

Cutting the Cost to Society:
The importance of VTE Prophylaxis

How to Prevent VTE

RACP Workshop
(Sponsored by Sanofi-Aventis)
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Preventing VTE

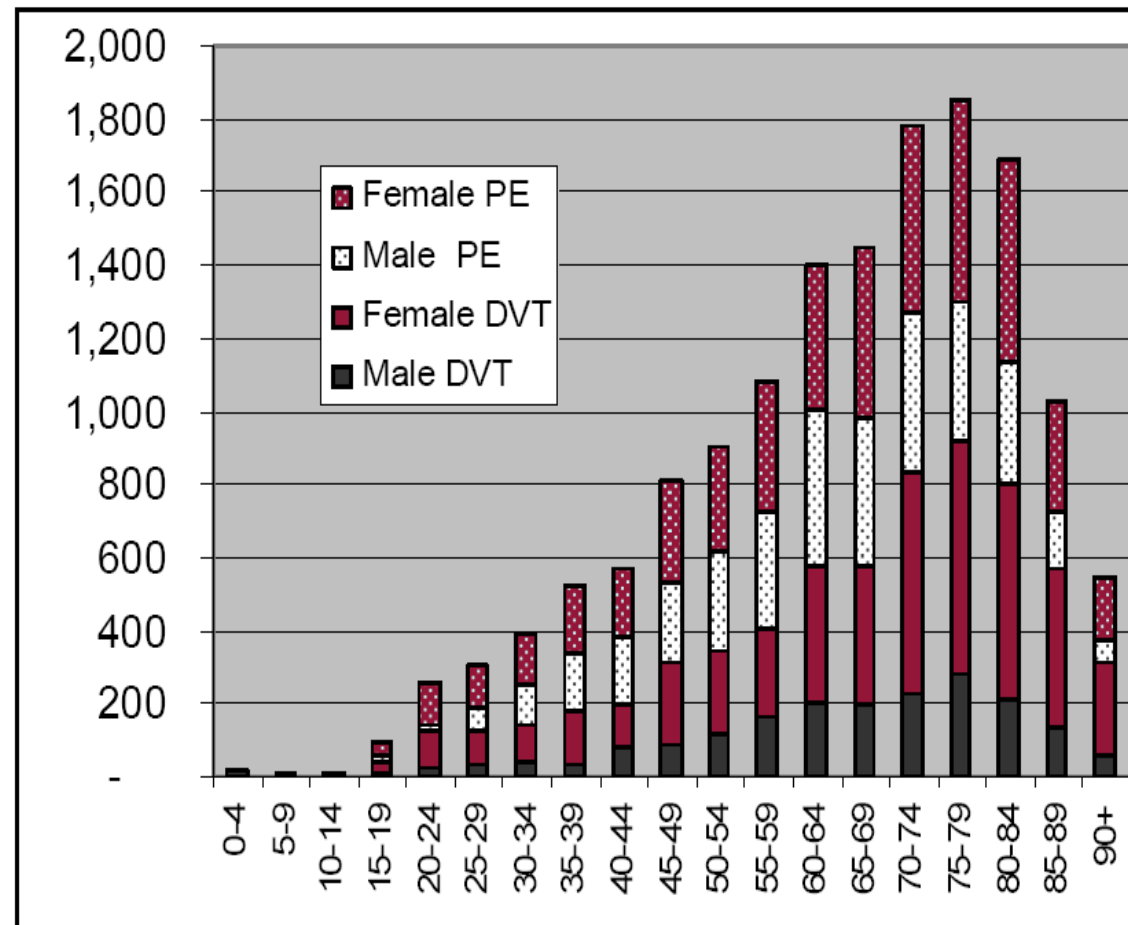
- What do we know about it?
- How do we deal with it?
 - Evidence – based clinical guidelines
 - Individual examples
 - Alex Gallus; Renea Collins
 - Apply guidelines to clinical practice
 - Developing local guidelines, Audit, Feedback, and other Manoeuvres
 - Renea Collins; Alex Gallus

The Australian Burden of VTE in 2008

(Access Economics and ANZ Working Party 2008)

- 14,700 cases (70/100,000): 55% PE, 45% DVT
- Immediate cost: \$A 1.7B to health care and productivity
- Predisposition: 40% surgical, 40% medical, 20% unprovoked (WA data, NICS 2005).

