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Università di Foggia  
Economia

# Missione 4 Istruzione e Ricerca

Attività Partner  
Unifg – Dip. di Economia

Responsabile Unità locale  
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09 Dicembre 2024

Progetti di Rilevante Interesse  
Nazionale  
Call 2022

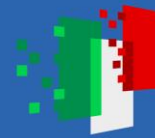
**The telemedicine service  
evaluation by using electronic  
platforms**



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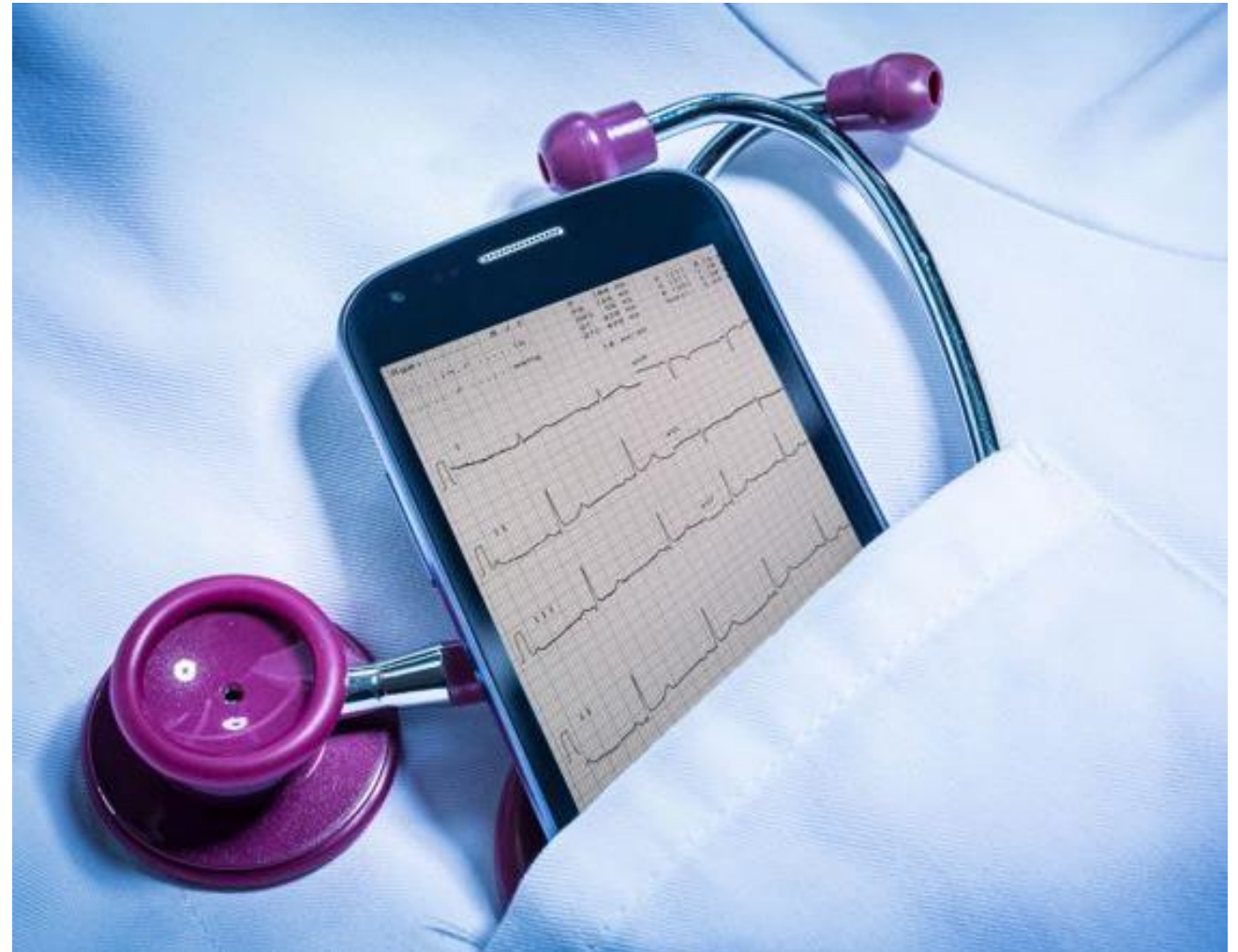
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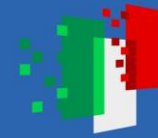


