Handbook on implementing ASP in acute care hospitals in Switzerland; 1st edition, 2024.

Working paper provided for the call for project proposals (June 2024)

Editor: Project Partnership of StAR-3

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➢ **Handbook 1st Edition: Basic level ASP**		
➢ **Introduction**	**About the handbook** The aim of the handbook on implementing antimicrobial stewardship programs (ASP) in acute care hospitals in Switzerland is to support acute care hospitals in implementing a basic level ASP. The handbook is based on a concept developed at the CHUV in accordance with international guidelines [WHO toolkit, 2019; CDC, 2019]. Furthermore, it aligns with the certified quality improvement measure of the national quality contract. The handbook enables hospitals to implement ASP activities with less time and personnel resources while reducing potentially associated costs, frustrations, and risks. **Target audience** The document is intended for senior professionals who are involved in setting up an ASP at the hospital. Clinicians, pharmacists, IPC nurses, infection prevention and control (IPC) experts, quality managers, medical microbiologists, hospital executive staff, and additional stakeholders involved are equally addressed. **Precondition** The ASP requires the support of the hospital management and of relevant committees. The willingness to change established routines and the investment in staff hours and other associated costs e.g. IT infrastructure are both essential. **Starting an ASP from scratch** To help get the hospital started from scratch, follow the steps of the practical guide. This phase may take 6 to 12 months and require 50 to 200 staff hours. **Implementation of the basic elements of an ASP** Above step will have laid a foundation for local antimicrobial stewardship that can be extended to a comprehensive ASP in a stepwise manner. This may require 12 to 36 months.	Certified quality improvement measure for ASP of the national quality contract Starting an ASP from scratch: practical guide Minimum structural requirements for IPC in Switzerland

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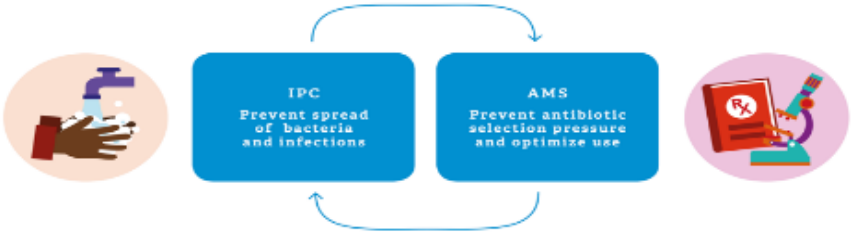
	Local ASPs are a worthwhile investment, given that scientific data have shown ASPs to be cost-effective for hospitals. They contribute to improving treatment outcomes and patient safety while supporting national goals of reducing antimicrobial resistance and improving quality of care. **IPC and ASP are complementary** The ASP must be closely aligned with measures to reduce healthcare-associated infections implemented by the IPC team. ASP will reduce the risk of the development and spread of drug resistance. ASP is complementary to IPC measures for reducing the transmission of multidrug resistant microorganisms (MDRO) and diagnostic services for the rapid detection of MDRO. 	Detection and diagnosis of MDRO in non-outbreak and in outbreak settings - Prevention and control of MDRO in non-outbreak setting - Management of MDRO outbreaks

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➢ **Content**	**Content** **Overview of the content of the handbook** 1. Strategic support, local team, and dedicated resources 2. Monitoring and reporting of antimicrobial use 3. Local antimicrobial resistance epidemiology and *C. difficile* monitoring 4. Antimicrobial therapy guidelines 5. Education & training and raising awareness 6. Prescribing of antimicrobials 7. Prescribing audits with feedback to prescribers 8. IT support and digitalization 9. Reporting system For each of the fields of ASP, the handbook offers practical tools to reach a basic level of ASP. It addresses prescribers and other relevant staff in their daily clinical work in the acute care setting. More tools are being prepared by the StAR-3 project partnership and will be offered by 2026.	

