


National Strategy for the Monitoring, Prevention and Control of Healthcare-Associated Infections (NOSO Strategy)



 Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation
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Preface

Switzerland has one of the most efficient healthcare systems in the world. This should not, however, detract from the fact that there is also a risk here in Switzerland of becoming infected with pathogens while in hospital or in a nursing home. As a result, people can suffer severe or even life-threatening infections in addition to existing diseases and symptoms.

We must therefore ensure a lasting improvement in protection against these infections, as they can drastically restrict the quality of life of those affected. Besides this, however, considerable economic costs and losses are also incurred, as these infections make treatment more expensive, in addition to prolonging recovery time and delaying any resumption of work.

In many places in Switzerland, there are already successful initiatives and measures for the monitoring and prevention of healthcare-associated infections. In individual areas, national tests and pilot programmes have been launched in recent years. This is a very encouraging development that we must intensify. On the basis of current knowledge, it can be assumed that up to half of these infections can be avoided at reasonable expenditure. With a nationally coordinated approach, we therefore want to ensure that, as part of their tasks and responsibilities, all stakeholders intensify their efforts, using optimal coordination among each other, to ensure more effective protection against infections.

The Federal Council has included protection against healthcare-associated infections as a priority measure in its global health strategy "Health2020" and has prepared a strategy for combating this health policy challenge. This strategy is the result of a broad-based participatory process. It creates the right conditions to further expand existing structures and previously acquired knowledge on protecting against these infections, combining the forces of all stakeholders and aligning them to the common goal. Targeted measures should be deployed in areas where infections can be avoided and people protected against infections.

I would like to thank all partners whose great dedication contributed to the drafting of the NOSO Strategy. I am convinced that together we will achieve our goals, thanks to the willingness of all stakeholders to work closely together.

A handwritten signature in black ink, appearing to read 'A Berset'.

Alain Berset,
Federal Councillor,
Head of the Federal Department of Home Affairs

Contents

Summary	4
1 Introduction	6
1.1 Reasons for a national strategy for Switzerland	6
1.2 Development process and planned implementation process	8
1.3 Definition of “HAI” and “potentially dangerous pathogens”	9
2 Fundamentals	10
2.1 Development and causes of HAIs	10
2.2 Risk factors for HAIs	11
2.3 Occurrence and frequency of HAIs	12
2.4 HAI pathogens	13
2.5 Importance for health policy	14
2.6 Avoidability and best practices in infection prevention	14
3 Existing activities	17
3.1 Federal activities	17
3.2 National structures and programmes	18
3.3 International structures and programmes	21
4 Global objective and scope of the Strategy	23
5 Strategy model	25
6 Action areas, strategic objectives, key measures and responsibilities	28
6.1 Strategic framework	28
6.2 Summary of responsibilities	31
6.3 Governance action area	35
6.4 Monitoring action area	47
6.5 Prevention and control action area	54
6.6 Education and research action area	57
7 Aspects of implementation	63
7.1 Implementation priorities and stakeholder involvement	63
7.2 Legal foundations	64
7.3 Resources and financing	67
7.4 Communication	68
7.5 Evaluation	68
8 Thanks	69
9 Appendix	71
9.1 Abbreviations	71
9.2 Glossary	72

Summary

Every year, some 70 000 patients fall ill in Swiss hospitals due to a healthcare-associated infection (HAI), and approximately 2000 of them die as a result. In particular, surgical site infections and catheter-associated bacteraemias (blood poisoning) are common and are associated with serious consequences. But the lungs and urinary tract are also at risk or are susceptible to infections during and after medical interventions. Studies show that, depending on the type of infection, between 20 % and 50 % of these infections can be avoided through targeted monitoring and prevention measures.¹

Importance for health policy

There are numerous initiatives as well as concrete measures in Switzerland to reduce healthcare-associated infections (HAIs). They do, however, vary greatly in terms of scope and quality depending on the establishment and region. To date, there is no national system for monitoring of the epidemiological situation, nor are there any generally valid, evidence-based minimal requirements or standards for preventing and combating healthcare-associated infections. In addition, healthcare facilities need targeted support in introducing and adequately implementing measures to ensure that the topic receives a higher priority in their everyday work.

Need to act in Switzerland

The Federal Council has recognised the need to act and in its comprehensive health policy strategy “Health2020” has declared the reduction of HAIs one of the primary measures for supplementing and improving the population’s health protection. The revised Epidemics Law that entered into force on 1 January 2016 charges the Confederation – with the involvement of the cantons – with defining goals and strategies for the detection, monitoring, prevention and control of communicable diseases and develop a national programme in the area of HAIs. With the national NOSO Strategy², the Confederation, cantons and stakeholders involved in strategy development are providing the necessary foundations for targeted and nationally coordinated action.

Political mandate

The NOSO Strategy is based on best practices in Switzerland and abroad and closes existing gaps. It sets out the responsibilities for achieving objectives and implementing measures.³ The suggested key measures take account of healthcare establishments’ different needs and possibilities and their operational requirements. The NOSO Strategy is also coordinated with federal measures such as the Antibiotic Resistance Strategy (StAR) and pilot programmes that are part of the quality strategy, so as to ensure a common approach without any duplication.

Premises

The NOSO Strategy includes both occurrence and outbreaks of HAIs in *inpatient care* facilities (hospitals and nursing homes) in Switzerland. *Outpatient care* – this also includes day clinics – does not fall within the scope of this strategy. This is due to the enormous complexity of the task of taking account of the different needs of inpatient and outpatient service providers in one strategy document. The Confederation intends to extend the NOSO Strategy to the outpatient domain in a second step.

Scope

The NOSO Strategy defines any infections as HAIs that occur while staying in a hospital or nursing home in connection with a diagnostic, therapeutic or nursing measure, or that are simply due to the circumstances of the stay, possibly as a result of pathogens in the air or on surfaces.

What is a healthcare-associated infection (HAI)?

¹ Harbarth, S., Sax, H. and Gastmeier, P., “The preventable proportion of nosocomial infections: an overview of published reports”, *Journal of Hospital Infection* 2003 Aug; 54(4): 258–66. Umscheid, C. A. et al. (2011), “Estimating the proportion of healthcare-associated infections that are reasonably preventable and the related mortality and costs”, *Infection Control & Hospital Epidemiology*, Vol. 32, No. 2

² The acronym NOSO refers to the specialist term “nosocomial infection” (from Greek νόσος *nósos* “disease” and κομᾶν *komein* “to take care of”).

³ Once the Strategy is adopted, implementation is planned in a second stage by the Federal Council. Individual aspects of implementation are already presented in chapter 7, however.

The strategy's global objectives include the reduction of HAIs and the prevention of the spread of potentially dangerous pathogens in inpatient care. If the relevant stakeholders succeed in achieving this aim through coordinated efforts, the patients, residents and staff in the healthcare facilities concerned will benefit from a higher level of safety. The population will also be better protected against HAIs, which will reduce follow-up costs for the healthcare system.

Global objective and long-term effect

To reduce the number of infections and associated loss of quality of life, as well as long-term effects and deaths, the national NOSO Strategy defines four priorities (action areas), each with different strategic objectives and key measures.

Strategy structure

1) Governance

Governance

The Federal Council coordinates the procedure of HAI monitoring, prevention and control. Evidence-based standards and guidelines, defined responsibilities, optimised structures and processes, incentives and a functioning knowledge management all contribute towards achieving the global objective. The different stakeholders assume an active role in accomplishing their respective tasks. They support the achievement of objectives by means of their own control instruments, through suitable information and communication measures and by complying with requirements.

2) Monitoring

Monitoring

On the basis of existing structures, ongoing programmes and legal foundations, and by respecting responsibilities at the cantonal and federal levels, the monitoring of HAIs and their pathogens is being developed in Switzerland as needed. To this end, there are plans to record HAIs (outcome data) and pathogens as well as observe significant structural and process parameters (e.g. quality of monitoring or adherence to prevention measures in institutions). Depending on requirement, the collected data are evaluated locally (health institution), regionally (cantons) or nationally (Confederation, ANQ, etc.) and promptly made available to the parties concerned. They are used as a basis for developing and implementing targeted interventions or for evaluating their impact.

3) Prevention and control

Prevention and control

Targeted measures are designed to ensure that the different stakeholders (mainly Confederation, cantons, hospitals, nursing homes and professional societies) and persons affected (staff, patients, residents and visitors) are aware of the problem, take it seriously and contribute to implementing the NOSO Strategy. Information, practical implementation guidance and evaluations help organisations and individuals review and where necessary adapt their attitude and behaviour regarding infection risks in accordance with the strategy objective.

4) Education and research

Education and research

The institutions in charge of the respective levels of education coordinate the optimisation of educational concepts and offers in the area of infection prevention. In cooperation with university hospitals and other healthcare institutions as well as professional societies and associations, they ensure education and continuing professional development (CPD) of healthcare professionals into specialists in infection prevention. Hospitals and nursing homes support their staff's CPD. Research into infection risks is promoted, as is research into the possibilities and limitations of improving patient safety.

As part of their respective responsibilities, the Confederation and the cantons ensure that the national NOSO Strategy is implemented and work closely with the different stakeholders in this area. The strategy objective, namely to ensure a significant and lasting reduction in HAIs, can only be achieved if implementation occurs on a wide scale and all stakeholders do their bit.

Implementation

1 Introduction

1.1 Reasons for a national strategy for Switzerland

Healthcare-associated infections (HAIs) are a serious and urgent problem for public health both globally and in Switzerland and are of major importance for health policy. Every year, some 70,000 patients fall ill in Swiss hospitals due to a healthcare-associated infection (HAI), and approximately 2,000 of them die as a result. These estimates are based on the results of a prevalence study according to which 7.2% of hospitalised patients contract a healthcare-associated infection.⁴ The majority of published studies show that, depending on the type of infection, between 20% and 50% of these infections could be avoided through targeted monitoring and prevention measures.⁵ HAIs not only represent avoidable suffering for patients, they are also a burden on healthcare systems and on the economy as a result of protracted periods of hospitalisation and long-term damage as well as additional treatment costs and lost work time. Furthermore, they harm the reputation of healthcare facilities. In nursing homes, infectious diseases in the elderly – some of whom have a poor general state of health – can lead to a significant restriction in quality of life or even death. There is currently a lack of evidence-based studies and data available on this topic.

Health policy challenge

HAI avoidance measures are already being implemented in Switzerland. They do, however, vary greatly in terms of scope and quality depending on the establishment and region (cf. chapter 3.2). There are already national comprehensive surveys such as the module for measuring surgical site infections by the National Association for the Development of Quality in Hospitals and Clinics (ANQ) and Swissnoso. Swissnoso (Swiss association of experts in the field of infectious diseases and hospital hygiene) and the Swiss Society for Hospital Hygiene (SGSH) have already published several recommendations on infection reduction. But there is no national monitoring system that includes all the relevant types of infection. Also lacking are uniform national rules defining evidence-based or best practice-based procedures and standards, as well as systematic evaluation and monitoring of the success of implementation. With the development of the surgical site infection intervention module, Swissnoso has also provided guidelines for the prevention of surgical site infections. Despite some national standards, however, each institution is also required to develop its own solutions to implementing the national legislation that are customised to each specific situation,

Heterogeneous view

The revised Epidemics Act that entered into force on 1 January 2016⁶ charges the Federal Council – with the involvement of the cantons – with defining goals and strategies for the detection, monitoring, prevention and control of communicable diseases. Within the framework of its health policy priorities (“Health2020”), the Federal Council has defined the reduction of nosocomial infections as a priority measure for improving the population’s health protection. Parallel to these developments, the problem of antibiotic resistance is increasingly present in public and political discussion, to a large degree through the Antibiotic Resistance Strategy (StAR), which was approved by the Federal Council in November 2015 as part of

Statutory mandate

⁴ Sax, H., Pittet, D. (2005), “Resultate der Schweizerischen Prävalenzstudie der nosokomialen Infektionen 2004 (snip04)”, *Swissnoso Bulletin*, 12:1./Sax, H., 2006, “Qualitätsmanagement: Hygiene in den Spitälern”, *Die Volkswirtschaft* 12–2006, pp. 17–19; cf. Swissnoso notice dated 23 August 2013. In this earlier rough estimate, causality is not fully established.

⁵ Harbarth, S., Sax, H. and Gastmeier, P., “The preventable proportion of nosocomial infections: an overview of published reports”, *Journal of Hospital Infection* 2003 Aug; 54(4): 258–66. Umscheid, C. A. et al. (2011), “Estimating the proportion of healthcare-associated infections that are reasonably preventable and the related mortality and costs”, *Infection Control & Hospital Epidemiology*, Vol. 32, No. 2

⁶ Federal Act of 28 September 2012 on Combating Communicable Human Diseases (EpG; SR 818.101), version: 1 January 2016

“Health2020”. This deep awareness of the problem promotes rapid and targeted implementation of the NOSO Strategy.

Several parliamentary motions also underline the significance that Parliament attaches to the subject. According to the Federal Council, it was important to include these motions in the present strategy.

Parliamentary motions

The motion of National Councillor Thomas Hardegger (12.3104, *Avoiding hospital infections. Statutory regulations for hygiene measures*) charges the Federal Council with providing the legal foundations to ensure that in the fight against nosocomial infections the current state of medical knowledge is taken into account and the risk of becoming infected with resistant germs is reduced. In each of its responses to two interpellations by National Councillor Thomas Hardegger (14.4107, *Publication of measurement results on hospital infection rates*; and 14.3358, *Lack of incentives in the DRG system for preventing hospital infections*), the Federal Council referred to the ongoing development of the national NOSO Strategy.

The national NOSO Strategy is supposed to indicate the solution to a problem that has for years been deemed by many health experts to be urgent but resolvable. It aims to achieve a broad and sustained effect through combining forces and aligning them to the common goal. Stakeholders in the field of HAI monitoring, prevention and control – particularly the Confederation, the cantons, healthcare institutions, professional societies, expert panels, associations, educational and research institutions – have different interests and expectations in terms of a national strategy. To protect the public health, all stakeholders are called upon to make their contribution towards achieving the strategic objectives in the four defined action areas.

Joint responsibility

A broad-based and comprehensive strategy should establish the basis for a targeted and nationally coordinated approach. The strategy includes the following premises:

Strategy premises

- The strategy’s global objective is to reduce HAIs and prevent the spread of potentially dangerous pathogens in hospitals and nursing homes.
- The safety of patients, residents and staff in hospitals and nursing homes should be increased, with better protection of the population against HAIs and a reduction in follow-up costs for the healthcare system. The strategy is also designed to contribute towards preventing and combating antibiotic resistance.
- The strategy is based on best practices in Switzerland and abroad, using existing structures, promoting the use of synergies and closing existing gaps.
- The strategy defines four thematic priorities (action areas) for reducing HAIs – governance, monitoring, prevention and control, as well as education and research – with the respective strategic objectives and key measures.
- The strategy defines responsibilities for implementing the measures.
- In order to take due account of the different interests and expectations in terms of the NOSO Strategy, the relevant stakeholders and stakeholder groups were included as part of a participatory process in the development of the strategy.
- The proposed measures take account of the needs of healthcare institutions, which may differ in terms of their range of services, supply structure and catchment area, among other things.
- The NOSO Strategy is coordinated with other federal measures such as the Strategy on Antibiotic Resistance (StAR), the National Vaccination Strategy (NVS), the National Strategy GRIPS against seasonal influenza and the pilot programmes that are part of the quality strategy, so as to ensure a rigorous approach without

any duplication. The differences in scope are taken into account upon implementation of the strategy.

1.2 Development process and planned implementation process

The NOSO Strategy originated in close cooperation with the Swiss Conference of the Cantonal Ministers of Public Health (CMPH), H+ (the Hospitals of Switzerland), CURAVIVA (the association for Swiss nursing homes and institutions), the Swissnoso expert panel as well as medical professional societies, associations, insurers and other relevant stakeholders. Given the very complex topic and the different points of view and interests in terms of possible approaches, their involvement was of crucial importance. Stakeholders and stakeholder groups were involved in preparing the strategy right from the start and will also play an important role in implementing it.

Participatory development

Stakeholders and stakeholder groups were able to share their knowledge, their experiences and their concerns at two large stakeholder workshops and in three topic-specific expert panels. The first workshop in July 2014 focussed on clarifying the need for action. In the structured exchange, participants were invited to describe the current challenges from their point of view. Together, they drew up the strategic priorities and objectives of the strategy. This was followed by three subject-specific expert panel gatherings from October until December 2014, where the focus was on specifying measures to achieve the defined objectives.

Workshops and expert panels



Figure 1: Development process and design of the NOSO Strategy

Before developing the strategy further, measures were reviewed critically, uncertainties discussed and content revised accordingly. The focus of the second stakeholder workshop in March 2015 was on evaluating results and closing any existing gaps. Figure 1 shows the development process and the design of the national NOSO Strategy. This in-depth review of the topic allowed the effective need to be determined, existing findings to be pooled and adequate solutions to be developed.

From July until September 2015, the FOPH held a stakeholder consultation on the draft strategy. Feedback is summarised in a report⁷ and has been incorporated in this version of the strategy.

Consultation

The NOSO Strategy defines action areas, objectives and measures. For each measure, it also presents a rough prioritisation and states who is in charge and who is the implementing partner. Detailed implementation planning is not included in this strategy document; it will be taken in hand in spring 2016, after the strategy is adopted

Implementation

⁷ www.bag.admin.ch

by the Federal Council. The implementation plan is drawn up by the FOPH, again in cooperation with the relevant stakeholders. Alongside the measures, it will show scheduling, responsibilities, financing and subsequent evaluation. Measures are not realised simultaneously but in a reasonable sequence according to their urgency, importance and in relation to their contribution to achieving the objective.

For coordinated implementation of the strategy, a federally run coordinating body (cf. *chapter 6.3*) is being created that will ensure that the strategy is being implemented across all stakeholders and topics, as well as being coordinated to the Federal Council's other activities (StAR, national quality strategy). A further review is also being carried out as to which specialists should be added to the Swissnoso expert panel. The aim is to strengthen that body and expand it with representatives from related disciplines and different institutional contexts. In an advisory capacity, this expanded expert panel (referred to here as Swissnoso+) brings specific expertise the likes of which does not exist in the federal administration.

1.3 Definition of “HAI” and “potentially dangerous pathogens”

The NOSO Strategy includes monitoring, prevention and control of HAIs and prevention of transmission of potentially dangerous pathogens. This strategy defines any infections as HAIs that occur while staying in a healthcare facility in connection with a diagnostic, therapeutic or nursing measure, or that are simply due to the circumstances of staying in the institution, possibly as a result of pathogens in the air or on surfaces. There should also be no indication that the infection was already present or in the incubation phase at the time of admission to the hospital or nursing home.⁸ The term “HAI” originated in the English-speaking world, but the same comprehensive meaning can also be found in the term *nosocomial infections* (from the Greek νόσος “disease” and κομᾶν “to take care of”).

Potentially dangerous pathogens include any bacteria, fungi, viruses and parasites with the ability to cause serious diseases with complications that are difficult or even impossible to treat as a result of microbiological factors such as resistance properties, virulence and the ability to survive in hospital and nursing home environments, and thus have a higher potential to cause suffering and harm.

What is a healthcare-associated infection (HAI)?

What is a potentially dangerous pathogen?

⁸ This corresponds to the definition of the Robert Koch Institute (RKI) for *nosocomial infection*; see Robert Koch Institute (ed.), 2011, *Definition nosokomialer Infektionen (CDC-Definitionen)*, 7th edition, Berlin.

2 Fundamentals

2.1 Development and causes of HAIs

HAIs caused by bacteria, viruses, fungi or parasites can be differentiated according to *endogenous* and *exogenous infections*. *Exogenous infections* are the direct result of absorbing pathogens from one's environment. The pathogens can be transmitted via contaminated objects or surfaces, through air or water, or through direct contact with other people (for instance staff members' hands). It should also be noted that visitors often carry pathogens into a hospital or nursing home, which makes them infection carriers. The pathogens can also be passed on through contaminated foods, injections or infusions.

Exogenous and endogenous infections

Endogenous infections, on the other hand, can be differentiated as *primary or secondary infections*. In a primary endogenous HAI, the pathogens are part of a patient's normal flora. These types of infections mainly arise when skin or mucous membranes are weakened or damaged. The risk of infection increases if the immune system is compromised as well, for instance in the course of treatment with medication. *Secondary endogenous hospital infections* occur when the pathogens only become part of a patient's flora during hospitalisation and later develop into endogenous infections.⁹

Various factors contribute to the development of HAIs: patient-related factors (e.g. severe primary diseases, compromised immune systems), environmental factors (e.g. contaminated water, surfaces), factors related to invasive procedures (e.g. surgery, catheters, artificial ventilation), human factors (e.g. direct contact) and microbiological factors (e.g. virulence of the pathogens).

Causes

Contrary to hospitals, in nursing homes infections originate and are caused not only by more frequent use of ostomy appliances and urinary catheters but also by those institutions' more open structure for the purpose of unimpeded access.

