SwissASP – Portfolio

Proposal from the StAR working group SwissASP

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Background

Antibiotics are widely used for the prevention and management of serious infections in the hospital setting. However, unnecessary and inappropriate inpatient antibiotic use contributes to the selection of antimicrobial resistance which ultimately puts patients at risk of poor outcomes including death from difficult to treat infections.

One approach towards improving the use of antibiotics in hospitals is through antibiotic stewardship. While hospitals may need to individually determine where there is the biggest unmet need locally, several elements and activities should be considered integral to any strategy and should form part of a nationally coherent response.

Swissnoso with its partners the Swiss Society for Infectious Diseases and the Swiss Society of Microbiology has been tasked in the context of the Swiss Antibiotic Resistance Strategy StAR with developing a nationally agree strategy for antimicrobial stewardship. In addition to defining the required framework conditions for implementing AS in Swiss hospitals, a portfolio of specific activities in the 5 core areas of hospital antimicrobial stewardship relevant to Switzerland has been developed.

Objective

Based on the Swiss healthcare system as well as data on current antimicrobial stewardship activities in Swiss hospitals, this document summarizes the types of activities and measures that may be considered by hospitals wishing to engage in antimicrobial stewardship. The portfolio considers each of the core areas (Expertise and technology, Monitoring and surveillance, Reporting and communication, Education and training, and Interventions) separately. Measures are generally presented as basic, intermediate or advanced, and where relevant suggestions are made for assessment of their implementation. Appendix 1 includes a checklist to evaluate the current state of antimicrobial stewardship in the hospital setting in the core areas and to define areas with the biggest need for improvement.

Expertise and technology

Dedicated workforce members with knowledge and skills to lead and implement antimicrobial stewardship are critical to its success. Relevant expertise may already be acquired as part of current training in infectious diseases, clinical microbiology and clinical pharmacy. However, additional training or continuous professional development will be required for any workforce members involved in implementing antimicrobial stewardship, including those working within designated formal antimicrobial stewardship teams or units (see Appendix 2).

Table 1: Basic and advanced measures to be considered for expertise and technology in the hospital setting.[1]

Basic measures	Advanced measures
Determine and document training needs and activities for any workforce member involved in antimicrobial stewardship implementation as part of regular appraisals or performance reviews.	Provide specific training opportunities, e.g. relevant to local AS activities or IT infrastructure, for a wider group of staff involved in implementing antimicrobial stewardship.
Provide basic training in antimicrobial stewardship, leadership development, patient safety or quality improvement for leads of formal teams or units (see Resources).	Provide training opportunities in antibiotic stewardship, patient safety and quality improvement for members of formal teams or units.
	Engage members of formal antimicrobial stewardship teams in provision of training to key hospital personnel (e.g. infectious diseases, infection prevention and control, pharmacy, quality management and patient safety).

Information technology systems can make an important contribution to the implementation of antimicrobial stewardship through the provision of clinical decision support and real-time data management, review and reporting. Clinical decision support systems include approval systems, real-time data curation for surveillance and monitoring, and electronic prescription and medication management systems. Two key aspects for these systems are a data structure suitable for auditing and reporting and the need to interface with hospital, network or national systems.

Electronic prescription and medication management systems that enable structured access to complex data informing antimicrobial prescribing (clinical, microbiological, laboratory, concomitant medication, allergies) and incorporating access to guidelines or algorithms

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[1] Note that the target of these measures are members of the antimicrobial stewardship team or unit rather than any antibiotic prescribers.

support the judicious use of antimicrobials (see Appendices 4 and 5). A mixture of alerts, prompts and restrictions should be used with care taken to avoid "alert fatigue". At the same time, such systems provide an opportunity for consistent data capture about antibiotic prescribing to facilitate data collection and reporting, including potentially benchmarking between hospitals.

Information technology systems cannot replace expert advice in supporting safe and appropriate antimicrobial prescribing, including continuous evaluation of electronic systems to confirm their suitability and relevance.

Table 2: Types of information technology systems for use as decision support tools in the hospital setting.

IT system	Comments
Access to guidelines and mobile applications	Passive through various entry points in hospital systems
	Guideline dissemination, antibiograms, dosing calculators
Antimicrobial approval systems	Actively triggered by prescriptions of target antibiotics
	Implementation of formulary, auditing and feedback, educational opportunity
Electronic prescribing and medication management	Active through alerts, prompts and restrictions at various stages of prescribing and medication management; may require decision support
	Automated processes, e.g. stop orders, standard order sets, auditing
Advanced clinical decision support systems 1) Interface with infection prevention and control systems	Active through effective communication between laboratory and e-prescribing
	De-escalation, microbe-antimicrobial mismatches, avoid double coverage, surveillance
2) Custom-made complex Bayesian or mathematical models	Active learning system

Specific minimal recommendations

- Hospitals should designate staff members responsible and accountable for implementation of AS, and include the identification of their training needs/training undertaken as part of annual performance review.
- Hospitals should demonstrate that they provide resources for specific training for AS leads (protected time, financial support).
- Hospitals should explicitly include assessment of the potential for electronic clinical decision support for AS when upgrading or purchasing IT systems.

