

Venous thromboembolism (VTE) refers to deep vein thrombosis (DVT) and its most serious complication, pulmonary embolism (PE). VTE is a major issue in healthcare quality, contributing to significant morbidity, mortality, and resource expenditure.<sup>a,b</sup>

- DVT affects 2 million Americans annually.<sup>c,d</sup>
- One-third (600,000) of individuals with DVT develop PE.<sup>a,c,d</sup>

The National Quality Forum defines preventable grave medical errors and events as "never events," including wrong-site surgery and injuries caused by care management rather than the underlying disease. Although failing to treat VTE and MI with low-molecular-weight heparins (LMWHs) and factor Xa inhibitors (FXIs) is a "never event," almost 60%<sup>a</sup> of individuals with VTE and MI do not receive appropriate LMWH/FXI medication.

To model the impact of LMWH/FXI market share changes and utilization on the annual budget of a hospital.

We examined a cohort of adults treated with three LMWH/FXI medications: dalteparin sodium (LMWH), enoxaparin sodium injection (LMWH), and fondaparinux (FXI).

#### **MODEL ASSUMPTIONS:**

Model Annual Hospital Cost Data:

- Annual hospital VTE event costs: \$10,000 (DVT); \$20,000 (PE); \$9,000 (MI)<sup>f</sup>
- Drug costs (unit of supply; no. of syringes per pack) were estimated from 2010 wholesale acquisition costs: \$305.76 (5,000 IU/0.2 mL;10) for dalteparin; \$300.69 (40 mg/0.4 mL;10) for enoxaparin; and \$106.26 (2.5 mg/0.5 mL;2) for fondaparinux.

Model Population and Utilization Data:

- Proportion of eligible patients treated with LMWH/FXI medication (LMWHI/FXI utilization) was assumed: 60% at baseline
- Baseline LMWH/FXI market share: 0% dalteparin, 90% enoxaparin, and 10% fondaparinux
- Perspective: hospital
- Hospital size: 500 beds
- Mean hospital occupancy rate: 70%<sup>g</sup>
- Mean hospital length of stay: 5.3 days<sup>h</sup>

#### **ANALYSES:**

Estimated changes in VTE event rates and costs, given increased LMWH/FXI utilization from 60% to 80% and:

- constant market share: 0% dalteparin, 90% enoxaparin; or
- changed market share: 90% dalteparin, 0% enoxaparin

