

Short- and Long-term Healthcare Resource Utilization and Costs Associated with Cardiogenic Shock Complicating Myocardial Infarction – A Population-Based Cohort Study



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INTRODUCTION

- Cardiogenic shock due to acute myocardial infarction (AMI-CS) is associated with higher rates of adverse outcomes when compared to other causes¹
- Short-term mortality in AMI-CS remains as high as 50%, with up to 57% of patients dead by 1 year^{2,3}
- Only emergent revascularization of the culprit artery has been demonstrated to improve mortality in CS⁴

OBJECTIVES

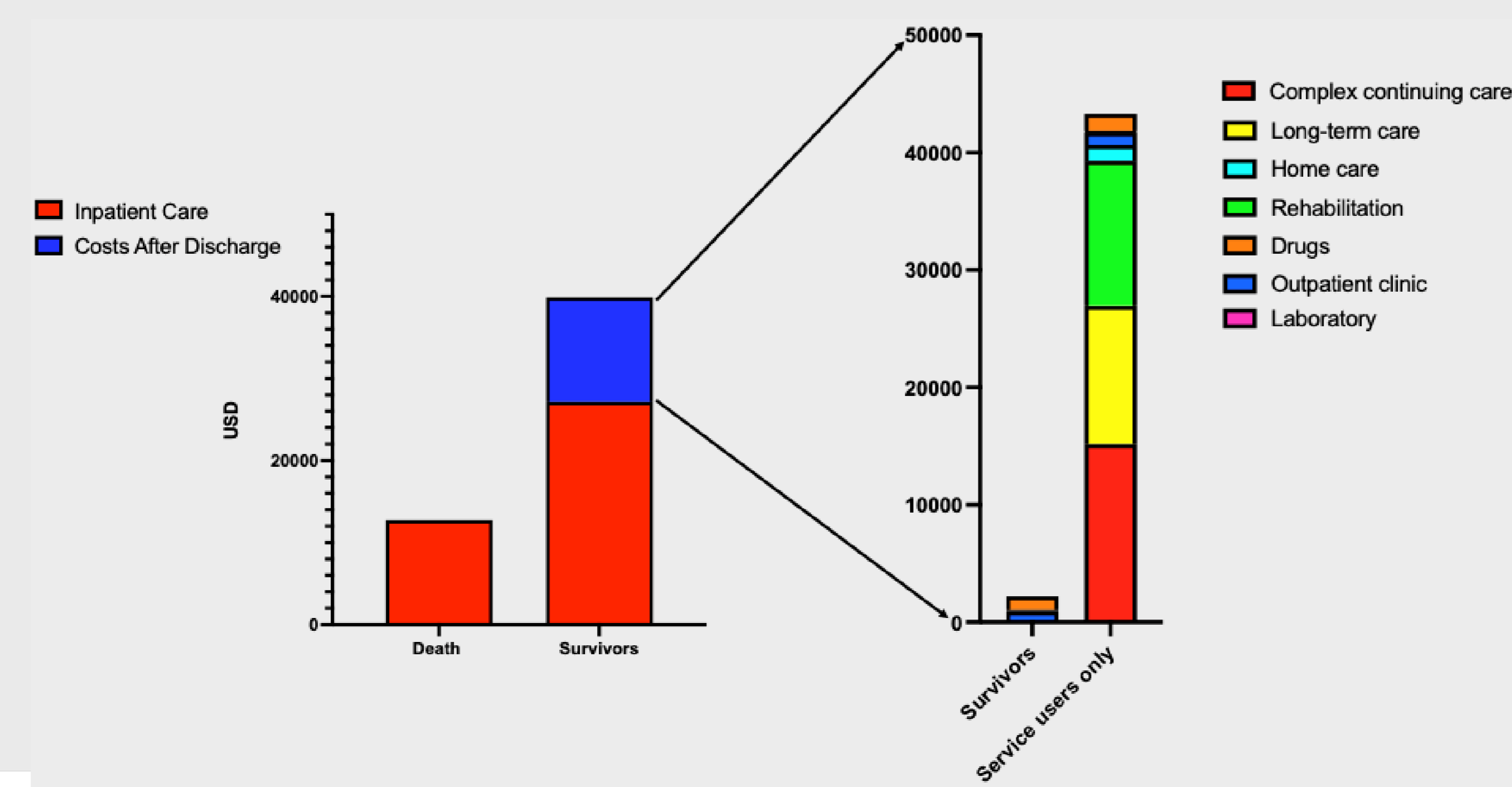
- Healthcare costs associated with management of AMI-CS in contemporary cardiac centers remain poorly defined
- Given the prolonged intensive care unit stay that is often necessary for these patients³, a thorough understanding of costs in AMI-CS and patient factors associated with increased cost is necessary to optimize care delivery
- We therefore used health administrative databases from the province of Ontario to investigate the short- and long-term resource utilization and healthcare costs associated with AMI-CS at an individual patient-level

