Interreg CENTRAL EUROPE

Co-funded by the European Union

Health Labs4Value

3.3.1. Reports from implementation of testing phase in territorial Health Living Labs (real-world setting)

GUIDELINE

KEY DEFINITIONS:

A prototype can be perceived as something being built to represent a product or experience before the actual artefact is completed.[1]

Pilot test should provide insights into anything that might be missing in the innovation, so this can be adjusted before the complete roll-out to a larger group of test users.[2]

Real-word health care setting place/location existing or occurring in reality, e.g. hospitals, clinics and pharmacies across diverse geographies, enabling to obtain by researchers real-world evidence (RWE) based on real-world data (RWD)

Real-world evidence (RWE) is evidence about the use, safety and effectiveness of a medical product, technology or drug that is based on or derived from analysis of data generated in a real-world health care setting.[3]

Real-world data (RWD) includes information about the health of individuals or the delivery and/or outcomes of health care that is collected outside of traditional clinical trials and thus reflects results within the context of the particular health care system.[4]

Implementation is defined as a specified set of activities designed to put into practice an activity or program.[5]

Within innovation research and living lab projects, a crucial component is to test an innovation in a real-life context with potential end users. Such a field test can validate assumptions by combining insights on behaviour and attitudes towards the innovation. This allows for iterative tailoring of the innovation to the needs and wants of the potential end users. Moreover, relevant insights can be gathered to stop or rescope the innovation project before big investments are made. Although studies indicate that testing innovations (or prototypes) in real-life contexts improves the innovation process, there is no specific framework on how to conduct a field test for an innovation. Therefore, for the needs of the solutions proposed in the project and after reviewing the literature on the subject, the following path for implementation of testing phase in real-word setting was proposed:

1. Finish the recruitment process of 20 patients with their relatives. The recruited participants should be those who are confronted with the solution **(end of September 2024).**
2. Prepare all the necessary protocols, written consents etc. based on the national regulations or internal regulations of the institution which should be filled in and signed by the participants.

[1] Sanders, E. B.-N., & Stappers, P. J. 2012. Convivial Toolbox: Generative Research for the Front End of Design. Amsterdam: BIS.
[2] Coorevits, L., Georges, A., & Schuurman, D. 2018. A Framework for Field Testing in Living Lab Innovation Projects. Technology Innovation Management Review, 8(12): 40-50.
[3] Chodankar D. Introduction to real-world evidence studies. Perspect Clin Res. 2021 Jul-Sep;12(3):171-174. doi: 10.4103/picr.picr_62_21. Epub 2021 Jul 7.
[4] As above
[5] Implementation Stages | NIRN". nirn.fpg.unc.edu. National Implementation Research Network. Archived from the original on 2022-05-23. Retrieved 2022-01-26.

3. Before the first confrontation the users with the solution, there should be a pre-test phase sing PREMs and PROMs specifically adapted to the evaluated solution. Use also some other forms of evaluation if possible, e.g. measurement devices.
4. Store all the data from pre-test phase: both forms, electronically or in paper is possible.
5. Users react to and interact with the new solution.
6. At the end of the testing, post-test phase using the same PREMs and PROMs should be provided to gain quantitative insights.
7. Store all the data from post-test phase: both forms, electronically or in paper is possible.
8. Analyse/Compare the results obtained from pre- and post-tests.
9. Summarize the results with reporting the final feedback for the prototype improvements.

- HCOs with Teams play a key role in that phase with the support of KPs with their expertise.
- The challenges and progress will be discussed with other piloting regions during the monthly calls facilitated by WP T3 leader on a transnational level.

Name:

Location: Budapest, Hungary

Date: 02.28.2025

Institution: TritonLife, CTRIA

BACKGROUND INFORMATION

1. **Context about the Territorial Health Living Labs and the goals of the testing phase.**

The aim is the development of a new patient management system involving Health Living Labs. These labs facilitate co-creation between hospitals, developers, healthcare professionals, and patients.

The new patient management system was designed based on:

- SWOT analysis of existing systems
- Focus group meetings with stakeholders
- Open Camp events
- Personal interviews

The co-creation process involved healthcare institutions, R&D companies, innovation professionals, patients, and relatives. The Central Transdanubian Regional Innovation Agency also contributed expertise. This collaborative approach ensured the system addressed real needs and concerns.

The core goal of the testing phase is to evaluate the co-designed prototype, specifically the new patient management system, in a real-world Health Living Lab environment. This involves assessing its effectiveness, usability, and compliance with regulatory requirements. Key objectives include:

- Validate the prototype's functionality: Testing all features to ensure they work as expected.

- Evaluate integration with existing systems: Ensuring seamless integration with existing hospital software for data synchronization and efficient workflows.
- Asses regulatory compliance: Verifying that the system meets Hungarian healthcare regulations and data protection standards (e.g., GDPR).
- Gather user feedback: Collecting feedback from healthcare professionals on the system's usability and impact on their daily tasks.
- Identify potential challenges: Identifying and addressing any difficulties or issues that arise during implementation and testing.
- Measure performance: Assessing the system's performance in handling data volume and user load to ensure stability and responsiveness.
- Ensure security and data privacy: Rigorously testing security protocols to protect sensitive patient information and prevent unauthorized access.
- Assess the degree of compliance: Evaluating how well the custom-developed system addresses the specific legal, regulatory, and integration challenges of the Hungarian healthcare environment.

2. **Define the purpose of testing the new value-based solution with patients (e.g., improving patient outcomes, increasing efficiency).**

   The purpose of testing this new value-based solution with patients is twofold: to increase efficiency and to increase patient satisfaction. The new patient management system is designed to improve the organization of surgical procedures and enhance the efficiency of doctors and healthcare institutions. By streamlining processes such as scheduling, quote generation, and communication, the system aims to reduce administrative burdens and improve overall workflow efficiency within the hospital.

