Appendix J: Health economic evidence tables

J.1 Risk assessment for medical, surgical and trauma patients

J.1.1 Accuracy of risk assessment tools for VTE in hospital admissions

No relevant economic evaluations were identified.

J.1.2 Accuracy of risk assessment tools for bleeding in hospital admissions

No relevant economic evaluations were identified.

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

J.2 Risk assessment for people having day procedures

J.2.1 Accuracy of risk assessment tools for VTE for day procedures

No relevant economic evaluations were identified.

J.2.2 Accuracy of risk assessment tools for bleeding for day procedures

No relevant economic evaluations were identified.

J.2.3 Effectiveness of risk assessment tools for day procedures

No relevant economic evaluations were identified.

J.3 Reassessment of VTE and bleeding risk

J.3.1 Reassessment of risk for hospital admissions

No relevant economic evaluations were identified.

J.3.2 Reassessment of risk for day procedures

No relevant economic evaluations were identified.

J.4 Risk assessment for pregnant women and women up to 6 weeks postpartum

No relevant economic evaluations were identified.

J.5 Giving information to patients and planning for discharge

No relevant economic evaluations were identified.

J.6 General VTE prevention for everyone in hospital

No relevant economic evaluations were identified.

J.7 Nursing care: Early mobilisation and hydration

No relevant economic evaluations were identified.

J.8 Obesity

No relevant economic evaluations were identified.

J.9 People using antiplatelets

No relevant economic evaluations were identified.

J.10 People using anticoagulation therapy

No relevant economic evaluations were identified.

J.11 Acute coronary syndromes

No relevant economic evaluations were identified.

J.12 Acute stroke patients

Study	[CLOTS Trials Collaboration[184], Dennis 2015[248], Denis 2015[247]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: quality-adjusted life-days) **Study design:** Randomised Controlled Trial **Approach to analysis:** Within-trial analysis of individual patient level data of costs and outcomes using generalised linear modelling of cost data and **Perspective:** UK NHS **Follow-up:** 6 months	**Population:** Immobile stroke patients admitted to 92 UK centres from days 0 to 3 of admission. **Cohort settings: (n=2876)** Start age: 74.6 years Male: 48% **Intervention 1: (n=1438)** Usual care only. Routine care defined as early mobilisation hydration and anti-platelet or anti-coagulant medication.	**Total costs of IPC plus hospital days (mean per patient):** Intervention 1: £12,116 Intervention 2: £12,567 Incremental (2−1): £451 (95% CI: NR; p=NR) **Currency & cost year:** UK pounds [2013] **Cost components incorporated:** Hospital stay IPC cost (capital and equipment)	**Quality-adjusted life-days (mean per patient):** Intervention 1: 26.7 days Intervention 2: 27.6 days Incremental (2−1): 0.9 days (95% CI: -2.1 to +3.9; p=NR)	**ICER (Intervention 2 versus Intervention 1):** £610.88 per quality adjusted life day (da) 95% CI: NR Probability Intervention 2 cost-effective (£20K/30K threshold): NR **Analysis of uncertainty:** Sensitivity analyses based on multiple imputations of the EQ5D-3L to account for missing data did not alter the conclusions. No other one way sensitivity analysis was conducted. Subgroup analysis based on predicted prognosis at randomisation showed that IPCD appeared to reduce the risk of DVT and probably improve survival in all immobile

Treatment effect duration:[(a)] 6 months **Discounting:** Costs: n/a ; Outcomes: n/a	**Intervention 2: (n=1438)** Thigh length IPC in addition to usual care. IPC the IPC system used as the Kendall SCD™ express sequential compression (Covedien Ltd, Mansfield, MA, USA) with thigh length sleeves worn continuously on both legs for 30 days or next CDU (if >30 days) or until the patient was independently mobile, discharged from randomising hospital or refused to wear the sleeves or the staff became concerned about his/her skin condition.			stroke patients except those in the fifth quintile (those with best prognosis). The authors concluded that IPC is likely to be most effective in the subgroups of immobile stroke patients In the three intermediate quintiles.
Data sources				
Health outcomes: 6 month quality of life data gathered during associated trial. Base-line utility modelled using a Bayesian Network incorporating data from the other CLOTS studies because of the questionable validity of asking patients or carers to rate their quality of life shortly after admission to hospital with a severe stroke. **Quality-of-life weights:** EQ-5D-3L UK tariff. **Cost sources:** NHS reference costs for English centres, Scottish Health Service Costs for Scottish centres.				
Comments				
Source of funding: University of Edinburgh, NHS Lothian and NIHR HTA Program. Covidien LtD provided IPCs **Limitations:**Most of the cost difference was derived from a per diem amount applied to a non- significant difference in length of stay rather than the actual cost of the hospital stay. Important costs were excluded from the analysis such as readmissions, post-hospital care, deep vein thrombosis, and pulmonary embolism. The timeframe was only 6 months which is unlikely to be sufficient to capture important cost and health consequences. The statistical methods used to estimate quality of life at baseline was experimental and had not been independently verified. The EQ-5D-3L generic quality of life measurement tool was known to have limitations in detecting small functional improvements in severely disabled people. There is a high degree of uncertainty around the estimates provided.				
Overall applicability:[(b)] Directly applicable **Overall quality**[(c)] Potentially serious limitations				

Abbreviations: 95% CI: 95% confidence interval; CUA: cost-utility analysis; da: deterministic analysis; EQ-5D-3L: Euroqol 5 dimensions 3 levels (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); ICER: incremental cost-effectiveness ratio; IPC: intermittent pneumatic compression; 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) Directly applicable / Partially applicable / Not applicable
(c) Minor limitations / Potentially serious limitations / Very serious limitations

J.13 Acutely ill medical patients

Study	**[National Clinical Guideline Centre 2010[666]]**			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design**: Decision analytic model **Approach to analysis:** A decision tree model was developed based on the results of a systematic literature review and a network meta-analysis. **Perspective:** UK NHS and PSS **Time horizon:** VTEs and major bleeding events modelled for the acute period 10 days). QALYs and health service costs arising from these events are modelled over the patient's lifetime **Treatment effect**	**Population:** Adult (18 years or older) admitted as general medical admissions to hospitals in England. **Cohort settings:** Start age: 74 years Male: 47% **Intervention 1:** No prophylaxis **Intervention 2:** LMWH (average of dalteparin 5000 units sc daily) and enoxaparin (4000 units subcutaneously daily) **Intervention 3:** UFH (5000 units three times daily) **Intervention 4:**	**Total costs (mean per patient):** Intervention 1: NR Intervention 2: NR Incremental (2−1): NR (95% CI: NR; p=NR) **Currency & cost year:** 2009 UK pounds **Cost components incorporated:** Pharmacological prophylaxis costs, prophylaxis testing, nurse time, VTE diagnosis and treatment costs, other events treatment costs (i.e. stroke, PTS, CTEPH, major bleeding, reoperation)	**QALYs (mean per patient):** Intervention 1: NR Intervention 2: NR Incremental (2−1): NR (95% CI: NR; p=NR)	**Incremental net monetary benefit (INMB)** (pa) **Intervention 1:** £0 (comparator) **Intervention 2:** £328 **Intervention 3:** £118 **Intervention 4:** -£61 Probability cost-effective (£20K threshold): **Intervention 1:** 1.7% **Intervention 2:** 72.3% **Intervention 3:** 17.7% **Intervention 4:** 8.3% **Analysis of uncertainty:** Deterministic and probabilistic sensitivity analyses were performed. The deterministic SAs explored the impact of changing the incidence of CTEPH and PTS and their costs, including HIT, changing its incidence, lower costs for LMWH, changing fatality rate after PE and MB and change the cost effectiveness threshold.

