



# Incidence, Mortality, and Resource Utilization of Deep Venous Thrombosis and Pulmonary Embolism in Cardiac Surgical patients: Insights from the National Inpatient Sample 2005 – 2015



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## Background

- Deep venous thrombosis (DVT) and pulmonary embolism (PE) are life-threatening complications following surgery, warranting prophylaxis.
- Clinical guidelines for thromboembolism prevention in cardiac surgery are lacking.
- This study aimed to characterize the national incidence, mortality, and costs associated with DVT and PE following isolated cardiac operations, such as coronary artery bypass grafting (CABG), aortic valve replacement (AVR), mitral valve replacement (MVR), aortic pulmonary replacement (PVR), tricuspid valve replacement (TVR).

## Methods

- All adults undergoing above operations in U.S. from 2005 to 2015
- National Inpatient Sample (NIS), which contains data for nearly 50% of all US hospitalizations.
- International Classification of Diseases, Ninth Revision (ICD-9) codes were used to identify patients with in-hospital DVT and PE.
- **Primary outcome:** in-hospital mortality in patients who developed DVT or PE following cardiac surgery.
- **Secondary outcomes:** length of stay, cost, and predictors of DVT and PE
- Multivariable logistic regression adjusted for patient and hospital characteristics was used to identify the independent impact of DVT and PE on mortality and cost of hospitalization.

