Healthcare burden of surgical site infections following coronary artery bypass graft surgery

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Background

- Coronary artery bypass graft surgery (CABG) is an established procedure
- Post-CABG surgical site infections (SSIs) have decreased since use of antibiotic prophylaxis became standard
- SSIs still affect roughly 1.7-7.4%[1] of patients in Europe, complicating recovery of affected patients and adding to the burden on European healthcare systems[2]
- Sternal wound infections (SWIs) are a particular concern after cardiac surgery
- Here, the cost and resource use burden of these SWIs is estimated for the EU28

Methods

- National surveillance data and peer-reviewed European literature was reviewed to identify the following parameters:
  - CABG procedures per year
  - SWI rates
  - Ratio of superficial to deep SWIs
  - Length of hospital stay for CABG patients
  - Additional length of stay due to SWIs
  - Cost per day of intensive care unit and general ward
- Using these parameters a published Markov-model representing CABG care was adopted to focus purely on inpatient costs
- Where national data couldn't be identified proxy values based on the other European countries was utilized

Results

- From the EU-28, full data were identified in Austria, Denmark, France, Germany, Italy, Netherlands, Portugal, Spain, Sweden, and United Kingdom (72.8% of the EU28 population)
- Rates of CABG ranged from 17.86 (Spain) to 64.75 (Denmark) per 100,000 population, while 2.4% (Germany) to 10.4% (Netherlands) of CABG patients were affected by SWIs (**Fig. 1**)
- In these ten countries, SWIs following CABG added:
  - €97 million per year
  - 15,172 ICU days and 79,522 GW days
  - 3,392 readmissions
- SWIs increase the average cost of CABG by €418 (UK) to €1,720 (Netherlands, **Fig. 2**), which meant a 5.6% (UK) to 20.1% (Portugal, **Fig. 3**) increase of mean costs per procedure
- Extrapolating from the ten countries to the EU-28 we estimated a SSI burden of €15 million per year
- A 1%-point reduction in the 30-day SSI rate would result in savings of **€18.03 million** and **24,684 bed days**

Discussion

- A German costing study, not used in our analysis, was available for model validation.[3] An SSI case costs €7,051–8,342 more than a control case. Our model, using costs and incidences reported in this paper, estimated an increase of €7,711
- A group in the USA reduced their DSWI to zero (over 30 months and 590 procedures)
  - They updated 15 of 42 perioperative processes and saved USD 600,000 compared with previous practice[4]
  - Key implementations were: Use of disposable ECG leads & wires, antibiotic-coated sutures, silver-impregnated dressings.
- Disposable ECG leads were shown to reduce SSIs by 18.8% at 30-days post CABG[5]
- The presented model indicates a cost saving of €16.03 million if this 18.8% reduction could be achieved across the EU-28

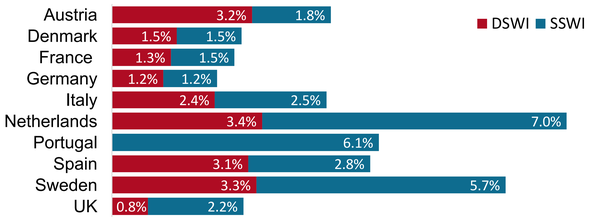

Fig. 1 SWI rates. DSWI: Deep sternal wound infection, SSWI: superficial sternal wound infection. For Portugal no data on DSWI rates was available.

Conclusion

- The cost of post-CABG SWIs is a substantial burden in the EU
- There are economic grounds for considering new methods for reducing the incidence of post operative SWIs

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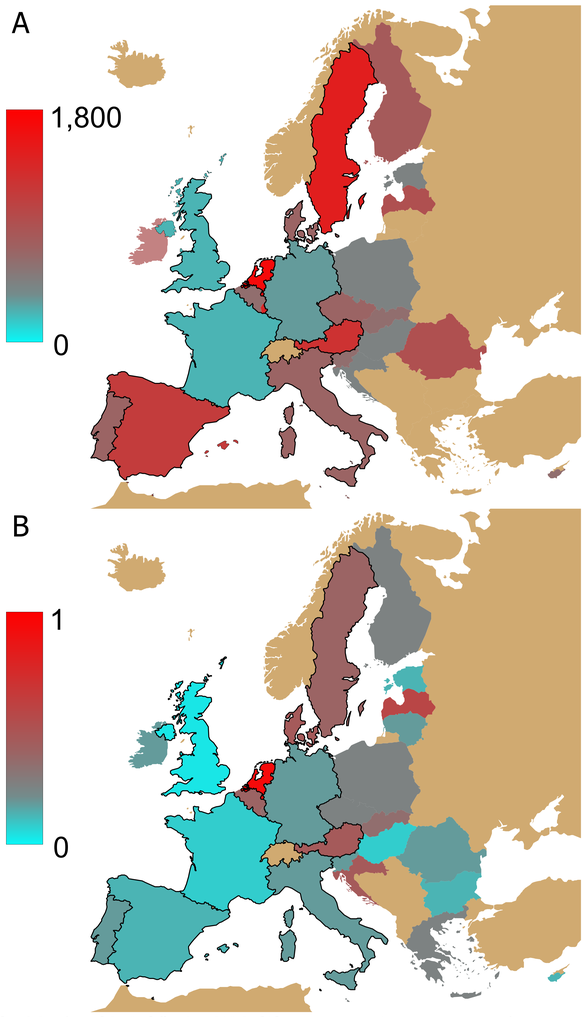

Fig. 2 Burden of SWIs following CABG. **(A)** average cost; increase per procedure **(B)** per capita; black border: countries with sufficient data available; borderless: results through extrapolations based on data of other countries

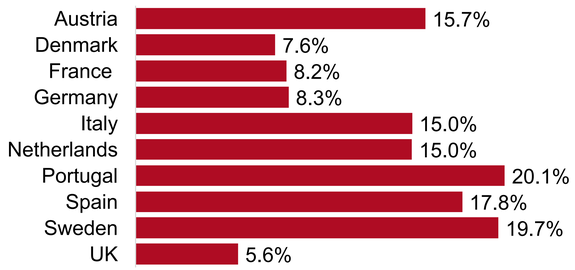

Fig. 3 SWI burden contribution to average CABG procedure cost.

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