   In addition to enhancing efficiency, the testing phase also focuses on increasing patient satisfaction. The system aims to provide patients with clear and accurate information about their surgeries, improve communication channels, and ensure transparent operations. By addressing these key areas, the system seeks to create a more positive and reassuring experience for patients, leading to increased satisfaction with the hospital's services. The co-design process actively involved patients, ensuring their needs and concerns were considered in the development of the system, further emphasizing the goal of improving patient satisfaction.

3. **A brief description of the new value-based solution being tested.**

The new value-based solution being tested is a comprehensive patient management system designed to enhance healthcare delivery and operational efficiency. Key features include:

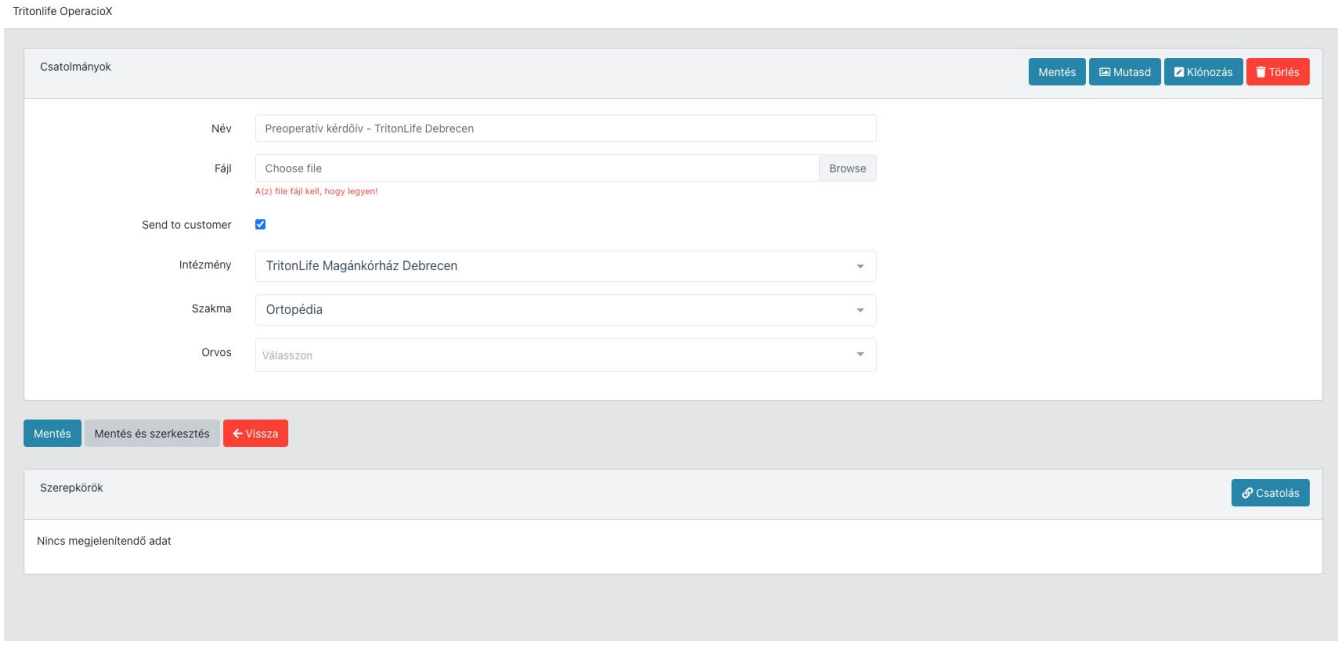
- Optimized scheduling: The system allows for efficient booking and management of surgical appointments, with the ability to view and select date ranges in the calendar.
- Location-based pricing: Surgeries can be linked to specific locations as well as doctors, with support for unique pricing per site, enhancing flexibility and accuracy in cost management.
- Integrated patient feedback: The system incorporates structured data collection on surgery