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## Agenda

1. **Electronic Medical Record to support telemedicine service (Literature review & Survey administration to the user)**
2. **Use of platform for the telemedicine service evaluation**
3. **Telemedicine services and interaction with patients**





# 1. Electronic Medical Record to support telemedicine service (Literature review – DeLone and McLean Model)

## 1. EMR and Telemedicine Support:

1. **Purpose:** Enhance telemedicine services through improved EMR interoperability, increasing operational efficiency and patient care outcomes.
2. **Key Features:** Interoperability and data integration enable sending, receiving, and incorporating medical records, providing electronic access to health data for physicians and patients, and enhancing public health surveillance.
3. **Benefits:** Improved planning, implementation, and evaluation of healthcare practices.

## 2. Literature Evidence:

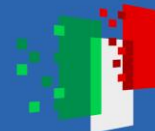
1. **Patient Outcomes:** Utilization of automated systems for sharing diagnostic data correlates with reduced mortality rates for acute conditions and enhanced process quality in healthcare.
2. **System Utilization:** High adoption rates of EMR in the U.S. signify robust integration capabilities with telemedicine, enhancing overall healthcare delivery and patient management.



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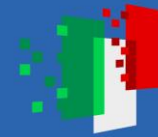


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## 1. Electronic Medical Record to support telemedicine service (Literature review – DeLone and McLean Model)

### 3. Challenges and Integration:

1. **Workflow Efficiency:** Integration supports a bidirectional workflow, allowing seamless use of a single platform for various health systems, which aids in reducing prescription errors and consolidating patient data for better decision-making and reduced administrative burden.
2. **Advanced Integration:** Incorporates biometric data from remote monitoring, facilitating comprehensive patient tracking and enabling healthcare professionals to handle increased patient capacity efficiently.



## 1. Electronic Medical Record to support telemedicine service Survey administration to the user

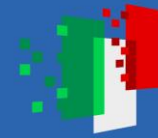
The interview to be conducted with users has been designed as semi-structured, incorporating questions pertaining to the following areas:

Technology  
Acceptance Model  
(TAM)

Health Information  
Technology  
Acceptance Model  
(HITAM)

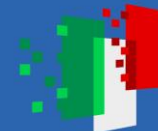
Mobile Application  
Rating Scale  
(MARS)

The application of these models will facilitate the deductive thematic analysis of the interviews. Implicit and explicit responses that are not aligned will be subjected to an inductive analysis.



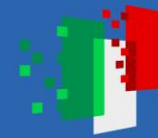
## 1. Electronic Medical Record to support telemedicine service Survey administration to the user

Question	Elaboration Questions	Theory, study or construct
Which health app(s) have you used?	Do you still use that/those app(s)? (If multiple apps) Which of those apps are still on your device? Which of these do you still use? Which one(s) would you like to talk about today?	Experience
(If on present device) Please show me how you use your health app.	How did you set it up? What problems do you recall in setting it up? (Prompts: user interface, prompts, permissions, language used)	Technological literacy
For approximately how long have you used (did you use) this app?	How often do/did you use it? (If discontinued) Why did you stop using the app?	Experience
How did you 'discover' this app?	(Prompts: health prof recommendation, peer/family recommendation, self-search)	TAM—subjective norms[50]
On which platform do/did you use this app?	(Prompts: iPhone, iPad, Android phone, Android tablet)	Descriptors of use
What do/did you like about this app?	Does/did the app fulfil your needs? Why or why not? Do/did you enjoy sessions with your health app? How is/was working with your app satisfying? Is/was your health app worth recommending to others?	TAM—usefulness;[50] Mobile App Rating Scale[43]
How easy is/was using your app?	What makes/made the app information clear and understandable? How do/did you find the font size and representation? How do/did you add remarks to your readings?	TAM—ease of use;[50] Acceptance Factors of mobile apps[51]
Have you sometimes not known (did you sometimes not know) what to do next with your app?	Are/were there any parts of the app you don't use, because they're complicated? What app features do/did you find unintuitive? Do/did you sometimes wonder if you're using the app the right way? Who do/would/did you turn to for help using the app (prompts: family, friends, or online forum)?	Technological literacy; Acceptance Factors of mobile apps[51]



