



Swedish strategic programme against antibiotic resistance

Strama Annual Report 2008

Strama's remit and organisation

Strama's objective is to promote transdisciplinary collaboration in the effort to safeguard the availability of effective antibiotics in human and veterinary bacterial infections, and to initiate measures primarily related to human health.

Strama's board sets the budget and formulates the business plan. The base for Strama's national activities consists of a coordinating office located in the premises of the Swedish Institute for Infectious Disease Control (SMI). The office has 4.95 permanent whole-time-equivalent posts: 0.9 doctors, 1.75 pharmacists and 2.3 posts in project management and administration. Strama's activities are organised and carried out by a management group of national experts, working alongside local county-organised Strama groups. In December, there were a total of thirty Strama groups. A number of these have been allocated tasks and funding from the relevant county council, but most remain unfunded.

Specific task

In 2007, Strama and SMI were asked by the Government to make recommendations for a future national system for monitoring antibiotic resistance and consumption. Strama presented its report to the Ministry of Health and Social Affairs during a symposium held to mark the first European Antibiotic Awareness Day on November 18th. The proposal consists of two parts – a description of currently existing national monitoring systems – and proposed future monitoring systems for antibiotic resistance, prescribing and sales. The main proposal on antibiotic resistance is the introduction of a national database to collate all locally-generated data in anonymised form on a daily basis. A change in resistance patterns could then be spotted immediately, enabling alerts to be issued at local and national level. The early detection of changes in resistance patterns in the community requires the development of a system for carrying out "monitoring cultures" in primary care.

The more antibiotics we use, the greater the risk of bacterial resistance. Access to reliable statistics on antibiotic sales is needed for us to obtain an accurate picture of the current level of sales and to be able to monitor adherence to current treatment guidelines, as well as to enable us to identify needs and to evaluate the effects of implemented interventions. The report therefore proposes a national antibiotic sales monitoring system that would extract information about diagnosis, prescribing, diagnostic tests and culture results directly from computerised primary care medical record systems. This proposed system is intended to function as a national quality register.

Referrals and responses

Strama has responded to the following referrals: *Re-regulation of the pharmacy market, SOU 2008:4, Patient data and pharmaceuticals etc, SOU 2007:48*. Strama's opinion has also been sought with regard to the National Board of Health and Welfare's recommendations for the prevention of neonatal group B streptococcal infection (GBS). Responses have been made jointly with SMI to *Retail trade in certain non-prescription medicines, interim report of the pharmacy market inquiry SOU 2008:33* and to *the European Commission's proposed directive on patients' rights in cross-border healthcare*.

Interdisciplinary coordination

Authorities

Strama has held regular meetings with the National Board of Health and Welfare and the Swedish Institute for Infectious Disease Control (SMI). These meetings were held to discuss collaboration on shared issues. One of the main issues in 2008 was the Government-commissioned report that was presented at a conference jointly organised with SMI, the National Board of Health and Welfare and the Swedish Association of Local Authorities and Regions (SALAR) to mark European Antibiotic Awareness Day (see below).

Strama, in a joint initiative with the Antibiotic Resistance Group (ARG) of SMI, coordinated the measures taken by these public bodies to combat a continuing outbreak of vancomycin resistant enterococci (VRE). This culminated in a workshop in which the affected county councils, the National Board of Health and Welfare, the Central Field Epidemiology Team (CFG) and the National Veterinary Institute (SVA) took part. The workshop was the basis on which CFG was given the task of investigating the outbreak further and proposing a coordinated national plan of action.

Strama and the Swedish Medical Products Agency jointly arranged an expert meeting in order to draw up new antibiotic treatment guidelines and have worked together to ensure that these guidelines are applied throughout the healthcare system. There is continuing dialogue with the Medical Products Agency on other current issues, including temporary supply shortages and licensing processes involving important medicines.

Strama has provided SALAR with support staff and technical resources for its point prevalence studies of hospital infection and for its efforts to develop instruments for the continuous monitoring of these and other healthcare-associated infections. Strama, SALAR and SMI have also instigated a close collaboration in order to integrate the proposed future antibiotic resistance and consumption monitoring systems with the national IT strategic plan.

