

The economics of a silent pandemic

A health economic analysis of antibiotic resistance in Sweden

Akademisk avhandling

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Avhandlingen baseras på följande delarbeten

- I. **Larsson, S.**, Prioux, M., Fasth, T., Ternhag, A., Struwe, J., Dohnhammar, U., Brouwers, L. A microsimulation model projecting the healthcare costs for resistance to antibacterial drugs in Sweden. *European Journal of Public Health*, 2019; 29:3: 392–396.
- II. **Larsson, S.**, Svensson, M., Ternhag, A. Production loss and sick leave caused by antibiotic resistance: a register-based cohort study. *BMC Public Health*, 2022; 22, 527.
- III. **Larsson, S.**, Persson, J. Measuring quality of life using different value sets for EQ-5D or SF-6D: Are the results comparable? *Submitted manuscript*.
- IV. **Larsson, S.**, Edlund, C., Naucér, P., Svensson M., Ternhag, A. Cost-effectiveness analysis of temocillin treatment in febrile UTI patients accounting for the emergence of antibiotic resistance. *Submitted manuscript*.

**SAHLGRENKA AKADEMIN
INSTITUTIONEN FÖR MEDICIN**



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A health economic analysis of antibiotic resistance in Sweden

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Abstract

The overall aim of this thesis was to analyze the health economic consequences of antibiotic resistance in Sweden, and to assess the implications of methodological assumptions related to measuring health in health economic analysis.

The thesis consists of four papers. Paper I analyzes the development of antibiotic resistance in Sweden and estimates the associated costs of healthcare. In total, healthcare costs were estimated to more than EUR 23 million in 2018 and were expected to more than triple by 2050. The analysis is based on the additional costs of resistance compared to susceptible bacteria. Paper II estimates the cost of production loss for hospitalized patients absent from work due to a resistant infection. Results shows that sick-leave days were, on average, eight days more than for infections caused by susceptible bacteria. Paper III analyzes how QALY estimates from different instruments and value sets relates to each other. Results show that the EQ-5D Burström and the SF-6D Brazier value sets rendered most comparable estimates, independent of health state severity. Finally, paper IV examines whether it is cost-effective to treat patients with severe urinary tract infection with temocillin instead of cefotaxime. The results show that it is cost-effective given a certain price level.

The results from this thesis, and the studies included, suggest a significant health economic impact of antibiotic resistance in Sweden. Even with its limitations, health economic analysis is an essential tool in understanding serious health problems in the light of limited resources. Such analyses enable allocation of resources towards interventions with the most value for money.

Keywords: Health economics, health economic analysis, cost-effectiveness analysis, antibiotic resistance, production loss, QALY instruments, QALY value set.