## 1. Electronic Medical Record to support telemedicine service Survey administration to the user

Have you found any 'bugs' in your health app, or things it can't do?	If the app crashes or freezes (crashed or froze), is/was it easy to restart? Have you ever given up due to technical glitches? Have you ever contacted the company about any technical glitches?	Limitations of the app; Acceptance Factors of mobile apps[51]
How much sight and sound stimulation do/did you get from your health app?	(Prompts: graphs, things that flash up, reminders about personal targets, warnings, sound effects/reminders)	Mobile App Rating Scale[43]
What customization features would you like to see in your health app?		Mobile App Rating Scale[43]
What is your view of information stored on the cloud?	Do you find it an invasion of privacy?	
Describe your Initial user profile setup	Was registration via social media e.g. Facebook, Google + an option?	
Is your health app affiliated with a government health organization?	(Researcher to check later if participant unsure)	Mobile App Rating Scale[43]
Does/did your doctor (or other main health care provider) know you have used this app?	(If yes) How would you describe his/her reaction? Are you encouraged by a health professional (pharmacist, general practitioner) to self-reflect on your chronic condition?	Doherty[52] Design and Evaluation Guidelines
What medical or technical jargon have you seen in your app which you don't understand?		Doherty[52] Design and Evaluation Guidelines
Does your app use technology you are already familiar with?	Are the dialogue boxes and input fields similar to what you are used to?	Doherty[52] Design and Evaluation Guidelines
Do you feel you require a peripheral (plug-in or Bluetooth) device to operate your app more effectively?		Yin[53] Usability Risk Level Evaluation
Do you prefer tactile feedback (vibrations) over plain text feedback?	Have you noticed anything vibrate when you've done something wrong or you receive a warning?	Yin[53] Usability Risk Level Evaluation
What features of your app do you think conflict with each other?	(Prompt: inconsistent shortcuts)	Yin[53] Usability Risk Level Evaluation
Are you satisfied with the time taken to perform tasks on your app?	(Prompts: time to display graphs, time to synchronize information)	Yin[53] Usability Risk Level Evaluation



## 2. Use of platform for the telemedicine service evaluation: Survey

The interview explored, through 39 questions (excluding demographic information), 11 aspects related to patients' experiences with the tele-visit service:

- User Awareness
- Equipment Used
- User Satisfaction
- Communication with Healthcare Personnel
- Cost and Time Saving
- Kano Model
- Net Promoter Score
- Churn Rate
- Privacy
- Suggestion Box

### USER SATISFACTION TELEMEDICINA

Sondaggio per l'indagine circa l'impiego dei servizi di tele visita

fiorellapia.salvatore@gmail.com [Cambia account](#)

Non condiviso

\* Indica una domanda obbligatoria

#### ANAGRAFICA

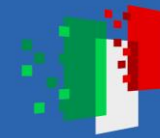
Nome e Cognome (opzionale)

La tua risposta

Fascia di età \*

- Pediatrico (0-12)
- Adolescente (13-19)
- Giovane (20-35)
- Adulto (36-55)





## 2. Use of platform for the telemedicine service evaluation: Survey – USER AWARENESS

Chart 7: "On a scale of 1 to 5, how familiar are you with the Televisit service? - Had you heard of 'televisit' before it was suggested by the doctor at the hospital where you are being treated?"

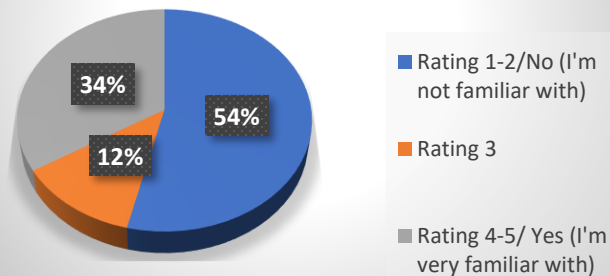


Chart 8: "Have you ever used a remote visit service?"