CASES OF DVT, PE AND VTE, BY AGE AND GENDER, 2008



VTE Prophylaxis is Effective

- Risk Reduction = 55 – 75% with effective preventive methods; hazards are small
- Anticoagulants
 - Low-dose sc unfractionated heparin
 - Low-dose sc low molecular weight heparins
 - (Warfarin)
- Physical methods to prevent venous stasis
 - Graded pressure support stockings
 - Intermittent pneumatic compression devices

Benefit and Cost

Improved VTE Prevention has the best evidence for greatest clinical benefit and least cost among 73 clinical quality improvement initiatives evaluated

(Agency for Healthcare Research and Quality, USA; 2001)

Evidence-Based Clinical Practice Guidelines for VTE Prevention

- International Expert Groups
 - 7th ACCP 2004; IUA
 - [8th ACCP 2008])
- National
 - 4th ANZ VTE Working Party, 2007
- Local
 - Region; Hospital
 - Surgical and Medical Units

Clinical Practice Guidelines

- Formally review data on VTE and the likely benefits or harm from preventive methods
- Offer Guidance but do not Prescribe
 - e.g. Recommend
(strong evidence and great benefit v harm)
 - e.g. Consider
(weaker evidence or less benefit v harm)
- For homogenous patient groups with consistent data on VTE prevention
 - Elective joint replacement (e.g. THR, TKR)
- For groups with varying risks
 - Elderly medical inpatients; Pregnancy

Use of Practice Guidelines

① Clinicians

- a. Guidance for individual patients
- b. Guidance for standard practice of clinical units

② Medico-Legal

- Defend or Support claims of negligence or malpractice

③ As basis for Clinical Quality Improvement

- Was VTE risk assessed?
- Is there a recorded decision on VTE prophylaxis?
- What proportion of all surgical or medical admissions received appropriate VTE prophylaxis?

1a and 2 require detailed guidance, 1b and 3 broad brush

Prevention of Venous Thromboembolism

The Australia & New Zealand Working
Party on the Management and Prevention
of Venous Thromboembolism

Best Practice Guidelines for
Australia & New Zealand 4th Edition 2007

Surgery: VTE prophylaxis recommendations (4th ANZ)

RISK	FEATURES	PROPHYLAXIS	DURATION	DOSAGE
HIGH	<ul style="list-style-type: none"> • Hip or Knee arthroplasty • Major trauma 	LMWH or Fondaparinux * + IPC# &/or GCS	<ul style="list-style-type: none"> • at least 10 days • 28 - 35 days for hip arthroplasty 	Enoxaparin 40mg/day <i>or</i> Dalteparin 5,000U/day <i>or</i> Fondaparinux 2.5mg/day

Foot Impulse Technology (FIT) with GCS may be used if IPC not possible

* **Fondaparinux for orthopaedic surgery only**

Surgery: VTE prophylaxis recommendations (4th ANZ)

RISK	FEATURES	PROPHYLAXIS	DURATION	DOSAGE
SUBSTANTIAL	<ul style="list-style-type: none"> • Major surgery* age > 40 years 	LMWH or LDUH + GCS &/or IPC	5 – 10 days	Enoxaparin 20mg/day, <i>or</i> Dalteparin 2,500U/day, <i>or</i> LDUH 5,000U BD or TDS

* Major surgery: intra-abdominal surgery or surgery > 45 minutes duration

Surgery: VTE prophylaxis recommendations (4th ANZ)

RISK	FEATURES	PROPHYLAXIS	DURATION	DOSAGE
LOWER	All other surgery	consider GCS LMWH <i>or</i> LDUH if additional risk factors [†]	until hospital discharge	If additional risk factors: Enoxaparin 20mg/day, <i>or</i> Dalteparin 2,500u/day, <i>or</i> LDUH 5,000U BD <i>or</i> TDS

[†] Additional VTE risk factors:

immobility, thrombophilia, oestrogen therapy, pregnancy or puerperium, active inflammation, strong family history of VTE and/or obesity.