METHOD

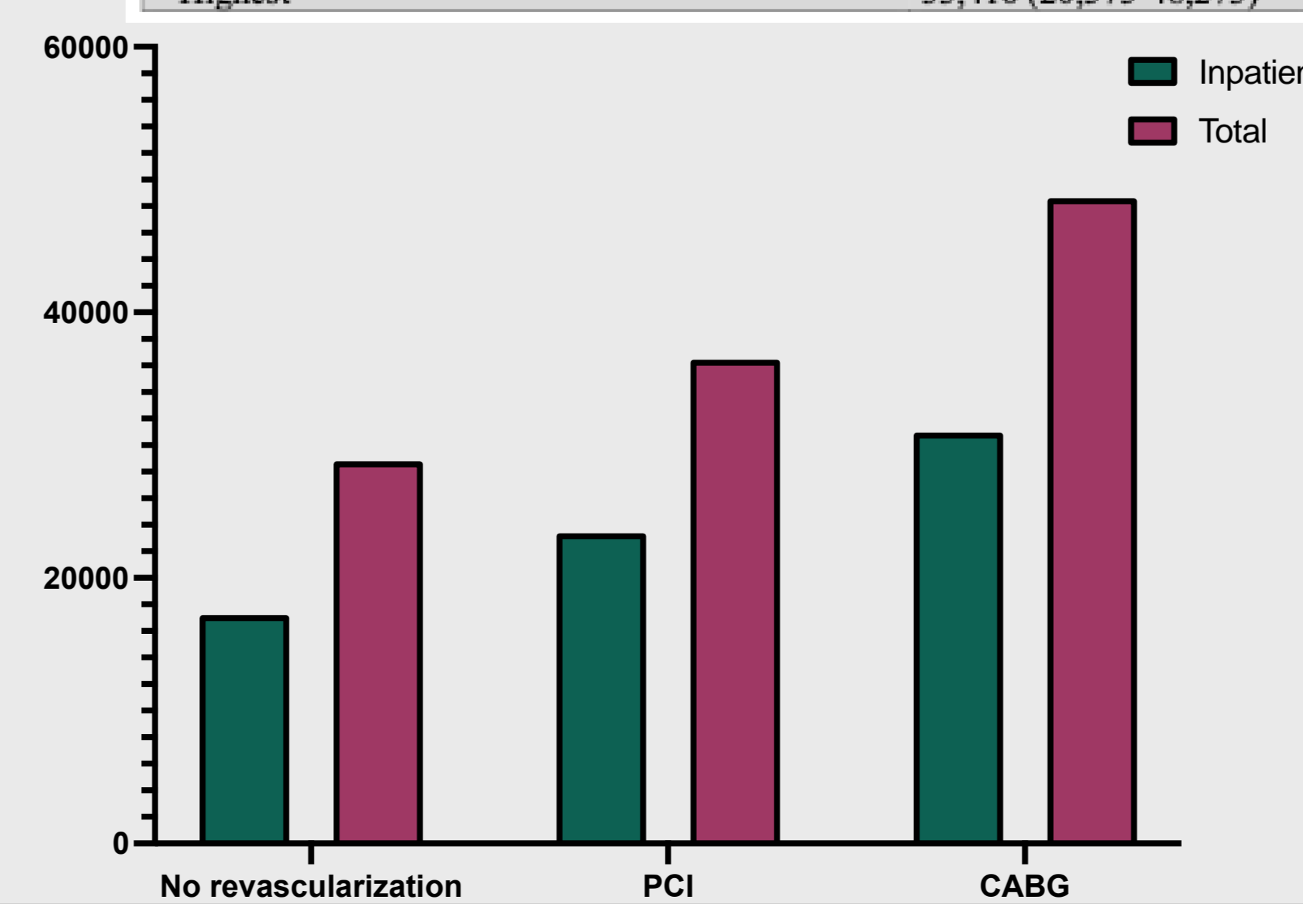
- Adult patients admitted with AMI-CS between April 2009 and March 2019 were included; patients with out-of-hospital cardiac arrest were excluded
- We report total costs (in 2023 USD) within one year following the index admission, using a generalized linear model to identify factors associated with increased cost
- We created separate models for patients who died in hospital and for survivors
- We stratified patients by revascularization strategy, including medical management, percutaneous coronary intervention (PCI), and coronary artery bypass grafting (CABG)
- We evaluated total costs individually by fiscal year across the ten-year period from 2009 to 2019

