

Magnitude of the Problem of Venous Thromboembolism in USA Hospitals

Frederick A. Anderson, Jr; Max Zayaruzny;
John A. Heit; Alexander T. Cohen;
on behalf of the VTE Impact Assessment Group

Presented at ASH, December 10, 2005 Poster #903

Sponsored by an educational grant from
sanofi-aventis

Objective: Estimate the Number of Hospital Patients at Risk for VTE in the USA Annually

1. Define VTE risk, sufficient to require prophylaxis, based on **2004 ACCP Guidelines**
2. Characterize “at risk” USA acute care hospital discharges, based on the Y2002 **Healthcare Cost & Utilization Project Database**

Consensus Recommendations for VTE Prophylaxis



2004 ACCP Consensus

Example - Medically Ill Hospitalized Patients

6.0 Medical conditions

6.0.1. In acutely ill medical patients who have been admitted to the hospital with congestive heart failure or severe respiratory disease, or who are confined to bed and have one or more additional risk factors, including active cancer, previous VTE, sepsis, acute neurologic disease, or inflammatory bowel disease, we recommend prophylaxis with LDUH (**Grade 1A**) or LMWH (**Grade 1A**).

6.0.2. In medical patients with risk factors for VTE, and in whom there is a contraindication to anticoagulant prophylaxis, we recommend the use of mechanical prophylaxis with GCS or IPC (**Grade 1C+**).



Healthcare Cost & Utilization Project (HCUP)

- The Nationwide Inpatient Sample (NIS) is a unique and powerful database of hospital inpatient stays. Researchers and policymakers use NIS to identify, track, and analyze national trends in health care utilization, access, charges, quality, and outcomes.
- NIS is the largest all-payer inpatient care database in the United States. It contains data from approximately 7 million hospital stays.
- NIS 2003 contains all discharge data from 995 hospitals located in 35 States, approximating a 20-percent stratified sample of U.S. community hospitals.
- The sampling frame for the NIS 2003 is a sample of hospitals that comprises approximately 90 percent of all hospital discharges in the United States.

HCUP: Clinical Classification System

- ◆ >12,000 ICD-9 disease codes
- ◆ >3,500 procedure codes
- ◆ Categorized into 259 clinical meaningful categories

CCS Code

ICD-9 Codes included in CCS Code

152 Arthroplasty knee 8141; 8142; 8143; 8144; 8145; 8146; 8147; 8154; 8155

153 Hip replacement, total and partial 8151; 8152; 8153; 8161; 8162; 8163; 8164; 8169

Mapping ACCP Guidelines to CCS & ICD-9 Codes

2004 ACCP Guidelines for Prevention of Venous Thromboembolism
Matched against Clinical Category Codes

ACCP Summary Recommendations	HCUP Clinical Category Codes
<p>3.0 Orthopedic Surgery 3.1 Elective hip arthroplasty 3.1.1. For patients undergoing elective THR, we recommend the routine use of one of the following three anticoagulants: (1) LMWH (at a usual high-risk dose, started 12 h before surgery or 12 to 24 h after surgery, or 4 to 6 h after surgery at half the usual high-risk dose and then increasing to the usual high-risk dose the following day); (2) <u>fondaparinux</u>, (2.5 mg started 6 to 8 h after surgery) or (3) adjusted-dose VKA started preoperatively or the evening after surgery (INR target, 2.5; INR range, 2.0 to 3.0) [all Grade 1A].</p>	<p>Age 40 years and over.</p> <p>Plus,</p> <p>THA = CCS [153] = ICD-9 [8 8151; 8152; 8153; 8161; 8162; 8163; 8164; 8169]</p>

Proportion of USA Hospital Discharges at Risk for VTE

2004 ACCP Guidelines for VTE Prophylaxis

+

2002 HCUP Database



Match ACCP Risk Factors to HCUP codes



Estimate number of USA hospital patients who met guideline criteria for VTE Px in Y2002