Monitoring and surveillance

Assessing rates and trends of antibiotic use and antimicrobial resistance is critical for the evaluation of the impact of antimicrobial stewardship activities. In addition, data relevant to quality improvement should be collected and tracked to provide timely and continuous information on the success of implementing specific interventions.

In general, the following types of measures are relevant for quality improvement:

1) Structural measures: Assessment of availability of key resources for implementation of antimicrobial stewardship, including expertise, communication and education

2) Process measures: Examples include compliance with guidelines and relevant care bundles, adherence to specified interventions including targeted reductions in the use of specified antibiotics, adequacy of documentation of documentation or prescription details.

3) Outcome measures: Examples include *C. difficile* rates, SSI rates, change in resistance rates.

4) Balancing measures: Examples include readmissions, admissions to intensive care, treatment-related toxicity. Some outcome measures can also be balancing measures.

Table 3: Proposed monitoring activities in the hospital setting.[2]

Basic measures	Intermediate measures	Advanced measures
Participate in national surveillance of antibiotic use through anresis	Assess rates and volume of antimicrobial prescribing over time (hospital-level or divisional)	Assess patient outcomes such as *C. difficile* rates, length of stay
Participate in national surveillance of antimicrobial resistance through anresis	Audit compliance with prescribing guidelines and antimicrobial restrictions	Track local changes in antimicrobial resistance patterns
Participate in national point prevalence surveys of antibiotic use	Audit adequacy of antibiotic prescriptions, e.g. documentation of indication and other prescription details	Determine cost-relevant changes e.g. in length of stay, cost-effective use of diagnostic services
Perform self-assessment of antimicrobial stewardship activities using a structured tool	Audit completeness and assess accuracy of antibiotic allergy history	Assess occurrence of unintended negative consequences such as rate of adverse drug events or intensive care admissions
Review structural measures at regular intervals	Provide a relevant and regularly updated local antibiogram	Evaluation of hospital datasets combining clinical, prescription, laboratory and outcome data

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[2] Note that hospitals should select from the basic measures according to the available resources and existing monitoring activities.

Basic measures correspond to surveillance activities and assessment of structural indicators. Intermediate measures include data collection on process measures for quality improvement and provision of a regularly updated antibiogram. Advanced measures correspond to monitoring of outcome and balancing measures and analysis of hospital datasets.

Note that e-prescribing may be set up in such a way as to support monitoring antibiotic consumption. As hospitals implement e-prescribing, SwissASP will provide a forum for discussions of configurations of e-prescribing systems that not only support local data analysis but also comparative evaluations (see Appendix 5).

Specific minimal recommendations

- Hospitals should participate in national surveillance of antibiotic use through anresis to access the anresis SwissASP report enabling monitoring of local antibiotic use patterns.
- Hospitals should perform annual self-assessment of AS (see Appendix 1).
- Hospitals should review opportunities for and maximize the use of existing systems for electronic clinical decision support.

Reporting and communication

Reporting of key antibiotic use and antimicrobial resistance data, information about any tracking of antimicrobial stewardship activities as well as communication about antimicrobial stewardship are key aspects to ensure the success of antimicrobial stewardship. In general, communication activities targeted towards hospital management and staff should focus on clear, simple core clinical messages.

Reporting on antibiotic use at the hospital level should address the following aspects: If feasible, reporting should be at least quarterly and consideration should be given to the utility of providing information broken down by ward or division. These data should be combined with audit findings or other activities evaluating the success of antimicrobial stewardship activities. The data need to be made available to hospital management as well as relevant clinical leads, governance committees and frontline clinical staff, in particular providers. Ideally, an annual report comprising all relevant data and information on on-going initiatives is made available through internal communication channels.

Feedback should be provided to prescribers, for example by evaluating performance of the clinical workforce relative to other units and wards, and ultimately relative to other hospitals. Consideration can be given to the use of dashboards and control charts, and whether these should be made available to patients and the public.

Table 4: Reporting and communication measures for consideration in the hospital setting

Basic measures	Advanced measures
Regularly report on hospital-level antibiotic use, for example based on national surveillance through anresis	Incorporate information on antimicrobial stewardship, antibiotic use and antimicrobial resistance into the annual hospital business report
—	—
Regularly report on hospital-level antimicrobial resistance, for example based on national surveillance through anresis	Regularly report on indicators other than hospital-level antibiotic use or antimicrobial resistance, for example *C. difficile* infection rates (see also Interventions)
—	—
Prepare annual antimicrobial stewardship report for key internal stakeholders	Provide unit-specific data in visible places as a means of engaging frontline staff in antimicrobial stewardship
—	—
Prepare unit specific reports for specific clinical areas of interest, especially those currently targeted by tailored antimicrobial stewardship activities	Provide a dashboard or control chart for key metrics through internal communication channels

Specific minimal recommendations

- Hospitals should generate an annual report on antibiotic use (stratified by quarter) and antimicrobial resistance and make this available to staff, e.g. through an internal website.
- Hospitals should establish annual reporting on AS to the hospital executive and clinical leadership.

Education and training

Education is an important part of antimicrobial stewardship and can target prescribers, non-prescribing healthcare providers and patients and families. On-going educational or training opportunities should be made available to all healthcare providers who are antibiotic prescribers or involved in the review of antibiotic prescriptions and the administration of antibiotics. Communication of any observed trends in antibiotic use and antimicrobial resistance should form part of educational activities.