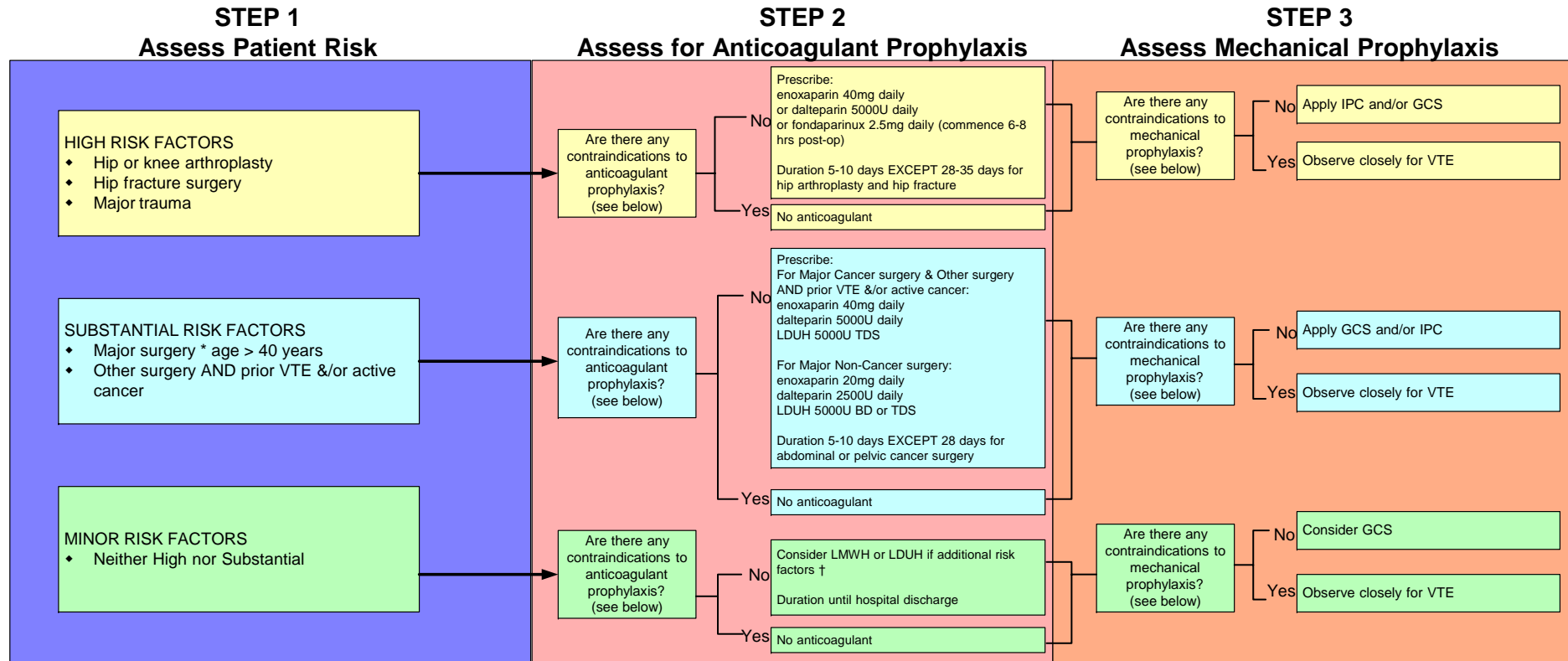
Medical conditions: VTE prophylaxis recommendations (4th ANZ)

RISK	FEATURES	PROPHYLAXIS	DURATION	DOSAGE
HIGH	<ul style="list-style-type: none"> • ischaemic stroke[#] • history of VTE • active cancer • decompensated heart failure • acute on chronic lung disease* • acute inflammatory disease • age >60 years* 	LMWH or LDUH	until resolution of acute medical illness or until hospital discharge	enoxaparin 40mg / day <i>or</i> dalteparin 5000U / day <i>or</i> LDUH 5000U BD or TDS
LOW	none of above features	nil		

*While patients over 60 years are currently classified as high risk, those that are otherwise well and ambulant and younger patients with acute on chronic lung disease may not be at high risk for VTE in the absence of other risk factors.

