

# MediLink

***Facilitating communication between specialists and family doctors in remote areas.***

KBC Rijeka is one of five clinical hospital centres in Croatia. It is a regional hospital centre covering three counties, providing medical care for approximately 600,000 inhabitants. Consists of 18 clinics, 6 clinical institutes, 6 independent institutes, 2 independent departments and the hospital pharmacy. KBC Rijeka employs more than 3.400 employees, 312 biomedical, and health researchers. The hospital performs activities of health care and diagnostic activities in the field of medicine with more than 3 mill. medical services. KBC Rijeka is a clinical partner for several higher education institutions (HEIs) such as The Faculty of Medicine Rijeka, The Faculty of Health Studies, and The Faculty of Dental Medicine.

## Challenge description

KBCRI Rijeka is the main clinical centre for the Primorsko-Goranska region. This region, due to its geographical location, has a lot of remote areas that include settlements in the surrounding mountain areas as well as the islands in the northern Adriatic Sea. Some of these areas as up to several hours drive from the KBCRI, which represents a significant problem for the local population when they need to visit a specialist. KBCRI already has agreements with some of the Health Centres in remote areas for the so-called “dislocated infirmary” where specialists from the KBCRI visit these remote health centres (usually two times a month) to provide services. One of the aims of the KBCRI Strategy 2021 – 2025. is to further develop these “dislocated infirmary” as well as to enhance cooperation with family doctors in individual and long-distance cooperation (telemedicine).

A remote telemedicine platform, portal, or application that would facilitate communication between specialists (cardiologists in KBCRI) and family doctors who are treating patients in remote areas would directly contribute to the objective stated in the KBCRI Strategy 2021 – 2025.

Furthermore, Heart failure (HF) remains a major medical problem in Croatia and represents a heavy economic burden for hospitals In Croatia. Diseases of the circulatory system are in first place as a cause of death (39.1%). Among the first 10 causes is ischemic heart disease with 12.2%. At the age >65 years, diseases of the circulatory system cause a mortality rate of 42%. When talking about Heart Failure and knowing that the prevalence is 1-2% in adult population worldwide, there are 31.000 to 62.000 people living with Heart Failure in Croatia. Detecting HF patients before their health deteriorates or needs hospitalization would be of great value for patients and the KBCRI.

Improved communication among specialist and primary care has the potential to improve patients' access to specialized care, enhance the efficiency of patient referrals, reduce delays in treatment, and ultimately contribute to better health outcomes for residents in remote areas of the Primorsko-Goranska region.

## Challenge main objectives

The main objective of the challenge is to establish a comprehensive and efficient telemedicine system that connects cardiologists from the hospital in Rijeka with family doctors in remote areas of the Primorsko-Goranska region. This solution aims to enhance access to specialized



cardiac care in remote locations, improve collaboration between healthcare professionals, and ultimately contribute to better health outcomes for patients with cardiovascular conditions.

## Solution functional requirements

### Compulsory functional requirements

- The solution shall be a platform, portal, or application. It must provide secure communication for real-time video conferencing, secure messaging, and collaborative discussions between specialists, patient, and family doctors. By talking with the family doctor and the patient at the same time, we can better and better learn more about the patient's condition, the way of treatment so far and how to improve the patient's condition, reduce hospitalizations and reduce the need to come to the hospital from distant places. Family medicine doctors have a way to send a referral to the computer system under the name of consultation and thus receive a specialist (cardiologist) report in writing based on an audio-video examination.
- The solution shall have an intuitive and user-friendly interface to ensure ease of use for both specialists and family doctors.
- The system should work as an individual solution and will not be integrated with existing hospital or health centre IT systems.
- The solution shall be scalable to accommodate potential increases in user numbers (so that several different video calls can be done at the same time).
- Language mode: the software should have a possibility to choose the Croatian language.
- The solution shall have the option to send/receive sound data (e.g. family doctor can use a digital stethoscope to record the heart or lungs of the patient and send it to the specialist to assess a patient who is not physically present). This will be the digital way of patient physical examination. The solution shall include an interface for collaboration between two or more remote locations, exchange of medical documentation (HIS,PACS,LIS), as well input for digital transmission of health and vital signs of the patient on the remote location (remote stethoscope, remote thermometer, etc.).
  - Inclusion of data gathered from stethoscope and thermometer is a must, and this functionality's must be integrated in the solution.
  - The solution must ensure integration of third-party medical equipment in that application (stethoscope, thermometer), and compliance with health communication standards (HL7, DICOM) for exchange of medical data records over digital source.