Number of at Risk Discharges* USA Hospitals - Y2002

◆ COPD	3,914,000
◆ CHF	3,800,000
◆ Pneumonia	2,237,000
◆ Septicemia	950,000
◆ THA/TKA	750,000
◆ Prostate Cancer	522,000
◆ Lung Cancer	505,000
◆ Hip Fracture	355,000

***Not excluding duplicates**

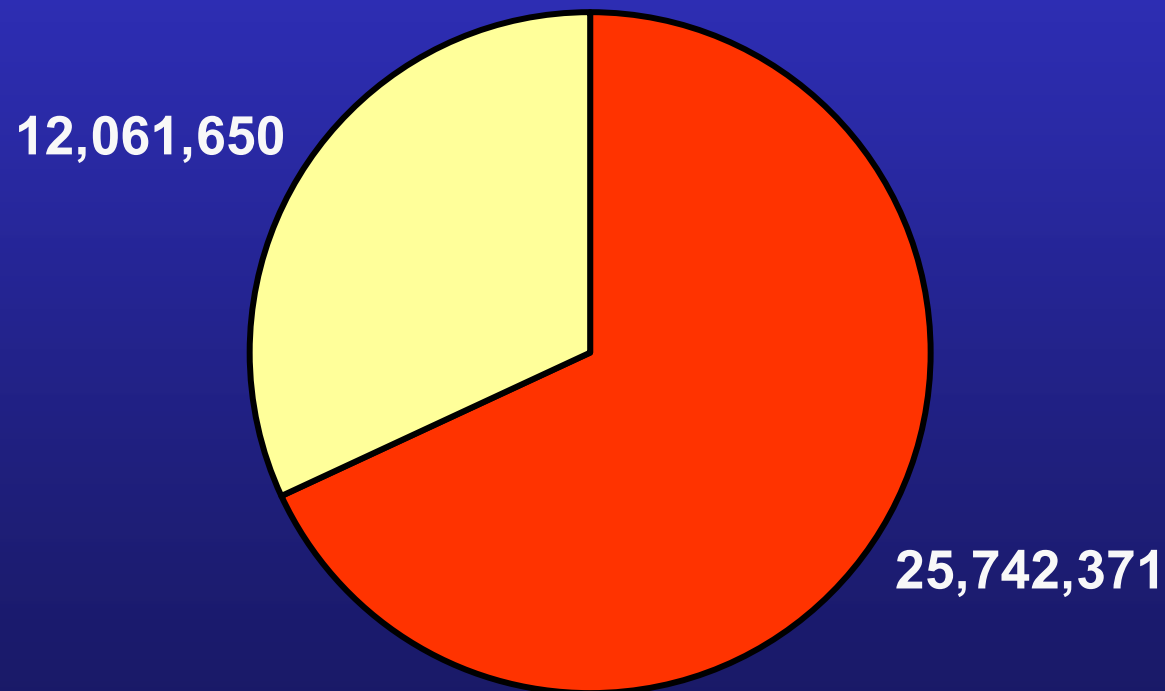
Search Strategy

1. Select surgical cases ≥ 18 years
2. Select medical cases from remaining cases
 - Age ≥ 40 and LOS ≥ 2 days
 - Prioritize search order: Cancer, AMI, Stroke, etc
 - Select according to primary discharge Dx
 - Select according to secondary discharge Dx*
 - Select according to tertiary discharge Dx*
 - Sum 1st, 2nd & 3rd to estimate total patients at risk