At the annual conference of the Swedish Society for Communicable Disease Prevention and Control, Strama contributed with a stall that provided general information about its current activities and the forthcoming campaign on infection problems in nursery schools.

Strama has continuous informal contacts with SVA/Strama-VL (the equivalent Strama organisation within veterinary medicine and food). Strama has been invited to speak at the annual veterinary conference. Strama has worked closely with the Swedish Zoonosis Council, which has been given the responsibility for the management of MRSA infections in horses, dogs and cats from the zoonosis perspective. Strama has been coopted onto the council when antibiotic-related issues were to be discussed.

Professional organisations

The Swedish Reference Group for Antibiotics (SRGA), which is the joint antibiotic expert group of the Swedish Society of Medicine, SMI and Strama, is a forum for the exchange of information between its constituent specialist associations. In addition to this, the SRGA and Strama employ the same experts for preparing background documentation and reports on antibiotic treatment.

Strama was invited to attend the executive committee of Swedish Infectious Diseases Association to discuss aspects of collaboration. The topics covered included the vital role played by specialists in infectious disease in formulating antibiotic policy as well as in the drawing up of targets and assessing performance in hospital care.

The various forms of care of the elderly account for a significant proportion of antibiotic use. In order to make progress here, a collaboration has been established with representative geriatricians. The out-

comes include Swedish participation in the European surveillance of antibiotic consumption in care homes for the elderly and an increase in the number of geriatric departments taking part in the national point prevalence study (PPS).

Strama's collaboration with representatives of dentistry continued during 2008 in the form of meetings to discuss antibiotic use.

Developments in antibiotic consumption and resistance

Consumption

The dispensing of antibiotics in primary and secondary care is monitored continuously by Strama's analysis group. Quarterly reports drawn up during the year demonstrate that antibiotic consumption fell slightly during 2008. The largest fall was seen in the county of Halland, which has worked hard to inform prescribers. Compliance with guidelines on the treatment of lower urinary tract infection in women has improved. In hospital care, the use of narrow-spectrum penicillins has increased, and the use of the broad-spectrum cephalosporins has decreased during the year. This is a positive development.

Resistance

In general, resistance patterns are still deteriorating. This applies in particular to intestinal bacteria with extended-spectrum beta-lactamase (ESBL), in which the preliminary data from Strama-sponsored studies show that importation associated with foreign travel is a major factor. In addition, intensive efforts are currently being made to control a national VRE epidemic in healthcare. The annual number of notifications rose from the usual 20–50 to 621 in 2008. On a more positive note, the number of reported MRSA cases in healthcare seems to have stabilised despite the continuing high rate of sampling, and the number of reported cases of pneumococci with reduced susceptibility to penicillin also seems to have remained stable.

Strama's remit according to its directive

The following is a concise description of Strama's activities in 2008 in relation to the areas defined by its directive.

Strama shall, based upon the national and international monitoring and analysis of the prevalence of antibiotic resistance and consumption, actively promote measures primarily related to human health.

The updating of the ESBL programme

Against the background of the rapidly increasing problems associated with the occurrence of ESBL, Strama has drafted a supplement to the action plan presented in 2007. The supplement consists of a review of the published literature on the effect of antibiotic policy interventions on the prevalence of ESBL-producing bacteria.

Expert meeting on lower respiratory tract infections

An expert meeting, *The Pharmacological Treatment of Lower Respiratory Tract Infections in Primary Care*, was jointly arranged with the Swedish Medical Products Agency. The meeting discussed the epidemiology of lower respiratory tract infections and antibiotic prescribing, lower respiratory tract infections in children, acute bronchitis, pneumonia and acute exacerbations of COPD. It concluded with a comprehensive proposal on the management of patients with cough of recent onset. The meeting's proposal was also presented at a symposium held during the Swedish Annual Medical Congress – *Bronchial catarrh or pneumonia – that is the question*.

Strama shall actively promote research into issues related to antibiotic resistance where the need for new knowledge has been identified.

Perforating otitis media in children

This study included children with perforating otitis media referred to the ENT departments in Kalmar and Nässjö. Cultures were taken and the children followed up at regular intervals without being given antibiotic treatment. Ears were examined and photographs taken of the eardrum at every review appointment. Just over 80 children had been included by the end of 2008. The study will be completed by June 1st 2009 and will be presented at a later date.

