



# Antibiotic Prophylaxis in Cardiac Surgery: Are We Following the Rules?

E. Volpi<sup>1</sup>, I. Benassi<sup>2</sup>, G. Lo Surdo<sup>1</sup>, M. Cossu<sup>3</sup>, S. Alduini<sup>1</sup>, M. Mangione<sup>3</sup>, M. Lorenzini<sup>4</sup>, P. Furofori<sup>5</sup>, P. Del Sarto<sup>5</sup>, M. Baroni<sup>6</sup>, S. Biagini<sup>1</sup>

1. Hospital Pharmacy, Ospedale del Cuore, Fondazione Toscana Gabriele Monasterio
2. Specialisation school in Hospital Pharmacy, University of Pisa
3. Information systems and information technologies, Fondazione Toscana Gabriele Monasterio
4. Nursing Service in Anesthesia and Resuscitation Unit, Fondazione Toscana Gabriele Monasterio
5. Anesthesia and Resuscitation Unit, Ospedale del Cuore, Fondazione Toscana Gabriele Monasterio
6. Clinical Risk Manager, Fondazione Toscana Gabriele Monasterio

## Background

**Antibiotic prophylaxis in cardiac surgery** is a key strategy for preventing surgical site infections (SSIs), achieved through intravenous administration of antibiotics, according to specific protocols within the hospital. According to international and national guidelines, antibiotics should be **administered within 30–60 minutes before surgical incision** and **discontinued within 24–48 hours after surgery**. Appropriate agent selection and precise timing are crucial to ensure effectiveness and reduce infectious complications. Due to their complexity and frequent use of implantable devices, cardiac surgeries are considered high-risk for SSIs and require mandatory prophylaxis.



## Aim

The aim of this study was to **evaluate adherence to the institutional antibiotic prophylaxis protocol** in **adult** and **pediatric** patients who underwent cardiac surgery, focusing on antibiotic selection, timing of administration, and duration, with the objective of identifying areas for improvement in antimicrobial stewardship.

## Materials and Methods

This retrospective study included all adult and pediatric patients who underwent cardiac surgery in our hospital from January 2022 to June 2025.

Adherence to the institutional prophylaxis protocol was assessed based on three parameters:

- **antibiotic selection**
- **timing of administration** (within 60 minutes before incision)
- **duration** ( $\leq 24$  hours)

Data were extracted from **electronic medical records** and evaluated by a **multidisciplinary team** including an anesthesiologist, clinical pharmacist, operating room nurse, and health informatics specialist.

## Results

A total of 4,276 patients were included (3,636 adults; 640 pediatric). High adherence was observed in antibiotic selection (adults: 96,9%; pediatric: 92,3%). Timing of administration was also satisfactory (adults: 96,6%; pediatric: 80,9%). However, prophylaxis duration — assessed from 2024 — showed lower adherence, particularly in pediatric patients (adults: 80,2%; pediatric: 37,5%). The extended duration in the pediatric group likely reflects a more cautious clinical approach due to the perceived higher infection risk in younger, often complex congenital cases. The lack of pediatric-specific evidence and protocols may also contribute to this trend.

## Conclusions

**Adherence** to the **antibiotic prophylaxis** protocol was generally **good**, especially in terms of selection and timing. However, prolonged prophylaxis beyond 24 hours, mainly in pediatric patients, indicates the need for targeted interventions. Implementing **automated electronic alerts** to support **timely discontinuation** may enhance compliance and strengthen **antimicrobial stewardship** practices.