### Pilot scope

End-user type	Role	Number
Cardiologists from the KBCRI	They have to provide requirements, recruit family doctors, use and validate the solution.	5
Primary care doctors (family doctors) in the branches of the Primorsko-Goranska Healthcare Center	They have to provide requirements, recruit patients, use and validate the solution.	5
Patients	Participate in the pilot and validate the solution.	25

**Table 1. Targeted users**

## Language

- Solution and the whole pilot, including the communication with the end-users will be conducted in Croatian language.

## Pilot set-up conditions

### Ethical, legal, or regulatory

An Ethics Committee of the KBCRI must previously validate the approach of the pilot. The solution shall be fully GDPR compliant. Solver should familiarize with the Croatian national law and all relevant legal or other documents that regulate healthcare system and IT sector in Croatia as well as European union. The hospital will not take the responsibility or obligation to perform legal/administrative/technical corrections or advises to selected Solvers or options. Solver will be responsible for the innovative solution/product that is not in line with all legal conditions that arrange the healthcare system in EU and/or Croatia.

### Technological

As for technical solution, the best secure practice is to use some form of teleconferencing systems available for communication between the nodes (remote locations). Teleconferencing systems use specialized SIP and H.323 communication protocols that are robust and ultimately secure, as well as compatible with today standards in video quality (HD, 4k, 8K). The communication can be peer to peer, or over telemedicine network, but both communication options must be available out of the box. The teleconferencing systems already comes with HD/4K cameras, as well with daisy chain microphones and speakers, but there must be one other input source to the teleconferencing system, and that is computer with custom application designed for interaction between doctor and patients. On that application. On hardware side, requirements are teleconferencing systems with cameras speakers and microphones, network devices, input computers, large LCD screens and remote stethoscope and thermometers.

System needs to be scalable; it needs to have peer to peer communication between the remote nodes and needs to have capabilities for data sharing between the remote nodes. Communication must be in audio and video format of the highest standard (minimum HD quality), and data sharing for medical equipment between nodes must be assured by the software. Medical equipment that must be compatible and integrated in the system is remote stethoscope and remote thermometer.

### Data access

Solution will work as a separate system and no data will be extracted from organisational systems, or any other for this solution. After such audio video consultation, the specialist and the family doctor will be able to make conclusion regarding patients' health. The medical report will be written and visible in digital form as a specialist report or consultation. Also, the Ethic Committee should give the agreement. The Confidentiality Agreement will be signed between KBCRI and the chosen supplier of the innovative solution.

## Expected impact and KPIs.

The solution has the potential to improve access to specialized care, enhance the efficiency of patient referrals, reduce delays in treatment, and ultimately contribute to better health outcomes for residents in remote areas of the Primorsko-Goranska region.

- Number of successful specialist -family doctor communications facilitated through MediLink. Goal is to have more than twenty-five (25) successful specialist-family doctor communications facilitated through MediLink.



- Enhance the efficiency of patient referrals and reduce unnecessary expenses for the patients and hospital. Goals is to reduce number of patients that after the teleconsultations will have to come to the hospital by at least 7%. The KPI will be measured by determining the percentage of patients who participated in the trials and did not need to physically visit the hospital from the total number. (Total number of patient who didn't need to visit hospital due to the solution / Total number of patients in the trials \*100).
- Patient and doctors' satisfaction: Administer patient satisfaction surveys on the patients who participated in testing (e.g. how satisfied were they with this kind of service, did the teleconsultation saved them time and money compared to physically traveling to the hospital, were they comfortable discussing their health concerns through the teleconsultation platform, how would you improve it, etc.). Goals is to analyse scores and feedback to assess satisfaction levels. The aim is to have at least 20 patient surveys received and have 60% of positive answers (Likert scale<sup>1</sup> will be used for rating). Also, the satisfaction of the doctors involved in the trials will be assessed to receive feedback and make improvements if possible. The satisfaction of the doctors who will participate in the pilot will be also measured by the survey. The aim is to have 60% of positive answers (Likert scale will be used for rating).

## Business opportunity

### Market size

- Internally, KBCRI Rijeka is the only clinical centre for the Primorsko-Goranska region. This region, due to its geographical location, has a lot of remote areas that include settlements in the surrounding mountain areas as well as the islands in the northern Adriatic Sea. Some of these areas are up to several hours drive from the KBCRI, which represents a significant problem for the local population when they need to visit a specialist. KBCRI already has agreements with some of the Health Centres in remote areas for the so-called "dislocated infirmaries" where specialists from the KBCRI visit these remote health centres (usually two times a month) to provide services. One of the aims of the KBCRI Strategy 2021 – 2025. is to further develop these "dislocated infirmaries" as well as to enhance cooperation with family doctors in individual and long-distance cooperation. Therefore, there is a significant potential to expand and replicate this solution outside Clinic for Cardiovascular diseases, as there are other clinics (Clinic for Cardiovascular diseases is one of the 18 clinics in KBCRI) that are also cooperating with the Health centre of Primorsko-Goranska county and their branches through the "dislocated infirmaries".
- There is also significant potential at the national level in Croatia as many Health centres in Croatia are dealing with lack of specialists (especially smaller and remote places like islands and rural areas). According to the Croatian Ministry of Health, there are currently 63 Health centres in Croatia (not including branches of County Health Centres) and most of them would have benefited from this solution as well as their patients. Furthermore, this solution can be also adapted to the communication between doctors in different hospitals/clinical centres (not only specialists with family doctors).

