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**CARES**



# CARES

**Remote Healthcare  
for Silver Europe**

*Soins de santé à distance  
pour l'Europe de la Silver*

**STUDY VISIT N°2  
NOUVELLE-AQUITAINE**

**Regional Council, Bordeaux  
22 November 2023**



RÉGION  
**Nouvelle-  
Aquitaine**



# Telemonitoring in cardiology

**Dr Sylvain Ploux**

Cardiologist at the Bordeaux University Hospital



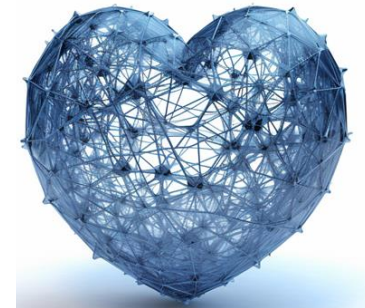
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# Remote Management of Chronic Cardiac Diseases in a Multicenter Hospital Network



Sylvain Ploux, MD, PhD

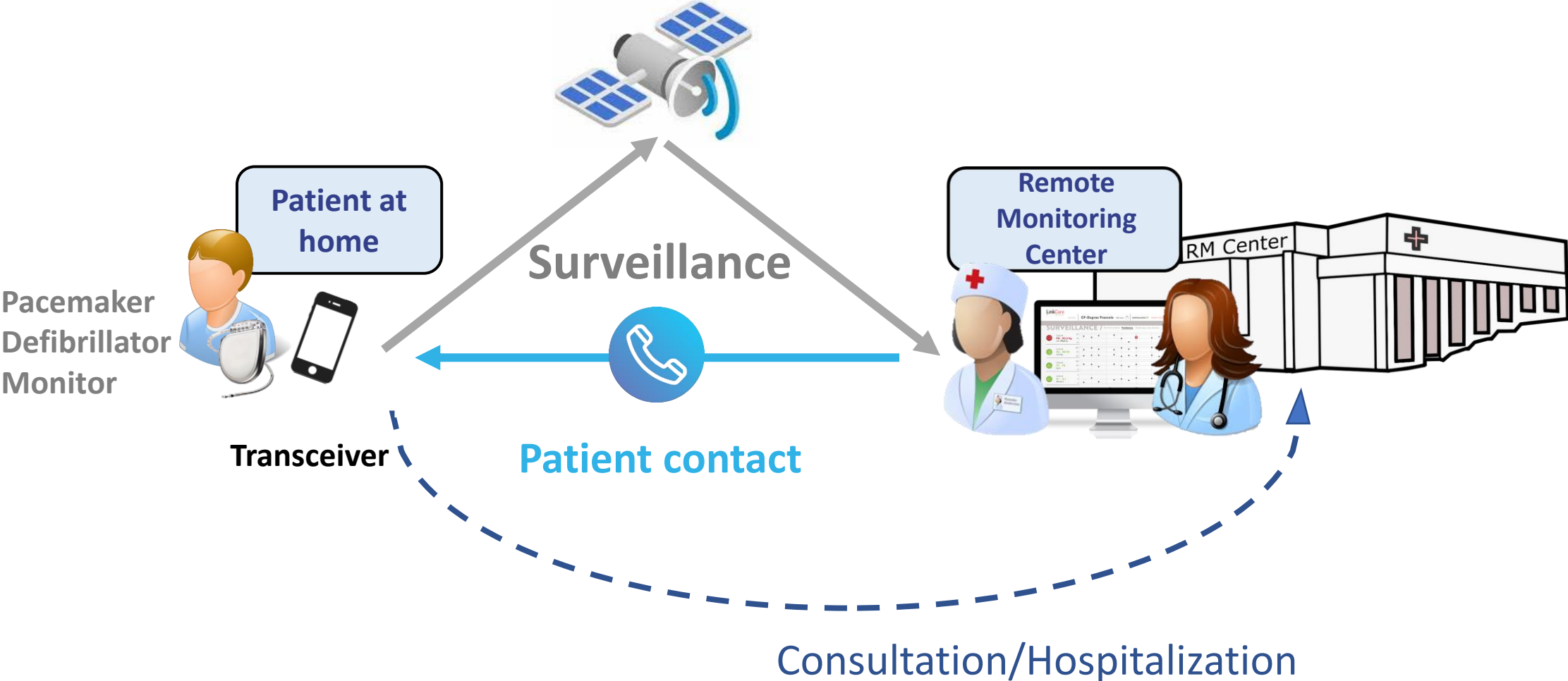
CHU Bordeaux & IHU Liryac, Electrophysiology and Heart Modeling Institute