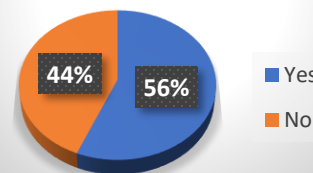
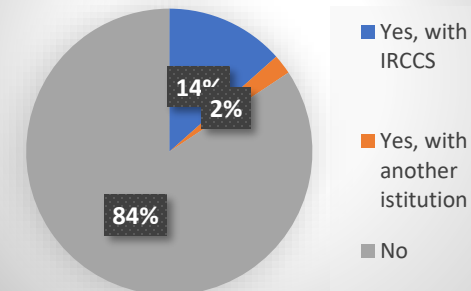
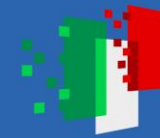


Chart 9: "Had you previously had other televisits before now?"





## 2. Use of platform for the telemedicine service evaluation: Survey – EQUIPEMENT USED

Chart 11: «Which tools did you use?»

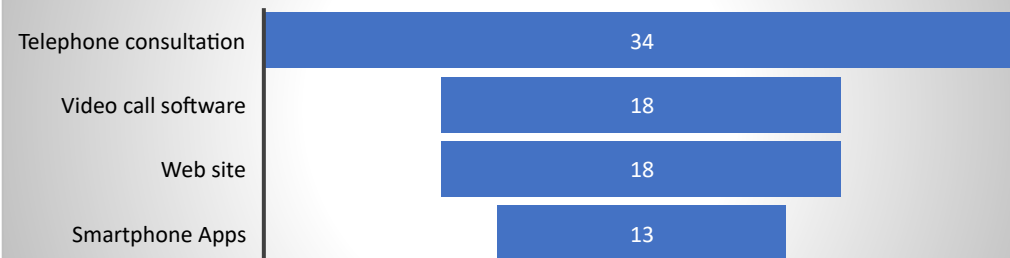


Chart 12: : «What type of device/equipment did you use to conduct the televisit?»

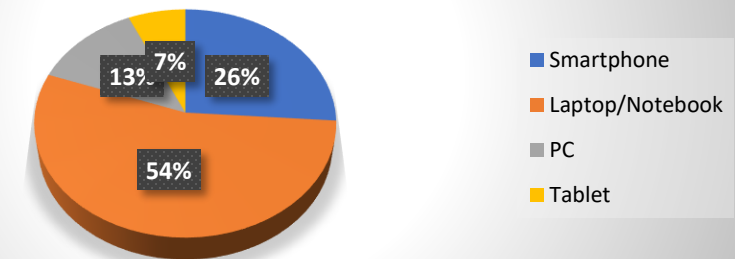
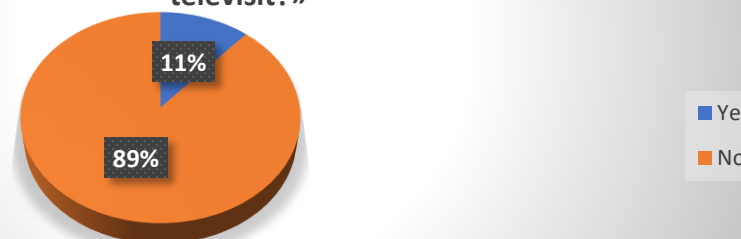
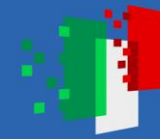


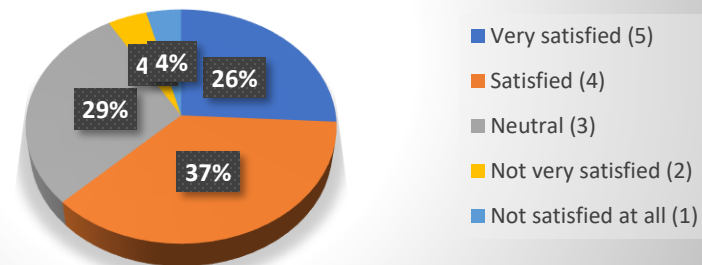
Chart 16: «Did you experience technical issues during the televisit? (e.g., temporary audio loss, reduced video quality...) – Or did you encounter technical difficulties in conducting the televisit?»