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➢ **1. Strategic support, local team, and dedicated resources**	For an ASP to be sustainable, support from the hospital management and relevant committees, an adequate governance structure for the ASP, and dedicated resources are pivotal. **(1) Obtain a formal statement from the hospital management in support of ASP** The document can contain a basic statement on antimicrobial stewardship in the hospital and a commitment to provide funds and IT resources for this purpose. It can be integrated into the hospital's strategic goals and /or into the quality management concept. To prepare such a statement, a concept defining the scope of the local ASP and the priorities for the next 3 to 5 years may be a good starting point. **(2) Set up a local ASP team with strong leadership and nominate a dedicated project champion** Establish a cross-hospital multi-disciplinary ASP team to develop an ASP and operate the program. Assemble a group of 3 to 5 senior staff spanning the relevant fields of expertise. This includes IPC specialists, clinicians with experience in infectious diseases or internal medicine, hospital pharmacists, and medical microbiologists of the local or associated microbiology laboratory. Consider involving quality managers, and liaison staff from other pertinent departments (e.g. surgery). Further, a dedicated IT single point of contact is helpful. The designated people should be motivated and solution oriented. Identify 1 or 2 senior staff members (e.g., IPC/ID physician and pharmacist) to provide operational and technical leadership of the first ASP team. Identify the person in the group who acts as a project champion – ideally, somebody who is not in the lead of the ASP group. The project champion continuously advocates for the project at the stakeholder level and negotiates solutions to secure their commitment. In addition, the project champion supports the leadership of the ASP team. A project champion should have strong communication skills, enjoy broad acceptance, and be familiar with the hospital.	ASP_presentation template slides (PDF) ASP_presentation template slides (PPT)

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	(3) Obtain adequate staff and financial resources for the ASP team and IT support Resources required to plan, operate, and further develop an ASP vary according to hospital type and size. Smaller hospitals may be able to invest 0.5 FTE to start an ASP and increase to 1 or more FTE once the program has become fully operational. International bodies recommend between 1 and 2.5 FTE depending on the size of the hospital. The activities should be included in the job description/specification of duties of the respective role. Do make use of the handbook: the tools provided in this first edition of the handbook contribute to saving local staff time for developing an ASP. Staff time covers ASP support provided by IPC specialists, infectious diseases senior physician, and a hospital pharmacist, as well as staff costs for the involvement of medical microbiologists, IT specialist, and quality manager. The activities include conducting education and training, antimicrobial stewardship rounds and audits as well as adapting IT tools and producing information materials e.g. AMR statistics. For smaller hospitals it is recommended to cooperate with a larger hospital/hospital network with the corresponding ASP expertise (cooperation agreement).	

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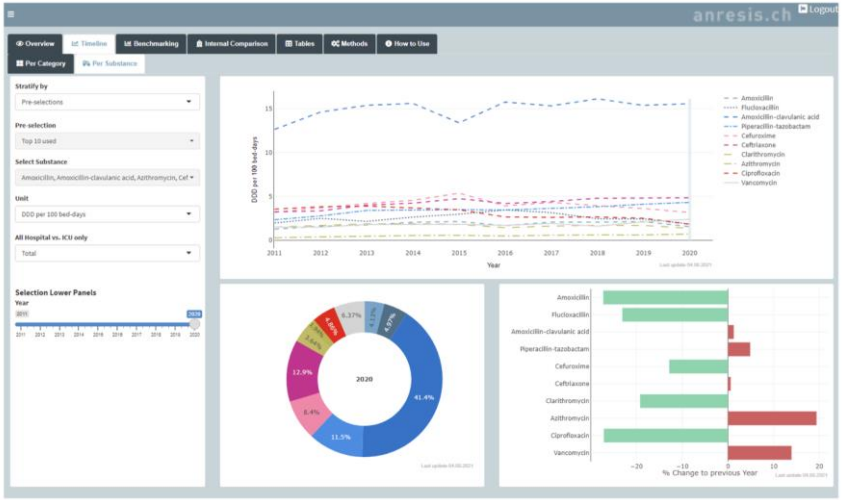
➢ **2. Monitoring and reporting of antimicrobial use**	Surveillance of antibiotic use is a crucial element in antibiotic stewardship, as it helps to identify fields of action. Antimicrobial use monitoring can either be set up locally or be conducted by using the ANRESIS platform for monitoring antibiotic use. We strongly recommend using ANRESIS because it provides the additional benefit of a benchmark with other hospitals of similar size. **(1) Ensure the hospital joins the ANRESIS platform for monitoring antimicrobial use** Hospitals should submit their data on antibiotic consumption to the platform at least once a year. ANRESIS (Swiss Centre for Antibiotic Resistance) has collected data on antibiotic use from hospitals since 2006. Participating hospitals get individual feedback and benchmark reports based on their data. Since 2023 data are available online via an interactive dashboard anytime.  If the hospital considers setting up its own local monitoring of antimicrobial use: – base monitoring of antimicrobial use on aggregated data from the local electronic patient record system (if not available, switch to pharmacy delivery data),	Information about the ANRESIS dashboard Contact https://www.anresis.ch/about-us/team/ The WHO AWaRe (Access, Watch, Reserve) classification. https://aware.essentialmeds.org/list Further information about the WHO AWaRe classification: Zanichelli, Veronica, et al. "The WHO AWaRe (Access, Watch, Reserve) antibiotic book and prevention of antimicrobial resistance." (2023): 290. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10042089/#R25 Of note is that current WHO targets for the use of “Access” group antibiotics (AWaRE classification) relate to the total use (in- and outpatient sector) and are yet to be adapted for the inpatient sector.