In departments where patients with compromised immune systems undergo treatment and where more invasive diagnostic and therapeutic measures are applied (e.g. emergency wards, oncology wards, intermediate care, geriatric wards), HAIs occur with particular frequency. Based on the significant rise in life expectancy of the Swiss population, it has become much more common to see older people with multiple primary diseases in hospital care. The increased usage of implants is also leading to an increase in HAIs. The growing number of multiresistant pathogens is particularly alarming, since they impede treatment and cause a significant proportion of morbidity and deaths in the inpatient field. Newly or prematurely born babies constitute an especially vulnerable portion of the population, since, for one thing, they do not yet possess the necessary immune defences.

Particular risk

An outbreak refers to a situation where two or more people exhibit HAIs within a short period of one another and where an epidemiological or material link is suspected. Situations where identified cases are accumulating in greater-than-expected numbers are also classified as outbreaks.¹⁰ In connection with HAIs, an increased incidence of infections caused by viruses or multiresistant pathogens or through contaminated devices and instruments at hospitals and nursing homes is of particular relevance. As an example, according to figures by the Robert Koch Institute (RKI), around one third

Outbreaks

⁹ Cf. Robert Koch Institute (RKI): *Nosokomiale Infektionen*; Gesundheitsberichterstattung des Bundes – vol. 8, June 2002, www.gbe-bund.de

¹⁰ Cf. WHO: www.who.int/topics/disease_outbreaks/en/.

of nosocomial outbreaks in Germany are caused by bacterial pathogens and two thirds by viral pathogens.¹¹

A strategy aimed at reducing HAIs must therefore address three different areas (outcome fields; cf. *chapter 4*, fig. 3 Impact model). HAIs can be reduced by preventing and containing:

Three outcome areas

1. the transmission and colonisation of potentially hazardous pathogens (viruses, bacteria, fungi, parasites);
2. infections resulting from invasive measures;
3. outbreaks.

2.2 Risk factors for HAIs

HAIs are associated with various risk factors (cf. *fig. 2*). The general *intrinsic risk factors*, which lie with the patients themselves, include old or very young age, severe primary diseases and compromised immune systems (patient factors).

Intrinsic and extrinsic risks

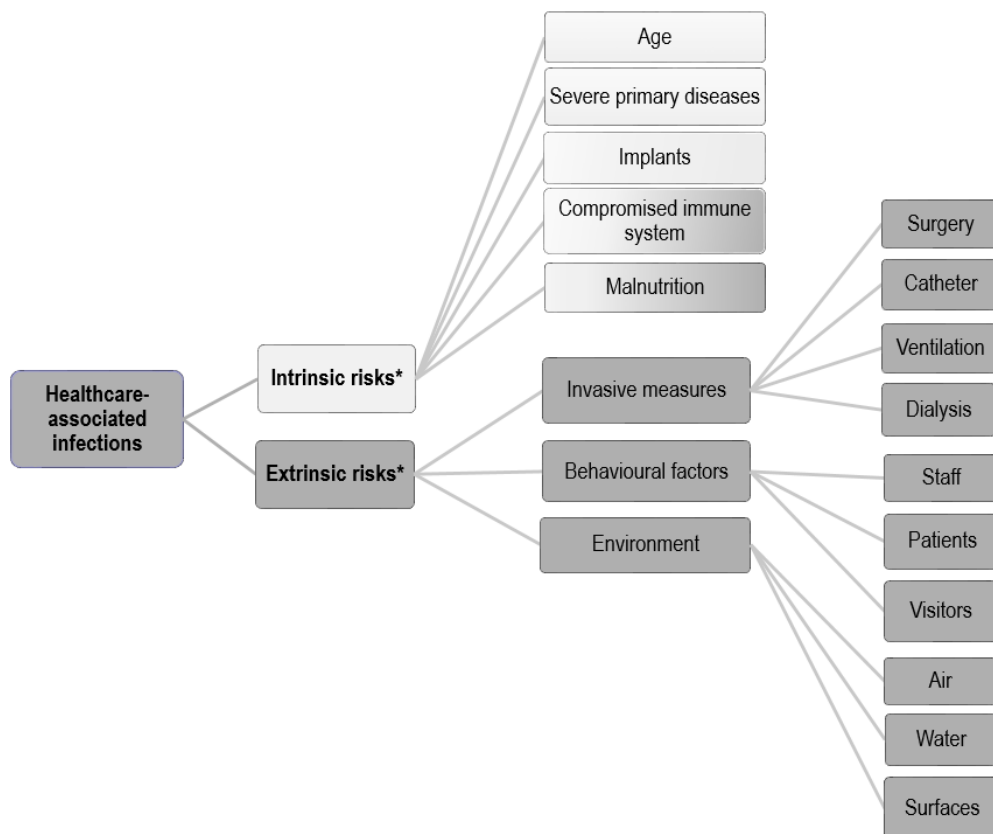


Figure 2: Risk factors (*) This list of intrinsic and extrinsic risks is not exhaustive. The blue fields show the areas where infections can be prevented.

Extrinsic risk factors include, for instance, the type and duration of the invasive diagnostic or therapeutic treatment, such as surgery, artificial ventilation, catheterisation of the bladder, intravascular catheters, injections, punctures, drug treatments (including antibiotics) and immunosuppressive medication. Other factors include environmental factors such as air, water and surfaces in the patient's environment as well as behavioural factors. The latter may, for instance, refer to procedural compliance (e.g. in terms of hand hygiene or wearing respiratory masks).

¹¹ Robert Koch Institute:
http://rki.de/DE/Content/Infekt/Ausbruehce/nosokomial/nosokomiale_Ausbrueche_node.html

In nursing homes organised as open houses, additional risks may emerge by way of the facilities and communal activities such as meals etc. When implementing preventive measures here, care should be taken to ensure they remain proportionate, since a nursing home should remain a residential facility and not become a hospital.

2.3 Occurrence and frequency of HAIs

Based on a Europe-wide point prevalence survey,¹² the European Centre for Disease Prevention and Control (ECDC) in Solna, Sweden, estimates that on any given day an average of 5.7 % of patients in acute-care hospitals in Europe suffer from at least one healthcare-associated infection; amounting to a total of around 3.2 million patients. Most common are catheter-associated urinary tract infections, ventilator-associated pneumonias, surgical site infections and catheter-associated bacteraemias (blood poisoning), each making up around one fifth of the total. The latter group is particularly important, since it has the highest mortality rate of all HAIs.

European Union

The ECDC estimates that in healthcare institutions, 3.4 % of the resident population exhibit at least one healthcare-associated infection on any given day, amounting to a total of 4.2 million residents annually. Respiratory tract infections and symptomatic urinary tract infections are most common in care facilities, each with a prevalence of around 31.2 %, followed by skin infections with a prevalence of 22.8%.¹³

The prevalence of HAIs in Swiss hospitals and nursing homes is reported neither regularly nor systematically. The latest national report confirms that these infections are comparable in frequency with those of other countries around Europe. Every year, some 70,000 patients fall ill in Swiss hospitals due to a HAI, and approximately 2,000 of them die as a result. These estimates are based on the results of a prevalence study (snip04), which was carried out in 2004 by the expert panel Swissnoso.¹⁴ The study indicated that the global prevalence of patients suffering from a HAI was 7.2 % (of 7,783 patients recorded at 50 different hospitals), with the highest proportion of infected patients (23.5 %) being in intensive-care wards. Most common were surgical site infections (28.8 %), followed by nosocomial pneumonias (19.7 %), nosocomial urinary tract infections (19.6 %) and primary bacteraemias (10.7 %).¹⁵ There is no comparable national study for nursing homes.

Switzerland

Since 2010, surgical site infections in acute-care hospitals have been recorded systematically throughout Switzerland by Swissnoso on behalf of the National Association for the Development of Quality in Hospitals and Clinics (ANQ). Results during the reporting period of 2011/2012 show the greatest prevalences after colon surgery (13.6 %), followed by appendectomy (5.1 %) and heart surgery (4.9 %).¹⁶ Current figures for other important types of infection (e.g. for infections contracted in intensive-care or oncology wards) are not existent.

¹² European Centre for Disease Prevention and Control (2013), *Point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care hospitals*. Stockholm: ECDC. <http://ecdc.europa.eu/en/publications/Publications/healthcare-associated-infections-antimicrobial-use-PPS.pdf>

¹³ European Centre for Disease Prevention and Control (2014), *Point prevalence survey of healthcare-associated infections and antimicrobial use in European long-term care facilities*. April–May 2013. Stockholm: ECDC. <http://ecdc.europa.eu/en/publications/Publications/healthcare-associated-infections-point-prevalence-survey-long-term-care-facilities-2013.pdf>.

¹⁴ The next countrywide data survey (prevalence study) is scheduled for 2016/2017 (cf. chapter 7.5).

¹⁵ Sax, H., Pittet, D. (2005), "Resultate der Schweizerischen Prävalenzstudie der nosokomialen Infektionen 2004 (snip04)", *Swissnoso Bulletin*, 12:1

¹⁶ ANQ, Swissnoso (2014), *Erfassung postoperativer Wundinfektionen – Kurzfassung Nationaler Vergleichsbericht 2011–2012*. www.swissnoso.ch/wp-content/uploads/2014/12/20141020_Surveillance-2011_2012-nationaler-Vergleichsbericht-KURZFASSUNG_de_final_3.pdf

Remarkably, infections that are easily preventable through adequate vaccination protection are also often transmitted in healthcare facilities, particularly seasonal influenza, chickenpox, measles, whooping cough and rotavirus-induced illnesses. These infections are linked to a significant rate of morbidity and can even lead to death if they affect people whose immune system is compromised due to their condition, their primary disease or their medical treatment (e.g. newborns, pregnant women, patients who have undergone immunosuppressive treatment or a transplant procedure).

2.4 HAI pathogens

HAIs are often caused by bacteria, fungi, (e.g. *Candida*), viruses (e.g. influenza and noroviruses) or parasites (e.g. *Giardia lamblia*). The ECDC's point prevalence survey in European acute-care hospitals¹⁷ identifies the following bacterial pathogens as the most common causes of HAIs: in nosocomial pneumonia types: *Pseudomonas aeruginosa* (17 %), *Staphylococcus aureus* (13 %) and *Klebsiella* spp. (11 %); in catheter-associated bacteraemias: coagulase-negative staphylococci (19 %), *S. aureus* (16 %) and *Escherichia coli* (11 %); and in nosocomial urinary tract infections: *E. coli* (36 %), enterococci (13 %) and *Klebsiella* spp. (12 %). In terms of surgical site infections, these differ depending on the surgical site – overall, *S. aureus* (18 %), enterococci (15 %) and *E. coli* (14 %) are most common. From all HAIs 5 % occur as gastrointestinal infections of which approximately 18 % are caused by the *Clostridium difficile* pathogen.¹⁸ In nursing homes within the European Union, *E. coli*, *S. aureus* and *Proteus mirabilis* are most often identified.¹⁹ Bacterial pathogens cause infections with a high disease burden that are difficult to treat, particularly when these pathogens exhibit high multiresistances to antibiotics (e.g. with the new, still fairly rare multiresistance mechanism “New Delhi Metallo-beta-lactamase-1 (NDM-1)” in *E.coli* and *Klebsiella* spp. bacteria).

Bacteria

The ECDC survey identified 6.8 % of the total number of HAIs recorded as being caused by fungi; the most common pathogen being *Candida* spp., which caused 8 % of nosocomial pneumonias, 7 % of bacteraemias and 6 % of nosocomial urinary tract infections.¹⁸

Fungi

Viruses were identified as being the cause for less than 1 % of the total number of HAIs; they were mainly found to trigger gastrointestinal infections (in 3 % of cases).¹⁸ Due to under-reporting, it is assumed that the actual proportion of viral pathogens is much higher. The list of viral pathogens includes pathogens that can cause major outbreaks in healthcare facilities, such as rotaviruses in children or noroviruses. Norovirus outbreaks can present nursing homes with substantial logistical and personnel challenges, since they can quickly take on significant dimensions (an infection rate of over 50 % of residents and 30–40 % of personnel is not rare).²⁰ The influenza virus is another viral nosocomial pathogen in hospitals and nursing homes,

Viruses

¹⁷ The EU's 28 Member States and the EFTA states Norway and Liechtenstein took part in the ECDC's point prevalence survey.

¹⁸ European Centre for Disease Prevention and Control (2013). Point prevalence survey of healthcare-associated infections and antimicrobial use in European acute care hospitals. Stockholm: ECDC. <http://ecdc.europa.eu/en/publications/Publications/healthcare-associated-infections-antimicrobial-use-PPS.pdf>

¹⁹ European Centre for Disease Prevention and Control (2014), Point prevalence survey of healthcare-associated infections and antimicrobial use in European long-term care facilities. April–May 2013. Stockholm: ECDC. <http://ecdc.europa.eu/en/publications/Publications/healthcare-associated-infections-point-prevalence-survey-long-term-care-facilities-2013.pdf>

²⁰ <http://www.sciencedirect.com/science/article/pii/S0195670109003375>

and its prevalence depends, among other things, on the extent of the annual circulation of the seasonal virus among the population.

In Western Europe parasites are rarely identified as the cause of HAIs (with 0.7 % in intensive-care wards).²¹ Single-cell parasitic pathogens such as *Giardia lamblia*, for instance, are identified as a cause of hospital-associated gastrointestinal infections.²²

Parasites

2.5 Importance for health policy

The various HAIs differ in terms of morbidity, mortality and economic impact. Urinary tract infections, for instance, may occur relatively often and can on occasion lead to blood poisoning, but they are effectively treatable using antibiotics and generally do not lead to extended periods of hospitalisation.²³ Surgical site infections, nosocomial pneumonias and bacteraemias, on the other hand, do have a considerable level of morbidity and mortality.²⁴

Economic impact

Besides the health-related problems, HAIs also cause significant added costs in the form of protracted periods of hospitalisation, additional examinations and treatments. In Switzerland these direct follow-up costs are estimated to amount to approx. CHF 230 million every year.²⁵ Additional follow-up costs such as loss of productivity, loss of income (including that of any family members providing care), costs for domestic help or reduced quality of life are not included in this calculation. HAIs therefore place a significant strain on the public health system and the economy, as well as damaging the reputation of the healthcare system.

2.6 Avoidability and best practices in infection prevention

Healthcare-associated infections are not wholly avoidable despite targeted preventive measures. Intrinsic and extrinsic risks may increase their likelihood. Some risk factors are currently on the rise: as medical technology develops, new diagnostic and treatment procedures emerge which lead to an increase in the number of invasive procedures. Life expectancy has risen greatly over the last 35 years, in part due to the improvements in medical care.²⁶ However, health-related problems and symptoms increase with age. Risk factors such as pre-existing primary diseases, a compromised immune system or a vital surgical procedure are almost impossible to influence. Nevertheless, it is possible to significantly reduce the frequency of infections with preventive measures.

Many infections can be prevented

The majority of studies published indicate that depending on the type of infection, between 20 % and 50 % of HAIs can be avoided through targeted control and prevention measures.²⁷ Individual studies further show that (depending on the

²¹ Vincent J.L., Rello J., Marshall J., Silva E., Anzueto A., Martin C.D., Moreno R., Lipman J., Gomersall C., Sakr Y., Reinhart K. (2009). International study of the prevalence and outcomes of infection in intensive care units. *Journal of the American Medical Association* 302: 2323-2329

²² Bobo L., Dubberke E., (2010). Recognition and Prevention of Hospital-Associated Enteric Infections in the Intensive Care Unit. *Critical Care Medicine* 38(8 0): pp. 324–334

²³ It must be noted in this context, however, that antibiotics should generally be used with some caution in order to minimise the risks of building up resistance.

²⁴ Umscheid, C.A. et al. (2011), "Estimating the proportion of healthcare-associated infections that are reasonably preventable and the related mortality and costs", *Infection Control & Hospital Epidemiology*, Vol. 32, No. 2

²⁵ Sax, H. et al., *Swissnoso Bulletin* 2003, 11:1

²⁶ Federal Statistical Office (FSO) Since 1981, the life expectancy for men has risen from 72.4 to 81.0 years, and for women from 79.2 to 85.2 years. See <http://www.bfs.admin.ch/bfs/portal/en/index/themen/01/06/blank/key/04/04.html>

²⁷ Harbarth S., Sax H. and Gastmeier P. (2003), "The preventable proportion of nosocomial infections: an overview of published reports", *Journal of Hospital Infection*, 54(4): 258–66

baseline infection rates) evidence-based measures could prevent between 65 % and 70 % of catheter-associated bacteraemias and catheter-associated urinary tract infections as well as 55 % of ventilator-associated pneumonias and surgical site infections.²⁸

Data collected in the context of a regulatory impact assessment implemented as part of the revised Epidemics Law show that it might be possible to save between CHF 99 and 336 million in hospital costs every year by applying targeted measures for the prevention and control of nosocomial infections. However, these savings are offset by increased additional expenses in connection with the new requirements and measures (e.g. staff training, recording HAIs), which would be incurred by service providers.²⁹

When establishing the relevant measures in nursing homes, one should also weigh up the potential of reducing the rate of infection with maintaining the residents' desired quality of life (e.g. through social interaction).

Preventive measures include standard hygiene measures such as hand hygiene and disinfection to interrupt transmission routes, as well as specific actions such as the timely removal of bladder catheters and intravascular catheters or a suitable perioperative antibiotic prophylaxis. Prevention also involves quality management measures to support implementation. Examples include staff training, patient information, audits and feedback, organisational changes (roles, resources), establishing infrastructural and technical conditions as well as financial or statutory incentives. Furthermore, various studies indicate that suitable monitoring of infections and of process and structural indicators as well as communication of results – both to staff and the public – can reduce the rate of infection.³⁰ The main aspects here are the comparison of the collected data with internal and external reference data (benchmarking) and feedback to the relevant people. Experience has shown that direct feedback to staff, for instance on adherence to hygiene regulations, is motivational and has a positive effect on acknowledging and observing the rules (adherence).

Preventive measures

A systematic review based on an analysis of 92 international studies came to the same conclusion³¹, identifying key elements for successful infection prevention in hospitals (best practices) in the areas of structure, organisation and management. Besides standardised audits and surveillance of networks, in terms of structures the review also identifies the following key elements:

- a functioning team specialised in hygiene (consisting of at least one hygiene specialist and a doctor trained in hygiene as well as microbiological support and IT support),
- good organisation within the hospital as a whole, bed occupancy enabling sufficient flexibility with regard to admission and care of patients,

²⁸ Umscheid, C.A., et al. (2011), "Estimating the proportion of healthcare-associated infections that are reasonably preventable and the related mortality and costs", *Infection Control & Hospital Epidemiology*, Vol. 32, No. 2

²⁹ Cf. The Federal Council Dispatch (BBl 2011 311) on the revision of the Federal Act on Combating Communicable Human Diseases (Epidemics Act, EpidA), p. 361

³⁰ Cf. (i) Gastmeier et al. (2006), "Effectiveness of a nationwide nosocomial infection surveillance system for reducing nosocomial infections", *Journal of Hospital Infection*, 64(1): 16–22; (ii) Brandt C., Sohr D., Behnke M. et al. (2006). Reduction of surgical site infection rates associated with active surveillance. *Infection Control & Hospital Epidemiology*, 27(12): 1347–51; (iii) Palumbo A. J., Loveless P.A., Moll E.M., Ostroff S. (2012). Evaluation of healthcare-associated infection surveillance in Pennsylvania hospitals. *Infection Control & Hospital Epidemiology*, 33(2):105–11.

³¹ Zingg, W., Holmes A., Dettenkofer M. et al. (2015). Hospital organisation, management, and structure for prevention of health-care-associated infection: a systematic review and expert consensus. *The Lancet Infectious Diseases*, 15(2): 212–24.

- a staffing ratio that is adapted to the complexity of patient care.

Regarding implementation of preventive measures, the authors of the study identified the following key elements:

- adequate and easy availability of good supplies for patient care which, together with optimised ergonomics, facilitates the correct execution of work,
- guidelines that are integrated into practical training,
- team- and application-oriented training, the development of which involves staff members with contact to patients,
- implementation of prevention programmes based on a multimodal strategy (e.g. care bundles, checklists) developed by a multi-disciplinary team, taking account of local conditions and identifying and enlisting “champions” for its implementation (that is to say: intrinsically motivated staff who are themselves interested in a high level of quality and can therefore serve as role models to others).
- An additional key element for a successful prevention of infections is to create and maintain a positive organisational structure by promoting good working relationships and communication among the staff, which requires support and leadership on the part of hospital management

Furthermore, vaccinations represent an important preventive measure against infections. Particularly in the case of patients with compromised immune systems or those who are chronically ill, and in the case of staff, vaccinations provide a significant element of protection.

