Interreg CENTRAL EUROPE

Co-funded by the European Union

Health Labs4Value

Technical Solution upscaled thanks to the Pilot experience in Poland

Anna Lipert, MUL

1. Executive summary

The report presents an innovative technological solution developed at the Clinical Hospital of the Medical University in Lodz with the support of the Health Labs4Value project. The solution improves the work of medical personnel and the development of telemedicine. It provides faster access to complete medical documentation. The solution supports the paperless process and increases patient convenience. The main aim of the implementation was to digitize most medical records.

In developing the solution, we collaborated with Medical University (MUL), which primarily supported us in the development of the solution in agreement with Living Lab methodology and to adhere to the patient-centered oriented and value-based healthcare approaches.

The prototype testing phase within the Health Labs4Value project was successful and provided valuable technical and organizational insights. The main learnings and insights are as follows: a) early and continuous stakeholder engagement is essential to ensure solutions meet real needs in the hospital environment; b) adaptive, context-sensitive design helps accommodate diverse regional requirements and care delivery models; c) participatory testing accelerates acceptance and impact, enhancing usability and relevance, particularly in complex healthcare settings.

There was a collaboration in co-designing, testing and implementing pilot solutions. Core Group comprised quadruple-helix actors e.g. patients, clinicians, policymakers, innovators what ensured collective ownership and legitimacy. Also, joint evaluation workshops and Open Innovation Camps fostered knowledge sharing and coordinated decision-making.

2. The technical solution based on the pilot experience

This report presents an innovative technical solution developed and tested by MUL and CSK UM in Lodz, Poland, as part of the HealthLabs4Value project. The solution digitizes the process of signing medical documentation by patients using biometric methods. The goal was to improve patient experience, enhance documentation accessibility and reduce costs related to paperwork and logistics.

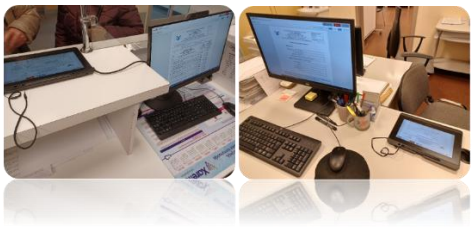
Tested in real-world settings with active patient involvement, the solution demonstrated potential benefits for both patients and healthcare staff. Challenges encountered during the implementation were addressed collaboratively with technology providers, laying a strong foundation for upscaling the solution across other departments and healthcare systems.

2.1. Brief overview on the background and context of the technical solution

The pilot was conducted at the Clinic of Chronic Cardiovascular and Metabolic Diseases within MUL. It aimed to test a value-based digital documentation system enabling patients to sign legally binding medical documents using biometric signatures. This supports a

patient-centered approach by ensuring clarity, accessibility, and security during the documentation process.

The pilot validated three key components: mobile tablets for use in wards, stationary tablets at registration points, and biometric pens for signing on printed documents. The goal was to provide flexible options for all patient demographics and ensure integration with the Hospital Information System (HIS).




➢ **Transnational aspects**

The transnational dimension of the solution development was particularly strong in the phase of functional refinement and methodological validation.

The Polish team benefited significantly from the experience of German, Czech and Hungarian partners who had previously implemented similar digital documentation systems and co-creation models. From Germany, feedback regarding patient data security and interoperability shaped the final configuration of HIS integration. From Czechia, the team integrated lessons on aligning hospital IT integration with legal documentation standards. From Hungary, MUL adopted guidelines on user authentication and role-based access within case management systems.

Knowledge exchange occurred through joint online meetings, peer reviews and Open Innovation Camps, which enabled cross-country comparison of user experiences and adaptation methods.

This transnational collaboration ensured that the Polish solution reflects best practices validated across Central European healthcare systems and supports cross-border scalability.

2.2. Detailed description of the technical solution and its uptake

The new system combined hardware and software components: tablets with zoom functionality for patients with impaired vision, biometric signature pens, and full integration with the HIS. The digitized documentation was stored within the patient's electronic medical records.

The rollout began with staff training, pre-testing using PREMs and PROMs, and real-life deployment. All documentation was stored in the HIS and supported by IT specialists. Transnational collaboration occurred through on-line meetings.

Key stakeholders in the process included hospital staff, patients with relatives, IT staff of the hospital and the members of the IT company.

Co-creation was ensured through direct engagement of patients, healthcare staff, and IT developers in multiple feedback cycles. There were 2 co-creation meetings during the organized Open Innovation Camps. After every each, there were meetings with Core Group members and also transntational. Also, there were several internal meetings between the company and the hospital IT staff depending on the needs.