Surgical VTE Prophylaxis Guide

For ALL patients undergoing surgery or when surgery is imminent



* Major surgery: intra-abdominal surgery or any surgery > 45 minutes duration

† Additional VTE Risk Factors
prior VTE, active cancer, immobility, thrombophilia, oestrogen therapy, pregnancy or puerperium, active inflammation, strong family history of VTE and/ or obesity.

Contraindications to anticoagulant prophylaxis
Active Bleeding
High risk of bleeding eg. haemophilia, thrombocytopenia (Platelet count < 50¹⁰/L, History of GI bleeding)
Severe hepatic disease (INR > 1.3)
Adverse reaction to heparin
On current anticoagulation
Other eg. very high falls risk and palliative management
Renal impairment with LMWH

GCS - Graduated Compression Stockings
IPC - Intermittent Pneumatic Compression

Contraindications to mechanical prophylaxis
Severe Peripheral Arterial Disease
Severe Peripheral Neuropathy
Recent skin graft
Severe leg deformity

LMWH - Low Molecular Weight Heparin
LDUH - Low Dose Unfractionated Heparin
VTE - Venous Thromboembolism

The Basics

1. Assess the Risk of VTE
 - a. If 'substantial' or above: consider suitable anticoagulant prophylaxis
 - b. If 'high' or above: consider adding stockings and/or intermittent pneumatic compression
2. Assess the risks of prophylaxis
 - a. If anticoagulant contraindicated: consider stockings and/or IPC alone
 - b. If stockings / IPC contraindicated: avoid
3. Record these steps

(1) VTE Risk Assessment

Patient - related	External factors
Age (especially over 60)	Surgery (general anaesthetic, > 45 mins)
Heart failure	<ul style="list-style-type: none">• Major joint (THR, TKR, hip #)• Abdomino-thoracic• Pelvic, etc
Acute on chronic respiratory infection	
Previous VTE	
Active cancer	Multiple trauma
Major obesity, etc.	Leg fracture, etc.

(2) Bleeding Risk Assessment

Patient - related	External factors
Age (especially over 80)	Surgical Procedure Neurosurgery Plastic and reconstructive
Renal failure (LMWH)	Head injury
Platelet count <100	Large ischaemic stroke
Antiplatelet drugs: ASA >160 mg; clopidogrel (anticoagulants)	Etc
Active or previous bleeding	
Etc	

Some Case Studies

(Courtesy of Tony Glennane)

(1) Active Cancer; Infection

B cell NHL, 76 yrs, chemotherapy, with recent fever, shortness of breath, reduced mobility	Risks	
	VTE	Bleeding
Age > 60 yrs	+	
Active cancer	+	
Acute chest infection	+	
Immobility	+	
Creatinine clearance 65 mL/min		-
Platelet count $135 \times 10^9/L$		-

Cancer and VTE

- ✓ Cancer patients have a 6-fold higher risk of VTE than non-cancer patients¹,
- ✓ VTE is the second leading cause of death in cancer patients²
- ✓ “All acutely ill medical patients should be routinely assessed for risk of VTE and considered for thromboprophylaxis,”¹

(1) Active Cancer; Infection

Recommended Prophylaxis¹

- ✓ Enoxaparin 40mg OD or
- ✓ Dalteparin 5,000 U OD or
- ✓ UFH 5,000 U BD or TDS
- ✓ Until resolution of acute medical illness or until hospital discharge

1. Australia and New Zealand Working Party on the Management & Prevention of Venous Thromboembolism. Prevention of Venous Thromboembolism: Best Practice guidelines for Australia and New Zealand. December 2007.

(2) Acute heart failure

50 year old man with 3 days increasing shortness of breath, orthopnea, productive cough; 90 kg, sleep apnea, ex-smoker (25 yr)	Risks	
	VTE	Bleeding
Age > 60 yrs	-	
Active cancer	-	
Heart failure	+	
Obesity	+	
Acute chest infection	?	
Creatinine clearance 65 mL/min		-

Heart Failure and VTE

- ✓ Chronic heart failure patients have a 3-fold higher risk of developing VTE^{1*}
- ✓ “All acutely ill medical patients should be routinely assessed for risk of VTE and considered for thromboprophylaxis,”²