University of Bordeaux -France







# ➤ Remote Monitoring of Cardiac Implantable Electronic Devices

Principle; Benefits; Limitations



# Reasons for implementing RM

-  Improves patient safety
  - Reduces time to medical intervention
  - Improves battery longevity
  - Improves recall management
- Improves patient survival → 50% 
-  Decreases health care utilization and costs
  - Decreases in office FU up to 83%
  - Reduces number and length of hospitalizations
  - Decreases staff work burden
- Improves patient satisfaction 
  - Benefits independent of the geographic location, the socioeconomic status or the age
  - Compliant with COVID quarantines/lockdowns

	COR	LOE
 2023	1	A

International guidelines

1. In patients with CIEDs, RM is recommended as part of the standard of care.

72% ≥65y and 48% ≥75y



## Human resources

**Requires a dedicated team of CIED RM personnel**



## The burden of Big Data

**>120 000 transmissions analyzed/y**



## Low yield

**5% of these transmissions require examination by a cardiologist**

# ➤ Remote Management of Heart Failure

Principle; Benefits; Limitations

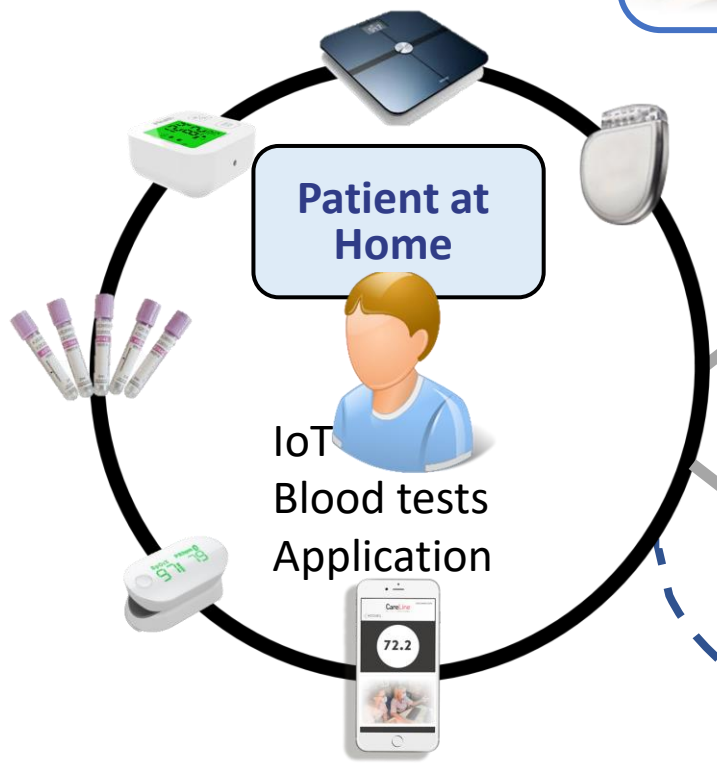




# Principle of HF remote Management



Patient Education/  
Videoconferencing

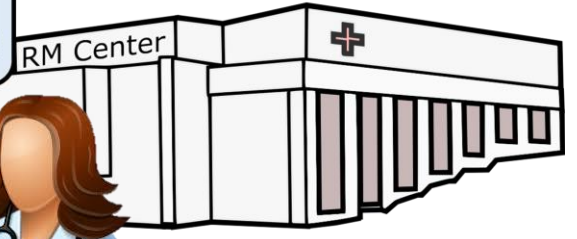


Patient at Home

IoT  
Blood tests  
Application



Remote Management center







surveillance

Intervention

Feedback

Consultation/Hospitalization

# Reasons for implementing RMT

-  **Comprehensive approach**
  - Treatment up-titration
  - Acute management of WHF events
  - Patient education
-  **Improves patient survival → 30%**
-  **Decreases days lost in hospitalization**
- Ambulatory management of WHF → 63%**
-  **Improves patient satisfaction**
- Benefits independent of the geographic location, the socioeconomic status or the age**
- Compliant with COVID quarantines/lockdowns**

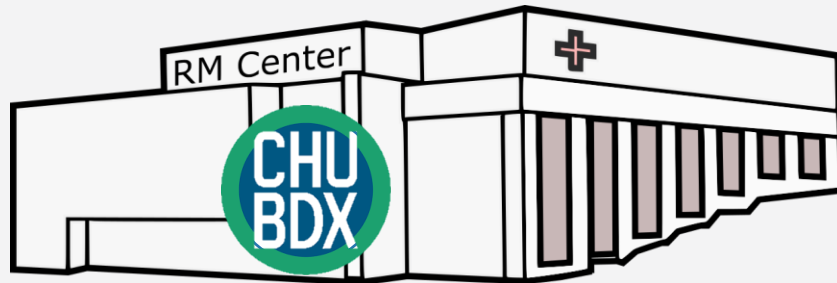
## International 2021 guidelines

Recommendations	Class <sup>a</sup>	Level <sup>b</sup>
Non-invasive HTM may be considered for patients with HF in order to reduce the risk of recurrent CV and HF hospitalizations and CV death. <sup>374</sup>	IIb	B

78% ≥65y and 42% ≥75y



Remote management of worsening heart failure to avoid hospitalization in a real-world setting