Note that educational needs will differ by target audience, most importantly according to whether the activity is aimed at prescribers, those dispensing and administering antibiotics or patients and the public.

Table 5: Education and training measures for consideration in the hospital setting

Basic measures: dissemination of information	Advanced measures: strategies based on behavior change principles
Provide regular updates on antimicrobial stewardship through internal communication tools	Provide patient or staff narratives relevant to antimicrobial stewardship through internal or external communication tools
Regularly present antibiotic use and antimicrobial resistance data to frontline staff	Engage in targeted educational activities for specific clinical areas or staff groups
Plan sessions on antimicrobial stewardship as part of required regular medical education and training and continuous professional development	Include information on antimicrobial stewardship in patient-facing materials
	Engage in audit and feedback as an educational strategy
Incorporate information on antimicrobial stewardship into orientation for new frontline staff	Provide academic detailing in clinical areas or for key clinicians with a high unmet need
Include antibiotic prescribing competencies as mandatory for prescribers joining the medical staff (see Appendix 3)	

For prescribers antimicrobial prescribing competencies have been proposed and these should be at the core of educational activities targeting this group (see Appendix 3). They include core concepts in microbiology, the pathogenesis and the diagnosis of infections and knowledge of how and where to access relevant guidance. At a minimum, prescribers should understand all aspects of an antibiotic prescription listed in Box 1.

Box 1: Key aspects for antibiotic prescribing to be addressed in each individual prescription

Disease: Indication including appropriate use of investigations and targeted therapy once definitive diagnosis has been made.

Drug: Choice of antibiotic including compliance with local recommendations noting reasons for deviation from these, review based on microbiological results and avoidance of duplicative therapy (potential overlapping spectrum) and unnecessary combination therapy.

Dose: Choice of optimal dose for indication and target organ, requirement for TDM as well as dose adjustment for renal impairment, hepatic impairment or for other reasons.

Duration: Planned and definitive duration including recommended time points for review.

Delivery: Current route of administration, optimal formulation and planned conversion from IV to oral route, where appropriate

Drug allergy: Appropriate documentation, selection of suitable alternatives to first-line recommended agents in cases of allergy, documentation of steps to ascertain allergy.

Furthermore, prescribers should understand the key aspects of decision-making about continued optimal antibiotic therapy such as antibiotic review, changes in antibiotic spectrum, dose or route of administration.

Non-prescribing healthcare providers who may review, dispense and administer antibiotics should be included in educational activities to ensure a good understanding of their role in antibiotic prescribing and antimicrobial stewardship.

Patient-facing educational activities are important to support effective communication between clinicians and patients about appropriate and safe antibiotic use.

Specific minimal recommendations

- Hospitals should provide mandatory training on antibiotic prescribing competencies to all prescribers joining the medical staff as part of induction.
- Hospitals should include AS as a topic in regular training activities of all frontline staff.
- Hospitals should include education and training activities in the job description of all staff members tasked with undertaking AS and provide protected time for this.

Interventions

Antimicrobial stewardship interventions aim to directly improve antibiotic use during frontline delivery of healthcare services. Relevant interventions will depend on the baseline assessment of the current state of antimicrobial stewardship at a given hospital and local needs. The outcomes of interventions should be monitored (see monitoring) and reported to hospital leadership and the clinical workforce (see communication).

General principles for antimicrobial stewardship interventions

- Collect evidence to identify areas of unmet need or those with the biggest room for improvement
- Prioritise interventions according to the hospital's local needs
- Align interventions with existing activities to increase efficiency of resource use and determine the best ways to incorporate them into normal workflow
- Identify and include all relevant internal stakeholders for selection and implementation of interventions
- Start with basic interventions and work up to more advanced interventions
- Facilitate awareness of interventions by using clinical decision support tools, education and communication

Antimicrobial stewardship interventions may occur at the front-end when they influence antimicrobial prescribing at initiation of antimicrobials or at the back-end when active

antimicrobial prescriptions may be modified. Interventions may target a single aspect of antimicrobial prescribing or several aspects, in which case the intervention may be considered a bundle. Furthermore, interventions may be divided into those that are considered system-wide (hospital, department or ward-level) and those that occur at the point of care (patient-level).

Interventions may be focused on specific diagnoses/infection syndromes or specific patient groups. Infection syndromes/diagnoses that could be targeted by antimicrobial stewardship include pneumonia, urinary tract infection, skin and soft tissue infections, sepsis, intra-abdominal infections, bloodstream-infections, device-associated and hospital-acquired infections, surgical site infections and surgical perioperative antibiotic prophylaxis.

Table 6: Front-end and back-end interventions at hospital and patient level.

	Front-end interventions	Back-end interventions
Hospital-level (system-wide)	- Local guidelines - Clinical decision support algorithms - Antibiotic formulary - Pre-authorization	- Antimicrobial stewardship rounds - Antibiotic prescription review - Mandatory antibiotic approval/ restriction
Patient-level (point of care)	- Antibiotic allergy management pathway - Standard order sets - Avoidance of duplicative therapy - Implementation of rapid diagnostics - Implementation of appropriate microbiological testing	- (Automated) stop orders - (Automated) IV to oral switching - Dose adjustment and optimization - Antibiotic management in *C. difficile* cases - Selective reporting of antimicrobial susceptibility

Table 7: Basic interventions for the hospital setting and examples for their evaluation.