*Excluding arthropathy, paralysis, coma

Subset for Surgical Risk Stratification*

■ Age \geq 18 and LOS \geq 2 days ■ Age $<$ 18 or LOS $<$ 2 days



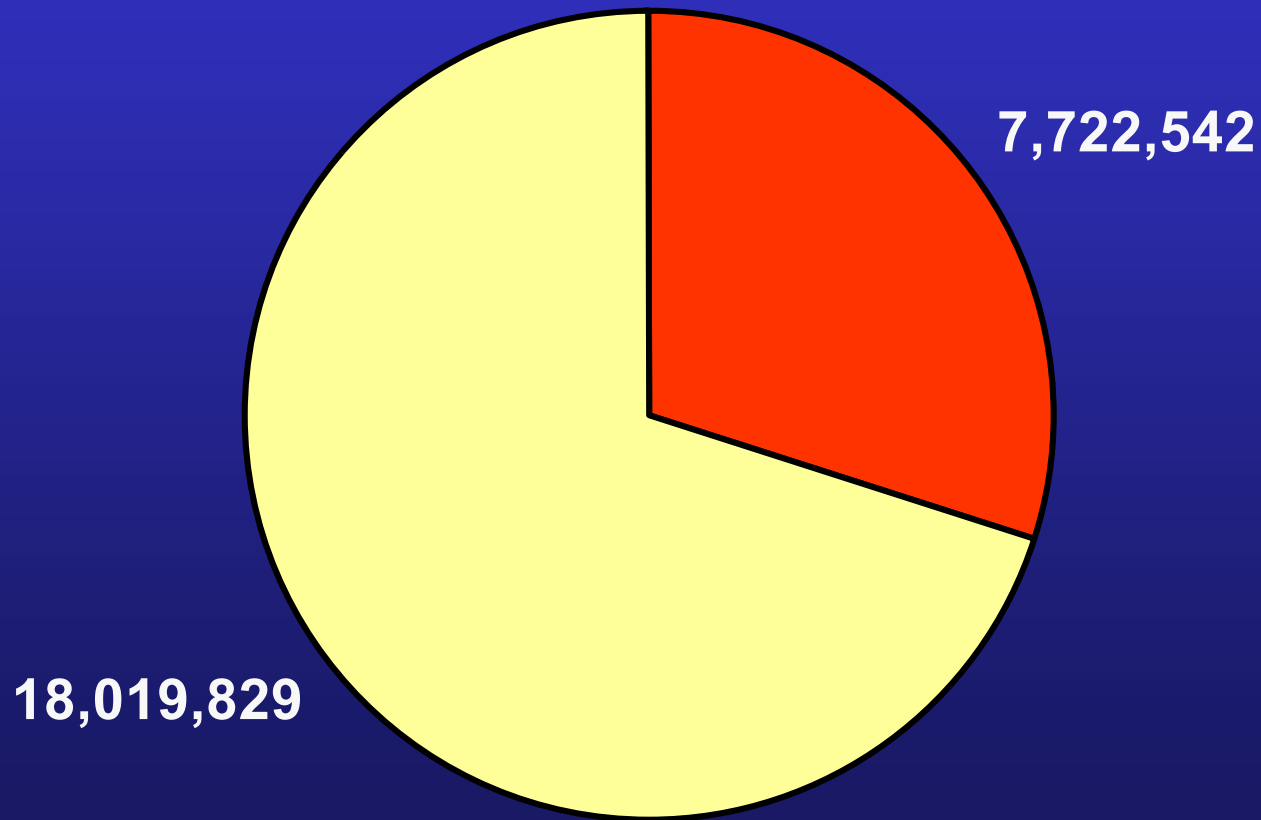
*Total Discharges from US Hospitals in 2002 = 37,804,021