161 patients  
over 15 months



NYHA  $\geq$  II\*



Mean age  
72 years

## Results

80%  
adherence

106 Worsening HF  
events



39 Hospitalizations



63% Remote Home  
Management





## Human resources

**Requires a dedicated staff**

**Requires frequent patient contacts → 10 calls/p/y**



**Multiparametric approach → Big data**

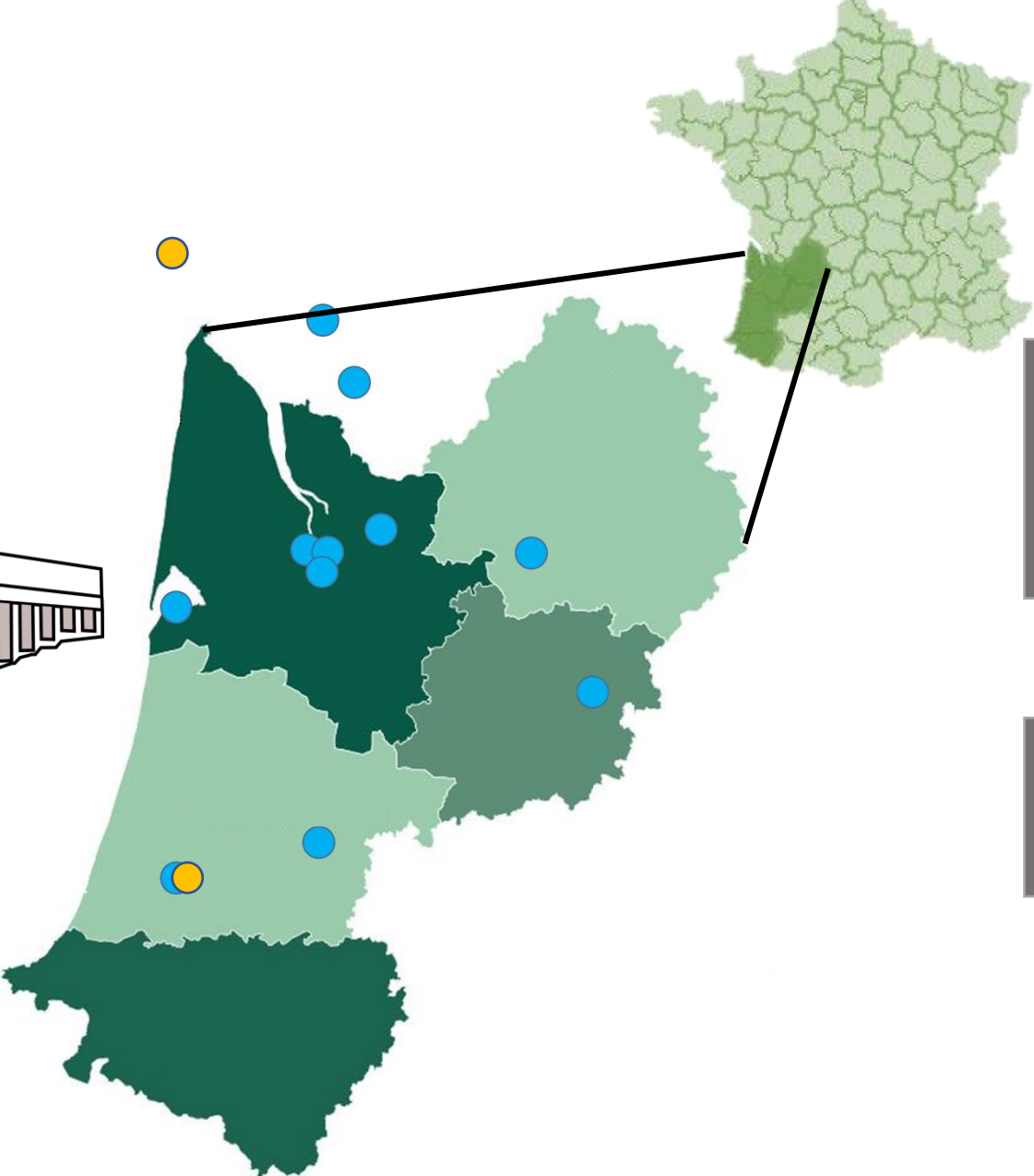
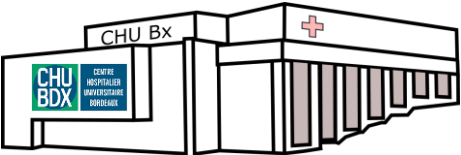
# ➤ The Remote Monitoring Center of Chronic Diseases and Connected Devices of the Bordeaux University Hospital

Objectives, Organisation, Activity, Research and Education



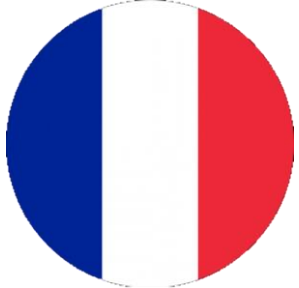
- Being capable of offering a remote monitoring/management strategy to the largest number of patients in order:
  - to improve their QOL
  - to reduce and shorten hospitalizations
  - to improve their survival
- Promoting remote management of chronic diseases
- Improving interprofessional collaboration and professional practice
- Creating big-databases for research purposes

