



Swedish work on containment of antibiotic resistance – in brief

Tools, methods and experiences

Sweden has relatively low use of antibiotics per capita and favourable antibiotic resistance conditions. The antibiotic consumption in Sweden has decreased substantially since the mid-1990s. This current situation is influenced by different factors including a long tradition of strong local commitment and strategic work on both regional and national level.

The Public Health Agency of Sweden has published a report that describes the context of the Swedish healthcare system and the tools for and examples of Sweden's successful work on containment of antibiotic resistance in human medicine, with a focus on the rational use of antibiotics and resistance monitoring. It can be used as a background document and inspiration for any work to control the trend of increasing levels of resistant bacteria.

For sustainable achievements in the work against antibiotic resistance, the efforts must be continuous and new systems and strategies developed. Prompt action is needed and collective measures are essential – both nationally and globally.

Swedish work to contain antibiotic resistance is characterized by local, national and international cooperation

The early response to the increasing antibiotic resistance in the mid-1990's with initiation of long-term and structured measures from the profession and authorities is one important explanation of why Sweden has been able to slow the escalation of antibiotic resistance. Part of the strategy was implementation of treatment recommendations for common infections in outpatient care resulting in a sustained decrease in antibiotic consumption.

Political support and commitment for the work is strong and many stakeholders are involved on local and national level. Strama (the Swedish strategic programme against antibiotic resistance) plays a central role in this field. The



The full report can be downloaded at
www.folkhalsomyndigheten.se

Strama network was initiated in 1995 and is characterized by multisectorial collaboration on local and national level. Essential components are multi-disciplinary interaction and networking, as well as local implementation where the local Strama groups play an important role. On a national level Strama has had different organisations over the years from initially being an NGO, later receiving a remit from the government, and since 2010 an advisory board to the Public Health Agency of Sweden.

The Public Health Agency of Sweden is responsible for national monitoring of antibiotic resistance and use of antibiotics in human medicine, with support from local

“ International political cooperation at the highest level is needed to achieve a global ban on antibiotics in animal feed and to phase out all sales of antibiotics without a prescription”

OTTO CARLSSON, PROFESSOR, SENIOR EXPERT,
THE PUBLIC HEALTH AGENCY OF SWEDEN

experts. Data is also communicated regularly to laboratories, Strama groups, the healthcare sector, policy makers and the media.

The Public Health Agency of Sweden works for an interdisciplinary, locally approved model by ensuring involvement of all relevant stakeholders including national and local authorities and professional and non-profit organisations. In 2012, the Swedish intersectoral coordinating mechanism was formed, a forum of 20 government agencies active in efforts against antibiotic resistance to strengthen action in the field.

Joint international efforts are important. Sweden has several bilateral collaborations and is actively involved in global efforts to contain antibiotic resistance through cooperation with actors in other countries, the EU and the WHO.

Sweden has always had a strong public health sector

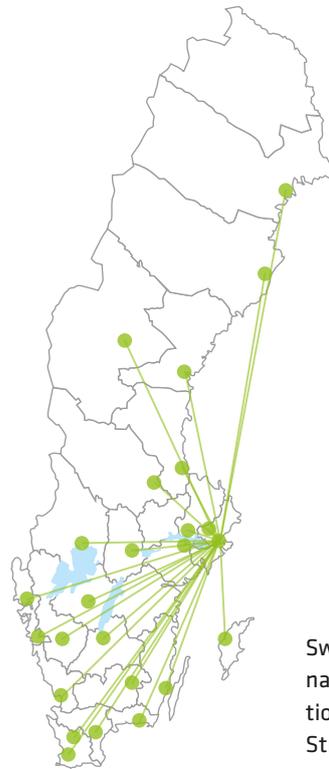
Any work on containment of resistance must be seen in and adapted to its context. In Sweden, the state is responsible for healthcare policies. Healthcare is largely organized at and funded by taxes at the county council level. Pharmaceuticals are regulated with prescription-only sales of antibiotics and prescribers may not own a pharmacy or sell pharmaceuticals for personal gain. Data and statistics are available from sales at all registered pharmacies and surveillance of antibiotic use and resistance is an important part of the containment strategy.

Strategic work on containment of antibiotic resistance includes efforts to reduce transmission of infections, resistant bacteria and healthcare-associated infections. The establishment of infection control units have been important and Swedish healthcare professionals are generally aware of and practice the basic procedures for infection control. Sweden has a strong core of specialists in clinical microbiology and infectious diseases that play a key role in promoting rational use of antibiotics and have done so from an early stage.

Additional factors that may explain the favourable situation in Sweden include high-standard laboratories, a tradition of frequent sampling and culturing, well-developed surveillance systems and high coverage of data on antibiotic sales. Still, there is a need for further progress including greater awareness, better infection control, improved diagnostics and adequate IT systems for diagnosis-linked prescribing data.