3 Existing activities

3.1 Federal activities

The Federal Council takes the transmission of diseases in hospitals and other healthcare establishments seriously and tackles this complex problem at various levels. Together with three other federal offices (FSVO, FOAG, FOEN), the FOPH has thus already developed the Strategy on Antibiotic Resistance (StAR). To take account of the issue's complexity, StAR follows the "One Health" approach and, besides human health, also includes animal health, agriculture, food safety and the environment. The main objective of StAR is to ensure long-term efficacy of antibiotics in maintaining human and animal health. This is to be achieved by, among other things, the containment of antibiotic-resistant pathogens. The two strategies StAR and NOSO have the following interfaces and synergetic objectives: HAIs are partly caused by antibiotic-resistant pathogens such as the methicillin-resistant *Staphylococcus aureus* (MRSA) bacteria, or the reduction of HAIs also leads to a reduction in the use of antibiotics.

Strategy on Antibiotic Resistance (StAR)

As part of the Confederation's national quality strategy for the Swiss healthcare system and based on the Federal Health Insurance Act (HInSA), the FOPH is initiating and financing national pilot programmes whose implementation is led by the Patient Safety Switzerland foundation. These pilot programmes test the implementation of concrete solutions in terms of immediate measures and to take account of the urgency of certain problem areas. Two pilot programmes, "Sichere Chirurgie" ("Safety in surgery") and "Sichere Medikation" ("Safety in medication") are already running. A third pilot programme, aimed at reducing the use of urinary tract catheters to lower the risk of infection and injury, started in 2015.³² These two strategies present interfaces as well.

Quality strategy

Vaccination – the most effective primary prevention measure – plays an essential role in preventing HAIs. As of the middle of 2017, there are plans to implement the National Vaccination Strategy (NVS) that was developed in cooperation with the cantons and other relevant stakeholders. The planned measures are intended to further reduce the number of infections, complications and deaths (that are preventable through vaccination) as well as eliminating individual pathogens.

National Vaccination Strategy (NVS)

A major objective of the National Strategy GRIPS against seasonal influenza is to reduce the transmission of influenza viruses within healthcare institutions. Healthcare institutions should, for example, be supported in providing the necessary framework conditions to ensure better protection of patients from influenza. This, above all, involves the active role of healthcare personnel. GRIPS is thus closely related to the NOSO Strategy.

GRIPS

³² The development and implementation of the pilot programmes is led by the Patient Safety Switzerland foundation. For further information, see www.patientensicherheit.ch

The Federal Council's report "Patient rights and patient participation in Switzerland" dated 24 June 2015 presents the current situation regarding patient rights and proposes possible courses of action to improve the position of patients.³³ Interfaces to the national NOSO Strategy exist on the one hand with regard to avoiding damage events as a result of infections that the persons concerned contract in hospitals and care facilities. Indeed, the report indicates that effective prevention of damage events is a central patient concern. In the light of this, the report calls for a reinforcement of the safety and error culture (including the involvement of patients in the avoidance of errors) and for continued efforts to prevent damage as part of national strategies and programmes. In addition, the Confederation and the cantons should work towards nationwide and – where necessary – binding introduction and implementation of measures and instruments that were developed in a participatory process. The NOSO Strategy also provides for such measures in the area of prevention and control. On the other hand, the report discusses the situation of patients in dealing with liability claims as a result of infections in hospitals and care facilities. In order to strengthen the injured person's admittedly difficult situation with regard to evidence, according to the report it should be investigated whether, in possibly determining binding standards to avoid infections, adequate measures should, at the same time, be introduced for improving the injured person's situation with regard to evidence. An interface also exists in the area of patient involvement in the prevention of damages.³⁴

Report on patient rights

In the light of these activities, the NOSO Strategy as a subject-specific strategy ensures that all aspects are taken into account that are important to the monitoring, prevention and control of these infections. It covers the HAI problem area comprehensively and with the required specificity. The strategy builds on the competences and experiences of existing structures and activities that have already proven themselves in Switzerland's federalist healthcare system (such as recording surgical site infections as part of the ANQ measurement plan together with Swissnoso).

NOSO as a subject-specific strategy

The Confederation's various activities are coordinated with each other at the level of project implementation and management. This prevents duplication and ensures the use of synergies and the exchange of any gained insights.

Coordination

3.2 National structures and programmes³⁵

There is currently no integrated national programme in Switzerland for the monitoring, prevention and control of HAIs. National guidelines and projects for the prevention and control of nosocomial infections are being developed by Swissnoso and by individual professional societies. For example, Swissnoso is carrying out the nationwide recording of surgical site infections on behalf of ANQ. This is part of the ANQ measurement plan and also a module of *Swiss Clean Care*. Since 2015 Swissnoso has also been offering the *CleanHands* module throughout Switzerland, an electronic tool for measuring hand hygiene performance using the method of the World Health Organisation (WHO). The Swiss Centre for Antibiotic Resistance³⁶ as one of the organisations that arose from the national research programme NFP 49

Switzerland

³³ *Patientenrechte und Patientenpartizipation in der Schweiz* (Patient rights and patient participation in Switzerland), Report in response to postulates 12.3100 Kessler, 12.3124 Gilli and 12.3207 Steiert, published on 24 June 2015. Cf. <http://www.bag.admin.ch/themen/gesundheitspolitik/15437/index.html?lang=de>

³⁴ The option for action C1a in the patient report and the strategic objectives G-4 as well as PC-1 of the NOSO Strategy are aimed at providing patients and the public with the necessary knowledge and awareness and including them in preventive measures.

³⁵ The description of the structures and programmes in Switzerland is based on a situation analysis conducted as part of the 2014/2015 strategy development which also contains a detailed presentation of the relevant stakeholders in the HAI field. www.bag.admin.ch/de/noso

³⁶ www.anresis.ch.

“Antibiotic resistance” (2001–2006). It records the situation in Switzerland regarding resistance and antibiotic use in humans. Other than that, the FOPH does not currently record HAIs. Among notifiable infections, exposure data regarding possible location, time, transmission path and environment are recorded in individual cases (e.g. with legionellosis). A national pilot programme funded by the FOPH for reducing urinary catheters in acute-care hospitals is being set up since spring 2015 by the Patient Safety Switzerland foundation together with Swissnoso. Besides preparing recommendations, projects and programmes, Swissnoso, Patient Safety Switzerland as well as various university hospitals (e.g. Geneva, Zurich) and professional societies such as the Swiss Society for Hospital Hygiene (SGSH) and the Swiss Society for Infectious Diseases (SSI) play a key role in disseminating knowledge through various channels including websites, newsletters and events as well as by participating in training and CPD offers (see paragraph below regarding “Training and continuing professional development”).

Two cantons (VD, VS) have cantonal infection prevention programmes in which specialists in infection prevention have received a cantonal mandate for comprehensive infection prevention in hospitals, nursing homes and outpatient care organisations. The cantons VD, NE, JU and VS have an intercantonal programme for monitoring nosocomial bacteraemias in public hospitals. Other cantons have individual measures in place when it comes to HAIs, such as monitoring the infections in all listed hospitals (ZH), monitoring multiresistant germs, or programmes for hand hygiene and influenza vaccination promotion. In the area of nursing homes, it is primarily hygiene concepts and hygiene guidelines that play a role at the cantonal level.³⁷

Cantons

The picture is equally heterogeneous at the level of healthcare institutions.³⁸ All university hospitals as well as some of the large cantonal and regional hospitals and regional hospital centres have their own department for hospital hygiene. Here, specialists in infection prevention work under the direction of an infectious disease specialist (FMH) who is trained in hospital hygiene. In addition, university hospitals in Geneva are home to a WHO collaborating centre for patient safety. In many institutions, infection prevention is subordinate to a specific unit and is not embedded in a cross-disciplinary function.

Healthcare institutions

Medium-sized and smaller institutions mostly employ professional nursing staff with or without any federally recognised training, who cover the area of hygiene either full-time or part-time.³⁹ There is often also a contractual consultative relationship to a centre with a hygiene department. In addition, there are hygiene specialists in private practice who perform advisory functions for smaller institutions.

The responsibility does not, however, lie solely with the medical and nursing staff but also with non-medical managerial structures (including the executive board) as decision-makers regarding measures, programmes and use of funds.

³⁷ As part the Strategy development, in February 2015 a survey was carried out in cantonal public health departments regarding existing and planned HAI-related activities. The results can be found in the abovementioned situation analysis at www.bag.admin.ch/de/noso.

³⁸ The situation outlined in this overview is supported by the results of the survey (carried out in collaboration with Swissnoso from May to June 2014 at hospitals and care facilities) regarding HAI-related structures and programmes. A structured electronic questionnaire in German, French and Italian was sent to all members of H+ (the Hospitals of Switzerland) and to a representative selection of 342 CURAVIVA Switzerland member institutions throughout the country. 137 hospitals and 125 nursing institutions took part in the survey. Detailed results can be found in the abovementioned situation analysis (cf. www.bag.admin.ch/de/noso).

³⁹ The hospitals that were surveyed (cf. footnote 37) employ a median of 39 % of one full-time equivalent of institutional hygiene specialists per 125 beds; for the surveyed care facilities that number is 7 % per 125 places.

Healthcare institutions have guidelines and work instructions on the prevention and control of HAIs, although these are mostly drawn up locally within the individual institutions. National and international scientific findings are used as a basis, as are recommendations of professional societies and the Swissnoso expert panel. Individual large hygiene departments offer access to their documents that is partly free (e.g. university hospitals of Geneva) and partly subject to charge (e.g. university hospital of Basel).

The majority of hospitals participate in regional, national and international HAI reduction programmes. Most hospitals with resources for infection prevention also have their own HAI reduction programmes which cover a broad spectrum ranging from in-house continued professional development and training for staff to monitoring individual HAIs and specific interventions for reducing individual HAIs.

Almost all care facilities have important HAI prevention structures as well, in the form of prevention guidelines and institutionalised hygiene. Most institutions, however, employ only minimal personnel resources for institutional hygiene specialists. And the person in charge of the hygiene team generally does not have any specific specialist training in epidemiology or hospital/institutional hygiene. Only a minority of care facilities take part in a regional, national or international HAI reduction programme (e.g. the FOPH influenza prevention campaign or the WHO hand hygiene campaign). Likewise, only a minority have their own local institutional hygiene programmes, whereby the focus is on measures to improve hand hygiene compliance. Under the direction of CURAVIVA (the association for Swiss nursing homes and institutions), a pilot programme was launched in 2014 to measure four medical quality indicators for retirement and care facilities, but these do not include HAIs.⁴⁰

Healthcare professionals who are involved in infection prevention can take a federal higher-level specialist examination to earn the protected title of “Fachexpertin/Fachexperte für Infektionsprävention im Gesundheitsbereich mit eidgenössischem Diplom” (federally qualified specialist in infection prevention in healthcare). This title has been recognised by the State Secretariat for Education, Research and Innovation (SERI) since 2012. The Swiss Nursing Association (SBK), the Swiss Society for Hospital Hygiene (SGSH) und H+ (the Hospitals of Switzerland) are the bodies responsible for examinations.

**Training and
continuing
professional
development (CPD)**

Doctors working in infection prevention generally have a specialist title (FMH) in infectious diseases and have received continuing professional training specifically in hygiene. There is, however, a lack of standards for the completion of a practical training in infection prevention, hospital hygiene or hospital epidemiology as part of a specialist medical training. While Switzerland does not yet have a title for specialisation in infection prevention within the healthcare system, such a title is in the planning stage.

CPD in infection prevention is primarily carried out by Swissnoso and SGSH. Besides these organisations, many university hospitals and medical faculties also have a central role in training and CPD as well as in research. Their commitment to CPD is not, however, restricted to establishing specific titles but also focuses on the creation of jobs for persons in CPD – in the field of infectiology largely through university hospitals.

⁴⁰ The medical quality indicators for collection and subsequent benchmarking of selected medical quality indicators are malnutrition, measures restricting movement, pain and polypharmacy.

3.3 International structures and programmes

The WHO provides various tools and guidelines on infection prevention in the healthcare system. And with its “Clean Care is Safer Care” (hand hygiene) and “Safe Surgery Saves Lives” (surgical site infections) programmes, the WHO is running two international campaigns on patient safety in the context of HAIs. Furthermore, in May 2015, the WHO member states signed the WHO’s “Global action plan on antimicrobial resistance”. One objective of this action plan is to reduce the occurrence of infections through effective measures in the areas of healthcare, hygiene and infection prevention.⁴¹

WHO, EU

With HAI-Net (Healthcare-Associated Infections Surveillance Network), the ECDC maintains a European HAI-monitoring network. EARS-Net (European Antimicrobial Resistance Surveillance Network) also provides European reference data on antimicrobial resistances.

The picture in relation to individual countries is very heterogeneous. This is illustrated by an analysis of national strategies and activities in hospital hygiene and infection prevention from ten selected countries⁴², which was prepared as part of the strategy development.

Individual countries

Six of the countries analysed⁴³ have national legislation regulating certain aspects of hospital hygiene and infection prevention. The formulation of the legislation is very different. Formal legislation in the Netherlands or Germany, for example, is phrased very generally, but in the Netherlands the guidelines of the National Institute for Public Health and the Environment (RIVM) have the authority of statutory provisions, and in Germany recommendations of the Commission for Hospital Hygiene and Infection Prevention (KRINKO) were made law. Scotland, one of the countries where a lot of work is being done on HAIs, has no law, but the health authority’s recommendations and measures are binding.

The agenda and priorities of the national strategies are influenced at very different levels. Usually priorities are set at health ministry level, but the agenda is determined entirely by other interest groups, namely politicians, the press or patient organisations. Similarly to the Swissnoso panel of experts in Switzerland, there are expert panels in many countries (seven out of ten)⁴⁴ that are involved in issues of infection prevention.

In just over half the countries (six out of ten)⁴⁵ there are national strategy plans, mostly in the area of organisation and management of infection prevention, but also for the training and employment of hygiene specialists. All the surveyed countries monitor process or outcome indicators, but only half of them⁴⁶ set targets, mostly in the form of a certain reduction in a specific infection or a lower limit for hand hygiene compliance.

Only half the surveyed countries⁴⁷ determine how infection prevention should be funded, mostly in the area of surveillance or prevention of HAIs. Three countries (France, Germany and Austria) have specified how the training of hygiene specialists will be funded. Scotland is the only country that provides financial support for hospitals for the infection prevention activities required by the authorities. All other countries

⁴¹ Cf. WHO (2015): Global action plan on antimicrobial resistance, objective 3, http://apps.who.int/gb/ebwha/pdf_files/WHA68/A68_20-en.pdf

⁴² Australia, Austria, Canada, Finland, France, Germany, the Netherlands, Norway, Scotland and Sweden

⁴³ Austria, France, Germany, the Netherlands, Norway, and Sweden

⁴⁴ Austria, Canada, France, Germany, the Netherlands, Norway and Scotland

⁴⁵ Austria, Canada, France, Germany, Norway and Scotland

⁴⁶ Canada, France, Norway, Scotland and Sweden

⁴⁷ France, Germany, the Netherlands, Norway and Scotland

support organisations or offices which organise surveillance and infection prevention for the respective ministries of health. In these countries, hospitals generally do not receive any support.

With the exception of Norway and Germany, all countries have a system for reporting process or outcome indicators. In Germany, hospitals report the parameters whose recording is mandatory to private institutions which are not allowed to pass hospital-related data to the health authority.

4 Global objective and scope of the Strategy

The global objective of the NOSO Strategy includes the reduction of healthcare-associated infections as well as the prevention of the spread of potentially dangerous pathogens in hospitals and nursing homes, in order to

Global objective

- (1) increase the safety of patients, residents and staff,**
- (2) improve protection of population health,**
- (3) contribute to the prevention and control of antibiotic resistance in Switzerland, and**
- (4) reduce follow-up costs.**

The impact model in figure 3 shows how this global objective with long-term effect is to be achieved:

Impact model

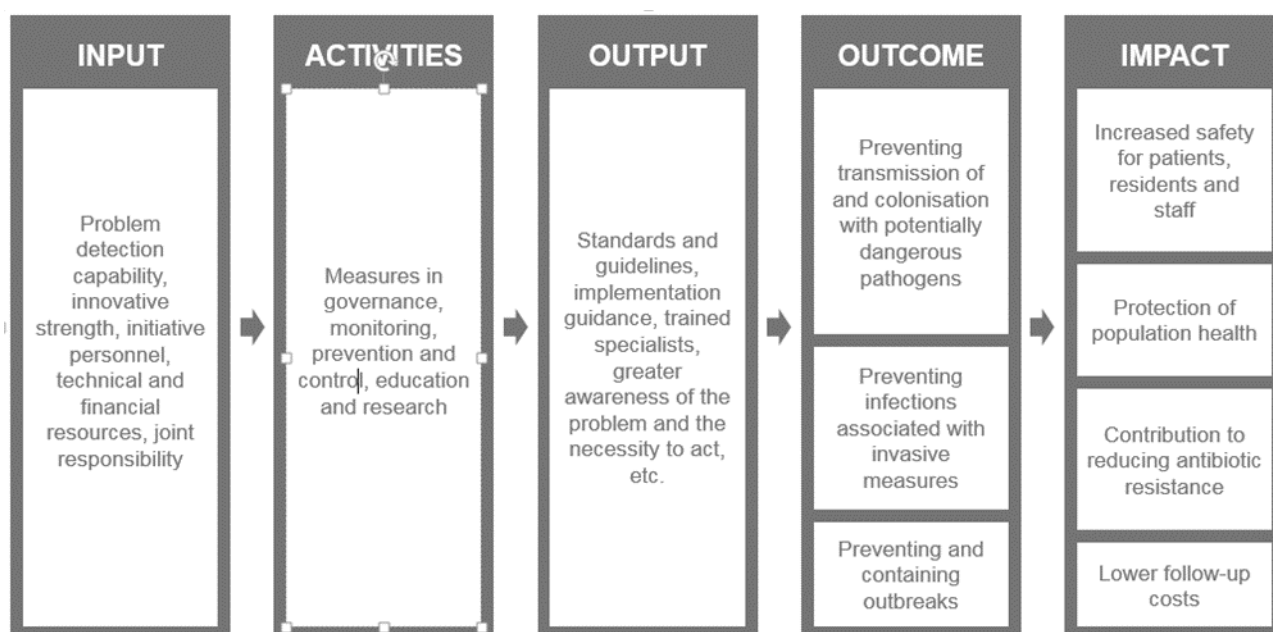


Figure 3: Impact model of national NOSO Strategy

According to the definition introduced earlier (cf. *chapter 1.3*), HAIs are acquired during a stay in a healthcare facility as a result of an examination, treatment or nursing measure, but they can also be simply due to the circumstances of staying in the institution, for example as a result of pathogens in the air or on surfaces.

Healthcare-associated infections

The global objective of *reducing HAIs* is aimed at lowering infection rates by as high a percentage as possible, whereby it is important to set the relative reduction target in reasonable accordance with the current infection rates and conditions of the respective institutions. The decision has been made not to quantify the reduction target by determining *one* maximally tolerable infection rate. The various HAIs vary greatly in terms of occurrence and frequency (cf. *chapter 2.3*). Setting *one* infection rate does not

Reduction means progress

take account of the complexity of the issue; it might give the wrong incentives and hinder any development of measures if healthcare facilities do not make any further efforts once the reduction target is reached.

The global objective is not aimed solely at reducing the occurrence of HAIs but also at reducing or preventing the consequences thereof. In cases where an infection cannot be prevented, it is important to at least reduce the risk of complications – for example by avoiding any development of resistance during antibiotic treatment.

The scope of the NOSO Strategy includes the occurrence of HAIs in patients, residents and visitors of all age groups as well as in staff in connection with inpatient care in Switzerland. The scope includes the transmission of and colonisation with potentially dangerous pathogens as well as HAI outbreaks in hospitals and nursing homes.⁴⁸

The national NOSO Strategy deals exclusively with HAIs that are acquired during inpatient treatment or during long-term nursing and care. This scope is the result of the two-stage approach with which the FOPH aims to monitor, prevent and control HAIs in Switzerland. In an initial step, the global objective and derived strategic objectives and measures apply exclusively to hospitals and nursing homes. In a second step, the strategy deals with services and providers in the outpatient domain, such as general practitioner and dental practices, the Spitex home-care service or day clinics (cf. glossary in *chapter 9.2*). Taking into account the specific circumstances and needs of these stakeholders as well as the framework conditions of outpatient treatment in general is a complex task. While the development of an overall strategy for both care areas would have been possible in principle, the FOPH has deliberately opted for a procedure in stages. This is primarily due to the huge amount of time required by stakeholders in participatory strategy development, which might have involved a delay in the development process, but not least of all because of the differences between outpatient and inpatient care as far as their respective stakeholders are concerned.

Given the increased use of invasive outpatient diagnostics and therapy or interventions in day clinics as well as in outpatient departments of hospitals, the importance of HAIs in outpatient structures is growing. The shift in service provision from the inpatient to the outpatient domain has persisted for years. There is also an interface to the outpatient domain in nursing homes, given the increased use of medical devices and care by doctors in private practice. Nursing homes and, above all, hospitals and birth centres which provide outpatient as well as inpatient services are therefore encouraged to already implement the NOSO Strategy (or parts thereof) across all divisions as best they can.