Selected Surgical Discharges

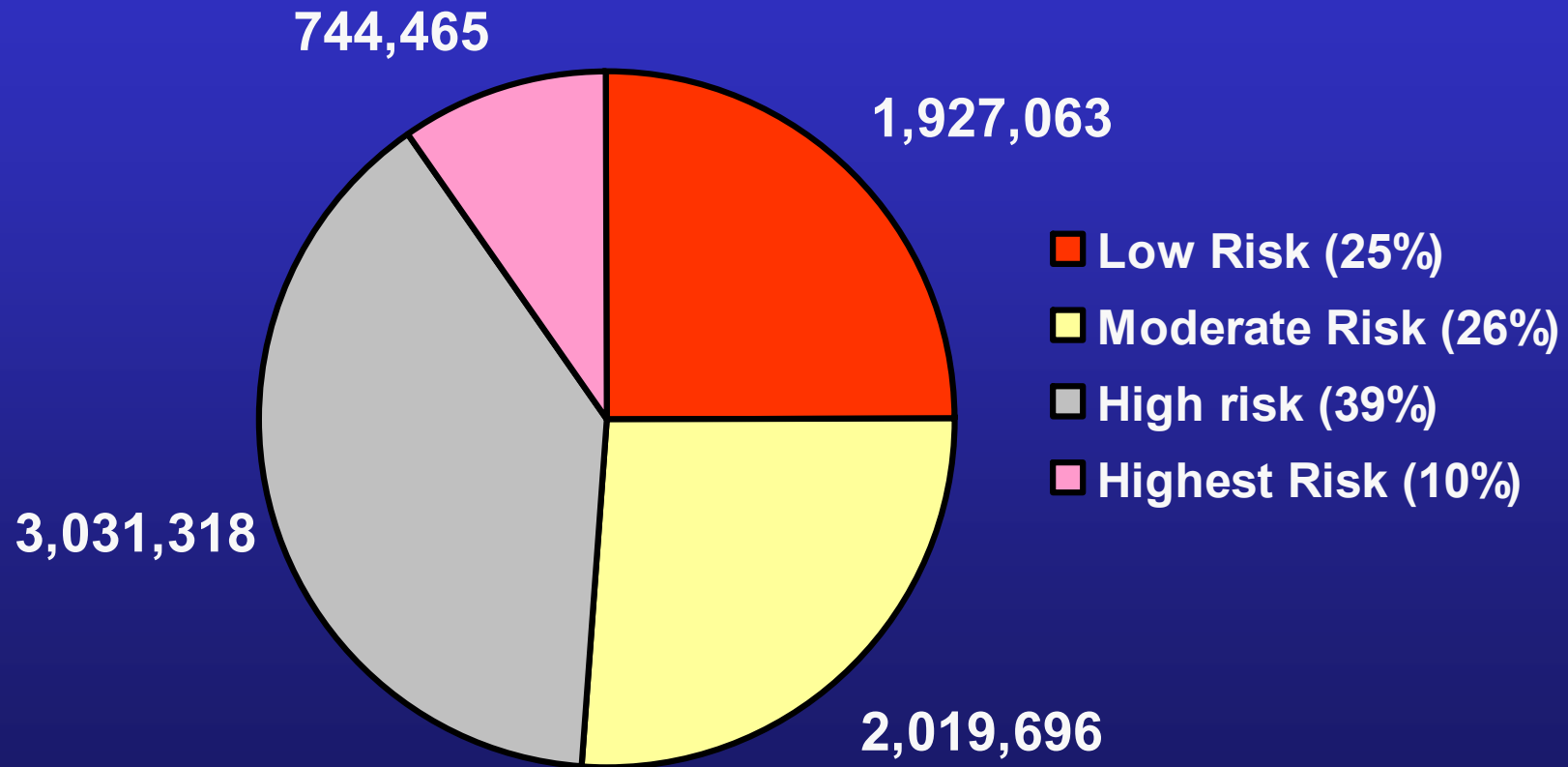
N= 25,742,371

(age \geq 18, length of stay \geq 2 days)