Strama – the Swedish strategic programme against antibiotic resistance

Strama was formed in the mid-1990s as a voluntary, multi-disciplinary network with the aim to safeguard the efficiency of antibiotic treatments. Strama has brought about many initiatives, being a driving force on issues concerning



Swedish work is based on national and local cooperation, with a network of local Strama groups.

antibiotic resistance. Some key components of the Strama work are information and training of physicians, monitoring, analysis and feedback of antibiotic use and resistance, treatment recommendations, studies, international monitoring and advocacy. Strama and work within the network are described in detail in the report, with examples of studies and successful initiatives.

Local Strama groups play an important part in communicating data and results to prescribers in order to demonstrate development and decide on the focus of local interventions. Networking and interaction are key elements in the Strama work: from the early identification of a problem, through analysis of possible measures, to implementation and follow-up. The Strama groups also share their experiences at recurrent Strama Days and through the web portal stroma.se. The Strama work is characterized by a cyclical process with continuous communication with prescribers.

The need for differentiated efforts in inpatient and outpatient care has in many places led to the establishment of separate groups, e.g. Hospital Strama, and in some cases also an ICU Strama group for intensive care.

Resistance data and data on antibiotic prescription form the foundation for work at local level

National and local monitoring forms the basis for developing treatment recommendations and following resistance development and implementing and measuring the effect of interventions. Data from clinical cultures, along with screening and transmission-tracing data, form the basis of Sweden's resistance surveillance. Four types of anti-

“ A good starting point is to set up a national infrastructure consisting of a network of high standard laboratories, using standardised methods and harmonised breakpoints to detect and define resistant bacteria. It is crucial that these national, public health laboratories agree on methods and standards.”

GUNNAR KAHLMETER,
ADJ PROFESSOR IN CLINICAL BACTERIOLOGY

biotic-resistant bacteria are monitored according to the Communicable Diseases Act and epidemiological typing is carried out on all notifiable forms of resistance.

Sweden is actively working for a quality-assured methodology for resistance surveillance. Comparing the prevalence of antibiotic resistance between different laboratories over time requires common susceptibility breakpoints and Sweden has used those established by the European Committee on Antimicrobial Susceptibility Testing for many years.

Four systems have been developed and used in national resistance surveillance that are further described in the full report;

ResNet Annual resistance monitoring and quality assurance online. Since 1994, participating laboratories submit susceptibility testing data to this web-based programme and are able to observe resistance conditions locally and nationally, and continuously assess the quality of their own diagnostic methods.

EARS-Net European resistance monitoring of invasive infections. Sweden contributes with national resistance data on serious infections to EARS-Net, a programme that has an important role in informing about the occurrence and spread of antibiotic resistance in Europe.

SmiNet Continuous monitoring of resistance. SmiNet is a web-based programme that receives and manages notifications from treating physicians and laboratories. Resistance is reported sooner and can be monitored continuously, unlike in EARS-Net and ResNet.

Svebar An IT system for early alerts and continuous resistance monitoring. The system is based on all results from

cultures being transferred on a daily basis from microbiological laboratories for early warnings and local feedback. Resistance monitoring in Sweden is mainly done on a voluntary basis and has good geographic coverage. The Public Health Agency of Sweden and the Swedish Veterinary Institute analyse and compile national data on antibiotic sales and resistance in an annual report, SWEDRES/SVARM.

Monitoring of the use of antibiotics includes all sales

Swedish experience demonstrates that work for rational use should be carried out close to the prescriber, which requires prescription data from the hospital clinic or health centre level and from individual prescribers. The Swedish eHealth Agency maintains pharmaceutical sales statistics, delivered by all registered pharmacies. Data on county and national level are published on the Public Health Agency of Sweden's website and in electronic newsletters.

The systems currently used for monitoring in Sweden have developed gradually, from the relatively simple diagnosis-prescription studies of the 1990s to today's increasingly sophisticated instruments, such as the Anti-Infection Tool IT system. Strama has conducted repeated manual diagnosis-prescription studies in outpatient care, covering counties with a total of approximately 1.2 million people. Local Strama groups have also previously performed point prevalence measurements in inpatient care, with coordination from the Public Health Agency of Sweden. The studies have provided in-depth knowledge about indications and prescribing patterns. Several initiatives have been taken in recent years to set up registers and systems that automatically generate diagnosis-linked data in outpatient care as well as in inpatient care. Examples include:

PRIS Register for dealing with infections in primary care. The register is based on data automatically retrieved from patients' medical records and includes diagnosis-linked prescribing data.