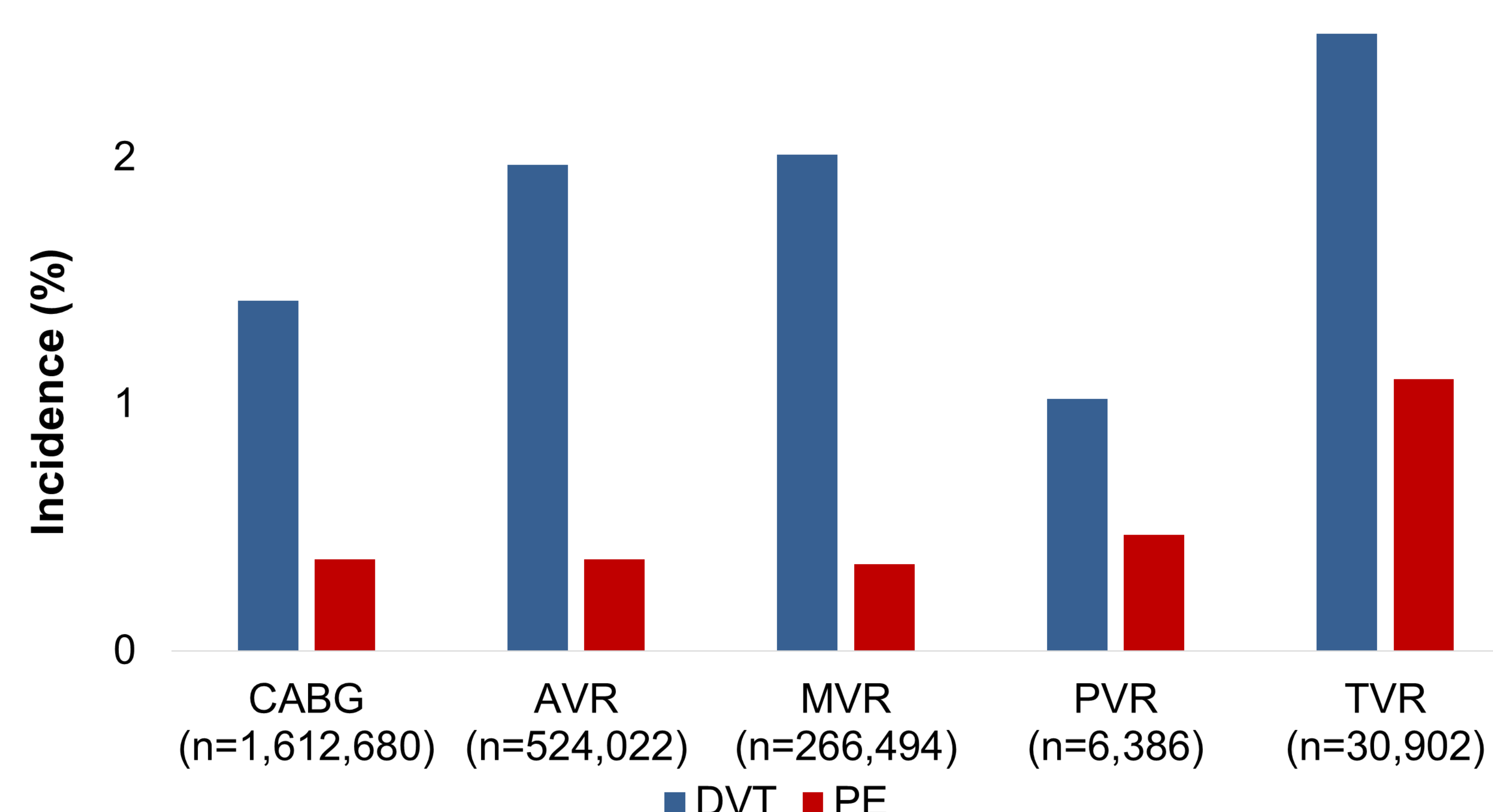
## Results

**Table 1. Baseline Characteristics**

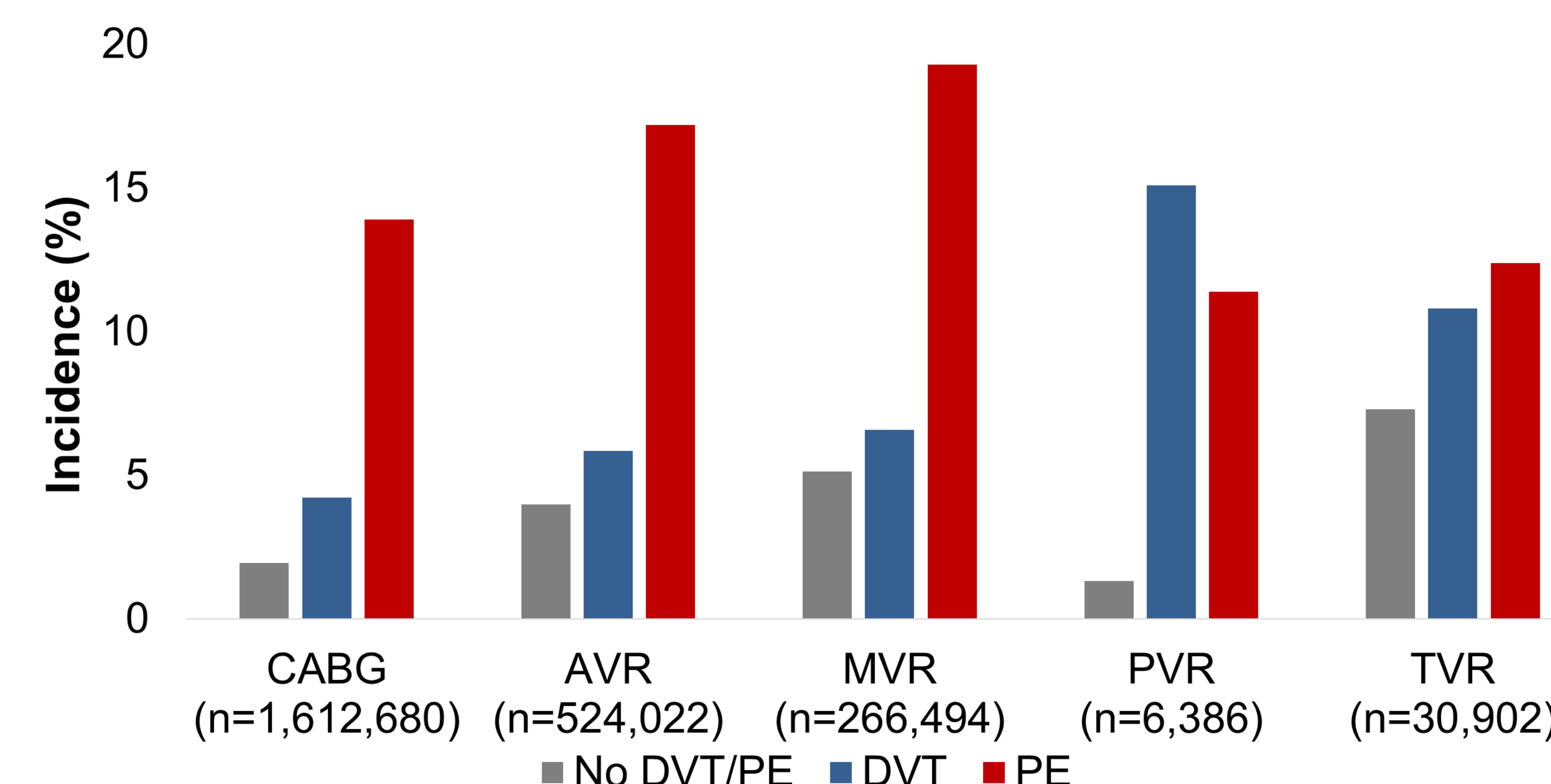
	No DVT/PE (n=3,129,755)	DVT (n=51,897)	PE (n=12,096)	P
Age, years	65.8	68.1	66.0	<0.001
Female, %	31.2	33.2	36.2	<0.001
Elixhauser Index*	3.7	4.0	4.7	<0.001

\*The Elixhauser Comorbidity Index is a validated measure of comorbidities based on ICD diagnosis codes (Range -19 to 89)