RESULTS

- 9,789 consecutive patients with AMI-CS were included across 135 centres
- The mean age was 70.5 (SD 12.3) years and 67.7% were male
- In-hospital mortality was 30.2% with 45.9% dead within 2 years
- Among survivors, burden of comorbidity was associated with increased cost, as were complex inpatient interventions
- Patients who received CABG incurred higher total costs than those who received PCI or medical management
- No significant differences were seen in cost per year from 2009 to 2019



Sector	Median costs (IQR)
Total costs	
Entire cohort	37,913 (20,113-66,582)
Patients deceased in hospital	17,730 (9,323-38,379)
Survivors to discharge	45,713 (29,688-77,683)
Readmitted patients*	63,539 (41,608-107,020)
Total costs after discharge (survivors to discharge)	12,719 (4,262-35,275)
Acute care sectors (entire cohort)	
Inpatient	23,912 (12,324-41,833)
ED	608 (416-1,126)
Continuing care sectors (survivors to discharge)	
Complex continuing care	0 (0-0)
Long-term care	0 (0-0)
Rehabilitation	0 (0-0)
Home care	0 (0-1,124)
Continuing care sectors*	
Complex continuing care (n=460, 6.7%)	15,170 (5,604-36,706)
Long-term care (n=360, 4.5%)	11,779 (4,404-24,408)
Rehabilitation (n=765, 11.2%)	12,324 (7,775-16,860)
Home care (n=3,172, 46.5%)	1,368 (458-4,076)
Outpatient care (survivors to discharge)	
Outpatient clinics	923 (320-1,830)
Laboratory (OHIP ^b)	125 (39-256)
Drugs ^b	1,163 (132-2,380)
Outpatient care*	
Outpatient clinics (n=5,984, 87.6%)	1,062 (565-1,961)
Laboratory (OHIP, n=5,579, 81.7%)	161 (86-299)
Drugs ^b (n=5,886, 86.2%)	1,445 (545-2,660)
Physician billings ^c	6,720 (3,550-10,635)
Total costs by home time quartile	
Lowest	77,643 (45,730-130,076)
Second	54,703 (38,828-85,175)
Third	36,431 (25,604-55,025)
Highest	33,416 (20,575-48,273)



CONCLUSION

- AMI-CS is associated with high cost and resource utilization, as well as high rates of short- and long-term mortality
- While inpatient costs were significant, survivors also had substantial resource use following discharge, especially among those readmitted to hospital or discharged to a non-home setting
- To maximize cost-effectiveness, resource utilization as well as novel therapies for AMI-CS should focus not only on improving mortality, but also on reducing disability

ACKNOWLEDGEMENTS

- We would like to thank our colleagues at ICES for their assistance with data collection and management
- We would like to thank the Alternative Funding Plan for the Academic Health Sciences Centres of Ontario for their funding support

