships within the dataset. The objective is to facilitate a more comprehensive understanding of the data and support data-driven decision-making through clear, intuitive, and informative visual outputs. Users will also have the option to customize the analysis parameters and export the results in various formats to support reporting, collaboration, or further investigation outside the platform.

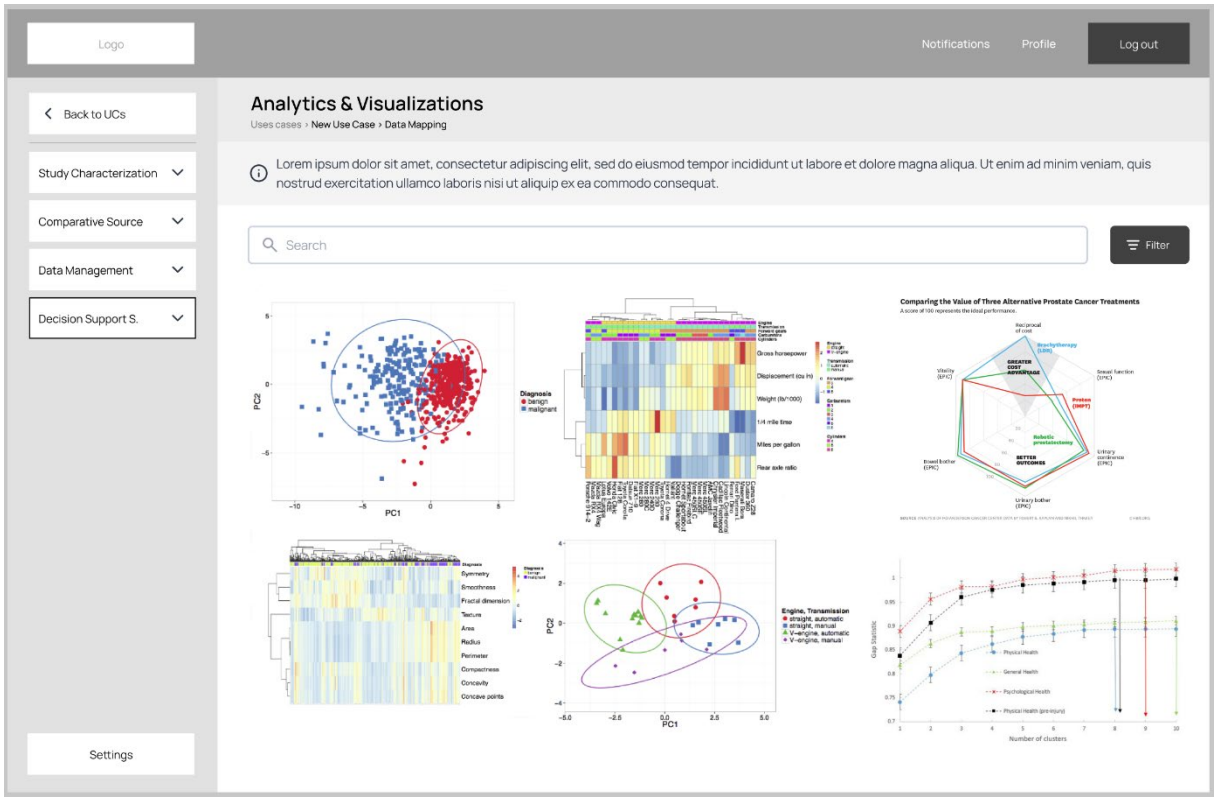

Figure 20 IMPROVE dashboard: Analytics & Visualizations.

The following screens, Synthesis of comparative sources and Comparative analysis, are currently under development and will be further refined in upcoming iterations of the dashboard.

The Synthesis of comparative sources screen (Figure 21) will allow users to visualize key features extracted from relevant literature, best practices, and policy documents. This synthesis aims to provide a consolidated view of external knowledge sources that address similar topics or challenges, helping users to better understand the broader research and policy landscape related to their study. Extracted features may include methodological approaches, target populations, technologies assessed, outcome measures, and contextual factors, among others.

Building on this, the Comparative analysis screen (Figure 22) will support the direct comparison between the defined study and the information retrieved from the external sources. This comparison will help users assess how their study aligns with or differs from existing evidence and ongoing initiatives. Additionally, the dashboard will provide recommendations derived from the literature and best practices, with the goal of improving the study design, execution, or assessment from a VBHC perspective.

These two components will be essential for guiding evidence-based refinement of studies and promoting alignment with proven approaches in the field.