# **Budget Impact Analysis of Increasing LMWH/FXI Utilization**

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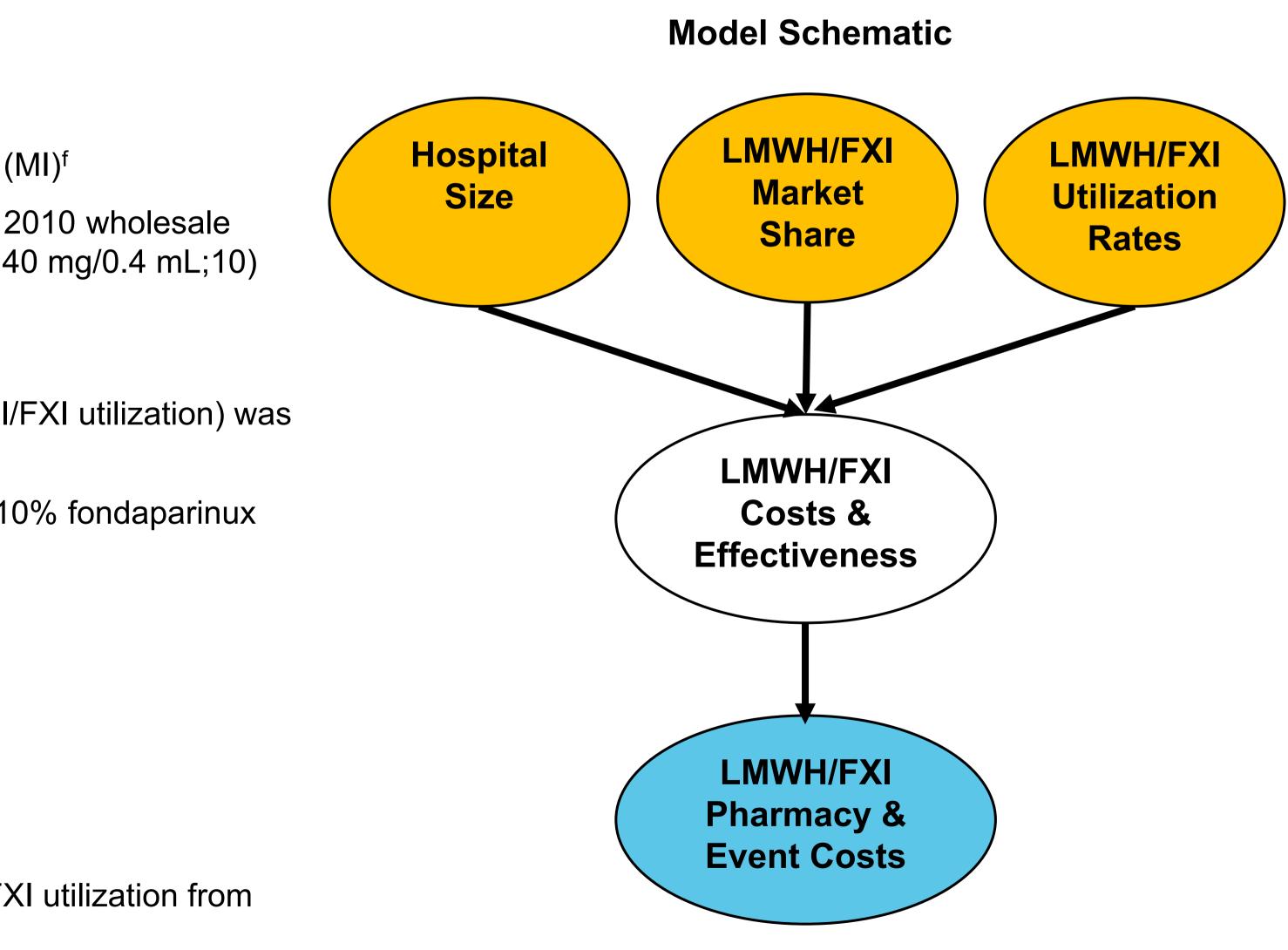
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#### Introduction

- 10% of all U.S. hospital deaths are due to PE.<sup>b</sup>
- Myocardial infarction (MI) occurs in 935,000 Americans annually.<sup>e</sup>

## Objective

#### Methods



References: aGoldhaber Am J Cardiol 2004; AHRQ MEPS Full Year Consolidated Household Component Data File; Analysis of 2008 HCUP Nationwide Inpatient Sample.