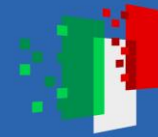




## 2. Use of platform for the telemedicine service evaluation: Survey – USER SATISFACTION

Chart 34: “On a scale of 1 to 5, how well did Televisit meet your needs? - Overall, how satisfied are you with the televisit experience?”





## 2. Use of platform for the telemedicine service evaluation: Survey – Communication with Healthcare Personnel

Chart 20: In your opinion, how clear and sufficient was the information and the reasoning provided by your doctor for recommending a televisit instead of a traditional in-person visit?

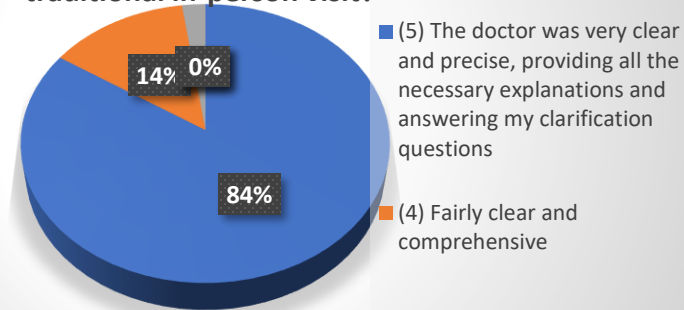
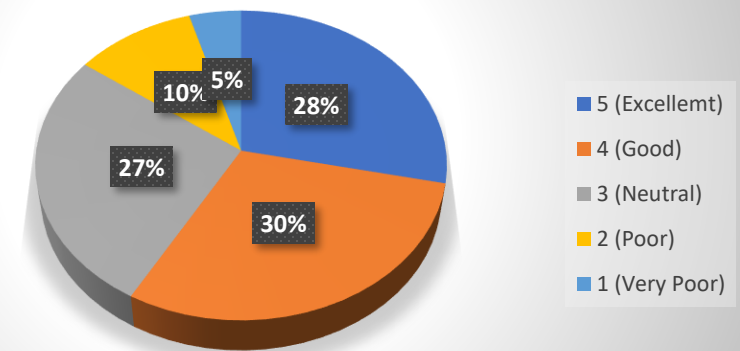
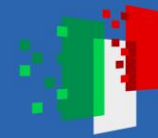


Chart 21: "On a scale of 1 to 5, how clear was the interaction with the doctor during the televisit?"





## 2. Use of platform for the telemedicine service evaluation: Survey – COST AND TIME SAVING

Chart 25: "Did conducting a televisit provide any economic benefits? (including savings on travel costs, possible overnight stays, and similar expenses). If yes, approximately how much?"

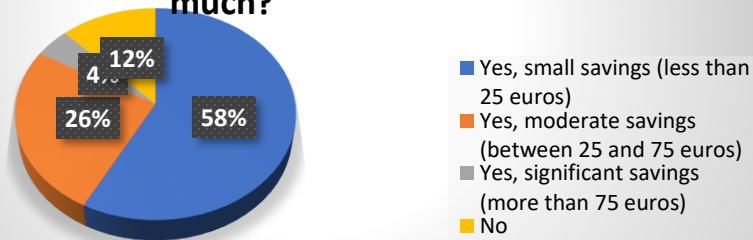
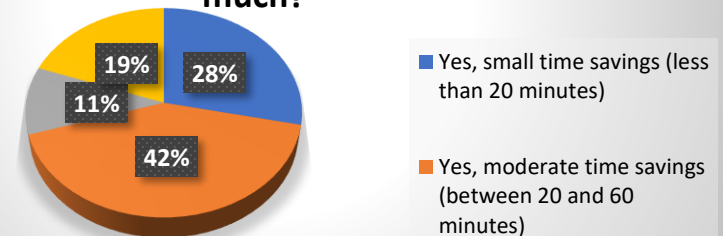


Chart 26: "Did conducting a televisit take less time than a face-to-face traditional alternative? (Including travel time, waiting room time, etc.). If yes, approximately how much?"



## 2. Use of platform for the telemedicine service evaluation: Survey – KANO MODEL, NET PROMOTER SCORE E CHURN RATE

Chart 30: Did you face any technical issues with the equipment? (e.g., interruptions, abnormal shutdowns, and similar issues)?