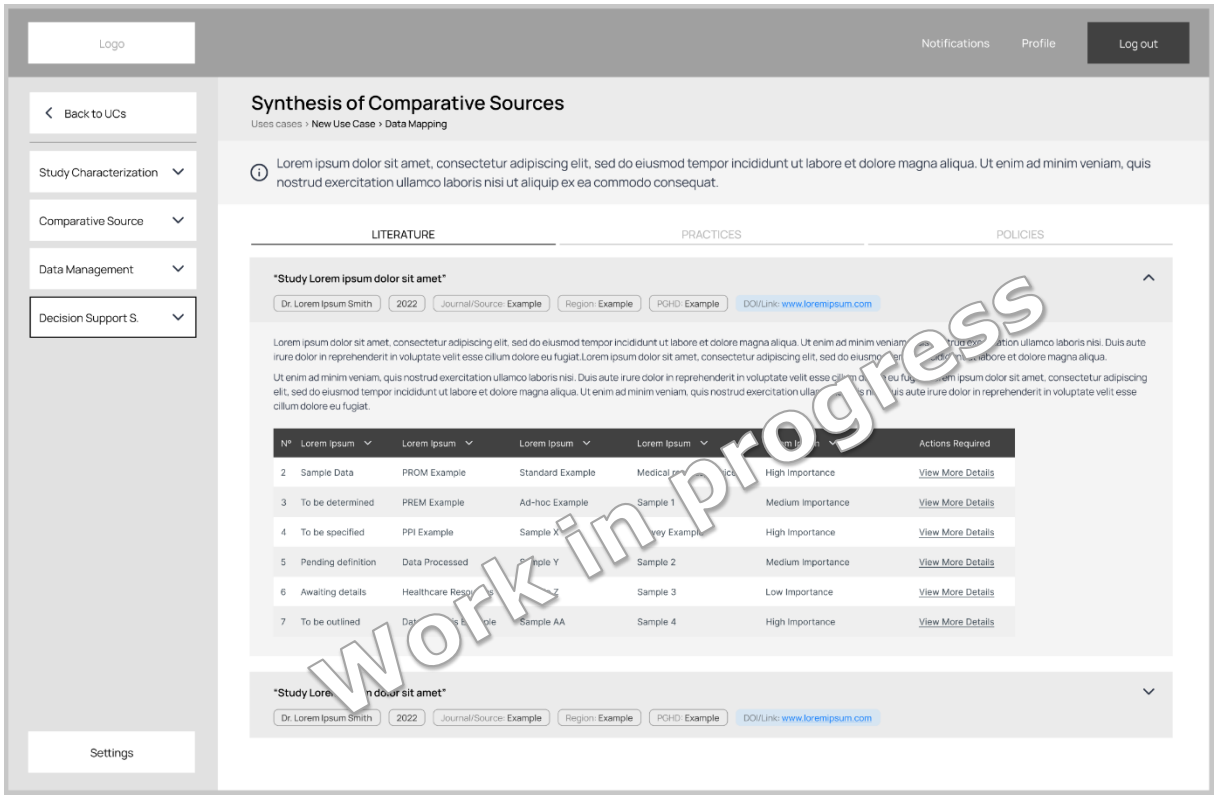

Figure 21 IMPROVE dashboard: Synthesis of comparative sources.

Figure 22 IMPROVE dashboard: Comparative analysis.

Following the synthesis and comparison with external sources, the final functionality of the dashboard, IMPROVE Oracle, provides users with a set of tools for strategic-level analysis and decision support.

This module (Figure 23) is designed to go beyond operational or clinical aspects and offer a high-level perspective on the study's positioning and potential impact. It includes advanced features such as gap analysis, which helps identify missing elements, inconsistencies, or areas that may require refinement in the study design Additionally, users can perform structured SWOT (Strengths, Weaknesses, Opportunities, and Threats) and PESTLE (Political, Economic, Social, Technological, Legal, and Environmental) analyses to explore both internal and external factors that could influence the study's execution and outcomes.

These functionalities are intended to support evidence-based decision-making by providing a comprehensive strategic overview and enabling users to proactively address risks, leverage strengths, and align their initiatives with VBHC principles. Ultimately, IMPROVE Oracle serves as a key component in transforming study insights into actionable recommendations and long-term planning strategies.

Figure 23 IMPROVE dashboard: IMPROVE oracle.

The current design is expected to be updated and improved in future iterations, following validation workshops with all project partners and individual interviews with stakeholders. These upcoming activities will gather structured feedback regarding usability, visual presentation, completeness of functionalities, and overall alignment with user needs and expectations. The insights obtained will guide the refinement of the dashboard design towards the next version and support the implementation of a high-fidelity prototype.