The scope defined for the first stage of the NOSO Strategy – hospitals and nursing homes – already constitutes a major challenge in terms of implementation. Nursing homes work under different conditions from those of hospitals. There are major differences between the two categories, not only in terms of staff framework conditions but also from financial and structural aspects. In addition, as part of their prevention strategies, long-term care facilities have to face the task of finding a suitable balance between maintaining a comfortable living environment for their residents and providing effective protection against infections. These differences are reviewed with the stakeholders concerned and are taken into account when formulating specific measures as well as in implementation planning.

Scope

Strategy in two stages

Optional implementation in the outpatient domain

Hospitals and nursing homes: differentiated implementation required

⁴⁸ Rehabilitation clinics, psychiatric and other specialist clinics fall under the category of hospitals (cf. glossary in chapter 9.2). The scope of the NOSO Strategy includes, *mutatis mutandis*, all institutions and facilities which, in addition to their primary outpatient care services, also allow inpatient treatment or care, such as birth centres with a department for inpatient postpartum care.

5 Strategy model

In order to prevent the occurrence of HAIs in healthcare facilities, reduce the number of transmissions of and colonisation with potentially dangerous infection pathogens, and in order to detect and contain any impending outbreaks at an early stage, all relevant stakeholders must act in a structured and coordinated manner. The concerted efforts are based on a strategy model that makes the connections between the strategy's global objective, scope and action areas understandable at a glance (*fig. 4*).

Structured and coordinated action



Figure 4: NOSO Strategy model

The global objective of the NOSO Strategy indicates the basic orientation of coordinated health policy action – outcome and impact (cf. impact model in *chapter 4*). The central and substructure of the strategy model can be understood as being in three dimensions:

The *institutional dimension* of the NOSO Strategy includes all healthcare facilities which provide inpatient treatment as well as the Confederation, cantons and insurers, professional societies, national expert panels, associations, education and research institutions and other stakeholders. The coordinated work of all these stakeholders forms the basis for achieving the global objective.

Three dimensions

The three thematic action areas of monitoring, prevention and control as well as education and research constitute the strategy's *content dimension*. The action areas identify the significant intervention levels in HAI reduction. The thrust of the envisaged changes in each case is reflected in the strategic objectives that underlie the individual action areas. Various key measures are designed to help achieve the objectives.

Governance is the strategy's *action-oriented dimension* and is an independent action area. It differs from the three other action areas by virtue of its cross-disciplinary function. Governance can be understood as a series of cross-topic strategic action approaches which, in their entirety, determine the framework of joint efforts to reduce HAIs. All strategic objectives in the governance action area are cross-linked to specific strategic objectives and individual measures in the three thematic action areas.

The NOSO Strategy is thus divided into *four action areas* with the following strategic areas of focus:

Four action areas

1) Governance

Governance

The Federal Council coordinates the procedure of HAI monitoring, prevention and control. Evidence-based standards and guidelines, defined responsibilities, optimised structures and processes, incentives and a functioning knowledge management all contribute towards achieving the global objective. The different stakeholders assume an active role in accomplishing their respective tasks. They support the achievement of objectives by means of their own control instruments, through suitable information and communication measures and by complying with requirements.

2) Monitoring

Monitoring

On the basis of existing structures, ongoing programmes and legal foundations, and by respecting responsibilities at the cantonal and federal levels, the monitoring of HAIs and their pathogens is being developed in Switzerland as needed. To this end, there are plans to record HAIs (outcome data) and pathogens as well as observe significant structural and process parameters (e.g. quality of monitoring or adherence to prevention measures in institutions). Depending on requirement, the collected data are evaluated locally (health institution), regionally (cantons) or nationally (Confederation, ANQ, etc.) and promptly made available to the parties concerned. They are used as a basis for developing and implementing targeted interventions or for evaluating their impact.

3) Prevention and control

Prevention and control

Targeted measures are designed to ensure that the different stakeholders (mainly the Confederation, cantons, hospitals, nursing homes and professional societies) and persons affected (staff, patients, residents and visitors) are aware of the problem, take it seriously and contribute to implementing the NOSO Strategy. Information, practical implementation guidance and evaluations help organisations and individuals review and where necessary adapt their attitude and behaviour regarding infection risks in accordance with the strategy objective.

4) Education and research

Education and research

The institutions in charge of the respective levels of education coordinate the optimisation of educational concepts and offers in the area of infection prevention. In cooperation with university hospitals and other healthcare institutions as well as professional societies and associations, they ensure education and continuing professional development (CPD) of healthcare professionals into specialists in infection prevention. Hospitals and nursing homes support their staff's CPD. Research into

infection risks is promoted, as is research into the possibilities and limitations of improving patient safety.

The strategic objectives are achieved with a catalogue of 14 key measures. Measures differ in terms of the level of relevant stakeholders and their local or national focus. The package can thus include nationally regulative measures, measures with national recommendations and even measures that stakeholders formulate and implement individually. The combination of top-down and bottom-up approaches assists in the achievement of objectives.

14 key measures

6 Action areas, strategic objectives, key measures and responsibilities

6.1 Strategic framework

The four action areas contain a total of 14 key measures that contribute to achieving four strategic objectives and thus the global objective. Several of these key measures have already been introduced and some implemented in Switzerland (albeit not throughout), others are linked to efforts in adjacent health policy areas (such as immunisation or quality strategy). Each measure is based on the implementation principle of taking previous experiences into account, building on what is time-tested, using synergies and bridging gaps. In connection with the strategy framework, *chapter 6.2* presents an overview of the responsibilities and cost bearers in terms of the planned measures.

“Governance” action area (G)

Strategic objective of governance

Nationally uniform standards and guidelines on HAI monitoring, prevention and control for hospitals and nursing homes have been developed and are regularly updated. The stakeholders know their responsibilities and roles and coordinate their activities. Hospitals and nursing homes have structures and processes in place for reducing HAIs. Strategy implementation is supported with suitable tools and positive incentives. Best practice knowledge is shared at regional, national and international levels.

Key measures in governance

- G-1 Develop evidence-based and best practice-oriented standards and guidelines
- G-2 Establish tasks and responsibilities, optimise structures
- G-3 Support implementation with suitable tools and positive incentives
- G-4 Build up and expand knowledge

“Monitoring” action area (M)

Strategic objective of monitoring

A national system for monitoring HAIs and their influencing factors (structures and processes) has been set up and is in operation. HAI data and analyses are promptly available and presented according to needs and target group. Switzerland has a high level of knowledge about the epidemiology of dangerous pathogens which can cause HAIs.

Key measures in monitoring

- M-1 Set up and operate a national monitoring system
- M-2 Evaluate data in a targeted manner, making analyses available promptly according to needs and target group
- M-3 Enhance early detection

“Prevention and control” action area (PC)

Strategic objective of prevention and control

Staff, patients, residents and visitors to hospitals and nursing homes are familiar with the problem of HAIs and their consequences for personal and public health. They understand the measures to be taken and help implement them. Immunisation is promoted in hospitals and nursing homes.

Key measures in prevention and control

- PC-1 Optimise and further develop prevention and control
- PC-2 Promote public awareness and involve those directly affected in infection prevention
- PC-3 Promote learning and dialogue culture in hospitals and nursing homes
- PC-4 Promote preventive vaccination in hospitals and nursing homes

“Education and research” action area (ER)

Strategic objective of education and research

Staff in hospitals and nursing homes are trained in infection prevention according to needs. They have the necessary competence to help reduce HAIs. Research and development are promoted and the use of new technologies is systematically evaluated.

Key measures in education and research

- ER-1 Reinforce the importance of infection prevention in training and continuing professional development
- ER-2 Anchor the issue of HAIs in research promotion
- ER-3 Determine costs, efficacy and safety of new technologies, reinforce quality assurance

Figure 5 provides an overview of the four action areas and the 14 key measures of the NOSO Strategy:

Governance (G)	G-1 Standards and guidelines	G-2 Responsibilities and structures	G-3 Implementation support	G-4 Knowledge management
Monitoring (M)	M-1 National monitoring system	M-2 Targeted data utilisation	M-3 Early detection	
Prevention and control (PC)	PC-1 Optimisation and further development	PC-2 Awareness- raising and involvement	PC-3 Learning and dialogue culture	PC-4 Promotion of preventive vaccination
Education and research (ER)	ER-1 Infection prevention in education	ER-2 Research promotion	ER-3 New techno- logies, quality assurance	

Figure 5: Action areas and key measures of the national NOSO Strategy

6.2 Summary of responsibilities

The following table provides an overview of possible responsibilities with regard to design and implementation of the measures. Details are clarified further with stakeholders and partners in the course of implementation planning. Defined responsibilities may change based on the structuring of the measures.

Action area	Measure/ sub-area	Measure design		Measure implementation Addressee/resource requirement/cost bearer
		Design (*technical responsibility); coordination ⁴⁹	Resource requirement/ cost bearer (design)	
Governance	G-1 Standards and guidelines			
	Minimum number of specialist staff	Swissnoso+*, professional societies, H+, university hospitals; Confederation	Confederation, Swissnoso+	Cantons, hospitals, nursing homes
	Data requirements, methods and standards	Swissnoso+*, ANQ, professional societies, H+, university hospitals; Confederation	Confederation, Swissnoso+	Hospitals, nursing homes
	Recommendations for data processing	Swissnoso+*, ANQ, CURAVIVA/senesuisse, CMPH, H+; Confederation	Confederation, cantons, Swissnoso+	Hospitals, nursing homes
	Competences and learning objectives	Institution in charge of the respective level of education*, cantons, SGI; Confederation	Institution in charge of the respective level of education, cantons	Hospitals, nursing homes
	G-2 Responsibilities and structures			
	Tasks and division of responsibilities	Confederation*, ANQ, CURAVIVA/senesuisse, professional societies, CMPH, H+, Swissnoso+, Patient Safety Switzerland; Confederation	Confederation	ANQ, Confederation, CURAVIVA/senesuisse, CMPH, H+, Swissnoso+, Patient Safety Switzerland
	Optimise structures	Confederation*, ANQ, CURAVIVA/senesuisse, professional societies, cantons, H+, Swissnoso+, Patient Safety Switzerland; Confederation	Confederation	Swissnoso+, hospitals, nursing homes
	Coordination structures for monitoring	Confederation*, ANQ, CURAVIVA/senesuisse, professional societies, CMPH, H+, Swissnoso+, Patient Safety Switzerland; Confederation	Confederation	Swissnoso+, hospitals, nursing homes
	Quality management and infection prevention	H+*, CURAVIVA/senesuisse, Confederation, cantons, Swissnoso+; H+, cantons	H+, cantons	Hospitals, nursing homes

⁴⁹ Legend to the column Design/Coordination: The responsible organisations for the design are in each case in the same color as the corresponding action area of which the lead (technical responsibility) is with the stakeholders marked by *. The coordinating stakeholders are written in black. General rule: Cantons are involved in coordinating measures through the federally led coordinating body EpG (in accordance with art. 54 EpG).

Action area	Measure/ sub-area	Measure design		Measure implementation
		Design (*technical responsibility); coordination	Resource requirement/ cost bearer (design)	Addressee/resource requirement/cost bearer
Governance	G-3 Implementation support			
	Implementation guidance and evaluations	Swissnoso+*, CURAVIVA/senesuisse, professional societies, H+, Patient Safety Switzerland, university hospitals; Confederation, CMPH	Confederation, Swissnoso+	Professional societies, cantons, hospitals, Patient Safety Switzerland, nursing homes
	Support pioneering projects	Patient Safety Switzerland*, H+, Swissnoso+; Confederation (EpG and quality strategy)	Confederation, Patient Safety Switzerland, Swissnoso+	Hospitals, nursing homes
	Improve incentives	Confederation*, CURAVIVA/senesuisse, H+, cantons, Swissnoso+, santésuisse; Confederation, cantons	Confederation, cantons	Cantons, hospitals, nursing homes
	Infection prevention as a criterion for planning, supervision and licensing	Cantons*, Confederation, CMPH, H+, Swissnoso+; cantons	Cantons	Cantons, hospitals, nursing homes
	G-4 Knowledge management			
	Knowledge platform	Swissnoso+*, CURAVIVA/senesuisse professional societies, H+; Confederation	Confederation, Swissnoso+	Professional societies, hospitals, nursing homes
	Knowledge transfer	Swissnoso+*, professional societies; Confederation	Confederation, Swissnoso+	Professional societies, hospitals, nursing homes
	International cooperation	Confederation*; Confederation	Confederation	-
Monitoring	M-1 National monitoring system			
	Strengthen stakeholders	Swissnoso+*, CURAVIVA/senesuisse, cantons, H+; Confederation, CMPH	ANQ, Confederation, cantons, Swissnoso+, hospitals, nursing homes	ANQ, Swissnoso+, hospitals, nursing homes
	High-quality monitoring	Swissnoso+; Confederation* with CMPH	ANQ, Confederation, Swissnoso+	ANQ, Swissnoso+, hospitals, nursing homes
	M-2 Targeted data utilisation			
	Evaluation of data	Swissnoso+*; Confederation	ANQ, Confederation, Swissnoso+	ANQ, Swissnoso+, hospitals, nursing homes
	Internal feedback on adherence	Swissnoso+*; H+	Confederation, Swissnoso+	Hospitals, nursing homes
	Public reporting and Benchmarking	ANQ*, Swissnoso+; Confederation, CMPH	ANQ, Confederation, Swissnoso+, cantons	Will be defined within the framework of the implementation planning

Action area	Measure/ sub-area	Measure design		Measure implementation
		Design (*technical responsibility); coordination	Resource requirement/ cost bearer (design)	Addressee/resource requirement/cost bearer
Monitoring	M-3 Early detection			
	Enhance early detection	Swissnoso+*; Confederation	Confederation, Swissnoso+	Hospitals, nursing homes
	Complete ordinances	Confederation*, Swissnoso+; Confederation	Confederation, Swissnoso+	Hospitals, nursing homes
Prevention and control	PC-1 Optimisation and further development			
	Optimisation and further development	Confederation*, CURAVIVA/senesuisse, CMPH, H+, Swissnoso+, Patient Safety Switzerland; Confederation, CMPH	Confederation, cantons	Hospitals, nursing homes
	PC-2 Awareness-raising and involvement			
	Communication concept	Confederation*, CURAVIVA/senesuisse, CMPH, H+, Swissnoso+, Patient Safety Switzerland; Confederation	Confederation	Hospitals, nursing homes
	Involve persons affected	Confederation*, CURAVIVA/senesuisse, FMH, CMPH, H+, Swissnoso+, Patient Safety Switzerland; Confederation	Confederation, cantons	Hospitals, nursing homes
	Formal commitment	Confederation*, CURAVIVA/senesuisse, CMPH, H+; Confederation, CMPH	Confederation, cantons	Cantons, hospitals, nursing homes
	PC-3 Learning and dialogue culture			
	Learning and dialogue culture	Confederation*, CURAVIVA/senesuisse, CMPH, H+, Swissnoso+; Confederation	Confederation, cantons	Hospitals, nursing homes
	PC-4 Promotion of preventive vaccination			
	Promotion of preventive vaccination	Confederation*, CMPH; Confederation, CMPH	Confederation, cantons	Hospitals, nursing homes

Action area	Measure/ sub-area	Measure design		Measure implementation
		Design (*technical responsibility); coordination	Resource requirement/ cost bearer (design)	Addressee/resource requirement/cost bearer
Education and research	ER-1 Infection prevention in education			
	Basic and continued training of facilitators	Institution in charge of the respective level of education *; Confederation	Institution in charge of the respective level of education, cantons	Cantons, hospitals, nursing homes
	Infection prevention for staff in healthcare institutions	Hospitals*, nursing homes*, cantons; Confederation	Cantons, hospitals, nursing homes	Hospitals, nursing homes
	Institutionalise education in infection prevention	Hospitals*, nursing homes*; Confederation, CMPH, H+	Hospitals, nursing homes	Hospitals, nursing homes
	ER-2 Research promotion			
	Research promotion	Professional societies*; Confederation, CMPH	Swissnoso+; Confederation	Research institutions, university hospitals
	ER-3 New technologies, quality assurance			
	New technologies and quality assurance	Professional societies*; Confederation	Swissnoso+, Confederation	Research institutions, hospitals, nursing homes

6.3 “Governance” action area

Etymologically, “governance” is derived from the ancient Greek κυβερνάω, which means “taking the helm”.

Governance as a collective task

As a transverse module of the national NOSO Strategy, the “governance” action area includes those strategic approaches which the Confederation, together with its implementation partners (cantons, hospitals, nursing homes, professional associations, etc.), wants to tackle first in the individual (thematic) action areas in order to achieve the strategy’s global objective.

The Confederation coordinates the procedure of HAI monitoring, prevention and control. Evidence-based standards and guidelines, defined responsibilities, optimised structures and processes, incentives and a functioning knowledge management all contribute towards achieving the global objective. The different stakeholders assume an active role in accomplishing their respective tasks. They support the achievement of objectives by means of their own control instruments, through suitable information and communication measures and by complying with requirements.

Strategic thrust

In the cross-topic “Governance” action area, the Confederation holds an important role, especially when it comes to improving framework conditions. In this context, the Confederation mainly takes on the role of initiator and coordinator (cf. *chapter 6.2*).

Tasks of the Confederation

Switzerland’s health system is generally regulated cantonally. As regulators, the cantons are responsible for hospital and healthcare planning as well as for issuing and enforcing other regulations (such as adapting conditions for granting operating licences or service contracts). Due to the federalist organisation of the healthcare system, the cantons are also considered the Confederation’s central interfaces in implementing the NOSO Strategy. They make an important contribution wherever proximity to service providers and other target groups or knowledge of regional and local conditions or needs are crucial.

Tasks of cantons

As governance also includes control and regulation in the sense of corporate management, hospitals and nursing homes are also relevant stakeholders in this action area. Their governance task in relation to the NOSO Strategy is mainly to ensure in-house work coordination, risk, quality and knowledge management (including training) as well as promoting a transparent corporate culture aligned to collaborative learning.

Tasks of hospitals and nursing homes

In the “Governance” action area, NOSO Strategy stakeholders have the following strategic objective:

Strategic objective of governance

National uniform standards and guidelines on HAI monitoring, prevention and control for hospitals and nursing homes have been developed and are regularly updated. The stakeholders know their responsibilities and roles and coordinate their activities. Hospitals and nursing homes have structures and processes in place for reducing HAIs. Strategy implementation is supported with suitable tools and positive incentives. Best practice knowledge is shared at regional, national and international levels.

What has already proved itself in Switzerland and abroad and shown to be effective and implementable should serve as a basis for developing existing regulations in Switzerland. Through the work of Swissnoso and individual professional societies, there are already national guidelines on monitoring, prevention and control of HAIs. To bridge existing gaps, further recommendations for nationally uniform, evidence-based or best practice-oriented standards and guidelines are being developed in all action areas within the NOSO Strategy framework. Cantons are invited to align their rules with these recommendations. A certain degree of flexibility, however, is also important for implementation at the local level in order to take account of the specific circumstances. Once adopted, the standards and guidelines must be reviewed and updated regularly.

Standards and guidelines

In addition to the development of standards and guidelines for a correct and targeted approach to HAIs, institutional rules are also required to improve stakeholder interaction in the interests of achieving objectives. Initiative and personal responsibility of these stakeholders have a key role in accomplishing their tasks. Even though resource availability and performance monitoring are important for comprehensive implementation of national requirements, they do not suffice. Only when the Confederation, the cantons, hospitals, nursing homes and their partners actively support an improved safety and quality culture the strategy objectives can be achieved.

Tasks and structures

A fundamental task of a healthcare institution is to ensure patients receive safe treatment. Yet preventive measures are often unattractive, as they are time-consuming or inconvenient to implement or else do not comply with standardised procedures. Nor is it uncommon for a lack of time and resources to force staff to set priorities in their work and make concessions. The same applies to developing solutions for urgent problems and implementing forward-looking projects. Costs and benefits of such projects are often unevenly distributed or the benefit is felt only indirectly and is certainly not quantifiable. In order to increase stakeholders' willingness to implement measures and pioneering investment in infection prevention, suitable implementation guidance and incentives must be provided.

Implementation support

Implementation coordination and knowledge management are key features of governance. In order that measures can be understood by all concerned and implemented uniformly and as intended, that existing knowledge can be disseminated quickly and new expertise can be established in practice, active networking between knowledge holders (centres of competence, expert panels, international organisations, etc.) and users is of great benefit.

Knowledge management

A major contribution to these strategic objectives is expected from the following key measures:

**Key measures
governance**

G-1	Develop evidence-based and best practice-oriented standards and guidelines
G-2	Establish tasks and responsibilities, optimise structures
G-3	Support implementation with suitable tools and positive incentives
G-4	Build up and expand knowledge

Table 1: Key measures in the “Governance” action area

Individual key measures in the “Governance” action area are presented in brief below.