Chart 31: How satisfied were you with your doctor's information about the visit?

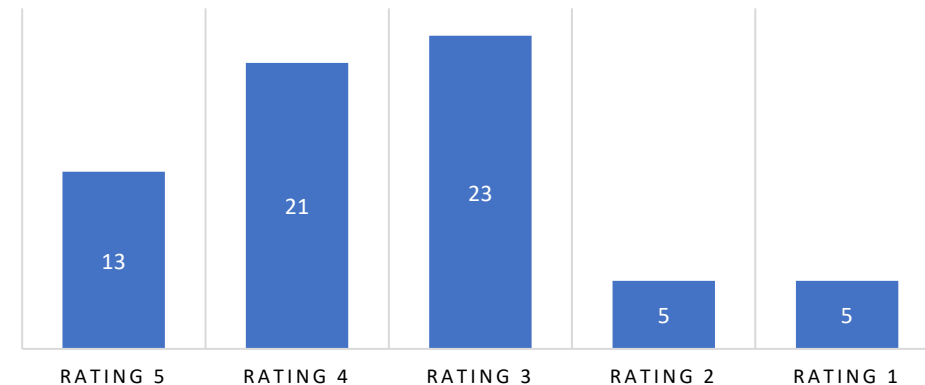
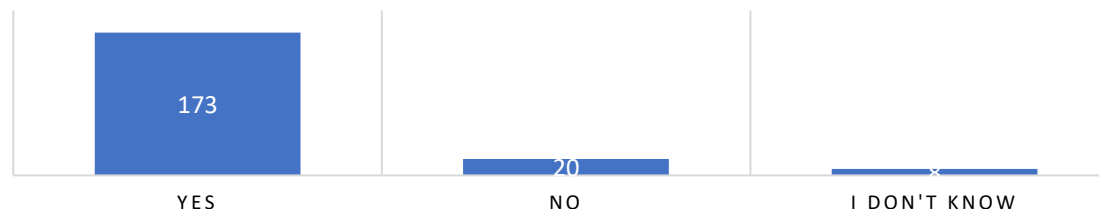


Chart 32: Would you do another televisit consultation? If your doctor proposed additional televisits, would you agree to more televisit appointments?





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## 2. Use of platform for the telemedicine service evaluation

### AREA BUSINESS EFFICIENCY

#### Investigation on Experts' Perspectives on Telemedicine

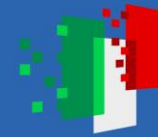
A survey was conducted with 26 healthcare professionals in the studied geographical areas to gain insight into their perspectives on telemedicine, with a particular focus on telehealth consultations. The findings revealed several key trends. Firstly, the implementation of technology in medicine has led to a reduction in staffing needs. Secondly, healthcare professionals require specific training, which has resulted in changes to their operational practices.



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## 2. Use of platform for the telemedicine service evaluation

### AREA BUSINESS EFFICIENCY

Opinions on Organisational Change Medical Responsibility:

As televisit-based systems mature, it is anticipated that defensive medicine will become aligned with in-person practices. This reflects the significant influence that clinicians' knowledge exerts on defensive medicine practices.

The potential for substitution represents a further risk.

It seems probable that there will be a greater uptake of telehealth, with a significant number of centres likely to give it precedence over in-person visits.

Although telemedicine enhances operational efficacy, it is incapable of wholly supplanting human interaction. Although patients may recuperate, they may nevertheless express discontent with the impersonal nature of digital interactions.

USCA (Special Continuity Care Units):

In the context of the global pandemic, USCA units employed remote monitoring via telephone and the utilisation of pulse oximeters, with data recorded in shared electronic platforms. Such systems served as electronic registries for patient data. The advent of teleradiology was intended to provide assistance to struggling centres; however, the reduction in personnel resulted in an increase in workload and a deterioration in working conditions.





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## 2. Use of platform for the telemedicine service evaluation

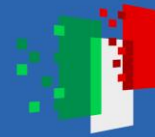
### AREA BUSINESS EFFICIENCY

#### Interaction with Patients Challenges:

The use of telemedicine may have the unintended consequence of undermining the doctor-patient relationship, particularly in situations that are emotionally charged. This could potentially result in the loss of crucial medical information.