The Anti-Infection Tool A national IT system for continuous registration of healthcare-associated infections and antibiotic prescription. The system makes it possible to calculate the proportion of healthcare-associated infections or antibiotic prescriptions among all admitted patients.

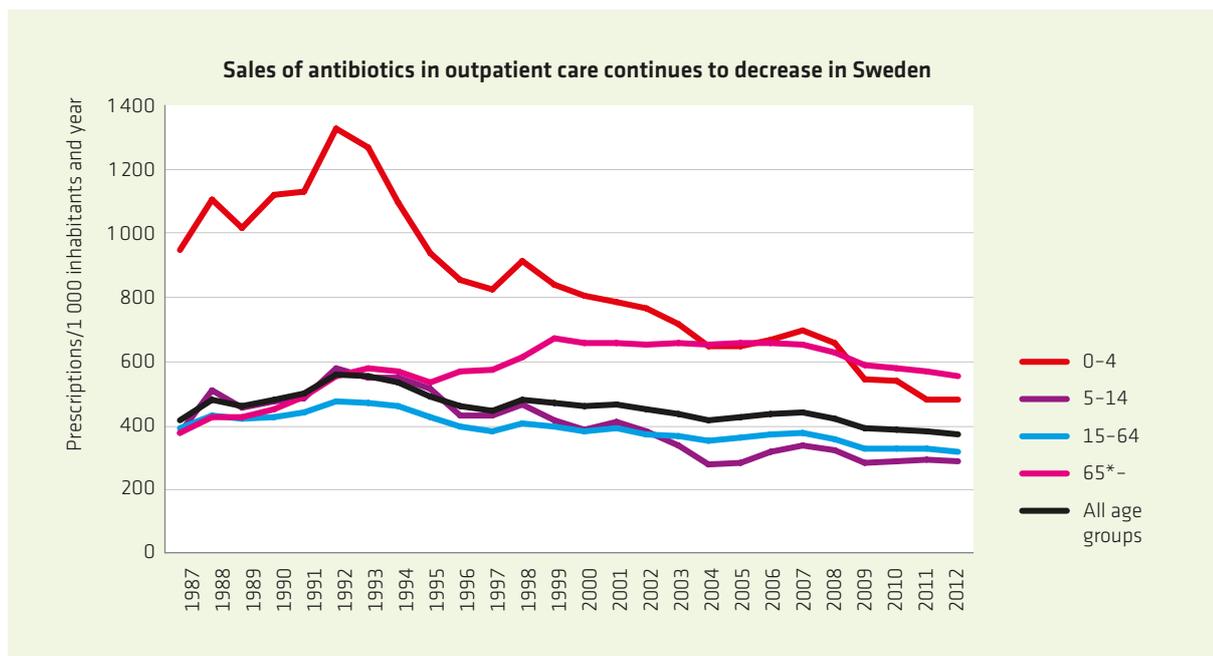
Other systems have been developed on local levels such as a tool for better prescribing in primary care. Within intensive care, ICU Strama has been running a special project since 2000 to systematically register and analyse antibiotic use and infection control in intensive care units. Sweden also participates in ESAC-Net, a European network for surveillance of antibiotic consumption. These, and other initiatives, are further described in the full report.

Evidence based treatment recommendations give support to the prescriber

Treatment recommendations are needed to more clearly define when an antibiotic is indicated. To gain the highest possible credibility and acceptance they are written in consensus with experts representing several medical specialties from both out- and inpatient care. The Medical Product Agency and the Public Health Agency of Sweden have published national recommendations for treatment of common infections in outpatient care and national care programmes for infections in inpatient care have been developed by the Swedish Society of Infectious Diseases, a nationwide group consisting mainly of infectious disease specialists.

Local organizations such as Strama groups and pharmaceutical committees are key actors for the dissemination and implementation of recommendations in healthcare settings. Based on national recommendations, local guidelines and memoranda adapted to local needs are produced, including local patterns of antibiotic resistance, traditions and information channels. Brochures, seminars, articles in the medical and news press, apps for smartphones as well as patient information leaflets are examples of how national and local recommendations have been communicated.

Extensive communication efforts on rational use of antibiotics are needed on many levels, locally, nationally and globally to spread the message on the prompt need to stop the spread of antibiotics resistance.



The total use of antibiotics has decreased since the mid-1990s. This coincides with the founding and first active years of Strama, and the low levels are maintained by a continuous Swedish strategic work. (Source: SWEDRES/SVARM)

The report has been produced within a collaboration project between the Indian National Center for Disease Control (NCDC) and the Public Health Agency of Sweden as a part of the countries' work for rational antibiotic consumption and improved surveillance of antibiotic resistance. The project has been financed by Sida.



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