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1. Aissouli N, Puymirat E, Delmas C, Ortuno S, Durand E, Bataille V, et al. Trends in cardiogenic shock complicating acute myocardial infarction. *Eur J Heart Fail*. 2020;22(4):664-72.
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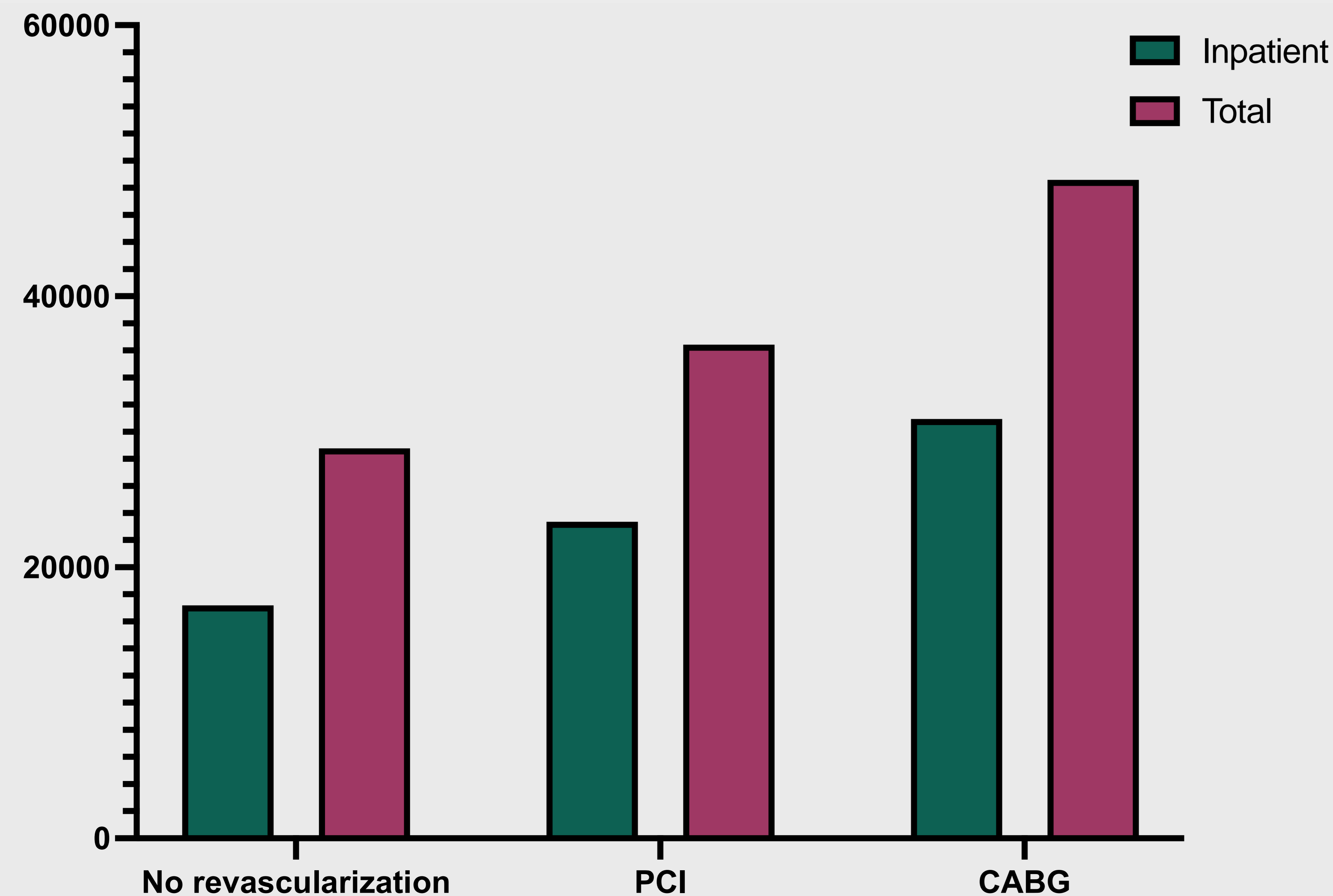