■ Major Surgical Procedures ■ Other Patients



Surgical VTE Risk in 7,722,542 Surgical Discharges: Based on ACCP Guidelines*



*Type of operation defined by primary CCS procedure code

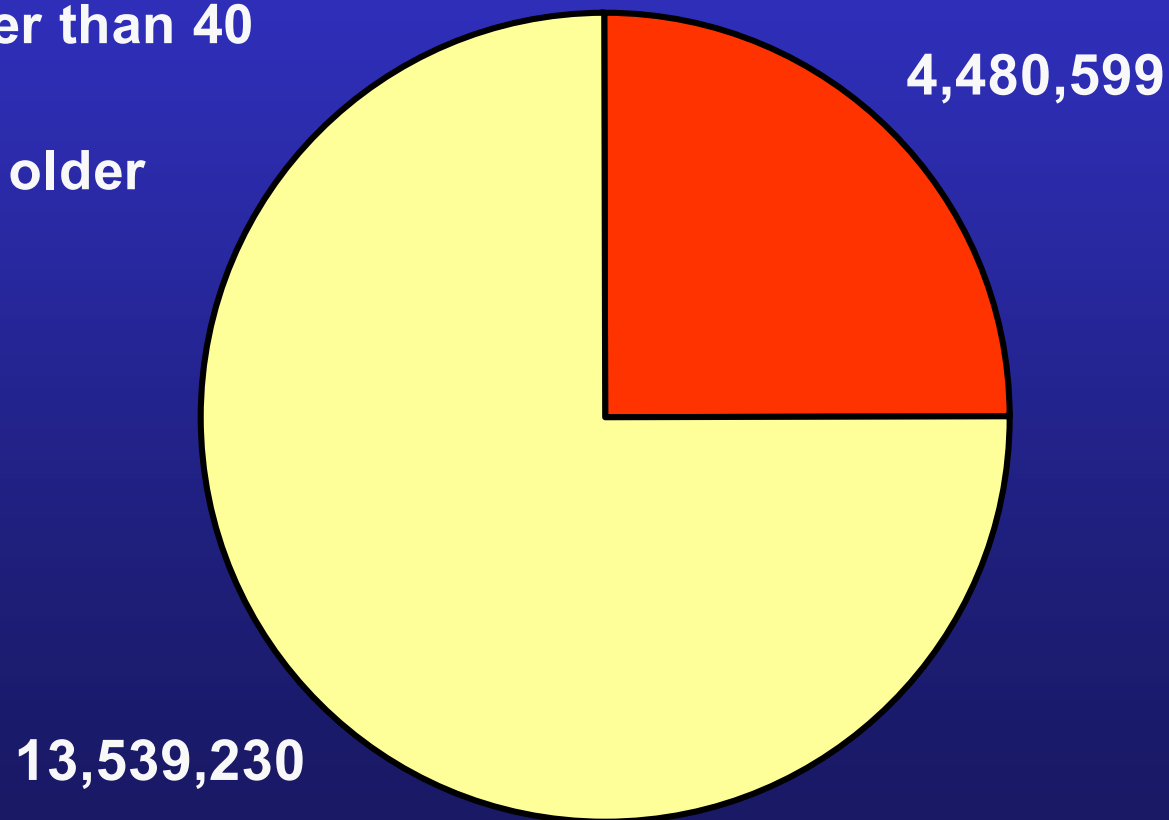
Selected Medical Discharges

N= 18,019,829

(age \geq 18, length of stay \geq 2 days, no major surgical procedure)

■ Younger than 40

■ 40 and older



7,596,645 Mutually Exclusive Hospital Discharges with VTE Risk due to One or More Medical Illness*

Heart failure	1,867,576
Respiratory failure	1,783,736
Sepsis/Pneumonia	1,467,633
Cancer	1,017,356
Stroke	515,370
AMI	401,906
Trauma	366,357
Artropathy/Spondylopathy	156,636
Paralysis/Coma	20,075

*Summing 1st, 2nd & 3rd discharge diagnoses

>13 Million USA Hospital Discharges had “ACCP Guideline-Defined” Risk of Venous Thromboembolism in Y2002

Highest risk surgery	744,465
High risk surgery	3,031,318
Moderate risk surgery	2,019,696
<u>Surgical subtotal</u>	<u>5,795,479</u>
Heart Failure	1,867,576
Cancer	1,017,356
Stroke	515,370
Other medical conditions	4,196,343
<u>Medical subtotal</u>	<u>7,596,645</u>
Grand Total	13,392,124

13,392,124 / 37,804,021 = **35% of all hospital discharges**

Summary

- ◆ There were 37,804,021 admissions to USA acute care hospitals in Y2002
- ◆ At least 35% of these patients should have received VTE prophylaxis
- ◆ This can serve as a key component of a full examination of the burden of VTE in the USA, including
 - Morbidity
 - Mortality
 - Economics of VTE prophylaxis