# Organization



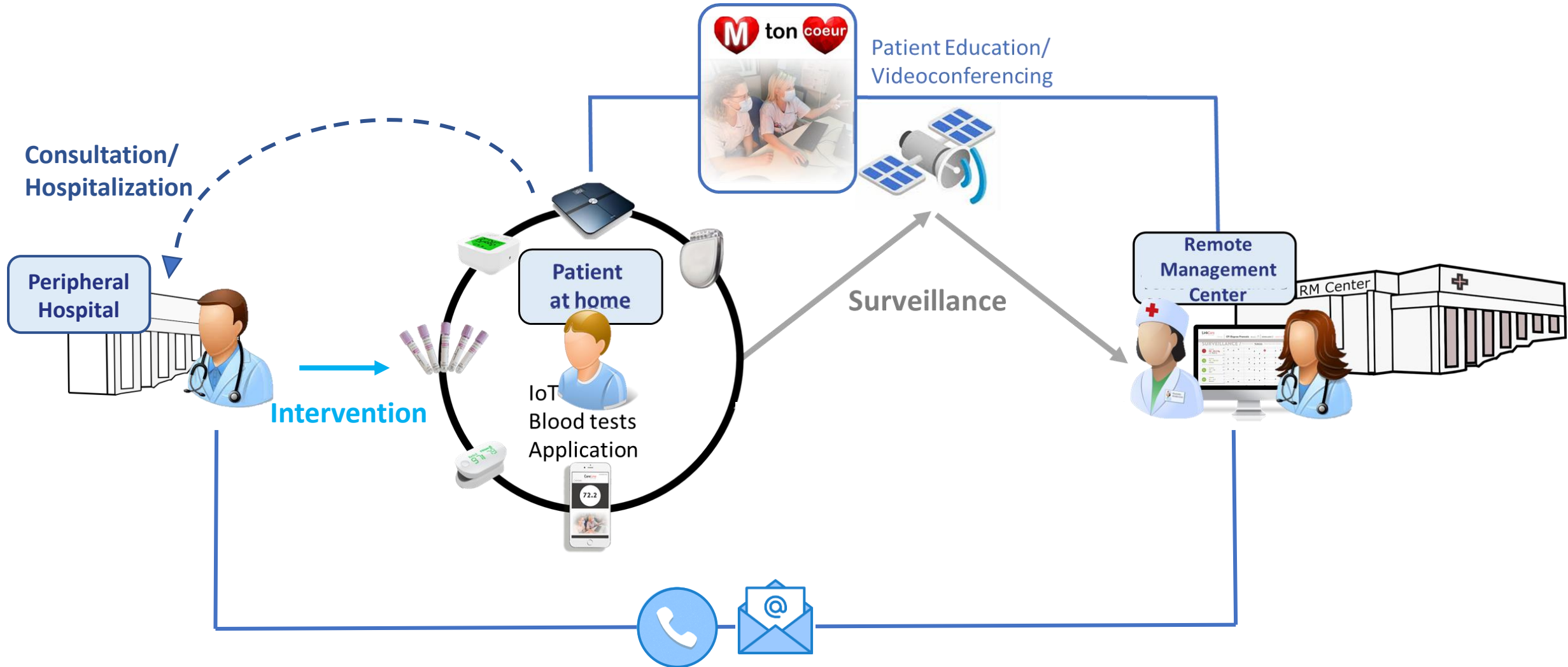
Unique regional multicenter network since 2012

Nr 1 RM network in France





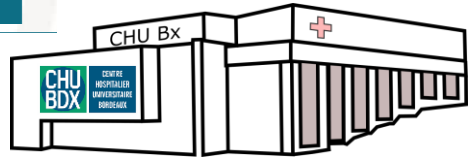
# Principle of a Collaborative Hospital Network for HF Remote Management







# The expert center



- Since 2001
- 1 cardiologist
- 6 technicians of RM
- + administrative staff
- 8am to 5pm, 5/7 days

- Appointments
- Billing

## Needs from the peripheral center

- Secured email address
- Patient medical history
- Last drug prescription
- Last blood test results
- Patient contacts/GP/nurse



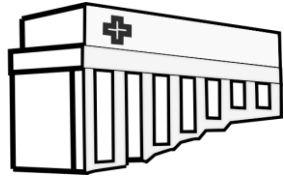
Cooperation agreement



- **Patient enrollment** prior to discharge: explanations, education, informed consent, patient registration + materials distribution
- **Managing patient connectivity**
- Transmission examination and analysis: **triage**
- **Patient calls and evaluation**
- Case presentation to the cardiologist
- Transmission of the cardiologist prescription to the patient
- **Communication with health care team and partners**
- **Traceability, documentation**
- Ordering monitors, connected scales, blood pressure devices, smartphones...