G-1 Standards and guidelines

**Standards and
guidelines**

Develop evidence-based and best practice-oriented standards and guidelines

The extended national Swissnoso+ expert panel is charged by the Confederation with developing recommendations for guidelines and standards for HAI monitoring, prevention and control. These are based on scientific evidence (where available), and attention is paid to their feasibility. For the authorities, they serve as a basis for adopting national uniform recommendations and supplementary regulations at a regional or local level which take account of the particular epidemiological and institutional characteristics and any special considerations.

Recommendations and resulting standards and guidelines are important for practically all areas of HAI reduction, for example in the field of hygiene (behaviour, procedures, hygiene requirements on structural and functional constructions of healthcare institutions, e.g. negative pressure isolation rooms) for determining optimal resourcing of healthcare facilities (reference standard for staffing ratios, see below) in the interest of effective infection prevention, for standardisation of data collection methods in clinical monitoring or in the areas of occupational safety and health protection. Learning objectives and competences in the field of infection prevention, as well as patient care bundles, require a certain degree of harmonisation at the national level.

Where evidence is lacking, inconsistent or of limited external validity, corresponding recommendations are based on best practice. Regardless of the basis underlying standards and guidelines, a central criterion of success is their feasibility in specific local contexts. To allow adaptation to local or regional institutional circumstances and framework conditions, standards and guidelines are formulated wherever possible not only as procedures but also as targets. Behavioural science tells us that many of the desired changes in (corporate) culture in relation to dealing with HAIs cannot be achieved through compulsory procedures.

Important sub-areas of this key measure include:

- Define minimum requirements in terms of specialist staff
- Determine data requirements, methods and standards for monitoring
- Develop recommendations for data processing
- Define task-specific competences and learning objectives

Define minimum requirements in terms of specialist staff

The extended national Swissnoso+ expert panel develops recommendations on determining minimum requirements for personnel resources. One of these recommendations is a nationally valid reference standard for staffing ratios. If incorporated into cantonal service agreements, this could lead to healthcare institutions (depending on size and mandate) employing sufficiently qualified specialist staff in the domain of infection prevention.

Minimum number of specialist staff

Introduction of in-house measures to reduce HAIs is frequently a question of personnel resources. Development of recommendations on minimal staff requirements allows transparent and nationally uniform determination and financing of additionally necessary capacities at healthcare institution level, i.e. the minimum number of specialised staff trained in infectious diseases or hospital hygiene. Determination of requirements in terms of necessary specialist staff is the cantons' responsibility and can be effectively supported by appropriate standards. A prerequisite to determining the requirement is that all processes necessary for effective action against healthcare-associated infections be mapped. On this basis, appropriate requirements are formulated for ensuring expertise (number and qualification of specialist staff, training requirements) and systematic and standardised data collection (IT).

Determine data requirements, methods and standards for monitoring

The data requirements regarding infections (outcome data), structures, processes and ongoing prevention activities are determined in the form of recommendations by Swissnoso+ and defined by the competent instance (Confederation, cantons, healthcare institutions) with the involvement of the EpGcoordinating body EpG. The recommendations take into account the different circumstances of the healthcare institutions; they are periodically reviewed and adapted where necessary.

Data requirements, methods and standards

The choice of data to be collected, collection methods and the amount of observations are important determinants for the quality of the data sets on which the prevention and control measures should be based. It is all the more important to determine the minimum data requirements – as well as collection methods, data formats and other quality parameters – centrally. These standards help prevent redundancies in data entry, as far as possible. Besides nationwide collection of the required minimum data, hospitals and nursing homes should be allowed the possibility of a supplementary local, institution-specific monitoring configuration, depending on each establishment's size, mandate and risk profile.

Swissnoso+ develops recommendations regarding monitoring systems and, in choosing suitable structure and process indicators, information processing and data protection, refers to proven indicators. Data requirements, methods and standards are reviewed regularly and adapted where necessary.

Develop recommendations for data processing

In cooperation with ANQ, Swissnoso+ reviews objectives, requirements and possible weaknesses of the individual applications and develops implementation recommendations for the Confederation, the cantons and healthcare facilities.

Recommendations for data processing

The questions as to the form in which the evaluated data and/or raw data from monitoring are prepared and which target groups should have access to them are the

subject of implementation planning. In principle, use of data within institutions or cantons as well as wider publication (*public reporting*) in a form that is geared to the target group are conceivable.

Define task-specific competences and learning objectives

The institutions in charge of the respective levels of education narrow down the topic of HAIs and make task-specific determinations for future learning objectives and corresponding content.

Competences and learning objectives

One of the aims of this measure is to optimise the transfer between current research findings and knowledge conveyed in educational and healthcare facilities. Institutions receive continuously updated learning materials via the learning platform and apply them directly at the workplace (cf. measure G-4 “Build up and expand knowledge”) and to support curricula (via e-learning).

The learning materials relating to HAIs that were developed for educational and healthcare facilities have been designed according to needs and specific tasks and take into account the different circumstances and challenges of hospitals and nursing homes as well as occupational safety and health protection aspects.

In the course of training, a key role is played by the medical faculties of Swiss universities, universities of applied sciences in healthcare and nursing, institutions of vocational training and nursing departments in hospitals. It is important that the impetus for implementing the measures discussed herein comes through a national authority, e.g. the State Secretariat for Education, Research and Innovation (SERI).⁵⁰

G-2 Responsibilities and structures

Establish tasks and responsibilities, optimise structures

Responsibilities and structures

On the basis of currently applicable responsibilities and stakeholders’ existing competences and experiences, ways are indicated as a result of this measure in which to optimise the current division of responsibilities. Existing structures are used, consolidated and adapted in terms of scope and resourcing to the forthcoming implementation of the NOSO Strategy.

The relevant stakeholders are largely aware of their competences and responsibilities at the policy level (including resource allocation, hospital and nursing home accreditation) and the professional level (expert knowledge, recommendations), but there remain some situations that still need to be clarified and optimised. It is also important, with a view to implementing the NOSO Strategy, to clarify, among others, the future role of Swissnoso, Patient Safety Switzerland, ANQ and university hospitals, professional societies and associations. The competences and skills of these stakeholders must be harnessed. The role of cantonal public health departments (particularly their persons in charge of hospital planning and communicable diseases) must be established with a view to their cooperation with infection prevention experts in healthcare facilities. In a further step, competences

⁵⁰ The Medical Professions Act (MedPA) specifies training objectives for university medical professions, and the Swiss Medical Association (FMH) is responsible for continuing professional development (CPD) and further education. As part of the medical CPD, the Swiss Society for Infectious Diseases (SSI) defines the corresponding examination questions. In vocational training, professional organisations (Organisationen der Arbeitswelt, OdA) determine training content and/or professional qualifications for each level.

and responsibilities must be determined at the level of all institutions (management and cooperation, quality assurance) and specialists as individuals. At the same time, there is a need for suitable instruments to evaluate the implementation of standards and guidelines.

Important sub-areas of this key measure include:

- Clarify duties, optimise division of responsibilities
- Optimise structures
- Secure structures to coordinate monitoring
- Take account of quality management and infection prevention

Clarify duties, optimise division of responsibilities

As a result of this measure, all stakeholders are aware of the tasks lying within their respective purview. Ways are indicated in which to optimise the current division of responsibilities. In particular, the role of organisations, medical professional societies and specialist centres who are active in the HAI field is clarified. Decision-making powers are based on expertise and comply with requirements in terms of discharging the responsibilities associated with the position.

Tasks and division of responsibilities

Optimise structures

The Confederation and cantons entrust the coordinating body EpG with the coordination of the strategy implementation. The coordinating body EpG promotes cooperation of all relevant stakeholders, thereby harnessing their specific competences and experience. The Swissnoso expert panel is being expanded and tasked with providing specialist implementation support. Tasks of the expanded named Swissnoso+ include the development of recommendations, identification of data requirements for monitoring, coordination of knowledge exchange, etc.

Optimise structures

In accordance with Article 54 EpG, the coordinating body ensures that the strategy is being implemented across stakeholders and topics, and coordinated with other federal activities (including StAR, quality strategie, “Koordinierter Sanitätsdienst, KSD”, an organisation for coordinated medical service, etc). It contributes to consolidating existing networks and pooling forces in the area of infection prevention. The coordinating body EpG also promotes uniform enforcement of the strategy and coordinates communication activities.

Meanwhile, the Swissnoso expert panel is being expanded by other specialists from neighbouring subject areas, taking due account of the various institutional contexts (small and medium-sized hospitals, nursing homes, etc.). This results in a kind of “Swissnoso Plus” (Swissnoso+),⁵¹ whose duties will include the following:

- Development of recommendations for evidence-based and best practice-oriented standards and guidelines for monitoring, prevention and control of HAIs (G-1),

⁵¹ In this Strategy report, the name “Swissnoso+” stands for what will one day be the expanded Swissnoso expert panel.

- Identification of data requirements, defining collection methods and standards for monitoring, as well as preparing recommendations on the use of results (G-1),
- Requirement analysis and development of tools, instruments and programmes to support implementation (G-3) and
- Coordination of knowledge transfer and content support for a national knowledge platform (G-4).

Secure structures to coordinate monitoring

Additional capacities are necessary to ensure overall coordination of monitoring in hospitals and nursing homes in Switzerland, for administration and evaluation of certain observations and identification of targeted interventions. These are primarily based on existing organisations and structures.

Coordination structures
for monitoring

Particularly when it comes to the further expansion of monitoring HAIs and their influencing factors, capacities beyond expert knowledge are necessary, such as for ensuring overall coordination of testing in hospitals and nursing homes, for central administration and evaluation of observations and the identification of targeted interventions. Questions as to which existing structures can accommodate these tasks and to what extent they need to be strengthened are clarified in one of the first steps of NOSO implementation planning.

Take account of quality management and infection prevention

Quality management in healthcare facilities is organised in such a way as to meet requirements for successful infection prevention and ensure appropriate measures and implementation thereof.

Quality management
and infection
prevention

There are major differences between quality management (risk management, patient safety) and infection prevention (infectious diseases and hospital hygiene) in terms of definition of tasks and the knowledge required to fulfil those tasks. It is important to consistently take these differences into account when organising work in hospitals and nursing homes. In order to achieve the strategy objective, infection prevention as well as quality management are essential, as is good cooperation between the two areas.

G-3 Implementation support

Support implementation with suitable tools and positive incentives

Implementation
support

With the provision of appropriate implementation guidance for hospitals and nursing homes, the Confederation arouses the interest of institutions in the strategy's concerns and facilitates uniform and resource-efficient implementation. At the same time, the cantons are to periodically evaluate the implementation of measures taken on their territory. By supporting and evaluating implementation, the Confederation and the cantons aim at making safety and quality a norm of institutions' everyday work.

The healthcare system will in future have nationally uniform, evidence-based standards and guidelines that are oriented to best practice in all action areas of the

NOSO Strategy. The aim of reducing HAIs and corresponding guidelines and measures are generally met with a high degree of moral acceptance in hospitals and nursing homes.

A greater awareness among relevant stakeholders of the problem and the necessity to act is an important but generally not a sufficient condition for successful implementation of the measures. In many places, the measures are at times considered too complex or time-consuming. Also, governing bodies of healthcare facilities are sometimes concerned about integrating new content into operational procedures.

Appropriate implementation guidance and promotion of established programmes and participation in those programmes can help hospitals and nursing homes align themselves even better based on evidence, and incorporate best practice-oriented measures into their operations.

At the same time, cantons are to periodically evaluate the implementation of measures taken on their territory. By supporting and evaluating implementation, the Confederation and the cantons aim at making safety and quality a norm of institutions' everyday work.

Important sub-areas of this key measure include:

- Support and evaluate implementation with suitable tools
- Support pioneering projects and programmes in infection prevention
- Improve incentives to implement preventive measures
- Consider HAI reduction measures as a criterion in supervisory, planning and licensing processes

Support and evaluate implementation with suitable tools

Hospitals and nursing homes are supported by suitable management instruments in the implementation of infection prevention and control measures. Additionally, evaluations of specific measures are carried out.

Implementation
guidance and
evaluations

To assist service providers in implementation, they are provided with user-friendly implementation guidance (checklists, care bundles, etc.) and appropriate training opportunities. These instruments help establish appropriate actions and reactions in practice and avoid mistakes wherever possible. Tools are also promoted that increase awareness and attention by calculating the cost savings that hospital or nursing home management can realise through their investment in infection prevention. Other tools help distinguish genuine and effective new developments from pseudo-innovations.

Evaluations that are aligned to specific questions also serve to identify examples of good practice, thus promoting implementation. Such evaluations must be coordinated with periodic reviews of the overall strategy.

Support pioneering projects and programmes in infection prevention

Research and development projects and other projects and (pilot) programmes are considered pioneering if they help reduce HAIs either in an innovative way or by solving an urgent problem. The development of such projects and programmes and the participation of healthcare facilities are supported with appropriate funding instruments (in particular with temporary start-up funding) and incentive mechanisms.

Support pioneering
projects

Pilot programmes, projects for developing practicable implementation guidance and especially (research) projects pointing out possible solutions to an urgent problem behave like public goods. While a greater circle of beneficiaries (often the whole of society) will enjoy the benefits, the costs of development and implementation are primarily borne by the project sponsors. It is important to correct this imbalance and motivate stakeholders to direct their specialist skills and innovative powers into useful projects that will shape the future.

Based on the national quality strategy and the EpG, the Confederation is already financing several such projects and programmes in the field of HAIs. The national quality programmes launched as part of the quality strategy are to be continued and expanded in future.

Healthcare facilities are known to be participating in nationwide ongoing testing programmes (from ANQ, Swissnoso, etc.). Which hospitals and nursing homes are participating in which cantonal and national programmes was determined in connection with the situation analysis in 2014/2015.⁵² The heterogeneity of involvement is due not only to the divergent appraisal of the issue in the individual cantons and healthcare institutions, but also often to the lack of incentives necessary for getting involved.

Hospitals and nursing homes are being motivated to take part in programmes and use more evidence-based and best practice-oriented measures. Active participation is in the interests of all those institutions wishing to assert themselves against the competition: in particular, it contributes to the positive development of their

⁵² Cf. "situation analysis" report, <http://www.bag.admin.ch/noso>, which was prepared during the development of the NOSO Strategy. In chapter 4 ("Existing structures") of the report, the results of the survey in the hospitals and nursing homes (May/June 2014) and in the cantonal public health departments (February 2015) are summarised.

organisational culture and promotes acceptance and implementation of measures among staff, with the corresponding effect on quality of care. Management support, provision of personnel resources and the existence of an in-house learning culture are crucial requirements for participation.

Improve incentives to implement preventive measures

Preventive efforts on the part of the healthcare institutions should be worthwhile. Corresponding incentives should be improved. As a result, infection prevention should continue to gain importance within the range of services provided by institutions.

Improve incentives

Implementation of internal measures and projects to reduce HAIs is basically part of the normal mandate of service providers. For the hospitals, the expenditure is already compensated for by the mechanism of deductability of costs incurred for provision of efficient and high-quality services. It is also important to understand that it is in the interest of acute somatic hospitals which operate on a fee-per-case system to invest in HAI prevention, as this will effectively reduce patients' length of stay.

But hospitals nevertheless have a limited interest in deploying resources for reducing HAIs. There are various reasons for this. Firstly, the positive effect of preventive measures is often delayed and difficult to differentiate from the influence of other measures and factors. Secondly, key figures are often lacking on the economic value added of infection prevention efforts. It is therefore important to clarify whether the necessary expenditures in nursing homes are covered by the relevant cantonal funding regimes. Targeted and appropriate financial structures and reputation-enhancing or competitive incentives⁵³ should be designed to motivate hospitals and nursing homes to implement preventive measures.

Consider HAI reduction measures as a criterion in supervisory, planning and licensing processes

Cantons are encouraged to make increasing use of their room for manoeuvre in assessing the activities of hospitals and nursing homes and making any subsequent licensing decisions. This enables them to promote further competition between institutions in the area of HAI reduction, as well as offering their citizens high-quality healthcare.

Infection prevention as a criterion for supervisory, planning and operating licences

In some cantons (such as Neuchâtel), healthcare facilities wishing to obtain or extend an operating licence have to present their measures and concrete contributions to reducing HAIs. Experience has shown, however, that many cantons do not make full use of their room for manoeuvre, even though it would be conceivable to apply safety criteria in connection with HAI prevention and control not only in the licensing process but also in subsequent service agreements. Practicable and measurable criteria would include the presence of qualified staff and situation-appropriate hygiene equipment or (after implementation of the NOSO Strategy) the institution's participation in public reporting. Linking licences to safety criteria should in any case

⁵³ This measure is explicitly not to be understood as containing such monetary incentives as start-up funding.

be done in such a way as to keep additional administrative expenses within limits for all concerned.

G-4 Knowledge management

Build up and expand knowledge

Knowledge exchange and networking in the field of HAI monitoring, prevention and control is the objective of this measure. Decentralised knowledge is pooled, geared to the respective target group and made publicly accessible.

Important sub-areas of this key measure include:

- Set up a knowledge platform
- Secure knowledge transfer between theory and practice
- Actively push international cooperation

Knowledge management

Set up a knowledge platform

To promote knowledge sharing and networking, a national knowledge platform is being set up and professionally operated. This platform allows relevant target groups and the public low-threshold access to relevant fundamentals of knowledge and action, contributing to stakeholder networking and increasing their motivation to get more involved in HAI control.

Knowledge platform

Thanks to the commitment of Swissnoso and various professional societies, there are already several electronic platforms (websites) in existence. The extent to which these platforms comply with the requirements of the NOSO Strategy and what new needs must be satisfied is being evaluated in an initial step. By consolidating and usefully supplementing existing offers, a comprehensive knowledge platform is to be set up and professionally operated. The platform offers multilingual information customised for specific target groups, including a collection of current guidelines and standards, practical application tools for downloading, links to national and foreign specialist literature, best practice examples as well as interactive elements such as e-learning tools and discussion forums. Publication of the current data on HAIs and relevant additional information (e.g. on measures and quality testing) is also conceivable. The knowledge platform is to be internet-based and publicly accessible. It will be run centrally and updated regularly.

Secure knowledge transfer between theory and practice

To ensure that new scientific findings make their way into practice, they are communicated in a user-friendly way, with the aim of supporting and reinforcing proven structures of knowledge transfer. Experts working in the healthcare institutions and their personal networks have an important role in the transfer of knowledge.

Knowledge transfer

The process of continuous knowledge transfer allows practice-relevant and targeted information about requirements and measures to reach the various users (doctors, nurses, patients, residents, visitors, etc.), with the result that measures are

implemented not only according to their immediate objective but also according to the specific (local) circumstances and framework conditions of the respective institutions. Transfer and sharing of knowledge between users (best practice and feasibility) are also important, as is feedback to the experts with regard to feasibility.

Networking among experts, particularly in knowledge transfer in small institutions and nursing homes, is gaining importance. It makes sense to have regional networks of health professionals under the direction of infection prevention coordinators from a university or cantonal hospital (network centre), who are familiar with the problems of local healthcare facilities, assisting them in an advisory role in the event of outbreaks and ensuring the knowledge transfer.

Actively push international cooperation

It is in Switzerland's interest to participate appropriately in the various programmes and expert networks (monitoring networks) of the European Centre for Disease Prevention and Control (ECDC) and other international organisations (such as WHO), and be able to contribute its expertise in the domain of infection prevention. In international relations, the Confederation thus carries out its job of opening doors to foreign administrative and specialist services, thereby giving an official character to existing informal contacts.

International
cooperation

Cooperation between Switzerland and the European Union in the field of communicable diseases is the subject of bilateral negotiations. The aim is to reach a public health agreement that, among other things, will ensure Switzerland's participation in the ECDC.

Scientific cooperation is being advanced by healthcare facilities. University medicine is already well networked. Based on these relationships, international political networking can also be reinforced.

6.4 “Monitoring” action area

Monitoring

With systematic acquisition and analysis (monitoring) of HAI data, healthcare facilities are aiming to acquaint themselves with the general situation and their own position compared to other healthcare facilities, establish problem areas and the extent of the problems and set priorities. Based on the results, they can deduce and continuously improve appropriate prevention and control measures. In addition, monitoring is an important basis of information that allows epidemiological developments to be identified (e.g. frequency of certain infections after introduction of a prevention or control measure, unusual accumulations or outbreaks).

In order to ensure the quality of prevention and control in inpatient healthcare throughout Switzerland and establish efficient measures, uniform standards are needed for the collection, administration and analysis of comparable data.

As far as data collection is concerned, HAI monitoring includes standardised observation and recording in three areas: *(a) HAI (outcomes)*, *(b) their pathogens*, and *(c) structures and processes* that mainly influence the occurrence or handling of infections and pathogens in a healthcare facility. The recording of structures and processes includes firstly regular quality control of monitoring systems and procedures in hospitals and nursing homes, and secondly adherence on the part of staff, patients, residents and visitors to current standards and guidelines on prevention and control of HAIs.