Basic interventions	Examples for tracking/evaluation
Provide a hospital-specific antibiotic formulary including restricted antibiotics requiring preauthorization or post-prescription approval	Availability of antibiotic formulary % of antibiotics requiring preauthorization or approval correctly prescribed
Provide hospital-specific treatment recommendations by either adopting national guidance or adapting such guidelines locally	Availability of local treatment recommendations
Standardize order forms for common infection syndromes based on hospital-specific guidelines	Availability of standard order sets % of target episodes with microbiological work-up as recommended

Basic interventions	Examples for tracking/evaluation
Develop and implement a policy on minimal standards for antibiotic prescriptions	Availability of antibiotic prescription policy % antibiotic prescriptions correctly documented
Implement antibiotic post-prescription review at specific time points	% antibiotic prescriptions reviewed
Establish and implement standardized approaches to dose adjustment for patients with organ dysfunction	Availability of recommendations for dose adjustment in patients with organ dysfunction % patients on relevant antibiotics with organ dysfunction with correct dose adjustment

Table 8: Advanced interventions for the hospital setting and examples for their evaluation

Advanced interventions	Examples for evaluation
Build clinical decision support algorithms into IT systems including (e)prescribing systems	% prescriptions with recommendations from algorithm in which recommendation is followed
Incorporate automatic alerts into (e)prescribing systems identifying potentially duplicative antibiotic therapy	% of alerted prescriptions streamlined
Establish a clinical pathway for antibiotic allergy assessment	Availability of clinical pathway % of patients with documented targeted antibiotic allergy undergoing recommended assessment
Establish guidance for specific measures to improve antibiotic use such as iv to oral switching or dose optimization for organisms with intermediate susceptibility	Availability of recommendations % of targeted prescriptions in which recommendation is followed
Implement automatic stop orders in specific appropriate situations e.g. empiric therapy or surgical perioperative prophylaxis	% of targeted prescriptions given for the recommended duration or less
Establish algorithms for use of rapid diagnostic methods	% of targeted patients in whom rapid diagnostics are used as recommended
Conduct regular antimicrobial stewardship rounds/consults in specific clinical areas	% of patients on antibiotics with documented antimicrobial stewardship consults in target clinical area % of targeted prescriptions in which consult advice is followed
Selective antimicrobial susceptibility testing reporting to support antibiotic prescribing	Availability of written policy on which AST reporting is based at hospital including details of selective reporting

Specific minimal recommendations

- Hospitals should be able to demonstrate at a minimum the availability of hospital-specific antibiotic formulary, treatment recommendations and antibiotic prescribing standards.
- Hospitals should ideally implement and document all basic interventions.
- Hospitals should plan to implement at least one advanced intervention suitable to the local context with appropriate documentary evidence of implementation and evaluation.

Resources

1) Training in AS

<u>WHO online course on antimicrobial stewardship</u>

Available at https://openwho.org/courses/AMR-competency

This course will equip clinicians who frequently prescribe antimicrobials with knowledge and tools to improve their use of these essential medications in daily clinical practice. Through case based examples, the course will highlight how antimicrobial stewardship principles can be applied to common clinical scenarios. We will first review foundational clinical knowledge necessary to use antimicrobials wisely. Then, we will illustrate how clinicians can incorporate this knowledge into the management of patients with common infections through adherence to the five core competencies of appropriate antimicrobial prescribing. This course will provide a framework for approaching each clinical encounter from the perspective of combating antimicrobial resistance. We hope it will assist you in your practice and inspire you to be a champion of antimicrobial stewardship.

Language: English

Type: Online

Cost: Free

<u>ABS Fortbildung</u>

Available at https://www.antibiotic-stewardship.de/fortbildung/

Die ABS Fortbildungsinitiative bemüht sich um die Planung und Durchführung von Fortbildungs-veranstaltungen für Mitarbeiter von Krankenhäusern, in denen rationale Antibiotikatherapie als abteilungs-übergreifendes Qualitätsziel definiert wurde.Sie soll durch eingehende Schulung von Ärzten und Apothekern helfen, die Verordnungsqualität zu verbessern.

Language: German

Type: Face to face

Costs: €1'250 /course

<u>Antimicrobial Stewardship: Managing Antibiotic Resistance</u>

Available at https://www.futurelearn.com/courses/antimicrobial-stewardship

Designed for healthcare professionals, this six-week course will inform you about – and empower you to provide – safe, high-quality antibiotic use. You'll interact with colleagues globally, to understand what antibiotic resistance means – and why the World Economic Forum has placed it alongside terrorism and climate change on its global risk register.