# The peripheral center



## Minimal requirements:

- 1 cardiologist
- 1 nurse RM
- + administrative staff
- Secured email address
- Signed cooperation agreement

- **Appointments**
- **Billing**

- **Patient enrollment** prior to discharge: explanations, education, informed consent, patient registration + materials distribution
- Filtered **alert management**
- **Communication with health care team and the expert center**
- **Traceability, documentation**



# The cooperation agreement

## Specifies

- Who is involved?
- Who is doing what: enrollment, triage, patient contact, management, return of the material
- Fees splitting



# Activity Volume

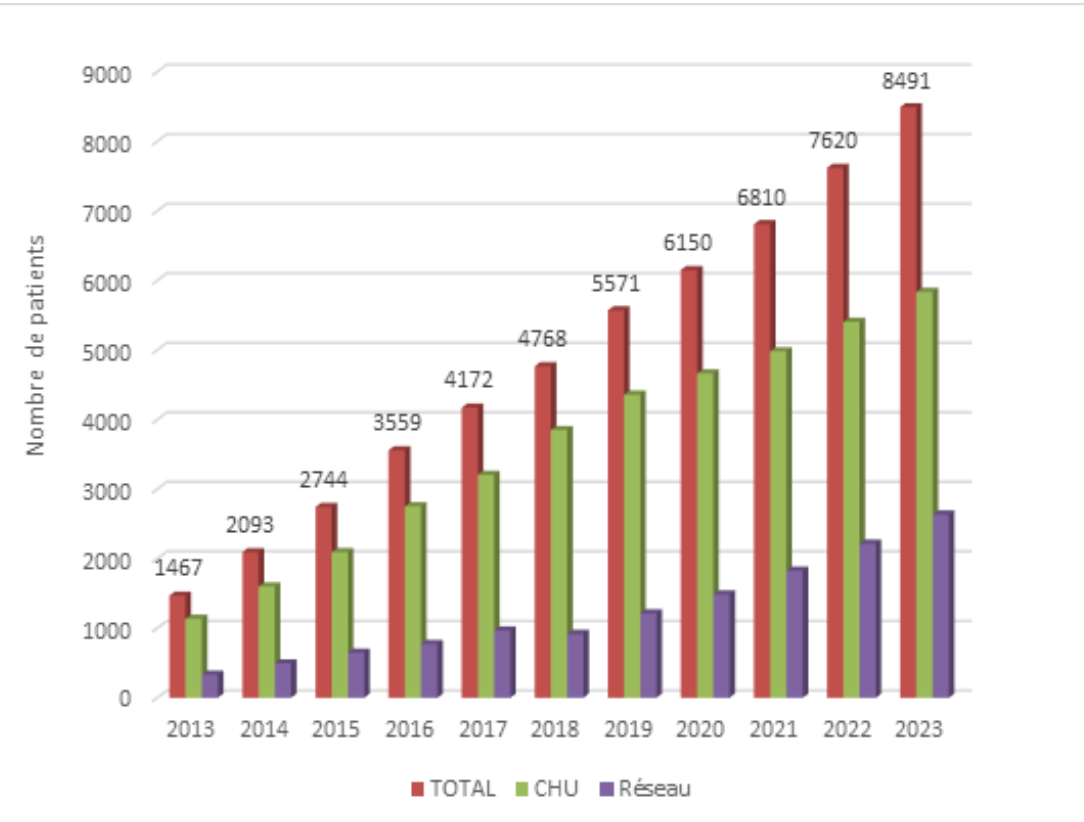