These three areas – *(a) HAI (outcomes)*, *(b) their pathogens*, and *(c) structures and processes* – differ in terms of stakeholders, collection methods, reporting channels and other aspects.

Data on the most common *HAIs (a)* should in future be collected according to nationally uniform guidelines, as is already the case with surgical site infections. Epidemiological information on the spread of various *pathogens(b)* responsible for *HAIs* can, if necessary, become mandatory as a result of the reporting ordinance under the EpG. In the area of *structures and processes (c)*, it is up to the cantons to collect and review information on the aspect of structures and resources. Data on processes are currently being recorded by the respective healthcare institutions. In addition, it is the task of the hospitals and nursing homes to collect institution-specific data in all three areas.

In the field of *HAIs (a)* surgical site infections are currently recorded throughout Switzerland by ANQ and Swissnoso. For all other HAIs such as catheter-associated bacteraemias (blood poisoning), ventilation-associated pneumonias or catheter-associated urinary tract infections, data are occasionally recorded at hospital level (cf. *chapter 3.2*), but there are no nationally comparable data – there is a need for action here which the NOSO Strategy aims to address. Data on the most common HAIs should in future be collected according to nationally uniform guidelines.

At the level of *pathogens (b)* anresis.ch has been collecting and analysing anonymised antibiotic resistance data from clinical microbiology laboratories since 2004. The collected resistance data cover approx. 60 % of annual days in hospital and more than 30 % of all outpatients. Since June 2014, monthly figures on selected multiresistant microorganisms are also being published in the FOPH Bulletin. In the context of implementing StAR, the introduction of a reporting requirement for selected resistances is being reviewed. Whether the reporting requirement should have any additional role in monitoring HAIs is to be reviewed as part of implementing the NOSO Strategy.

In terms of *structures and processes (c)* routine statistics are currently being collected by the Federal Statistical Office (FSO) according to Article 59a of the Federal Health

Insurance Act (HInsA) and published by the FOPH as quality indicators. Beyond this, it is the responsibility of the cantons to record and verify data. In the selection and recording of structural and process indicators relating to HAIs, there are currently major differences among healthcare institutions (e.g. hygienic hand disinfection, pre-surgical antibiotic prophylaxis or the ratio of infection prevention specialists per number of beds in a hospital). To achieve the NOSO Strategy objective, it must in future be possible to make statements both about the quality of monitoring and prevention systems as well as about target group adherence (staff, patients, residents, visitors) in relation to the measures.

Hospitals and nursing homes are already permitted to collect additional institution-specific data in all three areas.

Data collection and administration are only the first steps. It is just as important to make targeted analyses of the data and provide feedback to those concerned without delay, thereby expediting the continuous improvement process within the institutions. Only in this way will the healthcare system always be able to confront new challenges as a learning and responsive system.

On the basis of existing structures, ongoing programmes and legal foundations, and by respecting responsibilities at the cantonal and federal levels, the monitoring of HAIs and their pathogens is being developed in Switzerland as needed. To this end, there are plans to record HAIs (outcome data) and pathogens as well as observe significant structural and process parameters (e.g. quality of monitoring or adherence to prevention measures in institutions). Depending on requirement, the collected data are evaluated locally (health institution), regionally (cantons) or nationally (Confederation, ANQ, etc.) and promptly made available to the parties concerned. They are used as a basis for developing and implementing targeted interventions or for evaluating their impact.

Strategic thrust

In the “Monitoring” action area, NOSO Strategy stakeholders have the following strategic objective:

Strategic objective of monitoring

A national system for monitoring HAIs and their influencing factors (structures and processes) has been set up and is in operation. HAI data and analyses are promptly available and presented according to needs and target group. Switzerland has a high level of knowledge about the epidemiology of dangerous pathogens which can cause HAIs.

The national quality agreement makes it compulsory for hospitals to record certain surgical site infections.⁵⁴ Besides this, the decision as to which HAIs should be continuously observed and which methods should be used to record them is currently within the competence of the service providers. This makes for great disparity in how monitoring is conducted. There are also major differences in the selection and recording of structural and process indicators that influence the infection process (e.g. hygienic hand disinfection, pre-surgical antibiotic prophylaxis or the ratio of infection prevention specialists per number of beds in a hospital). The expansion and coordination of monitoring at the national level and the simultaneous strengthening of the specialists responsible in hospitals and nursing homes will improve the quality of monitoring, prevention and control of HAIs as well as the ability to compare healthcare institutions in terms of their performance. It is important to verify and get an overview

National monitoring system

⁵⁴ Measurement is performed by SWISSNOSO on behalf of ANQ.

of the data already collected according to their HAI relevance as well as prioritising the data requirement. Here, the expenditure connected with data collection should be taken into account in relation to the objective of reducing infections. Hospitals and nursing homes involved also need some leeway for additional surveys (based on their needs) alongside the (where appropriate) harmonised record of data already collected.

Clarifying which data are evaluated and used, as well as how and by whom, is just as important as establishing an efficient national monitoring system. The chief objective is to increase the motivation of all stakeholders to actively contribute to the monitoring as well as to the resulting prevention and control of HAIs. A primary use is therefore feedback to the staff of hospitals and nursing homes about observed adherence to hygiene requirements. Besides this, however, intra- and inter-institutional comparisons of structural, process and outcome indicators are also possible, for which an entire range of methods and instruments are available, from internal benchmarking to public reporting.

Analysis and provision of data

Analysis and provision of data should be as prompt as possible, i.e. shortly after observation – firstly, for the parties involved to recognise connections between structures, processes and outcome and to become aware of any responsibility they may have, and secondly, for analysis results to indicate the respective current situation.

Reference to a needs-based level of detail indicates that the individual target groups (hospital management, health policymakers, population, etc.) have differing focuses of interest. This should be taken into account in data analysis and data usage.

An accumulation of infections in a healthcare institution over a specific period is the strongest indicator of a looming nosocomial outbreak. If, in such a situation, the parties responsible for monitoring succeed in identifying the transmission paths and possible causes (sources of infection) promptly, specific measures to prevent and contain any further spread of the pathogen (within and outside the affected healthcare facility) can be taken in time and an outbreak prevented. Prerequisites for this include a functioning early detection system at the institutional level and immediate notification of unusual events to a central location.

Early detection

These strategic objectives are to be achieved by way of the following key measures: **Key measures monitoring**

M-1	Set up and operate a national monitoring system
M-2	Evaluate data in a targeted manner, making analyses available promptly according to needs and target group
M-3	Enhance early detection

Table 2: Key measures in the “Monitoring” action area

Individual key measures in the “Monitoring” action area are presented in brief below.

M-1 National monitoring system

Set up and operate a national monitoring system

National monitoring system

On the basis of recommendations and derived standards and guidelines regarding data requirement, methods and procedures, a national monitoring system is being designed. Currently existing monitoring programmes in Switzerland will be expanded and coordinated with each other.

National monitoring should not be understood as a comprehensive system that covers all types of infections and pathogens and fully reflects the diversity of structures and processes of infection prevention. Instead, it involves minimal data sets that can be generated from a larger group of hospitals and nursing homes. This ensures that, according to the situation, these data can be pooled at different levels according to the situation and analysed as needed (institutionally, regionally and nationally).

Important sub-areas of this key measure include:

- Strengthen stakeholders locally and provide appropriate training
- Ensure quality of monitoring

Strengthen stakeholders locally and provide appropriate training

Strengthen stakeholders

Framework conditions (necessary resources, infrastructure, tasks and costs) of monitoring HAIs are presented clearly and comprehensibly for hospitals and nursing homes. The resources needed for effective monitoring are available.

In the healthcare facilities, the persons responsible for monitoring have been determined and responsibilities clearly defined. Those responsible are appropriately trained and are well networked within the healthcare facility. The different circumstances within the healthcare institutions are taken into account in developing training standards. In their work, those responsible do their share of contributing to quality assurance in monitoring HAIs. The availability of sufficient financial and personnel resources for carrying out monitoring is among the most important framework conditions. Those responsible for monitoring are strengthened in their work of recording HAIs and their main influencing factors by being able to turn to Swissnoso+ in the event of any challenges or problematic cases.

Ensure quality of monitoring

The quality of HAI monitoring in hospitals and nursing homes is improved by regular external audits. The results of the audits allow healthcare institutions to make appropriate adjustments and ensure that valid and comparable data are generated.

High-quality monitoring

Depending on the focus, the audit covers the structures and/or processes of monitoring, or monitoring data. In addition to benchmarking, quality control allows identification of quality problems in the institution's in-house monitoring system (e.g. bias in the selection of cases to be included in the database, incomplete or incoherent data), and shows possible ways to improve quality.

M-2 Targeted data utilisation

Evaluate data in a targeted manner, making analyses available promptly according to needs and target group

Targeted data utilisation

Relevant observations are regularly evaluated at institutional, cantonal or federal level according to defined criteria. Data are used as recommended by the specialists responsible (cf. measure G-1).

Systematic analysis of monitoring data and transparent identification of changes are by themselves an incentive for the stakeholders to improve their services and increase motivation to implement the strategy and ultimately also improve its chances of success.

Important sub-areas of this key measure include:

- Evaluate data promptly, according to needs and target group
- Provide feedback on adherence-related observations directly to the staff concerned
- Introduce public reporting and benchmarking

Evaluate data promptly, according to needs and target group

Raw data from monitoring are evaluated and outcome, structural and process indicators are analysed by specialists at local, regional, cantonal and national levels and on the basis of relevant national standards and guidelines. Data protection issues are clarified with the involvement of the hospitals and nursing homes.

Evaluation of data

As a result of the measure, measurement data are promptly processed and evaluated according to needs and target group so that they can be used as a basis for various forms of reporting and for comparison between service providers. Compliance with standards and recommendations allows the specialists responsible for evaluation to ensure that the different circumstances of the institutions or institution categories are taken into account and comparisons are carried out correctly.

Provide feedback on adherence-related observations directly to the staff concerned

Relevant output data – structural and process indicators – are evaluated within the institution and reported back promptly and directly to the respective parties. This promotes co-responsibility among staff and an open problem detection and learning culture within the organisation.

Internal feedback on adherence

When employees recognise the purpose of internal regulations and instructions regarding infection prevention and are basically prepared to adhere to rules such as adequate hand disinfection, this has a significant influence on the efficacy of preventive efforts on the part of the healthcare facility. Providing better information to patients and residents can also lead to better adherence among staff. Systematic monitoring is important, as is feedback about adherence right up to top hierarchy levels to ensure that the directorate identifies any weaknesses and is committed to searching for solutions (cf. measure PC-3).

Introduce public reporting and benchmarking

Based on the recommendations and derived standards and guidelines, selected data and analysis results from national monitoring are made available to selected target groups or the public, depending on content. The aim of the measure is to increase transparency about service provision and intensify qualitative competition.

Public reporting and benchmarking

If the results are transparent, they generate qualitative competition among institutions and initiate improvement processes. With public reporting, however, it is important to ensure that the opposite development, namely *under-reporting* by the institutions, is avoided. Depending on data sovereignty, the healthcare facility, canton or Confederation decides on the form and content of any communication of institution-specific outcome data to the outside; the deciding instance does, however, consult with the other institutions beforehand. The collected data must be comparable and adjusted to accommodate the differences in circumstances of the service providers. The data allow the possibility of *internal benchmarking*, whereby different departments and sites of a hospital or nursing home are compared with each other as well as chronologically, and the results are communicated internally within the institution. As part of an *external benchmarking*, the same institution could (anonymously or openly) measure itself against the strongest “competitors” in its category. In each case, the case-mix of the institutions or departments must be taken into account in any comparison.

When introducing reporting, a step-by-step process is conceivable, with healthcare facilities first receiving their specific feedback and comparative data from other (comparable) institutions. Once a certain level of quality is reached in relation to dealing with HAIs, the data can also be published and, if need be, used for external benchmarking. Data are handled with appropriate care. As far as the Federal Health Insurance Act is concerned, Article 59a HInsA or the corresponding provisions of the Ordinance on Health Insurance are applicable, which basically provide for public reporting and name the bodies responsible. If and when data are published, it is always done in a way that is geared to the specific target group.

M-3 Early detection

Enhance early detection

Enhance early
detection

The NOSO Strategy provides the necessary framework to ensure that any threatening HAI outbreaks are detected early and the spread of pathogens can be contained.

Prerequisites include a functioning early detection system at the institutional level and immediate notification of unusual events to a central location.

Important sub-areas of this key measure include:

- Enhance early detection systems within institutions
- Determine reporting topics and deadlines, and put them on a statutory basis

Enhance early detection systems within institutions

Enhance early
detection systems

Within the framework of the NOSO Strategy, healthcare facilities are supported in their efforts to set up and operate early detection and warning systems. The aim is to harmonise or approximate the capacities and quality levels of early detection among the institutions.

The capacity of hospitals and nursing homes to detect any potential outbreaks in their own institution early is crucial to preventing epidemics. However, unusual events at the start of an outbreak are often concealed and at best make themselves known with only faint signals. That is why healthcare facilities are supported in their efforts to detect outbreak risks early and derive suitable interventions. This includes providing knowledge and electronic tools, best practices, consulting services and funding instruments. Support modalities are developed in the implementation phase, with the involvement of the hospitals and nursing homes. Those offers are nonbinding.

Determine reporting topics and deadlines, and put them on a statutory basis

Complete ordinances

The revised Epidemics Law also includes an update of the Federal Department of Home Affairs (FDHA) ordinance on reporting observations of communicable human diseases. This may determine which observations are to be reported.

Unusual events and pathogen accumulations must already be reported to the canton and the FOPH, but the subject of the reporting requirement is not sufficiently specified or defined. It is important to define clear criteria so hospitals and nursing homes report certain events and accumulations more systematically and consistently than in the past. Highly resistant or multiresistant germs and other potentially dangerous pathogens in particular call for specific reporting requirements (including electronic collection of patient information).

6.5 “Prevention and control” action area

Along with monitoring, prevention and control are the main pillars of a coherent HAI reduction policy. Nationally uniform guidelines and standards as well as systematic and comprehensive observation of infections, pathogens and their accumulations alone are no guarantee for success in the battle against HAIs, however.

Focus on
implementation

So that the various stakeholders can perform their allocated roles in prevention and control, their awareness of the problem and the necessary action must first be strengthened. Institutions then need practical assistance in realising the measures in everyday work with a minimum of expenditure. Participation in ongoing HAI reduction programmes gives further impetus to implementing the measures in their everyday work.

Targeted measures are designed to ensure that the different stakeholders (mainly the Confederation, cantons, hospitals, nursing homes and professional societies) and persons affected (staff, patients, residents and visitors) are aware of the problem, take it seriously and contribute to implementing the NOSO Strategy. Information, practical implementation guidance and evaluations help organisations and individuals review and where necessary adapt their attitude and behaviour regarding infection risks in accordance with the strategy objective.

Strategic
thrust

In the “Prevention and control” action area, NOSO Strategy stakeholders have the following strategic objective:

Strategic objective of
prevention and
control

Staff, patients, residents and visitors to hospitals and nursing homes are familiar with the problem of HAIs and their consequences for personal and public health. They understand the measures to be taken and help implement them. Immunisation is promoted in hospitals and nursing homes.

What is required is comprehensive needs-specific and target group-specific information based on established facts for all relevant target groups about the significance of HAIs and the necessity of the measures to be taken. Besides information, healthcare facilities in particular need an organisational culture that gives higher priority to infection prevention and allows all staff to deal with errors in a transparent and open manner. On this basis, it is possible to enhance the awareness of the problem in the entire population and of the necessity to act among the target groups that are relevant in terms of decision-making and action – hospital and nursing home staff, patients, residents and visitors – with regard to dealing with HAIs.

Awareness of the
problem and the
necessity to act

With the wide range of vaccines that are currently available, every insured person in Switzerland has an effective tool to hand in order to protect themselves and their fellow human beings from infectious diseases. In Swiss hospitals and nursing homes, several cases of measles, chickenpox, rubella, whooping cough and seasonal influenza occur on a daily basis. These infections are usually brought into the institution by staff or visitors and passed on to other people there. As a consequence, serious complications can result, particularly in immunocompromised patients and in cases where there has been vaccination failure or where patients have no immunisation (e.g. infants).

Preventive
vaccination

Immunisation is currently the most effective primary prevention measure and therefore plays an important role in preventing HAIs. The NOSO Strategy is therefore

implemented in close cooperation with current national strategies for diseases that can be avoided by vaccination – such as GRIPS and measles elimination – as well as with the National Vaccination Strategy (NVS).

These strategic objectives are to be achieved by way of the following key measures:

Key measures
prevention and
control

PC-1	Optimise and further develop prevention and control
PC-2	Promote public awareness and involve those directly affected in infection prevention
PC-3	Promote learning and dialogue culture in hospitals and nursing homes
PC-4	Promote preventive vaccination in hospitals and nursing homes

Table 3: Key measures in the “Prevention and control” action area

Individual key measures in the “Prevention and control” action area are presented in brief below.

PC-1 Optimisation and further development

Optimise and further develop prevention and control

Optimisation and
futher development

Healthcare facilities are continuously putting into practice the recommendations and derived national standards and guidelines on prevention and control of HAIs.

The standards and guidelines comprise scientific evidence and best practice and are updated regularly. Adherence thus puts in place the systemic and operational requirements for optimisation and continuous improvement of prevention and control measures within the institutions. In formulating prevention and control measures locally, the local situation (epidemiological and socio-cultural context) and specific circumstances of each institution such as size, range of services, catchment area, etc., are also taken into account.

PC-2 Awareness-raising and involvement

Promote public awareness and involve persons directly affected in infection prevention

Awareness-raising
and involvement

The promoting of awareness and involvement occurs in a suitable form at various levels and addresses decision-makers at institutional, cantonal and national levels as well as patients, residents, visitors and even the general public.

Important sub-areas of this key measure include:

- Develop and implement a communication concept specifically to particular target groups for informing the public
- Involve patients, residents and visitors in infection prevention
- Stakeholders formally declare their commitment

Develop and implement a communication concept specifically to particular target groups for informing the public

With the communication concept for the implementation phase, NOSO is acquiring an important instrument for implementing monitoring, prevention and control measures. Suitable communication measures aim to improve knowledge, heighten public awareness and support behavioural changes.

Communication
concept

The Swiss population's level of knowledge and associated problem awareness with regard to HAIs should improve. The Confederation is therefore developing a communication concept together with the relevant stakeholders for the implementation phase of the NOSO Strategy. The communication which is based on this concept should help raise HAI awareness among all target groups, making them familiar with prevention objectives and measures tailored to needs and addressees, and motivating them to adopt appropriate behaviour. This can strengthen the sense of responsibility and commitment of health professionals to proper implementation of the measures of the NOSO Strategy.

In the course of developing the communication concept, the suitability of a national HAI information and awareness-raising campaign (possibly coordinated with similar activities for the StAR and other strategies) to expand knowledge – particularly of the public – should also be reviewed.

Involve patients, residents and visitors in infection prevention

Through a cultural shift in terms of information and awareness raising, the quality of the exchange of knowledge between healthcare staff and patients, residents and visitors is improved. All healthcare staff undertake to adhere to the HAI prevention requirements.

Involve persons
affected

An exchange is sought between healthcare professionals and patients, residents and visitors regarding the significance of HAIs as well as regarding possible risks involved in treatment and prevention measures. Besides needs-based and addressee-based communication, it is also conceivable that affected persons might be made aware and become involved in prevention through interior design measures or other user-friendly elements, such as mobile hand disinfection stands in busy locations within the hospital. Such qualitative improvements in interaction are aimed at raising awareness among affected persons of the necessity of measures.

Stakeholders formally declare their commitment

Successful implementation of the national NOSO Strategy requires an effort on the part of all stakeholders. The Confederation, cantons and bodies responsible for hospitals and nursing homes therefore declare their joint commitment to HAI reduction. With their commitment, the necessary structures and financial resources for implementing the strategy can be made available.

Formal commitment

The first step is taken by the Confederation: its task is to persuade stakeholders to implement the NOSO Strategy. Stakeholders express their commitment, for example

by integrating national NOSO Strategy issues in cantonal healthcare programmes or in the institutions' mission statements.

PC-3 Learning and dialogue culture

Promote learning and dialogue culture in hospitals and nursing homes

Learning and
dialogue culture

In every healthcare facility, infection prevention becomes an integral part of corporate culture and quality management. The possibility of sanction-free reporting on errors and incidents contributes to the constructive dialogue and thus to the institution's continuing development.