- **Process of Functional Adaptation and Validation**

The biometric documentation solution introduced at MUL and CSK UM in Łódź was an existing technology adapted and functionally optimized to fit the Polish hospital environment. The process focused primarily on functional refinement, software customization and user integration rather than new product development. The implementation followed a structured,

iterative validation model inspired by the Living Labs, Patient-Centered Care (PCC) and Value-Based Healthcare (VBHC) methodologies. The individual steps of the model were as follows:

Step 1. Establishing the co-creation team

A multidisciplinary team (medical staff, IT specialists, patient representatives and administrative personnel) was formed. The group shared prior experience with similar digital solutions and co-creation processes.

Step 2. Needs assessment and system mapping

Through workshops and consultations, the hospital team analysed workflow bottlenecks and user requirements, adapting functionalities such as user interface language, access levels and integration with the Hospital Information System (HIS).

Step 3. Functional adaptation and pilot testing

The existing software was adjusted to local legal, linguistic and workflow contexts. Testing focused on usability, speed of documentation and patient comfort.

Step 4. Evaluation and feedback integration

Using PREM and PROM tools, as well as staff focus groups, the team assessed functionality and ease of use. Technical feedback loops were established between hospital IT staff and the technology provider.

Step 5. Validation and process documentation

The final stage involved documenting the validated methodology and adaptation guidelines. This step provided the basis for replication and upscaling across other departments and institutions.

This approach demonstrated that even a pre-existing digital tool requires structured, evidence-based adaptation to local clinical, technical and legal contexts — and that the process itself (co-creation, evaluation, iteration) is key to achieving sustainable improvement.

2.3. Measurable results

Quantitative results were collected through PREMs and PROMs.

As a PREM questionnaire, the specially designed questionnaire was used which contained the questions related to the assessed solution. It was prepared based on the other similar questionnaires used to evaluate modern solutions. The questions were rated from 1 to 3, so the final shore was numerical. Therefore, the final result of the evaluation provided not only

qualitative but also quantitative data about the solution. The results could be combined with the results from PROM results.

As a PROM questionnaire, the EQ-5D was used. It is a standardised measure of health-related quality of life developed by the EuroQol Group to provide a simple, generic questionnaire for use in clinical and economic appraisal and population health surveys. EQ-5D assesses health status in terms of five dimensions of health and is considered a 'generic' questionnaire because these dimensions are not specific to any one patient group or health condition. EQ-5D can also be referred to as a patient-reported outcome (PRO) measure, because patients can complete the questionnaire themselves to provide information about their current health status and how this changes over time. The descriptive system comprises five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. The patient is asked to indicate his/her health state by ticking the box next to the most appropriate statement in each of the five dimensions. The reason of using that tool was to compare the relation between the PROM and PREM. Sometimes better or worse opinions about solutions may result from the general mood or perceived comfort of a given person's life.

The solution was tested by 20 patients with relatives and staff members. Patients found the system intuitive; older users needed some assistance. Staff observed workflow changes – while documentation became more centralized and accessible, registration became slightly more time-consuming. Challenges included software bugs and HIS integration issues. Patient experience improved through reduced paperwork and better access to records.

Results of the evaluation:

Qualitative feedback from patients, including any challenges, concerns, or suggestions for improvement:

Patients did not report any comments. They were rather pleased with the solution, because it did not require them to look for a free seat and a table in order to fill out the documents. The only comments came from the employees serving the registration desk, where patients are admitted. They claimed that they were slower to admit a patient, because until now they could hand over the forms to fill out and admit another person, and now they have to complete the full admission of a patient and only then move on to the next one. From the patient's point of view, however, it is more beneficial and responds to the assumptions of the project, which is based, among others, on Patient-Centered Care approach.

At the stage of testing phase, it was difficult to assess key value-based healthcare metrics, such as cost-effectiveness, improved patient care, resource allocation. However, it is expected that the costs of patient service should decrease and the quality of services provided will improve. In the case of this solution, in order to properly assess the changes, the solution should be

compared in different departments, where there is a different specificity of the patient and the required documentation to sign.

3. Sustainability of the solution

3.1. Sustainability Strategy

Organizational sustainability is supported through trained staff and technical support. HIS integration ensures long-term viability. The solution's technical sustainability depends on regular updates and improved user authorization methods.

Financially, reduced printing and administrative workload imply long-term cost savings. Patient-centered design ensures continued relevance.

There are several funding possibilities to support the implementation of the proposed solution in the hospital setting, including governmental health grants, partnerships with non-governmental organizations (NGOs). Additionally, hospital may pursue private sector sponsorships, philanthropic donations or internal reallocation of budgets to prioritize patient care improvements. Applying for research or innovation grants through academic or healthcare institutions can also provide substantial financial support for implementation.

Sustainability of the solution relies on institutionalising the validated process of adaptation and training rather than on maintaining the software product itself.