duration:[(a)] 10 days **Discounting:** Costs: 3.5% ; Outcomes: 3.5%	Fondaparinux sodium (2.5 mg subcutaneously)			A two-way threshold analysis exploring the impact of baseline risk for both major bleeding and PE was also undertaken. In all SAs, the most cost effective strategy remained the same (LMWH), except where high bleeding baseline risk and low PE baseline risk were used, where no prophylaxis was the most cost effective strategy.
Data sources				
Health outcomes: baseline events were obtained from the no prophylaxis arm of the RCTs included in the systematic review and NMA that informed the model. Relative treatment effects for DVT (symptomatic and asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** utilities based on the EQ-5D UK tariff were sourced from the published literature and previous guidelines. **Cost sources:** standard sources on unit costs in the UK were used including the drug tariff, the NHS reference costs and the BNF.				
Comments				
Source of funding: National Institute for Health and Care Excellence (NICE). **Limitations:** Some uncertainty regarding the applicability of unit costs from 2009 to current NHS context. The relative treatment effect applied to all VTE events in the model is the relative treatment effect obtained from the DVT NMA.				
Overall applicability:[(b)] Directly applicable **Overall quality**[(c)] Potentially serious limitations				

Abbreviations: BNF: British National Formulary; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; da: deterministic analysis; da: deterministic analysis; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); HIT: Heparin induced thromboembolism; ICER: incremental cost-effectiveness ratio; LMWH: low molecular weight heparin; NR: not reported; NMA: network meta-analysis; pa: probabilistic analysis; PE: pulmonary embolism; QALYs: quality-adjusted life years; SA: sensitivity analysis; UFH: unfractionated heparin.

(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) Directly applicable / Partially applicable / Not applicable

(c) 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: years of	**Population:** Adult patients admitted to	**Total cost[(b)] (mean per patient):**	**Deaths[(b)] (mean per patient):**	**ICER:** DVTs

life lost, 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 **Treatment effect duration:**[(a)] same as follow-up **Discounting:** Costs: n/a ; Outcomes: 3%	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 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,	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, PTS and major bleeds Nursing time Hospital costs GP visits Monitoring	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 **Total PEs[(b)] (mean per patient):** Intervention 1: 0.0023 Intervention 2: Restricted: 0.0020 Intermediate: 0.0020 Broad: 0.0019	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) **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.

	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)			

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: CCA: cost-consequence 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

Study	**[Wilbur 2011[1007]]**

Study details	Population & interventions	Costs	Health outcomes	Cost-effectiveness
Economic analysis: CCA (health outcome: DVT [distal or proximal, not progressing to PE], combined toward events (PE, major bleed and death)) **Study design:** probabilistic decision analytic model **Approach to analysis:** Decision tree model to simulate the hospital stay of medical patients with results for cancer patients reported as subgroup analysis. **Perspective:** Canadian institutional (i.e. hospital perspective) **Time horizon:** 7 days **Treatment effect duration:**[(a)] 7 days **Discounting:** Costs: NA ; Outcomes: NA	**Population:** Hospital adult internal medicine patients. **Cohort settings:** Start age: NR Male: NR **Intervention 1:** UFH (5000 U, twice daily [bid], SC]) initiated on day 1 of hospital stay and continued for 7 days. **Intervention 2:** LMWH (enoxaparin 40 mg, once daily [od], administered subcutaneously [SC]) initiated on day 1 of hospital stay and continued for 7 days (mean LOS for internal medicine patient in the institution).	**Total costs (mean per patient):** Intervention 1: £2,892 Intervention 2: £2,896 Incremental (2−1): £4 (95% CI: NR; p=NR) **Cancer subgroup:** **Total costs (mean per patient):** Intervention 1: £2,908 Intervention 2: £2,910 Incremental (2−1): £2 (95% CI: NR; p=NR) **Currency & cost year:** 2009 Canadian dollars (presented here as 2009 UK pounds[(b)]) **Cost components incorporated:** Only direct medical costs included: -Thromboprophylaxis drug costs -VTE diagnosis - VTE treatment	**True DVT events (mean per patient):** Intervention 1: 0.024 events Intervention 2: 0.021 events Incremental (2−1): - 0.003 events (95% CI: NR; p=NR) **Untoward events (mean per patient):** Intervention 1: 0.0115 events Intervention 2: 0.0102 events Incremental (2−1): - 0.0013 events (95% CI: NR; p=NR) **PE events (mean per patient):** Intervention 1: 0.005 events Intervention 2: 0.004 events Incremental (2−1): - 0.001 events (95% CI: NR; p=NR) **Major bleeding events (mean per patient):**	**ICER (Intervention 2 versus Intervention 1):** £1,116 **per DVT averted** (da) 95% CI: NR £3,726 **per untoward event averted** (da) 95% CI: NR Probability Intervention 2 cost-effective (£20K/30K threshold): NA **Cancer subgroup:** **ICER (Intervention 2 versus Intervention 1):** £287 **per DVT averted** (da) 95% CI: NR £1,037 **per untoward event averted** (da) 95% CI: NR Probability Intervention 2 cost-effective (£20K/30K threshold): NA **Analysis of uncertainty:** One way sensitivity analyses were conducted to examine the robustness of the model results to changes in the following parameters' values:

		-pharmacy and nursing time For administering and preparing the medications -hospitalisation costs -costs of treating major bleeding (extended length of stay, treatments and other management costs)	Intervention 1: 0.0005 events Intervention 2: 0.0002 events Incremental (2−1): - 0.0003 events (95% CI: NR; p=NR) **Death (mean per patient):** Intervention 1: 0.006 events Intervention 2: 0.006 events Incremental (2−1): 0.000 events (95% CI: NR; p=NR) **Cancer subgroup:** **True DVT events (mean per patient):** Intervention 1: 0.037 events Intervention 2: 0.031 events Incremental (2−1): - 0.006 events (95% CI: NR; p=NR) **Untoward events (mean per patient):** Intervention 1: 0.044	-acquisition cost of LMWH (using the cost of other LMWHs included in the systematic review: dalteparin and nadroparin) -costs of managing PE and major bleeding -baseline rate of DVT -probability of progression to PE in absence of treatment -assuming alternative LOS PSA was also conducted, assigning distributions for each model parameter . It was conducted using "untoward events averted as the effectiveness outcome). The SAs were consistent across the different scenarios considered. None of the SAs were conducted for the cancer subgroup.

			events Intervention 2: 0.037 events Incremental (2−1): - 0.007 events (95% CI: NR; p=NR) **PE events (mean per patient):** Intervention 1: 0.007 events Intervention 2: 0.006 events Incremental (2−1): - 0.001 events (95% CI: NR; p=NR) **Major bleeding events (mean per patient):** Intervention 1: 0.0006 events Intervention 2: 0.0003 events Incremental (2−1): - 0.0003 events (95% CI: NR; p=NR) **Death (mean per patient):** Intervention 1: 0.006 events Intervention 2: 0.006	

			events Incremental (2−1): 0.000 events (95% CI: NR; p=NR)	

Data sources

Health outcomes: Baseline risk for the UFH group and relative treatment effect of LMWH vs UFH for DVT and major bleeding were based on a published review of the literature (Mismetti 2000 [644]) while probabilities of PE and death were sourced from other published papers . Heparin induced thrombocytopenia (HIT), PTS, minor bleeding were not modelled. **Quality-of-life weights:** NA. **Cost sources:** Costs of prophylaxis were obtained from the Vancouver general Hospital Pharmacy. Costs of investigations and tests were obtained from the British Columbia Medical Association Guide to Fees. Nursing and Pharmacy labour costs were based on estimate of time spent in preparation and administration of prophylaxis. The pharmacist wage rate was obtained from the Health Sciences Association of British Columbia while the nurse wage rate was obtained from the British Columbia Nurses' Union. Hospitalisation costs were calculated by multiplying length of stay by the per-diem cost. Costs of treating major bleeding were based on published studies.