Adverse events and errors in dealing with infection risks are already being registered and documented in most healthcare facilities in Switzerland. Yet there is still often room for improvement. In connection with HAI control, governing bodies of institutions are encouraged to introduce a culture of error management and learning or enhance existing learning systems. The absence of sanctions is crucial in this regard. Reporting must not be linked to the hospital's or home's in-house disciplinary system. It is not individual employees who bear responsibility for the quality and safety of care, but rather the institution as a whole. Parallel to the development of a corporate culture, in-house communication should be made more transparent and a culture of constructive dialogue should be built up. If employees or entire departments can learn from each other, this results in a knowledge gain for the institution.

Furthermore, for sustained improvement in quality and safety, employees are regularly notified, in a user-friendly manner, of current prevention measures and guidelines. Everyone thus achieves the same level of knowledge, which has a positive effect on dealing with infection risks in everyday work.

Prompt feedback of observed adherence to prevention regulations is another element of the internal learning and dialogue culture (cf. measure M-2).

PC-4 Promotion of preventive vaccination

Promote preventive vaccination in hospitals and nursing homes

Promotion of
preventive
vaccination

Healthcare facilities motivate their staff to be vaccinated against preventable infectious diseases and have their vaccination status checked regularly. They also make other persons who are in hospitals or nursing homes either temporarily or in the longer term increasingly aware of the benefits of vaccination.

One possible contribution to vaccination policy efforts is its promotion of vaccination in patients and staff through the development of a system for checking vaccination status and organising in-house vaccination options in hospitals and nursing homes.

6.6 “Education and research” action area

For successful implementation of measures in hospitals and nursing homes, the staff's (healthcare professionals, non-medical staff) perception of the problem and knowledge in their everyday work are crucial. In addition to factual knowledge, competences and abilities are required, as well as an awareness of the issue.

Transmit and apply
knowledge

As far as research is concerned, there are gaps in knowledge as well, in particular regarding causes of infections, transmission paths and efficacy of prevention measures in connection with invasive and non-invasive procedures. Research findings on implementation and behaviour are equally inadequate, and due to the lack of appropriate implementation instruments, established knowledge is only slowly penetrating the everyday work of healthcare institutions. For that reason, the complex research topic of HAIs should be promoted politically and financially in Switzerland as well.

The institutions in charge of the respective levels of education⁵⁵ coordinate the optimisation of educational concepts and offers in the area of infection prevention. In cooperation with university hospitals and other healthcare institutions as well as professional societies and associations, they ensure education and continuing professional development (CPD) of healthcare professionals into specialists in infection prevention. Hospitals and nursing homes support their staff's CPD. Research into infection risks is promoted, as is research into the possibilities and limitations of improving patient safety.

Strategic thrust

In the "Education and research" action area, NOSO Strategy stakeholders have the following strategic objective:

Strategic objective of education and research

Staff in hospitals and nursing homes are trained in infection prevention according to needs. They have the necessary competence to help reduce HAIs. Research and development are promoted and the use of new technologies is systematically evaluated.

The needs-appropriate training and CPD envisaged in the NOSO Strategy includes the following: learning objectives in relation to dealing with HAIs are defined at all levels according to the established needs and for all professions according to the specific task, with learning content being conveyed accordingly. This requires a pool of facilitators, some of whom work in educational institutions, some in the field.

Training and continuing professional development (CPD)

For sustainable acquisition of knowledge in all professional groups (healthcare professionals, non-medical staff), it is therefore essential to improve the status of infection prevention in hospitals and nursing homes and thus enhance the appeal of the corresponding area of study. At the same time, the healthcare facility management must morally support the training and CPD of employees and provide effective assistance with concrete means.

There is no shortage of ideas on how existing gaps in knowledge regarding HAIs might be closed and problems solved. Interest and potential capacity are also present among stakeholders in research and development. For project ideas to be further developed and implemented, however, an effective communication of research and development needs to the involved institutions in promoting research and potential partners in industry is crucial

Research and development

There is a further need for action in connection with the quality assurance of technologies. In order to support suitable innovations and avoid failed investments,

⁵⁵ At the tertiary level A, universities and their governing bodies are responsible for their educational concepts and offers. In vocational training (secondary level II and tertiary level B), the professional organisations (Organisationen der Arbeitswelt, OdA) determine training content. Depending on level (tertiary B, secondary II) and type of training, educational offers in vocational training are prepared by the cantons, OdA, companies or schools.

hospitals and nursing homes, as users, need reliable information on costs, benefits and safety of new or already deployed technologies and products.

These strategic objectives are to be achieved by way of the following key measures:

**Key measures
education and
research**

ER-1	Reinforce the importance of infection prevention in training and continuing professional development
ER-2	Anchor the issue of HAIs in research promotion
ER-3	Determine costs, efficacy and safety of new technologies, reinforce quality assurance

Table 4: Key measures in the “Education and research” action area

Individual key measures in the “Education and research” action area are presented in brief below.

ER-1 Infection prevention in education

**Infection prevention
in education**

Reinforce the importance of infection prevention in training and continuing professional development

Learning objectives in relation to dealing with HAIs are defined at all levels according to the established needs and for all professions according to the specific task, with learning content being conveyed accordingly. Medical and non-medical staff in healthcare institutions have the necessary competence to help reduce HAIs.

Any gaps in knowledge regarding HAIs and infection prevention measures in healthcare facilities can be closed with a well-designed system of training and CPD for all categories of healthcare professions. Application of the acquired knowledge in practice should not, however, remain a question of resources. Only when institution management shows a strong commitment for training employees and practical application of knowledge does education become a worthwhile investment leading to savings in healthcare costs.

Important sub-areas of this key measure include:

- Provide training and continuing professional development for specialists in infection prevention as needed
- Reinforce the importance of infection prevention in continuing professional development of staff in healthcare institutions
- Institutionalise staff training in the area of infection prevention

Provide training and continuing professional development for specialists in infection prevention as needed

Train facilitators

Based on the established need (cf. measure G-1), facilitators are trained as specialists in infection prevention. In their role as facilitators (specialised doctors, nurses or link nurses) they are able to convey in level-appropriate and task-specific communication the learning materials. The appeal of training and CPD for specialists in the area of infection prevention is enhanced through targeted measures.

Specialists are professionals such as doctors (mostly from the area infectiology), federally qualified specialists for infection prevention in healthcare (advanced PET diploma level) or link nurses and line managers. Link nurses and line managers are nurses who work in their specialist field, generally with CPD skills but no specific specialist training in hygiene, and who are in close contact with the infection prevention adviser. Needs-based facilitation means that facilitators can impart training content tailored to the knowledge requirements of the various professional groups (doctors, nurses, physiotherapists, radiology staff, management, food services, cleaning and technical staff, etc.). To this end, the needs and assessments of the hospitals and nursing homes are also assessed and taken into account. Training and CPD of facilitators require additional educational offers. In Switzerland, there is not yet a specialist title for infection prevention within the healthcare system, but it is in the planning stage (cf. *chapter 3.2*). Implementation of this measure is led by the institutions in charge of the respective levels of education. The Swiss Institute for Medical CPD and Further Education (Schweizerisches Institut für ärztliche Weiter- und Fortbildung SIWF) is responsible, for example, for defining curricula in the case of CPD and specialist titles for doctors.

Reinforce the importance of infection prevention in continuing professional development of staff in healthcare institutions

All medical and non-medical professionals in hospitals and nursing homes acquire a needs-appropriate level of knowledge regarding HAI issues and regularly refresh and expand their skills. In the role as facilitators, specialists in infection prevention provide the staff with targeted support within the framework of CPD and directly in the field.

Infection prevention for staff in healthcare institutions

The problem of infection prevention is already an integral part of training and CPD in the healthcare domain, though the different professional groups discuss the subject of infection prevention at different stages of the training and in varying detail. Within the framework of internal CPDs in hospitals and nursing homes as well as informal educational offers (e.g. bedside-teaching, consulting staff directly at their workplace), facilitators are able to offer targeted support and guarantee a needs-based knowledge building.

The implementation of this measure leads to an improvement of the staff's awareness with respect to infection prevention issues. The aim for all staff in hospitals and nursing homes is to attach greater importance to the problem, and increasingly review and implement prevention measures in self-responsibility. This also applies to aspects of occupational safety and health protection with respect to infection prevention.

Establishing a culture in infection prevention also contributes to an increase of the appeal of the subject infection prevention in medical studies and nursing training. In an initial step, the learning objectives of CPD courses are reviewed and updated if necessary. It has to be an aim that course modules are being taught by specialists in infection prevention. This requires both personnel and financial resources of the therefore responsible stakeholders.

Institutionalise staff training in the area of infection prevention

Governing bodies of healthcare facilities are committed to ensuring that their staff make an effort to improve their awareness of the HAI issue. They actively encourage this through specific CPD offers.

Support continuing professional development (CPD)

Every Swiss healthcare facility makes CPD in infection prevention an integral part of the in-house quality management system. Staff and supervisors formulate CPD goals together and review goal achievement. In order that management can actively support staff in acquiring knowledge, the offer of HAI courses is also being specifically developed for hospital and nursing home management. Mixed teaching events (blended learning) are also conceivable for groups made up of different professions. The required training material is developed at a national level and made available to healthcare facilities for internal training purposes.

The aim of the measure is to increase awareness of the importance of infection prevention at management level in healthcare facilities and make its short- and long-term benefits plain for their institutions. Besides the appeal that these additional training offers and derived expertise in matters of quality hold for individual healthcare facilities, the measure encourages competition among healthcare facilities.

ER-2 Research promotion

Anchor the issue of HAIs in research promotion

Research promotion

Research and innovation promotion stakeholders at national and local levels are encouraged to launch an increasing number of solicitations on the subject of HAIs and identify existing gaps in research. Cantons use the opportunity of their service contracts with the universities to influence the future direction of healthcare research.

HAI research (including basic research and research into care) is to be expedited through third-party funds from organisations promoting research and innovation. This is done in the research institutions.

As potential users, representatives from the field (industry, associations, administration, etc.) should in future become more involved in research be brought in as early as the idea-generating stage in order to give rise to ideas for new niche products. These partners bring additional resources to the project and can help with communication and implementation of the results.

ER-3 New technologies, quality assurance

Determine costs, efficacy and safety of new technologies, reinforce quality assurance

Technologies and quality assurance

Decision-making principles are being developed that will allow technology users to assess costs, efficacy and safety of technological innovations even before they are introduced. To this end, evidence-based measurement data are defined and utilised.

To reduce HAIs, new measures and technologies are being suggested constantly (such as catheters with a special anti-bacterial coating). Their cost/efficacy ratio and impact on the safety of patients, residents and staff are often difficult to assess, however. Many institutions do not currently have the necessary resources to find and test effective and profitable innovations. With the help of decision-making principles

developed by experts (e.g. Swissnos+, universities of applied science or universities) and derived recommendations, possibly unnecessary innovations and bad investments can be avoided.

7 Aspects of implementation

7.1 Implementation priorities and stakeholder involvement

Detailed planning of implementation is carried out by the FOPH with the involvement of infection prevention specialists, their organisations and other relevant stakeholders. This ensures that any previously gained experience and knowledge as well as existing structures, measures and programmes for HAI monitoring, prevention and control are incorporated into implementation in the best way possible.

As a result of this participatory process, the implementation plan will present a detailed schedule for realising the individual measures together with period of validity, clearly delegating respective competences and responsibilities (including financing), estimating the direct and indirect financial effects and defining one or several indicators for each measure with which the level of target achievement is periodically checked. The status quo of the existing structures, measures, programmes and other resources was determined in 2014/2015 as an important basis not only for strategy development but also for subsequent implementation planning.⁵⁶

Measures are not realised simultaneously but in a reasonable sequence according to their urgency, importance and in relation to their contribution to achieving the objective. From the Confederation's point of view, the following measures should have priority:

- Perform baseline study (cf. *chapter 7.5*) – starting 2016
- Expand structures (coordinating body EpG, Swissnoso+) and define responsibilities ("Governance" action area) – starting 2016
- Win over decision-makers at cantonal and hospital levels to become prominent proponents for implementing the NOSO Strategy ("Prevention and Control" action area) – starting 2016
- Expand existing surveillance of surgical site infections (Swissnoso/ANQ) in modules to include further HAIs ("Monitoring" action area) – starting 2016 and following years
- Develop national guidelines on HAI prevention and control ("Governance" action area) - starting 2016 and following years
- Provide suitable staff training for surveillance ("Education and research" action area) – starting 2017 and following years
- Promote awareness among patients and visitors ("Prevention and control" action area) – starting 2017 and following years

Surveillance is considered a priority area by the Confederation and should be expanded as soon as possible. The aim is to expand existing surveillance of surgical site infections in modules and provide national surveillance of the most common types of infection. These include the following:

- Catheter-associated bacteraemias (blood poisoning)
- Ventilation-associated pneumonias
- Catheter-associated urinary tract infections

Implementation plan

Important measures
from the
Confederation's point
of view

⁵⁶ Results of the situation analysis can be found at www.bag.admin.ch/de/noso.

7.2 Legal foundations

Control of the Swiss healthcare system is based on the federalist principle. Cantons have extensive competences in the healthcare domain, for example in hospital care, practice of health professionals, health promotion and sanitary tasks. The Confederation, on the other hand, is responsible for regulating a subject area only if granted the corresponding authority by the Federal Constitution. This applies to such areas as the control of communicable diseases, insurance and reproduction and transplantation medicine. The responsibilities of the Confederation and the cantons are closely linked, however.

Preliminary comment

Analysis of the legal foundations in selected cantons (BE, BS, ZH, VD) shows that there is a requirement of authorisation for a hospital or clinic to operate. One condition for obtaining an operating licence is generally that the hospitals and clinics ensure appropriate specialist care for the patients. This includes having the appropriate space and facilities and observing general hygiene standards. The institutions requiring a licence are subject to the sanitary supervision of the cantons, whereby licences can be withdrawn or restrictions imposed. Control and supervisory measures can also be imposed in connection with HAIs or in the event of HAI outbreaks. Specific conditions or requirements can be imposed on hospitals for the prevention and control of HAIs, with the threat of sanctions if these are not adhered to.

Cantonal law

It is the sole responsibility of the cantons to prescribe specific requirements (such as a requirement of authorisation) for the operation of healthcare facilities. The specific requirements differ from one canton to the next; the Confederation cannot set any requirements here either. Some cantons have guidelines which describe the conditions under which hospitals are granted an operating licence (e.g. VS).

In the course of developing the strategy, a survey was conducted in February 2015 among all cantonal public health departments regarding existing and planned activities in the area of HAIs, and questions were also asked about existing cantonal legal foundations, agreements and guidelines.⁵⁷ Eight cantons indicated that they have specific legal foundations for the monitoring, prevention and control of HAIs. Said legal foundations include cantonal health laws (NE, SG, VS, ZG), which govern the control of communicable diseases in general, as well as hospital laws (SZ) and regulations regarding hospital lists (AG, SO) which determine quality requirements. In the canton of Zurich, a Cantonal Council decree obliges listed hospitals in case of acute somatic disorders to carry out HAI surveillance. Fifteen cantons (AG, AR, BE, BS, FR, GR, JU, LU, OW, SG, SO, SZ, VD, VS, ZG) indicated that other agreements are in place with service providers concerning HAI monitoring, prevention and control or that this area is part of the service contracts. Five of these cantons (AR, BE, LU, SO, ZG) stated that service agreements oblige hospitals to participate in ANQ measurements. Fourteen cantons indicated that the service providers (generally listed hospitals) are obliged to monitor HAIs or that there is a reporting duty (going beyond federal requirements). Five of these fourteen cantons (BE, JU, SG, SO, SZ) referred to monitoring surgical site infections as part of ANQ measurements, eight cantons (AG, AR, BS, FR, TI, VD, VS, ZH) referred to HAI monitoring in general, while the canton NE referred to specific monitoring of MRSA. Five cantons (AG, BS, NW, VD, VS) stated cantonal guidelines on the monitoring, prevention and control of HAIs. Two cantons (SG, SH) mentioned guidelines for hospitals.

Analysis of legal foundations and survey results show that the regulations on monitoring, prevention and control of HAIs at cantonal level are not uniform and not

⁵⁷ Results are summarised in the abovementioned "situation analysis" report, available at www.bag.admin.ch/noso.

always specific. The focus is on the mentioned supervisory measures. There is also a lack of binding nationwide limit values, control standards and uniform guidelines for all hospitals.

Article 118 of the Federal Constitution is the central provision in federal health law. It obliges the Confederation to issue health protection regulations in important areas (such as medication, narcotics, chemicals and radiation protection). Article 118 para. 2 let. b Cst. authorises the Confederation to combat communicable, widespread or virulent diseases. The Epidemics Law of 18 December 1970 (EpG; SR 818.101) is based on this competency standard. The revised Law entered into force on 1 January 2016.

Federal law

Article 117 of the Federal Constitution empowers the Confederation to legislate on health and accident insurance. The Federal Health Insurance Act (HInSA) is based on this provision. Compulsory health insurance is the central indemnity system through which the majority of health benefits are paid. Performance and collective bargaining legislation has in effect significant repercussions on services offered and quality of performance.

The new Epidemics Law of 28 September 2012 (EpG; AS 2015 1435), which entered into force on 1 January 2016, provides the following measures in relation to the monitoring, prevention and control of healthcare-associated infections:⁵⁸

- *National programmes:* The FOPH is responsible for developing a national programme on HAIs and resistance in pathogens (with the involvement of the cantons). (cf. Art. 5 para. 1 let. b EpG).
- *Monitoring:* In cooperation with other federal agencies and the competent cantonal bodies, the FOPH operates systems for early detection and monitoring of communicable diseases (cf. Art. 11 EpG). For this purpose, the EpG provides for compulsory reporting of observations regarding communicable diseases (cf. Art. 12 EpG). Epidemiological findings regarding the assessment of the epidemiological situation may be demanded on a compulsory basis from doctors, hospitals or other public or private healthcare institutions. In order to assess the epidemiological situation regarding healthcare-associated infections, individual nosocomial pathogens, for example, may be subject to mandatory reporting. Assessment of the epidemiological situation allows a nationwide estimation of the incidence of healthcare-associated infections, identifying and monitoring critical developments at the local or national level at an early stage, and evaluating the efficacy of preventive measures at local and national levels. It should also be stated here that, besides the Confederation, ANQ is involved in HAI monitoring as well. The ANQ measurement plan and its implementation are regulated for hospitals and clinics in the collective agreements and service contracts of the cantons. This is a contractual ruling that is implemented throughout Switzerland.
- *Prevention:* The FOPH is responsible for communicating information relating to communicable diseases. It is responsible for publishing recommendations on measures against communicable diseases and on how to deal with pathogens (cf. Art. 9 EpG). These recommendations can be addressed to the public, certain groups of persons or to authorities or institutions. One possible area of application is also that of recommendations on HAI prevention in hospitals. The Confederation and cantons are also responsible for measures to control, reduce and eliminate risks of transmitting diseases (cf. Art. 19 EpG). The Epidemics Ordinance of 29 April 2015 (EpV) specifies these measures. In this way, for

⁵⁸ The term *healthcare-associated infections* that is used in the Strategy is synonymous with the term *treatment-associated infections* as used in the EpidA.

example, hospitals, clinics and other healthcare institutions are obliged to decontaminate, disinfect and sterilise their medical devices as a means of preventing Creutzfeldt-Jakob disease (Art. 25 EpV). Chapter 6 of the Medical Devices Ordinance (MedDO) of 17 October 2001 also contains more general rulings on handling medical devices, including their recycling and maintenance. The EpV contains specific provisions on compulsory reporting for healthcare institutions, especially hospitals, homes and medical practices in order to prevent healthcare-associated infections and antibiotic resistances. Institutions must inform both staff and persons working in these institutions as well as persons coming in contact with patients within the institution about prevention of healthcare-associated infections and antibiotic resistances. The above institutions are also obliged to provide suitable prevention and information material on HAIs and antibiotic resistances, and to take the necessary organisational measures to reduce the risk of disease transmission (cf. Art. 29 EpV).

- *Control:* To control healthcare-associated pathogens, the legal foundations stipulated in the EpG for classic epidemic control measures (isolation, medical surveillance, investigation, etc.) can be used. Cantons also ensure disinfection of possibly contaminated objects, premises, etc. (cf. Art. 30 et seq. and Art. 48 EpG).

The Federal Act of 18 March 1994 on Health Insurance (HInsA; SR 832.10) contains the following provisions on quality assurance of services:

- *Authorisation of services:* Services are only remunerated through the compulsory health insurance if they are efficacious, appropriate and cost-effective (Art. 24–31 HInsA, Art. 32 and 33 HInsA).
- *Accreditation of service providers:* Service providers who meet specific requirements in terms of quality and cost-effectiveness are authorised to charge their services to the compulsory health insurance. Cantonal planning of hospitals is an important sub-aspect (Art. 36–40 HInsA). As part of the cantonal service agreements for hospitals, specific minimum quality assurance measures can be prescribed (e.g. compliance with hygiene regulations, establishing a hygiene commission).⁵⁹
- *Monitoring cost-effectiveness and quality of services:* Various legal standards in the HInsA are aimed at ensuring the quality and suitable use (appropriateness) of the services (Art. 56, 58–59, 59a HInsA). Based on Article 58 HInsA, the Federal Council has also commissioned service providers and insurers to develop concepts and programmes relating to requirements in terms of quality of services and promotion of quality, as well as the implementation thereof. Systematic scientific controls are also provided to ensure quality. Such controls contain the requirement for proof of quality provided as well as the data collection and data analysis necessary for it (quality measurements).