Creation of a database for monitoring the management of infections in primary care

Sweden lacks a system for monitoring trends in antibiotic prescribing indications. A pilot scheme has therefore been launched in which data on diagnosis, prescribed antibiotics, cultures and other diagnostic tests are extracted from primary care medical record systems. Strama has funded the development of software for this "Strama module". The primary care centres that opt to link into this system can easily supply anonymised data about all infection-related consultations to a central database. A pilot study is due to take place in the spring of 2009, based on data from a few Swedish primary care centres. At a later date, all primary care centres that have the capability of connecting to the system will be invited to join. In the autumn of 2009 a large number of primary care centres will be invited to provide data for this primary care database. This will make it possible to evaluate the management of common infections in Sweden, to assess trends and to monitor compliance with national treatment guidelines. The maintenance of the database and the analysis of data will initially require continuous financial support from Strama, with the aim of eventually migrating to a national quality database.

The development of and support for an infection quality database in collaboration with the quality assurance group of the Swedish Association of General Practice (SFAM-Q).

Strama has played a part in the development of quality indicators for certain common infections in primary care, as well as covering the software development costs of a web-based version and helping to make it available nationally. The infection-related issues it currently covers include cystitis in women, COPD, pharyngo-tonsillitis, leg ulcers and lower respiratory tract infections. By January 1st 2009, 127 primary care centres were connected to the system and 9 527 consultations had been registered as infection diagnoses. Every six months the number of centres increases by about 30. From this database (www.pvkvalitet.se), participants can obtain immediate comparisons with other units and with optimal targets. These optimal diagnostic and treatment targets are based on Swedish national guidelines for the relevant diagnosis. The results are intended for use by each unit in promoting improved quality in the management of common infections in primary care.

Clinical trials

Strama's clinical trial, *A comparison of one and two weeks' ciprofloxacin treatment for pyelonephritis in women*, has been in progress since February 2006. Around 20 departments of infectious diseases included altogether 251 patients between 2006 and 2008. The trial will be concluded in 2009 with data collection and quality audit followed by presentation of the results.

Point prevalence study

The fourth Swedish hospital point prevalence study (PPS) since 2003 was carried out in November. Sixty-eight hospitals in 20 counties took part and reported data on over 16 000 inpatients. The proportion of inpatients receiving antibiotics was unchanged from previous studies at 33%. Positive developments were seen in two out of the three areas of intervention put forward by Strama's hospital group: Improved compliance with treatment guidelines in community-acquired pneumonia and in lower urinary tract infection in women. In the third area of intervention, the duration of surgical prophylaxis, far too many patients continue to receive unnecessarily long courses of prophylactic antibiotics.

ICU-Strama

Strama's work within intensive care continued during 2008. Software that can transcribe data from laboratory systems to the Swedish Intensive Care Register has been developed. A seminar on microbiology and intensive care was held at the Swedish Annual Medical Congress. An expert from ICU-Strama has visited over ten intensive care units with the aim of promoting greater understanding of healthcare-associated infection (HAI) and to encourage in-house initiatives. The aim of this proactive effort is to encourage improvements in knowledge and quality with the ultimate aim of minimising HAI at each and every ICU, and to set in motion a multidisciplinary collaboration (pathology, pharmacy infectious diseases and ICU) in matters relating to the prophylaxis, diagnosis, treatment and notification of HAI.

Strama shall collate and actively disseminate information relating to antibiotic resistance to stakeholders in healthcare and local authority care, as well as to decision-makers in public authorities, the general public and the media.

The campaign to implement new guidelines on the treatment of lower urinary tract infections.

A campaign was launched to implement the guidelines on lower urinary tract infection in women that were formulated at a meeting of experts from Strama and the Swedish Medical Products Agency. A summary of the guidelines was published alongside a debate article in *Läkartidningen*, the journal of the Swedish Medical Association. A concise and straightforward check list was distributed with the Journal of the Swedish Medical Products Agency, reaching every prescriber in the country. The check list was also distributed to around 10 000 nurses, primarily those working in care of the elderly.