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	– aggregate antibiotic use per antimicrobial group and hospital unit, – report as DDD (daily defined doses) and/or DOT (days of treatment) per 100 bed days and stratify by WHO AWaRe classification of antibiotics. **(2) Ensure feedback on local data on antimicrobial use is provided and critically discussed with prescribers** A process must be in place to ensure that data on antimicrobial use get discussed among the relevant groups (e.g., clinical department). Encourage the discussion of results in meetings with prescribers, especially if the use increases. Monitoring trends in antimicrobial use provides information on whether prescribing has improved. Site/dashboard access statistics can give hints as to whether monitoring data are used. If there is no visible effect, ensure local practice and the further development of ASP are reviewed and discussed in relevant committees.	

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➢ **3. Local antimicrobial resistance epidemiology and *C. difficile* monitoring**	The surveillance of antimicrobial resistance in local isolates of common microorganisms, as well as *C. difficile* infection monitoring, are important elements in antibiotic stewardship.	Contact https://www.anresis.ch/about-us/team/
➢ **3.1 Antimicrobial resistance epidemiology**	Regional/national resistance data must be considered in the development of guidelines on empiric antimicrobial prescription. **(1) Ensure the hospital has access to epidemiological data on local antimicrobial resistance for the most common pathogenic bacteria** Possible data sources are: – The associated microbiology laboratory. – ANRESIS, the Swiss Centre for Antibiotic Resistance, provides regional and national resistance data in a database query interface and in a graphic matrix with filter function. Furthermore, hospitals can request statistics based on local resistance data. **(2) Ensure that epidemiological data on antimicrobial resistance are user-friendly and being used** Resistance statistics are available to prescribers at the point of care and presented in a user-friendly way (e.g. matrix table). **(3) Ensure resistance statistics are up-to-date** Aim for regular (yearly) updates of resistance data	ANRESIS resistance data for Switzerland: https://www.anresis.ch/antibiotic-resistance/resistance-data-human-medicine/ https://guide.anresis.ch/human-bacteria

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➢ **3.2 *C. difficile* infection surveillance**	Local *Clostridioides difficile* infection (CDI) rates complement data on antibiotic use as additional indicator. CDI are often associated with antimicrobial use in combination with other risk factors and in-hospital transmission. **(1) Have an established CDI surveillance** ANRESIS has developed a platform for a laboratory data-based CDI surveillance. Consider your hospital to join the ANRESIS system. **(2) Ensure the surveillance of CDI is user-friendly and used** Ensure that the ASP and the IPC have established a joint process to investigate the increase of CDI rates, in which in-hospital transmission, prescribing practices, and other causes should be investigated. Furthermore, recommendations for improvement should be created and transmitted to the relevant groups (leaders of clinical departments, relevant committees).	Robert Koch-Institut *Clostridioides difficile* https://www.rki.de/DE/Content/Infekt/EpidBull/Merkblaetter/Ratgeber_Clostridium.html#doc2393684bodyText19 Minimum structural requirements for IPC in Switzerland