Comments

Source of funding: no funding received. **Limitations:** Some uncertainty regarding the applicability of resource use and cost data from Canada in 2009 to current NHS context. The perspective used was that of the institution. QALYs are not used as an outcome measure. The model has a short time horizon that covers only the duration of the hospital stay (7 days), hence, does not capture long term costs and effects. The main outcome reported (untoward events) is a composite outcome measure and its use would underestimate the rate of these events as the occurrence of multiple events is counted as one event. The source of baseline risk and relative treatment effects is slightly outdated. Unit costs are based on both national and local sources and it is not clear if the local sources are reflective of national unit costs. The results of the sensitivity analysis were not reported for the cancer subgroup. **Other:** Investigations to confirm DVT were Doppler ultrasound, examination of the legs, D-Dimer testing and Chest X-ray. Investigations to confirm symptomatic PE are electrocardiogram (ECG) and chest compound tomography (CT) scan with contrast. Treatment strategy for detected VTE would be LMWH and oral anticoagulation with warfarin (initiated at 5 mg orally daily and titrated to international normalised ration (INR) 2-3.

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

Abbreviations: bid: twice daily; CCA: cost-consequences analysis; 95% CI: 95% confidence interval; da: deterministic analysis; DVT: Deep vein thrombosis; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); HIT: heparin induced thrombocytopenia; ICER: incremental cost-effectiveness ratio; LMWH: low molecular weight heparin; LOS: length of stay; NA: not applicable; NR: not reported; od: once daily; pa: probabilistic analysis; PE: pulmonary embolism; PTS: post-thrombotic syndrome; QALYs: quality-adjusted life years; SC: subcutaneous; UFH: un-fractionated heparin; 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) Converted using 2009 purchasing power parities[715]

(c) Directly applicable / Partially applicable / Not applicable

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

J.14 Cancer

Study	[Chalayer 2016[165]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design:** Decision analytic model **Approach to analysis:** A decision tree based on results of Palumbo 2011 clinical trial[724]. **Perspective:** France National Health Insurance System **Time horizon:** 6 months **Treatment effect duration:**[(a)] 6 months **Discounting:** Costs: n/a ; Outcomes: n/a	**Population:** Patients newly diagnosed with multiple myeloma treated with protocols including thalidomide **Cohort settings:** Start age: NR Male: NR **Intervention 1:** Aspirin (100mg/day) for 3 months. **Intervention 2:** LMWH standard dose, standard duration) (Enoxaparin 40mg/day) for 6 months.	**Total costs (mean per patient):** Intervention 1: £230 Intervention 2: £1,283 Incremental (2−1): £1,053 (95% CI: NR; p=NR) **Currency & cost year:** 2013 Euros (presented here as 2013 UK pounds[(b)]) **Cost components incorporated:** Hospitalisation GP visits Home nursing Laboratory investigation Radiologic procedures Drugs	**QALYs (mean per patient):** Intervention 1: 0.300 Intervention 2: 0.299 Incremental (2−1): -0.001 (95% CI: NR; p=NR)	**ICER (Intervention 2 versus Intervention 1):** Intervention 1 dominant (less costly and more effective)(pa) 95% CI: n/a Probability Intervention 2 cost-effective (£20K/30K threshold): NR **Analysis of uncertainty:** None of the sensitivity analyses undertaken changed the conclusion**.**
Data sources				
Health outcomes: data on baseline risks and relative treatment effects are based on a single RCT (Palumbo 2011[724]). These outcomes included DVT, PE, stroke, acute MI, major bleeding and sudden death. **Quality-of-life weights:** EQ-5D index values were used. **Cost sources:** National unit cost sources were used including National reimbursement database and Vidal drug compendium.				
Comments				
Source of funding: None. **Limitations:** Some uncertainty regarding the applicability of unit costs from France in 2013 to current NHS context. The model does not incorporate any long-term consequences such as CTEPH or PTS. Baseline risk and relative treatment effects are based on a single open-label trial, so by definition, does not reflect all available evidence. Costs of LMWH administration might be underestimated.				

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

Abbreviations: 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; 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; n/a: not applicable; NR: not reported; pa: probabilistic analysis; PTS: post-thrombotic syndrome; 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 2013 purchasing power parities[715]

(c) Directly applicable / Partially applicable / Not applicable

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

J.15 Patients with central venous catheters

No relevant economic evaluations were identified.

J.16 Palliative care

No relevant economic evaluations were identified.

J.17 Critical care

No relevant economic evaluations were identified.

J.18 Pregnant women and women up to 6 weeks postpartum

No relevant economic evaluations were identified.

J.19 People with psychiatric illness

No relevant economic evaluations were identified.

J.20 Anaesthesia

No relevant economic evaluations were identified.

J.21 Lower limb immobilisation

No relevant economic evaluations were identified.

J.22 Fragility fractures of the pelvis, hip and proximal femur

Study	**[National Clinical Guideline Centre 2010[666]]**			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design**: Decision analytic model **Approach to analysis:** A decision tree model was developed based on the results of a systematic literature review and a network meta-analysis. **Perspective:** UK NHS and PSS **Time horizon:** VTEs and major bleeding events modelled for the acute period (10 days). QALYs and health service costs arising from these events are modelled over	**Population:** Adults admitted for hip fracture surgery in England. **Cohort settings: (HES data)** Start age: 82 years Male: 23% **Interventions:** 1. Fondaparinux sodium (2.5 mg subcutaneously) 2.Warfarin variable dose (adjusted to INR range 2 to 3, average dose 4mg/day) 3. LMWH (average of dalteparin 5000 units subcutaneous daily) and enoxaparin (4000 units subcutaneous daily) 4. UFH (5000 units three times daily)	**Total costs (mean per patient):** NR Incremental (2−1): NR (95% CI: NR; p=NR) **Currency & cost year:** 2009 UK pounds **Cost components incorporated:** Pharmacological prophylaxis costs, prophylaxis testing, nurse time, VTE diagnosis and treatment costs, other events treatment costs (i.e. stroke, PTS, CTEPH, major bleeding, reoperation)	**QALYs (mean per patient):** NR Incremental (2−1): NR (95% CI: NR; p=NR)	**Incremental net monetary benefit (INMB)** (pa) Intervention 1: £2148 (rank 1) Intervention 2: £1830 (rank 2) Intervention 3: £1711 (rank 3) Intervention 4: £1465 (rank 4) Intervention 5: £999 (rank 5) Intervention 6: £558 (rank 6) Intervention 7: £0 (rank 7) Probability cost-effective (£20K threshold): Intervention 1: 85% Intervention 2: 4.2% Intervention 3: 4.5% Intervention 4: 0.6% Intervention 5: 5.7% Intervention 6: 0.0% Intervention 7: 0.0%