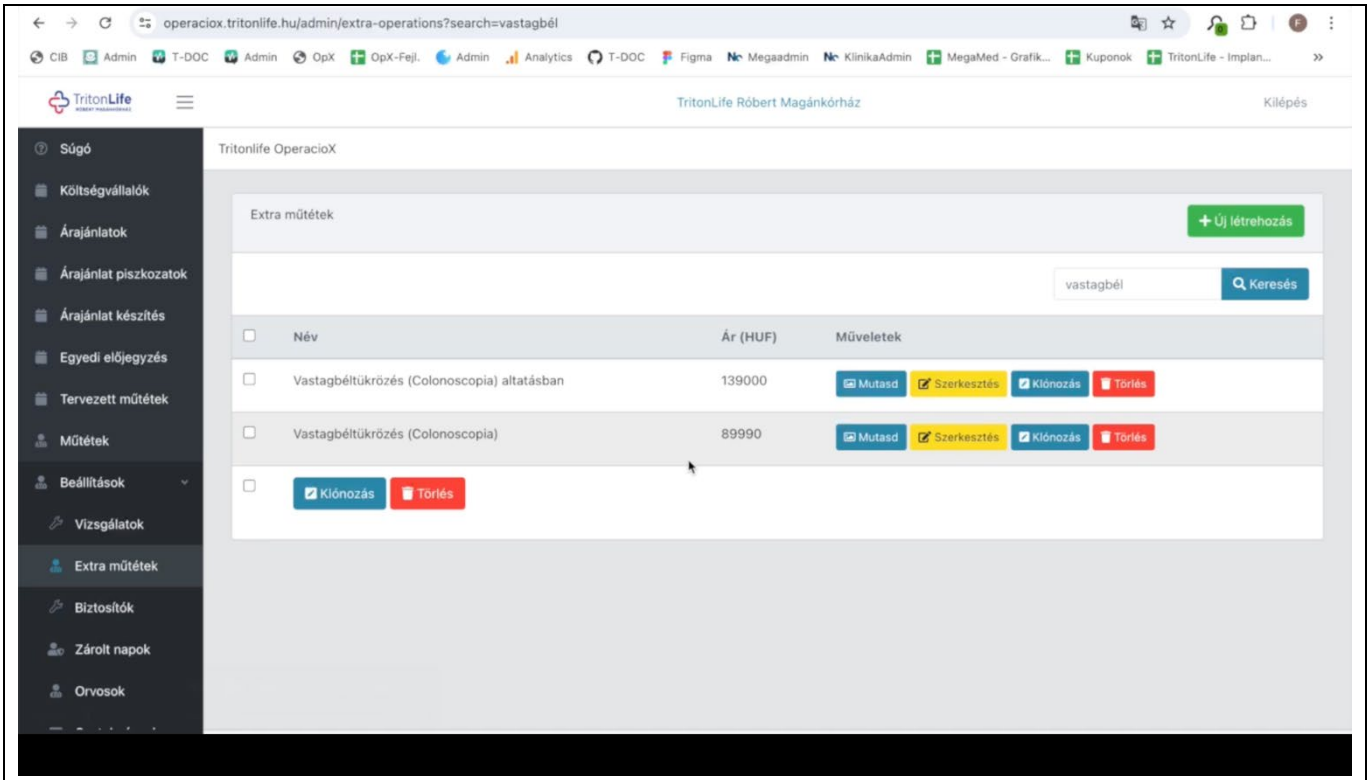
offer rejections, allowing case managers to select from predefined categories when recording a rejection. This feature aims to improve understanding of patient decision-making processes.

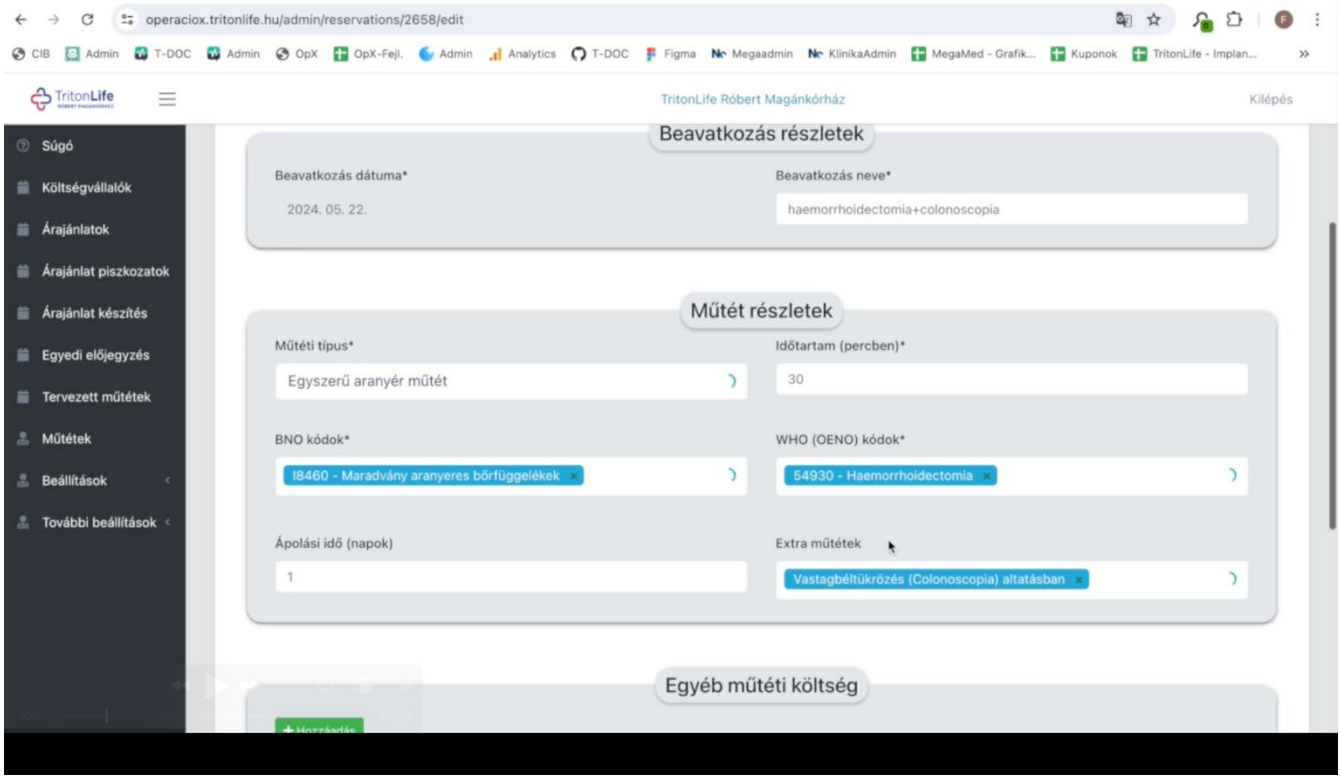
- Streamlined administrative tasks: The solution includes features like easy appointment rescheduling without automatically sending new price offers, reducing unnecessary administrative work.
- Emergency capacity management: The system integrates emergency capacity planning, improving resource allocation and responsiveness to urgent cases.
- User support: A help menu is included to provide guidance on effectively using the system, enhancing user experience for healthcare professionals.

This value-based solution aims to improve patient care quality, increase operational efficiency, and provide data-driven insights for continuous improvement in healthcare delivery.