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➢ **4. Antimicrobial therapy guidelines**	**(1) Ensure your hospital has a local set of evidence-based and relevant guidelines** The guidelines focus on empiric antimicrobial treatment and surgical perioperative prophylaxis. They should be based on local/regional antimicrobial resistance data. They should include a system for categorizing patients with penicillin allergy and provide information on adequate treatment options. Different sources can be used as a basis for local guidelines: – The Swiss Society of Infectious Diseases provides online guidelines for general practitioners and other specialists in the outpatient setting. – Larger hospitals offer access to their guidelines (see list of exemplary local guidelines in Switzerland (some of them include advice regarding penicillin allergies). – Mobile apps supporting the decision-making process regarding the therapy (e.g., Firstline, Sanford and others). – Swissnoso provides guidelines for perioperative antimicrobial prophylaxis. **For smaller and medium-sized hospitals**, the use of external antimicrobial treatment guidelines, e.g., from regional tertiary centers or hospital networks, rather than producing their own guidance, is recommended. **(2) Ensure local guidelines are user-friendly and used** Guidelines are available to prescribers at the point of care and guide them through the decision-making process. To ensure that prescribers use the guidelines, they should ideally be integrated into the local IT system or a smartphone app. If you design local antimicrobial treatment guidelines, focus on usability. Use a readily available format like a web application. Consider structuring them to allow for later integration into electronic patient record applications / your local hospital IT system. Site access statistics can give hints as to whether guidelines are used. **(3) Ensure guidelines are up-to-date** A process to regularly review and update local guidelines (recommended at least every	Schweizerische Gesellschaft für Infektiologie Guidelines www.ssi.guidelines.ch Examples for local hospital guidelines: in alphabetical order **University hospitals** CHUV Guide d'antibiothérapie https ://www.chuv.ch/fr/min/min-home/personnel-de-la-sante/guide-dantibiotherapie HUG https://firstline.org/hug/ Inselspital Bern https://antibiotika.insel.ch Universitätsspital Basel Sanford Guide + infektioStandards https://www.sanfordguide.com/products/digital-subscriptions/sanford-guide-infektiostandards/ USZ https://www.usz.ch/fachbereich/infektiologie/ueber-uns/bestellen-sie-unsere-antibiotikarichtlinien/ **Other hospitals:** KSB Kantonspital Baden https://www.kantonsspitalbaden.ch/Departement-Innere-Medizin/Dokumente/AB-Empf2023_v3.pdf

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	three years) should be established in the hospital. **(4) Ensure that guidelines are harmonized** Consider national recommendations, local trends in drug resistance, availability of antimicrobials, etc.	KSSG Guidelines: https://kssg.guidelines.ch/ Kantonspital Swissnoso Guidelines on perioperative antibiotic prophylaxis https://www.swissnoso.ch/guidelines-publikationen/guidelines

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➢ **5. Education & training and raising awareness**	Education & training combined with awareness campaigns reinforce new local routines – such as using guidelines and practicing a new prescription approach. **(1) Ensure the hospital provides education and training on antimicrobial prescription to prescribers and hospital pharmacists** Prescribing doctors, and hospital pharmacists are educated and trained in prescribing practices (see chapter 6). Those contents can be included in routine educational activities and delivered during the induction of new staff. Education on antimicrobial prescription should also include basic training in **diagnostic stewardship**. Here, it is recommended to train prescribers on the indications for urinary culture sampling (to avoid unnecessary antibiotic prescriptions in asymptomatic bacteriuria). Attendance data can give hints on how many prescribers and hospital pharmacists were educated and trained. **(2) Ensure the hospital educates clinicians, hospital pharmacists and nurses involved in administering antibiotics on the basics of antimicrobial stewardship** The activities aim for healthcare staff to understand the importance of antimicrobial stewardship and the local approach to prescribing. This education can be included in routine educational activities and delivered during the induction of new staff. **(3) Ensure the hospital raises awareness of antimicrobial stewardship** The hospital provides staff, patients, and visitors, with regular information on local ASP activities, e.g., during the World Antimicrobial Awareness Week.	For prescribers and hospital pharmacists: – BSAC algorithm: Start smart, then focus. Planned: Short video recording and transcript of a PowerPoint presentation [5-10 minutes in German/French] explaining the prescribing algorithm. – Dyar, O. et al. for ESGAP (ESCMID) What is antimicrobial stewardship? Historical background and introduction of antimicrobial stewardship into clinical settings. – ECDC Module 1 Introduction to Antimicrobial Stewardship: The relationship between inappropriate antimicrobial use and the risks of increasing antimicrobial resistance, poor patient outcomes, and excessive healthcare costs [15 minutes, English]. For general education: – BSAC algorithm: Start smart, then focus (see above) – Federal Office of Public Health (2021): Antimicrobial Stewardship – vom verantwortungsvollen Umgang mit Antibiotika in der Humanmedizin [8 minutes, German with English subtitles]