*Patients with heart failure were more likely to develop VTE than patients without heart failure, with an odds ratio of 2.93 [95% Confidence Interval (CI), (1.55-5.56)]

1. Cohen AT et al. Thromb Haemost 2005;94:750-9
2. Geerts WH et al. Chest 2004;126:338S-400S

(2) Acute heart failure

Recommended Prophylaxis¹

- ✓ Enoxaparin 40mg OD or
- ✓ Dalteparin 5,000 U OD or
- ✓ UFH 5,000 U BD or TDS
- ✓ Until resolution of acute medical illness or until hospital discharge

1. Australia and New Zealand Working Party on the Management & Prevention of Venous Thromboembolism. Prevention of Venous Thromboembolism: Best Practice guidelines for Australia and New Zealand. December 2007.

(3) Acute on Chronic Obstructive Lung Disease; Renal impaired

75 yr old man with 10 yr COAD, diabetes, peripheral artery disease; 3 days increasing SOB plus green sputum. Limited mobility	Risks	
	VTE	Bleeding
Age > 60 yrs	+	
Reduced mobility	+	
Acute chest infection	+	
Creatinine clearance 30 mL/min		+

(3) Infectious Lung Disease

- ✓ Postmortem studies have shown that pulmonary embolism is present in 28 to 51% of patients with COPD¹
- ✓ VTE is estimated in up to 25% of patients hospitalised with respiratory conditions²
- ✓ “All acutely ill medical patients should be routinely assessed for risk of VTE and considered for thromboprophylaxis,”³

(3) Acute on Chronic Obstructive Lung Disease; Renal impaired

Creatinine clearance 30 mL/ml is relative contraindication to LMWH

- ✓ UFH 5,000 U BD or TDS or
- ✓ Graded pressure compression stockings, or
- ✓ Reduced Enoxaparin 20mg OD? or
- ✓ Reduced Dalteparin 2,500 U OD??
- ✓ Until resolution of acute medical illness or until hospital discharge

(4) Disabling ischaemic stroke

66 yr old woman with acute L middle cerebral artery CVA (CT / MRI = ischaemic); R hemiplegia + dysphasia, family history VTE	Risks	
	VTE	Bleeding
Age > 60 yrs	+	
Reduced mobility	+	
Family history VTE	±	
CT head scan = no bleeding		±
Creatinine clearance 85 mL/min		-

(4) Disabling stroke

- ✓ Pulmonary Embolism (PE) accounts for up to 50% of early deaths in ischaemic or haemorrhagic strokes¹
- ✓ Without VTE prophylaxis up to 56% develop DVT²
- ✓ “All acutely ill medical patients should be routinely assessed for risk of VTE and considered for thromboprophylaxis,”¹

1. Wijdicks E et al- Mayo Clin Proc 1997;72:297-300 2. Thom,T et al- Report from American Heart Association, Circulation 2006; 113: e85-151
2. Australia and New Zealand Working Party on the Management & Prevention of Venous Thromboembolism. Prevention of Venous Thromboembolism: Best Practice guidelines for Australia and New Zealand. December 2007.

(4) Disabling ischaemic stroke

Recommended Prophylaxis¹

- ✓ Enoxaparin 40mg OD or Dalteparin 5,000U/day
- ✓ Until resolution of acute medical illness or until hospital discharge

If large ischaemic area, consider

- ✓ IPC / Stockings until resolution of acute medical illness or until hospital discharge, or safe to start anticoagulant

1. Australia and New Zealand Working Party on the Management & Prevention of Venous Thromboembolism. Prevention of Venous Thromboembolism: Best Practice guidelines for Australia and New Zealand. December 2007.

