J.1.3 Effectiveness of risk assessment tools in hospital admissions

Study	[Lecumberri 2011[546]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CCA (health outcome: objectively confirmed VTE events during hospitalisation, major bleeding, surgical re-operation, mortality (not reported in the paper) **Study design:** before and after comparison **Approach to analysis:** Analysis of patient level data on costs and incidence of VTE	**Population:** All hospitalised adult inpatients (medical and surgical) at the University Clinic of Navarra. The population also included pregnant women but very small percentage ranging between 3.2 to 4.4% across the follow-up periods. **Cohort settings:** **Mean age**: Intervention 1: 55 years Intervention 2: 55 years **Male**: Intervention 1 (January to June	**Total costs (mean per patient):** Intervention 1: £28 Intervention 2: £22 Incremental (2−1): -£6 (95% CI: NR; p=NR) **Currency & cost year:** 2009 Euros [(presented here as 2009 UK pounds[(b)])] **Cost components incorporated:** Tests for diagnosing	**VTE (events per patient):** Intervention 1: 0.003 events Intervention 2: 0.001 to 0.002 events Incremental (2−1): -0.002 to –0.001 events (95% CI: NR; p=NR) **Major bleeding (events per patient)** Intervention 1: 0.09 events Intervention 2: 0.08 to 0.077 events Incremental (2−1): - 0.01 events	**ICER (Intervention 2 versus Intervention 1):** Dominant 95% CI: NR Probability Intervention 2 cost-effective (£20K/30K threshold): n/a **Analysis of uncertainty:** One way sensitivity analyses were conducted, varying the estimates about clinical effectiveness with the bounds of their 95% CI. Worst and best case scenarios were determined by considering the

Perspective: Spanish institutional perspective **Follow-up:** 6 months before and four 6-months periods over 4 consecutive years after the implementation of the e-alert system. **Treatment effect duration:**[(a)] length of hospitalisation **Discounting:** Costs: n/a ; Outcomes: n/a	2005): 55% Intervention 2: Period 1 (January to June 2006): 54% Period 2 (January to June 20067: 53% Period 3 (January to June 2008): 53% Period 4 (January to June 2009): 53% **Intervention 1: (n=6,441)** No e-alert system to stratify patients' risk of thrombosis. **Intervention 2: (n=25,839 [>6000 per period], 47% medical patients and 53% surgical patients)** E-alert software to identify hospitalised patients at risk of VTE, linked to the computerised patients' database to use data on patient characteristics to stratify patients' thrombotic risk. Risk stratification was carried out using: - PRETEMED scale (a validated risk stratification tool) for medical patients. This is a point scale with major VTE risk factors (e.g. active cancer, previous VTE, acute MI, ischaemic stroke with limb paralysis, decompensated chronic obstructive pulmonary disease, and thrombophilia) were assigned a score of 3, congestive heart failure, chronic renal insufficiency/nephrotic syndrome, severe acute infection, lower limb cast or prolonged bed	suspected cases of VTE Treatment cost Follow-up visits Management of complications Software design and maintenance	(95% CI: NR; p=NR)	upper and lower cost estimates (real cost +/- 25%) and the lower and upper estimates of effectiveness. None of the sensitivity analyses resulted in a change of the conclusion regarding dominance of the intervention.

	rest were assigned a score of 2, pregnancy/post-partum period, recent prolonged flight, lower limb paresis, oestrogen therapy, thalidomide/lenalidomide administration, use of central vein catheter, obesity, age>60 years or smoking assigned a score of 1. High risk of VTE was defined as cumulative risk score of at least 4 points. - ACCP guidelines for surgical patients Screening was undertaken daily and alerts sent for those with high risk so that the physician can either order or withhold the prophylaxis. The prophylaxis guidelines were also displayed. Low molecular weight heparin (LMWH) was recommended for all high risk patients except those with high risk of bleeding where mechanical prophylaxis is recommended (elastic stockings or pneumatic compression devices)			

Data sources

Health outcomes: data on the incidence of VTE during hospitalisation were obtained from the hospital local databases (the Hospital Discharge Minimum Basic Dataset), which includes clinical and administrative data on each hospital discharge. **Cost sources:** costs were calculated according to the hospital local costs.

Comments

Source of funding: institutional funding. **Limitations:** The risk assessment tools used are different from those included in the clinical review. QALYs are not used as measure of outcome. Uncertainty regarding the applicability of costs and resource use from the Spanish health care system in 2011 to current NHS perspective. The economic analysis is conducted alongside a single observational study, so by definition does not reflect all evidence in this area. Short follow-up period, so long terms and consequences have not been included. Unit costs are based on local rather than national sources; hence it is not clear if these are generalisable.

Overall applicability:[c] partially applicable **Overall quality**[d] potentially serious limitations

Abbreviations: CCA: cost-consequence analysis; 95% CI: 95% confidence interval; da: deterministic analysis; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); ICER: incremental cost-effectiveness ratio; LMWH: low molecular weight heparin; n/a: not applicable; NR: not reported; pa: probabilistic analysis; QALYs: quality-adjusted life years

(a) For studies where the time horizon is longer than the treatment duration, an assumption needs to be made about the continuation of the study effect. For example, does a difference in utility between groups during treatment continue beyond the end of treatment and if so for how long.