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➢ **6. Prescribing of antimicrobials**	Current data on antibiotic resistance (section 3.1), guidelines for antimicrobial therapy (section 4) and the general principles (see section 6.1) promote appropriate prescribing of antibiotics. To further support appropriate prescribing, additional prescribing restrictions and reporting of resistance data should be established.	
➢ **6.1 Prescribing of antimicrobials – General principles**	Prescribers and hospital pharmacists should follow the local guidelines (see Chapter 4) and apply the principles of antibiotic prescribing. **(1) Antimicrobial stewardship prescribing algorithm: "Start Smart Then Focus" (adapted from BSAC)** ***Start smart (empirical treatment)*** *Only start antibiotics if there is high clinical probability of bacterial infection* 1. **For patients with suspected sepsis or other life-threatening infection, initiate effective antibiotic treatment within one hour of diagnosis** (or as soon as possible). 2. **Ensure that relevant microbiological specimens are being taken** Diagnostic methods include rapid antimicrobial susceptibility testing techniques. 3. **Take a thorough drug allergy history** to assess for patient hypersensitivity reactions and potential contraindications to specific antibiotics. 4. **Comply with local guidance on empirical antimicrobial treatment** unless an exception is clearly justified (e.g., known colonization with MDRO etc.). 5. **Document** the following on the drug chart and in the clinical notes: ○ clinical indication, dose, and route as per severity/patient factors, ○ known MDRO carriage/colonisation. ○ review/stop date or duration of treatment ***Then focus (review at 48-72 hours)*** *Based on clinical evolution and microbiology results, review the treatment and decide whether to:* 1. **STOP antimicrobials?** If no evidence of bacterial infection or, if bacterial infection unlikely. 2. **Change antibiotics?** De-escalate/adapt from empirical to targeted therapy, guided by microbiology results	**Start smart then focus (SSTF, PDF)** **Start smart then focus (SSTF, PPT)** Reference document: Clinical management algorithm for antimicrobial stewardship (adapted from BSAC, 2018) Swissnoso recommendations on perioperative antibiotic prophylaxis in Swiss hospitals, 20.09.2015: https://www.swissnoso.ch/guidelines-publikationen/guidelines#collapse-709176

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	and clinical evolution, among others. 3. **Switch from IV to oral therapy?** If satisfactory clinical response and if there are no infection- or patient-specific indications for continuing antibiotic therapy intravenously. 4. **Continue current regimen?** IF so, check if the dosage is still correct? Consider referral to an infectious diseases specialist and / or a clinical pharmacist). 5. **Outpatient parenteral antibiotic therapy (OPAT)?** IV antibiotics might be continued as ambulatory (outpatient) treatment, an option if the patient is clinically well and if patient safety is granted. Check for regional OPAT services. **Document all decisions,** including the next clinical review date. **(2) For perioperative antibiotic prophylaxis: Swissnoso** *General principles of perioperative (surgical) prophylaxis include:* – Clean surgery without the placement of a prosthesis or implant does not warrant perioperative prophylaxis. – Clean-contaminated or contaminated surgery, or surgery with placement of implants, require perioperative prophylaxis. – Perioperative prophylaxis is most effective if applied 0-60 min before knife to skin (vancomycin and fluoroquinolones 60-120 min). – Single doses of antimicrobials should not be adapted to renal function. – Redosing is required in interventions with a duration over two times the half-life of the used antibiotic agent. – If penicillin allergy can be excluded, cephalosporin, instead of other less effective options, can be used in most cases. – In general, prophylaxis over 24h is not associated with an additional benefit but might increase the risk of antimicrobial resistance selection and adverse events such as renal failure and CDI. Swissnoso provides an exemplary guideline on perioperative prophylaxis.	