Language: English

Type: Online

Costs: Free, $84 to obtain Certificate of Achievement if eligible

Antimicrobial Stewardship Training through MAD-ID (Making a difference in infectious diseases)

Available at https://mad-id.org/antimicrobial-stewardship-programs/

The MAD-ID Antimicrobial Stewardship Training Program is designed to help practitioners who are currently or planning to pursue antimicrobial stewardship activities. MAD-ID offers two levels of Antimicrobial Stewardship Training:

Basic Program: Designed to teach the basic skills and provide an overview of Antimicrobial Stewardship practice needed to develop an Antimicrobial Stewardship Program.

Advanced Program: Designed to meet the needs of pharmacists, physicians and other providers that have some antimicrobial stewardship experience and/or basic skills in this area. This program is delivered live at the MAD-ID Annual Meeting.

Language: English

Type: Online

Cost: Basic $500 (discount available for trainees and groups>4); Advanced $250 (discount available for groups>4)

Society of Infectious Diseases Pharmacists Antimicrobial Stewardship Certificate Program for Acute Care

Available at http://www.proce.com/activities/activity_detail?id=45

The Antimicrobial Stewardship Certificate Program (ASP) is an innovative and intensive practice-based activity for pharmacists focusing on the pharmacist's role in the area of appropriate use of antimicrobial agents. The certificate program, which emphasizes a health care team approach, seeks to foster the development of a strong knowledgebase in microbiology, pharmacology and disease state management in order to successfully implement an antibiotic stewardship program that will improve patient care, reduce healthcare expenditures and potentially reduce rates of resistance and prolong the longevity of the limited number of antimicrobial agents available to treat infections.

Language: English

Type: Online

Cost: $750 for entire course (group discount available)

Antimicrobial Stewardship: From Principles to Practice (British Society for Antimicrobial Chemotherapy)

Available at http://www.bsac.org.uk/antimicrobialstewardshipebook/BSAC-AntimicrobialStewardship-FromPrinciplestoPractice-eBook.pdf

This e-book does not aim to provide a comprehensive traditional textbook of stewardship nor a comprehensive state of the art review of the literature supporting stewardship. Instead, the focus is on application to clinical practice with illustrations of good practice articulated through case studies, stories, videos, podcasts, presentations, practical narratives and self - assessment exercises. We hope you find it informative, engaging and enjoyable. Above all we hope it supports your practice.

Language: English

Type: E-book

Cost: Free

CDC Training on Antibiotic Stewardship

Available at https://www.train.org/cdctrain/course/1075730/compilation

This interactive web-based activity is the first of four sections designed to help clinicians optimize antibiotic use to combat antibiotic resistance and improve healthcare quality and patient safety. This course will include information about antibiotic resistance and threats and a detailed explanation of the benefits of antibiotic stewardship. Additionally, this course will discuss risks and benefits of antibiotics, with a focus on the microbiome, adverse drug events, and Clostridium difficile infections. Lastly, clinicians will be empowered to optimize patient care by integrating antibiotic stewardship activities into outpatient care.

The goal of the course is to provide a comprehensive educational resource to instruct about antibiotic stewardship and to assist learners in delivering effective and consistent messages to patients about antibiotic use and antibiotic resistance. Antibiotic stewardship is the effort to measure and improve antibiotic use and is fundamental to high quality patient care. The course provides guidance for how to apply antibiotic stewardship principles to the most common conditions that lead to inappropriate antibiotic use. While outpatient antibiotic stewardship is the focus, the course also contains modules on acute care hospital and long-term care stewardship.

Language: English

Type: Online course

Cost: Free

2) Other relevant online resources

Making the Business Case for ASP (SHEA)
Available at http://www.shea-online.org/images/priority-topics/Business_Case_for_ASP.pdf

The Core Elements of Hospital Antibiotic Stewardship Programs (CDC)
Available at https://www.cdc.gov/antibiotic-use/healthcare/pdfs/core-elements.pdf

Perspectives on context in successful quality improvement (The Health Foundation)
Available at https://www.health.org.uk/publications/perspectives-on-context

Mobile Applications to Support AMS (NSW Clinical Excellence Commission)
Available at http://www.cec.health.nsw.gov.au/patient-safety-programs/medication-safety/antimicrobial-stewardship/quah/ams-implementation-toolkit/mobile-apps-to-support-ams

The 5x5 Antimicrobial Audit (NSW Clinical Excellence Commission)
Available at http://www.cec.health.nsw.gov.au/patient-safety-programs/medication-safety/antimicrobial-stewardship/quah/5x5-antimicrobial-audit

Antimicrobial Stewardship Strategies (Public Health Ontario)
Available at https://www.publichealthontario.ca/en/health-topics/antimicrobial-stewardship/acute-care/asp-strategies

Toolkit for Reduction of Clostridium difficile Infections Through Antimicrobial Stewardship (Agency for Healthcare Research and Quality)
Available at https://www.ahrq.gov/hai/patient-safety-resources/cdiff-toolkit/index.html

Sample Antimicrobial Stewardship Policy (NSW Clinical Excellence Commission)
Available at http://www.cec.health.nsw.gov.au/__data/assets/pdf_file/0004/258736/QUAH-AMS-Toolkit-Sample-AMS-Policy-UPDATED-FEB-2017.pdf

Antimicrobial prescribing and stewardship competencies (PHE)
Available at
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/253094/ARHAIprescrcompetencies__2_.pdf

Strategies to Asses Antibiotic Use (CDC)
Available at https://www.cdc.gov/antibiotic-use/core-elements/implementation.html

Run Chart Tool (Institute for Healthcare Improvement)
Available at http://www.ihi.org/resources/Pages/Tools/RunChart.aspx

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Appendix 1

Checklist for hospital antimicrobial stewardship programming (based on CHASP, Report of the Leading Health Systems Network 2018)

1. Executive sponsorship

1.1. Has hospital management formally identified antimicrobial stewardship as a priority objective for the institution and included it in its key performance indicators?