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<sup>1</sup> <https://www.questionpro.com/blog/what-is-likert-scale/#:~:text=Definition%3A%20Likert%20scale%20is,%2C%20product%2C%20or%20target%20market>

### Adoption plans

If the pilot project will be successful, our internal decision-making body will decide about the acquisition of the innovative solutions. There is no commitment for KBCRI to adopt or purchase the innovation if successful.



# Leading SME

GENERAL INFORMATION	
NAME OF THE SME	Bit4bytes d.o.o.
DESCRIPTION OF THE SME	Bit4bytes is a versatile Design and Development Agency, comprising a creative team of developers, designers, and strategists committed to guiding companies across platforms and places with agile design and digital experiences. Our expertise extends to crafting innovative solutions for the healthcare industry, including a platform designed for elder care with monitoring and smart devices integration.
WEBSITE URL	<a href="http://www.bit4bytes.com">www.bit4bytes.com</a>

Table 2. Leading SME general information

## Solution proposed:

### Bit4Health (B4H)

Introducing an advanced healthcare communication platform designed to deliver specialized cardiac care, this solution focuses on enhancing remote consultations, collaboration, and patient outcomes. Here are the key features:

- **Comprehensive Telehealth Platform**

The solution is a secure and user-friendly platform offering real-time video conferencing, secure messaging, and collaborative discussions between specialists, patients, and family doctors.

It facilitates simultaneous consultations with family doctors and patients, providing insights into the patient's medical history, ongoing treatment, and potential improvements to optimize care.

- **Intuitive Interface**

Boasting an intuitive and user-friendly interface, the platform ensures ease of use for both specialists and family doctors, promoting seamless communication and collaboration.

- **Independent Solution**

Designed as a standalone system, the platform operates independently, eliminating the need for integration with existing hospital or health center IT systems. This ensures a flexible and efficient solution.

- **Scalability**

The solution is scalable to accommodate a growing user base, allowing multiple concurrent video calls to take place. This ensures flexibility and adaptability to evolving healthcare needs.

- **Collaboration Interface**

A built-in interface facilitates collaboration between remote locations, enabling the exchange of medical documentation (HIS, PACS, LIS).

- **Data Integration and Standards Compliance**

Ensures inclusion of data gathered from stethoscopes and thermometers, seamlessly integrating these functionalities into the solution.

Supports the integration of third-party medical equipment, such as stethoscopes and thermometers, and complies with health communication standards (HL7, DICOM) for secure exchange of medical data records over digital sources.

This healthcare communication platform aims to bridge the gap in specialized cardiac care, promoting collaboration, accessibility, and improved health outcomes for patients in remote locations.

## Work to be done by the leading SME

- **Analysis:** Identify and document the specific requirements and objectives of the pilot project.
- **Design:** Design prototype based on the specific requirements and objectives.
- **Development:** Development based on a designed and specified prototype.
- **Delivery:** Deployment of the solution within the real environment.
- **Support:** Completion of user training sessions to ensure healthcare staff are proficient in using the solution. Support while using the solution, fixing bugs, and maintaining the solution.

Task/month	1	2	3	4	5	6	7	8	9	10	11	12
Analysis with the user	█	█										
Design prototype	█	█	█	█								
Development			█	█	█	█	█	█				
Delivery								█				
Support								█	█	█	█	█

Table 3. Bit4Health Gantt Chart



# Follower SME

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## Scope of work performed by the follower SME

### 1. Functional Testing:

Verifies that the communication platform performs its intended functions accurately and efficiently.

### 2. Usability Testing:

Evaluates the communication platform's user interface (UI) and user experience (UX) to ensure it is intuitive and user-friendly for healthcare professionals.

Involves conducting tests with end-users to gather feedback on navigation, workflow efficiency, and overall satisfaction.

### 3. Performance Testing:

Assesses the communication platform's performance under various conditions, including peak usage, to ensure it can handle the expected workload without slowdowns or crashes.

Measures factors such as response time, throughput, and resource utilization to identify any performance bottlenecks.

### 4. Security Testing:

Focuses on identifying vulnerabilities and ensuring the communication platform's resistance to unauthorized access, data breaches, and cyber threats.