Media surveillance

Strama uses web-based media surveillance to monitor the impact of its public activities. For example, the Strama press releases that were timed to coincide with European Antibiotic Awareness Day resulted in around 120 articles, reports and references in Swedish newspaper, radio, and TV coverage.

Web site

Strama's web site is a very important means of communication with many target groups. News, activities and statistics are continually updated and distributed as an electronic newsletter.

Swedres

The Swedres annual report showed that Swedish antibiotic consumption increased in 2007, as it did in the two preceding years. This increase was seen in nearly every county, and the highest consumption was seen in the metropolitan counties and in Halland. The increase was most evident in the youngest age groups. Data from the individual-based drug register held by the Swedish National Board of Health and Welfare showed that 35% of children aged 0–6 yrs were given antibiotics in primary care during 2007. The equivalent figure for the population as a whole was 25%. This report has been widely distributed throughout the healthcare system. The number of notified cases of resistant bacteria remained relatively stable in comparison with 2006, with the exception of VRE and ESBL. A worrying increase was seen in both of these bacteria. Swedres is produced in collaboration with the Swedish National Veterinary Institute which has a corresponding veterinary report, SVARM, in the same publication.

Article in Barnbladet

Strama contributed an article to *Barnbladet*, the journal of the Swedish Paediatric Nurses Association. The article "Strama is fighting antibiotic resistance – parents and nurseries are important target groups" was published in issue No 6, 2008 and described Strama's current and past work. The article gave examples of past projects run by Strama in nursery schools and child care as well as examples of ongoing projects.

Smittskydd – the journal of the Swedish Institute for Infectious Disease Control (SMI)

Strama has contributed to every issue of SMI's journal, *Smittskydd*. Different subjects are taken up in a regular feature article.

Global surveillance and Strama-nytt (Strama's newsletter)

Strama continuously monitors international scientific journals and general media publications in order to stay informed about new and important advances in knowledge. As a consequence, interesting and influential articles are reported in *Strama-nytt*. Seven issues have been distributed this year to about a thousand subscribers.

Abstracts of scientific studies

Scientific studies often take a long time to carry out and analyse. To ensure that conclusions can be implemented in the healthcare system as quickly as possible, Strama has decided to write and distribute short reports pending availability of the complete scientific papers.

During 2008, the following "in short" reports have been presented:

- Public perception and expectation of antibiotic treatment.
- Point prevalence studies in hospital care 2003, 2004 and 2006.
- ICU-Strama – antibiotic use, antibiotic resistance and healthcare hygiene in intensive care.
- Repeated diagnosis and prescribing studies in primary care 2000, 2002 and 2005.

Education days and meetings

This year's Strama day attracted around 100 participants. Their evaluation of the meeting was very positive as regards both content and speakers.

The interest expressed in the 2007 theme days entitled "Healthcare-related infection and antibiotic resistance can be curbed" was carried through to 2008, and a further meeting was arranged with the help of the Gothenburg Strama group, amongst others, which attracted 150 participants.

At the 2008 Swedish Annual Medical Congress in Gothenburg, Strama had a stall for distributing information and stimulating discussion about antibiotic use. The display included examples of work on antibiotic resistance in Sweden, the EU and the rest of the World. Boxes of tissues bearing the message "Penicillin isn't a cough linctus!" were given out to participants. A well-attended and highly appreciated symposium was arranged under the title "Antibiotic resistance – the never-ending pandemic?" and in which speakers presented the local and global aspects of antibiotic resistance today and in the future. The updated guidelines on the treatment of lower respiratory tract infections were also presented at another symposium entitled "Bronchial catarrh or pneumonia – that is the question". Strama was invited to speak on the problems of antibiotic resistance and overconsumption in the elderly at the specialist geriatricians' symposium.

At the annual congress of foundation doctors in Stockholm, Strama contributed with a display stall at which the treatment guidelines for cystitis were discussed. The congress programme included a lecture on infections in primary care, during which the effects of antibiotics, the problem of resistance, and treatment guidelines were discussed.