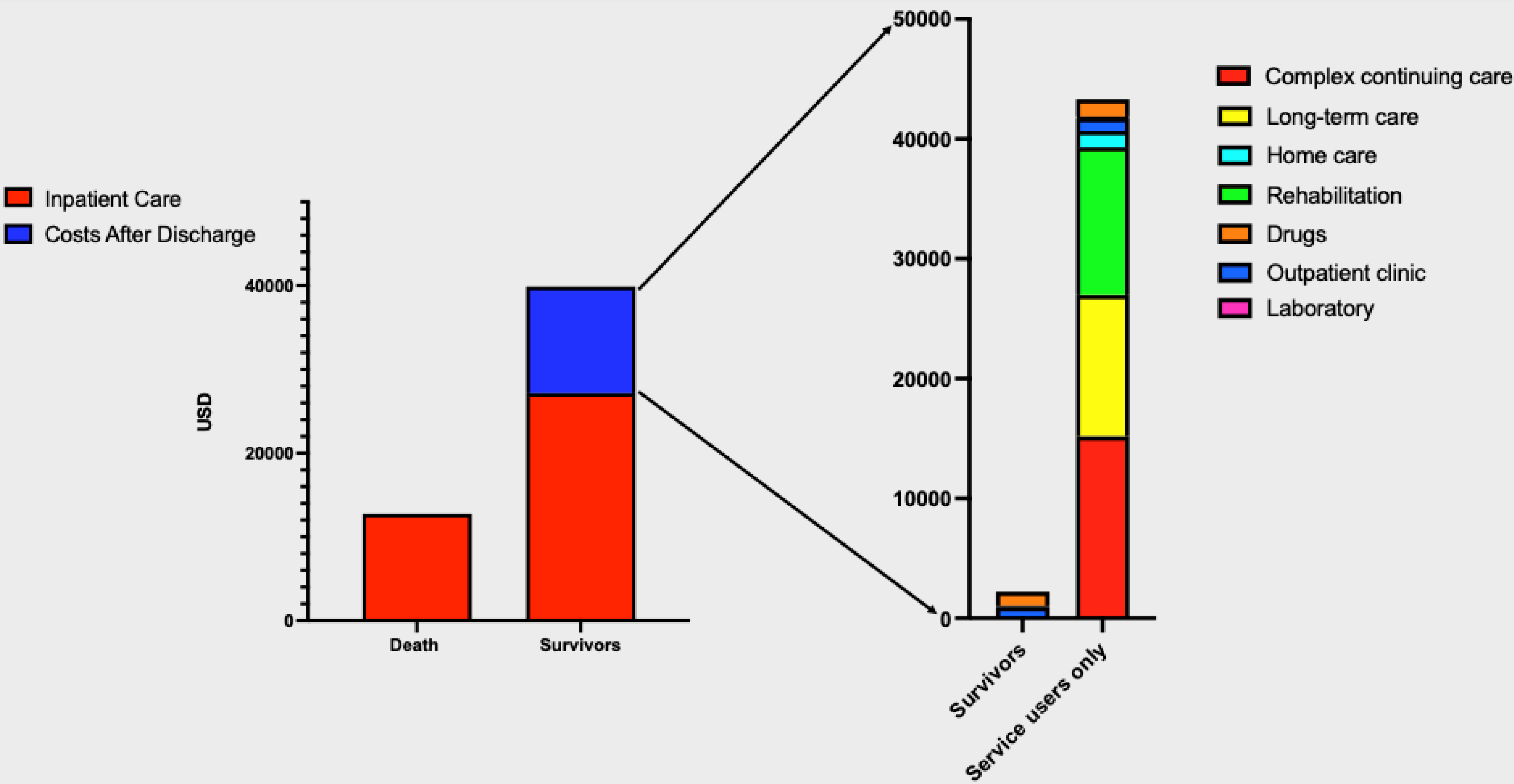
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One-Year Costs After Admission with Acute Myocardial Infarction Complicated by Cardiogenic Shock in Ontario (2009-2019, n=9,789, USD)

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