(5) Elective Total Hip Replacement

76 yr old man admitted for first elective THR; Myocardial infarction 10 yrs ago, treated hypertension, still smokes, raised cholesterol	Risks	
	VTE	Bleeding
Elective THR	+	±
Age > 60 yrs	+	
Hypertension	-	
Active smoker	-	
Raised cholesterol	-	
Creatinine clearance 85 mL/min		-

(5) Elective Total Hip Replacement

- ✓ 51% of patients will develop evidence of DVT without prophylaxis, at routine venography¹
- ✓ Fatal PE occurs in approximately 1 per 500 elective hip arthroplasties²
- ✓ Mean time to VTE diagnosis is 21.5 days for THR³
- ✓ Guidelines recommend AGAINST Aspirin alone as prophylaxis against VTE for any patient group (Grade 1a)²

1. Australia and New Zealand Working Party on the Management & Prevention of Venous Thromboembolism. Prevention of Venous Thromboembolism: Best Practice guidelines for Australia and New Zealand. December 2007 2. Geerts WH, Pineo GF, Heit JA, et al. Prevention of venous thromboembolism: the seventh ACCP Conference on Antithrombotic and thrombolytic Therapy. Chest. 2004;126:338S-400S. 3. Warwick.D Findings from the Global Orthopaedic Registry. J bone J Surg 2007;89.799-807

(5) Elective Total Hip Replacement

Recommended Prophylaxis¹

- ✓ Enoxaparin 40mg OD or
- ✓ Dalteparin 5,000U OD or
- ✓ fondaparinux 2.5mg OD
- ✓ Plus IPC# &/or GCS
- ✓ 28 - 35 days for hip arthroplasty

Foot Impulse Technology (FIT) with GCS may be used if IPC not possible * fondaparinux for orthopaedic surgery only

1. Australia and New Zealand Working Party on the Management & Prevention of Venous Thromboembolism. Prevention of Venous Thromboembolism: Best Practice guidelines for Australia and New Zealand. December 2007.

(6) Colorectal Surgery and previous VTE

70 year old woman for elective hemicolectomy (carcinoma); previous DVT; treated hypertension	Risks	
	VTE	Bleeding
Cancer surgery	+	±
Age > 60 yrs	+	
Creatinine clearance 65 mL/min		-

(6) Colorectal Surgery and previous VTE

- ✓ Previous VTE and/or active cancer are significant predictors for the development of VTE post-operatively, whether major or other types of surgery¹
- ✓ Cancer surgery patients have 2-3 times the risk of VTE as non-cancer patients undergoing similar surgical procedures ^{2,3}
- ✓ VTE is the most common cause of death at 30 days after cancer surgery⁴
- ✓ There is consistent evidence that prophylaxis should be continued for 28-35 days in patients with major curative surgery for cancer thought to be at very high VTE risk¹

1. Australia and New Zealand Working Party on the Management & Prevention of Venous Thromboembolism. Prevention of Venous Thromboembolism: Best Practice guidelines for Australia and New Zealand. December 2007 2. Geerts WH et al. Chest 2004;126;338S-400S 3. White RH et al. Thromb Haemost. 2003;90:446-455. 4. Agnelli G et al. Ann Surg. 2006;243:89-95.

(6) Colorectal Surgery

Recommended Prophylaxis¹

- ✓ Enoxaparin 40mg OD or
- ✓ Dalteparin 5,000U OD or
- ✓ UFH 5,000U TDS or
- ✓ Plus IPC &/or GCS
- ✓ 5-10 days (possibly up to 35 days)

1. Australia and New Zealand Working Party on the Management & Prevention of Venous Thromboembolism. Prevention of Venous Thromboembolism: Best Practice guidelines for Australia and New Zealand. December 2007.

(6) Colorectal Surgery and previous VTE

- If previous VTE recent, extensive, idiopathic or recurrent, consider increasing (LMW)heparin dose when safe and/or replacing prophylactic heparin with warfarin, continued for 6 – 8 weeks (or until fully recovered)

(7) Knee Arthroscopy

- 28 yr-old woman for simple laparoscopy after old net-ball injury; low oestrogen dose OCP. No other risk factors

(8) Laparoscopic Cholecystectomy

- 75 yr old obese woman with inflamed gall-bladder and gall-stone

(7) Knee Arthroscopy

- Risk assessment: low - moderate (OCP)
- Prophylaxis: Graded pressure stocking (?LMWH, ?duration)

(7) Laparoscopic cholecystectomy

- Risk assessment: high
- Prophylaxis: UFH or LMWH; duration until recovers mobility