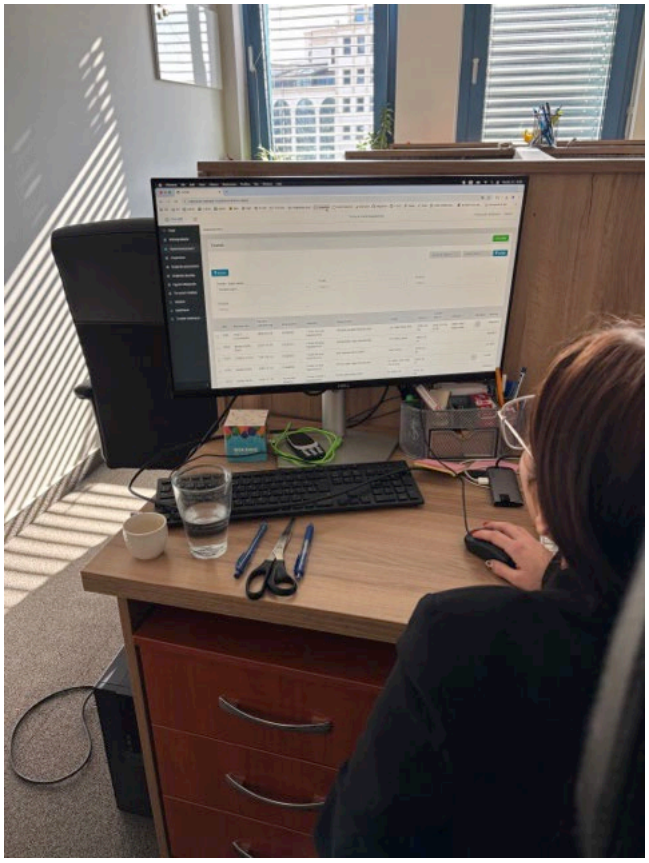
Print screens:



