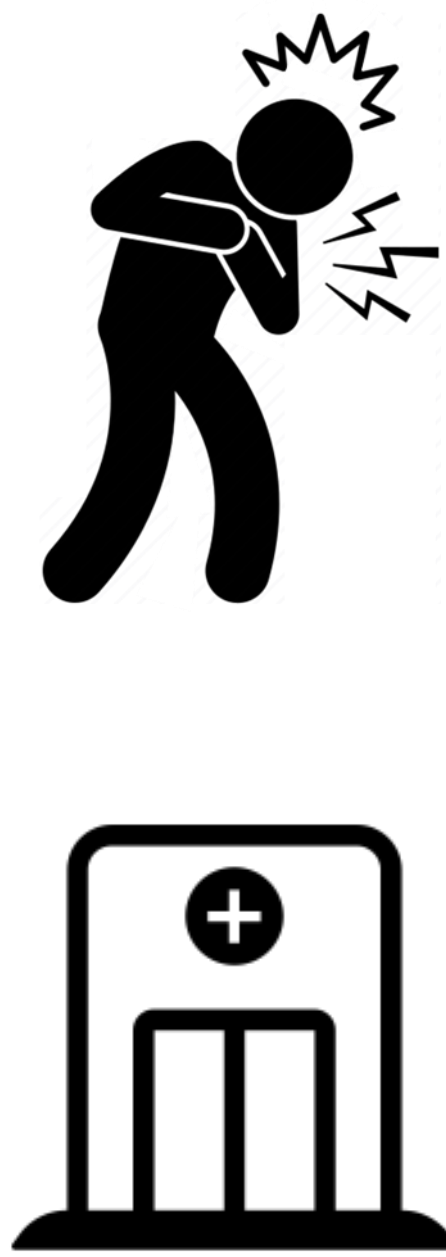


The Budget Impact of Including the Automated Time-resolved Fluorescence Immunoassay as Point-of-care Testing on Cardiac Markers in an Emergency Department in China

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BACKGROUND



Acute chest pain ranks among the most prevalent reasons for emergency department (ED) visits worldwide. In the United States, it accounts for approximately 5.2% of all ED visits, and in England and Wales, it comprises around 6.0% of such visits.

50.0-67.2% of patients' chest pain is related to acute coronary syndrome (ACS). However, diagnostic methods to quickly detect whether chest pain is related to ACS or not are limited, which results in greatly healthcare resource waste in ED.

OBJECTIVE

- This study aims to estimate the potential budget impact of introducing automated point-of-care testing (POCT) for cardiac markers among patients with heart disease-related chest pain in ED, considering the hospitals' and patients' perspectives in China.

METHODS

Overview:

- The model estimates the differences in total hospital budgets and per patient per year (PPPY) healthcare costs before and after adding an automated POCT to test cardiac markers among patients with heart disease in ED.
- The model compares automated and semi-automated POCT.
- Healthcare costs associated heart disease-related chest pain were calculated based on:
 - Epidemiology of chest pain and heart disease
 - Test fee for cardiac markers
 - Test preparation time for cardiac markers
 - Labor costs of doctors/laboratory technicians and hospital cleaners
- All costs were estimated in 2023 Chinese Yuan.

Model Inputs:

- Epidemiology inputs from published literature or expert opinions were used to estimate the annual number of patients with heart disease in ED.
- Laboratory costs of cardiac markers were based on government published cost manual; hospitalization costs at ED, costs of complications due to delayed diagnosis, test preparation time, retest rate, length of stay in ED were based on published literature or data on file or expert opinions.
- Labor costs of ED doctors, laboratory technicians and hospital cleaners were based on published literature (Table 1).

Table 1. Model Inputs

Parameters	Model Inputs	Reference
Patients with suspected/confirmed heart disease-related chest pain in ED	80.0%/50.0%	Expert opinions
Test fee for cardiac markers	Automated POCT: ¥265 Semi-automated POCT: ¥265	Government published cost manual
Test preparation time for cardiac markers/retest rate	Automated POCT: 2 mins/1.0% Semi-automated POCT: 17 mins/4.0%	Data on file/ assumption
Length of stay in ED (days)	Automated POCT: 2.10 Semi-automated POCT: 2.13	Expert opinions
Complication costs due to delayed dx/hospitalization costs (per day)	¥11,987/¥2,100	Data on file and expert opinions
Labor costs of ED doctors, laboratory technicians/hospital cleaners (per hour)	¥28/¥11	Published literature