Ultimately, the measures described, which are provided by the HInsA to improve the quality of healthcare and patient safety, also serve to prevent and contain HAIs.

At the federal level, however, there are currently no legal foundations for monitoring healthcare facilities or for concrete, binding requirements on hygiene standards regarding HAIs.

⁵⁹ Cf. chapter D of the appendix to the Zurich hospital lists 2012, acute somatic disorders, rehabilitation and psychiatry: General requirements (version 2015.1)

7.3 Resources and financing

Success of the NOSO Strategy presupposes the financing of the suggested measures.

Financing principles

Individual measurements in hospitals are currently running through ANQ and are financed by annual contributions based on the number of discharges from inpatient acute care. This system has proved itself and should be retained.

As part of the *quality strategy*, pilot programmes to improve patient safety were funded by the Confederation. The Confederation intends to expand funding of such projects and programmes in future and fund them through health insurers' premiums for everyone insured under the HlnsA. The Federal Council is expected to define the topics and objectives to be addressed.

In hospitals, the expenditure necessary for efficient service provision in the required quality is covered by the remuneration of services. In the case of nursing homes, on the other hand (which currently have only limited resources to reduce HAIs), the question arises as to additional financing options.

On 29 April 2015, as part of the request to the Federal Council regarding the entry into force of the Epidemics Law, the Federal Council approved five full-time equivalents (FTE) as well as equipment in the sum of CHF 9.1 million annually. CHF 3.3 million of that amount is planned to go towards equipment and 1.25 FTE for implementation of the NOSO Strategy. The Confederation will contribute financially to the following areas according to its responsibilities:

- Set-up and operation of monitoring modules
- Set-up of prevention modules
- Informing stakeholders and the public
- Developing standards/recommendations
- Evaluation of the NOSO Strategy

The FOPH will determine cost implications for the cantons, hospitals and nursing homes as part of the detailed plan of action for implementing the strategy. Costs of implementation planning (design, coordination) will be borne by the Confederation.

The following funding principles (based on the "Health2020" strategy that was approved by the Federal Council at the beginning of 2013) will be applied:

- The financial commitment of private organisations should be increased in the interests of implementing the strategy in as targeted a way as possible. Use of federal and cantonal funds should in no way replace private funding. On the other hand, when it comes to the financial commitment of private organisations, it is important to avoid conflicts of interest and false incentives.
- For funding distribution of the remaining costs of individual measures between the Confederation and the cantons, the existing division of responsibilities between the two levels of government is authoritative. Any shifting of burden between the Confederation and the cantons must be avoided. Due account should ultimately also be taken of the principle of fiscal equivalence (user-pays principle).

Funding modalities should, based on the above principles, be clarified with the cantons and concerned stakeholders during implementation planning.

7.4 Communication

To communicate the strategy's key messages and its implementation vis-à-vis target groups, a second communication concept shall be developed before the implementation phase starts (cf. measure PC-1). This concept will be based on the first FOPH document elaborated for the strategy development phase.

Communication concept

The focus should be on communicative support of the strategy objective. The concept (an important part of which should also include information about communicating the status of implementation) will be developed in collaboration with the main stakeholders of the NOSO Strategy. Pursuant to Article 3 EpG, this will be directed by the FOPH.

7.5 Evaluation

In accordance with Article 81 of the revised Epidemics Law, the Federal Council will periodically review the efficacy, appropriateness and cost-effectiveness of the measures according to the Law. This also applies to the evaluation of the strategy.

Interim report

The point of departure is updated at the start of the implementation phase by collecting current infection rates (baseline study).

Subsequently, measures are evaluated at regular intervals with the participation of specialists; cost trends are also reviewed in that context. Two to four years after the strategy is adopted, an interim report is planned, which will allow any necessary adjustments to be made to the implementation work.

The interim report should answer the following questions in particular:

- Can the objectives be achieved?
- Were the right implementation steps taken?
- Are the instruments and measures effective and efficient?
- What conclusions and recommendations are drawn for any adjustment of the strategy, its objectives and measures?

Eight years after adoption of the strategy, an overall evaluation must be made regarding implementation and efficiency. In their analysis, both the interim report and the overall evaluation take account of the national and international situations. The partners involved in implementing the strategy are informed about the results of all evaluations.

Overall evaluation

Based on the evaluation reports, as defined by the Public Health Action Cycle, it should be reviewed to what degree objectives were reached and what health benefits were achieved. Based on these findings, adjustments must be made to the implementation. The findings could potentially also be incorporated into a follow-up strategy.

Public Health Action Cycle

8 Thanks

The NOSO Strategy was developed in close collaboration with the stakeholders. The Federal Office of Public Health would like to thank the representatives of all institutions and organisations who have participated in the workshops and expert panels in order to develop the strategy. Thanks are also due to everyone who was involved in the advisory groups and whose names are not mentioned here.

3M Schweiz AG

ACSI – Associazione consumatrici e consumatori della Svizzera italiana (Consumer Association of Italian-Speaking Switzerland)

ANQ – Nationaler Verein für Qualitätsentwicklung in Spitälern und Kliniken (National Association for the Development of Quality in Hospitals and Clinics)

ANS – Swiss Association for Nursing Science

BFH – Bern University of Applied Sciences, Health Division

CHUV – Centre hospitalier universitaire vaudois (Lausanne University Hospital)

CMPH – Swiss Conference of the Cantonal Ministers of Public Health

CURAVIVA Switzerland – the association for Swiss nursing homes and institutions

DVSP – Dachverband Schweizerischer Patientenstellen (Swiss Patient Federation)

fibs – (former DIBIS) Fachexperten/-innen Infektionsprävention & Berater/-innen Spitalhygiene (Specialists in Infection Prevention and Hospital Hygiene Counsellors)

FMH – Swiss Medical Association

GZO Wetzikon Hospital

H+ – the Hospitals of Switzerland

HEIG-VD – School of Business and Engineering Vaud

HUG – Hôpitaux Universitaires de Genève (Geneva University Hospitals)

ILS – Institute for Food Safety and Hygiene of the University of Zurich

Nyon Hospital

Patient Safety Switzerland

PIGS – Pediatric Infectious Disease Group of Switzerland

santésuisse – Swiss Health Insurers' Association

SBK–ASI – Schweizer Berufsverband der Pflegefachfrauen und Pflegefachmänner (Swiss Nursing Association)

Senesuisse – Verband wirtschaftlich unabhängiger Alters- und Pflegeeinrichtungen Schweiz (Association of Financially Independent Old Age and Nursing Institutions)

SGAR – Schweizerische Gesellschaft für Anästhesiologie und Reanimation (Swiss Society for Anaesthesiology and Reanimation)

SGC – Schweizerische Gesellschaft für Chirurgie (Swiss Surgical Society)

SGG – Schweizerische Gesellschaft für Gastroenterologie (Swiss Society for Gastroenterology)

SGGG – Schweizerische Gesellschaft für Gynäkologie und Geburtshilfe (Swiss Society of Gynaecology and Obstetrics)

SIG – Schweizerische Gesellschaft für Intensivmedizin (Swiss Society for Intensive Care Medicine)

SGPG – Schweizerische Gesellschaft der Fachärztinnen und -ärzte für Prävention und Gesundheitswesen
(Swiss Society for Physicians Specialising in Prevention and Public Health)

SGSH – Schweizerische Gesellschaft für Spitalhygiene (Swiss Society for Hospital Hygiene)

SIM – Swiss Insurance Medicine

SIPI – Spécialistes Infirmiers en Prévention de l'Infection (Specialist Nurses in Infection Prevention)

SPO – Schweizerische Stiftung SPO Patientenschutz (Swiss Foundation for Patient Protection)

SSI – Swiss Society for Infectious Diseases

SSM – Swiss Society for Microbiology

SSP – Swiss Society of Paediatrics

SVBG – Schweizerischer Verband der Berufsorganisationen im Gesundheitswesen (Swiss Association of Professional Healthcare Organisations)

SVS – Schweizerische Vereinigung der Spitaldirektorinnen und Spitaldirektoren (Swiss Federation of Hospital Directors)

Swissmedic – Swiss Agency for Therapeutic Products

Swissnoso

Triemli Hospital, Zürich

University of Basel – Institute of Nursing Science

USZ – University Hospital Zurich

VKS – Swiss Association of Cantonal Officers of Health

ZHAW – Zurich University of Applied Sciences

9 Appendix

9.1 Abbreviations

ANQ	Nationaler Verein für Qualitätsentwicklung in Spitälern und Kliniken (National Association for the Development of Quality in Hospitals and Clinics)
anresis.ch	Swiss Centre for Antibiotic Resistance
CARO	Ordinance of 3 July 2002 on Costing and Activity Recording by Hospitals, Maternity Units and Nursing Homes under the Health Insurance, SR 832.104
CMPH	Swiss Conference of the Cantonal Ministers of Public Health
CPD	Continuing professional development
Cst.	Federal Constitution
DRG	Diagnosis-related groups
ECDC	European Centre for Disease Prevention and Control
EpG	Federal Act of 28 September 2012 on Combating Communicable Human Diseases (Epidemics Law, EpG; SR 818.101)
EpV	Ordinance of 29 April 2015 on Combating Communicable Human Diseases (Epidemics Ordinance, SR 818.101.1)
EU	European Union
FMH	Swiss Medical Association
FOPH	Federal Office of Public Health
GRIPS	Nationale Strategie zur Prävention der saisonalen Grippe (National Strategy for the Prevention of Seasonal Influenza)
HAI	Healthcare-associated infection
HAI-Net	Healthcare-Associated Infections Surveillance Network
HTA	Health technology assessment
HInsA	Federal Act of 18 March 1994 on Health Insurance, SR 832.10
HInsV	Ordinance of 27 June 1995 on Health Insurance, 832.102
MedDO	Ordinance of 17 October 2001 on Medical Devices, SR 812.213
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
NVS	National Vaccination Strategy
OdA	Organisationen der Arbeitswelt (professional organisations)
SERI	State Secretariat for Education, Research and Innovation
SGSH	Schweizerische Gesellschaft für Spitalhygiene (Swiss Society for Hospital Hygiene)
SR	Classified Compilation of Federal Legislation
SSI	Surgical site infection
StAR	Strategie Antibiotikaresistenzen (Antibiotic Resistance Strategy)
WHO	World Health Organization

9.2 Glossary

Adherence	Willingness of staff, patients, residents and visitors of a healthcare facility to follow current guidelines and instructions. Contrary to passive → <i>compliance</i> , the term “adherence” appeals to individuals’ personal responsibility.
Antibiotics	Naturally or artificially manufactured substances that can kill bacteria or inhibit their growth. Antibiotics are used in human medicine for treating bacterial conditions.
Antibiotic prophylaxis	Use of → <i>antibiotics</i> with the aim of preventing a possible illness in phases or situations where there is an increased risk of infection (particularly before or during an operation).
Antibiotic resistance	Properties of bacteria that allow them to attenuate or completely neutralise the effect of → <i>antibiotics</i> .
Behavioural science	A branch of biology that, inter alia, examines human behaviour. In connection with → <i>healthcare-associated infections</i> , behavioural scientists are particularly interested in the question as to which factors encourage a behavioural change in the desired direction (e.g. more frequent hand disinfection in patient rooms).
Benchmarking	Method allowing services of various healthcare facilities to be compared with each other by analysing processes and functions. The most successful methods and procedures (→ <i>best practices</i>) are the gauge for benchmarking (comparison and reference value). Benchmarking is designed to ensure that healthcare facilities adjust or optimise their processes.
Best practice	Optimal and/or exemplary methods, practices or procedures that have already been proven.
Bottom-up principle	The bottom-up approach used in the present strategy is based on the insight that (1) competences, knowledge and skills exist, and can be retrieved, at all levels of hierarchy, and (2) inclusion of all levels (depending on context: healthcare facilities, employees, etc.) promotes the efficacy of the strategy.
Care bundle	A small package of measures for doctors, nurses and assistants with a limited number of clearly defined activities or work steps which, if followed closely, are designed to bring about the desired improvement in the patient’s health.
Colonisation	The totality of microorganisms living as resident microbes on the inner and outer surface of the human body, normally without causing any symptom of disease. Colonised persons are not considered to be ill but can nonetheless infect other persons in their environment.
Communicable disease	Disease which is communicable to humans through a → <i>pathogen</i> or its toxic products.
Compliance	Following of directives and instructions on the part of employees, patients and visitors in healthcare facilities (cf. → <i>adherence</i>).
Control	All the measures aimed at preventing further spread of a → <i>communicable disease</i> . These include medical monitoring of the (already infected) person or persons concerned, prohibition to carry out an occupation or activity, isolation in a healthcare facility or decontamination.
Dangerous pathogens	Dangerous pathogens are pathogens which, due to their microbiological factors such as their resistance properties, virulence and ability to survive in healthcare facilities, are hard to prevent and difficult or impossible to treat.
Epidemic	Localised temporal clustering of incidences of an infectious disease. From the epidemiological perspective, the term “epidemic” is used if the number of new cases of a disease increases within a specific period.

Evidence	Empirical proof of efficacy of a procedure, treatment, etc.
Exogenous infections	Transmission of a → <i>pathogen</i> to the patient from the environment (as opposed to endogenous infections, which originate in the body itself).
Extrinsic risk	Risk of an infection occurring in connection with, among other things, surgical procedures, catheter placement or administration of → <i>immunosuppressive medication</i> , which impair the functioning of the immune system.
Health2020	The report adopted by the Federal Council in January 2013 sets out the priorities of Swiss health policy up to the year 2020. It contains 36 measures in four health policy action areas which will be implemented in stages. They are directed at achieving a total of 12 objectives and are intended to optimally prepare the Swiss healthcare system for current and future challenges.
Healthcare-associated infections (HAIs)	Infections acquired while staying in a healthcare facility, frequently in connection with a diagnostic, therapeutic or nursing measure. Examples of such measures include invasive surgical procedures, placement of a urinary or intravascular catheter or artificial ventilation. HAIs can also simply be due to the circumstances of staying in the institution, for example as a result of pathogens in the air or on surfaces. The most common types of HAIs are urinary tract infections, followed by respiratory tract infections (pneumonias), surgical site infections and bacteraemias.
Health technology assessment	Process for the systematic scientific evaluation of health-related measures and medical technologies and resources. Efficacy, safety and cost-effectiveness of the health intervention are the primary focus of the assessment. The results serve as a basis for decisions in the healthcare system, for example before investments or medical treatments.
Hospital	(Pursuant to Art. 39 para. 1 HInsA) Institution or department thereof that provides inpatient treatment of acute diseases or performs inpatient medical rehabilitation measures.
Incidence	The number of new cases of a disease or illness in a population group within a specified period (cf. → <i>prevalence</i>).
Immunosuppressive medication	Medicinal products which impair immune system function (e.g. in order to prevent transplant rejection or to reduce symptoms of an autoimmune disease). They lead to a fundamental restriction in defence mechanisms, which increases the risk of infection.
Implementation research	Scientific investigation of influencing factors and methods of incorporating action-relevant and evidence-based knowledge into health policy and health practice.
Infection prevention	In the broader sense and as a teaching or study subject, infection prevention includes → <i>monitoring</i> , → <i>prevention</i> , → and → <i>control</i> of → <i>healthcare-associated infections</i> .
Infectious diseases (the science of)	The science and study of infectious diseases caused in the human body by the penetration and propagation of organisms such as bacteria, viruses, parasites and fungi.
Inpatient treatment	<p>Pursuant to Article 3 CARO, inpatient treatment constitutes stays in hospital or in a maternity unit for the purpose of examination, treatment and care</p> <ol style="list-style-type: none"> of at least 24 hours; of less than 24 hours, where a bed is occupied for one night; in hospital, with transfer to another hospital; in a maternity unit, with transfer to a hospital; in the event of death. <p>All treatments that do not meet these requirements are considered → <i>outpatient treatments</i>. Thus repeated stays in a day clinic or night clinic (that until the HInsA</p>

	revision and associated CARO revision of 22 October 2008 were considered semi-residential care) are now considered outpatient services.
Intrinsic risk	Risk of an infection occurring in connection with patient-specific circumstances such as an immune deficiency or pre-existing primary diseases.
Invasive procedures	Medical diagnostic or therapeutic measures whereby devices or catheters are introduced into the patient's body tissue. Typical invasive procedures include operations and punctures.
Long-term treatment	Pursuant to Article 6 CARO, long-term treatment constitutes stays in hospital or in a nursing home without a treatment, nursing or medical rehabilitation in the hospital being medically indicated.
Monitoring	Continuous process of collection, administration, analysis and communication of data. Nosocomial monitoring includes systematic → <i>surveillance</i> of → <i>healthcare-associated infections</i> and relevant → <i>pathogens</i> as well as systematic observation of processes and structures in the healthcare facility which are intended to contribute to the reduction of infections. Monitoring findings can be used as a basis for developing measures to reduce → <i>healthcare-associated infections</i> . But they can also serve to determine epidemiological developments, particularly for gauging the impact of a measure already taken.
Multiresistant pathogens	Bacteria that are simultaneously resistant to various → <i>antibiotics</i> with different chemical structures and/or different mechanisms of action.
Nosocomial infections	(From the Greek: νόσος "disease" and κομᾶν "to take care of"): Infections that are acquired in a healthcare facility in connection with a medical treatment, nursing measure or other circumstances of the stay (e.g. → <i>pathogens</i> in the air). This strategy uses the term → <i>healthcare-associated infections</i> within the meaning of nosocomial infections.
Nursing home	(Pursuant to Art. 39 para. 3 HInsA) Institution, facility or department thereof which provides nursing and medical care as well as rehabilitation to long-term patients. In contrast to retirement homes (which generally provide only a hotel infrastructure and occasional animation programmes), nursing homes offer additional structures for medical care and nursing.
Outbreak	Occurrence of an infection (coinciding with an inpatient medical procedure) in two or more persons where an epidemiological link is suspected. Situations where identified cases are accumulating in greater-than-expected numbers are also classified as outbreaks.
Outcome indicators	A group of → <i>quality indicators</i> which quantify the results of institution-specific measures for monitoring, prevention and control of → <i>healthcare-associated infections</i> (HAIs). The most important HAI outcome indicator is infection frequency.
Outpatient treatment	Pursuant to Article 5 CARO, all treatments that are not → <i>inpatient treatments</i> are considered outpatient treatments. Repeated stays in day clinics or night clinics are also considered outpatient treatment.
Pathogens	Natural microorganisms (e.g. viruses, bacteria, fungi, protozoa and other parasites), genetically modified organisms or substances (such as prions and toxins) which cause or can worsen a → <i>communicable disease</i> .
Prevalence	The proportion of persons in a population group who have become ill or infected at a given time (cf. → <i>incidence</i>).
Prevention	All the measures involved in reducing and eliminating risks of disease transmission.
Process indicators	A group of → <i>quality indicators</i> , which quantify the work processes of a healthcare institution in relation to → <i>HAIs</i> . Examples of process indicators are the share of properly

	performed hand disinfection procedures in a department or the timely administration of pre-surgical → <i>antibiotic prophylaxis</i> . Determination of process indicators allows information to be obtained which can help optimise processes and ultimately improve results (→ <i>outcome indicators</i>).
Public Health Action Cycle	With its four phases, the Public Health Action Cycle provides a basis for strategic planning. The phases are: (1) recording and analysis of the population's health problems (assessment); (2) development of health policy intervention strategies (policy development); (3) implementation of these strategies in the healthcare system (assurance); and (4) checking acceptance and efficacy (evaluation).
Public reporting	Publication of data on frequency of → <i>healthcare-associated infections</i> in individual or all healthcare facilities as well as on the measures taken.
Quality indicators	Key figures referring to results (→ <i>outcome indicators</i>), processes (→ <i>process indicators</i>) or structures (→ <i>structural indicators</i>) of a healthcare facility in general. The occurrence of → <i>healthcare-associated infections</i> which can be avoided when treatment and other processes are implemented correctly can also be the subject of quality indicators.
Structural indicators	A group of → <i>quality indicators</i> which quantify the organisational structures of a healthcare institution. A structural indicator in the area of → <i>healthcare-associated infections</i> is, for example, the ratio of infection prevention specialists per number of beds in a hospital.
Surveillance	Systematic and continuous observation and recording, analysis and interpretation of data, including data on → <i>communicable diseases</i> (and in this context on → <i>pathogens</i> , transmission paths, illnesses, deaths, etc.), with the stated aim of deriving appropriate conclusions from the observations regarding measures to be taken. Surveillance is part of → <i>monitoring</i> .



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