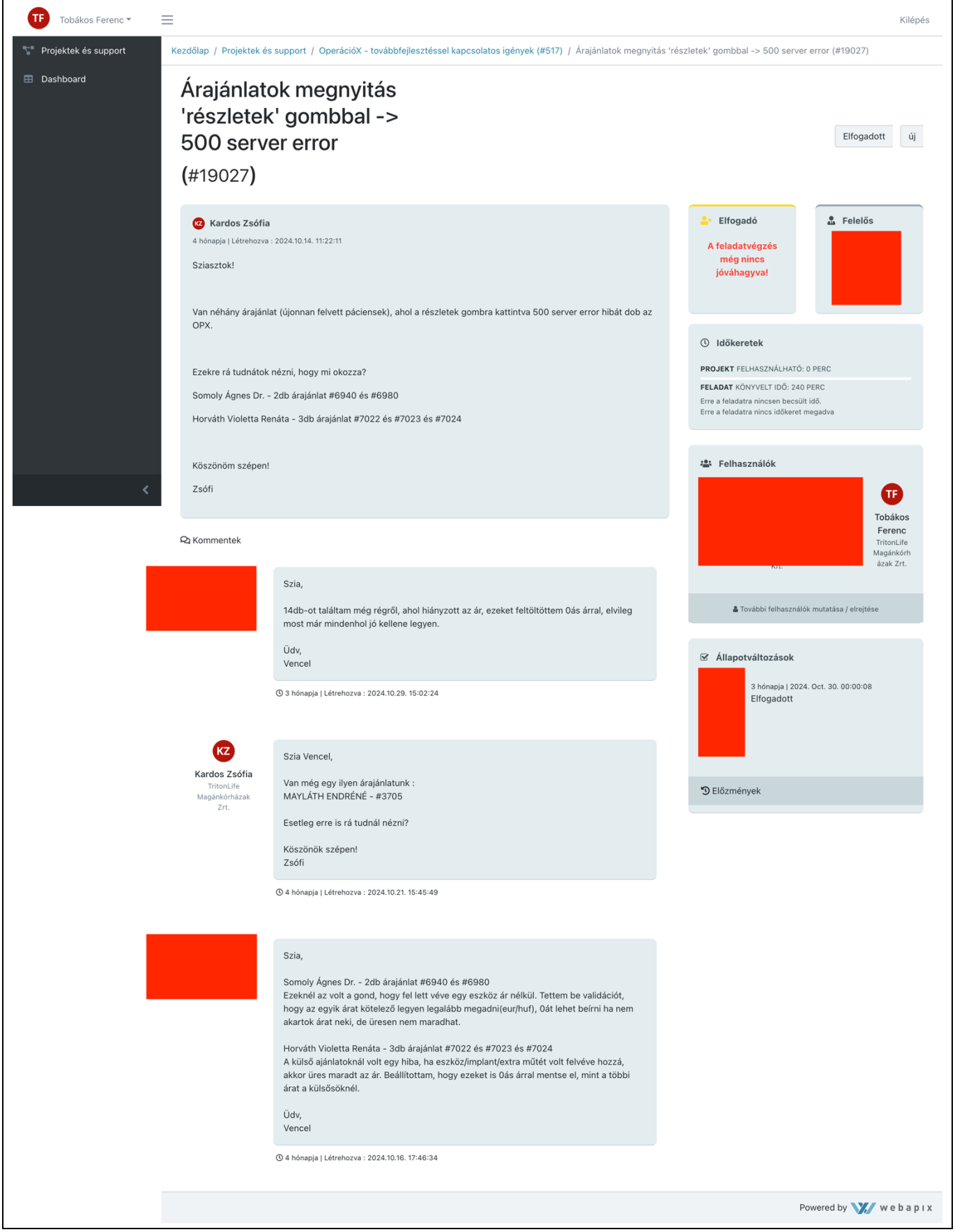

operaciox.tritonlife.hu/admin/extra-operations?search=vastagbél
TritonLife
TritonLife Róbert Magánkórház
Kilépés
Súgó
Költségvállalók
Árajánlatok
Árajánlat piszkozatok
Árajánlat készítés
Egyedi előjegyzés
Tervezett műtétek
Műtétek
Beállítások
Vizsgálatok
Extra műtétek
Biztosítók
Zárolt napok
Orvosok
Tritonlife OperacioX
Extra műtétek
+ Új létrehozás
vastagbél
Keresés
Név
Ár (HUF)
Műveletek
Vastagbéltükrözés (Colonoscopia) altatásban
139000
Vastagbéltükrözés (Colonoscopia)
89990
Mutasd
Szerkesztés
Klónozás
Törlés


operaciox.tritonlife.hu/admin/reservations/2658/edit
TritonLife
TritonLife Róbert Magánkórház
Kilépés
Beavatkozás részletek
Beavatkozás dátuma*
2024. 05. 22.
Beavatkozás neve*
haemorrhoidectomia+colonoscopia
Műtét részletek
Műtéti típus*
Egyszerű aranyér műtét
Időtartam (percben)*
30
BNO kódok*
I8460 - Maradvány aranyeres bőrfüggelékek
WHO (OENO) kódok*
54930 - Haemorrhoidectomia
Ápolási idő (napok)
1
Extra műtétek
Vastagbéltükrözés (Colonoscopia) altatásban
Egyéb műtéti költség

Testing pictures:



Bug report:


TF
Tobákos Ferenc
Kilépés
Projektek és support
Dashboard
Kezdőlap / Projektek és support / OperációX - továbbfejlesztéssel kapcsolatos igények (#517) / Árajánlatok megnyitás 'részletek' gombbal -> 500 server error (#19027)
Árajánlatok megnyitás 'részletek' gombbal -> 500 server error (#19027)
Elfogadott
új
Kardos Zsófia
4 hónapja | Létrehozva : 2024.10.14. 11:22:11
Sziasztok!
Van néhány árajánlat (újonnan felvett páciensek), ahol a részletek gombra kattintva 500 server error hibát dob az OPX.
Ezekre rá tudnátok nézni, hogy mi okozza?
Somoly Ágnes Dr. - 2db árajánlat #6940 és #6980
Horváth Violetta Renáta - 3db árajánlat #7022 és #7023 és #7024
Köszönöm szépen!
Zsófi
Elfogadó
A feladatvégzés még nincs jóváhagyva!
Felelős
Időkeretek
PROJEKT FELHASZNÁLHATÓ: 0 PERC
FELADAT KÖNYVELT IDŐ: 240 PERC
Erre a feladatra nincsen becsült idő.
Erre a feladatra nincs időkeret megadva
Felhasználók
TF
Tobákos Ferenc
TritonLife Magánkórházak Zrt.
További felhasználók mutatása / elrejtése
Állapotváltozások
3 hónapja | 2024. Oct. 30. 00:00:08
Elfogadott
Előzmények
Kommentek
Szia,
14db-ot találtam még régről, ahol hiányzott az ár, ezeket feltöltöttem 0ás árral, elvileg most már mindenhol jó kellene legyen.
Üdv,
Vencel
3 hónapja | Létrehozva : 2024.10.29. 15:02:24
KZ
Kardos Zsófia
TritonLife Magánkórházak Zrt.
Szia Vencel,
Van még egy ilyen árajánlatunk :
MAYLÁTH ENDRÉNÉ - #3705
Esetleg erre is rá tudnál nézni?
Köszönök szépen!
Zsófi
4 hónapja | Létrehozva : 2024.10.21. 15:45:49
Szia,
Somoly Ágnes Dr. - 2db árajánlat #6940 és #6980
Ezeknél az volt a gond, hogy fel lett véve egy eszköz ár nélkül. Tettem be validációt, hogy az egyik árat kötelező legyen legalább megadni(eur/huf), 0át lehet beírni ha nem akartok árat neki, de üresen nem maradhat.
Horváth Violetta Renáta - 3db árajánlat #7022 és #7023 és #7024
A külső ajánlatoknál volt egy hiba, ha eszköz/implant/extra műtét volt felvéve hozzá, akkor üres maradt az ár. Beállítottam, hogy ezeket is 0ás árral mentse el, mint a többi árat a külsősöknél.
Üdv,
Vencel
4 hónapja | Létrehozva : 2024.10.16. 17:46:34
Powered by webapix

TESTING METHODOLOGY

1. **Describe how the 20 patients were selected (e.g., demographics, health conditions).**

The selection process for participants in Open Camp 2 aimed to build upon the insights gained from the first event while also expanding representation across different patient profiles. While efforts were made to invite attendees from the initial Open Camp, only three individuals were able to participate in the second iteration.

To ensure a robust and diverse participant pool, recruitment efforts focused on patients within the hospital's database who had experience with the entire surgical journey, from requesting a quote to receiving post-operative care. The intention was to gather feedback from individuals with first-hand knowledge of the processes the new system aimed to improve.

Age diversity was also a consideration during recruitment. Although the hospital's patient demographic skews towards older age groups, efforts were made to include a wide range of individuals, successfully representing patients from their early thirties to their seventies. However, due to the limited number of patients under 30, this age group was not represented in the Open Camp.

In terms of group composition, the goal was to maintain a balance between patients and their relatives, with a slight emphasis on patient representation. Unfortunately, achieving gender balance proved challenging, as the final participant pool consisted of only two men out of a total of 26 attendees. Despite this imbalance, the valuable insights and perspectives shared by all participants contributed to a comprehensive evaluation of the new patient management system.