Study	[National Clinical Guideline Centre 2010[666]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
the patient's lifetime **Treatment effect duration:**[(a)] 10 days **Discounting:** Costs: 3.5% ; Outcomes: 3.5%	5. IPCD-FID 6.Aspirin (High dose) 7. No prophylaxis			**Analysis of uncertainty:** Deterministic and probabilistic sensitivity analyses were performed. The deterministic SAs explored the impact of changing the incidence of CTEPH and PTS and their costs, including HIT, changing its incidence, lower costs for LMWH, changing fatality rate after PE and MB and change the cost effectiveness threshold. In all analyses, fondaparinux remained as the most cost-effective strategy. A two-way threshold analysis exploring the impact of baseline risk for both major bleeding and PE was also undertaken. It showed that as the risk of bleeding increases and the risk of PE decreases, LMWH becomes the most cost-effective option.
Data sources				
Health outcomes: baseline events were obtained from the no prophylaxis arm of the RCTs included in the systematic review and NMA that informed the model. Relative treatment effects for DVT (symptomatic and asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** utilities based on the EQ-5D UK tariff were sourced from the published literature and previous guidelines. **Cost sources:** standard sources on unit costs in the UK were used including the drug tariff, the NHS reference costs and the BNF.				
Comments				
Source of funding: National Institute for Health and Care Excellence (NICE). **Limitations:** Some uncertainty regarding the applicability of unit costs from 2009 to current NHS context. Some of the interventions are not included in the current clinical review, for example aspirin (high dose), warfarin (variable dose) and UFH. The relative treatment effect applied to all VTE events in the model is the relative treatment effect obtained from the DVT NMA.				
Overall applicability:[(b)] Partially applicable **Overall quality**[(c)] Minor limitations				

Abbreviations: BNF: British National Formulary; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; da: deterministic analysis; da: deterministic analysis; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); FID: foot impulse devices; HES: Hospital Episode statistics; HIT: Heparin induced thromboembolism; ICER: incremental cost-effectiveness ratio; INMB: incremental net monetary benefit; IPCD: intermittent pneumatic compression

devices; LMWH: low molecular weight heparin; NR: not reported; NMA: network meta-analysis; pa: probabilistic analysis; PE: pulmonary embolism; QALYs: quality-adjusted life years; SA: sensitivity analysis; UFH: unfractionated heparin.

(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) Directly applicable / Partially applicable / Not applicable

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

Study	**[National Clinical Guideline Centre 2010[666]]**			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design**: Decision analytic model **Approach to analysis:** A decision tree model was developed based on the results of a systematic literature review and a direct meta-analysis of the trials that randomised patients at the point of discharge. **Perspective:** UK NHS and PSS **Time horizon:** VTEs and major bleeding events modelled for the acute period 28 days). QALYs and health service costs arising from these events are modelled over the patient's lifetime **Treatment effect**	**Population:** Adults admitted for hip fracture surgery in England. **Cohort settings: (HES data)** Start age: 82 years Male: 23% **Interventions 1:** No post discharge prophylaxis (it is not clear whether prophylaxis was given during the initial hospital stay) **Intervention 2:** Post-discharge prophylaxis with fondaparinux 2.5 mg given subcutaneously once daily.	**Total costs (mean per patient):** NR Incremental (2−1): NR (95% CI: NR; p=NR) **Currency & cost year:** 2009 UK pounds **Cost components incorporated:** Pharmacological prophylaxis costs, prophylaxis testing, nurse time, VTE diagnosis and treatment costs, other events treatment costs (i.e. stroke, PTS, CTEPH, major bleeding, reoperation)	**QALYs (mean per patient):** NR Incremental (2−1): NR (95% CI: NR; p=NR)	**Incremental net benefit (INB)** (pa) Intervention 1: £0 Intervention 2: £239 Probability cost-effective (£20K threshold): Intervention 1: 8.0% Intervention 2: 92.0% **Analysis of uncertainty:** Deterministic and probabilistic sensitivity analyses were performed. The deterministic SAs explored the impact of changing the incidence of CTEPH and PTS and their costs, including HIT, changing its incidence, lower costs for LMWH, changing fatality rate after PE and MB and change the cost effectiveness threshold. In all SAs, the most cost effective strategy remained the same (fondaparinux). A two-way threshold analysis exploring the impact of baseline risk for both major bleeding and PE was also

Study	[National Clinical Guideline Centre 2010[666]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
duration:[(a)] 28 days **Discounting:** Costs: 3.5% ; Outcomes: 3.5%				undertaken. It showed that as the risk of bleeding increases and the risk of PE decreases, no prophylaxis becomes the most cost-effective option.
Data sources				
Health outcomes: baseline events were obtained from the no prophylaxis arm of the RCTs included in the systematic review and direct meta-analysis that informed the model. Relative treatment effects for DVT (symptomatic and asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** utilities based on the EQ-5D UK tariff were sourced from the published literature and previous guidelines. **Cost sources:** standard sources on unit costs in the UK were used including the drug tariff, the NHS reference costs and the BNF.				
Comments				
Source of funding: National Institute for Health and Care Excellence (NICE). **Limitations:** Some uncertainty regarding the applicability of unit costs from 2009 to current NHS context. The relative treatment effect applied to all VTE events in the model is the relative treatment effect obtained from the DVT MA.				
Overall applicability:[(b)] Partially applicable **Overall quality**[(c)] potentially serious limitations				

Abbreviations: BNF: British National Formulary; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; da: deterministic analysis; da: deterministic analysis; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); HES: Hospital Episode statistics; HIT: Heparin induced thromboembolism; ICER: incremental cost-effectiveness ratio; NR: not reported; NMA: network meta-analysis; pa: probabilistic analysis; PE: pulmonary embolism; QALYs: quality-adjusted life years; SA: sensitivity analysis.

(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) Directly applicable / Partially applicable / Not applicable

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

J.23 Elective hip replacement

No relevant economic evaluations were identified.

J.24 Elective knee replacement

No relevant economic evaluations were identified.

J.25 Non-arthroplasty orthopaedic knee surgery

No relevant economic evaluations were identified.

J.26 Foot and ankle orthopaedic surgery

No relevant economic studies were identified.

J.27 Upper limb orthopaedic surgery

No relevant health economic studies were identified.

J.28 Spinal surgery

No relevant health economic studies were identified.

J.29 Cranial surgery

No relevant health economic studies were identified.

J.30 Spinal injury

No relevant health economic studies were identified.