The process will be embedded in MUL's internal Living Lab structure, which ensures:
- regular staff training and certification in digital documentation management,
- continuous patient feedback integration into hospital quality systems,
- cooperation with partner hospitals for benchmarking and shared updates.

3.2. Key lessons learned

From a technical perspective, the solution involved integration with the existing HIS system, ensuring that patient documentation could be stored, retrieved, and linked with existing medical records. Security protocols were established to prevent unauthorized access from mobile tablet interfaces, including supervised completion and planned PIN-based authentication.

Strategically, the rollout was aligned with MUL's digital transformation strategy, focusing on reducing administrative overhead, increasing patient autonomy, and improving documentation traceability. Key performance indicators include time saved per patient admission, reduction of paper usage, and user satisfaction as measured by PROMs/PREMs.

Close collaboration with technology vendors allowed continuous iteration based on real-time feedback, while participation in transnational project meetings helped benchmark progress and

refine implementation strategies. Future development phases include integration with national e-Health platforms and expansion into additional clinical departments beyond the pilot site.

4. Upscaling of the Technical Solution

4.1. General goal and strategy for upscaling

The pilot confirmed the solution's adaptability and methodology effectiveness.

- **Solution as a device:**

Short-term goals include expansion to more hospital departments. Mid-term, the solution can be implemented regionally with additional language and legal adaptations.

Functional scalability includes the development of mobile apps and greater integration with complementary health IT systems. The HIS compatibility, biometric features, and device modularity make it adaptable to different clinical settings.

However, before scalability the strategy should be prepared to consider belove elements:

- purchasing the solution
- adapting the documentation to the use in the solution
- installing digitizing devices
- staff training
- post-implementation care
- funding possibilities

- **Solution as the methodology/approach:**

For upscaling, the methodology, including training materials, adaptation steps and validation forms, will be transferred to other hospital departments and external healthcare facilities.

By focusing on process ownership (held by the hospital and university) rather than product ownership (held by the vendor), the solution ensures long-term institutional sustainability and replicability.

4.2. Concrete goals and measures for upscaling

The other measurements, except PREMs and PROMs, allowing for obtaining additional variables and analysis are possible, what was not possible during the piloting phase. In the longer term it is possible to observe the time of admission of patients which was previously without the implemented solution and now. Also, the time needed to fill in the documents in

the electronic form between the wards can be recorded as the type of patients and their physical efficiency because of the disease is different there.

Supplement – Evidence for Achieving RCR104 (Uptake and Upscale of the Solution):

To provide evidence for the uptake and upscale (RCR104), we will prepare the following key documents and activities that demonstrate genuine interest and strategic commitment to further development and expansion of the solution:

- **Upscaling Strategy**

This document will include a timeline for expanding the solution to other hospitals and regions, including defined phases, goals, responsible stakeholders and measurable success indicators.

- **Action Plan**

An operational action plan will be prepared for the period 2025–2035, outlining specific steps for expanding functionalities, adapting content to new diagnostic groups and involving new partners.

- **Letters of Commitment**

Letters of intent or support will be collected from key stakeholders, such as:

- healthcare institutions/hospitals,
- univeristies to support promotion and user validation,
- private companies interested in user validation.

- **Evidence of Stakeholder Engagement**

Regular meeting minutes from project and stakeholder working groups, showing active involvement in the development, implementation, and upgrade of the solution.

- **Milestones**

Key milestones will be identified, such as:

- Expansion of the solution to additional hospital departments,
- Integration with the hospital system HIS.

4.3. Resource Requirements for upscaling

There are several funding possibilities to support the implementation of the proposed solution in the hospital setting, including governmental health grants, partnerships with non-governmental organizations (NGOs). Additionally, hospital may pursue private sector sponsorships, philanthropic donations or internal reallocation of budgets to prioritize patient

care improvements. Applying for research or innovation grants through academic or healthcare institutions can also provide substantial financial support for implementation.

5. Conclusions

The biometric documentation system piloted at MUL improves patient experience and administrative workflows. Real-world testing identified key technical issues, which were addressed. The system is sustainable, with clear potential for scaling. Future implementations will benefit from improved legal validation, adaptive training, and continuous feedback from both patients and staff. The solution supports the values of Patient-Centered Care and Value-Based Healthcare, making it a strong candidate for broader adoption.

- **Added Value and Practical Application:**

The Polish case demonstrates that meaningful digital transformation in healthcare is achieved not only through technological innovation, but through a structured co-creation and validation process. The solution should therefore be understood as a tested and validated methodology for functional adaptation of digital documentation systems in hospital settings, supported by evidence-based evaluation (PREM/PROM) and cross-country learning.

This methodological approach can be replicated in other hospitals using different digital tools, provided similar conditions (time, resources, multidisciplinary engagement) are met.