

Cost and duration of hospital stays for complex patients receiving a Micra™ VR or a single-chamber conventional pacemaker with epicardial lead in France

Objectives

Conventional cardiac **pacing systems** consist of a pacing can requiring subcutaneous implantation, and **pacing leads**, inserted by transvenous route, or by surgical procedures when the transvenous route is not accessible. Despite technological advances in pacemakers since their introduction, **serious adverse events may still occur following implantation: a large recent pacemaker registry has shown a complication rate of 20% at 5 years** ¹.

The **Micra™ VR** device is a **single chamber leadless miniaturized pacemaker** reimbursed in France since February 2019 as an **alternative to conventional pacemakers with either epicardial or transvenous lead** for patients at a **high risk of complications (HR)** or **contraindicated for transvenous lead implantation (CI)**.

Patients implanted with Micra™ VR or with epicardial lead pacemakers generally have **more comorbidities than patients receiving transvenous lead pacemakers** and were the focus of this study.

The objectives of this study were to describe **the cost and length of stay** for a single chamber pacemaker implantation with an **epicardial lead** or with a **Micra™ VR device**.

Methods

An **observational retrospective** study was conducted using the **French National Hospital Database (PMSI)**.

Adult (≥18 years old) patients with **at least one hospital stay for epicardial single-chamber (epiSC) pacemaker** or **Micra™ VR** device implantation (identified via device LPP codes) between **January 1, 2019, and December 31, 2021**, were included.

Indications for Micra™ VR device implantation:

- **Contraindicated for a transvenous device:** patients with infectious history and/or absence of venous access who would otherwise receive an epicardial lead
- **High risk of complications:** patients on hemodialysis, chemotherapy with implanted catheter or prior lead fracture and patients with comorbidities of interest - immunosuppression, diabetes, valvular pathology, cancer history, COPD, and kidney failure.

This information was identified via ICD10, CCAM (French Classification for Procedures) and DRG codes the 6 years preceding the index stay.

Length of stay and costs were described based on the type of implant.

Conclusion

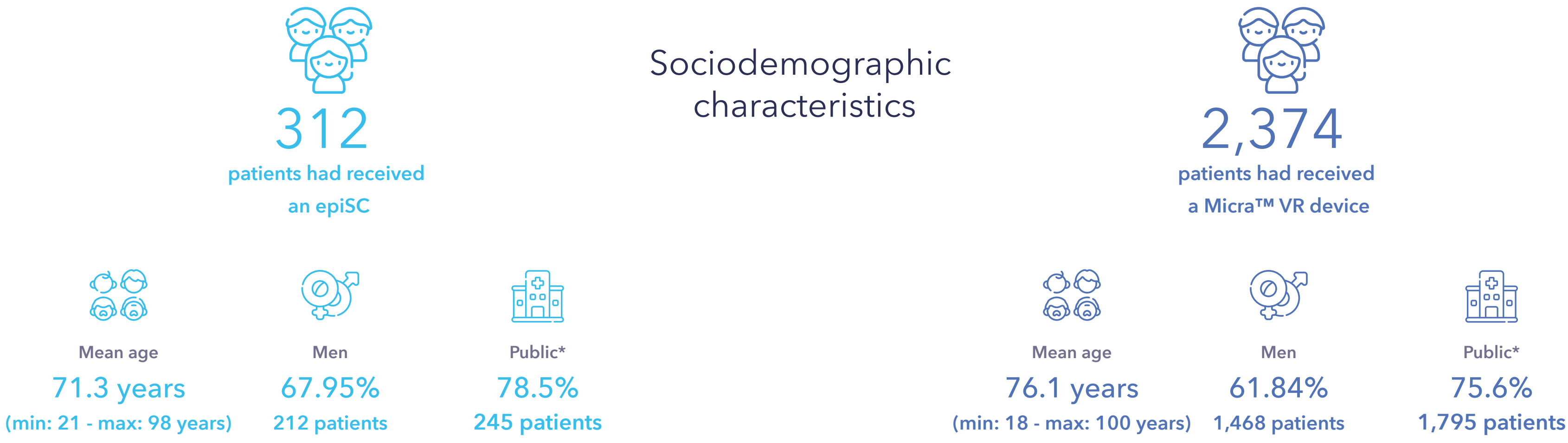
The **indications for an implant of a Micra™ VR or a pacemaker with epicardial leads can be different** and thus those patients are **not directly comparable**.

However, there is some overlap between the indications: Both types of patients are **contraindicated** to a pacemaker with transvenous lead and Micra™ VR is indicated, amongst other, in patients who would otherwise receive an epicardial lead pacemaker in France. In addition, both patient groups have **severe conditions** which are likely to result in **high costs and prolonged hospitalization compared to transvenous pacemakers**.

Patients implanted with an epicardial lead pacemaker have longer hospital stays, including longer ICU stays, and were associated with a higher economic burden compared with Micra™ VR. While the two groups are not directly comparable, it is an interesting finding that implanting an epicardial lead may be much more resource intensive than implanting Micra despite similar indications.