1.2. Are there dedicated and sustainable budgeted resources for antimicrobial stewardship activities?

1.3. Does your hospital follow recommended staffing standards for antimicrobial stewardship activities?

2. Governance and accountability

2.1. Does your hospital have a formal written antimicrobial stewardship strategy detailing the approach towards ensuring appropriate antimicrobial use?

2.2. Does your hospital have a formal committee, structural unit or team responsible for antimicrobial stewardship?

2.3. Is there an identified clinical leader for antimicrobial stewardship who is responsible for identifying and implementing locally relevant antimicrobial stewardship activities?

2.4. Is there documentation clearly defining the roles and responsibility and procedures of collaboration of staff members who are part of the formal antimicrobial stewardship unit or team?

2.5. Is there documentation clearly defining the procedures of collaboration between the antimicrobial stewardship unit or team and other relevant committees and teams, such as patient safety, quality improvement and infection prevention and control?

3. Expertise and technology

3.1. In your hospital is there, or do you have access to, at least one experienced physician with training in infection management (prevention, diagnosis and treatment) and stewardship available to contribute to an antimicrobial stewardship unit or team?

3.2. In your hospital is there, or do you have access to, at least one of the following trained and experienced healthcare professionals: hospital pharmacist with drug expertise in antibiotics, clinical microbiologist, infection prevention and control expert?

3.3. Is a dedicated multidisciplinary antimicrobial stewardship unit or team available at your hospital or otherwise accessible to you?

3.4. Does your hospital support antimicrobial stewardship activities with adequate information technology services?

4. Monitoring and surveillance

4.1. Does your hospital participate in national or local monitoring of antibiotic susceptibility rates for a range of key bacteria?

4.2. Does your hospital participate in national or local monitoring of antimicrobial consumption?

4.3. Does your hospital regularly evaluate the quality of antimicrobial use at the unit or hospital level?

4.4. Does your antimicrobial stewardship team or unit monitor compliance with one or more specific interventions aimed to improve antimicrobial use?

5. Reporting and communication

5.1. Is regular reporting on antimicrobial consumption or other monitoring data available at the hospital level?

5.2. Is regular reporting on antimicrobial resistance levels in key bacteria available at the hospital level?

5.3. Is there reporting on antimicrobial stewardship activities included in annual reporting of key performance indicators of the hospital?

6. Education and training

6.1. Does your hospital offer a range of educational resources to support staff training on best practices in antimicrobial prescribing?

6.2. Are antibiotic prescribing competencies part of mandatory training for all prescribers at the hospital?

6.3. Do members of the antimicrobial stewardship team or unit regularly receive relevant training?

7. Interventions

7.1. Does your hospital have an antimicrobial formulary?

7.2. Does your hospital have regularly reviewed and up-to-date recommendations for infection management to assist with selection and prescribing of antimicrobials (drug dose, duration and delivery) for common clinical conditions?

7.3. Is there a system whereby an antimicrobial stewardship team or unit review or audit antimicrobial management for specific agents or clinical conditions at your hospital?

7.4. Can clinical antimicrobial stewardship advice from a relevant team, unit or expert be easily accessed at your hospital?

7.5. Does the antimicrobial stewardship team or unit regularly participate in rounds specifically addressing infection management and antimicrobial prescribing?

7.6. Are there minimal documentation requirements for antimicrobial prescriptions (i.e. an antimicrobial plan) within the medical record or during electronic prescribing?

Appendix 2

Content for education and training of healthcare providers in antimicrobial stewardship
(based on Pulcini and Gyssens)

Topic	Concept	Learning outcomes	Target groups
Diagnosis of infection	Infection/ inflammation	- Interpretation of clinical markers - Interpretation of point of care tests - Interpretation of laboratory markers	Prescribers
	Identification of causative pathogen	- Use and interpretation of point-of-care tests - Indication for microbiological and other relevant samples - Optimal handling of (pre-analytics) of samples - Interpretation of sample results	Prescribers Nursing and ancillary healthcare staff
	Susceptibility to antimicrobials	- Interpretation of Gram stains, pathogen identification results and susceptibility reports	Prescribers
Antibiotics	Mechanisms of action	- Target organisms and spectrum - Indications for combination therapy - Consequences of bacterial resistance	Prescribers Pharmacists
	Toxicity	- Common unwanted side effects and necessary therapy adaptations - Important drug-drug interactions	Prescribers Pharmacists
Treatment of infection	Indication for antimicrobials	- Empiric therapy, targeted therapy, prophylaxis - Colonization and infection - Infections unlikely to benefit from antimicrobials	Prescribers
	Optimised use	- Optimal drug for target infection - Optimal dose, duration and delivery - Suitable alternatives in cases of drug allergy	Prescribers Pharmacists