#### Adaptation in Communication:

It is imperative that healthcare professionals adopt new communication styles and a sense of confidence in order to effectively utilise telemedicine tools such as video calls. The advancement of telemedicine may necessitate the acquisition of new skills and the adaptation of hitherto unfamiliar practices by healthcare professionals.



### 3. Telemedicine services and interaction with patients

The efficacy of telemonitoring in the management of cardiovascular diseases (CVD) has been demonstrated, with a reduction in hospital admissions and a notable reduction in healthcare costs.

#### Clinical Efficiency

- Telemonitoring of pacemakers and other cardiac devices significantly reduces hospital readmissions and mortality rates through timely interventions.

#### Quality of Life

- Enhances patient quality of life by facilitating better disease management and reducing the necessity for in-person visits.

#### Cost-effectiveness

- Studies show annual savings per patient due to reduced hospital visits and travel expenses ranging from \$900 to \$1,200



### 3. Telemedicine services and interaction with patients: Economic and operational impact

#### Professional impact

- Reduced in-person visits lower certain professional incomes, highlighting the need for standardized reimbursement policies

#### Challenges

- Variability in intervention types and follow-up durations complicates long-term efficacy studies

#### Future research directions

- Focus on standardizing interventions and extending study follow-ups to fully leverage telemonitoring potential and overcome systemic barriers like inconsistent reimbursement practice

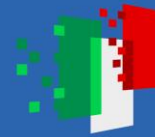
Telemonitoring represents a transformative approach to the management of chronic cardiovascular conditions, with the potential to enhance both clinical outcomes and patient experiences. However, this approach is not without its challenges, which require a strategic research focus to address them effectively.



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### 3. Telemedicine services and interaction with patients: Methodological approach for effectiveness evaluation

#### Study Design

Examines patients with implanted pacemakers under telemonitoring.

#### Data Collection

Analyzes the frequency and type of interactions, adherence levels, and required interventions.

#### Evaluation metrics

Includes hospital admission rates, clinical parameter improvements, quality of life evaluations, and cost-effectiveness.



### 3. Telemedicine services and interaction with patients: Research questions

#### Clinical outcomes

- How does telemonitoring compare with conventional monitoring in terms of clinical outcomes (e.g., hospitalization rates, device issue detection)?

#### Economic outcomes

- What is the cost-effectiveness ratio of telemonitoring?

#### Patient benefits

- Are there improvements in patient satisfaction or quality of life with telemonitoring?



### 3. Telemedicine services and interaction with patients: Research questions

#### Clinical outcomes (Mortality and Clinical Event Detection)

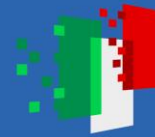
- A meta-analysis of 8 studies involving 6,106 patients showed no significant difference in 12-month mortality rates between telemonitoring and conventional clinic follow-ups. However, one extended study reported a significant reduction in mortality after 24-34 months.
- Telemonitoring effectively identifies arrhythmias and device malfunctions early, with some studies reporting a 50% faster detection of significant clinical events compared to standard monitoring.



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### 3. Telemedicine services and interaction with patients: Research questions

**Economic outcomes**  
(Cost reduction)

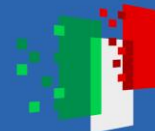
- Telemonitoring significantly reduces healthcare costs by decreasing clinic visits (60-80%) and transportation expenses, particularly beneficial for those far from medical facilities. It also reduces hospitalization costs, with estimated annual savings of about \$1,000 per patient in the U.S. and Europe.



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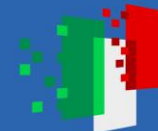
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### 3. Telemedicine services and interaction with patients: Research questions

**Patients benefits**  
(QoL improvement)

- While telemonitoring does not directly improve QoL compared to in-person visits, it enhances patient satisfaction through the convenience of remote follow-ups and reduced travel needs. A substantial proportion of patients prefer telemonitoring for its ease, supporting its use for long-term medical device management.





## Main references

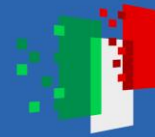
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**Thank you for your attention**

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