This iterative and participatory approach will ensure that the final version of the dashboard is not only technically robust, but also aligned with real-world clinical practices, data environments, and decision-making needs. The integration of feedback from both clinical and technical stakeholders will help guarantee that the dashboard evolves into a practical, intuitive, and valuable tool that effectively supports the implementation of VBHC across the diverse UCs addressed within the IMPROVE project.

5. Roadmap and Validation plan

This section outlines the development roadmap and validation strategy for the IMPROVE dashboard. The plan ensures that the dashboard continues to evolve in alignment with project goals and stakeholder expectations, while remaining adaptable to feedback and technical integration requirements.

The roadmap follows an iterative and user-centred approach, enabling progressive refinement through continuous collaboration with UC leaders, technical partners, and end users.

The current version of the dashboard corresponds to a low-fidelity prototype, which includes a complete conceptual workflow and interface mock-ups covering the main functional areas: study characterisation, data management, comparative analysis, and decision support.

In the next stages, the development process will focus on:

- Consolidating the feedback gathered during the co-creation activities.
- Refining the technical specifications and aligning with relevant data structures and integration requirements.
- Developing a high-fidelity prototype that includes interactive components and early functional modules.
- Testing selected functionalities with real or synthetic data.
- Engaging stakeholders in dedicated validation sessions to evaluate usability, content relevance, and overall performance.
- Iteratively improving the dashboard based on validation outcomes and pilot deployment feedback.
- Develop and deploy an initial version of the dashboard to be available to the pilot site.

The validation strategy is designed as a multi-step process, integrating qualitative and quantitative methods to ensure both technical soundness and user acceptance. It is embedded within the piloting activities and tailored to the specificities of each UC.

Validation activities will include:

- Workshops and interactive sessions with project partners to assess the practical applicability of the dashboard to their study context.
- Interviews and surveys involving clinical, technical, and managerial stakeholders.
- Usability testing of core functionalities, such as data mapping, visualization, and analytics.
- Assessment of the interpretability and perceived usefulness of the outputs from a value-based healthcare perspective.
- Technical evaluation, including data consistency, system responsiveness, and integration with external sources.

The outcomes of this process will guide future iterations and help ensure that the dashboard becomes a robust and relevant tool for supporting value-based decision-making across a variety of healthcare settings.

Conclusions and next activities

The current version of the dashboard prototype reflects a consolidated understanding of the functional needs, clinical priorities, and technical requirements gathered through active engagement with the project's UC partners. Its conceptual structure and low-fidelity interface serve as a solid foundation for further development, testing, and validation.

The next phase will focus on transforming the conceptual design into a high-fidelity prototype with interactive features and integrated functionalities. Validation activities will be carried out through structured workshops, stakeholder interviews, and pilot studies, ensuring continuous alignment with user needs and project objectives.

Future efforts will also prioritise:

- Technical alignment with data collection systems and platform integration.
- Refinement of dashboard visualisation and analytical modules.
- Deployment in selected UCs to evaluate usability, performance, and value generation.

These steps will ensure that the dashboard evolves into a robust, scalable solution capable of supporting value-based assessment and decision-making in diverse healthcare environments.

About IMPROVE

IMPROVE aims to be a dynamic, ready-to-use framework for seamlessly integrating patient-reported information. This adaptable system constantly evolves with the latest evidence, using PGHD and health system data to provide cost-effective solutions for diverse treatment conditions in real settings. The project follows Ontology, Epistemology, and Methodology principles. Ontology defines structures in patient-reported outcomes; Epistemology ensures valid knowledge; Methodology links techniques to outcomes, systematically addressed in its work.

IMPROVE optimizes patient-reported information in real settings, offering a deep understanding of patient behaviors. The project sets up ontology, epistemology, and methodology to minimize the burden on stakeholders cost-effectively. It adopts a scalable, data-driven approach with NLP-driven knowledge extraction. Real World Data is integrated into the Federated Causal Evidence module for comprehensive understanding. Evidence collected enables visualizing attributes affecting patient-reported outcomes through IMPROVE Engagement Factors and Indicators Knowledge Graphs.

IMPROVE's toolkit includes resources for decision-makers, featuring plausible scenarios via the Copenhagen Method. Patient engagement via the MULTI-ACT model ensures sustainable healthcare aligned with patient priorities. This project delivers a modular, open access strategy, providing a trustworthy ecosystem of evidence-based applications. Patient engagement and co-creation scenarios solidify its role in transforming healthcare research and care.

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Project partners:

Coordinator

Associated Partner