J.31 Major trauma

Study	[Carter Chiasson 2009[175]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design:** Decision analytic model **Approach to analysis:** A Markov analysis using weekly cycles over lifetime (30 years) time horizon. **Perspective:** Canadian health care purchaser. **Time horizon:** lifetime **Treatment effect duration:**[(a)] 2 weeks **Discounting:** Costs: 5% ; Outcomes: 5%	**Population:** Adult (>/= 15 years)Trauma patients with severe injuries admitted to the ICU who were believed to have a contraindication to pharmacological VTE prophylaxis for up to 2 weeks because of a risk of major bleeding. **Cohort settings:** Start age: 39.3 years Male: 76% **Intervention 1:** Pneumatic compression devices (IPCD) and expectant management alone during the first 2 weeks. **Intervention 2: (results not reported here)**	**Total costs (mean per patient):** Intervention 1: £35,571 Intervention 3: £36,529 Incremental (3−1): £975 (95% CI: NR; p=NR) **Currency & cost year:** 2007 Canadian dollars (presented here as 2007 UK pounds[(b)]) **Cost components incorporated:** Intervention costs (including VCF insertion) Hospital stay Readmissions Management of adverse events (mainly major bleeding) DVT and VTE diagnosis and treatment	**QALYs (mean per patient):** Intervention 1: 6.9 Intervention 3: 6.9 Incremental (3−1): 0.0 (95% CI: NR; p=NR)	**ICER (Intervention 3 versus Intervention 1):** N/A [VCF more costly and equally effective] 95% CI: NR Probability Intervention 2 cost-effective (£20K/30K threshold): NR **Analysis of uncertainty:** A wide range of one-way sensitivity analyses was undertaken including changing the following parameters: -risk of DVT -risk of PE for patient with DVT -risk of mortality associated with PE -risk of proximal DVT after insertion of VCF -inclusion of the cost of VCF removal for all patients who had no VTE at discharge. None of the SAs changed the conclusion from the base case analysis.

	IPCD as well as weekly Serial Doppler ultrasound (SDU) screening for the duration of hospitalisation beginning in the first week of ICU admission. **Intervention 3:** Prophylactic insertion of vena-cava filter (VCF).			
Data sources				
Health outcomes: Baseline risks of proximal DVT and PE were based on published data from observational cohort study and a randomised trial. Relative efficacy of VCF was based on data from single RCT identified through a systematic review of the literature. **Quality-of-life weights:** Not reported. **Cost sources:** Both local and National sources of unit costs were used, including the Alberta Drug Benefit List, as well as published studies.				
Comments				
Source of funding: None. **Limitations:** Uncertainty regarding the applicability of unit costs from Canada, in 2007 to current NHS context. The discount used is 5% for both costs and outcomes; however, this was tested in a sensitivity analysis with a range of 0-6%. It is not clear which utility measure was used to derive the utility values used in the model. The health states included in the long term of the model does not seem to include CTEPH as a complication of PE. Baseline risks as well as relative effectiveness are based on the results of an observational cohort and single RCT so by definition, not reflective of all the evidence in this area. Both local and national unit costs were used in the analysis, so may not be generalisable. Utility values were not tested in sensitivity analysis.				
Overall applicability:[(c)] Partially applicable **Overall quality**[(d)] Potentially serious limitations				

Abbreviations: 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility 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; N/a: not applicable; NR: not reported; PCD: pneumatic compression device; QALYs: quality-adjusted life years, RCT: Randomised controlled trial; SAs: sensitivity analyses; SDU: serial Doppler Ultrasound; VCF: vena-cava filter.

(d) 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.

(e) Converted using 2007 purchasing power parities[715]

(f) Directly applicable / Partially applicable / Not applicable

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

Study	**[Lynd 2007[590]]**			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**

Economic analysis: CCA (health outcomes: life-years gained (LYG), DVT averted, PE averted, MB, mortality) **Study design:** Decision analytic model **Approach to analysis:** Decision tree model run probabilistically. **Perspective:** Canadian Heath care payer **Time horizon:** lifetime **Treatment effect duration:**[(a)] NR **Discounting:** Costs: 0% ; Outcomes: 5%	**Population:** Patients with major trauma (trauma score of =>9) **Cohort settings:** Start age: 39 years Male: 72% **Intervention 1:** UFH 5000 units once daily. **Intervention 2:** LMWH (enoxaparin 30 mg once daily).	**Total costs (mean per patient):** Intervention 1: £6,572 Intervention 2: £6,619 Incremental (2−1): £47 (95% CI: NR; p=NR) **Currency & cost year:** 2003 Canadian dollars (presented here as 2003 UK pounds(b)) **Cost components incorporated:** Direct costs incurred during the hospital stay including: a) Mean total cost of hospital stay for treated patients b) Mean cost of diagnosis and treatment of DVT and PE c) Additional cost of prophylaxis due to major bleeds	**LYG (mean per patient):** Intervention 1: 17.05 Intervention 2: 16.92 Incremental (2−1): - 0.13 (95% CI: NR; p=NR) **DVT (mean per patient):** Intervention 1: 0.147 Intervention 2: 0.061 Incremental (2−1): - 0.086 (95% CI: NR; p=NR) **PE (mean per patient):** Intervention 1: 0.003 Intervention 2: 0.0012 Incremental (2−1): -0.0018 (95% CI: NR; p=NR) **MB (mean per patient):** Intervention 1: 0.0084 Intervention 2: 0.0388 Incremental (2−1): 0.0018 (95% CI: NR; p=NR) **Mortality (mean per patient):** Intervention 1:0.01 Intervention 2: 0.003 Incremental (2−1): - 0.007 (95% CI: NR; p=NR)	**ICER (Intervention 2 versus Intervention 1)-DVT primary outcome:** £553 per DVT averted (pa) 95% CI: NR Probability Intervention 2 cost-effective (£20K/30K threshold): NR Probability Intervention 2 cost-effective (£10,435 ($20,000 Canadian dollars (2003) threshold): 93% **ICER (Intervention 2 versus Intervention 1)-LYG primary outcome:** Intervention 2 dominated (less effective and more costly) (pa) 95% CI: NR Probability Intervention 2 cost-effective (£20K/30K threshold): NR Probability Intervention 2 cost-effective (£10,435 ($20,000 Canadian dollars (2003) threshold): 9% **Analysis of uncertainty:** PSA as well as 1-way, 2-way DSA. All analyses had minor effects on the ICERs with UFH remaining dominant when LYG was used as the primary outcome.
Data sources				

Health outcomes: A systematic review of the literature was undertaken but only a single RCT (Geerts 1996[340]) was retrieved and used as the source of data on baseline risk and relative efficacy. **Quality-of-life weight:** N/A. **Cost sources:** local unit costs were used for pharmacological prophylaxis. Ontario Nurses Union collective bargaining agreement and London Health Sciences Centre, London, Ontario were the reported unit cost sources.	
Comments	
Source of funding: Canadian Institutes for Health Research post-doctoral fellowship; Michael Smith Foundation for Health Research; Heart and Stroke Foundation of Ontario. **Limitations:** Uncertainty regarding the applicability of unit costs from Canada, in 2003 to current NHS context. The discount used is 5% for outcomes; however, this was tested in a sensitivity analysis with a range of 3-7%. QALYs were not used as outcome. The health states included in the long term of the model do not include distal DVT, CTEPH and PTS. Baseline risks as well as relative effectiveness are based on the results of a single RCT (Geerts 1996[340]) so by definition, not reflective of all the evidence in this area. Both local and national unit costs were used in the analysis, so may not be generalisable.	
Overall applicability:[(c)] partially applicable	**Overall quality**[(d)] potentially serious limitations

Abbreviations: CCA: cost-consequences analysis; 95% CI: 95% confidence interval; CTEPH: Chronic thromboembolic hypertension; da: deterministic analysis; DSA: deterministic sensitivity analysis; DVT: deep vein thrombosis; LYG: life-years gained; ICER: incremental cost-effectiveness ratio; NR: not reported; pa: probabilistic analysis; PE: pulmonary embolism; PSA: probabilistic sensitivity analysis; QALYs: quality-adjusted life year; PTS: post-thrombotic syndrome; RCT: randomised controlled trial.