(b) Converted using 2009 purchasing power parities[715]

(c) Directly applicable / Partially applicable / Not applicable

(d) Minor limitations / Potentially serious limitations / Very serious limitations

Study	**[Millar 2016[640]]**			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CCA (health outcomes: deaths, non-fatal VTE events avoided) **Study design:** decision tree model **Approach to analysis:** a decision tree model was designed based on the results of the PREVENT trial. **Perspective:** Australian public health care system **Follow-up:** inpatient admission period	**Population:** Adult patients admitted to Australian hospital as medical inpatients. **Cohort settings:** Start age: 74 years Male: NR **Intervention 1:** No VTE prophylaxis. **Intervention 2:** VTE prophylaxis using LMWH (Enoxaparin 40 mg/day). Three levels of eligibility for prophylaxis	**Total cost[b] (mean per patient):** Intervention 1: £29 Intervention 2-Restricted : £26 Intervention 2-Intermediate : £30 Intervention 2-Broad : £39 **Currency & cost year:** Australian dollars presented here as 2014 UK pounds[c] **Cost components incorporated** LMWH prophylaxis Treatment costs for DVT, PE,	**Deaths[b] (mean per patient):** Intervention 1: 0.0004 Intervention 2: Restricted: 0.0005 Intermediate: 0.0006 Broad: 0.0009 **Total DVTs[b] (mean per patient):** Intervention 1: 0.0043 Intervention 2: Restricted: 0.0025 Intermediate: 0.0024 Broad: 0.0021	**ICER:** DVTs 1. No VTE Prophylaxis: dominated 2.a (Restricted eligibility): baseline 2.b. (Intermediate eligibility): extendedly dominated (da) 2.c. (Broad eligibility) vs 2.a. (restricted eligibility): £29,861 per DVT averted (da) **PEs** 1. No VTE Prophylaxis: dominated 2.a (Restricted eligibility): baseline 2.b. (Intermediate eligibility): extendedly dominated (da) 2.c. (Broad eligibility) vs 2.a. (restricted eligibility): £170,827 per DVT averted (da)

Treatment effect duration:[(a)] same as follow-up **Discounting:** Costs: n/a ; Outcomes: 3%	were examined: 2.a. Restricted: where only patients with strongest risk factors were given prophylaxis (malignancy, especially with chemotherapy, previous history of VTE, some rarer high risk conditions such as inflammatory bowel disease. (~ 25% of all inpatient admissions) 2.b. Intermediate: where patients with strong and moderate risk factors, such as cardiac or respiratory failure, sepsis or inflammation, are given prophylaxis (~ 40% of all inpatient admissions) 2.c. Broad: where everyone from the intermediate group as well as those satisfying an age criterion (>40 or >60) are given prophylaxis (~80% of all inpatient admissions)	PTS and major bleeds Nursing time Hospital costs GP visits Monitoring	**Total PEs[(b)] (mean per patient):** Intervention 1: 0.0023 Intervention 2: Restricted: 0.0020 Intermediate: 0.0020 Broad: 0.0019	**Death** 1. No VTE Prophylaxis: £30,000 per death averted 2.a (Restricted eligibility): baseline 2.b. (Intermediate eligibility): dominated (da) 2.c. (Broad eligibility) vs 2.a. (restricted eligibility): dominated (da) **Analysis of uncertainty:** A range of sensitivity analyses were conducted including changing baseline VTE risk, fatality rate for PE and major bleeding and assumptions regarding VTE risk in non-eligible patients.
Data sources				
Health outcomes: Data on symptomatic DVTs, PEs and major bleeding were based on the results of the PREVENT trial. **Quality-of-life weights:** n/a. **Cost sources:** national unit costs were used and these were obtained from the Medicare Benefits Schedule, Australia and the Department of Health and Ageing, Canberra.				

Comments
Source of funding: NR. **Limitations:** Some uncertainty regarding the applicability of resource use and cost data from Australia in 2014 to current NHS context. Discounting was used only for health outcomes and the rate used is different from that recommended in the NICE Reference Case. QALYs are not used as an outcome measure. The model has a short time horizon that covers only the duration of the hospital stay, hence, does not capture long term costs. Only symptomatic events are included in the model. The source of baseline risk and relative treatment effects is based on a single trial and is not reflective of the total body of evidence. The results of the costs and outcomes are not presented as means per patient.
Overall applicability:[b] Partially applicable **Overall quality**[c] Potentially serious limitations

Abbreviations: CEA: cost effectiveness and analysis; 95% CI: 95% confidence interval; da: deterministic analysis; DVT: Deep vein thrombosis; ICER: incremental cost-effectiveness ratio; LMWH: low molecular weight heparin; n/a: not applicable; NR: not reported; pa: probabilistic analysis; PE: pulmonary embolism; QALYs: quality-adjusted life years; VTE: venous thromboembolism.

(a) For studies where the time horizon is longer than the treatment duration, an assumption needs to be made about the continuation of the study effect. For example, does a difference in utility between groups during treatment continue beyond the end of treatment and if so for how long.

(b) Calculated by NGC based on 1,458,600 inpatient admissions.

(c) Converted using 2014 purchasing power parity[715]

(d) Directly applicable / Partially applicable / Not applicable

(e) Minor limitations / Potentially serious limitations / Very serious limitations