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➢ **6.2 Prescribing: Prescription restrictions**	**Prescription restrictions and selective reporting** support the appropriate use of antimicrobials from the Watch and Reserve group. Those should only be used in exceptional circumstances, e.g., in infections with MDRO and with otherwise limited treatment options. **(1) Ensure that a hospital-wide restriction on prescribing of Watch and Reserve antibiotics is in place** It is recommended to compile a list of predefined reserve-group antibiotics, for which an infectious diseases consultation is mandatory. Alternatively, the prescription of listed antibiotics can be restricted to infectious diseases physicians (preauthorization). **(2) Ensure that selective reporting is established in your hospital** Selective reporting (the name of certain antimicrobial agents to which the isolated pathogen is susceptible is 'hidden' in the list of antibiotics in the report) is recommended for carbapenems, for example, and can be considered for quinolones in urine cultures.	

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➢ **7. Prescribing audits with feedback to prescribers**	Audits provide essential information on the quality of prescriptions. They are ideally framed as a quality improvement strategy and are conducted within a supportive environment. Audits should primarily target reductions in antibiotic initiations, prolonged antibiotic duration, inappropriate route, and/or the unnecessary use of broad-spectrum antibiotics. **(1) Ensure that the hospital participates in national surveillance (point prevalence study, PPS, and surgical site infection surveillance, SSI).** Critical review of surveillance results on antimicrobial use is a very useful ASP activity. This data provides a snapshot on prevalence and trends in antimicrobial use over time. **(2) Ensure the participation of an infectious diseases specialist or hospital pharmacist on the ICU and, optionally, on selected haemato-oncology units** providing feedback on antimicrobial prescriptions. **(3) Ensure that outcomes regarding the local practice and use of antimicrobials are discussed with prescribers and suitable follow-up interventions are developed and evaluated.** Audit results can indicate whether prescribing has improved. If there is no visible effect, ensure that local practice and the further development of ASP are discussed in relevant committees.	**Swissnoso** https://www.swissnoso.ch/punktpraevalenz-erhebung/ueber-die-punktpraevalenz-erhebung https://www.swissnoso.ch/module/ssi-surveillance/resultate

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➢ **8. IT support and digitalization**	IT support and digitalization are essential for a local ASP to thrive in the short and long term. **(1) Define a dedicated single point of contact in the IT department** Preferably define this person at an early stage. The IT department, guided by **the ASP team**, – implements access to data on antibiotic use and antimicrobial resistance and to other routine data from your local electronic patient records (e.g., line lists of patients under certain antibiotics or information focusing on diagnostics) – integrates the guidelines in the electronic patient record system – integrates education & training resources (e-learning courses) and materials of awareness campaigns (screen savers, reminders, etc.) in the IT system – develops and implements decision support tools for the prescriptions, such as alerts (deprescription, antibiotic allergies). **(2) Promote digital transformation within the local ASP** Swissnoso, ANRESIS, SPHN, Swiss Pathogen and Surveillance Platform (SPSP), and other national actors are developing a digitalisation strategy to take advantage of the rapid advances in data science. ASP leaders should follow forthcoming developments around guidance and software solutions for hospital IPC that will automate data collection and digital surveillance and thus can support local ASP. Hospitals should invest in IT interfaces between local databases and national platforms. User surveys and access statistics inform about the usability of the IT support tools.	

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➢ **9. Reporting system**	A reporting system enables governance and further development of the local ASP. **(1) Implement annual reporting on ASP within existing reporting and steering processes** Yearly reporting should include: – Annual goals – Antimicrobial use, e.g., broad-spectrum antibiotic use, proportions of Access/Watch/Reserve antibiotics, antibiotic initiations, as well as the frequency of CDI – ASP activities and results – Recommendations for further development of the local ASP	