(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 2003 purchasing power parities[715]

(c) Directly applicable / Partially applicable / Not applicable

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

J.32 Abdominal surgery (excluding bariatric surgery)

Study	**[National Clinical Guideline Centre 2010[666]]**			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design**: Decision analytic model **Approach to analysis:** A decision tree model was developed based on the	**Population:** Adult (18 years or older) admitted for elective abdominal surgery to hospitals in England. **Cohort settings:** Start age: 60 years Male: 50%	**Total costs (mean per patient):** Intervention 1: NR Intervention 2: NR Incremental (2−1): NR (95% CI: NR; p=NR)	**QALYs (mean per patient):** Intervention 1: NR Intervention 2: NR Incremental (2−1): NR (95% CI: NR; p=NR)	**Incremental net benefit (INB)** (pa) **Intervention 1: £**488 **Intervention 2:** £464 **Intervention 3:** £408 **Intervention 4:** £348 **Intervention 5:** £347 **Intervention 6:** £314

results of a systematic literature review and a network meta-analysis. **Perspective:** UK NHS and PSS **Time horizon:** VTEs and major bleeding events modelled for the acute period 10 days). QALYs and health service costs arising from these events are modelled over the patient's lifetime **Treatment effect duration:**[(a)] 10 days **Discounting:** Costs: 3.5% ; Outcomes: 3.5%	**Interventions:** 1. AES 2. IPCD-FID 3. UFH+ AES 4. LMWH+ AES 5. LMWH 6. Aspirin high dose 7. UFH 8.Fondaparinux+ IPCD-FID 9.Fondaparinux 10.VKA 11.No prophylaxis 12.UFH+ Aspirin high dose	**Currency & cost year:** 2009 UK pounds **Cost components incorporated:** Pharmacological prophylaxis costs, prophylaxis testing, nurse time, VTE diagnosis and treatment costs, other events treatment costs (i.e. stroke, PTS, CTEPH, major bleeding, reoperation)		**Intervention 7:** £241 **Intervention 8:** £127 **Intervention 9:** £104 **Intervention 10:** £75 **Intervention 11:** £0 **Intervention 12:** -£694 Probability cost-effective (£20K threshold): **Intervention 1:** 38.3% **Intervention 2:** 24.5% **Intervention 3:** 4.1% **Intervention 4:** 10.1% **Intervention 5:** 0.3% **Intervention 6:** 0.7% **Intervention 7:** 0.0% **Intervention 8:** 0.2% **Intervention 9:** 0.5% **Intervention 10:** 0.0% **Intervention 11:** 0.0% **Intervention 12:** 21.3% **Analysis of uncertainty:** Deterministic and probabilistic sensitivity analyses were performed. The deterministic SAs explored the impact of changing the incidence of CTEPH and PTS and their costs, including HIT, changing its incidence, lower costs for LMWH, changing fatality rate after PE and MB and change the cost effectiveness threshold. A two-way threshold analysis exploring the impact of baseline risk for both major

				bleeding and PE was also undertaken. There was only one situation in the deterministic sensitivity analysis in which the most cost effective strategy changed: high dose aspirin alone was the most cost effective strategy when the population specific pulmonary embolism relative risks were used. The results were highly sensitive to baseline risk of major bleeding and baseline risk of pulmonary embolism. For patients at lowest risk of major bleeding, combination prophylaxis is cost-effective, rather than mechanical prophylaxis alone.
Data sources				
Health outcomes: baseline events were obtained from the no prophylaxis arm of the RCTs included in the systematic review and NMA that informed the model. Relative treatment effects for DVT (symptomatic and asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** utilities based on the EQ-5D UK tariff were sourced from the published literature and previous guidelines. **Cost sources:** standard sources on unit costs in the UK were used including the drug tariff, the NHS reference costs and the BNF.				
Comments				
Source of funding: National Institute for Health and Care Excellence (NICE). **Limitations:** Some uncertainty regarding the applicability of unit costs from 2009 to current NHS context. The relative treatment effect applied to all VTE events in the model is the relative treatment effect obtained from the DVT NMA.				
Overall applicability:(b) Partially applicable **Overall quality**(c) Potentially serious limitations				

Abbreviations: AES: Anti-embolism stockings; BNF: British National Formulary; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; da: deterministic analysis; da: deterministic analysis; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); FID: foot impulse devices; HD: high dose; HIT: Heparin induced thromboembolism; ICER: incremental cost-effectiveness ratio; IPCD: intermittent pneumatic compression device; LMWH: low molecular weight heparin; NR: not reported; NMA: network meta-analysis; pa: probabilistic analysis; PE: pulmonary embolism; QALYs: quality-adjusted life years; SA: sensitivity analysis; UFH: unfractionated heparin; VKA: Vitamin K antagonists.

(d) 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.

(e) Directly applicable / Partially applicable / Not applicable

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

Study	[National Clinical Guideline Centre 2010[666]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design**: Decision analytic model **Approach to analysis:** A decision tree model was developed based on the results of a systematic literature review and a network meta-analysis. **Perspective:** UK NHS and PSS **Time horizon:** VTEs and major bleeding events modelled for the acute and post discharge period. QALYs and health service costs arising from these events are modelled over the patient's lifetime **Treatment effect duration:**[(a)] 21 days **Discounting:** Costs: 3.5% ; Outcomes: 3.5%	**Population:** Adult (18 years or older) admitted for elective abdominal surgery to hospitals in England ; randomised 10 to 12 days after surgery (mainly cancer surgery patients) **Cohort settings:** Start age: 60 years Male: 50% **Intervention 1:** No post discharge prophylaxis **Intervention 2:** LMWH initiated post discharge and continued for 21 days.	**Total costs (mean per patient):** Intervention 1: NR Intervention 2: NR Incremental (2−1): NR (95% CI: NR; p=NR) **Currency & cost year:** 2009 UK pounds **Cost components incorporated:** Pharmacological prophylaxis costs, prophylaxis testing, nurse time, VTE diagnosis and treatment costs, other events treatment costs (i.e. stroke, PTS, CTEPH, major bleeding, reoperation)	**QALYs (mean per patient):** Intervention 1: NR Intervention 2: NR Incremental (2−1): NR (95% CI: NR; p=NR)	**Incremental net benefit (INB)** (pa) **Intervention 1:** £0 (comparator) **Intervention 2:** £49 Probability cost-effective (£20K threshold): **Intervention 1:** 22.5% **Intervention 2:** 77.5% **Analysis of uncertainty:** Deterministic and probabilistic sensitivity analyses were performed. The deterministic SAs explored the impact of changing the incidence of CTEPH and PTS and their costs, including HIT, changing its incidence, lower costs for LMWH, changing fatality rate after PE and MB and change the cost effectiveness threshold. A two-way threshold analysis exploring the impact of baseline risk for both major bleeding and PE was also undertaken. The result was consistent for all deterministic sensitivity analyses. In the probabilistic sensitivity analysis, LMWH was more cost-effective in 77% of the 5000 simulations of the probabilistic sensitivity analysis. It was also found that life expectancy would have to be halved for it to no longer be cost-effective for these patients.
Data sources				
Health outcomes: baseline events were obtained from the no prophylaxis arm of the RCTs included in the systematic review and MA that informed the model. Relative treatment effects for DVT (symptomatic and asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** utilities based on the EQ-5D UK tariff were				

sourced from the published literature and previous guidelines. **Cost sources:** standard sources on unit costs in the UK were used including the drug tariff, the NHS reference costs and the BNF.	
Comments	
Source of funding: National Institute for Health and Care Excellence (NICE). **Limitations:** Some uncertainty regarding the applicability of unit costs from 2009 to current NHS context. The relative treatment effect applied to all VTE events in the model is the relative treatment effect obtained from the DVT MA.	
Overall applicability:[(b)] Directly applicable	**Overall quality**[(c)] Potentially serious limitations