2. **Specify the time frame of the testing.**

Testing started in early October 2024 and ran until the end of February 2025.

3. **Outline how the solution was tested (e.g., use in real-world settings, patient interaction, clinical support).**

To create a more comprehensive testing approach, the involvement of 26 participants, a mix of patients and their relatives, proved invaluable. These individuals took part in dedicated Open Camp events, making significant contributions to the testing and overall development process.
The Open Camp events served as an important forum for gathering diverse perspectives and ensuring that the prototype met the needs of both patients and healthcare providers.
However, the solution was tested primarily through simulated use by healthcare professionals due to the prototype's administrative focus. The testing was heavily weighted towards internal validation and simulation by health professionals, with a focus on simulating the full patient journey to identify potential issues.
The testing process involved the following key elements:

- Simulated environment: The new system's modules were tested extensively in a simulated environment to mimic real-world scenarios without affecting actual patient care.

- Healthcare professional involvement: More than 15 colleagues within the organization, including case managers, finance staff, doctors, and nurses, participated in the internal testing of the system.
- End-to-end journey simulation: The colleagues engaged in the simulated environment and spent weeks testing all the administrative system modules in a simulated environment by simulating many test patient journeys.
- Functional testing: The testing process likely involved verifying that each function of the administrative system operated as intended, with test parameters set to be as close as possible to a real-world situations.

4. Explain how data was collected (e.g., surveys, interviews, clinical measurements, feedback forms).

Data collection methods:

- PREMs and PROMs questionnaires: Data was collected from patients and relatives through Patient-Reported Experience Measures (PREMs) and Patient-Reported Outcome Measures (PROMs) questionnaires. These questionnaires were designed to capture feedback on their experiences with the existing system and their expectations for the new prototype.
- Bug reports: During internal testing, medical staff and case managers recorded specific error notes ("bug reports") directly within the system. This real-time feedback mechanism allowed software developers to quickly identify and address technical issues. Hundreds of such bug reports were generated during the testing.
- Personal interviews: In-depth, personal interviews were conducted with the testing colleagues to gather more detailed comments and insights beyond specific bugs. These interviews aimed to understand their overall experiences and suggestions for improving the system's functionality.

a) Did you need to prepare any additional protocols, written consents etc. except PREMs and PROMs questionnaires? If YES, describe them and explain why it was necessary.

Other than the PREMs and PROMs questionnaires, no additional written consents were required from patients. The questionnaires were the sole method of data collection from patients.
However, the medical staff and case managers' recordings of specific error notes, directly received by the software developers and used as a basis for correcting the errors, were an important part of the testing process. Hundreds of such bug reports were generated during the testing. In order to make the system more functional, rather than specific bugs, longer personal interviews were conducted with the testing colleagues to give their comments. The medical staff were informed that their opinion would be recorded, but no separate document was signed about it.

b) How did you store the data and how did you secure them?

Data storage and security:

1. Patient data: The PREMs and PROMs questionnaires completed by patients were anonymous, ensuring the protection of their personal data.
2. Error messages: Error messages and bug reports generated during testing were handled within the system in accordance with the strictest data protection protocols. This involved encryption, access controls, and adherence to relevant data privacy regulations.

IMPLEMENTATION DETAILS

1. Identify the key stakeholders involved in the testing, including healthcare professionals, patients, and technical support teams.

The key stakeholders involved in the testing include:

- Healthcare professionals: During the testing, the medical staff, the case managers were able to record specific error notes, which were directly received by the software developers and used as a basis for correcting the errors. Hundreds of such bug reports were generated during the testing. In order to make the system more functional, rather than specific bugs, longer personal interviews were conducted with the testing colleagues to give their comments.
- Patients and relatives: The PREMs and PROMs questionnaires completed by patients were anonymous, so their personal data were protected.
- Software developers: During the testing, the medical staff, the case managers were able to record specific error notes, which were directly received by the software developers and used as a basis for correcting the errors.

2. Describe how patients were supported during the testing phase (e.g., onboarding, training, technical assistance).

While the testing phase heavily relied on internal staff for technical evaluation, patients were supported through specific activities within the Open Camp events to maximize their understanding and contribution:

- Welcome session: The Open Camp events began with a welcome session to introduce the Health Labs4Value project and set the stage for the day's activities. This included an overview of the project's goals, the purpose of the new system, and the importance of patient feedback.
- Project presentation: A short presentation on the Health Labs4Value project provided context for the prototype and its intended benefits. This helped patients understand the purpose of the system and how it aimed to improve their experience.
- Prototype presentation and discussion: A key component of the support was a detailed presentation of the new patient management system prototype. Following the presentation, an open discussion took place, allowing patients to ask questions, express their opinions, and provide initial feedback.

- Guidance on questionnaires: While the questionnaires were anonymous and designed to be straightforward, support may have been offered to ensure patients understood the questions and were able to provide accurate responses based on their experiences and expectations.

Patient support during the testing phase centred around providing information, context, and opportunities for feedback within the structured environment of the Open Camp events. This approach ensured that patients were well-informed and able to contribute meaningfully to the evaluation of the new system.

During the Open Camp events, a safe and peaceful environment was meticulously ensured to foster open communication and constructive feedback. Well-prepared moderators expertly guided the sessions, facilitating discussions, and ensuring that all participants had the opportunity to share their perspectives in a comfortable and respectful atmosphere.