ENDORSE (Lancet 2008) a worldwide cross-sectional study



32 countries -- 358 hospitals

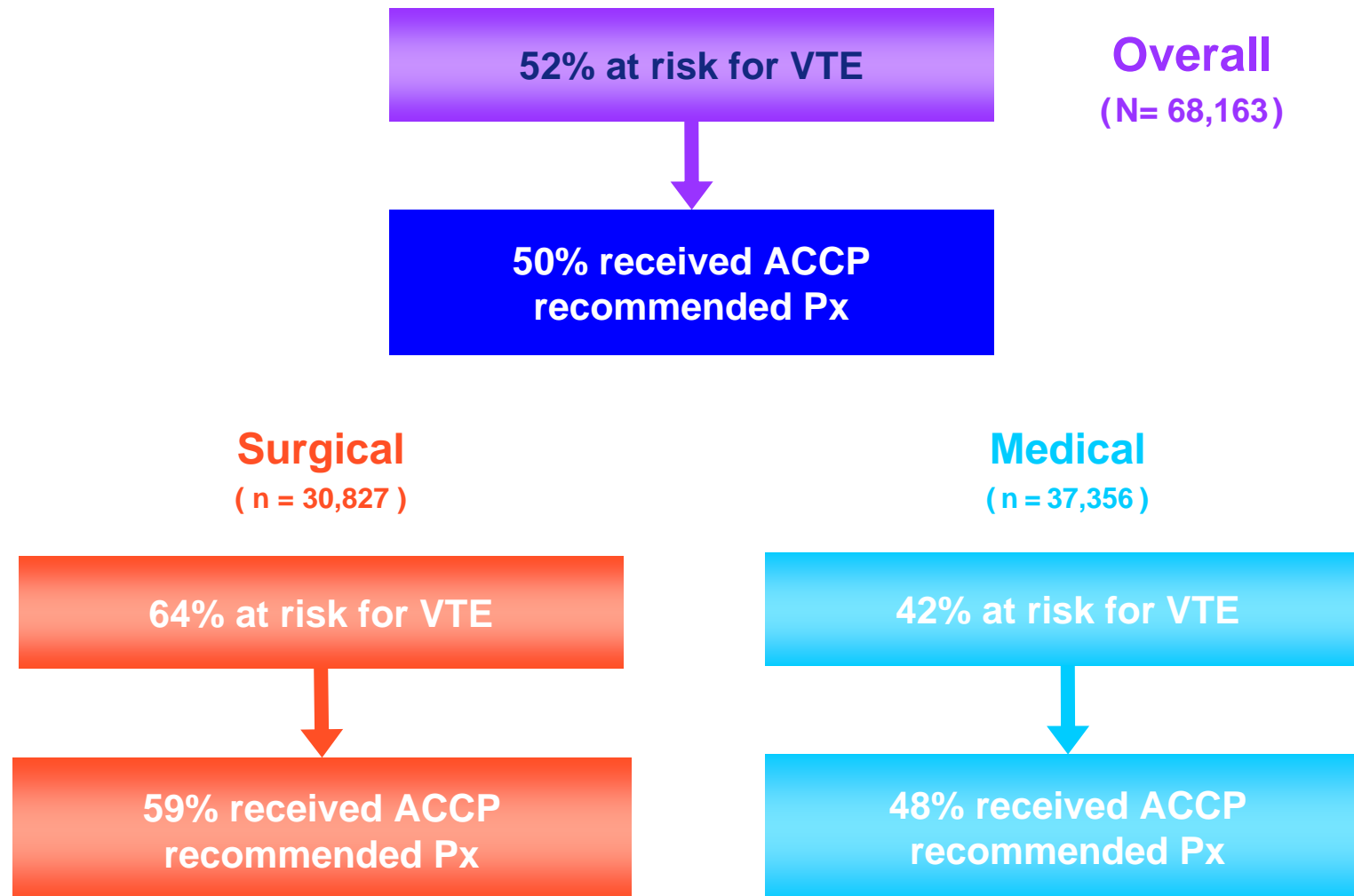
First patient enrolled August 2, 2006

Last patient enrolled January 4, 2007

Median of 8 days to enroll eligible patients/hospital

ENDORSE

(Cohen, Tapson, Anderson, et al Lancet 2008)



ENDORSE

Study Results

A Cohen et al, Lancet
2008: 371: 387 - 394