European Antibiotic Awareness Day, 18th November

European Antibiotic Awareness Day is an EU public health initiative promoted by the European Centre for Disease Prevention and Control (ECDC). The focus this year is mainly on informing the general public about the importance of stopping all unnecessary use of antibiotics. On the first European Antibiotic Awareness Day, the Swedish Institute for Infectious Disease Control, the Swedish National Board of Health and Welfare, and the Swedish Association of Local Authorities and Regions jointly arranged a national conference on antibiotic resistance aimed at decision-makers in the healthcare system. At the conference, each of these three public bodies presented their government-commissioned reports to Maria Larsson, the Swedish Minister for Elderly Care and Public Health. The most impor-

tant conclusions were presented at a morning press conference, and they attracted great media attention.

Strama distributed leaflets and posters to all the nation's primary care centres. These contained information about coughs, colds and antibiotics. The main message was: "Getting a cold? Don't take antibiotics. Take care of yourself instead." Several local Strama groups issued press releases to the local media, with information about the antibiotic awareness day and about local antibiotic prescribing patterns in children with respiratory tract infections. Strama groups held public lectures in Uppsala and Malmö on antibiotic resistance. The Strama group in Halland organised a press conference on 14th November which attracted great media attention. Encouraging statistics on antibiotic prescribing in Halland were presented at the press conference, alongside the results of a survey of doctors' attitudes to antibiotic prescribing.

Strama shall work for the practical implementation of knowledge gained in the field of antibiotic resistance by changing the attitude and behaviour of prescribers, other relevant professional groups and the general public.

Educational material

Educational material for GPs about paediatric infection has been developed. This material covers the diagnosis and treatment of common childhood infections and consists of an informational section and a number of overhead diagrams. The material could also be used by GPs in the teaching of child health clinic and nursery school staff.

A protocol for healthcare hygiene quality in nursing homes.

Strama has helped to develop a protocol for healthcare hygiene quality in nursing homes. This protocol is an instrument for judging the quality of healthcare hygiene and provides a basis for safeguarding the quality of healthcare hygiene as laid down by the Swedish Health and Medical Service Act. The protocol is applied in conjunction with expert healthcare hygiene advice.

Strama shall work for the development of programmes of action at regional and local levels, with concrete aims, measures and audit methods adapted for practical implementation.

In its contacts with county council chief executives and drugs and therapeutics committees, Strama has emphasised the importance of having active local Strama groups and that this requires official sanction and funding. Two members of Strama's national management board serve as links between it and the local groups. Information about national and local activities is disseminated in this way. Priorities and collaborative activities were discussed at a residential meeting of Strama group chairmen.

Strama shall allocate and administer the funds it receives from central government for measures needed to fulfil the tasks that the strategy group has been set by this ordinance, and to monitor organisations that have received state funding.

The local Strama groups have been given the opportunity to seek funding for local projects. 979 000 SEK was allocated in 2008 to the following projects:

- Antibiotic use at Östersund Hospital.
- Assessment of healing and microbiological findings in perforating acute otitis media in children aged 2–16 yrs.
- Children, infections and antibiotics – educating parents of young children within the framework of child health clinic parenting classes.
- The effect of meticulous registration of infection and antibiotic use on a neonatal ward.
- Investigation of MRSA, ESBL and VRE in the elderly.

- ESBL faecal carrier status – a prevalence study.
- ESBL carrier status in patients with diarrhoea acquired abroad*.
- Duration of MRSA carrier status and the risk factors for becoming a long-term carrier.
- Use of register data from out-of-hours computer systems, computerised patient medical records and pharmacy order intake systems to quantify antibiotic use in hospital care.
- To define rational antibiotic prescribing patterns in a population of Swedish children.
- Can the presence of group B streptococci (GBS) be demonstrated by PCR-based diagnostic techniques in late pregnancy?

*This study was presented at the international ICAAC congress in September. The results showed that a third of 50 tested travellers had ESBL-producing bacteria in their gut flora following travel to foreign countries, including Thailand, India and Egypt.

Strama shall be active internationally in the field of antibiotic resistance.