**Figure 1. Incidence of DVT and PE in Cardiac Surgery**

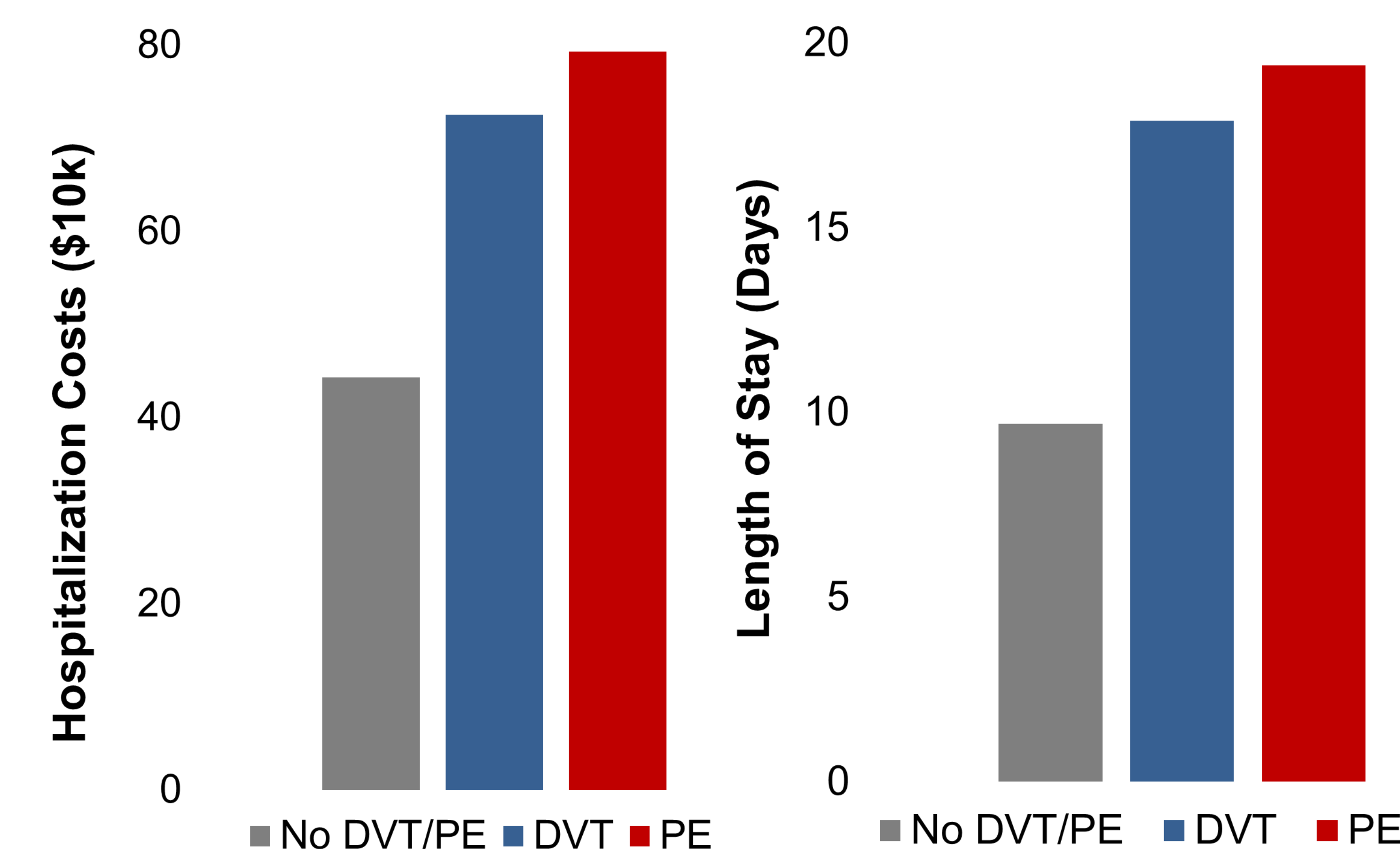


**Figure 2. Unadjusted In-Hospital Mortality Associated with DVT and PE in Patients undergoing Cardiac Surgery**



## Results

**Figure 3. Resource Utilization Associated with DVT and PE in Patients undergoing Cardiac Surgery**



**Table 3. Independent Impact of DVT and PE on In-Hospital Mortality and Hospitalization Costs Following All Cardiac Surgery**

	Complication	Odds Ratio	P
Mortality	DVT	0.73	<0.001
	PE	3.39	<0.001
Cost	DVT	1.28	<0.001
	PE	1.31	<0.001

## Conclusion

- The incidence of symptomatic DVT and PE associated with cardiac surgery is significant, given the large volume of cardiac surgeries performed. Despite the limitations of the study, the results provide evidence for increased mortality resource use associated with DVT and PE.
- These findings suggest that current strategies for DVT and PE prophylaxis may need to be optimized in order to improve quality of care and decrease healthcare costs.