Abbreviations: AES: Anti-embolism stockings ;BNF: British National Formulary; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; da: deterministic analysis; da: deterministic analysis; EQ-5D: Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); FID: foot impulse devices; HIT: Heparin induced thromboembolism; ICER: incremental cost-effectiveness ratio; LMWH: low molecular weight heparin; NR: not reported; NMA: network meta-analysis; pa: probabilistic analysis; PE: pulmonary embolism; QALYs: quality-adjusted life years; SA: sensitivity analysis;

(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) Directly applicable / Partially applicable / Not applicable

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

Study	**[Wade 2015[985]]**			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design:** Systematic review and economic model, including value of information analysis. **Approach to analysis:** a two stage modelling approach, a decision tree for the acute phase (up to 14 days post-surgery) followed by Markov models for the long term phase with annual cycles.	**Population:** Patients undergoing any general surgery (subgroups considered were THR, TKR, general surgery for high risk patients, general surgery for medium risk patients and general surgery for low risk patients. The results presented here are for the general surgery subgroups [high, medium and low risk patients]) **Cohort settings:** Start age: 60 years	**Total costs (mean per patient):** **High risk patients:** Intervention 1: £521 Intervention 2: £522 Intervention 3 : £345 **Intermediate risk patients:** Intervention 1: £276 Intervention 2: £306 Intervention 3 : £230 **Low risk patients:** Intervention 1: £177 Intervention 2: £217	**QALYs (mean per patient):** **High risk patients:** Intervention 1: 12.755 Intervention 2: 12.758 Intervention 3 : 12.764 **Intermediate risk patients:** Intervention 1: 12.765 Intervention 2: 12.767 Intervention 3 : 12.769 **Low risk patients:** Intervention 1: 12.769 Intervention 2: 12.769	**ICER:** **High risk patients:** Intervention 1: Dominated Intervention 2: Dominated Intervention 3: Dominant 95% CI: NR Probability Intervention 1 cost-effective (£20K/30K threshold): 4%/4% Probability Intervention 2 cost-effective (£20K/30K threshold): 18%/18% Probability Intervention 3 cost-effective (£20K/30K threshold): 78%/79% **Intermediate risk patients:** Intervention 1: Dominated

The relative effectiveness of the interventions was based on a systematic review and network meta-analysis (NMA) of published RCTs. **Perspective:** UK NHS and PSS **Time horizon:** lifetime **Treatment effect duration:**[(a)] 14 days **Discounting:** Costs: 3.5% ; Outcomes: 3.5%	Male: 50% **Intervention 1:** LMWH (which is assumed to be the background pharmacological prophylaxis therapy administered to all patients) for a duration of 7 days (standard duration). **Intervention 2:** Knee-length AES in addition to pharmacological prophylaxis (LMWH) for a duration of 7 days (standard duration). **Intervention 3:** Thigh-length AES in addition to pharmacological prophylaxis (LMWH) for a duration of 7 days (standard duration).	Intervention 3 : £182 **Currency & cost year:** 2014 UK pounds **Cost components incorporated:** Prophylaxis costs. Monitoring tests. Nurse time. VTE treatment costs. Costs of treating adverse events , long term consequences and complications (CTEPH, PTS, bleeding, stroke, re-operation)	Intervention 3 : 12.771	Intervention 2: Dominated Intervention 3: Dominant 95% CI: NR Probability Intervention 1 cost-effective (£20K/30K threshold): 5%/4% Probability Intervention 2 cost-effective (£20K/30K threshold): 18%/18% Probability Intervention 3 cost-effective (£20K/30K threshold): 78%/78% **Low risk patients:** Intervention 1: comparator Intervention 2: Dominated Intervention 3: £2,632 95% CI: NR Probability Intervention 1 cost-effective (£20K/30K threshold): 9%/7% Probability Intervention 2 cost-effective (£20K/30K threshold): 18%/18% Probability Intervention 3 cost-effective (£20K/30K threshold): 74%/75% **Analysis of uncertainty:** Probabilistic sensitivity analysis was conducted. Analyses were reported for two main scenarios : i- the base-case NMA based on the no interaction, random-effects analysis, using the predictive distribution output ii- the direct meta-analysis comparing thigh-length AES (plus pharmacological prophylaxis) with

				knee-length AES (plus pharmacological prophylaxis). Additionally, sensitivity analysis changing the price used for AES (based on published prices and clinical experts estimate) and the level of patient adherence to thigh-length stockings (90% and 75%). The results of all scenario and sensitivity analyses were largely consistent with the base case results.

Data sources

Health outcomes: baseline event rates were based on the ACCP 2012 guideline, which used systematic review of RCTs published between 2003 and 2010 and meta-analysis. LMWH was considered the baseline treatment. The relative treatment effect was based on a systematic review and NMA of RCT data. long-term events included are PTS, CTEPH, stroke, VTE recurrence, The main health outcomes included were DVT (symptomatic), DVT (asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** from published sources largely using the EQ-5D UK tariff. **Cost sources:** standard UK unit cost sources including NHS reference costs and the drug tariff in addition to data from published sources and clinical expert opinions.

Comments

Source of funding: NIHR HTA. **Limitations:** Mixed population of all surgery types, however subgroup analysis is also presented. The model did not include some relevant health outcomes; e.g. clinically-relevant non-major bleeding, minor bleeding and surgical site infection.

Overall applicability:[(b)]Directly applicable **Overall quality**[(c)] Potentially serious limitations

Abbreviations: AES: anti-embolism stockings; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; 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; NMA: network-meta-analysis; NR: not reported; pa: probabilistic analysis; PTS: post-thrombotic syndrome; QALYs: quality-adjusted life years; RCT: randomised controlled trial; TKR: total knee replacement; THR: total hip replacement.

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) Directly applicable / Partially applicable / Not applicable

c) Minor limitations / Potentially serious limitations / Very serious limitations

J.33 Bariatric surgery

Study	[Wade 2015[985]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design:** Systematic review and economic model, including value of information analysis. **Approach to analysis:** a two stage modelling approach, a decision tree for the acute phase (up to 14 days post-surgery) followed by Markov models for the long term phase with annual cycles. The relative effectiveness of the interventions was based on a systematic review and network meta-analysis (NMA) of published RCTs. **Perspective:** UK NHS and PSS **Time horizon:** lifetime **Treatment effect duration:**[(a)] 14 days	**Population:** Patients undergoing any general surgery (subgroups considered were THR, TKR, general surgery for high risk patients, general surgery for medium risk patients and general surgery for low risk patients. The results presented here are for the general surgery subgroup-high risk patients only. **Cohort settings:** Start age: 60 years Male: 50% **Intervention 1:** LMWH (which is assumed to be the background pharmacological prophylaxis therapy administered to all patients) for a duration of 7 days (standard duration). **Intervention 2:** Knee-length AES in addition to pharmacological prophylaxis (LMWH) for a	**Total costs (mean per patient):** **High risk patients:** Intervention 1: £521 Intervention 2: £522 Intervention 3 : £345 **Currency & cost year:** 2014 UK pounds **Cost components incorporated:** Prophylaxis costs. Monitoring tests. Nurse time. VTE treatment costs. Costs of treating adverse events , long term consequences and complications (CTEPH, PTS, bleeding, stroke, re-operation)	**QALYs (mean per patient):** **High risk patients:** Intervention 1: 12.755 Intervention 2: 12.758 Intervention 3 : 12.764	**ICER:** **High risk patients:** Intervention 1: Dominated Intervention 2: Dominated Intervention 3: Dominant 95% CI: NR Probability Intervention 1 cost-effective (£20K/30K threshold): 4%/4% Probability Intervention 2 cost-effective (£20K/30K threshold): 18%/18% Probability Intervention 3 cost-effective (£20K/30K threshold): 78%/79% **Analysis of uncertainty:** Probabilistic sensitivity analysis was conducted. Analyses were reported for two main scenarios : 1. the base-case NMA based on the no interaction, random-effects analysis, using the predictive distribution output 2. the direct meta-analysis comparing thigh-length AES (plus pharmacological prophylaxis) with knee-length AES (plus pharmacological prophylaxis). Additionally, sensitivity analysis changing