Strama is internationally recognised for its extensive experience of comprehensive and effective programmes to combat antibiotic resistance. Several other countries wish to take advantage of this knowledge base to implement similar programmes of their own. Strama's remit to be active internationally in the field of antibiotic resistance is, however, restricted to the countries of the EU. Strama's cooperation has, however, been requested by public health authorities in India and China, which is why Strama's chairman took part in these government-level contacts. Strama is also playing a part in the planning of a conference to be held in the autumn of 2009 under the auspices of the Swedish EU chairmanship.

Strama's chairman sits on the ECDC planning committee for European Antibiotic Awareness Day. Strama contributed with three presentations at the conference on antibiotic use in primary care that was held in November 2008 under the French chairmanship. Strama has sat on a working committee that has drawn up proposed policy recommendations for the prevention of healthcare-associated infection (including those caused by resistant bacteria). These are going to be presented in the spring of 2009 under the chairmanship of the Czech Republic.

Strama has, during 2008, continued to play a part in the European collaboration *European Surveillance of Antimicrobial Consumption (ESAC)*. 2007 sales figures for antibiotics and antifungals have been submitted for compilation to ESAC. Representatives of Strama took part in ESAC's annual conference in Athens on 13th–14th November. Public information on ESAC's web site has been translated into Swedish.

The collaborative activities within ESAC also include four further sub-groups A) Hospitals B) Primary care C) Nursing homes and D) Social economics. Sweden did not take part in the European hospital point prevalence study this year but has submitted data to ESAC for the primary care project, and is also helping to prepare the ground for point prevalence calculations in nursing homes. Representatives from Strama took part in a meeting about projects in primary care and social economics held in Antwerp in June.

Scientific articles

Strama's three diagnosis/prescribing studies in primary care were published during the year in the *Scandinavian Journal of Infectious Diseases*. A Swedish version was published in *Läkartidningen*, the journal of the Swedish Medical Association. The aim was to relate diagnoses, diagnostic tests and prescribed antibiotics to treatment recommendations in three consecutive diagnosis/prescribing studies. Doctors at primary care centres in five counties completed a form for every patient that consulted for infection-related problems. A total of 15 371 consultations were included in the analysis. The number of respiratory tract infections fell and the proportion of these that were treated with antibiotics also fell from 54% to 49%. The greatest reduction was seen in children.

GPs were interviewed after antibiotic prescribing rates rose sharply in Halland. The aim was to obtain a picture of attitudes to the treatment of infection in primary care. The interviews were completed, analysed and then presented at meetings in Halland and to mark European Antibiotic Awareness Day. The report has been given to the Swedish National Board of Health and Welfare.

The results of Strama's study of the use of hand disinfection in nursery schools were published in the journal *Acta Paediatrica*. The study showed that hand disinfection with ethanol gel reduced children's sickness absence by 12%. A reduction of this magnitude in the parental benefit costs of looking after sick children could save society an estimated 200 million SEK annually. Introducing hand disinfection gel at nursery schools in Sweden would cost an estimated 10 million SEK annually.

A review article outlining the Swedish campaign against antibiotic resistance was published in 2008. "Fighting antibiotic resistance in Sweden – past, present and future" was published in *Wiener Klinische Wochenschrift*.

Two academic articles on Strama's work were published during the year. "Strama – a Swedish working model for containment of antibiotic resistance" in *Eurosurveillance*, and "Sustained reduction of antibiotic use and low bacterial resistance: 10-year follow-up of the Swedish Strama programme" in *The Lancet Infectious Diseases*.

Other scientific articles published in 2008 include:

Antibiotic resistance and infectious resistance genes – pandemics that are here already! (In Swedish) *SVA-vet (the journal of the National Veterinary Institute)*.

Prevalence and Management of Infections in Nursing Homes in Uppsala County, Sweden. *Open Longevity Science*.

New guidelines on urinary tract infection in women. (In Swedish) *Läkartidningen (the journal of the Swedish Medical Association)*.

Use shorter courses of treatment for lower urinary tract infection and don't use quinolones! (In Swedish) *Läkartidningen (the journal of the Swedish Medical Association)*.

Infections and antibiotic prescribing in Swedish nursing homes: A cross-sectional study. *Scandinavian Journal of Infectious Diseases*.

Antibiotic susceptibility patterns and clones of *Pseudomonas aeruginosa* in Swedish ICUs. *Scandinavian Journal of Infectious Diseases*.



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