RESULTS

Present the results from pre- and post- test phase (PREMs and PROMs results) and additional issues related to:

Here's a summary of the quantitative results from the PREMs and PROMs questionnaires:

PREMs results (existing system):

- Booking surgery appointments: Predominantly positive, leaning towards "easy".
  - Grade 1: 0
  - Grade 2: 0
  - Grade 3: 9
  - Grade 4: 8
  - Grade 5: 9
- Pre-operative information: Largely "not completely clear but was given in time".
  - a) was not clear and was not received in time: 0
  - b) was clear but not in time: 0
  - c) was not completely clear but was given in time: 16
  - d) clear and on time: 10
- Satisfaction with quotation process: Similar to booking, generally positive.
  - Grade 1: 0
  - Grade 2: 0
  - Grade 3: 9
  - Grade 4: 8
  - Grade 5: 9
- Stress level from administration: Relatively low increase in stress.
  - Grade 1: 0
  - Grade 2: 9
  - Grade 3: 8
  - Grade 4: 8
  - Grade 5: 1

- Post-operative care coordination: Generally rated well.
  - Grade 1: 0
  - Grade 2: 0
  - Grade 3: 8
  - Grade 4: 8
  - Grade 5: 10
- Overall satisfaction: Mix of positive ratings, leaning towards moderately positive.
  - Grade 1: 0
  - Grade 2: 0
  - Grade 3: 6
  - Grade 4: 14
  - Grade 5: 6

PROMs results (new system - expected):

- Simplified booking: Overwhelming expectation of simplification.
  - Grade 1: 0
  - Grade 2: 0
  - Grade 3: 0
  - Grade 4: 11
  - Grade 5: 15
- Clear and timely pre-operative information: Strong expectation of clear and timely information.
  - a) I do not think it will be clear and timely: 0
  - b) I think it will be clear, but not necessarily timely: 0
  - c) I do not think it will be clear but timely: 7
  - d) I think it will arrive clearly and on time: 19
- Satisfaction with new quotation process: High expectations of satisfaction.
  - Grade 1: 0
  - Grade 2: 0
  - Grade 3: 0
  - Grade 4: 11
  - Grade 5: 15
- Reduced pre-operative stress: Anticipated stress reduction.
  - Grade 1: 0
  - Grade 2: 0
  - Grade 3: 0
  - Grade 4: 13
  - Grade 5: 13
- Improved post-operative care coordination: Strong expectation of improvement.
  - Grade 1: 0
  - Grade 2: 0
  - Grade 3: 0
  - Grade 4: 12

    - Grade 5: 14
- Overall impact on satisfaction: Anticipated positive impact on overall satisfaction.
    - Grade 1: 0
    - Grade 2: 0
    - Grade 3: 0
    - Grade 4: 12
    - Grade 5: 14

a) patients' overall satisfaction with the solution, ease of use, and experience;

To assess patients' overall satisfaction, ease of use, and experience, we can analyze the PREMs and PROMs responses related to booking surgery appointments, pre-operative information, satisfaction with the quotation process, stress levels, post-operative care coordination, and overall satisfaction.

- Booking surgery appointments: The PREMs show that patients generally found the existing booking process to be relatively easy (Grades 3, 4, and 5 combined). The PROMs, however, reveal a strong expectation that the new system will *simplify* this process even further, with the vast majority anticipating a rating of 4 or 5 (greatly simplify). This indicates that while the existing system wasn't perceived as overly difficult, patients believe the new system will provide a more streamlined and user-friendly experience.
- Pre-operative information: The PREMs results indicate an area for improvement. While most patients received pre-operative information in a timely manner, a significant portion (16 answers) felt that it was "not completely clear." The PROMs demonstrate a clear expectation that the new system will address this issue, with most respondents anticipating "clear and on time" information. This suggests that patients are looking for better clarity and comprehensibility in the information provided before surgery.
- Satisfaction with quotation process: Similar to booking, the PREMs show a generally positive experience with the existing quotation process. However, the PROMs again indicate an expectation of increased satisfaction with the new system. This could be driven by anticipation of greater transparency, accuracy, or efficiency in the quotation process.
- Stress level from administration: The PREMs results suggest that administrative processes before surgery had a mixed impact on patients' stress levels, with responses spread across the scale. The PROMs show a strong expectation that the new system will help reduce pre-operative stress. This suggests that patients believe the new system will be less burdensome, confusing, or time-consuming, leading to a more relaxed and positive experience.
- Post-operative care coordination: The PREMs data shows a positive sentiment towards the post-operative carre, while the PROMs reflect a strong expectation for even better coordination with the new system.
- Overall satisfaction: The PREMs results demonstrate moderately positive overall satisfaction with the hospital's administrative services, with a concentration in Grade 4. The PROMs, however, show a clear shift towards greater satisfaction with the implementation of the new system.

In summary, the PREMs results provide a baseline understanding of patients' experiences with the existing system, highlighting areas where satisfaction is relatively high but also pinpointing

opportunities for improvement, particularly in the clarity of pre-operative information. The PROMs results, on the other hand, showcase a strong expectation that the new system will deliver a more user-friendly, efficient, transparent, and stress-free experience, leading to greater overall satisfaction. The discrepancy between the PREMs and PROMs scores underlines the potential of the new system to enhance patients' perceptions of their care journey.

b) qualitative feedback from patients, including any challenges, concerns, or suggestions for improvement;

A key observation from the testing phase is the difference in the nature of feedback received from patients compared to healthcare workers. While patients, as the eventual beneficiaries of the improved administrative system, expressed overwhelmingly positive *expectations* for its impact on their overall experience (as evidenced by the PROMs), they were not in a position to provide concrete, actionable suggestions for improvement related to the system's inner workings. Because patients will not directly use the new administrative system, they can only judge the outcome as "end users". Their feedback was more general, focusing on anticipated benefits like clearer communication, reduced stress, and a smoother overall process.