**14 partners**

**>8500 patients**

**>10<sup>5</sup> remote transmissions/y**

**>6500 medical advice/y**

**Linear growth**





## Information sharing

**No common medical files**

**Implies multiple email exchanges**

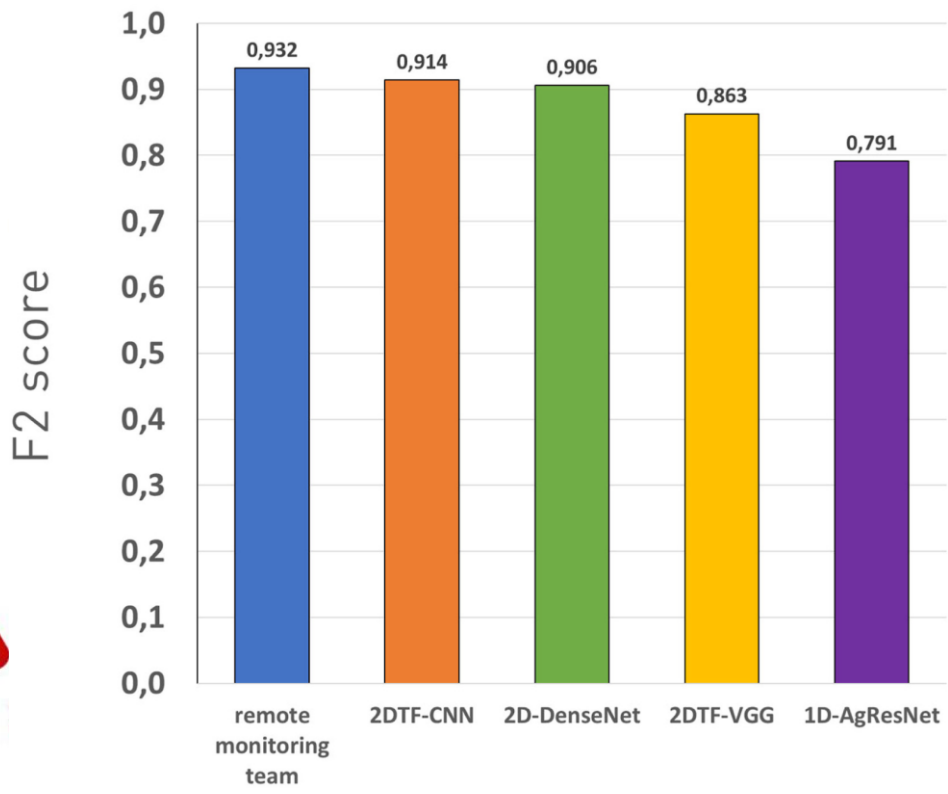
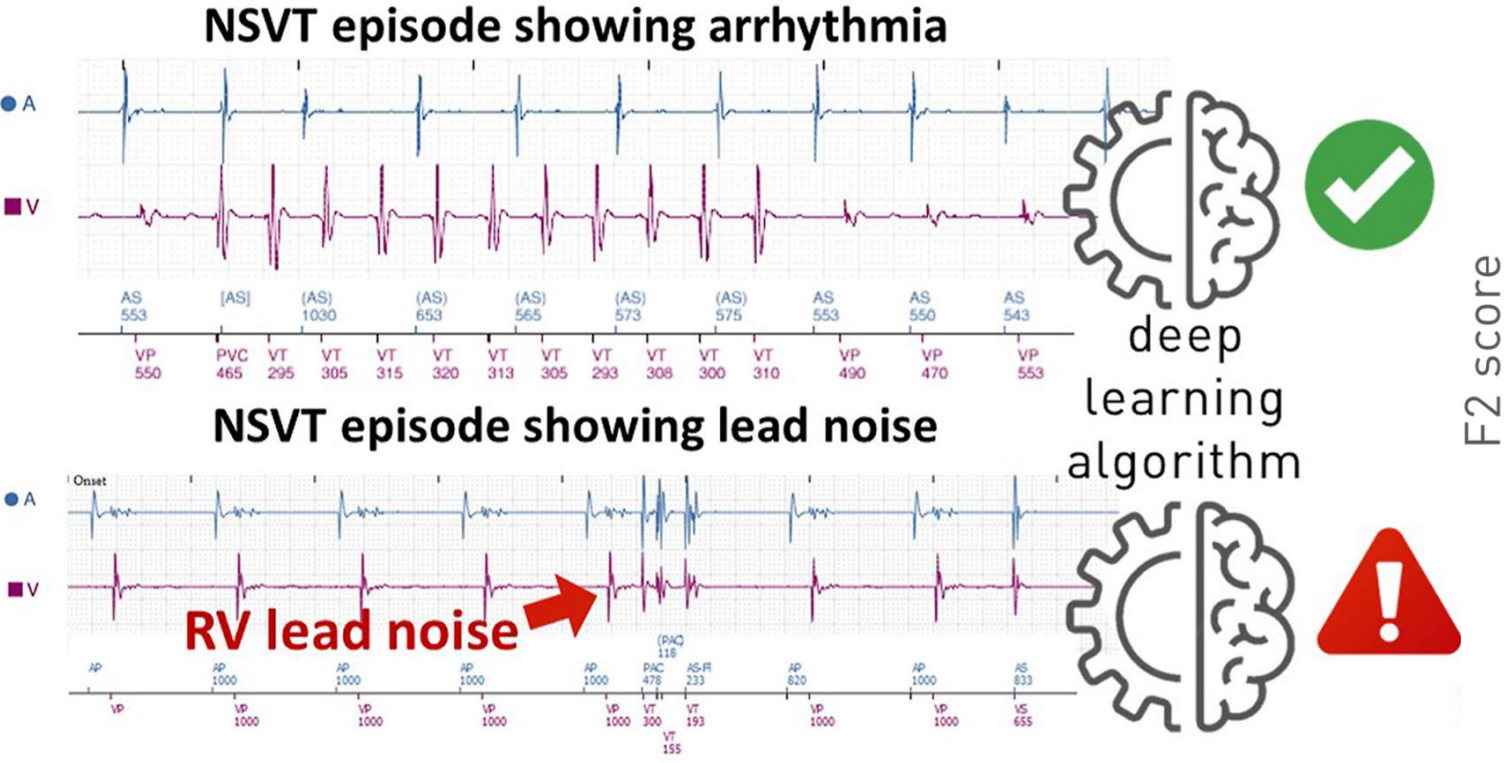