Discounting: Costs: 3.5% ; Outcomes: 3.5%	duration of 7 days (standard duration). **Intervention 3:** Thigh-length AES in addition to pharmacological prophylaxis (LMWH) for a duration of 7 days (standard duration).			the price used for AES (based on published prices and clinical experts estimate) and the level of patient adherence to thigh-length stockings (90% and 75%). The results of all scenario and sensitivity analyses were largely consistent with the base case results.
Data sources				
Health outcomes: baseline event rates were based on the ACCP 2012 guideline, which used systematic review of RCTs published between 2003 and 2010 and meta-analysis. LMWH was considered the baseline treatment. The relative treatment effect was based on a systematic review and NMA of RCT data. long-term events included are PTS, CTEPH, stroke, VTE recurrence, The main health outcomes included were DVT (symptomatic), DVT (asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** from published sources largely using the EQ-5D UK tariff. **Cost sources:** standard UK unit cost sources including NHS reference costs and the drug tariff in addition to data from published sources and clinical expert opinions.				
Comments				
Source of funding: NIHR HTA. **Limitations:** Mixed population of all surgery types, however subgroup analysis is also presented. The model did not include some relevant health outcomes; e.g. clinically-relevant non-major bleeding, minor bleeding and surgical site infection.				
Overall applicability:[(b)]Directly applicable **Overall quality**[(c)] Potentially serious limitations				

Abbreviations: AES: anti-embolism stockings; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; 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; NMA: network-meta-analysis; NR: not reported; pa: probabilistic analysis; PTS: post-thrombotic syndrome; QALYs: quality-adjusted life years; RCT: randomised controlled trial; TKR: total knee replacement; THR: total hip replacement.

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) Directly applicable / Partially applicable / Not applicable

c) Minor limitations / Potentially serious limitations / Very serious limitations

J.34 Cardiac surgery

No relevant health economic studies were identified.

J.35 Thoracic surgery

Study	[Wade 2015[985]]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost-effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design:** Systematic review and economic model, including value of information analysis. **Approach to analysis:** a two stage modelling approach, a decision tree for the acute phase (up to 14 days post-surgery) followed by Markov models for the long term phase with annual cycles. The relative effectiveness of the interventions was based on a systematic review and network meta-analysis (NMA) of published RCTs. **Perspective:** UK NHS and PSS	**Population:** Patients undergoing any general surgery (subgroups considered were THR, TKR, general surgery for high risk patients, general surgery for medium risk patients and general surgery for low risk patients. The results presented here are for the general surgery subgroups – high risk patients only. **Cohort settings:** Start age: 60 years Male: 50% **Intervention 1:** LMWH (which is assumed to be the background pharmacological prophylaxis therapy administered to all patients) for a duration of 7 days (standard duration). **Intervention 2:**	**Total costs (mean per patient):** **High risk patients:** Intervention 1: £521 Intervention 2: £522 Intervention 3 : £345 **Currency & cost year:** 2014 UK pounds **Cost components incorporated:** Prophylaxis costs. Monitoring tests. Nurse time. VTE treatment costs. Costs of treating adverse events , long term consequences and complications (CTEPH, PTS, bleeding, stroke, re-operation)	**QALYs (mean per patient):** **High risk patients:** Intervention 1: 12.755 Intervention 2: 12.758 Intervention 3 : 12.764	**ICER:** **High risk patients:** Intervention 1: Dominated Intervention 2: Dominated Intervention 3: Dominant 95% CI: NR Probability Intervention 1 cost-effective (£20K/30K threshold): 4%/4% Probability Intervention 2 cost-effective (£20K/30K threshold): 18%/18% Probability Intervention 3 cost-effective (£20K/30K threshold): 78%/79% **Analysis of uncertainty:** Probabilistic sensitivity analysis was conducted. Analyses were reported for two main scenarios : iii- the base-case NMA based on the no interaction, random-effects analysis, using the predictive distribution output iv- the direct meta-analysis comparing thigh-length AES (plus

Time horizon: lifetime **Treatment effect duration:**[(a)] 14 days **Discounting:** Costs: 3.5% ; Outcomes: 3.5%	Knee-length AES in addition to pharmacological prophylaxis (LMWH) for a duration of 7 days (standard duration). **Intervention 3:** Thigh-length AES in addition to pharmacological prophylaxis (LMWH) for a duration of 7 days (standard duration).			pharmacological prophylaxis) with knee-length AES (plus pharmacological prophylaxis). Additionally, sensitivity analysis changing the price used for AES (based on published prices and clinical experts estimate) and the level of patient adherence to thigh-length stockings (90% and 75%). The results of all scenario and sensitivity analyses were largely consistent with the base case results.
Data sources				
Health outcomes: baseline event rates were based on the ACCP 2012 guideline, which used systematic review of RCTs published between 2003 and 2010 and meta-analysis. LMWH was considered the baseline treatment. The relative treatment effect was based on a systematic review and NMA of RCT data. long-term events included are PTS, CTEPH, stroke, VTE recurrence, The main health outcomes included were DVT (symptomatic), DVT (asymptomatic), PE (symptomatic) and major bleeding. **Quality-of-life weights:** from published sources largely using the EQ-5D UK tariff. **Cost sources:** standard UK unit cost sources including NHS reference costs and the drug tariff in addition to data from published sources and clinical expert opinions.				
Comments				
Source of funding: NIHR HTA. **Limitations:** Mixed population of all surgery types, however subgroup analysis is also presented. The model did not include some relevant health outcomes; e.g. clinically-relevant non-major bleeding, minor bleeding and surgical site infection.				
Overall applicability:[(b)] Partially applicable **Overall quality**[(c)] Potentially serious limitations				

Abbreviations: AES: anti-embolism stockings; 95% CI: 95% confidence interval; CTEPH: chronic thromboembolic pulmonary hypertension; CUA: cost-utility analysis; 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; NMA: network-meta-analysis; NR: not reported; pa: probabilistic analysis; PTS: post-thrombotic syndrome; QALYs: quality-adjusted life years; RCT: randomised controlled trial; TKR: total knee replacement; THR: total hip replacement.

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) *Directly applicable / Partially applicable / Not applicable*
c) *Minor limitations / Potentially serious limitations / Very serious limitations*

J.36 Vascular surgery

No relevant economic studies were identified.

J.37 Head and neck surgery

J.37.1 Oral and maxillofacial surgery

No relevant economic studies were identified.

J.37.2 Ear, nose and throat (ENT) surgery

No relevant economic studies were identified.