

# Providing value in the prevention of sternal wound infections following coronary artery bypass graft

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#### Abbreviations

- CABG Coronary Artery Bypass Graft Surgery
- EU European Union
- GW General Ward
- ICU Intensive Care Unit
- SSI Surgical Site Infection
- SWI Sternal Wound Infection
  - DSWI Deep Sternal Wound Infection
  - SSWI Superficial Sternal Wound Infection

# Sternal wound infections are a serious and costly adverse event



CABG is an established procedure that can greatly improve patient quality of life



SSIs occur in ~1 in 20 CABG patients in the EU (European centre for disease prevention and control, 2018)



Superficial and deep SWIs increase patient length of hospital stay and readmissions (Jenks et al., 2014)

#### Research aim



Quantify SSI/SWI burden Assess valuebased purchasing

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### Not all parameters could be represented with local data



- Local data for all investigated parameters was identified for:
- Only partial local data sets could be established for the 20 additional European countries

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### Deep and superficial SWI rates following CABG procedures vary



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## Model-based approximation of SWI impact on European healthcare systems

- Markov model
- Parameters:
  - CABG procedures/year
  - SWI rates
  - Superficial vs. deep ratio
  - Length of stay
  - Hospital stay to treat SWI
  - Cost of ICU
  - Cost of GW



### SWIs following CABG have a considerable impact on healthcare budgets

Average cost increase per procedure



Average cost increase per capita



Black border: countries with sufficient data available; borderless: results through extrapolations based on data of other countries

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### SWIs make up a substantial part of the cost of every CABG procedure



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#### The annual burden in Europe







Hospital stay

- €122.5 million overall burden
- €598 per procedure

- >20,000 additional ICU days
- >100,000 additional ward days

#### Is it realistic? Model validation

- A German costing study (Findeisen et al. 2018), not used in model development, was used to validate the model
- Findeisen et al. reported that
  - From the payer perspective, an SSI case costs €7,051-8,342 more than a control case
  - Hospital costs were higher, with a deep-incisional SSI costing an additional €26,331 and organ-space SSIs an additional €59,903
- Our model, using costs and incidences reported in the paper, estimated an increase of €7,711 for payers



#### Value-based purchasing

- Mean cost of an SSI to the healthcare system is
- A technology preventing one SSI per 100 procedures would save
- Maximal cost of technology per procedure would

Value-based purchasing is a local decision, the price agreed will vary by country and hospital

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€16,423

€16,423

€164

#### What are the options?

#### Kles et al, 2015

A US group reduced their deep SWI rate to 0 (30 months, 590 procedures) following a Six Sigma assessment

They updated 15 of 42 perioperative processes and saved \$600,000
Key implementations: disposable ECG leads & wires, antibiotic-coated sutures, silver-impregnated dressings

#### Lankiewicz et al, 2018

 A single-patient-use ECG cable & lead wire system was shown to reduce SSIs by 18.8% at 30-days post CABG (reaching significance at 90-days post CABG)

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