

# The Path to Sustainable Cardiac Surgery in Rwanda:

## Analysis of costs for consumables used during cardiac surgery for a non-governmental organization

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Problem Statement, Aim, & Hypothesis

**Problem Statement:** The cost of consumables in NGO-led cardiac surgery in Low and Middle Income Countries (LMICs) is poorly defined. Quantifying these costs is essential for optimizing resource allocation and sustainability.

**Aim:** Quantify the per-patient cost of consumables used in single and double valve replacement procedures performed by an NGO in Rwanda in order to guide future humanitarian efforts and support economic sustainability in global surgery initiatives.

**Hypothesis:** NGO-led cardiac surgery in LMICs is a cost-effective alternative to patient transfer to high income countries, with consumable costs per patient being lower than the estimated cost of overseas treatment.

Background

- **Global Surgical Access Disparities**
  - Over 5 billion people lack access to basic surgical services
  - Low Income countries: 0.04 cardiac surgeons per million
  - High Income Countries: 7.15 cardiac surgeons per million
- **Cardiovascular Disease Burden**
  - Leading cause of morbidity and mortality worldwide
  - ~1/3 of patients require surgical or interventional care
- **Long-Term vs. Interim Solutions**
  - Long term: Develop endogenous cardiac surgery programs in LMICs
  - Interim: NGO led cardiac surgery missions vs. patient transport to high income locales

Table 2 Total estimated costs in US dollars

Category	Total Cost (USD)
Anesthesia supplies	444.26
Perfusion supplies	1,570.09
Surgical supplies	1,587.35
Inpatient supplies	271.62
Medications	468.01
Fluids	564.47
Replacement valves	4,550.00
Total	9,455.80

Estimated costs of consumables for single- and double-valve replacements in Rwanda. Replacement valves were estimated at a cost of \$3,500 per valve, with an average of 1.3 valves per patient. USD= United States dollars

Results

- Total cost per patient: **\$9,455.80**
- Most Expensive Cost Category: Replacement valves (\$3,500 per valve)

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Methods

We conducted a retrospective review and quantitative description of data from cardiac surgeries performed by an NGO in Rwanda

- Data Collection**
- Obtained financial data from 2020 through Team Heart, an NGO providing cardiac surgical care in Rwanda.
- Consumables Identification**
- Compiled a list of required surgical, perfusion, anesthesia, and inpatient supplies and medications.
- Quantity Estimation**
- Determined the average usage per patient based on six individuals who underwent single or double-valve replacement surgery in 2020.
- Cost Calculation**
- Multiplied the purchasing price of each item by the average quantity used per patient to determine total costs.
- Exclusions:**
- Costs absorbed by the local hospital.

Conclusions

- Consumables for cardiac valve surgery in Rwanda cost just over \$9,000 per patient.
- This cost is lower than the estimated expenses of transporting patients to high-income countries for treatment.
- Findings support the relative cost efficiency of providing cardiac surgical care in low- and middle-income countries under this model.
- Results will inform the allocation of local and international resources for sustainable cardiac care expansion.