RESULTS

- In the hypothetical population of 20,000 ED patients, 8,000 patients had heart disease.
- Introducing automated POCT resulted in a decrease of ¥136,250 in annual hospital costs (Figure 1) and a reduction of ¥77 PPPY (Figure 2).
- The hospital budget decrease was mainly due to the shorter test preparation time (total bed days per year before vs. after market entry: 16,712 vs. 16,149 days [Δ = 563 days])
- The PPPY budget decrease was mainly due to lower costs of ED hospitalization due to delayed diagnosis (before vs. after market entry: ¥2,239 vs. ¥2,207 [Δ = ¥32])
- The total hospital costs and PPPY healthcare budget were most sensitive to test preparation time, test fee, and ED length of stay.

Figure 1. Budget Impact Results – Total Healthcare Costs per Year

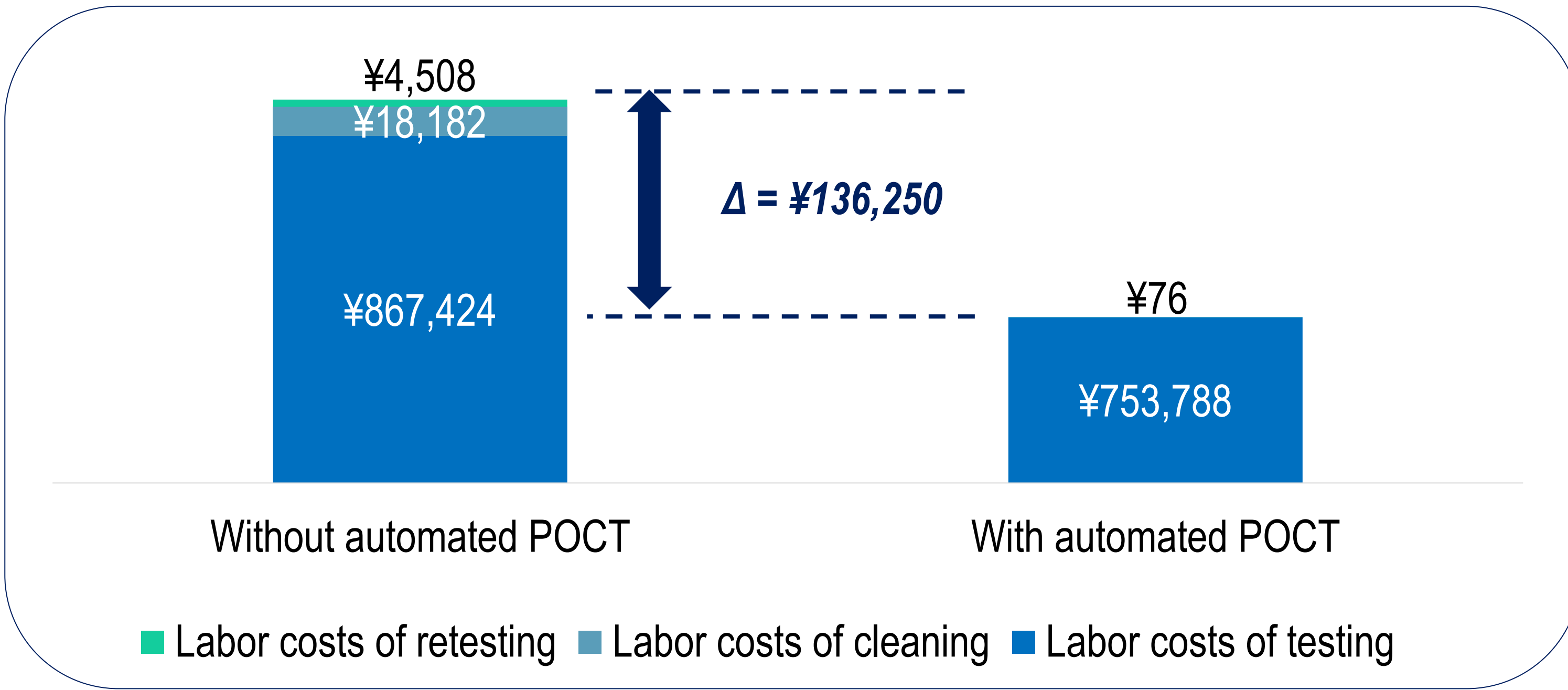
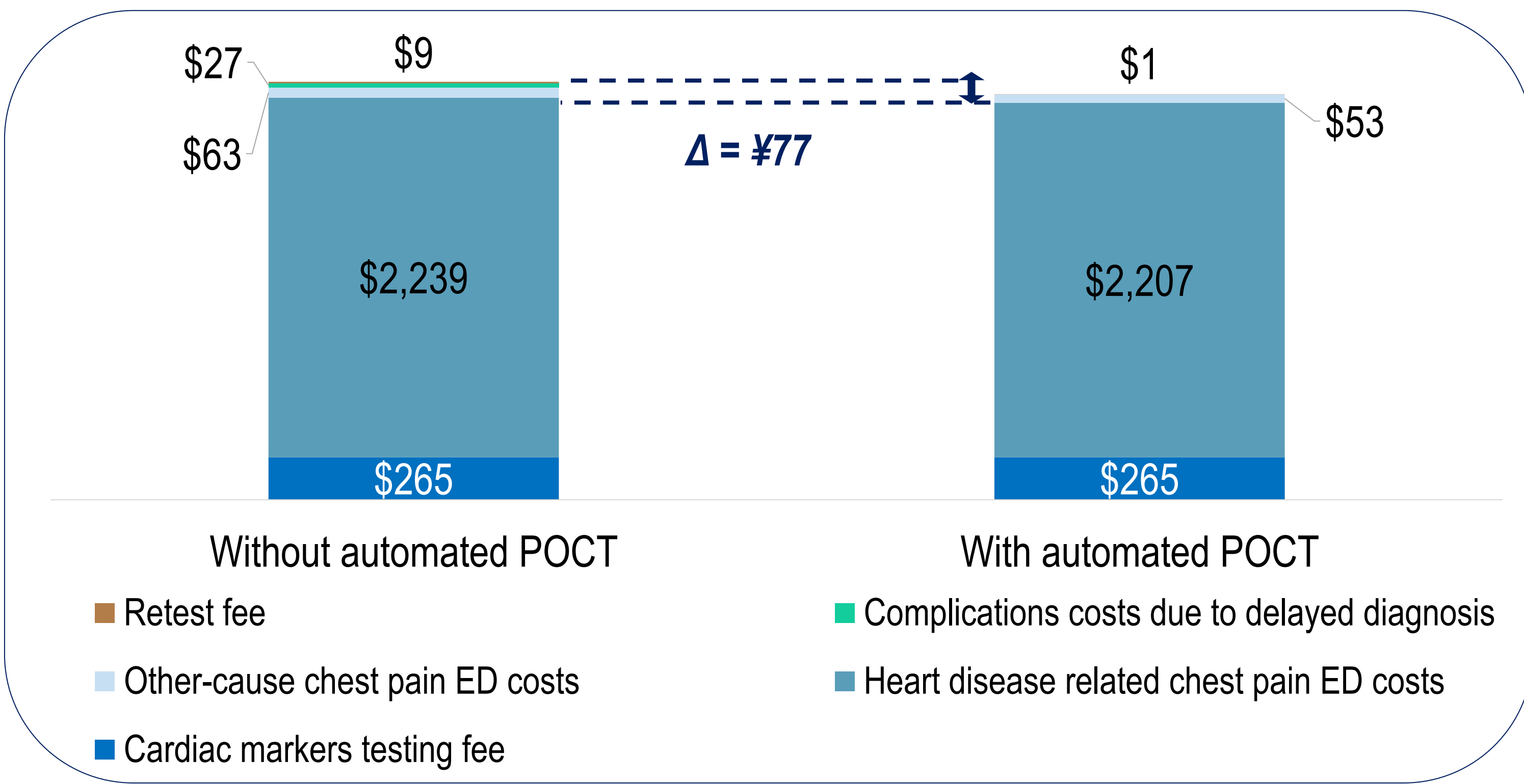


Figure 2. Budget Impact Results – per Patient per Year (PPPY) Costs



CONCLUSIONS

The inclusion of automated POCT for cardiac markers testing provides a budget-saving and efficient option for patients with heart disease-related chest pain in ED from both hospitals' and patients' perspectives.

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