- First and unique university degree for RM technicians in France since 2019 (20-30 pers/y)

- The CareLine web platform specifically designed for HF remote management. Multiparametric approach (clinical, CIEDs, blood tests).



- Translational research in collaboration with Liryc aiming at improving data analysis through the use of machine-learning algorithms.



Strik M et al. Artificial intelligence for detection of ventricular oversensing: Machine learning approaches for noise detection within nonsustained ventricular tachycardia episodes remotely transmitted by pacemakers and implantable cardioverter-defibrillators. Heart Rhythm. 2023

# Conclusion



- Remote monitoring and management of heart diseases **reduces the number and length of hospitalizations and improves patient survival**
- Requires a **dedicated team organized in a RM center**
- Remote management strategies **must be available for any patient at any age**





The multicenter hospital network:

- Is an effective strategy for overcoming the human resource obstacle
- Is an effective medium to ensure **equal access to health care**
- Improves **interprofessional collaboration** and professional practice

This organization will further improve with the widespread diffusion of the national EMR

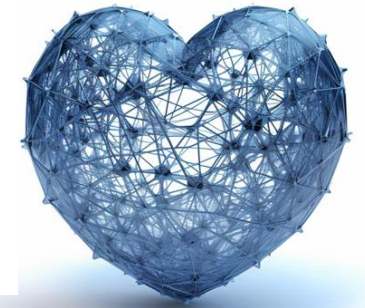


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# Thank you

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