Results

Study Population

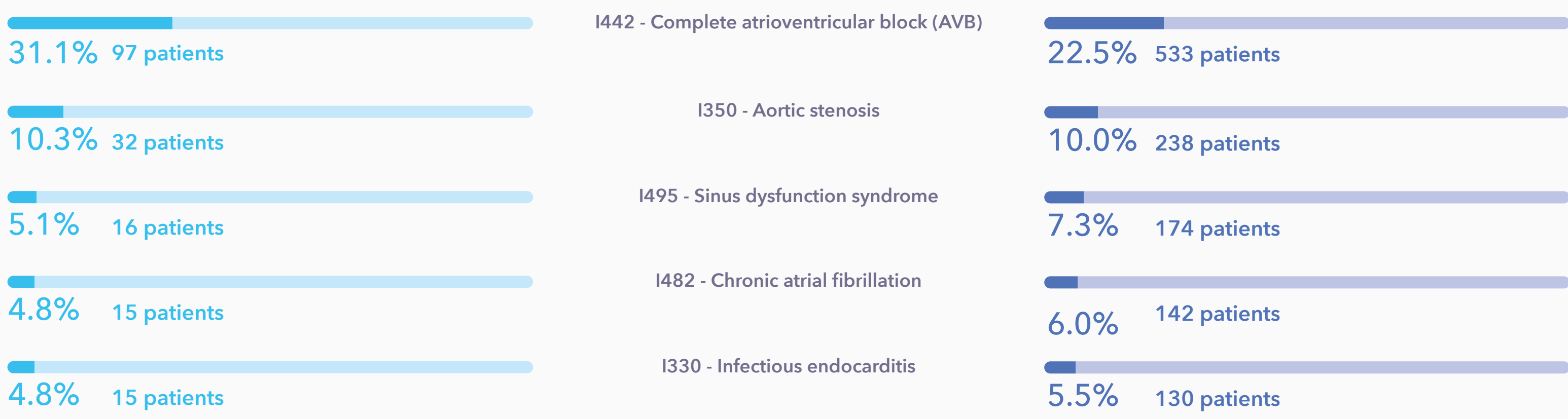


*Public sector was mostly constituted by University hospitals, related to the restrictions for epiSC and Micra™ VR medical device implantation.

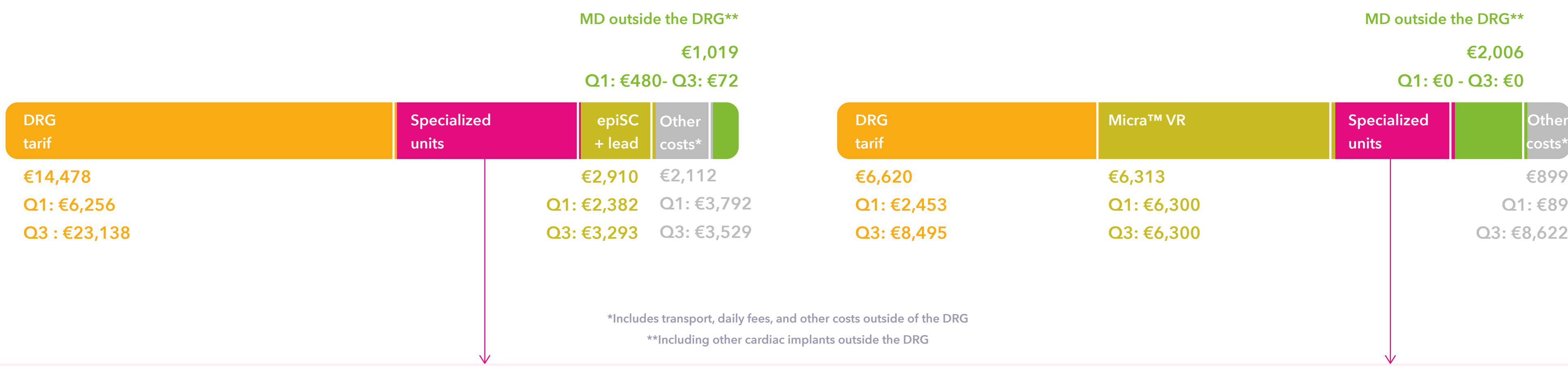
Comorbidities



Top 5 principal diagnostics



Hospitalization costs



Specialized units focus



AVB: Atrioventricular block

CCAM: Classification Commune des Actes médicaux (French medical classification for clinical procedures)

CI: Contraindicated (for transvenous lead implantation)

CIED: Cardiac Implantable Electrical Devices

COPD: Chronic obstructive pulmonary disease

DRG: Diagnosis related group

epiSc = epicardial single-chamber pacemaker

HR: High risk (of complications)

ICU: Intensive Care Units

LPP: Liste des produits et prestations (List of products and services)

MD = medical device

PMSI: Programme de médicalisation des systèmes d'information (French National Hospital Database)

(1) Udo EO, Zuthoff NPA, Hemel NM van, Cock CC de, Hendriks T, Doevendans PA, et al. Incidence and predictors of short- and long-term complications in pacemaker therapy: The FOLLOWPACE study. Heart Rhythm. May 1, 2012;9(5):728-35

PMSI bases provided by ATH, Data controller: Medtronic; Processing implementation officer: HEVA. Study registered under MR006 with the Health Data Hub on 14/06/2022 (Declaration of conformity n° 2215682 v 0 of 05/11/2019).

Produced with the institutional support of Medtronic France - 9 boulevard Romain Rolland, 75014 Paris