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Objectives

The Svebar system was developed to improve surveillance of antimicrobial resistance, focusing on both early warnings (EW), and the creation of a nationally uniform database of antimicrobial susceptibility test (AST) results. Here, we describe aspects of early warning surveillance and reporting of antimicrobial resistance trends.

Methods

The system is designed to avoid pre-mapping of terms. Instead terms used by the laboratories are manually mapped the first time they appear in Svebar through the daily import of data files. The system offers the possibility to discard results from irrelevant samples based on specific terms.

EWs are always tied to a specific species and a defined antimicrobial resistance phenotype. Either a single resistance (Staphylococcus aureus and vancomycin resistance) or a resistance pattern such as Escherichia coli resistant to cefotaxim OR ceftazidime AND ciprofloxacin OR levofloxacin is used. Alternatively EWs can be defined as acceptable resistance levels (Streptococcus pneumoniae and penicillin resistance of maximum 5 %). Central (all laboratories and SMI) or local (one laboratory) warnings are automatically emailed daily and central warnings are followed up via telephone/email with appointed contact persons at the local laboratory.

Reports on AST-trends are generated for national, regional and local level. Analysis of the results and development of the system is done in collaboration with local expertise.

Results

The system has been functional since 2011. More laboratories were gradually connected. Important phenotypes such as vancomycin resistance in Enterococci, carbapenem resistance in E. coli and K. pneumoniae, high-level penicillin resistance in Streptococcus pneumoniae, multiresistance in defined species (E.coli, K.pneumoniae, Pseudomonas aeruginosa and others) are detected, reported back to the participating laboratories and analysed daily on both local and national level.

Validation of data showed good concordance between Svebar and data obtained from the laboratories. Some over-reporting, approximately 5-10%, occurred in Svebar. This was due, in part, to reporting routines in some laboratories using hidden, duplicate results. Another explanation was a systematic error in a Svebar importing routine. Both sources of errors have been handled.

Thirty-three EWs were signalled between November 26 and December 9, originating from 8 laboratories. The most common trigger was ‘Vancomycin resistance in Enterococcus feacium’ and four carbapenem-resistant Enterobacteriaceae were detected.

Currently, 415 terms are ignored by the system as they represent irrelevant sample, analysis or species, e.g. air, Borrelia-PCR or Anaerobe?. Almost 2300 terms have been mapped in total.

Conclusion

The Swedish automated antimicrobial resistance system for early warning of exceptional phenotypes and antimicrobial resistance trends is functional in 13 of 26 laboratories in December 2013. With
currently defined phenotypes it handles on average 2-3 new EWs per day. These signals are analysed and acted upon on a national and local level involving clinical microbiologists, infection control and county medical officers.