Antibiotic prescribing and stewardship	Bacterial resistance	- Basic understanding of antimicrobial resistance and its drivers - Local/regional epidemiology of antimicrobial resistance	Prescribers Nursing and ancillary healthcare staff
	Antibiotic prescribing	- Sources of guidance for empiric therapy - Minimal set for an antibiotic prescription (reason, review date etc) - Use of therapeutic drug monitoring	Prescribers Pharmacists
	Communication and multidisciplinary work	- Key factors in communication with patients - Interaction with local experts and antibiotic champions	Prescribers Nursing and ancillary healthcare staff Pharmacists

Appendix 3

<u>Generic antimicrobial prescribing competencies</u> (based on ESCMID generic competencies in antimicrobial prescribing and stewardship)

Generic knowledge of antimicrobials for every independent prescriber includes

- The names and class of antimicrobial being prescribed, in addition to the trade name, if used in prescribing
- The clinically relevant spectrum of activity for commonly prescribed antimicrobials
- The basic principles of antimicrobial pharmacokinetics and pharmacodynamics
- The contraindications to the use of an antimicrobial
- Common antimicrobial and drug/food interactions
- Common side-effects of antimicrobials, including allergy, how to monitor for them, and what to do when they are suspected

In addition, every independent prescriber must understand:

1.1. How and where to access relevant guidance on antimicrobial prescribing and stewardship
1.2. When not to prescribe antimicrobials (viral infections, colonization and carriage)
1.3. When antimicrobials may not be part of or may not be the sole component of optimal infection management (incision and drainage of abscesses, removal of foreign material)
1.4. The need for complete documentation of all important details of a treatment plan for all antimicrobial prescriptions
1.5. The legal requirements for prescribing antimicrobials in Switzerland, including compliance with these when prescribing

For the selection and initiation of antimicrobial treatment:

2.1. Basing selection on relevant guidance and local antimicrobial susceptibility patterns as well as
2.2. Relevant microbiological cultures or other tests obtained prior to the start of treatment
2.3. Optimal timing of antimicrobial treatment (e.g. as soon as possible for life-threatening infetions)
2.4. Optimal drug, dose and delivery (route) for the type of infection targeted
2.5. Optimal duration, including documentation of review and stop dates

For the continuation and rationalization of therapy

3.1. When indicated, monitoring antimicrobial levels and adjusting doses

3.2. Adapting antimicrobials to microbiological results and clinical condition, by either escalating or preferentially de-escalating therapy

3.3. Reviewing empiric antimicrobial therapy at the latest at 48-72 hours and regularly thereafter (if continued) and stopping if there is no evidence of infection

3.4. Considering iv to oral switching as soon as possible, when indicated and if continued treatment is required

2. For antimicrobial prophylaxis

3.1. Appropriate dosing including the importanc e of single prophylactic dosing for surgical and other procedures

3.2. The range of procedures for which prophylaxis has been shown to be effective

3.3. Situations in which additional prophylactic antimicrobial doses are required

3.4. Indications for and management of medical antimicrobial prophylaxis (e.g. in certain immunosuppressed groups for specific indications), when relevant to prescriber specialty

Appendix 4

Readiness assessment for implementing electronic clinical decision support systems (based on Antimicrobial Stewardship in Australian Health Care 2018)

1) Technical:

   Are personnel resources available in IT to support:

   - o Data extraction and processing
   - o Databases and servers
   - o Implementation of necessary data security requirements?

   Will the current IT infrastructure be able to support the electronic clinical decision support system, including relevant interfaces with existing systems?

2) Finanical/Staff:

   Can adequate project support, both administrative and clinical, be dedicated to implementation of the new system?

3) Skills:

   Have all relevant personnel (clinical, technical and administrative) undergone sufficient training prior to implementation of the new system?

   Has a train-the-trainer approach been adopted to disseminate relevant skills to end users of the new system?

4) Process:

   Has sufficient consideration been given to the steps required during the following stages of implementing the new system:

   - o Project planning
   - o System implementation/going live
   - o Evaluation and adaptation

5) Administration:

   Is there adequate support at an executive and clinical leadership level for implementation of the new system?

Appendix 5
<u>E-prescribing antibiotics – prescription content</u>

A number of different e-prescribing systems are likely to be in operation in Switzerland. As e-prescribing supports the accurate and efficient communication of any drug therapy prescribed to patients while minimizing common sources of errors, it is considered a valuable tool for antimicrobial stewardship. In particular, e-prescribing can often be easily combined with electronic decision support tools that prompt prescribers about optimal choices. Importantly, e-prescribing systems can also enable monitoring and evaluation of antibiotic prescribing at the hospital, but also at a more granular level down to the individual prescriber.

To improve comparability and thereby ensuring the complete benefits of e-prescribing can be realized by all stakeholders, guidance on best practices for e-prescribing as they relate to antibiotics is provided below. Note, that recommendations relating to required patient demographics as well as other key content fields for e-prescribing are not included.