In contrast, healthcare workers – including case managers, medical staff, and finance personnel – who directly interacted with the prototype during internal testing, were able to identify specific bugs and areas for improvement in the system's functionality and usability. This is reflected in the generation of "hundreds of bug reports" by these users, which provided developers with concrete issues to address and resolve.

Key suggestions and concerns from healthcare workers:

- Calendar view enhancement: Users requested the ability to select a date range in the calendar view instead of being limited to viewing just one day.
- Help menu addition: A help menu was requested to provide guidance and information on how to use the system effectively.
- Appointment modification: Users wanted the option to easily reschedule appointments without automatically sending a new price offer to the patient.
- Linking surgeries to locations: It was suggested that surgeries should be linkable not only to doctors but also to specific locations. Additionally, unique pricing per location should be supported.
- Emergency capacity integration: There was a request to include emergency capacity management in the system.
- Structured data collection on surgery offer rejections: To better understand the reasons behind surgery offer rejections, it was suggested to implement structured data collection, allowing case managers to select from predefined categories when recording a rejection.

c) how the solution affected healthcare professionals and workflows in the Territorial Health Living Labs (e.g., time efficiency, collaboration, workload);

The primary benefits of the prototype on health workers are in terms of improved efficiency, time savings, and a reduced chance of error. The system aims to streamline administrative tasks, automate processes, and provide a more user-friendly interface, all of which are expected to contribute to:

- Increased efficiency: By automating tasks such as quote generation, appointment scheduling, and data entry, healthcare professionals should be able to handle a larger volume of work in less time.
- Time savings: A more efficient workflow translates directly into time savings for healthcare workers, freeing them up to focus on more patient-centric activities.
- Reduced chance of error: By providing a more structured and standardized system, the prototype is expected to minimize manual errors, which can be costly and time-consuming to correct.

Furthermore, the prototype can improve collaboration between colleagues in different areas, such as case managers, finance managers, and doctors, by:

- Centralizing information: The system centralizes patient information, making it easily accessible to all relevant parties and reducing the need for back-and-forth communication.
- Streamlining communication: Automated notifications and alerts can keep everyone informed of important updates, reducing the risk of miscommunication or delays.
- Facilitating coordination: The system can help to coordinate tasks between different departments, ensuring that all steps in the patient journey are completed efficiently and effectively.

d) evaluate the solution's performance based on key value-based healthcare metrics (e.g., cost-effectiveness, improved patient care, resource allocation).

While the system is not yet live, and therefore no concrete, quantifiable data are currently available to assess its performance on key value-based healthcare metrics, strong expectations exist for significant improvements across several areas. These expectations are based on the anticipated functionality and improvements offered by the new system.

Cost-effectiveness: A significant improvement in cost-effectiveness is anticipated. This is primarily driven by the expectation that work processes will become more efficient, reducing administrative overhead. Furthermore, the system aims to minimize costly errors, such as unused operating theatre time due to inattention or scheduling issues.

Improved efficiency of patient care: Efficiency in patient care is expected to increase as a result of the smoother processes facilitated by the new system. This includes streamlined communication, more transparent scheduling, and reduced administrative burden, all of which contribute to a better patient experience.

Resource allocation: A substantial improvement in resource allocation is expected due to the greater

optimization of surgery schedules. This could lead to more efficient utilization of operating rooms, medical staff, and other hospital resources. Additionally, the time savings realized through increased efficiency can be reinvested in patient care. For example, case managers will have more time to dedicate to individual patient needs, providing more personalized support and attention.

CONCLUSIONS:

Summarize the results with their practical application. Discuss also the following issues:

In summary, we are extremely satisfied with the testing phase of our prototype. The involvement of both patients and medical staff proved invaluable in developing and refining the system. The Living Labs methodology demonstrated its effectiveness in generating valuable results and insights, validating our approach to collaborative innovation in healthcare.

a) any obstacles encountered during the testing phase, such as technical issues, patient adherence, or logistical challenges;

Obstacles encountered during the testing phase:

- Patient and relative engagement: One of the most significant challenges was involving patients and their relatives effectively. Unlike the development of medical procedures, patients don't feel a strong sense of ownership or direct involvement in administrative system development, despite being the ultimate beneficiaries.
- Hospital staff involvement: Time constraints and natural resistance to new software implementation posed challenges in engaging hospital staff fully in the testing process.
- Requirement specification: Accurately conveying hospital processes and requirements to software developers was challenging, as the developers often lacked a comprehensive understanding of complex healthcare workflows.

b) how these challenges were addressed or mitigated during the phase.

Addressing and mitigating challenges:

- Enhancing patient engagement:
  - Leveraged the hospital's extensive database to identify and involve a diverse group of patients.
  - Offered incentives in the form of treatment coupons to encourage participation and feedback.
- Facilitating staff involvement:
  - Implemented internal reorganizations to integrate system testing into regular working hours, rather than requiring overtime.
  - Conducted detailed presentations highlighting the benefits of the new system to staff, emphasizing how it would improve their daily workflows and patient care.
- Bridging the gap with developers:

- Provided developers with comprehensive, detailed descriptions of hospital processes.
- Established continuous communication channels, allowing developers to ask questions and receive clarifications throughout the development period.

These solutions proved effective in addressing the initial challenges, resulting in a more collaborative and productive testing phase. The experience gained from this process will be invaluable for improving future testing phases and system developments.

Highlight key insights gained that could improve future testing phases.

Key insights for future testing phases include:

- Early stakeholder engagement and education about the system's benefits
- Integration of testing into regular workflows to minimize disruption
- Continuous, open communication between healthcare professionals and developers
- Use of incentives to encourage patient participation
- Detailed documentation of healthcare processes for non-medical team members