## Impact on Event Rates and Costs:

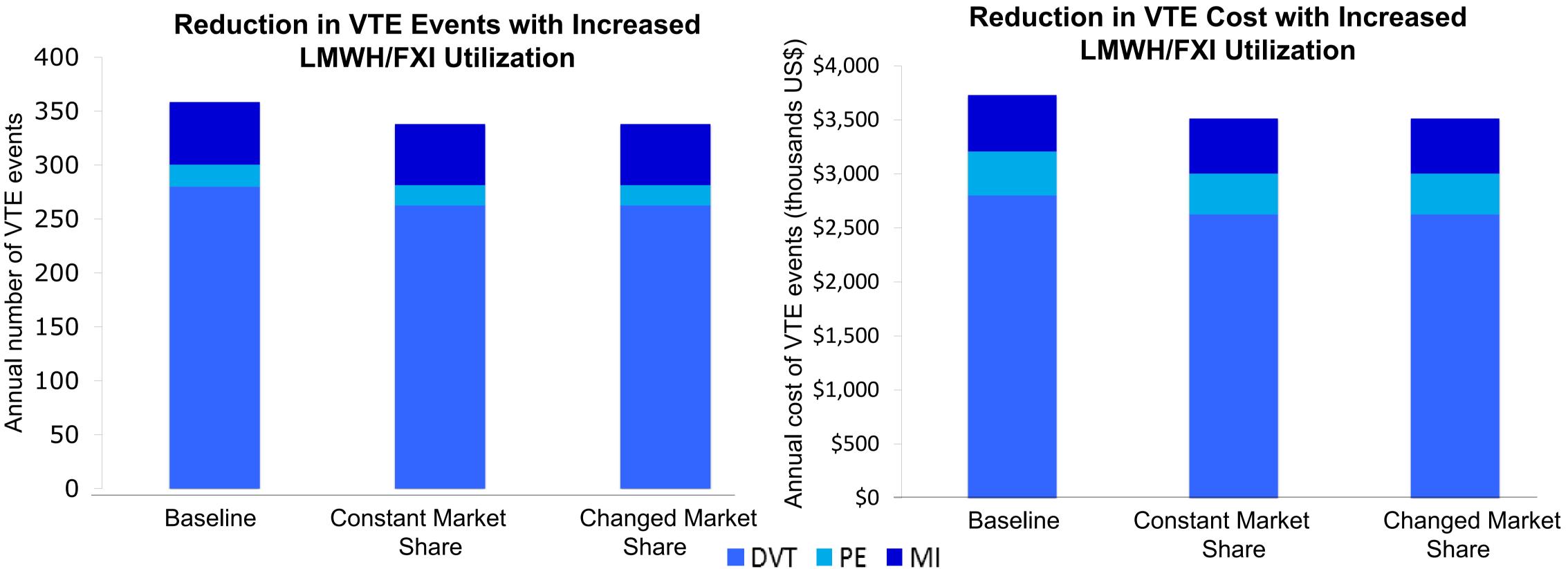
Increasing LMWH/FXI utilization from 60% to 80% resulted in: DVT: **1**6.3% and **1**\$175,300

Impact on pharmacy and total hospital (event + pharmacy) costs:

Increasing LMWH/FXI utilization from 60% to 80%

In addition, *changing* market share to: 90% dalteparin, 0% enoxaparin, 10% fondaparinux

When LMWH/FXI utilization increased from 60% to 80%, total VTE events decreased by 20 (-5.7%) and total VTE costs decreased by \$217,400 (-5.8%); these reductions occurred regardless of product market share distribution.



#### Sensitivity Analyses :

## Limitations:

- Results from individual hospital settings may differ due to different patient populations.

## **Conclusions**:

- Increasing LMWH/FXI utilization has the potential to reduce VTE event rates and costs.
- Increased medication costs can be offset by changing the mix of LMWH/FXI products used.
- Clinical outcomes can potentially be improved by changing LMWH/FXI utilization from enoxaparin to dalteparin.

#### Results

MI: ↓ 2.4% and ↓ \$12,600 PE: **1**7.2% and **1**\$29,500

Pharmacy costs	Total hospital costs
<b>1</b> \$341,200 (+33.3%)	<b>1</b> \$123,800 (+2.6%)
<b>1</b> \$142,200 (+13.9%)	<b>↓</b> \$75,200 (-1.6%)

• Total hospital costs decreased by \$149,257 (3.14%) when LMWH/FXI utilization remained at 60% with 90% dalteparin and 0% enoxaparin. • Total hospital costs remained constant when LMWH/FXI utilization increased to 80% with 54% dalteparin and 34% enoxaparin.

#### Conclusions

• We considered a hospital budget perspective (e.g., excluding outpatient costs, quality of life), which may underestimate societal impact.