1) Drug description

   A list of e-prescribing drug names will be provided within the system. This can be complemented by additional antimicrobials if relevant. Care should be taken to ensure that all drug names contain reference to the International Nonproprietary Name (INN) designation for the antimicrobial being prescribed. This facilitates identification of antimicrobials for analysis and comparison. It also reduces variation in prescribing and drug errors. Ideally, drug descriptions should not be enterable as free text. Prescriptions should be deemed invalid if drug descriptions are entered into any free text fields in the system. Instead, efforts should be made to add any missing medications onto the drug database. Consideration needs to be given to inclusion of a reference name (e.g. specific brand). A classification code should be included linked to drug description to aid analysis.

2) Single dose strength value

   Write full Arabic decimal numbers with a leading zero when a decimal point is necessary but without trailing zeros. The clear identification of numbers can prevent dosing errors up to hundred-fold. Note that the single dose strength value should be provided for each active ingredient for fixed dose combinations.

3) Single dose strength unit

   Provide a list of metric strength units for selection for weight or volume. Note that this should include single dose unit (e.g. for solid formulations) or strength unit for liquids, delivery rate, dosage form concentration or dose released from a single device actuation. Only standard abbreviations are to be used including kg=kilogram, g=gram, mg=milligram, mcg=microgram, L=litre, mL=milliliter, mEq=milliequivalent, mmol=millimole. Note that there is no universal abbreviation for units. Not that singlde

dose strength units should be provided for each active ingredient for fixed dose combinations.

4) Route of administration

All e-prescriptions should include route of administration. This should be specific and not abbreviated. Consideration should be given to use of SNOMED qualifiers to reduce heterogeneity of designation.

5) Frequency or timing of administration

Include detailed information on the frequency of administration, including intermittent dosing (e.g. once a week on Monday). Note that this includes information on continuous infusion. Consideration should be given to use of SNOMED qualifiers to reduce heterogeneity of designation.

6) Empiric or targeted treatment

If feasible, antibiotic prescriptions should automatically request a designation as empiric (not informed by microbiological sampling) or targeted.

7) Indication for treatment

All in-hospital e-prescriptions of antibiotics should include the indication for treatment. A drop-down list of indications is preferable to free text. An override function can be included to avoid frequent use of an "other" option. A list of indications is provided below in table X. The combination of 6) and 7) provides an opportunity for linking to hospital guidelines.

8) Stop or review date

All e-prescriptions for antibiotics must include a stop or review date. This should not be a number of days of treatment, e.g. in any free text fields.

9) Notes field

A notes field can be included and can be used as a mandatory field if a prescription is deviating from hospital guidelines as one form of electronic decision support tool.

	List of indications
CNS	Infection of the central nervous system
	Prophylaxis for CNS surgery
EYE	Eye infection, e.g. endophthalmitis
	Prophylaxis for ophthalmological surgery
ENT	ENT infection, including mouth, sinuses and larynx
	Prophylaxis for ENT surgery
RESP	Pneumonia or lower respiratory tract infection (LRTI)
	Lung Abscess
	Upper respiratory tract infection (URTI), but not ENT
	Acute bronchitis or exacerbations of chronic bronchitis
	Pulmonary tuberculosis
	Prophylaxis for thoracic/pulmonary surgery

CVS	Cardiovascular system infections, e.g. endocarditis – not device associated
	Cardiovascular system infection, e.g. endovascular prosthesis – device-associated
	Prophylaxis for thoracic/cardiac surgery
GI	Gastrointestinal infections, e.g. salmonellosis
	Intra-abdominal sepsis, including hepatobiliary and intra-abdominal abscess
	Prophylaxis for gastrointestinal or hepatic surgery
BJI	Septic arthritis – not device associated
	Osteomyelitis – not device associated
	Bone/joint infection – device associated
	Prophylaxis for orthopaedic surgery
SSTI	Cellulitis – not surgery associated
	Deep soft tissue infection – not surgery associated
	Abscess – not associated with surgery
	Pressure or diabetic ulcer
	Surgical site infection –soft tissue
	Surgical site infection – deep space infection
	Prophylaxis for plastic/reconstructive surgery
UTI	Lower urinary tract infection – not device associated
	Lower urinary tract infection – device associated
	Pyelonephritis
	Prostatitis
	Prophylaxis for urological surgery
	Prophylaxis for recurrent UTI
OBG	Obstetric/gynecological infection
	Maternal prophylaxis for neonatal sepsis
	Prophylaxis for obstetric surgery
	Prophylaxis for gynaecological surgery
GUM	Sexually transmitted disease
	Epididymo-orchitis
	Post-exposure prophylaxis
Other	Bloodstream infection – not device associated
	Bloodstream infection – device associated
	Sepsis – no clear primary focus
	Pyrexia of unknown origin
	Fever in the neutropenic patient
	Infection of the lymphatics, e.g. suppurative lymphadenitis
	Extra-pulmonary tuberculosis
	Medical prophylaxis
	Other (to specify in free text)

Appendix 6

<u>Document requirements for AS guidance documents</u>

All documents providing hospital-wide or department-specific guidance relevant to antimicrobial stewardship should include the following information: Title, authorship, version number, ratification, if applicable, date effective from (at least month/year), brief description of intended use or scope of guideline. Ideally a planned review cycle or expiry date should also be indicated. Note that one section of any guidance should describe what monitoring will be done to evaluate compliance with the recommendations.